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California Department of Health Care Services (DHCS), Newborn Hearing Screening Program (NHSP)

Technical Requirements Specification
Electronic Data Transmission (EDT)
Version 2.82

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Table of Contents

Table of Figures 6

List of Tables 7

1 Introduction 9

1.1. Purpose 9

1.2. Scope 9

2. Definition of Terms 9

3. Development Methodology & Environment 10

3.1. Desktop Requirements 10

3.1.1 Browser Support 10

3.1.2 Windows Support 10

3.2. Languages, Tools and Standards 10

3.3. Development Tools & Languages 11

3.4. Environment – Data Transport 11

3.5. Hospital Network – Screening Device Uploads 11

3.6. Hospital Network – HL7 11

4. EDT Configuration Process 13

4.1. Frequently Asked Questions Document 13

4.2. Technical Requirements Specifications 13

4.3. HL7 Interface Configuration 13

4.4. Beta Launch with Parallel Testing 13

4.5. Hospitals Go-Live 13

5. Data Profiles for the State Program 14

5.1. Data Transmission Selection Overview 14

5.2. Manual Data Entry Process 15

5.3. Semi-Automatic Process 16

5.4. Fully Automatic Process 21

6. Demographic Data Entry 22

7. Hearing Results Entry 28

7.1. Hearing Results Data Fields 28

8. Risk Factor Entry 30

9. How will the hospitals send their HL7 messages to the State? 31

10. DMS HL7 Interface 33

10.1. HL7 Message Grammar 34

10.1. ORU Message Grammar *34*

10.2. ADT Message Grammar [A01, A08] *34*

10.2. Explanation of the Use of the OBX segment in the Newborn Hearing Screening HL7 Message 35

10.2.1. OBX-3: List of Identifiers *35*

10.3. HL7 Message Examples 39

10.3.1. Sample ADT Message using an OBX segment for Demographic Data *39*

10.3.2. Sample ORU message *40*

10.3.3. Sample ADT message *41*

10.4. HL7 Message Mapping for Newborn Hearing Screening Message from Hospitals to DHCS 42

10.4.1. MSH – Message Header Mapping *42*

10.4.2. EVN – Event Type Segment Mapping *44*

10.4.3. PID – Patient Identification Mapping *44*

10.4.4. NK1 – Next of Kin Mapping *54*

10.4.5. PV1 – Patient Visit Segment Mapping *59*

10.5. ORC – Common Order Segment Mapping 60

10.5.1. ZCA – Custom Segment – California State Newborn Hearing Screening Program *62*

10.5.2. OBR – Observation Request segment to be Sent with ORU Result Messages *68*

10.5.3. OBX – Result Segments *70*

10.6. Update Patients 71

10.7. Mandatory Inbound Fields 73

10.8. Matching Conditions and Affiliation Rules [Applies to all Message Types] 73
10.9. DHCS HL7 emails to Hospital Administrators 75
10.9.1. SFTP 75
1. Login Failed *75*
2. Upload Successful *75*
10.9.2. HL7 Interface 76
1. PID 3: Medical Record Number *76*
2. PID 5: Baby Last Name *77*
3. PID 5: Baby First Name *77*
4. PID 7: Baby Birth Date *78*
5. PID 8: Gender *79*
6. PID 11: Mother County *80*
7. PID 12: Birth County *81*
8. PID 15: Mother Primary Language *81*
9. PID 22: Ethnicity *82*
10. PID 23: Birth Hospital *82*
11. PID 25: Birth Order *83*
12. NK1 3: Relationship *83*
13. NK1 4: Next of Kin County [Validating County as part of the Address Sent] *84*
14. PV1 3: Unit *84*
15. OBR 14: Date Received *85*
16. OBR 16: Ordering Provider *87*
17. OBR 25: Result Status *88*
18. OBR 4: Universal Service Identifier/Procedure Code *89*
19. OBR 7: Screening Date *89*
20. OBR 34: Screener Name *92*
21. OBX 1: Set ID *92*
22. OBX 3: OBX Identifiers *93*
23. OBX 4: Field Used to Match Results to the Screen *93*
24. OBX 5: Screening Result and other values *94*
25. OBX 11: Result Status *98*
26. ZCA 1: Acuity and Unit *99*

27. ZCA 2: Gestational Age 100

28. ZCA 3: Mother Email 100

29. ZCA 4: Mother Cell Phone 101

30. ZCA 5: Legal Guardian Flag 102

31. ZCA 6: Legal Guardian Email 102

32. ZCA 7: Legal Guardian Cell Phone 103

33. ZCA 8: Risk Factors [We will be validating on each one of the nine fields. Below is an example of one of them] 103

34. ZCA 9: Submitting Hospital ID 104

35. ZCA 10: Insurance Type 104

36. ZCA 11: Birth Hospital ID 105

11. System Message Logging 105

12. HL7 Concepts and Definitions 107

13. Screening Device Data File Upload 108

13.1. Hospital Requirements 108

14. HiTrack File Format Information 110

14.1. HiTrack Flat-File Format 110

14.2. HiTrack Flat File Name 110

14.3. HiTrack Flat File Data Structure 110

14.4. Standard Field Values 112

15. Algo5 XML Format Information 114

15.1. Sample XML File 114

16. Data Matching for Uploaded Data 119

16.1. Successful Data Match 119

16.2. Unmatched Data Process 119

Table of Figures

Figure 1 - EDT Configuration Process 13
Figure 2 - Transmission Options 14
Figure 3 - Manual Data Entry Process 16
Figure 4 - Manual Data Entry Process 16
Figure 5 - Semi-Automatic Data Entry Process 17
Figure 6 - Semi-Automatic Data Entry Process - Upload 17
Figure 7 - Semi-Automatic Data Entry Process - Single 18
Figure 8 - Semi-Automatic Data Entry Process - Batch 19
Figure 9 - Semi-Automatic Data Entry Process – EDT 20
Figure 10 - Semi-Automatic Data Entry Process – EDT 21
Figure 11 - Fully Automatic Data Entry Process 21
Figure 12 - Fully-Automatic Data Entry Process – HL7 22
Figure 13 -- HL7 Data Transport System Architecture – Inbound Messaging 32
Figure 14 -- High level diagram of inbound messages to DMS 33
Figure 15 – Update Newborn via HL7 Update Demog Message 72
Figure 16 - Screening Device Upload Flow 109

List of Tables

Table 1 - Acronym/Term Definitions 9
Table 2 - Message types supported by interface 11
Table 3 - EDT Selection Overview 14
Table 4 - Patient Information 23
Table 5 - Mother's Information 24
Table 6 – Legal Guardian 25
Table 7 - Submitter Information 27
Table 8 - Birth Hospital Information 27
Table 9 - Hearing Data Fields 28
Table 10 - OBX Identifiers 35
Table 11 - Message Header Mapping 42
Table 12 - Processing ID 43
Table 13 - Event Type Mapping 44
Table 14 - Patient Identification Mapping 45
Table 15 - Gender 50
Table 16: Language 52
Table 17: Ethnicity 53
Table 18: Multiple Birth Order 53
Table 19: Next of Kin Mapping 54
Table 20: Next of Kin Relationship 57
Table 21: Telecommunication use code 58
Table 22: Telecommunication equipment type 58
Table 23 – PV1 Segment Mapping 59
Table 24 – Assigned Patient Location 60
Table 25 – ORC segment Mapping 60
Table 26: Order Control Options 61
Table 27: Order Status Options 61
Table 28 – ZCA Custom Segment Mapping 62
Table 29 - Acuity 66

Table 30 - Unit 66
Table 31 - Mother's Legal Guardian Flag 66
Table 32 - Risk Factor 67
Table 33 - Insurance Type 67
Table 34 - OBR Mapping 68
Table 35 - OBX Mapping 70
Table 36 - HiTrack Fields 110
Table 37 - HiTrack File Format Fields 111
Table 38 - Screening Outcomes 112

1 Introduction

Electronic Data Transmission (EDT) is the interface that allows for the remote entry of data into the California iCMS Hearing Database Management System (DMS). Hospitals can use EDT to transmit demographic data, risk factor data, and hearing result data from screening devices. This document focuses on the technical requirements necessary for a hospital to configure EDT in order to transmit data from authorized hospitals to the California Newborn Hearing Screening Program (NHSP) DMS.

1.1. Purpose

This document describes the various processes (also referred to as tasks) and the interfaces to the NHSP DMS. This document is intended primarily for the developers and reviewers of the interfaces project.

1.2. Scope

The processes and interfaces defined in this document apply to the interface between the hospitals Health Information System (HIS) and the California NHSP DMS.

2. Definition of Terms

The following terms shall be used throughout this document.

Table 1 - Acronym/Term Definitions

Acronym	Definition
ADT	Admission, Discharge and Transfer. An HL7 message type is used to broadcast patient demographic data, specifically data related to patient admission and registration.
DMS	The California iCMS Hearing Screening Database Management Service. This is the system that will capture data on newborn hearing screening from hospitals and allow the state to manage the data according to state program guidelines.
HIS	Hospital Information System. General term for patient data management applications running at the hospital.
HL7	Health Level Seven. An ANSI (American National Standards Institute) standard messaging protocol used for medical and health related data processing systems
Temporary Table (aka Holding file)	Temporary Table at the State that “holds” data sent via HL7. Interface software will process data as needed to process electronic submission.
iCMS	The name for the software that the state is employing for this project. It stands for (i)nternet CMS or Case Management System.
MRN	Medical Record Number. A method to identify patient and patient information within a health care organization. The number is unique only to specific organization that generated the number. It is not unique across hospital networks.
MSH	Message Header Segment. This segment is a mandatory HL7 segment that includes mandatory information for the data transmission.

Acronym	Definition
ORC	Common Order Segment. This segment is used to place an order for newborn hearing screening results to the DMS.
ORU	Observational Report, Unsolicited. An HL7 message type used to broadcast a data report.
PID	Patient Identification Segment. This segment is used to retrieve patient demographics sent by the HIS.
RDE	Remote Data Entry – web application that allows hospitals and clinics to enter demographic data at the bedside and send to the DMS.
SRV	Secure Remote Viewer. Web application that allows hospitals and clinics to view Mailer images from the system.
Task	A sequence of operations that executes independently of other tasks. Each task runs in its own data and code space, and is scheduled to run by the operating system.

3. Development Methodology & Environment

This software was designed as an event-driven, object oriented system. The software was developed under the Windows .NET environment. The software is web-based and will run on standard web browsers. The EDT interface supports three types of data transmissions: demographic data, results from a hearing screening device, and risk factors. These data types are defined later in the document. The DMS supports HL7 messaging for demographic data, risk factor data, and file uploads from screening devices

3.1. Desktop Requirements

The following is a listing of general product functionality that will be incorporated in all application modules.

3.1.1 Browser Support

Web Components will be fully compatible with IE6 and IE7, IE8 and Firefox v3.x, v4.x and v5.x. If the end-user launches the RDE form from a non-supported browser, messaging will appear explaining that the browser (and/or version) is not supported, and will list the recommended browser options.

3.1.2 Windows Support

System must run on Windows 2000, Windows 7, XP, or Vista operating systems.

3.2. Languages, Tools and Standards

The HL7 interface is compatible with version 2.6 of the HL7 standard. Uploads from hearing screening devices require the device to output either HiTrack or Algo5 XML formats.

3.3. Development Tools & Languages

The HL7 interface is written with and tested using the following tools (these are for development purposes only, and are not required to reside on the target machine to interface with the deployed software):

- Microsoft Visual Studio
- Borland Delphi
- Interfaceware Iguana
- Interfaceware Chameleon
- Microsoft SQL Server
- C#, Ajax, ASP.Net, Active X and Javascript

3.4. Environment – Data Transport

For the HL7 interface the following is acceptable to transmit data:

- SSL connection between the HIS and DMS via Security Certificates
- Secure FTP interface between the HIS and DMS

Device uploads are done through a file upload screen in the DMS.

3.5. Hospital Network – Screening Device Uploads

In order to transmit data into the DMS from hearing screening device equipment, a hospital must ensure that the device files are in the appropriate format (HiTrack or Algo5 XML) and are able to be accessed by the workstation that will be uploading to the DMS website.

3.6. Hospital Network – HL7

It is expected that each hospital group that wants to send data to the state program will be responsible for configuring the HIS to send and receive data to the HL7 interface. There are several different approved versions of the HL7 messaging standard; this interface will be configured to process version 2.6 messages or earlier. The following messages will be processed by the state program HL7 interface:

Table 2 - Message types supported by interface

Message Event	Meaning	Type
ORU^R01	Unsolicited transmission of an Observation Message	Incoming to DMS

ADT^A01	Admit a patient	Incoming to DMS
ADT^A08	Update Patient information	Incoming to DMS

4. EDT Configuration Process

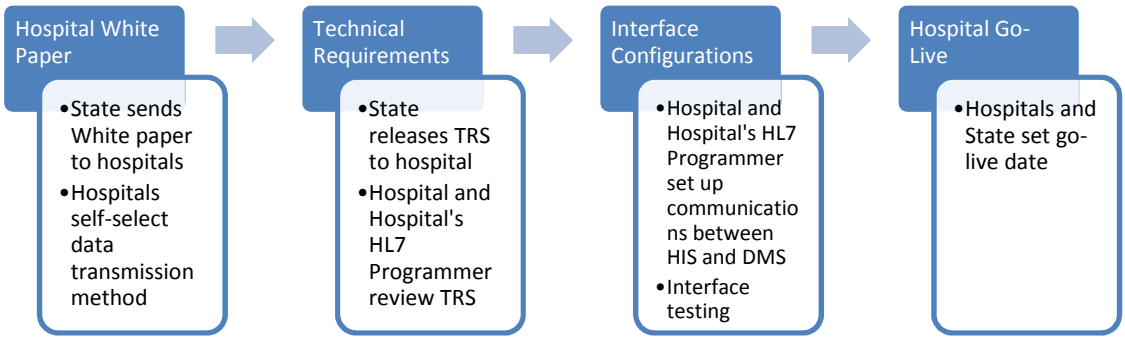


Figure 1 - EDT Configuration Process

The DMS will accept data electronically from hospitals. Some hard copy reports will be required for a period of time, and some ongoing QA reports will be necessary to verify all infants have been entered. The process has several pieces:

4.1. Frequently Asked Questions Document

Hospitals in the state have received a document that addressed several frequently asked questions regarding the upcoming implementation of the NHSP DMS. Based on individual hospital review, each hospital was asked to report their intention for data transmission.

4.2. Technical Requirements Specifications

All hospitals have received a previous version of this document (Technical Requirements Specification (TRS) V2.5). The current document (TRS 2.7) replaces all previous versions of the TRS and should be used to assist EDT hospitals in the interface configuration. Neometrics will work with hospital staff to review EDT protocols and set dates for transmission tests.

4.3. HL7 Interface Configuration

Neometrics will work with the hospitals to configure the HL7 interface. Hospitals send test messages that are validated against the specifications. The HL7 interface is tuned so that messages can be sent when the project goes live.

4.4. Beta Launch with Parallel Testing

Hospitals electing EDT configuration will work with Neometrics on sending a series of messages as defined in the TRS to run in parallel with the current process for submitting data for a period of four weeks.

4.5. Hospitals Go-Live

DHCS and Neometrics will work with hospitals to achieve their go live dates. Each hospital will be notified by the state of their specific go live date and all steps which will need to be taken in order to prepare for go-live as well as ongoing support procedures once they are live.

5. Data Profiles for the State Program

Three types of data can be electronically submitted to the DMS: demographic, in-patient hearing screen results and risk factors for hearing loss. Submitting hospitals have options when providing data to the state program. These options are displayed in Figure 2:

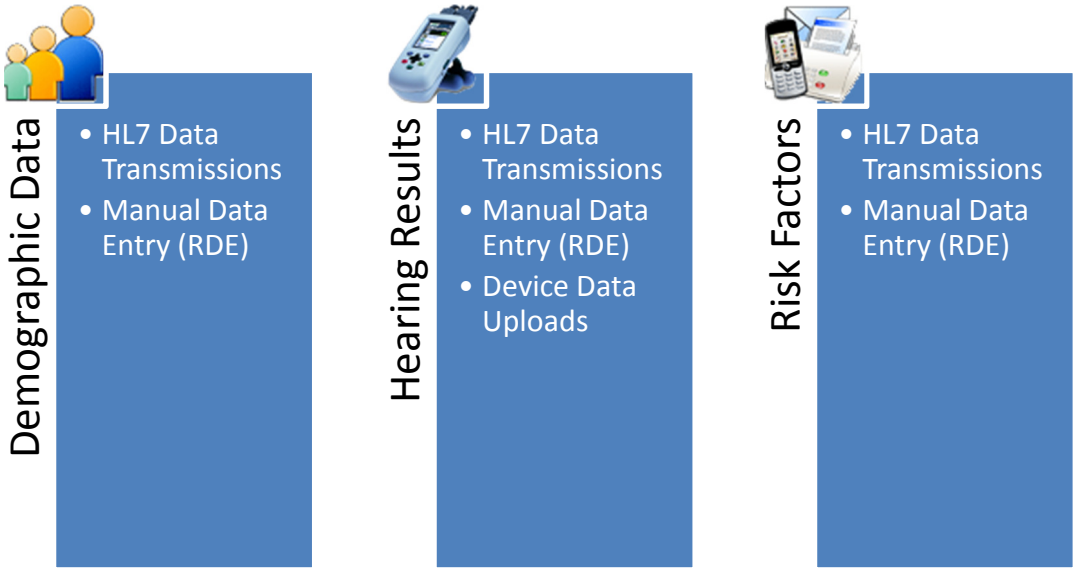


Figure 2 - Transmission Options

The following sections detail the options for each data type to help submitting hospitals determine the proper data submission methods.

