HiTrack
EHDI Data Management System

Requirements for Data Linking with HiTrack EHDI Data Tracking and Follow-up Software

Revised 9/2025

The HiTrack data and patient information management system is designed to help hospitals and state agencies operate more efficient and successful newborn hearing screening programs, including timely and appropriate referral of infants to diagnosis and intervention. HiTrack does this by tracking infants throughout the early hearing detection and intervention process, compiling reports and reminders and generating letters to parents and physicians who need to be informed about results at various stages.

For these activities to occur, information about the infant's demographic characteristics, contact information, stage in the screening process, screening results, and certain program information such as screener name and hospital must be available in the HiTrack system. Although such information can be entered directly into HiTrack, much of this data may already be available in other sources. For example, leading manufacturers of comprehensive newborn hearing screening equipment have designed their software to collect this information during the screening process. Also, computer-based hospital records often contain demographic and contact information about the baby. By "linking" existing information to the HiTrack software, the data and patient management process is more efficient and accurate for the early hearing detection and intervention program staff.

The purpose of this document is to outline how linkage to HiTrack is best accomplished. The following topics are addressed:

1. The hearing screening process
2. Minimum required data elements to be collected for effective tracking
3. Two data linking formats available to send data to HiTrack
   a. The HiTrack importing and linking process using the Flat File method
   b. The HiTrack importing and linking process using the XML method
   c. File Location, Name and Patient Matching Criteria
4. Maintaining Compatible Pick Lists between HiTrack and the screening equipment data collection software.
5. The recommended process for testing a software link and coordinating ongoing technical assistance to mutual users.
6. Exporting data from HiTrack
7. Registration information

When you are ready to begin working on this linkage, contact HiTrack linking support at 435-797-3584 or at ncham.helpdesk@usu.edu The Help Desk will direct any inquires you may have to an appropriate support contact. Registration information about your product is needed to complete the link. This communication will also help you make sure that you have the most recent version of HiTrack for your testing procedures and so we can assist with your work.

Section #1: Overview of the Hearing Screening Process

The staff at HiTrack have worked with hundreds of hospitals over the past 20 years to implement successful EHDI programs. In doing so, they have learned that there are many different ways hospitals operate newborn hearing screening programs. They have also learned what the staff at most hospitals need to efficiently manage the data generated by such programs. To be appropriate for broad use, data collection and management tools must be able to accommodate the following types of protocols:

- Some hospitals use only OAE-based methods, others use only ABR-based methods, and others use a combination of OAE and ABR.

- Whatever technology or combination of technologies is being used, some hospitals complete the screening prior to hospital discharge, while many others do a “first stage” inpatient screen prior to discharge and a “second stage” outpatient screen after discharge.

- It is common practice for screeners to make multiple attempts to screen the same ear on the same infant, either as an inpatient or an outpatient. The program coordinator is usually only interested in tracking the best result for each ear at each stage, although some would like to save a history of all screening results.

- To pass hearing screening most programs require a bilateral pass during the same session. In other words, infants who pass one ear but not the other are usually referred for further screening or diagnostic procedures.

- Depending on the equipment being used, deciding whether the infant passes the screening test is sometimes done automatically by the screening equipment and sometimes by the screener or supervising audiologist. No matter which process is used to make this decision, for each child HiTrack needs:

    - ✔ the result, date and time of each ear tested (one left and one right)
    - ✔ a label designating the stage of screening (inpatient/outpatient)

- When patients leave the facility without being tested, no-result outcome codes are needed to account for the following situations:
    - Infants discharged prior to screening (Missed)
    - Deceased, Parental Refusal of Screening, Transferred Out
    - Appropriate dates are required when no-result codes are used.

Because of the variety of protocols used, the data collection software for screening equipment should enable users to:

- maintain a list by name, medical record number and date of birth of all babies who need to be screened (usually this is a listing of all live births).

- track which babies have completed screening, which are “in process,” and which have not been screened.

- provide a procedure for entering/scoring results (either automatically or manually) and identifying and storing at a minimum the “best” result for each ear in a way that is linked to the infant’s identifying information.

- know the date and time each test was done.

- recall and display the actual test results for a given child.

- know whether a particular result was collected at prior to hospital discharge (Inpatient) or after hospital discharge (Outpatient.)

- identify the type of procedure used to generate each result. (TEOAE, DPOAE, OAE or A-ABR)

Section #2: Minimum Required Data Elements

There are 14 required minimum data elements for the screening software to collect and export to HiTrack. These elements are essential for effective tracking of babies after screening. These data elements are the most accessible at the time of screening. Since HiTrack is often installed outside of the nursery, any data that is not exported by the screening software is less available to the program coordinator once the baby is discharged.

Smart hand held screening devices should collect critical data most available at the time of screening. Therefore, in addition to the linking requirements for the screening management software, a column has been provided below that includes essential data fields for the device.

Variable Name	***Flat File Field***	***XML Table and Field***	***Availability In Screening Management Software***	***Availability On Device***
Infant's last name*	CLAST	Baby.last_name	Required	Required
Infant's first name	CFIRST	Baby.first_name	Required	Required
Infant's date of birth*	CDOB	Baby.birth_datetime	Required	Required
Infant's medical record number*	CMID	Person_Assigned_Medical_ID.IDNumber	Required	Required
Infant's birth facility	HOSP_CODE	Baby.birthing_facility_id	Required	Optional
Infants birth order	MULTI_CODE	Baby.multiple, Baby.birth_order	Required	Optional
Infant's birth weight*	BW_GRAMS	Baby.weight	Required	Optional
Mother's full name	MLAST, MFIRST	Person.last_name Person.first_name (requires a Contact_Role)	Required	Recommended
Code/ID of screening site	SCRN_SITE	Event.facility_id	Required	Optional – Could be auto-filled by software
Code/ID of infant's Primary Care Provider	PE_ID	Contact_Role.contact_id	Required	Optional
Code/ID of Screener conducting test	INITSCRNRO, etc.	Test.screener_id	Required	Required
Stage of test: Inpatient/Outpatient	STAGE	Event.stage_code	Required	Required
Test Result, Date and Time for left and right ears including times	IRO, ILO or IRA, ILA, RSCRNTIME, LSCRNTIME	Test.result, .Test.test_date	Required	Required
Outcomes and status Dates for un-tested babies.	IRO, ILO	State_History_Record.transition_code, or Tracking_Status_History_Record.to_state	Required	Optional

* matching variable

It is also important to note that a small number of infants may leave the hospital without being screened. These infants also need to be entered into the screening/tracking database because screening programs need a record of all infants who were missed, or of those who did not pass the initial screening in both ears, so that parents can be contacted for rescreening at a later time. As discussed earlier, no-result outcome codes and dates should be used to reflect these situations.

Additionally there are a number of other variables that screening program coordinators often find convenient for screeners to enter at the time screening is performed. See Table 1 at the end of this document for a complete list of variables supported by Flat File exports.

