Minnesota e-Birth Records Project:
Assessing Readiness for e-Birth Records Standards

Report to Centers for Disease Control and Prevention
National Center for Health Statistics

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Division of Health Policy
Office of Vital Records and Office of Health Information Technology
PO Box 64882
St. Paul, MN 55164-0882

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Executive Summary

Introduction

The Minnesota Electronic Birth Records Project (e-Birth Records Project) evaluated the readiness of the Minnesota Department of Health (MDH) and Minnesota birth hospitals for secure standards-based exchange of birth records information using the Integrating the Healthcare Enterprise (IHE) Birth and Fetal Death Reporting (BFDR) Profile and Health Level Seven International (HL7) standard message and document specifications (e-birth records standard). The goals of the project were to evaluate and determine readiness for adoption and use of the above standards in registering Minnesota births and to make recommendations and identify next steps. The collaborative project involved state agencies including the MDH Office of Vital Records (OVR), MDH Office of Health Information Technology (OHIT), and the state's central information technology organization (MN.IT), from September 18, 2012 to April 15, 2014. Funding and technical assistance were provided by the Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS).

Methods

A cross disciplinary team implemented the study using a multi-prong approach including analyses of information content, workflow and technology, proof of concepts testing, model development and validation, and discovery of opportunities for improvement. Stakeholder engagement was a critical component, which included an ongoing community of interest and an advisory group that provided input and validation to the study. One hospital and one health system served as in-depth sources of information and testing. Unity Hospital, part of Allina Health, provided data on workflow, processes, and policies relating to collecting and submitting the birth records information to MDH. Essentia Health partnered with MDH to advance the proof of concept and provide perspective on technical readiness of hospitals. The scope of this project was limited to evaluation of the birth registration process including the civil and medical components between the hospital and MDH.

Key Findings

The results suggest that MDH and hospitals support the adoption of e-birth records standards but lack the readiness to fully test and implement the e-birth records standards. The stakeholders identified four key contributing factors contributing to the lack of readiness.

1. Policies are not in place to support using e-birth records standards for collection of civil and medical information. The IHE BFDR Profile does not include all of the civil information for birth registration due to policies requiring civil information be self-reported by the parent(s) on the birth record.
2. Current incentives through meaningful use and health reform do not directly support the implementation of e-birth records standards for hospitals, HIT vendors, and Offices of Vital Records.
3. All birth registration data is not in the EHR nor always available as structured data which is necessary for successful implementation the IHE BFDR Profile.
4. The IHE BFDR Profile has been tested with only one EHR product, Epic with the Stork module.

Recommendations

The project and stakeholders identified seven recommendations to address the key factors and advance the readiness of all birthing hospitals and Offices of Vital Records to adopt and implement the studied e-birth records standards.

1. **Align policies to support using e-birth records standards.**
   Hospital, jurisdictional and NAPHSIS policies need to be aligned to support e-birth records standards. NAPHSIS should lead this work with technical assistance from NCHS.

2. **Leverage activities of the Office of National Coordinator (ONC) and other federal activities.**
   Although current federal activities do not support e-birth records standards, activities and strategies of the ONC and other others should be leveraged to advance e-birth records standards through certification of EHRs and electronic birth reporting systems (EBRS).

3. **Continue expansion and testing of e-birth records standards.**
   Continue expansion and testing of the e-birth records standards led by NCHS with stakeholder engagement including hospitals, jurisdictions' Office of Vital Records, EHR, EBRS, and HIT vendors, the ONC and other providers, such as prenatal care clinics.

4. **Provide resources and technical assistance for readiness and implementation.**
   The findings emphasized the need for resources and technical assistance for Offices of Vital Records and hospitals to prepare for the implementation of e-birth records standards. Create tools, templates, and training along with NCHS or NAPHSIS staff assistance.

5. **Demonstrate the value of and build stakeholder support for e-birth records standards**.
   The project identified the need to communicate the value of e-birth records standards. Targeted communication about the value of e-birth records standards to hospitals, Offices of Vital Records, prenatal care providers and public health.

6. **Build Offices of Vital Records' e-birth records capacity.**
   In addition to participating in the above recommendations, all Offices of Vital Records should prepare for e-birth records by building e-birth records capacity such as employing an informatics-savvy workforce and engaging in agency discussion on health information exchange.

7. **Implement opportunities for improvement.**
   In addition to assessing the readiness of the e-birth records standards, the project also identified opportunities for improvement for hospitals and MDH. These opportunities can be share with other hospitals and Offices of Vital Records and implemented with ongoing feedback and continuous learning.

Conclusion

In summary, this project revealed support for adoption and use of e-birth records standards. Addressing the contributing factors to the lack of readiness and implementing the recommendations will require the effort of the entire vital records community and its partners. The support of e-birth records standards will strengthen the vital records system to document and improve the health of all people.

Introduction

The Minnesota Electronic Birth Records Project (e-Birth Records Project) evaluated the readiness of the Minnesota Department of Health (MDH) and Minnesota birth hospitals for secure electronic exchange of birth registration information between hospital electronic health record (EHR) systems and the state's vital records system, the Minnesota Registration and Certification System (MR&C), using the Integrating the Healthcare Enterprise (IHE) Birth and Fetal Death Reporting (BFDR) Profile and Health Level Seven International (HL7) standard message and document specifications. The goals of the project were to:
1) evaluate and determine readiness for adoption and use of the above standards, and
2) make recommendations and identify next steps for implementation statewide.

The collaborative project involved the MDH Office of Vital Records (OVR), Office of Health Information Technology (OHIT), and the state's central information technology organization MN.IT, from September 18, 2012 to April 15, 2014. Funding and technical assistance were provided by the Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS).

Background

Status of Vital Records in the United States

The National Vital Statistics Systems (NVSS) collects and maintains essential data on all U.S. births and deaths – more than six million vital events are reported annually. These data are provided through contracts between NCHS and jurisdictions that operate vital registration systems. The jurisdictions are legally responsible for the registration of vital events including births, deaths and fetal deaths. In the United States, legal authority for the registration of these events resides individually with the 50 States, plus Washington, DC, and New York City, and territories; Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands. The jurisdictions are also responsible for maintaining registries of vital events which include a wide range of range of demographic, medical, and geographic data derived from about 4 million birth records, 2.4 million death records and fetal death reports, and for issuing copies of birth and death certificates.

In their work, jurisdictions are experiencing:

- Higher expectations of data quality and timeliness by stakeholders and the public.
- Separate, costly reengineering projects in various jurisdictions.
- Limited integration among internal vital records systems and with other stakeholder systems.
- Need for a standards-based, uniform, and systematic approach to collecting and exchanging data from vital records[1].

[1] eVital Records Standards Initiative, February 2014.
http://www.cdc.gov/nchs/data/dvs/eVital_Records_Standards_2014.pdf Access February 28, 2014

To address some of these needs, NCHS has provided support and collaborated with the National Association for Public Health Statistics and Information Systems (NAPHSIS) and other vital records stakeholders through the e-Vital Standards Initiative. The goal of the e-Vital Standards Initiative is to support the development of vital records standards to enable interoperable electronic data exchange among EHR, U.S. vital records systems and potentially other public health information systems for birth, death and fetal death events.

The e-Vital Standards Initiative and partners have developed e-vital records standards, including:

- Data Models (HL7 Domain Analysis Model)
- Function Profiles (based on HL7 EHR-S FM)
- Messaging Standards (HL7 V2.5.1)
- Document Standards (HL7 CDA)
- Content Profiles (IHE)

The current status and details of the e-vital records standards can be found at http://www.cdc.gov/phin/resources/standards/data_interchange.html

e-Birth Records Standards

NCHS provided funding and technical assistance to MDH to evaluate the readiness for adoption and use of two e-birth records standards. Although both the e-birth records content and messaging standards are for birth and fetal death, this project focused only on the standards for the U.S. Standard Certificate of Live Birth. Specifically, the project focused on:

- The *IHE Birth and Fetal Death Reporting (BFDR) Profile,* which describes the content used to pre-populate the form with clinical information from the EHR used to generate a birth record or fetal death report. The profile describes the content used in automating the data captured for vital records purposes for the 2003 Revisions of the U.S. Standards Certificate of Live Birth and the U.S. Standards Report of Fetal Death.

- The *HL7 Version 2.5.1 Implementation Guide: Reporting Birth and Fetal Death Information Reporting, Release 1 – US Realm*, which is an initial effort to provide guidance and messaging infrastructure for transmitting medical/health information on live births and fetal deaths from a birthing facility setting to a jurisdictional vital records electronic registration system.

The U.S. Standards Certificate of Live Birth contains civil and medical information. The civil information includes demographic and administrative data. These data elements can be found in the NCHS's *Mother's Worksheet for Child's Birth Certificate* and include legal name of father, mother, and baby; education level and race of father and mother; and marital status. The medical information includes information on prenatal care, labor and delivery and the newborn, all of which are identified in NCHS's *Facility Worksheet for the Live Birth Certificate.* These paper forms along with the newly developed e-

birth records standards align with the specifications in the U.S. Standard Certificate of Live Birth. *See Appendix A for Commonly Used Terms and Appendix B for Resources and Documents.*

Methods

The Minnesota e-Birth Records Project evaluated the readiness of MDH and Minnesota birth hospitals for secure electronic exchange of birth registration information between hospital EHR systems and the state's vital records system, MR&C, using the IHE BFDR Profile and HL7 standard message and document specifications. This was achieved using a collaborative team model, stakeholder engagement, and a multi-prong approach.

Collaborative Team Model

The project used a participatory collaborative team model, comprising staff from the OVR, OHIT, and MN.IT at MDH (Figure 1). The project team included a project manager, business/program experts, information technology experts, health informaticians and project sponsors. The project team met an average of two times per month to monitor progress, identify next steps and assign duties. Additional information technology experts were called upon as needed for the technical team and were responsible for configuring and implementing the technical components of the project. The technical team met as needed. The project sponsors were the directors of the Offices of Vital Records and Health Information Technology. The sponsors assured support from MDH leadership and resources for the project.

Figure 1. Partners' Roles and Expertise

Partner	*Roles and Expertise*
The Office of Vital Records maintains birth and death records for the state of Minnesota.	Business/program experts and project sponsors
The Office of Health Information Technology supports e-health and informatics projects.	Project manager, health informaticians, and project sponsors
MN.IT at MDH provides IT-related activity at MDH	Information technology experts

Stakeholder Engagement

The project team engaged all Minnesota hospitals (148) and independent birthing centers (4) in the fall of 2012 through requests for participation in three areas: 1) community of interest; 2) advisory group membership; and 3) willingness to be a partner hospital. MDH collaborated with the Minnesota Hospital Association to identify and contact hospital administrators and birth registrars at all the facilities statewide.

The *Community of Interest (COI)* was open to all organizations and individuals interested in vital records and standards-based exchange of health information. MDH invited all hospitals to participate as well as MDH staff and e-health experts. The 40-member COI received periodic communications that updated,

educated and engaged stakeholders in topics relating to the e-Birth Records Project, e-birth records standards, and e-health.

A 19-member *advisory group* consisted of local, state and federal experts in vital records, public health and e-health, and provided guidance on the methodology, interpreted findings and recommended next steps and statewide policy. The advisory group included members from six hospitals of varying size representing separate, distinct communities within Minnesota. Other members and technical advisors represented NCHS, MDH Center for Health Statistics, Minnesota Hospital Association, Minnesota Department of Human Services, MN.IT, and the Minnesota Immunization Information Connection. The full list of members can be found in Appendix C. The project sponsors, directors of the OVR and OHIT, served as the advisory group co-chairs. Group members met seven times during the project.

Two *local partners* were selected for different parts of the project.

- Unity Hospital, part of Allina Health, provided data on workflow, processes and policies relating to collecting and submitting the birth records information to MDH via the MR&C. Allina Health is a major provider of health care services in Minnesota, with over 90 clinics, 11 hospitals, pharmacies, and specialty medical services. Unity Hospital is a 220-bed suburban hospital in Fridley, MN. Unity oversees an average of 1200 births annually, the majority of which are considered low risk (34-week or more gestation). The hospital uses Epic software for their EHR system. In addition, experts representing Unity Hospital and Allina Health sat on the advisory group.

- Essentia Health partnered with MDH to advance the proof of concept at the 2014 IHE North American Connectathon and provided the hospital perspective on the technical readiness and needs of hospitals. Essentia Health is an integrated health system with 18 hospitals and 67 clinics in Minnesota, North Dakota, Wisconsin and Idaho. Essentia uses Epic EHR software including the Stork module, which is specifically designed for obstetrics and gynecology. Essentia Health staff participated in the advisory group.

The project also engaged stakeholders through participation at a variety of meetings and presentations. At these events, MDH collected feedback on the approach, models, and results from individuals, organizations and the vital records community (Figure 2). In addition, the project engaged the Minnesota e-health community and participated in the Health Information Technology Policy Committee's request for comments for meaningful use stage 3.

Figure 2. Venues for Stakeholder Engagement	
Minnesota	*National*
2013 Excellence in Birth Registration Conference and Training	2013 NAPHSIS /NCHS Conference
e-Health Advisory Committee (2013-2014)	2013 eHealth Initiative Conference
MDH's Executive Steering Committee (2012-2014)	2013 AMIA Symposium
2013 Minnesota e-Health Summit	2013 HIMSS Showcase
Numerous internal and external meetings	2014 HIMSS Showcase

Approach

The project team and engaged stakeholders implemented the multi-prong approach highlighted in Figure 3 and described in the following paragraphs.

Figure 3. Multi-Prong Approach and Activity Overview	
Approach	*Activity Summary*
Analyze Information, Technology, and Workflow	• Describe the current birth registration process at MDH and partner hospital. • Test proof of concept among partners. • Compare data standards and collection tools.
Develop and Validate Models (current and future)	• Develop models incorporating information, technology, and workflow components. • Leverage stakeholders to reaffirm and identify themes and variances in current and proposed models.
Discover Opportunities for Improvement	• Identify opportunities for improvements in the information, technology, and workflow in current and proposed models.

Analyze Information, technology, and workflow components.

The approach to analyze information, technology and workflow used three primary activities 1) describe the current birth registration process at the partner hospital and MDH; 2) test proof of concept among partners; and 3) compare data standards and collection tools.

Describe the Current Birth Registration Process

Business Process Analysis (BPA) was used to describe the current birth registration process at MDH OVR and at Unity Hospital. The project team adopted elements of the Collaborative Requirements Development Methodology (CRDM) from the Public Health Informatics Institute[2] to perform the analysis. The BPA consisted of review of the processes and workflow surrounding the collection and exchange of birth record information at Unity Hospital and at MDH OVR including identifying collected data elements, applicable policies, related task sets, roles, timelines, and data usage.

[2] Public Health Informatics Institute. Collaborative Requirements Development Methodology (CRDM). Available at: http://phii.org/crdm/ . Accessed December 24, 2013.

MDH Business Process Analysis

To better understand the process and workflow at MDH, the project team conducted interviews with subject matter experts and key system users at the OVR including the State Registrar, birth registration field representatives, MR&C IT staff, and data content and quality experts. Additionally, the project team reviewed existing documentation for the MR&C system and the birth registration process including the MR&C User Guide and Manual, software requirement specifications, Birth Registration Manual, as well as applicable MN Statutes and Rules. Birth registration field representatives provided an overview of MDH guidelines for hospital users of MR&C. Staff interviews and system documents highlighted MR&C's functional components and task flow. Data content and quality experts commented on internal and external uses of the birth record data and quality concerns. Together, these methods identified the goal and objectives of birth registration and its governing business rules.

Hospital Business Process Analysis

At Unity Hospital, the project team interviewed staff responsible for birth registration and the Patient Care Director of Women & Children's Services. Two site visits were made including a tour of the Family Birth Center. This involved a walk-through of the patient and information flow, starting from unit admission, labor and delivery, postpartum recovery including the nursery and lactation consultation, and discharge. Unity Hospital provided copies of some of the paper documentation used during the patient stay at their birth center, which included forms and worksheets. Also included were documents given to patients for information or educational purposes. The project team used the interviews and documentation reviews to confirm the components of birth record information submitted to OVR. This included identifying the sources for that information and documenting staff roles, workflow, timelines, and potential constraints in obtaining or submitting the information. In addition, to understand the birth registration process from a system user perspective, project team members who are not normally involved in birth registration used the MR&C Test System to create test birth records and observe reporting capabilities available to hospital and other birth registration staff.

Test Proof of Concept between Partners

MDH tested the proof of concept for the IHE BFDR Profile standards-based exchange with national partners in 2013 and 2014. This work demonstrated standards-based information flow between separate and distinct partners in the birth registration process including CDC/NCHS and health information technology (HIT) vendors. Preparation for the IHE North American Connectathon and HIMSS Interoperability Showcase included attending weekly conference calls with partners, technical configuration involving creating a test environment, and multiple demonstrations.

