

HITSP Newborn Screening Requirements and Design

HITSP/RDSS 153



Healthcare Information Technology Standards Panel

Submitted to:

Healthcare Information Technology Standards Panel

Submitted by:

**Population Perspective Technical Committee
(Formerly Population Health Technical Committee)**



DOCUMENT CHANGE HISTORY

Version Number	Description of Change	Name of Author	Date Published
1.0	Review Copy	Population Perspective TC	September 25, 2009



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1.0 INTRODUCTION

1.1 REQUIREMENTS AND DESIGN OVERVIEW

This section provides a high level definition of this Interoperability Specification and background information about the underlying Use Case that it is based upon.

The HITSP Newborn Screening Interoperability Specification will describe the information flows, issues, and system capabilities supporting newborn screening reporting and information exchanges among clinical care settings and public health. The Use Case upon which this specification is created is focused upon:

- The ability to communicate initial screening results, confirmatory testing orders, and results and information specific to referral and management of the patient
- The ability to report newborn screening information to Public Health.

1.2 COPYRIGHT PERMISSIONS

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1.3 REFERENCE DOCUMENTS

This section provides a list of key reference documents and background material.

A list of key reference documents and background material is provided in the table below. These documents can be retrieved from www.hitsp.org.

Table 1-1 Reference Documents

Reference Document	Document Description
HITSP Acronyms List	Lists and defines the acronyms used in this document
HITSP Glossary	Provides definitions for relevant terms used by HITSP documents



2.0 REQUIREMENTS

2.1 SYNOPSIS OF REQUIREMENTS

The Newborn Screening (NBS) Use Case is focused on the electronic exchange of information related to newborn screening among ordering clinicians, pediatric clinicians, consumers, Public Health, testing laboratories, and audiology service providers. Newborn screening reporting and information exchanges may also include individual case reporting to Public Health, appropriate registries, and local health service providers.

The scope of this 2009 Use Case is focused on:

- The ability to communicate initial screening results, confirmatory testing orders, and results and information specific to referral and management of the patient
- The ability to report newborn screening information to Public Health

NBS information exchanged to support the focus of this Use Case consists of all newborn screening orders, results, and information associated with an order or result. Result information may include normal, abnormal, out of range, and confirmatory results within the domains of hearing, hemoglobin, metabolic, and pulmonary/genetic screening tests. The newborn screening domains that are out of scope in this Use Case are endocrine, congenital infections, and other domains such as enzyme disorders.

This Use Case highlights the ability to share de-identified newborn screening information with the clinical research community without requiring additional data collection or data entry. This Use Case also identifies information exchanges that begin with initial newborn screening and extend to include portions of Long Term Follow-Up (LTFU). The information exchanged may include analysis, conditions, hearing tests/results, dates, and other pertinent data. The Personalized Healthcare Workgroup has developed a newborn screening reference of cross-mappings as a companion document to the Use Case to facilitate the development of electronic laboratory reports for newborn screening. The document entitled "Newborn Screening Coding and Terminology Guide" is available at the Newborn Screening Use Case web page located at <http://www.hhs.gov/healthit/usecases/nbs.html>. Specifics regarding datasets, data elements, and nomenclature considerations are addressed in the Dataset Considerations section of this document, as well as in the Newborn Screening Coding and Terminology Guide.

Recognizing that States may utilize various processes, require different testing, and gather variable data when conducting NBS, these processes are generalized throughout this Use Case in order to achieve further standardization of information exchange. Further, this document does not prescribe policy or dictate process.

To effectively complete NBS, this Use Case describes some specific information exchanges.

Examples of specific information exchanges:

1. The clinician may receive direction on screening requirements, request patient- or test-specific information, order initial tests, receive results, request second specimens, order confirmatory tests, request referrals/interventions, and report Public Health cases

It would be beneficial to clinicians to have electronic communication supporting: the determination of which newborn screening tests are required, the ordering of newborn screening tests, the receipt of newborn screening results, the ordering of genetic/genomic tests (addressed in the 2008 Personalized Healthcare Use Case), the reporting of Public Health case reports (addressed in the 2008 Public Health Case Reporting Use Case), the requesting of referrals and/or interventions, and the exchange of information to support patient care (addressed in the 2008 Consultations and Transfers of Care Use Case).



2. The Use Case addresses the potential need for the consumer to be informed and educated about the NBS process, the implications of consenting to screening, and the potential need to provide additional information and/or specimens

Consumers could benefit from better care, which includes earlier appropriate interventions and receiving educational material that is audience-specific and culturally appropriate regarding the screening and/or a suspected or confirmed condition. The communication of standard comprehensive educational information to consumers could result in them providing more relevant information and greater cooperation and receiving better understanding and improved care.

3. Public Health may determine and communicate screening requirements, receive and/or process screening orders, receive initial/confirmatory/second specimen results, and track and report long-term outcomes

Public Health could benefit from electronic communication supporting: the exchange of screening requirements, the receipt of orders, the communication of orders to contracted or third party laboratories, the receipt of laboratory or audiology results, the receipt of Public Health case reports (addressed in the 2008 Public Health Case Reporting Use Case), and the receipt of information for the purposes of determining long-term outcomes.

4. The Testing Laboratory and Audiology Services may receive orders, perform tests, and report results including interpretation and referral recommendations

Testing Laboratory and Audiology Services could benefit from electronic communication supporting: the receipt and processing of orders, the sending of results, the receipt of additional relevant information regarding the patient and family history. This Use Case assumes the developing presence of electronic systems such as Electronic Health Records (EHRs), Laboratory Information Systems (LISs), Public Health Systems/Intermediaries, Audiology Systems, Personally Controlled Health Records, and other local or Web-based solutions that support clinicians, consumers, Public Health, and other healthcare providers while recognizing the issues and obstacles associated with these assumptions.

Table 2-1 lists and describes the major subdivisions of a Harmonization Request, called Scenarios.

Table 2-1 Description of Scenarios

Scenario Name	Scenario Description
Ordering and Resulting	This scenario covers initial screening both for Newborn Dried Blood Spot (NDBS) and Early Hearing Detection and Intervention (EHDI) and ends with the reporting of results, either within normal limits, or notification of the need for confirmatory testing if results are outside of normal limits
Abnormal and Out of Range Results	This scenario covers the processes in response to an out of range (or abnormal) screening test either from the NDBS or the EHDI

2.2 ORDERING AND RESULTING SCENARIO

This scenario covers initial screening both for Newborn Dried Blood Spot (NDBS) and Early Hearing Detection and Intervention (EHDI) and ends with the reporting of results, either within normal limits, or notification of the need for confirmatory testing if results are outside of normal limits.

After the parents or current guardian(s) receive the appropriate educational material on the screening testing process (ideally during the prenatal period) and are appropriately informed and/or consented, the newborn screening testing is performed. For metabolic testing, a blood specimen is taken, typically in the form of a blood spot on specially designed filter paper. In some instances, this may need to be done at a later time by the pediatric clinician. The blood spot is sent to a testing laboratory which may sub-divide the specimen for testing at other facilities. Results of the metabolic screening are reported to the birthing facility, appropriate Public Health facilities, the ordering and pediatric clinician, and in some instances the consumer(s) who are notified by either the ordering or pediatric clinician. A second specimen may be required in some states and/or for particular circumstantial reasons.



The hearing test (EHDI) is performed at an audiology center associated with the birthing facility. Results of the hearing test are reported to the birthing facility, appropriate Public Health facilities, the ordering and pediatric clinician, and in some instances the consumer(s) who are notified by either the ordering or pediatric clinician. Result confirmation may be necessary in certain situations. Upon the communication of normal results, the newborn screening process is complete.

2.2.1 ORDERING AND RESULTING INFORMATION EXCHANGE REQUIREMENTS

The following Information Exchange Requirements Table summarizes the relationship between the Exchange Action, Exchange Content, and the Initiating and Responding Systems.

Table 2-2 Ordering and Resulting Information Exchange Requirements (IER)

IER Number	Exchange Action	Exchange Content	Initiating System	Responding System(s)	Exchange Attribute
IER1	Request & Response	PEC-NBS6 – Guideline	Electronic Health Record (EHR) System	Public Health Information System	
IER2	Request & Response	PEC-NBS8 - Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	
IER3	Send	PEC-NBS8 - Education Brochure	Public Health Information System	Electronic Health Record (EHR) System	Site identifier, subject identifier, visit identifier, study identifier, redacted Newborn Screening document
IER4	Publish/Register	PEC-NBS1 - Consent to Procedure	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Refusal documentation
IER5	Publish/Register	EC30 - Consent Document Component	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Consent to share information Mom/Baby consent authorization requirements Policy MAY require EC 26 - Nonrepudiation of Origin Data and/or EC25 - Anonymization Instructions
IER6	Publish/Register	PEC-NBS2 - Consent to Retain/Use Test Sample	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Policy requirement considerations vs. voluntary participation e.g. Texas policy allows for: Screen only, disclose information, refuse
IER7	Request & Response	EC23 - Patient Demographics	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Pediatric Demographic Option for mom/baby linkage
IER8	Request & Response	PEC-NBS9 - Newborn Record	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	GAP: Resolution – anticipate a construct to be delivered in 2010 from IHE PCC – Newborn Discharge Summary



IER Number	Exchange Action	Exchange Content	Initiating System	Responding System(s)	Exchange Attribute
IER9	Request & Response	PEC-NBS4 - Birthing Summary	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	NOTE: More applicable for referrals to specialist. Birthing summary is not readily available today. May be as a pre-existing condition; Birthing
IER10	Request & Response	PEC-NBS9 - Newborn Record	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	GAP: Resolution – anticipate a construct to be delivered in 2010 from IHE PCC – Newborn Discharge Summary
IER11	Request & Response	PEC-NBS4 - Birthing Summary	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER12	Send	PEC-NBS9 - Newborn Record	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	
IER13	Send	PEC-NBS4 - Birthing Summary	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	
IER14	Send	PEC-NBS3 - Lab Order (NBS)	Electronic Health Record (EHR) System	Laboratory Information Systems	Need to indicate test qualifiers (first, repeat specimen, or repeat test);
IER15	Request & Response	EC24 - Pseudo-identity	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Situations for adoption or child protective situations: pseudonymization/de-identification from Mother to baby/baby-to mother
IER16	Send	PEC-NBS13 - NBS pre-populate form from Birthing Summary	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	HITSP/TP50 RFD Pre-populate; Data Entry
IER17	Send	PEC-NBS13 - NBS pre-populate form from Birthing Summary	Electronic Health Record (EHR) System	Public Health Information System	HITSP/TP50 RFD Pre-populate; Data Entry
IER18	Send	PEC-NBS9 - Newborn Record	Electronic Health Record (EHR) System	Public Health Information System	
IER19	Provide/Register	PEC-NBS9 - Newborn Record	Electronic Health Record (EHR) System	HIE	
IER20	Query/Retrieve	PEC-NBS9 - Newborn Record	Public Health Information System	HIE	
IER21	Send	PEC-NBS5 - Hearing Screening Order	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	In the case that the EHR supporting the hearing screening order is a different system from that servicing the hearing screening activities
IER22	Send	PEC-NBS5 - Hearing Screening Order	Electronic Health Record (EHR)	Hearing Screening System	



IER Number	Exchange Action	Exchange Content	Initiating System	Responding System(s)	Exchange Attribute
IER23	Publish/Register	PEC-NBS3 - Lab Order (NBS)	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Need to indicate test qualifiers (first, repeat specimen, or repeat test);
IER25	Query/Retrieve	PEC-NBS3 - Lab Order (NBS)	Laboratory Information Systems	Health Information Exchange (HIE)	Pending HITSP Lab Orders Document
IER27	Publish/Register	PEC-NBS5 - Hearing Screening Order	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER30	Send	EC36 - Lab Result (used when constraint is 'message')	Laboratory Information Systems	Electronic Health Record (EHR) System	
IER31	Provide/Register	EC37 - Lab Result (used when constraint is 'document')	Laboratory Information Systems	Health Information Exchange (HIE)	
IER32	Query/Retrieve	EC37 - Lab Result (used when constraint is 'document')	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER33	Send	EC36 - Lab Result (used when constraint is 'message')	Laboratory Information Systems	Public Health	
IER34	Query/Retrieve	EC37 - Lab Result (used when constraint is 'document')	Public Health	Health Information Exchange (HIE)	
IER35	Send	PEC-NBS10 - Hearing Screening Test Results	Hearing Screening System	Electronic Health Record (EHR) System	
IER36	Send	PEC-NBS10 - Hearing Screening Test Results	Hearing Screening System	Public Health Information System	Public health interprets information
IER38	Provide/Register	Care status summary/outcome	Public Health Information System	Health Information Exchange (HIE)	Jurisdictionally Driven – Hearing Screening Outcome
IER39	Notification	Care status summary/outcome	Public Health	Electronic Health Record (EHR) System	Abnormal Results Flagged
IER40	Subscribe	Care status summary/outcome	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Policy considerations to assert subscription request may depend upon a relationship with the patient
IER41	Send	Care status summary/outcome	Public Health Information System	Electronic Health Record (EHR) System	
IER42	Query/Retrieve	PEC-NBS10 - Hearing Screening Test Results	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER43	Query/Retrieve	PEC-NBS6 - Guideline	Personal Health Record (PHR) Systems	Public Health Information System	
IER44	Publish/Register	PEC-NBS11 - Refusal of Screening	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	Mom/baby authorizations
IER45	Publish/Register	PEC-NBS1 - Consent to Procedure	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	May collapse with Refusal of screening



IER Number	Exchange Action	Exchange Content	Initiating System	Responding System(s)	Exchange Attribute
IER46	Publish/Register	EC30 Consent Document Component	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	Consent to share information Mom/Baby consent authorization requirements Support for capture of refusal Policy MAY require EC 26 Nonrepudiation of Origin Data and/or EC25 Anonymization Instructions
IER47	Publish/Register	PEC-NBS2 - Consent to Retain/Use Test Sample	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	Policy requirement considerations vs. voluntary participation Support for capture of refusal e.g. Texas policy allows for: Screen only, disclose information, refuse
IER48	Send	PEC-NBS7 - Antepartum Summary	Personal Health Record (PHR) Systems	Electronic Health Record (EHR) System	Pediatric Clinician Required NOTE: Priority to Birthing Record Pediatric Clinician if different
IER49	Send	EC90 - Genetic Risk Decision Support	Personal Health Record (PHR) Systems	Electronic Health Record (EHR) System	
IER50	Publish/Register	PEC-NBS7 - Antepartum Summary	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	Pediatric Clinician Required NOTE: Priority to Birthing Record Pediatric Clinician if different
IER51	Query/Retrieve	PEC-NBS7 - Antepartum Summary	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Pediatric Clinician Required NOTE: Priority to Birthing Record Pediatric Clinician if different Subscription option
IER52	Subscribe	PEC-NBS9 - Newborn Record	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	
IER53	Subscribe	PEC-NBS4 - Birthing Summary	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	
IER54	Subscribe	PEC-NBS10 - Hearing Screening Test Results	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	
IER55	Subscribe	EC37 - Lab Result (used when constraint is 'document')	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	



IER Number	Exchange Action	Exchange Content	Initiating System	Responding System(s)	Exchange Attribute
IER57	Query/Retrieve	PEC-NBS3 - Lab Order (NBS)	Public Health Information System	Health Information Exchange (HIE)	Need to indicate test qualifiers (first, repeat specimen, or repeat test)
IER58	Send	PEC-NBS5 - Hearing Screening Order	Electronic Health Record (EHR) System	Public Health Information System	
IER60	Query/Retrieve	PEC-NBS5 - Hearing Screening Order	Public Health Information System	Health Information Exchange (HIE)	
IER61	Provide/Register	PEC-NBS10 - Hearing Screening Test Results	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER62	Query/Retrieve	PEC-NBS10 - Hearing Screening Test Results	Public Health Information System	Health Information Exchange (HIE)	
IER63	Send	EC36 - Lab Result (used when constraint is 'message')	Electronic Health Record (EHR) System	Public Health	
IER64	Send	PEC-NBS10 - Hearing Screening Test Results	Public Health	Public Health	Policy may require Anonymize patient identifiable data (EHD and NDBS)
IER65	Send	EC36 - Lab Result (used when constraint is 'message')	Public Health	Public Health	Policy may require Anonymize patient identifiable data (EHD and NDBS) stage
IER66	Provide/Register	PEC-NBS10 - Hearing Screening Test Results	Public Health	Health Information Exchange (HIE)	
IER67	Provide/Register	EC37 - Lab Result (used when constraint is 'document')	Public Health	Health Information Exchange (HIE)	
IER68	Query/Retrieve	PEC-NBS10 - Hearing Screening Test Results	Public Health	Health Information Exchange (HIE)	
IER69	Query/Retrieve	EC30 - Consent Document Component	Public Health	Health Information Exchange (HIE)	
IER70	Query/Retrieve	EC23 - Demographic Data	Laboratory Information Systems	Health Information Exchange (HIE)	Required Pediatric Demographics
IER71	Send	PEC-NBS3 - Lab Order (NBS)	Laboratory Information Systems	Laboratory Information Systems	Need to indicate test qualifiers (first, repeat specimen, or repeat test)
IER72	Publish/Register	PEC-NBS3 - Lab Order (NBS)	Laboratory Information Systems	Health Information Exchange (HIE)	Need to indicate test qualifiers (first, repeat specimen, or repeat test)
IER74	Send	PEC-NBS12 - Request for new Specimen	Laboratory Information Systems	Electronic Health Record (EHR) System	Notification
IER75	Send	PEC-NBS12 - Request for new Specimen	Laboratory Information Systems	Personal Health Record (PHR) Systems	Notification



IER Number	Exchange Action	Exchange Content	Initiating System	Responding System(s)	Exchange Attribute
IER85	Query/Retrieve	DRNBS 12 Educational Materials	Personal Health Record (PHR) Systems	Public Health Information System	NOTE: Assume that the Consumer has access to the test results as enabled by HITSP/IS05

2.3 ABNORMAL AND OUT OF RANGE RESULTS SCENARIO

This scenario covers the processes in response to an out of range (or abnormal) screening test either from the NDBS or the EHDI. When the NDBS result is indeterminate, of insufficient quantity, out of range or abnormal, additional testing may be required. If known and available, the infant's primary care provider is notified, a family history may be obtained and in certain situations, a sub-specialist or sub-specialist team may be notified. Consultations may take place between any or all of these clinicians and the results of any additional or confirmatory testing are reported back to Public Health. If the results are confirmed, the infant is referred to a specialist where culturally competent or appropriate counseling and education can be initiated.

