



**MiHIN**  
Shared Services

Michigan Health Information Network

# Newborn Screening – Critical Congenital Heart Disease (CCHD) Implementation Guide

Version 8

June 30, 2016

# Document History

Date	Version	Section(s) Revised	Description	Modifier
6/1/16	1	All	Initial Draft	N. Newton
6/2/16	2	All	Revision	M. Taylor
6/6/16	3	All	Revision	N. Newton
6/16/16	4	App. B	Update	N. Newton
6/16/16	5	All	Revision	M. Taylor
6/17/16	6	All	Reviewed and edited	S. Southard
6/24/16	7	All	Reviewed, edited	D. Livesay
6/30/16	8	All	Edited	D. Livesay

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# Acronyms and Abbreviations Guide

<b>ACRS</b>	Active Care Relationship Service
<b>API</b>	Application Programming Interface
<b>CCHD</b>	Critical Congenital Heart Disease
<b>CMS</b>	Centers for Medicare & Medicaid Services
<b>DDE</b>	Direct Data Entry
<b>DQA</b>	Data Quality Assurance
<b>DSM</b>	Direct Secure Messaging
<b>EHR</b>	Electronic Health Record
<b>FHIR</b>	Fast Healthcare Interoperability Resources
<b>HIE</b>	Health Information Exchange
<b>HIN</b>	Health Information Network
<b>HISP</b>	Health Internet Service Provider
<b>HL7</b>	Health Level Seven
<b>HPD</b>	Health Provider Directory
<b>MDHHS</b>	Michigan Department of Health and Human Services
<b>MIDIGATE</b>	Medical Information Direct Gateway
<b>MiHIN</b>	Michigan Health Information Network Shared Services
<b>MUCA</b>	Master Use Case Agreement
<b>NBS</b>	Newborn Screening
<b>OID</b>	Object Identifier
<b>PO</b>	Participating Organization

<b>RAS</b>	Registration and Attestation System
<b>REST</b>	Representational State Transfer
<b>SAML</b>	Security Assertion Markup Language
<b>SOM</b>	State of Michigan
<b>TDSO</b>	Trusted Data Sharing Organization
<b>UCE</b>	Use Case Exhibit
<b>UCS</b>	Use Case Summary
<b>VPN</b>	Virtual Private Network



# Definitions

**Attribution.** The connection between a consumer and their health care providers. One definition of attribution is: Assigning a provider or providers, who will be held accountable for a member based on an analysis of that member's claim data. The attributed provider is deemed responsible for the patient's cost and quality of care, regardless of which providers actually deliver the service.

**Active Care Relationship.** (a) For health providers, a patient who has been seen by a provider within the past 24 months, or is considered part of the health provider's active patient population they are responsible for managing, unless notice of termination of that treatment relationship has been provided to HIN; (b) for payers, an eligible member of a health plan; (c) an active relationship between a patient and care manager or other person or organization for the purpose of treatment, payment or operations; or (d) a relationship with a health provider asserted by a consumer and approved by such health provider.

**Active Care Relationship Service.** The HIN Infrastructure Service that contains information on those TDSOs and health professionals who have an active care relationship with a patient.

**Applicable Laws and Standards.** In addition to the definition set forth in the Data Sharing Agreement, the federal Confidentiality of Alcohol and Drug Abuse Patient Records statute, section 543 of the Public Health Service Act, 42 U.S.C. 290dd-2, and its implementing regulation, 42 CFR Part 2; the Michigan Mental Health Code, at MCLA §§ 333.1748 and 333.1748a; and the Michigan Public Health Code, at MCL § 333.5131, 5114a.

**Conforming Message.** A message that is in a standard format that strictly adheres to the implementation guide for this use case.

**Critical Congenital Heart Disease (CCHD).** A group of serious heart defects that are present from birth. These abnormalities result from problems with the formation of one or more parts of the heart during the early stages of embryonic development.

**Data Sharing Agreement.** Any data sharing organization agreement signed by both HIN and an organization

**Electronic Address.** A string that identifies the transport protocol and end point address for communicating electronically with a recipient. A recipient may be a person, organization or other entity that has designated the electronic address as the point at which it will receive electronic messages.

**Electronic Medical Record or Electronic Health Record.** A digital version of a patient's paper medical chart.

**Electronic Service Information.** All information reasonably necessary to define an electronic destination's ability to receive and use a specific type of information (e.g.,

discharge summary, patient summary, laboratory report, query for patient/provider/healthcare data).