5.1. Data Transmission Selection Overview

Table 3 - EDT Selection Overview

Is there a PC with internet access in your nursery?	Can your screening device?		Is the hospital HIS capable of:			Your Transmission mode	Corresponding Section in Document
	Export data?	Capture required demographic fields?	Sending admission data? (ADT)	Loading screening results from the device	Transmitting screening data (ORU)		

Is there a PC with internet access in your nursery?	Can your screening device?		Is the hospital HIS capable of:			Your Transmission mode	Corresponding Section in Document
	Export data?	Capture required demographic fields?	Sending admission data? (ADT)	Loading screening results from the device	Transmitting screening data (ORU)		
Yes	No	No	No	No	No	Manual	Manual Data Entry Process
Yes	Yes	No	No	No	No	Semi Automatic (Upload)	Semi-Automatic Process
Yes	Yes	Yes	No	No	No	Semi Automatic (single, batch)	Semi-Automatic Process
Yes	No	No	Yes	No	No	Semi-Automatic (EDT)	Semi-Automatic Process
Yes	Yes	Yes	Yes	No	No	Semi-Automatic (EDT)	Semi-Automatic Process
Yes	Yes	Yes	Yes	Yes	Yes	Fully Automatic (batch,HL7)	Fully Automatic Process

5.2. Manual Data Entry Process

The manual process is designed for hospitals that do not have HIS systems, or are not yet set up to transmit data electronically. The DMS provides web-based modules that hospitals use to transmit data. Once the data is gathered, hospital staff uses the web-based modules to manually enter the demographic **data for every baby born** – as well as subsequent hearing screening result information into the state system. The flow is shown below:

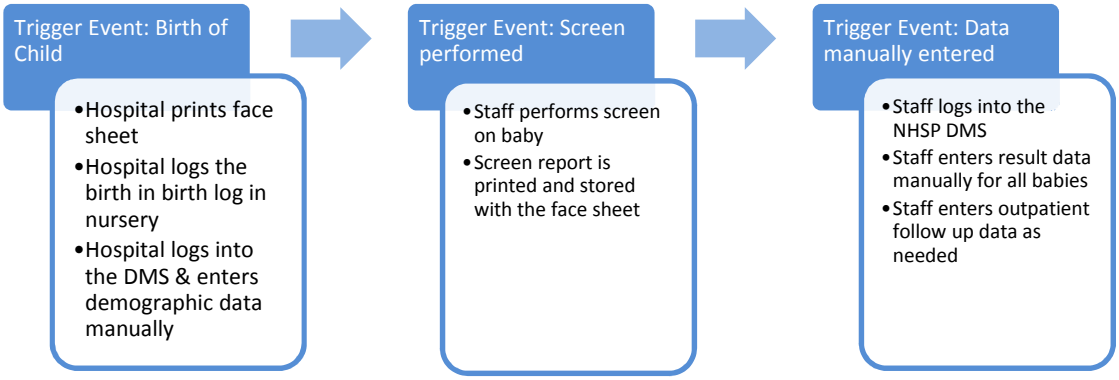
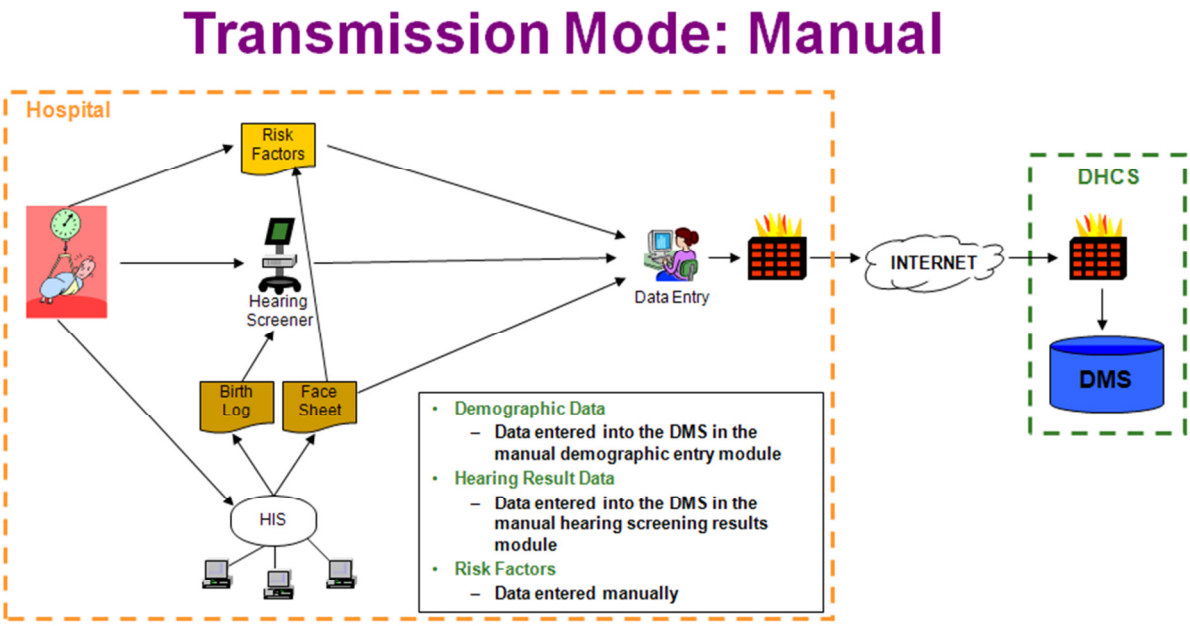


Figure 3 - Manual Data Entry Process



	Can your screening device?		Is the hospital HIS capable of:			
Is there a PC with internet access in your nursery?	Export data?	Capture required demographic fields?	Sending admission data? (ADT)	Loading screening results from the device	Transmitting screening data (ORU)	Your Transmission mode
Yes	No	No	No	No	No	Manual

Figure 4 - Manual Data Entry Process

5.3. Semi-Automatic Process

The semi-automatic process is when the demographic data or inpatient screening results are sent to the DMS via an EDT interface. The inpatient screening results can be manually entered via DMS web-based modules or with an upload of files exported from hearing screening devices. After

admitting the baby, the hospital transmits the demographics to the state. This data is stored in a temporary table at the state until the inpatient screen results are submitted. The flow is shown below:

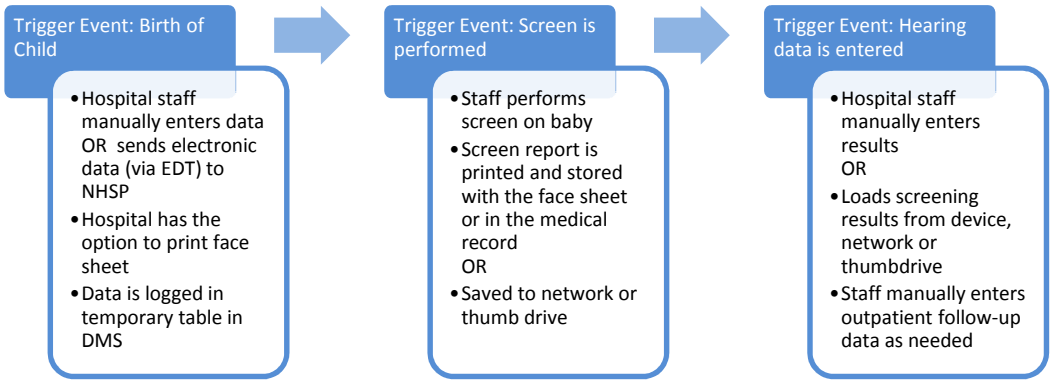
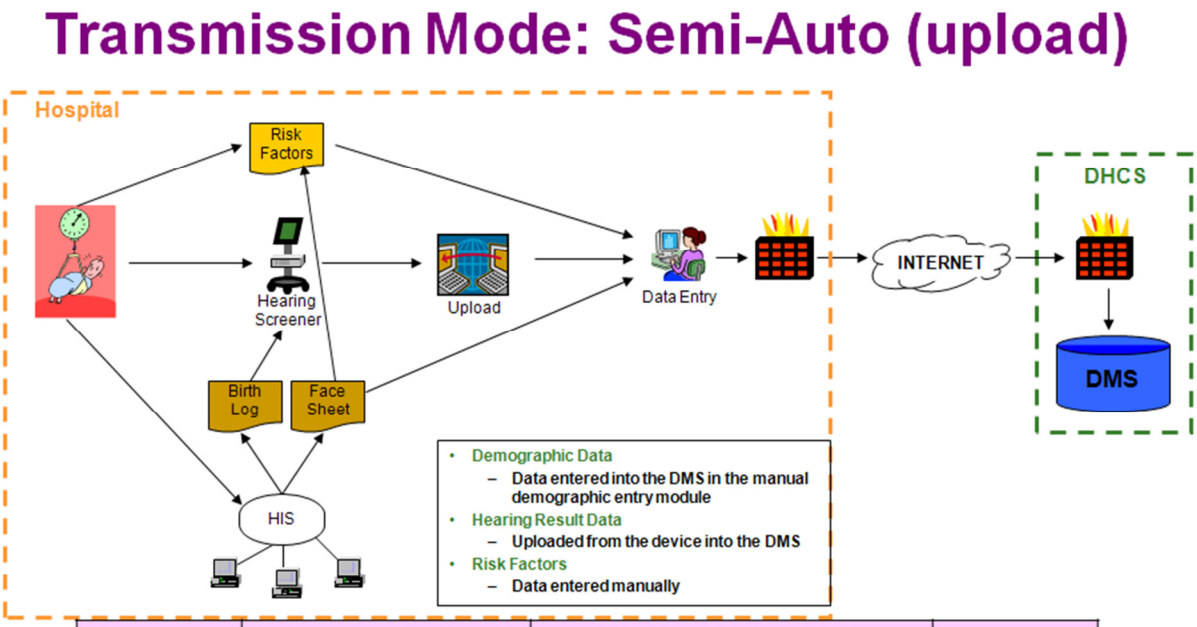


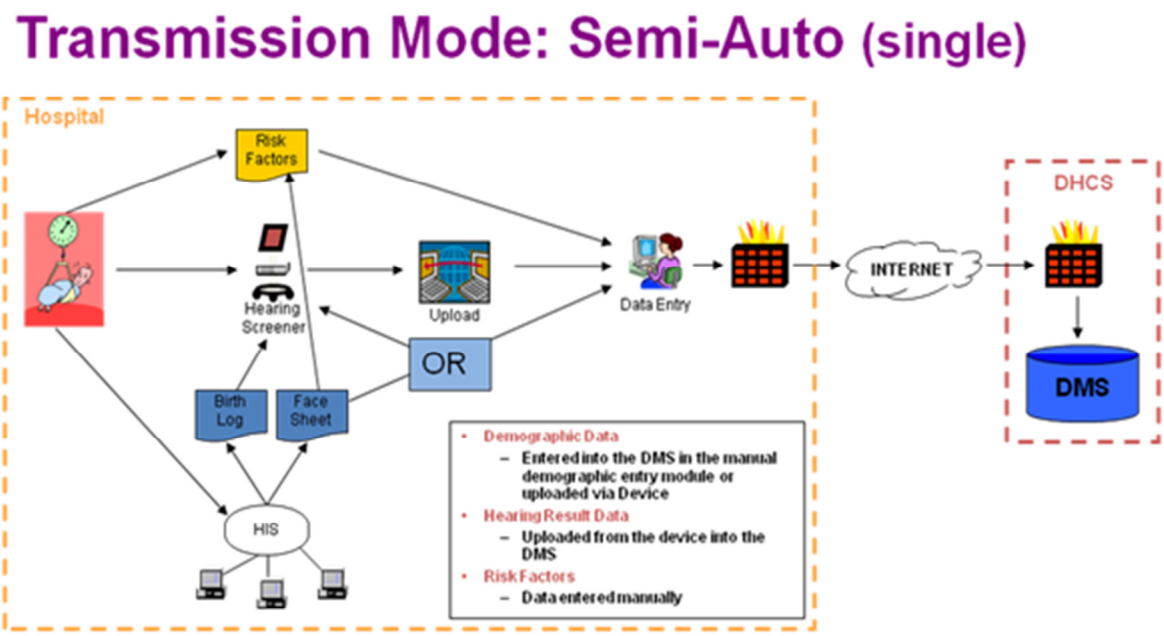
Figure 5 - Semi-Automatic Data Entry Process

There are several Semi-Automatic transmission options available: Upload, Single, Batch, and EDT.



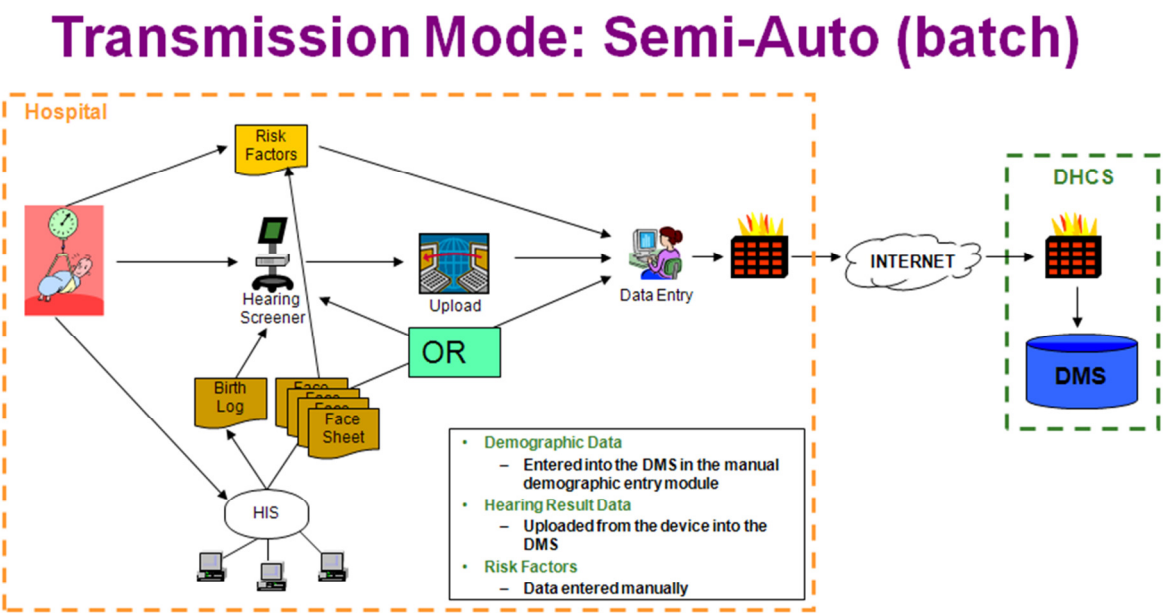
	Can your screening device?		Is the hospital HIS capable of:			
Is there a PC with internet access in your nursery?	Export data?	Capture required demographic fields?	Sending admission data? (ADT)	Loading screening results from the device	Transmitting screening data (ORU)	Your Transmission mode
Yes	Yes	No	No	No	No	Semi-Automatic (Upload)

Figure 6 - Semi-Automatic Data Entry Process - Upload



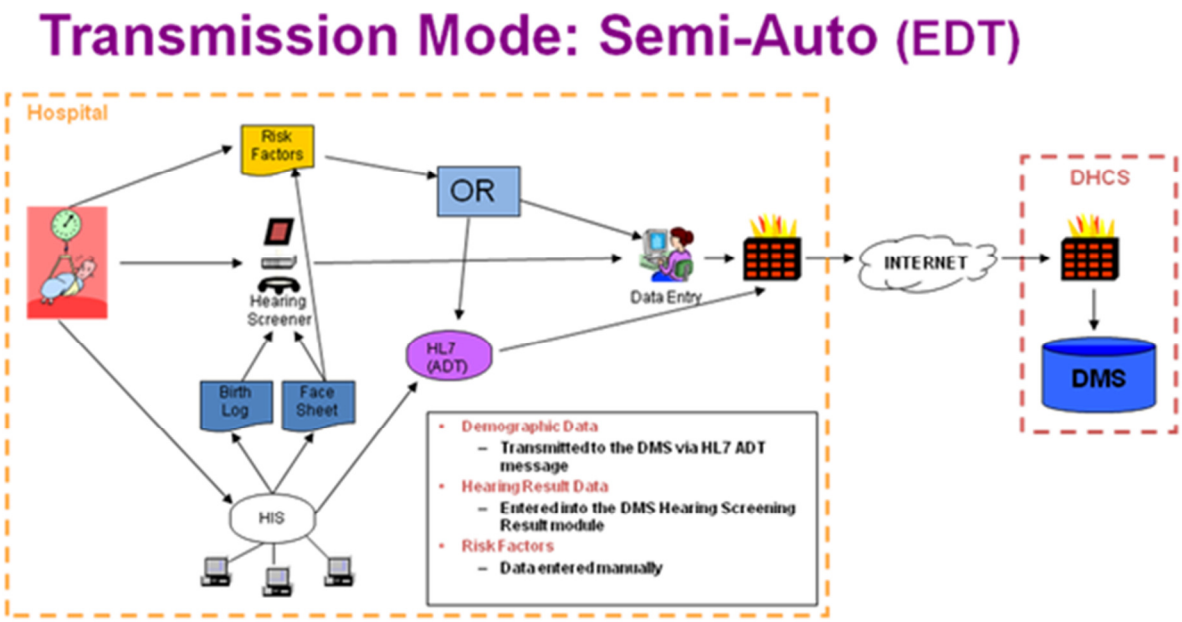
	Can your screening device?		Is the hospital HIS capable of:			
Is there a PC with internet access in your nursery?	Export data?	Capture required demographic fields?	Sending admission data? (ADT)	Loading screening results from the device	Transmitting screening data (ORU)	Your Transmission mode
Yes	Yes	Yes	No	No	No	Semi-Automatic (single, batch)

