



# Impact of Electronic Health Records Implementation on the Early Detection Hearing and Intervention Programs

Discretionary Advisory Committee on Heritable  
Disorders in Newborns and Children  
May 29, 2014

John Eichwald, M.A., Chief

Child Development and Disability (CDD) Branch

Division of Human Development and Disability (DHDD)

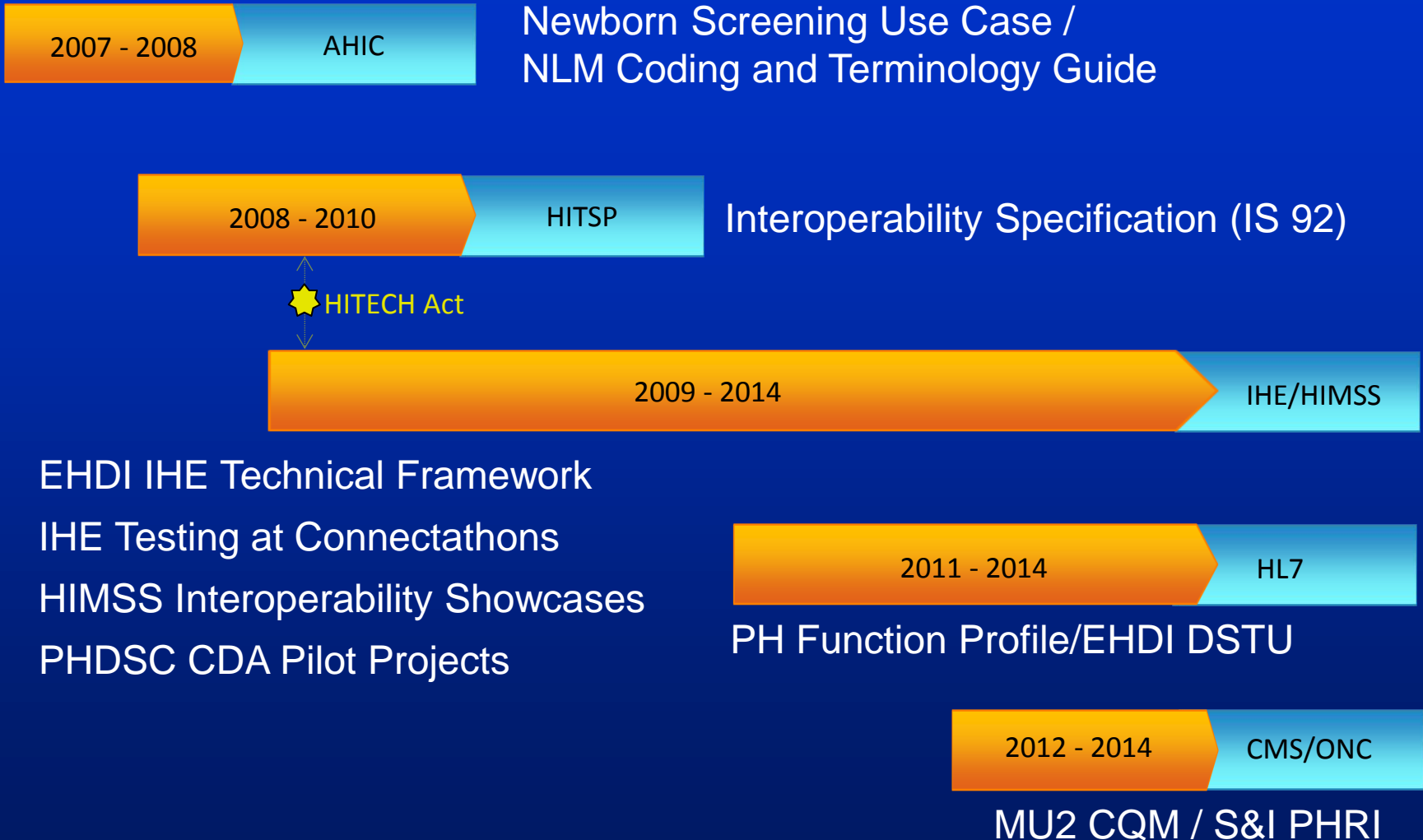
National Center on Birth Defects and Developmental Disabilities (NCBDDD)

Centers for Disease Control and Prevention (CDC)

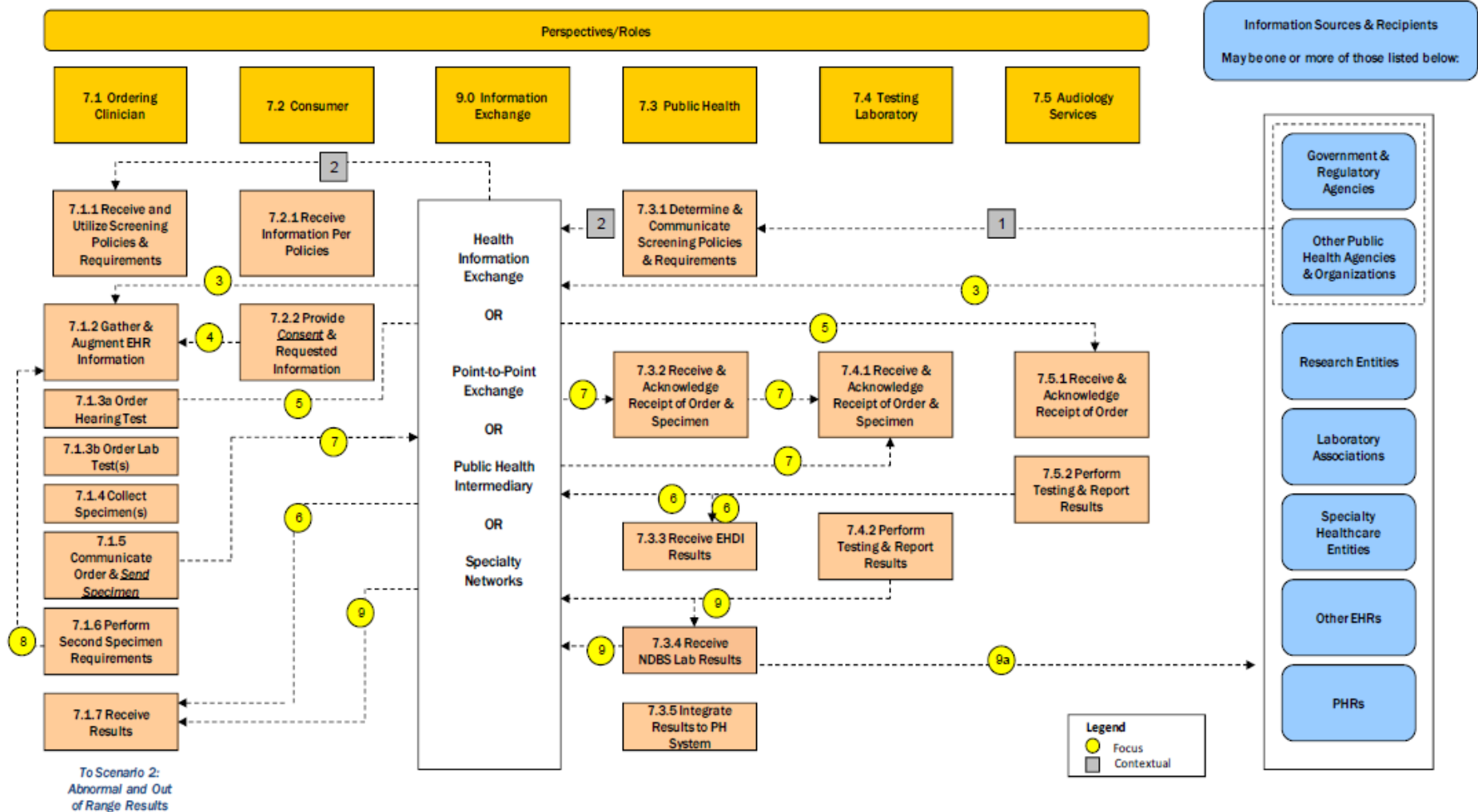


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# Timeline



# AHIC Detailed Use Case Newborn Screening (2008)



# HITSP IS 92: Newborn Screening (2010)



## Did You Know....

HITSP is chaired by Dr. John Halamka, Chief Information Officer of Harvard Medical School.

## HITSP Member Workspace

(password required)

## Public Review and Comment

## Reference Documents

- [Acronyms](#)
- [AHIC Use Cases](#)
- [Conventions](#) (naming and numbering)
- [Glossary](#)
- [Harmonization Framework](#)
- [Interoperability Specifications Overview](#)



## Interoperability Specification

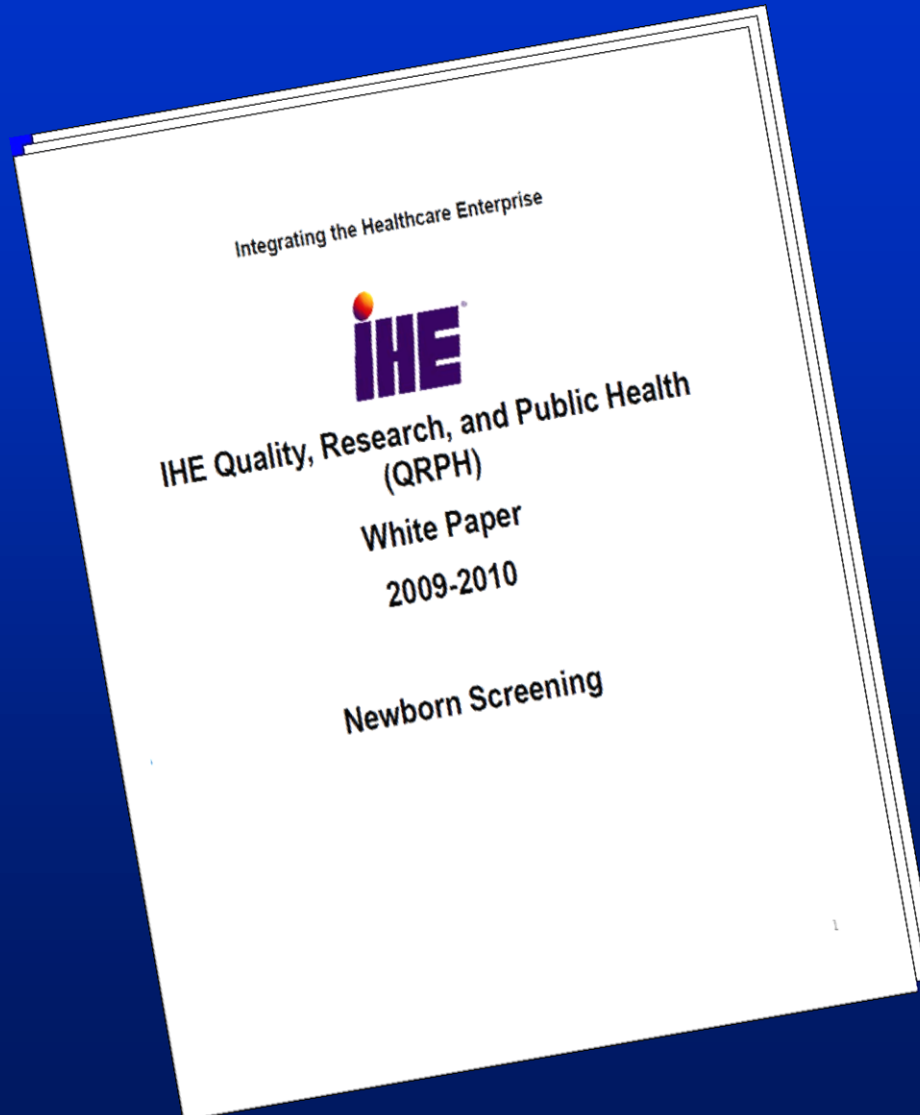
### IS 92 - Newborn Screening Interoperability Specification

The Newborn Screening Interoperability Specification describes the information flows, issues, and system capabilities supporting newborn screening reporting and information exchanges among clinical care settings and public health.