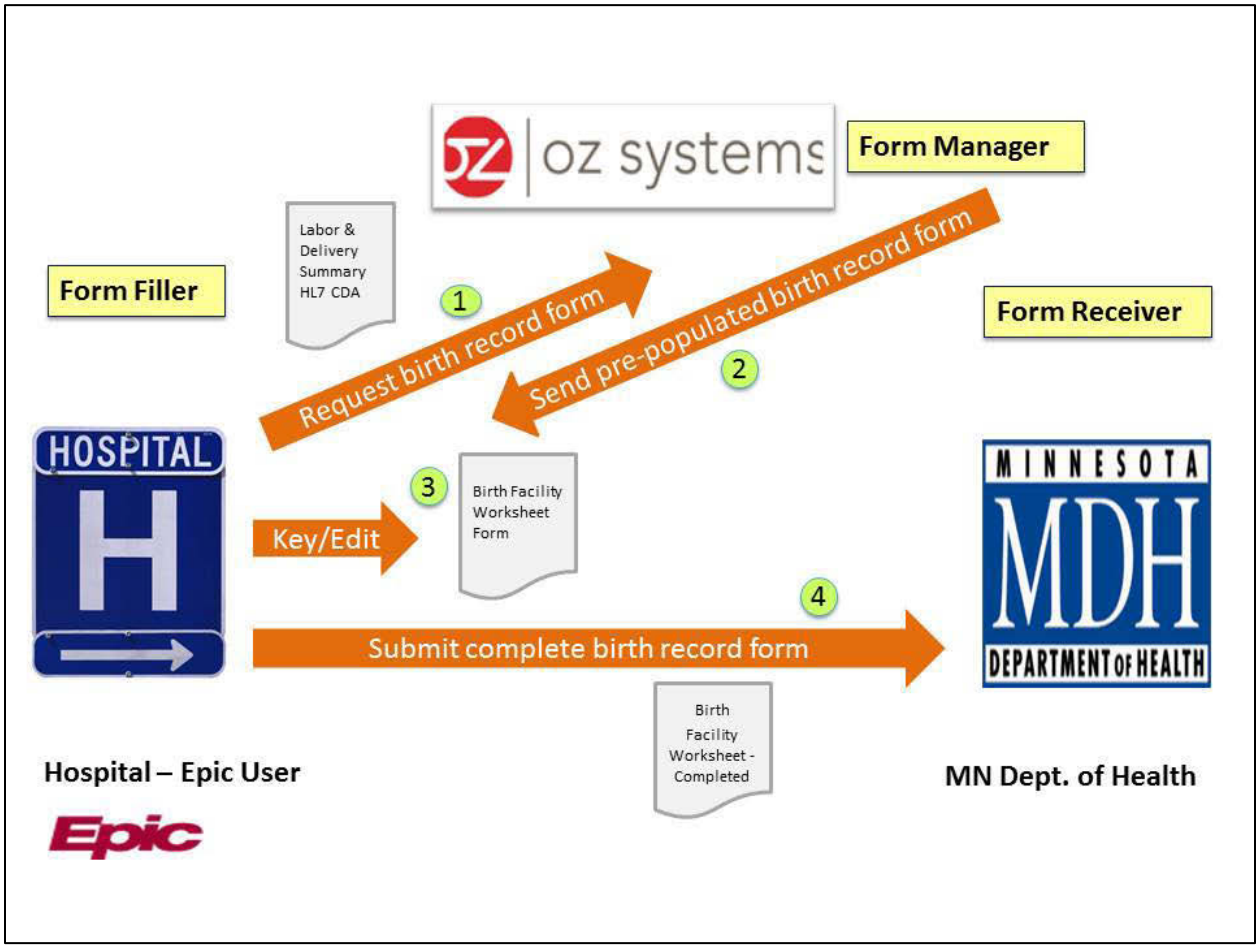
The Connectathon and the Showcase work utilized the IHE BFDR Profile and the Retrieve Form for Data Capture (RFD) profile. RFD provides a standardized method for gathering data within a user's current application to meet the requirements of an external system. The IHE BFDR Profile defines the content and format that prepopulates the form used to generate a birth record or fetal death report.

MDH participated as the Form Receiver, a role that allowed the participant to receive an instance of a pre-populated birth record form from within the EHR. For the purpose of testing and demonstration,

Epic acted as the Form Filler, representing a hospital EHR user and birth registrar (Figure 4). The Form Filler sent a document to the Form Manager (Step 1), OZ Systems, who is the intermediary HIT vendor that provided technical services. The Form Manager used mappings defined in the IHE BFDR Profile to pre-populate a vital records form and return it to the Form Filler for completion before submitting it to the Form Receiver (MDH) (Step 2). The Form Filler (hospital staff or designated birth registrar) is able to edit the form or add additional information (Step 3) before submitting the form (Step 4).

This method allows for the electronic capture of clinical information for the newborn and mother from the EHR and its electronic submission to the state vital records information system. Some demographic information required for birth registration is not normally available in the EHR.

Figure 4. Demonstrated Standards-Based Information Flow



IHE Connectathon

The Connectathon is an annual event that takes place in Chicago and is organized by IHE to conduct interoperability and connectivity testing among stakeholders. Three members of the MDH technical team attended the IHE Connectathon during the week of January 28, 2013, including the technical project manager, lead developer and a database, data content, and system configuration expert. They were joined by external partners including the EHR and HIT vendors, standards experts, and

representatives from NCHS. The partners tested the systems' interoperability and conformance to the standards-based specifications in a controlled and monitored environment.

In 2014, MDH again participated with its partners in the Connectathon during the week of January 27, 2014, for another round of connectivity testing and to help advance the mapping of the IHE BFDR Profile to an EHR product. In 2014, MDH sent one IT expert and sponsored the participation of Essentia Health, one of the local partners.

Test results were recorded and posted in the IHE Connectathon results database indicating the role, profile, and successful completion for each participant (http://connectathon-results.ihe.net/). Upon successful completion of testing, MDH and its partners advanced to the demonstration phase at the HIMSS Interoperability Showcase.

HIMSS Interoperability Showcase

During the week of March 4, 2013, a business/program and an information technology expert from MDH participated in the HIMSS Interoperability Showcase, an interactive demonstration of live clinic information systems using standards-based interoperability. The project team and its partners demonstrated Use Case 16, "Vital Registration and Care Coordination for Newborn Hearing Screening", to show the flow of information starting from the prenatal care provider, through labor & delivery and postpartum, public health reporting, public health hearing screening, pediatrician, and ending at CDC/NCHS (Appendix D).

MDH participated in the 2014 HIMSS Interoperability Showcase during the week of February 24. The e-Birth Records Project sent two staff, an information technology expert and a health informatician. Together with Epic, Oz Systems and Genesis Systems, MDH presented vignette 20 (V20-Birth Records), showing how the IHE BFDR Profile uses the EHR to pre-populate components of a baby's birth record.

Compare data standards and collection tools

The project team mapped the 2003 Revision of the U.S. Standards Certificate of Birth and compared to the national and Minnesota-specific standards and collection tools (Figure 5) identified during the hospital and MDH business process analysis. This process analyzed the questions and the responses. Differences in content and structure of question and response were identified and recommendations were made for alignment or further analysis.

Develop and Validate Models

The analysis and results of the first part of the approach led to the development of current and proposed models. Throughout the project, the project team leveraged stakeholder groups to reaffirm methods and identify themes and variances in birth registration process models. In addition to the COI and advisory group, the project team shared communication and received feedback through stakeholder engagement (Figure 2). This was an ongoing process throughout the entire project.

Figure 5. National and Minnesota Specific Data Standards and Collection Tools	
Data Standard and Collection Tool	*Description*
IHE BFDR Profile (September 2013)	National e-birth records standard for content
HL7 v2.5.1 (October 2013)	National e-birth records standard for messaging
Facility Worksheet for Live Birth (02/05/04)	NCHS tool (paper document) for collection of prenatal, labor and delivery, and newborn medical information
MDH Birth Certificate Information-Medical Portion (04/2012)	MDH tool (paper document) for collection of prenatal, labor and delivery, and newborn medical information
Mother's Worksheet for Child's Birth Certificate (01/28/04)	NCHS tool (paper document) for collection of civil information such as name, demographics, and parentage
Naming Your Baby and Birth Certificate Information (10/2012)	MDH tool (paper document) for collection of civil information such as name, demographics, and parentage
MR&C (test site)	MDH Office of Vital Records information system
Interjurisdictional Exchange Natality File (Enhanced STEVE format)	NCHS electronic tool for jurisdictions to submit birth information to NCHS and other jurisdictions

See Appendix A for Commonly Used Terms and Appendix B for Resources and Documents.

Discover Opportunities for Improvement

During the project, opportunities for improvements in the current and proposed models for the birth registration process were identified through stakeholder engagement and discussions with the partner hospitals and health systems.

Results and Observations

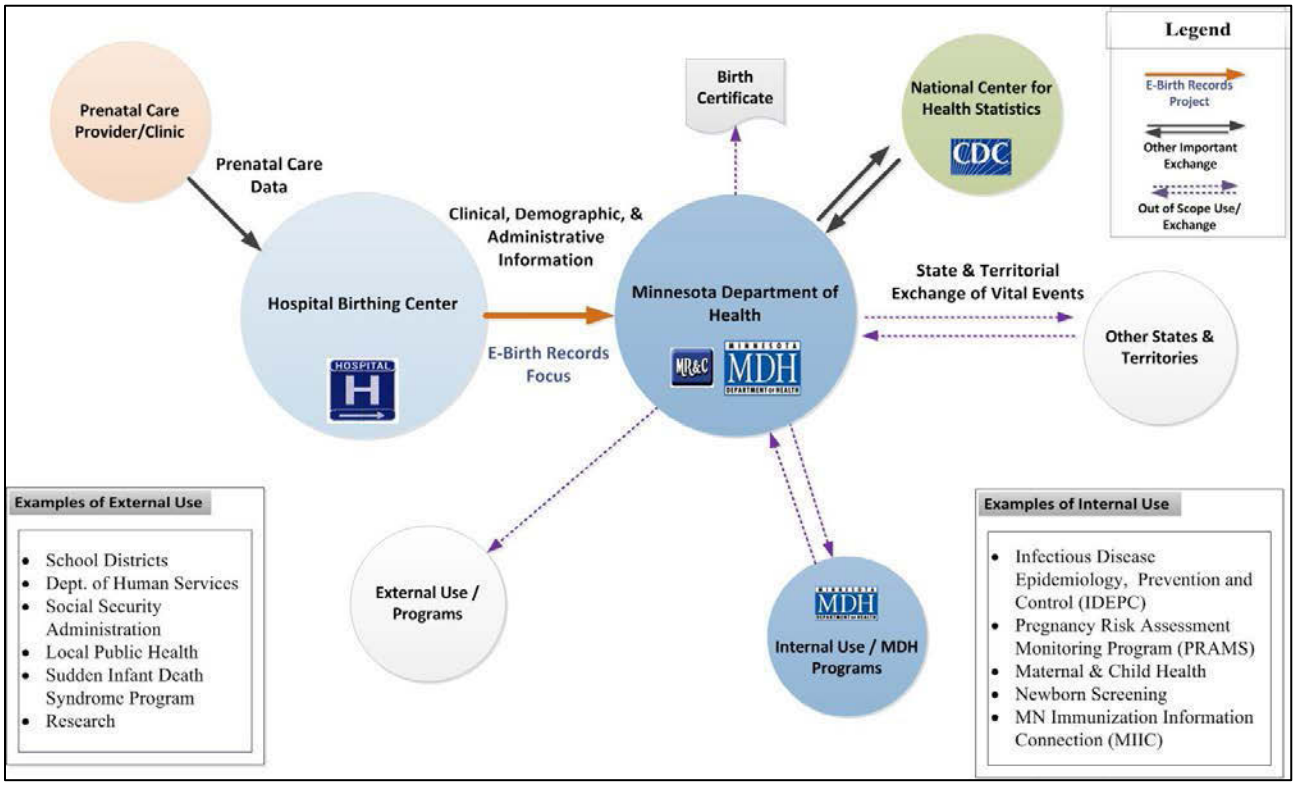
Birth Registration Process

The project identified and described the steps to collect and submit birth registration information from the partner hospital to MDH. Figure 6 shows a high-level view of that process - the Minnesota birth registration process. Although some of the inputs and outputs from the process were out of scope for this project, they show important interdependences among the sources and uses of birth data and they were necessary considerations for e-birth records standards development.

Birth record information abstracted and submitted to MDH is used by internal programs and multiple organizations external to MDH. Areas within MDH that significantly rely on the information include the Immunization Program, Pregnancy Risk Assessment and Monitoring Program, STD & HIV Section, Birth Defects Monitoring and Analysis Unit, Newborn and Child-Follow-up Unit, and Newborn Screening Section. These programs use the information for public health surveillance and to target interventions.

External organizations include school districts, NCHS, other states and territories, Minnesota Department of Human Services, Social Security Administration, local health departments, and others.

Figure 6. Overview of Minnesota's Current Birth Registration Process



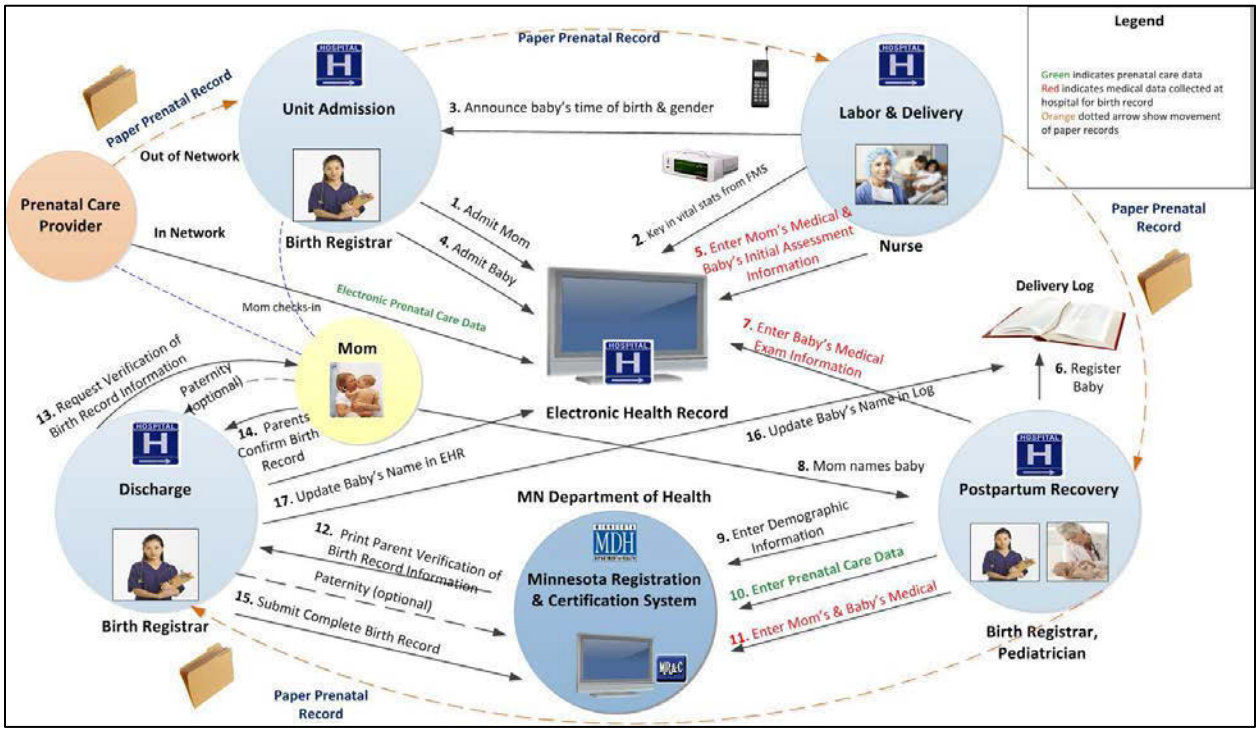
Hospital's Birth Registration Process

The project analyzed Unity Hospital's workflow and process to search, abstract and submit birth registration information from the hospital to MDH. Staff work through 17 high-level steps occur during admission, labor and delivery, postpartum recovery and discharge (Figure 7) (see Appendix E for detailed process).

During the birth registration process, civil and medical information (Figure 8) were collected using Minnesota's The *Birth Certificate Information – Medical Portion* and *Naming Your Baby and Birth Certificate Information* paper forms, which are Minnesota-specific adaptions of NCHS's *Facility Worksheet for the Live Birth Certificate* and *Mother's Worksheet for Child's Birth Certificate*. The abstracted information in these forms came from multiple sources. Many of the medical data elements present in the EHR were re-entered into the MR&C including mother's medical information, newborn's medical information and newborn's initial assessment information. The civil data elements were collected using the *Naming Your Baby and Birth Certificate Information* completed by the mother after the birth. Unity Hospital's process of collection, abstraction and entry of information needed for one

birth record could take less than an hour with no interruptions, or could take several hours depending on competing duties, accessibility of information and additional work activities and tasks.

Figure 7. Unity Hospital's Current Birth Registration Process



MR&C is programmed to perform validations to ensure completeness and compliance with national standards. The validations may require the user to correct or provide information that was missed during the registration process data entry. Once a record is started and saved, it moves to a work queue where it is available until it is filed. The MR&C Work queue displays all unfinished birth records for authorized hospital birth registrar users associated with the facility. This ensures all birth records are visible to authorized users and can be completed regardless of staff schedules. Records may be started by one birth registrar and completed by another. Unmarried parents have the opportunity to establish paternity during the birth registration process. Upon entry of marital status and parental intention to file paternity documents, the birth registrar can use MR&C to print appropriate forms ready for signatures. Birth registrars fax these paternity acknowledgement forms to OVR after they are signed and notarized.

Before submitting to MDH, birth registrars print a copy of the information that will be on the newborn's birth certificate and ask for parental verification. This includes the baby's name, parent's information, and also time and date of birth. Parents may ask the birth registrar to make changes or corrections which the birth registrar enters in MR&C. When the complete birth record is finalized, it is registered and MR&C issues a state file number. Unity Hospital's timeline for the initiation and completion of a birth record is usually two days from time of birth. Minnesota Statute 144.215 requires hospitals to register birth record information within five days of a birth.

Figure 8. Birth Registration Data	
Civil Information	*Medical Information*
Newborn's Name	Prenatal Care • Visit History • Previous Pregnancies & Outcomes • Risk Factors • Infections • Obstetric Procedures
Mother's Information • Name • Place & Date of Birth • Race / Ethnicity • Marital status • Educational Attainment	
Father's Information • Paternity Establishment (If applicable) • Name • Place & Date of Birth • Race /Ethnicity • Educational Attainment	Labor & Delivery Summary (Mother & Newborn) • Delivery Method & Characteristics • Maternal Morbidity • Newborn Weight • Gestation • Apgar Score • Abnormal Conditions • Congenital Anomalies • Breastfeeding

The project team observed several key potential inhibitors of the birth registration process through leveraging the local and national stakeholders' engagement. These are discussed below.

Prenatal Care Data

Prenatal care data may be accessible electronically or as a faxed paper document. Occasionally, it is not available from the clinic prior to the patient's hospital admission for delivery. Figure 9 shows the different sources for prenatal care data, their format, and whether it is accessible through the EHR. At Unity Hospital, if the prenatal care document is faxed, it will be part of the patient's paper chart which moves with the patient until discharge. The hospital does not enter prenatal care data from paper records into the EHR's discrete or text fields; instead, the documents are scanned as images into the EHR post-discharge. Stakeholders affirmed the multiple sources of prenatal care. Some indicated that hospital policies prevent prenatal care data from being scanned or entered into the EHR.

