

OSA Data Submission Specifications Overview

Version 3.01.0

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1 Introduction

Version 3.01.0 of the OSA assessment type is documented in these data submission specifications. It is being provided separately, as this assessment type is not federally required. All users of the specifications are strongly urged to read through this document carefully.

2 Version History

The table below summarizes the published versions of the data submission specifications along with their effective dates.

Table 1: Data Submission Specifications Version History

Data Specs Version	Effective Start Date	Effective End Date
3.01	10/01/2023	none

All changes associated with Version 3.01.0 are identified in the *Item Change Report* and in the *Edit Change Report*.

3 Version Implementation

Each published version of the data specifications is assigned a version number that is formatted as N.NN.NN (e.g., “1.00.1”). The first portion of the version number (e.g., “1.00”) is referred to as the major version number, and the last portion (e.g., “.1”) is referred to as the minor version number. The major version number is incremented whenever there is a substantive change to the data specifications that requires software changes. Minor version numbers are incremented when minor changes or corrections are made to a major version.

When a new major version of the data specs is published, it is assigned a starting effective date. The version that is in effect when the new specs are published is assigned an ending effective date of the day before the new version takes effect. Version 3.01 is the initial version of the OSA data specs. Additional versions of the OSA data specs are not expected; however, if there are additional versions, assessments will be processed as described below.

The target date for a submitted OSA record is equal to A2300 (assessment reference date).

When a submitted record is validated by the IQIES system, its target date is evaluated and is used to load the specifications in effect on the target date. If the submitted record does not conform to those specifications, the appropriate warnings or error messages will be issued and the record may be rejected.

Once a new version of the data specs takes effect, data submission software must typically handle records from the previous version (or versions) and the new version. That software must therefore calculate the target date for each record, determine which version of the specifications applies, and use those specifications to validate the record prior to submission. Failure to do this may result in warnings, fatal errors, or unexpected results.

For example, suppose that a new item is defined and activated in a new version of the data specifications. If that new item is submitted for a record with a target date that precedes the new version of the specs, then that new item will be ignored. It will be ignored because the new item is unknown to the data specs that are in effect and the IQIES system ignores unknown items. If the new item is omitted from a record with a target date that is on or after the effective date of the new specs, then a fatal error will occur and the record will be rejected. This will occur because the IQIES system will apply the new version of the specs and will see that the new item was not submitted when it was required.

Note that the appropriate data specs version is determined regardless of the submission date. It should also be noted that if a record is being modified using Section X, then the version of the data specs is determined using the target date of the modified record, just as if it was a new record.

When submitting a record (new record, modification, or inactivation), the SPEC_VRSN_CD field in the control section must be included. The SPEC_VRSN_CD is an informational item which indicates the

version of the data specs that was used to create the record. The allowable values of SPEC_VRSN_CD correspond to the published major version numbers, and the submitted value should match one of these values. If it does not, a warning will be issued. Note that if the value submitted does not match the version that is in effect based upon the target date of the record, no warning will be issued. Furthermore, the value submitted does not affect or control in any way the version of the data specs that is applied to the submitted record. As explained above, this is controlled solely by the target date of the submitted record.

The IQIES system enforces version control on the set of items that must be submitted for a given item subset (item subsets are discussed in more detail later in this document). This means that if a new MDS item is added to one or more item subsets in a version of the data specs, then that item must be submitted for records with target dates on or after the data specs' effective date. As noted above, failure to do so will result in a fatal error and in record rejection. However, with rare exceptions, edits are not versioned by IQIES. Thus, if a new version of the data specs implements a new or revised edit for an item or items, that edit will be effective for all records containing the item(s), regardless of target date, that are submitted after the new version of IQIES is installed.

To understand this, consider the following two examples:

- In August, a new version of IQIES was released which implements data specifications with a target date of October 1 of that year. This new version of the data specs includes a new consistency edit which tightens the logic between items A and B. Items A and B are unchanged by the new specs version; only the consistency logic has changed. In this case, the new edit will apply to all records that contain items A and B and that are submitted on or after the August installation date. In other words, the edit is effective retroactively.
- In the same version of the data specifications described above, a new item (item C) is added effective October 1. A new edit was also added which describes the logic between existing item A and the new item C. Technically, this edit is also effective on the day in August that IQIES is installed. However, edits only apply to items that are active on a particular record. Since item C will never occur on a record with a target date before October 1, the edit will never “fire” before October 1. Thus, as a practical matter, the new edit that involves item C won't become effective until October 1 when item C becomes active.

On rare occasions, new edits will not be retroactive and will apply only to certain target date ranges. When this occurs, it will be noted in the data specs.

4 Data Specifications Files

Two sets of files are included in the data specifications. The first set consists of reports and documentation that describe the data specifications. The second set is based upon the data dictionary that was used to generate the data specifications. This latter set of files will be useful to software developers. Note that in the file names below, **vn.nn.r** stands for the version and revision number associated with the data specifications. The **vn.nn** portion represents the version number, while **.r** represents the revision number. For example, **1.00.0** would be the initial release of Version 1.00. The first revision would be 1.00.1, the second would be 1.00.2, etc. In addition, the file names for draft versions of the documents will contain the word “draft” after the version number.

4.1 Reports and Documentation

- **MDS 3.0 data specs overview (vn.nn.r).pdf** The current document.
- **Data specs reports (vn.nn.r).pdf** These reports contain detailed data specifications for every item in the data set by section. The “All Sections” PDF contains the complete item set.
- **Unduplicated edits by ID report (vn.nn.r).pdf** This report contains an unduplicated list of all edits (formatting rules, consistency checks, etc.) that apply to the item set. It is sorted by the edit ID number.