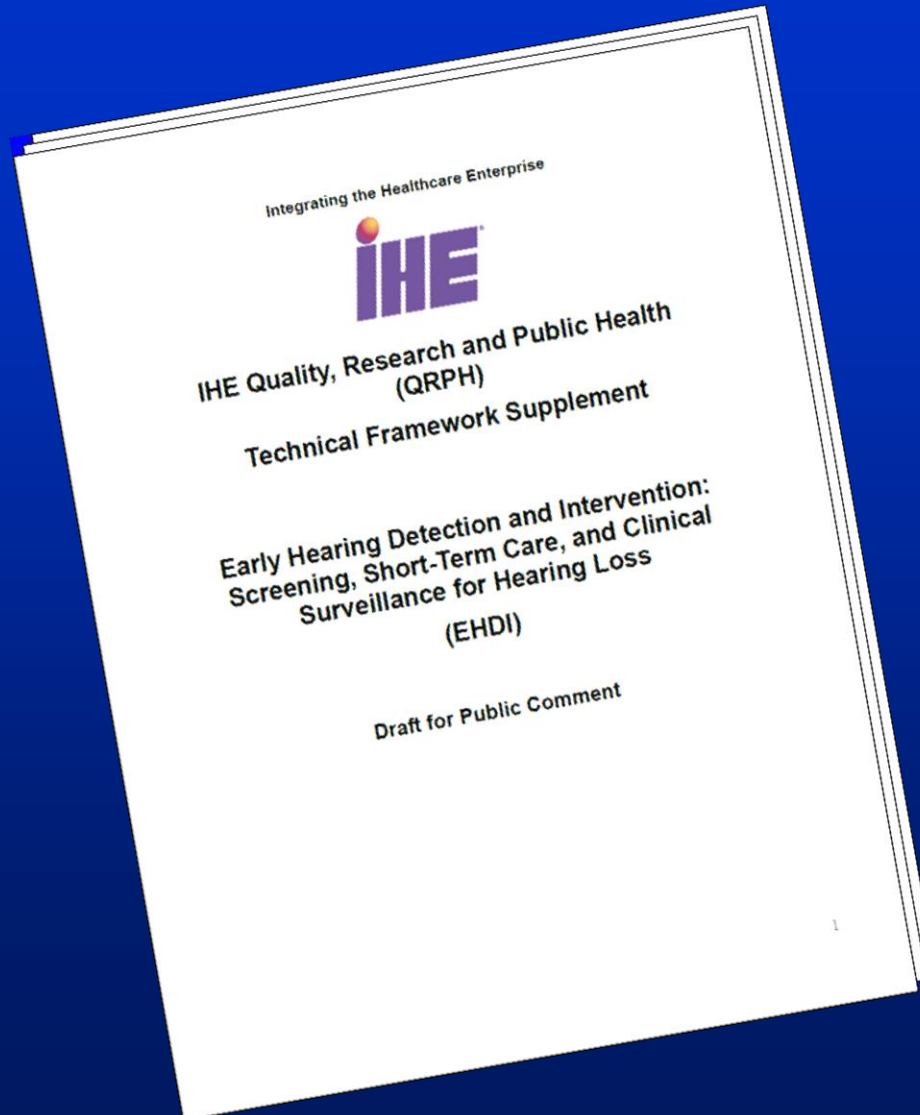
- [View by Topic](#) ✓
- [View by Status](#) ✓
- [View Complete Library](#) ✓

Construct	Title / Version	Referenced by	Status	Document Access
IS 92	Newborn Screening Interoperability Specification Version:1.0	IS 92 V:1.0	Released (Panel Approved)	<a href="#">DOWNLOAD</a>

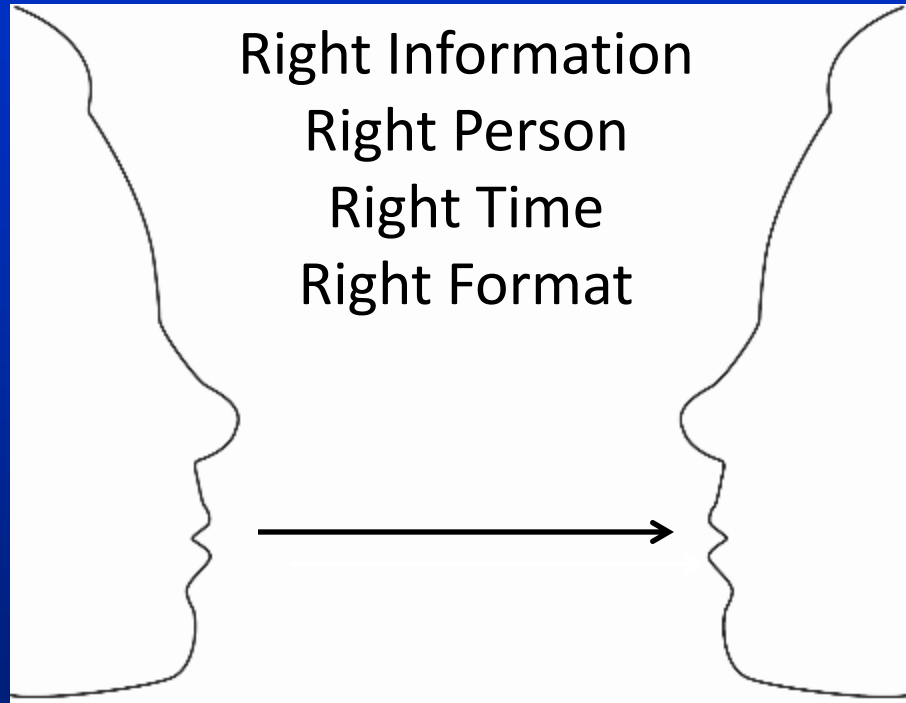
# Integrating the Healthcare Enterprise (IHE) Quality, Research and Public Health (QRPH)



# EHDI IHE QRPH Technical Framework June 2010



# COMMUNICATION (101)



INFORMATION  
SENDER

MESSAGE

INFORMATION  
RECEIVER

# Health Information Standards “Semantic Interoperability”

ICD/CPT  
LOINC  
SNOMED-CT  
RxNorm  
DICOM Images  
Value Sets

CONTENT  
CREATOR





# Newborn Screening Coding and Terminology Guide

Data Standards for Electronic Reporting

- Home
- Views
- Downloads
- HL7
- Resources
- Code Standards
- About
- Updates
- Contact Us

## Conditions View

The Conditions View presents the conditions you selected on a previous screen, and for each condition, the related Enzyme Commission code (when applicable), the Secretary's Advisory Committee on Heritable Disorders in Newborns and Children (SACHDNC) Category, and International Classification of Diseases, Ninth and Tenth Revisions, Clinical Modification (ICD-9-CM and ICD-10-CM) codes.

Condition <sup>1</sup> <i>Choose condition to view related measurements</i>	Abbr <sup>1</sup>	SACHDNC Category <sup>2</sup>	SNOMED CT Code <sup>3</sup>	ICD-9-CM Code <sup>4</sup>	ICD-10-CM Code <sup>5</sup>	Affected Protein <sup>6</sup>	EC# <sup>7</sup>	UniProt Number <sup>8</sup>
--	-------------------	-------------------------------	-----------------------------	----------------------------	-----------------------------	-------------------------------	------------------	-----------------------------

### Conditions screened by Point of Care Testing

#### Hearing Loss

<a href="#">Hearing Loss</a>	HEAR	Core	15188001	389.9	H91.90	N/A	N/A	N/A
------------------------------	------	------	----------	-------	--------	-----	-----	-----

#### Critical Congenital Heart Disease

<a href="#">Critical congenital heart disease</a>	CCHD	Core	None	None	None	N/A	N/A	N/A
---	------	------	------	------	------	-----	-----	-----

### MS/MS (Tandem Mass Spectrometry) Measured Conditions

#### Amino Acid Disorders

<a href="#">Argininemia</a>	ARG	Secondary	23501004	270.6	E72.21	Arginase	3.5.3.1	P05089 P78540
<a href="#">Argininosuccinic aciduria</a>	ASA	Core	41013004	270.6	E72.22	Argininosuccinate lyase	4.3.2.1	P04424
<a href="#">Carbamoyl-phosphate synthase deficiency</a>	CPS	Other	62522004	270.6	E72.29	Carbamoyl-phosphate synthase (ammonia)	6.3.4.16	P31327
<a href="#">Citrullinemia type I</a>	CIT-I	Core	398680004	270.6	E72.23	Argininosuccinate synthase	6.3.4.5	P00966
<a href="#">Citrullinemia type II</a>	CIT-II	Secondary	30529005	270.6	E72.23	Calcium-binding mitochondrial carrier protein Aralar2	None	Q9UJS0
<a href="#">Dihydrolipoamide dehydrogenase deficiency</a>	E3	Core	29914000	270.3	E71.0	Dihydrolipoyl dehydrogenase	1.8.1.4	P09622
<a href="#">Disorders of bipterin</a>	BIOPT-BS	Secondary	237914002	270.1	E70.1	6-pyruvoyltetrahydropterin	4.2.3.12	Q03393

**Search the NLM Value Set Repository**

Query:

Narrow search results by selecting from pull-down menus below:

- CMS eMeasure (NQF Number)**
- Quality Data Model Category**
- Steward**
- Meaningful Use Measures**
- Code System**


[Export Search Results \(Excel\)](#)

Search Results		Value Set Details			
Matched Value Sets					
Download View		Toggle Clear		Page 1 of 1 20 View 1 - 6 of 6	
<input type="checkbox"/>	Name	Type	Code System	Steward	OID
<input checked="" type="checkbox"/>	Hearing Examination	Extensional	SNOMEDCT	NCBDDD	<a href="#">2.16.840.1.114222.4.1.214079.1.1.2</a>
<input type="checkbox"/>	Livebirth	Extensional	SNOMEDCT	NCBDDD	<a href="#">2.16.840.1.114222.4.1.214079.1.1.1</a>
<input type="checkbox"/>	Medical Reasons	Extensional	SNOMEDCT	NCBDDD	<a href="#">2.16.840.1.114222.4.1.214079.1.1.7</a>
<input type="checkbox"/>	Newborn Hearing Screen Left	Extensional	LOINC	NCBDDD	<a href="#">2.16.840.1.114222.4.1.214079.1.1.3</a>
<input type="checkbox"/>	Newborn Hearing Screen Right	Extensional	LOINC	NCBDDD	<a href="#">2.16.840.1.114222.4.1.214079.1.1.4</a>
<input type="checkbox"/>	Pass Or Refer	Extensional	SNOMEDCT	NCBDDD	<a href="#">2.16.840.1.114222.4.1.214079.1.1.6</a>
Download View		Page 1 of 1 20		View 1 - 6 of 6	



VADS Navigation Menu >>

**View Information**

**View Name** IHE EHD: Screening, Short-Term Care, and Clinical Surveillance for Hearing Loss  [Download View](#)

**View Description** Value sets associated with IHE Early Hearing Detection and Intervention: Screening, Short-Term Care, and Clinical Surveillance for Hearing Loss (EHD)

**View Status** Published


**View Status Date** 12/16/2010

**View Version** 2

**View Version Status** Published

**View Version Status Date** 02/15/2012

**View Version Description** Updated JCIH-EHDI Newborn Hearing Loss Diagnosis value set - added permanent concept.














**View Notes** The Early Hearing Detection and Intervention Content Profile (IHE EHD Content Profile) is aimed  [Subscribe](#)