**End Point.** An instance of an electronic address or ESI.

**Exhibit.** A use case exhibit or a pilot activity exhibit.

**Health Level 7 (HL7).** An interface standard and specifications for clinical and administrative healthcare data developed by the American National Standards Institute. HL7 provides a method for disparate systems to communicate clinical and administrative information in a normalized format with acknowledgement of receipt

**Health Information.** Any information, including genetic information, whether oral or recorded in any form or medium, that (a) is created or received by a health professional, health plan, public health authority, employer, life insurer, school or university, or health care clearinghouse; and (b) relates to the past, present, or future physical or mental health or condition of an individual; the provision of health care to an individual; or the past, present, or future payment for the provision of health care to an individual.

**Health Information Network (HIN).** An organization or group of organizations responsible for coordinating the exchange of protected health information (PHI) in a region, state, or nationally.

**Health Plan.** An individual or group plan that provides, or pays the cost of medical care (as defined in section 2791(a)(2) of the Public Health Service Act, 42 U.S.C. 300gg-91(a)(2)). Health Plan further includes those entities defined as a health plan under HIPAA, 45 CFR 160.103.

**Health Professional or Health Provider.** (a) Any individual licensed, registered, or certified under Federal or State laws or regulations to provide health care services; (b) any person holding a non-clinical position within or associated with an organization that provides healthcare or healthcare related services; and (c) people who contribute to the gathering, recording, processing, analysis or communication of Health Information.

**Health Provider Directory.** The statewide shared service established by HIN that contains contact information on health professionals, facility/hospital, other healthcare organizations, electronic addresses, end points, and electronic service information, as a resource for authorized users to obtain contact information and securely exchange health information.

**HIN Infrastructure Service.** Certain services that are shared by numerous use cases. HIN Infrastructure Services include, but are not limited to, ACRS, HPD, Statewide Consumer Directory (SCD), and the Medical Information Direct GATEway (MIDIGATE®).

**HIN Services.** The HIN infrastructure services and additional services and functionality provided by HIN allowing an organization to send, receive, find, or use information to or from HIN as further set forth in an exhibit.

**Information Source.** Any organization that provides information that is added to a HIN Infrastructure Service.

**Meaningful Use.** Using certified EHR technology to improve quality, safety and efficiency of healthcare, and to reduce health disparities.

**Message.** A mechanism for exchanging message content between an organization to HIN services, including query and retrieve.

**Message Content.** Information which is sent, received, found or used by an organization to or from HIN Services, including, but not limited to, PHI, common keys, de-identified data, metadata, Digital Credentials, and data schema. Message Content includes the Message Content Header.

**Message Header.** The MSH segment present in every HL7 message type that defines the message's source, purpose, destination, and certain syntax specifics such as delimiters (separator characters) and character sets. It is always the first segment in the HL7 message, with the only exception being HL7 batch messages.

**Michigan Health Information Network Shared Services.** The HIN for the State of Michigan.

**Negative Acknowledgment.** “Not acknowledged” and is used to negatively acknowledge or to reject previously received message content or to indicate some kind of error.

**Newborn Screening.** Screening to detect conditions such as critical congenital heart disease (CCHD) in newborns. The newborn screening is not limited to this test.

**Notice.** A message transmission that is not message content and which may include but not be limited to an acknowledgement of receipt or error response.

**Patient Data.** Any data about a patient or a consumer that is electronically filed in an organization or organization's systems or repositories. The data may contain protected health information, personal credit information, or personally identifiable information.

**Person Record.** Any record in a HIN Infrastructure Service that primarily relates to an individual person.

**Pilot Activity.** The activities set forth in the applicable exhibit and typically includes sharing message content through early trials of a new use case that is still being defined and is still under development and which may include organization feedback to HIN to assist in finalizing a use case and use case exhibit upon conclusion of the pilot activity.

**Principal.** A person or a system utilizing a federated identity through a federated organization.

**Provider Community.** A healthcare provider with an active care relationship with the applicable patient.

**Send / Receive / Find / Use.** Means sending, receiving, finding, or using message content. Sending involves transport of message content. Receiving involves accepting and possibly consuming/storing message content. Finding means querying to locate message content. Using means any use of the message content other than sending, receiving and finding.

**Service Interruption.** A party is unable to send, receive or find message content for any reason, including but not limited to the failure of network equipment or software, scheduled or unscheduled maintenance, general Internet outages, and events of force majeure.