When the EHDI result is abnormal, similar processes are initiated. A family history is obtained and confirmatory auditory testing is done. An audiology evaluation may involve referral for genetic consultation which may in turn lead to various kinds of genetic testing. Again, consultations may take place between a primary care provider, various specialists and/or the Public Health department. After confirmation of hearing loss, the audiologist or primary care provider refers the patient to the appropriate specialists and results are reported to Public Health.

This scenario also covers clinical management of children with conditions identified by newborn screening, Public Health reporting, program monitoring, and health services. Clinical management is consistent with standard of care and, when available, research derived from outcome data from prior newborn screening.

During the short term follow-up (STFU) period, children may require a variety of medical interventions, which might include emergency management, nutritional therapy, audiology follow-up and/or management, or other forms of treatment. Pertinent clinical findings must follow patients as they move between clinicians as described in the 2008 Consultations and Transfers of Care Use Case. As described in the Dataset Considerations section of this document, additional information may be needed in addition to the information needs described in previous Use Cases. This is particularly important considering the type of information gathered by newborn screening since much of it has an impact during childhood development.

Long term follow-up (LTFU) and outcomes should be reported to Public Health at appropriate intervals. This information is important to determine the effectiveness of newborn screening. Other registries and research organizations may also benefit from receiving this information. Research organizations would receive only de-identified data.

2.3.1 ABNORMAL AND OUT OF RANGE RESULTS INFORMATION EXCHANGE REQUIREMENTS

The following Information Exchange Requirements Table summarizes the relationship between the Exchange Action, Exchange Content, and the Initiating and Responding Systems.



Table 2-3 NBS Abnormal and Out of Range Information Exchange Requirements

Information Exchange Requirement Number	Exchange Action	Exchange Content	Initiating System	Responding System(s)	Exchange Attribute
IER1	Request & Response	PEC-NBS6 - Guideline	Electronic Health Record (EHR) System	Public Health Information System	
IER2	Request & Response	PEC-NBS8 - Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	
IER4	Publish/Register	PEC-NBS1 - Consent to Procedure	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER5	Publish/Register	EC30 Consent Document Component	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Consent to share information. Mom/Baby consent authorization requirements. Policy MAY require EC 26 Nonrepudiation of Origin Data and/or EC25 Anonymization Instructions
IER6	Publish/Register	PEC-NBS2 - Consent to Retain/Use Test Sample	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Policy requirement considerations vs. voluntary participation e.g. Texas policy allows for: Screen only, disclose information, refuse
IER14	Send	PEC-NBS3 - Lab Order (NBS)	Electronic Health Record (EHR) System	Laboratory Information Systems	Need to indicate test qualifiers (first, repeat specimen, or repeat test); Pediatric Demographics
IER21	Send	PEC-NBS5 - Hearing Screening Order	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	PDR-NBS14 Pediatric Demographics
IER22	Send	PEC-NBS5 - Hearing Screening Order	Electronic Health Record (EHR) System	Hearing Screening System	
IER23	Publish/Register	PEC-NBS3 - Lab Order (NBS)	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Need to indicate test qualifiers (first, repeat specimen, or repeat test); Pediatric Demographics
IER25	Query/Retrieve	PEC-NBS3 - Lab Order (NBS)	Laboratory Information Systems	Health Information Exchange (HIE)	Pending HITSP Lab Orders Document Pediatric Demographics
IER27	Publish/Register	PEC-NBS5 - Hearing Screening Order	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER30	Send	EC36 - Lab Result (used when constraint is 'message')	Laboratory Information Systems	Electronic Health Record (EHR) System	
IER31	Provide/Register	EC37 - Lab Result (used when constraint is 'document')	Laboratory Information Systems	Health Information Exchange (HIE)	
IER32	Query/Retrieve	EC37 - Lab Result (used when constraint is 'document')	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	



Information Exchange Requirement Number	Exchange Action	Exchange Content	Initiating System	Responding System(s)	Exchange Attribute
IER33	Send	EC36 - Lab Result (used when constraint is 'message')	Laboratory Information Systems	Public Health	
IER34	Query/Retrieve	EC37 - Lab Result (used when constraint is 'document')	Public Health	Health Information Exchange (HIE)	
IER35	Send	PEC-NBS10 - Hearing Screening Test Results	Hearing Screening System	Electronic Health Record (EHR) System	
IER36	Send	PEC-NBS10 - Hearing Screening Test Results	Hearing Screening System	Public Health Information System	Public health interprets information
IER38	Provide/Register	PEC-NBS10 - Hearing Screening Test Results	Public Health Information System	Health Information Exchange (HIE)	Jurisdictionally Driven – Hearing Screening Outcome. Require Care status summary/outcome
IER39	Notification	PEC-NBS10 - Hearing Screening Test Results	Public Health	Electronic Health Record (EHR) System	Abnormal Results Flagged Require Care status summary/outcome
IER40	Subscribe	PEC-NBS10 - Hearing Screening Test Results	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Policy considerations to assert subscription request may depend upon a relationship with the patient. Require Care status summary/outcome
IER41	Send	PEC-NBS10 - Hearing Screening Test Results	Public Health Information System	Electronic Health Record (EHR) System	Require Care status summary/outcome
IER42	Query/Retrieve	PEC-NBS10 - Hearing Screening Test Results	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Require Care status summary/outcome
IER44	Publish/Register	PEC-NBS11 - Refusal of Screening	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	Mom/baby authorizations
IER45	Publish/Register	PEC-NBS1 - Consent to Procedure	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	May collapse with Refusal of screening
IER46	Publish/Register	EC30 - Consent Document Component	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	Consent to share information. Mom/Baby consent authorization requirements. Support for capture of refusal. Policy MAY require EC 26 Nonrepudiation of Origin Data and/or EC25 Anonymization Instructions



Information Exchange Requirement Number	Exchange Action	Exchange Content	Initiating System	Responding System(s)	Exchange Attribute
IER47	Publish/Register	PEC-NBS2 - Consent to Retain/Use Test Sample	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	Policy requirement considerations vs. voluntary participation. Support for capture of refusal e.g. Texas policy allows for: Screen only, disclose information, refuse
IER49	Send	EC90 - Genetic Risk Decision Support	Personal Health Record (PHR) Systems	Electronic Health Record (EHR) System	
IER54	Query/Retrieve	PEC-NBS10 - Hearing Screening Test Results	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	Subscription option
IER55	Query/Retrieve	EC37 - Lab Result (used when constraint is 'document')	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	Subscription option
IER57	Query/Retrieve	PEC-NBS3 - Lab Order (NBS)	Public Health Information System	Health Information Exchange (HIE)	Need to indicate test qualifiers (first, repeat specimen, or repeat test); Pediatric Demographics
IER58	Send	PEC-NBS5 - Hearing Screening Order	Electronic Health Record (EHR) System	Public Health Information System	
IER60	Query/Retrieve	PEC-NBS5 - Hearing Screening Order	Public Health Information System	Health Information Exchange (HIE)	
IER61	Provide/Register	PEC-NBS10 - Hearing Screening Test Results	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER62	Query/Retrieve	PEC-NBS10 - Hearing Screening Test Results	Public Health Information System	Health Information Exchange (HIE)	
IER64	Send	PEC-NBS10 - Hearing Screening Test Results	Public Health	Public Health	Anonymize patient identifiable data (EHDI and NDBS)
IER65	Send	EC36 - Lab Result (used when constraint is 'message')	Public Health	Public Health	Anonymize patient identifiable data (EHDI and NDBS) stage
IER66	Provide/Register	PEC-NBS10 - Hearing Screening Test Results	Public Health	Health Information Exchange (HIE)	
IER67	Provide/Register	EC37 - Lab Result (used when constraint is 'document')	Public Health	Health Information Exchange (HIE)	
IER68	Query/Retrieve	PEC-NBS10 - Hearing Screening Test Results	Public Health	Health Information Exchange (HIE)	
IER69	Query/Retrieve	EC30 Consent Document Component	Public Health	Health Information Exchange (HIE)	



Information Exchange Requirement Number	Exchange Action	Exchange Content	Initiating System	Responding System(s)	Exchange Attribute
IER71	Send	PEC-NBS3 - Lab Order (NBS)	Laboratory Information Systems	Laboratory Information Systems	Need to indicate test qualifiers (first, repeat specimen, or repeat test); Pediatric Demographics
IER72	Publish/Register	PEC - Lab Order (NBS)	Laboratory Information Systems	Health Information Exchange (HIE)	Need to indicate test qualifiers (first, repeat specimen, or repeat test); Pediatric Demographics
IER76	Send	PEC-NBS7 - Antepartum Summary	Personal Health Record (PHR) Systems	Electronic Health Record (EHR) System	
IER78	Query/Retrieve	EC90 - Genetic Risk Decision Support	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER79	Send	EC32 - Summary of Care	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	
IER80	Send	EC23 – Demographic Data	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	Pediatric Option
IER81	Send	EC48B - Discharge Summary	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	
IER82	Send	EC90 - Genetic Risk Decision Support	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	
IER83	Send	EC37 - Lab Result (used when constraint is 'document')	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	Subscription option
IER84	Send	EC48a - Referral Summary	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	
IER86	Send	EC48B - Discharge Summary	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	
IER87	Send	EC90 - Genetic Risk Decision Support	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	
IER88	Query/Retrieve	EC32 - Summary of Care	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	
IER89	Query/Retrieve	EC48B - Discharge Summary	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	
IER90	Query/Retrieve	EC90 - Genetic Risk Decision Support	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	
IER91	Provide/Register	EC32 - Summary of Care	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER92	Provide/Register	EC23 – Demographic Data	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Pediatric Option



Information Exchange Requirement Number	Exchange Action	Exchange Content	Initiating System	Responding System(s)	Exchange Attribute
IER94	Provide/Register	EC90 - Genetic Risk Decision Support	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER95	Query/Retrieve	EC32 - Summary of Care	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER96	Query/Retrieve	EC23 - Demographic Data	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	Pediatric Option
IER97	Query/Retrieve	EC48B - Discharge Summary	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	
IER99	Query/Retrieve	EC90 - Genetic Risk Decision Support	Public Health Information System	Health Information Exchange (HIE)	
IER100	Send	EC90 - Genetic Risk Decision Support	Electronic Health Record (EHR) System	Public Health Information System	
IER101	Send	EC32 - Summary of Care	Public Health Information System	Electronic Health Record (EHR) System	
IER102	Send	EC23 - Demographic Data	Public Health Information System	Electronic Health Record (EHR) System	Pediatric Option
IER103	Send	EC48B - Discharge Summary	Public Health Information System	Electronic Health Record (EHR) System	
IER104	Send	EC90 - Genetic Risk Decision Support	Public Health Information System	Electronic Health Record (EHR) System	
IER105	Send	EC48A - Referral Summary	Public Health Information System	Electronic Health Record (EHR) System	
IER106	Send	PEC-NBS10 - Hearing Screening Test Results	Public Health Information System	Electronic Health Record (EHR) System	
IER107	Send	EC36 - Lab Result (used when constraint is 'message')	Public Health Information System	Electronic Health Record (EHR) System	
IER108	Send	PEC-NBS10 - Hearing Screening Test Results	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	Subscription option

2.4 SYSTEM DESCRIPTION

The following table lists systems involved in the above listed scenarios, and identifies the stakeholders served by those involved systems.



Table 2-4 System Names and Descriptions

System Name	System Description	Stakeholders
Electronic Health Record (EHR) System	The Electronic Health Record (EHR) System is a secure, real-time, point-of-care, patient-centric information resource for clinicians	Electronic Health Record (EHR)/Personal Health Record (PHR) System Suppliers Clinicians Healthcare Entities Specialty Healthcare Entities
Health Information Exchange (HIE)	A Health Information Exchange (HIE) is a multi-stakeholder system that enables the exchange and use of health information, in a secure manner, for the purpose of promoting the improvement of health quality, safety and efficiency	Health Information Exchange Organizations
Public Health Information System	An automated and integrated system used to document and address information of interest to public health. Local, state, and federal government organizations and personnel use these systems to help protect and improve the health of their respective constituents. A critical effort under this charge is collecting health information to monitor for the existence of emerging health threats appearing in the population and manage these threats once manifested. Staff of these agencies interacts with the public health information system to verify and validate system indications of public health threats, and to assert acknowledgements that may be required by system processes	Government and Regulatory Agencies Knowledge Suppliers Public Health Agencies Public Health Systems Suppliers Registries Research Entities Social Service Agencies
Laboratory Information Systems	Information system supporting the testing, analysis, and information management for laboratory organizations. Medical laboratories, in either in a hospital or ambulatory environment, which analyze specimens as ordered by clinicians to assess the health status of patients. Laboratories, depending on how they are affiliated with hospitals, can be part of either Individual Healthcare Facilities or Integrated Healthcare Data Suppliers. These systems are responsible for updating interface engine rules and triggers in response to Use Case modifications of requested data feeds.	Laboratory Associations Laboratory Information System (LIS) Suppliers Testing Laboratories
Personal Health Record (PHR) Systems	A healthcare record system used to create, review, annotate and maintain records by the patient or the caregiver for a patient. The PHR may include any aspect(s) of the health condition, medications, medical problems, allergies, vaccination history, visit history or communications with healthcare providers	Personal Health Record (PHR) System Suppliers, Consumers Patients
Hearing Screening System	A System used to measure and record the audiology function of the patient	Audiology Service Providers

2.5 EXCHANGE CONTENT DESCRIPTIONS

The exchange content descriptions answer one or more data requirements, and map to existing or planned HITSP constructs.



