Increasing Capability for EHDI-EHR Interoperability

A Self-Assessment Tool

Public Health
Informatics Institute

Introduction

The National Center on Birth Defects and Developmental Disabilities at the Centers for Disease Control and Prevention (CDC) has partnered with the Public Health Informatics Institute (PHII) to develop a self-assessment activity designed to increase the EHDI program's capability to exchange electronic health information with clinical electronic health record systems (EHRs).

This self-assessment tool can help facilitate strategic planning in state/territorial EHDI programs. It provides a forum for EHDI coordinators to discuss their information system needs with their partners in the agency's leadership, information technology or eHealth units.

Participating in this self-assessment activity will give EHDI coordinators a clearer understanding of success factors and the agency's current capabilities. It also provides guidance on what characteristics the program and agency can adopt for greater interoperability with clinical partners.

The self-assessment format and process

Interoperability between EHDI information systems and EHRs refers to the ability of these systems to exchange information effectively and to use the information that has been exchanged.

During the self-assessment, participants will discuss and answer questions organized by the following aspects of interoperability:

- Workflow – The processes the EHDI program uses to achieve its objectives (e.g., sending care plans, receiving screening results, etc.).
- Policies – The agency's health information strategy and support for procedures enabling information exchange.
- Infrastructure – Resources (including technology and workforce) the agency provides to the EHDI program supporting data use and exchange.
- Data & Standards – The data formats and technical specifications that enable information exchange.

Ideally, the EHDI coordinator will form a team to collaboratively complete the self-assessment. Collectively, the team should be knowledgeable of the agency's information technology resources, data use and exchange policies, and EHDI program. Team members could be staff, external partners or contractors. Example participants include: EHDI managers, agency IT staff, solution providers, state eHealth coordinators, and agency leaders tasked with information systems strategy development.

For each question in the self-assessment tool, you will see response options based on four levels of capability maturity (see Table 1). These levels are adapted from the Capability Maturity Model (CMM) developed by the Software Engineering Institute at Carnegie Mellon University[1]. The model describes the progressive stages an organization advances through as it adopts a new process or practice. It is not uncommon for organizations, even successful ones, to be at relatively low levels of this model. This reflects the organizational challenges that are inevitable with formally establishing new ways of working and then rigorously evaluating that work.

Table 1. Capability Levels

Level Name	Description
0 - None	No capability is evident; "starting from scratch."
1 - Emergent	Capability is limited to isolated, ad hoc efforts or attempts at repeating successes from earlier initiatives.
2 - Defined	Capability is demonstrated by systematic, ongoing efforts that have been formally adopted, institutionalized, or routinely practiced (e.g., standard operating procedures).
3 - Optimized	Capability is demonstrated by efforts to formally evaluate and improve established processes, procedures or practices.

The capability levels are stages of growth, with each level serving as a prerequisite for higher levels. For each question, please select the one response option that reflects your current capability level. Do not choose a given response option if you have not yet achieved all the prerequisite levels. For example, if a question relates to an activity you have piloted and evaluated but not yet formally adopted, then Level 3 would not be an appropriate response because Level 2 has not yet been reached.

For any particular question that seems inapplicable to your EHDI program or public health agency, you may select the "Not Applicable" response and move on to the next question.

Many questions will likely require conversation and consensus-building to reach agreement on one response option. One important advantage of having these specific responses is that it enables more objective responses that can be compared from year to year. So repeating this self-assessment periodically is a good way to measure and document your growing capabilities.

The self-assessment tool is designed to indicate capabilities for interoperability between EHDI systems and EHRs while not being too prescriptive in how that interoperability is achieved. As a result, detailed and jurisdiction-specific technical issues are outside the scope of the CMM-based questions. For those jurisdictions that wish to share such details, some open-ended questions are provided as an appendix to this self-assessment tool. Discussing these questions may help your team prepare for the self-assessment activity.

References

1. Mark Paulk, William Curtis, Mary Beth Chrissis, & Charles Weber. Capability Maturity Model for Software (Version 1.1) (CMU/SEI-93-TR-024). Pittsburgh, PA: Software Engineering Institute, Carnegie Mellon University, 1993. http://resources.sei.cmu.edu/library/asset-view.cfm?AssetID=11955

CMM is a registered service mark of Carnegie Mellon University.

Part 1: Workflow

Question 1.1

Has the EHDI program completed an assessment that identifies existing or potential data exchange partners?

☐	Level 0	The EHDI program has not undertaken this assessment.
☐	Level 1	The EHDI program has made has made isolated, ad hoc or periodic efforts to conduct this assessment.
☐	Level 2	The EHDI program has completed such an assessment.
☐	Level 3	EHDI program evaluates how it conducts these assessments to improve how it identifies and engages data exchange partners.
☐	N/A	This capability or activity is not applicable to our EHDI program.

Key concepts

Data exchange partner refers to an entity that sends data to or receives data from the agency in the course of conducting business or meeting reporting requirements. For the purpose of this assessment, consider both data exchange partners that the EHDI program has existing relationships with (e.g., birthing centers) as well as potential data exchange partners (e.g., pediatricians, audiologists).

Part 1: Workflow

Question 1.2

Has the EHDI program established data sharing agreements with other entities (e.g., health care providers, vital records) it would like to exchange data with?