- **Item change report (vn.nn.r).pdf** This report lists changes that were made to items or item responses since the previous release of the data specs. This report will not be produced for the initial release of the data specs, but will be included in subsequent releases.
- **Edit change report (vn.nn.r).pdf** This report lists changes that were made to edits since the previous release of the data specs. This report will not be produced for the initial release of the data specs, but will be included in subsequent releases.
- **HTML data specs (vn.nn.r).zip** This zip file contains a set of HTML files that display the same information as is in the detailed data specs document. To use these files, unzip them to an empty folder and use a browser to open the file called INDEX.HTML. This will open a two-panel window. The left-hand panel can be used to navigate a list of the MDS items or of the MDS edits. When an item or edit is selected, the right-hand panel present detailed information about the entity that was selected. Hyperlinks allow easy navigation among items and edits. This provides a convenient alternative to the PDF version of the data specs.

4.2 Data Dictionary Files

- **MDS data dictionary tables (vn.nn.r).mdb** This is the Microsoft Access database that contains all of the MDS data dictionary tables that were used to generate the reports listed above. Additional reports are also available in the database.
- **itm_mstr (vn.nn.r).csv** A comma-separated value file containing data from the itm_mstr table in the data dictionary. This is the master item table that contains one record for each MDS item. This table could be useful for programmers who wish to build their own MDS 3.0 data dictionary.
- **itm_val (vn.nn.r).csv** A comma-separated value file containing data from the itm_val table in the data dictionary. This table contains one record for every response option for each MDS item. This table can also be used in a data dictionary when linked with the item master table described above. It could also be used to generate reports or screens containing the text of each item's response options.

The fields within each of these tables are described in Appendix A of this document.

4.3 Microsoft Access Reports

As noted above, one of the files that is distributed with the data specifications is the Microsoft Access database that contains the MDS 3.0 data dictionary. This database can be used to generate additional reports that are not distributed with the data specifications. The following is a brief description of these reports.

- **Public: data dictionary report.** This report contains a description of each table and field that is part of the data specs data dictionary.
- **Public: data specs report.** This is the same as the data specs report that is part of the distribution package.
- **Public: edit change.** This is the same as the edit change report that is part of the distribution package.
- **Public: item change report.** This is the same as the item change report that is part of the distribution package.
- **Public: item list by item.** This report is a simple list of all MDS items, sorted in logical order.
- **Public: item list by type.** This report is a simple list of all MDS items, sorted by type (code, checklist, number, text, etc.).
- **Public: item subset matrix.** This report lists each MDS item along with the item subsets for which it is active, inactive, or state-optional. It is based upon the ISC information in the itm_mstr table.

- **Public: item-response report.** The report lists each MDS item along with its corresponding response options.
- **Public: undup edits by type.** This is an unduplicated list of edits, sorted by type (none-of-the-above, skip pattern, format, consistency, etc.).

5 Detailed Data Specifications Report

The Detailed Data Specifications Report contains at least one page for every item in the MDS 3.0 item set. Each item begins on a new page. The report is divided into six major sections:

1. Basic information.
2. Item subsets for which the item is active, inactive, and state-optional
3. Allowable responses or values for the item
4. Fatal and warning edits associated with the item.
5. Supplemental information about the item (this section appears only for certain items).
6. Version notes describing changes to the item and the edits that apply to it.

Each of these sections is described below.

5.1 Basic Item Information

The top section presents basic information about the item under the following headings:

- **Item.** The item identifier (e.g., B0100).
- **Description.** A brief description of the item (e.g., “comatose”).
- **Item Group.** There are four groups of items:
 - **Control items.** Control items are supplemental items that are included in the submission file and are used to control processing or for other purposes (e.g., whether the file is a production or test file, the name of the software that was used to produce the submission file, etc.).
 - **Assessment items (abbreviated “asmt” on the report).** Assessment items are items that are part of the complete MDS 3.0 Item Set. This includes:
 - Federal items which are defined by the federal government for inclusion on submitted records. Federal items are in Sections A – R and T – Z of the MDS 3.0.
 - State items which are items defined by the States and approved by CMS for inclusion on records submitted from providers in their State. State items are always included in Section S,
 - **Calculated items (abbreviated “calc” on the report).** These items are calculated by the IQIES system, stored in CMS’s national database, and will be included in fixed-format files that are produced by CMS. **These items are not submitted and are not to be included on the XML submission files.** The structure and use of the fixed-format file layout is described in a later section of this document.
 - **Filler items.** Filler is reserved for future use on fixed-format files containing MDS 3.0 data. **These items are not submitted and are not to be included on the XML submission files.** The structure and use of the fixed-format file layout is described in a later section of this document.
- **LOINC code.** In order to promote the use of electronic health records and standardized nomenclature systems, CMS will support the optional submission of LOINC codes that are

associated with MDS items and with the each of the responses to those items. MDS software that supports electronic health records and standardized transmission protocols, such as HL7 (<http://www.hl7.org>), should benefit from the assignment of LOINC codes to MDS items and responses. At this time, LOINC codes were not assigned, but when they are available relevant LOINC codes will be displayed on this report.