Table 2-5 Exchange Content Descriptions

Exchange Content Identifier	Exchange Content Name	Exchange Content Definition	Data Requirements
PEC-NBS3	Lab Order (NBS)	Laboratory Order for Newborn Bloodspot. NOTE: Critical to implementation of the Use Case	DR25 PDR-NBS3 NBS Lab Order Pediatric Demographics
PEC-NBS5	Hearing Screening Order	Order for Newborn Hearing Screening	PDR-NBS5 Hearing Screening Order NOTE: While most hospitals have standing orders, it is anticipated that interoperability for the order may be needed across enterprise systems (EHR to Hearing Screening System)
PEC-NBS12	Request for new Specimen	Used to request a new specimen be collected or sent to the lab	PDR-NBS12 New Specimen Request NOTE: May be expressed as a vocabulary code within existing C37 or C36 (pending further analysis)
PEC-NBS13	NBS pre-populate form from Birthing Summary	Used to define the pre-population mapping from CDA documents to pre-populate the Newborn Blood Spot filter paper form	DR25 PDR-NBS3 NBS Lab Order
PEC-NBS4	Birthing Summary	Provides information regarding the labor and delivery supporting post-partum care for both mother and newborn NOTE: This is an option with added value for pre-population and to facilitate the referrals for abnormal results	PDR-NBS4 Birthing Data
PEC-NBS7	Antepartum Summary	Provides a summary of pregnancy care	PDR-NBS7 Antepartum Data
PEC-NBS9	Newborn Record	Newborn's Discharge Summary	<ul style="list-style-type: none"> • PDR-NBS9 Newborn Clinical Data • DR31 Problem List • DR01 Admission Medications History • DR15 Hospital Admission Diagnosis • DR02 Advance Directives • DR03 Allergies and Other Adverse Reactions • DR08 Discharge Diagnosis • DR38 Discharge Diet • DR17 Hospital Discharge Medications • DR07 Diagnostic Results • DR11 Functional Status • DR14 History of Present Illness • DR16 Hospital Course • DR22 Medical Equipment • DR27 Personal Information • DR28 Physical Examination • DR29 Plan of Care • DR13 History of Past Illness • DR34 Review of Systems • DR24 Medications Administered • DR37 Vital Signs



Exchange Content Identifier	Exchange Content Name	Exchange Content Definition	Data Requirements
PEC-NBS6	Guideline	Unstructured, Non-patient-specific clinical guideline content. This includes the directions within the state. NOTE: This is an option with added value for electronic	PDR58 PDR-NBS6 Structured Guideline Data
PEC-NBS8	Education Brochure	Unstructured, Non-patient-specific education material	PDR58 Unstructured Data PDR-NBS8 Structured Education Material
PBS-NBS10	Hearing Screening Test Results	Used to communicate the results from a Hearing Screening Test	<ul style="list-style-type: none"> • DR07 • PDR-NBS10 Hearing Screening Test Results • Designated NICU • Birth weight (grams) • Gestational age at birth (weeks) • Mother's education • Test date (s) • Test time (s) • Test Type (TOAE; DPOAE; AABR) (LOINC has these) • Test ear: Right Ear; Left Ear; Bilateral • Test results Pass, Refer, (LOINC Codes) The absence of data are presumably Missed or Not done (includes Technical Fail) • Care path outcome (next steps) Need to be able to repeat test results
PEC-NBS11	Refusal of Screening	Used to record that the patient or patient agent refused screening test	<ul style="list-style-type: none"> • PDR-NBS11 Screening Refusal NOTE: May be covered by Consent for Procedure if Refusal indication is among the attributes
PEC-NBS1	Consent to Procedure	Used to communicate consent by patient or patient agent to a procedure, diagnostic test, or laboratory test	PDR-NBS1 Consent for Procedure DR27 Personal Information
PEC-NBS2	Consent to Retain/Use Test Sample	Used to communicate consent by patient or patient agent to retain and/or use test sample	PDR-NBS2 Consent to retain sample DR27 Personal Information
EC36	Lab Result (used when constraint is 'message')	Defines the data necessary for transmission of 'message'-based complete, preliminary, final and updated laboratory results	Message Header Content PDR 50 Fully Coded Lab Result Content
EC37	Lab Result (used when constraint is 'document')	Defines the data necessary for transmission of 'document'-based complete, preliminary, final and updated laboratory results	Document Meta-data PDR 50 Fully Coded Lab Result Content



Exchange Content Identifier	Exchange Content Name	Exchange Content Definition	Data Requirements
EC48A	Referral Summary	Document-based patient encounter data (excluding laboratory, radiology)	DR31 Problem List DR02 Advance Directives DR03 Allergies and Other Adverse Reactions DR23 Medications DR10 Family History DR11 Functional Status DR14 History of Present Illness DR18 Immunizations DR21 List of Surgeries DR22 Medical Equipment DR27 Personal Information DR26 Payers DR34 Review of Systems DR28 Physical Examination DR29 Plan of Care DR33 Reason for Referral DR07 Diagnostic Results DR13 History of Past Illness DR35 Social History DR37 Vital Signs
EC23	EC23 - Demographic Data		
EC24	EC 24 - Pseudo-identity		PDR-NBS14 Pediatric Demographics
EC30	EC30 - Consent Document Component		
EC32	Summary of Care	Describes the document content summarizing a consumer's registration, medication and health data information	DR02 Advance Directives DR03 Allergies and Other Adverse Reactions DR06 Comment DR31 Problem List DR09 Encounters DR12 Healthcare Providers DR18 Immunizations DR19 Information Source DR26 Payers DR20 Language Spoken DR23 Medications DR27 Personal Information DR29 Plan of Care DR30 Pregnancy DR32 Procedure DR36 Support DR37 Vital Signs



Exchange Content Identifier	Exchange Content Name	Exchange Content Definition	Data Requirements
EC48B	Discharge Summary	A discharge summary is a type of medical summary	DR31 Problem List DR01 Admission Medications History DR15 Hospital Admission Diagnosis DR02 Advance Directives DR03 Allergies and Other Adverse Reactions DR08 Discharge Diagnosis DR38 Discharge Diet DR17 Hospital Discharge Medications DR07 Diagnostic Results DR11 Functional Status DR14 History of Present Illness DR16 Hospital Course DR22 Medical Equipment DR27 Personal Information DR28 Physical Examination DR29 Plan of Care DR13 History of Past Illness DR34 Review of Systems DR24 Medications Administered DR37 Vital Signs
EC62	Unstructured Data	Used to capture and store patient identifiable, unstructured document content, such as text, PDF, and images rendered in PDF	Document Meta-data DR58 Unstructured Data Content
EC90	Genetic Risk Decision Support	Used to communicate genetic and family history information from healthcare IT applications to a clinical decision support system that provides an assessment of genetic risk of disease for a patient	DR27 Personal Information DR10 Family History DR xx Lab Result

2.6 DATA REQUIREMENTS

The following data requirements support the exchanges of data among systems involved in newborn screening.

Table 2-6 Data Requirements

Data Requirement Number (DR)	Description	Data
PDR-NBS5	Hearing Screening Order	<ul style="list-style-type: none"> PDR-NBS3 Demographics DR25 NICU Mother's education <p>NOTE: LOINC codes newly developed For Ordering a procedure/test</p> <ul style="list-style-type: none"> May be an HL7 message NICU and mother's education <p>Should align with HITSP Orders Data Requirements NOTE: Not needed in most current environments there is a standing order</p>



Data Requirement Number (DR)	Description	Data
PDR-NBS3	NBS Lab Order ¹	<p>Ordering information</p> <ul style="list-style-type: none"> • State (where screening is performed) • Pre-Printed Unique Filter Paper Number (Barcoded) • Placer (Hospital) Order Number • Filler (Laboratory) Accession Number (added by the laboratory) • Blood Draw Date/Time • Initial/Repeat • Filter Paper Number of Initial Test • Hospital/Submitter information (NPI code, name, address, phone) • Newborn Screening Lab information (code, name, address) • Ordering Physician (NPI, name) • Submitter's Initials (to identify the person who drew the blood) <p>Patient (baby's) information</p> <ul style="list-style-type: none"> • Baby's name • Multiple birth information (qualifies the name) • Baby's aliases (other previous names) • Date/Time of Birth • Baby's Gender • Baby's Race and Ethnicity • Baby's Medical Record Number • Birth Hospital (NPI code or code for Home Birth) • Birth Weight • Weight at time of sample (where required) • Gestational age (or assessment of prematurity) • Transfusion y/n • Last Transfusion Date • Feeding Type or Status (coded) <p>Mother's information</p> <ul style="list-style-type: none"> • Mother's Name • Mother's Birthdate • Mother's Phone • Mother/Caregiver Address, City, State, Zipcode

- ¹ Newborn screening is ordered as a single test panel and the composition of the panel depends on which tests are mandated in the state where the tests is performed, but it is always based on the 29 test core panel proposed by the American College of Medical Genetics (ACMG) and recommended by the Advisory Committee on Heritable Disorders in Newborns and Children (ACHDNC). Identifying the state where the test is performed on the order will be used to define the specific newborn screening panel that is ordered.
- Some public health laboratories that perform newborn screening are not required to be CLIA certified and do not have CLIA identifiers. It will be necessary to have and alternate laboratory identifier for all newborn screening laboratories
- Nearly all of the fields on the NBS Lab Order should be considered optional because each state specifies which fields appear on the filter paper order form and are required for mandated newborn screening in that state.
- The fields listed above represent the most prevalent and frequently used fields. The ability to accommodate additional fields as needed by limited numbers of states can be accommodated through general purpose LOINC codes for additional fields.
- The fields listed on the NBS Lab Order are usually echoed back to the clinician as part of the laboratory test results report to assist in interpreting the results or locating the patient.
- The NBS Lab Order is intended to align with HITSP Orders Data Requirements for Lab Orders and many of these interactions have been detailed in the 2008 General Lab Orders Use Case
- The National Library of Medicine maintains a Newborn Screening Codes web site that will maintain the LOINC codes and SNOMED codes that were provided in the Newborn Screening Coding and Terminology Guide that was developed as a companion to the Newborn Screening Use Case with periodic review by the ACHDNC.
- Reporting the results of newborn hearing screening on the dried blood spot filter paper form is not an ideal practice and separate reporting of the results to public health by the person performing the test should be encouraged. The option to include the hearing results on the blood sport order is included because several states still follow this practice and the data should be sent this way only if there is no alternative



Data Requirement Number (DR)	Description	Data
		<ul style="list-style-type: none"> • County • Mother's Maiden Name <p>Baby's physician information</p> <ul style="list-style-type: none"> • Baby's Physician Name (primary care) • Physician Phone • Physician Id (NPI) <p>Additional fields as required by individual states (examples)</p> <ul style="list-style-type: none"> • Mother's HIV status • Mother's SSN • Father's information • Family history of specific conditions • Primary Language <p>Hearing Screening Information</p> <ul style="list-style-type: none"> • Results of hearing screening (pass/refer for left, right, or both ears, method used) • Reason hearing screening was not done • NICU stay (changes requirements for hearing testing) • Antibiotics • Mother's education level • Other hearing loss risk factors <p>NOTE: Standard panel is 29 tests; over 5-69 tests that can be done; American College of Medical Genetics (ACMG)</p> <p>NOTE: Intended to align with HITSP Orders Data Requirements for Lab Orders</p> <p>See PHII Implementation Guide for sending lab results to ordering clinicians</p> <p>See Newborn Screening Coding and Terminology Guide.</p> <p>See 2008 General Lab Orders Use Case</p>
PDR-NBS10	Hearing Screening Test Results	<ul style="list-style-type: none"> • Test Interpretation Required (DR07) • Care Plan (Public Health Instructions for patient) • May be produced as an Unstructured Document (DR58)
PDR-NBS4	Birthing Data	<ul style="list-style-type: none"> • Labor and Delivery Admission History and Physical • Labor and Delivery Summary • Maternal Discharge Summary • Antepartum Information • Delivery event information • Pediatric clinician • Encounter Date • Patient Information (DOB, age, gender, resident zip code, state of residence) • Date/time of last record update • Linkage between Mom/Baby records <p>NOTE: Data attained from this and other sources (Antepartum Summary, Birth Event Record, Laboratory Results, Audiology Results, Laboratory Orders, Hearing Screening Orders) must support the following public health monitoring assessments: should support 1) tracking and estimating screening rates for both NDBS and EHDI, 2) tracking and confirmation of completion of all recommended confirmatory or diagnostic testing for both NDBS and EHDI, 3) tracking and confirmation of clinical or early intervention service delivery, 4) tracking the number of infants with conditions identified with newborn screening, 5) measuring rates of false positives, and 6) maybe using data to evaluate selection of cut-off points for normal or within/out of range results</p>
PDR-NBS6	Structured Guideline Data	<p>GAP</p> <ul style="list-style-type: none"> • Presentation Preserving format • Screening guidelines, • Management and testing guidelines (e.g. pre-natal screening guidelines, timing for testing, possibly guidelines for management of pregnancy complications) • Emergency Management of identified condition • ACMG



Data Requirement Number (DR)	Description	Data
		<ul style="list-style-type: none"> • ACT sheet, care plan for conditions – data requirements • State protocol • Abnormal results care guidelines
PDR-NBS7	Antepartum Data	<ul style="list-style-type: none"> • Antepartum History and Physical • Antepartum Laboratory • Antepartum Education • Pediatric clinician • Maternal age • Maternal occupation • Medical history • Menstrual history • Pregnancy history • Genetic screenings • Risk factors <p>NOTE: Data attained from this and other sources (Antepartum Summary, Birth Event Record, Laboratory Results, Audiology Results, Laboratory Orders, Hearing Screening Orders) must support the following public health monitoring assessments: should support 1) tracking and estimating screening rates for both NDBS and EHDI, 2) tracking and confirmation of completion of all recommended confirmatory or diagnostic testing for both NDBS and EHDI, 3) tracking and confirmation of clinical or early intervention service delivery, 4) tracking the number of infants with conditions identified with newborn screening, 5) measuring rates of false positives, and 6) maybe using data to evaluate selection of cut-off points for normal or within/out of range results</p>
PDR-NBS8	Structured Education Material	GAP
PDR-NBS9	Newborn Clinical Data	<ul style="list-style-type: none"> • Newborn Birth Attributes • NICU Attributes • Prenatal Attributes • Pediatric clinician • Encounter Date • Patient Information (DOB, age, gender, resident zip code, state of residence) • Date/time of last record update • Linkage between Mom/Baby records <p>NOTE: Data attained from this and other sources (Antepartum Summary, Birth Event Record, Laboratory Results, Audiology Results, Laboratory Orders, Hearing Screening Orders) must support the following public health monitoring assessments: should support 1) tracking and estimating screening rates for both NDBS and EHDI, 2) tracking and confirmation of completion of all recommended confirmatory or diagnostic testing for both NDBS and EHDI, 3) tracking and confirmation of clinical or early intervention service delivery, 4) tracking the number of infants with conditions identified with newborn screening, 5) measuring rates of false positives, and 6) maybe using data to evaluate selection of cut-off points for normal or within/out of range results</p>
PDR-NBS11	Screening Refusal	<ul style="list-style-type: none"> • Procedure or Test to be performed • Risks disclosed • Consent Refusal • Authorized by
PDR-NBS12	New Specimen Request	GAP
PDR-NBS13	NBS Pre-op	<ul style="list-style-type: none"> • DR25 • PDR-NBS3 NBS Lab Order
PDR-NBS14	Pediatric Demographics	<ul style="list-style-type: none"> • Patient Name: First, Middle, Last • Patient Alias Name: First, Middle, Last • Patient Address • Patient Phone Number • Patient Identifier



