

Texas Newborn Screening

Implementation Guide for Newborn Screening Orders Messaging

HL7 Version 2.5.1



TEXAS
Health and Human
Services

Texas Department of State
Health Services

Based on HL7 Version 2.5.1 Implementation Guide: Laboratory Orders (LOI) from EHR, Release 1, STU
Release 3 - US Realm

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UPDATE HISTORY

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0.2	5/29/2018	B. Reilly	<ul style="list-style-type: none"> - Corrected MSH-4 to R and clarify as a sender defined field. - Updated label example to exclude form serial number. - Updated LOINCs by OBX to indicate RE when the OBX with that value is requested but not required for all messages - Corrected LOINCs by OBX with CWE data type from CWE to CE
1.0	09/01/2019	B. Reilly	<ul style="list-style-type: none"> - Clarified language definition for RE Usage - Updated Usage of MSH-3 Sending application to RE - Updated Usage of MSH- Receiving application to R
1.1	11/2019	B. Reilly	- Added OBR-19 Placer Field 2 as a field that will be returned in result messages as received in the order message.
2.0	11/2020	B. Reilly	<ul style="list-style-type: none"> - Added ORC-15 Order Effective Date/Time, and OBR-18 Placer Field 1 as fields that will be returned in result messages as received in the order message. - Updated Section V, Table 18 Soft Errors and Table 19 Hard Errors to include all possible errors sent by DSHS. - Added Section VIII Example Message

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SECTION 1: OVERVIEW

This implementation guide (IG) provides specifications and standards used to create HL7 2.5.1 messages for submission to the Texas Department of State Health Services (DSHS) Laboratory. Additionally, this guide includes examples that demonstrate how the elements connect and form complete Newborn Screening specimen order messages. Combined with the Texas Newborn Screening Implementation Guide for Newborn Screening Results Messaging, this guide allows facilities submitting newborn screening specimens a means for electronically transferring patient and specimen information and receiving test results.

Although registered users throughout the state can use [DSHS Newborn Screening Web Application](#) to submit specimen demographic information, most newborn screening submitters process similar data in their own Electronic Health Record (EHR) systems and/or in a hospital Laboratory Information System. The Texas DSHS Newborn Screening HL7 interface is designed to allow those providers to use their own information systems to generate and submit the required data electronically and receive results electronically.

This guide and message format were specifically designed to allow partner facilities or vendors to claim conformance to HL7 Version 2.5.1 Implementation Guide: Laboratory Orders (LOI) from EHR, Release 1, STU Release 3 - US Realm. However, as described in this guide, the DSHS system allows flexibility where possible to accommodate exchange partners who do not wish to strictly adhere to LOI.

A. INTENDED AUDIENCE

This document is intended for technical staff from hospital and clinic partners, EHR vendors, LIS vendors and other entities supporting providers' specimen order submission to the Texas Newborn Screening Laboratory. The reader of this state Implementation Guide (IG) should have a solid HL7 foundation and be very familiar with the contents of the HL7 Version 2.5.1 Implementation Guide: Laboratory Orders (LOI) from EHR, Release 1, STU Release 3 - US Realm, located on the [HL7 web page](#). The goal of the state IG is to provide an unambiguous specification for creating and interpreting messages exchanged between providers and the DSHS Laboratory.

B. MEANINGFUL USE

The Centers for Medicare and Medicaid Services (CMS) have the Medicare and Medicaid Electronic Health Record Incentive Programs (EHR Incentive Programs), designed to provide incentives to Eligible Providers, Eligible Hospitals, and Critical Access Hospitals for the adoption and utilization of EHR systems. To receive an incentive payment, participants must demonstrate "meaningful use" of certified EHR technology by meeting measurement criteria such as ordering lab test results, recording certain patient information and reporting information to public health.

More information about the EHR incentive programs may be found on CMS web page, [Electronic Health Records Incentive Programs](#).

Information about the Medicaid EHR Incentive Program in Texas may be found on the Texas Medicaid & Healthcare Partnership's web page, [Electronic Health Records Incentive Program Overview](#). Information about submitting data to DSHS registries and systems to meet EHR Incentive Program requirements may be found at [Texas DSHS Support for Meaningful Use of Electronic Health Records](#).

C. DATA EXCHANGE REQUIREMENTS

In order for the sending partner (i.e., the provider, EHR or LIS) to engage in data exchange with the DSHS Laboratory, the organization will need to ensure that they:

- Are a registered Newborn Screening specimen submitter with DSHS
- Have a current DSHS Laboratory Services Site Agreement on record
- Ensure that all associated facilities in their organizational hierarchy is accurate
- Have the ability to send NBS specimen order data by constructing a valid HL7 version 2.5.1 message
- Have the ability to interface with the DSHS Laboratory using one of the available file transport options listed below

TRANSPORT OPTIONS FOR DATA EXCHANGE

There are a few different transport methods that may be considered to securely submit newborn screening orders, formatted as HL7 messages, to the DSHS NBS Lab. The current preferred method of submitting HL7 messages is Virtual Private Network.

VIRTUAL PRIVATE NETWORK (VPN)

A virtual private network (VPN) extends a private network across a public network, and enables users to send and receive data across shared or public networks as if their computing devices were directly connected to the private network. Applications running across the VPN may therefore benefit from the functionality, security, and management of the private network.

The Texas DSHS Laboratory's Virtual Private Network protocol is designed for "real-time" single messaging. Organizations should avoid sending numerous instances of individual messages at a single given instance.

D. SCOPE

The HL7 standard is used for data exchange by many entities in the healthcare industry. The complete standard covers a variety of situations in patient care. The DSHS Laboratory supports a specific subset of HL7 pertaining to Newborn Screening (NBS) Laboratory Orders and NBS Laboratory Results. This HL7 IG covers the format and content requirements for sending HL7 NBS Order messages to the DSHS Laboratory in the OML^021 format. The DSHS Laboratory Interfacing system is designed to allow (but not require) partner conformance to HL7 Version 2.5.1 Implementation Guide: Laboratory Orders (LOI) from EHR, Release 1, STU Release 3 - US Realm.

This guide is intended to facilitate the transfer of newborn screening specimen information from EHR and LIS systems to the DSHS Laboratory Information Management System. This includes:

- Sending demographic information about the patient, the patient's mother, and the primary care physician that will care for the child upon discharge from the birthing facility.
- Sending observations about the specimen collection.
- Acknowledging receipt of orders
- Reporting errors in the messaging process

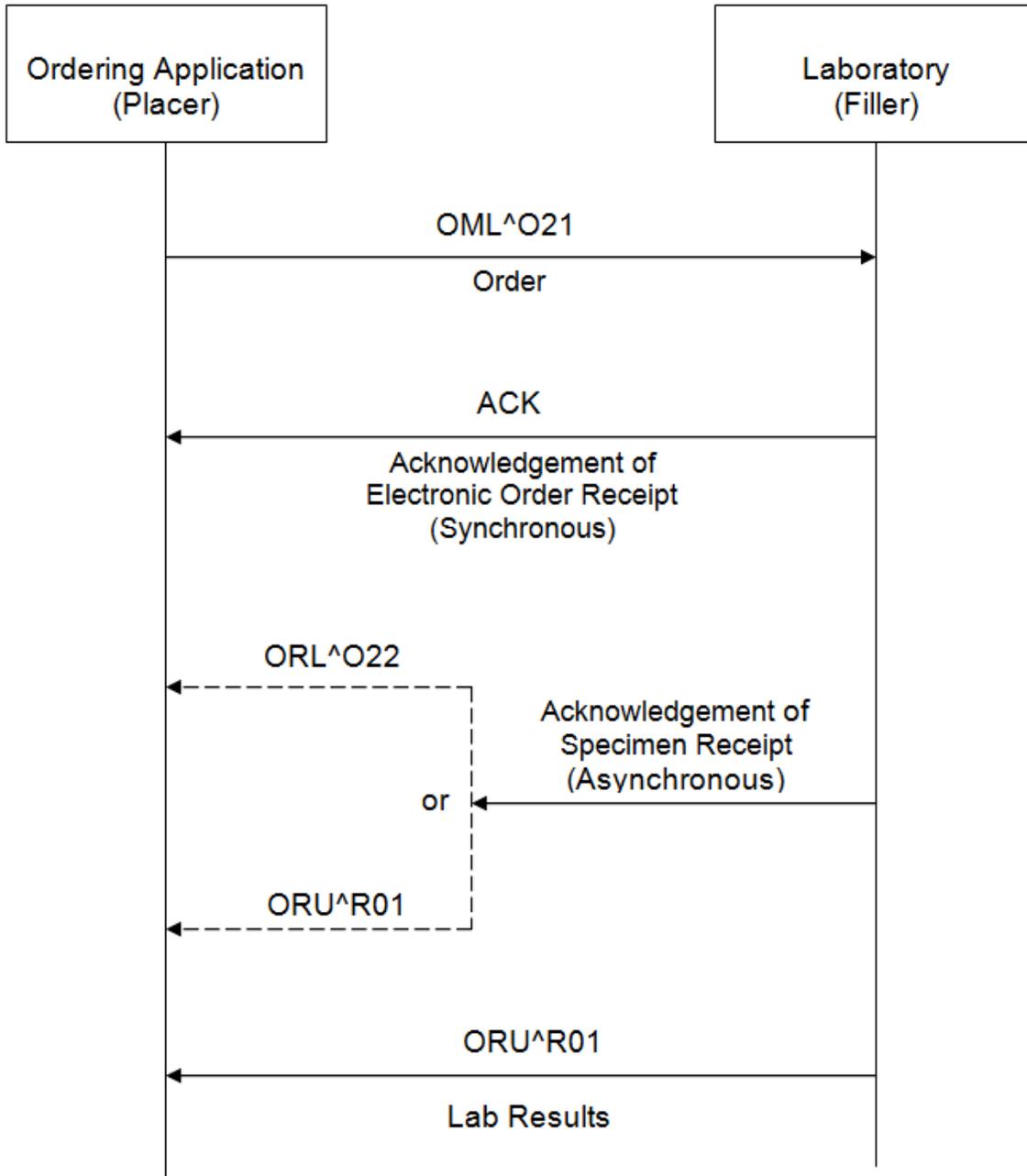
The companion guide Texas Newborn Screening Implementation Guide for Newborn Screening Results Messaging outlines the format and content requirements that DSHS will use in generating the associated results message for the order test sample.

Out of Scope - Ordering of point of care results for newborn screening for Early Hearing Detection and Intervention (EHDI) and Critical Congenital Heart Disease (CCHD)

E. ACTORS, GOALS, AND MESSAGING TRANSACTIONS

The following diagram illustrates where the OML^O21 message fits into an order interaction between the DSHS Laboratory and the entity submitting the newborn screening specimen.

Figure 1: Use Case and Goal



This guide outlines the appropriate messaging format to send an electronic order for a newborn screening specimen to the DSHS Laboratory.

Table 1: Use Case and Goal - Orders

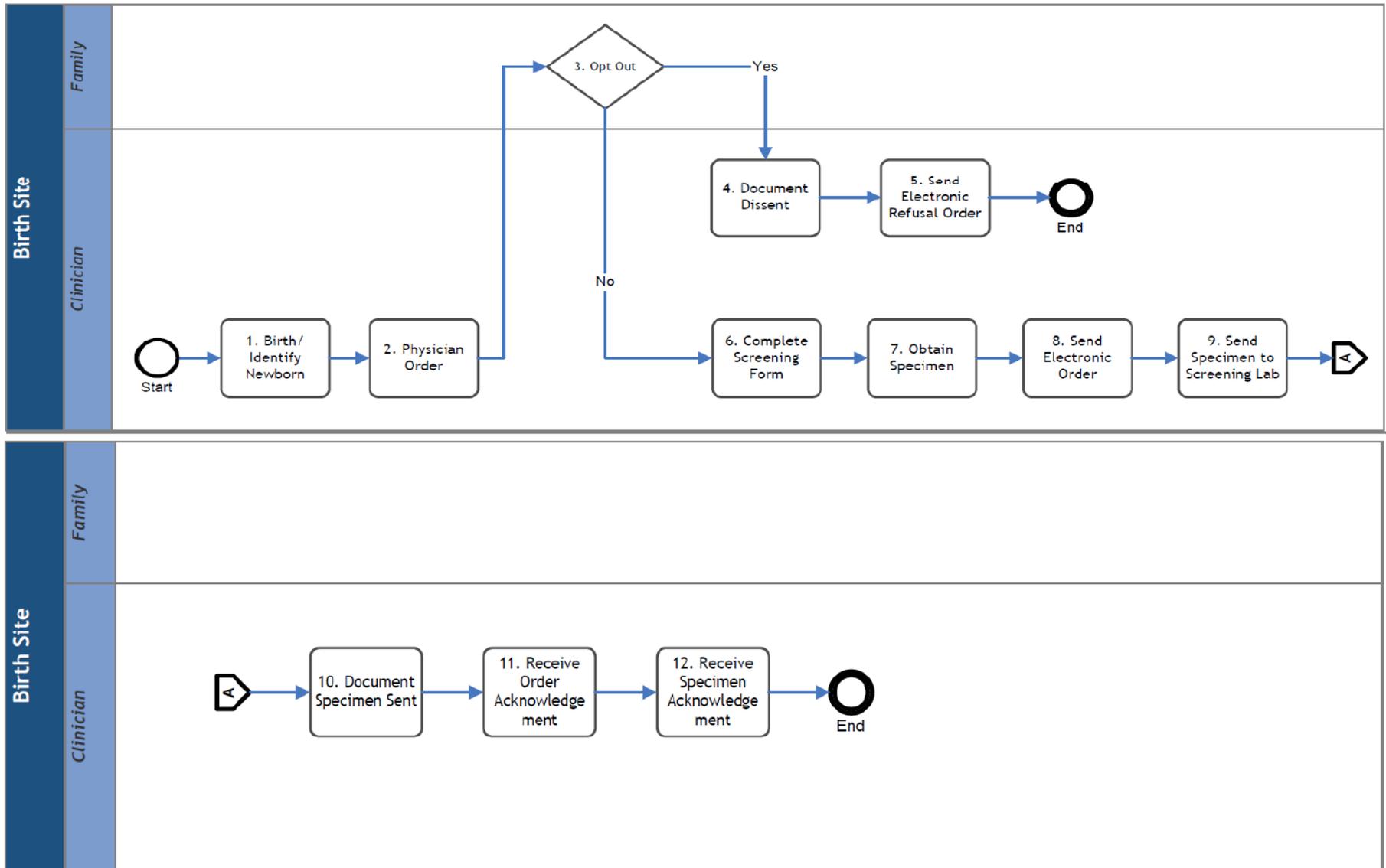
Use Case	Message Type	Goal
Send Newborn Screening Specimen Order	OML^O21	To send newborn screening specimen and associated patient demographic information to the DSHS Laboratory.
Acknowledge Receipt	ACK^O21	To acknowledge receipt of a message.
Report Error	ACK^O21	To send error messages related to submitted messages. These errors could result in rejection of the message.