**Version History**

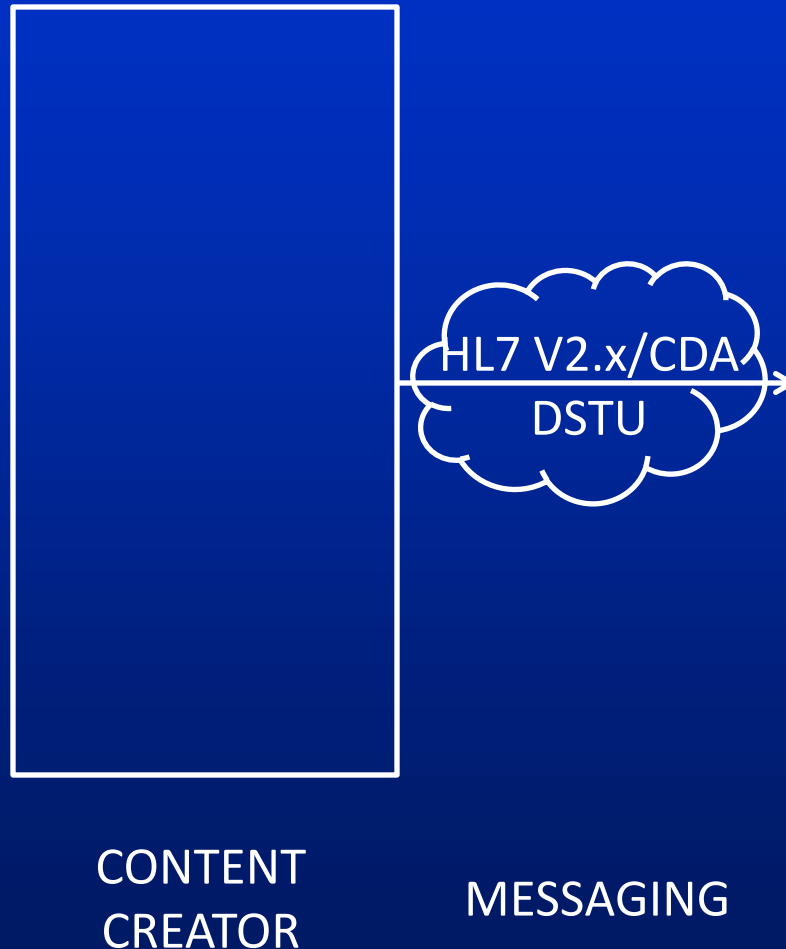
◀ Version 2 ▶

(Current)

13 Value Sets found 

Value Set Code	Value Set Name	Version #	Value Set OID	
<input type="checkbox"/> PHVS_HearingLossRiskFactors_JCIH_EHDI	JCIH-EHDI Hearing Loss Risk Factors	1	1.3.6.1.4.1.19376.1.7.3.1.1.15.2.11	 <a href="#">Details</a>
<input type="checkbox"/> PHVS_HearingLossRiskFactorsProcedures_JCIH_EHDI	JCIH-EHDI Hearing Loss Risk Factors - Procedures	1	1.3.6.1.4.1.19376.1.7.3.1.1.15.2.12	 <a href="#">Details</a>
<input type="checkbox"/> PHVS_HearingScreenLeft_JCIH_EHDI	JCIH-EHDI Hearing Screen Left	1	1.3.6.1.4.1.19376.1.7.3.1.1.15.2.8	 <a href="#">Details</a>
<input type="checkbox"/> PHVS_HearingScreenRight_JCIH_EHDI	JCIH-EHDI Hearing Screen Right	1	1.3.6.1.4.1.19376.1.7.3.1.1.15.2.9	 <a href="#">Details</a>
<input type="checkbox"/> PHVS_NewbornHearingLossDiagnosis_JCIH_EHDI	JCIH-EHDI Newborn Hearing Loss Diagnosis	2	1.3.6.1.4.1.19376.1.7.3.1.1.15.2.14	 <a href="#">Details</a>
<input type="checkbox"/> PHVS_NewbornHearingLossReferrals_JCIH_EHDI	JCIH-EHDI Newborn Hearing Loss Referrals	1	1.3.6.1.4.1.19376.1.7.3.1.1.15.2.16	 <a href="#">Details</a>
<input type="checkbox"/> PHVS_NewbornHearingProcedure_JCIH_EHDI	JCIH-EHDI Newborn Hearing Procedure	1	1.3.6.1.4.1.19376.1.7.3.1.1.15.2.17	 <a href="#">Details</a>
<input type="checkbox"/> PHVS_NICUServiceDeliveryLocation_JCIH_EHDI	JCIH-EHDI NICU Service Delivery Location	1	1.3.6.1.4.1.19376.1.7.3.1.1.15.2.13	 <a href="#">Details</a>
<input type="checkbox"/> PHVS_OutpatientEncounter_JCIH_EHDI	JCIH-EHDI Outpatient Encounter	1	1.3.6.1.4.1.19376.1.7.3.1.1.15.2.2	 <a href="#">Details</a>
<input type="checkbox"/> PHVS_ProcedureDeclined_JCIH_EHDI	JCIH-EHDI Procedure Declined	1	1.3.6.1.4.1.19376.1.7.3.1.1.15.2.20	 <a href="#">Details</a>
<input type="checkbox"/> PHVS_ReasonForNoFollowUpPatientReason_JCIH_EHDI	JCIH-EHDI Reason for no Follow-up - Patient Reason	1	1.3.6.1.4.1.19376.1.7.3.1.1.15.2.7	 <a href="#">Details</a>
<input type="checkbox"/> PHVS_ReasonForNoHearingLossDiagnosis_JCIH_EHDI	JCIH-EHDI Reason for no Hearing Loss Diagnosis	1	1.3.6.1.4.1.19376.1.7.3.1.1.15.2.15	 <a href="#">Details</a>
<input type="checkbox"/> PHVS_JointCommissionMedicalReason_JCIH_EHDI	Joint Commission Medical Reason	1	1.3.6.1.4.1.33895.1.3.0.75	 <a href="#">Details</a>

# Health Information Messaging “Technical Interoperability”



# Hearing Loss Panel (HL7 v2.5.1)

OBR|17|128993 ^ ST ELSEWHERE HOSPITAL^ 9999999999 ^NPI|999555^  
TNSPHLAB^77D7777777^CLIA |54111-0^Newborn hearing loss panel^LN  
||201010141853||^VH|||201010151121||1111111111^Smiles^Minnie^^Dr^^N  
PI&2.16.840.1.113883.4.6&ISO^L ^^NPI^^^^^^MD|||||201010160918|||F

OBX|1|TX|57700-7^Hearing loss newborn screening comment/discussion  
^LN||Any baby with clinical features suggestive of hearing loss requires clinical  
and diagnostic follow-up regardless of whether the NMS result is normal or  
abnormal.||||N|||F

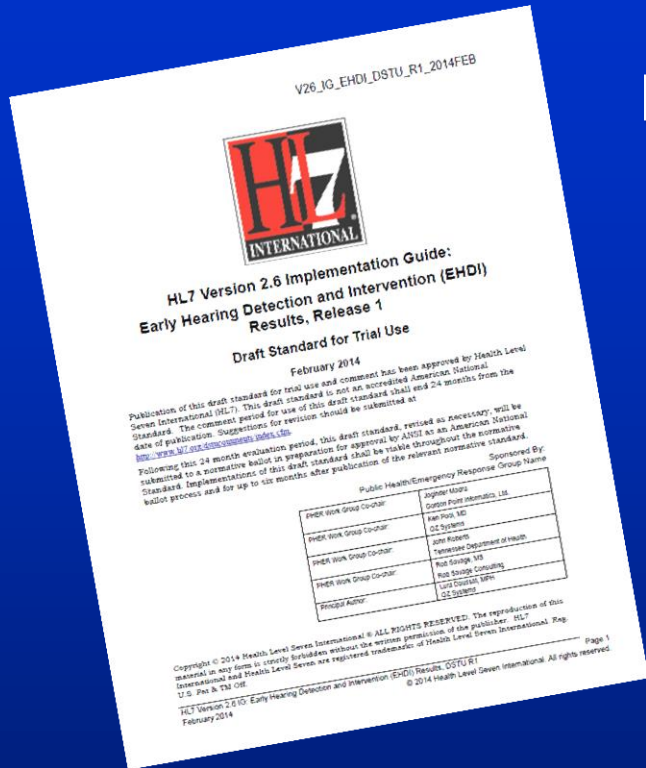
OBX|2|CE|54109-4^Newborn hearing screen - right^LN||LA10392  
1^Pass^LN||||N|||F

OBX|3|CE|54108-6^Newborn hearing screen - left^LN||LA10392  
1^Pass^LN||||N|||F

OBX|4|CE|54106-0^Newborn hearing screen method^LN||LA10388-9^Auditory  
brain stem response^LN||||N|||F

# EHDI HL7 Implementation Guide

## HL7 Version 2.6 Implementation Guide: Early Hearing Detection and Intervention (EHDI) Results, Release 1 Draft Standard for Trial Use February 2014



This implementation guide focuses on the secure transmission of newborn hearing screening results from screening equipment to a public health program by specifying the interface through an Electronic Health Record (EHR) or a device manager system

# EHDI DSTU

intended to facilitate the exchange of:

- sending and receiving
  - screening results of each ear
  - reason screen not done
  - patient demographics
  - hearing loss risk indicators (risk factors)
  - date, time and duration of test(s)
  - screener ID
  - device details
- reporting errors about the messaging process
- acknowledging receipt of information



# EHDI HL7 Implementation Guide

**Table 5-4 Patient Identification Segment (PID)**

Cardinality	Optional ity	Value Set	HL7 Element Name	Comments/Descriptions
[1..*]	R		Patient Identifier List	This field is used by the healthcare facility to uniquely identify a patient. This may include medical record number, billing number, birth certificate ID, national unique ID.  NHSN Cardinality: NHSN currently supports up to 4 patient identifiers.
[1..*]	R	HL70200	Patient Name	This field contains the patient's name or aliases. When the name
[0..1]	RE		Mother's Maiden Name	This field contains the family name under which the mother was born.
[0..1]	R		Date/Time of Birth	Patient's date and time of birth. The time zone component is required. Format: YYYYMMDDHHMM[SS[.S[S[S[S]]]]]
[0..*]	RE	HL70005	Race	This field refers to the patient's race.
[0..1]	RE	HL70189	Ethnic Group	This field further defines patient ancestry. The user MAY use table

PID|1||MRN123||Jones^BabyGirl|James|201201300005-0600|F||2106-3^White^HL70005~1002-5^American Indian or Alaska Native^HL70005|201 Street^^Arlington^TX^99999^USA||^PRN^PH^^011^555^555-5555||eng^English^ISO6392|||98766|||1234555|N^Not Hispanic or Latino^HL70189|HospitalABC|N|1|





# CCHD HL7 Implementation Guide

Draft Standard for Trial Use (DSTU):

*“Implementation Guide for the Messaging of Newborn Screening using pulse oximetry devices for Critical Congenital Heart Defects (CCHD)”*

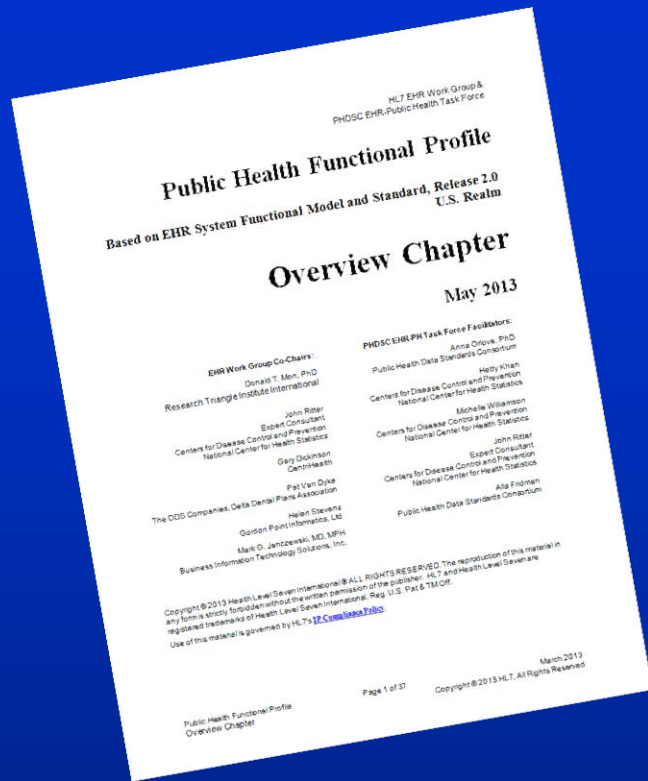
Version 2.6 HL7 Approval – June 2012

This guide implementation focuses on standardizing on how CCHD newborn screening information is transmitted from a point of care device to an interested consumer such as public health



# Public Health Functional Profile

Based on EHR System Functional Model and Standard Release 2.0 (U.S. Realm)



The initial PHFP balloted in 2011 identified functional requirements and conformance criteria for public health-clinical information collection, management and exchanges that included three public health domains: Early Hearing, Vital Records and Chronic Disease (Cancer Surveillance)

Release 2.0 added Public Health Laboratory, Health Statistics, Occupational Disease, Injury & Fatality, Birth Defects, Deep Vein Thrombosis/Pulmonary Embolism and Adverse Events

# Public Health Functional Profile

- Care Provision #2.6
- Conformance Criteria #9

The system SHOULD provide the ability to

*capture and store newborn hearing screening results from devices and transmit those results to other systems (e.g., to public health programs)*

# HL7 Clinical Document Architecture (CDA)

## Six Core Characteristics

- **Persistence** – A clinical document continues to exist in an unaltered state, for a time period defined by local and regulatory requirements.
- **Stewardship** – A clinical document is maintained by an organization entrusted with its care.
- **Potential for authentication** - A clinical document is an assemblage of information that is intended to be legally authenticated.
- **Context** - A clinical document establishes the default context for its contents.
- **Wholeness** - Authentication of a clinical document applies to the whole and does not apply to portions of the document without the full context of the document.
- **Human readability** – A clinical document is human readable.