Data Requirement Number (DR)	Description	Data
		<ul style="list-style-type: none"> • Patient Birth Date • Patient Sex • Patient Race • Patient Ethnicity • Patient Primary Language • Patient Multiple Birth Indicator • Patient Multiple Birth Order • Patient Birth Registration Number • Patient Birth State/Country • Patient Birthing Facility • Mother's Name: First, Middle, Last • Mother's Maiden Name • Mother's SSN • Father's Name: First, Middle, Last • Father's SSN • Insurance Plan • Insurance Company • Immunization Services Funding Eligibility • Next of Kin Relationship • Next of Kin Address • Next of Kin Telephone • Next of Kin DOB • Last Update Time/Date • Last Update Facility
PDR-NBS1	Consent for Procedure	<ul style="list-style-type: none"> • Procedure or Test to be performed • Risks disclosed • Consent Refusal • Authorized by • Effective Date/Time • Expiration Date/Time • Signature
PDR-NBS2	Consent to retain sample	<ul style="list-style-type: none"> • Sample type • Sample uses permitted • Authorized by
DR01	Admission Medications History: Contains information about the relevant medications of a patient prior to admission to a facility	2.2.1.13 Admission Medications Section
DR02	Advance Directives: Contains information that defines the patient's expectations and requests for care along with the locations of the documents	2.2.1.16 Advance Directives Section
DR03	Allergies and Other Adverse Reactions: Contains data on the substance intolerances and the associated adverse reactions suffered by the patient	2.2.1.2 Allergies and Other Adverse Reactions Section
DR06	Comment: Contains a comment to be supplied for any other data requirement	2.2.2.11 Comment
DR07	Diagnostic Results: Contains information about the results	2.2.1.22 Diagnostic Results Section



Data Requirement Number (DR)	Description	Data
	from diagnostic procedures the patient received	
DR08	Discharge Diagnosis: Contains information about the conditions identified during the hospital stay that either need to be monitored after discharge from the hospital and/or where resolved during the hospital course	2.2.1.11 Discharge Diagnosis Section
DR09	Encounters: Contains information describing the patient history of encounters. At a minimum, includes current and pertinent historical encounters, and may include a full encounter history	2.2.1.27 Encounters Section
DR10	Family History: Contains information about the genetic family members, to the extent that they are known, the diseases they suffered from, their ages at death, and other relevant genetic information	2.2.1.25 Family History
DR11	Functional Status: Provides information about the capability of the patient to perform acts of daily living	2.2.1.9 Functional Status Section
DR12	Healthcare Providers: Contains the healthcare providers involved in the current or pertinent historical care of the patient	2.2.2.4 Healthcare Provider
DR13	History of Past Illness: Contains data about problems the patient suffered in the past	2.2.1.4 History of Past Illness Section
DR14	History of Present Illness: Contains information about the sequence of events preceding the patient's current complaints	2.2.1.7 History of Present Illness Section
DR15	Hospital Admission Diagnosis: Contains information about the primary reason for admission to a hospital facility	2.2.1.10 Hospital Admission Diagnosis Section
DR16	Hospital Course: Contains information about of the sequence of events from admission to discharge in a hospital facility	2.2.1.21 Hospital Course Section
DR17	Hospital Discharge Medications: Contains information about the relevant medications ordered for the patient for use after discharge from the hospital	2.2.1.14 Hospital Discharge Medications Section
DR18	Immunizations: Contains information describing the	2.2.1.17 Immunizations Section



Data Requirement Number (DR)	Description	Data
	immunizations administered to the patient	
DR19	Information Source: Contains information about the original author to be supplied and for a reference to the original document to be provided	2.2.2.10 Information Source
DR20	Language Spoken: Contains the primary and secondary languages of communication for the patient	2.2.2.2 Language Spoken
DR21	List of Surgeries: Provides a list of surgeries the patient has received	2.2.1.8 List of Surgeries Section
DR22	Medical Equipment: Contains information describing a patient's implanted and external medical devices and equipment that their health status depends on, as well as any pertinent equipment or device history	2.2.1.28 Medical Equipment Section
DR23	Medications: Description of the relevant medications for the patient, e.g. An ambulatory prescription list	2.2.1.12 Medications Section
DR24	Medications Administered: Contains information about the relevant medications administered to a patient during the course of an encounter	2.2.1.15 Medications Administered Section
DR25	Orders	
DR26	Payers: The Payers Section contains data on the patient's payers, whether a 'third party' insurance, self-pay, other payer or guarantor, or some combination - At a minimum, the patient's pertinent current payment sources should be listed	2.2.1.1 Payers Section
DR27	Personal Information: Contains the name, address, contact information, personal identification information, ethnic and racial affiliation and marital status of the subject person	2.2.2.1 Personal Information
DR28	Physical Examination: Contains information describing the physical findings	2.2.1.18 Physical Examination Section
DR29	Plan of Care: Contains information about the expectations for care to be provided including proposed	2.2.1.24 Plan of Care Section



Data Requirement Number (DR)	Description	Data
	interventions and goals for improving the condition of the patient. A plan of care section varies from the assessment and plan data requirements in that it does not include a physician assessment of the patient condition	
DR30	Pregnancy: Contains a coded entry indicating whether the patient is currently pregnant	2.2.2.9 Pregnancy
DR31	Problem List: Contains data on the problems currently being monitored for the patient	2.2.1.3 Problem List Section? 2.2.2.7 Condition
DR32	Procedure: Contains a coded entry indicating a procedure performed on a patient	2.2.2.17 Procedure
DR33	Reason for Referral: Contains information about the reason that the patient is being referred	2.2.1.6 Reason for Referral Section
DR34	Review of Systems: Contains information describing patient responses to questions about the function of various body systems	2.2.1.20 Review of Systems Section
DR35	Social History: Contains information about the person's beliefs, home life, community life, work life, hobbies, and risky habits	2.2.1.26 Social History Section
DR36	Support: Contains the patient's sources of support, such as immediate family, relatives and guardian at the time as the summarization is generated. Support information also includes next of kin, caregivers and support organizations. At a minimum, key support contacts relative to healthcare decisions, including next of kin, should be included. Support providers may include providers of healthcare related services, such as a personally controlled health record, or registry of emergency contacts	2.2.2.3 Support
DR37	Vital Signs: Contains information documenting the patient vital signs	2.2.2.14 Vital Sign
DR38	Discharge Diet	
DR58	Unstructured Data Content	
	Message Header Content	



Data Requirement Number (DR)	Description	Data
PDR 50	Fully Coded Lab Result Content	

The following table lists a number of general constraints applicable to this specification. They include assumptions, a number of pre-conditions and post-conditions as well as external trigger events that play a critical role in implementing this specification.

The section numbers below (e.g., 7.3.1.x) refer to the original Use Case events, which are described in Table 5-1 in the Appendix and provide context for those constraints.

Table 2-7 Constraints

Constraint	Type of Constraint
Assume that the Consumer has access to the test results as enabled by IS05	Assumption
It is expected that initial newborn screening will occur in hospital settings rather than provider offices. Subsequent screening will be likely to happen in the outpatient clinician office setting	Assumption
Home birth, birth center and hospital need to be considered for the initial screening (i.e., midwifery needs to be included in the analysis)	Assumption
The HIE requires some connection to a registry	Assumption
Government and Regulatory Agencies are part of Public Health for this Use Case	Assumption
Research Entities and Social Service Agencies are part of public health for this Use Case NOTE: there are no direct Use Case interactions so these Use Case stakeholders could be removed	Assumption
7.1.3a In the case of a home birth, an audiologist is not present. It needs to be determined who creates the EHR and who is responsible	Assumption
7.3.1.1 Protocols may differ in midwifery facilities - could be part of the guideline or advice	Assumption
7.3.3.1 Screening done by birth hospital and can be sent to Public Health	Assumption
7.3.3.1 nursery care or the hospital service that is fulfilling the order, rather than auditory services facilities are sending results - results from the birthing facility EHR to Public Health; also birthing facility communicates results to parents and other providers	Assumption
7.3.3.1 Results are transmitted directly to EHDI program (Early Hearing Detection and Intervention)	Assumption
7.3.3.1a Need to associate multiple results with the same child before computing aggregate statistics	Assumption
7.3.3.1a This is the only way that Public Health receives the screening results; resolution of duplicates needed in this case	Assumption
7.3.3.1b Electronic Birth Certificate (EBC) - is a request for the legal birth certificate document to be created hospital-of-birth ->Public Health ->vital records+screening program. This is addressed in HITSP/IS91 Maternal and Child Health	Assumption
7.3.3.1c In the case of a commercial lab or involvement of another state, there may be delay to hearing screening resulting from binding to lab testing pathway	Assumption
7.3.4.1 In the case of a commercial lab or involvement of another state, there may be delay to hearing screening resulting from binding to lab testing pathway	Assumption
7.3.1.1 Policies and requirements are the same concept as a protocol/guideline - could take advantage of CDS, but would not drive the development of these	Assumption
7.3.1.1 T81 Possibility - but this is overkill as the guidelines are relatively static	Assumption
7.3.1.1 Policies change - many not in years, some may be annual	Assumption
7.2.2.2 Need for identifying the physician providing care - pediatrician may be family practitioner or other specialist	Assumption
7.2.2.2 Need to align the concepts for Medical home for the infant	Assumption
7.3.5.2 Pseudonymize and anonymize pertains to research, not Public Health registries	Assumption
7.4.1.1a Laboratory order is communicated from a source with an EHR	Assumption
7.4.1.2a Public health would need to be informed as well	Assumption



Constraint	Type of Constraint
7.5.1.1, 7.5.2.1 Most hospitals do not have audiology services – it is the nursery or volunteer staff that conducts the screening	Assumption
7.5.2.2 Most hospitals do not have audiology services – it is the screening personnel (e.g. nursery or volunteer staff) that reports the results	Assumption
7.5.2.2 The last screening test is the test reported or may be driven by the state protocol	Assumption
7.5.2.2 Hospital may do multiple screening tests in the hospital	Assumption
7.5.2.2 Vital records data requirements: do not need clinical results, but many states are using this approach	Assumption
7.5.2.2 Anticipate that bureau of vital statistics requirements will be described in the MCH Use Case	Assumption
8.1.1.1 Audiologist are not yet in the picture – this is the hospital screening staff that will inform either the clinician directly and/or State Department of Public Health which may contact clinician	Assumption
8.1.1.3 Assume that this is 'Other' online source – only the communication partners differ between 8.1.1.2 and 8.1.1.3	Assumption
8.1.2.1 Assume family history is for the purpose of risk factor monitoring and possibly for repeat test recommendations/orders	Assumption
8.1.2.1 Policy decisions are out of scope	Assumption
8.1.2.2 Assume that there may be a gap in information detail on what was originally collected for the mother	Assumption
8.1.2.2 Family history gathering may have been captured for a different purpose	Assumption
8.1.3.1 Assume that this is a repeat AND/OR confirmatory tests	Assumption
8.1.3.1 Assume this may instead be a referral for EHDl	Assumption
8.1.3.1 Confirmatory may or may not be a repeat of the same test	Assumption
8.1.6.4 In some cases the care giver may send the specimen to the lab – assume this is out of scope	Assumption
8.1.6.4 By most policy, it is not the pediatric clinician that files this report but the audiologist listed in action 8.1.8.2, but reporting is valid for metabolic or genetic	Assumption
8.1.6.4 This may support birth defects registry reporting where a registry exists	Assumption
8.1.8.3 Implication that the emergency care staff has access to the results, medical summaries	Assumption
8.1.8.3 The condition is identified	Assumption
8.1.8.3 If diagnosis, may be a plan of care	Assumption
8.1.9.2 This includes the Public Health STFU	Assumption
8.1.9.2 Any reference to services referral is covered in the Maternal and Child Health IS	Assumption
8.1.9.2 Any Long-term follow-up is outcome assessment – this is covered in the Quality IS	Assumption
8.1.9.2 This includes the Public Health STFU	Assumption
8.1.9.2 Any reference to services referral is covered in the Maternal and Child Health IS	Assumption
8.1.9.2 Any Long-term follow-up is outcome assessment – this is covered in the Quality IS	Assumption
8.1.9.3 This includes the Public Health STFU	Assumption
8.1.9.3 Any reference to services referral is covered in the Maternal and Child Health IS	Assumption
8.1.9.3 Any Long-term follow-up is outcome assessment – this is covered in the Quality IS	Assumption
8.1.9.3 This may not be covered in the Use Case given the age group constraining imposed by the Use Case and/or the IS implementation. Also considerations of well child care and not abnormal results may pertain	Assumption
8.2.2.1 Based upon jurisdiction policy and disclosure protocols, the results are made available to the patient PHR	Assumption
8.2.3.1 Based upon jurisdiction policy and disclosure protocols, the results are made available to the patient PHR	Assumption
8.3.1.1 Family genetic/genomic information is part of the risk factor	Assumption
8.3.1.2 Assume that they are informing the patient's family as the patient is a newborn	Assumption
8.3.5.1 LTFU requirements are addressed by other Use Cases and should not be part of this IS	Assumption
8.3.5.3 Policy subject to 'part C' of individual with disabilities education act	Assumption
8.3.5.4 Tracking may include e.g. number of births vs. number of screening	Assumption
8.3.5.4 Including Hospital Screening Results	Assumption



Constraint	Type of Constraint
8.3.5.5 These communications may come from public health or from other clinicians/ organizations	Assumption
8.4.2.2 May go to Public Health	Assumption
Support the technical measures to ensure Security and Privacy of consumer/patient health information	Pre-Condition
Authentication service to authenticate requestors and/or data submissions from various locations	Pre-Condition
Security and Privacy policies, procedures and practices are commonly implemented to support acceptable levels of consumer/patient security and privacy	Pre-Condition
Legal and governance issues regarding data access authorizations, data ownership, and data use are in effect	Pre-Condition
Support the following HITSP Security and Privacy constructs: <ul style="list-style-type: none"> • HITSP/C19 – Entity Identity Assertion • HITSP/T16 - Consistent Time – Maintain time • HITSP/T17 - Secured Communication Channel – Authenticate node • HITSP/T15 - Collect and Communicate Security Audit Trail – Record audit event in repository • HITSP/TP30 - Manage Consent Directives – Capture/Request consent directive • HITSP/TP20 - Access Control – Access control request 	Pre-Condition
Child is born and new electronic health records are established for the newborn at the birthing facility, health department, medical home, EHR	Pre-Condition
Initial screening results are known	Pre-Condition
The jurisdiction for the child is known	Pre-Condition
Newborn Screening protocols are defined by the jurisdiction	Pre-Condition
Pre-requisite: Dependency that EHR has already communicated notification of birth of the child (see Maternal and Child Health (MCH) Use Case)	Pre-Condition
Results are entered and available to the patient EHR, hospital of birth, medical home, PHR, specialty providers, and public health record	Post-Condition
Follow-up results are entered and available to the patient EHR, hospital of birth, medical home, PHR, specialty providers, and public health record	Post-Condition
Registration or referral for Long-term care follow-up (e.g. Dietary management, early intervention)	Post-Condition
Initiate long-term care management	Post-Condition
Enabling ongoing monitoring of screening effectiveness and care quality/outcomes	Post-Condition
New screening techniques or policies are recommended	Trigger
New screening policies and requirements are available	Trigger
A child is born	Trigger
Information not maintained by the EHR is available to the EHR for augmentation (e.g. Risk factor information from the mother's record)	Trigger
Electronic consent is gather from the patient caregiver	Trigger
Clinical conditions indicate that the child is stable and ready for the hearing screening test	Trigger
Specimen has been collected and order detail captured	Trigger
Clinical conditions or policy dictates second screening	Trigger
Results are available for communication	Trigger
Family history and consent is available from caregiver	Trigger
Clinical conditions or policy dictates repeat screening or confirmation	Trigger
Jurisdiction policy dictates that reporting to public health is required	Trigger
Clinical conditions or jurisdiction policy dictates referrals and short-term follow-up	Trigger



3.0 DESIGN

3.1 CAPABILITIES USED IN NEWBORN SCREENING

The following Capabilities table summarizes the set of capabilities selected to support the Newborn Screening Value Case scenarios, along with the Information Exchange Requirements satisfied by that Capability.