The companion guide Texas Newborn Screening: Implementation Guide for Newborn Screening Results Messaging outlines the messaging formats that the DSHS Laboratory will use to send specimen receipt and results messages to the ordering entity.

Table 2: Use Case and Goal - Results

Use Case	Message Type	Goal
Send Specimen Receipt Notification	ORL^O22	To send notification of receipt of the physical specimen in the DSHS Laboratory
Send Newborn Screening Specimen Results	ORU^R01	To send results for the newborn screening specimen testing panel.

Figure 2: Task Flow Diagram for Newborn Screening Orders



SECTION II: HL7 MESSAGING INFRASTRUCTURE

This section will contain a basic description of the terms and definitions, which are used in this document in order to understand the HL7 standard as it applies to newborn screening laboratory information systems.

A. HL7 DEFINITIONS

The terms below are organized to move from the message to subsequently more granular components. The details of how HL7 messages are structured for DSHS Laboratory purposes will be explained later in this document.

MESSAGE

A message is the entire unit of data transferred between systems in a single transmission. It is a series of segments in a sequence defined by the message specifications.

SEGMENT

A segment is a logical grouping of data fields. Segments within a defined message may be required or optional, may occur only once, or may be allowed to repeat. Each segment is named and is identified by a segment ID, a unique 3-character code.

FIELD

A field is a string of characters delimited by field separators (|). Each field has an element name and is identified by the segment it is in and its position within the segment; e.g., PID-5 is the fifth field of the PID segment.

COMPONENT

A component is an element within a composite field and is delimited within the field by component separators (^). Within a field having several components, not all components may be required. Leading empty components must be represented by a delimiter (^); trailing empty components may be eliminated from the field. A component is referenced by the 3-character segment code, followed by the field position, and the component position with that field; e.g., OBX-5.2 denotes the second component of the fifth field of the OBX segment.

NULL AND EMPTY FIELDS

The null value is transmitted as two double quote marks "". A null-valued element differs from an empty element. The null value means that the receiving system voids any previous value. An empty element remains unchanged. The empty element does not overwrite previously entered data.

DATA TYPE

A data type restricts the contents and format of the data field. Data types are given a 2- or 3-letter code that is specified by HL7. Some data types are coded or composite types with several components. The applicable HL7 data type is listed and defined in each field definition. Data type specifications can be found in *Section VII: Data Types* of this implementation guide. The data types listed throughout this document are the data types required by LOI. Whereas the DSHS laboratory can support all defined data types, less restrictive data types may be allowed as long as the required information is formatted correctly and in the required location within the data type.

CODE SETS

The Texas DSHS Laboratory associates most data elements with a list of acceptable values. Where applicable, this guide lists code values expected by The Texas DSHS Laboratory. The Texas DSHS Laboratory may not use all the HL7 permitted values.

DELIMITERS

Delimiter characters are used to separate segments, fields and components in an HL7 message. The delimiter values are given in MSH-2 and used throughout the message.

	Field Separator (ASCII 124)
^	Component Separator (ASCII 094)
&	Sub-component Separator (ASCII 038)
~	Repetition Separator (ASCII 126)
\	Escape Character (ASCII 092)

MESSAGE SYNTAX

Several segments form each message. Each segment begins with a three-letter code that identifies the segment category. Segments must be a single line and end with a segment terminator. Square brackets, [], enclose required but may be empty segments. Braces, { }, enclose segments that may be repeated.

SEGMENT TERMINATOR

Only the ASCII 013 carriage return is allowed. Throughout this document, this character is represented as <CR>. This value cannot be changed by implementers.

B. RULES FOR SENDING SYSTEMS

The following rules are used by sending systems to construct HL7 messages for submission to The Texas DSHS Laboratory.

- Encode each segment in the order specified in the message format.
- Begin the segment with the 3-letter segment ID (for example “PID”).
- Precede each field with the data field separator (“|”).
- Use the HL7 recommended encoding characters (“^~\&”).
- Encode the data fields in the order given in the table defining the segment’s structure.
- Encode the data field according to its HL7 data type format. Less restrictive data types may be allowed as long as the required information is formatted correctly and in the required location within the data type.
- Do not include any characters for fields not present in the segment. Since later fields in the segment are encoded by ordinal position, fields that are not present do not reduce the number of field separators in the segment. For example, when the second and third fields are not present, the field separators maintain the ordinal position of the fourth field (as in MSG|field1|||field4).
- Represent data fields that are present but explicitly null by empty double quotes (“”). The Texas DSHS Laboratory does not expect that any patient fields will be sent as null. All patient fields should be sent every time.
- Trailing separators may optionally be omitted. For example, |field1|field2 is equivalent to |field1|field2|||, when field3 and all subsequent fields are not present.
- End each segment with the default HL7 segment terminator, carriage return character (ASCII 013).

C. FIELD SPECIFICATIONS & USAGE

SEQ

The ordinal position of the field in the segment. Since the Texas DSHS Laboratory does not use all possible fields in the HL7 standard, these are not always consecutive. When values are provided for fields NOT supported by the Texas DSHS Laboratory, those fields will be ignored and will NOT be retained by DSHS.

DT

HL7 data type of the field. Note that this guide provides the LOI conformant data type.

USAGE

A key attribute to HL7 fields, components, and sub-components is the Usage Code. In the table below are the acceptable Usage Codes used in this IG.

Table 3, Usage Codes

Usage Code	Interpretation	Comment
R	Required	A conforming sending application shall populate all “R” elements with a non-empty value. The absence of a required element will result in an error.
RE	Required but may be empty	A conforming sender should be capable of providing all "RE" elements. If the conforming sender knows the required values for the element, then it must send that element. If the conforming sender does not know the required values, then that element may be omitted. Partners wishing to never send RE fields must explicitly request this omission in writing to DSHS. Requests will be submitted for DSHS Laboratory Director consideration.
C(a/b)	Conditional	This usage has an associated condition predicate that determines the operational requirements (usage code) of the element. If the predicate is satisfied: Follow the rules for a which SHALL be one of “R”, “RE”, “O” or “X”. If the predicate is NOT satisfied: Follow the rules for b which shall be one of “R”, “RE”, “O” or “X”. a and b can be the same
O	Optional	The Texas DSHS Laboratory allows exchange partners to send optional elements in order to meet LOI or partner internal requirements. This guide specifies fields that will be returned to the submitter upon receipt. Other fields may be sent but will not be consumed by DSHS or returned to the submitting facility.
X	Not Supported	The element is not supported. Sending applications should not send this element. A receiving application may raise an error if it receives an unsupported element.

CARDINALITY

Indicator of the minimum and maximum number of times the element may appear.

- [0..0] Element never present.
- [0..1] Element may be omitted or exist, at most, one occurrence.
- [0..n] Element may be omitted or repeat up to n times.
- [0..*] Element may be omitted or repeat an unlimited number of times.
- [1..1] Element must have exactly one occurrence.
- [1..n] Element must appear at least once and may repeat up to n times.
- [1..*] Element must appear at least once and may repeat an unlimited number of times.
- [m..n] Element must appear at least m times and may repeat up to n times.

SECTION III: ORDER MESSAGE (OML^O21) SEGMENT DETAILS

This chapter will contain specifications for each segment used in the OML^O21 order message. It will indicate which fields are supported or required and describe any constraints on these fields.

Table 4: OML^O21 Segments

Segment	Definition	LOI IG Usage	Texas DSHS Labor	Note
MSH (Message Segment Header)	The MSH segment defines the intent, source, destination, and some specifics of the syntax of a message.	Ability to create and process is required for conformant systems.	R	This begins every message and includes information about the type of message, how to process it, and by whom it was created.
PID (Patient Identifier Segment)	The PID segment contains permanent patient identifying and demographic information that, for the most part, is not likely to change. Used by all applications as the primary means of communicating patient identification information frequently.	Ability to create and process is required for conformant systems.	R	Used to carry information about the patient/client.
NK1 (Next of Kin Segment)	The NK1 segment contains information about the patient's next-of-kin or other related parties. For newborn screening purposes, an NK1 is required that transmits information on the patient's mother.	Ability to create and process is required for conformant systems.	R	Used to carry information about the mother of the newborn. Important to The Texas DSHS Laboratory for abnormal result follow-up, patient matching, Medicaid billing, and linkage of multiple newborn screening specimens.
ORC (Common Order Segment)	The ORC segment is used to transmit fields that are common to all orders (all types of services that are requested).	Ability to create and process is required for conformant systems.	R	Used to give information about the newborn screening order.

Segment	Definition	LOI IG Usage	Texas DSHS Labor	Note
OBR (Observations Request Segment)	The observation request (OBR) segment is used to capture information about one test being performed on the specimen. Most importantly, the OBR identifies the type of testing to be performed on the specimen, and ties that information to the order for the testing.	Ability to create and process is required for conformant systems.	R	Used to identify an order for results to the newborn screening testing panel.
OBX (Observation Result Segment)	The OBX segment has many uses. It carries observations about the object of its parent segment. In the OML^O21, it is associated with the OBR and ORC pair. The basic format is a question and answer.	Ability to create and process is required for conformant systems.	R	Used to transmit various ask at order entry and/or ask at specimen entry responses.
SPM (Specimen Segment)	The SID segment is used to describe the characteristics of a specimen. It differs from the intent of the OBR in that the OBR addresses order-specific information.	Ability to create and process is required for conformant systems.	O	Used to carry specimen specific information. Whereas all data elements required by DSHS may be sent in other parts of the message, DSHS does not require the SPM segment.

A. MSH: MESSAGE SEGMENT HEADER

The MSH segment is required for each message sent. It contains information used to identify the intent, source and destination of the message, as well as certain specifics about the syntax of the message. MSH segments separate multiple messages.

Example MSH Segment:

```
MSH|^~\&|OrderingFacilityApplicationName^2.16.840.1.114222.XXX^ISO|OrderingFacilityName^2.16.840.1.114222.XXX^ISO|txdshslabNBS^2.16.840.1.114222.4.1.181960.2^ISO|txdshslab^2.16.840.1.114222.4.1.181960^ISO|20190720091229||OML^O21^OML_O21|0123|P|2.5.1||AL|AL
```

Table 5: Message Segment Header (MSH)

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
1	Field Separator	ST	R	R	[1..1]	
2	Encoding Characters	ST	R	R	[1..1]	
3	Sending Application	HD_02	RE	RE	[0..1]	
4	Sending Facility	HD_02	R	R	[1..1]	
5	Receiving Application	HD_01	R	RE	[1..1]	
6	Receiving Facility	HD_01	R	R	[1..1]	
7	Date/Time Of Message	DTM_10	R	R	[1..1]	
8	Security		O	O		
9	Message Type	MSG_01	R	R	[1..1]	
10	Message Control ID	ST	R	R	[1..1]	
11	Processing ID	PT_01	R	R	[1..1]	
12	Version ID	VID_01	R	R	[1..1]	HL70104
13	Sequence Number		O	O		
14	Continuation Pointer		O	O		
15	Accept Acknowledgment Type		O	R		
16	Application Acknowledgment Type		O	R		
17	Country Code		O	O		
18	Character Set		O	O		
19	Principal Language Of Message		O	O		
20	Alternate Character Set Handling Scheme		O	O		
21	Message Profile Identifier		O	R		

MSH-1: FIELD SEPARATOR

This field contains the separator between the segment ID and the first real field, MSH-2-encoding characters. As such, it serves as the separator and defines the character to be used as a separator for the rest of the message. Required value is '|', (ASCII 124).