A Primary Key (Globally Unique Identifier) value is required for each Baby and Contact when using the XML File format. See Section 3b for details on additional variables required for XML File exports.

Section #3: The HiTrack importing and linking process

There are two data linking formats available to send data to HiTrack. The drawbacks and benefits to each format are explained below:

	Option A: Flat File	***Option B: XML File***
Description	A text file where each pair of tests is represented by a full row of sequential comma separated values. Each row of data is delimited by a carriage return. Text is enclosed with double quotes.	A text file where values are enclosed by table name and field name delimiters as described in an XSD Schema file. Uniqueness is maintained in each table of data by a Primary Key consisting of a Globally Unique Identifier (GUID).
Benefits	✓ Simpler implementation.	✓ Provides a mechanism for exporting complex relational data to HiTrack without duplication or repeating rows. ✓ Ensures life-span uniqueness of patient and test data by requiring Primary Keys to be defined using Microsoft's Globally Unique Identifier data type (GUID). ✓ Includes Change Date & Time Columns so that advanced overwrite rules can be applied by HiTrack when merging rows. ✓ Microsoft .NET Framework support simplifies data structure creation and export. ✓ All fields are available to export to HiTrack. ✓ Industry standard data exchange format.
Drawbacks	✓ Non-relational. Identifying patient information must be repeated for each new set of tests, contact info or risk indicators. ✓ Only a sub-set of fields are available for import into HiTrack. ✓ Patient and Record uniqueness must be based on a combination of patient variables. This is problematic because identifying variable values may change due to data entry correction.	More difficult to implement, especially without using the .NET Framework.

Section #3a: Flat File Format

HiTrack imports screening software export data in a comma delimited ASCII format (*.txt). Column headers should not be included. Below are additional specifications for the various file elements, as well as some general formatting rules:

File Element	Format
Character fields	Delimited by double quotes
Date fields	YYYYMMDD
Time fields	HH:MM (24 Hour)
Boolean fields	Y or N
Field separator	Comma
Record separator	Carriage return/linefeed
End of file marker	1A hex or CHR(26) (if not already appended by your tools)

- ✓ Alphanumeric (text) fields MUST BE enclosed in double quotation marks (e.g., "some text"). The purpose of having text enclosed in double quotation marks is to prevent HiTrack from confusing a comma(s) included in the text with the commas used to separate the variable fields. Accordingly, if the comma is enclosed in double quotes, HiTrack will ignore the comma, thereby ensuring that it interprets the accurate data for each variable. **Any double quotes within user entered text must be removed**.
- ✓ Date and numeric fields SHOULD NOT be enclosed in double quotes.
- ✓ Strictly adhere to the order and number of fields as shown in Table 1 that contains a complete list of variables and their sequence.
- ✓ Records need to be separated with a carriage return/line feed, and an end of file marker needs to be sent.
- ✓ In the instances where data will not be written to a data field, a comma still needs to be included to denote the presence of a field.

Following is an example Flat File contents for the first four fields:

```
"8675309","Bon"       ,"Jack"     ,20191231
"8877069","Burroughs" ,"William"  ,20191222
```

Refer to Table 1 at the end of this document for exact column definitions and descriptions for the Flat File format.

Section #3b: XML File Format

The relational database structure for an XML file is contained in an XSD schema file. The following chart is a graphical representation of HiTrack's XSD schema file. Tables typically related to Screening are highlighted in yellow, but data may be exported for any one of the table elements.

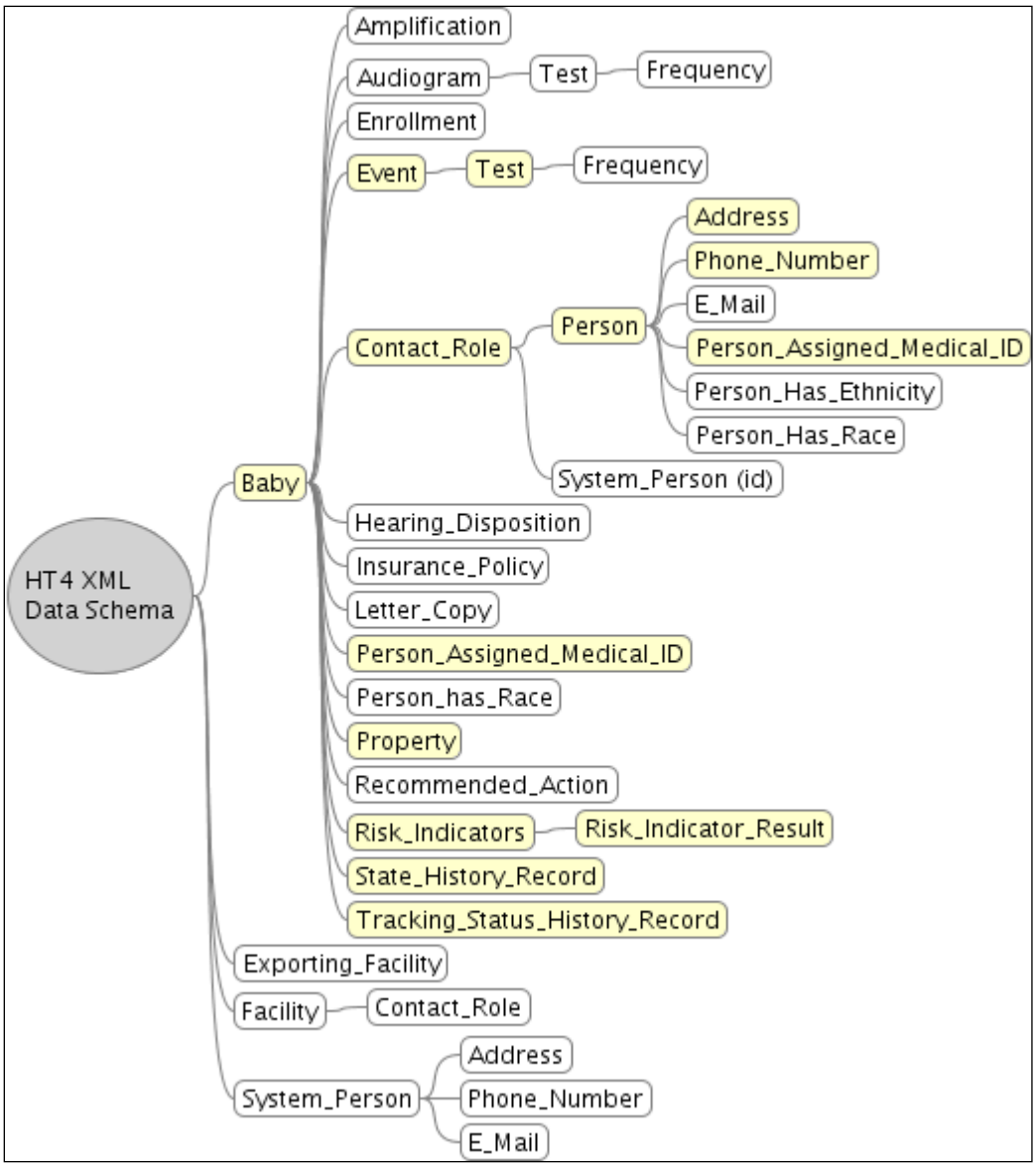


Figure 1

Please refer to the XSD Schema file for column names and information on primary keys and foreign keys.