Table 3-1 Capabilities Used

Capability	Capability Summary	IERs satisfied
HITSP/CAP119 Communicate Structured Document	<p>This capability addresses interoperability requirements that support the communication of structured health data related to a patient in a context set by the source of the document who is attesting to its content. Several document content subsets, structured according to the HL7 CDA standard, are supported by this capability. The following are examples of the type of structured data that may be used:</p> <ul style="list-style-type: none"> Continuity of Care Document (CCD) – HITSP/C32 Emergency Department Encounter Summary – HITSP/C28 Discharge Summary (Inpatient encounter and/or episodes of care) – HITSP/C48 Referral Summary Ambulatory (encounter and/or episodes of care) – HITSP/C48 Consultation Notes – HITSP/C84 History and Physical -- HITSP/C84 Remote Monitoring Observation Document – HITSP/C74 Healthcare Associated Infection (HAI) Report Document – HITSP/C75 <p>Document creators shall support a number of the HITSP specified coded terminologies as defined by specific content subsets specified in this capability</p>	<p>IER4, IER5, IER6, IER7, IER8, IER9, IER10, IER11, IER12, IER13, IER18, IER19, IER20, IER23, IER25, IER26, IER27, IER31, IER35, IER38, IER 39, IER40, IER 41, IER42, IER48, IER49, IER50, IER 51, IER52, IER53, IER54, IER61, IER 62, IER64, IER66, IER68, IER70, IER72, IER75, IER76, IER77, IER78, IER79, IER81, IER82, IER84, IER86, IER87, IER88, IER89, IER90, IER91, IER92, IER93, IER94, IER95, IER96, IER97, IER99, IER100, IER101, IER102, IER103, IER104, IER105, IER106, IER108</p>
HITSP/CAP120 Communicate Unstructured Document	<p>This capability addresses interoperability requirements that support the communication of a set of unstructured health data related to a patient in a context set by the source of the document who is attesting to its content. Two types of specific unstructured content are supported, both with a structured CDA header:</p> <ul style="list-style-type: none"> PDF-A supporting long-term archival UTF-8 text 	<p>IER38 IER39 IER40 IER41 IER42</p>
HITSP/CAP121 Communicate Clinical Referral Request	<p>This capability addresses interoperability requirements that support provider-to-provider (clinical) referral request interaction. It allows the bundling of the referral request document with other relevant clinical documents of interest by referencing such documents as shared by other capabilities such as:</p> <ul style="list-style-type: none"> CAP119 Communicate Structured Document; CAP120 Communicate Unstructured Document; or CAP133 Communicate Immunization Summary 	<p>IER79, IER80, IER81, IER82, IER84, IER105</p>
HITSP/CAP122 Retrieve Medical Knowledge	<p>This capability addresses the requirements to retrieve medical knowledge that is not patient-specific based on context parameters. The actual content delivered is not constrained by this capability; this capability focuses on providing the mechanism to ask for (query) and receive the medical knowledge</p>	<p>IER1, IER2, IER43, IER85</p>



Capability	Capability Summary	IERs satisfied
HITSP/CAP123 Retrieve Existing Data	This capability supports queries for clinical data (e.g., common observations, vital signs, problems, medications, allergies, immunizations, diagnostic results, professional services, procedures and visit history)	IER8, IER9
HITSP/CAP126 Communicate Lab Results Message	This capability addresses interoperability requirements that support the sending of a set of laboratory test results. Ordering Providers of Care receive results as a laboratory results message. The communication of the order is out of scope for this capability. The content of these test results may be either or both: General Laboratory Test Results; Microbiology Test Results. This capability may use content anonymization	IER30, IER33, IER63, IER65, IER107
HITSP/CAP127 Communicate Lab Results Document	This capability addresses interoperability requirements that support the communication of a set of structured laboratory results related to a patient in a context set by the source of the document who is attesting to its content. Non-ordering Providers of Care access historical laboratory results as documents and "copy-to" Providers of Care may receive document availability notifications to retrieve such lab report documents. Lab Report content creators shall support HITSP specified coded terminologies as defined by specific content subsets specified in this Capability for: General Laboratory Test Results; Microbiology Test Results. This capability may use content anonymization	IER31, IER32, IER34, IER55, IER67, IER83
HITSP/CAP135 Retrieve and Populate Form	This capability addresses interoperability requirements to support the upload of specific captured data (e.g. public health surveillance reportable conditions, healthcare associated infection reporting) to Public Health Monitoring Systems and Quality Organizations Systems. The forms presented may be pre-populated by information provided by the clinical or laboratory information systems to avoid manual re-entry. A number of supplemental information variables may be captured from within the user's clinical information system to improve the workflow and timeliness of required reporting. One or more types of form content may be supported: <ul style="list-style-type: none"> • Pre-population for Public Health Case Reports from Structured Documents using CDA • Pre-population for Quality Data from Structured Documents using CDA • No pre-population content Systems may optionally support the means to retrieve request for clarifications	IER16, IER17
HITSP/CAP136 Communicate Emergency Alert	This capability addresses interoperability requirements to support multicast of non-patient specific notification messages about emergencies events, alerts concerning incidence of communicable diseases, alerts concerning population needs for vaccines and other generic alerts sent to an identified channel. The intended recipients are populations such as "all emergency departments in XXX county", "within a geographic area", etc. . Note that this capability is not used to communicate patient-specific or identifiable data	IER39
HITSP/CAP138 Retrieve Pseudonym	This capability addresses interoperability requirements to support a particular type of anonymization that both removes the association with a data subject, and adds an association between a particular set of characteristics relating to the data subject and one or more pseudonyms. This enables a process of supplying an alternative identifier, which permits a patient to be referred to by a key that suppresses his/her actual identification information. The purpose of this capability is to offer a pseudonymization framework for situations that require the use of specific data without disclosing the specific identity of patients or providers. Pseudo-identifiers are intended to allow accessibility to clinical information, while safeguarding any information that may compromise the privacy of the individual patient or provider. However, unlike anonymization, the alternative identifier key can be used to re-identify the individuals whose data was used	IER15, IER70



Capability	Capability Summary	IERs satisfied
HITSP/CAP142 Retrieve Communications Recipient	This capability addresses interoperability requirements that support access to a directory to identify one or more communication recipients in order to deliver alerts and bi-directional communications (e.g., public health agencies notifying a specific group of service providers about an event). The method and criteria by which individuals are added to a directory is a policy decision, which is out of scope for this construct	IER39
HITSP/CAP143 Manage Consumer Preference and Consents	This capability addresses management of consumer preferences and consents as an acknowledgement of a privacy policy. This capability is used to capture a patient or consumer agreement to one or more privacy policies; where examples of a privacy policy may represent a consent, dissent, authorization for data use, authorization for organizational access, or authorization for a specific clinical trial. This capability also supports the recording of changes to prior privacy policies such as when a patient changes their level of participation or requests that data no-longer be made available because they have left the region	IER4, IER5, IER6, IER44, IER45, IER46, IER47, IER69
HITSP/CAP 99 Communicate Laboratory Orders	HITSP/CAP99 Communicate Lab Orders Message	IER14, IER57, IER71
HITSP/CAP XXX Communicate Procedure Orders		IER21, IER22, IER 58, IER 60
HITSP/CAP XXX NEW Communicate Device Results Data (PCD - Devices)		IER36

3.2 CAPABILITY ORCHESTRATION

The table and below illustrates the data flow and information exchanges between the primary Systems engaged in the support of the requirements described in Section 2.0. Subsets of these Systems perform information exchanges according to one or more of the HITSP Capabilities identified in this Specification. The in-scope requirements are supported by Capabilities previously specified by HITSP.

Table 3-2 Capability Orchestration

System	Capability	Optionality ²
Electronic Health Record (EHR) System	HITSP/CAP119 Communicate Structured Document	R
	HITSP/CAP120 Communicate Unstructured Document	R
	HITSP/CAP121 Communicate Clinical Referral Request	O
	HITSP/CAP122 Retrieve Medical Knowledge	C[101]
	HITSP/CAP123 Retrieve Existing Data	O
	HITSP/CAP126 Communicate Lab Results Message	C[102]
	HITSP/CAP127 Communicate Lab Results Document	C[102]
	HITSP/CAP135 Retrieve and Populate Form	C[103]
	HITSP/CAP136 Communicate Emergency Alert	O
	HITSP/CAP138 Retrieve Pseudonym	C[104]
	HITSP/CAP143 Manage Consumer Preference and Consents	R
	HITSP/CAP 99 Communicate Laboratory Orders	R
	HITSP/CAP XXX Communicate Procedure Orders	R

² Optionality = "R" for Required, "R2" for Required if Known or "O" for Optional, or "C" for Conditional



System	Capability	Optionality ²
Health Information Exchange (HIE)	HITSP/CAP XXX NEW Communicate Device Results Data (PCD – Devices)	C[105]
	HITSP/CAP119 Communicate Structured Document	R
	HITSP/CAP120 Communicate Unstructured Document	R
	HITSP/CAP122 Retrieve Medical Knowledge	O
	HITSP/CAP127 Communicate Lab Results Document	R
	HITSP/CAP135 Retrieve and Populate Form	O
	HITSP/CAP138 Retrieve Pseudonym	C[104]
	HITSP/CAP142 Retrieve Communications Recipient	O
	HITSP/CAP143 Manage Consumer Preference and Consents	R
	HITSP/CAP 99 Communicate Laboratory Orders	O
Public Health Information System	HITSP/CAP XXX Communicate Procedure Orders	R
	HITSP/CAP119 Communicate Structured Document	R
	HITSP/CAP120 Communicate Unstructured Document	R
	HITSP/CAP121 Communicate Clinical Referral Request	O
	HITSP/CAP122 Retrieve Medical Knowledge	O
	HITSP/CAP126 Communicate Lab Results Message	C[102]
	HITSP/CAP127 Communicate Lab Results Document	C[102]
	HITSP/CAP135 Retrieve and Populate Form	O
	HITSP/CAP136 Communicate Emergency Alert	C[106]
	HITSP/CAP138 Retrieve Pseudonym	C[104]
	HITSP/CAP142 Retrieve Communications Recipient	O
	HITSP/CAP143 Manage Consumer Preference and Consents	R
	HITSP/CAP 99 Communicate Laboratory Orders	C[107]
	HITSP/CAP XXX Communicate Procedure Orders	C[107]
	HITSP/CAP XXX NEW Communicate Device Results Data (PCD – Devices)	C[105]
Laboratory Information Systems	HITSP/CAP126 Communicate Lab Results Message	C[107]
	HITSP/CAP127 Communicate Lab Results Document	C[107]
	HITSP/CAP138 Retrieve Pseudonym	C[104]
	HITSP/CAP143 Manage Consumer Preference and Consents	R
	HITSP/CAP 99 Communicate Laboratory Orders	R
Personal Health Record (PHR) Systems	HITSP/CAP119 Communicate Structured Document	R
	HITSP/CAP120 Communicate Unstructured Document	O
	HITSP/CAP121 Communicate Clinical Referral Request	O
	HITSP/CAP122 Retrieve Medical Knowledge	O
	HITSP/CAP127 Communicate Lab Results Document	O



System	Capability	Optionality ²
	HITSP/CAP143 Manage Consumer Preference and Consents	O
Device – Hearing Screening Device	HITSP/CAP119 Communicate Structured Document	
	HITSP/CAP120 Communicate Unstructured Document	
	HITSP/CAP XXX Communicate Procedure Orders	R
	HITSP/CAP XXX NEW Communicate Device Results Data (PCD – Devices)	R

Table 3-3 below lists the conditions applicable to the orchestration (see above table) of the capabilities engaged in this RDSS.

Table 3-3 Conditions

Condition Code	Condition Description
C[101]	Knowledge Consumer may be used to retrieve guideline and educational material. Email or Web-based retrieval alternatives may be use. At least one of these methods must be supported. Jurisdiction implementations may require the use of one or more methods
C[102]	Shall support at least one of these capabilities
C[103]	Implementation environment may require support the pre-population of forms from Birthing Summary
C[104]	Required where pseudonymization is required by the jurisdiction or information sharing agreements
C[105]	Implementation environment may require where device sends hearing screening results
C[106]	Shall support Capability 136 or Capability 119 with NAV
C[107]	Required where Public Health Initiates Screening Referrals

3.2.1 ADDITIONAL CONSTRAINTS ON REQUIRED CAPABILITIES

This section describes the constraints that further limit the capabilities that are used.

Table 3-4 Additional Constraints on Capabilities

Capability	Constraint	Constraint Type	Purpose
HITSP/119	Require support for Publish/Subscribe	General	Enable clinicians and public health to subscribe to newborn related data
HITSP/119	Require Notification (T29)	General	Enable support for notification of availability of newborn related data
HITSP/119	Require Pediatric Option for Patient Identification (TP22, TP23, T24)	General	Enable support for newborn identity resolution
HITSP/99	Support lab order value sets	General	Enable appropriate semantic expression for newborn screening orders
HITSP/126	Support lab order value sets	General	Enable appropriate semantic expression for newborn screening results



Capability	Constraint	Constraint Type	Purpose
HITSP/127	Support lab results value sets Support Anonymize	GeneralPI	Enable appropriate semantic expression for newborn screening results
HITSP/128	Support lab results value sets Support Anonymize	General	Enable appropriate semantic expression for newborn screening results

3.2.2 EXISTING HITSP CAPABILITIES

The table below provides a description of existing HITSP capabilities that will be used for this Use Case solution. It also specifies whether the capability requires modification to support the Newborn Screening RDSS.

Table 3-5 Capabilities and Required Modifications

HITSP Capability	Modification Required	Description
HITSP/CAP119 Communicate Structured Document	Additional support needed for: <ul style="list-style-type: none"> • Birthing Summary • Antepartum Record • Lab Order Document • Hearing Screening Results Infrastructure support required for: <ul style="list-style-type: none"> • Notify (T29) • Publish/Subscribe Add System Interface support for <ul style="list-style-type: none"> • Hearing Screening System 	This capability addresses interoperability requirements that support the communication of structured health data related to a patient in a context set by the source of the document who is attesting to its content. Several document content subsets, structured according to the HL7 CDA standard, are supported by this capability. The following are examples of the type of structured data that may be used: <ul style="list-style-type: none"> • Continuity of Care Document (CCD) • Emergency Department Encounter Summary • Discharge Summary (In-patient encounter and/or episodes of care) • Referral Summary Ambulatory (encounter and/or episodes of care) • Consultation Notes • History and Physical • Personal Health Device Monitoring Document • Healthcare Associated Infection (HAI) Report Document Document creators shall support a number of the HITSP specified coded terminologies as defined by specific content subsets specified in this capability
HITSP/CAP120 Communicate Unstructured Document	Add System Interface support for <ul style="list-style-type: none"> • Hearing Screening System May need to add support for: <ul style="list-style-type: none"> • Screening Guidelines • Educational Brochures 	This capability addresses interoperability requirements that support the communication of a set of unstructured health data related to a patient in a context set by the source of the document who is attesting to its content. Two types of specific unstructured content are supported, both with a structured CDA header: <ul style="list-style-type: none"> • PDF-A supporting long-term archival • UTF-8 text
HITSP/CAP121 Communicate Clinical Referral Request	Add System Interface support for Public Health Information System	This capability addresses interoperability requirements that support provider-to-provider (clinical) referral request interaction. It allows the bundling of the referral request document with other relevant clinical documents of interest by referencing such documents as shared by other capabilities such as: CAP119 Communicate Structured Document; CAP120 Communicate Unstructured Document; or CAP133 Communicate Immunization Summary



HITSP Capability	Modification Required	Description
HITSP/CAP122 Retrieve Medical Knowledge	Consider specific support for infobutton request for Guidelines or Educational Brochures for Newborn Screening	This capability addresses the requirements to retrieve medical knowledge that is not patient-specific based on context parameters. The actual content delivered is not constrained by this capability; this capability focuses on providing the mechanism to ask for (query) and receive the medical knowledge
HITSP/CAP123 Retrieve Existing Data	May need additional support for querying for newborn attributes	This capability supports queries for clinical data (e.g., common observations, vital signs, problems, medications, allergies, immunizations, diagnostic results, professional services, procedures and visit history)
HITSP/CAP126 Communicate Lab Results Message	Support for Newborn Screening Value Sets	This capability addresses interoperability requirements that support the sending of a set of laboratory test results. Ordering Providers of Care receive results as a laboratory results message. The communication of the order is out of scope for this capability. The content of these test results may be either or both: General Laboratory Test Results; Microbiology Test Results. This capability may use content anonymization
HITSP/CAP127 Communicate Lab Results Document	Support for Newborn Screening Value Sets	This capability addresses interoperability requirements that support the communication of a set of structured laboratory results related to a patient in a context set by the source of the document who is attesting to its content. Non-ordering Providers of Care access historical laboratory results as documents and "copy-to" Providers of Care may receive document availability notifications to retrieve such lab report documents. Lab Report content creators shall support HITSP specified coded terminologies as defined by specific content subsets specified in this Capability for: General Laboratory Test Results; Microbiology Test Results. This capability may use content anonymization
HITSP/CAP135 Retrieve and Populate Form	Add support for Prepopulation from Birthing Summary	This capability addresses interoperability requirements to support the upload of specific captured data (e.g. public health surveillance reportable conditions, healthcare associated infection reporting) to Public Health Monitoring Systems and Quality Organizations Systems. The forms presented may be pre-populated by information provided by the clinical or laboratory information systems to avoid manual re-entry. A number of supplemental information variables may be captured from within the user's clinical information system to improve the workflow and timeliness of required reporting. One or more types of form content may be supported: <ul style="list-style-type: none"> • Pre-population for Public Health Case Reports from Structured Documents using CDA • Pre-population for Quality Data from Structured Documents using CDA • No pre-population content Systems may optionally support the means to retrieve request for clarifications
HITSP/CAP136 Communicate Emergency Alert	Support for abnormal Newborn Screening results alert and associated instructions	This capability addresses interoperability requirements to support multicast of non-patient specific notification messages about emergencies events, alerts concerning incidence of communicable diseases, alerts concerning population needs for vaccines and other generic alerts sent to an identified channel. The intended recipients are populations such as "all emergency departments in XXX county", "within a geographic area", etc. . . . Note that this capability is not used to communicate patient-specific or identifiable data



