State of Utah
Implementation Guidance
Electronic Laboratory Reporting (ELR)

Version 1.9
July 2019

Background:

All electronic laboratory report (ELR) messages for the State of Utah will be sent to the Utah Department of Health (UDOH). According to the Utah Administrative Code Rule R386-702,

> "Each reporting entity shall report each confirmed case and any case who the reporting entity believes in its professional judgment is likely to harbor an illness, infection, or reportable condition".

This means that laboratories and/or hospitals that use referral laboratories for their testing must ALSO report the results of that testing. In addition, it means that referring laboratories are still obligated to report the testing that they perform.

At this time, UDOH is requesting that all laboratories and hospitals that perform testing on Utah citizens, or that have other laboratories perform testing on their patients, for any reportable condition initiate ELR reporting.

Intent:

Utah is requesting that all entities contact UDOH to declare their intent to initiate ELR, and fill out the implementation guide as well as provide a comprehensive vocabulary that they plan to use.

Message Transmission:

Reporting entities must be able to submit ELR messages in a secured manner. UDOH is capable of receiving messages through SFTP, APHL Informatics Messaging Service (AIMS) Platform Route-not-Read, and Utah Health Information Network (UHIN) Clinical Health Information Exchange (cHIE).

Message Format:

Laboratories may submit messages in HL7 v2.3.1:ORU^R01 or v2.5.1:ORU^R01. Hospitals seeking Meaningful Use attestation must submit messages in HL7 v 2.5.1:ORU^R01. All messages must conform to the "HL7 Version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1 (US Realm)". This implementation guide is available at www.HL7.org in the store. Test messages should be checked against the PHIN Message Quality Framework to ensure that they are structured correctly prior to sending to UDOH.

Required Fields/Information:

In addition to fields required by HL7, the following fields are required by UDOH:

MSH Segment Fields:

MSH-4.1 – Sending facility – this is the name of the hospital/laboratory facility that is sending the results electronically to the UDOH. For example: if your EHR vendor is sending the message, then the information in the MSH-4.1 must be the facility where the EHR resides. If you belong to a conglomerate of hospitals, the

location of the electronic record (and thus the patient) is very important. In addition the UDOH needs to know the exact laboratory performing the test (performing lab must be sent in the OBX-23 field of the HL7 message). The patient history can become very complicated. A patient may be seen at a clinic, Clinic A (the diagnostic facility), have their blood sent to hospital A, then sent to reference lab B for performance, with the result coming back to and being entered into the EHR system of hospital A and then being forwarded to Clinic A. If Hospital A is reporting this result from their EHR system, then the message should clearly state that they are the sending facility in MSH-4.1. At this time the UDOH is only requiring the name of the Sending Facility (MSH-4.1). Populating the MSH-4.2 with an OID or NPI number is optional. However, sending facilities must provide a translation of their codes, this includes the facility name as provided in MSH-4.1.

MSH-5.1 – Senders should use "NEDSS".
MSH-6.1 – Senders should use "UDOH".
MSH-7 – Date and time the ELR message was sent.
MSH-15 –Senders should use "NE".
MSH-16 – Senders should use "NE".
MSH-21 – Senders should use "PHLabReport-NoAck".

PID Segment Fields:

PID-3.1 – This should be the hospital Medical Record Number for the patient. Hospitals must send the patient Medical Record Number in PID-3.1. Laboratories should send it if known.
PID-3.5 – Hospital Lab Senders should use "MR" stands for Medical Record Number.
PID-4 – For facilities using HL7 2.3.1, this can be any other patient identifier as long as it is identified.
PID-5 – Patient name (last name, first name, middle name or initial)
PID-7 – Patient date of birth.

Note: No messages will be accepted without a first and last name as well as a date of birth.

