Approach and Challenges to Implementing Electronic Data Transmission (EDT) for Newborn Screening in a State with Greater than 100 Birth Hospitals

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(2) Neometrics, a division of Natus Medical Incorporated
(3) New York State Department of Health, Division of Family Health
Objective

To share NYS experience during implementation of electronic data transmission (EDT)

EDT:
• Hospital demographic information transmitted electronically to Newborn Screening Program
• Screening results electronically transmitted back to hospitals (Optional via HL7 messaging).
Background

- New York State births/year: ~250,000
- 140 hospitals throughout state

**Basic Terminology:**

ADT = Admit Discharge Transfer: Contains patient demographic information from admissions/discharge/transfer information

ORM = Order message (contains ADT information and all other information on sample collection card)

ORU = Order Result Message (observation result): screen result going back to hospital
# Team Approach

<table>
<thead>
<tr>
<th>Hospital Staff</th>
<th>Department of Health Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursery</td>
<td>Data Entry</td>
</tr>
<tr>
<td>Laboratory</td>
<td>Accessioning</td>
</tr>
<tr>
<td>IT</td>
<td>Project management</td>
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<tr>
<td></td>
<td>IT:</td>
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<tr>
<td></td>
<td>- HL7 expertise</td>
</tr>
<tr>
<td></td>
<td>- Data transfer expertise</td>
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</tbody>
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**Strong vendor support**
Collection Form

Notes:

• Data collected at various times
• Some information on card is not housed in hospital database
• Card used as a data collection device
• Information on card transcribed from various sources of data within hospital
• Spot for label
Why Implement EDT?

Demographic Data:
- Reduce transcription errors:
  - data in hospital database transcribed to card
  - data on card entered into NBS database
- Electronic tracking of samples submitted by hospital
- Initiate a NBS order by the hospital

Newborn Screening Data:
- Data relayed directly to hospital database
- Reduce paper
- Electronic medical records
- Data can be shared with other sources (PCP/Specialist)

Meaningful use!
NYS Approach

• Surveys sent to hospitals to determine HL7 readiness

• Large hospitals that were “HL7 ready” were approached

• Hospitals were provided with documentation describing three EDT options
EDT Options

1. “Fully Automatic” (ORM/ORU HL7)*
2. “Remote Demographic Entry” (RDE): a web-based data entry application developed by Neometrics
3. “Semi-automatic” (combination of ADT HL7 & web-based data entry via RDE)

*Note: Currently can only provide hospitals with screening results if option 1 is chosen
<table>
<thead>
<tr>
<th>Hospital Ordering and Submitting NBS specimens</th>
<th>RDE</th>
<th>ADT</th>
<th>HL7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handwrite infant’s last name on blood card – and data collected on card if card used as collection tool</td>
<td>Handwrite infant’s last name on card</td>
<td>Handwrite infant’s last name on card</td>
<td></td>
</tr>
<tr>
<td>Hospitals staff enter all data into RDE web based form</td>
<td>Health Information System sends ADT file to DOH; pre-populates RDE form, hospital staff fills in “missing” data</td>
<td>Health Information System sends ADT and clinical data via ORM/HL7 message</td>
<td></td>
</tr>
<tr>
<td>Affix RDE-generated label to blood card (optional)</td>
<td>Affix RDE-generated label to blood card</td>
<td>Affix hospital configured/generated label to form</td>
<td></td>
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</tbody>
</table>
## Benefits

<table>
<thead>
<tr>
<th></th>
<th>RDE</th>
<th>ADT</th>
<th>HL7</th>
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</thead>
<tbody>
<tr>
<td>Benefits</td>
<td>Simple, web accessed system</td>
<td>Limited manual data entry</td>
<td>Minimal or no data entry</td>
</tr>
<tr>
<td></td>
<td>Low tech solution for hospitals-limited IT resource usage</td>
<td>Less risk of data errors from user entry</td>
<td>Message standardization = lowest risk of ongoing errors</td>
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<tr>
<td></td>
<td>NBS Program changes to application and data collected on blood card are centrally managed by DOH vendor, requires no effort from hospitals</td>
<td>Data in hospital database does not have to be reentered by hospital staff</td>
<td>Most time savings for hospital users-automated processes</td>
</tr>
<tr>
<td></td>
<td>Easiest and fastest implementation</td>
<td>Moderate time saving for hospital staff</td>
<td>Screen data can be electronically transferred to hospital via ORU</td>
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<tr>
<td></td>
<td>Recommended for small hospitals.</td>
<td>Little additional programming involved</td>
<td>Recommended for large hospitals.</td>
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</table>
## Limitations/Challenges

<table>
<thead>
<tr>
<th>RDE</th>
<th>ADT</th>
<th>HL7</th>
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<tbody>
<tr>
<td>Label not very helpful – hospitals still use blood collection form to collect patient information</td>
<td>Little interest in this method</td>
<td>Requires full understanding of HL7 messaging</td>
</tr>
<tr>
<td>Data entry work shifted to hospital</td>
<td>Requires strong understanding of HL7 messaging</td>
<td>Not all required data is in hospital database, hospitals developed supplemental tool</td>
</tr>
<tr>
<td>Hospital staff must access web</td>
<td>Hospital staff must access web</td>
<td>Timing of EDT orders and error resolution</td>
</tr>
<tr>
<td>Difficult to implement in large hospitals; training</td>
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<td>Transition from paper to electronic system</td>
</tr>
<tr>
<td>Hospital will not receive electronic NBS results</td>
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Results

• Five hospitals are using ORM HL7 messaging (5.7% of specimens)
• Fifteen hospitals are transmitting data via RDE (11.3% of specimens)
• One hospital is implementing ADT HL7 <1%
• Two hospitals are consuming NBS results from ORU message
• Combined the NBS Program receive ~17-18% of specimen demographic information electronically
Lessons Learned (1)

Hospitals and the NBS Program were impacted

- Changes required in hospital and NBS workflow
- What is in it for hospitals/especially affected staff
- Challenging to keep hospital staff trained in data entry requirements
- Need more internal data checks built into hospital data entry screens
- Some NBS data elements were not in the hospital electronic medical record
- Hospital practices should change: collect data electronically at varied stations
Lessons Learned (2)

• Lack of staffing at hospitals and hospitals undergoing changes to databases were common issues
• Highly recommend a visit to each hospital to understand their workflow
• Separate EMRs (and different systems) for the mother and baby were commonly encountered
• NBS Program changes to blood collection card needs to be scheduled and permit backward capability
• Emphasis should be on quality not quantity, otherwise your data entry staff will be overwhelmed with errors
• Try to get buy in from Medical Record Providers –include data collection screens for use at multiple institutions

• Label must include information needed to process the sample (DOB, date sampled, birth weight, hospital): THINK COOP.
Conclusions

• Need strong IT support

• Significant challenges to program and hospitals
  – The inability to verify data creates a higher risk of errors; need to ensure the most important data is accurate

• The current implementation plan is undergoing assessment for improvements and the project is expected to net benefits for infants, hospitals and the Program

• Need to change mindset of hospital and NBS staff from paper based to electronic based data collection
Acknowledgments/Questions

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HL7 Team: Kathleen Fiato, Thomas Heckert, Lisa Hein, Tricy Thomas, Christopher Johnson

RDE Team: Amanda Kufs, Bryan LaPlante, Mary Graziano

Thank You