Figure 9. Sources of Prenatal Care for Unity Hospital			
Source of Prenatal Care	EHR System	Format	Availability
Allina or Affiliated Clinic	Same EHR	Electronic	Thru the EHR at time of admission at birth center
Associated Clinic	Different or no EHR	Paper, faxed	Received at 36-week-gestation, prior to admission
No Relationship to Hospital	Different or no EHR	Paper, faxed	Requested from provider after patient admission at birth center

Electronic Fetal Monitoring System

The electronic fetal monitoring system (EFM) is a medical device that monitors and records vital signs such as baby's heart rate and mother's contraction activity through electronic sensors placed on mother's abdomen. At Unity Hospital, there is little or no interface between the EHR and the EFM, so staff must manually enter relevant data into the EHR. At other hospitals, work has begun to better integrate the EFM and EHR, but most facilities manually enter the information.

Source and Announcement of Time or Birth

At birth, newborns must be admitted into the EHR system as new patients. At Unity Hospital, baby's record is "pended" to mother's record when she is admitted, but the actual admission requires knowledge of the newborn's time of birth and gender. The notification of birth and gender occurs within a few minutes of birth via a telephone call placed from the labor and delivery staff to the unit's admission desk. For most births, the hospital uses the time on the EFM as the source for time of birth. In instances where EFM is not used, such as in water births, time is determined using the clock on the wall.

Delivery Log

Unity Hospital maintains a delivery logbook or "Baby Name Book" to keep track of births occurring in their birth center. In this paper log, birth registrars register the newborn under the mother's last name, followed by a letter designating order of birth; for example: *Smith, Baby A*. This is a common practice at Minnesota hospitals, although the naming convention varies among facilities. The log is updated, by the birth register, when the newborn is named and serves as a reminder for birth registrars to update the information in the EHR to reflect the child's legal name.

Collection of Clinical Information

The clinical information in the EHR is updated throughout the mother and newborn stay at the birthing center. Clinical information from three sources, the labor, delivery and immediate postpartum records for mother and newborn, newborn assessment, as well as mother's prenatal care record are required for birth registration. Searching for and abstracting information from the EHR involves reviewing multiple EHR screens for information in both discrete and text or narrative fields. The location of information within an EHR varies, dependent on hospital, birth, vendor/product, and provider. Hospitals across the state are instructed to use the Minnesota Department of Health's Medical Worksheet (*Birth Certificate Information – Medical Portion*) to collect the clinical information which is a combination of data from prenatal care and labor and delivery summary records for mother and newborn.

Collection of Civil Information

In addition to this clinical information, administrative and demographic information on parent(s) is collected from the parents during the birth registration process and submitted to the MDH in the birth record. Upon admission into the birth center, the mother receives the MDH's Mother's Worksheet (*Naming Your Baby and Birth Certificate Information*) which is used to collect civil information including the newborn's name as well as the names, dates and places of birth, addresses, education, and race/ethnicity for both parents. The birth registrar collects the mother's worksheet before discharge and uses it to enter data included in the birth record for the newborn. Additionally, the voluntary

paternity acknowledgement documents may be filed, which will become part of the newborn's birth record.

Minnesota Department of Health's Birth Registration Process

The process of submission of birth records from hospitals to MDH is primarily through interactions of birth registrars with the MR&C system. MDH activated MR&C on March 21, 2011, replacing an outdated electronic system. MR&C is an integrated, web-based application for birth, death, and fetal death registration and certificate issuance. MR&C allows state and local issuance staff members, hospital birth registrars, funeral directors, physicians and medical examiners, to enter, maintain and use birth and death data. MN.IT staff support and maintain the custom-built application.

MDH has resources in the form of field service representatives, helplines and technical support available to assist birth registration staff at the 102 birth hospitals in Minnesota. In 2013, 67,781 hospital and birthing center births were registered through MR&C. In addition, approximately 640 home birth records were also filed, which were out of scope for this project.

The objectives of the MDH birth registration process are to 1) create a record of a live birth within five days following birth; 2) ensure the birth record information is complete and reported in compliance with national standards; and 3) securely maintain and store this vital record. This work is directed and supported by Minnesota Statutes and Rules, acting as the business rules. The current detailed birth record information process at MDH, including goals, objectives, business rules, its initiation (trigger), task sets, data collected (input), information dissemination (outputs), and outcomes is highlighted in Appendix F – a matrix of MDH birth registration process.

Test Proof of Concept

The proof of concept was tested among partners in five instances showing the flow of birth registration information from the hospital EHR to MDH. The 2013 Connectathon collaboration resulted in a successful completion for each participant, which allowed MDH and its partners to advance to the 2013 HIMSS Showcase. In addition to passing the profile, this collaboration achieved technical mapping of 31% (51/164) of data elements of the IHE BFDR Profile to the Stork, the obstetric/labor and delivery module of Epic.

During the 2013 HIMSS Showcase, the Use Case, "Vital Registration and Care Coordination for Newborn Hearing Screening" was demonstrated by the same collaborative team with the addition of NCHS as the end user of the information. During the HIMSS conference, an estimated 43 tours, each comprising 2-20 interested attendees participating in the demonstration. This activity was also an opportunity to talk to leaders in e-health and health care from across the country and around the world, as other nations' health care leaders attended, too. Many participants showed interested in the use case, discussing the value to public health and vital records and the role meaningful use would play in adoption and use of e-birth records standards.

The project partners once again collaborated for the 2014 Connectathon. 2014's team was joined by Taini-Cisco who, along with Epic, acted as a Form Filler. Once again, the team passed the Connectathon tests and advanced to the 2014 HIMSS Showcase.

The 2014 HIMSS Showcase demonstrated the Birth Records vignette to an estimated 55 tour groups. Unfortunately, NCHS was not able to participate, but MDH staff presented the public health and birth records need for e-birth records standards as well as showing the inefficiencies in the current system. Feedback was overwhelmingly positive, with attendees appreciating the improved workflow and efficiencies at hospitals and improvement in the quality and timeliness of birth records data for public health use.

However, questions were raised by attendees regarding the exclusion of demographic information (Mother's Worksheet) from the standards and prepopulated birth form. The impression was of a process that although improved, was still partly manual and required an additional step because the birth registrar has to log into the vital records information system to review the pre-populated form and key in some of the demographic information to complete the record. The father's demographic information (e.g. education, race) and paternity establishment are examples of information typically not found in the EHR system and data that will not be captured through the BFDR Profile. Current policies and recommendations advise on continued use of the Mother's Worksheet for gathering demographic information, but as noted, some consumers would like a one-stop shop for birth registration. This could potentially hamper efforts to implement the standard in hospitals, unless mandated.

In addition to the Connectathon profile work, MDH sponsored and collaborated with Essentia Health in the Projectathon. This new activity of the Connectathon was very successful for e-birth records standards as it was the first instance of hospital participation in successful testing. Essentia Health, in the role of Form Filler, successfully submitted the prepopulated test birth record data to MDH using Oz Systems as the Form Manager.

Essentia Health highlighted a few key observations from their role and experience in the Projectathon:

- **Value:** Staff from Essentia Health felt there would be value to use standards to capture and prepopulate the birth records. They noted that more work between the EHR system and HIT vendors to map the IHE BFDR Profile to the EHR and Form Manager is needed as the number of data elements that prepopulate is currently very limited. Another observation, echoed by other stakeholders, is that the necessity of logging into a separate system (MR&C) to provide demographic information does not create an ideal workflow for birth registrars.

- **EHR System**: The hospital/Form Filler will need to have implemented the latest version of Epic's Stork module to use the IHE BFDR Profile. In addition to the EHR software, there will be additional technical work to create a production interface. Currently, the wait time for a hospital to implement new EHR software is approximately 18 months.

- **Training**: Training on the workflow and organizational changes will be necessary at hospitals to implement the IHE BFDR Profile. This can be a burden on both small hospitals and large health systems. For example, Essentia Health has seven hospitals with several different workflows for birth record information collection and birth registration processes. This could require customized training for each hospital to accommodate the variations in process.

- **Data Location**: The capture of clinical information in the narrative notes will be a challenge, in both resources and accuracy. The birth registrar will still be required to read and analyze the data to manually key the data into the EHR system before requesting the pre-population of the IHE BFDR Profile. As identified in the hospital business process analysis, Essentia Health also stated that having the prenatal care history in the EHR can also be challenging.

- **Leadership Support:** For hospitals, birth registration might not be a priority because it impacts few employees. Given the need to utilize resources on other HIT implementations, it might not become an implementation priority unless mandated. The adoption and implementation of the e-birth records standards may fall to industry leaders, such as Essentia Health, focused on adopting innovative solutions to improve their processes and quality of services.

- **HL7:** Although not tested at the Projectathon, Essentia Health provided feedback on using HL7 for submitting birth records from the hospital to MDH. Most health systems have developed an infrastructure for submitting HL7 transactions to public health. The focus, to date, has been on adopting and implementing HL7 for meaningful use transactions, such as immunizations. Essentia Health has developed the infrastructure for three state health agencies. Potential future use of HL7 for transactions of birth records would need endorsement from hospitals/health systems leadership such as an operations group. This would only occur after the messaging is proven to improve reporting workflow. In addition, this would require MDH to be ready to receive HL7 messages for this purpose.

Status of Minnesota Department of Health and e-Birth Records Standards

Through discussions during the MDH business process analysis and interviews with OVR staff, the project team assessed the readiness for using the IHE BFDR Profile and HL7 messaging. MDH has been developing a centralized internal infrastructure to provide electronic messaging, transformation, and translation services for MDH program applications such as MR&C. Referred to as the Internal Exchange Hub, it is built to support multiple programs for exchange of health and other data with external partners including healthcare providers and other state and federal agencies. It aims to eliminate non-standard approaches for health information exchange among MDH program areas which can be costly to maintain. The hub will help provide support for future implementation of Direct and CONNECT protocols for secure health information exchange.

Once the hub is operational, MDH program applications will be connected. HL7 messages will come into the hub then be routed and translated for specific applications. Program applications must first be able to receive and consume HL7 messages. MR&C has the potential be one of the program applications that receive HL7 messages through the hub. However, connectivity must be created between the exchange hub and MR&C so HL7 messages may be properly ingested. Depending on the technology in place at the time and the maturity of the hub, this is likely to be of moderate technical effort.

To better utilize the limited resources and staff expertise available for HL7 MDH is developing a strategy to address its informatics needs around governance, investment, leadership and health information exchange. This process is in the beginning stages but interest and need grows daily as questions arise around how to balance and prioritize resources for meaningful use and non-meaningful use public health transactions.

Comparison of Data Standards and Collection Tools

NCHS and Minnesota have each created data standards and collection tools, electronic and paper, for use in collecting data for the birth registration process. The project team compared these data standards and collection tools and the e-birth standards to the 58 questions in the U.S. Standard Certificate for Live Birth (Standard Certificate). This comparison identified three primary types of differences . The complete analysis can be found in Appendix G and H with the summarized results below.

The first difference occurred between the Standard Certificate and the e-birth standards. The comparison discovered that 22 of the 58 questions did not align, primarily due to the exclusion of the civil information from the e-birth records standards. As noted earlier, this data is excluded from the e-birth standards by the policy requiring self-reporting by the parents. In Minnesota, the civil information is collected using the Naming Your Baby and Birth Certificate Information worksheet and entered directly into the MR&C. The information is not entered into the EHR. Additionally, the e-birth standards incorporate NCHS' and NAPHISIS' 2011 policy decisions to eliminate some questions. The Standard Certificate did not reflect those changes.

The second and third difference are between the Standard Certificate and Minnesota data standards and collection tool. Minnesota responses did not align to the Standard Certificate responses in 27 questions. Minnesota-specific responses were observed in additional options in value sets or differently structured date and time data fields. Discussions with stakeholders indicated that having jurisdiction-specific responses is a common practice. This additional information can be used to support identified data needs.

The comparison also identified 14 Minnesota-specific questions with no similar question on the Standard Certificate. Some were added in response to state public health programming, such as questions related to the perinatal Hepatitis B prevention program, and some questions were inadvertently carried forward from the previous data set. Similar to the above difference, jurisdictions commonly add questions to support other public health programs or respond to data needs.

Stakeholder Engagement and Feedback

Most feedback received through stakeholder engagement was incorporated into the corresponding results and observation sections addressed previously in the report. Feedback not specifically relating to a section is discussed below.

Hospital Staff Training Needs

Through engaging with Minnesota hospitals via the advisory group, community of interest and the 2013 Excellence in Birth Registration Conference, the project team observed a need to build awareness of and training in e-health topics. These topics included electronic health information exchange, meaningful use, HL7, standards, informatics and EHRs. It is necessary to not only communicate on these definitions but also clarify how they connect to the project, birth records and improving population health.

At the 2013 Excellence in Birth Registration Conference and Training, over 130 attendees, representing 75% of Minnesota birthing hospitals and birth centers, learned about the e-Birth Records Project. The project was discussed during the plenary presentation and project team members were on hand with a poster to answer questions and discuss the work. The overall feedback from the conference attendees was positive as attendees recognized it as a method to improve workflow and quality of data. Some attendees expressed concern regarding "losing job to the EHR" and automation of the process. The conference evaluation indicated a desire to learn more about the e-Birth Records Project and required skills to implement.

Building Support with Hospital Leadership

From discussions with leadership at hospitals, the project team discovered that although the standards-based exchange of birth information is viewed as important, hospital resources are focused on achieving meaningful use stage 1 and 2, value-based purchasing, hospital readmission penalties, preparing for the transition to ICD-10, and various other health reform related activities. Consensus was that if vital records became a specialized registry for hospitals as public health reporting for meaningful use, hospitals and their vendors will devote resources to achieving electronic exchange of birth records.

Importance of Meaningful Use

Feedback throughout the project indicated the importance of meaningful use in the adoption and use of e-birth records standards. The focus of hospitals, EHR vendors and states is currently on meeting the meaningful use requirements. Without the inclusion of vital records as a public health reporting option or requirement, the adoption of e-birth records standards will be very slow.

The Minnesota e-Health Initiative, at the urging of the project team, supported the addition of vital records as a specialized registry option for hospitals to comply with public health reporting for meaningful use stage 3. This feedback was incorporated in to the Minnesota e-Health Initiative's coordinated response to the Health Information Technology Policy Committee's request for comments for meaningful use stage 3 that was submitted on January 11, 2013. The complete response can be found at http://www.health.state.mn.us/e-health/stage3muresponse.pdf.

Mapping the IHE BFDR Profile to Additional EHR Vendors

Most Minnesota hospitals (96%) and clinics (85%) had EHRs in 2012[3] which is a necessary component of e-birth records standards adoption and use. The importance of the hospital's EHR vendor is significant as the IHE BFDR Profile is only mapped to the Epic Systems, Stork module. Although hospitals with Epic account for 67% of births in 2012 (Figure 10), stakeholder discussions discovered that not all hospitals with Epic EHRs have purchased the additional Stork module.

Figure 10. EHR Vendors by Birth Hospitals and Births (2012)

EHR Vendor	*# of Birth Hospitals*	*% of Birth Hospitals*	*# of Births*	*% of Births*
Epic	42	41%	45,298	67%
Meditech	22	22%	5,105	8%
McKesson	10	10%	8,724	13%
Other	28	27%	8,092	13%
Total	102	100%	67,219	100%

Engagement of Electronic Birth Registration System Vendors

The project discovered a lack of engagement of the Electronic Birth Registration System (EBRS) vendors in the development and testing of the e-birth records standards. This discussion with stakeholders led to a need to engage the EBRS vendors in the Connectathon and HIMSS showcase. In addition, stakeholders discussed the lack of standards or requirements for EBRS which has resulted in highly customized EBRS for individual states.

Quality

Throughout the project, stakeholders discussed quality as an important part of the current and future birth registration process. Quality was discussed two ways 1) quality of the data and 2) using the data for quality improvement. It was assumed that the quality of data would improve with implementation of the IHE BFDR Profile. Although the project did not study this factor, the top ten corrected data elements from the birth registration process are listed in Figure 11. It should be noted that the top eight are civil information, data elements not collected in the IHE BFDR Profile.

Figure 11. Top Ten Most Correct Items

1. Child middle name
2. Child first name
3. Mother maiden last name
4. Father date of birth
5. Father place of birth – city
6. Child last name
7. Mother place of birth – city
8. Mother maiden middle name
9. Last menstrual period – month
10. Last menstrual period - day

[3] Minnesota e-Health Profile: http://www.health.state.mn.us/e-health/assessment.html

The other part of the quality discussion was around using the data for quality measurements. This led to the recognition that states and hospitals could increase the use of the birth records data. Discussions around this topic are planned between MDH and with partners such as the Minnesota Department of Human Services. In addition, the discussions acknowledged that increased use and visibility of birth registration data could improve the quality of data.

Opportunities for Improvement

Hospital

The project identified numerous opportunities for improvement of the current birth registration process. Those specific to the hospital's process were summarized in Figure 12 and discussed in the following paragraphs. In addition, the project team developed and validated a proposed model that uses e-birth records standards and incorporates the opportunities for improvement (Figure 14).

Bi-Directional Electronic Exchange

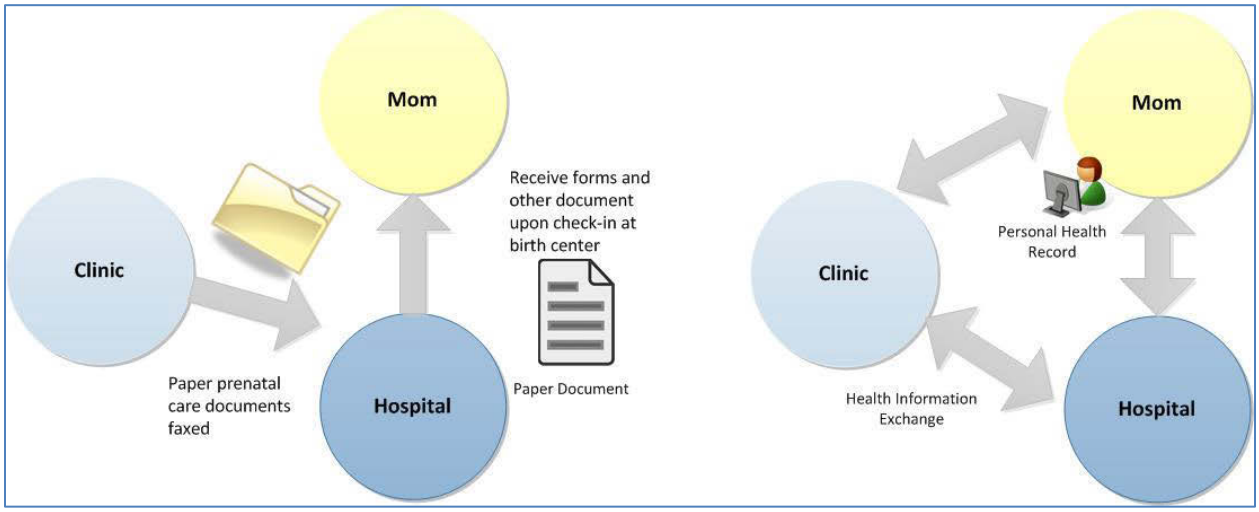
The review of the birth-related data exchange practices between Minnesota clinics and hospitals, particularly between Unity Hospital and its partner clinics, identified different methods for sharing prenatal care data based on the nature of relationship between the organizations. The implementation of bi-directional electronic exchange of prenatal information between clinic and hospital could improve this process and has several benefits including increasing the availability of clinical data at the hospital which may increase quality of care; improve workflow and efficiency; and aid in the transition to going "paperless." Additionally, exchange of clinical data from hospital to clinic could improve availability of information post-birth, enhance coordination of care and improve quality of care from obstetricians, pediatricians and other health care providers for both mom and newborn.

