Birth Data Quality:
How good is it?

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Study Overview

Objective

- Develop a study protocol to determine how closely information on the birth certificate matches information recorded in the medical record

- Basic design
  - Independently abstract information from medical records that is reported on the birth certificate
  - Compare abstracted information with information captured on the birth certificate

Collaborative Effort

- Resources needed to conduct a data quality study
  - Staff to abstract records
  - Abstraction tool
  - Database to collect abstracted information
  - Cooperation of facilities to allow abstraction of their medical records

Collaborative Effort

- NCHS provided the following support.
  - Hired a contractor to assist with abstraction tool, creation of system to collect information, data entry and hiring of well-trained abstractors
  - Provided consultation on fields to be abstracted, creation of abstraction tool, sampling and analysis

Study Design

- 2 states; 4 hospitals each
  - Hospitals chosen for differing characteristics including data quality
- 1095 medical records reviewed and compared
  - State A = random sample based on PRAMS sample
  - State B = convenience sample
- Both states use the 2003 revision of the birth certificate.

Study Design - Abstraction

- More than 50 medical and health items from the facility worksheet were abstracted, including:
  - Obstetric estimate of gestation
  - Weight at birth
  - Number of prenatal visits
  - Risk factors in this pregnancy
  - Obstetric procedures
  - Onset of labor
  - Characteristics of labor and delivery
  - Method of delivery
  - Abnormal conditions of the newborn
  - Principal source of payment
- Rare items (e.g. congenital anomalies) were not included

Study Design – Abstraction/Data

- Abstractors sent contractor the completed abstract forms on an ongoing basis so that quality could be monitored
- Contractor double-entered all abstracted information and differences were reconciled
- NCHS matched birth certificate data to the abstracted data base
- NCHS developed an Excel application for comparison of the abstracted medical record and birth certificate data

Results

Definitions

- Accuracy/Agreement (Continuous Variable)– The percentage of all births for which the values reported on the birth certificate and in the medical records agree.

$$= \frac{\text{values reported on the birth certificate and in the medical record agree}}{\text{all births}}$$

- Sensitivity/True Positive Rate (Dichotomous Variables)– The percentage of births with a condition indicated on the medical record that was also reported on the birth certificate.

$$= \frac{\text{reported on both the birth certificate and in the medical record}}{\text{reported in the medical record}}$$

Sensitivity or Agreement by State Selected Items

Item	State A	State B
Cesarean delivery	97.9	91.8
Epidural or spinal anesthesia during labor	96.1	85.4
NICU admission	95.1	45.1
Induction of labor	86.0	45.9
Source of payment for delivery – Private insurance	82.3	85.8
Source of payment for delivery – Medicaid	79.0	72.6
Date of 1st prenatal care visit - Month	76.6	79.6*
Total # of prenatal visits	47.8*	22.1*
Fetal intolerance of labor	11.5	15.8
LMP-month	88.5*	82.6*

*High levels of unknown data on either birth certificate or medical record

Birthweight and Gestation Agreement

Item	State A	State B
Clinical Estimate of Gestation (within 1 week)	98.0	92.5
Birthweight (within 25 grams)	97.0	97.0

Cesarean Deliveries Sensitivity

State

Item	State A	State B
Cesarean delivery	97.9	91.8

Hospital

Item	1	2	3	4	5	6	7	8
Cesarean delivery	94.6	96.4	100	100	96.4	90.2	81.3	100

Epidural or Spinal Anesthesia Sensitivity

State

Item	State A	State B
Epidural/spinal anesthesia	96.1	85.4

Hospital

Item	1	2	3	4	5	6	7	8
Epidural/spinal anesthesia	98.9	89.4	99.2	98	92.2	97.7	67.1	79.2

Induction of Labor Sensitivity

State

Item	State A	State B
Induction of labor	86	45.9

Hospital

Item	1	2	3	4	5	6	7	8
Induction of labor	82.9	96.7	63.0	90.4	80.5	5.1	17.5	92.9

Source of Payment - Medicaid Sensitivity

State

Item	State A	State B
Medicaid	79.0	72.6

Hospital

Item	1	2	3	4	5	6	7	8
Medicaid	88.4	95.8	86.2	42.2	92.7	93.5	45.2	90.3

Date of First Prenatal Visit - Month Agreement

State

Item	State A	State B
Date of 1st prenatal care visit - month	76.6	79.6*

Hospital

Item	1	2	3	4	5	6	7	8
Date of 1st PNCV - mn	95.3	97.3	86.1	27.2	85.1	73.3	75.4	82.8

* Unknown values on either birth certificate or medical record for State B = 17.8%

Total Number of Prenatal Visits Agreement

State

Item	State A	State B
Total # of prenatal care visits*	47.8	22.1
Total # of prenatal care visits (within 2 visits)	84.3	65.0

Hospital

Item	1	2	3	4	5	6	7	8
# of PNC visits*	69.7	31.3	65.4	27.2	34.3	4.6	28.4	23.0

* Unknown values on either birth certificate or medical record for State A = 4.2%; State B = 18.6%

Fetal Intolerance of Labor Sensitivity

State

Item	State A	State B
Fetal intolerance of labor	11.5	15.8

Hospital

Item	1	2	3	4	5	6	7	8
Fetal intolerance	0.0	36.4*	82.4*	0.0	11.6	33.3*	25.0	0.0*

*Number of cases less than 20 in both birth certificate and medical records

Conclusions

Good Quality*

- Number of previous live births now living/now dead (parity)
- Birthweight (within 25grams)
- Clinical estimate of gestation (within 1 week)
- Fetal presentation at delivery – Cephalic
- Method of delivery – Vaginal
- Method of delivery – Cesarean
- Epidural/spinal anesthesia
- Source of payment – Private insurance
- Is infant being breastfed?
- Infant living?

*Agreement or sensitivity > 80% for both states

Poor Quality

- Mother had a previous preterm birth*
- Moderate/heavy meconium staining*
- Fetal intolerance of labor*
- Prepregnancy hypertension**
- Prepregnancy diabetes*
- Tocolysis**

*Agreement or sensitivity <40% for both states
**Agreement or sensitivity <40 in one state; frequencies <20 in second state.

Somewhere in the Middle

- Many more items had between 40% and 80% agreement or sensitivty
  - gestational hypertension and diabetes
  - breech presentation
  - NICU admission

- Reminder– no reliable information on infrequently occurring events (e.g., infertility therapy, infections, maternal morbidities).

Study Limitations

- Number of hospitals (4 per state) and selection
- Convenience sample of births in one state
- Small numbers (1,095)
  - No info on infrequently occurring items e.g., infertility therapy, infections, maternal morbidities, congenital anomalies)

Summary

- This studiy provides valuable insight into the quality of the revised medical/health birth data.
- Large differences in data quality by:
  - Item
  - State/Jurisdiction
  - Hospital
- Some variables are better than expected and some are worse than expected.
- Results by hospital suggest that some very poorly performing items may be responsive to improvement efforts but…may require substantial effort to achieve even moderate quality.

Overall - There is a strong need for improvement

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