

Use of Hospital-specific Cutoffs to Evaluate NBS Specimen Transit Time

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Introduction

Delays in blood spot specimen arrival at a state newborn screening (NBS) laboratory may contribute to irreversible health problems for infants with a disorder requiring immediate diagnosis and treatment. Prompt pickup and delivery of NBS specimens reduces turnaround time from birth to reporting of results and initiation of treatment.

Michigan's NBS Program works with birthing units to assure specimens are picked up by the state-funded courier services and delivered to the NBS laboratory the next business day. All birthing units in Michigan have Monday-Friday and either Saturday or Sunday courier service.

The NBS Program provides each birthing unit with a quarterly report that includes data on performance metrics related to the NBS process. One measure was percent of specimens received in the State NBS Laboratory within three days of collection. Using one cutoff for the entire state limited the ability to adjust for weekends and varying specimen pickup days and times. Thus, the NBS Program created hospital-specific cutoffs for evaluating specimen transit time to allow better monitoring of transit time by both the NBS Program and birthing units and the ability to pinpoint hospital-related factors that contribute to delays.

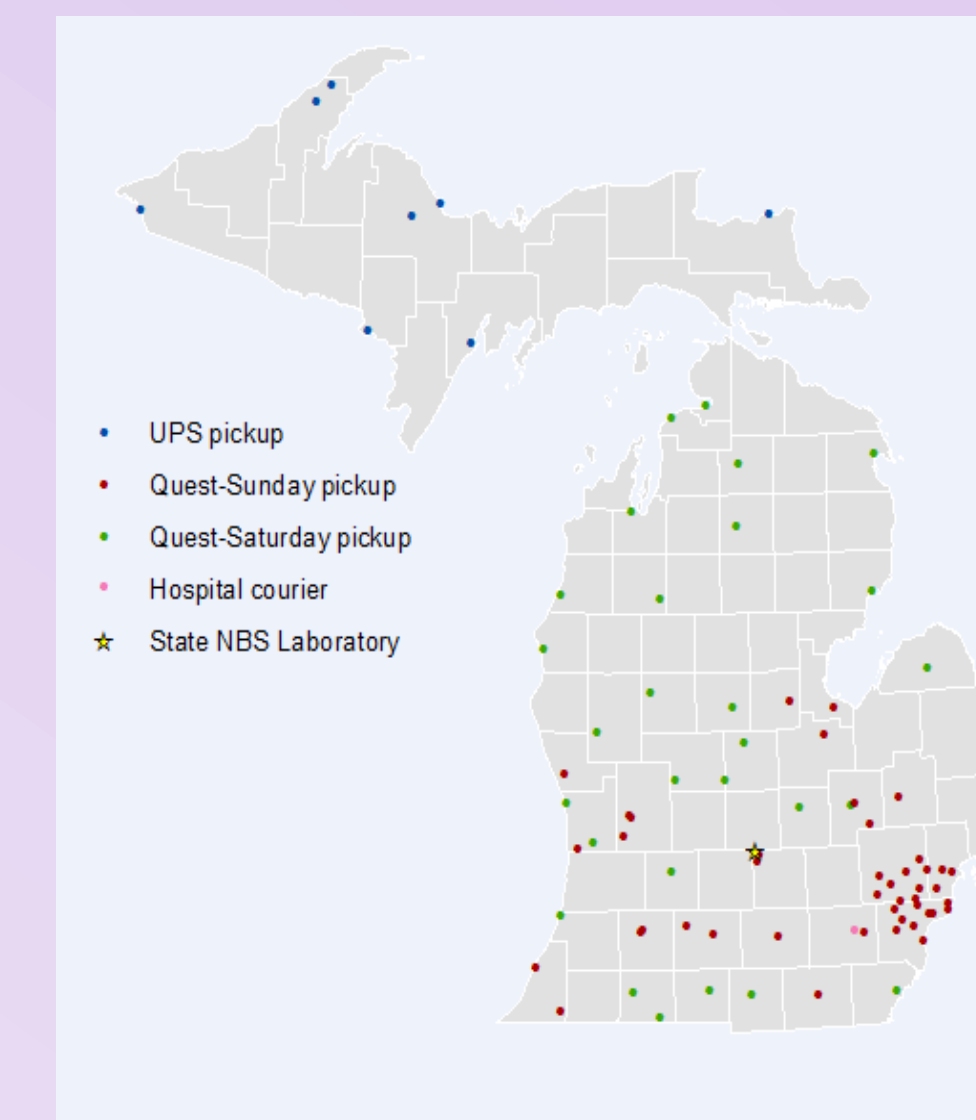
Methods

NBS Program staff created a database that documents the specimen pickup time for Monday-Friday and the weekend day and time for every birthing unit in the state. The NBS nurse consultant maintains this database and updates the information when changes occur.

