



How Reliable Are the Birth Certificate Variables for Mothers with Medicaid Coverage?

Data from Three Recent Federal Evaluations

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Birth certificate data, collected for every birth in the United States, are frequently used for public health research. Such data have been used to track progress toward the Healthy People 2020 maternal and child health goals and to analyze socioeconomic disparities in health outcomes. A new Standard Certificate of Live Birth was issued in 2003, and all states had adopted the new form by 2015.¹ This brief presents data on the reliability of some data collected using the new birth certificate form, particularly variables critical for studying disparities in maternal and child health outcomes for women with Medicaid coverage at delivery. We evaluate six variables; three variables were new additions on the 2003 birth certificate (Medicaid enrollment at birth, prepregnancy body mass index, and breastfeeding initiation), and the other three variables have shown to be unreliable but are of significant policy research interest (pregnancy smoking, diabetes, and hypertension).

Until now, it has been impossible to evaluate the reliability of these variables for women² with Medicaid across states. Data from three federal evaluations conducted from 2012 to 2016 provide a unique opportunity to evaluate the agreement between individual-level program evaluation data and data from birth certificates for infants born to Medicaid-enrolled women. The evaluations are here

called MIHOPE, MIHOPE-Strong Start, and Strong Start. More information on these evaluations is available from three evaluation reports (Duggan et al. 2018; Lee et al. 2019; Hill et al. 2018).

Each study targeted women with Medicaid, and each collected data for all six variables of interest. Because methods for the MIHOPE and MIHOPE-Strong Start evaluations were similar, we group data from those two evaluations for this analysis, here called MIHOPE/MIHOPE-Strong Start.

All three studies validated information on Medicaid enrollment by checking states' Medicaid enrollment records and collected data on the other five variables from either medical records or mothers' self-reports.

The three evaluations linked mothers' evaluation data to birth certificates, allowing us to assess agreement between birth certificate and program evaluation data. Agreement between the two data sources increases confidence in the accuracy of the data, and disagreements reduce such confidence. However, neither data source constitutes a "gold standard," so low agreement levels between birth certificates and evaluation data do not necessarily mean birth certificate data are inaccurate. Human errors, including those related to recall, omission, and misreporting, apply to the data sources examined. Data collection for the three evaluations, however, may have been more accurate than data from birth certificates for several reasons: evaluation data collection processes were more standardized, some risk factors (e.g., smoking) were less subject to recall bias in the evaluation data because they were collected during pregnancy, and evaluation data relied on directly accessed prenatal medical records for some medical and pregnancy risk factor variables.

Because variables were not always collected in all periods or states, the numbers of women and states for whom we have data differ by variable and evaluation. Table 1 shows the numbers of states and mothers with data for each variable in the MIHOPE/MIHOPE-Strong Start and Strong Start samples.

For each variable, we compared rates between the birth certificate and evaluation data and tested the resulting agreement level, represented by the percentage of times the two data sources agree. When data are available from at least 200 cases, we display variation across states in the agreement between evaluation and birth certificate data in figure 1. The state-specific data are not shown for breastfeeding because only two states provided data for Strong Start and state sample sizes were too small for MIHOPE/MIHOPE-Strong Start.

TABLE 1

Number of Women and States with Data for Select Variables from Both Program Evaluations and Birth Certificates

Variable	Number of Women		Number of States Included in Comparison	
	MIHOPE/MIHOPE-Strong Start	Strong Start	MIHOPE/MIHOPE-Strong Start	Strong Start
Medicaid enrollment at delivery	3,412	13,322	17	12
Prepregnancy body mass index	2,804	12,688	17	10
Breastfeeding initiation	813	685	15	2
Prepregnancy smoking	2,830	11,788	17	10
Hypertension	4,147	16,626	17	12
Diabetes	4,097	17,361	17	12

Source: Authors' analysis of program evaluation and birth certificate data.

Results

Table 2 compares birth certificate and evaluation data for the six analysis variables, averaged across all states in the dataset.

TABLE 2

Comparison of Rates for Select Variables between Birth Certificate and Evaluation Data

Variable	EVALUATION DATA SOURCE			
	MIHOPE/MIHOPE-Strong Start		Strong Start	
	Birth certificate	Evaluation data	Birth certificate	Evaluation data
Enrolled in Medicaid at delivery	78.4%	100.0%	88.3%	100.0%
Prepregnancy body mass index	27.9	27.5	27.6	28.8
Breastfeeding initiation	70.1%	77.9%	79.4%	79.6%
Prepregnancy smoking	19.6%	30.7%	15.0%	26.0%
Diabetes	6.4%	5.6%	4.5%	7.3%
Hypertension	7.7%	6.1%	8.6%	12.3%

Source: Authors' analysis of birth certificate and program evaluation data.