XML Schema Notes:

- ✓ <Event> rows group a series of <Test>s done at the same stage on the same day.
- ✓ The "Property" table is used for baby Notes.
- ✓ Dates are formatted as "2002-10-10T12:00:00-05:00" (noon on 10 October 2002, Eastern Standard Time in the U.S.)
- ✓ Parents, Contacts and Physicians are associated with baby records using the <Contact Role> table, including what type of contact they are. See Table 3 for Contact Types. In the <Contact Role> table, <For Party Id> is a foreign key to Baby <id> and <Contact ID> is a foreign key to Person <id>.
- ✓ Refer to Appendix A for the XSD Schema file and an example XML file.
- ✓ More information on XML Schema can be found at the World Wide Web Consortium's XML Schema web page http://www.w3.org/XML/Schema

XML Not Tested Outcomes

The relational data model used by the XML File format allows for accurate representation of the complex relationships that exist in patient data including no-result outcomes. For infants without test results "State" and "Tracking" changes must be recorded in the "State History Record" and "Tracking Status History Record" tables.

Use the "State History Record" table to record when babies are "missed" (not tested prior to discharge) or to record babies who skipped screening and referred directly for audiological evaluation, with "M" and "E" as "Transition Code", respectively. This allows further tracking in HiTrack.

Use "Tracking Status History Record" to record when infants are not screened due to Parent Refusal, Demise or when screening is not yet complete because the infant is transferred to a different facility. Use "R","D" and "T" to represent the change of state to "Refused", "Deceased" and "Transferred Out" respectively.

For Deceased patients, <deceased> should be set to Y in the Baby Table, in addition to filling in the Deceased Date field.

XML Preferred Contact

A Contact Role for "Preferred Contact" should be included for baby contacts when contacts are sent. For example, if the Birth Mother is also the Preferred Contact, two "Contact Role" rows will exist for that baby and that contact, one with a "Birth Mother" type and the other with a "Preferred Contact" type.

XML Schema Required Fields

Some fields are required by the schema because they are Boolean non-null fields. The XSD schema contains the *full* list of required fields. These fields are noteworthy but repeated here for your convenience.

- ✓ <Baby>
  - <birthing_facility_id>
  - <deceased> "Y"/"N"
  - <deleted> "N" (Not used)
  - <parent_screening_consent> "U"
  - <parent_data_sharing_consent> "U"
  - <consent_given_verbally> "U"
  - <visibility> "1"
  - <multiple> "Y"/"N"
- ✓ <Person_Assigned_MedicalID>
  - <person_id> Baby or Person ID
  - <birth_id> (For a baby Med ID this is the same as the person_id)
  - <facility_id>
  - <IDNumber> Minimum Length 5 – Maximum Length 50.
- ✓ <Contact_Role>
  - <role_start> "Date"
- ✓ <Event>
  - <event_type> "S" = Screening, "D"= Diagnostic
  - <facility_id>
- ✓ <Person> & <System_Person>
  - <deceased> "Y"/"N"
  - <deleted> "N"
  - <visibility> "0"/"1"
- ✓ <Facility>
  - <is_person> "N"
  - <deleted> "N"
  - <visibility> "0"/"1"
- ✓ <Address>
  - <address_type> "D" (domestic)
  - <address_use> "M" (mailing)
- ✓ <Tracking_Status_History_Record>
  - <from_tstatus> "P" (In Progress)
  - <during_state> "I" (Inpatient)

Section #3c: File Location, Name and Patient Matching Criteria

File Location and File Name Standards

HiTrack can read data files from a removable device (i.e. floppy disk, flash drive) or from a pre-specified location on a local hard drive or network drive. Keep in mind, however, that many screening programs have more than one piece of screening equipment or want to have their database in a different location from their screening equipment.

For Flat File Format, the manufacturer and the HiTrack support team will need to select a mutually-agreeable name for the file ending with a TXT extension. (e.g., "youreqpt.txt")

For XML File Format, the manufacturer and the HiTrack support team will need to select a mutually-agreeable name ending with an XML extension. (e.g., "your_data_file.xml".)

After the data import procedure the file is renamed with a time-stamp (e.g. "your_data_file_xml_2019-07-19-12-00-01.old") to prevent test duplication and to help users keep a record of data files that have been imported.

Exact Matching Criteria – XML merges

After HiTrack imports baby data from an XML file, it will first check whether a baby record already exists in the existing HiTrack data by searching for a match on the unique <id> GUID value. (Matches on <id> are also checked for other tables in the XML Schema.) If no match is found for Baby <id>, then HiTrack will expand its matching approach using the same procedure used in Flat Files (see below).

When exporting additional tests for infants that were previously exported using XML, it is important to reuse the same previously used <id> value for that baby. This allows HiTrack to make exact matches when merging.

Expanded Matching Criteria – Flat File and unmatched records from XML merges

After HiTrack imports baby data from a Flat File, it will search for a matching existing record by checking **infant's medical record number, infant's last name, and infant's date of birth**. If an exact match is found on all three variables, HiTrack will add incoming result data to the matching baby record. If an exact match is not found on any of the three fields, a new baby record will be created.

Partial matches found during both XML and Flat Files are kept in a special "Pending Data" list. A HiTrack user can then investigate and resolve the matching issues at a later time.

Overwrite Rules

For XML Files field overwriting is done based on recency rules using the Change Date from the incoming row compared to the row already existing in HiTrack. Newer field value changes will overwrite rows with older dates. For Flat Files more reserved rules are used that only take in values for previously blank fields and append when it is not exactly matched.

Section #4: Maintaining Program Information Pick Lists Between HiTrack and the Screening Software

HiTrack uses “pick lists” (a.k.a. “drop-down menus”) for variables such as facility, type of nursery, physician name, screener name, etc. to save time and avoid confusion caused by different data entry conventions or different spellings of the same name. To maintain data integrity all of the pick lists in the screening software *must* contain the same possible values as those used in HiTrack.

Some HiTrack pick lists, such as those used to document screening outcomes, are static and do not change by site. Other pick lists are customizable and contain codes and definitions that are established by users to reflect their specific hospital staff and setup. HiTrack allows users to add to these lists to keep their software updated with current screening program participants, including the option to suppress retired entries that need to be retained for data integrity. The customizable pick lists are collectively known as "Program Information".

Another important reason for obtaining the pick lists from HiTrack is because many hospitals report their hearing screening data to state government agencies. At the state level is it important to know where the screening was done, who the physician is and other data described by program information. We recommend that manufacturers include this import feature in their software because the screening equipment software is often the "first stop" for these patient details used to generate letters and to aid in tracking.