PID-8 – Patient sex (gender).
PID-10 – Patient race (if known).
PID-11 – Patient address. At a minimum, hospitals must send patient address, including: street address (PID-11.1), unit or apartment number if applicable (PID-11.2), city (PID-11.3), state (PID-11.4), and zip code (PID-11.5), laboratories should send it if known. If a laboratory does not capture patient address, they must send the name and address/phone number of the ordering provider.
PID-13 – Patient phone number (if known). Area code in the PID-13.6 and local telephone number in PID-13.7.
PID-22 – Patient ethnicity (if known).

PID-29 – Patient death date/time [YYYYMMDDHHMM] (populate only if patient died).
PID-30 – Patient death indicator. If PID-29 is populated with a death date/time, this field should be populated with "Y".

PV1-2 – Is patient inpatient, outpatient, or ER visit.
PV1-3 – If patient is inpatient, what is the patient's room number.
PV1-7 – This is the patient's primary physician (attending doctor).
PV1-44 – If inpatient, this is the patient's admission date and time.

ORC Segment Fields:

ORC-3 – Filler Order Number – if the reporting facility is NOT the facility that performed the test, we need to have the filler order number to link the results from the reporting facility to the results from the performing facility. The filler order number must be used in this circumstance.
ORC-12 (or **OBR-16**) – Ordering provider – This is the clinician that ordered the test.
ORC-14 (or **OBR-17**) – Phone number to call in the event that there is a problem with the test. This would probably be the contact number for the ordering provider.
ORC-21 – Ordering facility name – This is the facility that placed the lab test request.
ORC-22 – Ordering facility address.
ORC-24 – Ordering provider address.

OBR Segment Fields:

OBR-3.1 – Filler Order Number – this should be the laboratory accession number only if the reporting entity is using HL7 v2.3.1. If the reporting entity is using HL7 v2.5.1 then the accession number should be located at SPM-2. The filler order number is assigned by the lab performing the test and sent to the requesting facility. It is the number whereby reports from hospitals can be linked to the corresponding report from performing laboratories.
OBR-4.1 – Universal Service ID – this should be the LOINC code corresponding to the requested test or panel of tests
OBR-4.5 – This should be the lab's description of the ordered test (not the LOINC description)
OBR-7 – For specimen-based observations, this should be the date and time the specimen was collected. As some specimens are routinely collected multiple times during the day, it is essential that this field be populated with time in order for public health to logistically organize the results. For HL7 v2.5.1 use **SPM-17** for specimen collection.
OBR-13 - Please put Pregnancy status in this field for all females of child-bearing age.

OBR-15 – Specimen source - This is a mandatory field for all culture-based tests. Use OBR-15 if for HL7 v2.3.1 and **SPM-4** if for HL7 v2.5.1. Specimen source should use SNOMED CT codes.
OBR-16 (or **ORC-12**) – Ordering provider – This is the clinician that ordered the test.
OBR-17 – (or **ORC-14**) Order callback phone number – This is the number

OBX Segment Fields:

OBX-3.1 – Observation Identifier – This should be the LOINC code corresponding to the actual test
OBX-3.2 – Observation Identifier Text – This should be the text name of the LOINC code in OBX-3.1.
OBX-3.3 – Observation Identifier Coding System Name – This should be "LN" for LOINC.
OBX-3.4 –Observation Alternate Identifier (laboratory's own code identifier for lab test.
OBX-3.5 – Observation Alternate Text – This should be the text name that the laboratory has for the lab test.
OBX-3.6 – Observation Alternate Coding System Name – This should be "L" for local code.
OBX-3.9 - For labs using v2.5.1 – put the original text of the lab test (this is the name of the test that is in the laboratory manual and is sent to clinicians) in this field.
OBX-5.1 – Result Code – This should be a SNOMED CT code corresponding to the result for all tests with ordinal result values and all microbiological organism names.
OBX-5.5 – Result Description – This should be the laboratory result description (not the SNOMED-CT description)

Note: The result code should be the same as the result description. You may NOT attempt to concatenate results using these two fields. For example, using OBX 5.1 to indicate positive and OBX 5.5 to indicate Salmonella is not acceptable.