Note: Diabetes and hypertension rates represent mothers who were ever diagnosed (i.e., before or during pregnancy).

Medicaid enrollment at birth. All women in the three evaluations had Medicaid coverage at delivery. For the combined MIHOPE/MIHOPE-Strong Start sample, birth certificate data indicate only 78.4 percent of women had Medicaid coverage at delivery. This rate is higher in the Strong Start birth certificate sample, 88.3 percent, meaning birth certificates still miss identifying more than 10 percent of women with Medicaid. Given that the evaluations validate Medicaid enrollment at delivery using administrative data, birth certificates underreport Medicaid enrollment on average. When certificates are completed, hospital staff or mothers might not always know or accurately report a woman's

Medicaid participation. Another factor could be retrospective Medicaid enrollment, meaning the results of the Medicaid application process might not be known at the time of delivery.

Prepregnancy body mass index (BMI). A mother's BMI is a critical risk factor in pregnancy and other maternal health outcomes.³ Reassuringly, the average maternal prepregnancy BMI showed substantial agreement across data sources, ranging from 27.5 (MIHOPE/MIHOPE-Strong Start evaluation data) to 28.8 (Strong Start evaluation data), and data from birth certificates fell within this range.

Breastfeeding initiation. The new birth certificate contains the following question: "Is the infant being breastfed at discharge?" A question for all three evaluations asks postpartum mothers whether the infant has ever been breastfed. The share of mothers who had initiated breastfeeding ranged from 70.1 percent (MIHOPE/MIHOPE-Strong Start birth certificates) to 79.6 percent (Strong Start evaluation data). These rates, representing women with Medicaid in select states, are substantially below the rate for all US women in 2017, 84.1 percent (CDC 2020). In addition, agreement was low between the birth certificate and evaluation data. Because of a relatively large amount of missing data in one or both data sources, fewer states reporting, and differences in when the questions were asked of mothers for the birth certificate and evaluation data, breastfeeding initiation results should be interpreted with caution. More research is needed on the reliability of breastfeeding data from birth certificates.

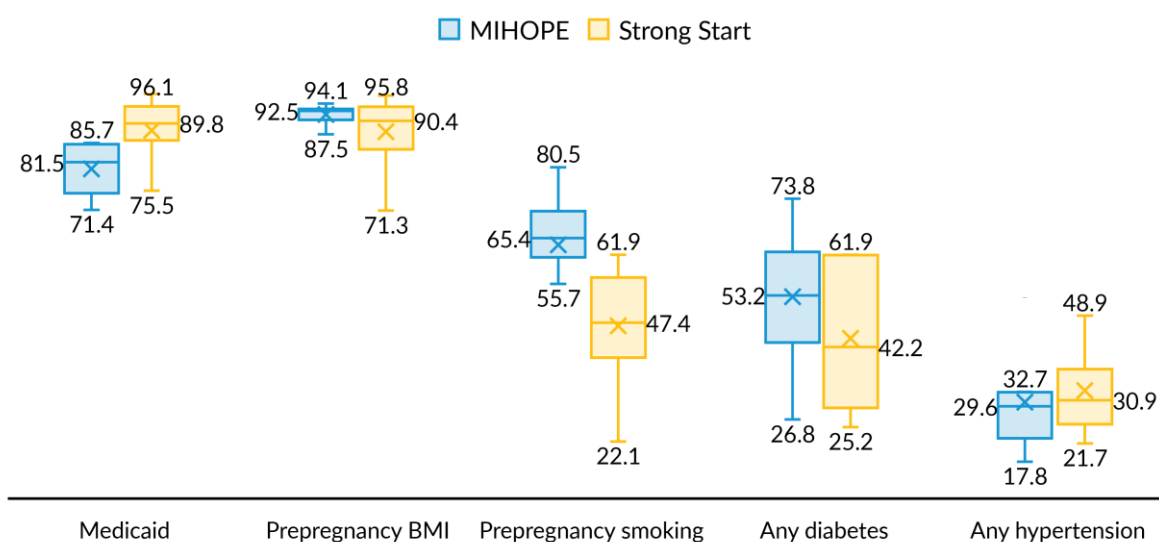
Prepregnancy smoking. Maternal smoking is an important risk factor for poor maternal and infant health outcomes. The evaluation data show higher rates of prepregnancy smoking than do birth certificate data. MIHOPE/MIHOPE-Strong Start evaluators asked pregnant women about prior smoking when they were randomized into the evaluation, which occurred before delivery. This means women were asked the question closer to the time before they were pregnant, potentially avoiding some recall bias. Table 2 shows 30.7 percent of women reported they smoked before their pregnancy in the evaluation data, whereas birth certificate data show 19.6 percent smoked before pregnancy. Prepregnancy smoking rates were also higher in Strong Start evaluation data (26.0 percent) than in the linked birth certificates (15.0 percent).