**Source System.** A computer system, such as an electronic health record system, at the organization, that sends, receives, finds or uses message content or notices.

**Statewide Consumer Directory.** A HIN Infrastructure Service that helps organizations provide tools giving consumers the ability to manage how their personal Health Information can be shared and used. The SCD is essentially a Software Development Kit with a robust set of FHIR APIs that can be used by online health portals, mobile apps, or any other consumer-facing health applications that enable consumers to take an active role in viewing and editing their preferences for how their health information is shared.

**Transactional Basis.** The transmission of message content or a notice within a period of time of receiving message Content or notice from a sending or receiving party as may be further set forth in a specific exhibit.

**Transitions of Care.** The movement of a patient from one setting of care (e.g. hospital, ambulatory primary care practice, ambulatory specialty care practice, long-term care, rehabilitation facility) to another and can include transfers within a healthcare organization.

**Trusted Data Sharing Organization.** An organization that has signed any form of agreement with HIN for data sharing.

**Use Case.** A specific scenario or group of scenarios for sharing patient health information.

**Use Case Exhibit.** The legal agreement attached as an exhibit to the Master Use Case Agreement that governs participation in any specific Use Case.

**Use Case Implementation Guide.** The document providing technical specifications related to Message Content and transport of Message Content between organizations, HIN, and other TDSOs. Use Case Implementation Guides are made available via URLs in exhibits.



**Use Case Summary.** The document providing the executive summary, business justification and value proposition of a use case. Use case summaries are provided by HIN upon request and are available via [www.mihin.org](http://www.mihin.org).

**View Download Transmit.** A requirement for Meaningful Use with the objective to provide patients with the ability to view online, download and transmit their health information within four business days of the information being available to an Eligible Professional.

**XCA.** The IHE (Integrating the Healthcare Enterprise®) standard for Cross-Community Access to support the means to query and retrieve patient relevant healthcare data held by other communities.

**XDS.b.** The IHE (Integrating the Healthcare Enterprise®) standard for Cross-Enterprise Document Sharing revision b, to support the means to query and retrieve patient relevant healthcare data held within a community.

# 1 Introduction

## 1.1 Purpose of Use Case

Babies with a confirmed diagnosis of critical congenital heart disease (CCHD) are at risk of having serious complications within the first few days or weeks of life and often require emergency care. Currently, positive test results from CCHD screenings at birth are sent to the Birth Defects Registry.

Receipt of CCHD test screening results in near real-time from the state’s birthing hospitals would assist the Michigan Department of Health and Human Services (MDHHS) in improving beneficiary patient health and reducing patient healthcare costs through early detection. According to state records, more than 40% of births in Michigan are covered by Medicaid on average.

MDHHS plans to have these positive results delivered to the future Chronic Disease Registry, where the information will then be disseminated to MDHHS home nurse visit programs. One goal of these home nurse programs is to reduce levels of infant mortality in the State of Michigan.

**Purpose of Use Case:** This use case allows real-time transmission of CCHD test screening results from birthing hospitals to the State of Michigan, without additional workflow steps.

## 1.2 Message Content

For this use case, Message Content means an HL7 2.5.1 conforming message containing information regarding newborn screening.

## 1.3 Data Flow and Actors

In this use case, the health information network (HIN) brokers the transport of the CCHD data through MDHHS data hub to the Michigan Newborn Screening Registry.

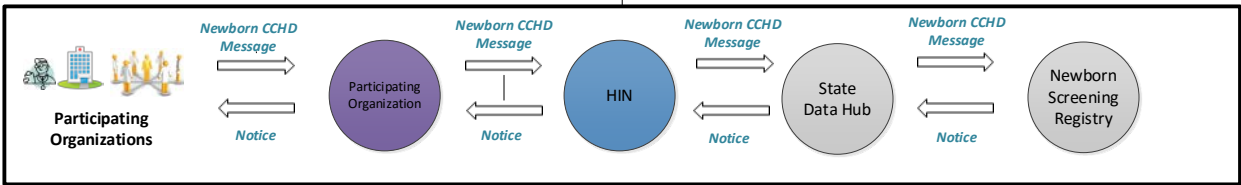


Figure 1. Workflow Between Participating Organization, HIN, and Registry

## 2 Standard Overview

### 2.1 Message Format

The current message format supported by the Newborn Screening Registry is HL7 v2.5.1. Updated versions of HL7 messages may be implemented and supported in the future, such as Fast Healthcare Interoperability Resources (FHIR). For more information on FHIR, refer to this website:

<http://www.hl7.org/implement/standards/fhir>

### 2.2 Message Example

For an example of a properly formatted message for this use case, refer to Appendix B at the end of this document.