The second opportunity for utilizing bi-directional exchange is to give mothers access to information, forms/documents, and educational materials through her Personal Health Record (PHR). This exchange, between mom and clinic as well as mom and hospital can happen at any time, but ideally before the hospital visit. For instance, the exchange could include review of educational material on breastfeeding or access to hospital forms such as the consent for release of information, patient bill of rights, or even the Mother's Worksheet (MDH's Naming Your Baby and Birth Certificate Information) a tool to collect civil information needed for birth registration at hospital. The benefit added by implementing this exchange is primarily patient convenience, but it may enhance hospital workflow and availability of information, in addition to going "paperless." Figure 13 depicts the current process of exchange between hospital, clinic, and mother (left), in comparison to the potential bi-directional electronic exchange (right).

Figure 12. Summary of Opportunities of Improvement with Benefits and Barriers		
Opportunities	**Benefits**	**Enablers**
Bi-Directional Electronic Exchange ➢ Between Hospitals & Clinics ➢ Between Mom & Hospital/Clinic through Personal Health Record	• Improve quality of care • Improve workflow • Improve care coordination • Paperless • Convenient	• Discrete fields supported by EHR vendors • Agreed upon standards • Incentives or resources to implement • Government support, including laws and mandates
Interfacing Fetal Monitoring System & EHR ➢ Eliminate manual data entry by linking the two systems	• Improve data accuracy • Improve workflow • MN hospitals already moving toward interfacing the two systems	• Access to middleware technology or additional (integrated) EHR software modules • Access to middleware vendor to keep up with evolution of EHRs • Agreed upon standards
Standardization of Source & Electronic Notification of Time of Birth ➢ Use Fetal Monitoring System as source ➢ Implement electronic notification vs. call	• Single source used for time of birth • More accurate which may be important for family • Faster admission of baby into EHR (if advanced care is required) • Improve workflow	• Link time on Fetal Monitoring System to EHR • Electronic notification of TOB incorporated into workflow for facility • Configured technology for electronic notification
Electronic Capture of Civil Information (Mother's Worksheet). Possibilities: ➢ Access from Personal Health Record ➢ Access from kiosks or bedside tablets ➢ Potential capture of civil information from EHR	• Convenient, anytime access to document • Mom as the "original source" without intermediary • Eliminate problems with illegible handwriting and need to correct birth record at hospital • Improve hospital workflow • Structured capture of existing civil data from EHR is more efficient	• User interface addresses computer literacy issues and cultural and language barriers • Updated policies on use of EHR as a source of birth registration information

Figure 12. Summary of Opportunities of Improvement with Benefits and Barriers		
Opportunities	**Benefits**	**Enablers**
Eliminating Reliance on Delivery Logs	• Improve privacy & security of patient data • Eliminate gaps in updating baby's name when transferred	• Workflow that assures the highest level of privacy and security
Structured Capture of Clinical Information from EHRs ➢ Birth registrar will access IHE BFDR Profile ➢ Template will prepopulate with birth record related data for mom & newborn from EHR ➢ Birth registrar will validate for completeness and submit template to MDH	• Improve data accuracy by eliminating manual data entry • Eliminate interpretation of clinical data by non-clinicians • Increase birth record timeliness by capturing existing EHR data • Improve hospital workflow & process efficiency	• Hospital and clinic exchange health information • Data available in hospital EHR as discrete fields • Full mapping of IHE BFDR Profile to EHR products • HIT vendors incorporate & support requirements
Electronic Source for Civil Information (Paternity Document) ➢ Access through Personal Health Record from Hospital/Clinic ➢ Electronic signature and notarization	• More efficient • More convenient for family • Improves timeliness of birth records	• Workflow incorporates opportunities and advantages of personal health record or patient portal

Figure 13. Current Exchange vs. Bi-Directional Exchange between clinics, hospitals, and Patients



Interfacing Hospital EHR and Fetal Monitoring System

The lack of interoperability or interfacing between the fetal monitoring systems (EFM) and EHR systems can potentially introduce errors that may compromise data accuracy. The potential problems can be alleviated by creating an interface between the EHR and EFM. This opportunity may also improve workflow for labor and delivery nursing staff. However, it is important to note that before data is incorporated into the EHR, it must be validated staff to prevent erroneous data from becoming part of the record.

It is encouraging that some Minnesota hospitals are already planning on interfacing the two systems. Interfacing the EHR and EFM requires the implementation of middleware technology requiring middleware vendors to keep up with changes and advancements in EHRs. Increasing interoperability between medical devices and other health information technology solutions also requires the use of agreed upon standards. IHE has a standard for medical devices, the IHE-PCD or Patient Care Device Domain that is established for increasing interoperability between systems, which can potentially be applicable if tested for this purpose.

Standardization of Source & Electronic Notification of Time of Birth

Although the exact time of birth may not seem very important, it may matter to the family. This may especially be true around the midnight hour for a variety of reasons including as a factor in when the child can attend school, in multiple births (measuring outcomes), and on auspicious dates based on cultural or personal beliefs. Therefore using a standard source for time of birth, ultimately the fetal monitoring system when possible, will facilitate a more accurate assessment of time. Some advisory group members explored the use of an electronic notification mechanism from the EFM to the admission area, similar to hospitals' code blue. One important consideration is the accuracy of the time on the EFM which must coordinate with the hospital's computer system. Another area worth exploring is the use of IHE NANI Profile (Newborn Admission Notification Information) to see if might work for the hospital internal communication scenario.

Electronic Source for Civil Information (Mother's Worksheet)

One way to make the process of collecting civil information more efficient and convenient for patients and to improve hospital workflow is to allow the mother access to the Mother's Worksheet through her Personal Health Record or patient portal (as recommended above through the establishment of bi-directional electronic exchange). Alternatively, collecting the information electronically using a kiosk or bedside tablet could alleviate problems associated with illegible handwriting and save staff time. The worksheet can then be submitted to MDH under supervision from the birth registrar. This will also remove the human intermediary and allow mom to be the "original source" for the civil information. Computer literacy and language barriers might be hurdles in the electronic capture method suggested above.

Ideally, portions of the information on the Mother's Worksheet could come from available sources in the hospital or clinic, such as mom's EHR. The question is: Can the structured capture of the EHR data facilitate the pre-population of all or portions of the data needed for the Mother's Worksheet? NCHS is aware of a standard or functional profile that may be used for capturing civil information from the mother's EHR. One barrier mentioned from the advisory group was the possibility that mother's name in the EHR might be different (e.g. she was recently married and now uses her husband's last name instead of her maiden name which was used in her EHR). Additionally, some information such as the father's race/ethnicity and education may not always be available in the EHR as reported from or his wife or partner. Lastly, there are recommendations from groups such as the National Association for Public Health Statistics and Information Systems (NAPHSIS) against the use of EHR as the source for the birth record civil information that should be further evaluated.

Eliminating Reliance on Delivery Logs

To keep track of births at the facility, many hospitals maintain a delivery logbook or "Baby Name Book." In it, baby is registered under the mother's last name followed by a letter designating order of birth; for example: Smith, Baby A or some similar naming convention. The project team heard several opinions on why the log persists in the era of EHRs and other health information systems, ranging from lack of trust in electronic information systems, the longevity of the logbook which predates EHRs, and the fact that systems change and get replaced over the years, but the log remains a consistent source. This process, although long-standing at many hospitals, makes the birth registration process vulnerable and presents both a privacy and security risk. The EHR and other process improvements can eliminate the need for the delivery logs.

Structured Capture of Clinical Information from EHR

Implementing the IHE BFDR as the way to capture structured data from the EHR provides the benefit of reducing dual entry of data and interpretation of data by non-clinicians. In addition, it can improve the workflow and process. There are several barriers to the structured capture of data from the EHR. First is data availability – data must be available in the EHR at the time of exchange for this process to work successfully. In addition to availability, the data must exist in the right format, as discrete fields or

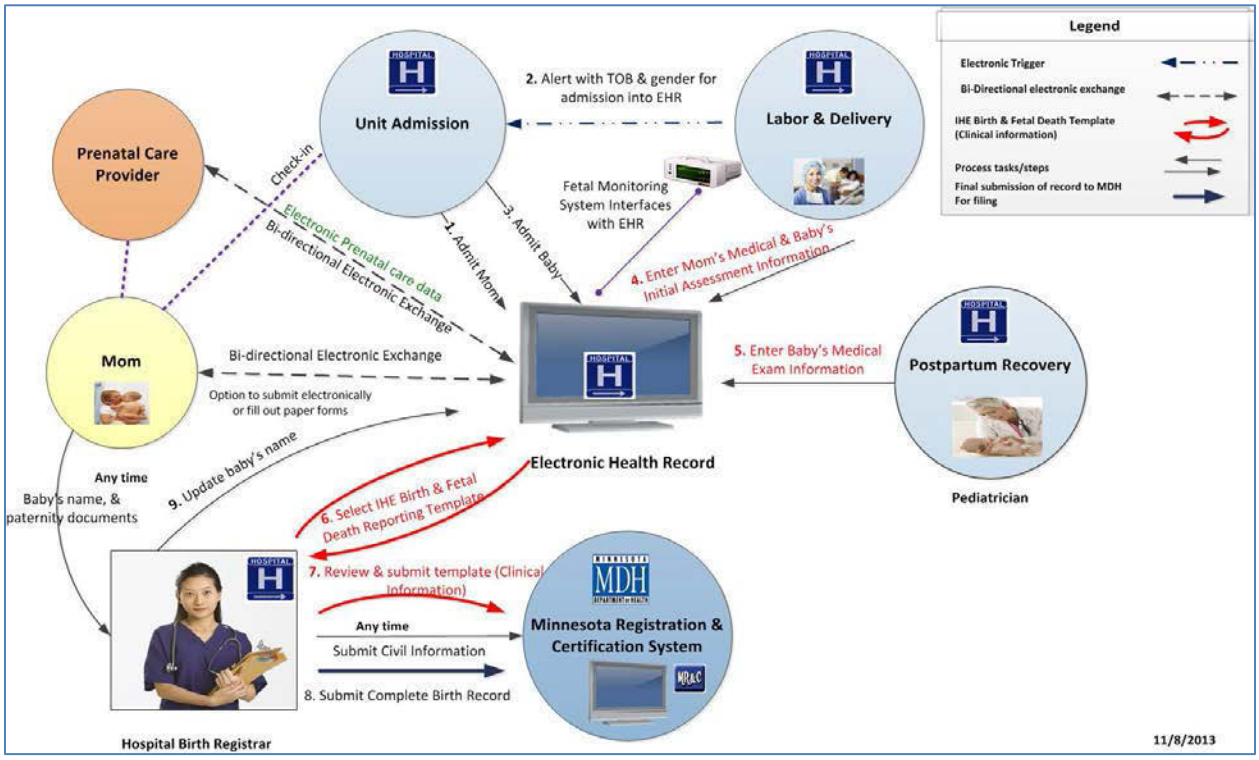
structured data, not as free text or images. Another issue raised by the advisory group was the ability to identify the source of the data. An audit trail to the source of the data is an important consideration.

Electronic Source for Civil Information (Paternity Document)

The Recognition of Parentage Form (ROP) to establish paternity is required for hospitals, but it is not a required step in the birth registration process and its inclusion is voluntary by the parents. Most hospitals place the responsibility for administering the ROP with birth registration. It can be time consuming, requiring parents to watch a video and sign the ROP form in front of a notary public. This takes place at the hospital after the baby is born. The executed paternity document is faxed to MDH during birth registration. At Unity Hospital, this step takes up to two hours, which could also delay the birth registration process if either parent is unavailable to sign the document or cannot present identification.

Information about paternity establishment including the ROP could be discussed prenatally, which would improve the process of signing after the child is born. The electronic capture of the ROP is one strategy to improve the process. For instance, the mother can access the ROP Form and educational video through her personal health record at any time, ideally prenatally. There are also options for electronic signature and notarization that need to be further explored.

Figure 14. Proposed Hospital Birth Registration Model



The proposed Hospital Birth Registration Model (Figure 14) incorporates the opportunities for improvement detailed in Figure 11. The proposed model has nine high level steps, compared to

seventeen high level steps in the current model. The proposed model utilizes the EHR as the source of information for the IHE BFDR Profile; all information about the mother and newborn will be available in the EHR and accessible to potentially improve future care events. In addition, the proposed model engages the patient sooner and allows for multiple modes of communication between the patient and health care providers, increasing the convenience for both users.

Minnesota Department of Health

Leverage Comparison Data Standards and Tools

The identified variations between national and state data standards and tools offer opportunities for improvement in both data alignment and the change management process. First, OVR should fully explore, document, and address, if necessary, the differences between the *Standard Certificate* and Minnesota's information. This will prepare Minnesota for implementation of the IHE BFDR Profile. In addition, some Minnesota-specific data elements could be eliminated if found not necessary. Elements recently eliminated from the 2003 Revision of the U.S. Standards Certificate of Birth should be assessed for necessity. When complete, the changes should be added to the data standards and tool comparison results. Second, this tool, if kept up-to-date, can be used for change management, assisting in the identification, evaluation and handling of changes to the birth records Minnesota process and data standards and tools.

Document Use of Birth Records Information

The project identified numerous programs that use the birth records information. All data uses should be documented as an opportunity for improvement and a strategy for building support for birth records. This should include program, activity, frequency, data elements used, and other components necessary to document the data requests. This can be used to identify future relationships for achieving interoperability with other programs – meaning electronic, real-time, and legally authorized sharing of data among programs.

Incorporate MR&C User Experience into Birth Registration Process

Birth registration is currently a labor-intensive process, requiring birth registrars or other hospital staff members to abstract and collect the necessary information from various paper and electronic sources and input in the information into the electronic vital records information system. When birth registrars log into the system, they navigate several screens, each requiring data entry of demographic and clinical information for mother and newborn. The user interface experience is important so the user can easily review and complete all information on the screen before moving on to the next section. It is also important that the user be alerted if there are any missing or invalid information immediately before proceeding. User experience and system ease of use are important in getting complete, timely, and correct birth record information.

Discussion

Through the multi-prong approach including extensive stakeholder engagement and feedback, the results suggest that MDH and hospitals support the adoption of e-birth records standards but lack the

readiness to fully test and implement the e-birth records standards. The vital records community across Minnesota is receptive to moving towards standards-based exchange of birth records information. Throughout the project, positive feedback and great interest in implementing e-birth records standards was noted. Birth registrars and others on the advisory group could easily see the benefits and were eager to discuss opportunities for change and improvement. While seeing the benefits, many identified the lack of readiness at both MDH and hospitals. The stakeholders identified four key contributing factors to the lack of readiness.

1. Policies are not in place to support using e-birth records standards for collection of civil and medical information. The IHE BFDR Profile does not include all of the civil information for birth registration due to policies requiring civil information be self-reported by the parent(s) on the birth record. These hospital, jurisdictional and NAPHSIS policies inhibit the adoption and use of e-birth records standards and contribute to the lack of readiness.

2. Current incentives through meaningful use and health reform do not directly support the implementation of e-birth records standards. Hospitals, HIT vendors, and MDH are focused on numerous health reform activities such as meaningful use stages 1 and 2, value-based purchasing, accountable care, hospital readmission penalties, and the transition to ICD-10. These activities do not directly support the implementation of e-birth records standards and often compete for the resources needed for e-birth records. This makes it difficult for an organization to identify and prioritize resources, including workforce, for e-birth records standards that have no financial or legal incentives.

3. All birth registration data is not in the EHR nor always available as structured data. The project identified numerous causes for the birth registration data not to be in the EHR or available as structured data in the EHR. Successful implementation and use of the IHE BFDR is dependent on structured data in the EHR. This factor primarily involves the workflow of staff at the hospitals and prenatal care clinics, health information exchange between the hospital and prenatal clinic, and the HIT vendors.

4. The IHE BFDR Profile has been tested with only one EHR product. The EHR vendor Epic, using its Stork module, is the only EHR product to be tested with the IHE BFDR Profile. The lack of engagement of EHR vendors in testing the IHE BFDR Profile was viewed as contributing to the lack of readiness as not all hospitals have Epic and not all hospitals with Epic have purchased Stork. This factor is compounded by the 18-month wait for hospitals to implement newly released EHR software and competing priorities of EHR vendors.

Recommendations

The project and stakeholders identified seven recommendations to address the key factors and advance the readiness of all birthing hospitals and Offices of Vital Records to adopt and implement the studied e-birth records standards. Possible strategies and examples to achieve the recommendations are listed.

1. **Align policies to support using e-birth records standards.**
   Hospital, jurisdictional and NAPHSIS policies need to be aligned to support e-birth records standards. This work should be led by NAPHSIS with technical assistance from NCHS. Strategies are identified below:

   - NAPHSIS and partners should evaluate current birth registration policies to identify the needs and implications of using e-birth records standards for collection of civil and medical information. Current policies should be aligned and consensus reached on timeline for aligned policies implementation.
   - NAPHSIS and partners should develop guidance to implement aligned policies. Guidance may include best practices for jurisdictions and hospitals.
   - NAPHSIS should engage the American Hospital Association and other partners to develop and disseminate guidance to hospitals.