Current pick lists for a facility can be obtained from HiTrack as a single XML file and as separate TXT flat files in one of these methods:

1. In the Merge Companion use the Equipment Linking menu from the Dashboard. This feature allows you to select a destination folder for HiTrack’s pick lists and gives a button to use to create the updated files.
2. In HiTrack’s user interface you can find Equipment Linking from System dashboard. This page generates different links for each of the different types of pick list files including an XML file.

Flat File Program Information Details:

HOSPITAL.TXT	(names of hospitals where screening is done)
NUR_TYPE.TXT	(type of nurseries, e.g., well-baby, NICU, etc.)
AUDNETID.TXT	(names of audiologists)
SCREENER.TXT	(names of screeners)
PEDNAMES.TXT	(names of physicians)

Note that all of the Flat File Program Information’s text files consist of a "Code" and "Definition" format except PEDNAMES.TXT. This file has separate columns for last name, first name and organization of each physician.

Refer to Table 5 for detailed Pick List format and usage information.

XML Program Information Details:

- ✓ The XML Program Information Schema is the same as the Schema used for patient information. Both HiTrack 4 and HiTrack 5 series support this XML Schema.
- ✓ Person entries such as Physicians, Screeners and Audiologists are maintained together in the <System_Person> table and are differentiated by their "System Use Type". (Refer to Table 4 for system use type values)
- ✓ Other Pick List items are shown in the diagram to the right.
- ✓ Each table has a <visibility> column that determines whether or not the user has decided to suppress the person or entry on the user interface. (1=Shown, 0=Suppressed)

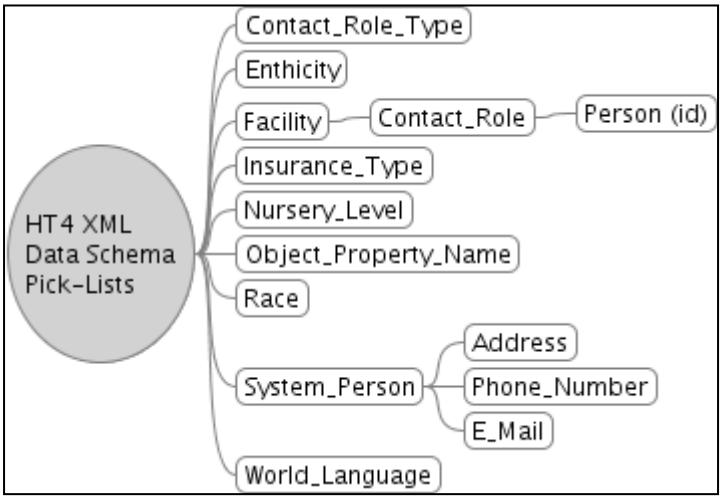


Figure 2: Overview of the HiTrack Program Information Schema

Section #5: Testing Software Links and Coordinating Technical Assistance

Even the most carefully planned and programmed software link needs to be rigorously tested so that bugs can be identified and fixed prior to a general software release. Allow at least two months between the completion of major programming work and any projected software release date.

Steps in software assessment include:

1. In-house alpha testing in which our testing staff attempt to break the software link by entering erroneous data in ways that mirror the data entry errors of screeners in real hospital settings. (This assumes that your software has completed a phase of testing within your organization where your own functionality specifications have been assessed.)

   This phase also includes cross training of HiTrack and equipment developer staff to provide future technical assistance to mutual users. In long-term planning screening equipment developers will be primarily responsible for providing technical assistance to future users on all aspects of the screening device and HiTrack support staff will answer all technical assistance questions related to HiTrack functions. However, it is our experience that user satisfaction with the link is increased significantly if support personnel on both sides become familiar with the screening software and the HiTrack software. During this phase HiTrack support staff and equipment manufacturers will also ideally work together to prepare documentation on the software link for distribution to end users.

   It is extremely helpful if screening equipment and software can be loaned to HiTrack support staff so that we can participate fully in testing the software link and in providing ongoing technical assistance to future mutual users on basic aspects of screening data entry and export. Note that on-loan devices are used only to evaluate data collection and export features in the screening equipment software.

2. After initial testing beta testing should be conducted with a small number of hospitals that use both the screening equipment and HiTrack.

2. After testing it is expected that equipment manufacturers and the HiTrack support staff will coordinate the date on which the corresponding software packages will be released, since in most cases end users must update both their screening and tracking software to use the link.

Note: The effectiveness of the manufacturers hearing testing technology or techniques are not reviewed by the HiTrack support staff at any part of this process.

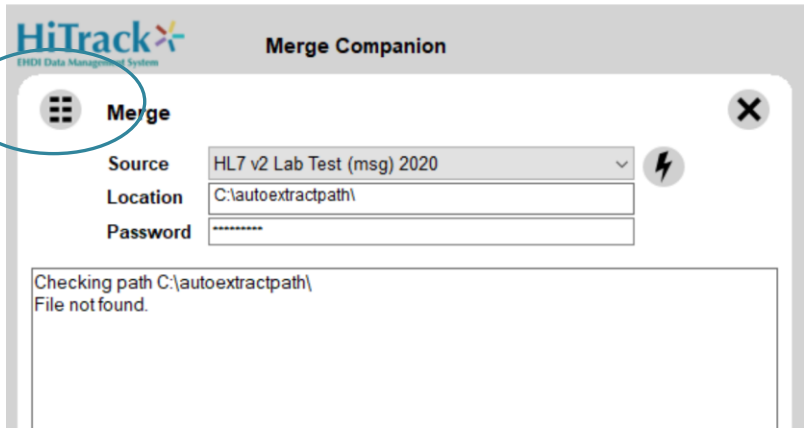
Section #6: Exporting data from HiTrack

In some cases it may be advantageous to export demographic data from HiTrack to be imported into the screening device software. The device software can then access this pre-populated list of infants to be screened.

Exporting from HiTrack

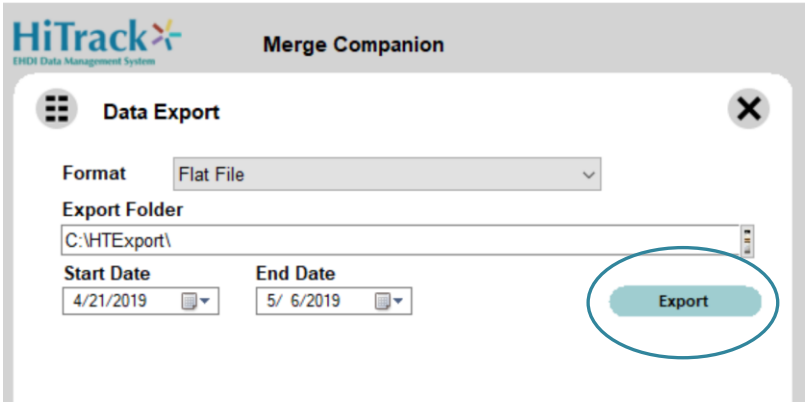
Using the Merge Companion to create an export file from HiTrack:

From the main panel click on the Dashboard icon.