# XML + XSLT = Human Readability

## XML Code:

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- Edited by John Eichwald -->
<NHS>
  <ehdi>
    <Ear>Left </Ear>
    <Result>Did Not Pass </Result>
    <Date>01/02/2014 </Date>
    <Screener>Izza Screener </Screener>
  </ehdi>
  <ehdi>
    <Ear>Right </Ear>
    <Result>Pass </Result>
    <Date>01/02/2014 </Date>
    <Screener> Izza Screener </Screener>
  </ehdi>
  <ehdi>
    <Ear>Left </Ear>
    <Result>Pass </Result>
    <Date>01/03/2014 </Date>
    <Screener>Ima Audiologist </Screener>
  </ehdi>
  <ehdi>
    <Ear>Right </Ear>
    <Result>Pass </Result>
    <Date>01/03/2014 </Date>
    <Screener>Ima Audiologist </Screener>
  </ehdi>
</NHS>
```

## XSLT Code:

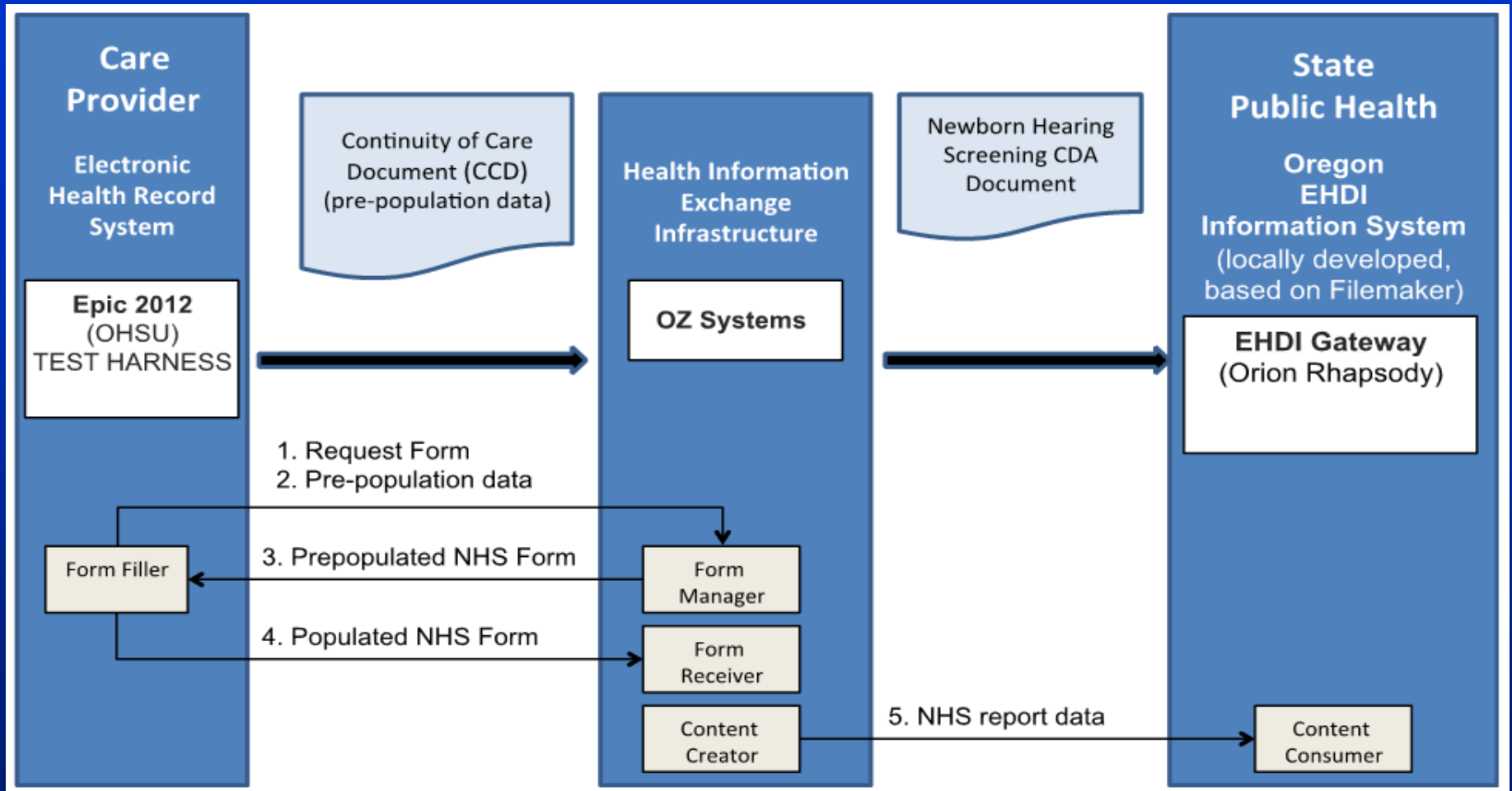
```
<?xml version="1.0" encoding="ISO-8859-1"?>
<!-- Edited by John Eichwald -->
<xsl:stylesheet version="1.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
  <xsl:template match="/">
    <html>
      <body>
        <h2>Newborn Hearing Screening Results</h2>
        <table border="1">
          <tr bgcolor="#9acd32">
            <th style="text-align:left">Date</th>
            <th style="text-align:left">Ear</th>
            <th style="text-align:left">Result</th>
            <th style="text-align:left">Screener</th>
          </tr>
          <xsl:for-each select="NHS/ehdi">
            <tr>
              <td><xsl:value-of select="Date"/></td>
              <td><xsl:value-of select="Ear"/></td>
              <td><xsl:value-of select="Result"/></td>
              <td><xsl:value-of select="Screener"/></td>
            </tr>
          </xsl:for-each>
        </table>
      </body>
    </html>
```

## Result:

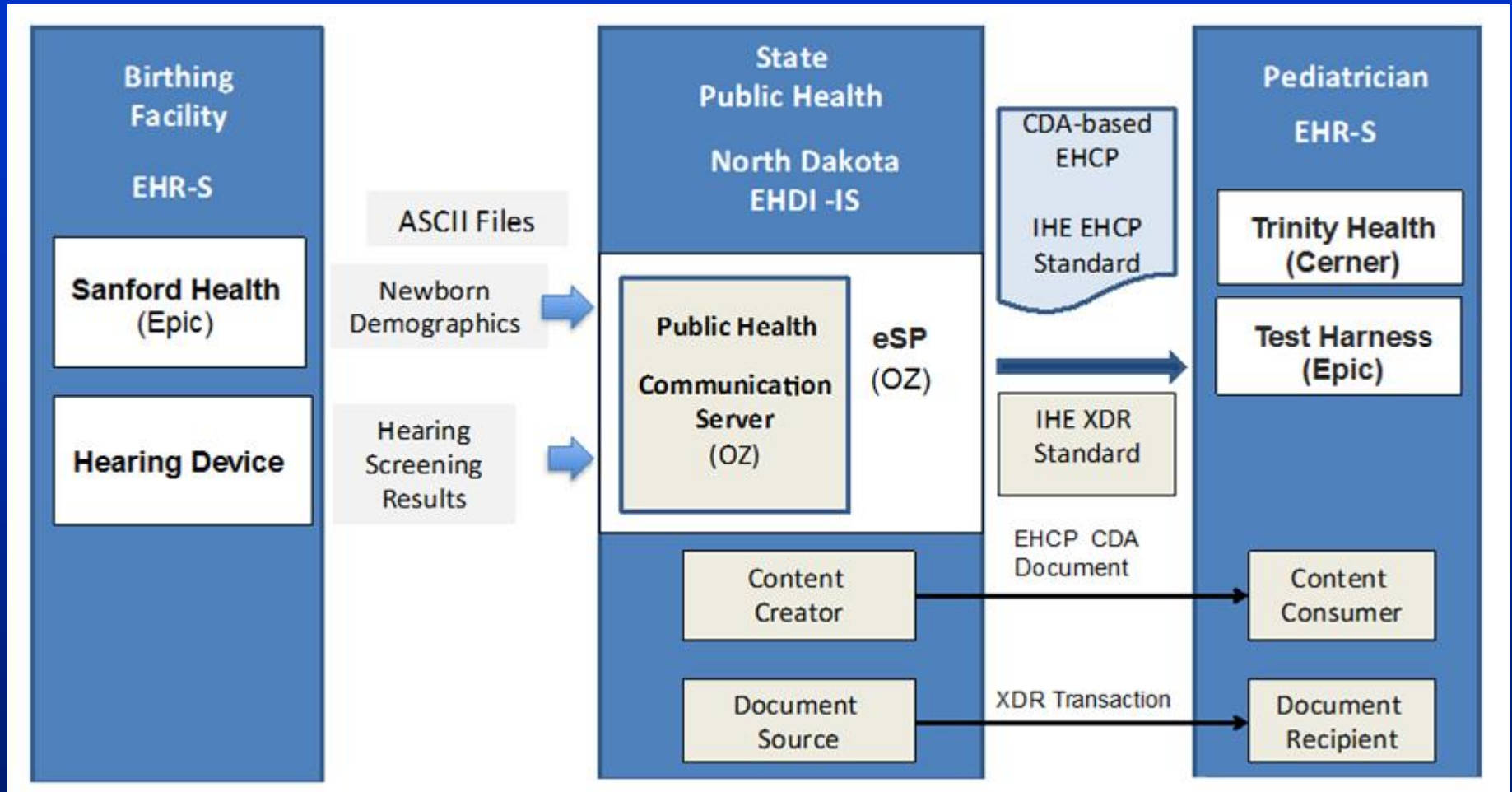
### Newborn Hearing Screening Results

Date	Ear	Result	Screener
01/02/2014	Left	Did Not Pass	Izza Screener
01/02/2014	Right	Pass	Izza Screener
01/03/2014	Left	Pass	Ima Audiologist
01/03/2014	Right	Pass	Ima Audiologist

# EHDI CDA Pilot Project Architecture (2013) Oregon



# EHDI CDA Pilot Project Architecture (2013) North Dakota

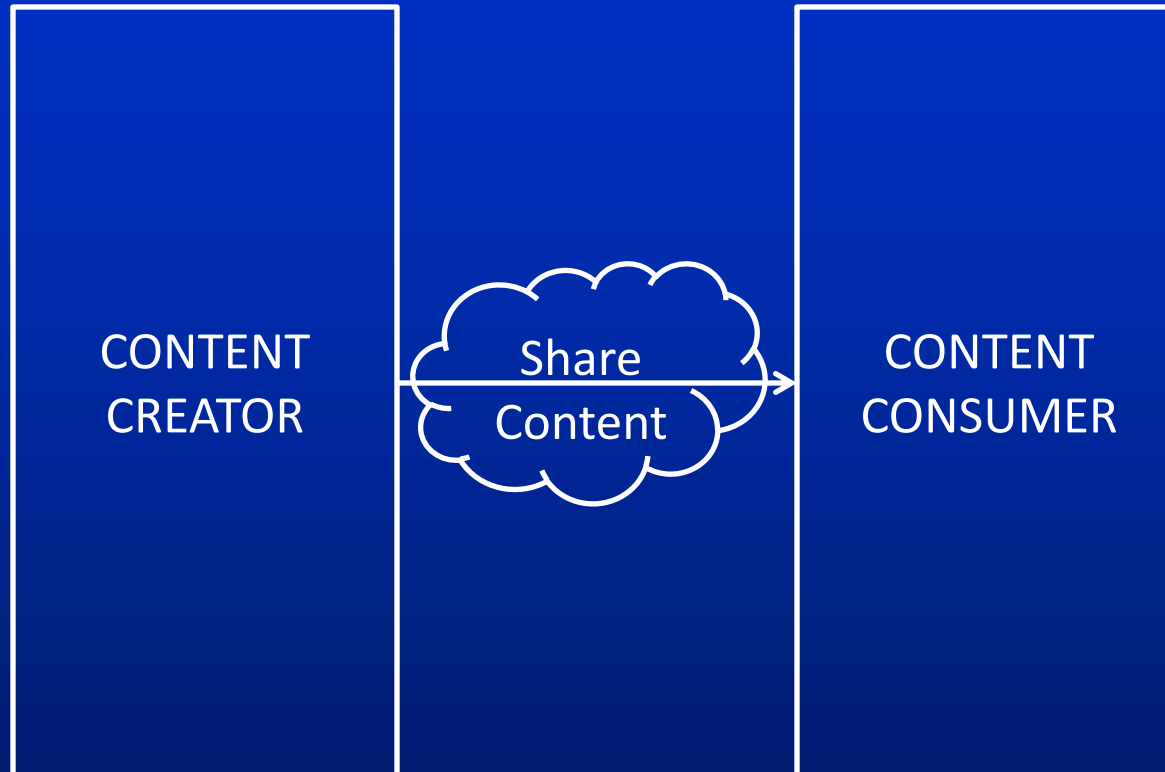


# HL7 Consolidated CDA Standard

Section	Description
<b>Header</b>	Patient information and demographics
<b>Allergies, Adverse Reactions, and Alerts</b>	Includes status and severity of each.
<b>Encounters</b>	Surgeries, ED visits, etc.
<b>Immunizations</b>	Immunizations and vaccines
<b>Medications</b>	As prescribed by the provider
<b>Care Plan</b>	Planned activities and encounters
<b>Discharge Medications</b>	Part of hospital discharge summary
<b>Reason for Referral</b>	Written reason for referral
<b>Problem List</b>	Concerns, complaints, and observations
<b>Procedures</b>	History of procedures
<b>Functional and Cognitive Status</b>	List of impairments
<b>Results</b>	Includes laboratory tests
<b>Social History</b>	Observations like smoking, drinking, etc.
<b>Vital Signs</b>	Includes height, weight, blood pressure, etc.
<b>Discharge Instructions</b>	Written discharge instructions



# Health Information Processing “Process Interoperability”



specifies the process to implement and comply with both content and messaging standards

# **Integrating the Healthcare Enterprise (IHE) Quality, Research & Public Health (QRPH) EHDI Profiles & Technical Frameworks**

- **Quality Measure Execution for Early Hearing (QME-EH)**
  - QME-EH specifies a Quality Reporting Document Architecture (QRDA) Category I document for the “hearing screening prior to hospital discharge” clinical quality measure
- **Early Hearing Care Plan (EHCP) / Hearing Plan of Care (HPoC)**
  - Defines content of an early hearing care plan which can be made available to authorized care providers as jurisdictionally directed by a Public Health Agency. The EHCP covers detection, documentation and intervention for hearing loss.
- **Early Hearing Detection and Intervention-Workflow Document (EHDI-WD) *(NEW)***
  - Utilizes workflow tasks to construct the EHDI workflow for performing the newborn hearing screening, making referrals (if needed), while collecting the information into a Early Hearing Care Plan which provides guidance on newborn hearing care practices.