2. **Leverage activities of the Office of National Coordinator (ONC) and other federal activities.**
   Although current federal activities do not support e-birth records standards, activities and strategies of the ONC and other others should be leveraged to advance e-birth records standards. Strategies are identified below:

   - NCHS and NAPHSIS should work with the ONC for vital records certification of EHRs based on the work of the e-Vital Standards Initiative.
   - NAPHSIS and partners should certify EBRS based on shared requirements from jurisdictions. Lessons learned from public health laboratories and immunizations registries work in this area should be reviewed.
   - NCHS and partners should communicate about and develop guidelines to use the EBRS as specialized registry for meaningful use stages 2 and 3.

3. **Continue expansion and testing of e-birth records standards.**
   The continued expansion and testing of the e-birth records standards is recommended and should be led by NCHS with stakeholder engagement including hospitals, jurisdictions' Office of Vital Records, EHR, EBRS and HIT vendors, the ONC and other providers, such as prenatal care clinics. Strategies are identified below:

   - NCHS should expand e-birth records standards to include the remaining medical data elements of birth record.
   - NCHS, NAPHSIS, hospitals, prenatal care providers and Offices of Vital Records should build support and demonstrate the need for antepartum profiles. This profile can facilitate standards-based exchange of prenatal care information from the prenatal care provider to the hospital EHR as structured data.
   - NCHS should continue to support the testing of e-birth records standards. All partners, including EHR, EBRS and HIT vendors, NCHS, Offices of Vital Records and hospitals, should participate in future events such as the Connectathon, Projectathon and HIMSS Showcase. New partner vendors should be engaged to expand the testing to additional EHR, EBRS and HIT vendors.
   - NCHS and NAPHSIS, when standards are more fully developed, should fund pilot testing that engages hospitals, EHR, EBRS and HIT vendors, NAPHSIS and Offices of Vital Records.

4. **Provide resources and technical assistance for readiness and implementation.**
   The findings emphasized the need for resources and technical assistance for Office of Vital Records and hospitals to prepare for the implementation of e-birth records standards. This can take the form of tools, templates and training along with NCHS or NAPHSIS staff assistance. Strategies are identified below:

   - NAPHSIS and NCHS should survey all jurisdictions on views of e-birth records standards and assess barriers, training and workforce needs, and organizational factors such as access to information technology staff. Action on the findings should be identified, prioritized and implemented.
   - NAPHSIS, NCHS and Offices of Vital Records should validate and update the comparison tool developed for the project. This tool and a developed process for use should be a recommended practice to prepare Offices of Vital Records for e-birth records standards and to achieve better change and data management. In addition, this tool can be used to identify and assess jurisdiction-specific questions by all jurisdictions, NAPHSIS and NCHS.
   - NCHS should fund additional applied research projects to assess readiness to adopt and implement e-birth records standards. The projects should include processes deemed out of scope but identified in Figure 6 such as exchange of information with prenatal care provider and hospitals and the office of vital records and internal and external partners.
   - NAPHSIS should evaluate opportunities to share the burden of implementing e-birth records standards. This could include looking at sharing resources for training, using a Form Manager and updating jurisdiction's birth registrations systems and processes.
   - NAPHSIS and partners should develop the informatics trainings necessary for jurisdictions to prepare for e-birth records standards. This can be done by engaging with educational opportunities through the Public Health Informatics Institute, Applied Public Health Informatics Fellowship and academia.

5. **Demonstrate the value of and build stakeholder support for e-birth records standards.**
   The project identified the need to engage hospital and health care system staff representing multiple roles including birth registrar, hospital and birthing center leadership, and information technology staff. In addition, Offices of Vital Records need to engage program staff, agency leadership and information technology staff. Strategies are identified below:

   - NCHS and NAPHIS should develop and implement a communications plan that will show the value of and build community support for e-birth records. The plan should engage health and public health providers along with their associations and professional organizations. In addition, the plan needs to show the role e-birth records plays in health reform, accountable care organizations, achieving health equity, improved patient service, and improving population health.
   - NAPHSIS and NCHS should incorporate steps to advance e-birth records standards and e-vital records standards into the Vital Statistics Cooperative Program (VSCP) next five-year agreement.
   - NCHS, NAPHSIS, Offices of Vital Records and hospitals should support the inclusion of vital records as a public health reporting option or specialized registry for meaningful use.
   - NAPHSIS and NCHS should disseminate findings of e-birth records standards work to a broad range of partners from public health, vendors, e-health, health care and academia.

- NAPHSIS should build upon its previous work in e-birth records and its More Better Faster report to establish a national strategy for implementing e-birth records standards and connect e-birth records standards use to quality improvement and quality measurement reporting.

6. **Build Offices of Vital Records' e-birth records capacity.**
   In addition to participating in the above recommendations, all Offices of Vital Records should prepare for e-birth records through building e-birth records capacity. Strategies are identified below:

   - Conduct a readiness assessment of agency systems and select hospitals in the community. This should include documentation of current processes, workflow, data and organizational practices.
   - Engage in agency discussions around health information exchange, electronic public health reporting and meaningful use reporting.
   - Identify and prepare for e-health and information technology needs such as health information exchange and interoperability.
   - Start a jurisdiction e-vital records initiative that includes efforts to engage stakeholders; establish a shared vision; create an e-birth records roadmap; assembles steering committee and establish a governance process.
   - Develop an informatics-savvy workforce by 1) developing leadership support for informatics; 2) defining informatics role within Office; and 3) incorporating informatics skill sets and responsibilities into position descriptions.
   - Incorporate e-health and e-vital records into the planning and daily activities of vital records. This may include adding an e-health component to the strategic plan, goals, or vision.

7. **Implement opportunities of improvement.**
   In addition to assessing the readiness of the e-birth records standards, the project also identified opportunities for improvement for hospitals and MDH. These opportunities can be extrapolated to all hospitals and Offices of Vital Records. Strategies are identified below:

   - Leverage the jurisdiction's e-Vital Records Initiative or similar stakeholder group to prioritize opportunities for improvement and develop best practices for implementing.
   - Incorporate opportunities for improvement into the Office of Vital Records strategic or work plan.

Additional Considerations

The project identified numerous areas that were out of scope of the project but should be considered in future e-birth records standards work.

- It is generally believed that implementation of e-birth records standards will improve the quality of the data. Additional research should occur to understand the relationship between e-birth records standards and the present quality of the data.
- Interoperability between EBRS and other public health systems is another significant area of study to improve the use and value of birth records data.

- There is a need for standardization and general requirements for jurisdictions' EBRS. This could be a strategy to share the costs of application development and maintenance. This is also a possible opportunity to leverage ONC certification of EBRS vendors and products.
- This project focused on parts of the interoperability stack identified by the Standards and Interoperability Framework but more work is needed fully realize the need and benefits of interoperability for the birth registration process including the prenatal care providers and NCHS
- This project focused on birth records but the implementation of e-birth records standards would have implications on the fetal death reports and death reports. These implications should be studied.

Conclusion

In summary, this project revealed support for adoption and use of e-birth records standards. Addressing the factors contributing to the lack of readiness and implementing the recommendations will require the effort of the entire vital records community and its partners. The support of e-birth records standards will strengthen the vital records system to document the lives and improve the health of all people.

Appendices

Appendix A: Commonly Used Terms

American Medical Informatics Association (AMIA): AMIA is a professional group dedicated to the development and application of medical informatics in support of patient care, teaching, research, and health care administration. **Reference:** http://www.amia.org/mbrcenter/

Birth and Fetal Death Reporting Profile (BFDR Profile): This document describes the content used to pre-populate the form with clinical information from the EHR used to generate a birth record or fetal death report. The profile describes the content used in automating the data captured for vital records purposes for the 2003 Revisions of the U.S. Standards Certificate of Live Birth and the U.S. Standards Report of Fetal Death. **Reference:** http://www.ihe.net/profiles/

Birth Record: the electronic report of a birth which registered with the Office of Vital Records. The birth record contains demographic and health data collected at the time of birth, but it is not a medical record of the mother or child.

Birth Certificate: the legal document, printed from the birth record, which contains the names, dates and places of birth for the parent(s) and child.

Business Process Analysis: Developing an understanding of how an organization meets its business objectives by identifying and documenting activities, participants, and information flow through the use of detailed description and creation of diagrams.

Centers for Disease Control and Prevention (CDC): CDC is the national public health agency charged with protecting the health and safety of Americans. **Reference:** http://www.cdc.gov/

Civil Information: The names, dates, and places of birth of the parent(s) and child that print from the birth record on a birth certificate.

Community of Interest (COI): A 40-member group who responded to an open invitation to all Minnesota hospitals. The COI received periodic email updates to educate and engage members about the project.

Consolidated or Clinical Document Architecture (CDA): CDA is a standard used to define the structure of clinical documents like discharge summaries and progress notes. These documents can include text, images, and other types of media.

Connectathon: The Connectathon is an annual event held in Chicago that is organized by IHE and brings together stakeholders from across healthcare industry including vendors, users, and public health for supervised structured testing of standards-based interoperability solutions.

e-health: e-health is the adoption and effective use of Electronic Health Record (EHR) systems and other health information technology (HIT), including health information exchange to improve health care quality, increase patient safety, reduce health care costs, and enable individuals and communities to make the best possible health decisions. **Reference:** http://www.health.state.mn.us/e-health/e.html

Electronic Health Record (EHR) Systems: EHR is a real-time patient health record with access to evidence-based decision support tools that can be used to aid clinicians in decision-making. The EHR can

automate and streamline a clinician's workflow, ensuring that all clinical information is communicated. It can also prevent delays in response that result in gaps in care. The EHR can also support the collection of data for uses other than clinical care, such as billing, quality management, outcome reporting, and public health disease surveillance and reporting. EHR is considered more comprehensive than the concept of an Electronic Medical Record (EMR). **Reference:** http://www.hhs.gov/healthit/glossary.html

Health Information Exchange (HIE): Health information exchange or HIE means the electronic transmission of health related information between organizations according to nationally recognized standards [Minn. Stat. §62J.498 sub. 1(f)]. **Reference:** https://www.revisor.mn.gov/statutes/?id=62J.498

Health Information Technology (HIT): IT is the application of information processing involving both computer hardware and software that deals with the storage, retrieval, sharing, and use of health care information, data, and knowledge for communication and decision-making. **Reference:** http://healthit.hhs.gov/

Health Level Seven International (HL7): HL7 is a standard interface for exchanging and translating data between computer systems. HL7 is also a not-for-profit organization accredited by the American National Standards Institutes (ANSI) that develops standards for data transfer. **Reference:** http://www.hl7.org/

Healthcare Information and Management Systems Society (HIMSS): HIMSS is the healthcare industry's membership organization exclusively focused on providing leadership for the optimal use of healthcare information technology and management systems for the betterment of human health. **Reference:** http://www.himss.org/ASP/aboutHimssHome.asp

Informatics: The application of computer science and information science to the management and processing of data, information, and knowledge. **Reference:** http://www.ehealthinitiative.org/

Integrating the Healthcare Enterprise (IHE): An organization made up of healthcare industry professionals which is focused on improving interoperability between healthcare computers systems and development and promotion of standards in support of improving quality of patient care and outcomes. **Reference:** http://www.iheusa.org/

Interoperability: The ability of two or more systems or components to exchange information and to use the information that has been exchanged accurately, securely, and verifiably, when and where needed. **Reference:** http://www.ehealthinitiative.org/

Meaningful Use: The Medicare and Medicaid EHR Incentive Programs provide financial incentives for the "meaningful use" of certified EHR technology to improve patient care. To receive an EHR incentive payment, providers have to show that they are "meaningfully using" their EHRs by meeting thresholds for a number of objectives. CMS has established the objectives for "meaningful use" that eligible professionals, eligible hospitals, and critical access hospitals (CAHs) must meet in order to receive an incentive payment. **Reference:** http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Meaningful_Use.html

Minnesota Department of Health (MDH): MDH is the Minnesota's lead public health agency; it convenes and staffs the Minnesota e-Health Advisory Committee and e-Health initiative. MDH is the

designated agency in Minnesota to coordinate resources and activities related to the HITECH act. **Reference:** http://www.health.state.mn.us/

Minnesota e-Health Advisory Committee: The Minnesota e-Health Advisory Committee is legislatively established private-public collaboration responsible for advising the Commissioner of Health and dedicated to accelerating the adoption of health information technology in Minnesota. This group addresses high-level strategic issues and recommends policy for data exchange between public health and health care providers. **Reference:** http://www.health.state.mn.us/e-health/

Minnesota e-Health Initiative: The Minnesota e-Health Initiative is a public-private collaborative that represents the Minnesota health and health care community's commitment to prioritize resources and to achieve Minnesota's mandates. The initiative is legislatively authorized and has set the gold standard nationally for a model public-private partnership. **Reference:** http://www.health.state.mn.us/e-health/

Minnesota Registration & Certification (MR&C) System: Minnesota's electronic state vital records system.

National Association of Public Health Statistics and Information Systems (NAPHSIS): NAPHSIS is a national association of state vital records and public health statistics offices which provides leadership for vital records and vital records information systems in order to improve population health. **Reference:** http://www.naphsis.org

Office of the National Coordinator for Health Information Technology (ONC): ONC is the principal federal entity charged with coordination of nationwide efforts to implement and use the most advanced health information technology and the electronic exchange of health information. **Reference:** http://www.healthit.gov/

National Center for Health Statistics (NCHS): NCHS is the nation's principle health statistics agency which is located within CDC. Its role is gather data that will help identify health issues and help guide policy to improve the health of all Americans. **Reference:** http://www.cdc.gov/nchs/about.htm

Personal Health Record (PHR): An electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be drawn from multiple sources while being managed, shared, and controlled by the individual.

Registration: The process by which vital records are completed, filed and incorporated into the official records of the Office of Vital Records.

Retrieve Form for Data Capture (RFD) profile: RFD provides a standardized method for gathering data within a user's current application to meet the requirements of an external system.

Standards: Documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics to ensure that materials, products, processes, and services are fit for their purpose **Reference:** http://www.ehealthinitiative.org/

State Registrar: As a designee of the commissioner of health, the state registrar oversees the recording, maintaining, and issuance of vital records and birth and death certificates.

Vital Statistics: Vital statistics for the United States are obtained from the official records of live births, deaths, fetal deaths, marriages, divorces, and adoptions. The official recording of these events in the responsibility of the individual states or jurisdictions . The Federal government obtains use of the records for statistical purposes through a cooperative arrangement with the responsible agency in each state.

Appendix B: Resources and Documents

The following are resources and documents that are referred to in the report or reviewed for the project.

Minnesota Statutes

144.213 OFFICE OF VITAL RECORDS: Describes the role of Office of Vital Records, and role and duties of the State Registrar. https://www.revisor.mn.gov/statutes/?id=144.213

144.215 BIRTH REGISTRATION: Describes when and where to file a birth record, applicable rules, paternity establishment, Social Security Registration, and non-hospital births. https://www.revisor.mn.gov/statutes/?id=144.215

144.225 DISCLOSURE OF INFORMATION FROM VITAL RECORDS: Describes access to vital records as public information, confidential data, disclosure of health data associated with birth registration, laws and rule for vital records preparation, access to data for research purposes, sharing practices for residence of other states, Commissioner's role, certified birth and death records and their formats. https://www.revisor.mn.gov/statutes/?id=144.225

144.226 FEES: Describes the fees associated with requesting, replacing, amending a birth record. https://www.revisor.mn.gov/statutes/?id=144.226

4601.0600 FILING DOCUMENTATION OF BIRTH WITHIN FIRST YEAR OF BIRTH: Describes the requirements for filing a birth record for births occurring in institutions, outside of institutions, for infants of unknown parentage, required information for birth registration, recognition of parentage, and additional requirements needed. https://www.revisor.mn.gov/rules/?id=4601.0600

Data Standards and Collection Tools

Facility Worksheet for Live Birth (02/05/04). NCHS's paper-based collection tool (worksheet) used for gathering medical information for birth registration based on the U.S. Certificate of Live Birth and Report of Fetal Death. http://www.cdc.gov/nchs/data/dvs/facwksBF04.pdf

HL7 Version 2.5.1 Implementation Guide: Birth and Fetal Death Reporting, Release 1, US Realm: It provides guidance and messaging infrastructure for transmitting medical/health information on live births and fetal deaths from a birthing facility setting to a jurisdictional vital records electronic registration system. The use case describes the transmission of the data using trigger events and abstract messages to record the creation, revision, or retraction of live birth or fetal death reports. http://www.hl7.org/implement/standards/product_brief.cfm?product_id=320

IHE Quality, Research, and Public Health Technical Framework Supplement: Birth and Fetal Death Reporting (BFDR) Trial Implementation: The BFDR profile describes the content to be used in automating the data captured for vital records purposes such as for the 2003 Revisions of the U.S. Standards Certificate of Live Birth and the U.S. Standards Report of Fetal Death.
http://www.ihe.net/uploadedFiles/Documents/QRPH/IHE_QRPH_Suppl_BFDR.pdf

IHE IT Infrastructure Technical Framework Supplement: Retrieve Form for Data Capture (RFD): RFD provides a standardized method for gathering data within a user's current application to meet the requirements of an external system. RFD supports the retrieval of forms from a form source, display and completion of a form, and return of instance data from the display system to the source system.
http://www.ihe.net/Technical_Framework/upload/IHE_ITI_Suppl_RFD_Rev2-2_TI_2011-08-19.pdf

MDH Birth Certificate Information-Medical Portion (04/2012)). Minnesota Department of Health's paper-based collection tool (worksheet) used for collecting medical information for birth registration.
http://www.health.state.mn.us/divs/chs/osr/birthreg/forms.html

Mother's Worksheet for Child's Birth Certificate (01/28/04).). NCHS's paper-based collection tool (worksheet) used for gathering civil information for birth registration based on the U.S. Certificate of Live Birth and Report of Fetal Death. This information is provided by the mother.
http://www.cdc.gov/nchs/data/dvs/momswkstf_improv.pdf

Minnesota Registration & Certification System (MR&C): Birth Registrar User Manual. A guide for birth registrars that provides step by step information on using MR&C to enter new birth and fetal death records as well as making corrections, printing documents and running reports.
http://www.health.state.mn.us/divs/chs/osr/birthreg/mrcusermanual.pdf

Name Your Baby and Birth Certificate Information (7/2013). Minnesota Department of Health's paper-based collection tool (worksheet) used for collecting civil information for birth registration. This information is provided by the mother (also referred to as the Mother's Worksheet).
http://www.health.state.mn.us/divs/chs/osr/birthreg/momsheet.pdf

U.S. Standard Certificate of Live Birth (2003 Revision): The standard developed and approved by the Department of Health and Human Services for the collecting of live birth information.
http://www.cdc.gov/nchs/data/dvs/birth11-03final-ACC.pdf

Additional Resources

More, Better, Faster: Strategies for Improving the Timeliness of Vital Statistics. Report issued by NAPHSIS to advance the timeliness of vital statistics reporting.
http://www.naphsis.org/about/Documents/NAPHSIS_Timeliness%20Report_Digital%20%281%29.pdf

Appendix C: Minnesota e-Vital Records Advisory Group

Name	Organization
Jeanette Ruff	St. Joseph's Medical Center (Essentia), Brainerd
Kim Pearson	St. Mary's Medical Center (Essentia), Duluth
Cheri Clough	Unity Hospital (Allina Health), Fridley
Katie Krause	St. Francis Regional Medical Center (Allina Health), Shakopee
Ruth Kaczor	St. Cloud Hospital (CentraCare Health System), St. Cloud
Melanie Countryman	Dakota County Public Health
Fritz Ohnsorg	Minnesota Department of Human Services
Karen Welle	MDH, Department of Health Policy
Emily Emerson	MDH, Minnesota Immunization Information Connection (MIIC)
Barb Hearley	Minnesota Central IT Organization (MN.IT)
David Stroud	MDH, Center for Health Statistics
Mark Sonneborn	Minnesota Hospital Association
Marty LaVenture	MDH, Office of Health Information Technology
Steve Elkins and Heidi Granlund	MDH, Office of Vital Records
Lynn Shallenbarger	Methodist hospital (Park Nicollet), St. Louis Park
Delton Atkinson	National Center for Health
Nicole Giesen	St. Francis Regional Medical Center (Allina Health), Shakopee
Patty VonIderstine	Allina Health
Traci Hazlett	Methodist hospital (Park Nicollet), St. Louis Park
Helen Bassett	MDH, Office of Vital Records
Melissa Timmerman	Essentia Health
Keavin Bostrom	Essentia Health

Appendix D: Use Case16: Vital Registration and Care Coordination

The following is a description of the flow of information that was achieved at the HIMSS Interoperability Showcase.

