Unit Overview

This unit describes HL7 event codes, messages, and segments that are supported in the Universal Interface to transfer discrete results (ORU) and display-only documents (ZDM) records from an external system to OCF. This unit explains the detailed requirements for these messages. This unit also describes how the Universal Interface processes these messages.

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This unit describes the transfer of information when the Cerner Millennium system is *not* the primary ancillary system used to perform, enter, control, and monitor departmental orders, results, and clinical and management reports. Consequently, this unit does not consider issues related to specimen collections, exam requisitions, labeling and accessioning, medical device instruments, reference laboratory interfaces, bidirectional orders interface, and other discipline-specific topics.

General Description

The Cerner Millennium Universal Interface supports the receipt of discrete ORU result messages from an external system for storage of results and pending results in OCF. Although OCF alone does not provide full support for the receipt of orders from an external system, a subset of what would be a separate order record can be denormalized for storage in OCF as a pending result event.

The Universal Interface supports the receipt of ZDM messages for display documents with optional endorsements from an external system for storage in OCF. The Universal Interface also can use ZDM or ORU messages to store reference pointers to documents stored in an external system.

Release Considerations
With the 2007.19 Release Update, the Universal Interface supports accepting images and image documents (.PDF) using the HL7 ED data type. These results are posted to CareAware MultiMedia with a reference pointer being stored on the CLINICAL_EVENT table.

The Universal Interface responds to all ORU and ZDM messages with an immediate, general ACK acknowledgment message.

Trigger Events

The Universal Interface accepts the following message types, events and order control codes for transfer of results and documents from an external system directly into OCF:

Message	Event	Code	Description	Constraints
ORU	R01	RE	Discrete results	See below.
ORU	ZB1	RE	Discrete blood bank crossmatch results (specimen/product)	See below.
ORU	ZB2	RE	Blood product transfused event	See below.
ORU	R03	RE	Document or display results	See below.
ZDM	R03	-	Display-only Documents with optional endorsements	See below.
ORU	R01	CN	Radiology results (linked)	See below.

The constraints are as follows:

- The ability to accept and process pending results activity to OCF varies by discipline and service area. Before sending pending results, the external system must assign and send unique order identifiers (filler order number or accession number) and must guarantee that these same identifiers are used when sending discrete results. In addition, to effectively match pending result records to actual results without creating an excessive number of extra inactive clinical event rows, a relatively stable start or observation date and time should be available. The date and time used should be clinically significant. For example, for specimen orders, use the collected date and time; for exam orders, use the exam completed date and time.
- To view pending results at the discrete level, the sending system should send OBX segments only for the *required* detail procedures. The sending system should not send OBX segments for non-required details (OBX segments) without a performed or verified observation value.
- The Universal Interface does *not* accept multiple patients, or multiple visits or encounters, on a single transaction.
- The discrete blood bank events (ZB1 and ZB2) enable the Universal Interface to capture a snapshot of the blood bank product at the time the message is received. The Universal Interface *cannot* use these messages to provide blood bank product inventory tracking or product availability.
- Documents provided in ZDM messages are not suitable for Message Center workflows. See Unit 12i - Medical Document Management Inbound.

ORU Message Definition---Unsolicited Discrete Results

The ORU message definition for unsolicited discrete results is described below.

Unsolicited Discrete Results (R01) and Display Results (R03)

The Universal Interface accepts Unsolicited Observation Messages (ORU) for discrete or display results using the following HL7 2.2 message format, this is processed by the ESI Server:

ORU Segment	Segment Name	Comments

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MSH	Message Header	MSH-9 valued ORU^R01 or ORU^R03. R01 - discrete results. R03 - display document results.
PID	Patient Identification	
[PV1]	Patient Visit	
{		
ORC	Order Common	Required as a placeholder.
OBR	Observation Report	
ZDS		
[{ NTE }]	Notes and Comments	Order-level comments.
[{		
OBX	Observation/Result	
ZDS		
[{NTE}]	Notes and Comment	Observation-level comments. Footnotes and interpretive data. For R03 display results, NTE segments follow the last OBX segment.
}]		
}		

The Universal Interface accepts Unsolicited Observation Messages (ORU) for discrete or display results using the following HL7 2.5.1 message format, this is processed by the Java ESI Server:

ORU Segment	Segment Name	Comments
MSH	Message Header	MSH-9 valued ORU^R01 R01 - discrete results.
[{SFT}]	Software Segment	Not Supported
{	-- PATIENT_RESULT begin	
[	-- PATIENT begin	
PID	Patient Identification	
[PD1]	Additional Demographics	Not Supported
[{NTE}]	Notes and Comments	
[{NK1}]	Next of Kin/Associated Parties	Not Supported
[	-- VISIT begin	
PV1	Patient Visit	
[PV2]	Patient Visit - Additional Info	Not Supported
]	-- VISIT end	
]	-- PATIENT end	
{	-- ORDER_OBSERVATION begin	
[ORC]	Order Common	Not Supported
OBR	Observation Request	
[{NTE}]	Notes and Comments	
[{	-- TIMING_QTY begin	
TQ1	Timing/Quantity	
[{TQ2}]	Timing/Quantity Order Sequence	Not Supported

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}]	-- TIMING_QTY end	
[CTD]	Contact Data	Not Supported
[{	-- OBSERVATION begin	
OBX	Observation related to OBR	
{[NTE]}	Notes and Comments	
}]	-- OBSERVATION end	
[{FT1}]	Financial Transaction	Not Supported
{[CTI]}	Clinical Trial Identification	Not Supported
[{	-- SPECIMEN begin	
SPM	Specimen	
[{OBX}]	Observation related to Specimen	
}]	-- SPECIMEN end	
}	-- ORDER_OBSERVATION end	
}	-- PATIENT_RESULT end	
[DSC]	Continuation Pointer	Not Supported
[ZDS]	Document Endorsements	

Discrete Blood Bank Specimen---Product (Crossmatch) Results (ZB1)

The Universal Interface accepts Unsolicited Observation Messages (ORU) for discrete blood bank specimen-product results using the following message format. The Universal Interface does not require the ZB1 event to process this type of result; however, the message structure as defined below is required. The event was defined to clarify the distinction between discrete blood bank specimen results (such as type and Rh), discrete specimen product results (such as crossmatch), and the blood bank transfused status event.

ORU Segment	Segment Name	Comments
MSH	Message Header	ZB1 - Blood bank specimen-product result. OR R01 - discrete results.
PID	Patient Identification	
[PV1]	Patient Visit	
{		
ORC	Order Common	Required as aplaceholder.
OBR	Observation Report	
[{ NTE }]	Notes and Comments	Order-level comments.
[{		
OBX	Observation/Result	Use if sending specimen-only results (such as type and Rh) in the same message as specimen-product results.
[{NTE}]	Notes and Comment	Observation-level comments. Footnotes and Interpretive data.
}]		
[{		
ZBP	BPU Information	Blood product unit information.
OBX	Observation	Specimen-product result (such as crossmatch).
[{NTE}]	Notes and Comments	
}]		
}		

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Discrete Blood Bank Transfused Event (ZB2)

The Universal Interface accepts Unsolicited Observation Messages (ORU) for discrete blood bank transfused event using the following message format. The Universal Interface does not require the ZB2 event to process this type of result; however, the message structure as defined below is required. The ZB2 event was defined to clarify the distinction between discrete blood bank specimen results (such as type and Rh), discrete specimen product results (such as crossmatch), and the blood bank transfused status event.

ORU Segment	Segment Name	Comments
MSH	Message Header	ZB2 - Blood Bank Transfused Status Event.
PID	Patient Identification	
[PV1]	Patient Visit	
{		
ORC	Order Common	Required as a placeholder.
OBR	Observation Report	
[{ NTE }]	Notes and Comments	Order-level comments.
ZBP	BPU Information	Blood product unit information. An OBX segment following the ZBP is not allowed during transfused status processing.
}		

ORU Message Processing

ORU message processing is described below.

Ordered Procedure/OBR Segment

The OBR segment corresponds to an ordered procedure. The Universal Interface uses the OBR to create a parent CLINICAL_EVENT row and uses OBX segments to create detail CLINICAL_EVENT rows whose PARENT_EVENT_ID references this CLINICAL_EVENT group.

The Universal Interface also inserts additional child rows into appropriate clinical event tables determined from the event code and event code parameters defined on the V500_EVENT_CODE table, the service area associated with the event (such as microbiology, anatomic pathology, or radiology), and other data values available in the ORU message.

The Universal Interface expects data in the OBR segment even when equivalent fields may be available in the ORC segment. These OBR fields include, but are not limited to, the following: *placer order number* (OBR-2), *filler order number* (OBR-3), and *ordering clinical staff* (OBR-16).

Cerner Event Codes

The identifier in OBR-4 Universal Service ID or OBX-3 Observation Identifier is used as an alias to a Cerner Event Code (Code Set 72). As needed, the Universal Interface creates (add-on-the-fly) new, unauthenticated event codes with an active status using the first component as the event code and the second component as the event code description. New event codes added by the Universal Interface are included in an OTHER RESULT event set. Manual intervention then is required to assign the new event codes to appropriate event sets.

Alternately, OBR-4.1 can be an alias to the Order Catalog code (Code Set 200) and OBX-3.1 can be an alias to the Discrete Task Assay (Code Set 14003). When the ESI Configuration Tool (ESIConfigTool.exe) is configured to use this option and an alias is found, the Universal Interface uses the Order Catalog code value or discrete task assay code value to indirectly identify the event code from the CODE_VALUE_EVENT_R table. When the option is configured and an alias is not found, the Universal Interface returns to the default event code alias processing described in the previous paragraph.

The OBR-4.2 and OBX-3.2 description components are not stored in the CLINICAL_EVENT record but can be used in creating a new active event code and primitive event set if an existing event code is not found.

The sending system should value the OBR-4 Universal Service ID and OBX-3 Observation Identifier using the first three components:

```
|code^description^coding scheme\|
```


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Note
By default, the Universal Interface does not use the last three components of OBR-4 Universal Service ID (OBR-4.4,5,6) or OBX-3 Observation Identifier (OBX-3.4,5,6) and ignores the transmitted coding system provided in OBR-4.3 and OBX-3.3, rather using the primary and alternate contributor sources defined in the ESI Configuration Tool for a given contributing system (MSH-3 Sending Application).

The Universal Interface provides configurations to accept the primary contributor source in OBX-3.3 Code System or OBX-3.6 Alternate Code System with or without add-on-the-fly. The Universal Interface aliases the configured OBX-3.3 Code System or OBX-3.6 Alternate Code System on code set 73 Contributor Source Code and uses that contributor source code to look up the code value alias using the associated OBX-3.1 Identifier or OBX-3.4 Alternate Identifier. If the alias is not found and the add-on-the-fly option is selected, the Universal Interface creates a new, unauthenticated event code as defined above. Alternate contributor source processing occurs as needed on the non-primary triplet of the OBX-3 CE data type.

Examples:

```
|8012345^Potassium|       (where '8012345' is a code value alias on the primary or alternate contributor source
defined for the contributor system)
|8012345^Potassium^99HP|  (where the ESI SPECIAL SOURCE FLAG is configured to accept the Primary contributor
source for OBX-3 field processing in the first triplet of the CE data type,
                          '99HP' is a code value alias on code set 73 for the primary contributor source and
'8012345' is a code value alias on the primary contributor source)

|8012345^Potassium^^12814-0^Potassium^LN|    (where the ESI SPECIAL SOURCE FLAG is configured to accept the
Primary contributor source for OBX-3 field processing in the second triplet
                                            of the CE data type, "LN" is a code value alias on code set 73 for
the primary (LOINC) contributor source, and 12814-0 is a code value
                                            alias on the LOINC contributor source)
```

LOINC Assignment

The Universal Interface accepts LOINC identifiers from inbound ORU Result messages and post them to the REF_CD_MAP_HEADER and REF_CD_MAP_DETAIL tables to assign the LOINC to the associated clinical event being written.

When processing general lab results, if OBX-3.4 Observation Identifier Code System or OBX-3.6 Observation Identifier Alternate Code System is an alias to the LOINC code value on code set 400 Source Vocabulary Code, the Universal Interface assigns the associated OBX-3.1 Identifier or OBX-3.4 Alternate Identifier to the result clinical event.

When processing microbiology stain reports, if OBX-3.4 Observation Identifier Code System or OBX-3.6 Observation Identifier Alternate Code System is an alias to the LOINC code value on code set 400 Source Vocabulary Code, the Universal Interface assigns the associated OBX-3.1 Identifier or OBX-3.4 Alternate Identifier to the stain report clinical event.

When processing microbiology susceptibility results, if OBR-26.4 Parent Result Code System or OBR-26.6 Parent Result Alternate Code System is an alias to the LOINC code value on code set 400 Source Vocabulary Code, the Universal Interface assigns the associated OBR-26.1 Identifier or OBR-26.4 Alternate Identifier to the organism identified.

When processing microbiology susceptibility results, if OBX-3.4 Observation Identifier Code System or OBX-3.6 Observation Identifier Alternate Code System is an alias to the LOINC code value on code set 400 Source Vocabulary Code, the Universal Interface assigns the associated OBX-3.1 Identifier or OBX-3.4 Alternate Identifier to the antibiotic susceptibility result.

SNOMED CT Code Assignment

The Universal Interface accepts SNOMED CT identifiers from inbound ORU Result messages and posts them to the REF_CD_MAP_HEADER and REF_CD_MAP_DETAIL tables to assign the SNOMED code to the associated clinical event being written.

When processing Microbiology lab results, the system performs one of the following lookups to support SNOMED CT codes:

1. The system first performs a lookup to see if OBX-5.3 Observation Value Code System or OBX-5.6 Observation Value Alternate Code System is an alias to the SNOMED code value on code set 400 Source Vocabulary Code and supports concepts (Vocabularies support concepts when the field_name attribute equals to "DEFAULT_CONCEPT_SOURCE_MEAN" and field_value attribute is populated on the CODE_VALUE_EXTENSION table). If concepts are supported, the Universal Interface assigns the associated OBX-5.1, Identifier or OBX-5.4, Alternate Identifier to the result clinical event and constructs the concept_cki (for example, SNOMED!116680003) using the source vocabulary and concept_identifier from CMT_CONCEPT table. The system also maps the concept_identifier from OBX-5.1 or 5.4 to concept_identifier on CMT_CONCEPT table and then establishes a link to concept_cki on NOMENCLATURE table.

   The interface uses OBR-7, Observation Date/Time as the effective date of the concept and uses that date to perform a lookup on the concept based nomenclatures. The lookup also fails to use the current date as effective date of the concept when OBR-7 is either empty or invalid.

2. The system performs a direct lookup on the NOMENCLATURE table using OBX 5.1, Identifier and 5.3 Name of Coding when the vocabulary aliased by

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5.3/5.6 does not support concepts and no concept_cki is constructed in this case.

When processing microbiology susceptibility results using the ESI server, if OBX-5.3 Observation Identifier Code System or OBX-5.6 Observation Identifier Alternate Code System is an alias to the SNOMED CT code value on code set 400 Source Vocabulary Code, the Universal Interface assigns the associated OBX-5.1 Identifier or OBX-5.4 Alternate Identifier to the stain report clinical event on the MBO row. The SNOMED CT codes are linked to rows on the CE_MICROBIOLOGY table that store the non-stain report's linked organism. The related SNOMED CT codes are stored on the REF_CD_MAP_HEADER and REF_CD_MAP_DETAIL tables and rows are written from the MBO rows.

When processing microbiology susceptibility results using the ESI server, if OBR-26.3, Parent Result Code System or OBR-26.6, Parent Result Alternate Code System is an alias to the SNOMED code value on code set 400 Source Vocabulary Code, the Universal Interface assigns the associated OBR-26.1 Identifier or OBR-26.4 Alternate Identifier to the organism identified.

Clinical Event Class

The Clinical Event Class indicates the type or category of an event. The event_class_cd (Code Set 53) determines how the ESI server processes and stores an event (such as ORU or ZDM), what clinical event tables and subtables are written to, and how the reference number and other derived event attributes are valued. The event class, along with other event attributes, also determines how other Cerner Millennium applications retrieve and display a given result or document.

Before inserting a row on the CLINICAL_EVENT table, the Universal Interface first determines the appropriate event_class_cd from values provided in the HL7 message.

To determine the event class for detail or child events, OBX-2 - Value Type can be an alias to the event_class_cd. If an alias does not exist, the ESI server uses default processing (such as an alias is not required) for the following HL7 value types: ST, TX, NM, CE, and RP. Cerner recommends using default processing. For other HL7 value types (such as ED) or to override the default processing, Cerner users must create an alias to the appropriate or wanted event_class_cd.

To determine the parent event class, OBR-24 - Diagnostic Service Section can be an alias to the event_class_cd. If an alias does not exist, the ESI server determines a default group event class.

The following table lists the Cerner-defined (CDF) meaning of event class codes available for processing by the Universal Interface. The table also lists suggested HL7 value types appropriate for each event class code.