# National Quality Forum (NQF) Measures

## Centers for Disease Control and Prevention (CDC)

- NQF #1354: Hearing screening prior to hospital discharge
- NQF#1360: Audiological evaluation no later than 3 months of age
- NQF#1361: Intervention no later than 6 months of age

## Health Resources and Services Administration (HRSA)

- NQF #1351: Proportion of infants covered by Newborn Bloodspot Screening

## National Committee for Quality Assurance (NCQA)

- NQF #1402: Newborn hearing screening

# CMS Stage 2 EHR Incentive Program

EHR incentive payments requires hospitals to report on 16 of 29 inpatient Clinical Quality Measures that cover at least 3 domains

NQF1354/CMS31: “Hearing screening prior to hospital discharge”: Clinical Process/Effectiveness domain

Retooled EHDI CQM as an “eMeasure” for EHR

- Lantana Consulting Group
- MITRE Corporation
- Oklahoma Foundation for Medical Quality

# AHRQ

## U.S. Health Information Knowledgebase (USHIK)



Agency for Healthcare Research and Quality  
Advancing Excellence in Health Care

### United States Health Information Knowledgebase

- [USHIK Home](#)
- [Standards](#)
- [HITSP](#)
- [Common Formats](#)
- [Meaningful Use](#)
- [All-Payer Claims](#)
- [Draft Measures](#)
- [Child EHR Format](#)
- [Feedback / Help](#)

### Hearing Screening Prior To Hospital Discharge - EHDI\_1a

CMS31v3

Versions: [CMS31v1, December 2012 EH](#) · [CMS31v2, April 2013 EH](#) · [CMS31v3, April 2014 EH](#)

[Compare Versions](#)

#### At A Glance

[Downloads/Resources](#)

[Population Criteria](#)

[Data Criteria](#)

[Supplemental Data Elements](#)

[Reporting Stratification](#)

[Metadata](#)

[References](#)

This measure assesses the proportion of births that have been screened for hearing loss before hospital discharge.

<b>ID</b>	31	<b>Improvement Notation</b>	An increase in the rate.
<b>NQF</b>	1354	<b>Measurement Period</b>	January 1, 20xx through December 31, 20xx
<b>Version</b>	3	<b>Transmission Format</b>	None
<b>Release Package</b>	<a href="#">April 2014 EH</a>	<b>Scoring</b>	Proportion
<b>GUID</b>	0924fbae-3fdb-4d0a-aab7-9f354e699fde	<b>Type</b>	Process
<b>Eligibility</b>	<a href="#">Eligible Hospitals</a>	<b>Measure Set</b>	Early Hearing Detection and Intervention (EHDI)
<b>Domain</b>	<a href="#">Clinical Processes/Effectiveness</a>	<b>Measure Steward</b>	CDC National Center on Birth Defects and Developmental Disabilities

**Initial Patient Population:** All live births discharged during the measurement time period born at a facility

**Numerator:**

All live births during the measurement time period born at a facility and screened for hearing loss prior to discharge, or not being screened due to medical reasons or medical exclusions.,  
**Exclusions:** Not applicable

**Denominator:**

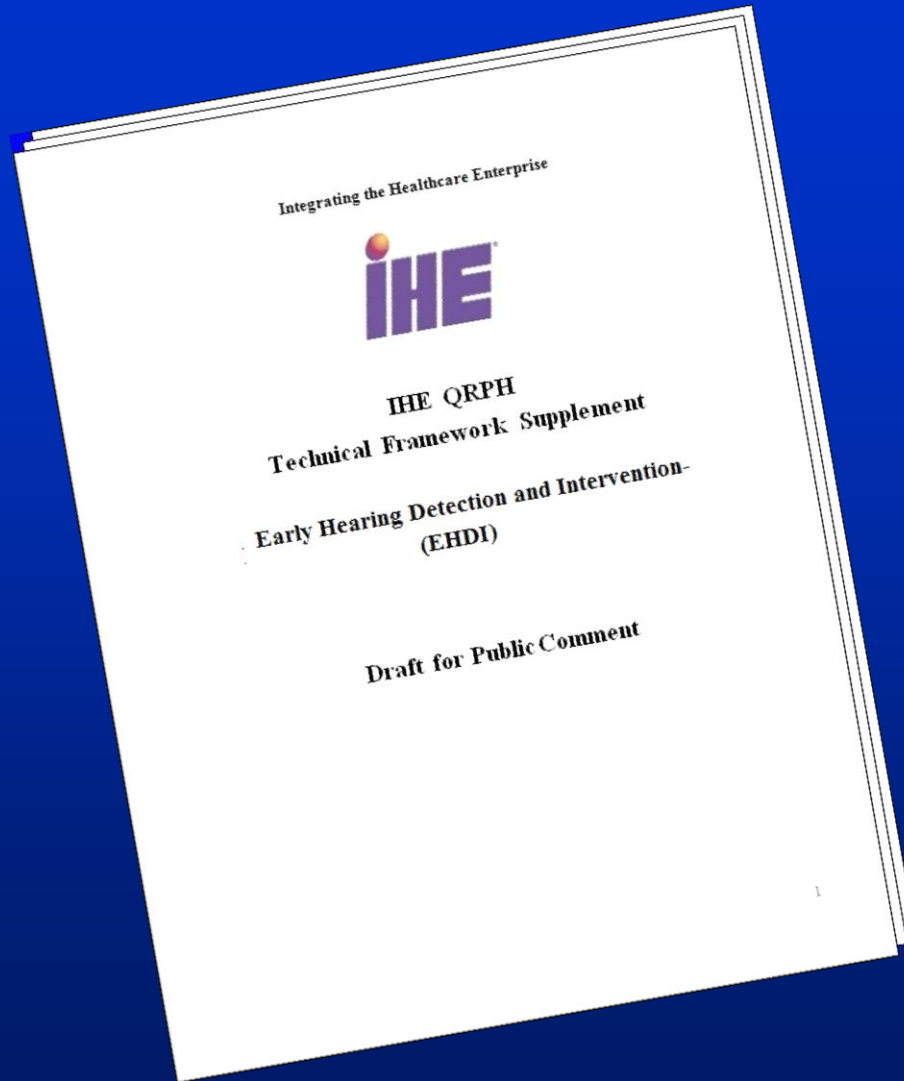
All live births discharged during the measurement time period born at a facility,  
**Exceptions:** None, **Exclusions:** Patient deceased prior to discharge and has not received hearing screening.

# 2014 ONC Certified Health IT Product List

EHR systems and modules that have been tested and certified as fulfilling Clinical Quality Measures (CQM) domain requirements

- Acmeware, Inc.
- Allscripts
- Cerner Corporation
- CitiusTech, Inc.
- Dynamic Health IT, Inc.
- Epic Systems Corporation
- FDB (First Databank, Inc.)
- HCA Information Technology & Services, Inc.
- Health Care Systems, Inc.
- Healthcare Management Systems, Inc.
- Iatric Systems, Inc.
- IHM Services Company
- Massachusetts eHealth Collaborative (MAeHC)
- McKesson
- MEDHOST, Inc.
- Medisolv Inc
- Midas+ Solutions
- Northwestern University
- NTT DATA, Inc.
- QuadraMed Corporation
- Rural Wisconsin Health Cooperative
- Siemens Medical Solutions USA Inc

# 2014 EHDI IHE QRPH Technical Framework



Public Comment period: June 6 – July 6  
[http://www.ihe.net/QRPH\\_Public\\_Comments](http://www.ihe.net/QRPH_Public_Comments)

# Hearing Plan of Care (HPoC)

## Hearing Plan of Care

<b>Patient</b>	Baby Girl Hale		
<b>Date of birth</b>	April 2, 2013, 04:30:00, EST		
<b>Sex</b>	Female		
<b>Race</b>	White		
<b>Ethnicity</b>	Hispanic or Latino		