Figure 7 - Semi-Automatic Data Entry Process - Single



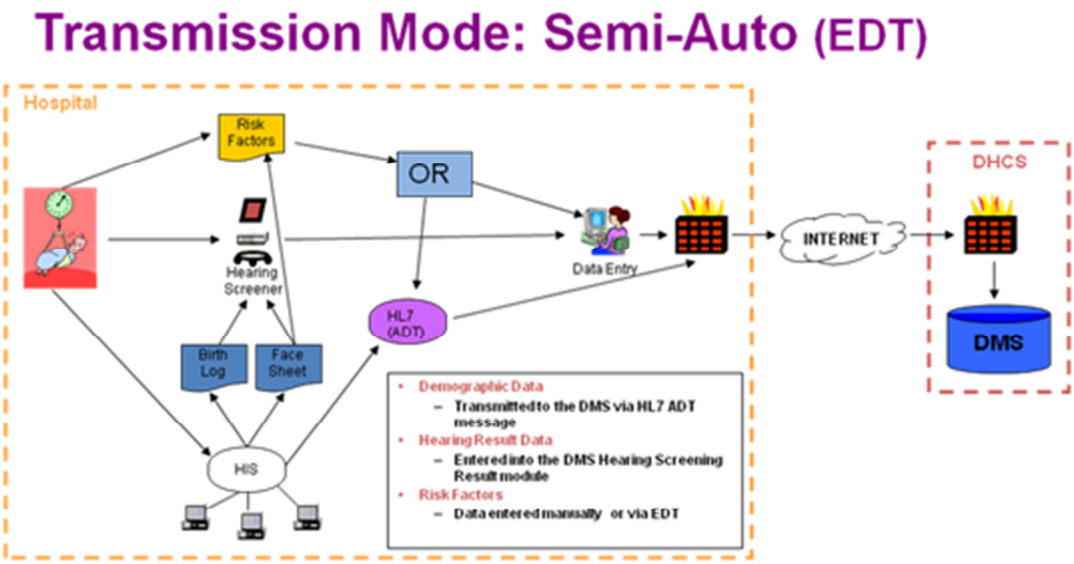
	Can your screening device?		Is the hospital HIS capable of:			
Is there a PC with internet access in your nursery?	Export data?	Capture required demographic fields?	Sending admission data? (ADT)	Loading screening results from the device	Transmitting screening data (ORU)	Your Transmission mode
Yes	Yes	Yes	No	No	No	Semi-Automatic (single, batch)

Figure 8 - Semi-Automatic Data Entry Process - Batch



	Can your screening device?		Is the hospital HIS capable of:			
Is there a PC with internet access in your nursery?	Export data?	Capture required demographic fields?	Sending admission data? (ADT)	Loading screening results from the device	Transmitting screening data (ORU)	Your Transmission mode
Yes	No	No	Yes	No	No	Semi-Automatic (EDT)

Figure 9 - Semi-Automatic Data Entry Process – EDT



	Can your screening device?		Is the hospital HIS capable of:			
Is there a PC with internet access in your nursery?	Export data?	Capture required demographic fields?	Sending admission data? (ADT)	Loading screening results from the device	Transmitting screening data (ORU)	Your Transmission mode
Yes	No	No	Yes	No	No	Semi-Automatic (EDT)

Figure 10 - Semi-Automatic Data Entry Process – EDT

5.4. Fully Automatic Process

The data are received by the state program and placed in a temporary table, (baby is searchable via the search screen in the case management module on the website) pending receipt of the hearing screening result data. Hearing screening result data are transmitted via an updated electronic data transmission (ORU) or device upload. The flow is shown below:

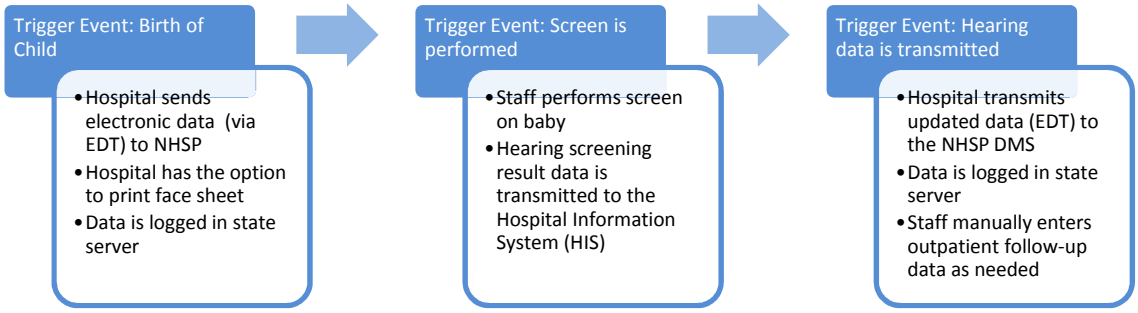
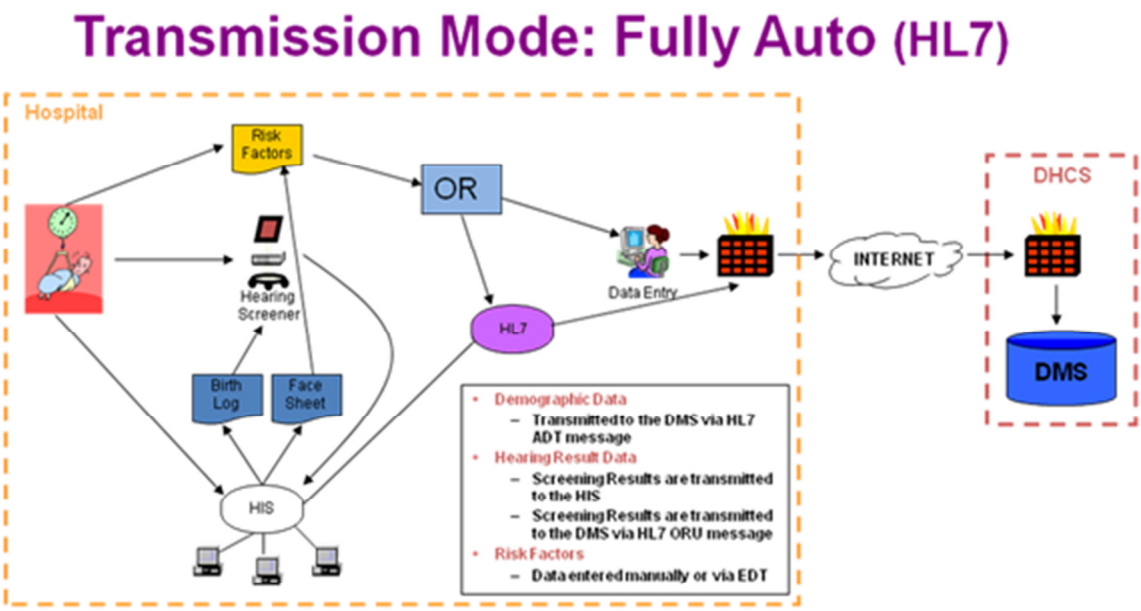


Figure 11 - Fully Automatic Data Entry Process



	Can your screening device?		Is the hospital HIS capable of:			
Is there a PC with internet access in your nursery?	Export data?	Capture required demographic fields?	Sending admission data? (ADT)	Loading screening results from the device	Transmitting screening data (ORU)	Your Transmission mode
Yes	Yes	Yes	Yes	Yes	Yes	Fully Automatic (batch,HL7)

Figure 12 - Fully-Automatic Data Entry Process – HL7

6. Demographic Data Entry

The state program system requires demographic data to be submitted by submitting hospitals. Submitting hospitals have the option of sending data via

1. HL7 data transmissions
2. Using the Demographic Entry Module on the Website
3. Uploading data from a hearing screening device in the approved file format

Demographic data are gathered on the newborn and grouped by type of data. The four groups are:

- Patient Information
- Mother Information
- Legal Guardian Information

- Submitter Information

The chart below lists the minimum demographic fields required for all infants. Additional data elements are needed for infants who are transferred, refer on screening, or are missed. Later sections of the document define the HL7 grammar that is used to transmit data.

Table 4 - Patient Information

Available Fields	Field Type	Required	Validation	Notes
NHSP Number	Text		Auto-Generated by System	
Medical Record Number	Text	Yes		
Last Name	Text	Yes		
First Name	Text	Yes		
AKA Last Name	Text			
AKA First Name	Text			
Date of Birth	Date	Yes	Valid Date, not after current date	
Gestational Age in Weeks	Number			
Multiple Birth Order	List Value			Not Multiple Birth (Default) First Multiple Second Multiple Third Multiple Fourth Multiple Fifth Multiple Sixth Multiple Seventh Multiple Eighth Multiple
Gender	List Value	Yes		Male Female Unknown
Ethnicity	List Value			Hispanic American Indian Asian Black Pacific Islander White Other

Available Fields	Field Type	Required	Validation	Notes
				Unknown Two or more races Refused to answer
Acuity	List Value	Note: Required for patients that require follow-up		WBN (default), NICU
Unit	List Value	Note: Required for patients that require follow-up		NICU PICU Other
Non-Nursery Unit	Text			
Insurance Type	List Value			(Default to Blank) Medi-Cal Healthy Families HMO Private Not Insured Unknown

Table 5 - Mother's Information

Available Fields	Field Type	Required	Validation	Notes
Mother's Last Name	Text		N/A	
Mother's First Name	Text			
Street Address	Text			
Zip code	Number		Validate against table	
City	Text		Populated with Zip code	
State	Text		Validate against table	Default to CA
County of Residence	Library Value		Validate against database	Auto populate based on Zip Code
Country of Residence	List			U.S. Mexico Other

Available Fields	Field Type	Required	Validation	Notes
Home Phone	Text			
Cell Phone	Text			
Work Phone	Text			
Work Extension	Text			
Email	Text			
Primary Language	List			English(Default) Spanish Cambodian Chinese Farsi Hmong Korean Laotian Russian Vietnamese Other
Mother is Legal Guardian	Boolean			

Table 6 – Legal Guardian

Available Fields	Field Type	Required	Validation	Notes
Legal Guardian Last Name	Text		N/A	
Legal Guardian First Name	Text			
Relationship	List			Mother (Default) Father, Aunt Uncle Grandparent Sibling Other Other Relative Adoptive Parent Foster parent Cousin Friend Social Worker

Available Fields	Field Type	Required	Validation	Notes
				Interpreter Child Protective Services Residential Healthcare Facility None.
Street Address	Text			
Zip code	Number		Validate against table	
City	Text		Populated with Zip code	
State	Text		Validate against table	Default to CA
County of Residence	Library Value		Validate against database	Auto populate based on zip code
Country of Residence	Library Value			U.S. (Default)Mexico Other
Home Phone	Text			
Cell Phone	Text			
Work Phone	Text			
Work Extension	Text			
Email	Text			
Primary Language	List			English (Default) Spanish Cambodian Chinese Farsi Hmong Korean Laotian Russian Vietnamese Other

Table 7 - Submitter Information

Available Fields	Field Type	Required	Validation	Notes
Submitter ID	Library Value	Yes	Submitter Lookup capabilities	This field will populate for Hospital Users

Table 8 - Birth Hospital Information

Available Fields	Field Type	Required	Validation	Notes
Birth Hospital ID	Library Value	Yes	Birth Hospital Lookup capabilities	
County of Birth	Library Value	Yes	Auto-populated	This field will populate based on Birth Hospital Selected

7. Hearing Results Entry

7.1. Hearing Results Data Fields

The DMS requires data from the Inpatient Hearing Screen be entered in the system. These data may be entered in one of three ways:

- Manually
- Via upload of screener export file (Details provided in Section 13)
- Via HL7 transmission from HIS (Details provided in Section 10)

The following fields can be transmitted to the DMS;

Table 9 - Hearing Data Fields

Field Display	Field Type	Required	Validation	Notes
Medical Record No	Text	Yes		
Screen No	Text			Auto generated
Screen Type	List Value	Yes		'Inpatient' or 'Outpatient'
Date of Screening	Date	Yes	Greater than or equal to the date of birth	
Screening Provider	Library Value			
Result Right Ear	List Value	Yes		Missed Pass Refer Previously Passed No Show Rescheduled Cancel Refused > 6 months NMI Expired
Result Left Ear	List Value	Yes		Same as above
Screening Method Right Ear	List Value	Yes		ABR OAE N/A
Screening Method Left Ear	List Value	Yes		ABR OAE N/A
Screener	Text	Yes		
IP Malformation Right Ear	List Value			Atresia Microtia

Field Display	Field Type	Required	Validation	Notes
				Both None
IP Malformation Left Ear	List Value			Atresia Microtia Both None
Date Screening Results Received	Date			Default to current date

8. Risk Factor Entry

There are several risk factors for entry into the state program. The DMS supports manual entry and EDT submission of the following risk factors for hearing loss:

- Caregiver concern regarding hearing, speech, language, or developmental delay.
- Family history of permanent childhood hearing loss.
- Neonatal intensive care of more than 5 days or any of the following regardless of length of stay: ECMO, assisted ventilation, exposure to ototoxic medications (gentamicin and tobramycin) or loop diuretics (furosemide/Lasix), and hyperbilirubinemia that requires exchange transfusion.
- In utero infections, such as CMV, herpes, rubella, syphilis, and toxoplasmosis.
- Craniofacial anomalies, including those that involve the pinna, ear canal, ear tags, ear pits, and temporal bone anomalies.
- Physical findings, such as white forelock, that are associated with a syndrome known to include a sensorineural or permanent conductive hearing loss.
- Syndromes associated with hearing loss or progressive or late-onset hearing loss, such as neurofibromatosis, osteopetrosis, and Usher syndrome; other frequently identified syndromes including Waardenburg, Alport, Pendred, and Jervell and Lange-Nielson.
- Neurodegenerative disorders, such as Hunter syndrome, or sensory motor neuropathies, such as Friedreich ataxia and Charcot-Marie-Tooth syndrome.
- Culture-positive postnatal infections associated with sensorineural hearing loss, including confirmed bacterial and viral (especially herpes viruses and varicella) meningitis.

9. How will the hospitals send their HL7 messages to the State?

For testing, Hospital will be connecting to the State's test server. This is where we will be testing and correcting the HL7 messages. We will work with hospitals on fine tuning their messages and the data transport.

We will be using SFTP with key authentication. SFTP, or secure FTP, is a program that uses SSH to transfer files. It requires a user to have a password. In our environment we are also requesting Public key authentication to make the process more secure.

Data transport should be tested after the message has been fine-tuned and approved by Neometrics as being valid. A valid message is defined as one that follows the mandatory fields set in the Technical Requirements Specification EDT Document (TRS). If you have all the required fields in your document and the data are correctly mapped as per the TRS, we can then continue on to testing the data transport. That is sending your HL7 message to the Test Environment.

Here are the steps:

a. We need your hospital Public IP, the one your SFTP client will be connecting from. We will then add this IP to our firewall to allow your IP to access the State's Test Server.
b. We will provide you with the IP and port to connect to:

   IP: 209.34.67.7

   Port: 2010

c. We will need a public key from each Hospital.. On your end you would generate a key pair, public/private keys. Once that is done, you will send us the Public Key. We will supply you with the User ID and Password for the SFTP server. Once you login via the User ID and Password, the server will authenticate against your key using the public key. In the Setup process, the first time that you are logging in, you will have to specify the location of that private key for your SFTP client.

If you successfully login, you should be able to view the folder and upload your file.

