CDISC biomedical concepts and dataset specializations are currently supported standards. These include an abstract conceptual layer, aligned with NCI terminology, which is linked to a simplified implementation layer of pre-configured SDTM dataset specializations.

Information for additional specializations, such as CDASH data collections, will be added when they become available.

The biomedical concepts and dataset specializations are informative content. They will start to fill gaps such as semantics, variable relationships and value level metadata. Key objectives are to reduce variability in standards implementations, increase metadata-driven automation and reduce barriers to operational implementation.

CDISC biomedical concepts and dataset specializations will be released in incremental packages. The first package was released on October 26, 2022. Subsequent packages have been released and are now available via CDISC Library APIs (see News and Updates).

Please use CDISC Jira for comments and feedback.
The base URL for the API is:

https://library.cdisc.org/api/cosmos/v2

Or, this one for legacy support:

https://library.cdisc.org/api/cosmos/v1

Note that there has not been a target sunset date established yet.

The model and schema describing the CDISC biomedical concepts and SDTM dataset specializations can be found on GitHub.

The following table shows the basic construct of API requests to obtain biomedical concepts:

<table>
<thead>
<tr>
<th>API request template</th>
<th>API v2 Only?</th>
<th>Return Latest Version Only?</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/mdr/bc/packages</td>
<td></td>
<td></td>
<td>Get Biomedical Concept Package List</td>
</tr>
<tr>
<td>/mdr/bc/packages/{package}/biomedicalconcepts</td>
<td></td>
<td></td>
<td>Get Biomedical Concept List in a Package (example)</td>
</tr>
<tr>
<td>/mdr/bc/packages/{package}/biomedicalconcepts/{biomedicalconcept}</td>
<td></td>
<td></td>
<td>Get Biomedical Concept in a Package (example)</td>
</tr>
<tr>
<td>/mdr/bc/biomedicalconcepts</td>
<td>✓</td>
<td>✓</td>
<td>Get Biomedical Concept (example)</td>
</tr>
<tr>
<td>/mdr/bc/biomedicalconcepts?category={category}</td>
<td>✓</td>
<td>✓</td>
<td>Get List of Biomedical Concepts for a Given Category (example)</td>
</tr>
</tbody>
</table>

The following table shows the basic construct of API requests to obtain SDTM dataset specializations:

<table>
<thead>
<tr>
<th>API request template</th>
<th>API v2 Only?</th>
<th>Return Latest Version Only?</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/mdr/specializations/sdtm/packages</td>
<td></td>
<td></td>
<td>Get SDTM Dataset Specialization Package List</td>
</tr>
<tr>
<td>/mdr/specializations/sdtm/packages/{package}/datasetspecializations</td>
<td></td>
<td></td>
<td>Get SDTM Dataset Specialization List in a Package (example)</td>
</tr>
<tr>
<td>/mdr/specializations/sdtm/datasetspecializations</td>
<td></td>
<td></td>
<td>Get SDTM Dataset Specialization in a Package (example)</td>
</tr>
<tr>
<td>/mdr/specializations/sdtm/datasetspecializations/{datasetspecialization}</td>
<td>✓</td>
<td>✓</td>
<td>Get SDTM Dataset Specialization List (example)</td>
</tr>
<tr>
<td>/mdr/specializations/sdtm/datasetspecializations/{datasetspecialization}</td>
<td>✓</td>
<td>✓</td>
<td>Get SDTM Dataset Specialization (example)</td>
</tr>
<tr>
<td>/mdr/specializations/sdtm/domains</td>
<td>✓</td>
<td></td>
<td>Get SDTM Dataset Specialization Domain List (example)</td>
</tr>
<tr>
<td>/mdr/specializations/sdtm/datasetspecializations?domain={domain}</td>
<td>✓</td>
<td>✓</td>
<td>Get a List of SDTM Dataset Specializations for a Given Domain (example)</td>
</tr>
</tbody>
</table>

The following table shows the basic construct of API requests to obtain dataset specializations:

<table>
<thead>
<tr>
<th>API request template</th>
<th>API v2 Only?</th>
<th>Return Latest Version Only?</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/mdr/specializations/datasetspecializations?biomedicalconcept={biomedicalconcept}</td>
<td>✓</td>
<td>✓</td>
<td>Get a List of Dataset Specializations that Specialize a Biomedical Concept (example)</td>
</tr>
</tbody>
</table>