☐	Level 0	The EHDI program has not established data sharing agreements.
☐	Level 1	The EHDI program has discussed data sharing with other entities; these discussions may or may not have resulted in data sharing agreements.
☐	Level 2	The EHDI program has a process it uses to routinely establish data sharing agreements and keep them up-to-date.
☐	Level 3	The EHDI program evaluates its process for data sharing agreements and uses findings to improve data sharing.
☐	N/A	This capability or activity is not applicable to our EHDI program.

Key concepts

Data sharing agreements are used to establish clear parameters for exchange between organizations or operational units within an agency. These are written agreements that may include:

- Descriptions of allowable use of data.
- Responsibilities of the parties to the agreement.
- Description of the legal authority or business reason to share data.
- Description of the frequency of data exchange.
- Provisions for reporting violations of agreements, including breeches of privacy or security.
- Privacy provisions that describe the circumstances when personally identifiable information may be exchanged.
- Security provisions describing who is able to view data, access data, or make modifications to data and how the organization ensures only authorized individuals perform those functions.
- Descriptions of the purpose for the data exchange and agreement on specific data elements to be exchanged.

Part 1: Workflow

Question 1.3

How does the EHDI program typically <u>receive</u> reporting information from birthing/screening facilities?

☐   Level 0   By phone or paper-based forms received via mail, fax or email.

☐   Level 1   Primarily by phone or paper-based forms received via mail, fax or email with some pilot efforts to receive electronic reports.

☐   Level 2   Primarily via electronic reports with some by phone or paper-based forms received via mail, fax or email.

☐   Level 3   Primarily via electronic reports that are evaluated to improve volume, accuracy or timeliness of data reception.

☐   N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

Examples of **information** include case or patient level reports, aggregate reports or reports used to monitor process quality.

Birthing/screening facilities are the clinical locations where a newborn receives initial newborn hearing screening, often a hospital or birthing center.

Paper-based forms via email can include free-form or semi-structured text intended for human readability. This text could be in the email itself or in a document attached to the email.

Electronic reports include messages generated with the aid of computer systems and intended to be received and processed by computer systems. Electronic reports could be created by manually entering information into an electronic form (e.g., Web-based portals for data entry) or generated automatically by the sending system (e.g., HL7 message).

Public health agencies typically send and receive both paper-based forms and electronic reports. Select the response that represents the agency's highest level of capability.

Part 1: Workflow

Question 1.4

How does the EHDI program typically <u>send</u> information to birthing/screening facilities?

☐	Level 0	By phone or paper-based forms sent via mail, fax or email.
☐	Level 1	Primarily by phone or paper-based forms sent via mail, fax or email with some pilot efforts to send or display electronic reports.
☐	Level 2	Primarily via electronic reports with some by phone or paper-based forms sent via mail, fax or email.
☐	Level 3	Primarily via electronic reports that are evaluated to improve volume, accuracy and timeliness of data transmission.
☐	N/A	This capability or activity is not applicable to our EHDI program.

Key concepts

Examples of **information** include case or patient level reports, aggregate reports or reports used to monitor process quality.

Birthing/screening facilities are the clinical locations where a newborn receives initial newborn hearing screening, often a hospital or birthing center.

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Public health agencies typically send and receive both paper-based forms and electronic reports. Select the response that represents the agency's highest level of capability.

Part 1: Workflow

Question 1.5

How does the EHDI program typically <u>receive</u> reporting information from diagnostic facilities?

☐ Level 0   By phone or paper-based forms received via mail, fax or email.

☐ Level 1   Primarily by phone or paper-based forms received via mail, fax or email with some pilot efforts to receive electronic reports.

☐ Level 2   Primarily via electronic reports with some by phone or paper-based forms received via mail, fax or email.

☐ Level 3   Primarily via electronic reports that are evaluated to improve volume, accuracy or timeliness of data reception.

☐ N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

Examples of **information** include case or patient level reports, aggregate reports or reports used to monitor process quality.

Diagnostic facilities are the clinical locations, typically outpatient, where a newborn receives an audiologic diagnosis. The purpose of the diagnosis may be to confirm an initial hearing screening, prescribe interventions and monitor results.

Paper-based forms via email can include free-form or semi-structured text intended for human readability. This text could be in the email itself or in a document attached to the email.

Electronic reports include messages generated with the aid of computer systems and intended to be received and processed by computer systems. Electronic reports could be created by manually entering information into an electronic form (e.g., Web-based portals for data entry) or generated automatically by the sending system (e.g., HL7 message).

Public health agencies typically send and receive both paper-based forms and electronic reports. Select the response that represents the agency's highest level of capability.

Part 1: Workflow

Question 1.6

How does the EHDI program typically <u>send</u> information to diagnostic facilities?

☐	Level 0	By phone or paper-based forms sent via mail, fax or email.
☐	Level 1	Primarily by phone or paper-based forms sent via mail, fax or email with some pilot efforts to send or display electronic reports.
☐	Level 2	Primarily via electronic reports with some by phone or paper-based forms sent via mail, fax or email.
☐	Level 3	Primarily via electronic reports that are evaluated to improve volume, accuracy and timeliness of data transmission.
☐	N/A	This capability or activity is not applicable to our EHDI program.

Key concepts

Examples of **information** include case or patient level reports, aggregate reports or reports used to monitor process quality.