MSH-2: ENCODING CHARACTERS

This field contains the four characters in the following order: the component separator, repetition separator, escape character, and subcomponent separator. Required values are '^~\&' (ASCII 94, 126, 92 and 38 respectively).

MSH-3: SENDING APPLICATION

The sending application may be used to indicate the application name of the sending system. A human readable name should be sent as the namespace ID. This information will be used for logging or debugging purposes. The Texas DSHS Laboratory will return any value sent in this field in MSH-5 of the result message.

MSH-4: SENDING FACILITY

The sender controls and defines the value in this field. The Texas DSHS Laboratory will return any value sent in this field in MSH-6 of the result message. A unique identifier for each facility is recommended, such as facility name or code. Senders are encouraged to send the 8-digit NBS submitter ID number in the Namespace ID, but it is not required. The submitter ID is required to be sent in ORC-21.10.

MSH-5: RECEIVING APPLICATION

The receiving application will be used to indicate the application name of the receiving system. The required value for this field is the DSHS laboratory NBS application OID
txdshslabNBS^2.16.840.1.114222.4.1.181960.2^ISO

MSH-6: RECEIVING FACILITY

The receiving facility will be used to indicate the name of the facility where the data is being sent. The required value for this field is 'txdshslab^2.16.840.1.114222.4.1.181960^ISO'.

MSH-7: DATE/TIME OF MESSAGE

This field contains the date/time that the sending system created the message. If the time zone offset is included in MSH-7 (Date/Time Of Message) it becomes the default time zone for the message instance and applies to all other date/time fields in that same message instance where a time zone offset is not valued.

MSH-9: MESSAGE TYPE

Three components of this field give the HL7 message type: Message Code ([Table 0076](#)), Trigger Event ([Table 0003](#)) and Message Structure ([Table 0354](#)). Within HL7, the triggering event is considered to be the real-world circumstance causing the message to be sent. MSH-9 (Message Type) SHALL contain the constant value 'OML^O21^OML_O21'

MSH-10: MESSAGE CONTROL ID

This field contains a unique identifier assigned by the sending application that specifically identifies the message. The receiving system echoes this ID back to the sending system in the Message Acknowledgement Segment (MSA) of the acknowledgement (ACK) response message. The content and format of the data sent in this field is the responsibility of the sender. The receiver returns exactly what was sent in the response messages.

MSH-11: PROCESSING ID

This field is used to decide whether to process the message in the test or production environment (see Appendix A, [Table 0103](#)). The Texas DSHS Laboratory requires the value 'P' for production processing or 'T' for test environment processing.

MSH-12: VERSION ID

This field contains the identifier of the version of the HL7 messaging standard used in constructing, interpreting, and validating the message. The version number that is read in the first MSH segment of the file will be the version assumed for the whole file (see Appendix A, [Table 0104](#)). MSH-12 shall have the literal value of '2.5.1'.

B. PID: PATIENT IDENTIFIER SEGMENT

The Patient Identifier segment is used by all applications as the primary means of communicating patient identification information. This segment contains permanent patient identifying and demographic information.

Example Patient Identifier (PID) Segment:

PID|1||123456^^^MR||BabyLast^BabyFirst|MotherMaiden|201907011118|F^Female^HL70001||2028-9^Asian^HL70005~2106-3^White^HL70005|||||ABCD1234^^^OrderingFacilityName&2.16.840.1.114222.XXX&ISO^AN|||223456^^^OrderingFacilityName&2.16.840.1.114222.XXX&ISO^MR|N|Birth Hospital Name|Y|1

Table 6: Patient Identifier Segment (PID)

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
1	Set ID – PID	SI	R	R	[1..1]	
2	Patient ID		X	X		
3	Patient Identifier List	CX	R	R	[1..1]	
4	Alternate Patient ID – PID		X	X	[1..1]	
5	Patient Name	XPN	R	R	[1..1]	
6	Mother’s Maiden Name	XPN	RE	O	[0..1]	
7	Date/Time of Birth	DTM_06	R	R	[1..1]	
8	Administrative Sex	IS	R	R		HL70001_USL
9	Patient Alias			X		
10	Race	CWE	RE	RE	[0..*]	HL70005_USL
11	Patient Address	XAD	O	RE		
12	County Code		O	X		
13	Phone Number – Home		O	O		
14	Phone Number – Business		O	O		
15	Primary Language		O	O		
16	Marital Status		O	O		
17	Religion		O	O		
18	Patient Account Number	CX	O	O		
19	SSN Number – Patient		O	X		
20	Driver’s License Number – Patient		O	X		
21	Mother’s Identifier	CX	O	O	[0..1]	
22	Ethnic Group	CWE	RE	RE	[0..1]	HL70189_USL
23	Birth Place	ST	O	O	[0..1]	
24	Multiple Birth Indicator	ID	RE	RE	[0..1]	HL70136
25	Birth Order	NM	RE	RE	[0..1]	
26	Citizenship		O	O		
27	Veterans Military Status		O	O		
28	Nationality		O	X		

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
29	Patient Death Date and Time	DTM_06	O	C(RE/O)	[0..1]	
30	Patient Death Indicator	ID	O	RE	[0..1]	HL70136_USL
31	Identity Unknown Indicator		O	O		
32	Identity Reliability Code		O	O		
33	Last Update Date/Time		O	O		
34	Last Update Facility		O	O		
35	Species Code		O	O		
36	Breed Code		O	O		
37	Strain		O	O		
38	Production Class Code		O	O		
39	Tribal Citizenship		O	O		

PID-1: SET ID

This field contains the number that identifies this transaction. For the first occurrence of the segment, the sequence number shall be one, for the second occurrence, the sequence number shall be two, etc. PID-1 shall have the literal value of '1'.

PID-3: PATIENT IDENTIFIER LIST

This field contains the Medical Record Number used by the healthcare facility to uniquely identify a patient.

PID-5: PATIENT NAME

This field contains the name of the patient. PID-5.1 Family Name is required. The family name or the given name should not contain a suffix (e.g. JR or III).

As newborns often do not have a first name at the time of order transmission, PID-5.2 Given Name may be empty. Submitters may use the literal "BabyBoy" or "BabyGirl" for the first name. For multiple births, submitters are encouraged to carefully use the literal values of "Twin A" or "Twin B" if a given name is not yet assigned. The given name, if known, should not include the patient's middle name or middle initial. These should be sent in their appropriate designated fields.

PID-6: MOTHER'S MAIDEN NAME

This field contains the family name under which the mother was born (i.e., before marriage). It is used to assist in distinguishing between patients with the same last name. In this context, where the mother's maiden name is used for patient identification, The Texas DSHS Laboratory uses only last name. The mother's full legal name appears in the NK1 segment.

PID-7: DATE/TIME OF BIRTH

This field contains the patient’s date of birth in YYYYMMDDHHMM format. This date is required as testing protocols and cut-off values are specifically designed for the exact age of the infant at the time of specimen collection. When known, the exact time of birth should be included to allow the most accurate determination of age at collection.

PID-8: ADMINISTRATIVE SEX

This field contains the patient’s sex. Refer to Appendix A, [Table 0001 – Administrative Sex](#) for suggested values.

PID-10: RACE

This field refers to the patient’s race. Refer to Appendix A, [Table 0005 - Race](#) for values. The current Texas NBS card requests an "Ethnicity" field that combines Race and Ethnicity values. Upon import of electronic messages, DSHS will convert the received values as noted in the table below. Partners are encouraged to develop user interfaces that match the proper race and ethnicity values and allow the system to convert to the currently requested NBS card values.

Table 7: HL7 Race / Ethnicity Mappings

HL7 Race	HL7 Ethnicity	NBS Card Ethnicity
1002-5 American Indian	H or N or U or NULL	5 - Am. Indian
2028-9 Asian	H or N or U or NULL	4 - Asian
2054-5 Black	H or N or U or NULL	2 - Af. Amer.
2076-8 Native Hawaiian or Other Pacific Islander	H or N or U or NULL	6 - Other
2131-1 Other	H or N or U or NULL	6 - Other
2106-3 White	H	3 - Hispanic
2106-3 White	N or U or NULL	1 - White
White and 1 other selection	H or N or U or NULL	Non-white selection
Multiple non - white selections	H or N or U or NULL	6 - Other
More than 2	H or N or U or NULL	6 - Other
NULL	H	3 - Hispanic

PID-11: PATIENT ADDRESS

The patient address may be sent in order to conform to LOI. However, the DSHS Laboratory does not consume or return the patient address. For newborn screening purposes, the mother’s address information is requested in the Next of Kin/Associated Parties (NK1) segment.

Note: Currently not used by DSHS; may be sent, but will not be consumed.

PID-18: PATIENT ACCOUNT NUMBER

This optional field contains the patient account number assigned by the healthcare facility. The DSHS

Laboratory will return this value in the result message if received in the order.

PID-21: MOTHER'S IDENTIFIER

This optional field contains an identifier for the mother assigned by the healthcare facility used to link the mother's account to the baby's. The DSHS Laboratory will return this value in the result message if received in the order.

PID-22: ETHNIC GROUP

This field further defines the patient's ancestry. Refer to Appendix A, [Table 0189 – Ethnic Group](#).

PID-23: BIRTH PLACE

If known and separate from the submitting facility, the birth hospital for the patient may be sent in this field. If received, it will be returned in the result message.

PID-24: MULTIPLE BIRTH INDICATOR

This field indicates whether the patient was part of a multiple birth. Refer to Appendix A, [Table 0136 – Yes/No](#) for valid values. If patient was part of a multiple birth, then field should contain 'Y' (Yes). If patient was a single birth, then field should contain 'N' (No). A blank value indicates birth status is undetermined.

PID-25: BIRTH ORDER

When a patient was part of a multiple birth, a value indicating the patient's birth order is entered in this field. This field should only be used if PID-24 Multiple Birth Indicator is valued as 'Y' (Yes). The expected value would be 1, 2, 3, etc. depending on the total number of children born as multiples.

PID-29: PATIENT DEATH DATE AND TIME

This field contains the date and time at which the patient death occurred, if patient is deceased. If a death date is sent, PID-30 must indicate a value of 'Y' for permanently inactive/deceased.

Note: Currently not used by DSHS; may be sent, but will not be consumed.

PID-30: PATIENT DEATH INDICATOR

This field indicates whether the patient is deceased. Refer to Appendix A, [Table 0136 – Yes/No](#) for valid values. This field may be valued as 'N' (No) if patient is not deceased or is not known to be deceased. This field should be valued as 'Y' (Yes) if the patient is known to be deceased and the date should be sent in PID-29.

Note: Currently not used by DSHS; may be sent, but will not be consumed.

C. NK1: NEXT OF KIN SEGMENT

The NK1 segment contains information about the patient’s next-of-kin or other related parties. For newborn screening purposes, an NK1 is required where NK1-3 Relationship is valued MTH. This information about the mother of the newborn is important to The Texas DSHS Laboratory for abnormal result follow-up, patient matching, Medicaid billing, and linkage of multiple newborn screening specimens. In uncommon scenarios where the birth mother is not the primary contact for the baby (e.g. ward of the court or foster care), the alternate contact information should still be sent in the required NK1 where NK1-3 is valued ‘MTH’.

Example NK1 Segment:

```
NK1|1|MotherLast^MotherFirst|MTH^Mother^HL70063|123 SUNSHINE
DR^^AUSTIN^TX^78756|^PH^^555^9204202||N^Next of
Kin^HL70131|||||19901115|||||123456789^^^txMCDmedIDadm&2.16.840.1.113883.4.4
46&ISO^MA~555667788^^^SSN&2.16.840.1.113883.4.1&ISO^SS
```

Table 8: Next of Kin Segment (NK1)

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
1	Set ID - NK1	SI	R	R	[1..1]	
2	Name	XPN	R	R	[1..1]	
3	Relationship	CWE	R	R	[1..1]	HL70063_USL
4	Address	XAD	RE	RE	[0..1]	
5	Phone Number	XTN	RE	RE	[0..1]	
6	Business Phone Number		O	O		
7	Contact Role	CWE	O	RE	[0..1]	HL70131_USL
8	Start Date		O	O		
9	End Date		O	O		
10	Next of Kin / Associated Parties Job Title		O	O		
11	Next of Kin / Associated Parties Job Code/Class		O	C(R/O)		
12	Next of Kin / Associated Parties Employee Number		O	O		
13	Organization Name - NK1		O	O		
14	Marital Status		O	O		
15	Administrative Sex		O	O		
16	Date/Time of Birth	DTM_05	RE	R	[0..1]	
17	Living Dependency		O	O		
18	Ambulatory Status		O	O		
19	Citizenship		O	O		
20	Primary Language		O	O		
21	Living Arrangement		O	O		
22	Publicity Code		O	O		

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
23	Protection Indicator		O	O		
24	Student Indicator		O	O		
25	Religion		O	O		
26	Mother's Maiden Name		O	O		
27	Nationality		O	O		
28	Ethnic Group		O	O		
29	Contact Reason		O	O		
30	Contact Person's Name		O	O		
31	Contact Person's Telephone		O	O		
32	Contact Person's Address		O	O		
33	Next of Kin/Associated Party's Identifiers	CX	RE	O	[0..1]	
34	Job Status		O	O		
35	Race		O	O		
36	Handicap		O	O		
37	Contact Person Social Security		O	O		
38	Next of Kin Birth Place		O	O		
39	VIP Indicator		O	O		

NK1-1: SET ID

This field contains the number that identifies this transaction. For the first occurrence of the segment, the sequence number shall be one, for the second occurrence, the sequence number shall be two, etc.

