Collect and Match: The Essentials to a Functional Data Wardrobe

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Background

Manual reporting of hearing screening results is a time consuming process and prone to data entry error, often resulting in delayed reporting and identification of hearing loss. Oregon Health and Science University (OHSU) and the Oregon Early Hearing Detection and Intervention (EHDI) program have developed a direct electronic transfer (Figure 1) of newborn hearing screening results and patient specific demographic information. This data is automatically extracted from Electronic Health Records (EHR) to the Oregon EHDI database where it is matched to patient files reported by the Oregon Birth Certificate registry. A complicated matching algorithm (Table 1) has yielded a high match rate, improving timely reporting and eliminating redundant data entry, however infrequent matching errors persist.

Objectives

- Identify matching errors.
- Track time needed to review and correct files.
- Identify solutions to eliminate errors

Methods

51 unique unmatched files were reviewed in EHR and the birth certificate registry to identify matching error(s)

Figure 1: Direct Electronic Transfer

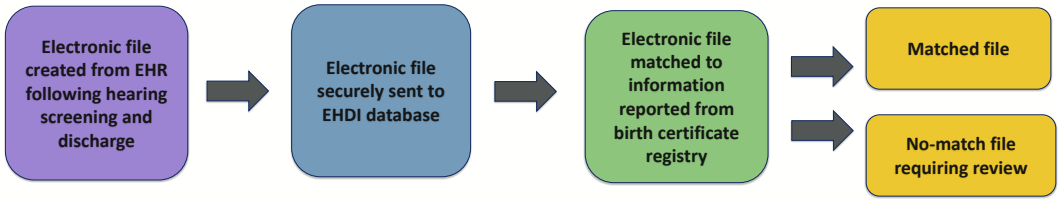
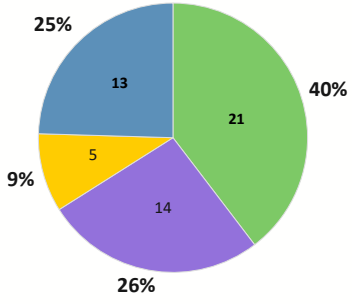


Table 1: Patient Demographic Matching Algorithm

OHSU EHR		EHDI/Birth Certificate
1. Child's MRN + DOB	Strongest Match	1. Child's MRN + DOB
2. Transfer ID (Birth Hospital MRN) + DOB		2. Transfer ID (Birth Hospital MRN) +DOB
3. Child's Last Name + Child's First Name + DOB + Gender		3. Child's Last Name + Child's First Name + DOB +Gender
4. Child's Last Name + DOB + Gender		4. Child's Last Name + DOB + Gender
5. Child's Last Name + DOB + Gender		5. Mother's Last/Legal Name + DOB + Gender
6. Child's Last Name + DOB + Gender		6. Mother's Maiden Name + DOB + Gender
7. Mother's Maiden Name + DOB + Gender		7. Child's Last Name + DOB + Gender
8. Mother's Maiden Name + DOB + Gender		8. Mother's Legal/Last Name + DOB + Gender
9. Mother's Maiden Name + DOB + Gender	Weakest Match	9. Mother's Maiden Name + DOB + Gender

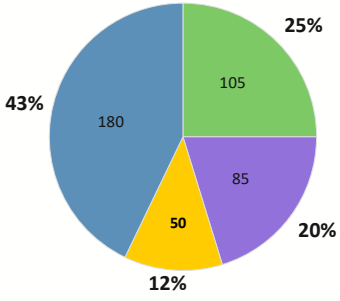
Figure 2: Data Matching Errors



n=53 files

(n=53 as some files contained multiple errors)

Figure 3: Time Spent Investigating Errors



n= 420 minutes

Results

Approximately 7 hours were required to investigate and correct data matching errors for the 51 records. The most frequent errors were related to unforeseen algorithm data extraction issues including neonatal demise (21) and out-of-state transfers (14) (Figure 2). The remainder were attributed to data collection and entry errors such as name errors (13) and MRN errors (9), which required the most time to investigate and correct (figure 3). While some errors are to be expected with manual data entry, mitigating these errors appears the be the largest challenge moving forward, as algorithm issues can be reduced with the use of improved data extraction.

Recommendations

Neonatal Demise

- **EHDI:** Update data use agreement to include records of deceased patients.
- **OHSU:** Include "deceased" flag in patient demographic information.

Out-of-State Transfer

- **OHSU:** Include "birth facility" flag in patient demographic information.

MRN/Name Errors

- **EHDI/OHSU:** Implement consistent data collection and entry processes.

Acknowledgments

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