- **Item type.** Items are classified into the following types:
 - **Text.** Items are those that contain text (e.g., A0500C, resident last name).
 - **Code.** Coded items are those with a limited number of response options (e.g., B0100, Comatose, has three valid response options).
 - **Checklist.** Checklist items are a subset of coded items for which each component item in the checklist has response options of 0 (Not checked (No)), or 1 (Checked (Yes)). There are two types of checklists:
 - **None-of-the-Above Checklists** where the component items include a “none of the above” component that is “checked” when all of the other component items are “unchecked”. An example checklist is C0900, memory/recall ability.
 - **Other Checklist** where the final item can be checked in addition to other items being checked. An example of this checklist is X0900 Reason for Modification.
 - **Number.** Numeric items can contain a range of numeric values (e.g., K0200A, height, or K0200B, weight).
 - **Date.** Examples of date items include A0900, birth date, and A2300, assessment reference date.
 - **ICD.** The I8000 ICD items contain diagnosis codes. Beginning with version 1.15.0, the MDS will accept only ICD-10 codes. Records conforming to older versions of the data specifications must contain ICD-9 codes. ICD items must conform to a specific format that is defined in the data specifications.
- **Max length.** This property shows the maximum number of characters or bytes that the submitted item may contain.
- **Fixed format start-end bytes.** This column displays the start and end bytes that will be used to store the item on fixed-format files. The structure and use of the fixed-format file layout is described in a later section of this document.

5.2 Item Subsets

The item subsets section contains two lines: active and inactive. These lines list the ISC codes that apply to the item. For example:

Active: OSA

Inactive: XX

5.3 Item Values

The table in the third section of the page lists the allowable values that may be submitted for the item. For example, three values are listed for item B0100: 0, 1, and - (dash). For each value, the LOINC code and the text associated with the value are listed. As noted above, at this time LOINC codes are unavailable but will be added in a later version of the data specifications. The text associated with each item value is taken directly from the MDS item set, where available. Some values and their associated text are not listed on the item set itself (i.e., “-” and “^”) and will be discussed in more detail in a later section.

Note that when the text for a response option contains directions for a skip pattern, that text is omitted from the item value listed. For example, on the comprehensive assessment, option “0” says

“No→Continue to B0200, Hearing”. In the data specs report, the text after “No” is omitted. The reason for this is that the skip text sometimes changes depending upon the type of assessment and the items included on that assessment.

5.4 Item Edits

The table in the fourth section of the page lists the fatal and warning edits that are associated with the item. This table contains the following four columns:

- **Edit ID.** Each edit was assigned an edit ID code. These codes begin with the number -3501 and increase sequentially in absolute value. The order of the edit IDs is arbitrary. These edit ID codes will be used on the feedback reports that are produced by the IQIES system. This makes it possible to directly relate an error or warning on the feedback reports with a specific edit in the data specifications.

Please note that *in the Detailed Data Specifications Report, edits are listed under every item to which they apply*. Thus, a given skip pattern edit, for example, will be listed under the item that triggers the skip pattern as well as under every item that may be skipped according to the value of the trigger item. The unique edit IDs unambiguously identify these edits that apply to more than one item.

A second report described below (the Unduplicated Edit Report), lists each edit only once and references all of the items to which each edit applies. This system of uniquely and unambiguously identifying edits is intended to assist developers in ensuring that all required edits are incorporated in their software.

- **Edit Type.** As noted above, there are various types of edits which are described below.
 - **Format.** Format edits specify special rules for formatting item values.
 - **Consistency.** Consistency edits define logical constraints among multiple items.
 - **Skip pattern.** Skip patterns are a subset of consistency edits. Skip patterns always involve two or more items. The first item in the group is designated the trigger (or gateway) item. The value of the trigger item determines whether the remaining items are answered by the assessor or are skipped. If an item is skipped, it will be blank (have no value). Items that are blank because they are skipped must be denoted with the “caret” character (^) in the submission file. If an item is not skipped, it will have a value other than the “caret” character. Skip pattern edits are listed for every item involved, including both the trigger item and all dependent items.
 - **None of the above.** These edits specify rules for none of the above checklist items. As noted above, checklist items consist of a group of component items all of which have values of 0 (Not checked (No)), and 1 (Checked (Yes)). Furthermore, the checklist group always includes a “none of the above” item. Checklist items always have three none-of-the-above subparts (designated “a”, “b”, and “c”) associated with them
- **Severity.** The severity column describes the impact of violating the edit. There are two possible values:
 - **Fatal.** Violation of a fatal edit will result in rejection of the submitted XML file. Format, none-of-the-above, and skip pattern edits are always fatal. Most consistency edits are fatal, but some are warnings.
 - **Warning.** Violation of a warning edit will result in a warning message on the user feedback report. However, a warning will not prevent the submitted assessment data from being accepted and stored in the IQIES system.
- **Edit Text.** This column contains the text of the edit. Note: The IQIES system edit text may vary slightly from the data specifications edit text.

5.5 Supplemental Information

The fifth section of the report is a Supplemental Information table. This table appears for only a few items. It contains a list of one or more informative messages that provide background information or additional instructions that are related to the item. These messages are not issued by the IQIES system. This table contains the following columns:

- **Info ID.** This is a unique ID that is assigned to the message. Info IDs begin with the number -9001 and increase sequentially in absolute value. The order of the edit IDs is arbitrary.
- **Type.** The type of message is always “Information” for information messages.
- **Text.** This column contains the text of the message. For example, item A0100C, State provider number, has a supplemental information entry.