NK1-2: NAME

This field contains the name of the mother. The mother last name must be sent in NK1-2.1 (Family Name). The mother first name must be sent if known in NK1-2.2 (Given Name). In scenarios where the birth mother is not the primary contact for the baby, such as an adoptive mother or a guardian, the name of that individual should be sent for the mother's name.

NK1-3: RELATIONSHIP

This field contains a code to indicate the relationship to the baby of the individual identified in the segment. For newborn screening, use the literal value 'MTH'. In scenarios where the birth mother is not the primary contact for the baby, the alternate contact information should still be sent with the value 'MTH'.

NK1-4: ADDRESS

This field contains the address of the mother.

NK1-5: PHONE NUMBER

This field contains the telephone number of the next of kin/associated party. The Texas DSHS Laboratory supports repetition of this field, however only one phone number will be stored. The primary telephone number must be sent in the first sequence. This number should be the best number to reach the mother in the event that an out of range test result is determined. The guardian's number should be provided for foster care. Refer to Appendix A, [Table 0202 – Telecommunication Equipment Type](#) for valid values.

NK1-7: CONTACT ROLE

This field contains the contact role. The DSHS Laboratory will return this value in the result message if received in the order.

NK1-16: DATE / TIME OF BIRTH

This field contains the date of birth of the mother in YYYYMMDD format. The DSHS Laboratory requests this data element for patient matching and specimen linking purposes. This field may be empty if not known.

NK1-33: NEXT OF KIN/ASSOCIATED PARTY'S IDENTIFIERS

This field is used to transmit the mother's Medicaid number and Social Security Number in repeating fields. Refer to Appendix A, [Table 0203 – Identifier Type](#) for the appropriate codes, Security Number (SS) or Medicaid ID (MA). These fields are critical for patient matching and specimen linking.

D. ORC: COMMON ORDER SEGMENT

The Common Order segment (ORC) is used to transmit fields that are common to all orders (all types of services that are requested).

Example ORC Segment:

```
ORC|NW|123456^OrderingFacilityName^2.16.840.1.114222.XXX^ISO||25^OrderingFacilityName^2.16.840.1.114222.XXX^ISO|CM||||20190720090530|||1234567890^Dolittle^John^Q^JR^DR^^^NPI&2.16.840.1.113883.4.6&ISO^L^^^NPI|||20190720090030|||||ORDERING FACILITY NAME^^^^^txdshslabNBS&2.16.840.1.114222.4.1.181960.2&ISO^FI^^^01234567
```

Table 9: Order Request Segment (ORC)

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
1	Order Control	ID	R	R	[1..1]	
2	Placer Order Number	EI	R	R	[1..1]	
3	Filler Order Number		O	RE		
4	Placer Group Number	EI	O	RE	[0..1]	
5	Order Status		O	O		
6	Response Flag		O	O		
7	Quantity/Timing		O	X		
8	Parent		O	O		
9	Date/Time of Transaction	DTM_10	O	R	[0..1]	
10	Entered By		O	O		
11	Verified By		O	O		
12	Ordering Provider	XCN_02	O	R	[0..1]	
13	Enterer's Location		O	O		
14	Call Back Phone Number	XTN	O	RE	[0..2]	
15	Order Effective Date/Time	DTM_05	O	O	[0..1]	
16	Order Control Code Reason		O	O		
17	Entering Organization		O	O		
18	Entering Device		O	O		
19	Action By		O	O		
20	Advanced Beneficiary Notice Code		O	RE		
21	Ordering Facility Name	XON	R	R	[1..1]	
22	Ordering Facility Address		O	O		
23	Ordering Facility Phone Number		O	O		
24	Ordering Provider Address		O	O		
25	Order Status Modifier		O	O		
26	Advanced Beneficiary Notice Override Reason		O	X		
27	Filler's Expected Availability Date/Time		O	O		

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
28	Confidentiality Code		O	O		
29	Order Type		O	O		
30	Enterer Authorization Mode		O	O		
31	Parent Universal Service Identifier		O	O		

ORC-1: ORDER CONTROL

Determines the function of the order segment. This field may be valued 'NW' for a new order, 'CA' to cancel an order, or 'RP' to replace an order.

Note that order cancellations can only be processed up until the time that physical specimen is received in the laboratory and demographic information has been imported into the Newborn Screening Laboratory Information Management System.

ORC-2: PLACER ORDER NUMBER

The placer order number is used to identify uniquely this order among all orders sent by a provider organization.

ORC-2 is a system identifier assigned by the placer software application. The Placer Order Number and the Filler Order Number are essentially foreign keys exchanged between applications for uniquely identifying orders and the associated results across applications.

The DSHS Laboratory will return this value in the result message.

ORC-4: PLACER GROUP NUMBER

The DSHS Laboratory will return this value in the result message if received in the order.

ORC-9: DATE / TIME OF TRANSACTION

This field contains the date and time of the event that initiated the current transaction as reflected in ORC-1 Order Control Code. This field is not equivalent to MSH-7 Date and Time of Message which reflects the date/time of the physical message.

Note: Currently not used by DSHS; may be sent, but will not be consumed.

ORC-12: ORDERING PROVIDER

This field shall contain the provider ordering the newborn screening. The DSHS Laboratory will return this information in the result message.

ORC-14: CALL BACK PHONE NUMBER

This field contains the telephone number to call for clarification of a request or other information regarding the order.

Note: Currently not used by DSHS; may be sent, but will not be consumed.

ORC-15: ORDER EFFECTIVE DATE/TIME

The DSHS Laboratory will return this value in the result message if received in the order.

ORC-21: ORDERING FACILITY NAME

This field contains the name of the facility submitting the specimen. ORC 21.10 MUST contain the Texas DSHS Laboratory 8 digit NBS submitter ID number. The entity must be registered in the Texas DSHS Laboratory under this identifier.

E. OBR: OBSERVATION REQUEST SEGMENT

The observation request (OBR) segment identifies the type of testing to be performed on the specimen. For the newborn screening panel test order, the value required in OBR-4 (Universal Service Identifier) is 54089-8^Newborn screening panel AHIC^LN.

Example OBR Segment(s):

```
OBR|1|123456^OrderingFacilityName^2.16.840.1.114222.XXX^ISO||54089-8^Newborn screening panel
AHIC^LN||201907200835||12188^Hippocrates^Harold^H^IV^Dr^MD^^OrderingFacilityName&2.16.840.1.114222.XXX&ISO^L^^EI||F^Patient fasting prior to procedure^HL70916||1234567890^Dolittle^John^Q^JR^DR^^^NPI&2.16.840.1.113883.4.6&ISO^L||PlacerField1|PlacerField2|||||||||||||^difficulty collecting sample|||||||A^Alert provider when abnormal^HL70507
```

Table 10: Order Request Segment (OBR)

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
1	Set ID - OBR	SI	R	R	[1..1]	
2	Placer Order Number	EI	R	R	[0..1]	
3	Filler Order Number		O	RE		
4	Universal Service Identifier	CWE	R	R	[1..1]	LOINC
5	Priority – OBR		O	X		
6	Requested Date/Time		O	X		
7	Observation Date/Time	DTM_08	R	R	[1..1]	
8	Observation End Date/Time		O	C(RE/X)		
9	Collection Volume		O	O		
10	Collector Identifier	XCN	O	O	[0..1]	
11	Specimen Action Code		O	O		
12	Danger Code		O	O		
13	Relevant Clinical Information	CWE	O	RE	[0..1]	HL70916_USL
14	Specimen Received Date/Time		O	X		
15	Specimen Source		O	X		
16	Ordering Provider	XCN	O	R	[0..1]	
17	Order Call-back Phone Number	XTN	O	RE	[0..2]	
18	Placer Field 1	ST	O	O	[0..1]	
19	Placer Field 2	ST	O	O	[0..1]	
20	Filler Field 1		O	O		
21	Filler Field 2		O	O		
22	Results Rpt/Status Chng - Date/Time		O	X		
23	Charge to Practice		O	O		
24	Diagnostic Service Sect ID		O	O		
25	Result Status		O	X		

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
26	Parent Result		O	O		
27	Quantity/Timing		O	X		
28	Result Copies To	XCN	O	RE	[0..5]	
29	Parent		O	O		
30	Transportation Mode		O	O		
31	Reason for Study		O	O		
32	Principal Result Interpreter		O	O		
33	Assistant Result Interpreter		O	O		
34	Technician		O	O		
35	Transcriptionist		O	O		
36	Scheduled Date/Time		O	O		
37	Number of Sample Containers		O	O		
38	Transport Logistics of Collected Sample		O	O		
39	Collector's Comment	CWE	O	O	[0..1]	
40	Transport Arrangement Responsibility		O	O		
41	Transport Arranged		O	O		
42	Escort Required		O	O		
43	Planned Patient Transport Comment		O	O		
44	Procedure Code		O	O		
45	Procedure Code Modifier		O	O		
46	Placer Supplemental Service Information		O	O		
47	Filler Supplemental Service Information		X	X		
48	Medically Necessary Duplicate Procedure Reason		O	O		
49	Result Handling	CWE	O	O	[0..3]	
50	Parent Universal Service Identifier		O	O		

OBR-1: SET ID - OBR

For the first order transmitted, the sequence number shall be 1; for the second order, it shall be 2; and so on.

Although LOI outlines the use of a second OBR for the Newborn screening card data panel, the DSHS Laboratory does not require this OBR. Only one OBR for the overall newborn screening order is required.

OBR-2: PLACER ORDER NUMBER

The placer order number is used to identify uniquely this order among all orders sent by a provider organization.

OBR-2 is a system identifier assigned by the placer software application. The Placer Order Number and the Filler Order Number are essentially foreign keys exchanged between applications for uniquely identifying orders and the associated results across applications.

The DSHS Laboratory will return this value in the result message.

OBR-4: UNIVERSAL SERVICE IDENTIFIER

This field contains the identifier code for the requested observation/test/battery. OBR-4 shall be valued '54089-8^Newborn screening panel AHIC^LN'.

OBR-7: OBSERVATION DATE / TIME

This field shall represent the date and time the specimen was collected.

OBR-10: COLLECTOR IDENTIFIER

This field will identify the person, department, or facility that collected the specimen. If received in the order message, the DSHS Laboratory will return this value in the result message.

OBR-13: RELEVANT CLINICAL INFORMATION

This field contains additional clinical information about the patient or specimen. If received in the order message, the DSHS Laboratory will return this value in the result message.

OBR-16: ORDERING PROVIDER

This field shall contain the provider ordering the newborn screening. The DSHS Laboratory will return this information in the result message.

OBR-17: ORDER CALL BACK PHONE NUMBER

This field contains the telephone number for reporting a status or a result using the standard format with extension and/or beeper number when applicable.

Note: Currently not used by DSHS; may be sent, but will not be consumed.

OBR-18: PLACER FIELD 1

The DSHS Laboratory will return this information in the result message as received in the order message.

OBR-19: PLACER FIELD 2

The DSHS Laboratory will return this information in the result message as received in the order message.

OBR-28: RESULT COPIES TO

This field identifies the people who are to receive copies of the results. The DSHS Laboratory Interface does not currently support the ability to send result copies to recipients other than the order sender. Interfacing partners may pre-adopt the capability to send this information in the event that the DSHS resulting capabilities is expanded in the future.

Note: Currently not used by DSHS; may be sent, but will not be consumed.

OBR-39: COLLECTOR'S COMMENT

This field is for reporting additional comments related to the sample. If received in the order message, the DSHS Laboratory will return this value in the result message.

OBR-49: RESULT HANDLING

This field transmits information regarding the handling of the result. If received in the order message, the DSHS Laboratory will return this value in the result message. The DSHS Laboratory Interface does not currently support the ability to send result copies to recipients other than the order sender. Interfacing partners may pre-adopt the capability to send this information in the event that the DSHS resulting capabilities is expanded in the future.

F. OBX: OBSERVATION RESULT SEGMENT

The observation/result (OBX) segment contains information regarding a single observation result. This includes identification of the specific type of observation, the result for the observation, and when the observation was made. The basic format is a question (OBX-3) and an answer (OBX-5).