Diabetes and hypertension. Rates of diagnosed diabetes (both prepregnancy and pregnancy-related) were lower in the Strong Start birth certificates than in the Strong Start evaluation data (4.5 percent versus 7.3 percent). In contrast, such rates were slightly higher in the MIHOPE/MIHOPE-Strong Start data than in the linked birth certificate data (6.5 percent versus 5.6 percent). We also find slightly higher rates and a wider range of rates of hypertension (ever diagnosed before or during pregnancy), 6.1 percent to 12.3 percent. The highest hypertension rate is reported in Strong Start evaluation data. Average diabetes (4.5 percent) and hypertension rates (9.3 percent) for Medicaid-covered women were similar to those for all US women of reproductive age from the 2011–16 National Health and Nutrition Examination Survey (Azeez et al. 2019). Diabetes and hypertension rates are derived from medical records for the evaluation data sources, and instructions from the Centers for Disease Control and Prevention to states suggest the same should be done for birth certificates. Conversely, National Health and Nutrition Examination Survey rates come from physical examinations.

Variation across states. Across states, average rates for the six variables examined are similar between evaluation and birth certificate data and benchmark relatively well to national data sources. However, averages across states should be interpreted with caution. Figure 1 illustrates the data in box plots, showing the median agreement level and the range within 3 standard deviations above or below the mean.

FIGURE 1

Variation in Agreement Levels across States for Each Variable, by Survey



Source: Authors' analysis of program evaluation data.

Notes: BMI = body mass index. MIHOPE is short for MIHOPE/MIHOPE-Strong Start. The range is from the lowest (within 3 standard deviations of mean) to the highest. The middle number is the median of all states included. Includes only states with at least 200 observations, varying from 5 states to 11 states, depending on the variable and data source.

Agreement levels varied widely across states. Medicaid participation rates ranged from 71.4 percent to 96.1 percent agreement, depending on the state and whether the birth certificate data are compared with the Strong Start or the MIHOPE/MIHOPE-Strong Start evaluation data. Agreement levels for prepregnancy BMI also varied similarly, from 71.3 percent to 95.8 percent agreement. Agreement in prepregnancy smoking rates had a much wider range, from 22.1 percent to 82.3 percent. Diabetes rates ranged from 25.2 percent to 73.8 percent agreement, and hypertension rates ranged from 17.8 percent to 48.9 percent agreement.

Conclusion

The purpose of this brief is to provide information on the reliability of selected variables on the 2003 birth certificate by comparing them with such variables from three program evaluation data sources. Medicaid enrollment at delivery and prepregnancy BMI showed the most consistency between birth certificate and evaluation data; for both variables, the range across states in the percentage of times the data sources agree is narrower than such ranges for the other four variables examined. This means researchers and policy analysts who want to analyze the BMI of mothers with Medicaid coverage across states using birth certificates can be somewhat confident in their results. They also do not necessarily have to match Medicaid enrollment files to identify Medicaid-enrolled women in most states, though some women—especially those enrolled retrospectively—will be missed.

In contrast, agreement in rates for three of the risk factors examined (pregnancy smoking, diabetes, and hypertension) varied widely across states. Though average rates across all states for these variables benchmark relatively well to rates from national sources, the large state variation shows researchers and policy analysts should be cautious when making cross-state comparisons of these pregnancy risk factors. We cannot draw conclusions about variations in the reliability of breastfeeding initiation rates across states, because they were not regularly reported in all data sources.

Given the large differences in their agreement with evaluation data across states, birth certificate data may not be appropriate for multistate comparisons, particularly for smoking, diabetes, and hypertension. When researching these topics, researchers should consider supplementing birth certificate data with other data sources, as was done for the MIHOPE, MIHOPE-Strong Start, and Strong Start studies. Ongoing efforts by states and the Centers for Disease Control and Prevention to improve the United States' vital statistics systems remain crucial to epidemiological and public health research.

Notes

- ¹ The new form is available at <https://www.cdc.gov/nchs/data/dvs/birth11-03final-ACC.pdf>.
- ² This analysis uses the terms “women” and “mothers” when describing people with Medicaid coverage at the time of delivery. We use these terms to align with language used in our data sources, but we acknowledge not all people who become pregnant or give birth identify as women. We remain committed to using respectful, inclusive language.
- ³ People with a BMI over 25.0 are considered overweight or obese.

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