<b>Contact info</b>	40 Happy Valley Road Westerly, RI 02891, US Tel: +1-401-315-1234		
<b>Patient IDs</b>	7000051-8 1.3.6.1.4.1.21367.13.60.15		
<b>Document Id</b>	1826133985 MDHT		
<b>Document Created</b>	April 2, 2013, 16:33:48, EST		
<b>Healthcare service</b>	Treatment plan from April 2, 2013, 16:33:48, EST		
<b>Performer</b>	Jan Smith		
<b>Author</b>	John Brown, MD, Westerly Birthing Facility		
<b>Contact info</b>	2001 NE Green Oaks Blvd Westerly, RI 02891, US Telecom information not available		
<b>Encounter Id</b>	9937012 2.16.840.1.113883.19	<b>Encounter Type</b>	Display name for type of encounter
<b>Encounter Date</b>	From April 1, 2013, 10:00:00, EST to April 2, 2013, 16:33:48, EST		
<b>Encounter Location</b>	Westerly Birthing Hospital of		
<b>Document maintained by</b>	OZ Systems		
<b>Contact info</b>	2001 NE Green Oaks Blvd Arlington, TX 76006, US Tel: +1-214-631-6161		

### Table of Contents

- [HEARING PLAN OF CARE](#)
- [RISK INDICATORS FOR NEWBORN](#)
  - [RISK INDICATORS FOR HEARING LOSS](#)
  - [OTHER RISK INDICATORS](#)
- [PROCEDURES AND INTERVENTIONS](#)
- [DIAGNOSTIC TESTS AND/OR LABORATORY DATA](#)
- [ACTIVE PROBLEMS](#)



# Hearing Plan of Care (HPoC)

## HEARING PLAN OF CARE

- Provide parents with information about hearing, speech, and language milestones
- Provide ongoing developmental screening (and referral when indicated) per the AAP "Bright Futures Guidelines, 3rd Ed."
- Refer promptly for audiology evaluation when there is any parental concern<sup>‡</sup> regarding hearing, speech, or language development
- Refer for audiology evaluation (at least once before age 30 months) infants who have any risk indicators for later-onset hearing loss
- Provide vision screening (and referral when indicated) as recommended in the AAP "Bright Futures Guidelines, 3rd Ed."
- Identify and aggressively treat middle ear disease

## RISK INDICATORS FOR NEWBORN

These are all the risks for this newborn.

### RISK INDICATORS FOR HEARING LOSS

No Risk Indicators for Hearing Loss.

### OTHER RISK INDICATORS

No other risk indicators.

## PROCEDURES AND INTERVENTIONS

This is the list of the baby's procedures that had been performed before being discharged. No information provided about procedures.

## DIAGNOSTIC TESTS AND/OR LABORATORY DATA

Context Information	
Type of Test:	Newborn Hearing Loss Panel
Date of Screening Outcome:	11/28/2013 12:00am
Ordered by:	Dr. John Brown
Outcome Authored by:	Oz Systems
LEFT EAR Outcome:	PASS
RIGHT EAR Outcome:	MEDICAL EXEMPTION

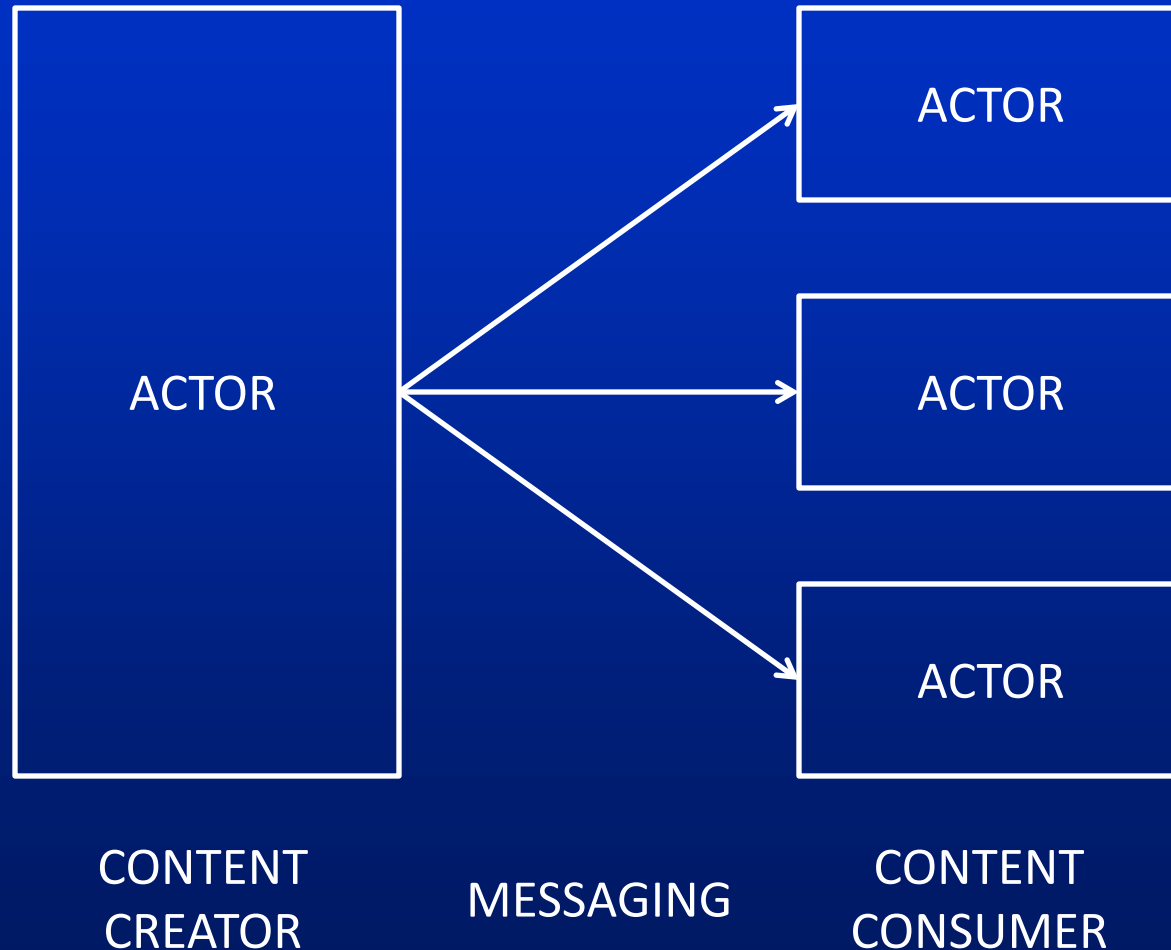
History of Testing:

Date/Time	Ear	Test Type	Result/Interpretation	Reason (if not tested or no result available)
04/02/2013 1:00pm	Left Ear	Automated auditory brainstem response	P / FAIL	
04/02/2013 1:15pm	Left Ear	Automated auditory brainstem response	F / PASS	
04/02/2013 1:00pm	Right Ear	N/A	Medically not indicated	The ear could not be tested for medical reasons.

## ACTIVE PROBLEMS

This is the list of the baby's active concerns at the point of discharge. These problems are taken into consideration in creating the Hearing Plan of Care.

# Newborn Admission Notification Information (NANI)



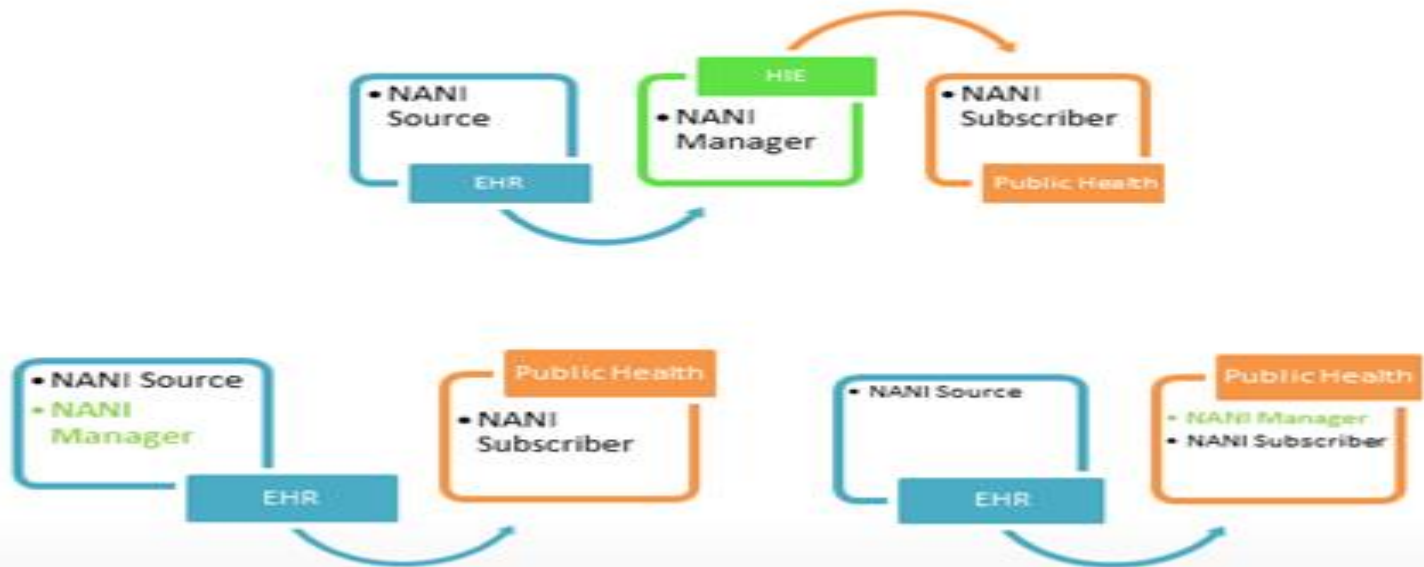
# EHDI NANI

- Automates transfer of basic patient admission information on a newborn from a Birthing Hospital EHR to Public Health (PH)
- Describes the content to be communicated by a hospital EHR to PH
- Facilitates effective communication among hospitals, PH, and PCPs
- Provides a timely and accurate denominator of hospital births that supports quality measure reporting

NANI is being implemented for EHDI but could be used for other public health programs such as: Immunization Programs, Newborn Bloodspot Screening, Critical Congenital Heart Disease, or Communicable Disease Reporting

# NANI Manager

## Jurisdictionally-defined Actor Grouping in NANI Profile



**Labor&Delivery**



**Newborn Screening**



HL7 v2

IHE Newborn Admission Notification Information (NANI)

**State EHDI Program**



HL7 v2

HL7 EHDI Messaging Data Standard Trial Use (DSTU)

HL7 HQMF

e-Measure Definition

CQM EHDI Clinical Quality Measure (CMS 31v1/NQF 1354)

IHE Early Hearing Care Plan (EHCP)