# 3 Onboarding Process

## 3.1 Initial Onboarding

For an organization to share data with HIN under this use case, the organization undergoes two onboarding processes simultaneously. The two onboarding processes are legal onboarding and technical connectivity onboarding. These may occur in parallel – i.e. the organization can review and complete legal agreements with HIN while simultaneously establishing and testing technical connectivity. To initiate these two parallel onboarding processes, notify HIN at [www.mihin.org/requesthelp](http://www.mihin.org/requesthelp).

### 3.1.1 Initial Legal Process

The first time an organization undergoes the legal onboarding process with HIN, the organization negotiates and enters into a master organization agreement and master use case agreement which then allows the organization to enter into one or more use cases via use case exhibits.

Once an organization has entered into a master organization agreement, the organization can enter into an unlimited number of use cases with HIN. All of HIN's use cases are available at:

<http://mihin.org/about-mihin/resources/>

### 3.1.2 Initial Technical Connectivity Process

HIN considers itself “transport agnostic” and offers multiple options for organizations to establish technical connectivity to transport data to HIN. Organizations should select one or more connectivity methods for message transport based on their technical capabilities, and should communicate the selection(s) by visiting [www.mihin.org/requesthelp](http://www.mihin.org/requesthelp) early in the onboarding process. Currently, HIN accepts the following transport methods:

- LLP over IPsec VPN – Lower-Layer Protocol over Internet Protocol Security Virtual Private Network
- DSM – Direct Secure Messaging

For VPN (virtual private network) connectivity two VPNs are required. A primary VPN will facilitate regular traffic, and a secondary will be established for fail-over purposes.

Additional transport methods may be added in the future. These can include NwHIN, XCA, REST/RESTFUL APIs, FHIR, and others.

The following steps describe the technical onboarding process. However, HIN typically conducts “onboarding kickoff” meetings with new organizations to go through each of these steps in detail and answer any questions.

1. The organization selects one or more supported transport methods and establishes connectivity with HIN. This step varies based on the method selected:

- a. LLP over IPsec VPN – HIN’s site-to-site VPN request form must be completed, submitted and approved by HIN. Visit [www.mihin.org/requesthelp](http://www.mihin.org/requesthelp) to obtain the VPN request form. A pre-shared key is exchanged between the organization and HIN to initialize the connection. The LLP over IPsec VPN is the most efficient transport for very high volumes of messages.
  - b. Direct Secure Messaging – HIN accepts Direct Secure Messages from Health Internet Service Provider (HISPs) that have EHNAC-DTAAP (DirectTrust) accreditation. Test messages are sent to verify HISP connectivity (“ping pong”). The Message Header section in the test messages is verified for appropriate routing configuration.
2. Test messages are sent by the organization to HIN.
    - a. All test messages must have a “T” in the Message Header – field 11
    - b. Test traffic is routed via HIN to the appropriate destination. For CCHD messages, the destination is the CCHD registry via the state data hub.
    - c. The end destination monitors for inbound test traffic and confirm receipt with HIN, which confirms with the organization.
  3. For the CCHD use case, the registry deems the sending facility to have entered into Data Quality Assurance Status (DQA) once they have successfully received a properly formatted message from the sending facility via the organization through HIN.
  4. The CCHD registry declares the sending facility to be at Production Status after a period of successful testing and exiting DQA status.
    - a. At this time, the sending facility may then send production messages through the organization to HIN. The sending facility now places a “P” (for production) value in the MSH-11 instead of the “T” used during testing.

## 3.2 Onboarding Additional Sending Facilities

When an organization wishes to onboard additional sending facilities, those facilities must first register with the CCHD registry. Once successful, the registration information from the registry, including the Facility OID, must be emailed to [www.mihin.org/requesthelp](http://www.mihin.org/requesthelp). The new sending facility should then begin sending test messages to the CCHD registry in the same fashion as the initial facility as detailed in section 3.1.2, making sure to place a “T” value in MSH-11. The receiving system deems the sending facility to be in DQA and eventually Production Status.

For specific information regarding testing, refer to the MDHHS Newborn Screening CCHD Implementation Guide:

[www.mihin.org/newborn-screening-cchd/ucig/](http://www.mihin.org/newborn-screening-cchd/ucig/)

# 4 Specifications

## 4.1 Message Trigger Events

The HL7 message type for CCHD messages are ORU and the trigger event is R01.