Step	Description
2-1 (Setup)	OB/GYN or CNMW (certified nurse/midwife) collects expectant mother's demographic and medical history information during prenatal care and provides antepartum summary and antepartum history and physical (AP*) documents which will be available to the labor and delivery department to use when the mother gives birth.
2-2	The expectant mother arrives at the Birthing Facility. The clinical details from her birth and initial post-partum period are captured on the Labor and Delivery Summary (LDS) in the Birthing Facility EHR. Relevant medical and health information from the LDS will also pre-populate the Birth and Fetal Death Report (BFDR) . Clinician at birth reviews and edits the information in the electronic form for completeness and accuracy. Upon approval, the information from the Form populates the state/jurisdiction's Electronic Birth Registration System.
2-3	A Form Manager application from a State Public Health Agency is used to populate electronic form (Vital Records Facility Worksheet) with clinical data from the Birthing Facility EHR. Once complete, this information is transmitted to the appropriate jurisdictional authority for birth registration and the production and dissemination of local and national birth statistics.
2-4	Hearing screening results from information capture and/or from Birthing Facility are transmitted to EHDI Program responsible for creating the EHCP. EHCP generated from EHDI-IS communicates an individual newborn's hearing screening outcome and jurisdiction-specific guidelines for follow-up care to Pediatrician EHR through HIE. Quality Measure Execution information (QME-EH) is sent to the HIE analytics to measure and monitor Meaningful Use Measure: NQF 1354: EHDI-1a—Hearing Screening prior to Hospital Discharge).
2-5	Pediatrician receives an Early Hearing Care Plan from Public Health and a CCD-Summarization of Episode Note from Birthing Facility EHR to provide comprehensive care.
2-6	Number of births (denominator) and number of newborn hearing tests performed prior to Hospital Discharge (numerator), are used to compute Meaningful Use eMeasures via HIE Analytic value added services.
2-7	CDC/NCHS receives birth certificate information from all vital records jurisdictions. Statistics are collected and analyzed to monitor the demographic and health status of the population and for epidemiologic research.

Appendix E: Unity Hospital's Detailed Birth Registration Process

The following is a detailed report on Unity Hospital's Birth Registration Process. Table 1 lists information about the forms and documents used for internal communication, to obtain information from patients, and to provide information to patients and their families. Table 2 contains the Birth record processing using Minnesota Department of State's Registration and Certification System (MR&C)

Organization: Allina Health, Unity Hospital
Address: 550 Osborne Road, Fridley, MN 55432
Unit Name: Family Birth Center

Unity Hospital is a 220-bed suburban facility which is part of Allina Hospitals & Clinics, a major non-profit provider of health care services in Minnesota. Recently renovated, Unity Hospital's Family Birth Center is equipped and trained to serve the low risk/low intervention delivery community. The Family Birth Center will accommodate water births, provide doula support and lactation consultants for new mothers and is prepared to respond to any emergency situation as it arises. A level II Special Care Nursery, staffed by Neonatal Nurse Practitioners is available if needed. Unity Hospital's Family Care Unit is a locked unit, as is the standard in the Twin Cities, to monitor visitors and protect patients. All visitors and guests must check-in prior to entry.

Structure and Flow of the Unit: Unit admission, Labor & Delivery, Postpartum Recovery, Discharge. Nursery and breastfeeding consultation are part of the Postpartum Recovery area.

Statistics: 100 births per month average (more than 1200 annually), 93% low risk births

Birth Registration Personnel: Seven individuals — five Health Unit Coordinators (HUC), who manage patient information, and two Personal Care Technicians (PCT), who provide support for birth unit.

Birth Unit Admission

Expecting moms and family members are greeted by a PCT who asks for patient ID, assists with rooming, admission of patient into hospital information system, collection of demographic and administrative information, and obtaining patient consent and waivers for the viewing and use of both mom's and newborn's medical information.

Forms and documentation completed by parents

1. Allina Hospitals and Clinics Assignment of Benefits Form
2. Consent for Release and Combining of Health Records Among Health Care Providers (For mother and baby)
3. Consent for Release of Information (For mother and baby)
4. Enhanced Surveillance Response Form
5. MDH Mother's Worksheet "Naming Your Baby and Birth Certificate Information"

Completed Forms 1-4 are collected from patient at admission. MDH Mother's Worksheet is completed and collected from patient during Post-partum Recovery.

Forms and documentation initiated at admission by Labor & Delivery birth registrars

6. Internal checklist
7. MDH Birth Facility Medical Worksheet
8. Your Baby's Birth Certificate
9. Unity's Souvenir Birth Certificate (Non-legal document issued by hospital)
10. Baby Navigator

The mom is admitted into Excellian EHR system.

Prenatal Information

Prenatal information is not commonly reviewed before admission to the unit. Prenatal records may be accessed or obtained in different ways:

- If mom received care from Allina or affiliated clinics using the same EHR system, her records will be in Excellian.
- If mom received care at associated clinics, her information will be faxed to Unity at 36 weeks gestation.
- Otherwise, patient has to sign a release of information (ROI) form which is faxed to outside providers in order to receive faxed copies of the record.

If prenatal care data is faxed it will be part of the patient's paper chart, moving with the patient until Discharge. The paper chart is then sent to the Medical Record Office to be scanned as an image for addition to the EHR.

Other Observations

- Certain data is more difficult to obtain including:
  - Date of last menstrual cycle (LMP) – prenatal care is the source which may not be available
  - Date/month WIC was started
  - Smoking information – extent and timelines of tobacco use
- MDH Mother's Worksheet "Naming Your Baby and Birth Certificate Information" is kept for a month.

LABOR & DELIVERY

During labor and delivery (L&D), the MDH Birth Facility Medical Worksheet for baby and mother as well as Unity's Internal Checklist for L&D admission duties and postpartum discharge duties forms are filled. Each room has a computer for accessing and updating the patient's EHR (Epic Excellian) and an L&D nurse may update the mom and baby's information either in the room or while back at his/her workstation. The room is also equipped with centralized fetal monitoring system (QS) which is applied to mother's abdomen and records mom's and baby's vital signs and other statistics (e.g. contractions, heart rate). QS does not interact with Excellian and the L&D nurse must key in the data manually, with the

exception of the BP/pulse which may be fed into the EHR by pushing a button on the QS systems. The manual data entry from QS into Excellian continues throughout labor and is completed until the final information is gathered after delivery.

When the baby is born, the L&D nurse calls unit admission to announce baby's exact time of birth and sex. At this point baby's chart is initiated. However, the baby already has an EHR record that is "pended" or attached to mom's record. The L&D nurse enters information about the labor and birth and initial assessments about new born into Excellian. Information about the labor and delivery is communicated with other unit's staff through internal communication documents. The average recovery and stay in this area is 1-2 hours following a delivery without complication.

POSTPARTUM RECOVERY

The new mother is transferred to the postpartum recovery room, typically within 1-2 hours following a delivery without complications. Newborns usually room-in with mom but may be transferred to the nursery per mom's request. They may also stay is level 2 (special-care) if necessary. This mother's room is equipped with a patient care white board which includes information on:

- Care plan
- Pain Management Plan
- Anticipated Discharge Date

The newborn is examined by a pediatrician within 24 hours following birth and the assessment results are entered into the EHR. This information is part of the medical data required for birth registration. The new mom is responsible for choosing the baby's name and filling out the MDH Mother's Worksheet "Naming Your Baby and Birth Certificate Information" which was initiated when she was admitted. If mom is unable to fill out the form due to language barrier a family member may do so on her behalf, an interpreter may be available for translation and filling out the form, or computerized assistance is provided through access to live help through the Internet. The birth registrar is responsible for coordinating this activity and helping to fill out the form if needed. Some of the issues that affect the collection of timely information include language barriers, cultural differences, and parental indecisiveness regarding baby's name.

The new mom turns in the completed Mother's Worksheet which has her marital status information. If she is not married, the birth registrar will discuss arrangements for completing a form for establishing paternity (Request for Parentage or ROP).

The hospital maintains a Baby Name Book to keep track of births. Until the baby is named, he or she will be referred to by the mother's last name followed by a letter.

During this time, the birth registrar may initiate a birth record for the baby by accessing the Minnesota Registration and Certification System (MR&C). All Unity's seven birth registrars have unique MR&C login information. Once a record is started and saved but has not been finalized it moves to a Work Queue. Upon logging into the system all birth registrars will see the hospital's unfinished birth records in the

Work Queue. A record may be started by one person but completed by another. This will help with the timeliness of processing birth records during the transition between staff shifts. The information submitted to the MR&C System is obtained from the MDH Mother's Worksheet (demographics information) and the Birth Facility Medical Worksheet for Baby and Mother. The hospital's timeline for initiating and completing a birth record is usually 2 days. Minnesota Department of Health requires hospitals to report this information within 5 days.

The postpartum recovery area also includes a lactation consultation room where new moms receive information on lactation and breastfeeding from a board-certified lactation nurse. The typical length of stay in the postpartum recovery area is 1.7 days.

Forms and documentation initiated by birth registrar

11. Internal Communication for Birth Registrar

Follow up testing/vaccine for baby

12. Minnesota Department of Health Newborn Screening Form

If mom is Hepatitis B+, HBIG vaccine is given to baby within 12 hours. In addition, HepB vaccine is given to baby before discharge.

DISCHARGE

Following postpartum recovery which is usually about 48 hours, the new family is ready to leave the hospital. At this time several tasks must be completed:

- Completing the recording of the baby's birth in the MR&C System
- Parental review and verification of the baby's birth record and error correction
- Submitting baby's complete birth record to MDH using the MR&C System
- Updating the EHR and Baby Name Book with baby's legal name
- Instructions to parents on obtaining birth certificate and Social Security card for baby

Once the parent(s) verify that the baby's name and other birth record information is correct the birth registrar can finalize the record, meaning submit the complete record to MDH through MR&C. After the baby's name is verified his/her information is updated in the Baby Name Book to reflect the correct legal name. The name is also updated the EHR. This is usually completed at discharge.
Most of these activities are coordinated by the birth registrar. If Recognition of Parentage (ROP) is required finalizing the birth record information could be delayed as both parents have to sign the forms which must be notarized.

Forms and documentation parents may receive at discharge

9. Unity's Souvenir Birth Certificate
13. How to Get a Birth Certificate for Your Baby
14. Instructions on proofreading and correcting birth record

15. Parental Verification Form – This form must be requested by parents; otherwise they will not automatically receive it.

POST-DISCHARGE FOLLOW-UP

Birth certificates may be ordered in person by fax or mail from Minnesota Department of health or any local issuance office. The cost for the first birth certificate is $26 and additional copies may be requested at $19 per copy.

After the new family leaves the hospital there is still time to correct or amend the baby's birth record. The family receives notification from the county about the legal information that has been submitted for birth registration and they may determine that correction or changes are necessary. Correction or changes requests can be made without a filing fee if requested within one year after filing. After one year days, the record may be amended for a $40 fee. The parents will need to contact the hospital, although they may also contact the county or MDH if within one year after filing. After one year post-filing amendments can only be requested through MDH. If the hospital is unable to amend the filed record in the MR&C it has to submit a Hospital Statement to Correct/Amend to Minnesota Department of Health form.

Forms and documentation

16. Minnesota Department of Health Hospital Statement to Correct/Amend

Table 1: Information about the forms and documents used for internal communication, to obtain information from patients, and to provide information to patients and their families.

Form /Document	Contents	Purpose	Initiated At	Completed At
1. Allina Hospitals and Clinics Assignment of Benefits This is a packet that contains several documents (see contents)	Acknowledgement of receipt of the following documents: • Notice of Privacy Practices • Federal and State Patient Rights Information • Health Care Directive Brochure • Important Message from Tricare/Champus. Additionally, it seeks patient agreement to authorize third-party payers to reimburse hospital for services rendered and the patient to pay any additional costs. Patient signature and date & time are collected.	This is a form that helps patient and family members understand patient' rights and responsibilities, and provides supplementary information.	Admission	Admission

Table 1: Information about the forms and documents used for internal communication, to obtain information from patients, and to provide information to patients and their families.				
Form /Document	**Contents**	**Purpose**	**Initiated At**	**Completed At**
2. Consent for Release and Combining of Health Records Among Health Care Providers (**For mother and baby**)	Consent for sharing patient information with other affiliated providers that use the same electronic health record system (Excellian) for coordination of care and ease of exchange. This is accompanied by a list of providers currently using the Excellian EHR system and applies to providers that may join the same system in the future.	To inform patient that her records and those of the newborn's will be shared by other providers and to obtain her consent	Admission	Admission
3. Consent for Release of Information (**For mother and baby**)	Consent to use a provider record locator to access and obtain patient information, to release information to payers, for consent to release of information by payers and networks, release of information by health care providers, and consent for use of medical records in research.	Overview of Allina's information seeking and sharing practices and seeking patient consent, marital status, as well as information about the newborn: name, DOB, sex, plurality.	Admission	Admission
4. Enhanced Surveillance Response Form	Verifying if patient has a fever or cough, traveled to specific countries or has been in contact with someone who has recently traveled to those areas or has been in contact with someone with pneumonia; provides instructions on preventive measures to stop spread of germs.	Respiratory / influenza prevention survey	Admission	Admission
5. MDH Mother's Worksheet "Naming Your Baby and Birth Certificate Information"	Mother and father's demographic information including name, address, DOB, SSN, race, and education, and baby's name, DOB, sex	Information will be used to create a birth record and for birth research purposes	Admission	Postpartum Recovery

Table 1: Information about the forms and documents used for internal communication, to obtain information from patients, and to provide information to patients and their families.				
Form /Document	**Contents**	**Purpose**	**Initiated At**	**Completed At**
6. Internal checklist	Two-part form to communicate gestation, parity, marital status, labs, risk factors, physician(s)	Internal communication for labor & delivery admission duties and postpartum discharge duties. The information entered on this form will also be used in processing the birth record by birth registrars.	Admission	Discharge
7. Minnesota Department of Health Birth Facility Medical Worksheet for Baby and Mother	It collects medical information on the baby and the mother, both prenatal received from clinics and at delivery.	This is the same as "Minnesota Department of Health Birth Certificate Information – Medical Portion". Completed to give a summary of health data on mom and baby.	Admission	Postpartum Recovery
8. Your Baby's Birth Certificate	Why is a birth certificate needed? How to obtain one for the baby? Choosing baby's name, information on birth certificate, who to obtain a copy of birth certificate, changing or correcting baby's birth certificate, social security card for baby	Instructions on actions and information needed for getting a birth certificate, including making corrections, as well as obtaining a social security card	Admission	Admission
9. Unity's Souvenir Birth Certificate	Baby's name, date and time of birth, sex, place of birth, name and DOB of parent(s).	This is a non-legal birth certificate that will be initiated and updated after delivery with information and newborn footprints (**This is not the baby's official birth certificate but contains some of the same information**)	Admission	Discharge
10. Baby Navigator	This forms contains specific information about the labor and birth on mother and baby and includes any special circumstances	This is a nursing communication tool to collect key labor & delivery notes for entry into mother's medical record	Admission	Labor & Delivery

Table 1: Information about the forms and documents used for internal communication, to obtain information from patients, and to provide information to patients and their families.				
Form /Document	**Contents**	**Purpose**	**Initiated At**	**Completed At**
11. Internal Communication for Birth Registrar	This form includes information about the patient name and room number, marital status, ROP information, recording in Minnesota Registration and Certification (MR&C) System, verification of record information by parents, information provided to parents on how to obtain birth certificate and social security number	Internal communication for birth registrar entering birth record	Postpartum Recovery	Discharge
12. Minnesota Department of Health Newborn Screening Form	Blood sample drawn after 24 hours of age and before discharge.	To test for 50+ newborn genetic disorders not evident at birth for which there are treatment options available	Post-Delivery	Post-Discharge
13. How to get a birth certificate for your baby	How to obtain birth certificate, costs, instructions on obtaining social security card	Helping parents with the next steps which is creating a legal identity for their baby	Discharge	Discharge
14. Instructions on proofreading and correcting birth record	Instruction for parents to proofread birth documentation at home if not done at hospital, informing them that the record has been submitted to Minnesota Department of Health, how to initiate the correction process if errors are found	Instructions on proofreading and correction of birth documents	Discharge	Discharge
15. Parental Verification Form	Baby's name, date and time of birth, gender, plurality, parent(s) name, date and place of birth; obtaining parental signature	This is used to verify and confirm that the information that will be printed on the baby's legal birth certificate is accurate and also to instruct parents to contact the hospital in case corrections are needed	Discharge	Discharge