PARENT EVENT CLASS CODES used for GROUPING

Event Class (Code Set 53)	Description	Comments
GRP	Group event	A generic parent or root event class used to group one or more child (such as NUM, TXT, or DOC) detail events under the same clinically significant date and to capture specimen- or group-level data and comments. Used only when a more specific parent event class (such as RAD) is not appropriate. The event code alias corresponds to the ordered procedure provided in OBR-4---Universal Service Id. The CLINICAL_EVENT row is inserted with a default view level of 0 (zero). ESI uses GRP as the default parent event class when unable to determine a more specific grouping class.
MDOC	Master document	A group clinical event representing a master document composed of multiple textual sections where each section is itself a clinical event row with a DOC event class. The view level for the MDOC clinical event row is variable. When the parent clinical event has a RAD class, the view level of the MDOC clinical event is 0 (zero). When the parent clinical event has an AP class, the view level of the MDOC clinical event is 1 (one). The MDOC event class is the parent or root clinical event when the OBR-24---Diagnostic Service Section is an alias to the event_class_cd with an MDOC meaning. When the parent clinical event has an MDOC class, the view level is 1 (one).
MBO	Microbiology result	The parent group clinical event designating a microbiology result composed of one or more reports or report sections, and zero or more isolates with zero or more susceptibility results. The Universal Interface identifies a microbiology result (MBO event class) when the OBR-24---Diagnostic Service Section is MA or MB or is an alias to the event_class_cd with an MBO meaning.
RAD	Radiology result	The parent group clinical event row designating a radiology report that contains one or more report sections, each with a DOC event class. The Universal Interface identifies a radiology report (RAD event class) when the OBR-24---Diagnostic Service Section is RAD or an alias to the event_class_cd with a RAD meaning.
AP	Anatomic pathology result	The parent group clinical event row designating an anatomic pathology case composed of one or more documents and associated SNOMED codes. Each document has its own grouper clinical event row with an MDOC event class and one or more child clinical event rows for report sections each with a DOC event class. One or more CE_CODED_RESULT rows containing SNOMED codes can be associated with each document or document section. The Universal Interface identifies an anatomic pathology case (AP event class) when the OBR-24 - Diagnostic Service Section is an alias to the event_class_cd with an AP meaning.

DETAIL or CHILD EVENT CLASS CODES

Event Class (Code Set 53)	Description	Comments

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NUM	Numeric event	A detail event whose result value is numeric. The event code alias corresponds to OBX-3 - Observation Identifier. The suggested-OBX-2 - Value Type is NM. The result value is stored on the CE_STRING table. The CLINICAL_EVENT row is inserted with a default view level of 1 (one).
TXT	String event	A detail event whose result value is a short, alphanumeric string limited to a size of 255 bytes. The event code alias is provided as the OBX-3 - Observation Identifier. The OBX-2 - Value Type is ST or ID. The result value is stored on the CE_STRING table. The CLINICAL_EVENT row is inserted with a default view level of 1 (one).
DOC	Long text or document event	A detail clinical event whose result value is usually a long, textual result or document. For ORU messages, the event code alias corresponds to OBX-3 - Observation Identifier. The OBX-2 - Value Type is TX or RP. For ZDM messages, the event code alias corresponds to the- ZDC-1 - Document Type Code. The document header information is stored on the CE_BLOB_RESULT table. The document text is stored on the CE_BLOB table. The CLINICAL_EVENT row is inserted with a default view level of 1 (one) unless the document is a section of a master document. When the text result is a section of a master document, the DOC view level is 0 (zero).
Attachment	Attachment event	A detail clinical event whose result value is an image or image document. For ORU messages, the event code alias corresponds to OBX-3 - Observation Identifier. -The OBX-2 - Value Type is ED. The OBX-2 value type - ED. The image or image document is stored on the LONG_BLOB table or in the CareAware MultiMedia archive.

Event Reference Numbers

Reference numbers are used to identify and associate specific clinical events. The event reference number designates a unique CLINICAL_EVENT record for the purposes of inserting and updating. Reference numbers are derived by the Universal Interface from unique values provided in the transmitted message. The reference number must be unique within each contributing system (MSH-3 - Sending Application).

The Universal Interface does not commit updates to an existing event when the person of the transmitted message does not match the person of the existing event.

Within each contributing system, the combination of the unique transmitted identifier provided as the filler order number (OBR-3.1) and application ID (OBR-3.2) and other values designate a unique CLINICAL_EVENT record. Determination of each reference number is not configurable, but instead, is a derived algorithm by message type.

The Universal Interface derives the reference number for ORU messages by concatenating the following values:

Sequence	Description	Source
1	Filler Order Number	OBR-3.1 and 3.2 (root and child).
2	Ordered Procedure Code	OBR-4.1 - Universal Service Code (root and child).
3	Detail Procedure Code	OBX-3.1 - Observation Identifier (child).
4	Detail Sub-Identifier	OBX-4 - Sub-Identifier (child).
5	View Level	0 or 1.

Example:
IF OBR-3.1 =1224 and OBR-4.1 = CHEM7 and OBX-3 = NA
THEN Reference Number for the parent or root CHEM7 = 1224CHEM70 (0 is the view level)
AND Reference Number for the child NA = 1224CHEM7NA1 (1 is the view level)

The maximum size of the reference number stored in Cerner Millennium is 100 characters. This is the size after the value has been derived by the Universal Interface. Cerner recommends limiting the size of the transmitted value (OBR-3) to less than 60 characters.

The default for defining document reference number is described later in this unit.

Standard Detail Events/OBX Segments

Unless specified below in a separate paragraph (for example, microbiology), the Universal Interface processes OBX segments as standard detail results.

With the exception of some coded results, the Universal Interface cannot process a detail event (same event code, same reference number) associated with more than one value type. For example, the Universal Interface cannot process two OBX segments with the same observation identifier where one OBX has an NM value type and the second OBX has an ST or TX value type.

Event notes (NTE segments) may be associated with either group or detail events, depending on whether the NTE segment occurs after the OBR or OBX segments respectively.

Numeric Results

The Universal Interface accepts numeric detail results (OBX-2---Value Type of NM) and inserts them on the CE_STRING_RESULT table using an event class code (Code Set 53) with a meaning of NUM.

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String Results

The Universal Interface accepts string results (OBX-2---Value Type of ST or ID) and inserts them on the CE_STRING_RESULT table using an event class code (Code Set 53) with a meaning of TXT. The maximum string result size is 255 characters.

The Universal Interface does not reject string results greater than 255 characters; instead, the Universal Interface changes the event class code to DOC and inserts results on the CE_BLOB_RESULT table.

Cerner recommends reserving the ST value type for short text strings (less than 80 characters) and using the text (TX) value type for longer textual results.

Coded Results

The Universal Interface accepts coded results (OBX-2 - Value Type of CE) and inserts them on the CE_CODED_RESULT (CECR) table. Coded results are the child of a root or parent or other child event whose Cerner Millennium event class is one of the following: AP, RAD, MBO, GRP, MDOC, DOC, or TXT.

Coded results always must follow, never precede, an associated non-coded result. For example, the OBX for an AP diagnosis containing textual results (TX value type) must precede the OBX for an AP diagnosis containing SNOMED coded results (CE value type).

The Universal Interface accepts multiple instances of a coded result value (OBX-5 - Observation Value within a single OBX where each instance is separated by a repeat delimiter. To allow grouping of multiple coded values as a unit, the Universal Interface uses the OBX-4 - Observation Sub Id as the CECR.group_nbr.

Alternately, the Universal Interface accepts multiple CE results provided as multiple OBX segments where each segment contains a single coded result. To allow grouping of multiple coded values as a unit, the Universal Interface uses the OBX-4 - Observation Sub Id_as the CECR.group_nbr.

For purposes of replacement or inactivation, the Universal Interface treats coded results as a unit when multiple coded results are provided in the same OBX separated by repeat delimiter or when multiple coded results have the same OBX-3 - Observation Identifier and OBX-4 - Observation Sub Id. The Universal Interface assumes that multiple codes are fragments (modifiers) that construct a single independent observation. The sending system must send all coded results for an observation. The Universal Interface inactivates all existing coded result rows and inserts all new coded result rows.

Each instance of the result value is provided using the HL7 format for the CE data type. The Universal Interface processes coded results using the first three components of the CE data type. If the first three components are not valued, the Universal Interface uses the last three components. The transmitted or configurable coding system must be a valid alias to a nomenclature source vocabulary code (Code Set 400).

```
| Code^Description^Coding System^Alt Code^Alt Description^Alt Coding Scheme |
```

Acceptable CE result values include the following item:

```
|POS^POSITIVE^99HH|
POS^POSITIVE^99HH~CONF^Confirmed^99HH||
|^^^POS^POSITIVE^99HH|
|^^^POS^POSITIVE^99HH~^^^CONF^Confirmed^99HH|
|POS^^99HH|
|^POSITIVE|  /* No Code. Process as string result with TXT event class */
|POS|    /* No Coding System.  Process as string result with TXT event
class
```

The CE-3 - Coding System component must be an alias to a valid- Cerner Millennium source vocabulary code (Code Set 400). For coded alpha results, the CE-3--Coding System also can be an alias to a Cerner Millennium principle type (Code Set 401) whose meaning is ALPHA RESPONS or any other valid principle type. The Universal Interface defaults to a principle type of OTHER. The Universal Interface does not validate or match using the principle type. The principle type is required by ESI only to add nomenclature rows on-the-fly.

The transmitted CE-1 - Code matches an entry (source_identifier) on the NOMENCLATURE table. The source_identifier must be unique within each source vocabulary. Nomenclature identifiers from different source vocabularies that have the same meaning can be linked manually using the concept_identifier and concept_source_cd.

For local-source vocabulary codes, if the transmitted code does not match an existing nomenclature identifier for the transmitted source vocabulary, the Universal Interface inserts a new unauthenticated nomenclature row and posts a coded result. The Universal Interface defines a local-source vocabulary as one that begins with 99.

For standard-source vocabulary codes, if the transmitted code does not match an existing nomenclature identifier for the transmitted source vocabulary, the Universal Interface inserts a new unauthenticated nomenclature row and posts a coded result. The Universal Interface defines a standard-source vocabulary as one whose code value has a CDF meaning.

If the transmitted description does not match the source_string on the NOMENCLATURE table, the Universal Interface does not update an authenticated or unauthenticated nomenclature row with the new description. If the transmitted code does not match an existing nomenclature identifier, the Universal Interface processes the result as a string result using the CE-2 - Description as the result value. If the CE-2 - Description is not valued, the Universal Interface instead uses the CE-1 - Code as the result value.

For coded alpha results when the CE result is a single instance, the Universal Interface values the CE.result_val as follows: Use the transmitted description if

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valued or use the short_string from the nomenclature row. For coded alpha results when the CE result contains multiple instances, the Universal Interface values the CE.result_val as follows: Use each description delimited by a comma (such as Positive, Confirmed). For coded alpha results, when CE-3 - Coding System is an alias to a vocabulary source code (Code Set 400) whose meaning is FREETEXT, the Universal Interface processes the result as a string result (TXT event class) using the transmitted description as the result value. The Universal Interface inserts a row on the CE_CODED_RESULT and NOMENCLATURE tables. The Clinical Event server determines the value for the CE.result_tag based on the class and status of the clinical event row.

When the coded result OBX (CE value type) immediately follows an OBX with the same observation ID but with different value type (such as TX), the ESI server inserts CECR rows with the other value type clinical event row as the CECR.event_id. The coded result (CECR) is a child of the parent clinical event row whose event class is determined by the other value type.

The Universal Interface identifies a coded alpha result or coded independent observation when the coded result OBX (CE value type) does not immediately follow an OBX with the same observation ID and non-CE value type. The ESI server inserts a parent clinical event row whose event class is TXT and a child CECR row. A coded alpha result does not have a parent CE_STRING_RESULT row. Consequently, the normal range is denormalized and added to the CLINICAL_EVENT table.

When the coded result OBX has an observation ID that is valued with CASE or an alias to APCASE, the ESI server inserts CECR rows with the OBR event class (such as DOC or MDOC) clinical event row as the parent (CECR.event_id). For example, there is an AP surgical pathology report (MDOC class) with multiple sections (gross, microscopic, and diagnosis sections each with a DOC class). An OBX with a CE value type with an event code that matches the MDOC surgical pathology report would have a CECR row inserted with the event_id of the MDOC clinical event row. An OBX with a CE value type that follows an OBX with a TX value type where both OBX segments have the same diagnosis event code would have a CECR row inserted with the event_id of the diagnosis DOC clinical event row.

Free-Text Modifiers

Each OBX can contain multiple instances of coded results where one or more instances does not include a code (such as a free-text modifier). In this situation, each instance is not independent, but a fragment of the whole observation. An example is

```
|428.0^Congestive Heart Failure^I9C~^Massive Heart|
```

The Universal Interface formats one or more consecutive free-text modifiers immediately following a valid code using a carriage return line feed into the 255-character CECR.descriptor field. For coded alpha results, the Universal Interface converts all descriptions (coded and free text) to a comma-separated list for use as the CE_result_val.

For generic ORU processing, each OBX can contain multiple instances of coded results where all instances contain only the description component. If all instances of the coded result value are transmitted with only a description component and without a code component, the Universal Interface converts the result to a string result (TXT event class). The Universal Interface formats the actual result value using a comma to separate each description.

Group Number

If the sending application sends multiple codes with the same observation ID and observation sub-ID, these codes are not independent but are fragments or pieces that must be used together to construct the entire observation. The Universal Interface uses the transmitted sub-ID as the CECR_group_nbr. This allows coded results with the same observation ID and sub-ID to be treated as a unit.

If the sending application sends multiple OBX segments with the same observation ID and different observation sub-ID, the Universal Interface uses the transmitted sub-ID as the CECR.group_nbr. This allows coded results with the same observation ID but different sub-IDs to be treated as independent observations.

For example, the specimen is the observation identifier and multiple specimens exist. Multiple OBX segments (one segment for each specimen) is transmitted as a CE result with same observation identifier but with different sub-IDs. One clinical event row is inserted with the event code of the observation identifier. Multiple CECR rows are inserted with a group_nbr equal to the observation sub-ID.

Future Direction: A configurable option by event class and other attributes determines if results are updated using Update, Replace, or ReplaceRows ensure. Update ensures that updates are made to an existing value in an event row only if that attribute is valued in the transmitted message; attributes valued in the database but not in the message remain unchanged in the database. Replace ensures that updates are made to an existing row exactly to match the transmitted event; attributes valued in the database but not valued in the message are nulled in the database. ReplaceRow replaces all existing rows for this event or all rows on a specified child table with data exactly as transmitted in the message

Text Results

The Universal Interface accepts text discrete results (OBX-2 - Value Type of TX) and inserts them on the CE_BLOB_RESULT table using an event class code (Code Set 53) with a meaning of DOC.

The text result may be the only result transmitted as a single display document using an ORU message and the event class. These are inserted with an event class of DOC.

The text result can be an observation sent in addition to other result types. For example, the sending system transmits a group of results with five OBX segments. Four results have an NM value type; the last result is an interpretation transmitted as a TX value type. The Universal Interface posts isolated detail tests transmitted in an ORU message and a TX value type using an event class of DOC.

Detail results that consist of multiple lines of text can be provided as multiple OBX segments where each OBX segment represents a line of text (hard carriage return and no word wrap). Each OBX must have the same OBX-3 - Observation and OBX-4 - Observation Sub-Id. The Universal Interface concatenates lines for storage as a blob result.

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Alternatively, detail text results can be provided as multiple OBX segments where each OBX segment represents text data with word wrap. The sending system inserts a hard carriage return only when typed by a user. Essentially, each OBX equals a paragraph of text data (hard carriage return). Each OBX must have the same OBX-3 - Observation Id and OBX-4 - Observation Sub-Id.

The Universal Interface also accepts text results provided as a single OBX segment with a repeat delimiter separating instances of the OBX-5 - Observation Value. Each repeat delimiter represents an implied hard carriage return. Each instance equals a paragraph of text data.

Text Results---Master Document

For some diagnostic service sections (such as radiology or anatomic pathology), a discrete result transmitted in an ORU message represents a document consisting of one or more sections. Each OBX is a section of the document. The Universal Interface inserts each text section with an event class of DOC and a view level of zero.

The Universal Interface also inserts a header row on the CLINICAL_EVENT table with an event class of MDOC (master document) and a view level of zero or one. The view level is 0 (zero) when the parent clinical event is a radiology RAD event. The view level is 1 (one) when the parent clinical event is an anatomic pathology AP event. The viewer applications display all sections of the document as a single document. The user is unaware that the document sections are stored separately.

The Universal Interface uses OBR-24 - Diagnositc Service Section (Code Set 53) to identify service departments whose results include the MDOC event class. As described later in this document, the Universal Interface also inserts a CLINICAL_EVENT row with a grouper event class for anatomic pathology and radiology results.