5.6 Version Changes

The final section of the report lists any changes that were made to the item or the edit since the previous version of the data specs was released. This section appears only for items where a change was made. This section does not appear in the initial release of the data specifications, but will be included in subsequent releases.

6 Unduplicated Edit Report

As noted in the previous section, the Detailed Data Specifications Report lists all of the edits that are associated with each item in the MDS data set. Because most edits apply to multiple items, there is a great deal of duplication on this report. For this reason, a second report is provided which lists each edit only once. The Unduplicated Edit Report lists each edit as well as the items that it applies to.

For each edit listed, the edit ID, type, and text of the edit are displayed. After this, the items to which the edit applies are listed.

This report should serve as a resource for developers who wish to ensure that their software incorporates all required edits and that each of those edits is applied to the proper set of items.

7 Conventions Used in the Data Specification Reports

Certain conventions were adopted in the data specification reports in order to make them clear and unambiguous. These conventions are described below.

- On the Detailed Data Specifications report, the “Item Values” table lists all allowable values for each item. If a submission file contains any values other than those listed in this table, a fatal error will occur and the file will be rejected. Note that edits may constrain the list of allowable values based upon specific logical conditions (e.g., if Item A has certain values, then only a subset of Item B’s values may be allowed). However, it is never allowable to submit a value that is not listed in the “Item Values” table.
- If the item is a numeric item, then the “Item Values” table will not list every individual value (because enumerating all possible values is not practical). Instead, the first two rows of the “Item Values” table will list the minimum and maximum allowable values. Restrictions on the values between the minimum and maximum values are listed in the edits for the item. Any additional rows will list special values that may be submitted.
- Two special values are reserved for use on certain items:
 - Dashes (-) are used to indicate that an item was not assessed or the information was not available. For example, if a resident is in a facility for only a few days, it may not be possible to complete the entire assessment. In this case, the assessor may indicate for certain items that the item was not assessed. Dashes are allowed on most, but not all, items. When a dash is allowed for an item, it will be listed in the “Item Values” table. A dash must not be submitted for items where the “Item Value” table does not list it as an

allowable value; submitting dashes for such items will result in a fatal error. When a dash is allowed for not assessed, a single dash should be submitted for the item regardless of the item's normal length. Also note that dashes have a somewhat different use for the Therapy End Date items (O0400A6, O0400B6, O0400C6). For ongoing therapy, the end date is filled with 8 dashes. Please refer to the edits for the therapy end dates for more details.

- Carets (^) are used in the submission file to indicate that an item was left blank due to a skip pattern or, for certain text items, that the item was left blank by the assessor. If an item is active for given type of assessment but was skipped because it is in a skip pattern, then the XML tags for the item must be included in the XML file and a single caret must be submitted as the value between the element's tags. Note that carets are allowed for only some items, as indicated by the "Item Values" table. Also note that carets have a somewhat different use for the diagnosis code items (I8000A through I8000J). Like other items, a single caret is used to indicate that a given diagnosis code is entirely blank. For non-blank diagnosis codes, carets are used to indicate blank characters within the code itself. Please refer to the edits for the diagnosis code items for more details.
- Where edits refer to values of an item, those values are always enclosed in brackets. The values contained within brackets should be understood to be character literals even though quotation marks were omitted. Furthermore, when more than one value is listed, they are implicitly connected by a logical "OR". The following summarizes the conventions that are used when specifying values:
 - [1,2,3] means "1" or "2" or "3".
 - [00-15] means "00" through "15" (inclusive).
 - [^] means the caret character, which indicates a blank.
 - "Not equal [^]" refers to any legal value for an item other than the caret character (which indicates a blank).
 - [-] refers to a dash (which indicates that an active item was not assessed or no information was available).
- The relational edits that are included in the data specifications apply only to items that are active for a particular item subset. Items that are not active on a particular item subset should not be submitted and are not edited and not stored in the database even if they are submitted.

For example, consider an edit that says "If Item A = [1], then all active Items B, C, and D must equal [2]". If Item A was equal to [1], then any of the items B, C, and D that were active must equal [2]. However, if any of these three items (e.g., Item B) was inactive, it would not be submitted, would not have a value, and that item (Item B) would not be edited. The edit would therefore not apply to the inactive item but would continue to apply to the remaining active items, if any. Similarly, if Item A was not active, the entire edit would not apply.

8 XML File Structure

As noted above, OSA data will be submitted using the same XML format as MDS 3.0 files. XML files must employ ASCII character encoding.

Only a single assessment may be included in a XML file. This XML file must be compressed into a zip file to be submitted. If a facility wishes to submit data for multiple assessments during an upload session, separate XML files must be created for each assessment. These separate XML files should be zipped together into a single zip submission file which can then be uploaded.

The IQIES system will process only zip files. Any submitted file that is not a zip file will be rejected. All submission files must be 5 MB or less in size. Any submission file exceeding this size limitation will be rejected by the system. If a ZIP file contains multiple XML files, the IQIES system will sort the data within

the ZIP file before processing. This allows proper processing of MDS records when multiple records are submitted for the same resident, as long as those multiple records are included in the same ZIP file. If multiple records for the same resident and target date are being submitted at the same time, these records should therefore be included in the same ZIP file. If they are spread across two or more ZIP files, unexpected timing errors may occur.

The following rules must be followed for naming XML and ZIP submission files:

1. File names for ZIP files cannot exceed 260 characters, including the file extension. A file extension of “.zip” is required.
2. File names for XML files cannot exceed 260 characters, including the file extension. A file extension of “.xml” is recommended, but is not required.