Please see the diagram below for more details:

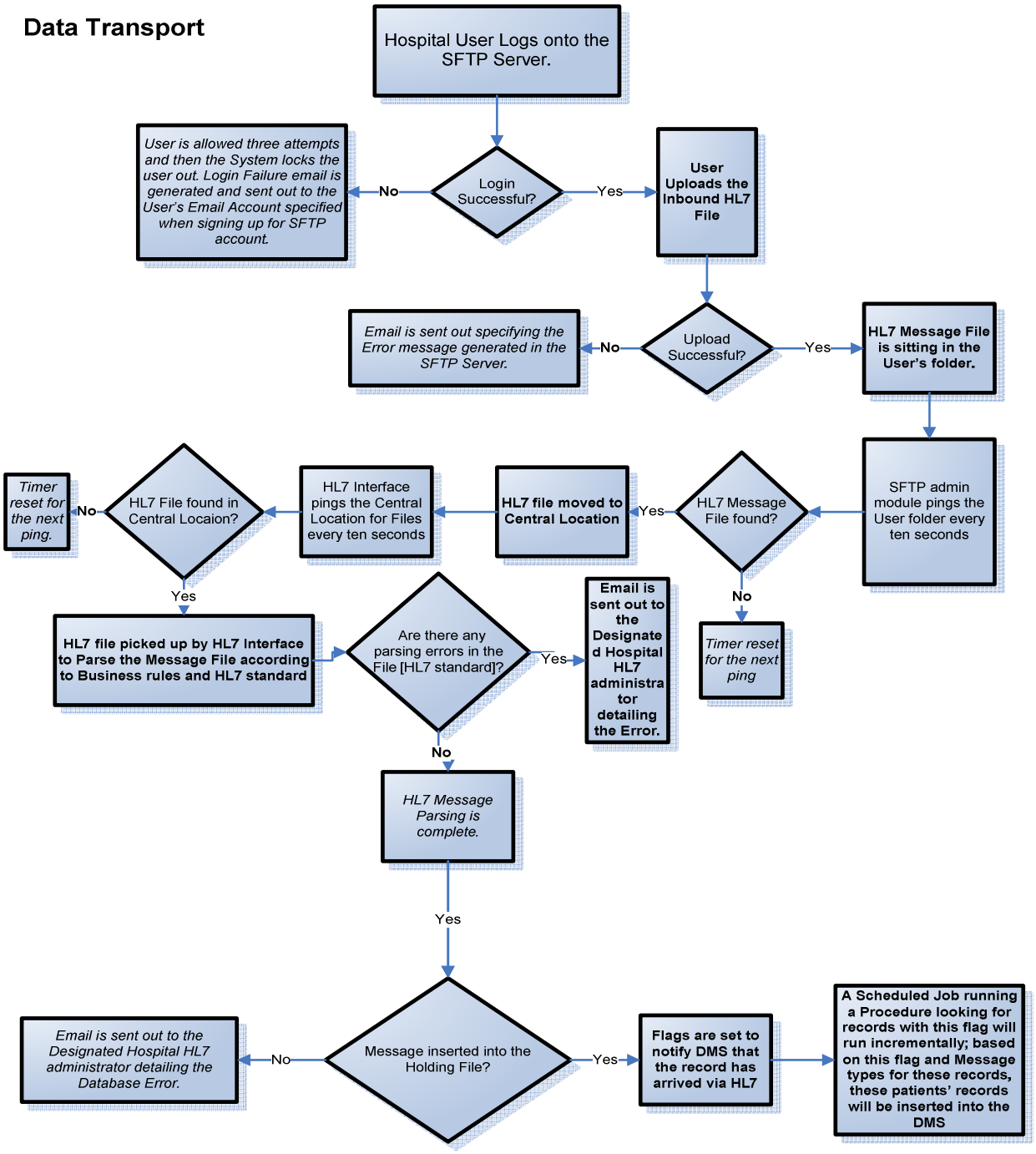


Figure 13 -- HL7 Data Transport System Architecture – Inbound Messaging

10. DMS HL7 Interface

The HL7 Interface will be configured to receive messages from a static IP address to a Secure FTP service. The HIS must be configured to send HL7 messages to the DMS HL7 interface.

A high level diagram of the Interface process is shown in Figure 2. The Interface process extracts data from the HL7 ADT or ORU message segment. The extracted data is then placed in a temporary table for use by applications at the State.

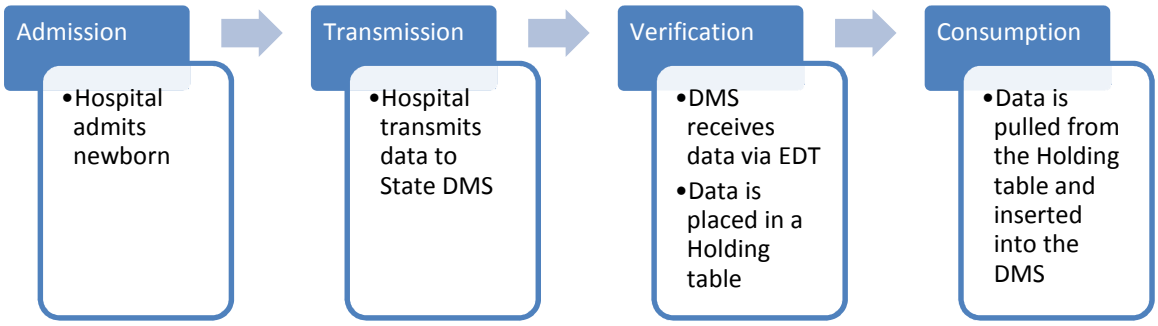


Figure 14 -- High level diagram of inbound messages to DMS

10.1. HL7 Message Grammar

The HL7 interface accepts ORU and ADT messages using the following formats.

10.1. ORU Message Grammar

Segment	Description	Required?	Repeat?
MSH	**Message Header**	**Yes**	**No**
PID	**Patient Identification**	**Yes**	**No**
NK1	**Next of Kin**	**No**	**Yes**
PV1	**Patient Visit**	**No**	**No**
ORC	**Order Details**	**No**	**No**
OBR	**Observation Request**	**Yes**	**Yes**
OBX	**Observation Result**	**Yes**	**Yes**
ZCA	**Custom Hearing Fields**	**No**	**No**

10.2. ADT Message Grammar [A01, A08]

Segment	Description	Required?	Repeat?
MSH	**Message Header**	**Yes**	**No**
EVN	**Event Code**	**No**	**No**
PID	**Patient Identification**	**Yes**	**No**
NK1	**Next of Kin**	**No**	**Yes**
PV1	**Patient Visit**	**No**	**No**

Segment	Description	Required?	Repeat?
OBX	**Observation Result**	**No**	**Yes**
ZCA	**Custom Hearing Fields**	**No**	**No**

10.2. Explanation of the Use of the OBX segment in the Newborn Hearing Screening HL7 Message

- To be used for Data Elements that have no place in the HL7 standard Segments, like Gestational Age or Birth Weight
- Hearing Screening Results Data

10.2.1. OBX-3: List of Identifiers

OBX Identifiers are a list of Identifiers that can be sent via repeating OBX segments. They contain Demographic information for the Legal Guardian, the Baby and the Mother that is not covered in Standard HL7 Segments [i.e. Gestation Age, Acuity, etc]. It is information that you can choose to send via the NK1 or custom California Newborn Hearing Segment, ZCA. But if you don't want to put a new segment together, the ZCA, then you can choose to use repeating OBX segments.

Table 10 - OBX Identifiers

OBX Identifier	Field Length	Valid Values	Description
INSURANCETYPE	1	1. Medi-Cal 2. Healthy Families 3. HMO 4. Private 5. Not Insured 6. Unknown	Type of Insurance
ACUITY	1	1. WBN 2. NICU	Acuity of the Newborn
GESTAGE	2		Gestational Age in weeks
MOTHEREMAIL	50		Email Address of the Newborn's Mother
MOTHERCELL	10	i.e. 5559991111	Cell Phone for the Newborn's Mother

OBX Identifier	Field Length	Valid Values	Description
MOTHERLEGALGUARDFLAG		1. YES 2. NO	Legal Guardian Indicator
LGEMAIL	50		Legal email address for legal guardian
LGCELL	10	i.e. 5559991111	Cell Phone Number for legal guardian
SCREEN_TYPE	5	00201 (Inpatient) 00202 (Outpatient)	Type of screen performed (Inpatient or Outpatient)
RESULT_RIGHT_EAR	1	0. Missed 1. Pass 2. Refer 3. No Show 4. Rescheduled 5. Cancel 6. Refused 7. > 6 months 8. NMI 9. Expired A. Previously Passed	Result for the right ear
RESULT_LEFT_EAR	1	0. Missed 1. Pass 2. Refer 3. No Show 4. Rescheduled 5. Cancel 6. Refused 7. > 6 months 8. NMI 9. Expired A. Previously Passed	Result for the left ear
METHOD_RIGHT	1	1. ABR	Right ear screening method

OBX Identifier	Field Length	Valid Values	Description
		2. OAE 3. N/A	
METHOD_LEFT	1	1. ABR 2. OAE 3. N/A	Left ear screening method
MALFORM_RIGHT	1	1. Atresia 2. Microtia 3. Both 4. None	Inpatient Right Ear Malformation
MALFORM_LEFT	1	1. Atresia 2. Microtia 3. Both 4. None	Inpatient Left Ear Malformation
BABYUNIT	50		The nursery in the Hospital where baby is currently located
BABYNONNU	50		Non-Nursery Unit for the baby
RISKFACTOR01	1	1. YES 2. NO 3. NOT ENTERED	Caregiver concern regarding hearing, speech, language, or developmental delay.
RISKFACTOR02	1	1. YES 2. NO 3. NOT ENTERED	Family history of permanent childhood hearing loss.
RISKFACTOR03	1	1. YES 2. NO 3. NOT ENTERED	Neonatal intensive care of more than 5 days or any of the following regardless of length of stay: ECMO, assisted ventilation, exposure to ototoxic medications (Gentamicin and tobramycin) or loop diuretics (furosemide/Lasix), and

OBX Identifier	Field Length	Valid Values	Description
			hyperbilirubinemia that requires exchange transfusion.
RISKFACTOR04	1	1. YES 2. NO 3. NOT ENTERED	In utero infections, such as CMV, herpes, rubella, syphilis, and toxoplasmosis.
RISKFACTOR05	1	1. YES 2. NO 4. NOT ENTERED	Craniofacial anomalies, including those that involve the pinna, ear canal, ear tags, ear pits, and temporal bone anomalies.
RISKFACTOR06	1	1. YES 2. NO 3. NOT ENTERED	Physical findings, such as white forelock, that are associated with a syndrome known to include a sensorineural or permanent conductive hearing loss.
RISKFACTOR07	1	1. YES 2. NO 3. NOT ENTERED	Syndromes associated with hearing loss or progressive or late-onset hearing loss, such as neurofibromatosis, osteopetrosis and Usher syndrome; other frequently identified syndromes include Waardenburg, Alport, Pendred, and Jervell and Lange-Nielson.
RISKFACTOR08	1	1. YES 2. NO 3. NOT ENTERED	Neurodegenerative disorders, such as Hunter syndrome, or sensory motor neuropathies, such as Friedreich ataxia and Charcot-Marie-Tooth syndrome.
RISKFACTOR09	1	1. YES 2. NO 3. NOT ENTERED	Culture-positive postnatal infections associated with sensorineural hearing loss, including confirmed bacterial and viral (especially herpes viruses and varicella)

OBX Identifier	Field Length	Valid Values	Description
			meningitis.
BIRTHHOSPITALNPI	10		

10.3. HL7 Message Examples

10.3.1. Sample ADT Message using an OBX segment for Demographic Data

Here is an example of an ADT message that uses an OBX segment to send demographic information:

MSH|^~\&|MEDITECH|IP0041|CAHEAR|CAHEAR|20100407115308||ADT^A01|Q5555999910001|P|2.5
EVN||201101011235||||||||
PID|1||778899^^^PHK||NATUSBABYTWO^GIRL|MAMA NATUSBABYTWO|201003011400|2|NEOMETRICSTWO^BABY|2|1001MINERALWELLST^^LOSANGELES^CA^90210^1^^^06039^|06039|212-632-3912|212-333-6666|2|||1200543404^^^K0^FIN_NBR||||1|IP0041||0|||||
NK1|1|JEFFERSON^MIRANDA|2|123 MAIN LANE^^LOS ANGELES^CA^90210^1^^^06039|^^PH^TEST@NATUS.COM^^216^5551234^~^^CP^^^512^5557894^|512-545-3215|0|
PV1|||I||||||||||
OBX|1||INSURANCETYPE||3||||||F
ZCA|1^1^NNU-NORTH6|32||||||2^2^2^2^2^3^2^2^2^2|IP0006||

10.3.2. Sample ORU message

MSH|^~\&|MEDITECH|IP0022|CAHEAR|CAHEAR|201004071153
08||ORU^R01|Q5555999910001|P|2.5
PID|1||23452345||NATUSBABY^GIRL|MAMA
NATUSBABY|201003011400|2|NEOMETRICS^BABY|2|1001
MINERAL WELLS ST^^LOS
ANGELES^CA^90210^1^^^06039^|06039|212-632-3912|212-333-
6666|2|||1200543404^^^K0^FIN_NBR||||1|||1|||||
NK1|1|THOMAS^JACK|3|123 AVELYN LANE^^LOS
ANGELES^CA^90210^US^^06039|212-555-1234|212-545-
3214||||||||||||||2||||
OBR|1|||54111-0^Newborn Hearing Loss
Panel|||20100419125701||||||20100418111021||IP0006|||||||||F|||||||||BOB||
||||
OBX|1|ST|RESULT_LEFT_EAR|1|3||||||F|
OBX|2|ST|RESULT_RIGHT_EAR|1|3||||||F|
OBX|3|ST|SCREEN_TYPE|1|00201||||||F|
OBX|4|ST|METHOD_RIGHT|1|1||||||F|
OBX|5|ST|METHOD_LEFT|1|1||||||F|
OBX|6|ST|MALFORM_RIGHT|1|4||||||F|
OBX|7|ST|MALFORM_LEFT|1|4||||||F|
OBR|2|||54111-0^Newborn Hearing Loss
Panel|||20100418123201||||||20100416111028||IP0006|||||||||F|||||||||STEV
E||||||
OBX|1|ST|RESULT_LEFT_EAR|2|1||||||F|
OBX|2|ST|RESULT_RIGHT_EAR|2|1||||||F|
OBX|3|ST|SCREEN_TYPE|2|00202||||||F|
OBX|4|ST|METHOD_RIGHT|2|2||||||F|
OBX|5|ST|METHOD_LEFT|2|2||||||F|
OBX|6|ST|MALFORM_RIGHT|2|4||||||F|
OBX|7|ST|MALFORM_LEFT|2|4||||||C|
ZCA|1^1^NNU-
NORTH6|32|MAMANATUSBABY@AOL.COM|212-777-
8888|1|TESTER@AOL.COM|(516)-271-
1475|2^2^2^2^2^2^2^2^2|IP0022|2|IP0022

10.3.3. Sample ADT message

MSH|^~\&|MEDITECH|IP0006|CAHEAR|CAHEAR|20100407115308||ADT^A01|Q5555999910001|P|2.5
EVN||201012011239|||||
PID|1||480956^^^PHK||NATUSBABY^GIRL|MAMA NATUSBABY|201003011400|2|NEOMETRICS^BABY|2|1001 MINERAL WELLS ST^^LOS ANGELES^CA^90210^1^^^06039^|06039|212-632-3912|212-333-6666|2|||1200543404^^^K0^FIN_NBR||||1|||0|||||
NK1|1|THOMAS^JACK|3|123 AVELYN LANE^^LOS ANGELES^CA^90210^US^^06039|212-555-1234|212-545-3214||||||||||||||2||||
PV1|||I||||||||
ZCA|1^1^NNU-NORTH6|32|MAMANATUSBABY@AOL.COM|212-777-8888|1|TESTER@AOL.COM|(516)-271-1475|2^2^2^2^2^2^2^2^2|IP0006|2|IP0006

10.4. HL7 Message Mapping for Newborn Hearing Screening Message from Hospitals to DHCS

10.4.1. MSH – Message Header Mapping

Data from the message header are used to identify the sender of the message and the message type being processed as well as logging a Unique Messaging ID.

[Seg = Segment; Seq = Sequence/Position; Len = Allowable Character Length; OPT = Optionality (Is it required or not); DT = Data Type]

Table 11 - Message Header Mapping

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
MSH	1	1	R	**R**	ST	VARCHAR(255)	**Field Separator**		"|"	Field Separator
MSH	2	4	R	**R**	ST	VARCHAR(255)	**Encoding Characters**		"^ ~ \ &"	Encoding Characters
MSH	3	227	O	O	HD	VARCHAR(255)	**Sending Application**	Sending Application	"EPIC"	
MSH	4	227	O	**R**	HD	VARCHAR(10)	**Sending Facility**	SUBMID	"IP0006"	This is an Internal CA DHCS Hospital Submitter ID# that has been assigned to every hospital in CA that will be submitting Hearing Screening Results and Baby Demographics. A translation table will be provided to groups. Individual hospitals will be provided their unique submitter id #.
MSH	5	227	O	O	HD		Receiving Application		"CAHEAR"	
MSH	6	227	O	O	HD		Receiving Facility		"CAHEAR"	
MSH	7	24	R	**R**	DTM	DATETIME	**Date/time of Message**	Message Date Time	"20110203091446"	YYYY[MM[DD[HH[mm[SS]]]]]
MSH	8	40	O	O	ST		Security			
MSH	9	15	R	**R**	MSG					
MSH	9.1	15	R	**R**	ID		**Message Code**		"ADT"	
MSH	9.2	15	R	**R**	ID	VARCHAR(255)	**Trigger Event**	Message Type	"A01"	

MSH	10	199	R	**R**	ST	VARCHAR(255)	**Message Control ID**	Message ID	"123456789ABCD"	Needs to be a Unique Value each time sent by the Sending Facility
MSH	11	3	R	**R**	PT	VARCHAR(255)	**Processing ID**	Processing Mode	"T"	
MSH	12	60	R	**R**	VID	VARCHAR(255)	**Version ID**	Version_ID	"2.6"	

Sending Facility – This field has the identity of the sending facility, this matches the Submitting Hospital ID. The state program uses this value to associate data in the message to the submitter of the data. This will be a unique value assigned to each hospital. Please contact the HL7 Interface Administrator for your Hospital ID.