HITSP Capability	Modification Required	Description
HITSP/CAP138 Retrieve Pseudonym	Support to pseudonymize Mothers Identity	This capability addresses interoperability requirements to support a particular type of anonymization that both removes the association with a data subject, and adds an association between a particular set of characteristics relating to the data subject and one or more pseudonyms. This enables a process of supplying an alternative identifier, which permits a patient to be referred to by a key that suppresses his/her actual identification information. The purpose of this capability is to offer a pseudonymization framework for situations that require the use of specific data without disclosing the specific identity of patients or providers. Pseudo-identifiers are intended to allow accessibility to clinical information, while safeguarding any information that may compromise the privacy of the individual patient or provider. However, unlike anonymization, the alternative identifier key can be used to re-identify the individuals whose data was used
HITSP/CAP142 - Retrieve Communications Recipient		This capability addresses interoperability requirements that support access to a directory to identify one or more communication recipients in order to deliver alerts and bi-directional communications (e.g., public health agencies notifying a specific group of service providers about an event). The method and criteria by which individuals are added to a directory is a policy decision, which is out of scope for this construct
HITSP/CAP143 - Manage Consumer Preference and Consents	Add support for: <ul style="list-style-type: none"> Consent to procedure Patient Consent to retain Sample Refusal of screening Mom/Baby consent authorization 	This capability addresses management of consumer preferences and consents as an acknowledgement of a privacy policy. This capability is used to capture a patient or consumer agreement to one or more privacy policies; where examples of a privacy policy may represent a consent, dissent, authorization for data use, authorization for organizational access, or authorization for a specific clinical trial. This capability also supports the recording of changes to prior privacy policies such as when a patient changes their level of participation or requests that data no-longer be made available because they have left the region

3.2.2.1 EXTENSIONS TO HITSP CONSTRUCTS

For the above listed HITSP Capabilities, the table below identifies any, extensions that might needed to existing HITSP Constructs to satisfy the Newborn Screening RDSS.

Table 3-6 Constructs and Required Extensions

HITSP Construct	Extension Required	Description
HITSP/C80 Clinical Document and Message Terminology	Support for Newborn Screening Related vocabularies	Additional attributes supporting newborn screening are anticipated. C80 will need updating to support related vocabularies for these additional attributes
HITSP/C83 CDA Content Modules	Support for Newborn Screening Related sections	Additional CDA sections supporting newborn related data are anticipated. C83 will need updating to support related CDA sections for these
HITSP/T81 Retrieval of Medical Knowledge	Support for Guidelines and Educational Brochures	Consideration for specific content related to requests for Newborn Screening Guidelines or Newborn Screening related Educational Brochures for identified conditions
HITSP/TP30 Manage Consent Directives	Support for: <ul style="list-style-type: none"> Consent to Procedure Screening refusal Patient Consent to retain Sample Mom/Baby consent authorization 	Manage Consent Directives might be updated to expand support for Consent to Procedure, Screening Refusal, or patient consent to retain sample. These might be handled as new constructs. Pending SPI TC analysis



HITSP Construct	Extension Required	Description
HITSP/C35 Lab Result Terminology	Support for Newborn Screening Value Sets	Lab results need to leverage newborn screening related value sets. These may need to be identified in this construct
HITSP/C62 Unstructured Document	Support for Guidelines and Educational Brochures	May need updating to more specifically identify the unstructured content as being a Guideline or Educational Brochure
HITSP/T24Pseudonymize	Modify to accommodate Newborn Screening Pseudonymization	Pseudonymization of mother's ID in situations of adoption may require pseudonymization of the parent identifiers

3.2.3 NEW HITSP CAPABILITIES

The table below provides a description of the new HITSP Capabilities that will be created for this Use Case.

Table 3-7 New Capabilities

New Capability	Capability Description	IER
HITSP/CAP 99 Communicate Laboratory Orders	This Capability satisfies the information exchange requirements for the sending and receiving of a set of laboratory order, control and status messages. Laboratory orders may be from an inpatient or outpatient (E.g.: Clinic, ER, office, etc) environment.	IER14, IER57, IER71
HITSP/CAP XXX Communicate Procedure Orders	This Capability satisfies the information exchange requirements for the sending and receiving of a procedure order, control and status message. Procedure orders may be from an inpatient or outpatient environment	IER21, IER22, IER 58, IER 60
HITSP/CAP XXX NEW Communicate Device Results Data (PCD - Devices)	This Capability satisfies the information exchange requirements for sending and receiving measurement results data. Device results may be delivered to an EHR or Public Health Information System	IER36

3.2.3.1 NEW HITSP CONSTRUCTS

The table below provides a description of the new HITSP Constructs needed for this Use Case.

Table 3-8 New Constructs

New Construct	Construct Description	IER
Laboratory Order	This Component specifies the format and content for communication of laboratory orders	IER14, IER23, IER25, IER57, IER71, IER72
Hearing Screening Order	This Component specifies the format and content for communication of Hearing Screening orders	IER21, IER22, IER27, IER39, IER40, IER41, IER42, IER58, IER60
Antepartum Summary	This Component specifies the format and content for communication of antepartum data	IER48, IER50, IER51, IER76
Birth Summaries	This Component specifies the format and content for communication of labor and delivery data	IER9, IER11, IER13, IER16, IER17
Newborn Record	This Component specifies the format and content for communication the Newborn clinical record	IER8, IER10, IER12, IER18, IER19, IER20, IER52
Publish and Subscribe	This Transaction Package supports the subscription to documents shared in TP13	IER40
Consent to Procedure	This Component supports the capture of the patient or patient agent consent to a procedure	IER4, IER45
Consent to Retain Sample	This Component supports the capture of the patient or patient agent consent to retain test sample	IER6, IER47
Consent Refusal	This Component supports the capture of the patient or patient agent refusal to consent to procedure	IER44
Anonymize Newborn Screening Results	This Component support the anonymization of newborn screening results for information re-purposing	IER5, IER46, IER64, IER65



4.0 STANDARDS GAPS AND OVERLAPS

4.1 GAPS WHERE THERE ARE NO STANDARDS

The table below identifies the scenario requirements and known associated gaps, along with the recommended resolutions.

Table 4-1 Use Case Requirements and Associated Standards Gaps

Requirement Number	Summary Description	Identified Gaps	Recommended Resolution
IER8	Request & Response Newborn Record EHR	GAP: Not currently profiled as a standard CDA document	Anticipate a construct to be delivered in 2010 from IHE PCC – Newborn Discharge Summary
IER9	Request & Response Birthing Summary EHR	GAP: Not currently profiled as a standard CDA document	Anticipate a construct to be delivered in 2010 from IHE PCC – Newborn Discharge Summary
IER1	Request & Response Guideline data EHR PH	No current standard for Structure Guidelines No standard for Newborn Screening Guideline Content	SDO Referral
IER43	Query/Retrieve Guideline PHR PH	No current standard for Structure Guidelines No standard for Newborn Screening Guideline Content	SDO Referral
IER2	Request & Response Education Brochure EHR PH	No current standard for Structure Educational Material No standard for Newborn Screening Educational Material Content	SDO Referral
IER3	Send Education Brochure PUBLIC HEALTH EHR	No current standard for Structure Educational Material No standard for Newborn Screening Educational Material Content	SDO Referral
IER85	Query/retrieve Education Materials PHR PH	No current standard for Structure Educational Material No standard for Newborn Screening Educational Material Content	SDO Referral
IER74	Send request new specimen LIMS EHR	No current standard for requesting a new specimen	SDO Referral
IER75	Send request new specimen Laboratory Information Management System (LIMS) PHR	No current standard for requesting a new specimen	SDO Referral

4.2 STANDARD OVERLAPS

The table below presents the identified overlaps and the respective resolution plans.

Table 4-2 Use Case Requirements and Associated Standard Overlaps

Requirement Number	Summary Description	Standard Overlap	Recommended Resolution
No applicable Use Case Requirements			



5.0 APPENDIX

The following sections include relevant materials referenced throughout this document.

5.1 USE CASE TO INFORMATION EXCHANGE AND DATA REQUIREMENTS

This section contains an extraction of systems, required interactions and conditions/scenarios from the Use Case into a matrix/table.

Note that the actions and numbering are not intended to be sequential, can be iterative and should not be interpreted as a sequence diagram; actions may not occur sequentially.

Table 5-1 Mapping of Use Case Actions to Information Exchange Requirements

Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
7.1.1 Event: Receive and Utilize Screening Policies & Requirements	7.1.1.1 Receive and use information regarding newborn screening to manage screening program	IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 – Guideline	NOTE: Receipt of guideline and perhaps CDS requirements - from Public Health agency. Describes process and timeline. Some similarity to receiving immunization schedule in IRM (IS10). Variation (especially timing of tests) based on health and status of the child (E.g., prematurity)
	7.1.1.2 Utilize information for patient education	IER 2 Request & Response Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS8 - Education Brochure	NOTE: Educational brochure - what is newborn testing, then brochure - what is the meaning of an abnormal result. Interoperability would come into play only with PHR and that is unlikely to be used in the context of a newborn with the mother in the hospital. Materials may come with the received guideline. Mostly likely not an interoperability issue
		IER3 Send Education Brochure	Public Health Information System	Electronic Health Record (EHR) System	PEC-NBS8 - Education Brochure	
	7.1.1.3 Inform patients and/or obtain consent from parents/current guardian(s)	IER4 Publish/Register Consent to Procedure	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS1 - Consent to Procedure	NOTE: Patient consent based on local policy. Similar to consent requirements for other HITSP activities (especially immunizations). New consent requirement - consent for access to child information. Refusal Documentation



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER5 Publish/Register Patient Consent	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC30 Consent Document Component	Consent to share information Mom/Baby consent authorization requirements Policy MAY require EC26 - Nonrepudiation of Origin Data and/or EC25 - Anonymization Instructions
		IER6 Publish/Register Patient Consent	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS2 - Consent to Retain/Use Test Sample	Policy requirement considerations vs. voluntary participation e.g. Texas policy allows for: Screen only, disclose information, refuse
7.1.2 Gather and Augment EHR Information	7.1.2.1 Obtain key pieces of information	IER7 Request & Response Patient Demographics	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC23 - Patient Demographics	Pediatric Demographic Option for mom/baby linkage NOTE: Identification of required data set. Capture within EHR - possible use of QED, XDS Query Data requirement: Obtain information from the mother's record to flow into the infant's record. Maternal chart includes gestational information, prenatal testing and delivery information <ul style="list-style-type: none"> • Privacy issue? • Identification issue? • Also very relevant to the Maternal and Child Health Use Case - Maternal history is described in that Use Case • In the case of multiple births, it may be difficult to determine which infant represents which fetus of a multiple birth. This issue also applies to IRM (IS10)
		IER8 Request & Response Newborn Record	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	PEC-NBS9 - Newborn Record	
		IER9 Request & Response Birthing Summary	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	PEC-NBS4 - Birthing Summary	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER10 Request & Response newborn record	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS9 - Newborn Record	
		IER11 Request & Response Birthing Summary	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS4 - Birthing Summary	
		IER12 Send Newborn Record	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	PEC-NBS9 - Newborn Record	
		IER13 Send Birthing Summary	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	PEC-NBS4 - Birthing Summary	
		IER14 Send Lab Order	Electronic Health Record (EHR) System	Laboratory Information Systems	PEC-NBS3 - Lab Order (NBS)	
		IER15 Request & Response Pseudo-identity	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC24 - Pseudo-identity	Situations for adoption or child protective situations pseudonymization/de-identification from Mother to baby/baby-to mother
		IER16 Send Birthing Summary Pre-populate	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS13 - NBS pre-populate form from Birthing Summary	TP50 RFD
		IER17 Send Birthing Summary Pre-populate	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS13 - NBS pre-populate form from Birthing Summary	TP50 RFD
		IER18 Send Newborn Record to public health	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS9 - Newborn Record	
		IER19 Provide/Register Newborn Record to HIE	Electronic Health Record (EHR) System	HIE	PEC-NBS9 - Newborn Record	
		IER20 Query/Retrieve Newborn Record to public health	Public Health Information System	HIE	PEC-NBS9 - Newborn Record	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
7.1.3a Order Hearing test(s)	7.1.3a.1 A clinician at the birthing facility orders EHDI testing	IER21 Send Hearing Screening Order	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	PEC-NBS5 - Hearing Screening Order	NOTE: The responsible party needs to be able to generate the order for audiology testing and transmit for EHDI testing. Expectations may also be different for birth intended to be home births but with complications that require hospitalization. May consider review of Consultation and Transfer of Care for similarities
		IER22 Send Hearing Screening Order EHR ADEV	Electronic Health Record (EHR) System	Hearing Screening System	PEC-NBS5 - Hearing Screening Order	
7.1.3b Order NDBS screening test(s)	7.1.3b.1 A clinician at the birthing facility orders NDBS testing	IER23 Publish/Register Lab Order to HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	NOTE: Overlaps with laboratory order Use Case extension. Reference Lab Order capabilities with Newborn Screening Value Set constraints
		IER14 Send Lab Order EHR LIMS	Electronic Health Record (EHR) System	Laboratory Information Systems	PEC-NBS3 - Lab Order (NBS)	
7.1.4 Collect Specimen(s)	7.1.4.1 A clinician obtains blood and prepares the dried blood spot.	No Interoperability Requirement				
	7.1.4.1a Specimen obtained at a non-standard time, due to medical or logistical reasons	No Interoperability Requirement				
7.1.5 Communicate Order and Send Specimen	7.1.5.1 Specimen and order information are sent to either the testing laboratory or Public Health	IER23 Publish/Register Lab Order to HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER14 Send Lab Order EHR LIMS	Electronic Health Record (EHR) System	Laboratory Information Systems	PEC-NBS3 - Lab Order (NBS)	
		IER25 Query/Retrieve Lab Order LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		No interoperability Requirement				Sending the specimen by mail
7.1.6 Perform Second Screening Specimen Requirements	7.1.6.1 Second specimen collected.	No Interoperability Requirement				
	7.1.6.2 Second specimen follows similar pathway to initial specimen		Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER14 Send Lab Order EHR LIMS	Electronic Health Record (EHR) System	Laboratory Information Systems	PEC-NBS3 - Lab Order (NBS)	
		IER25 Query/Retrieve Lab Order LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		No interoperability Requirement				Sending the specimen by mail
	7.1.6.3 Second hearing screen is ordered	IER21 Send Hearing Screening Order EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	PEC-NBS5 - Hearing Screening Order	
		IER27 Publish Hearing Screening Order EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS5 - Hearing Screening Order	
		IER22 Send Hearing Screening Order EHR Device	Electronic Health Record (EHR)	Hearing Screening System	PEC-NBS5 - Hearing Screening Order	
		No interoperability Requirement				Sending the specimen by mail
7.1.7 Receive Results	7.1.7.1 Clinician or birthing facility receives test results	IER30 Send Lab Results LIMS EHR	Laboratory Information Systems	Electronic Health Record (EHR) System	EC36 - Lab Result (used when constraint is 'message')	
		IER31 Provide/Register Lab Results LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER32 Query/Retrieve Lab Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
		IER33 Send Lab Results LIMS PH	Laboratory Information Systems	Public Health	EC36 - Lab Result (used when constraint is 'message')	
		IER34 Query/Retrieve Lab Results Public Health HIE	Public Health	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
		IER35 Send Hearing Screening Test Results EHR	Hearing Screening System	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	
		IER36 Send Hearing Screening Test Results DEV Public Health	Hearing Screening System	Public Health Information System	PEC-NBS10 - Hearing Screening Test Results	
		IER38 Provide/Register Care status summary/outcome Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER39 Notification Care status summary/outcome Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER40 Subscribe Care status summary/outcome EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER41 Send Care status summary/outcome Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER42 Query/Retrieve Care status summary/outcome EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER39 Notification Care status summary/outcome Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
7.2.1 Receive Information Per Policies.	7.2.1.1 Consumer receives information regarding policies	IER85 Query/Retrieve Education Materials PHR Public Health	Personal Health Record (PHR) Systems	Public Health Information System	PEC-NBS8 - Education Brochure	NOTE: Assume that the Consumer has access to the test results as enabled by IS05
		IER43 Query/Retrieve Guideline PHR Public Health	Personal Health Record (PHR) Systems	Public Health Information System	PEC-NBS6 - Guideline	
7.2.2 Provide Consent and Requested Information, if required by state	7.2.2.1 Consumer is informed and may provide consent for screening tests	IER44 Publish/Register Screening Refusal PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	PEC-NBS11 - Refusal of Screening	Mom/baby authorizations
		IER45 Publish/Register Procedure Consent PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	PEC-NBS1 - Consent to Procedure	May collapse with Refusal of screening
		IER46 Publish/Register Patient Consent PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	EC30 Consent Document Component	Consent to share information Mom/Baby consent authorization requirements Support for capture of refusal Policy MAY require EC 26 Nonrepudiation of Origin Data and/or EC25 Anonymization Instructions
		IER47 Publish/Register Consent to retain bloodspot PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	PEC-NBS2 - Consent to Retain/Use Test Sample	Policy requirement considerations vs. voluntary participation Support for capture of refusal e.g. Texas policy allows for: Screen only, disclose information, refuse
	7.2.2.2 Consumer provides other requested information	IER48 Send Pediatric Clinician PHR EHR	Personal Health Record (PHR) Systems	Electronic Health Record (EHR) System	PEC-NBS7 - Antepartum Summary	Pediatric Clinician Required
		IER50 Publish/Register Pediatric Clinician PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	PEC-NBS7 - Antepartum Summary	Pediatric Clinician Required
		IER51 Query/Retrieve Pediatric Clinician EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS7 - Antepartum Summary	Pediatric Clinician Required Subscription option