Diagnostic facilities are the clinical locations, typically outpatient, where a newborn receives an audiologic diagnosis. The purpose of the diagnosis may be to confirm an initial hearing screening, prescribe interventions and monitor results.

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Public health agencies typically send and receive both paper-based forms and electronic reports. Select the response that represents the agency's highest level of capability.

Part 1: Workflow

Question 1.7

How does the EHDI program typically <u>receive</u> reporting information from primary care providers/pediatricians?

☐   Level 0   By phone or paper-based forms received via mail, fax or email.

☐   Level 1   Primarily by phone or paper-based forms received via mail, fax or email with some pilot efforts to receive electronic reports.

☐   Level 2   Primarily via electronic reports with some by phone or paper-based forms received via mail, fax or email.

☐   Level 3   Primarily via electronic reports that are evaluated to improve volume, accuracy or timeliness of data reception.

☐   N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

Examples of **information** include case or patient level reports, aggregate reports or reports used to monitor process quality.

A **primary care provider** (PCP) is a health care practitioner who sees people that have common medical problems. This person is usually a doctor, but may be a physician assistant or a nurse practitioner. A **pediatrician** specializes in children and their diseases.

Paper-based forms via email can include free-form or semi-structured text intended for human readability. This text could be in the email itself or in a document attached to the email.

Electronic reports include messages generated with the aid of computer systems and intended to be received and processed by computer systems. Electronic reports could be created by manually entering information into an electronic form (e.g., Web-based portals for data entry) or generated automatically by the sending system (e.g., HL7 message).

Public health agencies typically send and receive both paper-based forms and electronic reports. Select the response that represents the agency's highest level of capability.

Part 1: Workflow

Question 1.8

How does the EHDI program typically <u>send</u> information to primary care providers/pediatricians?

☐   Level 0   By phone or paper-based forms sent via mail, fax or email.

☐   Level 1   Primarily by phone or paper-based forms sent via mail, fax or email with some pilot efforts to send or display electronic reports.

☐   Level 2   Primarily via electronic reports with some by phone or paper-based forms sent via mail, fax or email.

☐   Level 3   Primarily via electronic reports that are evaluated to improve volume, accuracy and timeliness of data transmission.

☐   N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

Examples of **information** include case or patient level reports, aggregate reports or reports used to monitor process quality.

A **primary care provider** (PCP) is a health care practitioner who sees people that have common medical problems. This person is usually a doctor, but may be a physician assistant or a nurse practitioner. A **pediatrician** specializes in children and their diseases.

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Part 1: Workflow

Question 1.9

How does the EHDI program typically <u>receive</u> reporting information from early intervention services?

☐	Level 0	By phone or paper-based forms received via mail, fax or email.
☐	Level 1	Primarily by phone or paper-based forms received via mail, fax or email with some pilot efforts to receive electronic reports.
☐	Level 2	Primarily via electronic reports with some by phone or paper-based forms received via mail, fax or email.
☐	Level 3	Primarily via electronic reports that are evaluated to improve volume, accuracy or timeliness of data reception.
☐	N/A	This capability or activity is not applicable to our EHDI program.

Key concepts

Examples of **information** include case or patient level reports, aggregate reports or reports used to monitor process quality.

Early intervention services are intended to enhance language, communication, cognitive and social skill development, with the goal of increasing the likelihood of success in school and other aspects of life. Specific services may include (but are not limited to) medical services, speech-language pathologists and family support.

Paper-based forms via email can include free-form or semi-structured text intended for human readability. This text could be in the email itself or in a document attached to the email.

Electronic reports include messages generated with the aid of computer systems and intended to be received and processed by computer systems. Electronic reports could be created by manually entering information into an electronic form (e.g., Web-based portals for data entry) or generated automatically by the sending system (e.g., HL7 message).

Public health agencies typically send and receive both paper-based forms and electronic reports. Select the response that represents the agency's highest level of capability.

Part 1: Workflow

Question 1.10

How does the EHDI program typically <u>send</u> information to early intervention services?

☐   Level 0   By phone or paper-based forms sent via mail, fax or email.

☐   Level 1   Primarily by phone or paper-based forms sent via mail, fax or email with some pilot efforts to send or display electronic reports.

☐   Level 2   Primarily via electronic reports with some by phone or paper-based forms sent via mail, fax or email.

☐   Level 3   Primarily via electronic reports that are evaluated to improve volume, accuracy and timeliness of data transmission.

☐   N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

Examples of **information** include case or patient level reports, aggregate reports or reports used to monitor process quality.

Early intervention services are intended to enhance language, communication, cognitive and social skill development, with the goal of increasing the likelihood of success in school and other aspects of life. Specific services may include (but are not limited to) medical services, speech-language pathologists and family support.

Paper-based forms via email can include free-form or semi-structured text intended for human readability. This text could be in the email itself or in a document attached to the email.

Electronic reports include messages generated with the aid of computer systems and intended to be received and processed by computer systems. Electronic reports could be created by manually entering information into an electronic form (e.g., Web-based portals for data entry) or generated automatically by the sending system (e.g., HL7 message).

Public health agencies typically send and receive both paper-based forms and electronic reports. Select the response that represents the agency's highest level of capability.

Part 1: Workflow

Question 1.11

How does the EHDI program identify live birth events in its jurisdiction?