Table 1: Information about the forms and documents used for internal communication, to obtain information from patients, and to provide information to patients and their families.				
Form /Document	**Contents**	**Purpose**	**Initiated At**	**Completed At**
16. Minnesota Department of Health Hospital Statement to Correct/ Amend	Correction or amendment to birth record: filing date (within one year after birth – no fee, after one year following birth – $40 fee); request to delete duplicate record, information that needs correction	If after discharge the parents notice errors or need to amend the record they will contact the hospital and the hospital will contact Minnesota Department of Health	Post-Discharge	Post-Discharge

Table 2: **Birth record processing using Minnesota Department of State's Registration and Certification System (MR&C)**			
Task	**Time of Entry**	**Information**	**Source Of Information**
Initiating a New Birth Record	Postpartum Recovery	The birth registrar enters and saves the following information in MR&C **1. Demographic Information** Mother's Name, DOB, Birth Place, Address, SSN Baby's Name, DOB, Sex, Plurality Parent's Information: Marital Status Father's Name, DOB, Birth Place, Address, SSN Both Parents' Education Both Parents' Hispanic Origin Both Parent's Race/Ethnicity **2. Medical Information** Child's Medical Information Mother's medical Information – Prenatal Mother's Medical Information – Delivery	**1.** Minnesota Department of Health Mother's Worksheet "Naming Your Baby and Birth Certificate Information" **2.** Minnesota Department of Health Birth Certificate Information – Medical Portion
Birth Record Information Verification	Discharge	The birth registrar prints a copy of the unfinished birth record information in MR&C and ask the parents to verify the accuracy of information which include: Baby's Name, Date & Time of Birth, Sex, Plurality, Parent(s) Name(s), Date and Place of Birth; Parent Signature	MR&C
Finalizing the Birth Record	Discharge	Upon verification of birth record information by parent(s), the complete birth record is submitted and a State File Number is issued.	NA
Amendments / Corrections	Post-Discharge	Parents may request changes to the birth record up to one year after it is finalized. The record may be amended after one year but MDH must be contacted to make the changes.	Minnesota Department of Health Hospital Statement to Correct/Amend

Appendix F: MDH Birth Registration Process Matrix

MDH Birth Registration Process Matrix								
Business Process	**Goal**	**Objective**	**Business Rules**	**Triggers**	**Task Sets**	**Inputs**	**Outputs**	**Outcomes**
Birth record entered by hospital registrar	Registering a live birth at a hospital	**1.** Create a record of a live birth within 5 days following birth **2.** Ensure the birth record information is completed and reported in compliance with national standards (Birth Edit Specifications For the 2003 Revision of the U.S. Standard Certificate of Birth**) **3.** Securely maintain and store this vital record **** last revised on 3/18/2005**	**Birth Registration: Filing Requirement** **MN Statute 144.215 – *Subd. 1*:**– A birth record must be filed with the state registrar for each live birth within 5 days after birth. **Birth Registration: Information Required** **MN Statute 144.215 – *Subd. 1*** Requires social security numbers from parents at the time birth is registered? **Minnesota Rules, part 4601.0600, *subpart 4* –** Requires that information prescribed on the documentation of birth form to be filed for each birth including required information: **1.** Date and country of birth **2.** Child's sex **3.** Birth order, if multiples **4.** First name, middle name, and maiden	A record of a live birth is initiated by the hospital	**1.** MR&C authenticates authorized user **2.** MR&C main screen is displayed **3.** User selects existing record or initiates new birth record a. User selects Enter Birth Record to create new record OR b. User selects Existing Record by (See Reference B) i. Selecting record from Work Queue OR ii. Entering search criteria in Search Birth Record Screen Search criteria : • Baby's name • Mom's Name • Dad's names Mom's DOB • State File Number • Date Filed • Record status • Facility name iii. System displays search results iv. System displays Follow On Actions v. User selects Follow On Action to View Birth Record (End of Process) **4.** For new record, user enters	Hospital enters birth information from: ***Minnesota Department of Health Birth Certificate Information - Medical Portion** which contains mom & baby's medical information For a complete list of data fields refer to the Minnesota Department of Health Medical Birth Certificate Information - Medical Portion **Minnesota Department of Health Naming Your Baby and Birth Certificate Information** which contains demographic information ○ Baby and parents'	**1.** Record of a live birth **2.** IJE File (InterJurisdictional Exchange (Electronic Exchange)) • NCHS file	A record of birth is created within 5 days following a live birth at a hospital facility in accordance with NCHS guidelines for birth information completeness and reporting (Birth Edit Specifications For the 2003 Revision of the U.S. Standard Certificate of Birth)

MDH Birth Registration Process Matrix								
Business Process	**Goal**	**Objective**	**Business Rules**	**Triggers**	**Task Sets**	**Inputs**	**Outputs**	**Outcomes**
			surname of mother **Disclosure of Information from Vital Records & data about births** **MN Statute 144.225.** – Vital Records Specific; protection of vital records from loss, mutilation, or destruction, and prevention of improper disclosure of vital records that are confidential or private data on individuals ***Subd*. 2 –** Birth data specific, data pertaining to births to unmarried mothers are confidential except designated as public by mother with few exceptions ***Subd*. 2a –** Health data associated with birth registration may be disclosed to commissioner of human services for public health purposes or medical care assistance ***Subd*. 5 –** birth data shall be shared with another state where mother resides **Authorized User Verification**		basic birth information: • Baby's DOB • Mom's name • Mom's SSN • Mom's MRN • Birth plurality • Birth order **5.** System performs duplicate check verification for new records **6.** If record is a duplicate (**B**)t the system displays potential duplicate birth record. The user will: a. Choose to work with new record and is routed back to the main process **(A)** b. Choose to work with existing record i. If record was not filed it will be routed back to **(C)** the main process ii. If record was filed it will be displayed in View Only mode (End of process) 7. Systems displays screen to enter birth record information. (Sub-process A, C, D are directed to this step) 8. User enters and saves data into unfinished record a. Baby's birth info. b. Baby's medical info. c. Mom's demographic d. Dad's demographic e. Mom's medical info.	names ○ Race ○ Education, ○ Place of birth ○ Address **Paternity Documents** Disclaimer: ***** Worksheet includes data fields listed in the National Facility Worksheet AND Minnesota specific data fields.		

MDH Birth Registration Process Matrix								
Business Process	**Goal**	**Objective**	**Business Rules**	**Triggers**	**Task Sets**	**Inputs**	**Outputs**	**Outcomes**
			Authentication of user identity and authorization		9. Validation thru Checks & edits a. System performs data validations based on national standards for birth specification b. User will be prompted to correct and confirm information c. User will update record and resubmit. 10. User decides to save record as unfinished or finalize it a. If saved as unfinished system will ask if Follow On Actions are performed i. If the answer is yes, user can select a Follow On Action and the process ends. ii. If the answer is no, the process end. b. If user decides to finalize birth record the system will check to see if paternity documents are needed i. If the answer is yes, user submits paternity document. ii. At this stage, user may choose to perform Follow On Action as described in 10ai 11. System files record and issues State file Number 12. Systems displays confirmation to user and option for Follow On Actions 13. Systems creates an audit log 14. Process ends			

Appendix G: Comparison of Data Standards and Collection Tools
U.S. Standard Certificate for Live Birth and NCHS and Minnesota Data Standards and Collection Tools

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
1	CHILD'S NAME (First, Middle, Last, Suffix)	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
2	TIME OF BIRTH (24 hr)	Aligns Partially 1. MR&C & MDH Birth Certificate Information – Medical Portion offer am/pm and 24 hours	MDH should evaluate use and need to align
3	SEX	Align Partially 1. US Standards certificate, BFDR Profile and HL7 Implementation Guide lack response "not yet determined"	NCHS & NAPHSIS should discuss addition of "not yet determined".
4	DATE OF BIRTH (Mo/Day/Yr)	Aligns	None
5	FACILITY NAME (If not institution, give street and number)	Aligns	None
6	CITY, TOWN, OR LOCATION OF BIRTH	Aligns 1. It is not manually entered into MR&C but auto filled as it is associated with the Birth Registrar logged in.	None
7	COUNTY OF BIRTH	Aligns 1. It is not manually entered into MR&C but auto filled as it is associated with the Birth Registrar logged in.	None
8a	MOTHER'S CURRENT LEGAL NAME (First, Middle, Last, Suffix)	Aligns	None

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
8b	DATE OF BIRTH (Mo/Day/Yr)	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
8c	MOTHER'S NAME PRIOR TO FIRST MARRIAGE (First, Middle, Last, Suffix)	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
8d	BIRTHPLACE (State, Territory, or Foreign Country)	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide 2. Name Your Baby & Birth Certificate Information Worksheet and MR&C include MN-specific response of "mother's birthplace (city/town)"	NCHS should add to BFDR Profile and HL7 Implementation Guide MDH should evaluate use and need of "mother's birthplace city/town"
9a	RESIDENCE OF MOTHER-STATE	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
9b	COUNTY	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
9c	CITY, TOWN, OR LOCATION	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
9d	STREET AND NUMBER	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
9e	APT. NO.	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
9f	ZIP CODE	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
9g	INSIDE CITY LIMITS? □ Yes □ No	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
10a	FATHER'S CURRENT LEGAL NAME (First, Middle, Last, Suffix)	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
10b	DATE OF BIRTH (Mo/Day/Yr)	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
10c	BIRTHPLACE (State, Territory, or Foreign Country)	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide 2. Name Your Baby & Birth Certificate Information Worksheet and MR&C include MN-specific response of "father's birthplace (city/town)"	NCHS should add to BFDR Profile and HL7 Implementation Guide MDH should evaluate use and need of "father's birthplace city/town"
11	CERTIFIER'S NAME: TITLE: □ MD □ DO □ HOSPITAL ADMIN. □ CNM/CM □ OTHER MIDWIFE □ OTHER (Specify)_____	Does not align 1. MN is not required to have certifier's name and title. 2. Question and response not part of BFDR Profile or HL7 Implementation Guide	MDH should verify and document policy on not collecting certifier's name and title NCHS should add to BFDR Profile and HL7 Implementation Guide

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
12	DATE CERTIFIED _____/ _____ / _____ MM DD YYYY	Does not align 1. MN is not required to certify 2. Question and response not part of BFDR Profile or HL7 Implementation Guide	MDH should verify and document policy on not collecting date certified NCHS should add to BFDR Profile and HL7 Implementation Guide
13	DATE FILED BY REGISTRAR _____/ _____ / _____ MM DD YYYY	Aligns	None
14	MOTHER'S MAILING ADDRESS: □ Same as residence, or: State: City, Town, or Location: Street & Number: Apartment No.: Zip Code:	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
15	MOTHER MARRIED? (At birth, conception, or any time between) □ Yes □ No IF NO, HAS PATERNITY ACKNOWLEDGEMENT BEEN SIGNED IN THE HOSPITAL? □ Yes □ No	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide 2. Minnesota-specific questions and responses for "Married & husband not the father of your baby, complete a Husband's non-Paternity statement and a voluntary recognition of parentage?", "single-sign voluntary recognition of parentage", "If marital status is Single - baby record", "Yes- change to public record" and "No- leave as confidential record"	NCHS should add to BFDR Profile and HL7 Implementation Guide MDH should verify and document policy on mother married additional questions and response.

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
16	SOCIAL SECURITY NUMBER REQUESTED FOR CHILD? □ Yes □ No	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
17	FACILITY ID. (NPI)	Aligns 1. This can also include a state assigned number. It is not manually entered into MR&C but auto filled as it is associated with the Birth Registrar logged in.	None
18	MOTHER'S SOCIAL SECURITY NUMBER:	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide 2. MR&C includes Minnesota-specific response of "unknown", "none" and "not obtainable"	NCHS should add to BFDR Profile and HL7 Implementation Guide MDH should evaluate use and need of "unknown", "none" and "not obtainable"
19	FATHER'S SOCIAL SECURITY NUMBER:	Does not align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide 2. MR&C includes Minnesota-specific response of "unknown", "none" and "not obtainable"	NCHS should add to BFDR Profile and HL7 Implementation Guide MDH should evaluate use and need of "unknown", "none" and "not obtainable"

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
20	MOTHER'S EDUCATION (Check the box that best describes the highest degree or level of school completed at the time of delivery) □ 8th grade or less □ 9th - 12th grade, no diploma □ High school graduate or GED completed □ Some college credit but no degree □ Associate degree (e.g., AA, AS) □ Bachelor's degree (e.g., BA, AB, BS) □ Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA) □ Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS,DVM, LLB, JD)	Does not align 1. MR&C and Interjurisdictional Exchange Natality File (Enhanced STEVE format) have "unknown" response. 2. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
21	MOTHER OF HISPANIC ORIGIN? (Check the box that best describes whether the mother is Spanish/Hispanic/Latina. Check the "No" box if mother is not Spanish/Hispanic/Latina) □ No, not Spanish/Hispanic/Latina □ Yes, Mexican, Mexican American, Chicana □ Yes, Puerto Rican □ Yes, Cuban □ Yes, other Spanish/Hispanic/Latina (Specify)_____	Does not align 1. MR&C and Interjurisdictional Exchange Natality File (Enhanced STEVE format) have "unknown" response. 2. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
22	MOTHER'S RACE (Check one or more races to indicate what the mother considers herself to be) □ White □ Black or African American □ American Indian or Alaska Native (Name of the enrolled or principal tribe)___ □ Asian Indian □ Chinese □ Filipino □ Japanese □ Korean □ Vietnamese □ Other Asian (Specify)_____ □ Native Hawaiian □ Guamanian or Chamorro □ Samoan □ Other Pacific Islander (Specify)_____ □ Other (Specify)_____	Does not Align 1. Name Your Baby & Birth Certificate Information (10-2012) & MR&C uses expanded races options which are collapsed for reporting in IJE 2. MR&C and Interjurisdictional Exchange Natality File (Enhanced STEVE format) have "unknown" response. 3. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
23	FATHER'S EDUCATION (Check the box that best describes the highest degree or level of school completed at the time of delivery) □ 8th grade or less □ 9th - 12th grade, no diploma □ High school graduate or GED completed □ Some college credit but no degree □ Associate degree (e.g., AA, AS) □ Bachelor's degree (e.g., BA, AB, BS) □ Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA) □ Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS,DVM, LLB, JD)	Does not align 1. MR&C and Interjurisdictional Exchange Natality File (Enhanced STEVE format) have "unknown" response. 2. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide
24	FATHER OF HISPANIC ORIGIN? (Check the box that best describes whether the mother is Spanish/Hispanic/Latina. Check the "No" box if mother is not Spanish/Hispanic/Latina) □ No, not Spanish/Hispanic/Latina □ Yes, Mexican, Mexican American, Chicana □ Yes, Puerto Rican □ Yes, Cuban □ Yes, other Spanish/Hispanic/Latina (Specify)_____	Does not align 1. MR&C and Interjurisdictional Exchange Natality File (Enhanced STEVE format) have "unknown" response. 2. Question and response not part of BFDR Profile or HL7 Implementation Guide	NCHS should add to BFDR Profile and HL7 Implementation Guide

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
25	FATHER'S RACE (Check one or more races to indicate what the mother considers herself to be) □ White □ Black or African American □ American Indian or Alaska Native (Name of the enrolled or principal tribe)___ □ Asian Indian □ Chinese □ Filipino □ Japanese □ Korean □ Vietnamese □ Other Asian (Specify)_____ □ Native Hawaiian □ Guamanian or Chamorro □ Samoan □ Other Pacific Islander (Specify)_____ □ Other (Specify)_____	Does not Align 1. Question and response not part of BFDR Profile or HL7 Implementation Guide 2. Name Your Baby & Birth Certificate Information (10-2012) & MR&C uses expanded races options which are collapsed for reporting in IJE 3. MR&C and Interjurisdictional Exchange Natality File (Enhanced STEVE format) have "unknown" response.	NCHS should add to BFDR Profile and HL7 Implementation Guide
26	PLACE WHERE BIRTH OCCURRED (Check one) □ Hospital □ Freestanding birthing center □ Home Birth: Planned to deliver at home? □ Yes □ No □ Clinic/Doctor's office □ Other (Specify)_____	Aligns 1. The Interjursidiction Exchange Natality File and the IHE BFDR Profile have "unknown" as an option for plan to deliver at home. 2. The Interjursidiction Exchange Natality File does not have "other specific". 3. The Interjursidiction Exchange Natality File has "unknown".	None

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
27	ATTENDANT'S NAME, TITLE, AND NPI NAME: _____ NPI:_____ TITLE: □ MD □ DO □ CNM/CM □ OTHER MIDWIFE □ OTHER (Specify)_____	Aligns Partially 1. Minnesota specific responses include "CNM", "CM", "lay midwife", "TOM", "RN", "CNP", "Father", "ME", "PA", "FNP", "MS"	MDH should evaluate use and need of "CNM", "CM", "lay midwife", "TOM", "RN", "CNP", "Father", "ME", "PA", "FNP", "MS"
28	MOTHER TRANSFERRED FOR MATERNAL MEDICAL OR FETAL INDICATIONS FOR DELIVERY? □ Yes □ No IF YES, ENTER NAME OF FACILITY MOTHER TRANSFERRED FROM:_____	Aligns 1. MR&C and Interjurisdictional Exchange Natality File (Enhanced STEVE format) have "unknown" response.	None
29a	DATE OF FIRST PRENATAL CARE VISIT _____ /_____/ _____ MMDDYYYY □ No Prenatal Care	Aligns Partially 1. MR&C has the response "yes" for prenatal care 2. MR&C has the response "information currently unavailable".	MDH should evaluate use and need of "yes" and "information currently available"
29b	DATE OF LAST PRENATAL CARE VISIT _____ /_____/ _____ M M D D YYYY	Aligns	None
30	TOTAL NUMBER OF PRENATAL VISITS FOR THIS PREGNANCY _____ (If none, enter "0".)	Aligns Partially 1. Minnesota question on form has wording differences	MDH should evaluate wording on MDH Birth Certificate Information – Medical Portion