When the OBX value type is TX and the event class is MDOC, the Universal Interface identifies the event code for each section of a composite document from the OBX-3.1.1 - Observation Identifier Code and OBX-3.1.2 - Observation Identifier Code Suffix. The code suffix also is used to uniquely identify coded and other non-textual observations associated with a report. The suffix is a sub-component of *OBX-3.1 - Observation Identifier* transmitted using the sub-component delimiter. The Universal Interface concatenates the code and its suffix, deriving the event code alias for each section, for example,

```
Identifier&Suffix^Description^Coding System|
```

Acceptable observation identifiers for report sections include the following example:

```
|&IMP|\t\tIMP is an alias to a generic Impression Section for all reports
|CH2V&IMP|\tCH2VIMP is an alias to a specific Impression Section for CH2V
|CH2V&IMP|\tCH2VIMP is an alias to an Impression Section grouped by modality
|CHEST&IMP|\tCHESTIMP is an alias to a Impression section grouped by modality
|CH2V I| \tCH2V I is an alias to an Impression section grouped by modality
CH1V I| \tCH1V I is an alias to the same Impression section grouped by modality.|
```

Note
The suffix value also can be used for coded observations (OBX with a CE value type) associated with specific report sections instead of the entire document. For example, SNOMED codes transmitted with an anatomic pathology report for anatomic site could be transmitted with an &ANT suffix.

Also, with the MDOC event class, the interface can accept images or image documents (such as PDF) when using the ED data type. For more information on this processing, see Unit 12i: Medical Document Management Inbound.

Reference Pointer (RP) Data

The Universal Interface accepts a reference pointer or handle to data stored on an external system using the ORU message with an OBX whose value type is RP.

The Universal Interface accepts reference pointer data (OBX-2 - Value Type of RP) and inserts it on the CE_BLOB_RESULT (CEBR) table using a default event class code (Code Set 53) with a meaning of DOC. The external application is one known to Cerner Millennium for which a Cerner-defined document storage code (Code Set 25) and document format code (Code Set 23) has been established.

The HL7 Reference Pointer (RP) data type provides information about data stored on another system using the following format:

Components:
Pointer (ST) ^ Application ID (HD) ^ Type of Data (ID) ^ Subtype (ID)

Sub-components of application ID:
Namespace (IS) & Universal ID (ST) & Universal ID Type (ID)

The constraints and requirements are listed below:

- The maximum size of the Pointer value is 255 bytes. The pointer value is a unique key assigned by the system that stores the data. Cerner recommends that the blob handle does not include physical location information. The Universal Interface stores the RP-1 - Pointer value_ in CEBR.blob_handle. The

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Universal Interface cannot accept and store binary Pointer values.
- Cerner supports only the RP-2.1 - ApplicationID.Namespace sub-component and ignores the Universal ID and Universal ID Type sub-components.
- The RP-2.1---ApplicationID.Namespace is an alias to a document storage code (Code Set 25) with a valid Cerner-defined meaning for remote storage. The Universal Interface stores the document storage code value in CEBR.storage_cd. To meet the requirements of imaging systems that require the return of their exact application ID, the Universal Interface also stores the Namespace value as a tag to the transmitted blob handle in CEBR.blob_handle. The Universal Interface separates the Namespace value from the Pointer value with a delimiter string of HNAM (note that a space precedes and follows the literal HNAM.
- Currently, the Universal Interface does not use or validate the RP-3 - Type of Data value.
- The RP-4 - Subtype is an alias to a document format code (Code Set 23). The Universal Interface stores the document format code in CEBR.format_cd.
- The Universal Interface can accept and post a reference pointer before the ability of a Cerner Millennium application to access or view the remote data. The list and status of imaging systems supported by Cerner Millennium is available on request.
- Both Code Set 23 and 25 are non-extendable code sets, with only one code value row allowed for each CDF meaning. Multiple code value aliases can point to the same code value.

The Cerner Millennium document storage codes for Code Set 25 are listed below. This table provides a list of document storage codes that are supported using the reference pointer functionality, except for CareAware MultiMedia, which is used to support posting images to Cerner Millennium.

Value	Description
BLOB	DB Blob Table
DICOM_SIUID	Dicom Study Instance UID
DICT	Dictation System
LVTC	LanVision Document Imaging System
MMF	CareAware MultiMedia
OTG	OTG
PACS_FOLDER	PACs Folder
ROQ1	IMNet Imaging System
RVS	Remote Viewer
URL	Standard URL

The Cerner Millennium document storage codes for Code Set 23 are listed below.

Value	Description
LONG_BLOB	Long_Blob
LONG_TEXT	Long_Text
NONE	None
PACS	PACS Folder ID
PTIFF	Proprietary TIFF (IMNET)
RTF	Rich Text Formats
TIFF	Tagged Image File Format
WINBMP	Windows BMP
HTML	Hypertext Markup Language
JPEG	Joint Photographic Experts Group
XML	Extensible Markup Language
URL	Uniform Resource Locator
GIF	Graphics Interchange Format
PDF	PDF document
MSWORD	Word document

Some examples are shown below.

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```
|1234A321634^EFC^SD|   2.2 example where
 1234A321634 is the handle
EFC is a code value alias to code value (cs 25) whose meaning is ROQ1
SD is a code value alias to code value (cd 23) whose meaning is PTIFF
CEBR.blob_handle = 1234A321634 HNAM EFC

|1234A321634^EFC^Image^TIFF|  (2.3 example where
             1234A321634 is the handle
IMNET is code value alias to code value (cs 25) whose meaning is ROQ1
ZPTIFF is code value alias to code value (cs 23) whose meaning is PTIFF
Note: if .4 component not valued Image is alias (cs 23) to PTIFF
CEBR.blob_handle = 1234A321634 HNAM IMNET

|123BXF3265^3665^Image^RTF| (2.3 example where 123BXF3265 is the handle
3665 is code value alias to code value (cs 25) whose meaning is DHT
RTF is code value alias to code value (cd 23) whose meaning is RTF
CEBR.blob_handle = 123BXF265 HNAM 3665

 |445ZAD6597^4673^Image^RTF| (2.3 example where 445BXF6597 is the handle
3665 is code value alias to code value (cs 25) whose meaning is DHT
RTF is code value alias to code value (cd 23) whose meaning is RTF
CEBR.blob_handle = 445ZAD6597 HNAM 4673
```

Encapsulated Data (ED)

The Universal Interface accepts encapsulated data using the ORU message with an OBX whose value type is ED. This includes accepting RTF documents, as well as, with the 2007.19 Release Update, accepting images or image documents to CareAware MultiMedia using the PowerChart paper clip functionality.

The Universal Interface accepts encapsulated data (OBX-2---Value Type of ED) and inserts it on the CE_BLOB_RESULT (CEBR) table using a default Cerner Millennium event class code (Code Set 53) with a meaning of DOC when processing RTF documents. When using the logic to post images to CareAware MultiMedia, the Universal Interface uses an event class code (Code Set 53) with a meaning of ATTACHMENT to post the image.

The HL7 Encapsulated Data (ED) data type provides supports ASCII MIME-encoding of binary data.

The components are listed below:

<source application (HD)> ^ <type of data (ID)> ^ <data subtype (ID)> ^ <encoding (ID)> ^ <data (ST)>

The following table provides an explanation of how each component is used in the message.

HL7 Component	Description	ORU Mapping
OBX-5.1---Source Application	A unique name that identifies the system that was the source of the data.	N/A
OBX-5.2---Type of Data	An ID data type that declares the general type of data.	Used to determine if the data in OBX-5.5 is an image, text, or application type of data. This is a required field when posting images to CareAware MultiMedia and aliased on Code Set 16092.
OBX-5.3---Data Subtype	An ID data type declaring the format for the data.	Used to determine the MIME type of the data in OBX-5.5. This is a required field and aliased on Code Set 23 (format_cd). The interface accepts encoded data of Base64, Hex, and ASCII. The interface defaults to ASCII if this value is not aliased on Code Set 16090. This field is not used when sending a basic RTF report, but is used when processing images to CareAware MultiMedia.
OBX-5.4---Encoding	An ID data type declaring the encoding system used for the data.	The interface accepts encoded data of Base64, Hex, and ASCII. The interface defaults to ASCII if this value is not aliased on Code Set 16090. This field is not used when sending a basic RTF report, but is used when processing images to CareAware MultiMedia.
OBX-5.5---Data	A string type providing the actual encoded data.	Actual text or encoded image to be posted.

For examples of ORU messages with OBX segments using the ED data type, see Unit 12i: Medical Document Management Inbound.

Blood Bank Results

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The Universal Interface accepts three types of blook bank results or events for storage on the Clinical Event tables:

- Specimen result
- Specimen-product result
- Product transfused event

All blood bank results for storage must be associated with a patient. The Clinical Event model cannot accept blood bank product-only results.

Specimen Result

The Universal Interface defines a specimen result as a blood bank result performed only on the patient specimen (such as Type and Rh). This type of blood bank result does not require blood product information to uniquely identify the result.

The Universal Interface processes a blood bank specimen result as a standard detail event. The contributor system provides each result detail in an OBX segment with an ST, NM, ID, or CE result type (OBX-2---Value Type).

Specimen-Product Results

The Universal Interface defines a specimen-product result (such as a crossmatch) as a blood bank result performed on a mixture of a sample from the patient specimen and a sample from a specific blood product unit. This type of blood bank result requires both patient specimen information (such as a filler order ID, universal service identifier, or observation identifier) and blood product information (such as a unique product identifier, blood product type, or unit number) to uniquely identify the result.

Specimen and order information is provided in the OBR segment. Product data is provided in the Cerner-defined ZBP segment.

> **Note**
> The Universal Interface inserts product information only when the product is directly linked to a patient, either as a part of the specimen-product result or as a part of the product transfused event. Product information must be provided for each patient and event (if a product is crossmatched to more than one patient, a separate ORU message with a ZBP segment is required for each patient). The product CLINICAL_EVENT row is a child of the parent event row inserted for the patient specimen. Product information on the CE_PRODUCT table is a snapshot of product information when the event occurred.

The Universal Interface processes specimen-product results in an ORU message as follows. The ORU message is formatted as described for the ZB1 event.

- Required ORC/OBR pair provides information about the order and patient specimen.
- Optional OBX segments containing specimen results (such as OBX-4---Observation Sub-ID) are not valued. For example, if the ordered procedure is a Type and Crossmatch, an OBX for the ABO result, and an OBX for the RH result, may follow the ORC/OBR pair.
- Required ZBP segments contain product-unit-specific data for storage on the CE_PRODUCT table, including the product type, product unit number, and unique product reference number. The product reference number equals the OBX-4 - Observation Sub-ID for all specimen-product results associated with a given product. ZBP segments must precede related OBX segments.
- OBX segments containing specimen-product results (such as the_OBX-4---Observation Sub-ID _value) matches the unique product reference number from the preceding ZBP segment).

The HL7 fields are described below.

HL7 Field	Value/Description/Comments
ORC-1---Order Control Code	RE.
OBR-3---Filler Order Number	Order/specimen reference number. Must be unique.
OBR-4---Universal ID	Alias to the event code that identifies the parent orderable procedure. Event class of parent clinical event - GRP.
OBR-15---Specimen Source	Not an alias to BPU (blood product unit)---Code Set 2052. Specimen source cannot translate to source of blood product unit.
ZBP Blood Product Segment	Cerner standard Z segment containing product information considered clinically significant for the electronic health record. Presence of ZBP identifies a specimen-product result.
OBX segments: Specimen-Product Results	
OBX-2---Value Type	ST or CE.
OBX-3---Observation ID	Detail events for crossmatch (such as XM INTERP).
OBX-4---Observation Sub-ID	Unique product identifier. Matches ZBP.

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OBX-13---User-Defined Access Check	Literal NONPUB to set the publish_flag to zero (non-publishable). **Future Direction:** The transmitted value is the code value alias (code set to be determined) whose CDF meaning or extension parameters cause the ESI server to set the publish_flag to zero (non-publishable).

Blood Bank Product Transfused Event

The Universal Interface accepts and posts a third type of blood bank event the blood product transfused event. The ORU message is formatted as described for the ZB2 event. The Universal Interface identifies a transfused event when the OBR-4 - Universal Service Identifier is an alias to the code value whose CDF meaning is TRANSFUSE (Code Set 16089, ESI Result Processing).

Field	Description	Value
OBR-3	Filler order ID	Permanent unique identifier for the event.
OBR-4	Universal service ID	Alias to appropriate event_cd (such as Transfused) and aliased to Code Set 16089 with TRANSFUSE meaning.
OBR-7	Observation date and time	Date and time the products in this message are assumed transfused. This date is the clinically significant date.
OBR-25	Result status	Assumed Transfused Status: Alias to Unauthenticated for transfused status. The Universal Interface always uses a value of TRANSFUSED for the result tag. Returned Event: Alias to INERRORNOMUT to inactivate the current row and alter the reference number so it is not longer available for match or updates.

The Universal Interface also accepts a transfused event not directly linked to an order or specimen-product result (such as fresh-frozen plasma).

The sending system must value the OBR-3---Filler Order ID with a permanent unique identifier for the event. The Universal Interface derives the transfused event reference number from the Filler Order ID and view level.

The sending blood bank application must have a trigger to send the transfused event and triggers to send any corrections or returns. OCF does not update or change the product status until a message with the new status is transmitted from a sending system.

Example: Specimen-Only Result With Specimen-Product Result

```
MSH
PID
ORC|RE
OBR|1|869807^E|887654321^L1|8012347^TXM||||199703060800||||||||||00BB97000123||||BLB
OBX|1|ST|8012344^ABO||A||||||F|||199703061300OBX|1|ST|8012344^RH||POS||||||F|||199703061300
ZBP|1|0156PC|0156||PC^Packed Cells|XM|199703061300||A|POS|K+~I|IRRAD |^^AMRC^^^BBSUPL|||||255|255
OBX|1|ST|8012345^XM|0156PC|COMPATIBLE||||||F|||199703061300
ZBP|2|L01568PC|L01568||PC^Packed Cells|TRNSF|199703061300||A|POS|||||Y||||210
OBX|1|ST|8012345^XM|L01568PC|COMPATIBLE||||||F|||199703061300
ZBP|1|0157PC|0156||PC^Packed Cells|XM|199703061300||A|POS|K+~I|IRRAD |^^AMRC^^^BBSUPL|||||255|255
OBX|1|ST|8012345^XM|0157PC|NONCOMPATIBLE||||||F|||199703061300
```

Example: Transfused Event

```
MSH
PID
ORC|RE
OBR|1|869807^ES|887654321^L1|TRANSFUSE STATUS||||199703061500||||||||||\t|00BB97000123||||BLBTRAN
ZBP|1|0156PC|0156||PC^Packed Cells|TRANSF|199703061500||A|POS|K+~I|IRRAD |^^AMRC^^^BBSUPL|||||255|255
```

Microbiology Results

Microbiology results include culture reports and sensitivity results. Microbiology results can be viewed as a hierarchy: the culture, organisms or isolates, sensitivity type, and panels or individual antibiotics. To be clinically useful, all microbiology results must reference the ordered culture using the parent orderable procedure OBR-4 - Universal Service ID and the parent reference numbers OBR-3 - Filler Order Number. The Universal Interface identifies a microbiology result when the OBR-24 - Diagnostic Service Section is set to MB or MA or is an alias to the Microbiology Event Class (Code Set 53) whose meaning is MBO.

Microbiology text reports associated with the culture must be sent as a standard result ORU message with one or more OBX segments with a TX value type. Microbiology systems frequently identify a culture as Positive or Negative.

Microbiology text reports often are generated from coded phrases. The Universal Interface does not accept coded microbiology phrases, but instead, accepts only accept the actual report text.

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Organism identification is coded and should be provided as a separate OBX segment within the report ORU message as follows and interface accepts SNOMED CT codes in OBX-5:

Field	Description	Value
OBX-2	Value Type	CE.
OBX-3	Observation Identifier	Literal ORGANISM.
OBX-4	Observation Sub-ID	Isolate sequence number. Does not change for this culture.
OBX-5	Observation Value (Isolate OBX)	Organism Code^Description^Name of Coding System.

The Universal Interface also accepts Organism Identification as a separate OBX within the ORU sensitivity result message, as well as an OBX within an ORU report message. In addition, if a separate isolate OBX has not been provided previously, the Universal Interface can identify an organism using the OBR parent fields as described in Susceptibility Results.

Example: Parent Culture Report (General Report Type)

```
MSH
PID
OBR|1|269807^ES|987654321^LAB1|5012345^C URINE|||||||||||||00MA95000123||||MB
OBX|1|TX|5012345^C URINE||Paragraph 1 or line 1 of general micro report.\tOBX|2|TX|5012345^C URINE||Paragraph 2 of
line 2 of general MB report\t
OBX|3|CE|ORGANISM|1|EC^Escherichia Coli  \t\t
OBX|4|CE|ORGANISM|2|GPC^Gram Positive Cocci
```

Example: Parent Culture Report (Alternate Format Using Specific Report Types)