## 4.2 General Message Requirements

For general rules that apply to the entire message, refer to the Newborn Screening CCHD Implementation Guide, located at:

[www.mihin.org/newborn-screening-cchd/ucig/](http://www.mihin.org/newborn-screening-cchd/ucig/)

## 4.3 Specific Segment and Field Definitions

### 4.3.1 Segment 1 – Message Header

The definitions in the table below shall be conformed to by all HL7 messages communicating the message header (MSH) segment.

Sequence	Length	DT	Usage	Cardinality	TBL#	Item #	Element Name	Comments
1	1	ST	R	1..1		00001	Field Separator	
2	4	ST	R	1..1		00002	Encoding Characters	
3	180	HD	R	1..1	0361	00003	Sending Application	
4	180	HD	R	1..1	0362	00004	Sending Facility	Facility OID
5	180	HD	R	1..1	0361	00005	Receiving Application	CCHD
6	180	HD	R	1..1	0362	00006	Receiving Facility	MDHHS
7	26	TS	R	1..1		00007	Date/Time of Message	
8	40	ST	X	0..0		00008	Security	
9	7	CM	R	1..1	0076 0003	00009	Message Type	ORU
10	20	ST	R	1..1		00010	Message Control ID	Should be repopulated (rather than pass-through) for outbound message header
11	3	PT	R	1..1		00011	Processing ID	<b>P</b> when in production, <b>T</b> for testing
12	60	VID	R	1..1	0104	00012	Version ID	
13	15	NM	X	0..0		00013	Sequence Number	
14	180	ST	X	0..0		00014	Continuation Pointer	

Sequence	Length	DT	Usage	Cardinality	TBL#	Item #	Element Name	Comments
15	2	ID	X	0..0	0155	00015	Accept Acknowledgment Type	
16	2	ID	X	0..0	0155	00016	Application Acknowledgment Type	
17	2	ID	X	0..0		00017	Country Code	
18	16	ID	X	0..0		00692	Character Set	
19	60	CE	X	0..0			Principal Language of Message	
20	20	ID	X	0..0		00356	Alternate Character Set Handling Scheme	

#### 4.3.2 All Remaining Segments

The message header is the only segment which HIN requires to be formatted in a certain way. HIN does not evaluate or verify any other part of the message. For all remaining segments and fields, follow the CCHD standards, which can be found in the Newborn Screening CCHD Implementation Guide at:

[www.mihin.org/newborn-screening-cchd/ucig/](http://www.mihin.org/newborn-screening-cchd/ucig/)



# 5 Troubleshooting

## 5.1 Production Support

	Severity Levels			
	1	2	3	4
<b>Description</b>	<b>Critical Impact/ System Down:</b> Business critical software is down or critical interface has failed. The issue is impacting all production systems, causing all participating organizations' or other organizations' ability to function to be unusable.	<b>Significant Business Impact:</b> Software component severely restricted. Entire organization is unable to continue business functions, causing all communications and transfer of messages to be halted.	<b>Partial Failure or Downtime:</b> Program is useable and less significant features unavailable. The service is online, though may not working as intended or may not currently working as intended or may not currently be accessible, though other systems are currently available.	<b>Minimal Business:</b> A non-critical software component is malfunctioning, causing minimal impact, or a test system is down.
<b>Example</b>	All messages to and from MiHIN are unable to be sent and received, let alone tracked	MiHIN cannot communication (send or receive) messages between single or multiple participating organizations, but can still successfully communicate with other organizations.	Messages are lost in transit, messages can be received but not transmitted.	Additional feature requested.
<b>Primary Initiation Method</b>	<b>Phone:</b> (517) 336-1430	<b>Phone:</b> (517) 336-1430	Web form at <a href="http://mihin.org/requesthelp">http://mihin.org/requesthelp</a>	Web form at <a href="http://mihin.org/requesthelp">http://mihin.org/requesthelp</a>
<b>Secondary Initiation Method</b>	Web form at <a href="http://mihin.org/requesthelp">http://mihin.org/requesthelp</a>	Web form at <a href="http://mihin.org/requesthelp">http://mihin.org/requesthelp</a>	Email to <a href="mailto:help@mihin.org">help@mihin.org</a>	Email to <a href="mailto:help@mihin.org">help@mihin.org</a>
<b>Tertiary Initiation Method</b>	Email to <a href="mailto:help@mihin.org">help@mihin.org</a>	Email to <a href="mailto:help@mihin.org">help@mihin.org</a>	N/A	N/A
<b>Initial Response</b>	Within 2 hours	Within 2 hours	1 business day	1 business day
<b>Resolution Goal</b>	24 hours	24 hours	3 business days	7 business days