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
31	MOTHER'S HEIGHT _____ (feet/inches)	Aligns	None
32	MOTHER'S PREPREGNANCY WEIGHT _____ (pounds)	Aligns	None
33	MOTHER'S WEIGHT AT DELIVERY _____ (pounds)	Aligns	None
34	DID MOTHER GET WIC FOOD FOR HERSELF DURING THIS PREGNANCY? □ Yes □ No	Aligns-Partially 1. Minnesota specific question and response "If yes, what month of pregnancy did WIC begin" with "1-9" months or "unknown"	MDH should evaluate use and need of what month prenatal care began.
35a	Now Living Number _____ □ None	Aligns 1. Interjurisdictional Exchange Natality File and MR&C have "unknown" response.	None
35b	Now Dead Number _____ □ None	Aligns – Partial 1. Interjurisdictional Exchange Natality File and MR&C have "unknown" response.	None
35c	DATE OF LAST LIVE BIRTH _____/_____ MM Y Y Y Y	Aligns – Partially 1. MDH Birth Certificate Information - Medical Portion (4/2012) is structured 8 date format. 2. Interjurisdictional Exchange Natality File and MR&C have "unknown" response.	MDH should evaluate and review date structure/format
36a	Other Outcomes Number _____ □ None	Aligns 1. Interjurisdictional Exchange Natality File and MR&C have "unknown" response.	None

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
36b	DATE OF LAST OTHER PREGNANCY OUTCOME _____/_____ MM Y Y Y Y	Aligns – Partial 1. MDH Birth Certificate Information - Medical Portion (4/2012) is structured 8 date format 2. Interjurisdictional Exchange Natality File has "unknown" response.	MDH should evaluate and review date structure/format
37	CIGARETTE SMOKING BEFORE AND DURING PREGNANCY For each time period, enter either the number of cigarettes or the number of packs of cigarettes smoked. IF NONE, ENTER "0". Average number of cigarettes or packs of cigarettes smoked per day. # of cigarettes # of packs Three Months Before Pregnancy _ OR _ First Three Months of Pregnancy _ OR _ Second Three Months of Pregnancy _ OR _ Third Trimester of Pregnancy _ OR _	Aligns	None
38	PRINCIPAL SOURCE OF PAYMENT FOR THIS DELIVERY □ Private Insurance □ Medicaid □ Self-pay □ Other (Specify) ____	Does not align 1. BFDR Profile and HL7 Implementation Guide do not include. 2. Minnesota-specific answers "Champus/Tricare", "Indian Health Service", and "Other Government"	NCHS should add to BFDR Profile and HL7 Implementation Guide MDH evaluate use and need of "Champus/Tricare", "Indian Health Service", and "Other Government"
39	DATE LAST NORMAL MENSES BEGAN _____ /_____/ _____ M M D D YYYY	Aligns 1. Interjurisdictional Exchange Natality File has "unknown" response.	None

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
40	MOTHER'S MEDICAL RECORD NUMBER	Aligns	None
41	RISK FACTORS IN THIS PREGNANCY (Check all that apply) Diabetes □ Prepregnancy (Diagnosis prior to this pregnancy) □ Gestational (Diagnosis in this pregnancy) Hypertension □ Prepregnancy (Chronic) □ Gestational (PIH, preeclampsia) □ Eclampsia □ Previous preterm birth □ Other previous poor pregnancy outcome (Includes perinatal death, small-for-gestational age/intrauterine growth restricted birth) □ Pregnancy resulted from infertility treatment-If yes, check all that apply: □ Fertility-enhancing drugs, Artificial insemination or Intrauterine insemination □ Assisted reproductive technology (e.g., in vitro fertilization (IVF), gamete intrafallopian transfer (GIFT)) □ Mother had a previous cesarean delivery If yes, how many _____ □ None of the above	Aligns- Partially 1. Interjurisdictional Exchange Natality File and MR&C have "unknown" response 2. Minnesota specific risk factors include "anemia", "other", and "other specific" 3. MDH Birth Certificate Information - Medical Portion (4/2012) and MR&C uses "none" and Facility Worksheet for the Live Birth Certificate Final (2/5/04) uses "none of the above"	MDH evaluate use and need of "anemia", "other", and "other specific" MDH should update "none" response to none of the above.

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
42	INFECTIONS PRESENT AND/OR TREATED DURING THIS PREGNANCY (Check all that apply) □ Gonorrhea □ Syphilis □ Chlamydia □ Hepatitis B □ Hepatitis C □ None of the above	Aligns-Partially 1. Minnesota specific responses: "genital herpes" GBS" "HIV positive" "other" "other specific__" 2. Interjurisdictional Exchange Natality File and MR&C have "unknown" response. 3. MDH Birth Certificate Information - Medical Portion (4/2012) and MR&C uses "none" and Facility Worksheet for the Live Birth Certificate Final (2/5/04) uses "none of the above"	MDH should evaluate use and need of "genital herpes" GBS" "HIV positive" "other" "other specific__" MDH should update "none" response to none of the above.
43	OBSTETRIC PROCEDURES (Check all that apply) □ Cervical cerclage □ Tocolysis External cephalic version: □ Successful □ Failed □ None of the above	Aligns-Partially 1. MDH Birth Certificate Information - Medical Portion (4/2012) and MR&C uses "none" and Facility Worksheet for the Live Birth Certificate Final (2/5/04) uses "none of the above" 2. Interjurisdictional Exchange Natality File and MR&C have "unknown" response.	MDH should update "none" response to none of the above.
44	ONSET OF LABOR (Check all that apply) □ Premature Rupture of the Membranes (prolonged, > 12 hrs.) □ Precipitous Labor (<3 hrs.) □ Prolonged Labor (> 20 hrs.) □ None of the above	Aligns-Partial 1. MDH Birth Certificate Information - Medical Portion (4/2012) and MR&C uses "none" and Facility Worksheet for the Live Birth Certificate Final (2/5/04) uses "none of the above" 2. Interjurisdictional Exchange Natality File and MR&C have "unknown" response.	MDH should update "none" response to none of the above.

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
45	CHARACTERISTICS OF LABOR AND DELIVERY (Check all that apply) □ Induction of labor □ Augmentation of labor □ Non-vertex presentation □ Steroids (glucocorticoids) for fetal lung maturation received by the mother prior to delivery □ Antibiotics received by the mother during labor □ Clinical chorioamnionitis diagnosed during labor or maternal temperature > 38°C (100.4°F) □ Moderate/heavy meconium staining of the amniotic fluid □ Fetal intolerance of labor such that one or more of the following actions was taken: in-utero resuscitative measures, further fetal assessment, or operative delivery □ Epidural or spinal anesthesia during labor □ None of the above	Does not align 1. HL7 Implementation Guide does not have the responses for “Steroids” and “antibiotics” 2. Non-vertex presentation deleted from standard effective 2011 but still listed on all US Certificate, the two national worksheets and the two MDH worksheets 3. MDH Birth Certificate Information - Medical Portion (4/2012) &MR&C have "Clinical chorioamnionitis" and "temperature >38 C" as separate response items. 4. MDH Birth Certificate Information - Medical Portion (4/2012) &MR&C have "Other” and “If other specify” 5. Interjurisdictional Exchange Natality File and MR&C have “unknown” response. 6. MDH Birth Certificate Information - Medical Portion (4/2012) and MR&C uses "none" and Facility Worksheet for the Live Birth Certificate Final (2/5/04) uses "none of the above"	MDH should update “none” response to none of the above. MDH should evaluate use and need of MN specific responses and recently deleted questions and responses. NCHS should update HL7 Implementation Guide to include for “Steroids” and “antibiotics”
46A	METHOD OF DELIVERY A. Was delivery with forceps attempted but unsuccessful? □ Yes □ No	Does not align 1. NCHS deleted the question and responses in 2011.	MDH should evaluate use and need of recently deleted questions and responses. NCHS should update U.S. Standard Certificate of Live Birth

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
46B	METHOD OF DELIVERY B. Was delivery with vacuum extraction attempted but unsuccessful? □ Yes	Does not align 1. NCHS deleted the question and responses in 2011. 2. NCHS & MN worksheets contain question and response. 3. MN still collects.	MDH should evaluate use and need of recently deleted questions and responses. NCHS should update U.S. Standard Certificate of Live Birth
46C	METHOD OF DELIVERY C. Fetal presentation at birth □ Cephalic □ Breech □ Other	Aligns 1. Interjurisdictional Exchange Natality File and MR&C have "unknown" response.	None
46D	METHOD OF DELIVERY D. Final route and method of delivery (Check one) □ Vaginal/Spontaneous □ Vaginal/Forceps □ Vaginal/Vacuum □ Cesarean If cesarean, was a trial of labor attempted? □ Yes □ No	Aligns Partially 1. MDH Birth Certificate Information-Medical Portion and MR&C include response "VBAC" 2. Interjurisdictional Exchange Natality File, BFDR Profile, and MR&C have "unknown" response.	MDH should evaluate use and need of response "VBAC"

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
47	MATERNAL MORBIDITY (Check all that apply) (Complications associated with labor and delivery) □ Maternal transfusion □ Third or fourth degree perineal laceration □ Ruptured uterus □ Unplanned hysterectomy □ Admission to intensive care unit □ Unplanned operating room procedure following delivery □ None of the above	Aligns Partially 1. MN specific responses include “cord prolapse”, “placental abruption”, seizure during labor”, “placenta previa”, “other” and “if other specify” 2. MDH Birth Certificate Information - Medical Portion (4/2012) and MR&C uses "none" and Facility Worksheet for the Live Birth Certificate Final (2/5/04) uses "none of the above"	MDH should evaluate use and need of response “cord prolapse”, “placental abruption”, seizure during labor”, “placenta previa”, “other” and “if other specify” MDH should update “none” response to none of the above.
48	NEWBORN MEDICAL RECORD NUMBER	Aligns-Partial 1. Not found in the HL7 Implementation Guide	NCHS should add to HL7 Implementation Guide
49	BIRTHWEIGHT (grams preferred, specify unit) _____ □ grams □ lb/oz	Aligns	None
50	OBSTETRIC ESTIMATE OF GESTATION: _____ (completed weeks)	Aligns	None
51	APGAR SCORE: Score at 5 minutes:_____ If 5 minute score is less than 6, Score at 10 minutes: _____	Aligns Partially 1. MDH Birth Certificate Information – Medical Portion and MR&C include response of “score at 1 minute” 2. Interjurisdictional Exchange Natality File, BFDR Profile, and MR&C have “unknown” response.	MDH should evaluate use and need of response “ score at 1 minute”

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
52	PLURALITY - Single, Twin, Triplet, etc. (Specify)_____	Aligns 1. Interjurisdictional Exchange Natality File, BFDR Profile, and MR&C have "unknown" response.	None
53	IF NOT SINGLE BIRTH - Born First, Second, Third, etc. (Specify) _____	Aligns 1. Interjurisdictional Exchange Natality File, BFDR Profile, and MR&C have unknown	None
54	ABNORMAL CONDITIONS OF THE NEWBORN (Check all that apply) □ Assisted ventilation required immediately following delivery □ Assisted ventilation required for more than six hours □ NICU admission □ Newborn given surfactant replacement therapy □ Antibiotics received by the newborn for suspected neonatal sepsis □ Seizure or serious neurologic dysfunction □ Significant birth injury (skeletal fracture(s), peripheral nerve injury, and/or soft tissue/solid organ hemorrhage which requires intervention) □ None of the above	Aligns Partially 1. HL7 Implementation guide lacks responses for "Newborn given surfactant replacement therapy" and "Antibiotics received by the newborn for suspected neonatal sepsis" 2. MDH Birth Certificate- Medical Information and MR&C have additional responses of "confirm bacterial infection", "anemia", "other", "other specify" 3. Interjurisdictional Exchange Natality File, BFDR Profile, and MR&C have unknown 4. MDH Birth Certificate Information - Medical Portion (4/2012) and MR&C uses "none" and Facility Worksheet for the Live Birth Certificate Final (2/5/04) uses "none of the above"	NCHS should add HL7 Implementation Guide MDH should evaluate use and need of responses confirm bacterial infection", "anemia", "other", "other specify" MDH should update "none" response to none of the above.

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
55	CONGENITAL ANOMALIES OF THE NEWBORN (Check all that apply) □ Anencephaly □ Meningomyelocele/Spina bifida □ Cyanotic congenital heart disease □ Congenital diaphragmatic hernia □ Omphalocele □ Gastroschisis □ Limb reduction defect (excluding congenital amputation and dwarfing syndromes) □ Cleft Lip with or without Cleft Palate □ Cleft Palate alone □ Down Syndrome □ Karyotype confirmed □ Karyotype pending □ Suspected chromosomal disorder □ Karyotype confirmed □ Karyotype pending □ Hypospadias □ None of the anomalies listed above	Aligns Partially 1. MDH Birth Certificate Information-Medical Portion and MR&C have different responses of “cleft lip” and “cleft palate” 2. Interjurisdictional Exchange Natality File, and MR&C have unknown for Down Syndrome karyotype status and Suspected karyotype status 3. Minnesota specific responses included “other urogenital anomalies”, “polydactyly/syndactyly/ adacytyly”, “Club foot”, “Other musculoskeletal/ integumental” , “other anomalies” and “if, other specify” 4. Interjurisdictional Exchange Natality File, BFDR Profile, and MR&C have unknown 5. MDH Birth Certificate Information - Medical Portion (4/2012) and MR&C uses "none" and Facility Worksheet for the Live Birth Certificate Final (2/5/04) uses "none of the above"	MDH should evaluate use and need of “cleft lip”, “cleft palate”, other urogenital anomalies”, “polydactyly/syndactyly/ adacytyly”, “Club foot”, “Other musculoskeletal/ integumental” , “other anomalies” and “if, other specify” MDH should update “none” response to none of the above.

Comparison of Data Standards and Collection Tools: U.S. Standard Certificate for Live Birth (Standard Certificate) and NCHS and Minnesota Data Standards and Collection Tools			
#	**Standard Certificate Question and Response**	**Analysis Summary**	**Recommendations**
56	WAS INFANT TRANSFERRED WITHIN 24 HOURS OF DELIVERY? □ Yes □ No IF YES, NAME OF FACILITY INFANT TRANSFERRED TO:_____	Aligns 1. Interjurisdictional Exchange Natality File, and MR&C have unknown	None
57	IS INFANT LIVING AT TIME OF REPORT? □ Yes □ No □ Infant transferred, status unknown	Aligns 1. MDH-Birth Certificate Information Medical Portion lacking response of "unknown"	MDH should evaluate adding response "unknown"
58	IS THE INFANT BEING BREASTFED AT DISCHARGE? □ Yes □ No	Does not Align 1. The US Certificate and MDH Birth Certificate Information-Medical Portion have differing questions and response.	MDH should evaluate use and need of question and responses.

Appendix H: Minnesota-Specific Questions and Responses

Minnesota-Specific Questions &Responses			
#	Minnesota-Specific Question and Response	Analysis Summary	Recommendations
1	Month Care began (Month of pregnancy prenatal care began)	Does not align 1. Minnesota-specific question and responses	MDH should evaluate use and need of question and responses.
2	Mother's Hep B Status □ Yes □ No □ Unknown	Does not align 1. Minnesota-specific question and responses	MDH should evaluate use and need of question and responses.
3	Baby get Hep B vaccine □ Yes – when? □ No □ refused	Does not align 1. Minnesota-specific question and responses	MDH should evaluate use and need of question and responses.
4	HBIG given to baby □ Yes – when? □ No □ refused	Does not align 1. Minnesota-specific question and responses	MDH should evaluate use and need of question and responses.
5	Toxicology tests administered to mother and/or the newborn □ Yes – when? □ No □ Results	Does not align 1. Minnesota-specific question and responses	MDH should evaluate use and need of question and responses.
6	Mother's age at time of infant birth	Does not align 1. Minnesota-specific question and responses 2. Also in Interjurisdictional Exchange Natality File (Enhanced STEVE format)	MDH should evaluate use and need of question and responses.

Minnesota-Specific Questions &Responses			
#	**Minnesota-Specific Question and Response**	**Analysis Summary**	**Recommendations**
7	Where do you usually live, if not United State, country (Mother)	Does not align 1. Question part of Mother's Worksheet for Child's Birth Certificate and Interjurisdictional Exchange Natality File (Enhanced STEVE format)	MDH should evaluate use and need of question and responses.
8	Father's age at time of infant birth	Does not align 1. Minnesota-specific question and responses 2. Also in Interjurisdictional Exchange Natality File (Enhanced STEVE format)	MDH should evaluate use and need of question and responses.
9	Father's mailing address	Does no align 1. Minnesota-specific question and responses	MDH should evaluate use and need of question and responses. MDH should evaluate use and need of question and responses.
10	Did you smoke cigarettes 3 months before or during pregnancy □ Yes □ No □ Unknown	Does not align 1. Minnesota Specific Question and Response	MDH should evaluate use and need of question and responses.
11	Check here if gestational agreement (surrogacy) court order is present □ Court state □ Court county □ File number □ File date	Does not align 1. Minnesota specific question and response	MDH should evaluate use and need of question and responses.
12	Have you ever been married? □Yes □No	Does not align 1. Minnesota specific question and response	MDH should evaluate use and need of question and responses.

Minnesota-Specific Questions &Responses			
#	**Minnesota-Specific Question and Response**	**Analysis Summary**	**Recommendations**
13	If not married, has a paternity acknowledgment been completed for this child? □ Yes, a paternity acknowledgment has been completed □ No, a paternity acknowledgment has not been completed	Does not align 1. Minnesota specific question and response	MDH should evaluate use and need of question and responses.
14	26a. If other than the mother, what is the name of the person providing information for this worksheet? 26b. What is your relationship to the baby's mother □ Father of the baby □ Other relative □ Hospital employee □ Other, please specify	Does not align. 1. Questions on the Mother's Worksheet for Child's Birth Certificate (1/28/2004) only	MDH should evaluate use and need of question and responses.

Appendix I: Acknowledgements

The Minnesota Department of Health thanks the many members of the Minnesota e-Vital Records Advisory Group for their ideas, expertise, and time in developing this report. Please refer to Appendix C for a listing of the Advisory Group.

In addition, special thanks to:

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