Choose “Export Data” when the Dashboard appears.

Specify the desired export folder and DOB range. Click Export to create the file.



Section #7: Registration with the HiTrack Support team

Configuration settings must be established to allow the HiTrack software to import your data file. Please provide the following information:

1. Which types of tests can be performed? TPOAE, DPOAE, A-ABR, etc?
2. How would you like your equipment to show up in HiTrack? (i.e. what text should be shown in a drop-down list or menu?)
3. What mutually-agreeable filename do you plan to export your file as? (filename.txt or filename.xml)

Table 1: Flat File Data Structure for Importing to HiTrack

Required fields in **bold**.

#	*Field Name*	*Type*	*Size*	*Description*
1	**CMID**	Character	50	**Child medical ID** (min. length:5, max. length 50)
2	**CLAST**	Character	50	**Child last name**
3	CFIRST	Character	50	Child first name
4	SEX	Character	1	Child sex (M male; F=female)
5	**CDOB**	Date	8	**Child date of birth** (yyyymmdd)
6	CTOB	Character	5	Child time of birth (must be on 24-hour clock, hh:mm)
7	**MULTI_CODE**	Character	1	Child multiple birth code (S=single birth; multiple, A, B, C etc.)
8	RACE	Character	2	Child race (See Table 2)
9	COHORT	Character	2	(Include in data structure, but do not use)
10	**STAGE**	Character	1	**Inpatient or outpatient status** (I=Inpatient; O=Outpatient) If not designated, HiTrack assumes all data was collected on an inpatient basis.
11	**HOSP_CODE**	Character	3	Birth hospital code (User-customized pick list. HiTrack has the capability to allow users to automatically assign this variable to all incoming records during the import process if it is not already written to each infant's record by the screening software.)
12	**SCRN_SITE**	Character	3	Screening-site code (User-customized pick list. HiTrack has the capability to allow users to automatically assign this variable to all incoming records during the import process if it is not already written to each infant's record by the screening software.)
13	TYPE	Character	1	Nursery type (See Table 2)
14	**PE_ID**	Character	4	Pediatrician's ID (User-customized pick list)
15	INS_CODE	Character	2	Insurance code (See Table 2)
16	BW_LOCAL	Numeric	7	(Include in data structure, but do not use)
17	BW_TYPE	Character	1	(Include in data structure, but do not use)
18	**BW_GRAMS**	Numeric	5	Child's birth weight in grams.
19	**SCRN_TYPE**	Character	1	**Type of screening results (**O = TEOAE; D=DPOAE; G = Generic OAE; A = A-ABR. If screening equipment is capable of testing & sending more than one type, separate rows for the infant should be sent.)
20	**IRO**	Character	1	Right ear OAE result (See Table 2)
21	**IDRO**	Date	8	Right ear OAE test date (yyyymmdd)
22	IRODTA	Character	12	Screening data test number for right OAE
23	**INITSCRNRO**	Character	50	Right ear OAE screener ID
24	INAUDOAE_R	Character	3	Right ear OAE scoring audiologist ID
25	**ILO**	Character	1	Left ear OAE result (See Table 2)
26	**IDLO**	Date	8	Left ear OAE test date (yyyymmdd)
27	ILODTA	Character	12	Screening data test number for left OAE
28	**INITSCRNLO**	Character	50	Left ear OAE screener ID
29	INAUDOAE_L	Character	3	Left ear OAE scoring audiologist ID
30	**IRA**	Character	1	Right ear ABR result (See Table 2)

31	**IDRA**	Date	8	Right ear ABR test date (yyyymmdd)
32	IRADTA	Character	12	Screening data test number for right ABR
33	**INITSCRNRA**	Character	50	Right ear ABR screener ID
34	**ILA**	Character	1	Left ear ABR result (See Table 2)
35	**IDLA**	Date	8	Left ear ABR test date (yyyymmdd)
36	ILADTA	Character	12	Screening data test number for left ABR
37	**INITSCRNLA**	Character	50	Left ear ABR screener ID
38	INSCR_TIME	Numeric	6	(Include in data structure, but do not write to this field)
39	**MLAST**	Character	50	Mother last name
40	**MFIRST**	Character	50	Mother first name
41	MMAIDEN	Character	50	Mother maiden name
42	MIDNUM	Character	50	Mother ID number
43	MADD	Character	64	Mother first address line
44	MADD2	Character	64	Mother second address line
45	MCTY_TOWN	Character	32	Mother city and town
46	MSTATE	Character	2	Mother state
47	MZIP	Character	10	Mother zip code
48	M_PHONE	Character	13	Mother phone number
49	M_LANG	Character	2	Mother language (See Table 2)
50	M_BIRTH	Date	8	Mother date of birth (yyyymmdd)
51	TRKVAR1	Character	1	1st tracking variable
52	TRKVAR2	Character	1	2nd tracking variable
53	TRKVAR3	Character	15	Region unique ID number (BRN)
54	FX	Boolean	1	Risk indicator – family history (blank is allowed for all Risk Indicators, though column structure is required)
55	BW	Boolean	1	Risk indicator – birth weight <1500 grams (retired)
56	ME	Boolean	1	Risk indicator – Culture-Positive Postnatal Infections
57	OD	Boolean	1	Risk indicator – ototoxic medication (retired)
58	HL	Boolean	1	Risk indicator – stigmata, syndrome associated with loss (retired)
59	HY	Boolean	1	Risk indicator – hyperbilirubinemia (retired)
60	CI	Boolean	1	Risk indicator – In utero Infections
61	CF	Boolean	1	Risk indicator – cranio-facial anomalies
62	MV	Boolean	1	Risk indicator – mechanical ventilation (retired)
63	AP	Boolean	1	Risk indicator – abnormal apgar scores (retired)
64	OTHER	Character	20	Risk indicator – other risk indicators (retired)
65	ALTLAST	Character	50	Alternate contact last name
66	ALTFIRST	Character	50	Alternate contact first name
67	ALTADD	Character	30	Alternate contact first address line
68	ALTADD2	Character	30	Alternate contact second address line
69	ALT_MCTY	Character	16	Alternate contact city and town
70	ALT_STATE	Character	2	Alternate contact state
71	ALT_ZIP	Character	10	Alternate contact zip code