Date/Time of Message – This field is used to record the date and time a message is received.

Message Type – This field is used to determine the type of message that is being sent to the state program. As described in Table 2, the message types supported by the interface are: ADT^A01, ADT^A08 and ORU^R01.

Message Control ID – This field contains an identifier that uniquely identifies the message for the sending facility.

Processing ID – This field specifies the mode that this data is being applied. Valid values are:

Table 12 - Processing ID

Value	Description
P	Production
D	Debugging
T	Training

Version ID – This field contains the HL7 version ID used by the Submitting facility; which is used to match vocabulary for the incoming message. The value sent will be 2.x ("x" will vary based on the version used by the Submitter).

10.4.2. EVN – Event Type Segment Mapping

As per the HL7 standard, "The EVN segment is used to communicate necessary trigger event information to receiving applications." The Segment is listed here because it is a required HL7 segment.

Table 13 - Event Type Mapping

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
EVN	1	3	O	O	ID	VARCHAR(50)	Event Type Code	EVENTTYPECODE	"A01"	
EVN	2	26	**R**	R	TS	DATETIME	**Recorded Date/Time**	RECORDEDDATETIME	"20110203091446"	YYYY[MM[DD[HH[mm[SS]]]]].
EVN	3	26	O	O	TS	DATETIME	Date/Time Planned Event	DATETIMEPLANNEDEVENT	"20110203091446"	YYYY[MM[DD[HH[mm[SS]]]]]
EVN	*4*	*3*	*O*							
EVN	5	250	O	O	XCN	VARCHAR(50)	Operator ID	OPERATORID	"DAN"	
EVN	*6*	*26*	*O*							
EVN	*7*	*241*	*O*							

Event Type Code – Same as MSH-9 Message Type.

Recorded Date/Time – This could be the system date/time this message was sent or triggered in the Hospital HIS.

Date/Time Planned Event – This field contains the date/time that the event is planned.

Operator ID - This field identifies the individual responsible for triggering the event.

10.4.3. PID – Patient Identification Mapping

This segment is used to Transmit Patient Demographics in the HL7 message.

Table 14 - Patient Identification Mapping

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
PID	1	4	O	O	SI	VARCHAR(255)	Set ID		"1"	
PID	*2*	*20*	*O*	*O*	*CX*	*VARCHAR(255)*	*Patient ID*			
PID	3	250	R	R	CX		**Patient Identifier List**			
PID	3.1	250	R	R	ST	VARCHAR(17)	**ID Number**	MEDRECNO	"123456789ABCD"	
PID	4	20	O	O	ST		Alternate Patient ID			
PID	5	250	R	R	XPN		**Patient Name**			
PID	5.1	250	R	R	FN	VARCHAR(35)	**Family Name**	LNAME	"Smith"	
PID	5.2	250	R	R	ST	VARCHAR(20)	**Given Name**	FNAME	"Baby A"	
PID	6	250	O	O	XPN		Mother's Maiden Name			
PID	6.1	250	R	R	FN	VARCHAR(35)	**Family Name**	MLNAME	"Smith"	
PID	6.2	250	R	R	ST	VARCHAR(20)	**Given Name**	MFNAME	"MommyFirst"	
PID	7	24	O	R	DTM					
PID	7.1	24	O	R	DTM	DATETIME	**Date /Time of Birth**	BIRTHDT/BIRTHTM	"20110203091446"	YYYY[MM[DD[HH[mm[SS]]]]]: Value for Birth Date will be based on

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
										the first 8 digits, 02/03/2011, the Birth Time will be based on [HH[mm]], 0914.
PID	8	1	O	R	IS	CHAR (1 Byte)	**Administrative Sex**	GENDER	"1"	Only Numerical Values will be accepted here. Refer to the User defined Tables for Values in the Document.
PID	9	250	O	O	XPN		Patient Alias			
PID	9.1	250	O	O	FN	VARCHAR(35)	Family Name	AKA Last Name	"SMITHY"	
PID	9.2	250	O	O	ST	VARCHAR(25)	Given Name	AKA First Name	"ALLEN"	
PID	*10*	*705*	*O*	*O*	*CWE*		*Race*			
PID	11	250	O	O	XAD		Patient Address			
PID	11.1	250	O	O	SAD	VARCHAR(5)	Street Address	STREET	"20 MAIN STREET"	WE ARE CONCATENATING THESE TWO FIELDS

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
PID	11.2	250	O	O	ST		Other Designation	MSTREET	"APT#19A"	WHEN SAVING: SO IN THE DATABASE IT WOULD BE SAVED AS "20 MAIN STREET (APT#19A)"
PID	11.3	250	O	O	ST	VARCHAR(50)	City	MCITY	"LOS ANGELES"	
PID	11.4	250	O	O	ST	CHAR(2)	State or Province	MSTATE	"CA"	
PID	11.5	250	O	O	ST	VARCHAR(5)	Zip or Postal Code	MZIPCODE	"90210"	
PID	11.6	250	O	O	ST	VARCHAR(50)	Country	MCOUNTRY	"1"	
PID	11.9	250	O	O	IS	VARCHAR(5)	County/Parish Code	MCOUNTY	"06039"	Mother's Residence County
PID	12	4	O	O	IS	VARCHAR(5)	County Code	BIRTHCOUNTY	"06039"	This is the Baby's Birth County, the county he was born in. This is the County that the Birth Hospital is in.
PID	13	250	O	O	XTN		Phone Number - Home			
PID	13.1	250	O	O	ST	VARCHAR(14)	Telephone Number AreaCode	MPHONEAREA	"212"	

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
PID	13.2	250	O	O	ST	VARCHAR(14)	Telephone Number	MPHONE	"555-1234"	
PID	14	250	O	O	XTN		Phone Number - Business			
PID	14.1	250	O	O	ST	VARCHAR(14)	Telephone Number AreaCode	MWORKAREA	"212"	
PID	14.2	250	O	O	ST	VARCHAR(14)	Telephone Number	MWORK	"555-1234"	
PID	15	705	O	O	CE		Primary Language			
PID	15.1	705	O	O	ST	CHAR(1)	Identifier	MPRIMARY LANGUAGE	"2"	
PID	*16*	*705*	*O*	*O*	*CE*		*Marital Status*			*These fields will be Ignored.*
PID	*17*	*705*	*O*	*O*	*CE*		*Religion*			*These fields will be Ignored.*
PID	*19*	*16*	*O*	*O*	*ST*		*SSN Number - Patient*			*These fields will be Ignored.*
PID	*18*	*250*	*O*	*O*	*CX*		*Patient Account Number*			*These fields will be Ignored.*

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
PID	*19*	*16*	*O*	*O*	*ST*		*SSN Number - Patient*			*These fields will be Ignored.*
PID	*20*	*25*	*O*	*O*	*DLN*		*Driver's License Number - Patient*			*These fields will be Ignored.*
PID	*21*	*250*	*O*	*O*	*CX*		*Mother's Identifier*			*These fields will be Ignored.*
PID	22	705	O	O	CE	CHAR(1)	Ethnic Group	ETHNICITY	“1”	
PID	23	250	O	O	ST	VARCHAR(30)	Birth Place	BIRTHHOSPITAL	"IP0006"	Instead of sending this value in ZCA segment, You can choose to send it here. Will only be R to send once. You can also send this value in an OBX segment using OBX Identifiers.
PID	*24*	*1*	*O*	*O*	*ID*		*Multiple Birth Indicator*			*These fields will be Ignored.*
PID	25	2	O	O	NM	CHAR(1)	Birth Order	TWIN	"1"	Only Numerical Values will be accepted here. Refer to the User defined Tables for Values in the Document.

Medical Record Number – This field contains the primary identifier used by the sending facility to identify a patient uniquely for a patient’s lifetime.

First Name – This field contains the legal first name of the newborn.

Last Name – This field contains the legal last name of the newborn.

Mother's First Name – This field contains the first name of the newborn's mother

Mother's Last Name – This field contains the last name of the newborn's mother

Birth Date/Birth Time – This field contains the birth date of the newborn and time of birth (time of birth is optional).

Gender – This field contains the newborn's gender. Valid values for this field are:

Table 15 - Gender

Value	Description
1	Male
2	Female
3	Unknown

AKA First Name – alternate first name for the newborn

AKA Last Name – alternate last name for the newborn

Street Address – This field contains the street address of the mother

City – This field contains the city of the mother

State – This field contains the state of the mother

Zip code – This field contains the zip code of the mother

Mother Country of Residence – Valid values are:

Table 16 - Country of Residence

Value	Description
1	US
2	Mexico
3	Other

Mother County of Residence – This is the county where the mother resides as per her address. FIPS (Federal Information Processing Standard) Codes are used for the County values. Refer to Table 17.

County of Birth – FIPS (Federal Information Processing Standard) Codes are used for the County values. Refer to Table 17.

Table 17 - County (FIPS) Codes

FIPS Value	County
06001	Alameda
06003	Alpine
06005	Amador
06007	Butte
06009	Calaveras
06011	Colusa
06013	Contra Costa
06015	Del Norte
06017	El Dorado
06019	Fresno
06021	Glenn
06023	Humboldt
06025	Imperial
06027	Inyo
06029	Kern
06031	Kings
06033	Lake
06035	Lassen
06037	Los Angeles
06039	Madera
06041	Marin
06043	Mariposa
06045	Mendocino
06047	Merced
06049	Modoc
06051	Mono
06053	Monterey
06055	Napa
06057	Nevada
06059	Orange
06061	Placer
06063	Plumas
06065	Riverside
06067	Sacramento
06069	San Benito
06071	San Bernardino
06073	San Diego
06075	San Francisco
06077	San Joaquin
06079	San Luis Obispo

FIPS Value	County
06081	San Mateo
06083	Santa Barbara
06085	Santa Clara
06087	Santa Cruz
06089	Shasta
06091	Sierra
06093	Siskiyou
06095	Solano
06097	Sonoma
06099	Stanislaus
06101	Sutter
06103	Tehama
06105	Trinity
06107	Tulare
06109	Tuolumne
06111	Ventura
06113	Yolo
06115	Yuba
59599	OUT OF STATE
99999	OUT OF COUNTRY

Home Phone – This field contains the home phone number of the mother

Work Phone – This field contains the business phone number of the mother.

Primary Language – This field contains the primary language of the mother. Valid values for this field:

Table 16: Language

Value	Description
2	English
3	Spanish
4	Cambodian
5	Chinese
6	Farsi
7	Hmong
8	Korean
9	Laotian

Value	Description
A	Russian
B	Vietnamese
Z	Other

Ethnicity – This field contains the ethnicity of the newborn. Valid values for this field:

Table 17: Ethnicity

Value	Description
1	Hispanic
2	American Indian
3	Asian
4	Black
5	Pacific Islander
6	White
7	Other
8	Unknown
9	Two or more races
A	Refused to answer

Birth Place – The location of the baby's birth; i.e. "IP0006". Not looking for the actual name, but the DHCS hospital ID assigned to each one.

Birth Order – The field contains the Birth Order information for the newborn. Valid values for this field:

Table 18: Multiple Birth Order

Value	Description
0	Not a multiple
1	First Multiple
2	Second Multiple
3	Third Multiple
4	Fourth Multiple
5	Fifth Multiple
6	Sixth Multiple

Value	Description
7	Seventh Multiple
8	Eighth Multiple

10.4.4. NK1 – Next of Kin Mapping

[Note: Required fields within are segment are only required if the segment is sent. If NK1 is sent, you must then send the required fields for that segment to be valid.]

The NK1 Segment holds the next of kin information for newborn. The Next of Kin segment can be used to transmit data pertaining to the legal guardian or the baby's parents. This is a required segment ***if*** the mother is not the legal guardian. The state program interface makes use of the Relationship field to determine if the data are related to the legal guardian, mother or father. The following data need to be transmitted to the state program:

Table 19: Next of Kin Mapping

HL7 Seg	HL7 Seq	HL 7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
NK1	1	4	R	R	SI	CHAR(1)	Set ID	NK1SETID	"1"	
NK1	2	250	O		XPN		Name			
NK1	2.1	250	O	R	FN	VARCH AR(50)	Family Name	LGLASTNAME	"SMITH"	
NK1	2.2	250	O	R	ST	VARCH AR(50)	Given Name	LGFNAME	"JACK"	
NK1	3	250	O		CE		Relations hip			
NK1	3.1	250	O	R	ST	VARCH AR(50)	Identifier	RELATIONSHIP	"3"	
NK1	4	250	O		XAD		Address			
NK1	4.1	250	O	R	SAD	VARCH AR(50)	Street Address	LGSTREET	"123 Main Street "	Will saved as "123 Main Street

NK1	4.2	250	O	O	ST		Other Designation		"Suite#200"	(Suite#200)
NK1	4.3	250	O	R	ST	VARCHAR(50)	City	LGCITY	"LOS ANGELES"	
NK1	4.4	250	O	R	ST	VARCHAR(50)	State or Province	LGSTATE	"CA"	
NK1	4.5	250	O	R	ST	VARCHAR(50)	Zip or Postal Code	LGZIP	"90210"	
NK1	4.6	250	O	O	ID	VARCHAR(50)	Country	LGCOUNTRY	"1"	
NK1	*4.7*	*250*	*O*	*O*	*ID*		*Address Type*			
NK1	*4.8*	*250*	*O*	*O*	*ST*		*ST*			
NK1	4.9	250	O	R	IS	VARCHAR(50)	IS	LGCOUNTY	"06039"	
NK1	5	250	O	O	XTN		Phone Number			
NK1	5.1	250	O	O	ST	VARCHAR(50)	Telephone Number	TELEPHONENUMBER	"2126551234"	
NK1	5.2	250	O	O	ID	VARCHAR(50)	Telecommunication Use Code	TELEPHONEUSECODE	"PRN"	REFER TO HL7 TABLE 0201
NK1	5.3	250	O	O	ID	VARCHAR(50)	Telecommunication Equipment Code	TELECOMEQUIPTYPE	"PH"	REFER TO HL7 TABLE 0202
NK1	5.4	250	O	O	ST	VARCHAR(50)	Email Address	EMAILADDRESS	MMOUSE@MICKEYMOUSECLUB.COM	
NK1	5.5	250	O	O	NM	FLOAT	Country Code	COUNTRYCODE	-	LEAVE BLANK IF USA
NK1	5.6	250	O	O	NM	FLOAT	Area/City Code	AREACITYCODE	"212"	
NK1	5.7	250	O	O	NM	FLOAT	Local Number	LOCALNUMBER	"6551234"	
NK1	5.8	250	O	O	NM	FLOAT	Extension	EXTENSION	-	You can send this information if you want to but we won't be pushing it into the DMS.
NK1	*5.9*	*250*	*O*	*O*	*ST*	*VARCHAR(50)*	*Any Text*	*ANYTEXT*		
NK1	*5.10*	*250*	*O*	*O*	*ST*	*VARCHAR(50)*	*Extension Prefix*	*EXTENSIONPREFIX*		

NK1	*5.11*	*250*	*O*	*O*	*ST*	*VARCHAR(50)*	*Speed Dial Code*	*SPEEDDIALCODE*		
NK1	*5.12*	*250*	*O*	*O*	*ST*	*VARCHAR(50)*	*Unformatted Telephone Number*	*UNIFORMATPHONE*		

NK1	6	250	O	O	XTN		Business Phone Number			
PID	6.1	250	O	O	ST	VARCHAR(14)	Business Phone Number AreaCode	BPHONEAREA	"212"	
PID	6.2	250	O	O	ST	VARCHAR(14)	Business Phone Number	BPHONE	"555-1234"	
NK1	7	250	O	O	CE		Contact Role			
NK1	7	250	O	R	ST	CHAR(1)	Identifier	CONTACTROLE	"1"	Send a "1" if the demographic information in this segment was for a legal guardian. Send "0" otherwise.
NK1	20	250	O	O	CE		Primary Language			
NK1	20	250	O	O	ST	CHAR(1)	Identifier	PRIMARY_LANGUAGE	"2"	

Legal Guardian Last Name – This field contains the last name of the legal guardian

Legal Guardian First Name – This field contains the first name of the legal guardian

Next of Kin Relationship – This field is the indicator that identifies the relationship of the Next of Kin data being transmitted for the newborn. Valid values for this field:

Table 20: Next of Kin Relationship

Value	Description
2	Mother
3	Father
4	Aunt
5	Uncle
6	Grandparent
7	Sibling
8	Other
9	Other Relative
A	Adoptive Parent
B	Foster Parent
C	Cousin
D	Friend
E	Social Worker
F	Interpreter
G	Child Protective Services
H	Residential Healthcare Facility
I	None

Legal Guardian Street – This field contains the street address of the legal guardian

Legal Guardian City – This field contains the city of the legal guardian

Legal Guardian State – This field contains the state of the legal guardian

Legal Guardian Zip code – This field contains the zip code of the legal guardian.

Legal Guardian County – This field contains the county code of the legal guardian. FIPS (Federal Information Processing Standard) Codes are used for the County values. Refer to Table 17.