☐	Level 0	The EHDI program is unable to conduct these activities.
☐	Level 1	The EHDI program is able to manually conduct these activities with inconsistent results and many unresolved duplicate birth events.
☐	Level 2	The EHDI program is able to conduct these activities using manual or automated approaches with consistently good results and few unresolved duplicate birth events.
☐	Level 3	The EHDI program evaluates how it receives and processes information to improve identification of live birth events.
☐	N/A	This capability or activity is not applicable to our EHDI program.

Key concepts

Even the best public health surveillance or vital registration system may not capture 100 percent of live births. For the purpose of this assessment, consider how well the EHDI program can identify all live births compared to the agency or jurisdictional vital registration system.

Part 1: Workflow

Question 1.12

Can the EHDI program identify infants that need hearing screening and/or follow-up services?

☐	Level 0	The EHDI program is unable to conduct these activities.
☐	Level 1	The EHDI program is able to manually conduct these activities with inconsistent results.
☐	Level 2	The EHDI program is able to conduct these activities using manual or automated approaches with consistently good results.
☐	Level 3	The EHDI program evaluates how it receives and processes information to improve identification of children needing hearing screening and/or follow-up services.
☐	N/A	This capability or activity is not applicable to our EHDI program.

Key concepts

For the purpose of this assessment, consider the children that are within scope of the EHDI program's mission. This may exclude children that were born in a neighboring jurisdiction but receive care in your jurisdiction.

Part 2: Policies

Question 2.1

Has your agency developed a strategic plan that addresses information systems and information management for the organization?

☐   Level 0   Agency has not attempted to develop such a strategic plan.

☐   Level 1   Agency has made isolated, ad hoc or periodic efforts to develop such a strategic plan.

☐   Level 2   Agency has completed such a strategic plan and updates it routinely.

☐   Level 3   Agency evaluates how it develops strategic plans to improve its information systems management.

☐   N/A   This capability or activity is not applicable to our agency.

Key concepts

Here **strategic plan** refers to a written "plan of action" for achieving specific goals or outcomes related to the agency's established information capability. This includes information systems and information management.

Information systems are a combination of hardware, software, infrastructure and trained personnel organized to facilitate planning, control, coordination and decision-making in an organization.

Information management refers to the collection of information from one or more sources and the distribution of that information to one or more audiences. Here information management means a more strategic approach to the structure, processing and delivery of information, compared to data management, i.e., technical tasks related to database operations and data quality assurance.

Part 2: Policies

Question 2.2

Has your agency completed an assessment intended to describe its information assets and information needs?

☐	Level 0	Agency has not undertaken such an assessment.
☐	Level 1	Agency has made isolated, ad hoc or periodic efforts to conduct such an assessment.
☐	Level 2	Agency has completed such an assessment and updates it routinely.
☐	Level 3	Agency evaluates its assessments to improve how the agency utilizes its information assets to meet its information needs.
☐	N/A	This capability or activity is not applicable to our agency.

Key concepts

Information assets refer to any definable piece or grouping of information which is managed and used to bring value to the organization. Typically, information assets are not easily replaceable without significant costs, skills, time and/or other resources. Examples include data sets from surveillance systems and registries, or from surveys or health statistics.

I**nformation needs** refer to the data and information that are required for public health practitioners to accomplish work goals and objectives.

For this assessment, consider how well the agency understands its information assets and information needs. Given the dynamic nature of public health and information availability, it might be unreasonable to expect that an agency always have information assets that meet all of its information needs.

Part 2: Policies

Question 2.3

Does your agency have a governance process that guides information systems projects towards agency objectives?

☐	Level 0	Agency has no such governance structure.
☐	Level 1	Agency has made isolated, ad hoc or periodic efforts to govern information systems projects.
☐	Level 2	Agency has established such a governance process and exercises it routinely.
☐	Level 3	Agency evaluates how well its governance process guides IT projects towards agency objectives.
☐	N/A	This capability or activity is not applicable to our agency.

Key concepts

Governance process refers to a formal process for decision-making. This may include a written plan which describes who participates in decision-making, an organized structure, such as a committee or coalition, and how decisions are made. Information system governance processes are intended to ensure that projects align with agency strategy, values, constraints and culture.

Part 2: Policies

Question 2.4

Has your agency developed a funding plan for long-term support of its information technology systems?

☐	Level 0	Agency has not developed such a funding plan.
☐	Level 1	Agency has made isolated, ad hoc or periodic efforts to plan for IT systems funding; funding shortfalls frequently limit sustainability of systems.
☐	Level 2	Agency routinely plans for IT systems funding and can generally sustain critical systems over time.
☐	Level 3	Agency evaluates its long-term IT funding plans to improve IT systems sustainability.
☐	N/A	This capability or activity is not applicable to our agency.

Key concepts

A **funding plan** is a written document that describes the potential sources of revenue (where money will come from) and how the organization will seek the funds (legislative strategy, grants, partnerships, monetized services, etc.) to support informatics activities. The plan may include revenue goals, measurable objectives or benchmarks, and action steps related to funding strategy.

Part 2: Policies

Question 2.5

Has your agency completed an agency-wide assessment to identify and engage stakeholders in efforts related to data exchange and interoperability?

☐   Level 0   Agency has not undertaken this assessment.

☐   Level 1   Agency has made isolated, ad hoc or periodic efforts to conduct this assessment.

☐   Level 2   Agency has completed this assessment and updates it routinely.