If you are experiencing difficulties or have questions, please contact the MiHIN Help Desk:

- [www.mihin.org/requesthelp](http://www.mihin.org/requesthelp)
- Phone: (517) 336-1430
- Monday – Friday 8:00 AM – 5:00 PM (Eastern)



## 6 Legal Advisory Language

This reminder applies to all use cases covering the exchange of electronic health information:

The Data Sharing Agreement (DSA) establishes the legal framework under which organizations can exchange messages through the HIN Platform, and sets forth the following approved reasons for which messages may be exchanged:

- a. By health care providers for Treatment, Payment and/or Health Care Operations consistent with the requirements set forth in HIPAA;
- b. Public health activities and reporting as permitted by HIPAA and other Applicable Laws and Standards;
- c. To facilitate the implementation of “Meaningful Use” criteria as specified in the American Recovery and Reinvestment Act of 2009 and as permitted by HIPAA;
- d. Uses and disclosures pursuant to an Authorization provided by the individual who is the subject of the Message or such individual’s personal representative in accordance with HIPAA;
- e. By Data Sharing Organizations for any and all purposes, including but not limited to pilot programs and testing, provided that such purposes are consistent with Applicable Laws and Standards; and
- f. For any additional purposes as specified in any use case, provided that such purposes are consistent with Applicable Laws and Standards.

Under the DSA, “**Applicable Laws and Standards**” means all applicable federal, state, and local laws, statutes, acts, ordinances, rules, codes, standards, regulations and judicial or administrative decisions promulgated by any governmental or self-regulatory agency, including the State of Michigan, the Michigan Health Information Technology Commission, or the Michigan Health and Hospital Association, as any of the foregoing may be amended, modified, codified, reenacted, promulgated or published, in whole or in part, and in effect from time to time. “Applicable Laws and Standards” includes but is not limited to HIPAA; the federal Confidentiality of Alcohol and Drug Abuse Patient Records statute, section 543 of the Public Health Service Act, 42 U.S.C. 290dd-2, and its implementing regulation, 42 CFR Part 2; the Michigan Mental Health Code, at MCLA §§ 333.1748 and 333.1748a; and the Michigan Public Health Code, at MCL § 333.5131, 5114a.

It is each participating organization’s obligation and responsibility to ensure that it is aware of Applicable Laws and Standards as they pertain to the content of each message sent, and that its delivery of each message complies with the Applicable Laws and Standards. This means, for example, that if a use case is directed to the exchange of physical health information that may be exchanged without patient authorization under HIPAA, the participating organization must not deliver any message containing health information for which an express patient authorization or consent is required (e.g., mental or behavioral health information).

**Disclaimer:** The information contained in this implementation guide was current as of the date of the latest revision in the Document History in this guide. However, Public Health Reporting Use Case policies are subject to change and do so frequently. HL7 versions and formatting are also subject to updates. Therefore, links to any source documents have been provided within this guide for reference. HIN applies its best efforts to keep all information in this guide up-to-date. It is ultimately the responsibility of the organization and sending facilities to be knowledgeable of changes outside of HIN's control.

# Appendix A

## A.1 CCHD Quick Reference Sheet

Color key:

- Will always be sent
- Will be sent if information is available
- Will be sent conditionally
- Optional
- Will be ignored

1	2	3	4	5	6	7							
MSH	^~\&	Sending Application	Sending Facility	Receiving Application	Receiving Facility	Date/Time of Message							
8	9	10	11	12	13	14 15 16							
Message Type	Message Control ID	Processing ID (T for test and P for production)	HL7 Version ID										
17	18	19											
Country Code	Character Set	Principal Language											
1	2	3	4	5	6	7 8 9 10							
PID	Set ID	Patient Identifier List	Patient Name	Mother's Maiden Name	Date/Time of Birth	Sex	Race						
11	12	13	14	15	16 17 18 19 20	21	22						
Patient Address	Home Phone Number	Primary Language				Mother's Identifier	Ethnic Group						
23	24	25	26 27 28	29	30	31 32							
Birth Place	Multiple Birth Indicator	Birth Order			Patient Death Date/Time	Patient Death Indicator							
33	34												
Last Update Date/Time	Last Update Facility												
1	2	3	4	5	6	7 8 9 10 11 12 13 14	15						
NK1	Set ID	Name	Relationship	Address	Phone	Business Phone	Contact Role						Administrative Sex
16	17 18 19	20											
Date/Time of Birth			Primary Language										
1	2	3	4 5 6	7	8	9							
PV1	Set ID	Patient Class	Assigned Patient Location			Attending Doctor		Consulting Doctor					