This is a table of supported parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>package</td>
<td>Package Identifier. An ISO 8601 date.</td>
</tr>
<tr>
<td>biomedicalconcept</td>
<td>Biomedical Concept Identifier. A string.</td>
</tr>
<tr>
<td>datasetspecialization</td>
<td>SDTM Dataset Specialization Identifier. A string.</td>
</tr>
<tr>
<td>category</td>
<td>Biomedical Concept Category. A string.</td>
</tr>
</tbody>
</table>
These are the changes in the response payload from /mdr/bc/packages/{package}/biomedicalconcepts/{biomedicalconcept}:

- **Attribute name changes**
  - $.category to $.categories
  - $.synonym to $.synonyms
  - $.resultScale to $.resultScales
- **Data type changes**
  - $.resultScales returns from a scalar to a list
- **New attributes**
  - $.ncitCode
  - $.dataElementConcepts.ncitCode

Some examples are slightly modified to provide a better visual and flow. The examples are reflective of v2 endpoints.

The JSON standard defines an object as "an unordered collection of zero or more name/value pairs". As such, the specific order in which object keys appear may vary in the response payload.

Get the biomedical concept list from the package released on October 26, 2022.

/mdr/bc/packages/2022-10-26/biomedicalconcepts

Lines 3-10: A list of HATEOS links to biomedical concepts matching the package parameter, excerpted to show Systolic Blood Pressure.

Each biomedical concept has 3 elements: href, title, and type.

For an in-depth explanation of HATEOS refer to In-depth: HATEOAS Implementation in CDISC Library API for more information about hypermedia links.

Get the one Systolic Blood Pressure biomedical concept from the package released on October 26, 2022.

/mdr/bc/packages/2022-10-26/biomedicalconcepts/C25298

Lines 17-20: Metadata about the biomedical concept list.
A list of HATEOAS links to related resources, such as self, parent package, and parent biomedical concept. A note on parent biomedical concept: In this example, Blood Pressure is the parent to Systolic Blood Pressure. parentBiomedicalConcept will not be present for topmost biomedical concepts.

Lines 3-7: The latest version of the parent biomedical concept (Blood Pressure).

A list of categories to which this biomedical concept belongs.

A list of external code systems to which this biomedical concept relates.
"dataElementConcepts": [
  {
    "conceptId": "C173522",
    "dataType": "integer",
    "href": "https://ncithesaurus.nci.nih.gov/...&code=C173522",
    "ncitCode": "C173522",
    "shortName": "Vital Signs Result"
  },
  {
    "conceptId": "C49669",
    "dataType": "string",
    "exampleSet": [
      "cmHg",
      "mmHg",
      "Pascal"
    ],
    "href": "https://ncithesaurus.nci.nih.gov/...&code=C49669",
    "ncitCode": "C49669",
    "shortName": "Unit of Pressure"
  },
  ...
],

"conceptId": "C25298",
"definition": "The maximum pressure exerted into the systemic arterial...",
"href": "https://ncithesaurus.nci.nih.gov/...&code=C25298",
"resultScales": [
  "Quantitative"
],
"ncitCode": "C25298",
"shortName": "Systolic Blood Pressure",
"synonyms": ["SYSBP" ]
}

Get a list of all biomedical concepts across packages.

/mdr/bc/biomedicalconcepts
Get the latest version of the Systolic Blood Pressure biomedical concept.

/mdr/bc/biomedicalconcepts/C25298

Lines 3-10: A list of HATEOS links to biomedical concepts, excerpted to show Systolic Blood Pressure. Each biomedical concept has 3 elements: href, title, and type.

For an in-depth explanation of HATEOS refer to In-depth: HATEOAS Implementation in CDISC Library API for more information about hypermedia links.
A list of HATEOAS links to related resources, such as self, parent package that has the latest version of this biomedical concept, and parent biomedical concept. A note on parent biomedical concept: In this example, Blood Pressure is the parent to Systolic Blood Pressure. parentBiomedicalConcept will not be present for topmost biomedical concepts.

A list of categories to which this biomedical concept belongs.