Example OBX Segment:

```
OBX|1|ST|57723-9^Unique bar code number of Current
sample^LN||190123456|||||F|||201907200835|
```

Table 11: Observation Result Segment (OBX)

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
1	Set ID – OBX	SI	R	R	[1..1]	
2	Value Type	ID	R	R	[0..1]	HL70125_USL
3	Observation Identifier	CWE	R	R	[1..1]	LOINC
4	Observation Sub-ID	OG_01	C(R/RE)	C(R/RE)	[0..1]	
5	Observation Value	Varies	R	R	[1..1]	
6	Units	CWE	RE	RE	[0..1]	
7	References Range		O	O		
8	Abnormal Flags		O	O		
9	Probability		O	O		
10	Nature of Abnormal Test		O	O		
11	Observation Result Status	ID	R	R	[1..1]	HL70085_USL
12	Effective Date of Reference Range		O	O		
13	User-Defined Access Checks		O	O		
14	Date/Time of the Observation	DTM_08	C(R/O)	C(R/O)	[0..1]	
15	Producer's Reference		O	O		
16	Responsible Observer		O	O		
17	Observation Method		O	O		
18	Equipment Instance Identifier		O	O		
19	Date/Time of the Analysis		O	O		
20	Reserved for harmonization with Version 2.6.		X	X		
21	Reserved for harmonization with Version 2.6.		X	X		
22	Reserved for harmonization with Version 2.6.		X	X		
23	Performing Organization Name		O	O		
24	Performing Organization Address		O	O		

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
25	Performing Organization Medical Director		O	O		
26	Patient Results Release Category		O	O		
27	Root Cause		O	O		
28	Local Process Control		O	O		
29	Observation Type	ID	O	R	[1..1]	HL70936_USL
30	Observation Sub-Type	ID	O	RE	[0..1]	HL70937_USL

OBX-1: SET ID – OBX

This field contains the sequence number. The first instance shall be set to ‘1’ and each subsequent instance shall be the next number in sequence.

OBX-2: VALUE TYPE

This field contains the format of the observation value in OBX-5. See *Section IV: Newborn Screening Data Elements - OBX Segments* for detail on value types for each observation. The value of OBX-2 shall be one of the following: ST, CWE, NM, TX, XAD or XTN.

OBX-3: OBSERVATION IDENTIFIER

This field contains a unique identifier for the observation. Logical Identifier Name and LOINC codes are sent in components one and two. The Name of the Coding System in the third component must be ‘LN’ for LOINC. See *Section IV: Newborn Screening Data Elements - OBX Segments* for a list of all requested data elements.

OBX-4: OBSERVATION SUB-ID

This field is used to distinguish between multiple OBX segments with the same value in OBX-3 Observation Identifier under the same OBR segment. The sub-identifier will increment sequentially.

Condition Predicate: (R/RE): OBX-4 should be included if there are multiple OBX segments associated with the same OBR segment that have the same OBX-3 (Observation Identifier) value.

OBX-5: OBSERVATION VALUE (VARIES)

This field contains the value observed by the observation producer. OBX-2-value type contains the data type for this field according to which observation value is formatted.

This field contains the value of OBX-3-observation identifier of the same segment. An observation value is always represented as the data type specified in OBX-2-value type of the same segment. Whether

numeric or short text, the answer shall be recorded in ASCII text.

OBX-6: UNITS

This shall be the units for the value in OBX-5. The value shall be from the ISO+ list of units. If the value is numeric and indicates some kind of quantity the units should be indicated here.

OBX-11: OBSERVATION RESULT STATUS

This field contains the observation result status. The expected value is 'F', for final.

OBX-14: DATE/TIME OF THE OBSERVATION

Records the date and time of the observation. It is the physiologically relevant date-time or the closest approximation to that date-time of the observation.

OBX-29: OBSERVATION TYPE

This field is pre-adopted from v2.8.2. The expected value for newborn screening order information is "QST" (question).

Note: Currently not used by DSHS; may be sent, but will not be consumed.

OBX-30: OBSERVATION SUB-TYPE

This field is pre-adopted from v2.8.2. The expected values for newborn screening order information are "AOE" (Ask at Order) or "ASC" (Ask at Specimen Collection).

Note: Currently not used by DSHS; may be sent, but will not be consumed.

G. SPM: SPECIMEN INFORMATION SEGMENT

The Specimen Information segment (SPM) is used to describe the characteristics of a single sample. The SPM segment carries information regarding the type of specimen, where and how it was collected, who collected it, and some basic characteristics of the specimen.

The HL7 Version 2.5.1 Implementation Guide: Laboratory Orders (LOI) requires an SPM segment. However, the DSHS laboratory can accept orders without an SPM segment as long as all SPM conditions are met and key data elements are transmitted in other allowable segments / fields.

Example SPM Segment:

```
SPM|1|SID20192019999&OrderingFacilityName&2.16.840.1.114222.XXX&ISO||440500007^Blood
spot specimen^SCT||CAP^Capillary
Specimen^HL70396|||||201907200835|||||000002019201009999^^^OrderingFacilityNa
me&2.16.840.1.114222.XXX&ISO^ACSN|190123456^^^txdshslab&2.16.840.1.114222.4.1.181960&I
SO^SID
```

Table 12: Specimen Information Segment (SPM)

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
1	Set ID – SPM	SI	O	R	[1..1]	
2	Specimen ID	EIP_02	O	RE	[1..1]	
3	Specimen Parent IDs		O	O		
4	Specimen Type	CWE	O	R	[1..1]	SNOMED_CT
5	Specimen Type Modifier		O	O		
6	Specimen Additives		O	O		
7	Specimen Collection Method	CWE	O	O		
8	Specimen Source Site		O	O		
9	Specimen Source Site		O	O		
10	Specimen Collection Site		O	O		
11	Specimen Role		O	O		
12	Specimen Collection Amount		O	O		
13	Grouped Specimen Count		O	O		
14	Specimen Description		O	O		
15	Specimen Handling Code		O	O		
16	Specimen Risk Code		O	O		
17	Specimen Collection Date/Time	DTM_08	O	R	[1..1]	
18	Specimen Received Date/Time		O	O		
19	Specimen Expiration		O	O		
20	Specimen Availability		O	O		
21	Specimen Reject Reason		O	O		
22	Specimen Quality		O	O		
23	Specimen Appropriateness		O	O		

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
24	Specimen Condition		O	O		
25	Specimen Current Quantity		O	O		
26	Number of Specimen		O	O		
27	Container Type		O	O		
28	Container Condition		O	O		
29	Specimen Child Role		O	O		
30	Accession ID	CX	O	O	[0..1]	
31	Other Specimen ID		O	R		

SPM-1: SET ID - SPM

The Texas Laboratory processes each newborn screening specimen as a single specimen. As such, SPM-1 will always be 1.

SPM-2: SPECIMEN ID

If sent, SPM 2.1 should contain the placer assigned specimen ID. This form serial number of the collection card is required to be sent in an OBX segment with OBX-5 valued as unique bar code number of current sample (57723-9). If a placer assigned specimen ID is received, it will be returned in SPM 2.1 of the result message.

SPM-4: SPECIMEN TYPE

This field describes the precise nature of the entity that will be the source material for the observation.

Note: This value is currently not used by the DSHS Laboratory for newborn screening orders. It may be sent, but will not be consumed. The DSHS Laboratory will send 440500007^Blood spot specimen^SCT in result messages.

SPM-7: SPECIMEN COLLECTION METHOD

This field describes the procedure or process by which the specimen was collected. The DSHS Laboratory will return this value in the result message if received in the order.

SPM-17: SPECIMEN COLLECTION DATE/TIME

This field should be valued the same as OBR-14. DSHS partners can include the value here for LOI conformance. However, DSHS will import the date of collection from OBR-14.

SPM-30: ACCESSION ID

This field contains accession identifier(s) associated with the specimen. In many cases, applications involved in the collection, transportation or testing of the specimen will assign their own accession identifiers. This field allows communication of these accession identifiers.

The DSHS Laboratory will return this value in the result message if received in the order.

SECTION IV: NEWBORN SCREENING DATA ELEMENTS – OBX SEGMENTS

The following data elements are requested in an OBX segment by the DSHS Laboratory. Data elements listed as optional may be collected by DSHS in the future, but are not currently stored or used. This guide only provides details and preferred answer lists for required elements. For more information on optional or unlisted elements, refer to LOI.

Table 13: Newborn Screening Data Elements – OBX Segments

LOINC Code	LOINC Name	Data Type	DSHS Usage	Cardinality
57723-9	Unique bar code number of Current sample	ST	R	[1..1]
57711-4	Unique bar code number of Initial sample	ST	RE	[0..1]
57721-3	Reason for lab test in Dried blood spot	CWE	RE	[0..1]
8339-4	Birth weight Measured	NM	RE	[0..1]
57714-8	Obstetric estimation of gestational age	NM	RE	[0..1]
57713-0	Infant factors that affect newborn screening interpretation	CWE	RE	[0..*]
67704-7	Feeding types	CWE	RE	[0..*]
62324-9	Post-discharge provider name	TX	RE	[0..1]
62327-2	Post-discharge provider practice address	XAD	RE	[0..1]
62328-0	Post-discharge provider practice telephone number	XTN	RE	[0..1]
57716-3	State printed on filter paper card [Identifier] in NBS card	TX	O	[0..1]
62323-1	Post-discharge provider ID [Identifier]	NM	O	[0..1]
79566-6	Collection method – Dried blood spot	CE	O	[0..1]
58229-6	Body weight Measured --when specimen taken	NM	O	[0..1]
62317-3	Date of last blood product transfusion	DT	O	[0..1]

UNIQUE BAR CODE NUMBER OF CURRENT SAMPLE (57723-9)

This LOINC transmits the form serial number indicated on the specimen collection kit. This value is the key identifier used by the DSHS laboratory information system. The field is required and MUST accurately match the 9 digit numeric value (excluding check digit) indicated on the physical demographic form for the order to be processed and for results to be sent.

It is highly recommended that submitting facilities configure systems to scan the value from the demographic form. For manual entry solutions, recommended validations include:

- Value must be 9 digits numeric
- Value must begin with a 1 or a 2.

Example OBX:

```
OBX|1|ST|57723-9^Unique bar code number of Current
sample^LN||190123456|||||F|||201907200835
```

UNIQUE BAR CODE NUMBER OF INITIAL SAMPLE (57711-4)

This LOINC transmits the form serial number of any previously processed specimens for the same patient. This OBX is not expected to be received for initial samples or in situations where any previous samples are unknown to the submitter.

Example OBX:

OBX|2|ST|57711-4^Unique bar code number of Initial sample^LN||190112233||||F|||201907200835

REASON FOR LAB TEST IN DRIED BLOOD SPOT (57721-3)

This LOINC transmits information related to the specimen Card field 'Baby's Age at Time of Collection / Test'. It can also be used to document parental refusal of the newborn screening specimen for established religious purposes.

Example OBX:

OBX|3|CE|57721-3^Reason for lab test in Dried blood spot^LN||LA12425-7^Subsequent screen - required by law^LN||||F|||201907200835

The below table identifies acceptable answers in OBX-5 for this data element. DSHS will translate LOINC answers to specimen collection card values as noted.

Table 14: Specimen Card Value Mapping to LOINC Answers – Age at Collection / Test

Specimen Card Value	LOINC	Description
1. Less than 7 days old	LA12421-6	Initial screen
2. 7 days or older	LA12425-7	Subsequent screen - required by law
3. Previous Abnormal	LA12427-3	Subsequent screen - for clarification of initial results (not by law or protocol)
N/A	LA14132-7	No sample collected due to parental refusal

BIRTH WEIGHT MEASURED (8339-4)

This LOINC transmits the birth weight of the patient in grams. For OBX where OBX-3 is 8339-4^Birthweight^LN, OBX-6 shall be valued g^gram^UCUM.

Example OBX:

OBX|4|NM|8339-4^Birthweight^LN||2805|g^gram^UCUM||||F|||201907200835

OBSTETRIC ESTIMATION OF GESTATIONAL AGE (57714-8)

This LOINC transmits the estimated gestational age at birth. For OBX where OBX-3 is 57714-8^Obstetric estimation of gestational age^LN, OBX-6 shall be valued wk^week^UCUM.

Example OBX:

```
OBX|5|NM|57714-8^Obstetric estimation of gestational  
age^LN|1|39|wk^week^UCUM||||F|||201907200835
```

INFANT FACTORS THAT AFFECT NEWBORN SCREENING INTERPRETATION (57713-0)

This LOINC transmits information related to the specimen card field 'Status'.

The below table identifies acceptable answers in OBX-5 for this data element. DSHS will translate LOINC answers to specimen collection card values as noted. Submitters may choose to develop user interfaces that correspond directly to the NBS card value or as a series of yes/no options for values 1-3 or as "Check All that apply" selections for options 1-3.