1	2	3	4	5	6	7							
OBR	Set ID	Place Order Number	Filler Order Number	Universal Service Identifier	■	■	Observation Date/Time						
8	9	10	11	12	13	14	15	16	17				
Observation End Date/Time	■	Collector Identifier	■	■	■	■	■	Ordering Provider	Order Callback Phone Number				
18	19	20	21	22	23	24	25	26	27	28	29	30	31
■	■	■	■	Results Rpt/Status Chng - Date/Time	■	■	Result Status	■	■	Result Copies To	■	■	■
32	33	34	35	36	37	38	39	40	41	42	43	44	45
Principle Result Interpreter	■	■	■	Scheduled Date/Time	■	■	Local	■	■	■	■	Procedure Code	Procedure Code Mod
<b>*OBR Segment may repeat</b>													

1	2	3	4	5	6				
OBX	Set ID	Value Type	Observation Identifier	Observation Sub-ID	Observation Value	Units			
7	8	9	10	11	12	13	14	15	16
Reference Ranges	Abnormal Flags	■	■	Observation Result Status	■	■	Date/Time of Observation	■	■
17	18	19	20	21	22	23			
Observation Method	Equipment Instance Identifier	Date/Time of Analysis	■	■	■	Performing Organization Name			
24	25								
Performing Organization Address	Performing Organization Medical Director								
<b>*OBX Segment may repeat</b>									



# Appendix B

## B.1 Sample CCHD Message

**MSH|^~\&|CCHD Screening Device  
Manager^1234^ISO|SendingFacility^1234^ISO|Receiving  
Application^2.16.840.1.113883.19.3.2^ISO|PublicHealth^2.16.840.1.113883.19.3.2^ISO|2  
0120701132554-  
0400||ORU^R01^ORU\_R01|20120701132554000005|P^T|2.6|||NE|AL|USA|||Devic e-  
Ack^^2.16.840.1.114222.4.10.3^ISO**

**PID|1||1||FRANKLIN^TRICIA^L||19860122|F|||770 SE PECAN  
STREET^^PONTIAC^MI^48341||839-555-9557|118-555-5271|||000-00-1103|**

**PV1||I|NICU^2^23|||1245319599^Smith^Theodore^^^Dr^MD^^^NPI|||**

**OBR|1|CWE|999555^PublicHealth^77D77712547^HL7|123456^HOSPITAL^999999999  
^NPI|73805-4^CCHD newborn screening  
panel^LN|||201201311234|201201311237|^Nurse^Annie^S|||^Smith^John^S^^Dr.^  
^^011^555^555-  
1234^123|||201201311234||F|^Jones^Brad^M^^Dr.^|||123&Cardiologist&  
Carmen|||Infant was asleep|||252465000^peripheral pulse  
oximetry^SCT|7087005^Intermittent(spot-check)^SCT|**

**OBX|1|CWE|73700-7^CCHD newborn screening interpretation^LN|1|LA18592-8^In  
range^LN|||F||201201311234||^Kemper's Protocol|^Masimo~^Radical-  
7~^Version~^13863~^Pulse OX Device Floor3|201201311234|||^Hospital|||**

**OBX|2|NM|57716-3^ Blood Spot Fiber Paper Card  
ID^LN|1|1707801|||F||201201311233|||201201311233|||^Hospital|||**

**OBX|3|CWE|73699-1^Number of Prior  
Screens^LN|1|0|||F||201201311234|||^Masimo~^Radical-  
7~^Version~^13863~^Pulse OX DeviceFloor3|201201311234|||^Hospital|||**

**OBX|4|NM|73696-7^Difference between preductal and postductal oxygen  
saturation^LN|1|2||N||F||201201311234|||^Masimo~^Radical-  
7~^Version~^13863~^Pulse OX Device Floor3|201201311234|||^Hospital|||**