A list of external code systems to which this biomedical concept relates.
"dataElementConcepts": [
  {
    "conceptId": "C173522",
    "dataType": "decimal",
    "href": "https://ncitthesaurus.nci.nih.gov/...&code=C173522",
    "ncitCode": "C173522",
    "shortName": "Vital Signs Result"
  },
  {
    "conceptId": "C49669",
    "dataType": "string",
    "exampleSet": [
      "cmHg",
      "mmHg",
      "Pascal"
    ],
    "href": "https://ncitthesaurus.nci.nih.gov/...&code=C49669",
    "ncitCode": "C49669",
    "shortName": "Unit of Pressure"
  },
  ...
],
Get a list of all the biomedical concept categories.

/mdr/bc/categories

```json
{
  "_links": {
    "self": {
      "href": "/mdr/bc/categories",
      "title": "Biomedical Concept Categories",
      "type": "Biomedical Concept Category List"
    }
  },
  "categories": [
    {
      "name": "Vital Signs",
      "_links": {
        "self": {
          "href": "/mdr/bc/biomedicalconcepts?category=Vital%20Signs",
          "title": "Biomedical Concepts Category (Vital Signs)",
          "type": "Biomedical Concepts Category"
        }
      }
    },
    ...,
    {
      "name": "Biomedical Concept Categories",
      "label": "Biomedical Concept Categories List"
    }
  ]
}
```

Get a list of the latest version of all biomedical concepts in the Vital Signs category.

/mdr/bc/biomedicalconcepts?category=Vital%20Signs

Lines 8-20: A list of HATEOS links to biomedical concept categories, excerpted to show Vital Signs. Each biomedical concept category has 3 elements: href, title, and type. For an in-depth explanation of HATEOS refer to In-depth: HATEOAS Implementation in CDISC Library API for more information about hypermedia links.

Lines 51-61: Metadata about the biomedical concept.

"conceptId": "C25298",
"definition": "The maximum pressure exerted into the systemic arterial...",
"href": "https://ncithesaurus.nci.nih.gov/...&code=C25298",
"resultScales": ["Quantitative"],
"ncitCode": "C25298",
"shortName": "Systolic Blood Pressure",
"synonyms": ["SYSBP"]}
{
    "_links": {
        "biomedicalConcepts": [
            {
                "href": "/mdr/bc/biomedicalconcepts/C25298",
                "title": "Systolic Blood Pressure",
                "type": "Biomedical Concept"
            },
            ...
        ],
        "self": {
            "href": "/mdr/bc/biomedicalconcepts",
            "title": "Biomedical Concepts (latest version)",
            "type": "Biomedical Concept List"
        }
    },

    "name": "Biomedical Concepts (latest version)",
    "category": "Vital Signs",
    "label": "Biomedical Concepts List"
}

Get the SDTM dataset specialization list from the package released on October 26, 2022.
/mdr/specializations/sdtm/packages/2022-10-26/datasetspecializations

{
    "_links": {
        "self": {
            "href": "/mdr/specializations/sdtm/...datasetspecializations",
            "title": "SDTM Dataset Specializations",
            "type": "SDTM Dataset Specialization list"
        },
        "datasetSpecializations": [
            {
                "href": "/mdr/specializations/sdtm/...datasetspecializations/SYSBP",
                "title": "Systolic Blood Pressure",
                "type": "SDTM Dataset Specialization"
            },
            ...
        ]
    }
}

Lines 3-10: A list of HATEOS links to biomedical concepts in the Vital Signs category, excerpted to show Systolic Blood Pressure. Each biomedical concept has 3 elements: href, title, and type.
For an in-depth explanation of HATEOS refer to In-depth: HATEOAS Implementation in CDISC Library API for more information about hypermedia links.

Lines 17-20: Metadata about the biomedical concept category list.

Lines 8-15: A list of SDTM dataset specializations matching the package parameter, excerpted to show Systolic Blood Pressure. Note the specialization type is set to "SDTM Dataset Specialization".
Get the one Systolic Blood Pressure SDTM dataset specialization from the package released on October 26, 2022.