HL7 CDA R2



**Medical Home**



**Specialist**



IHE EHDI Cross-enterprise Workflow Document

Care Tasks & States

IHE Quality Measure Execution (QME-EH)

HL7 QRDA

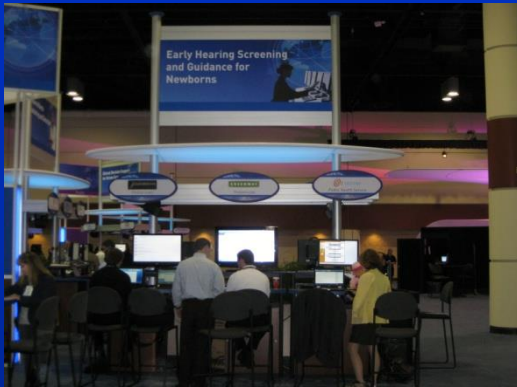


**Federal Reporting**



# Healthcare Information and Management Systems Society and PHI Conference Interoperability Showcases

HIMSS 2011  
(Orlando)



PHI 2011  
(Atlanta)



HIMSS 2012  
(Las Vegas)



HIMSS 2013  
(New Orleans)



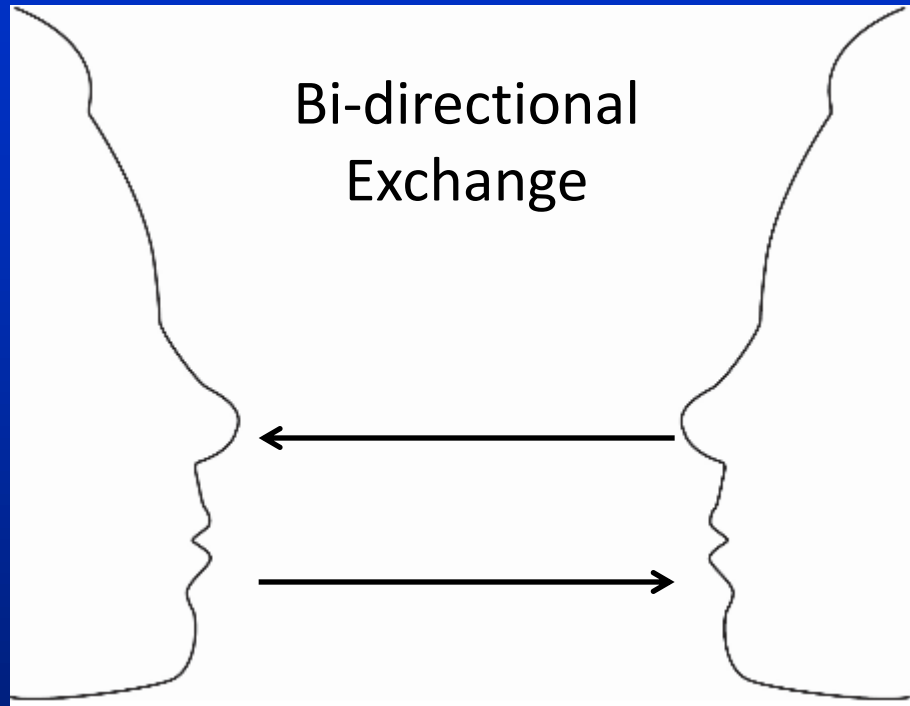
HIMSS 2014  
(Orlando)



PHI 2014  
(Atlanta)



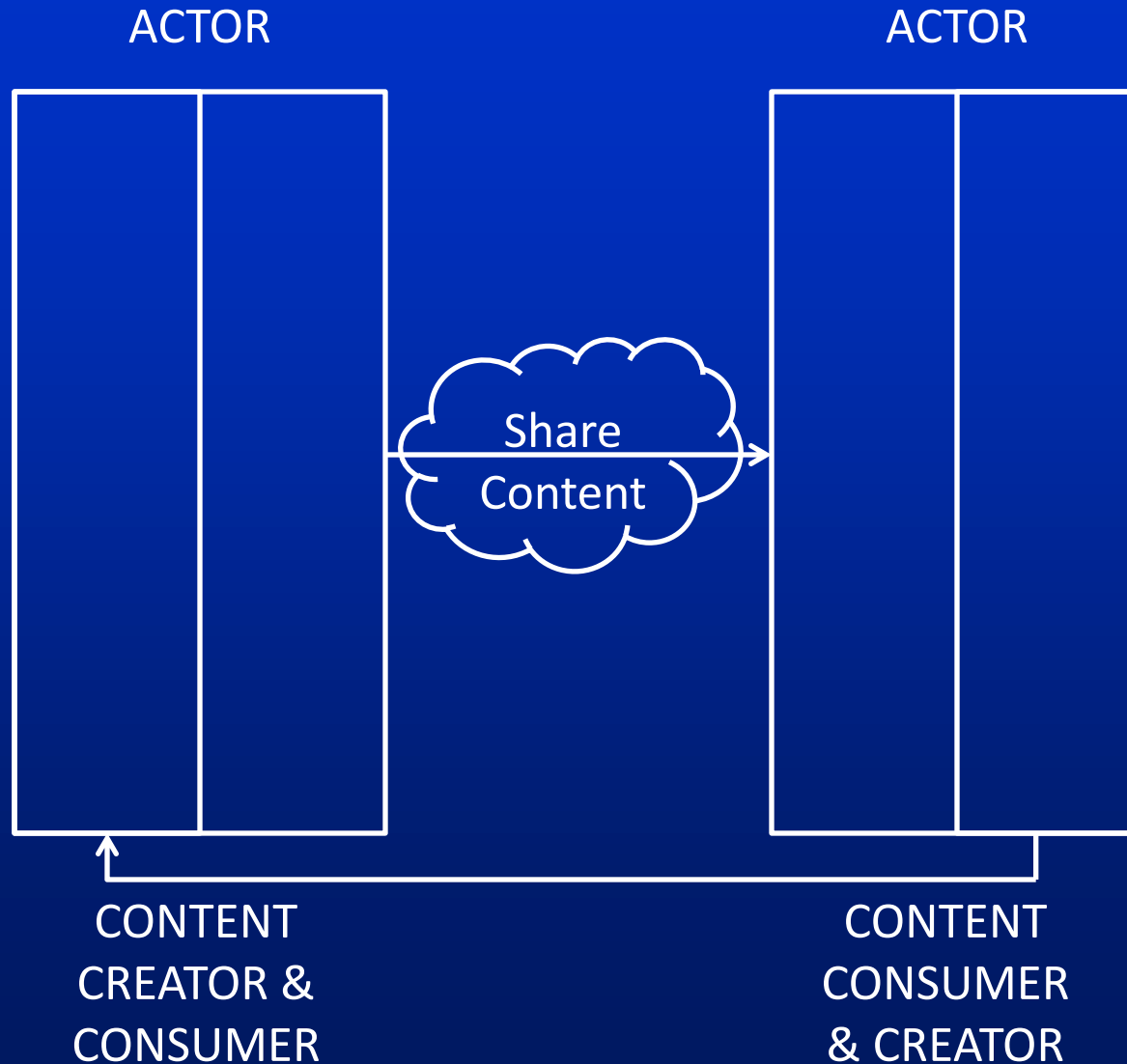
# COMMUNICATION (101)



MESSAGE  
CREATOR &  
CONSUMER

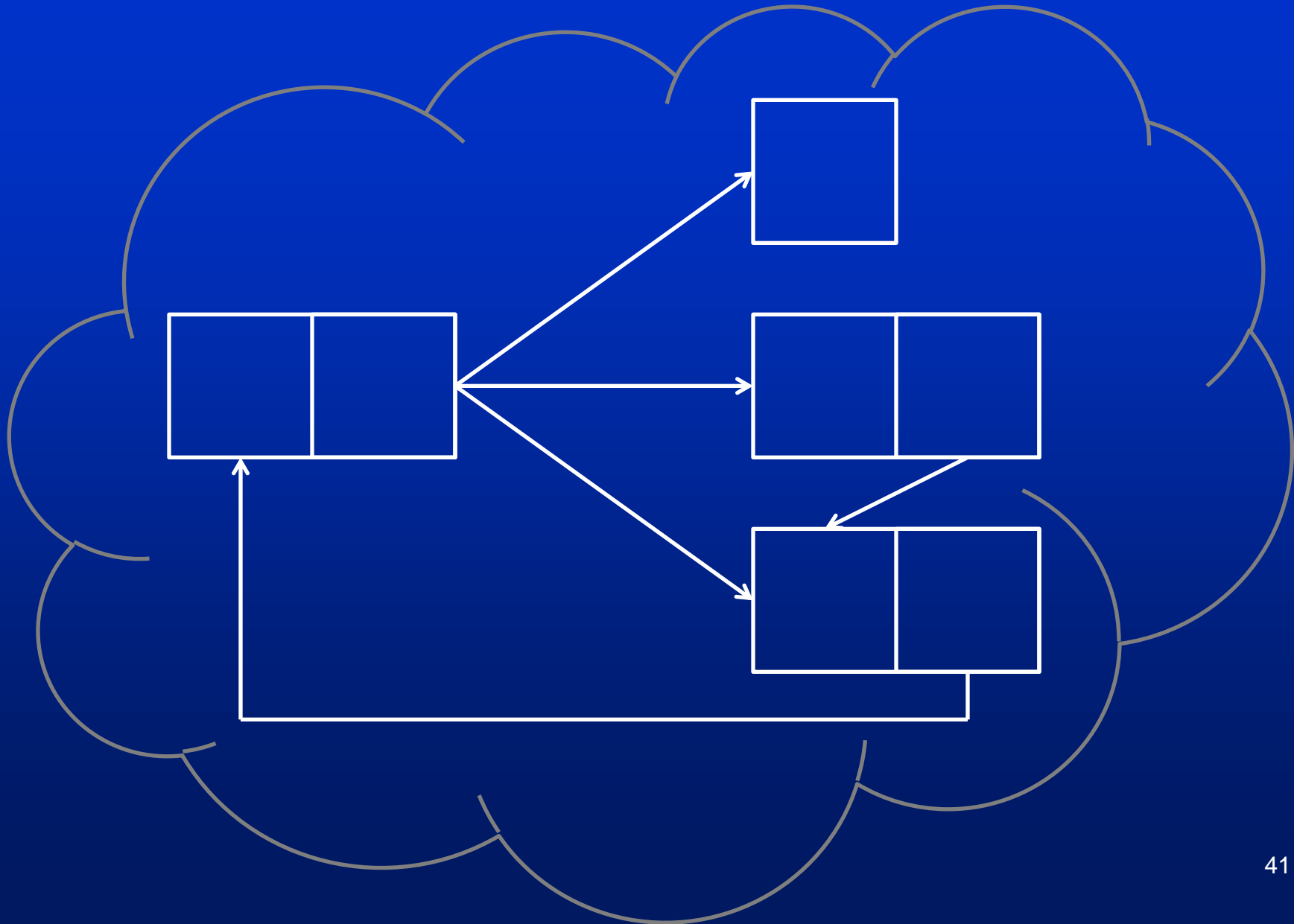
MESSAGE  
CONSUMER  
& CREATOR

# Bi-directional Exchange





# Health Information Exchange



# 2014 HIMSS Interoperability Showcases

Patient 2: 35 week neonate vignettes

#1 - Birth with vital records update

#2 – Newborn hospital care and discharge to pediatric unit

#3 – Hearing screening and PH supported pediatric care

Patient  
#1

Patient  
#2



# 2014 HIMSS Interoperability Showcases

## Patient 2 vendors included:

- Alere Accountable Care Solutions
- Alert
- Amcom
- Cerner
- Covidien
- Epic
- Genesis Healthcare
- Hyland Software
- IOD Inc
- Isirona (now NANThealth)
- Minnesota Dept of Health
- NextGen
- OZ Systems
- Philips
- Siemens
- Smiths Medical

# PHI 2014 - IHE Interoperability Showcase:

## Vital Records and Care Coordination for Newborn Hearing Screening

Improving the timeliness and quality of vital records and newborn hearing data for more efficient and effective birth registration and care giving for early childhood development.



### 1. Birthing Facility

Mother delivers a child. Labor and delivery events are documented in the Birthing Facility EMR

1. EMR creates a Labor and Delivery Summary (LDS) in Clinical Document Architecture (CDA) with the mother & child birth information
2. EMR retrieves the Vital Registration Form from the Form Manager application
3. EMR system populates the Vital Registration (VR) Form with EMR data
4. Staff verifies data and completes additional fields on the VR Form
5. The newborn hearing screening is performed, results sent to Public Health Early Hearing Detection and Intervention information system (EHD-IS).

State/Jurisdiction Vital Registration for Birth Certificate

1. EMR sends Vital Registration Form to Electronic Birth Registration System to generate birth certificate

Newborn Hearing Screening and Early Hearing Care Plan:

1. EHD-IS receives newborn information from the Vital Registration Form
2. The EHD-IS system receives hearing screening results, generates an Early Hearing Care Plan and publish this Care Plan into the Health Information Exchanges (HIE)

EHD Quality Measures:

1. EHD-IS generates EHD Quality Measure: number of children for whom hearing test was performed by Birthing Facility within the jurisdiction

Pediatric Care Provider retrieves the Early Hearing Care Plan

1. PCP queries the HIE for documents related to the patient
2. PCP retrieves the Early Hearing Care Plan provided by State EHD Program
3. PCP sends repeat screen & visit summary to the HIE with a referral to the audiologist

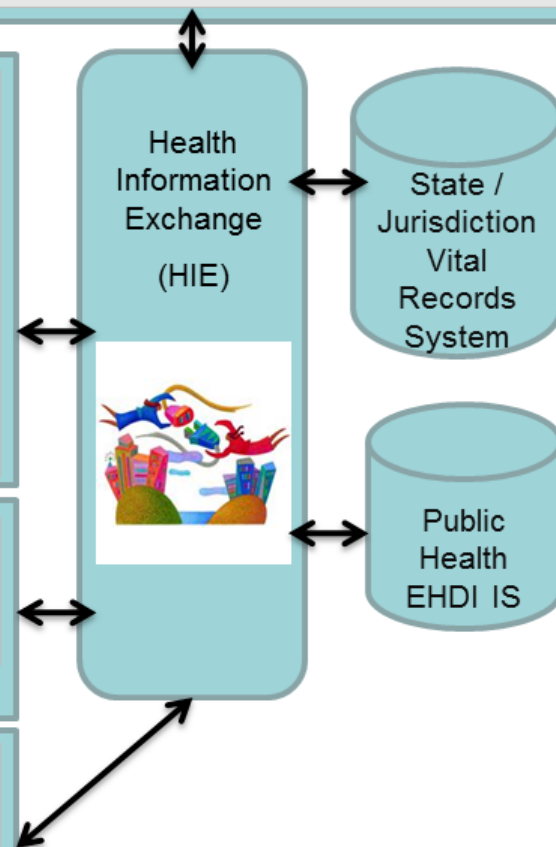


### 3. Pediatric Care Provider

The Audiologist retrieves the patient summaries, Early Hearing Care Plan, and available images using the HIE Provider Portal. Continuity of Care Documents and Public Health generated care plans are available through the HIE Services: Document Registry, Document Repository, and Secure Transport Infrastructure.



### 4. Audiologist /Infrastructure Physician Portal



# PHI 2014 - IHE Interoperability Showcase

## Vital Records & Care Coordination for Newborn Hearing Screening

- CareEvolution
- Epic
- Genesis Healthcare
- NextGen
- OZ Systems
- Utah Department of Health

# Standards and Interoperability (S&I) Framework

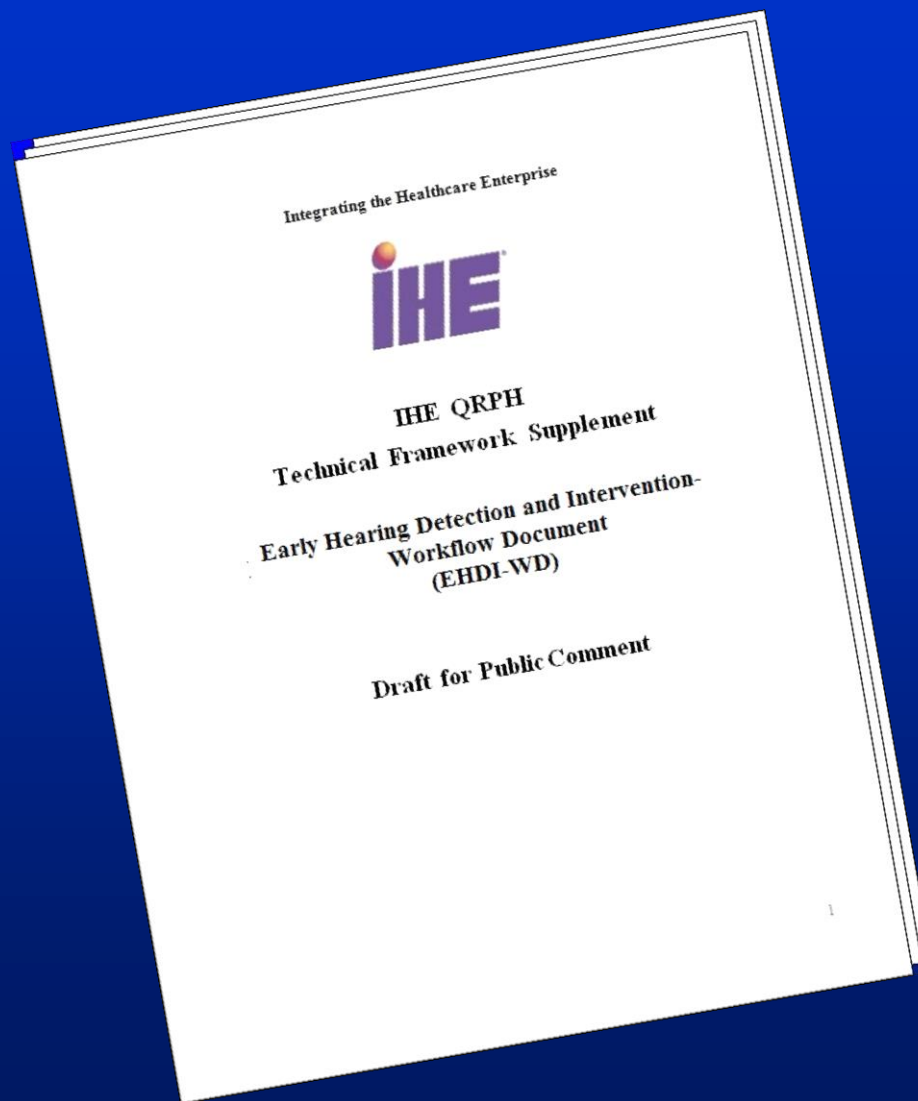
## ONC S&I Initiatives:

- Public Health Reporting Initiative (PHRI)
  - standardized public health EHR reporting
- Structured Data Capture (SDC)
  - standardize patient-level Common Data Elements (CDE) within an EHR