The <ASSESSMENT> beginning tag and the </ASSESSMENT> ending tag are used to enclose the elements for individual items that belong to the assessment. These tags are required. The file must include elements for every item that is active for the type of assessment that is being submitted. In addition, any State-optional items that are required in the facility's State must also be submitted. Any other elements that are included in the submission file will be ignored by the IQIES system and any data contained in those elements will not be stored in CMS's database.

The tag for each item corresponds to the item IDs that are listed in the Detailed Data Specifications Report. For example, the beginning tag for item A0100A is <A0100A> and the ending tag is </A0100A>. The submitted value for each item is included within that item's tags. For example, in Figure 1 the value of A0800 is “1”. The <ASSESSMENT> beginning tag, the </ASSESSMENT> ending tag, and all intervening tags must be upper case. These tags are required

For numeric items, leading and trailing zeroes may be omitted. For items that can contain a decimal value, the decimal point must be included if fractional amounts are included, but may be omitted if an integer value is being submitted. For example, legacy item M0610A was used to report the length of a pressure ulcer in centimeters and included up to one decimal value. If the value being submitted was 1.2 centimeters, then the following alternatives were acceptable:

```
<M0610A>1.2</M0610A>
<M0610A>01.2</M0610A>
```

If the value being submitted was 1.0 centimeters, then the following alternatives were acceptable:

```
<M0610A>1.0</M0610A>
<M0610A>1.</M0610A>
<M0610A>1</M0610A>
<M0610A>01.0</M0610A>
<M0610A>01.</M0610A>
<M0610A>01</M0610A>
```

For items that can contain only an integer value, no decimal point is allowed in the submitted value. For example, item C0500 is used to report the BIMS Summary Score. This is an integer item so will only accept the following integer values:

```
<C0500>0<C0500>
<C0500>1<C0500>
<C0500>2<C0500>
<C0500>3<C0500>
<C0500>4<C0500>
<C0500>5<C0500>
<C0500>6<C0500>
<C0500>7<C0500>
<C0500>9<C0500>
<C0500>00<C0500>
<C0500>01<C0500>
```

```

<C0500>02</C0500>
<C0500>03</C0500>
<C0500>04</C0500>
<C0500>05</C0500>
<C0500>06</C0500>
<C0500>07</C0500>
<C0500>09</C0500>
<C0500>10</C0500>
<C0500>11</C0500>
<C0500>12</C0500>
<C0500>13</C0500>
<C0500>14</C0500>
<C0500>15</C0500>

```

Note that these rules do not apply to the diagnosis code items (I8000A through I8000J) which are not numeric and which have their own specific formatting rules (refer to the specifications for those items for details).

Dates must be submitted in YYYYMMDD format (see item Z0500 in Figure 1 for an example). The exception is a birth date where the day or the month and day may be unknown. If the full birth date is known, it must be submitted as YYYYMMDD like any other date. For example, if the birth date is April 17, 1935, it would be submitted as:

```
<A0900>19350417</A0900>
```

If the year and month were known, but not the day, it would be submitted as:

```
<A0900>193504</A0900>
```

If only the year were known, it would be submitted as:

```
<A0900>1935</A0900>
```

Note that for all items except the diagnosis codes, leading and trailing blanks should be trimmed. In addition, alphabetic text in any item (such as resident name) may be submitted in either upper, lower, or mixed case. The IQIES system will trim leading and trailing blanks on all submitted values except the diagnosis codes (contained in I8000) and will convert alphabetic text except for the software vendor's e-mail address (SFTWR_VNDR_EMAIL_ADR) to upper case without issuing any warnings. These converted values will be used on submission feedback reports and other database reports. Thus, users should be aware that even if a text item (such as resident name) is submitted as a lower case string or with leading or trailing blanks, it will appear trimmed and in upper case in the feedback reports.

If the value of an item in the XML file exceeds the maximum length of the item, the item is not parsed and a fatal error is issued. Some items (such as A0500C, patient last name) can contain special characters, such as apostrophes. A properly formatted XML file may encode these characters using "entity references". For example, the name "O'NEAL" can be encoded using the "'" entity reference which substitutes for the apostrophe. If this entity reference is used, the name would be encoded as "O'NEAL".

IQIES's use of entity references follows existing XML standards. According to these standards, entity references are required for the less-than and ampersand symbols, but are optional for three other special characters (the greater-than, apostrophe, and quotation-mark symbols). Thus, the last name "O'NEAL" may be submitted either as "O'NEAL" or as "O'NEAL". Note that if an entity reference is used, it must be lower case; using upper case or mixed case characters may result in XML parsing errors or unexpected results.

It is possible that such an item, in its raw, XML form before it is parsed, could violate MDS edits. For example, a string such as "O'NEAL" could be longer than the maximum allowed length for an item or might contain characters (such as the ampersand) that are not allowed for the item. Such items **are** accepted, however, because the edits are applied **after** the XML file is parsed. The parsing converts the

XML coding of the special characters to the desired character. In the case of A0500C, “O'NEAL” is parsed to “O’NEAL” before any edits are applied.