Table 15: Specimen Card Value Mapping to LOINC Answers – Status

Specimen Card Value	LOINC	Description
0. Normal	LA137-2	None
1. Sick / Premature	LA12419-0	Infant in NICU at time of specimen collection
2. On Medications	LA12420-8	Systemic antibiotics before newborn screening
3. Transfused	LA12417-4	Any blood product transfusion (including ECLS/ECMO)
4. Both 1 & 2	LA12419-0 and LA12420-8 in repeating OBXs	Sick/Premature and On Medications OBXs
5. Both 1 & 3	LA12419-0 and LA12417-4 in repeating OBXs	Sick/Premature and Transfused OBXs
6. Both 2 & 3	LA12420-8 and LA12417-4 in repeating OBXs	On Medications and Transfused OBXs
7. All 1-3	LA12419-0, LA12420-8, and LA12417-4 in repeating OBXs	All three OBXs

Example – Single OBX (Specimen Card Answer – '0. Normal'):

```
OBX|6|ST|57713-0^Infant NICU factors that affect newborn screening interpretation^LN||LA137-  
2^None^LN||||F|||201907200835
```

Example Multiple OBX (Specimen Card Answer – ‘4. Both 1 and 2’):

OBX|6|ST|57713-0^Infant NICU factors that affect newborn screening interpretation^LN||LA12419-0^Infant in NICU at time of specimen collection^LN|||||F|||201907200835

OBX|7|ST|57713-0^Infant NICU factors that affect newborn screening interpretation^LN||LA12420-8^Systemic antibiotics before newborn screening^LN|||||F|||201907200835

FEEDING TYPES (67704-7)

This LOINC transmits information related to the specimen Card field ‘Feed’.

The below table identifies acceptable answers in OBX-5 for this data element. DSHS will translate LOINC answers to specimen collection card values as noted.

Table 16: Specimen Card Value Mapping to LOINC Answers – Feed

Specimen Card Value	LOINC	Description
1. Breastmilk Only	LA16914-6	Breast milk
2. Formula Only	LA16915-3	Lactose formula
3. TPN+-Milk	LA12418-2	TPN
4. Breastmilk & Formula	LA16914-6 and LA16915-3 in repeating OBXs	Breast milk and Lactose formula in repeating OBXs

Example Multiple OBX (Specimen Card Answer – ‘4. Breastmilk & Formula’):

OBX|8|CE|67704-7^Feeding types^LN||LA16914-6^Breastmilk^LN|||||F|||201907200835

OBX|9|CE|67704-7^Feeding types^LN||LA16915-3^Lactose formula^LN|||||F|||201907200835

POST-DISCHARGE PROVIDER NAME (62324-9)

This LOINC transmits the name of the healthcare provider that will care for the child after discharge from the birthing facility. The post-discharge provider fields are not intended for transmission of ordering physician information. DSHS uses the post-discharge provider information as a primary contact in the event that an abnormal result is identified. Inclusion of these fields will ensure timely follow-up on out of range results and improve submitter efficiency by reducing follow-up calls to identify the patient’s current healthcare provider.

Example OBX:

OBX|10|TX|62324-9^Post-discharge provider name in Provider^LN||Healthy, Bob|||||F|||201907200835

POST-DISCHARGE PROVIDER PRACTICE ADDRESS (62327-2)

This LOINC transmits the address of the healthcare provider that will care for the child after discharge from the birthing facility.

Example OBX:

```
OBX|11|XAD|62327-2^Post-discharge provider practice address^LN||1234 Main St^Ste.  
200^Austin^TX^78758^^^^^^^^^|||||F|||201907200835
```

POST-DISCHARGE PROVIDER PRACTICE TELEPHONE NUMBER (62328-0)

This LOINC is used to transmit the phone number and fax number of the healthcare provider that will care for the child after discharge from the birthing facility. Using the XAD data type, component 3 of OBX-5 is used to identify the telephone number type. Expected values are 'PH' and / or 'FX'.

Example OBX:

```
OBX|12|XTN|62328-0^Post-discharge provider practice telephone number in  
Provider^LN|1|^PH^^555^5551212^|||||F|||201907200835
```

```
OBX|13|XTN|62328-0^Post-discharge provider practice telephone number in  
Provider^LN|1|^FX^^555^5551213^|||||F|||201907200835
```

SECTION V: ACKNOWLEDGEMENT (ACK^O21) MESSAGE SEGMENT DETAILS

This chapter will contain specifications for each segment used in the ACK^O21 message. It will indicate which fields are supported or required and describe any constraints on these fields.

Table 17: ACK^O21 Message Segments

Segment	Definition	DSHS Usage	Cardinalit	Note
MSH (Message Segment Header)	The MSH segment defines the intent, source, destination, and some specifics of the syntax of a message.	R	[1..1]	This begins every message and includes information about the type of message, how to process it, and by whom it was created.
MSA (Message Acknowledgment Segment)	The MSA segment is included in the acknowledgement (ACK) message.	R	[1..1]	Contains information used to identify the receiver's acknowledgement response to an identified prior message.
ERR (Error Segment)	The ERR segment reports information about errors in processing the message. The segment may repeat. Each error will have its own ERR segment.	RE	[0..*]	Used to return information about errors.

A. ACKNOWLEDGEMENT (ACK) MESSAGES AND ERROR SEGMENTS

The DSHS Laboratory will provide each order transaction with a success or failure response. This message will include an application level response to indicate the success (MSA-1 = AA or AE) or failure (MSA-1 = AR) of the transaction to meet the standards for this guide or to meet application requirements as specified below. Soft errors (MSA-1 = AE) or hard errors (MSA-1 = AR) are communicated through the use of the appropriate ERR segment elements (ERR-3 and/or ERR-5).

ACCEPTED (AA ACK)

Message successfully transmitted and accepted, allowing associated demographic information to be imported.

Example ACK Message (Successful):

```
MSH|^~\&|txdshslabNBS^2.16.840.1.114222.4.1.181960.2^ISO|txdshslab^2.16.840.1.114222.4.1.181960^ISO|OrderingFacilityApplicationName^2.16.840.1.114222.XXX^ISO|OrderingFacilityName^2.16.840.1.114222.XXX^ISO|20190720091230||ACK^A01|0123|P|2.5.1
```

```
MSA|AA|0123
```

SOFT ERRORS – ACCEPT WITH ERRORS (AE ACK)

Soft errors (MSA-1 = AE) will allow receipt of the message and import of the associated demographic information. However, values in fields with errors will not be accepted or returned in a result message. The following is a list of DSHS laboratory newborn screening information system specific soft errors and the action that will occur upon import.

Table 18: Handling of Soft Errors

Field	Action	ERR 7
Birth Date/Time	Strip out	Birth Date Time - Hour is not a valid hour.
Birth Date/Time	Strip out	Birth Date Time - Minutes is not a valid minute.
Birthweight	Strip out	Birthweight includes non-numeric values.
Birthweight	Strip out	Birthweight is invalid (> 6000 or < 500).
Collection Date/Time	Strip out	Observation Date Time - Hour is not a valid hour.
Collection Date/Time	Strip out	Observation Date Time - Minutes is not a valid minute.
Medical Record	Truncate	Med Rec Number is greater than 30 characters.
Mother First Name	Truncate	Mother First Name is greater than 50 characters.
Mother Last Name	Truncate	Mother Last Name is greater than 50 characters.
Patient Last Name	Truncate	Patient Last Name is greater than 50 characters.
Previous Serial Number	Strip out	Previous Serial Number is not numeric.
Previous Serial Number	Strip out	Previous Serial Number is not 9 digits.
Medicaid Number	Strip out	Medicaid Number is not 9 digits
Medicaid Number	Strip out	Medicaid Number is not numeric
Mother SSN	Strip out	Mother SSN is not 9 digits

Field	Action	ERR 7
Mother SSN	Strip out	Mother SSN is not numeric
Mother DOB	Strip out	Mother DOB is not formatted properly.

Example ACK Message (Successful – Soft Error):

MSH|^~\&|txdshslabNBS^2.16.840.1.114222.4.1.181960.2^ISO|txdshslab^2.16.840.1.114222.4.1.181960^ISO|OrderingFacilityApplicationName^2.16.840.1.114222.XXX^ISO|OrderingFacilityName^2.16.840.1.114222.XXX^ISO|20190720091230||ACK^A01|0123|P|2.5.1

MSA|AE|0123

ERR||NK1^33^1|0^Message Accepted^HL70357|W^Warning^HL70516||||Medicaid Number is not 9 digits.

HARD ERRORS – ORDER REJECTION (AR ACK)

Hard errors (MSA-1 = AR) will result in a complete rejection of the electronic order. Unless replaced with a valid order, the demographic information will not be imported into the DSHS Laboratory newborn screening information system and results will not be sent electronically for the specimen.

The following is a list of DSHS laboratory newborn screening application specific hard errors that will result in the rejection of the order. Additional hard errors may occur for globally invalid values.

Table 19: Hard Errors Specific to DSHS NBS Laboratory

Field	ERR 2	ERR 7
Birth Date/Time	PID^7	Birth Date Time is missing.
Birth Date/Time	PID^7	Birth Date Time is not all numbers.
Birth Date/Time	PID^7	Birth Date Time is less than 8 digits.
Birth Date/Time	PID^7	Birth Date Time - Year is not a valid year.
Birth Date/Time	PID^7	Birth Date Time - Month is not a valid month.
Birth Date/Time	PID^7	Birth Date Time - Day is not a valid day.
Birth Date/Time	PID^7	Birth Date Time is greater than Observation Date Time.
Collection Date/Time	OBR^7	Observation Date/Time is missing.
Collection Date/Time	OBR^7	Observation Date Time is not all numbers.
Collection Date/Time	OBR^7	Observation Date Time is less than 8 digits.
Collection Date/Time	OBR^7	Observation Date Time - Year is not a valid year.
Collection Date/Time	OBR^7	Observation Date Time - Month is not a valid month.
Collection Date/Time	OBR^7	Observation Date Time - Day is not a valid day.
Collection Date/Time	OBR^7	Observation Date Time is in the future.
Form Serial Number	OBX	Kit Number is missing.
Form Serial Number	OBX	Kit Number is not 9 digits.
Form Serial Number	OBX	Kit Number is not numeric.
Form Serial Number	OBX	Form Serial Number is not assigned to the associated submitter ID per Newborn Screening database.
Medical Record	PID^3	Med Rec Number is missing.
Mother First Name	NK1^2^2	Mother First Name is missing.

Field	ERR 2	ERR 7
Mother Last Name	NK1^2^1	Mother Last Name is missing.
Patient Last Name	PID^5^1	Patient Last Name is missing.
Submitter ID	ORC^21	Ordering Facility Identifier is missing.
Submitter ID	ORC^21	Submitter ID is not 8 digits.
Submitter ID	ORC^21	Ordering Facility Identifier not found in Newborn Screening database.

Example ACK Message (Failure – Hard Error):

MSH|^~\&|txdshslabNBS^2.16.840.1.114222.4.1.181960.2^ISO|txdshslab^2.16.840.1.114222.4.1.181960^ISO|OrderingFacilityApplicationName^2.16.840.1.114222.XXX^ISO|OrderingFacilityName^2.16.840.1.114222.XXX^ISO|20190720091230||ACK^A01|0123|P|2.5.1

MSA|AR|0123

ERR||OBR^7|101^Required field missing^HL70357|E^Error^HL70516||||Observation Date/Time is missing

ERR||PID^7|102^Data type error^HL70357|E^Error^HL70516||||Birth Date Time is not all numbers.

B. MSA: MESSAGE ACKNOWLEDGEMENT SEGMENT

The MSA segment contains information sent by The Texas DSHS Laboratory to acknowledge an incoming message.

Table 20: Message Acknowledgement Segment (MSA)

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
1	Acknowledgement Code	ID	R	R	[1..1]	HL70008_USL
2	Message Control ID	ST	R	R	[1..1]	
3	Text Message		X	X		
4	Expected Sequence Number		X	O		
5	Delayed Acknowledgement		X	X		
6	Error Condition		X	X		

MSA-1: ACKNOWLEDGEMENT CODE

This field contains an acknowledgment code. See message processing rules. Refer to Appendix A, [Table 0008 - Acknowledgement code](#) for valid values.

MSA-2: MESSAGE CONTROL ID

This field contains the message control ID of the message sent by the sending system. It allows the sending system to associate this response with the message for which it is intended. This field echoes the Message Control ID sent in MSH-10 by the initiating system.

C. ERR: ERROR SEGMENT

The Error segment (ERR) is used to add error comments to acknowledgment messages. If the message was rejected for functional reasons, this segment will locate the error and describe it in the User Message.

Table 21, Error Segment (ERR)

SEQ	Data Element	Data Type	DSHS Usage	LOI Usage	Cardinality	Value Set
1	Error Code and Location		X	X		
2	Error Location	ERL_01	RE	RE	[0..1]	
3	HL7 Error Code	CWE	R	R	[1..1]	HL70357_USL
4	Severity	ID	R	R	[1..1]	HL70516_USL
5	Application Error Code		X	O		
6	Application Error Parameter		X	O		
7	Diagnostic Information	TX	X	R	[0..1]	
8	User Message	TX	R	R	[0..1]	
9	Inform Person Indicator		X	O		
10	Override Type		X	O		
11	Override Reason Code		X	O		
12	Help Desk Contact Point		X	O		

ERR-2: ERROR LOCATION

Identifies the location in a message related to the identified error, warning or message. Each error will have an ERR, so no repeats are allowed on this field. This field may be left empty if location is not meaningful. For example, if is unidentifiable, an ERR to that effect may be returned.