OBX-6 – IF OBX 5.1 is a numerical designation, then OBX 6 should be used to express the units of that value
OBX-7 – This should represent the negative or normal value or the interpretation range (Reference Range) that applies to the value reported in OBX.5. Enough information should be provided to understand the Abnormal Flag in the OBX.8 field. Do not put the Reference Range in a NTE segment, unless it is also present in this field.
OBX-8 – This is used as a modifier field for ordinal results, e.g. if the result is positive, the abnormal flag can be used to indicate a high or a low positive. It is

also a mandatory field for submitters who are sending quantitative results that require interpretation. See best practices below.

OBX-11 – Result status – This field indicates whether the report is preliminary, final, or corrected. Use table HL700085 for the vocabulary values used for this field.

OBX-19 – Date/Time of analysis – This field is when the laboratory actually performed the test.

OBX-23 – This field represents the name of the laboratory that actually performed the test. If the sending facility did not perform the test, this field is required.

NTE Segment Fields:

NTE-3 – Labs may use NTE-3 for culture results that require further description. Ideally, the NTE segment will appear after the OBX segment.

SPM-2 – Specimen ID – This is the laboratory Accession Number.

SPM-4 – This is the specimen source/type. This is a mandatory field for all culture-based tests.

SPM-17 – This is the date and time of specimen collection.

SPM-18 – This is the date and time the specimen was received at the lab.

Best Practices:

The Utah Department of Health recommends that submitters follow the structure found in Appendix A (HL7 Reporting of Culture and Susceptibilities) of the HL7 v 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1.

1. **Stool cultures:**
    a. Labs should provide the following information to UDOH on all stool cultures:
        i. The OBR should identify the appropriate LOINC for stool culture in the OBR 3.1 field.
        ii. In subsequent OBX segments, put the appropriate LOINC for stool culture in the OBX 3 field
        iii. Use sub-ID (pipe delimiters) for each organism.
        iv. Use the LOINC code for detection (found/not found) in the first OBX and then the LOINC code for identification (Salmonella) in the second OBX.
        v. Tie the OBX's together using sub-ID.
    b. Pathogen quantitation (e.g. 2+) and antibiotic susceptibility information are not required for stool cultures.
2. **Bacterial/viral/fungal disease cultures from sterile sites:**
    a. Labs should provide the following information to UDOH on all bacterial disease cultures identified from sterile sites such as blood, CSF, tissue, body and joint fluids, bone, etc.

i. The OBR should identify the appropriate LOINC for culture. You may use either generic LOINC codes (e.g. bacterial culture) or specific LOINC codes (e.g. blood culture).
ii. Do not use LOINC codes for bacterial identification if you are plating a specimen, use LOINC codes for culture, as this is the test you are performing. Only use LOINC codes for bacterial identification if you have received an isolate from another lab and are verifying its identification.
iii. Add an OBX segment for every organism isolated (even those that are not reportable) from that culture
iv. Indicate the quantity of the isolated organism in an OBX segment, using a sub-ID to correlate the quantity with the organism.

3. ***Streptococcal pneumonia*** **culture from sterile sites:**
    a. Send antibiotic susceptibility profiles of all tested (not just those that were reported to the clinician) antibiotics. Send the antibiotics in subsequent OBX segments using sub-ID to correlate the susceptibility profile with the organism.
4. UDOH prefers that the LOINC code for a panel be placed in the OBR segment, and that the individual tests be listed below that OBR segment in a series of OBX segments.
    a. Example: OBR segment would list the LOINC code for a combo Chlamydia and Gonorrhea PCR test. Following that would be an OBX segment listing a test and result for the Chlamydia portion of the combo test, and then an OBX segment listing the test and result for the Gonorrhea portion of the combo test.
    b. Example: OBR segment would list the LOINC code for a stool culture. Following that would be OBX segments with the same LOINC code and listing each of the isolates identified.
5. Use of **Abnormal Flag:** UDOH is requiring providers who send quantitative results that require interpretation to send that interpretation in the same message in the abnormal flag. For example: A serology test result of 5.1 IU is a submitted result. The interpretation of this result requires the reference range to determine if the result is positive, indeterminate, or negative. The same message should contain a value at OBX 8 with the proper interpretation. UDOH does not want the interpretation in a separate message, as it is difficult to recombine multiple messages. If a quantitative result does not have a reference range (such as a viral load test), then the abnormal flag is not required.
6. **Reference lab:** If a reporting entity has forwarded an isolate to a reference lab, that can be disclosed by using SNOMED CT codes 414976005 (Organism unidentified, referred to CDC) or code 414977001 (Organism unidentified, referred to reference lab for identification). Provision of this information to UDOH is optional. However, when the reporting entity receives results back from either CDC or the reference lab, the reporting entity must then report those final results to UDOH.