Legal Guardian Country – This field contains the country of the legal guardian. Refer to Table 16.

Legal Guardian Home Phone – This field contains the home phone number of the legal guardian.

Telecommunication Use Code – Please see the table below for valid values. The relevant values are in bold.

Table 21: Telecommunication use code

Value	Description
ASN	*Answering Service Number*
BPN	*Beeper Number*
EMR	*Emergency Number*
NET	*Network (Email) Address*
ORN	**Other Residence Number**
PRN	**Primary Residence Number**
VHN	*Vacation Home Number*
WPN	*Work Number*

Telecommunication Equipment Code – See the table below for valid values. The relevant values are in bold.

Table 22: Telecommunication equipment type

Value	Description
BP	Beeper
CP	**Cellular Phone**
FX	Fax
Internet	Internet address: use only if Telecommunication Use Code is NET
MD	Modem
PH	**Telephone**
TDD	**Telecommunications Device for the Deaf**
TTY	**Teletypewriter**
X.400	X.400 email address: use only if Telecommunication Use Code is NET

Email Address – Send the Legal Guardian email address here.

Area/City Code – Looking for only the area code here.

Local Number – i.e., “6514235”

Legal Guardian Business Phone – This field contains the business phone for the legal guardian

Legal Guardian Contact Role – Send a value of "1" if this is the legal guardian. If not, send "0".

Legal Guardian Primary Language – This field contains the primary language for the legal guardian. Refer to Table 18.

10.4.5. PV1 – Patient Visit Segment Mapping

Table 23 – PV1 Segment Mapping

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
PV1	*1*	*4*	*O*	*O*	*SI*	*varchar2 (50 Byte)*	*Set ID*	*SETID*		
PV1	2	1	R	R	IS	varchar2 (50 Byte)	Patient Class	Patient Type	"I"	
PV1	3	80	O	O	PL		Assigned Patient Location	Nursery Unit		
PV1	3	80	O	O	IS	Varchar2(1 Byte)	Point of Care	Unit	"1"	

Patient Class – See the User Defined Table from the HL7 standard. For our purposes, send "I". [Note: this is a required segment for HL7. Use the PV1-3 field here or in the ZCA to submit Newborn Unit information. If not sending Newborn Unit information here, this segment is not required.]

User-defined Table 0004 - Patient Class

Value	Description	Comment
E	Emergency	
I	Inpatient	
O	Outpatient	
P	Preadmit	
R	Recurring patient	
B	Obstetrics	
C	Commercial Account	
N	Not Applicable	
U	Unknown	

Assigned Patient Location – Nursery Unit for the baby.

Table 24 – Assigned Patient Location

Value	Description
1	NICU
2	PICU
3	Other

10.5. ORC – Common Order Segment Mapping

HL7 standard describes this segment as "used to transmit fields that are common to all orders."

Table 25 – ORC segment Mapping

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
ORC	1	2	R	R	ID	VARCHAR(255)	Order Control	ORDER_CONTROL	"NW"	See HL7 defined table in the V 2.5 Standard for Values.
ORC	2	427	O	O	EI	VARCHAR(255)	Placer Order Number	PLACER_ORDER_NUMBER	"ABCD123456789"	

ORC	3	427	O	O	EI	VARCHAR(255)	Filler Order Number	FILLER_ORDER_NUMBER	"ABCD123456789"	
ORC	4	22	O	O	EI	VARCHAR(255)	Placer Group Number	PLACER_GROUP_NUMBER	"ABCD123456789"	
ORC	5	2	O	O	ID	VARCHAR(255)	Order Status	ORDER_STATUS	"IP"	

Order Control - This field will define the function of the order being placed. Valid values for this field:

Table 26: Order Control Options

Value	Description
NW	New order
CA	Cancel order
XO	Order completed

Placer Order Number – This field contains the order number for the sending facility. This number will be sent back to the sending facility when the order is completed by the DHCS.

Filler Order Number – This number uniquely identifies the order for the receiving application.

Placer Group # – This field allows an order placing application to group sets of orders together and subsequently identify them.

Order Status – This field contains the status of the order that was placed with DHCS. The default value is IP

Table 27: Order Status Options

Value	Description

IP	In Progress

10.5.1. ZCA – Custom Segment – California State Newborn Hearing Screening Program

The following fields are requested by the Newborn Hearing Screening Program but are not yet captured by an existing HL7 Standard Segment. The HL7 Interface will be defining a custom 'Z' segment named ZCA.
This data can also be sent in an OBX segment. Please see section 10.2.1 in this document.

The ZCA Segment is defined as follows:

Table 28 – ZCA Custom Segment Mapping

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
ZCA	1	Custom	Custom	O	ST		Acuity			
ZCA	1.1	Custom	Custom	O	ST	CHAR(1)	Acuity	NICU	"1"	
ZCA	1.2	Custom	Custom	O	ST	VARCHAR(50)	Unit	UNIT	"1"	
ZCA	1.3	Custom	Custom	O	ST	VARCHAR(50)	NNU	SPCONTACT	"NNU-6 NORTH"	
ZCA	2	Custom	Custom	O	ST	CHAR(2)	Gestational Age	GESTATIONAL_AGE	"32"	
ZCA	3	Custom	Custom	O	ST	VARCHAR(50)	Mother Email	MEMAIL	ALEXISALLEN@AOL.COM	
ZCA	4	Custom	Custom	O	ST		Mother Cell Phone			

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
ZCA	4.1	Custom	Custom	O	ST	VARCHAR(14)	Mother Cell Phone Area Code	MCELLAREA	"212"	
ZCA	4.2	Custom	Custom	O	ST	VARCHAR(14)	Mother Cell Phone	MCELL	"555-1234"	
ZCA	5	Custom	Custom	O	ST	CHAR(1)	Mother Legal Guardian Flag	PGUARDIAN	"1"	
ZCA	6	Custom	Custom	O	ST	VARCHAR(50)	Legal Guardian Email	C_EMAIL	ALEXISALLEN@AOL.COM	
ZCA	7	Custom	Custom	O	ST		Legal Guardian Cell Phone			
ZCA	7.1	Custom	Custom	O	ST	VARCHAR(14)	Legal Guardian Cell Phone Area Code	CELLAREA	"212"	
ZCA	7.2	Custom	Custom	O	ST	VARCHAR(14)	Legal Guardian Cell Phone	CELL	"555-1234"	
ZCA	8	Custom	Custom	O	ST		Risk Factors			
ZCA	8.1	Custom	Custom	O	ST	CHAR(1)	RF 01	RF_VALUE	"1"	Caregiver concern regarding hearing, speech, language, or developmental delay.
ZCA	8.2	Custom	Custom	O	ST	CHAR(1)	RF 02	RF_VALUE	"1"	Family history of permanent childhood hearing loss.

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
ZCA	8.3	Custom	Custom	O	ST	CHAR(1)	RF 03	RF_VALUE	"1"	Neonatal intensive care of more than 5 days or any of the following regardless of length of stay: ECMO, assisted ventilation, exposure to ototoxic medications (Gentamicin and tobramycin) or loop diuretics (furosemide/Lasix), and hyperbilirubinemia that requires exchange transfusion.
ZCA	8.4	Custom	Custom	O	ST	CHAR(1)	RF 04	RF_VALUE	"1"	In utero infections, such as CMV, herpes, rubella, syphilis, and toxoplasmosis.
ZCA	8.5	Custom	Custom	O	ST	CHAR(1)	RF 05	RF_VALUE	"1"	Craniofacial anomalies, including those that involve the pinna, ear canal, ear tags, ear pits, and temporal bone anomalies.
ZCA	8.6	Custom	Custom	O	ST	CHAR(1)	RF 06	RF_VALUE	"1"	Physical findings, such as white forelock, that are associated with a syndrome known to include a sensorineural or permanent conductive hearing loss.

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
ZCA	8.7	Custom	Custom	O	ST	CHAR(1)	RF 07	RF_VALUE	"1"	Syndromes associated with hearing loss or progressive or late-onset hearing loss, such as neurofibromatosis, osteopetrosis, and Usher syndrome; other frequently identified syndromes include Waardenburg, Alport, Pendred, and Jervell and Lange-Nielson.
ZCA	8.8	Custom	Custom	O	ST	CHAR(1)	RF 08	RF_VALUE	"1"	Neurodegenerative disorders, such as Hunter syndrome, or sensory motor neuropathies, such as Friedreich ataxia and Charcot-Marie-Tooth syndrome.
ZCA	8.9	Custom	Custom	O	ST	CHAR(1)	RF 09	RF_VALUE	"1"	Culture-positive postnatal infections associated with sensorineural hearing loss, including confirmed bacterial and viral (especially herpes viruses and varicella) meningitis.
ZCA	9	Custom	Custom	O	ST	VARCHAR(10)	Submitter Information	SUBMID	"IP0006"	THIS SHOULD BE THE SAME VALUE AS THE ONE SENT IN MSH4.
ZCA	10	Custom	Custom	O	ST	CHAR(1)	Insurance Type	INSURANCE_TYPE	"2"	
ZCA	11	Custom	Custom	O	ST	VARCHAR(30)	Birth Hospital	BIRTHHOSPITAL	"IP0006"	THIS SAME VALUE CAN BE SENT VIA AN OBX OR BETTER YET, IN PID 23

Acuity – This field contains the acuity of the patient valid values are listed below:

Table 29 - Acuity

Value	Description
1	WBN
2	NICU

Unit – Baby's unit in the Hospital

Table 30 - Unit

Value	Description
1	NICU
2	PICU
3	Other

Non-Nursery Unit – If Other is selected in Unit, please send the exact location in this field.

Gestational Age – This field contains the number in weeks of the gestational period for this patient.

Mother's Email Address – This field contains the email address for the newborn's mother.

Mother's Cell Phone – This field contains the cell phone number for the newborn's mother

Mother's Legal Guardian Flag – This field contains an indicator that identifies the mother as the legal guardian. Valid Values are listed below:

Table 31 - Mother's Legal Guardian Flag

Value	Description
0	Mother is not the legal guardian
1	Mother is the legal guardian.

Legal Guardian Email Address - This field contains the email address of the legal guardian.

Legal Guardian Cell Phone Number - This field contains the cell phone number of the legal guardian.

Table 32 - Risk Factor

Value	Description
1	Yes
2	No
3	Not Entered

Risk Factor 01 - Caregiver concern regarding hearing, speech, language, or developmental delay.

Risk Factor 02 - Family history of permanent childhood hearing loss.

Risk Factor 03 - Neonatal intensive care of more than 5 days or any of the following regardless of length of stay: ECMO, assisted ventilation, exposure to ototoxic medications (Gentamicin and tobramycin) or loop diuretics (furosemide/Lasix), and hyperbilirubinemia that requires exchange transfusion.

Risk Factor 04 - In utero infections, such as CMV, herpes, rubella, syphilis, and toxoplasmosis.

Risk Factor 05 - Craniofacial anomalies, including those that involve the pinna, ear canal, ear tags, ear pits, and temporal bone anomalies.

Risk Factor 06 - Physical findings, such as white forelock, that are associated with a syndrome known to include a sensorineural or permanent conductive hearing loss.

Risk Factor 07 - Syndromes associated with hearing loss or progressive or late-onset hearing loss, such as neurofibromatosis, osteopetrosis, and Usher syndrome; other frequently identified syndromes include Waardenburg, Alport, Pendred, and Jervell and Lange-Nielson.

Risk Factor 08 - Neurodegenerative disorders, such as Hunter syndrome, or sensory motor neuropathies, such as Friedreich ataxia and Charcot-Marie-Tooth syndrome.

Risk Factor 09 - Culture-positive postnatal infections associated with sensorineural hearing loss, including confirmed bacterial and viral (especially herpes viruses and varicella) meningitis.

Submitter ID # – Submitting Hospital ID# -- an internal number in the DHCS number that will be provided to the hospitals.

Insurance Type – Patient Insurance type. Below is a table with valid values that should be sent.

Table 33 - Insurance Type

Value	Description
1	Medi-Cal

2	Healthy Families
3	HMO
4	Private
5	Not Insured
6	Unknown

Birth Hospital ID # – Birth Hospital ID number –Will be provided to the Hospitals. In rare cases the Birth Hospital will not be the same as Submitting Hospital, and the Birth Hospital ID will be different from the submitter ID. A list of all CA hospitals with their ID # will be provided to each hospital.

10.5.2. OBR – Observation Request segment to be Sent with ORU Result Messages

Used to send data about the observation details pertaining to the screening results that are being sent as part of this message**. This is a required segment when sending results.**

```
OBR|1|123456|654321|54111-0^Newborn Hearing Loss
Panel|||20100419125701||||||20100418111021||00001|||||||||F|||||||||BOB||||||
```

Table 34 - OBR Mapping

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
OBR	1	4	O	O	SI	VARCHAR(255)	Set ID	SETID		
OBR	2	427	O	O	EI	VARCHAR(255)	Placer Order Number	PLACERORDERNUMBER		
OBR	3	427	R	R	EI	VARCHAR(255)	Filler Order Number	FILLER_ORDER_NUMBER		
OBR	4	705	R	R	CWE		Universal Service Identifier			
OBR	4.1	705	R	R	ST	VARCHAR(255)	Identifier	Universal_Service_Idenitifier	54111-0	
OBR	4.2	705	R	R	ST	VARCHAR(255)	Text	Procedure_Name	Newborn Hearing Loss Panel	
OBR	5	2	O	O	ID	VARCHAR(255)	Priority			
OBR	6	24	O	O	DTM	VARCHAR(255)	Requested Date/Time			

OBR	7	24	R	R	DTM		Observation Date/Time			
OBR	7.1	24	O	R	DTM	DATETIME	Time	SCREENDATE	"20110203091446"	
OBR	14	26	O	R	TS		Specimen Received Date/Time			
OBR	14.1	26	O	R	DTM	DATETIME	Time	RCVD_DATE	"20110203091446"	
OBR	16	250	O	R	XCN		Ordering Provider			
OBR	16.1	250	O	R	ST	VARCHAR (50)	ID Number	SCRN_PROVIDERID	"IP0006"	
OBR	25	1	O	R	ID	VARCHAR (50)	Result Status	RESULT_STATUS	“F”	
OBR	34	200	O	R	NDL		Technician	SCREENER	“JamieS”	

Placer Order Number – Optional order number. Included for future compatibility.

Filler Order Number – This number uniquely identifies the order for the receiving application.

Universal Service Identifier - This field contains the ID generated by the Hospital to identify the requested observation test from the hospital.

Observation Date and Time – This field contains the date and time the hearing screen results are collected (YYYYMMDDHHMMSS).

Received Date and Time – Date/Time when the message is sent by the Hospital

Results Status - Mandatory status for the result. ‘F’ is the standard value.

Technician - Hospital entersfree text that identifies the screener that performed the screen in this field The data should be unique so that the hospital can always identify the screener at a later date.

10.5.3. OBX – Result Segments

Results are sent via repeating OBX segments. The main difference when sending demographics via this segment and when sending hearing screen results is the OBX4 field. For demographics data you don't need to use it. But it is essential that you use it when sending results. You will need to send the same value in the OBX4 field that you have in the associated OBR1 field. The number in the red below indicates the screening order, for example, "1" would be the initial screen, "2" the repeat screen, and so on. Here's an example to illustrate it.

```
OBR|1|||54111-0^Newborn Hearing Loss
Panel|||20100419125701||||||20100418111021||00001|||||||||||||||||BOB||||||
OBX|1|CE|RESULT_LEFT_EAR|1|3||||||F|
OBX|2|CE|RESULT_RIGHT_EAR|1|3||||||F|
OBX|3|CE|SCREEN_TYPE|1|00201||||||F|
OBX|4|CE|METHOD_RIGHT|1|1||||||F|
OBX|5|CE|METHOD_LEFT|1|1||||||F|
OBX|6|CE|MALFORM_RIGHT|1|NONE||||||F|
OBX|7|CE|MALFORM_LEFT|1|NONE||||||F|
```

In the above example, that result set is associated with the information contained in the OBR. The result set tells us what the results were for the Baby's hearing screen and the OBR gives us observation details on who the screener and the provider were and what date this screening was done and on which date was it sent to the State. See the table below for more detail. You should return to the OBX Identifiers list for valid values for OBX3 and OBX5 field.

Table 35 - OBX Mapping

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
OBX	1	4	O	O	SI	CHAR(1)	Set ID -- OBX			
OBX	2	2	O	O	ID	VARCHAR(50)	Value Type			
OBX	3	250	R	R	CE	VARCHAR(50)	Observation Identifier	VARIES	VARIES	See list of OBX Identifiers for details, Also the section on OBX segment
OBX	4	20	O	O	ST	VARCHAR(50)	Observation Sub-ID	VARIES	VARIES	

HL7 Seg	HL7 Seq	HL7 Len	HL7 OPT	DHCS OPT	HL7 DT	DHCS DT	HL7 Element Name	DHCS Element Name	Example Value	Notes
OBX	5	99999	O	O	VARIES	VARCHAR(50)	Observation Value	VARIES	VARIES	
OBX	11	1	R	R	ID	CHAR(1)	Observation Result Status	RESULT_STATUS	"F"	

Set ID -- The sequential number for the OBX segment

Value Type – The Data type for the variable.