Birthing units are advised to dry NBS specimens for at least 3 hours according to Clinical Laboratory Standards Institute guidelines. Since additional time may be needed to prepare specimens for shipping and transport specimens to the designated pickup location in the hospital, we allowed a 5-hour cushion between specimen collection time and the earliest possible pickup time.

We then developed hospital-specific cutoffs for determining whether specimens were received in the NBS laboratory on or before the appropriate day based on specimen collection time and each hospital's courier pickup days and times.

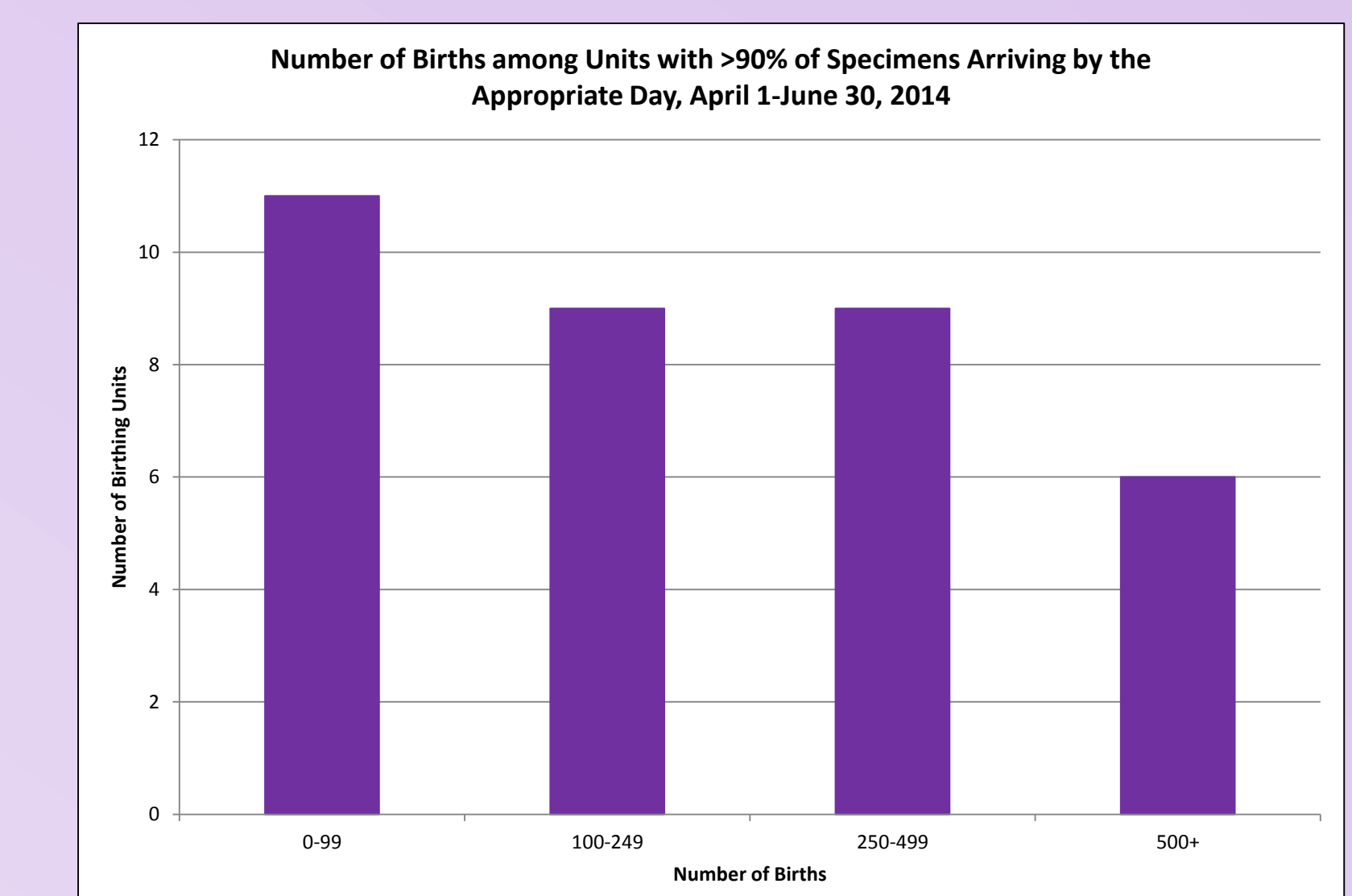
All first sample NBS specimens submitted by Michigan hospitals for infants born from April 1 through June 30, 2014 were included in this analysis.