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER52 Query/Retrieve Newborn Record PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	PEC-NBS9 - Newborn Record	Subscription option pediatric clinician
		IER53 Query/Retrieve Birth event record PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	PEC-NBS4 - Birthing Summary	Subscription option pediatric clinician
		IER54 Query/Retrieve Hearing Screening Test Results record PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Subscription option
		IER55 Query/ Lab Result PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	Subscription option
7.3.1 Determine & Communicate Screening Policies & Requirements	7.3.1.1 Public Health determines newborn screening policies and requirements	IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 – Guideline	
		IER 2 Request & Response Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS8 - Education Brochure	
7.3.2 Receive Order and Specimen	7.3.2.1 Public Health receives the testing order(s)	IER56 Send Laboratory Order EHR Public Health	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS3 - Lab Order (NBS)	
		IER23 Publish Lab Order EHR to HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER57 Query/Retrieve Lab Order Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER58 Send Audiology test Order EHR Public Health	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS5 - Hearing Screening Order	
		IER27 Publish Audiology test Order EHR to HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS5 - Hearing Screening Order	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER60 Query/Retrieve Audiology test Order Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	PEC-NBS5 - Hearing Screening Order	
7.3.3 Receive EHDI Results	7.3.3.1 Results of the EHDI are received by Public Health	IER36 Send Hearing Screening Test Results DEV Public Health	Hearing Screening System	Public Health Information System	PEC-NBS10 - Hearing Screening Test Results	
		IER61 Provide/Register Hearing Screening Test Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	
		IER62 Query/Retrieve Hearing Screening Test Results Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	
	7.3.3.1a EHDI results are received with the NDBS specimen and testing order	IER56 Send Laboratory Order EHR Public Health	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS3 - Lab Order (NBS)	
		IER23 Publish/Register Lab Order EHR to HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER57 Query/Retrieve Lab Order Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER36 Send Hearing Screening Test Results DEV PH	Hearing Screening System	Public Health Information System	PEC-NBS10 - Hearing Screening Test Results	
		IER61 Provide/Register Hearing Screening Test Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	
		IER62 Query/Retrieve Hearing Screening Test Results PH HIE	Public Health Information System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	
	7.3.3.1b EHDI results are noted on the birth certificate	Refer to IS91 Maternal and Child Health For Vital Statistics communications			Refer to IS91 Maternal and Child Health For Vital Statistics communications	
	7.3.3.1c EHDI results are received at the time of the NDBS results	IER32 Query/Retrieve Lab Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER33 Send Lab Results LIMS Public Health	Laboratory Information Systems	Public Health	EC36 - Lab Result (used when constraint is 'message')	
		IER34 Query/Retrieve Lab Results Public Health HIE	Public Health	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
		IER36 Send Hearing Screening Test Results DEV Public Health	Hearing Screening System	Public Health Information System	PEC-NBS10 - Hearing Screening Test Results	
		IER61 Provide/Register Hearing Screening Test Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	
		IER62 Query/Retrieve Hearing Screening Test Results Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	
7.3.4 Receive NDBS Lab Results	7.3.4.1 Public Health department receives the results of the NDBS testing	IER32 Query/Retrieve Lab Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
		IER33 Send Lab Results LIMS Public Health	Laboratory Information Systems	Public Health	EC36 - Lab Result (used when constraint is 'message')	
		IER34 Query/Retrieve Lab Results Public Health HIE	Public Health	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
	7.3.4.1a Public Health department receives results from birthing facility	IER32 Query/Retrieve Lab Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
		IER34 Query/Retrieve Lab Results Public Health HIE	Public Health	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
		IER63 Send Lab Results EHR Public Health	Electronic Health Record (EHR) System	Public Health	EC36 - Lab Result (used when constraint is 'message')	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
7.3.5 Incorporate Results into Public Health System	7.3.5.1 Results are incorporated into the Public Health system	No Interoperability requirement – edge system function				
	7.3.5.2 Results are sent to research entities or other Public Health registries or organizations	IER64 Send Hearing Screening Test Results Public Health	Public Health	Public Health	PEC-NBS10 - Hearing Screening Test Results	Policy may require Anonymize patient identifiable data(EHDI and NDBS)
		IER65Send Lab Results PH	Public Health	Public Health	EC36 - Lab Result (used when constraint is 'message')	Policy May Require Anonymize patient identifiable data (EHDI and NDBS) stage.
		IER66 Provide/Register Hearing Screening Test Results	Public Health	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	
		IER67 Provide/Register Lab Test Results	Public Health	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
		IER68 Query/Retrieve Audiology Results	Public Health	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	
		IER34 Query/Retrieve Lab Results	Public Health	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
		IER69 Query/Retrieve Patient Consent Public Health HIE	Public Health	Health Information Exchange (HIE)	EC30 -Consent Document Component	
7.4.1 Receive Order and Specimen	7.4.1.1 Testing laboratory receives order and NDBS specimen from birthing facility	IER14 Send Lab Order	Electronic Health Record (EHR) System	Laboratory Information Systems	PEC-NBS3 - Lab Order (NBS)	
		IER23 Publish/Register Lab Order to HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER25 Query/Retrieve Lab Order LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER16 Send Birthing Summary Pre-populate	Health Information Exchange (HIE)	Laboratory Information Systems	PEC-NBS13 - NBS pre-populate form from Birthing Summary	TP50 RFD
		IER17 Send Birthing Summary Pre-populate	Public Health Information System	Laboratory Information Systems	PEC-NBS13 - NBS pre-populate form from Birthing Summary	TP50 RFD
		IER70 Query/Retrieve Patient Identity LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	Pediatric Demographics	
	7.4.1.1a Testing laboratory receives order and NDBS specimen from clinician outside the hospital setting	IER14 Send Lab Order	Electronic Health Record (EHR) System	Laboratory Information Systems	PEC-NBS3 - Lab Order (NBS)	
		IER23 Publish/Register Lab Order to HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER25 Query/Retrieve Lab Order LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER16 Send Birthing Summary Pre-populate	Health Information Exchange (HIE)	Laboratory Information Systems	PEC-NBS13 - NBS pre-populate form from Birthing Summary	
		IER17 Send Birthing Summary Pre-populate	Public Health Information System	Laboratory Information Systems	PEC-NBS13 - NBS pre-populate form from Birthing Summary	
	7.4.1.2 Specimen is accessioned	IER71 Send Lab Order	Laboratory Information Systems	Laboratory Information Systems	PEC-NBS3 - Lab Order (NBS)	
		IER72 Publish/Register Lab Order to HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER25 Query/Retrieve Lab Order LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
	7.4.1.2a Specimen is deemed inadequate for testing	IER74 Send request new specimen LIMS EHR	Laboratory Information Systems	Electronic Health Record (EHR) System	PEC-NBS12 - Request for new Specimen	Notification
		IER75 Send request new specimen LIMS PHR	Laboratory Information Systems	Personal Health Record (PHR) Systems	PEC-NBS12 - Request for new Specimen	Notification
		IER30 Send Lab Results LIMS EHR	Laboratory Information Systems	Electronic Health Record (EHR) System	EC36 - Lab Result (used when constraint is 'message')	
		IER31 Provide/Register Lab Results LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
		IER32 Query/Retrieve Lab Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
7.4.2 Perform Testing & Report Results	7.4.2.1 The laboratory performs the tests	No interoperability requirement				
	7.4.2.2 The lab reports the results	IER30 Send Lab Results LIMS EHR	Laboratory Information Systems	Electronic Health Record (EHR) System	EC36 - Lab Result (used when constraint is 'message')	
		IER31 Provider/Register Lab Results LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	Notification option
		IER32 Query/Retrieve Lab Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	Subscription Option
7.5.1 Receive EHDl Order 7.5.2 Perform Testing & Report Results	7.5.1.1 Audiology receives order for EHDl	IER21 Send Hearing Screening Order	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	PEC-NBS5 - Hearing Screening Order	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER22 Send Hearing Screening Order EHR ADEV	Electronic Health Record (EHR) System	Hearing Screening System	PEC-NBS5 - Hearing Screening Order	
		IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	
	7.5.2.1 Audiology performs testing in a facility associated with the hospital or birthing center	No interoperability requirements				
	7.5.2.2 EHDI results are reported by Audiology	IER35 Send Hearing Screening Test Results EHR	Hearing Screening System	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	
		IER36 Send Hearing Screening Test Results DEV Public Health	Hearing Screening System	Public Health Information System	PEC-NBS10 - Hearing Screening Test Results	
		IER38 Provide/Register Care status summary/outcome Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER39 Notification Care status summary/outcome Public Health EHR	Public Health Information System	Electronic Health Record (EHR)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER40 Subscribe Care status summary/outcome EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome – Required
		IER41 Send Care status summary/outcome Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome – Required
		IER42 Query/Retrieve Care status summary/outcome EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome – Required
		IER39 Notification Care status summary/outcome Public Health EHR	Public Health	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome – Required



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	
	7.5.2.2a Second test is required	IER21 Send Hearing Screening Order	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	PEC-NBS5 - Hearing Screening Order	
		IER22 Send Hearing Screening Order EHR ADEV	Electronic Health Record (EHR) System	Hearing Screening System	PEC-NBS5 - Hearing Screening Order	
		IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	
8.1.1 Receive Abnormal or Out of Range Results and Educational Materials	8.1.1.1 Clinician receives out of range result	IER30 Send Lab Results LIMS EHR	Laboratory Information Systems	Electronic Health Record (EHR) System	EC36 - Lab Result (used when constraint is 'message')	
		IER31 Provide/Register Lab Results LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	Notification option
		IER32 Query/Retrieve Lab Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	Subscription Option
		IER35 Send Hearing Screening Test Results EHR	Hearing Screening System	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	
		IER36 Send Hearing Screening Test Results DEV Public Health	Hearing Screening System	Public Health Information System	PEC-NBS10 - Hearing Screening Test Results	
		IER38 Provide/Register Care status summary/outcome Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER39 Notification Care status summary/outcome Public Health EHR	Public Health	Electronic Health Record (EHR)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER40 Subscribe Care status summary/outcome EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER41 Send Care status summary/outcome Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER42 Query/Retrieve Care status summary/outcome EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER39 Notification Care status summary/outcome Public Health EHR	Public Health	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	
	8.1.1.2 Clinician receives information from Public Health	IER 2 Request & Response Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS8 - Education Brochure	
		IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	
	8.1.1.3 Clinician obtains information from an online source	IER 2 Request & Response Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS8 - Education Brochure	
8.1.2 Gather Detailed Family History	8.1.2.1 Gather detailed family history from the consumer by consultative interview	IER49 Send Family History PHR EHR	Personal Health Record (PHR) Systems	Electronic Health Record (EHR) System	EC90 - Genetic Risk Decision Support	
		IER77 Publish/Register Family History PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	EC90 - Genetic Risk Decision Support	
		IER78 Query/Retrieve Family History EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC90 - Genetic Risk Decision Support	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER76 Send Family History PHR EHR	Personal Health Record (PHR) Systems	Electronic Health Record (EHR) System	PEC-NBS7 - Antepartum Summary	
		IER77 Publish/Register Family History PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	PEC-NBS7 - Antepartum Summary	
		IER78 Query/Retrieve Family History EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS7 - Antepartum Summary	
		IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	
	8.1.2.2 Gather detailed family history using electronic tools	IER49 Send Family History PHR EHR	Personal Health Record (PHR) Systems	Electronic Health Record (EHR) System	EC90 - Genetic Risk Decision Support	
		IER77 Publish/Register Family History PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	EC90 - Genetic Risk Decision Support	
		IER78 Query/Retrieve Family History EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC90 - Genetic Risk Decision Support	
		IER76 Send Family History PHR EHR	Personal Health Record (PHR) Systems	Electronic Health Record (EHR) System	PEC-NBS7 - Antepartum Summary	
		IER77 Publish/Register Family History PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	PEC-NBS7 - Antepartum Summary	
		IER78 Query/Retrieve Family History EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS7 - Antepartum Summary	
		IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
8.1.3 Order Repeat Specimen and Confirmatory Test(s)	8.1.3.1 A repeat specimen or repeat audiological evaluation is ordered	IER79 Send Patient Clinical Information EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC32 - Summary of Care	
		IER80 Send Patient Demographic Data EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC23 – Demographic Data	Pediatric Option
		IER81 Send Patient Encounter/Discharge Summary EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC48B - Discharge Summary	
		IER82 Send Family Genetic/Genomic information EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC90 - Genetic Risk Decision Support	
		IER84 Send Referral/ Consult Request	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC48a - Referral Summary	
		IER21 Send Hearing Screening Order	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	PEC-NBS5 - Hearing Screening Order	
		IER71 Send Lab Order	Laboratory Information Systems	Laboratory Information Systems	PEC-NBS3 - Lab Order (NBS)	
		IER72 Publish/Register Lab Order to HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER25 Query/Retrieve Lab Order LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
	8.1.3.2 The pediatric clinician consults with a specialist	IER79 Send Patient Clinical Information EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC32 - Summary of Care	
		IER80 Send Patient Demographic Data EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC23 – Demographic Data	Pediatric Option