/mdr/specializations/sdtm/packages/2022-10-26/datasetspecializations/SYSBP

```
{
  "_links": {
    "parentBiomedicalConcept": {
      "href": "/mdr/bc/packages/2022-10-26/biomedicalconcepts/C25298",
      "title": "Systolic Blood Pressure",
      "type": "Biomedical Concept"
    },
    "parentPackage": {
      "href": "/mdr/specializations/sdtm/packages/2022-10-26/datasetspecializations",
      "title": "SDTM Dataset Specialization Package Effective 2022-10-26",
      "type": "SDTM Dataset Specialization Package"
    },
    "self": {
      "href": "/mdr/specializations/sdtm/packages/2022-10-26/datasetspecializations/SYSBP",
      "title": "Systolic Blood Pressure",
      "type": "SDTM Dataset Specialization"
    }
  }
}
```
"variables": [  
  
  "name": "VSORRESU",  
  "dataElementConceptId": "C49669",  
  "isNonStandard": false,  
  "mandatoryValue": false,  
  "mandatoryVariable": true,  
  "role": "Qualifier",  
  "relationship": {  
    "linkingPhrase": "is the unit for the value in",  
    "object": "VSORRES",  
    "predicateTerm": "IS_UNIT_FOR",  
    "subject": "VSORRESU"  
  },  
  "codelist": {  
    "conceptId": "C66770",  
    "href": "https://ncitthesaurus.nci.nih.gov/...&code=C66770",  
    "submissionValue": "VSRESU"  
  },  
  "assignedTerm": {  
    "conceptId": "C49670",  
    "value": "mmHG"  
  },  
  "vlmTarget": true  
],
Lines 44-60: VSSTRESN (Line 45) is the next variable on the list. It has an integer as `dataType` with a preconfigured `length` of 3. `relationship` (Lines 53-58) shows how this variable is related to another variable in the format of (subject, predicate, object): VSSTRESN IS_RESULT_OF VSTESTCD.

Lines 63-67: Metadata about the SDTM dataset specialization.

Get a list of all SDTM dataset specializations across packages.

/mdr/specializations/sdtm/datasetspecializations
Get the latest version of the Systolic Blood Pressure SDTM Dataset Specialization.

/mdr/specializations/sdtm/datasetspecializations/SYSBP

Lines 3-10: A list of SDTM dataset specializations, excerpted to show Systolic Blood Pressure.
Each SDTM dataset specialization has 3 elements: href, title, and type. For Refer to In-depth: HATEOAS Implementation in CDISC Library API for more information about hypermedia links.
Lines 2-18: A list of HATEOAS links to related resources, such as self, parent package, and parent biomedical concept. A note on parent biomedical concept: In this example, Systolic Blood Pressure is the parent biomedical concept to this SDTM dataset specialization. parentBiomedicalConcept will not be present if no parent is available at the time of publication.
"variables": [
  ...
  {
    "name": "VSORRESU",
    "dateElementConceptId": "C49669",
    "isNonStandard": false,
    "codelist": {
      "conceptId": "C66770",
      "submissionValue": "VSRESU",
      "href": "https://ncithesaurus.nci.nih.gov/...&code=C66770"
    },
    "assignedTerm": {
      "conceptId": "C49670",
      "value": "mmHg"
    },
    "role": "Qualifier",
    "relationship": {
      "subject": "VSORRESU",
      "linkingPhrase": "is the unit for the value in",
      "predicateTerm": "IS_UNIT_FOR",
      "object": "VSRES"
    },
    "mandatoryVariable": true,
    "mandatoryValue": false,
    "vlmTarget": true
  },

Line 19: Beginning of a variable (or, data element) list that comprise this Systolic Blood Pressure SDTM dataset specialization.

Lines 21-44: VSORRESU (Line 21) is a variable on the list. codelist (Lines 33-37) shows controlled terminology metadata for this variable. relationship (Lines 27-32) shows how this variable is related to another variable in the format of (subject, predicate, object): VSORRESU IS_UNIT_FOR VSRES.
Lines 45-61: VSSTRESN (Line 45) is the next variable on the list. It has an integer as datatype with a preconfigured length of 3. relationship (Lines 53-58) shows how this variable is related to another variable in the format of (subject, predicate, object): VSSTRESN IS_RESULT_OF VTESTCD.

Lines 64-70: Metadata about the SDTM dataset specialization.

Get a list of all the SDTM dataset specialization domains.

/mdr/specializations/sdtm/domains
Get a list of the latest version of all SDTM dataset specializations in the VS domain.

/mdr/specializations/sdtm/datasetspecializations?domain=VS
Get a list of the latest version of all dataset specializations that specialize the Glucose Measurement biomedical concept.

/mdr/specializations/datasetspecializations?biomedicalconcept=C105585
Lines 4-25: A list of SDTM dataset specializations that specialize the Glucose Measurement biomedical concept (C105585).