```
MSH
PID
OBR|1|269807^ES|987654321^LAB1|5012345^CURINE|||||||||||||00MA95000123||||MB
OBX|1|TX|5000415^GRAM ST||Paragraph 1 or line 1 of MB stain report\t
OBX|2|TX|5000417^PRE||Paragraph 1 or line 1 of MB prelim report~paragraph or line 2  \t
OBX|4|CE|ORGANISM|1|EC^Escherichia Coli\t\t
OBX|5|CE|ORGANISM|2|GPC^Gram Positive Cocci
```

Susceptibility Results

Sensitivity results report the response of specific organisms in a culture to different antibiotics and antibiotic strengths. Each isolate should be assigned an isolate sequence number for the culture. Organism names can change; therefore, both the sending and receiving system should key on the isolate sequence number and not the organism name. The Universal Interface accepts the isolate sequence number in the Observation - Sub-ID field (OBX-4).

The Universal Interface can accept sensitivity results before or after transmission of any culture report, including the Final Report; however, the appropriate reference numbers must be available in the sensitivity message.

The Universal Interface assumes the following when posting sensitivity results:

- The Diagnostic Service Section (OBR-24) is set to MB or MA or a code value.
- The same antibiotic can be ordered as more than one type of susceptibilities (such as MIC and a Kirby-Bauer) on the same organism in a culture. The ordered procedure (OBR-4) for the sensitivity ORU is translated to the susceptibility type code.
- The linked results field (OBR-26) contains the parent culture and organism information formatted as follows:

  ```
  |CultureProcedureCd&CultureProcAbbrev^OrgSeqNo.^OrganismCode&OrganismAbbr|
  ```

- The Parent Accession No. field (OBR-29) contains the culture's placer and filler order number formatted as follows:

  ```
  |PlacerOrdNo&AppId^FillerOrdNo&AppId|
  ```

- The sensitivity result for an antibiotic can have multiple interpretations, or an interpretation only with no result value.
- Susceptibility messages can contain results for a single or multiple isolates, and a single or multiple susceptibility type codes.

Example: Susceptibility Messages

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```
MSH    (one message)
PIDOBR|1|269807^ES|987654321^LAB1|5500010^MIC|||||||||||||00MA95000123||||MB|
     |5012345&C URINE^2^SAUR&Staph Aureus|||269807&ES^987654321&LAB1|
OBX|1|ST|551001^AMPICILLIN|2|1.0||R|
OBX|2|ST|551011^PENICILLIN|2|16.0||S|

MSH    (another message)
PID
OBR|1|269807^ES|987654321^LAB1|5500011^KB|||||||||||||00MA95000123||||MB|
     |5012345&C URINE^1^EC&E Coli|||269807&ES^987654321&LAB1|
OBX|1|ST|551001^AMPICILLIN|1||||R|
OBX|2|ST|551011^PENICILLIN|1||||S|
MSH    (one message with multiple isolates)
PID
OBR|1|269807^ES|987654321^LAB1|5500011^KB|||||||||||||00MA95000123||||MB|
     |5012345&C URINE^1^EC&E Coli|||269807&ES^987654321&LAB1
OBX|1|ST|551001^AMPICILLIN|1||||R|
OBX|2|ST|551011^PENICILLIN|1||||S|
OBR|2|269807^ES|987654321^LAB1|5500010^MIC|||||||||||||00MA95000123||||MB|
     |5012345&C URINE^2^SAUR&Staph Aureus|||269807&ES^987654321&LAB1|
OBX|1|ST|551001^AMPICILLIN|2|1.0||R|
OBX|2|ST|551011^PENICILLIN|2|16.0||S|
OBR|3|269807^ES|987654321^LAB1|5500011^KB|||||||||||||00MA95000123||||MB|
     |5012345&C URINE^2^SAUR&Staph Aureus|||269807&ES^987654321&LAB1|
OBX|1|ST|551001^AMPICILLIN|2|||R|
OBX|2|ST|551011^PENICILLIN|2|||S|

OBR|1||
5008726072.00|MIC|||20120827|20120827||AV018400||||20120815|BLD|AV018400||00000DX20120000954||||20120827||MB|AL|CBLO
Ag Tiss Ql ImStn^LN|2|99746000^^SNOMED^99758000^^SNOMED
```

Anatomic Pathology Reporting

The Universal Interface accepts discrete anatomic pathology results using the HL7 ORU message format. The Universal Interface accepts both discrete text report sections and coded SNOMED codes. The Universal Interface accepts the initial signed report and, if the parent accession or case is identified, the Universal Interface accepts an addendum report to the original. The Universal Interface identifies and processes an anatomic pathology discrete result as follows:

- The MSH-9.1---Message Type of ORU.
- The OBR-24---Diagnostic Service Section is an alias to the anatomic pathology Event Class (Code Set 53).
- For the original report, the case identifier, unique report identifier, or both are provided in the OBR-3---Filler Order Number field. The ESI server uses this value with other values in the message to determine both a reference number and series reference number.
- The document identifier or report type is provided in OBR-4 - Universal Service ID.
- The AP case or accession number can be provided in OBR-21 - Filler Field No. 2. If not valued, the OBR-3 - Filler Order Number is used as the AP case or accession number. An addendum transmitted as a separate report type always should have the same common case or accession number.
- **Future Direction:** When the addendum case or accession number is different from the original, for the addendum to be a child of the original AP case, the original AP case identifier will be provided in OBR-26.1 - Parent Number, OBR-29.2 - Parent Filler Order, or both, such as the original case number - AP19970000336; or the addendum case number - AP19970000336A, AP19970000336A1, or AP19970000336.
- Each report section is provided in separate OBX segments with a TX value type.
- SNOMED codes are provided in OBX segments with a CE value type and a source code aliased to the appropriate Cerner Millennium SNOMED source vocabulary code.
- Other coded results or observations for special processing is provided in OBX segments. The value type varies with the observation.

The Universal Interface inserts the parent or root case grouper clinical event row with an AP event class and a view level of 0 (zero) and a generic AP event code. The Universal Interface formats the reference number for the parent row using OBR-3 - Filler Order Number and the view level.

For each report, the Universal Interface inserts a document grouper clinical event row with an MDOC event class and a view level of 1 (one). The OBR document identifier or report type OBR-4 - Universal Service ID) is an alias to the event code for the MDOC row. The Universal Interface formats the reference number for the MDOC row concatenating OBR-3 - Filler Order Number, the report type identifier, and the view level.

Each document or report section is provided as a separate OBX segment. For each report section, the Universal Interface inserts a clinical event row with a DOC event class and a view level of 0 (zero). See Text Results and Text Results---Master Document earlier in this document. This section describes how the Universal Interface identifies a report section. The Universal Interface formats the reference number for each DOC row concatenating OBR-3 - Filler Order Number with the OBR report identifier, OBX report section identifier, and view level.

SNOMED codes are provided as a separate OBX segment following the associated report section. See Coded Results.

Non- SNOMED and non-report section OBX segments also provide observations that require special ESI server processing. The OBX-3---Observation Identifier is an alias to an ORU Special Processing code set (code set TBD) with a Cerner-defined meaning (CDF). In addition to special processing requirements, each observation can be an alias to an event code. Special processing observations with CDF meanings for anatomic pathology reports currently include the following

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items:

- CASE NORM that defines the normal or abnormal code for the case level (AP and MDOC) event class rows.
- OBX-8 - Abnormal Flag is an alias to the normalcy_cd (Code Set 52).
- OBX-3 - Observation Id is not an alias to an event code.

The electronic signature is provided as an NTE segment following the appropriate report section. The NTE-2 - Source of Comment is an alias to the entry_method_cd (Code Set 13) whose recommended CDF meaning is P and an alias to the note_type_cd (Code Set 14) whose meaning is SIGN LINE. The Universal Interface inserts a CE_EVENT_NOTE row.

Genomic Results

With the 2007.18 Release Update, the Universal Interface accepts discrete, historical, molecular-diagnostic, genomic results using the HL7 ORU message format. The results accepted can be numeric, string, or textual data. These results are stored on the clinical event and are for viewing only. Calculations or reporting is not provided for these results.

As part of genomic testing, many numeric result values and reference ranges use scientific notation. The interface accepts result values and reference ranges using the following scientific notation format: **1.23E+10**, where:

- 1.23 is the value.
- E indicates there is exponential information.
- +/- indicates whether the exponent is + or - (large or small number).
- 10 is the exponential value in base of 10.

If a system cannot send the scientific notation in this format, the Universal interface posts the result as a string result.

Radiology Diagnostic Reporting

The Universal Interface accepts discrete radiology results using the HL7 ORU message format. The Universal Interface accepts one or more discrete text sections with the initial report and one or more addendum sections attached to the same report.

The Universal Interface identifies and process a radiology discrete result as follows:

- The MSH-9.1 - Message Type of ORU and MSH-9.2 - Message Event of R01.
- The OBR-24 - Diagnostic Service Section is an alias to the radiology RAD Event Class (Code Set 53).
- The clinically significant date (usually exam performed or completed date) is provided in the OBR-7 - Observation Date/Time, OBR-8 - Observation End Date/Time, or both.
- Reason for Exam is provided in the OBR-31.2 - Reason for Study Description field or in an NTE segment following the OBR segment. The maximum size of the reason text is 32K.
- The unique report identifier (such as accession number) is provided in the OBR-3 - Filler Order Number field.
- The document identifier (exam) is provided in OBR-4.1 - Universal Service ID. The document description or report title is provided in OBR-4.2 - Service ID Description.
- **Future Direction:** Addendum is added as a section to the original report. The original report identifier (filler order number) is provided in the OBR-29.2 - Parent Filler Order Number and the original document identifier (universal service ID) in OBR-26.1 - Parent. Valuing parent fields is a requirement only when the original report identifier or the original document identifier does not match the addendum report identifier or addendum document identifier, such as the addendum is transmitted as a separate document not a section added to the original document.
- Each report section is provided in separate OBX segment with a TX value type.

The Universal Interface inserts the parent grouper clinical event row with an RAD event class and a view level of 1 (one). The Universal interface uses the OBR-4.1 - Universal Service ID -report identifier as the event code alias for this parent row. The Universal Interface formats the reference number for the RAD parent row by concatenating the report identifier OBR-3 - Filler Order Number), the document identifier (OBR-4.1 - Universal Service ID), and the view level 1 (one).

The Universal Interface inserts a document grouper clinical event row with an MDOC event class and a view level of 0 (zero). The Universal Interface uses the generic event code RADRPT for the MDOC clinical event row. The Universal Interface formats the reference number for the MDOC row by concatenating RADRPT to the RAD reference number value, changing the view level of the RAD reference number value from 1 (one) to 0 (zero).

Each document or report section is provided as a separate OBX segment. For each report section, the Universal Interface inserts a clinical event row with a DOC event class and a view level of 0 (zero). See Text Results and Text Results---Master Document earlier in this document. This section describes how the Universal Interface identifies a report section.

The Universal Interface formats the reference number for each DOC row concatenating the MDOC reference number, OBX report section identifier, and section view level.

The electronic signature is provided as an NTE segment following the appropriate report section. NTE-2 - Source of Comment is an alias to the entry_method_cd (Code Set 13) and an alias to the note_type_cd (Code Set 14). The Universal Interface inserts a CE_EVENT_NOTE row as a child of the sections DOC clinical event row. For proper display in Cerner Millennium applications, the electronic signature follows the Impression and Addendum sections.

The Universal Interface identifies personnel associated with the radiology report and inserts CE_EVENT_PRSNL rows using HL7 data elements provided in the OBR, OBX, or ZDS segments. For proper display in Cerner Millennium view applications, the event personnel rows are children of the Impression or Addendum clinical event row.

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HL7 Field	OBR or OBX Result Status	CEPRSNL Action Type (Code Set 21)	CEPRSNL Action Status (Code Set 103)	Comments
OBR-32---Main Result Interpreter	R	PERFORM	COMPLETE	Results transcribed but not signed. Use OBR-22---Report of Dt.
OBR-33---Assistant Result Interpreter	F or C	ASSIST	COMPLETE	
OBR-34---Technician (repeats)	R, F, or C	ASSIST	None	
OBR-35---Transcriptionist	R, F, or C	TRANSCRIBE	COMPLETE	If status is R, use OBR-22---Report of Dt. If F or C, transcribed date is unknown.
OBX-16---Responsible Observer	R	None	None	
OBX-16---Responsible Observer	I or R	PERFORM	COMPLETE	In-Process or Transcribed.
OBX-16---Responsible Observer	P or F	VERIFY	COMPLETE	Preliminary or Final results.
OBX-16---Responsible Observer	C	MODIFY	COMPLETE	Corrected results.

Note
If OBX-14 - Observation Date and Time is provided with a report section, the Universal Interface posts as the Cerner Millennium action date and time. If not valued, the Universal Interface uses the date and time provided in OBR-22 - Report Date and Time.

The Universal Interface determines the overall document authentication status from the OBR-25 - Result Status field. This status applies to the parent or grouper clinical event rows (RAD and MDOC event class).

The following table lists suggested Cerner Millennium result statuses. The actual status is determined using code value alias translation.

OBR Status (HL7 0123)	Cerner Millennium Result Status (Code Set 8)	Comments
O,S	ANTICIPATED	Not applicable to ORU^R01 or R03 messages.
I	IN PROGRESS IN LAB	Exam Complete, no results available. Only applicable for results from an LIS laboratory system.
R	TRANSCRIBED	Stored results, not verified.
P	UNAUTH	Results thought to be accurate but preliminary.
A	UNAUTH	Results known to be accurate but not all results available, verified, or incomplete.
F	AUTH	Authenticated (signed, verified, complete).
C	MODIFIED	Corrected, changed, added to, or replaced after authenticated.
X	CANCELED	Canceled. An update to this status allowed only before result authentication.
E*	INERROR	Results in error but viewable.
W*	INERRORNOVIEW	Results in error and not viewable from PowerChart. Can be updated to a valid result.
D*	INERRORNOMUT	Results in error. Not modifiable. Reference number modified during processing, so applications and interface are unable to retrieve or update this row.

* Suggested values to use as an extension to HL7 standard values.

The Universal Interface determines the discrete result status (Code Set 8) and succession type (Code Set 63) for each document section (DOC event class) from OBX-11 - Observation Result Status or OBR-25 - Result Status.

The ESI server sets the series reference number for the DOC event class equal to the reference number. When these two values are equal, succession logic required for complex documents based Code Set 63 does not apply. When these two values are equal, result succession follows standard result succession logic. The receipt of a new Unauthenticated result (any result whose status is not Authenticated or Modified) updates or replaces an existing Unauthenticated result. The previous Unauthenticated result is ended and not viewable from normal applications (such as PowerChart). The receipt of a new Authenticated or Modified result replaces the previous result as the active result.

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OBX Status (HL7 0085)	Cerner Millennium Event Status (Code Set 8)	Succession Type (Code Set 63)	Succession Class (Code Set 92)	Comments
I	IN PROGRESS IN LAB	I	Replace	Exam complete, no results available. Applies only to results from LIS. Pending results, interface only.
R	TRANSCRIBED	I	Replace	Stored results, not verified.
P	UNAUTH	I	Replace	Preliminary with verified or non-verified results.
F	AUTH	F (Final)	Replace	Authenticated (signed, verified, or complete).
C	MODIFIED	CA (Cum-amendment)	Replace	Corrected, changed, added to, or replaced after authenticated. All results included.
A	MODIFIED	A (Amend)	Append	Not used with ORU results.
D	INERRORNOMUT	N/A	N/A	Results in error. Not modifiable.
W	INERRORNOVIEW	N/A	N/A	Original result was wrong. For example, the original result was posted on wrong patient.
E	INERROR	N/A	N/A	Results in error but viewable.
U	AUTH			**Future:** Change status to final, no new results.
X	CANCELED	N/A	N/A	**Future:** Cancel only. Allowed for unauthenticated results.

Radiology Linked Accessions

The Universal Interface accepts linked reports within and between accessions. Linked accessions are used extensively for radiology reporting when multiple ordered exams and accessions can be read by the radiologist at the same time and have one impression. Only one record of the actual text is stored. All other linked accessions are completed but have no individual result record.

The Universal Interface accepts linked results using the HL7 ORU transaction with an event code of R01 (discrete). The message contains multiple ORC/OBR pairs with a CN combined order control code. Each pair identifies a linked accession. The first pair is the primary accession in the link. For updates to an existing linked document, the same primary accession always must be the first accession (first ORC/OBR pair) in the message. The report data follows the last ORC/OBR pair and has an RE results-to-follow order control code.