☐   Level 3   Agency evaluates this assessment process to improve stakeholder engagement for data exchange and interoperability.

☐   N/A   This capability or activity is not applicable to our agency.

Key concepts

Stakeholder refers to any individual, group or organization that may be affected by decisions or actions of the agency. **Stakeholder engagement** refers to the process by which those individuals and organizations are identified and invited to participate.

Interoperability refers to the extent to which systems and devices can exchange data, and interpret that shared data. For two systems to be interoperable, they must be able to exchange data and subsequently present that data such that it can be understood by a user.

Part 2: Policies

Question 2.6

Has your agency adopted a procedure for establishing data sharing agreements?

☐   Level 0   Agency has not adopted such a procedure.

☐   Level 1   Agency has made isolated, ad hoc or periodic efforts to adopt a procedure for establishing data sharing agreements.

☐   Level 2   Agency has adopted a procedure for establishing data sharing agreements and exercises it routinely.

☐   Level 3   Agency evaluates its process for data sharing agreements and uses findings to improve data sharing.

☐   N/A   This capability or activity is not applicable to our agency.

Key concepts

Data sharing agreements are used to establish clear parameters for exchange between organizations or operational units within an agency. These are written agreements that may include:

- Descriptions of allowable use of data.
- Responsibilities of the parties to the agreement.
- Description of the legal authority or business reason to share data.
- Description of the frequency of data exchange.
- Provisions for reporting violations of agreements, including breeches of privacy or security.
- Privacy provisions that describe the circumstances when personally identifiable information may be exchanged.
- Security provisions describing who is able to view data, access data, or make modifications to data and how the organization ensures only authorized individuals perform those functions.
- Descriptions of the purpose for the data exchange and agreement on specific data elements to be exchanged.

Part 2: Policies

Question 2.7

Has your agency established procedures to ensure privacy and confidentiality?

☐   Level 0   Agency has not adopted such procedures.

☐   Level 1   Agency has made isolated, ad hoc or periodic efforts to adopt a procedure for privacy and confidentiality.

☐   Level 2   Agency has adopted privacy and confidentiality procedures and exercises them routinely.

☐   Level 3   Agency evaluates its procedures to improve privacy and confidentiality.

☐   N/A   This capability or activity is not applicable to our agency.

Key concepts

Privacy refers to an individual's right to selectively release their personal or health information; **confidentiality** is the treatment of information that an individual has disclosed and ensuring that information is accessible only to those authorized to have access.

Part 2: Policies

Question 2.8

Has your agency adopted project management procedures for information technology projects?

☐ Level 0   Agency has not adopted such procedures.

☐ Level 1   Agency has made isolated, ad hoc or periodic efforts to use project management procedures.

☐ Level 2   Agency has adopted project management procedures and exercises them routinely.

☐ Level 3   Agency evaluates its procedures to improve project management.

☐ N/A   This capability or activity is not applicable to our agency.

Key concepts

Project management refers to practices designed to ensure a project is completed satisfactorily with respect to its budget, time line and scope. Project management techniques can also help an organization oversee work provided by information technology consultants and vendors.

Part 3: Infrastructure

Question 3.1

Does the EHDI program have access to information technology (IT) professionals?

☐   Level 0   The EHDI program has no access to IT professionals.

☐   Level 1   The EHDI program has limited access to an IT professional(s).

☐   Level 2   The EHDI program has routine access to IT professionals.

☐   Level 3   The EHDI program evaluates its access to IT professionals to improve its support for information technology.

☐   N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

Information technology professionals are those tasked with developing or maintaining information systems. Competencies include programming, database management and network administration. These individuals could be program staff, agency staff, state/territorial government staff, full or part time contractors, vendors, or partners from clinical or academic settings.

Part 3: Infrastructure

Question 3.2

Does the EHDI program have access to data analysts?

☐ Level 0   The EHDI program has no access to data analysts.

☐ Level 1   The EHDI program has limited access to a data analyst(s).

☐ Level 2   The EHDI program has routine access to data analysts.

☐ Level 3   The EHDI program evaluates its access to data analysts to improve its support for data analysis.

☐ N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

Here the terms **data analysts** refer to those tasked with making assessments on disease incidence/prevalence and effectiveness of interventions. Competencies can include epidemiology, statistics, research, data management and evaluation. These individuals could be program staff, agency staff, state/territorial government staff, full or part time contractors, vendors, or clinical/academic partners.

Part 3: Infrastructure

Question 3.3

Does the EHDI program staff have opportunities for training on public health informatics or health information technology?

☐ Level 0   The EHDI program has no access to such training.

☐ Level 1   Such training is ad hoc and rarely based on a formal plan.

☐ Level 2   The EHDI program routinely plans and budgets for such training.

☐ Level 3   The EHDI program evaluates how it trains staff on public health informatics or health information technology.

☐ N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

Public health informatics facilitates the effective use of information and information technology to support public health practice, services and research for the purpose of achieving improved health outcomes.

Health information technology (health IT) makes it possible for health care providers to better manage patient care through secure use and sharing of health information. Health IT includes the use of electronic health records (EHRs) instead of paper medical records to maintain people's health information.

Part 3: Infrastructure

Question 3.4

Does the EHDI program have access to an IT testing environment?

☐ Level 0   The program has no access to an IT testing environment.

☐ Level 1   The program is in the process of accessing an IT testing environment.