Results

- The figure to the left shows the geographic distribution of Michigan's birthing hospitals and the State NBS Laboratory, as well as each hospital's courier and weekend pickup day. Since Quest only provides service in the Lower Peninsula Monday-Saturday, the NBS Program uses 3 couriers to cover the entire state for weekdays and weekends. Of the 84 birthing hospitals, 29 used Quest for Monday-Saturday pickup, 46 used Quest for Monday-Friday pickup and A1 International for Sunday pickup, and the 8 hospitals in the Upper Peninsula used UPS for Monday-Saturday pickup. One hospital used its own courier.
- Of the 26,523 first sample specimens, 20,855 (79%) were received in the NBS laboratory on or before the appropriate day.

- Of the 117 birthing units, which include regular nurseries, neonatal intensive care units (NICUs), and special care nurseries (SCNs), 35 (30%) had >90% of their specimens received on or before the appropriate day. These 35 units included 4 NICUs, 2 SCNs, and 29 regular nurseries.
- The hospital units meeting the goal varied in size (see graph to the right). The smallest regular nursery meeting the goal had fewer than 50 births and the largest nursery had over 1,000 births during the quarter. Units meeting the goal submitted an average of 283 specimens during the quarter.
- Birthing units meeting the goal of 90% of specimens arriving on or before the appropriate day had geographic variability, with hospitals throughout the Lower Peninsula meeting the goal. Thus far, no hospitals in the Upper Peninsula have met the goal, though several are close.



Examples of Hospital-specific Cutoffs

Saturday courier service:

Assume Hospital 1 has pickup Monday-Friday at 5:00 pm and Saturday at 1:00 pm:

Specimen Collection Time	Should arrive on or before*
Friday after 12:00 pm - Saturday at 8:00 am	Monday
Saturday after 8:00 am - Monday at 12:00 pm	Tuesday
Monday after 12:00 pm - Tuesday at 12:00 pm	Wednesday
Tuesday after 12:00 pm - Wednesday at 12:00 pm	Thursday
Wednesday after 12:00 pm - Thursday at 12:00 pm	Friday
Thursday after 12:00 pm - Friday at 12:00 pm	Saturday

Sunday courier service:

Assume Hospital 2 has pickup Monday-Friday at 9:00 pm and Sunday at 3:00 pm:

Specimen Collection Time	Should arrive on or before*
Friday after 4:00 pm - Sunday at 10:00 am	Monday
Sunday after 10:00 am - Monday at 4:00 pm	Tuesday
Monday after 4:00 pm - Tuesday at 4:00 pm	Wednesday
Tuesday after 4:00 pm - Wednesday at 4:00 pm	Thursday
Wednesday after 4:00 pm - Thursday at 4:00 pm	Friday
Thursday after 4:00 pm - Friday at 4:00 pm	Saturday

Conclusions and Future Directions

- The use of hospital-specific cutoffs for assessing time from specimen collection to receipt in the NBS laboratory identifies hospitals that could improve their process for sending out specimens in a timely manner.
- One challenge for using hospital-specific cutoffs is that NBS Program staff need to maintain close contact with the couriers and hospitals in order to update the database if any changes in pickup time occur.
- NBS Follow-up Program staff provide technical assistance to hospitals with the lowest percentage of specimens received on the appropriate day to help identify areas for improvement.
- All birthing units are advised to learn their pickup times for each day, so they can ensure all specimens are in the designated location before the courier arrives.
- The new courier performance measure using hospital-specific cutoffs was included in the quarterly reports sent out to all birthing hospitals in July 2014 and highlighted in the summer NBS quarterly newsletter (available at www.michigan.gov/newbornscreening).

*Specimens could arrive one business day earlier if a specimen is processed in less than 5 hours after collection.