72	ALT_PHONE	Character	13	Alternate contact phone number
73	ALT_LANG	Character	2	Alternate contact language
74	ALT_RELAT	Character	2	Alternate contact relationship to baby. (See Table 3)
75	NOTES	Character	255	Additional notes
76	RILLNICU	Boolean	1	Risk indicator – illness or condition req. 48 hours+ to a NICU (retired)
77	RCAREGC	Boolean	1	Risk indicator – Caregiver Concern
78	RHEADT	Boolean	1	Risk indicator – Significant Head Trauma
79	ROMEFF	Boolean	1	Risk indicator – recurrent or otitis media w/ effusion for…3m (retired)
80	RSYNPHL	Boolean	1	Risk indicator – syndromes associated w/Progressive HL... (retired)
81	RNEONATI	Boolean	1	Risk indicator – neonatal ind. specifically hyperb, pers. ph associated w/mv, and cond. req. ECMO (retired)
82	-	Character	5	Reserved
83	-	Character	50	Reserved
84	-	Character	4	Reserved
85	-	Character	1	Reserved
86	-	Character	1	Reserved
87	-	Character	8	Reserved
88	-	Character	1	Reserved
89	-	Character	1	Reserved
90	-	Character	1	Reserved
91	-	Character	1	Reserved
92	-	Character	1	Reserved
93	-	Character	1	Reserved
94	MIR	Numeric	6	Right Impedance, Space delimited kOhm. Vert, Mast, Ground
95	MIL	Numeric	6	Left Impedance, Space delimited kOhm. Vert, Mast, Ground
96	MMR	Character	19	Right Ear Full Date and Time Test End including Seconds
97	MML	Character	19	Left Ear Full Date and Time Test End including Seconds
98	-	Character	5	Right Ear Test Duration in Seconds
99	-	Character	5	Left Ear Test Duration in Seconds
100	-	Character	5	Reserved
101	-	Character	5	Reserved
102	-	Character	5	Reserved
103	-	Character	5	Reserved
104	RSCRNTIME	Character	5	Right Ear Time of Screening (must be on 24-hour clock, hh:mm)
105	LSCRNTIME	Character	5	Left Ear Time of Screening (must be on 24-hour clock, hh:mm)
106	-			Reserved
107	-			Reserved
108	-			Reserved
109	-			Reserved
110	-			Reserved
111	GESTAGE			Child Gestational Age at Birth in Weeks

112	M_RACE	Character	2	Mother race (See Table 2)
113	ETHNICITY	GUID	36	Mother Ethnicity (See Table 5)
114	EDUCATION	GUID	36	Mother Education (See Table 5)
115	HTID	GUID	36	HiTrack Baby Primary Key GUID value. Sending this exact value will assure an automatic match. Sending new GUID values is allowed if they are unique values generated by the operating system or framework.
116	FID	GUID	36	HiTrack Facility Primary Key GUID value. **Must be a matching value from HiTrack's Facility List.**
117	HYAD	Boolean	1	Risk Ind. - Hyperbilirubinemia with exchange transfusion regardless of length of stay
118	AMAD	Boolean	1	Risk Ind. - Aminoglycoside administration for more than 5 days
119	AHIE	Boolean	1	Risk Ind. - Asphyxia or Hypoxic Ischemic Encephalopathy
120	ECMO	Boolean	1	Risk Ind. - Extracorporeal membrane oxygenation (ECMO)
121	CMV	Boolean	1	Risk Ind. - In utero infection with cytomegalovirus (CMV)
122	MZPBZ	Boolean	1	Risk Ind. - Mother + Zika and infant with no laboratory evidence & no clinical findings
123	MZPBP	Boolean	1	Risk Ind. - Mother + Zika and infant with laboratory evidence of Zika + clinical findings
124	MZPBN	Boolean	1	Risk Ind. - Mother + Zika and infant with laboratory evidence of Zika - clinical findings
125	CMCH	Boolean	1	Risk Ind. - Congenital microcephaly, congenital or acquired hydrophalus
126	TEMPBA	Boolean	1	Risk Ind. - Temporal bone abnormalities
127	PERINS	Boolean	1	Risk Ind. - Syndrome (of 400+) identified with atypical hearing threshold
128	POSTNS	Boolean	1	Reserved/Not used
129	WIC	Boolean	1	Mother participating in WIC
130	MOMADA	Boolean	1	ADA Communication Required
131	MVISORLANG	GUID	36	Mother Visual Oral Language (See Table 6)
132	SCRNCONSENT	Boolean	1	Parent Screening Consent
133	DATACONSENT	Boolean	1	Parent Data Sharing Consent
134	MEMAIL	Character	50	Mother Email Address

Table 2: Standard "Pick List" or "Drop-down menu" Code Values

Code	Variable Description
	RACE (Users can modify or add to this standard list)
01	Caucasian
02	Black or African American
03	Hispanic (Entry Retired – See Ethnicity Coding Below)
04	Asian Amer./Pacific Island
05	American Indian or Alaskan Native
R4	Asian Indian
R5	Chinese
R6	Filipino
R7	Japanese
R8	Korean
R9	Vietnamese
RA	Other Asian
RB	Native Hawaiian
RC	Guamanian or Chamorro
RD	Samoan
RE	Other Pacific Islander
98	Other
99	Unknown
	TYPE (Nursery type) (Users can modify or add to this standard list)
1	Well baby
2	Special Care - Level II
3	Special Care - Level III
4	Special Care - Level IV
5	Outpatient *(obsolete - do not use)*
	INS_CODE (Insurance) (Users can modify or add to this standard list)
01	Uninsured
02	Self Insured
03	Champus
04	Medical Assistance
1!	TriCare
2!	Medicaid
99	Unknown
	Screening Outcomes Flat File Fields: IRO, ILO, IRA, ILA (Right/Left OAE/ABR screening results columns) XML Field: Test <result>
1	**Pass** – pass criteria met.
2	**Refer** – pass criteria not met; referral for further screening or follow-up.
C	**Ear Not Testable** – attempt at screening made, but not completed (generally because the infant was not in a quiet or cooperative state). This is also used for Microtia/Atresia.
I	**Invalid** – screening criteria for valid testing were not met.

	Not-Tested Outcomes Flat File Fields: IRO, ILO, IRA, ILA (Right/Left OAE/ABR screening results columns) XML Fields: State_History_record <transition_code>, Tracking_Status_History_Record <to state>
M	**Missed** – no screening attempt made on either ear before discharge. (Inpatient screening only)
R	**Refused** – parents refused screening.
T	**Transferred** – infant transferred to another facility prior to screening.
D	**Deceased** – infant expired.
S	**Scheduled** – screening appointment has been scheduled. (Outpatient screening only)
B	**Broken Appointment** – parent did not return for scheduled appt. (Outpatient screening only)
L	**Locate/lost** – attempts to contact the family for follow-up have been unsuccessful but further attempts will be made. (Outpatient screening only)
X	**Follow-up Discontinued** – no further attempt will be made to conduct follow-up (i.e., family moved out of state, etc.)
E	**No Scrn->Dx**– no outpatient screening was attempted--the infant was referred directly for audiological evaluation. Used most frequently for NICU infants who require audiological evaluation prior to discharge. (Outpatient screening only)