## ONC S&I Cross-Initiative Workgroups:

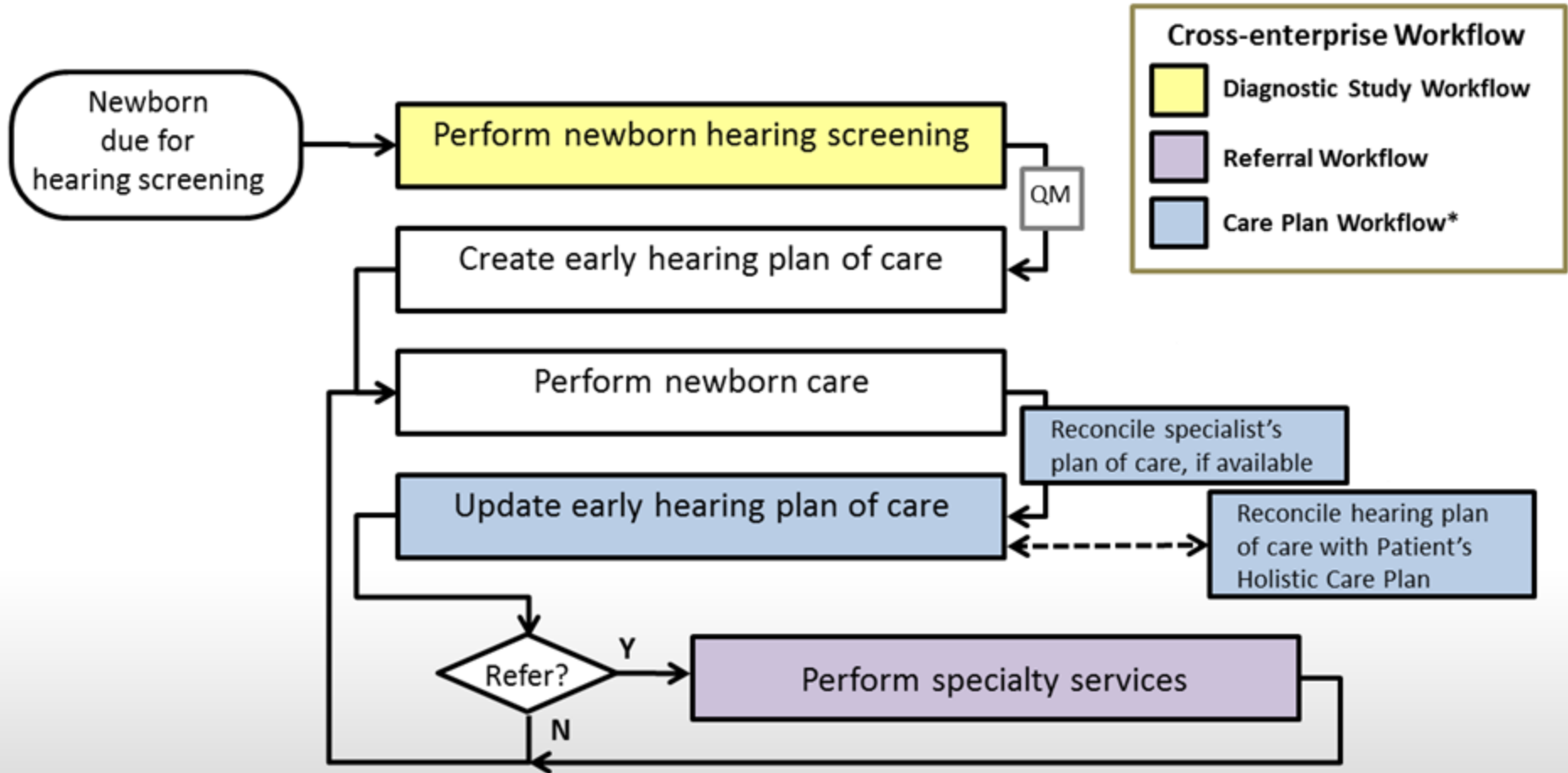
- Clinical Quality Framework (QDF)
  - harmonize Clinical Decision Support (CDS) and electronic Clinical Quality Measurement (eCQM)
- Public Health Tiger Team (PHTT)
  - combine Structured Data Capture (SDC) Data Access Framework (DAF) and Health eDecisions (HeD)

# Early Hearing Detection and Intervention Workflow (EHDI-WD)



# EHDI-WD

## Basic Process Flow





# Privacy and Security

Guided by various Federal and state/local laws including:  
Health Insurance Portability and Accountability Act (HIPAA)

- The HIPAA Privacy Rule covers protected health information (PHI) in any medium (electronic, written, or oral) and patients rights with respect to that information
- The HIPAA Security Rule specifies a series of additional administrative, physical, and technical safeguards to assure the confidentiality, integrity, and availability of electronic protected health information

# Privacy and Security: CMS EHR MU

## Eligible Professional Meaningful Use Core Measures Measure 9 of 17

Stage 2

Date updated: December, 2013

### Protect Electronic Health Information

#### Objective

Protect electronic health information created or maintained by the certified EHR technology (CEHRT) through the implementation of appropriate technical capabilities.

#### Measure

Conduct or review a security risk analysis in accordance with the requirements under 45 CFR 164.308(a) (1), including addressing the encryption/security of data stored in CEHRT in accordance with requirements under 45 CFR 164.312 (a)(2)(iv) and 45 CFR 164.306(d)(3), and implement security updates as necessary and correct identified security deficiencies as part of the provider's risk management process for EPs.

#### Exclusion

No exclusion.

### Table of Contents

- Attestation Requirements
- Additional Information
- Certification and Standards Criteria

# CMS EHR Certification & Standards Criteria

Access control: user identity and tracking controls for all authorized users

Authentication: verify person/entity is authorized to access

Encryption: information exchanged following encryption standards

Integrity: upon receipt, verify information has not been altered

Automatic log-off: session termination after inactivity period

Audit log\*: record electronic actions and generate audit log

\*record date, time, patient identification, and user identification whenever information is created, modified, accessed, disclosed or deleted

# IHE IT Infrastructure (ITI) Profiles

The Audit Trail and Node Authentication (ATNA) Integration Profile establishes security measures which, together with the Security Policy and Procedures, provide patient information confidentiality, data integrity and user accountability

Basic Patient Privacy Consents (BPPC) provides a mechanism to record the patient privacy consent(s) and a method for Content Consumers to use to enforce the privacy consent appropriate to the use

# Engagement Opportunities

- Health IT Policy Committee

[www.healthit.gov/facas/health-it-policy-committee](http://www.healthit.gov/facas/health-it-policy-committee)

- Health IT Standards Committee

[www.healthit.gov/facas/health-it-standards-committee](http://www.healthit.gov/facas/health-it-standards-committee)

## Standards and Interoperability (S&I) Framework

- Community-Led Initiatives/Cross-Initiative Workgroups

<http://wiki.siframework.org>

## Health Level Seven (HL7) International

- Public Health and Emergency Response (PHER)

[www.hl7.org/special/committees/pher](http://www.hl7.org/special/committees/pher)

## Integrating the Healthcare Enterprise (IHE)

- Quality, Research and Public Health (QRPH)

[www.ihe.net/Quality\\_Research\\_and\\_Public\\_Health](http://www.ihe.net/Quality_Research_and_Public_Health)

# Thank You!

[jeichwald@cdc.gov](mailto:jeichwald@cdc.gov)



*The opinions and conclusions in this presentation are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention.*

National Center on Birth Defects and Developmental Disabilities  
Division of Human Development and Disability  
Child Development and Disability Branch