Observation Identifier – Please see the OBX identifiers table in section 10.2.1listed earlier in this document for valid values.

Observation Value – Please follow the values listed earlier in section 10.2.1 in this document for the identifier used. There is strict checking on the values and wrong values will cause errors in parsing the message.

Observation result status – Mandatory status for the result. 'F' is the standard value.

10.6. Update Patients

For Update Patients, the message type needs to be ADT^A08 message type, Update Patient Information. A check would be performed in the DMS system to make sure this Patient record doesn't exist already based on the following fields:

1. Baby Last Name
2. Baby Alias
3. Baby Birth Date
4. Baby Gender
5. Baby First Name
6. Medical Record Number
7. Birth Hospital
8. Submitter ID # of the Submitting Facility [i.e. IP0006]

If no birth log record is found for this baby, we will not insert this record. We will wait for the Hospital of Birth to submit a birth log for this baby [System will wait for the ADT^A01 record]. Once that birth log record is in the DMS, the check, which will be made periodically, will pick the A08 record as an update, and then this Update Patient Record will update the birth log record.

Please see Figure 15 below for more details.

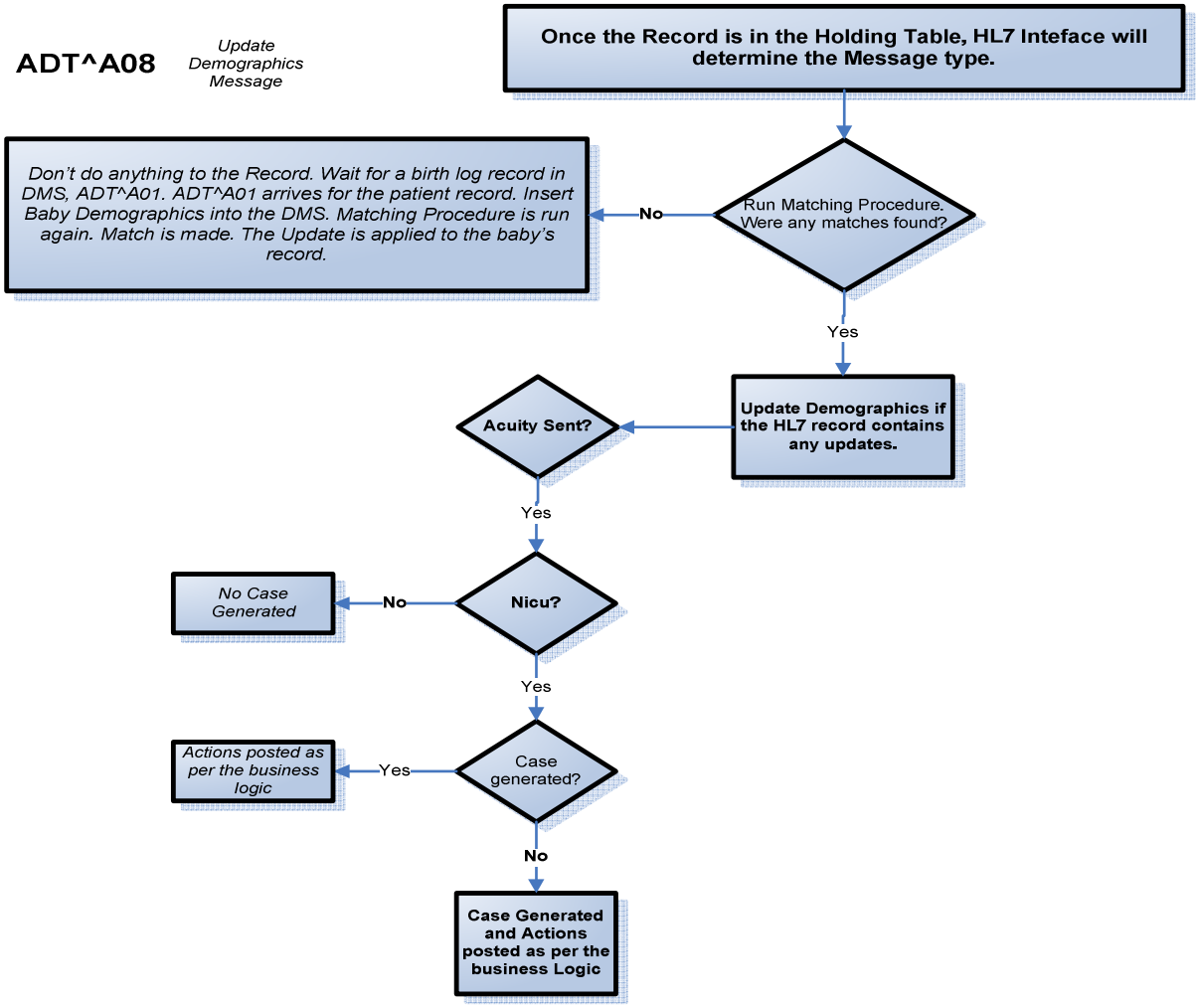


Figure 15 – Update Newborn via HL7 Update Demog Message

In order for A08 messages to be processed, a previous A01 from the same hospital for that patient record will be required.

10.7. Mandatory Inbound Fields

The following fields are mandatory. If they are not received, the state program interface will send an Email informing the Sending Facility HL7 Interface Administrator [designated by the Sending Facility].

Data will not be saved in the temporary table for processing in these cases.

- MSH:1 Field Separator
- MSH:2 Encoding Characters
- MSH:4 Sending Facility (DHCS Unique ID# that will be distributed to all Hospitals)
- MSH:7 Date/Time of Message
- MSH:9 Message Type
- MSH:10 Message Control ID
- MSH: 11 Processing ID
- MSH: 12 Version ID
- PID:3 Medical Record Number
- PID: 5 Patient last Name
- PID: 7 Baby Birth Date
- PID: 8 Gender
- PID: 5.2 Baby First Name
- PID: 23 Birth Hospital ID

10.8. Matching Conditions and Affiliation Rules [Applies to all Message Types]

There are two types of Matching that is done. One is done via the Remote Data Entry module on the DHCS website, for manual hospitals. The other matching is automated for Device Uploads and HL7 electronic data.

In the Electronic Data Upload module used by hospitals for Device Uploads on the DHCS website, once the file is uploaded with patient data, it is automatically checked for duplicates and exceptions. Duplicates refers to records that already exist in the DHCS DMS or records that have matches in the system. Exceptions are patient records that failed field validation rules like data type.

Once matching is performed, the user uploading the file is taken to a page with three grids.

Grid 1: **New Records**. No matches found. Or if a match was found, it was missing results data for that baby, which is being supplied via the file being uploaded now. Only applies

to File Uploads. For all new HL7 records, they will automatically be inserted into the DMS.

Grid 2: **Duplicate records**; meaning all infants sent via device upload **or** HL7 message where a matching demographic record is present in the DMS (see Note[1] below). Matches found are based on these criteria:

1. Primary match of Submitter ID and Medical Record Number, or

2. A secondary match is performed off of Baby Last Name or AKA, Baby DOB, Baby Gender, Baby First Name, Birth Hospital, or

3. A tertiary match is performed off of Baby Last Name or AKA, Baby DOB, and Baby Gender

Grid 3: **Exceptions**. Missing required fields, or User doesn't have access to these records because of rights.

Note [1]: HL7 records will be processed as follows:

- A01 with demographics only and no previous record in the DMS will automatically posted to the system.
- A01 with demographics and 1st set of results and no previous record in the DMS will automatically posted to the system.
- A01 with demographics and 1st set of results and existing record in the DMS will be posted to Grid 2.
- A08 or ORU without a previous A01 will automatically be posted to Grid 2 (regardless of whether it's the 1st or 2nd screen).
- A08 or ORU (where a previous A01 was sent) with demographics and 1ST set of results will automatically posted to the system.
- A08 or ORU (where a previous A01 was sent) with demographics and 2nd set of results from a screening that was performed on the same day will be posted to Grid 2.

HL7 records with bad patient data will not appear in Grid 3. They will be parsed via an HL7 parser engine that will send out error email messages based on the errors encountered in the file to HL7 administrators at the hospital that submitted them. These administrators need to be assigned by the hospital and should inform the DHCS vendor and supply the vendor with the email address at the hospital where the error emails will be sent.

At this time, all duplicates on these grids will need to be manually resolved by Hospital individuals familiar with the cases at their hospitals. This is a step before a case is generated for a baby with abnormal hearing results and it is important that the duplicates be resolved by an informed individual in the hospital Nursery or Newborn hearing screening program. The matching criteria has been set by the State and the Hearing Coordination Centers (HCCs). They want to make sure that no duplicate cases are generated for the same baby.

10.9. DHCS HL7 emails to Hospital Administrators

These are error emails that would be sent to the HL7 Hospital Administrator. These are only examples.

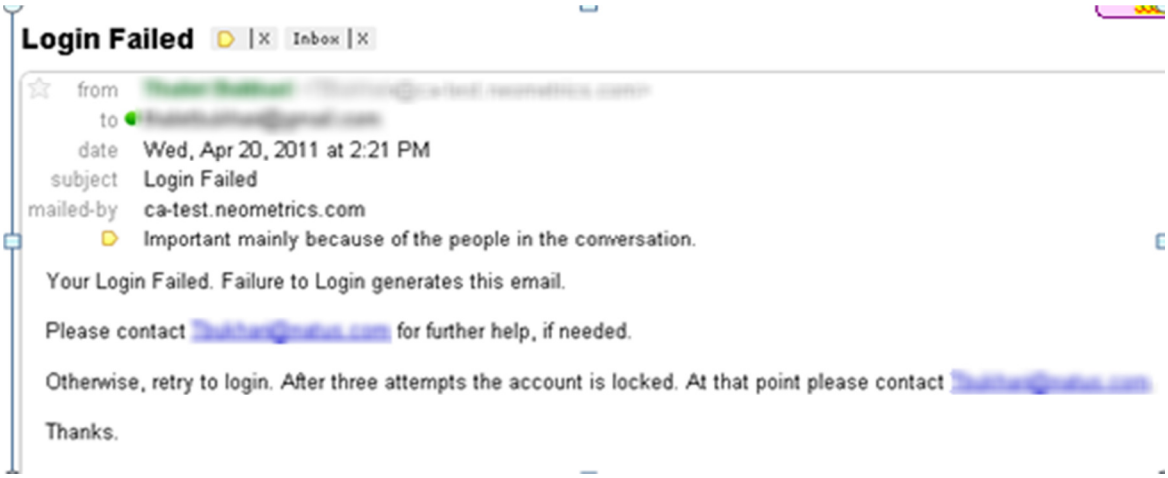
First are the SFTP emails followed by "error emails" sent for HL7 field validation rules. For example, if you send a value for an HL7 field that doesn't match the user defined values table for that field, an error email will be generated and sent out. The message will not be processed. It will have to be resent or a new message for the same patient data needs to be sent.

10.9.1. SFTP

1. Login Failed

   User failed to login because of an invalid password or public key or both.

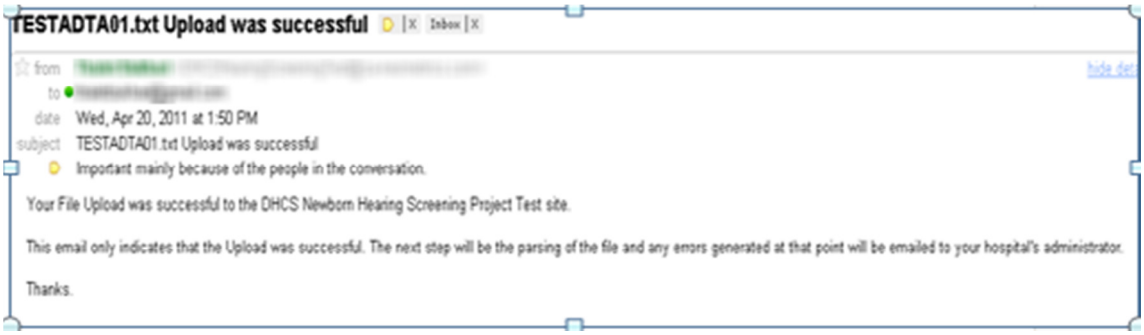
   Example:



2. Upload Successful

   File Upload was successful to the State's SFTP server. This doesn't imply that the files or batch of files uploaded was successfully parsed and entered into the State's Hearing Screening DMS.

   Example:



10.9.2. HL7 Interface

Field Validations

All fields with tables in the TRS are being validated for their values. Any fields that we have assigned values to are being validated.

Examples for each one of them is as follows.

1. PID 3: Medical Record Number

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID3: Medical Record Number missing. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-10767

2. PID 5: Baby Last Name

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID 5:Missing Baby Last Name. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-21839

3. PID 5: Baby First Name

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID 5:Missing Baby First Name. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-21839

4. PID 7: Baby Birth Date

Example A [Value sent was: 2010010109]

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID 7:Incorrectly formatted Birth Date. Correct Format(YYYYMMDD)OR (YYYYMMDDmmss). Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-33807

Example B [Value sent was 01012010]

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID 7:Invalid Birth Date. Correct Format(YYYYMMDD)OR (YYYYMMDDmmss). Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-56132

5. PID 8: Gender

Example A

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID 8: Missing Value for Gender. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-67226

Example B

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID 8: Gender not found. Value isn't valid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-78299

6. PID 11: Mother County

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID 11:Mother County not found. Value isn't valid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-89457

7. PID 12: Birth County

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID 12:Birth County not found. Value isn't valid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-89457

8. PID 15: Mother Primary Language

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID15: Mother Primary language not found. Value isn't valid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer

Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-100584

9. PID 22: Ethnicity

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID 22: Ethnicity not found. Value isn't valid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-111706

10. PID 23: Birth Hospital

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID 23: Birth Hospital ID is Invalid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-122901

11. PID 25: Birth Order

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PID 25: Birth Order not found. Value isn't valid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-134003

12. NK1 3: Relationship

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
NK1 3: Next of Kin Relationship not found. Value isn't valid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-145249

13. NK1 4: Next of Kin County [Validating County as part of the Address Sent]

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
NK1 4: Next of Kin County not found. Value isn't valid. Value isn't valid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-156436

14. PV1 3: Unit

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
PV1 1.3:Unit not found. Value isn't valid. Sent by Submitter 'IP0041', Message Control ID(MSH 10): Q5555999910001. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110421-174815

15. OBR 14: Date Received

Example A [i.e. Birthdate is 01012011. Value sent in this field is 01012010]

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBR 14:Invalid Date Received. Cannot be less than Birth Date. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:

http://CA-TEST:6543/log_browse?refid=20110422-270035

Example B

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBR 14:Invalid Date Received. Correct Format(YYYYMMDD)OR (YYYYMMDDmmss). Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-278469

Example C

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBR 14:Invalid Date Received. Cannot be greater than today's date. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-286872

Example D

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBR 14: Required Field Missing. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-295202

16. OBR 16: Ordering Provider

Example A

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event

OBR 16: Required Field Missing. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-303502

Example B [Value sent 'IP002'. Correct Value was 'IP0021']

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBR16: Ordering Provider not found. Value isn't valid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-311816

17. OBR 25: Result Status

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBR 25: Required Field Missing. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-320136

18. OBR 4: Universal Service Identifier/Procedure Code

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBR 4: Required Field Missing. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-336162

19. OBR 7: Screening Date

Example A

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBR 7:Invalid Screening Date. Cannot be less than Birth Date. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-344518

Example B

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBR 7:Invalid Screening Date. Correct Format(YYYYMMDD)OR (YYYYMMDDmmss). Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-352947

Example C

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBR 7:Invalid Screening Date. Cannot be greater than today's date. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-361345

Example D

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBR 7: Required Field Missing. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-369668

20. OBR 34: Screener Name

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBR 34: Screener Name. Required Field Missing. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-653920

21. OBX 1: Set ID

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBX 1: No value provided. If segment is sent, this is a required field. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics

Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-378056

22. OBX 3: OBX Identifiers

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBX3: Missing or Invalid OBX Identifier used. Please check the OBX_Identifiers list in TRS for correct values. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-386552

23. OBX 4: Field Used to Match Results to the Screen

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBX 4: No value sent. Required for ORU message types. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-395011

24. OBX 5: Screening Result and other values

Example A

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBX 5: No value sent. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-403400

Example B

Iguana Email Notification

Source: CAINBOUND

Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBX 5: Invalid Entry for result left ear. For Screening result sequence 1, Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-411779

Example C

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBX 5: Invalid Entry for result right ear. For Screening result sequence 1, Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-420212

Example D

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBX 5: Invalid Entry for screen type. For Screening result sequence 1, Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-428639

Example E

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBX 5: Invalid Entry for right ear method. For Screening result sequence 1, Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-437068

Example F

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBX 5: Invalid Entry for left ear method. For Screening result sequence 1, Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-445501

Example G

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBX 5: Invalid Entry for right ear malformation value. For Screening result sequence 1, Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-453947

Example H

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBX 5: Invalid Entry for right ear malformation value. For Screening result sequence 1, Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-472580

25. OBX 11: Result Status

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
OBX 11: No value sent. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email

CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-665194

26. ZCA 1: Acuity and Unit

Acuity

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
ZCA 1: Acuity not found. Value isn't valid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-497030

Unit

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
ZCA 1.2:Unit not found. Value isn't valid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-505451

27. ZCA 2: Gestational Age

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
ZCA 2: Gestational Age invalid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-529380

28. ZCA 3: Mother Email

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
ZCA 3:Invalid Entry for Mother Email. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-553521

29. ZCA 4: Mother Cell Phone

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
ZCA 4: Invalid Entry for Mother Cell Phone. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-561894

30. ZCA 5: Legal Guardian Flag

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
ZCA 5: Legal Guardian Flag is invalid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-570294

31. ZCA 6: Legal Guardian Email

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
ZCA 6: Invalid Entry for Legal Guardian Email. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-676475

32. ZCA 7: Legal Guardian Cell Phone

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
ZCA 7:Invalid Entry for Legal Guardian Cell Phone. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-587088

33. ZCA 8: Risk Factors [We will be validating on each one of the nine fields. Below is an example of one of them]

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
ZCA 8.5: Invalid entry for Risk Factors. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or

email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-595536

34. ZCA 9: Submitting Hospital ID

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
ZCA 9: Submitting Hospital ID not found. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-630612

35. ZCA 10: Insurance Type

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
ZCA 10: Insurance Type not found. Value isn't valid. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-613888

36. ZCA 11: Birth Hospital ID

Iguana Email Notification

Source: CAINBOUND
Log Type: Info

Logged message:

D:\CAHL7\CAINBOUND.vmd - Python output:

Interface Event
ZCA 11: Birth Hospital ID not found. Sent by Submitter 'IP0442', Message Control ID(MSH 10): Q5555999910303. Please Correct the Value and Resend Message. If need assistance, please contact Neometrics Customer Support at 1-800-645-3616 or email CHL7@natus.com. Please disregard the url address to view log entry at the bottom of this email. Thanks.