ERR-3: HL7 ERROR CODE

Identifies the HL7 (communications) error code. Refer to Appendix A, [Table 0357 – Message Error Condition Codes](#) for valid values.

ERR-4: SEVERITY

Identifies the severity of an application error. Knowing if something is Error, Warning or Information is intrinsic to how an application handles the content. Refer to Appendix A, [Table 0516 - Error Severity](#) for valid values. If ERR-3 has a value of '0', ERR-4 will have a value of '1'.

ERR-8: USER MESSAGE

Used to communicate error/instructions to the initiating system if an alternate interpretation to the text in ERR-7 (Diagnostic Information) is available to inform the appropriate users.

SECTION VI: SPECIMEN LABELS

To accept and import an electronic order into the DSHS Laboratory newborn screening information system, the DSHS laboratory must have a means to verify that the electronic order matches the physical specimen. In addition, user errors or technical issues may disrupt the adequate transfer of electronic information from the facility to DSHS. For these reasons, DSHS requires the physical specimen demographic form to include either a DSHS approved label or hand written information. Only DSHS approved labels or hand written information will be accepted by the laboratory. Specimens received with inadequate information on the demographic form may be rejected even if an electronic order is also received.

To improve patient safety and submitter efficiencies, interfacing partners are highly encouraged to implement a DSHS approved label. An example of an approved label is demonstrated below. Other proposed solutions must be submitted to DSHS for lab director review.

Figure 3: Example of DSHS Laboratory Approved Label

<u>Mother Information:</u> MotherLast, MotherFirst SSN: 555-66-7788 DOB: 11-15-1990 Med.#: 123456789 123 Sunshine Dr Austin, TX 78756 555-555-4321	<u>Newborn Information:</u> BabyLast, BabyFirst MRN: 123456 Birth Order: 1 Birth Weight (g): 2805 DOB: 07-01-2019 11:18 DOC: 07-20-2019 08:35
<u>PCP Information:</u> Healthy, Bob 1234 Main St Ste #200 Austin, TX 78758 Phone: 555-555-1212 Fax: 555-555-1213	Sex: 1 Feed: 4 Ethnicity: 4 Status: 4
<u>Submitter Information:</u> Ordering Facility Name 01234567	Type: F  190123456

A. LABEL SPECIFICATIONS

An ideal label includes the following:

- Dimensions of 5.5" wide by 2.5" tall.
 - Font size should be maximized.
 - Label layout should be 2 columns.
 - Section and field order should match example above.
 - The following field labels:
 - SSN:
 - MomDOB:
 - Med. #
 - PH:
 - Fax:
 - MRN:
 - Birth Order:
 - Birthweight:
 - **DOB:**
 - **DOC:**
 - Sex:
 - Ethnicity:
 - Feed:
 - Status:
 - **Test Type:**
 - Field Label and Value should be Bold for DOB, DOC, and Test Type.
 - Time must be displayed in military time
 - Sex, Ethnicity, Feed, and Status should display integer values equivalent to the collection kit.
 - Test Type is a calculated value. The formula for Test Type is:
 - IF test# (3- Previous Abnormal) is selected label will print R
 - ELSE
 - If DOB Time AND DOC Time are NOTNULL,
 - $(\text{DOC Date and Time} - \text{DOB Date and Time}) < 7.0 = \text{N}$
 - $(\text{DOC Date and Time} - \text{DOB Date and Time}) \geq 7.0 = \text{F}$
 - ELSE
 - $(\text{DOC} - \text{DOB}) < 6 = \text{N}$
 - $(\text{DOC} - \text{DOB}) \geq 6 = \text{F}$
- (Time is not included in the calculation if either the DOB time or DOC time are missing)

SECTION VII: DATA TYPES

Data types specify the format and type of data used. A data type may be as simple as a numeric data type, which allows a number. It may be a more complex coded entry that requires a specific set of code values and the name of the code system. Data types may contain subcomponents that are specified by data types.

The following list of data type flavors only includes those that are used by fields that are anticipated for Texas DSHS Laboratory use. Data types for fields that are not used in this Guide are not included, even if they are part of a segment that is used. Additionally, base HL7 data types such as (ST) are not described.

The data types listed are as required for LOI conformance. The DSHS Laboratory may be able to receive a less detailed version of these data types and will accept them as long as the key information required by the laboratory is included.

CWE: CODED WITH EXCEPTIONS

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Identifier	ST	R		
2	Text	ST	RE		It is strongly recommended that text be sent to accompany any identifier.
3	Name of Coding System	ID	R	HL70396_USL	
4	Alternate Identifier		O		
5	Alternate Text		O		
6	Name of Alternate Coding System	ID	C(R/X)	HL70396_USL	Condition Predicate: If CWE.4 (Alternate Identifier) is valued.
7	Coding System Version ID	ST	C(RE/O)		Condition Predicate: If CWE.3 (Name of Coding System) is not an HL7 defined table or user defined.
8	Alternate Coding System Version ID		O		
9	Original Text	ST	RE		Original Text is used to convey the text that was the basis for coding.
10	Second Alternate Identifier		O		
11	Second Alternate Text		O		
12	Second Name of Alternate Coding System		O		
13	Second Alternate Coding System Version ID		O		
14	Coding System OID		O		
15	Value Set OID		O		
16	Value Set Version ID		O		
17	Alternate Coding System OID		O		
18	Alternate Value Set OID		O		
19	Alternate Value Set Version ID		O		

SEQ	Component Name	DT	Usage	Value Set	Comments
20	Second Alternate Coding System OID		O		
21	Second Alternate Value Set OID		O		
22	Second Alternate Value Set Version ID		O		

CX: EXTENDED COMPOSITE ID WITH CHECK DIGIT (NON-GLOBALLY UNIQUE)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	ID Number	ST	R		
2	Check Digit	ST	O		
3	Check Digit Scheme		O		
4	Assigning Authority	HD	RE		
5	Identifier Type Code	ID	R	HL70203_USL	
6	Assigning Facility		O		
7	Effective Date		O		
8	Expiration Date		O		
9	Assigning Jurisdiction		O		
10	Assigning Agency or Department		O		

DTM_05: DATE/TIME 5 - PRECISE TO DAY

SEQ	Component Name	DT	Usage	Value Set	Comments
	YYYY		R		
	MM		R		
	DD		R		
	HH		O		
	MM		O		
	SS		O		
	[.S[S[S[S]]]]		O		
	+/- ZZZZ		O		

DTM_06: DATE/TIME 6 - PRECISE TO DAY, POTENTIALLY TO MINUTE

SEQ	Component Name	DT	Usage	Value Set	Comments
	YYYY		R		
	MM		R		
	DD		R		
	HH		RE		
	MM		RE		
	[SS[.S[S[S[S]]]]]		O		
	+/- ZZZZ		O		

DTM_08: DATE/TIME 8 - PRECISE TO MINUTE

SEQ	Component Name	DT	Usage	Value Set	Comments
	YYYY		R		
	MM		R		
	DD		R		
	HH		R		
	MM		R		
	[SS[.S[S[S[S]]]]]		O		
	+/- ZZZZ		O		

DTM_10: DATE/TIME 10 - PRECISE TO SECOND

SEQ	Component Name	DT	Usage	Value Set	Comments
	YYYY		R		
	MM		R		
	DD		R		
	HH		R		
	MM		R		
	[SS[.S[S[S[S]]]]]		R		
	+/- ZZZZ		O		

EI: ENTITY IDENTIFIER

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Entity Identifier	ST	R		
2	Namespace ID	IS	C(R/O)		Condition Predicate: If EI_02.3 (Universal ID) is not valued.
3	Universal ID	ST	C(R/O)		Condition Predicate: If EI_02.2 (Namespace ID) is not valued.
4	Universal ID Type	ID	C(R/X)	HL70301_USL	Condition Predicate: If EI_02.3 (Universal ID) is valued.

EIP_02: ENTITY IDENTIFIER PAIR (NON-GLOBALLY UNIQUE)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Placer Assigned Identifier	EI_02	RE		
2	Filler Assigned Identifier	EI_02	C(R/RE)		Condition Predicate: If EIP_02.1 (Placer Assigned Identifier) is not valued.

ERL_01: ERROR LOCATION

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Segment ID	ST	R		
2	Segment Sequence	NM	R		Absolute position of this segment in the message (e.g. 5th OBX, regardless of the number of intervening OBRs)
3	Field Position	NM	RE		
4	Field Repetition	NM	RE		
5	Component Number	NM	RE		
6	Sub-Component Number	NM	RE		

HD_01: HIERARCHIC DESIGNATOR (GLOGALLY UNIQUE)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Namespace ID	IS	RE		This value reflects a local code that represents the combination of HD_01.2 (Universal ID) and HD_01.3 (Universal ID Type).
2	Universal ID	ST	R		
3	Universal ID Type	ID	R		Fixed to 'ISO'.

HD_02: HIERARCHIC DESIGNATOR (NON-GLOBALLY UNIQUE)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Namespace ID	IS	C(R/O)		Condition Predicate: If HD_02.2 (Universal ID) is not valued.
2	Universal ID	ST	C(R/O)		Condition Predicate: If HD_02.1 (Namespace ID) is not valued.
3	Universal ID Type	ID	C(R/X)	HL70301_USL	Condition Predicate: If HD_02.2 (Universal ID) is valued.

ID: CODED VALUE FOR HL7 DEFINED TABLES

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Coded Value for HL7 Defined Tables	ID	RE		

IS: CODED VALUE FOR USER-DEFINED TABLES

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Coded Value for User-Defined Tables	IS	RE		

MSG_01: MESSAGE TYPE

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Message Code	ID	R	HL70076_USL	
2	Trigger Event	ID	R	HL70003_USL	
3	Message Structure	ID	R	HL70354_USL	

NM: NUMERIC

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Numeric	NM	RE		

OG_01: OBSERVATION GROUPER

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Original Sub-Identifier	ST	O		
2	Group	NM	R		
3	Sequence	NM	R		
4	Identifier	ST	RE		

PT_01: PROCESSING TYPE

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Processing ID	ID	R	HL70103_USL	
2	Processing Mode		O		

SI: SEQUENCE ID

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Sequence ID	SI	RE		

ST: STRING DATA

SEQ	Component Name	DT	Usage	Value Set	Comments
1	String Data	ST	RE		

TX: TEXT DATA

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Text Data	TX	RE		

VID_01: VERSION ID; US REALM VALUE SET REQUIRED

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Version ID	ID	R		
2	Internationalization Code		O		
3	International Version ID		O		

XAD: EXTENDED ADDRESS

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Street Address	ST	RE		
2	Other Designation	ST	RE		
3	City	ST	RE		
4	State or Province	ST	RE	USPS Alpha State Codes	
5	Zip or Postal Code	ST	RE		
6	Country Code	ID	RE	HL70399_USL	Use 3-character (alphabetic) form of ISO 3166 for HL7 Table 0399 as defined in HL7 Chapter 2, Section 2.15.9.17 of LOI.
7	Address Type	ID	RE	HL70190_USL	
8	Other Geographic Designation		O		
9	County/Parish Code		O		
10	Census Tract		O		
11	Address Representation Code		O		
12	Address Validity Range		X		
13	Effective Date		O		

XCN: EXTENDED COMPOSITE ID NUMBER AND NAME FOR PERSONS

SEQ	Component Name	DT	Usage	Value Set	Comments
1	ID Number	ST	RE		Note: Despite the component being named "ID Number" this component is an ST string data type, not numeric, so the component is not limited to just numbers.
2	Family Name	ST	RE		
3	Given Name	ST	RE		I.e., first name.
4	Second and Further Given Names or Initials Thereof		O		
5	Suffix (e.g., JR or III)		O		
6	Prefix (e.g., DR)		O		
7	Degree (e.g., MD)		X		
8	Source Table		C(O/O)		Note: This component is (C) in the v2.5.1 standard with no condition predicate defined; none is defined in this IG.