	M_LANG and ALT_LANG (Mother's or Alternate Contact's Language) (Users can modify or add to this standard list)		
01	English	16	Yiddish
02	Spanish	17	Asian Indian Lang.
03	French	18	Filipino Lang.
04	Chinese Languages	19	Greek
05	Italian	20	Arabic
06	Portuguese	21	Serbo-Croatian
07	Hmong	22	Ukrainian
08	Mon-Khmer(Cambodian	23	Polish
09	Haitian Creole	24	Am Ind./Alaska Native Lang
10	Japanese	25	Farsi
11	German	26	Turkish
12	Vietnamese	27	Aramaic
13	Korean	28	Romanian
14	Dutch and Afrikaans	29	Armenian
15	Hebrew	30	Russian
		31	Thai and Laotian
		32	Hungarian
		99	Unknown

Table 3: Contact Role Type GUIDS and Codes

These values should be used in both the <Cotnact_Role>.<contact_role_type> column and the ALT_RELAT flat file column

Preferred Contact (for letters, phone calls, etc.)	CAAABBBB-FA1C-4398-9230-045D3CE59657	PC
Birth Mother	CAAABBBB-FA1C-4398-9230-045D3CE59642	MC
Father	CAAABBBB-FA1C-4398-9230-045D3CE59641	FC
Primary Care Provider	CAAABBBB-FA1C-4398-9230-045D3CE59645	PCP
Attending Physician	CAAABBBB-FA1C-4398-9230-045D3CE59646	AP
Attending Nurse	CAAABBBB-FA1C-4398-9230-045D3CE59647	AN
Legal Guardian	CAAABBBB-FA1C-4398-9230-045D3CE59643	G
Kin	CAAABBBB-FA1C-4398-9230-045D3CE59644	K
EI Service Provider	CAAABBBB-FA1C-4398-9230-045D3CE59648	EISP
Other Health Care Provider	CAAABBBB-FA1C-4398-9230-045D3CE59649	OCP

Foster Parent	CAAABBBB-FA1C-4398-9230-045D3CE59659	02
Grandparent	CAAABBBB-FA1C-4398-9230-045D3CE5965C	GR

Table 4: XML Program Info XML System Use Types

These values will be present in the Program Information XML export in the <System Person>.<system_use_type> column.

Physician	{CCCCCCCC-FA1C-4398-9230-045D3CE59641}
Audiologist (are also considered screeners)	{CCCCCCCC-FA1C-4398-9230-045D3CE59642}
Screener	{CCCCCCCC-FA1C-4398-9230-045D3CE59648}

Table 5: Other Codes

Risk Indicators

These codes should be used in the <Risk_Indicator_Result>.<indicator_id> XML Format column.

Family History	A0C0BBB1-FA1C-4398-9230-045D3CE59601
Cranio-facial Anomalies	A0C0BBB1-FA1C-4398-9230-045D3CE59603
In utero Infections	A0C0BBB1-FA1C-4398-9230-045D3CE59604
Culture-Positive Postnatal Infections	A0C0BBB1-FA1C-4398-9230-045D3CE59606
Neonatal Intensive Care	A0C0BBB1-FA1C-4398-9230-045D3CE5960A
Chemotherapy	A0C0BBB1-FA1C-4398-9230-045D3CE5960B
Caregiver Concern	A0C0BBB1-FA1C-4398-9230-045D3CE59612
Significant Head Trauma	A0C0BBB1-FA1C-4398-9230-045D3CE59615
Hyperbilirubinemia Any Duration	A0C0BBB1-FA1C-4398-9230-045D3CE59618
Aminoglycoside Administration >5d	A0C0BBB1-FA1C-4398-9230-045D3CE59619
Asphyxia or Hypoxic Ischemic Encephalopathy	A0C0BBB1-FA1C-4398-9230-045D3CE5961A
ECMO	A0C0BBB1-FA1C-4398-9230-045D3CE5961B
CMV	A0C0BBB1-FA1C-4398-9230-045D3CE5961C
Mother + Zika; Infant no findings	A0C0BBB1-FA1C-4398-9230-045D3CE5961D
Mother + Zika; Infant w/Zika +	A0C0BBB1-FA1C-4398-9230-045D3CE5961E
Mother + Zika; Infant w/Zika -	A0C0BBB1-FA1C-4398-9230-045D3CE5961F
Congenital microcephaly, congenital or acquired hydrophalus	A0C0BBB1-FA1C-4398-9230-045D3CE59620
Temporal Bone Abnormalities	A0C0BBB1-FA1C-4398-9230-045D3CE59621
Syndrome	A0C0BBB1-FA1C-4398-9230-045D3CE59622

Ethnicity Codes

These values should be used in both the <Person_Has_Ethnicity>.<ethnicity_code> column and the ETHNICITY flat file column

Hispanic or Latino	EEEEBBBB-FA1C-4398-9230-045D3CE5ABE0
Not Hispanic or Latino	EEEEBBBB-FA1C-4398-9230-045D3CE5ABE1
Unknown	EEEEBBBB-FA1C-4398-9230-045D3CE5ABE3

Education Level Codes

These values should be used in both the <Person>.<education_level> column and the EDUCATION flat file column

College Graduate or above (entry retired)	eded6464-f022-1e7e-1479-4e91d70dd004
High School Graduate or GED	eded6464-f022-1e7e-1479-4e91d70dd002
Less than High School	eded6464-f022-1e7e-1479-4e91d70dd001
Some College or AA/AS degree	eded6464-f022-1e7e-1479-4e91d70dd003
Bachelor's Degree (e.g. BA, BS)	eded6464-f022-1e7e-1479-4e91d70dd006
Master's Degree (e.g. MA, MS)	eded6464-f022-1e7e-1479-4e91d70dd008

Doctorate Degree (e.g. Ph.D, EdD, JD)	eded6464-f022-1e7e-1479-4e91d70dd007
Unknown	eded6464-f022-1e7e-1479-4e91d70dd005

Visual / Oral Language Codes

American Sign Language	A54DB2FE-ACA3-42C0-97B9-79CFB0CB5A00
Cued Speech	A54DB2FE-ACA3-42C0-97B9-79CFB0CB5A01
Other (See Notes)	A54DB2FE-ACA3-42C0-97B9-79CFB0CB5A02
Oral - Same as Written	A54DB2FE-ACA3-42C0-97B9-79CFB0CB5A03
Total Communication	A54DB2FE-ACA3-42C0-97B9-79CFB0CB5A04

Table 6 Customizable "Pick List" Flat File structures (Schema.ini entries)

(Obsolete fields are marked in grey)