ORU Segment	Segment Name	Comments
MSH	Message Header	
PID	Patient Identification	
[PV1]	Patient Visit	
{		
ORC	Order Common - CN or RE	The first ORC has a CN order control code, all middle ORC segments have a CN order control code, and the last ORC segment has an RE order control code. The Universal Interface does not reject a linked result message when ORC segments are not sent. Current or future functionality based on values in the ORC segment (such as the order status), however, require the ORC and CN order control code.
OBR	Observation Report	
[{ NTE }]	Notes and Comments	Order-level comments.
}		
{		
OBX	Observation/Result	
[{NTE}]	Notes and Comment	
}		

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To break a linked result for a non-primary accession, the sending system sends an ORU message that includes the accession no longer in the original link with its new results. The new message can include only the one accession or can include multiple ORC/OBR pairs to establish a new linked result. Cerner does not require a second ORU update message that includes accessions remaining in the original linked result.

To break a linked result for the primary accession, the sending system sends at least two ORU messages in any sequence. One message contains the original primary accession as a single result, as a secondary accession in another link, or as a primary accession in a new linked result. Another message must contain the remaining accessions in the original link with a new primary accession. Both messages must include text results.

HL7 Segment Layouts

This section defines the HL7 data segments supported by this Cerner Millennium Universal Interface. The segment definition tables are populated as shown below. Shaded rows in the segment tables denote fields currently not supported by Cerner Millennium.

Heading	Contents	Values
Seq	HL7 Field Sequence	Begins with 01 for each segment.
HL7 Format	HL7 maximum bytes	Defined by HL7. Values are comma delimited, such as 20,ST,R. Defined by HL7. The data type in parentheses indicates the type used by Cerner Millennium. Required values: R - Required, C - conditional, O or empty - Optional,Repeat: r# where r indicates repeat and # is the number of instances. The *r* without a number indicates that a field can repeat an indefinite number of times.
HL7 Elem	HL7 Field identifier	Defined by HL7, Unique Identifier.
Name	HL7 field name	Defined by HL7.
Cerner Table	Cerner Millennium table	Abbreviated table name. A plus sign (+) denotes that the attribute is stored on multiple tables. *v* denotes that the attribute is stored on various tables depending on the event and other values.
Cerner Attribute	Cerner Millennium column or attribute	Attribute name. Blank denotes that the transmitted element is not stored.
Code Set	Cerner Millennium Code Set	Code set number. *E* before the code set number indicates an extendible Code Set, which is a Code Set that has non-aliased values, added on-the-fly (AOF).
R/O	Field required by Cerner Millennium	R - Required to process the message. C - Conditionally required. O - Optional. N - Not supported. B - Backward compatibility. Use new field defined. r# - Indicates a repeat and # is the number of instances. *r* without a number indicates that a field can repeat an indefinite number of times.
HL7 Ver	HL7 version number	The HL7 version in which the field was first supported.
Comments	Cerner Millennium Field Usage Comments	General comments.

Note
Code meanings listed as valid values represent Cerner-defined (CDF) meanings. The actual transmitted code from the external system does not have to match the code meaning but maps to a code meaning via the CODE_ALIAS table. Unless specifically identified with a size limit, Cerner Millennium can accept values considerably larger than the HL7 maximum size. For example, the maximum size of a code value alias built by a user is 255 characters. Because the code value display is 40 characters, add-on-the-fly code values are limited to 40 characters.

Control Segments (HL7 Chapter 2)

The control segments are described below.

MSH (Message Header) Segment

The MSH (Message Header) segment defines the characteristics of the message. The sending and receiving applications are identified, as well as the encoding

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characters used as delimiters for the message. The MSH message type is used to indicate the type of message being transmitted. In the MSH of the ACK response, the values of the Sending Application, Sending Facility, Receiving Application, and Receiving Facility are the reverse of the values in the original message.

MSH Segment Layout

MSH Seq	HL7 Format	HL7 Elem	Name	Cerner Table	Cerner Attribute	Code Set	R/O	HL7 Ver	Comments
01	1,ST,R	00001	Field Separator				R	2.3	Field separator. Must be printable character that is never included in transmitted data. The recommended value is a pipe (|) - ASCII(124). Values other than the recommended value can be configured by interface connection.
02	4,ST,R	00002	Encoding Char				R	2.3	Used to separate data field components, repeating data elements, and text control characters. Must be printable characters that are never included in transmitted data. Recommended values: Pos 1: Component Separator (^) - ASCII(94) Pos 2: Repetition Separator (~) - ASCII(126) Pos 3: Escape (), ASCII(92) Pos 4: Sub-Component (&)- ASCII(38) Values other than the recommended values can be configured by interface connection.
03	227,HD,O	00003	Send Application		Contributor_system_cd Contributor_source_cd	89 73	R	2.3	Site-defined description of sending application. Must be unique. Use (to Cerner Millennium): Determine what action the server takes for records already in the database. Note that CONTRIBUTOR_SOURCE_CD is a derived value configurable in the SI Manager (SI_Manager.exe) for each contributing system.
04	227,HD,O	00004	Send Facility				R	2.3	Site-defined description of sending facility. Use (to Cerner Millennium): 1) Default facility. 2) A configurable option to use this value to derive the encounter organization. **Blood Bank Inventory:** Cerner Table = BB_EDN_ADMIN Cerner Attribute = source_org_id
05	227,HD,O	00005	Receive Application			15769	O	2.3	Site-defined description of receiving application. To Cerner Millennium: Value RLI for PathNet Reference Laboratory interfaces. **Accept Attachments:** Valued with MSH-3---Sending Application.
06	227,HD,O	00006	Receiving Facility				O	2.3	Site-defined description of receiving facility. Use (to Cerner Millennium): A configurable option to use this value to derive the encounter organization. **Accept Attachments:** Valued with MSH-4---Sending Facility. **Blood Bank Inventory:** Cerner Table = BB_EDN_ADMIN Cerner Attribute = destination_loc_cd
07	26,TS,O	00007	D/T of Message				O	2.3	System date and time the message was formatted in the sending system.
08	40,ST,O	00008	Security				N	2.3	Not supported by Cerner Millennium.
09	15,MSG,R	00009	Message Type				R	2.3	Specific HL7 message type and event triggering the message.
09.1			Type				R	2.3	HL7 Table 0076: ORU.
09.2			Event				R	2.3	HL7 Table 0003: R01, R03, ZB1, and ZB2.
09.3			Structure				N	2.3.1	Not supported by Cerner Millennium.

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10	20,PT,R	00010	Message Control ID				R	2.3	Unique. Initiator generated. Responder returns sender value in ACK message in MSA-2. With acknowledgment messages, the MSH-10 value can be identical to the original sender value or can be a new unique value assigned by the acknowledging system. To Cerner Millennium: The Universal Interface does not reject a message when MSH-10 is not unique; however, non-unique values hinder or limit troubleshooting options.
11	01,ID,R	00011	Processing ID HL7 2.3 Processing id^mode				R	2.3	Status of the interface. Valid values from the HL7 0103 table for Cerner Millennium applications: T - Training/Testing Environment or P - Production Environment. Cross-environment processing is not supported. With HL7 2.3, MSH-11.2 determines the processing mode. Valid values from the HL7 0207 table are A - Archive I - Initial load, and R - Restore from archive. This field allows different priorities to be given to different processing modes. The interface does not support MSH-11.2---ProcessingMode.
12	08,ID,R	00012	Version ID				R	2.3	HL7 version. Set to 2.3. To Cerner Millennium: Set to 2.1, 2.2, or 2.3. Functionality based on HL7 2.3 fields. Components and segments are available only if the HL7 2.3 standard is used. The interface, however, has not defined processing parameters that reject a message due to the absence of an HL7-2.3-only field or component.
13	15,NM,O	00013	Sequence Number				N	2.3	Not supported by Cerner Millennium. HL7 sequence number protocol.
14	180,ST,O	00014	Continuation Pointer				N	2.3	Not supported by Cerner Millennium. Value indicating a single logical message transmitted using more than one physical message.
15	2,ID,O	00015	Accept Ack Type				N	2.3	
16	2,ID,O	00016	Application Ack type				N	2.3	
17	2,ID,O	00017	Country Code				N	2.3	Not supported by Cerner Millennium.
18	ID	00692	Character Set				N	2.4	Not supported by Cerner Millennium.
19	CE	00693	Language of Message				N	2.4	Not supported by Cerner Millennium.
20	20,ID,O	01317	Alternate character set handling scheme				N	2.4	Not supported by Cerner Millennium. HL7 User table 0356.
21	427,EI,O,r	01598	Message Profile Identifier				N	2.4	Not supported by Cerner Millennium.

MSH Segment Processing Notes

Alias MSH-5 to code value (Code Set15769) whose CDF meaning is OCFORDER for repository display only orders.

Example - Original Message:

```
MSH|^~\&|PM|CHLD|OCF|OCF|19960214134522||ORU^R01|A13345.78|P|2.2<CR>
```

Example - Acknowledgment:

```
MSH|^~\&|OCF|OCF|PM|CHLD|19960214134530|ACK|A13345.78|P|2.2<CR>
```


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MSA (Message Acknowledgment) Segment

The MSA (Message Acknowledgment) segment is returned as part of MSH, MSA pair in the ACK message type.

MSA Segment Layout

MSA Seq	HL7 Format	HL7 Elem	Name	Cerner Table	Cerner Attribute	Code Set	R/O	HL7 Ver	Comments
01	2,ID,R	00018	Acknowledge Code				R	2.3	Valid values: AA = ACK = message stored AE = ACK = message stored with error noted AR = NAK = message rejected. **Note** AE is not supported by the standard Universal Interface communications options. Custom scripting is required.
02	20,ST,R	00019	Message Control ID				R	2.3	Echo MSH segment control ID (MSH-10) of message being acknowledged.
03	80,ST,B	00020	Text Message				N		
04	15,NM,O	00021	Expected Seq #				N	2.3	Not supported by Cerner Millennium.
05	W	00022	Delayed Ack Type				N	2.3	Not supported by Cerner Millennium.
06	250,CE,B	00023	Error Condition				N	2.3	

MSA Segment Processing Notes

Original Message

```
MSH|^~\&|PM|CHLD|OCF|OCF|19960214134522||ORU^R01|A13345.78|P|2.2<CR>
```

Acknowledgment (Immediate Original Processing Rules)

```
MSH|^~\&|OCF|OCF|PM|CHLD|19960214134530||ACK|A13345.78|P|2.2<CR>
MSA|AA|A13345.78<CR>
```

NTE (Notes and Comments) Segment

The NTE segment is used for accepting textual notes and comments. The comment applies to the segment preceding the NTE segment. The Cerner Millennium tables referenced from the NTE segment are CENT - CE_EVENT_NOTE, LBLOB - LONG_BLOB, LONG - LONG_TEXT, and OCOM-ORDER_COMMENT.

NTE Message Layout

NTE Seq	HL7 Format	HL7 Elem	Name	Cerner Table	Cerner Attribute	Code Set	R/O	HL7 Ver	Comments
01	4,SI,O	00096	Set ID - NTE				O	2.3	Sequential. Start at 1 and increment by 1 for each set (order, result).

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02	8,ID	00097	Source of Comment	OCOM CENT CENT CENT	Comment_type_cd Note_type_cd Entry_method_cd Entry_meth	14 14 13	O	2.3	In HL7 2.3 processing Cerner Millennium uses Code Set 14 for the Comment type. There is special processing in SI Manager for notes and comments processing. In HL7 version 2.3.1 and forward this field uses Code Set 13 as the Source of Comment.
03	64k,FT,R,r	00098	Comment	LONG LBLOB CENT	Note_Text Long_blob Event_title_text		R,r	2.3	Cerner Millennium accepts notes up to 64K.
04	250,CE,O	01318	Comment Type				O	2.3.1	HL7 User Table 0364.
04.1	ST		Identifier	OCOM CENT	Comment_type_cd Note_type_cd	14 14	O	2.3.1	In HL7 version 2.3.1, the recommended values are PI - Patient Instructions, AI - Ancillary Instructions, GI - General Instructions, 1R - Primary Reason, 2R - Secondary Reason, GR - General Reason, RE - Remark and DR - Duplicate/Interaction Reason. **Orders:** When processing at the order level, the interface uses the COMMENT_TYPE_CD attribute on the ORDER_COMMENT table. **Results:** When processing at the result level, the interface uses the NOTE_TYPE_CD attribute on the CE_EVENT_NOTE table.
04.2	ST		Text	CV	Display		O	2.3.1	
04.3	ST		Coding System				O	2.3.1	

NTE Message Processing Notes

The NTE segment is used to send textual comments. The Universal Interface accepts comments as multiple NTE segments in which each NTE segment represents a hard carriage return or new line. The Universal Interface also accepts comments as a single NTE segment in which each instance of the NTE-3---Comment field separated by the repeat delimiter represents a new line.

If provided, the Universal Interface uses NTE-2---Source of Comment as an alias to both the note type and entry method. If a code value alias does not exist, the Universal Interface defaults a note type and entry method as described below.

By default, the Universal Interface determines the type of comment (NOTE_TYPE_CD on Code Set 14) from the HL7 message type, event, and segment immediately preceding the NTE segment. The Universal Interface defaults the source of note (ENTRY_METHOD_CD on Code Set 13) to ancillary/owner application. The Universal Interface defaults the person who entered the note (NOTE_PRSNL_ID, foreign key to the PRSNL table) to the person who verified the event on the contributor system.

The interface provides a special configuration, *To split the source of NTE-2*, which allows aliasing of the same value received in NTE-2---Source of Comment to two different code values on Code Set 14. The code values are distinguished from one another based on whether the NTE segments follows an OBR segment or an OBX segment in the ORU message. See ESI Special Configurations to properly configure the option.

Patient and Visit Segments (HL7 Chapter 3)

The patient and visit segments are described below.

PID (Patient Identification) Segment

The PID segment identifies the person and usually the encounter associated with the message. Cerner Millennium requires at least one primary patient or person Identifier. Other patient demographic information also is provided. The Cerner Millennium tables referenced from the PID segment are EA - ENCTR_ALIAS, EN - ENCOUNTER, P - PERSON, PA - PERSON_ALIAS, PP - PERSON_PATIENT, PH - PHONE, and PN - PERSON_NAME.

PID Segment Layout

PID Seq	HL7 Format	HL7 Elem	Name	Cerner Table	Cerner Attribute	Code Set	R/O	HL7 Ver	Comments
01	4,SI,O	00104	Set ID- PID				O		Start at 1, increment by 1.
02	20,CX,B	00105	External Patient ID				O		Identifier, such as a referring medical record number, assigned by another system.
02.1	ST,O		Patient ID	PA	Alias		O		

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02.2	ST,O		Check Digit				N		Not supported by Cerner Millennium. If transmitted separately, value stored separately.
02.3	ID,O		Check Digit Scheme				N		Not supported by Cerner Millennium. HL7 Table 0061.
02.4	HD		Assigning Authority	PA	Authority and type used to derive alias_pool_cd	263	O		Translation configured in the ESI configuration which determines alias_pool_cd and person_alias_type_cd. If transmitted, this value must match exactly the value entered in SI Manager (SI_Manager.exe), which in turn must match exactly an organization alias whose type is ESI Assign Authority.
02.5	ID,O		Identifier Type		Person_alias_type_cd	4	O		Translation configured in SI Manager (SI_Manager.exe). If transmitted, the value must match exactly the value entered in SI Manager (SI_Manager.exe).
03	20,CX,R,r	00106	Internal Patient ID				C,r		Repeating field. Cerner Millennium requires at least one primary, unique person alias. Cerner Millennium requires one person map to Cerner Millennium MRN type. Any configurable person identifier field (PID-2, PID-3 or PID-4) can be used. Although PID-19---Social Security Number is an option, Cerner does not recommend using this field as the primary, unique person identifier.
03.1	ST		Patient ID	PA	Alias		C		Identifier can be numeric or alphanumeric. Alias usually stored without leading zeros or formatting characters. ESO masks determine transmit format.
03.2	ST		Check Digit				N		Not supported by Cerner Millennium. If transmitted separately, value stored separately.
03.3	ID		Check Digit Scheme				N		Not supported by Cerner Millennium. HL7 table 0061.
03.4	HD		Assigning Authority	PA	Authority and type used to derive alias_pool_cd	263	C		If not valued and only one instance, translation configured in SI Manager (SI_Manager.exe) which determines ALIAS_POOL_CD and PERSON_ALIAS_TYPE_CD. If transmitted, this value must match exactly the value entered in SI Manager (SI_Manager.exe), which in turn must match exactly an organization alias whose type is ESI Assign Authority. If multiple identifier instances with different assigning authorities are transmitted, Cerner Millennium requires a valid value in this field.
03.5	ID		Identifier Type		Person_alias_type_cd	4	C		Configurable option. Cerner recommends sending alias of MRN type in this field. Other possible types include CMRN - Community Medical Record Number, NHIN - National Health Insurance Number, SHIN - State/province Health Insurance Number, MILITARYID, PASSPORT, and HNAPERSONID - HNA. Classic patient sys ID from feeder HNA system. If multiple identifier instances with different alias types are transmitted, Cerner Millennium requires a valid translation value in this field. For encounter-level processing, only one alias type should be of MRN type. During person-level processing, ESI supports multiple aliases of MRN type. Any configurable field (PID-2, PID-3, and PID-4) can contain the MRN alias.
04	20,CX,O,r	00107	Alternate Patient ID	PA	Alias		C,r		Translation configured in SI Manager (SI_Manager.exe) that determines ALIAS_POOL_CD and PERSON_ALIAS_TYPE_CD. Processing and configuration is identical to PID-4. The Universal Interface supports multiple instances.

