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HL7 Format for Transmitting Laboratory Results To MHA
AHRQ Demonstration Project

Identification of Laboratory Test Results to Be Transmitted
Only results of qualifying laboratory tests designated in Appendix A (LOINC Coding of Qualifying Laboratory Tests) performed from 30 days prior to admission through the day of discharge on patients 18 years and older admitted for general medical or surgical care will be transmitted. Please inform Demonstration Project staff if you are unable to supply requested data on any of the Qualifying Laboratory Tests listed in Appendix A.

General Overview of the HL7 Format for Data Transmission
Laboratory results will be transmitted in an HL7 format. Minimum data requirements are described below. If a hospital has a standard HL7 format for reporting that includes all required information, either in recommended or in other HL7 fields, the hospital's standard HL7 format can be used to transmit data. We can read the segments/fields we need and ignore the rest. However, if special programming is required to transmit required data, the following format is recommended.

The following HL7 segments can be used to transmit all required laboratory data:

MSH Hospital Identification & Transmittal Information
PID Patient Identification
PV1 Patient Visit
OBX Observation Results
NTE Notes & Comments

HL7 segments can be nested so that multiple patients can be included in a single transmission (MSH), multiple visits (i.e., hospitalizations) can be included for a single patient (PID), multiple observations (i.e., laboratory results) can be included for a single visit (PV1), and multiple notes and comments can be related to any observation (OBX).

Adjacent fields in HL7 transmissions are separated by a |. An empty field is denoted by two separators with no data separating them, i.e., ||. Each segment other than MSH is designated by its header (e.g., PID, PV1, OBX, NTE) followed by a separator and sequential numbers from beginning with 1 (e.g., PID|1|, OBX|3|, NTE|2|).

Please note that OBX, Field 7 contains the normal range for the test performed on the patient identified in the corresponding PID file. Normal ranges may vary with patients' ages and

genders. Please inform MHA staff if you are unable to provide an individualized normal range for any of the tests listed in Appendix A.

Detailed Description of Individual Segments

MSH – Message Header

Field #	Content	Max Length	Content Required	Comment
	MSH			Content always 'MSH'
1	Field Separator	1	Yes	Content always '|'
2	^~\&	4	Yes	Content always '^~\&'
3	Sending Application	227	No	
4	Sending Facility	227	Yes	MHA Hospital Identifier Code
5	Receiving Application	227	No	
6	Receiving Facility	227	Yes	Recipient name or code (e.g., MHA)
7	Date/Time of Message	26	Yes	CCYYMMDDHHMM (year, month, day, hour, minute)
8	Security	40	No	
9	Message Type	15	Yes	Content always 'CSU^Z01' (unsolicited study data, locally defined)
10	Message Control ID	20	No	
11	Processing ID	3	Yes	Production (P), Training (T), Debug (D)
12	Version ID	60	Yes	Content always '2.5.1'

EXAMPLE:

```
      1 2  3      4        5  6             7          8       9         10   11 12
MSH|^~\&||225||MHA|200803231435||CSU^Z01|12345|P|2.5.1
```

Note: All required fields completed. Field 10 completed but could have been left blank.

PID – Patient Identification

Field #	Content	Max Length	Content Required	Comment
	PID		Yes	Content always 'PID'
1	Set ID – PID	4	Yes	Content sequential number from 1 to n where n is the total number of unique patients whose data are included in this transmission (max = 9,999)
2	Patient ID	20	Yes	Medical record number required unless alternate unique identifier provided in Field 4
3	Patient Identifier List	250	No	
4	Alternate Patient ID	20	No	May be used for an alternate patient identifier (see Field 2) or for a secondary patient identifier
	Patient Name	250	No	

6	Mother's Maiden Name	250	No	
7	Date/Time of Birth	26	Yes	CCYYMMDD (year, month, day); time not required if age > 1 month
8	Administrative Sex	1	Yes	Gender M, F, U
9	Patient Alias	250	No	
10	Race	250	No	
11	Patient Address	250	No	
12	County Code	4	No	
13	Phone Number – Home	250	No	
14	Phone Number - Business	250	No	
15	Primary Language	250	No	
16	Marital Status	250	No	
17	Religion	250	No	
18	Patient Account Number	250	Yes	

Note: Fields 19-30 of PID exist but are not relevant to these data specifications.

EXAMPLE:

```
      1      2          3-6      7        8  9-17      18
PID|1|987654321|||||19350109|M|||||||||543216789
```

Note: All required fields completed. Field 2 could be blank if an alternate unique identifier is provided in Field 4. Field 4 blank, but a secondary identifier may be provided in this field. Field 18 is completed but could have been left blank.

PV1 – Patient Visit

Field #	Content	Max Length	Content Required	Comment
	PV1		Yes	Content always 'PV1'
1	Set ID – PV1	4	Yes	Content sequential number from 1 to n where n is the total number of hospital admissions for each patient in this transmission (max = 9,999)
44	Admit Date/Time	26	Yes	CCYYMMDDHHMM (year, month, day, hour, minute) Hour and minute should be included if known
45	Discharge Date/Time	26	No	CCYYMMDDHHMM (year, month, day, hour, minute) Should be provided if known at time of transmission; hour and minute should be included if known

Note: Fields 2-43 and 46-52 of PV1 exist but are not relevant to these data specifications.

EXAMPLE:

```
    1          2-43                  44          45
PV1|1|||||||||||||||||||||||||||||||||||||||||||||||||||||20080315|20080318
```

Note: All required fields completed. Field 44 would contain hour and minute of admission if these are known. Field 45 could be blank if the date of discharge is not known and would contain hour and minute of discharge if these are known.