To view this log entry in Iguana's logs, go to:
http://CA-TEST:6543/log_browse?refid=20110422-622259

11. System Message Logging

The HL7 Interface will log all data received in database tables. All data received will be stored in SQL Server tables. All messages will be stored with a Unique Messaging ID (UMI) that can be used by HIS and staff to access a record of data received and transmitted via the HL7 interface.

The error log files are used to store messages related to unexpected error conditions encountered during execution of the ADT and ORU processes. Hospital, HCC, and State administrators will have access to these log files for periodic review with HIS or internal staff.

12. HL7 Concepts and Definitions

Messages – a **message** is the atomic unit of data transferred between systems. It is comprised of a group of segments in a defined sequence. Each message has a **message type** that defines its purpose. For example the ORU Message type is used to transmit portions of a patient's Patient Administration (ORU) data from one system to another. A three character code contained within each message identifies its type.

The real-world event that initiates an exchange of messages is called a trigger event. These codes represent values such as a live birth or an initial screen is performed. There is a one-to-many relationship between message types and trigger event codes. The same trigger event code may not be associated with more than one message type.

Segments – a segment is a logical grouping of data fields. Segments of a message may be required or optional. They may occur only once in a message or they may be allowed to repeat. Each segment is given a name. For example, the ORU message may contain the following segments: Message Header (MSH), and Patient ID (PID). Each segment is identified by a unique three-character code known as the Segment ID.

Fields – a field is a string of characters. HL7 does not discriminate how systems actually store data within an application. When fields are transmitted, they are sent as character strings. Except where noted, HL7 data fields may take on the null value. Sending the null value, which is transmitted as two double quote marks ("), is different from omitting an optional data field. The difference appears when the contents of a message will be used to update a record in a database rather than create a new one. If no value is sent, (i.e., it is omitted) the old value should remain unchanged. If the null value is sent, the old value should be changed to null.

Position (sequence within the segment) – This is the ordinal position of the data field within the segment. This number is used to refer to the data field in the text comments that follow the segment definition table. In the segment attribute tables this information is in a column labelled SEQ.

13. Screening Device Data File Upload

13.1. Hospital Requirements

Most hearing screening devices can export screening results. The DMS interface currently supports the HiTrack or Algo5 XML formats. The Hospital IT staff is required to provide support to hospital staff to ensure that the file is available for import. The following tasks may be required to be performed in order for hospitals to upload data export files from hearing screening devices:

- Network Support for screening devices – Screening devices may need to be added to the hospital network so that exported files can be uploaded to the DMS
- Support for thumb drives ("sneaker net") – Devices that cannot be networked may use other media to copy data files from the device to the hospital network.
- Browser access to the hospital network or external media – DMS system runs in a web browser. Data upload requires that the upload module must have access to the exported data file, either on the hospital network or external media.

Once the exported data file is located in a location that can be accessed by the system, the DMS will upload the file securely to the state servers. Once the file is uploaded hospital users use the DMS to associate the device data to the newborn demographics that already exist in the system. A basic flow diagram follows:

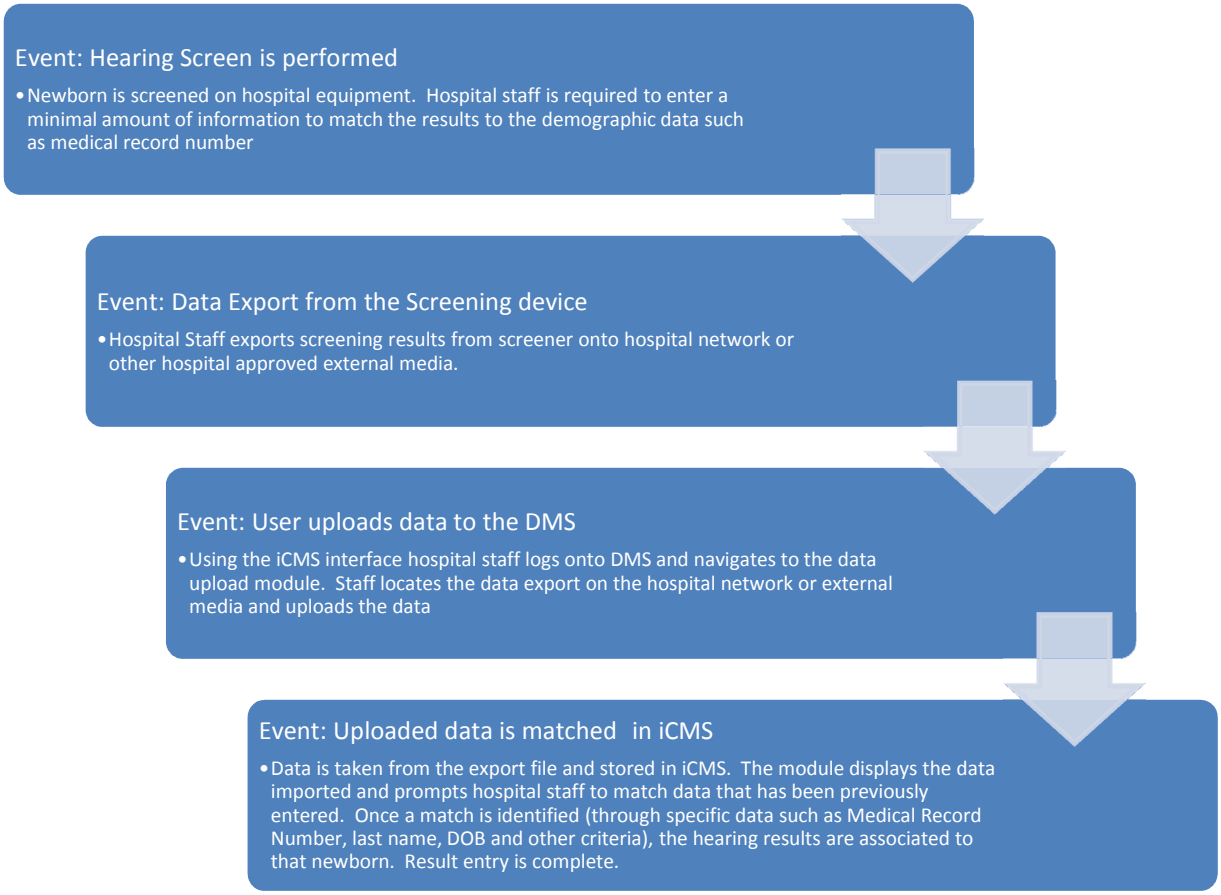


Figure 16 - Screening Device Upload Flow

14. HiTrack File Format Information

The following section describes the HiTrack File Format. You can visit http://www.hitrack.org for additional details. The following document can be found on that website and has been used to create much of the information presented here: http://www.hitrack.org/Content/Data_Linking_with_HITRACK.pdf

14.1. HiTrack Flat-File Format

DMS supports flat file data exports from Newborn Hearing Screening devices. The flat file export is defined in the following way:

Table 36 - HiTrack Fields

Field Type	Format Required
Text Fields	Enclosed in quotes
Date Fields	Use the yyyymmdd format. Where: yyyy = four-digit year mm = two-digit month dd = two digit day
Yes/No Fields	Use Y or N
Field Separator	Comma (,), Commas must be used even if a field has no data.
Record separator	Carriage return/linefeed
End of file marker	1A hex or CHR(26)

14.2. HiTrack Flat File Name

Hospital staff must decide on a naming convention for the flat files that are generated. The creation and validity of these files are the responsibility for each hospital IT staff. The DMS does not have any rules regarding the name of the file. Once a file is uploaded to the DMS, it is deleted from the DMS servers.

14.3. HiTrack Flat File Data Structure

The HiTrack flat file format maintains a specific file format that should be known to each hearing screening device. The DMS uses the data imported to match the hearing results to the demographics data (if previously entered). In order to successfully merge automatically, some demographic data fields are required to be entered into the screening device and uploaded to the DMS. Those fields are listed below:

- Medical Record Number
- Baby's Last Name
- Baby's First Name
- Baby's Gender
- Baby's Date of Birth

These fields pertain to demographic information only. There are other fields which are mandatory if results exist in the file. These are indicated with a YES in the required column in the table below. The HiTrack file format is detailed in the table below. Fields required for successful import into the DMS have a YES in the required column

Table 37 - HiTrack File Format Fields

Field Name	Type	Required	Length	Description
CMID	Character	Yes	15	Child's Medical Record Number
CLAST	Character	Yes	20	Child's last name
CFIRST	Character	Yes	15	Child's first name
CSEX	Character	Yes	1	Child's gender (M male; F=female)
CDOB	Date	Yes	8	Child's date of birth (yyyymmdd)
CTOB	*Character*		*5*	*Child's time of birth (must be on 24-hour clock, hh:mm)*
MULTI_CODE	*Character*		*1*	*Child's multiple birth code (S=single birth; multiple, A, B, C etc.)*
RACE	*Character*		*2*	*Child's race*
COHORT	*Character*		*2*	*Not used*
STAGE	Character	Yes	1	Inpatient or outpatient status (I=Inpatient; O=Outpatient).
HOSP_CODE	Character	Yes	3	hospital code. This is defaulted from the user logged into the DMS
SCRN_SITE	*Character*		*3*	*Screening-site code*
TYPE	*Character*		*1*	*Nursery type*
PE_ID	*Character*		*4*	*Pediatrician's ID*
INS_CODE	*Character*		*2*	*Insurance code*
BW_LOCAL	*Number*		*7*	*Not used*
BW_TYPE	*Character*		*1*	*Not Used*
BW_GRAMS	*Number*		*5*	*Child's birth weight in grams.*
SCRN_TYPE	Character	Yes	1	Type of screening results (O = TEOAE; D=DPOAE; G = Generic OAE; A = A-ABR.
IRO	Character	Yes	1	Right ear OAE result (see Screening Outcomes in Table 40)
IDRO	Date	Yes	8	Right ear OAE test date (yyyymmdd)

Field Name	Type	Required	Length	Description
IRODTA	Character	Yes	12	Screening data test number for right OAE
INITSCRNRO	Character	Yes	3	Right ear OAE screener ID
INAUDOAE_R	*Character*		*3*	*Right ear OAE scoring audiologist ID*
ILO	Character	Yes	1	Left ear OAE result (see Screening Outcomes in Table 40)
IDLO	Date	Yes	8	Left ear OAE test date (yyyymmdd)
ILODTA	Character	Yes	12	Screening data test number for left OAE
INITSCRNLO	Character	Yes	3	Left ear OAE screener ID
INAUDOAE_L	*Character*		*3*	*Left ear OAE scoring audiologist ID*
IRA	Number	Yes	1	Right ear ABR result (see Screening Outcomes in Table 40
IDRA	Date	Yes	8	Right ear ABR test date (yyyymmdd)
IRORUA	Character	Yes	12	Screening data test number for right ABR
INITSCRNRA	Character	Yes	3	Right ear ABR screener ID
ILA	Character	Yes	1	Left ear ABR result (see Screening Outcomes in Table 40
IDLA	Date	Yes	8	Left ear ABR test date (yyyymmdd)
ILORUA	Character	Yes	3	Screening data test number for left ABR
INITSCRNLA	Character	Yes	6	Left ear ABR screener ID

14.4. Standard Field Values

The Hi-Track export file has several suggested field values that are included in the HiTrack specification. The following field values represent the values accepted by the DMS. Hospital staff should contact their device manufacturers to ensure that the device output complies with this requirement.

Table 38 - Screening Outcomes

Value	Description
1	**Pass** – pass criteria met

Value	Description
2	**Refer** – pass criteria not met; referral for further screening or follow-up
N	**Not Required** – no attempt made to re-screen an ear that passed previously.
M	**Missed** – no screening attempt made on either ear before discharge. (Inpatient screening only)
R	**Refused** – parents refused screening.
T	**Transferred** – infant transferred to another facility prior to screening.
D	**Deceased** – infant expired.

15. Algo5 XML Format Information

The DMS accepts data in Algo 5 XML format. As with the HiTrack file, the hospital is required to provide support to staff to create this file and place in a location that the DMS can access it.

15.1. Sample XML File

The following is an example of an XML file


```
Algo5>
  <Culture>en-US</Culture>
- <PatientTestRecord>
- <Patient>
- <DemographicData>
  <Id>defdc9fd-2526-4ee3-8fb2-8b91c52263ac</Id>
  <MedicalRecordNumber>002247</MedicalRecordNumber>
  <FirstName>nbgirl2</FirstName>
  <LastName>test</LastName>
  <MiddleInitial />
  <AlsoKnownAs />
  <Birthdate>12/10/2010 12:00:00 AM</Birthdate>
  <BirthLocation />
  <Gender>2</Gender>
  <Address1 />
  <Address2 />
  <City />
  <State />
  <PostalCode />
  <Country />
  <Nationality />
  <Height />
  <Weight />
  <Telephone />
  <MobilePhone />
```

```
<CurrentPediatrician />
<MothersFirstName />
<MothersLastName />
<CaregiverFirstName />
<CaregiverLastName />
<Comment />
<Other />
<DischargeDate />
<ArchiveDate />
<ExportDate />
<CreationDate />
<LastModified>1/4/2011 4:36:39 PM</LastModified>
<UserText1 />
<UserText2 />
<UserText3 />
<UserText4 />
<UserText5 />
<UserDate1 />
<UserDate2 />
<UserDate3 />
<UserDate4 />
<UserDate5 />
<MothersBirthdate />
  </DemographicData>
<RiskFactors />
  </Patient>
- <Test>
- <TestResult>
<Id>b4b54ef7-2708-4798-b678-2f4e7cf737a3</Id>
<PatientId>defdc9fd-2526-4ee3-8fb2-8b91c52263ac</PatientId>
```

```
<TestType>1</TestType>
<LE_Result>1</LE_Result>
<RE_Result>3</RE_Result>
<TestDateTime>1/4/2011 4:39:28 PM</TestDateTime>
<Duration>972.3</Duration>
<Pediatrician />
<Medication />
<Physician />
<Examiner>sylvia</Examiner>
<Reason />
<ReferredBy />
<TestFacility />
<Comment />
<Other />
<Conclusion />
<Recommendation />
<Interpretation />
<TestInfo />
<Location>vmc</Location>
<LocationType>0</LocationType>
<ArchiveDate />
<ExportDate />
<UserAccountId>6e0d0911-2707-4f63-95de-12d985c5b006</UserAccountId>
<UserText1 />
<UserText2 />
<UserText3 />
<UserText4 />
<UserText5 />
<UserDate1 />
<UserDate2 />
```

```
<UserDate3 />
<UserDate4 />
<UserDate5 />
  </TestResult>
- <Plugin type="ABR">
<ResultId>c89daa71-c306-4e56-9db2-a0ed189167e0</ResultId>
<Method>LeftRightSimultaneous</Method>
<Application>Amplitude35dBSPL</Application>
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16. Data Matching for Uploaded Data

Data that are uploaded must be matched to existing demographic data record, or they will be treated as a new record in the DMS system.

16.1. Successful Data Match

If they are able to be linked to an existing record, the hearing results are attached to the record based on the data imported. This is the preferred outcome, saving the user keystrokes in data entry. The DMS uses the following information when attempting to match data that has been uploaded to existing data records.

1. Primary match of Submitter ID and Medical Record Number,
2. A secondary match is performed on Baby Last Name or AKA, Baby DOB, Baby Gender, Baby First Name, and Birth Hospital,
3. A tertiary match is performed on Baby Last Name or AKA, Baby DOB, and Baby Gender

Any records that cannot be matched to an existing record using the above criteria will be considered unmatched.

16.2. Unmatched Data Process

Data that is unmatched are displayed to the user for manual intervention.