SEQ	Component Name	DT	Usage	Value Set	Comments
9	Assigning Authority	HD_02	C(R/X)		Condition Predicate: If XCN_02.1 (ID Number) is valued. The Assigning Authority component is used to identify the system, application, organization, etc. that assigned the value in XCN_02-1 (ID Number).
10	Name Type Code	ID	RE	HL70200_USL	
11	Identifier Check Digit		O		
12	Check Digit Scheme		C(O/X)		Condition Predicate: If XCN_02.11 (Identifier Check Digit) is valued.
13	Identifier Type Code	ID	C(R/X)	HL70203_USL	Condition Predicate: If XCN_02.1 (ID Number) is valued.
14	Assigning Facility		O		
15	Name Representation Code		O		
16	Name Context		O		
17	Name Validity Range		X		
18	Name Assembly Order		O		
19	Effective Date		O		
20	Expiration Date		O		
21	Professional Suffix		O		
22	Assigning Jurisdiction		O		
23	Assigning Agency or Department		O		

XON: EXTENDED COMPOSITE NAME AND IDENTIFICATION NUMBER FOR ORGANIZATIONS

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Organization Name	ST	RE		
2	Organization Name Type Code		O		
3	ID Number		X		
4	Check Digit		O		
5	Check Digit Scheme		C(O/X)		Condition Predicate: If XON_02.4 is valued.
6	Assigning Authority	HD_02	C(R/X)		Condition Predicate: If XON_02.10 (Organization Identifier) is valued.
7	Identifier Type Code	ID	C(R/X)	HL70203_USL	Condition Predicate: If XON_02.10 (Organization Identifier) is valued.
8	Assigning Facility		O		
9	Name Representation Code		O		
10	Organization Identifier	ST	C(R/RE)		Condition Predicate: If XON_02.1 (Organization Name) is not valued.

XPN: EXTENDED PERSON NAME

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Family Name	ST	RE		
2	Given Name	ST	RE		I.e., first name.
3	Second and Further Given Names or Initials Thereof	ST	RE		
4	Suffix (e.g., JR or III)	ST	RE		
5	Prefix (e.g., DR)		O		
6	Degree (e.g., MD)		X		
7	Name Type Code	ID	R	HL70200_USL	
8	Name Representation Code		O		
9	Name Context		O		
10	Name Validity Range		X		
11	Name Assembly Order		O		
12	Effective Date		O		
13	Expiration Date		O		
14	Professional Suffix		O		

XPN_03: EXTENDED PERSON NAME; FAMILY NAME REQUIRED, OTHERS REQUIRED BUT MAY BE EMPTY, NAME TYPE CODE REQUIRED BUT MAY BE EMPTY

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Family Name	ST	R		
2	Given Name	ST	RE		I.e., first name.
3	Second and Further Given Names or Initials Thereof	ST	RE		
4	Suffix (e.g., JR or III)	ST	RE		
5	Prefix (e.g., DR)		O		
6	Degree (e.g., MD)		X		
7	Name Type Code	ID	RE	HL70200_USL	
8	Name Representation Code		O		
9	Name Context		O		
10	Name Validity Range		X		
11	Name Assembly Order		O		
12	Effective Date		O		
13	Expiration Date		O		
14	Professional Suffix		O		

XTN: EXTENDED TELECOMMUNICATION NUMBER

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Telephone Number		X		
2	Telecommunication Use Code		O		
3	Telecommunication Equipment Type	ID	R	HL70202_USL	
4	Email Address	ST	C(R/X)		Condition Predicate: If XTN_01.3 (Telecommunication Equipment Type) is valued 'X.400' or 'Internet'.
5	Country Code		O		
6	Area/City Code	NM	C(R/X)		Condition Predicate: If XTN_01.3 (Telecommunication Equipment Type) is valued 'PH', 'CP', 'FX', or 'TDD'.
7	Local Number	NM	C(R/X)		Condition Predicate: If XTN_01.3 (Telecommunication Equipment Type) is valued 'PH', 'CP', 'FX', or 'TDD'.
8	Extension	NM	C(RE/X)		Condition Predicate: If XTN_01.3 (Telecommunication Equipment Type) is valued 'PH', 'CP', 'FX', or 'TDD'.
9	Any Text		O		
10	Extension Prefix		O		
11	Speed Dial Code		O		
12	Unformatted Telephone number		C(O/X)		Condition Predicate: If XTN_01.3 (Telecommunication Equipment Type) is valued 'PH', 'CP', 'FX', or 'TDD'.

SECTION VIII: EXAMPLE MESSAGE

MSH|^~\&|OrderingFacilityApplicationName^2.16.840.1.114222.XXX^ISO|OrderingFacilityName^2.16.840.1.114222.XXX^ISO|txdshslabNBS^2.16.840.1.114222.4.1.181960.2^ISO|txdshslab^2.16.840.1.114222.4.1.181960^ISO|20190720091229||OML^O21^OML_O21|0123|P|2.5.1||AL|AL

PID|1||123456^^^^MR||BabyLast^BabyFirst|MotherMaiden|201907011118|F^Female^HL70001||2028-9^Asian^HL70005~2106-3^White^HL70005|||||ABCD1234^^^OrderingFacilityName&2.16.840.1.114222.XXX&ISO^AN||223456^^^OrderingFacilityName&2.16.840.1.114222.XXX&ISO^MR|N|Birth Hospital Name|Y|1

NK1|1|MotherLast^MotherFirst|MTH^Mother^HL70063|123 SUNSHINE
DR^^AUSTIN^TX^78756|^PH^^555^9204202||N^Next of
Kin^HL70131|||||19901115|||||123456789^^^txMCDmedIDadm&2.16.840.1.113883.4.446&ISO^MA~555667788^^^SSN&2.16.840.1.113883.4.1&ISO^SS

ORC|NW|123456^OrderingFacilityName^2.16.840.1.114222.XXX^ISO||25^OrderingFacilityName^2.16.840.1.114222.XXX^ISO|CM|||20190720090530||1234567890^Dolittle^John^Q^JR^DR^^^NPI&2.16.840.1.113883.4.6&ISO^L^^^NPI||20190720090030|||||ORDERING FACILITY NAME^^^^^txdshslabNBS&2.16.840.1.114222.4.1.181960.2&ISO^FI^^^01234567

OBR|1|123456^OrderingFacilityName^2.16.840.1.114222.XXX^ISO||54089-8^Newborn screening panel
AHIC^LN||201907200835||12188^Hippocrates^Harold^H^IV^Dr^MD^^OrderingFacilityName&2.16.840.1.114222.XXX&ISO^L^^EI||F^Patient fasting prior to procedure^HL70916||1234567890^Dolittle^John^Q^JR^DR^^^NPI&2.16.840.1.113883.4.6&ISO^L||PlacerField1|PlacerField2|||||^difficulty collecting sample|||||A^Alert provider when abnormal^HL70507

OBX|1|ST|57723-9^Unique bar code number of Current sample^LN||190123456||||F||201907200835|

OBX|2|ST|57711-4^Unique bar code number of Initial sample^LN||190112233||||F||201907200835|

OBX|3|CE|57721-3^Reason for lab test in Dried blood spot^LN||LA12425-7^Subsequent screen - required by law^LN||||F||201907200835|

OBX|4|NM|8339-4^Birthweight^LN||2805|g^gram^UCUM||||F||201907200835|

OBX|5|NM|57714-8^Obstetric estimation of gestational age^LN|1|39|wk^week^UCUM||||F||201907200835|

OBX|6|ST|57713-0^Infant NICU factors that affect newborn screening interpretation^LN||LA12419-0^Infant in NICU at time of specimen collection^LN||||F||201907200835|

OBX|7|ST|57713-0^Infant NICU factors that affect newborn screening interpretation^LN||LA12420-8^Systemic antibiotics before newborn screening^LN||||F||201907200835|

OBX|8|CE|67704-7^Feeding types^LN||LA16914-6^Breastmilk^LN|||||F||201907200835

OBX|9|CE|67704-7^Feeding types^LN||LA16915-3^Lactose formula^LN|||||F||201907200835

OBX|10|TX|62324-9^Post-discharge provider name in Provider^LN||Healthy,
Bob|||||F||201907200835

OBX|11|XAD|62327-2^Post-discharge provider practice address^LN||1234 Main St^Ste.
200^Austin^TX^78758^^^^^^^^|||||F||201907200835

OBX|12|XTN|62328-0^Post-discharge provider practice telephone number in
Provider^LN|1|^PH^^555^5551212^|||||F||201907200835

OBX|13|XTN|62328-0^Post-discharge provider practice telephone number in
Provider^LN|1|^FX^^555^5551213^|||||F||201907200835

SPM|1|SID20192019999&OrderingFacilityName&2.16.840.1.114222.XXX&ISO||440500007^Blood
spot specimen^SCT||CAP^Capillary
Specimen^HL70396|||||||201907200835|||||||000002019201009999^^^OrderingFacilityNa
me&2.16.840.1.114222.XXX&ISO^ACSN|190123456^^^txdshslab&2.16.840.1.114222.4.1.181960&I
SO^SID

APPENDIX A – CODE TABLES

The following tables define the valid values for the segments described above. In some cases, only selected values are listed in the HL7-type tables; please refer to the HL7 Standard for complete listings.

Table 22: Code Tables Appendix

Type	Table	Name	Value	Description
HL7	0001	Sex	Value	(use in PID-8, NK1-15)
HL7	0001	Sex	F	Female
			M	Male
			U	Unknown/Undifferentiated
HL7	0003	Event Type	Value	(use in MSH-9, second component)
HL7	0003	Event Type	O21	Laboratory Order
User	0005	Race	Value	(use in PID-10)
User	0005	Race	1002-5	American Indian or Alaska Native
			2028-9	Asian
			2054-5	Black or African American
			2076-8	Native Hawaiian or Other Pacific Islander
			2106-3	White
			2131-1	Other Race
HL7	0008	Acknowledgement Code	Value	(use in MSA-1)
HL7	0008	Acknowledgement Code	AA	Application Accept
			AE	Application Error
			AR	Application Reject
User	0063	Relationship	Value	(use in NK1-3)
User	0063	Relationship	MTH	Mother
HL7	0076	Message Type	Value	(use in MSH-9)
HL7	0076	Message Type	ACK	General Acknowledgement Message
			OML	Laboratory Order Message
HL7	0085	Observation Result Status Codes	Value	(use in OBX-11)
HL7	0085	Observation Value	F	Final Results

Type	Table	Name	Value	Description
HL7	0103	Processing ID	Value	(use in MSH-11)
HL7	0103	Processing ID	P	Production
			T	Test
HL7	0104	Version ID	Value	(use in MSH-12)
HL7	0104	Version ID	2.5.1	Release 2.5.1
HL7	0125	Value Type	Value	(use in OBX-2)
HL7	0125	Value Type	CWE	Coded with Exceptions
			TX	Text data
			NM	Numeric
			ST	String data
			XAD	Extended Address
			XTN	Extended Telecommunication Number
HL7	0136	Yes/No Indicator	Value	(use in PID-24)
HL7	0136	Yes/No Indicator	N	No
			Y	Yes
HL7	0155	Accept/Application Acknowledgment Conditions	Value	(use in MSH-15)
HL7	0155	Accept/Application Acknowledgment Conditions	AL	Always
			ER	Error/Reject Conditions Only
			NE	Never
			SU	Successful Completion Only
User	0189	Ethnic Group	Value	(use in PID-22)
User	0189	Ethnic Group	H	Hispanic or Latino
			N	Not Hispanic or Latino
			U	Unknown
HL7	0936	Observation Type	Value	(use in OBX -29)
HL7	0936	Observation Type	QST	Question
HL7	0936	Observation Sub-Type	Value	(use in OBX -30)
HL7	0936	Observation Sub-Type	AOE	Ask at Order Entry
			ASC	Ask at Specimen Collection

Type	Table	Name	Value	Description
HL7	0202	Telecommunication Equipment Type	Value	(use in OBX 5.3)
HL7	0202	Telecommunication Equipment Type	PH	Telephone
			FX	Fax
User	0203	Identifier Type	Value	(use in PID-3, NK1-33 and others)
User	0203	Identifier Type	MA	Medicaid Number
			MR	Medical Record Number
			PRN	Provider Number
			SS	Social Security Number
HL7	0301	Universal ID Type	Value	(use in all HD Data Types)
HL7	0301	Universal ID Type	HL7	Reserved for future HL7 registration schemes
			ISO	An International Standards Organization Object Identifier
HL7	0354	Message Structure	Value	(use in MSH-9)
HL7	0354	Message Structure	ACK	ACK
			OML_O21	OML
HL7	0357	Message Error Status Code	Value	(find in ERR-3)
HL7	0357	Message Error Status Code	0	Message Accepted
			100	Segment Sequence Error
			101	Required Field Missing
			102	Data Type Error
			103	Table Value Not Found
			200	Unsupported Message Type
			201	Unsupported Event Code
			202	Unsupported Processing ID
			203	Unsupported Version ID
			204	Unknown Key Identifier
			205	Duplicate Key Identifier
			206	Application Record Locked
			207	Application Internal Error

Type	Table	Name	Value	Description
User	0396	Coding System	Value	
User	0396	Coding System	HL7nnnn	HL7 Defined Codes (where nnnn is the HL7 Table Number)
			ISOnnnn	ISO Defined Codes (where nnnn is the ISO Table Number)
			LN	Logical Observation Identifier Names and Codes (LOINC®)
			NPI	National Provider Identifier
			SCT	SNOMED Clinical Terminology
HL7	0516	Error Severity	Value	(use in ERR-4)
HL7	0516	Error Severity	E	Error
			I	Information
			W	Warning
User	0533	Application Error Code	Value	
HL7	0533	Application Error Code	1	Illogical Date Error
			2	Invalid Date
			3	Illogical Value Error
			4	Invalid Value
			5	Table Value Not Found
			6	Required Observation Missing