Each element may contain either of two attributes: (a) LOINC_ITEM (the LOINC code associated with the item) and (b) LOINC_RESP (the LOINC code associated with the item’s response value). These attributes are optional; both, either, or neither of these attributes may be included with each element. No editing of these attributes will occur at this time. If these attributes are included, they must be syntactically correct (according to XML rules). In no other respect will their presence affect the processing of the XML file. LOINC codes that are included in the submission files will not be checked to insure that they correspond to the LOINC codes that are assigned to the items or values. These LOINC attributes are allowed solely to allow software developers to include them in the submission file if they are needed for other purposes. The LOINC attribute tags (“LOINC_ITEM” and “LOINC_RESP”) should be upper case for consistency. Figure 1 shows examples where both LOINC attributes are included (e.g., C0900A), where one or the other are included (e.g., C0800 or C1000), and where neither are included (A0800).

Figure 1 also illustrates the use of the special characters described above: dashes and carets. Item C1000 contains a dash, indicating that the item was not assessed or the information was not available. Item E0300 contains a “0” which triggers a skip pattern whereby the items E0500A through E0600C are skipped and the assessment continues with E0800. It can be seen in Figure 1 that the skipped items, E0500A through E0600C, contain carets.

9 Item Subset Codes

9.1 Introduction

Table 2 defines the OSA-related MDS 3.0 ISCs.

Table 2: OSA-related Item Subset Codes

Inactivation ISC	Description	Demo-graphic and Admin Items	QM Items	CAA Items	RUG (rehab) Items	RUG (non-rehab) Items	Survey and Certification Items	State-Optional Items	Section X (Modification/Inactivation) Items
OSA	Other State Assessment	x			x	x			
XX	Inactivation	X							x

Table 2 describes nursing home ISCs (which begin with “N”), Table 3 describes the swing bed ISCs (which begin with “S”), and Table 4 describes ISCs which can be nursing home or swing bed, e.g., the IPA. Table 5 represents inactivations¹, which are identical for nursing home and swing bed assessments. The columns in Tables 2, 3, 4, and 5 represent different groups of MDS 3.0 items, such as items used for quality measures (QMs), Care Area Assessment (CAA), etc². Cells marked with “x” in the body of the table indicate the item groups included for each ISC. For example, a nursing home quarterly assessment (NQ) consists of demographic and administrative items, QM items, both types of RUG items, items needed for survey and certification purposes, and Section X items. It also allows for federally defined comprehensive items States may choose to include.

It can be seen that the items that are included on a particular type of record is driven by the item groups that are associated with the ISC. The following two sections describe how one determines the ISC that is associated with an MDS 3.0 record and how one then determines which items are associated with that ISC.

¹For a description of inactivation procedures, please refer to Chapter 5 of the RAI manual.

² Note that there is considerable overlap among the items that are included in each of the item groups listed (i.e., the item groups are not mutually exclusive)

9.2 Determining the ISC for an MDS 3.0 Record

The OSA ISC is identified by the value of item A0300A. **If the value of A0300A in the XML file is equal to 1, then the assessment will be processed as an OSA. If A0300A is NOT included in the XML file, or if A0300A is equal to 0, then the ISC for the assessment will be determined using the A0200 and A0310 items, as described in the Overview document for the MDS 3.0 Data Specifications.**

9.3 Determining the MDS 3.0 Items Associated with an ISC

Once the ISC is ascertained, the items that are active, inactive, and state optional for the MDS record can be determined. The Access database includes a table called itm_mstr that contains the necessary information. The contents of this table are supplied with the data specs in a comma separated value file called itm_mstr.csv.

This table contains one record for each MDS submission item, and the columns correspond to the various ISCs. Each item/ISC combination in this table can have one of three values:

- x = the item is active on the ISC
- blank = the item is inactive on the ISC

Items that are active must be included in the XML submission file. Items that are inactive should be omitted from the XML file; if they are included they will be ignored by the IQIES system. Developers should note that the ISC assignments contained in the itm_mstr table is the definitive list that should be used for software development. A simplified version of this table may be included with the RAI manual, but may not contain all of the information required by developers.

10 Fixed-Format File Layout

10.1 Uses for the Fixed-Format Layout

As noted above, nursing home and swing bed providers will use XML files to submit data to CMS. However, the data specs also define a fixed-format file layout which will be used in other circumstances. For example, CMS will use the fixed file format for data extracts, such as those that will be used to periodically extract data from the national database which is sent to individual States. The format will also be used to pass data to utilities (e.g., RUG groupers) that are provided by CMS. Finally, the format will also be used to produce data extracts for other users (such as researchers or individual providers who need to rebuild their assessment database), and it will also be used for test data that will be supplied with CMS supplied software (such as RUGs DLLs). Basically, this fixed format will be useful for anyone who wishes to transfer large batches of assessment data, and software vendors may find it useful to support this format for importing MDS 3.0 data. Software which uses CMS-supplied DLLs will have to be able to build a fixed-format string of MDS 3.0 data in order to call those DLLs.

The data specifications provide information about starting and ending bytes for each item in the fixed format record. This information is also contained in the itm_mstr table in the Access database or in the itm_mstr.csv file that is supplied with the data specs. Each item's starting byte, ending byte, and length are contained in the following fields: fixed_rec_strt_byte, fixed_rec_end_byte, and fixed_rec_lngth. The table must be sorted by the field called itm_srt_id to put items in the order they will appear in the fixed format record.

Note that the table contains items that are not included in XML submission files. The field called itm_grp_cd identifies the item group: "control", "asmt" (assessment), "filler", and "calc" (calculated). Only control and assessment items are to be included in XML submission files. When a record is accepted by the IQIES system, certain calculated values are stored in CMS's national database. These calculated values will be contained in the "calc" items at the end of the fixed-format string.

10.2 Rules for Creating the Fixed-Format String

In order to enforce standardization, we have developed the rules below that describe how the fixed-format string must be formatted.