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05	250,XPN,R,r	00108	Patient Name familty ^ given ^ middle ^ suffix ^ prefix ^ degree ^ type code	PN	Name_last_key Name_first_key Name_middle_key Name_full_formatted Name_phonetic Name_last Name_first Name_middle Name_suffix Name_prefix Name_degree Name_type_cd	213	R		Delimited name is recommended. If a single string, interface does its best-guess attempt to split into components. ESI uses a comma to parse last name from the rest of the name. No other parsing attempts are performed. Formatted name stored as *last suffix, first middle*. All names on the NAME table have a name type code. The Universal Interface supports only one instance. The name type always is CURRENT. If the transmitted name does not match the existing name, ESI updates the existing name with a type of PREVIOUS. HL7 2.3 Table 0200. HL7 name type codes: L - Legal, M - Maiden, C - Adopted, or A - Alias.
06	30,ST,O	00109	Mother's Maiden Name	P	Mother_maiden_name		O		Treated as a person attribute and not an alias.
07	26,TS,O	00110	Date of Birth	P	Birth_dt_tm		O		
08	01,ID,O	00111	Sex	P	Sex_cd	57	O		Valid values M, F, or U. Default is U. HL7 Table 0001.
09	48,XPN,O,r	00112	Patient Alias XPN.7-type code	PA PN	Alias Name_type_cd	213	O,r		Cerner Millennium valid name type code meanings include ADOPTED, ALTERNATE, LEGAL, MAIDEN, OTHER, and PREFERRED. ESI supports multiple instances; however, ESI supports only one instance per name type. ESI flexes the name type based on the transmitted value in PID-9.7 aliased to Code Set 213. If type is not provided, ESI default to ALTERNATE NAME_TYPE_CD.
10	01,ID,O	00113	Race	P	Race_cd	282	O		HL7 User table 0005
11	106,XAD,,r	00114	Patient Address	AD			O		If type not sent, the Universal Interface uses the default type of Home.
11.1			Address Line 1	AD	Street_addr		O		
11.2			Address Line 2	AD	Street_addr2		O		
11.3			City	AD	City		O		
11.4			State	AD	State_cd	62	O		
11.5			Zip Code	AD	Zipcode		O		
11.6			Country	AD	Country_cd	15	O		HL7 User Table 0171.
11.7			Type	AD	Address_type_cd	212	O		C - Current or Temporary, P - Permanent, M - Mail, B - business, H - Home, F - Country of Origin. Valid Cerner Millennium codes also include: BIRTH and EMAIL (Internet) HL7 User table 0190.
11.8	ST,O		Other Geographic Desig	AD	Street_addr 3		O		
11.9	IS,O		County / Parish	AD	County_cd	74	O		
12	04,ID,O	00115	County Code	AD	County_cd	74	N		Do not use. Instead, use PID-11.9. Retained as a placeholder for backward compatibility only.
13	40, XTN ,O,r	00116	Home Phone Number TN^ use code ^ equip type ^ email address ^ country ^ area/city^ phone number^extension^ text	PH	Phone_type_cd Phone_num extension Call_instruction	43	O		Cerner Millennium default type HOME. HL7 2.3. If data type XTN sent, the Universal Interface can flex the phone type with a value provided in data type XTN.2HL7 Use Code or data type XTN.3HL7 Equipment Type aliased to Cerner Millennium phone type. The Universal Interface posts data type XTN.1 as a single string and does not parse it into discrete fields. The Universal Interface posts data type XTN.8 - Extension and data type XTN.9 - Text. See Unit 3: Concepts and Definitions.

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14	40, XTN ,O,r	00117	Business Phone Nbr	PH	Phone_type_cd Phone_num extension Call_instruction	43	O		Cerner Millennium default type BUSINESS. HL7 2.3: If data type XTN is sent, translate HL7 Use Code (Table 0201) and HL7 Equipment Type (Table 0202) to Cerner Millennium phone type. See PID-13 for additional discussion.
15	25,ST,O	00118	Language - Patient	P	Language_cd	36	O		
16	01,ID,O	00119	Marital Status	P	Marital_type_cd	38	O		HL7 User Table 0002.
17	03,ID,O	00120	Religion	P	Religion_cd	49	O		HL7 User Table 0006.
18	20, CX ,O	00121	Patient Account Nbr				C		Financial or billing number.
18.1	,ST		Patient Account #	EA	Alias		C		
18.2	,NM		Check Digit				N		Not supported by Cerner Millennium. Stored separately if transmitted separately.
18.3	,ID		Check Digit Scheme				N		HL7 0061. Not supported by Cerner Millennium.
18.4	,HD		Assigning Authority		Authority and Type used to derive alias_pool_cd	263	C		Configurable mapping in SI Manager (SI_Manager.exe). Valid translation value required when different assigning authorities (alias pools) are associated with the same contributing system.
18.5	,ID		Identifier Type		Encntr_alias_type_cd	319	C		Configurable mapping in SI Manager (SI_Manager.exe). Type meaning FIN NBR is used as the billing number for this encounter and for a charge interface from Cerner Millennium. Valid translation value required when different types are associated with the same contributing system.
19	16,ST,O	00122	SSN - Patient	PA	Alias		O		Person alias type code is SSN.
20	25,CM,O	00123	Driver's License Nbr	PA	Alias		N		Not supported by Cerner Millennium.
21	20,CK,O	00124	Mother's Identifier	PP	Mother_identifier		O		Attribute of the person in this PID. ESI does not use to create person_person_reltn between baby and mother.
22	1,ID,O	00125	Ethnic Group	P	Ethnic_group_cd	27	O		HL7 User Table 0189. Further defines ancestry.
23	25,ST,O XAD	00126	Birth Place	AD	Street_addr		O		Address Type - BIRTH. Cerner Millennium extension defines field as XAD type. If transmitted as ST, value posts as defined to STREET_ADDR. If transmitted as AD, values post to Cerner Millennium address components as listed in PID-11.
24	2,ID,O	00127	Multiple Birth Ind	PP	Birth_multiple_cd	335	O		HL7 defines as Y/N indicator.
25	2,NM,O	00128	Birth Order	PP	Birth_order		O		Number indicating birth order.
26	3,ID,O,r	00129	Citizenship	P	Citizenship_cd	14650	O		HL7 User Table 0171. Cerner Millennium uses two instances.
27	60,CE,O	00130	Veterans Military Stat	P	Vet_military_status_cd	14651	O		HL7 User Table 0172.
28	2,ID,O	00739	Nationality	P	Nationality_cd	14652	O		HL7 User Table 0212.
29	26,TS,O	00740	Patient Death dt_tm	P	Deceased_dt_tm		O		
30	1,ID,O	00741	Patient Death Ind	P	Deceased_cd	268	O		HL7 Table 0136 - Yes/No indicator.

PV1 (Patient Visit) Segment

The PV1 segment provides visit- or encounter-specific information. The Cerner Millennium tables referenced from the PV1 segment are BED - Bed, EA - ENCNTR_ALIAS, ED - ENCNTR_DOMAIN, EL - HENCNTR_LOC_HIST, EN - ENCOUNTER, EPRL - RENCNTR_PRSNL_RELTN, PRL - PERSNL, and PRLA -

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PERSNL_ALIAS.

PV1 Segment Layout

PV1 Seq	HL7 Format	HL7 Elem	Name	Cerner Table	Cerner Attribute	Code Set	R/O	HL7 Ver	Comments
01	04,SI	00131	Set ID- PV1				C		Start at 1, increment by 1.
02	01,ID,R	00132	Patient Class	EN	Encntr_class_cd (documentation only) Encntr_type_class_cd (derived from PV1-18)	321 69	R		Cerner Millennium uses PV1---Patient Type to derive the HNA visit_class (Code Set 69) stored as encntr_type_class_cd. Cerner Millennium uses ENCNTR_TYPE_CLASS_CD (Code Set 69) to define patient encounter processing parameters. The Universal Interface captures transmitted class for documentation only. Cerner Millennium does not use ENCNTR_CLASS_CD to define any internal processing options.
03	12, PL ,R	00133	Patient Location	EN			C		Current patient location. Cerner Millennium location is hierarchical (Facility-building point of service location-room-bed).
03.1	4,ID		Point of Service Location		Loc_nurse_unit_cd Location_cd	220	C		All location codes have an entry on Code Set 220 with different location type, such as nurse unit and ambulatory location.
03.2	4,ID		Patient Room		Loc_room_cd	220	C		Cerner Millennium location with type ROOM.
03.3	2,ID		Patient Bed		Loc_bed_cd	220	C		Cerner Millennium location type with type BED.
03.4	6,ID		Facility ID		Loc_facility_cd	220	C		If not valued, use MSH-4---Sending Facility. Must be unique across all facilities at a site. Location with type FACILITY. Cerner Millennium locations defined as FACILITY also have corresponding entry on ORGANIZATION table with type FACILITY.
03.5	,ID		Bed Status				N		Not supported by Cerner Millennium.
03.6	,ID		Location Type		Location_type_cd	222	O		Defines point-of-service location type AMBLOC, NURSEUNIT, CLINIC, DOCOFFICE, and CLIENT. **Note** Currently ignored by the ESI server. Instead, the ESI server finds existing location only of types NURSEUNIT or AMBLOC.
03.7	,ID		Building		Loc_building_cd		O		Cerner Millennium location with type BUILDING. If not valued, the ESI server uses the default building code identical to transmitted facility code.
03.8	,ST		Floor				N		Not supported by Cerner Millennium.
04	02,ID,O	00134	Admission Type	EN	Admit_type_cd	3	O		HL7 User Table 0007, such as accident, emergency, routine, and labor and delivery.
05	20,ST,O	00135	Pre-Admit Number	EN	Preadmit_nbr		O		
06	12,CM,O	00136	Prior Patient Loctn	ELH			O		Cerner Millennium creates a historical record of prior locations during internal processing. The Universal Interface ignores the transmitted value.

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07	60, XCN ,O	00137	Attending Doctor	EPRLR	Encntr_prsnl_reltn_cd Prsnl_alias_type_cd	N333 N320	O		HL7 User Table 0010. Code meaning ATTEND doctor relationship for this patient visit. Cerner Millennium allows only one active relationship of this type. Valid Cerner Millennium type code meanings are DOCNBR, DOCCNBR, DOCDEA, DOCUPIN, and PRSNLID. Type code is not a direct CVA mapping to PRSNL_ALIAS_TYPE_CD but is configured in the SI Manager (SI_Manager.exe) as described below. The Universal Interface can use data type XCN.13 as an alias to Code Set 333 to flex the ENCNTR_PRSNL_RELTN_CD. Personnel processing described for PV1-7 applies to all encounter personnel fields supported by the Universal Interface.
07.1	ID		Physician Id	PRLA	Alias		C		Personnel alias mapped to an alias pool for this contributing system in the SI Manager (SI_Manager.exe).
07.2-7	name		Name components	PN	HL7 PN data type. Unit 3: Concepts and Definitions. Also see PID-5.		C		Each non-free-text clinical staff has a row on both the PERSON and PRSNL tables, and all available name components on a row on the PERSON_NAME table. Add-on-the-fly (AOF) personnel and their corresponding name components are written to both the PERSON and PRSNL tables.
07.8	,ID		Source table		Facility or other source. Source, authority, or type used to derive Alias_pool_cd.		C		The translation is configured in the SI Manager (SI_Manager.exe), which determines the ALIAS_POOL_CD and PRSNL_ALIAS_TYPE_CD, such as UPIN. If transmitted, the value must match exactly the value entered in the tool.
07.9	,HD		Assigning Authority	PRLA	Authority, source, or type used to derive Alias_pool_cd.	263	C		The translation is configured in the SI Manager (SI_Manager.exe). If transmitted, the value must match exactly the value entered in the tool. The value entered in the tool also can be defined as an organization alias to flex the list of available alias pool codes.
07.10	,ID		Name Type				N		Not supported by Cerner Millennium.
07.11	,NM		Check Digit				N		Not supported by Cerner Millennium.
07.12	,ID		Check Digit Scheme				N		Not supported by Cerner Millennium.
07.13	,ID		Identifier Type		Authority, source, or type used to derive Alias_pool_cd. Flex: Encntr_prsnl_reltn_cd.	333	O		The translation is configured in the SI Manager (SI_Manager.exe). If transmitted, the value must match exactly the value entered in the tool. The value entered in the tool also can be defined as an organization alias to flex the list of available alias pool codes. The Universal Interface also can use the Identifier Type to flex the relationship type when the transmitted value is an alias to RELTN_CD (Code Set 33).
08	60, XCN ,O	00138	Referring Doctor	EPRLR	Encntr_prsnl_reltn_cd	333	O		Code meaning REFERDOC physician relationship for this patient visit. If the personnel processing option is configured as free-text, a relationship row is the only table for this physician. Cerner Millennium allows only one active relationship of this type.
09	60, XCN ,,r	00139	Consulting Doctor	EPRLR	Encntr_prsnl_reltn_cd	333	O		Code meaning CONSULTDOC for this visit. Universal Interface supports multiple instances of this field and this relationship type. As described in PV1-7, data type XCN.13---Identifier Type can be used to flex the encounter relationship (Code Set 333). The Universal Interface does not end the relationship of a consulting physician even if missing on a subsequent update.
10	03,ID,C	00140	Hospital Service	EN	Med_service_cd	34	O		HL7 User Table 0069. Required field by HL7 with trigger events A01, A02, A14, and A15. Not required by Cerner Millennium.
11	12, PL ,O	00141	Temporary Location	EN	Loc_temp_cd	220	N		Not supported by Cerner Millennium.

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12	02,ID,O	00142	Pre-Admit Test Ind	EN	Preadmit_testing_cd	366	O		HL7 User Table 0087. Pre-admit testing required before admission.
13	02,ID,O	00143	Re-Admission Ind	EN	Readmit_cd	47	O		HL7 User Table 0092. Patient is readmit or recurring visit.
14	03,ID,O	00144	Admission Source	EN	Admit_src_cd	2	O		HL7 User Table 0023. Where the patient came from before admission, such as transfer from another hospital, home, or nursing home.
15	02,ID,O,r	00145	Ambulatory Status	EN	Ambulatory_cond_cd	5	O		HL7 User Table 0009. Cerner Millennium uses only one instance. Transient or permanent limitation on arrival, such as disoriented, coma, or pregnant.
16	02,ID,O	00146	VIP Indicator	EN	Vip_cd	67	O		HL7 User Table 0099. Indicates that this patient may need to be treated with special consideration during this visit. Also see the ZPI segment for related confidentiality field.
17	60, XCN ,O	00147	Admitting Doctor	EPRLR	Encntr_prsnl_reltn_cd	333	O		HL7 User Table 0010. Code meaning ADMITDOC physician relationship for this visit. Cerner Millennium allows only one active relationship of this type.
18	02,ID,O	00148	Patient Type	EN	Encntr_type_cd	71	R		HL7 User Table 0018. Categorize patient populations to groups more specific than patient class. Cerner Millennium uses to define patient encounter processing options. Each type is configured to belong to an ENCNTR_TYPE_CLASS_CD (Code Set 69).
19	15,CX,O	00149	Visit Number	EA	Alias		O		Encounter alias of type VISIT. Configurable in the SI Manager (SI_Manager.exe) as a primary or secondary identifier to validate and update existing encounter or force the insertion of a new encounter.
20	50,CM,O,r	00150	Financial Class Class^effective date	EN	Financial_class_cd	354	O		HL7 User Table 0067. Primary class assigned to patient for purpose of identifying sources of reimbursements. Cerner Millennium uses only one instance. Effective date is ignored.
21	02,ID,O	00151	Charge Price Indicat				N		Not supported by Cerner Millennium.
22	02,ID,O	00152	Courtesy Code	EN	Courtesy_cd	16	O		HL7 User Table 0045. Special considerations for this patient (such as express discharge).
23	02,ID,O	00153	Credit Rating				N		Not supported by Cerner Millennium. HL7 User Table 0046.
24	02,ID,O,r	00154	Contract Code				N		Not supported by Cerner Millennium. HL7 User Table 0044.
25	08,DT,O,r	00155	Contract Effective dt				N		Not supported by Cerner Millennium.
26	12,NM,O,r	00156	Contract Amount				N		Not supported by Cerner Millennium.
27	03,NM,O,r	00157	Contract Period				N		Not supported by Cerner Millennium.
28	02,ID,O	00158	Interest Code				N		Not supported by Cerner Millennium. HL7 User Table 0073.
29	01,ID,O	00159	Tran to Bad Debt Cd				N		Not supported by Cerner Millennium. HL7 User Table 0110.
30	08,DT,O	00160	Tran to Bad Debt Dt				N		Not supported by Cerner Millennium.
31	10,ID,O	00161	Bad Debt Agency Cd				N		Not supported by Cerner Millennium. HL7 User Table 0021.
32	12,NM,O	00162	Bad Debt Trans Amt				N		Not supported by Cerner Millennium.
33	12,NM,O	00163	Bad Debt Rcov Amt				N		Not supported by Cerner Millennium.