☐ Level 2   The program is using an IT testing environment to test electronic messages incoming from or outgoing to clinical trading partners.

☐ Level 3   The program evaluates its IT testing environment's ability to test incoming or outgoing electronic messages.

☐ N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

An **IT testing environment** is a combination of software and/or hardware on which new tools or products are tested prior to adoption and implementation.

Part 3: Infrastructure

Question 3.5

Does the EHDI program integrate with a master patient index?

☐	Level 0	The program is not integrated with a master patient index.
☐	Level 1	The program is in the process of integrating with a master patient index.
☐	Level 2	The program is using a master patient index to deduplicate EHDI records and link to other programmatic data.
☐	Level 3	The program evaluates its integration with a master patient index to improve its data deduplication and integration with other programmatic data.
☐	N/A	This capability or activity is not applicable to our EHDI program.

Key concepts

A **master patient index** is a database that is used across a health care or public health organization to maintain consistent, accurate and current demographic and essential medical data on the patients seen or managed within its various departments. The patient is assigned a unique identifier that is used to refer to this patient across the enterprise. In a public health context, a patient might be a case that has been reported in accordance with public health regulations.

Part 3: Infrastructure

Question 3.6

Does the EHDI program integrate with a registry or master list of providers relevant to EHDI (e.g., birthing centers, pediatricians)?

☐ Level 0   The program is not integrated with such a registry or list.

☐ Level 1   The program is in the process of integrating with such a registry or list.

☐ Level 2   The program is using such a registry or list to identify all possible clinical trading partners.

☐ Level 3   The program evaluates its integration with such a registry or list to improve its data capture from and exchange with clinical trading partners.

☐ N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

A **provider registry** or **master facility list** is a directory of health care providers. Public health agencies may use one to identify and authenticate providers reporting conditions and events of public health significance. Accessing a shared provider registry can help reduce burdens associated with maintaining separate provider lists in individual programs across the agency.

Part 3: Infrastructure

Question 3.7

Does the EHDI program have access to an electronic message integration engine?

☐   Level 0   The program has no access to an integration engine.

☐   Level 1   The program is in the process of acquiring an integration engine or connecting to one used by an HIE or other external partner.

☐   Level 2   The program is using an integration engine, either its own or one used by an HIE or other partner, that validates and translates incoming EHR messages.

☐   Level 3   The program evaluates the performance of its integration engine to improve validation and translation of incoming EHR messages.

☐   N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

An **interface engine** is a software (sometimes combined with hardware) solution for translating and validating messages representing electronic health records. They are used to standardize messages received from a variety of clinical trading partners that may or may not be using standard message formats or coding systems.

Health information exchange (HIE) allows providers and other health care stakeholders to appropriately access and securely share a patient's vital medical information electronically. Here, HIE refers to an organizational entity that serves as a "hub" for electronic health record exchange between clinical and public health trading partners. Such an HIE might offer services like those provided by an integration engine.

Part 3: Infrastructure

Question 3.8

Does the EHDI program have the capability to securely exchange electronic health information with clinical partners?

☐ Level 0   The program has no such capability.

☐ Level 1   The program is in the process of implementing or accessing tools that would provide this capability.

☐ Level 2   The program has implemented or is accessing tools that provide this capability.

☐ Level 3   The program evaluates its capability to securely exchange electronic health information to improve its security practices and build trust with its clinical trading partners.

☐ N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

Here, **secure exchange** refers to the ability to send and receive electronic health information while ensuring it is protected from unauthorized access or alteration. Some entities partner with a third party, such as a Health Information Services Provider (HISP), to provide the technical infrastructure for secure health information exchange.

Part 4: Data & Standards

Question 4.1

Has the EHDI program adopted standard vocabularies for clinical terms or classifications (e.g., LOINC, SNOMED-CT)?

☐   Level 0   The EHDI program has not adopted any vocabulary standards.

☐   Level 1   The EHDI program is designing or implementing a pilot project that uses at least one vocabulary standard.

☐   Level 2   The EHDI program uses at least one vocabulary standard with its production EHDI-IS.

☐   Level 3   The EHDI program evaluates how well its use of vocabulary standards supports programmatic objectives.

☐   N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

Vocabulary standards refer to the commonly accepted terminologies and code systems used by systems developers for the clear and efficient transmission of information between information systems. LOINC and SNOMED-CT are two commonly used vocabulary standards for laboratory observations and clinical terminology, respectively.

Part 4: Data & Standards

Question 4.2

Has the EHDI program adopted message (or content) standards for health information (e.g., HL7 version 2, Clinical Document Architecture, etc.)?

☐   Level 0   The EHDI program has not adopted any message/content standards.

☐   Level 1   The EHDI program is designing or implementing a pilot project that uses at least one message/content standard.

☐   Level 2   The EHDI program uses at least one message/content standard with its production EHDI-IS.

☐   Level 3   The EHDI program evaluates how well its use of message/content standards supports programmatic objectives.

☐   N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

Message (or content) standards refer to commonly accepted structures for electronic messages used to exchange information between systems. Message standards specify how data elements (typically represented with standard vocabularies) should be arranged. Health Level Seven (HL7) is an organization that specifies message standards for health care. In public health contexts, most HL7 messages conform to Version 2 or the newer Version 3, which is based on HL7's Clinical Document Architecture (CDA).