**OBX|5|CWE|73804-7^CCHD newborn screening sensor name^LN|1|Masimo,  
Radical|||F||201201311234|||^Masimo~^Radical-7~^Version~^13863~^Pulse OX  
Device Floor3|201201311234|||^Hospital|||**

**OBX|6|CWE|73803-9^CCHD newborn screening sensor type^LN|1|LA19810-3^Single-  
use^LN|||F||201201311234|||^Masimo~^Radical-7~^Version~^13863~^Pulse OX  
Device Floor3|201201311234|||^Hospital|||**

**OBX|7|CWE|73801-3^CCHD newborn screening sensor wrap type^LN|1|LA19813-7^Cloth^LN||||F|||201201311234||||^Masimo~^Radical-7~^Version~^13863~^Pulse OX Device Floor3|201201311234||||^Hospital|||**

**OBX|8|CWE|73800-5^CCHD newborn screening sensor wrap size^LN|1|LA8983-4^size small^LN||||F|||201201311234||||^Masimo~^Radical-7~^Version~^13863~^Pulse OX Device Floor3|201201311234||||^Hospital|||**

**OBX|9|CWE|73698-3^Reason oxygen screening not performed^LN|1|LA19821-0^Early Discharge^LN||||F|||201201311234||||^Masimo~^Radical-7~^Version~^13863~^Pulse OX Device Floor3|201201311234||||^Hospital|||**

**OBX|10|NM|59407-7^Oxygen saturation in Preductal by Pulse Oximetry^LN|1|98|^percent||N||F|||201201311232||||^Masimo~^Radical-7~^Version~^13863~^Pulse OX Device Floor3|201201311232||||^Hospital|||**

**OBX|11|NM|73799-9^Pulse rate Preductal by Oximetry^LN|1|125|/min|100-150|N||F|||201201311232||||^Masimo~^Radical-7~^Version~^13863~^Pulse OX Device Floor3|201201311232||||^Hospital|||**

**OBX|12|NM|73798-1^Perfusion Index Preductal by Oximetry^LN|1|20|^percent|1-20|N||F|||201201311232||||^Masimo~^Radical-7~^Version~^13863~^Pulse OX Device Floor3|201201311232||||^Hospital|||**

**OBX|13|NM|73797-3^Signal Quality Preductal by Oximetry^LN|1||||N||F|||201201311232||||^Masimo~^Radical-7~^Version~^13863~^Pulse OX Device Floor3|201201311232||||^Hospital|||**

**OBX|14|CWE|73796-5^Infant's activity level at the time of the Preductal screen^LN|1|LA11864-8^asleep^LN||||N||F|||201201311232||||^Masimo~^Radical-7~^Version~^13863~^Pulse OX Device Floor3|201201311232||||^Hospital|||**

**OBX|15|NM|59418-4^Oxygen saturation in Postductal by Pulse Oximetry^LN|1|96|^percent||N||F|||201201311233||||^Masimo~^Radical-7~^Version~^13863~^Pulse OX Device Floor3|201201311233||||^Hospital|||**

**OBX|16|NM|73795-7^Pulse rate Postductal by Oximetry^LN|1|125|/min|100-150|N||F|||201201311233||||^Masimo~^Radical-7~^Version~^13863~^Pulse OX Device Floor3|201201311233||||^Hospital|||**

**OBX|17|NM|73794-0^Perfusion Index Postductal by Oximetry^LN|1|20|^percent|1-20|N||F|||201201311233||||^Masimo~^Radical-7~^Version~^13863~^Pulse OX Device Floor3|201201311233||||^Hospital|||**

**OBX|18|NM|73793-2^Signal Quality Postductal by Oximetry^LN|1||||N||F|||201201311233||||^Masimo~^Radical-7~^Version~^13863~^Pulse OX Device Floor3|201201311233||||^Hospital|||**

**OBX|19|CWE|73792-4^Infant's activity level at the time of the Preductal screen^LN|1|LA11864-FOR PILOT AND TRIAL IMPLEMENTATIONS ONLY Version 0.9.3 Page 129 of**

1518^asleep^LN||N||F||201201311233|||^Masimo~^Radical-  
7~^Version~^13863~^Pulse OX Device Floor3|201201311233|||^Hospital||

**OBX|20|NM|57714-8^Obsetric estimation of Gestational  
Age^LN|1|38|wk^week||N||F||201201311233|||201201311233|||^Hospital||**

**OBX|21|NM|8339-4^Body weight measured at  
birth^LN|1|4435|g^gram||N||F||201201311233|||201201311233|||^Hospital||**