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34	01,ID,O	00164	Delete Account Ind				N		Not supported by Cerner Millennium. HL7 User Table 0111.
35	08,DT,O	00165	Delete Account Date				N		Not supported by Cerner Millennium.
36	03,ID,O	00166	Discharge Dispositn	EN	Disch_disposition_cd	19	O		HL7 User Table 0112.
37	25,CM,O	00167	Disch To Location				O		
37.1	,ID		Code	EN	Disch_to_loctn_cd	20	O		HL7 User Table 0113. The facility to which the patient was discharged, such as another hospital or nursing home.
37.2	,ST		Description				N		Not supported by Cerner Millennium. Universal Interface uses code and ignores description.
38	02,ID,O	00168	Diet Type	EN	Diet_type_cd	18	O		HL7 User Table 0114. Indicates patient is on a special diet.
39	02,ID,O	00169	Servicing Facility	EN OA	Loc_facility_cd	220	C		**Note** Currently, the Universal Interface does not use to determine LOC_FACILITY_CD. If PD1-3.4-~~Facility is not valued, Universal Interface uses MSH-4~~ Sending Facility. Configurable in SI Manager (SI_Manager.exe) as the ESI encounter organization alias that determines the ORGANIZATION_ID for this encounter row. The encounter organization is used to determine internal processing parameters (such as billing) and values (such as client code). Fields available to determine this organization include MSH-4 ~~Sending Facility, MSH-6 Receiving Facility, PV1-3.4~~ Facility, and the default organization from SI Manager (SI_Manager.exe).
40	01,ID,O	00170	Bed Status				N		Not supported by Cerner Millennium.
41	02,ID,O	00171	Account Status	EN	Encntr_status_cd	N261	O		HL7 User Table 0117. Code meanings include TEMP, PRELIM, ACTIVE, CANCELLED, and COMPLETE.
42	12,CM,O	00172	Pending Location				N		Not supported by Cerner Millennium.
43	12,CM,O	00173	Prior Temp Location				N		Not supported by Cerner Millennium.
44	26,TS,O	00174	Admit Date/Time	EN	Arrive_dt_tm		C		The time that registration or admission was performed. Cerner Millennium requires this for A01 and A04 and any other event used to create a new encounter row.
45	26,TS,O	00175	Discharge Date/Time	EN	Disch_dt_tm		O		Actual time patient was discharged from facility. Patient types that do not always receive a discharge or other event to close an encounter must be defined in Cerner Millennium to automatically discharge.
46	12,NM,O	00176	Current Pat Balance				N		Not supported by Cerner Millennium.
47	12,NM,O	00177	Total Charges				N		Not supported by Cerner Millennium.
48	12,NM,O	00178	Total Adjustment				N		Not supported by Cerner Millennium.
49	12,NM,O	00179	Total Payments				N		Not supported by Cerner Millennium.

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50	20, CX	00180	Alternate Visit ID	EA	Alias		N		Not supported by Cerner Millennium.
51	1,IS,O	01226	Visit Indicator				N		Not supported by Cerner Millennium. HL7 User Table 0326. Specifies level on which data is sent. HL7 values: A - Account or V - Visit.
52	60,XCN,,r	01224	Other Healthcare Providers	EPLR	Encntr_prsnl_reltn_cd	333	O,r		Other healthcare providers (such as nurse practitioners, midwives, and physician assistants). Universal Interface supports multiple instances. Alias pool code, alias type, and flex ENCNTR_PRSNL_RELTN_CD determined as described in PV1-7.

General Order Segments (HL7 Chapter 4)

The general order segments are described below.

ORC (Common Order) Segment

ORC segments are optional for ORU result messages in the Universal Interface for results and other events to OCF.

Many of the data elements in the ORC segment are duplicated in the OBR. The Universal Interface assumes that the values of duplicated fields are identical and always uses the value from a specific segment (such as OBR). Consequently, if the sending system does not value ORC and OBR equivalent fields with identical values, the OBR value overrides the ORC value.

The Cerner Millennium tables referenced from the ORC segment are CE - CLINICAL_EVENT and CEPRL - CE_EVENT_PRSNL.

ORC Segment Layout

ORC Seq	HL7 Format	HL7 Elem	Name	Cerner Table	Cerner Attribute	Code Set	R/O	HL7 Ver	Comments
01	02,ID,R	00215	Order Control		Used by program.		C		ORU^R01: RE - result. ORU^O01: NW, SC, OC.
02	75,CM,C	00216	Placer Order Number				C		Use with Meds. For all others, use OBR value.
02.1			Unique Placer ID				N		Not used for OCF-only results processing.
02.2			Placer Application ID				C		
03	75,CM,C	00217	Filler Order Number				C		Use OBR value.
03.1			Unique Filler ID	CE	Reference_nbr		C		
03.2			Filler Application ID	CE	Source_app_cd	89	C		
04	75,CM	00218	Placer Group Number				N		Not supported for OCF-only results. For orders interface, an order alias can be created with this value.
05	02,ID	00219	Order Status	CE	Result_status_cd	8	C		Required for Meds. All others, use comparable field in OBR: IP - In Process or CM - Complete.
06	01,ID	00220	Response Flag				N		Not supported by Cerner Millennium.
07	200,TQ	00221	Quantity/Timing				N		Not supported by Cerner Millennium.
08	200,CM	00222	Parent				O		Use OBR value.
09	26,TS	00223	DT of Transaction				C		Use comparable field in OBR.
10	80, XCN	00224	Entered By				N		Not supported by Cerner Millennium.
11	80, XCN	00225	Verified By				N		Not supported by Cerner Millennium.

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12	80, XCN	00226	Ordering Clinical Staff	CEPRL	Action_prsnl_id		C		Use OBR value.
13	80,CM	00227	Enterer's Location				N		Not supported by Cerner Millennium.
14	40, XTN ,O,r2	00228	Call Back Phone Nbr				N		Not supported by Cerner Millennium.
15	26,TS	00229	Order Effective DT				N		Not supported by Cerner Millennium.
16	200,CE	00230	Order Cntrl Cd Reason				N		Not supported by Cerner Millennium.
17	60,CE	00231	Entering Organization				N		Not supported by Cerner Millennium.
18	60,CE	00232	Entering Device				N		Not supported by Cerner Millennium.
19	80, XCN	00233	Action By				N		Not supported by Cerner Millennium.

OBR (Order Detail) Segment

In the reporting of clinical data, the OBR serves as the report header. It identifies the observation set represented by the following atomic observations. It includes the relevant ordering information when that applies. It contains many of the attributes that usually apply to all of the included observations.

The Cerner Millennium tables referenced from the OBR segment are CE - CLINICAL_EVENT, CECOL - CE_SPECIMEN_COLL, CEMB - CE_MICROBIOLOGY, CENT - CE_EVENT_NOTE, CEPRL - CE_EVENT_PRSNL, CESPR - CE_SPECIMEN_TRANS, and LB - LONG_BLOB.

OBR Segment Layout

OBR Seq	HL7 Format	HL7 Elem	Name	Cerner Table	Cerner Attribute	Code Set	R/O	HL7 Ver	Comments
01	04,SI	00237	Set ID - OBR				O		Start at 1 and increment by 1.
02	75,CM	00216	Placer Order Number				C		The Universal Interface provides a configurable option to match a result to an existing order. If a match is found, the Cerner Millennium ORDER_ID is valued on the clinical event rows. Any of the following fields can be configured to provide the primary unique order identifier: OBR-2, OBR-3, OBR-18, OBR-20, or OBR-21. The primary order identifier can be an external order alias or the internal Cerner Millennium ORDER_ID. OBR-19---Placer Field2 is reserved for inter-communication between the order and result module. In addition, the interface can be configured to update the order status to In-Process or Complete using OBR-25-Result Status. See OBR-25.
02.1			Unique Placer Order ID						Assigned by the placer system.
02.2			Placer Application ID						
03	75,CM	00217	Filler Order Number	CE	Reference_nbr		R		Permanent, unique identifier for this result. The value stored is derived from the transmitted value and thus is larger than the transmitted value. The stored reference number field is 100 characters.
03.1			Unique Filler Order ID	CE	Reference_nbr		*R*		3.1 and 3.2 concatenated. Cerner recommends that the transmitted value not exceed 50-60 characters.
03.2			Filler Application ID				O		
04	200,CE,R	00238	Universal Service ID						

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04.1			Test Code	CE	Event_cd (alias) Event_set_cd	E72	R		The size of the Cerner Millennium alias field is 255 characters; however, the functional size of this alias for clinical event processing is limited. ESI uses the transmitted test code to derive the unique reference number. The stored reference number field is 100 characters. See the discussion in this unit related to derivation of the reference number. Cerner recommends limiting test code to 10 to12 characters. See OBR-3 and OBX-3.
04.2			Test Description	CE	Event_title_text		C		Used as the document title when OBR-4.5 is not valued.
04.3			Coding System				N		Coding system derived from MSH sending application.
04.4			Alternate Test Code				N		Not supported by Cerner Millennium.
04.5			Alternate Test Description	CE	Event_title_text		O		Documents only. Used when OBR event class has a view level of one (MDOC, RAD, and AP).
05	02,ID	00239	Priority						Not supported by Cerner Millennium. Instead, use OBR-27.6.
06	26,TS	00240	Requested Date/Time						Not supported by Cerner Millennium. Instead, use OBR-27.4.
07	26,TS,C	00241	Observation Date/Time. The clinically significant date/time.	CECOL CE	Collect_dt_tm Event_start_dt_tm		C		Specimen Order: When the specimen is collected. An ESI special configuration can be used to specify OBR-7 instead of OBR-8. Radiology: Exam performed date. Therapy or Study: Performed date. Required if OBR-8 is not valued. If not valued, defaults to observation end date and time.
08	26,TS,C	00242	Observation End Dt	CECOL CE	collect_dt_tm Event_end_dt_tm		C		When the specimen is collected. OBR-8 is used by default. Required if OBR-7 is not valued. If not valued, defaults to event start date and time.
09	20,CQ,C	00243	Collection Volume	CECOL	Collect_volume^ Collect_unit_cd	E54	O		Volume^units.Default unit is ML.
10	60,CN	00244	Collector Identifier	CECOL	Action_prsnl_id		O		Value for specimen procedures only. ACTION_TYPE_CD is COLLECT.
11	01,ID	00245	Specimen Action Code	CECOL	Specimen_status_cd	E61	O		HL7 Table 0065. Use with specimen procedures only. Valid HL7 values: A - Add-on. G - Generated reflex order. L - Lab to collect. O - Other department to collect. P - Pending specimen. R - Revised order. S - Schedule the tests specified below.
12	60,CE	00246	Danger Code						
12.1			Danger Code	CECOL	Danger_cd	E59	O		
12.2			Danger Text						
12.3			Coding System						
13	300,ST	00247	Relevant Clinical Info						Not supported by Cerner Millennium.
14	26,TS	00248	Specimen Received DT	CESPR	Receivd_dt_tm				Specimen procedures only.
15	300,CM	00249	Specimen Source	CECOL			C		Required to create specimen CECOL row.
15.1	CE		Source Code	CECOL	Source_type_cd	E2052			
15.2	ST		Additives	CECOL	Container_type_cd	E2051			
15.3	ST		Source Description	CECOL	Source_text				Free-text source or method of collection description.

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15.4	CE		Body Site	CECOL	Body_site_cd	E1028			
16	60,CN	00226	Ordering Clinical Staff	CEPRL	Action_prsnl_id				With an ACTION_TYPE_CD of ORDER.
17	40,TN	00250	Ord Call Back Phone No.						Not supported by Cerner Millennium.
18	60,ST	00251	Placer Field No.1				O		Configurable as the primary order identifier, accession number, or both.
19	60,ST	00252	Placer Field No.2						Configurable as the primary order identifier, accession number, or both.
20	60,ST	00253	Filler Field No.1				O		Configurable as the primary order identifier, accession number, or both.
21	60,ST	00254	Filler Field No.2	CE	Accession_nbr		O		Accession number is configurable to one of the following fields: OBR-2, OBR-3, OBR-18, or OBR-20. If not configured, the Universal Interface uses OBR-21 as the default.
22	26,TS,C	00255	Result Report or Status Change Date/Time	CEPRL	Action_dt_tm				Most recent verification or status change. Used when more specific date and time fields are not appropriate. Use varies with message, order control code, and event code.
23	40,CM	00256	Charge to Practice						Not supported by Cerner Millennium.
24	10,ID	00257	Diagnostic Serv Sect ID	CE	Event_class_cd	53			HL7 Table 0074. Universal Interface uses to determine grouper event class (such as AP, MBO, MDOC, or RAD).
25	01,ID,C	00258	Result Status. Represents status of results at the order level. Comparable to Order Status (ORC- 5).	CE	Result_status_cd	N8 If DOC: N63	C		HL7 Table 0123. Required for ORU. Valid HL7 values: A - Order in process. Not complete. C - Contains corrected result. F - Final or CompleteI - Specimen received. No results. O - Order received. No specimen. No results. P - Preliminary with verified results. R - Stored results not verified (such as Transcribed). S - Procedure scheduled but not done. No results. The Universal Interface provides a configurable option to update the order status to In-Process or Complete. The result status is aliased to one or more of the following code sets: Order action (Code Set 6003); order status (Code Set 6004), department order status (Code Set 14281), or both. The complete result status is aliased to the order action (Code Set 6003) of COMPLETE. Any result status that could trigger a order status change to INPROCESS is aliased to the order status code value (Code Set 6004).
26	200,CM	00259	Parent						Use with microbiology susceptibility results.
26.1	CE		Parent Order ID				C		Ordered Culture ID from OBR-4 or OBX-3 of the parent. When OBR-26.1.3 is aliased to the LOINC code value on Code Set 400, the LOINC identifier in OBR-26.1.1 is assigned to the organism.
26.2	ST		Parent Sub-ID				C		Isolate number from OBX-4 of the parent.
26.3	CE		Parent Results	CEMB	Organism_Code	E1021	C		Isolate ID from OBX-5 of the parent.
27	200,TQ	00221	Quantity Timing.4 - Start Date..6 - Priority (r1)..6 - Priority (r2).	CEPRL CECOL CE	Request_dt_tm Collect_priority_cd Event_priority_cd	E2054			|^^^yyyymmddhhmm^^RT^^C~^^^^^ST| Requested date and time, ACTION_TYPE_CD of ORDER. Order/collection priority. Report priority (only if different from order).
28	150,CN	00260	Result Copies To				N		Not supported by Cerner Millennium.
29	150,CM	00261	Parent Accession No.						Use with microbiology susceptibility results.

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29.1	CM		Parent Placer Order No.						Cultures placer order number and application ID.
29.2	CM		Parent Filler Order No.	CE	Reference_nbr				Cultures filler order number and application ID.
30	20,ID	00262	Transportation Mode						Not used with ORU (such as radiology transportation mode).
31	300,CE	00263	Reason for Study	CENT	Actual contents stored on the LONG_BLOB table.		O		Radiology reason for procedure (free text). Note type (Code Set 14) with meaning of - tbd. Entry Method (Code Set 13) with meaning of -tbd.
31.1			Reason ID						Not supported by Cerner Millennium.
31.2			Reason Text	LB	Long_blob				
32	60,CM	00264	Main Result Interpreter	CEPRL	Action_prsnl_id				ACTION_TYPE_CD - PERFORM.ACTION_DT_TM - Default time stamp.ACTION_STATUS_CD - Complete.
33	60,CM,,r	00265	Assist Result Interpreter	CEPRL	Action_prsnl_id				ACTION_TYPE_CD - ASSIST.ACTION_DT_TM - Default time stamp.ACTION_STATUS_CD - Complete. Translated through the PRSNL_ALIAS table, PERSNL_ALIAS_TYPE_CD and FACILITY_CD.
34	60,CM,,r	00266	Technician	CEPRL	Action_prsnl_id				ACTION_TYPE_CD - ASSIST.
35	60,CM,,r	00267	Transcriptionist	CEPRL	Action_prsnl_id				ACTION_TYPE_CD - TRANSCRIBE.
36	26,TS	00268	Scheduled Date/Time				N		Not supported by Cerner Millennium.
37	4,NM,O	01028	Number of Containers				N		Not supported by Cerner Millennium.
38	60,CE,O,r	01029	Transport Logistics of Specimen				N		Not supported by Cerner Millennium.
39	200,CE,,r	01030	Collectors comments				N		Not supported by Cerner Millennium.
40	60,CE,O	01031	Transport Arrangement Responsibility				N		Not supported by Cerner Millennium.
41	30,ID,O	01032	Transport Arranged				N		Not supported by Cerner Millennium. HL7 Table 0136 - Yes/no indicator.
42	1,ID,O	01033	Escort Required				N		Not supported by Cerner Millennium. HL7 Table 0136 - Yes/no indicator.
43	200,CE,,r	01034	Planned Patient Transport Comment				N		Not supported by Cerner Millennium.