Part 4: Data & Standards

Question 4.3

Has the EHDI program adopted standard transport methods for electronic health information (e.g., Secure FTP, Direct, Web services, PHIN MS)?

☐   Level 0   The EHDI program has not adopted any transport standards.

☐   Level 1   The EHDI program is designing or implementing a pilot project that uses at least one transport standard.

☐   Level 2   The EHDI program uses at least one transport standard with its production EHDI-IS.

☐   Level 3   The EHDI program evaluates how well its use of transport standards supports programmatic objectives.

☐   N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

Transport standards refer to the methods and approaches used by organizations to send and receive electronic messages. Transport standards are distinct from the actual content of the message and can vary in degrees of technological sophistication and approaches to security and encryption. Transport standards used in public health include, but are not limited to, Secure File Transport Protocol (SFTP), Direct (based on secure email), Public Health Information Network Messaging System (PHIN MS, which is provided by CDC and based on ebXML), and Web services used in service-oriented architectures.

Part 4: Data & Standards

Question 4.4

Has the EHDI program adopted Integrating the Healthcare Enterprise (IHE) Profiles?

☐   Level 0   The EHDI program has not adopted any IHE Profiles.

☐   Level 1   The EHDI program is designing or implementing a pilot project that uses at least one IHE Profile.

☐   Level 2   The EHDI program uses at least one IHE Profile with its production EHDI-IS.

☐   Level 3   The EHDI program evaluates how well its use of IHE Profiles supports programmatic objectives.

☐   N/A   This capability or activity is not applicable to our EHDI program.

Key concepts

The Integrating Healthcare Enterprise website states, "IHE is an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information. IHE promotes the coordinated use of established standards…to address specific clinical needs in support of optimal patient care." IHE profiles describe a clinical information need or workflow scenario and document how to use established standards to accomplish it. The following EHDI-related profiles are of interest to the EHDI community:

Newborn Admission Notification Information (NANI) profile describes the content needed to communicate a timely newborn admission notification electronically from a birthing facility to public health to be used by newborn screening programs.

The Early Hearing Care Plan (EHCP) profile describes the content needed to communicate care plan instructions to properly manage hearing loss in newborns and young children. EHCP is being superseded by the new Early Hearing Detection and Intervention (EHDI) profile that addresses both care plans and results from screening devices.

Quality Measure Execution-Early Hearing (QME-EH) profile describes the content needed to communicate clinical quality measures for monitoring newborn hearing screening.

Appendix A – Technical Questions

1. Does the EHDI program use an electronic EHDI tracking and surveillance system? If so please describe the system (e.g., vendor/product names or internally developed).

2. If the EHDI program uses an EHDI-IS, please describe the message types received from clinical trading partners and the transport mechanisms used to deliver the messages (e.g., via HIE, Direct, Web services; batched vs. individual messages).

3. Does the EHDI program use an electronic EHDI Tracking and Surveillance system to generate information for the annual CDC EHDI Hearing Screening and Follow-Up Survey (also known as the CDC Data Survey, http://www.cdc.gov/ncbddd/hearingloss/ehdi-data.html)?

4. Please describe where the EHDI program is located in the agency's organizational structure (e.g., the EHDI program resides within the MCH Branch, which resides within the Community Health Division, which reports to the Director of Public Health).

5. Please describe where the information technology unit (or equivalent) is located in the agency's organizational structure (e.g., the IT Unit resides within the Finance and Administration Division, which reports to the Director of Public Health). If your agency's IT unit is housed outside of the public health department (e.g., in a centralized department of IT), please describe that relationship.

6. Does the EHDI program have a sense of whether or not the birthing centers in your jurisdiction are using EHRs and, if so, which EHR products they are using?

7. Does the EHDI program have a sense of whether or not the pediatricians in your jurisdiction are using EHRs and, if so, which EHR products they are using?

8. Does the EHDI program have a sense of whether or not the audiologists in your jurisdiction are using EHRs and, if so, which EHR products they are using?

Appendix B – Interoperability Workshop Findings

Background

On October 14, 2014, the Public Health Informatics Institute facilitated a pre-conference workshop adjunct to an EHDI Grantee meeting hosted by CDC. The objective of the workshop was to collaboratively identify opportunities for and barriers to electronic health information exchange between EHDI programs and their clinical partners.

Participating EHDI Programs
Arkansas
Colorado
Idaho
Iowa
Nebraska
Oregon
Rhode Island
Tennessee

Other participants
CDC
Lantana Consulting
PHII

The purpose of this document is to describe EHDI stakeholders in terms of the information they might exchange with public health agency programs, as both a sender and receiver. Factors that could encourage or impede that exchange are also identified. This information will be used to inform EHDI-related health information technology standards. Participants indicated that electronic health information exchange efforts should first prioritize birthing centers/hospitals and then either PCP/Pediatricians or Audiologists.