1. The string must be 3,690 bytes in length.

2. The last three bytes of the string must contain the following characters:
 - a. Byte 3,688 must contain the percent sign ("%") to indicate the end of data.
 - b. Byte 3,689 must contain a carriage return character (ASCII 013).
 - c. Byte 3,690 must contain a line feed character (ASCII 010).
3. Except for the three items listed above, all items that are defined as calculated items (that belong to the item group called "Calc") may be left blank. These items are contained in bytes 2,927 through 3,687. These calculated items will be populated in export files that are created by CMS for various purposes.
4. Any items belonging to the item group called "Filler" should be left blank. Data for each item must be contained within the start and end bytes defined in the data specifications.
5. MDS items that are inactive on a particular record should be filled with blanks. Any data contained in the fields for inactive items will be ignored.
6. MDS items that are active on assessment record but are blank due to a skip pattern must contain a single caret (^). If the length of the item is greater than 1 byte, then the single caret must be left justified and the remaining bytes in the field must be filled with blanks. For example, if a resident is comatose (item B0100=1), then many items are skipped, including B0200 and D0300. If these items were **active** for a given assessment, then B0200, a one-byte item located in byte 512 of the fixed-format record, would contain "^". Item D0300, a two-byte item located in bytes 562-563, would contain "^ " (a caret followed by a space). On the other hand, if both of these items were **inactive** on a given record, then both would be blank filled.
7. Many MDS items may be coded with a single dash ("-") if the item was not assessed or information was not available to the assessor. If the length of the item is greater than 1 byte, then the single dash must be left justified and the remaining bytes in the field must be filled with blanks. For example, if item D0300, a two-byte item, which is 2 bytes in length, was coded with a dash, then "- " (a dash followed by a blank) would be inserted in bytes 562-563 in the fixed-format record.
8. The rules below define formatting rules that are specific to each of the different data types.
 - a. **Checklist items.** All of these items are one byte in length. The value that is contained in the record (i.e., [0,1,-,^]) must be inserted in the correct byte of the fixed-format record. No special formatting is required.
 - b. **Code items.** The value inserted in the fixed-format record for a coded item must match exactly one of the values allowed in the data specifications for that item. For example, item A0310A is a two-byte coded item that allows the following values: [00,01,02,03,04,05,06,99]. The value inserted in bytes 270-271 of the fixed-format record must match exactly one of the eight values listed. For example, it is not acceptable to insert " 1" (blank followed by a "1") or "1 " ("1" followed by a blank) for a value of "01". For a few items, the allowed values that are listed are shorter than the length of the item. For example, the data specs version code, SPEC_VRSN_CD, lists an allowed value of "1.00" even though the item is 10 bytes in length. In these cases, left-justify and blank fill the value (i.e., put "1.00" followed by six blanks in bytes 24-33 of the fixed-format record).
 - c. **Date items.** All date items are eight bytes in length and are coded as YYYYMMDD. These date values must be inserted in the fixed-format string exactly as coded. For example, if a date item contained "20101108" (11/08/2010), then "20101108" must be inserted in the appropriate bytes in the fixed-format string. There are several exceptional cases:
 - i. Item A0900 (birth date) can have a missing day (in which case it is coded YYYYMM), or a missing month and day (in which case it is coded YYYY). In these cases, left-justify the coded value and fill the remainder of the field with blanks. For example, if the date of birth was coded as "1920" (i.e., the month and year were unknown), then bytes 351-358 of the fixed-format record must contain "1920 " ("1920" followed by 4 blanks). Note that any fixed-format file that is created by CMS, the birth date will not contain a partial date because the month and/or day will be imputed where necessary.

- ii. Several date items can be dash filled. For example, item A2400C (end date of most recent Medicare stay) can be dash filled if the Medicare stay is ongoing. Dash-filling these items should not be confused with entering a single dash when the item was not assessed or the information could not be obtained. When a date item is dash filled, all eight dashes must be inserted in the fixed-format record. For example, if A2400C was coded as dash-filled, then "-----" (eight dashes) would be inserted in bytes 503-510 of the fixed format record.
- d. **ICD items.** The ICD diagnosis code items I8000A through I8000J have specific coding requirements that are described in detail in the data specs. These coding requirements do not allow for left- or right-trimming of the items. Characters of the ICD code must be in specific positions within the item and carets (which stand for blanks) are an integral part of the coded item. These items must be inserted in the fixed-format record exactly as coded and in conformance with the rules described in the data specs. For example, if item I8000A contained the value "^123.4^", then that exact value would be inserted in bytes 751-758 of the fixed-format string.
- e. **Number items.** The value inserted in the fixed-format string for a numeric item must match exactly one of the values (or the range of values) allowed in the data specifications for that item. This means that numeric values must be right-justified and zero-filled. For example, item D0300 can have the following values: [00-27,99,-,^]. If the value for an MDS record is "01", then "01" must be inserted in bytes 562-563 of the fixed-format record; "1 " (one followed by a blank) or " 1" (a blank followed by one) are not allowed. As with other items, however, special codes (dash and caret) must be left-justified and blank filled. Therefore, if the value for an MDS record is "-", then "- " (dash followed by a blank) must be inserted in the fixed format record.

The fixed-format numeric values for items that contain decimals (e.g., legacy item M0610A) must also match exactly the values listed in the data specs. For example, if M0610A had a value of "01.0", then "01.0" must have been inserted in bytes 920-923 of the fixed format record. Alternative representations which omit zeroes or the decimal are not allowed.