OBX - Observation/Result

Field #	Content	Max Length	Content Required	Comment
	OBX		Yes	Content always 'OBX'
1	Set ID - OBX	4	Yes	Content sequential number from 1 to n where n is the total number of qualifying observations (i.e., required laboratory results from 30 days prior to admission through the date of discharge) for each patient hospitalization in this transmission (max = 9,999)
2	Value Type	2	Yes	Result type: NM=numeric; ST=character string; CE=coded element
3	Observation Identifier	250	Yes	LOINC code
4	Observation Sub-ID	20	No	
5	Observation Value	9999	Yes	Value of test
6	Units	250	Yes	Units
7	References Range	60	Yes	Low value - high value
8	Abnormal Flags	5	No	Not required, but flag may be inserted to denote an abnormal value
9	Probability	5	No	
10	Nature of Abnormal Test	2	No	
11	Observation Result Status	1	Yes	C=correction; D= deletes the OBX record; F=final result; I=specimen in the lab, results pending; O=Order detail only, no result; P=preliminary result; R=results entered, not verified; S=partial results; X=results cannot be obtained for this specimen; W=posting is wrong, results sent for wrong patient
12	Effective Date of Reference Range	26	No	
13	User Defined Access Checks	20	No	
14	Date/Time of the Observation	26	Yes	CCYYMMDDHHMM (year, month, day, hour, minute) Date/Time sample obtained; hour and minute should be included if known
15	Producer's ID	250	No	
16	Responsible Observer	250	No	
17	Observation Method	250	No	

18	Equipment Instance Identifier	22	No	
19	Date/Time of the Analysis	26	No	CCYYMMDDHHMM (year, month, day, hour, minute) If available, should be provided as check on Date/Time of Observation; hour and minute should be included if known

EXAMPLE:

```
                                                                   11
    1   2                    3                    4  5     6        7     8-10↓12-13
OBX|1|NM|2951-2^SODIUM SERPL-SCNC| |138|MEQ/L|135-146| | | |F| | |

       14        15-18        19
200801100930| | | | |200801101430
```

NTE – Notes & Comments

Field #	Content	Max Length	Content Required	Comment
	NTE		Yes	Content always 'NTE'
1	Set ID – NTE	4	Yes	Content numbered to correspond to the number of the OBX field to which the note or comment relates (max = 9,999)
2	Source of Comment	8	Yes	L=Ancillary department (filler); P=Orderer (placer); O=Other
3	Comment	65536	Yes	'Sample hemolyzed' always should be commented in this field when it is observed; NTE comments also may transmit other required data by special arrangement with project staff
4	Comment type	250	No	

Note: If an NTE segment is needed (e.g. the sample is hemolyzed), it would follow the appropriate OBX segment.

EXAMPLE:

```
    1 2          3
NTE|2|L|Sample Hemolyzed
```

Nested Segments in a Single Transmission

Instead of a set of single segments (i.e., one MSH with one PID, one PV1, and one OBX with or without an NTE, segments may be nested in a single MSH transmission. Such a transmission might consist of one MSH followed by PID|1 for a first patient, PV1|1 for a first hospitalization for the first patient, OBX|1 for the results of the first laboratory test associated with the hospitalization, OBX|2 for the results of the second laboratory test associated with the hospitalization, NTE|2 for a note concerning the second laboratory test, OBX|3 for the

results of the third laboratory test associated with the hospitalization, PV1|2 for the second hospitalization for the first patient, OBX|1 for the results of the first laboratory test associated with the second hospitalization, OBX|2 for the results of the second laboratory test associated with the second hospitalization, PID|2 for a second patient, PV1|1 for a first hospitalization for this second patient, and OBX|1 for the results of the second laboratory test associated with the first hospitalization for the second patient.

An HL7 OBR segment exists, but is not required for this project. However, for hospitals that already use HL7 and utilize a nested OBR segment to transmit the date and time observations were made, OBR Field 7 may be used instead of OBX Field 14. Similarly, NTE Field 3 may be used to convey data required in OBX Field 11. Please inform project staff if you have a standard HL7 transmission protocol that assigns required data elements to fields other than those shown in the templates in the previous section.

EXAMPLE OF TRANSMISSION DESCRIBED ABOVE:

MSH|^~\&||225||MHA|200803231435||CSU^Z01|12345|P|2.5.1
PID|1|987654321|||||19350109|M|||||||||543216789
PV1|1|||||||||||||||||||||||||||||||||||||||||20080115|20080118
OBX|1|NM|2951-2^SODIUM SERPL-SCNC||138|MEQ/L|135-146||||F|||200801100930|||||200801101430
OBX|2|NM|2823-3^POTASSIUM SERPL-SCNC||6.2|MEQ/L|3.5-5.0||||F|||200801151130|||||200801151500
OBX|3|NM|2823-3^POTASSIUM SERPL-SCNC||4.4|MEQ/L|3.5-5.0||||F|||200801160815|||||200801161145
NTE|2|L|Sample Hemolyzed
PV1|2|||||||||||||||||||||||||||||||||||||||||20080318|20080322
OBX|1|NM|2951-2^SODIUM SERPL-SCNC||141|MEQ/L|135-146||||F|||2008031801030|||||200803180140
OBX|2|NM|2823-3^POTASSIUM SERPL-SCNC||4.1|MEQ/L|3.5-5.0||||F|||2008031801030|||||200803180140
PID|2|123456789|||||19420222|M|||||||||987612345
PV1|1|||||||||||||||||||||||||||||||||||||||||20080315|20080317
OBX|1|NM|1751-7^ALBUMIN SERPL-MCNC||3.8|G/DL|3.6-5.2||||F|||200803181530|||||200803191100