Stakeholder: Birthing Facility/Hospital

Sending information to EHDI Program

Information sent to EHDI	Factors that encourage sending information	Factors that impede sending information
1) Infant's hearing screening results (including rescreening) 2) Infant's risk factors 3) Infant's health insurance coverage 4) Infant's PCP and future appointments 5) Infant's demographics 6) Infant's guardianship status 7) Infant's NICU, medically fragile status 8) Infant death notice	1) Meet reporting requirements 2) Meet clinical care standards 3) Contribute data for screening quality reports; hospitals compete on screening rates 4) EHR-EHDI interoperability can reduce redundant data entry and related errors	1) High staff turnover 2) High cost of implementing EHR-EHDI exchange; too many different EHRs in jurisdiction 3) Reluctance to open connections through firewall 4) Screening results are not in EHR (obtained from screening device directly) 5) EHDI is considered low priority; no penalties for non-reporting, no rewards for reporting 6) Too many stand-alone public health systems requiring data entry; user account maintenance is burdensome 7) Believe public health is requesting too much information

Receiving information from EHDI Program

Information received from EHDI	Factors that encourage receiving information	Factors that impede receiving information
1) Screening quality reports 2) Clinical practice guidelines, including in-person training and screening equipment 3) Statistics on follow-up, outpatient screening results 4) Hearing plan of care 5) EHDI program newsletter 6) Request to update contact information for screening staff	1) Want to provide quality care (clinical, follow up, early intervention) 2) Respect for Joint Commission guidelines, 1-3-6 goals 3) Want information on EHDI program, system changes	1) EHDI not as urgent as other clinical care issues 2) Limited resources (time, funds) 3) Information from infant's PCP can be inconsistent with EHDI program's communications 4) Changes in infant's name (or other demographic information) 5) Midwives reluctance, inability to provide information on home births

Stakeholder: Pediatrician/PCP

Sending information to EHDI Program

Information sent to EHDI	Factors that encourage sending information	Factors that impede sending information
1) Hearing screening results (including rescreening, blood spot screen) - occasionally 2) Notice that child is not in patient panel 3) Notice that child is not DHH (evidence is unclear) 4) Notice that child's parents refused hearing care, did not keep appointment 5) Updates to infant's health, demographic, risk factor information 6) Hearing plan of care 7) Audiologic diagnosis 8) Alert concerning infant's hearing, health	1) Meet reporting requirements 2) Meet clinical care standards 3) Contribute to care coordination 4) Meaningful Use EHR program (meet Specialized Public Health Registry objective)	1) Limited reporting requirements, mechanisms 2) Reluctance to play role of medical home 3) Staff not aware of EHDI program, reporting requirements 4) No governmental funding to PCPs for EHDI 5) limited resources for EHRs or data entry into Web-based EHDI-ISs (time, funds) 6) PCP beliefs, practices are inconsistent with EHDI clinical guidelines; families get mixed messages 7) PCP believes EHDI is job of audiologist specialists 8) High cost of implementing EHR-EHDI exchange; too many different EHRs in jurisdiction

Receiving information from EHDI Program

Information received from EHDI	Factors that encourage receiving information	Factors that impede receiving information
1) Screening results 2) Audiologic diagnosis 3) Clinical practice guidelines 4) Screening, diagnosis follow up reminders 5) Hearing plan of care 9) Infant's risk factors (including updates) 6) Lists of audiologists and other resources 7) Discharge summary 8) Recommendations	1) Want to provide quality care (clinical, follow up, early intervention) 2) Respect for Joint Commission guidelines, 1-3-6 goals, AAP guidelines 3) Want high quality, timely data that improves care	1) Limited reporting requirements, mechanisms 2) Reluctance to play role of medical home 3) EHDI not as urgent as other clinical care issues 4) Limited resources (time, funds); not tech/EHR savvy 5) High cost of implementing EHR-EHDI exchange; too many different EHRs in jurisdiction 6) Lack of compliance with Joint Commission guidelines, 1-3-6 goals, AAP guidelines; lack familiarity with DHH (low incidence condition) 7) Don't know how to obtain screening results 8) Limited information exchange between PCP and hospital

Stakeholder: Audiologist

Sending information to EHDI Program

Information sent to EHDI	Factors that encourage sending information	Factors that impede sending information
1) Hearing screening results 2) Audiologic diagnosis 3) Hearing aid, cochlear implant fitting dates 4) Future appointment information 5) Follow up recommendations 6) Updates to infant's health, demographic, risk factor information 7) Early intervention updates and referrals 8) Genetics referrals 9) Ear, Nose, Throat specialist referrals 10) Guide By Your Side referrals	1) Meet reporting requirements (reporting is part of audiologists' culture) 2) Meet clinical care standards 3) Contribute to care coordination	1) Children not DHH are not reported 2) Typically not EHR users; not eligible for Meaning Use EHR program 3) Limited resources (time, funds) 4) Competition with other audiologists 5) Infrequent use of EHDI-IS, can't remember what to do

Receiving information from EHDI Program

Information received from EHDI	Factors that encourage receiving information	Factors that impede receiving information
1) Screening results 2) Clinical practice guidelines 3) Screening, diagnosis follow up reminders 4) Hearing plan of care 5) Child's medical history, risk factors (including updates) 6) Practice report card 7) Appointments, referrals from other providers 8) Early intervention referrals 9) Guide By Your Side referrals 10) Audiologic recommendations	1) Want to provide quality care (clinical, follow up, early intervention) 2) Respect for Joint Commission guidelines, 1-3-6 goals, AAP guidelines 3) Want high quality, timely data that improves care (e.g., child's medical history) 4) Want better care coordination	1) No legal basis for standard of care 2) HIPAA, privacy concerns 3) Not in the habit of contacting EHDI program 4) limited resources and other priorities