OBX (Order Detail) Segment

The OBX segment is used to transmit a single observation or observation fragment. It represents the smallest indivisible unit of a report. Its principal mission is to carry information about observations in report messages. The OBX segment also can be part of an observation order (prompt).

The Cerner Millennium tables referenced from the OBX segment are BLOB - CE_BLOB, CE - CLINICAL_EVENT, CEMB - CE_MICROBIOLOGY, CEPRL - CE_EVENT_PRSNL, CEST - CE_STRING_RESULT, CESUS - CE_SUSCEPTIBILITY, and CV - CODE_VALUE.

OBX Segment Layout

OBX Seq	HL7 Format	HL7 Elem	Name	Cerner Table	Cerner Attribute	Code Set	R/O	HL7 Ver	Comments
01	10 ,SI,O	00569	Set ID - OBX						Sequential under OBR. For compatibility with ASTM.

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02	02,ID,R	00570	Value Type	CE	Event_class_cd	N53	R		Valid values that do not require event class alias but have default processing are CE, NM, RP, ST, and TX. Valid values that must be aliased to an event class are DT, ID, TM, and TS. These value types should be aliased to the TXT event class and are processed as ST (string) results. FT value type currently not supported. Use RP for remotely stored documents. Use ED for RTF and images stored in CareAware MultiMedia. With the exception of the CE value type, the Universal Interface cannot process an event (same reference number and event code) associated with more than one value type, such as NM and TX or NM and ST.
03	80,CE,R	00571	Observation Identifier						Of the detail.
03.1	ID		Procedure ID	CE	Event_cd	E72	R		Of the detail. The size of the Cerner Millennium alias field is 255 characters; however, the functional size of this alias for clinical event processing is limited. ESI uses the transmitted procedure ID to derive the unique reference number. The stored reference number field is 100 characters. See the discussion in this unit related to derivation of the reference number. Cerner recommends limiting the Procedure ID to 10 to 12 characters. See OBR-3, OBR-4, and OBX-4. For lab result processing, if OBX-3.3 is aliased to the LOINC code value on Code Set 400, the LOINC identifier in OBX-3.1 is assigned to the clinical event.
03.2	ST		Procedure description	CE	Event_title_text		O		For Document processing, used as the document title when OBX-5.5 is not valued.
03.3	ID		Coding scheme	CV	contributor_source_cd	73	O		When configured to use the 1st triplet as the primary source for the clinical event alias this is an alias to Code Set 73 to determine the primary contributor source to alias OBX-3.1 on Code Set 72 Clinical Event.
03.4	ID ST		Alternate Procedure ID	CE	event_cd	E72	O		For lab result processing, if OBX-3.6 is aliased to the LOINC code value on Code Set 400, the LOINC identifier in OBX-3.4 will be assigned to the clinical event. When configured to use the 2nd triplet as the primary source for the clinical event alias, this alias is used with the contributor source identified in OBX-3.6 to derive the clinical event.
03.5	ST		Alternate Description		Event_title_text		O		For Documents processing, used as the document title when the OBX event class has a view level of one.
03.6	ID		Alt Coding Scheme	CV	Program use. contributor_source_cd	18089 73	O		For Document processing, this is an alias to Code Set 18089 to allow the Universal Interface to value section titles from the event code display, description, or definition. If not aliased, the Universal Interface uses OBX-3.2 or OBX-3.5. For lab result processing, when configured to use the 2nd triplet as the primary source for the clinical event alias this is an alias to Code Set 73 to determine the primary contributor source to alias OBX-3.4 on Code Set 72 Clinical Event.

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04	20,ST	00572	Observation Sub-ID				C		Additional ID for results with same Observation ID, such as isolate ID or blood bank unit number. For updates to properly occur, the value must be persistent within a reference number and event. When appropriate for a value type (such as CE, ST, or TX), the Universal Interface treats multiple OBXs with the same identifier (OBX-3) and sub ID (OBX-4) as a unit. Also used as part of the stored reference number derived from OBR-3, OBR-4, OBX-3, and OBX-4.
05	64k,R,,r Length is variable based on OBX-2-Value Type.	00573	Observation Value table and attribute varies with OBX-2Value Type and Service Discipline (event class).	CEST CEMB CESUS BLOB	String_result_text Organism_cd Result_numeric_value Blob_contents		C		Actual observed results of value type OBX-2. The table and column vary by type and service area. Microbiology susceptibility results may have interpretation in OBX-8 but have no actual result value. May repeat for CE and TX. Universal Interface does not support FT. The components for this field vary based on the data type in OBX-2.
06	60,CE,O	00574	Units	CEST CESUS	Unit_of_measure_cd Result_unit_cd	E54	O		

07	60,ST,O	00575	Reference Range	CE	Normal_low
					Normal_high
							O		Universal Interface extension: format range as
									`| low-high^low^high ||`
									such as
									`|35-80^35^80|`

07.1	ST		Range	CE	Normal_low Normal_high				The ESI server attempts to parse and use this range for normal_low and normal_high if the low and high components are empty. Several examples are shown below. | 35-80 | range parses to normal_low of 35, normal_high of 80. | <73 | range parses to normal_low of empty, normal_high of 73. | >-24 | range parses to normal_low of 24, normal_high of empty.
07.2	ST		Low	CEST	Normal_low	B			Remains for backward capability to Cerner Classic.
07.3	ST		High	CEST	Normal_high	B			Remains for backward capability to Cerner Classic.
08	10,ID,,r5	00576	Abnormal Flags	CE CESUS	Normalcy_cd Result_cd	E52 E64	O		HL7 Table 0078. Multiple instances ignored except for susceptibilities.
09	05,NM,O	00577	Probability	CEST CEMB	Feasible_ind Probability		N		Not supported by Cerner Millennium.
10	05,ID,O,r	00578	Nature of Abn Test	CE	Normalcy_method_cd	E50	O		HL7 Table 0080.
11	02,ID,R	00579	Observation Result Status	CE	Result_status_cd (Auth_status_cd)	N8	R		Valid values from HL7 0085 table: I - Specimen in lab, results pending. P - Preliminary. R - Transcribed or results entered, not verified. S - Partial results.F - Verified result or final report. C - Corrected. D - Delete this OBX. U - Status change to final. Defaults to parent's record_status_cd.
12	26,TS	00580	Date Last Observe Normal Values	CEST	Last_norm_dt_tm		O		Effective date and time for reference range in this OBX.
13	20,ST	00581	User access checks			N18089	N		Not supported by Cerner Millennium. Provides alternate or special processing options.

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14	26,TS	00582	Date/Time of the Observation	CEPRL	Action_dt_tm		R		Actual verification date and time.
15	60,CE	00583	Producer's ID						Composite field. Use when service performed by organization other than the sending facility, such as results performed at a reference laboratory.
15.1			Producer ID Code	CEPRL	Action_prsnl_id		*O*		Unique ID of producing service or performing personnel. With action_type_cd of PERFORM. In the U.S., HL7 recommends the Medicare number of the producing service. If not valued, Universal Interface assumes service performed as sending facility.
16	60, XCN ,O	00584	Responsible Observer	CEPRL	Action_prsnl_id				Observer verifying results, with action_type_cd of VERIFY.
17	60,CE,O	00936	Observation Method						Not supported by Cerner Millennium.

OBX Segment Processing Notes

For textual results, the Universal Interface accepts multiple OBX segments where each OBX segment represents a line of text. Alternately, for textual results, a single OBX segment can be transmitted where each OBX segment represents a paragraph of text up to 2,000 characters with word wrap but with no hard carriage returns. The Universal Interface does not accept textual results defined as HL7 FT formatted text value type. The Universal Interface also accepts the observation value formatted using the repeat delimiter to indicate a hard carriage return representing either a new line or new paragraph.

Blood-Bank-Product-Specific Segment

The blood-bank-product-specific segment is described below.

ZBP (Blood Product Unit) Segment

The Cerner-defined ZBP Blood Product unit segment is used to communicate blood product unit information that can be posted to the Clinical Event tables. The ZBP segment also is required to post blood bank patient-product events (such as Crossmatched and Transfused). The ZBP segment occurs after an OBR segment and can occur after OBX segments containing non-product-related blood bank results. During real-time blood bank result processing, the ZBP segment must occur immediately before an OBX segment (or segments) containing a result or event associated with this product. The ZBP segment can repeat.

The ZBP segment also is required during history upload processing to upload transfused, transfused product information, and non-transfused product information to Cerner Millennium blood-bank-specific tables. During history upload processing, the ZBP segment must occur immediately before the ZB2 segment and before an OBX segment (or segments) containing a result or event associated with this product. For a definition of the ZB2 segment and specific information related to history uploads, see Unit 20B: Blood Bank History Upload to Cerner Millennium.

The Cerner Millennium tables referenced from the ZBP segment are CEPA - CE_PRODUCT_ANTIGEN and CEPR - CE_PRODUCT. Mapping to blood-bank-specific tables is to be determined and is provided by the PathNet Blood Bank solution team.

ZBP Segment Layout

ZBP Seq	HL7 Format	HL7 Elem	Name	Cerner Table	Cerner Attribute	Code Set	R/O	HL7 Ver	Comments
01	4,SI	ZBP01	ZBP Set Id		Program use.		R		Start at 1, increment by 1.
02	40,ST	ZBP02	BPU Unique Identifier		Program use.		R		The sending system must format to exactly match an OBX-4-Observation Sub-Id for any OBX associated with this product. Uniquely identifies the unit. Frequently (but not always) created by concatenating the Unit Number, Sub Unit Number, and Product Type Code. When processing patient-product results to the Clinical Event tables, the Universal Interface uses this value concatenated with the OBR-3.1---Filler Order Number to format a unique, detail, clinical event reference number. The maximum size of the event reference number is 60 bytes.
03	20,ST	ZBP03	BPU Unit or Lot Number	CEPR	Product_nbr		R		Combination of Unit Number, Sub Unit Number, and Product uniquely identifies a blood product unit. When product is a manufactured product, the number is the product's lot number.

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04	5,ST	ZBP04	BPU Sub Unit Number	CEPR	TBD.		C		Required if the subunit number is needed to uniquely identify a blood product unit.
05	CE	ZBP05	BPU Product	CEPR	Product_cd	1604	R		Alias to blood product code.
06	IS	ZBP06	BPU Status	CEPR	Product_status_cd	1610	R		Alias to product status. Valid Cerner Millennium status include Destroyed, Pooled, Transferred, and Transfused.
07	TS	ZBP07	BPU Status Date and Time	CEPR	TBD.		O		Date and time the product was updated to this status. If not valued, the Universal Interface uses OBR-22-Status Change Date/Time. If not valued, the Universal Interface uses the MSH-7-Message Date/Time.
08	TS	ZBP08	BPU Expire Date and Time	CE	Expiration_dt_tm		O		Expiry date of the product at the time the status event occurred. Not applicable to a blood bank history upload.
09	CE	ZBP09	BPU ABO	CEPR	Abo_cd	1641	O		Alias to ABO codes.
10	CE	ZBP10	BPU RH	CEPR	Rh_cd	1642	O		Alias to RH codes.
11	CE,O,r	ZBP11	BPU Antigen	CEPA	Antigen_cd	1612	O		Alias to Antigen Code, Special Testing Code Value (Code Set 1612). Multiple instances allowed.
12	CE,O,r	ZBP12	BPU Attributes	CEPACEPA	Antigen_cd + TBD (such as Attribute_ind)	1612	O		Alias to Attribute Code, Special Testing Code Value (Code Set 1612) whose CDF meaning is SPTYP. Multiple instances allowed.
13	XON	ZBP13	BPU Supplier						Organization alias to BPU Supplier or Manufacturer. Organization name type. Uploads only.
13.1	,ST		Organization Name				O		Documentation only. The Universal Interface does not add blood bank organizations.
13.2	,IS		Organization Name Type				N		Not supported by Cerner Millennium.
13.3	,ST		Organization Identifier	ORGACEPR	Alias TBD.		C		Organization alias to a Blood Bank Supplier or Manufacturer. Required if blood product is from an external organization.
13.4	,NM		Check Digit				N		Not supported by Cerner Millennium.
13.5	,ID		Check Digit Scheme				N		Not supported by Cerner Millennium.
13.6	,HD		Assigning Authority				N		Not supported by Cerner Millennium.
13.7	,IS		Identifier Type Code	ORGA	Org_alias_type_cd	278	C		Alias to code value (Code Set 278) whose meaning is BBSUPL (Blood Bank Supplier) or BBMANUF (Blood Bank Manufacturer).
14	1,ID	ZBP14	Directed Indicator	CEPR		18229	N		Not supported by Cerner Millennium. HL7 Table 0111- Y/N.
15	1,ID	ZBP15	Autologous Indicator	CEPR		18229	N		Not supported by Cerner Millennium. HL7 Table 0111- Y/N.
16	1,ID	ZBP16	Donated by Relative Ind	CEPR		18229	N		Not supported by Cerner Millennium. HL7 Table 0111- Y/N.
17	1,ID	ZBP17	Pooled Product Indicator	CEPR		18229	N		Not supported by Cerner Millennium. HL7 Table 0111- Y/N. Used only for blood bank history uploads.
18	16,NM	ZBP18	Original Volume	CEPR			N		Not supported by Cerner Millennium. Original Volume (mL). Used only for blood bank history uploads.
19	16,NM	ZBP19	Assumed Transfused Volume	CEPR			N		Not supported by Cerner Millennium. Total Assumed Transfused Volume (mL).

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20	16,NM	ZBP20	Assumed Transfused Total International Units				N		Not supported by Cerner Millennium. Total Assumed Transfused International Units. Not used in either blood uploads or discrete results.
21	16,NM	ZBP21	Assumed Transfused Quantity	CEPR			N		Not supported by Cerner Millennium. Total Assumed Transfused Quantity or Vials. Only used for Blood Bank History uploads.
22	5,ST	ZBP22	BPU Supplier Prefix	BB			N		Not supported by Cerner Millennium. Used only for Blood Bank History uploads.
23	ID	ZBP23	Volume Units of measure	BB		54	N		Not supported by Cerner Millennium. Used only for Blood Bank History uploads to provide units for the volume in ZBP-18 and ZBP-19.

ZBP Segment Processing Notes

An assumption is that the Product Number, Sub Unit Number, and Product Code uniquely identify this unit or product.

A value of TBD represents data elements that are added to the CEPR table for the alpha implementation of discrete blood bank results. The name of the data element is to be determined.

When the ZBP segment is transmitted in an ORU message for real-time discrete blood bank results, the information posted to the clinical event tables represents a snapshot of product data known at the time of the event and is not intended to replace product data stored permanently in the blood bank clinical information system. The transfused data elements (status, volume, and units) are only assumed.

Actual transfusion events are inserted on the Clinical Event tables based on a true administration event (such as CE_BLOOD_TRANSFUSE).

Cerner-defined Document Segment

The Cerner-defined document segment is described below.

ZDS (Document Endorsements) Segment

The ZDS Document Endorsements segment is used to communicate document endorsement information (actions done or to be done). The ZDS segment is optional and can repeat.

ZDS Segment Layout

ZDS Seq	HL7 Format	HL7 Elem	Name	Cerner Table	Cerner Attribute	Code Set	R/O	HL7 Ver	Comments
01	12,ID	ZDS01	Action Code	CEPRL	Action_type_cd	21	R		Indicates the action that is or will be completed. Example alias action type codes include A - Author, O - Order, T - Transcribe, V - Verify, S - Sign, C - Cosign, R - Review, and CA - Cancel (correct, start administration, stop administration, insert, and review).
02	60,CN	ZDS02	Clinical Staff	CEPRL	Action_prsnl_id		R		Indicates code and name of person responsible for performing the specified action.
03	TS	ZDS03	Action Date and Time	CEPRL	Action_dt_tm		R		Date and time by which the action was or should be completed.
04	1,ID	ZDS04	Action Status	CEPRS	Action_status_cd	103	R		Not user-extendible. Resultant status of the action. Example alias codes are listed below. E - Expected/Requested. C - Completed. X - Canceled. R - Refused. D - Deleted.
05	2,ID	ZDS05	Action Priority Code				N		Not supported by Cerner Millennium. Priority of expected action.

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06	60,CN	ZDS06	Requesting Provider	CEPRL	Request_prsnl_id		N		Not supported by Cerner Millennium. Code and name of provider who requested that the action be completed. Not used.
07	120,ST	ZDS07	Action Comment	CEPRL	Action_comment		O		Comment or annotation describing the reason for the action or its status.
08	60,XCN	ZDS08	Proxy Personnel	CEPRL	Proxy_prsnl_id		O		Indicates code and name of person who carried out the action of the action_prsnl_id.

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