Note that these rules differ from the rules that apply to XML submission files. For example, if the value of D0300 on an MDS record is "01", a value of either "01" or "1" may be submitted in an XML file. However, for the fixed-format record, a value of "01" must be used. Similarly, if the value of legacy item M0610A was equal to "01.0", then values such as "1", "1.", "1.0" were allowed to be submitted in the XML file. However, the value "01.0" was required in the fixed-format record.

- f. **Text items.** Text items (such as A0500C, resident last name) can have a large set of possible values and the data specifications therefore cannot delineate all allowed values. Furthermore, the values for these items can be shorter than the maximum allowed length. Text values must therefore be left-justified and blank filled in the fixed-format record. For example, if a resident's last name is "Smith", then "SMITH " ("SMITH" followed by 13 spaces) must be inserted in bytes 293-310 of the fixed-format record. For consistency, all text items (except SFTWR_VNDR_EMAIL_ADR, software vendor email address) should be converted to upper case before inserting them in the fixed-format record, although this is not required. It is acceptable to use lower case characters for SFTWR_VNDR_EMAIL_ADR, since email addresses are typically lower case.

11 Additional Documentation

In order to understand the submission process completely, software developers will need information that is not contained within the data specs themselves or in the current document. This additional information is available in the RAI User's Manual that is being published by CMS. The RAI manual contains information about topics such as submission timing, record sequencing rules, and record modification and inactivation procedures. Detailed specifications for RUGs and QMs are being published in separate documents that may also be of use to software developers.

Appendix A: Data Dictionary Files

As noted above, the data dictionary that was used to produce the data specifications are distributed to assist software developers. The first of these files is the Microsoft Access database (MDB file) that was used to store the data dictionary tables. In addition, the data dictionary tables are distributed as a set of comma-separated value (CSV) files. The most useful tables that are contained in the database are described below.

Table A1: Database Table Descriptions

Table Name	Description
itm_mstr	Master table containing one record for every item that is contained in the MDS 3.0 item set. Indicates whether each item is active, inactive, or state-optional on each ISC. An "x" indicates the item is active, "s" indicates state-optional, and a blank indicates the item is inactive on the ISC.
itm_val	Detail table that contains one record for every value (response option) that is allowed for each item. This table is linked to the itm_mstr table using the itm_mstr_key field.
rltn_mstr	Contains one record for every edit or information message. The text of each message is stored in each record.
rltn_itm_txt	Contains one record for every edit or information message that is associated with every item. This table was used to generate the detailed data specifications report, the unduplicated edits report, and the supplemental information report.

The following table describes the fields that are contained in the item and ISC database tables described above.

Table A2: Database Field Descriptions

Table	Field	Data Type	Field Size	Description
itm_mstr	itm_mstr_key	Number	4	primary key
itm_mstr	sys_cd	Text	10	"MDS", "OASIS", "IRF-PAI", "CARE"
itm_mstr	form_vrsn	Text	10	form version (e.g., "1.00")
itm_mstr	spec_vrsn	Text	20	data specs version (e.g., "1.00")
itm_mstr	itm_srt_id	Number	4	item sort sequence (e.g., 12600)
itm_mstr	itm_id	Text	30	item ID code (e.g., "C0100")
itm_mstr	itm_db_id	Text	30	item database ID (e.g., "C0100_HEARG")
itm_mstr	itm_shrt_label	Text	50	item short label (e.g., "Hearing")
itm_mstr	itm_sect_srt_id	Text	2	item section sort ID (e.g., "01", "02")
itm_mstr	itm_sect_label	Text	10	item section label (e.g., "A")
itm_mstr	itm_grp_cd	Text	10	"Asmt", "Control", "State" (section S)
itm_mstr	itm_loinc_id	Text	20	LOINC item code
itm_mstr	itm_type_cd	Text	10	"Text", "Date", "Code", "Number", "ICD9"
itm_mstr	fixed_rec_srt_id	Number	4	Sort sequence for fixed-format items (e.g., 12600)
itm_mstr	fixed_rec_strt_byte	Number	4	Starting byte for fixed format record (e.g., export record)
itm_mstr	fixed_rec_end_byte	Number	4	Ending byte for fixed format record (e.g., export record)
itm_mstr	fixed_strt_end_bytes	Text	10	String showing start and end bytes
itm_mstr	fixed_rec_lngth	Number	4	Field length for fixed format record (e.g., export record)

Table	Field	Data Type	Field Size	Description
itm_mstr	itm_vrsn_notes	Memo	0	Notes describing changes since previous specs version
itm_mstr	itm_txt	Memo	0	Text extracted from assessment user's manual
itm_mstr	isc_active	Text	80	ISC list: item is active
itm_mstr	isc_inactive	Text	80	ISC list: item not active
itm_mstr	isc_state_opt	Text	80	ISC list: item state optional
itm_mstr	OSA	Text	1	Optional State Assessment
itm_mstr	XX	Text	1	Inactivation
itm_val	itm_val_key	Number	4	primary key
itm_val	itm_mstr_key	Number	4	foreign key
itm_val	val_srt_id	Number	4	value sort order within item
itm_val	itm_id	Text	30	item ID code (e.g., "C0100")
itm_val	val_id	Text	20	item value (e.g., "2")
itm_val	val_txt	Text	255	text associated with value (e.g., "Female")
itm_val	val_loinc_id	Text	20	LOINC value code