7. **Missing or unavailable LOINC or SNOMED CT codes:** If the lab is performing testing that does not have a currently-available LOINC code, leave OBX 3.1 empty and put the local code into OBX 3.4. If a result does not have a currently-available SNOMED CT code, leave OBX 5.1 empty and put a local code into OBX 5.4. All reporters using local codes must submit a value set consisting of codes and translations to ELR@utah.gov.
   If a SNOMED CT code is not available, do NOT use a SNOMED code from a different hierarchy level. (For example, if there were no SNOMED code for Salmonella xyz, do not substitute a SNOMED code for Salmonella species, and then insert a more specific code in the local and/or original text fields. Leave the SNOMED code blank and only use the correct/specific local and/or original text fields.)
   You may use SNOMED CT code 441742003 "Evaluation finding" as a default code for "Code Unavailable" and then put the actual results in the local code and/or original text field.
8. **Poor message structure practices:**
   a. Splitting one result into multiple messages (these are very difficult to reconstruct back into a single lab report)
   b. Using a LOINC code in the OBX segment with multiple types of results (e.g. using a LOINC code for ordinal results (such as positive) and the same LOINC code for quantitative results (such as 4.3)
   c. Using a LOINC code in the OBX segment with multiple types of units (e.g. using the same LOINC code for results with IU/ml as well as for Log IU/ml results.
   d. Using one OBX to one OBR. While this makes for a simple structure, it fails to accommodate UDOH being able to reconstruct the test without merging many messages into one result. This is very challenging technically. We will not approve this structure for meaningful use.
   e. Splitting the result field. For example, OBX 5.2 would represent a SNOMED for an organism and then OBX 5.5 would represent a local code for "detected" or "not detected".

Version Control:

Version 1.1 (02/11/2013)

- Added "or that have other laboratories perform testing on their patients" to the Background section.
- Added "
- Use of **Abnormal Flag:** UDOH is requiring providers who send quantitative results that require interpretation to send that interpretation in the same message in the abnormal flag. For example: A serology test result of 5.1 IU is a submitted result. The interpretation of this result requires the reference range to determine if the result is positive, indeterminate, or negative. The same message should contain a value at OBX 8 with the proper interpretation. UDOH does not want the interpretation in a separate message, as it is difficult to recombine multiple messages. If a quantitative result does not have a reference range (such as a viral load test), then the abnormal flag is not required." And "It is also a mandatory field for submitters who are sending quantitative results that require interpretation. See best practices below."
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Version 1.2 (March 8, 2013)

- Clarified the need to provide original text

Version 1.3 (September 19, 2013)

- Clarified sub-IDs

Version 1.4 (February 10, 2014)

- Clarified pregnancy location

Version 1.5 (February 26, 2014)

- Took out the unhelpful explanation for PID - 3.1

Version 1.6 (November 2015)

- Updated document formatting for consistency throughout the document.

Version 1.7 (February 2019)

- Updated list of supported electronic interfaces in the "Message Transmission" section.

Version 1.8 (March 2019)

- Updated list of supported electronic interfaces in the "Message Transmission" section.

Version 1.9 (July 2019)

- Updated list of supported electronic interfaces in the "Message Transmission" section.