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER81 Send Patient Encounter/Discharge Summary EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC48B - Discharge Summary	
		IER82 Send Family genetic/genomic information EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC90 - Genetic Risk Decision Support	
8.1.4 Collect specimen(s)	8.1.4.1 Clinician obtains specimen for confirmatory test(s)	No Interoperability requirement				
8.1.5 Communicate Order and Send Specimen	8.1.5.1 The order is communicated along with any specimens collected	IER21 Send Hearing Screening Order	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	PEC-NBS5 - Hearing Screening Order	
		IER71 Send Lab Order	Laboratory Information Systems	Laboratory Information Systems	PEC-NBS3 - Lab Order (NBS)	
		IER72 Publish/Register Lab Order to HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER25 Query/Retrieve Lab Order LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
8.1.6 Receive Results	8.1.6.1 The clinician receives confirmatory results from the testing laboratory or auditory services	See 7.5.2.2				
	8.1.6.2 The clinician receives additional information	IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 – Guideline	
		IER 2 Request & Response Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS8 - Education Brochure	
	8.1.6.3 The clinician refers the consumer to a specialist	IER79 Send Patient Clinical Information EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC32 - Summary of Care	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER80 Send Patient Demographic Data EHR EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC23 – Demographic Data	Pediatric Option
		IER81 Send Patient Encounter/Discharge Summary EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC48B - Discharge Summary	
		IER82 Send Family Genetic/Genomic Information EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC90 - Genetic Risk Decision Support	
		IER84 Send Referral/ Consult Request	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC48a - Referral Summary	
		IER91 Provide/Register Patient Clinical Information EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC32 - Summary of Care	
		IER92 Provide/Register Patient Demographic Data EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC23 – Demographic Data	Pediatric Option
		IER93 Provide/Register Patient Encounter/Discharge Summary EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC48B - Discharge Summary	
		IER94 Provide/Register Family Genetic/Genomic information EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC90 - Genetic Risk Decision Support	
		IER95 Query/Retrieve Patient Clinical Information EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC32 - Summary of Care	
		IER96 Query/Retrieve Patient Demographic Data EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC23 – Demographic Data	Pediatric Option
		IER97 Query/Retrieve Patient Encounter/Discharge Summary EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC48B - Discharge Summary	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER78 Query/Retrieve Family Genetic/Genomic information EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC90 - Genetic Risk Decision Support	
	8.1.6.4 Confirmatory genetic testing is done	IER71 Send Lab Order	Laboratory Information Systems	Laboratory Information Systems	PEC-NBS3 - Lab Order (NBS)	
		IER72 Publish/Register Lab Order to HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER25 Query/Retrieve Lab Order LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
	8.1.6.5 Further testing is done to identify genetic sub-types	IER71 Send Lab Order	Laboratory Information Systems	Laboratory Information Systems	PEC-NBS3 - Lab Order (NBS)	
		IER72 Publish/Register Lab Order to HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
		IER25 Query/Retrieve Lab Order LIMS HIE	Laboratory Information Systems	Health Information Exchange (HIE)	PEC-NBS3 - Lab Order (NBS)	
8.1.7 Public Health Case Reporting	8.1.7.1 Pediatric clinician files Public Health case report	Refer to HITSP/IS11 Public Health Case Reporting Interoperability Specification				
8.1.8 Request Referral & Place Intervention Orders	8.1.8.1 Consumer is referred for education and counseling for a genetic disorder	IER79 Send Patient Clinical Information EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC32 - Summary of Care	
		IER80 Send Patient Demographic Data EHR EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC23 – Demographic Data	Pediatric Option
		IER81 Send Patient Encounter/Discharge Summary EHR EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC48B - Discharge Summary	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER82 Send Family Genetic/Genomic information EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC90 - Genetic Risk Decision Support	
	8.1.8.2 Consumer is referred for education and counseling for an abnormal confirmatory hearing test	IER79 Send Patient Clinical Information EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC32 - Summary of Care	
		IER80 Send Patient Demographic Data EHR EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC23 – Demographic Data	Pediatric Option
		IER81 Send Patient Encounter/Discharge Summary EHR EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC48B - Discharge Summary	
		IER82 Send Family Genetic/Genomic information EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC90 - Genetic Risk Decision Support	
	8.1.8.3 Emergency management is required	IER79 Send Patient Clinical Information EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC32 - Summary of Care	
		IER80 Send Patient Demographic Data EHR EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC23 – Demographic Data	Pediatric Option
		IER81 Send Patient Encounter/Discharge Summary EHR EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC48B - Discharge Summary	
		IER82 Send Family Genetic/genomic information EHR	Electronic Health Record (EHR) System	Electronic Health Record (EHR) System	EC90 - Genetic Risk Decision Support	
		IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	
	8.1.8.4 Nutritional intervention is required	IER55 Query/Retrieve Lab Result PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	PEC-NBS4 - Birthing Summary	Subscription option



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER83 Send Lab Results EHR PHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	EC36 - Lab Result (used when constraint is 'message')	
		IER1 Request & Response Guideline Data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	
		IER 2 Request & Response Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS8 - Education Brochure	
		IERNBS3 Communicate education materials Query/Retrieve	Personal Health Record (PHR) Systems	Public Health Information System	PEC-NBS8 - Education Brochure	
		IER43 Query/Retrieve Guideline PHR Public Health	Personal Health Record (PHR) Systems	Public Health Information System	PEC-NBS6 - Guideline	
		IER88 Query/Retrieve Patient Clinical Information PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	EC32 - Summary of Care	
		IER89 Query/Retrieve Patient Encounter/Discharge Summary PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	EC48B - Discharge Summary	
		IER90 Query/Retrieve Family Genetic/Genomic information PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	EC90 - Genetic Risk Decision Support	
		IER86 Send Patient Encounter/Discharge Summary EHR PHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	EC48B - Discharge Summary	
		IER87 Send Family Genetic/Genomic information EHR PHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	EC90 - Genetic Risk Decision Support	
		IER88 Send Patient Clinical Information EHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	EC32 - Summary of Care	
		IER89 Send Patient Demographic Data EHR EHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	EC23 – Demographic Data	Pediatric Option



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
8.1.9 Short Term and Long Term Follow-Up	8.1.9.1 Children with various disorders require periodic follow-up visits	IER61 Provide/Register Hearing Screening Test Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	
		IER32 Query/Retrieve Lab Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
		IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	
		IER 2 Request & Response Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS8 - Education Brochure	
		IER91 Provide/Register Patient Clinical Information EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC32 - Summary of Care	
		IER92 Provide/Register Patient Demographic Data EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC23 – Demographic Data	Pediatric Option
		IER93 Provide/Register Patient Encounter/Discharge Summary EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC48B - Discharge Summary	
		IER94 Provide/Register Family Genetic/Genomic information EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC90 - Genetic Risk Decision Support	
		IER95 Query/Retrieve Patient Clinical Information EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC32 - Summary of Care	
		IER96 Query/Retrieve Patient Demographic Data EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC23 – Demographic Data	Pediatric Option
		IER97 Query/Retrieve Patient Encounter/Discharge Summary EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC48B - Discharge Summary	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER78 Query/Retrieve Family Genetic/Genomic information EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC90 - Genetic Risk Decision Support	
	8.1.9.2 Families are referred for education and/or social services	IER55 Query/Retrieve Lab Result PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	Subscription option
		IER54 Query/Retrieve Hearing Screening Test Results record PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Subscription option
		IER83 Send Lab Results EHR PHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	EC37 - Lab Result (used when constraint is 'document')	Subscription option
		IER108 Send Audiology Results EHR PHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	PEC-NBS10 - Hearing Screening Test Results	Subscription option
		IER1 Request & Response Guideline Data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	
		IER 2 Request & Response Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS8 - Education Brochure	
		IERNBS3 Communicate Education Materials Query/Retrieve	Personal Health Record (PHR) Systems	Public Health Information System	PEC-NBS8 - Education Brochure	
		IER43 Query/Retrieve Guideline PHR Public Health	Personal Health Record (PHR) Systems	Public Health Information System	PEC-NBS6 - Guideline	
		IER88 Query/Retrieve Patient Clinical Information PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	EC32 - Summary of Care	
		IER89 Query/Retrieve Patient Encounter/Discharge Summary PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	EC48B - Discharge Summary	
		IER90 Query/Retrieve Family Genetic/Genomic information PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	EC90 - Genetic Risk Decision Support	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER86 Send Patient Encounter/Discharge Summary EHR PHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	EC48B - Discharge Summary	
		IER87 Send Family Genetic/Genomic information EHR PHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	EC90 - Genetic Risk Decision Support	
		IER88 Send Patient Clinical Information EHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	EC32 - Summary of Care	
		IER89 Send Patient Demographic Data EHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	EC23 - Demographic Data	Pediatric Option
	8.1.9.3 Continue to monitor patient for LTFU activities	See 8.1.9.2				
8.2.1 Provide Detailed Family History and Any Appropriate Consent	8.2.1.1 Parents or current guardian(s) provide detailed family history and consent for confirmatory testing	7.1.1.3, 7.2.2.1, 8.1.2.2				
8.2.2 Confirmatory Testing	8.2.2.1 Patient provides a blood specimen for confirmation of the blood spot screening test result	See 7.1.6.1, 7.1.6.2, 7.1.7.1				
		IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	
		IER 2 Request & Response Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS8 - Education Brochure	
8.2.3 Confirmatory Audiology Evaluation	8.2.3.1 Infant undergoes confirmatory hearing test	See 7.1.6.3				



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER1 Request & Response Guideline data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	
		IER 2 Request & Response Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS8 - Education Brochure	
8.2.4 Receive Clinical Interventions and Support Services	8.2.4.1 Consumer receives referrals for interventions, treatments and other support services	See 8.1.6.3, 8.1.8.1, 8.1.8.2, 8.1.8.3, 8.1.8.4, 8.1.9.1, 8.1.9.2				
8.3.1 Collect and Distribute Disorder Information	8.3.1.1 Public Health collects data regarding disorders	See 7.3.1.1, 7.3.2.1, 7.3.3.1, 7.3.3.1a, 7.3.3.1c, 7.3.4.1, 7.3.4.1a, 7.3.5.2				
	8.3.1.2 Condition information is made available to clinicians	IER38 Provide/Register Care status summary/outcome PH HIE	Public Health Information System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER39 Notification Care status summary/outcome Public Health EHR	Public Health	Electronic Health Record (EHR)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER40 Subscribe Care status summary/outcome EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER41 Send Care status summary/outcome Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER42 Query/retrieve Care status summary/outcome EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER39 Notification Care status summary/outcome Public Health EHR	Public Health	Electronic Health Record (EHR)	PEC-NBS10 - Hearing Screening Test Results	Abnormal Results Alert Care status summary/outcome - Required
		IER1 Request & Response Guideline Data	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS6 - Guideline	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER 2 Request & Response Education Brochure	Electronic Health Record (EHR) System	Public Health Information System	PEC-NBS8 - Education Brochure	
8.3.2 Receive Detailed Family History	8.3.2.1 Public Health receives the detailed family history	IER99 Query/Retrieve Family Genetic/Genomic information Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	EC90 - Genetic Risk Decision Support	
		IER100 Send Family genetic/genomic EHR Public Health	Electronic Health Record (EHR) System	Public Health Information System	EC90 - Genetic Risk Decision Support	
8.3.3 Receive Confirmatory Result Information	8.3.3.1 Public Health receives the case report.	Refer to HITSP/IS11 for all requirements			Refer to IS11 for all requirements	
8.3.4 Request Referral & Place Intervention Orders	8.3.4.1 Public Health requests a referral	IER101 Send Patient Clinical Information Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	EC32 - Summary of Care	
		IER102 Send Patient Demographic Data Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	EC23 - Demographic Data	Pediatric Option
		IER103 Send Patient Encounter/Discharge Summary Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	EC48B - Discharge Summary	
		IER104 Send Family Genetic/Genomic information Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	EC90 - Genetic Risk Decision Support	
		IER105 Send Referral/consult request Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	EC48a - Referral Summary	
		IER106 Send Audiology Results	Public Health Information System	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER107 Send Lab Results Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	EC36 - Lab Result (used when constraint is 'message')	
		IER95 Query/Retrieve Patient Clinical Information EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC32 - Summary of Care	
		IER96 Query/Retrieve Patient Demographic Data EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC23 – Demographic Data	Pediatric Option
		IER97 Query/Retrieve Patient Encounter/Discharge Summary EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC48B - Discharge Summary	
		IER78 Query/Retrieve Family Genetic/Genomic information EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC90 - Genetic Risk Decision Support	
		IER32 Query/Retrieve Lab Results EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
		IER42 Query/Retrieve Care status summary/outcome EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
8.3.5 Conduct Long Term Follow-Up IER01 Provide authorization and consent	8.3.5.1 Public Health conducts LTFU of the screening results	No new requirements – see MCH and IS06			No new requirements – see MCH and IS06	
	8.3.5.2 Track outcomes through registries	Edge system function				
		IER96 Query/Retrieve Patient Demographic Data Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	EC23 – Demographic Data	Pediatric Option
	8.3.5.3 Hearing evaluation follow-up	IER96 Query/Retrieve Patient Demographic Data Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	EC23 – Demographic Data	Pediatric Option



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		See 7.1.1.3, 7.2.2.1,				
	8.3.5.4 Information is used to track key parameters of the newborn screening process	Edge system function fed through exchanges and data collected in 7.3.1.1, 7.3.2.1, 7.3.3.1, 7.3.3.1a, 7.3.3.1c, 7.3.4.1, 7.3.4.1a, 7.3.5.2				
	8.3.5.5 Results of newborn screening programs reported back to healthcare providers and consumers	See 7.1.7.1				
		IER55 Query/Retrieve Lab Result PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	Subscription option
		IER54 Query/Retrieve Hearing Screening Test Results record PHR HIE	Personal Health Record (PHR) Systems	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Subscription option
		IER83 Send Lab Results EHR PHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	EC37 - Lab Result (used when constraint is 'document')	Subscription option
		IER108 Send Audiology Results EHR PHR	Electronic Health Record (EHR) System	Personal Health Record (PHR) Systems	PEC-NBS10 - Hearing Screening Test Results	Subscription option
	8.3.5.5a Public Health focuses on unconventional situations	See 8.1.6.3, 8.1.8.1, 8.1.8.2, 8.1.8.3, 8.1.8.4, 8.1.9.1, 8.1.9.2				
		IER34 Query/Retrieve Lab Results Public Health HIE	Public Health	Health Information Exchange (HIE)	EC37 - Lab Result (used when constraint is 'document')	
		IER62 Query/Retrieve Hearing Screening Test Results Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
8.4.1 Receive Order & Specimen	8.4.1.1 Testing laboratory receives order and blood specimen from pediatric clinician	See 7.1.3b.1				Overlaps with Laboratory Orders Use Case Extension
	8.4.1.2 Specimen is accessioned	Edge system function – accession number association			Edge system function – accession number association	
8.4.2 Perform Testing & Report Results	8.4.2.1 The laboratory performs the tests	No interoperability requirement				
	8.4.2.2 Results are reported	See 7.1.7.1				
8.5.1 Receive Order	8.5.1.1 Audiology services receive the order for a confirmatory test	See 7.1.6.3				
8.5.2 Perform Testing & Report Results	8.5.2.1 Audiology services perform testing	No interoperability requirement				
	8.5.2.2 Results are reported to ordering clinician	IER35 Send Hearing Screening Test Results EHR	Hearing Screening System	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	
		IER36 Send Hearing Screening Test Results DEV Public Health	Hearing Screening System	Public Health Information System	PEC-NBS10 - Hearing Screening Test Results	
		IER38 Provide/register Care status summary/outcome Public Health HIE	Public Health Information System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER39 Notification Care status summary/outcome Public Health EHR	Public Health	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER40 Subscribe Care status summary/outcome EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required



Event	Action	IER	Initiating System	Responding System	Information Exchange	Comments
		IER41 Send Care status summary/outcome Public Health EHR	Public Health Information System	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER42 Query/Retrieve Care status summary/outcome EHR HIE	Electronic Health Record (EHR) System	Health Information Exchange (HIE)	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required
		IER39 Notification Care status summary/outcome Public Health EHR	Public Health	Electronic Health Record (EHR) System	PEC-NBS10 - Hearing Screening Test Results	Care status summary/outcome - Required Abnormal Results Alert
	8.5.2.3 Audiologist makes appropriate referrals	See 8.1.8.2				