Pick List	Notes	File & Schema
Birthing and Screening Facility List	DEFINITION contains Facility Name.	[hospital.txt] ColNameHeader=False Format=Delimited(,) CharacterSet=ANSI DecimalSymbol=. Col1=CODE Char Width 3 Col2=DEFINITION Char Width 25 *Col3=SHOW Char Width 1* *Col4=ORDER Integer* *Col5=StateCode Char Width 5*
Nursery Types/Levels	DEFINITION contains Type/Level name.	[nur_type.txt] ColNameHeader=False Format=Delimited(,) CharacterSet=ANSI DecimalSymbol=. Col1=CODE Char Width 1 Col2=DEFINITION Char Width 30 *Col3=ORDER Integer* *Col4=SHOW Char Width 1*
Audiologist List	DEFINITION contains user formatted audiologist name.	[audnetid.txt] ColNameHeader=False Format=Delimited(,) CharacterSet=ANSI DecimalSymbol=. Col1=CODE Char Width 3 Col2=DEFINITION Char Width 25 *Col3=ORDER Integer* *Col4=SHOW Char Width 1* *Col5=AUD_SIG Char Width 3*
Screener List	DEFINITION contains user formatted screener name.	[SCREENER.TXT] ColNameHeader=False Format=Delimited(,) CharacterSet=ANSI DecimalSymbol=. Col1=CODE Char Width 3 Col2=DEFINITION Char Width 25 *Col3=ORDER Integer* *Col4=SHOW Char Width 1*
Physician List	Physician name separated into PE_LAST, PE_FIRST and PE_ORG. Name concatenation of "First, Last - Organization" is required to uniquely display physicians in your software.	[pednames.txt] ColNameHeader=False Format=Delimited(,) CharacterSet=ANSI DecimalSymbol=. Col1=PE_ID Char Width 4 Col2=PE_LAST Char Width 30 Col3=PE_FIRST Char Width 30 Col4=PE_ORG Char Width 30 Col5=PE_ADD1 Char Width 30 Col6=PE_ADD2 Char Width 30 Col7=PE_CITY Char Width 16 Col8=PE_STATE Char Width 20 Col9=PE_ZIP Char Width 19 Col10=PE_PHONE1 Char Width 19 Col11=PE_PHONE2 Char Width 19 *Col12=SHOW Char Width 1* *Col13=MARKED Integer*

Insurance Type List	List of types of insurances. DEFINITION – Column 4 contains the insurance descriptions.	[ins_prog.txt] ColNameHeader=False Format=Delimited(,) CharacterSet=ANSI DecimalSymbol=. Col1=CODE Char Width 2 Col2=ORDER Integer Col3=SHOW Bit Col4=DEFINITION Char Width 25

Appendix A. Example XML File.

Example XML File contents

```
<?xml version="1.0" standalone="yes"?>
<dsHT4Merge xmlns="http://www.tempuri.org/dsHT4Merge.xsd">
  <Baby>
    <id>8f391c7c-c291-48ec-adc7-997b00b4d6c6</id>
    <nursery_level_code>eeeeeeee-fa1c-4398-9230-045d3ce59640</nursery_level_code>
    <current_location>room A</current_location>
    <parent_screening_consent>N</parent_screening_consent>
    <parent_data_sharing_consent>N</parent_data_sharing_consent>
    <consent_given_verbally>U</consent_given_verbally>
    <responsible_facility>57159186-b6d0-422d-924b-997600c08079</responsible_facility>
    <data_entry_complete>Y</data_entry_complete>
    <deceased>N</deceased>
    <last_name>Test</last_name>
    <first_name>Child</first_name>
    <middle_names></middle_names>
    <gender>F</gender>
    <visibility>1</visibility>
    <deleted>N</deleted>
    <change_user_id>jf</change_user_id>
    <change_datetime>2007-07-30T11:03:27.34-06:00</change_datetime>
    <gestation_period>30</gestation_period>
    <birth_datetime>2007-06-01T00:00:00-06:00</birth_datetime>
    <weight>4881</weight>
    <multiple>N</multiple>
    <birth_order>0</birth_order>
    <birthing_facility_id>57159186-b6d0-422d-924b-997600c08079</birthing_facility_id>
    <birth_datetime_option>3</birth_datetime_option>
    <baby_ehdi_stage>bbbbbbbb-fa1c-4398-9230-045d3ce59655</baby_ehdi_stage>
    <tracking_status>ad105d1a-b10f-ace0-0000-000000000001</tracking_status>
    <source_facility>57159186-b6d0-422d-924b-997600c08079</source_facility>
  </Baby>
  <Contact_Role>
    <contact_id>d0688ed2-c22e-45ce-8bfa-997b00b4d77d</contact_id>
    <for_party_id>8f391c7c-c291-48ec-adc7-997b00b4d6c6</for_party_id>
    <contact_role_type>caaabbbb-fa1c-4398-9230-045d3ce59642</contact_role_type>
    <role_start>2007-07-30T10:58:25.86-06:00</role_start>
    <change_datetime>2007-07-30T10:58:25.857-06:00</change_datetime>
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  </Contact_Role>
  <Contact_Role>
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  <Contact_Role>
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    <for_party_id>8f391c7c-c291-48ec-adc7-997b00b4d6c6</for_party_id>
    <contact_role_type>caaabbbb-fa1c-4398-9230-045d3ce59645</contact_role_type>
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    <change_datetime>2007-07-30T10:59:51.593-06:00</change_datetime>
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  </Contact_Role>
  <Event>
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    <baby_id>8f391c7c-c291-48ec-adc7-997b00b4d6c6</baby_id>
    <facility_id>57159186-b6d0-422d-924b-997600c08079</facility_id>
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    <stage_code>bbbbbbbb-fa1c-4398-9230-045d3ce59643</stage_code>
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```

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</Event>
<Event>
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  <baby_id>8f391c7c-c291-48ec-adc7-997b00b4d6c6</baby_id>
  <facility_id>57159186-b6d0-422d-924b-997600c08079</facility_id>
  <medical_person_id>cce11a6d-3965-4d59-8cd4-997b00b52bbc</medical_person_id>
  <event_status_code>ee00bbbb-fa1c-4398-9230-045d3ce59604</event_status_code>
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</Event>
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  <party_name>Logan Memorial Hospital</party_name>
  <visibility>1</visibility>
  <deleted>N</deleted>
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  <change_user_id>jf</change_user_id>
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</Facility>
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  <IDNumber>AAAAAA8</IDNumber>
  <person_id>8f391c7c-c291-48ec-adc7-997b00b4d6c6</person_id>
  <birth_id>8f391c7c-c291-48ec-adc7-997b00b4d6c6</birth_id>
  <facility_id>57159186-b6d0-422d-924b-997600c08079</facility_id>
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  <change_user_id>jf</change_user_id>
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  <deceased>N</deceased>
  <last_name>Test</last_name>
  <first_name>Parent</first_name>
  <party_name>Parent Test</party_name>
  <visibility>1</visibility>
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  <last_name>Moss</last_name>
  <first_name>George</first_name>
  <suffix>Ph. D.</suffix>
  <honorific>Dr.</honorific>
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  <last_name>Regal</last_name>
  <first_name>Nancy</first_name>
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  <party_name>Nancy Regal</party_name>
  <visibility>1</visibility>
  <deleted>N</deleted>
  <change_user_id>jf</change_user_id>
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  <last_name>Washington</last_name>
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