



# Practices in Prevention of Perinatal Hepatitis B at Wisconsin Delivery Hospitals

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## ABSTRACT (Revised)

**Background:** Nationally an estimated 95% of pregnant women are tested for hepatitis B surface antigen (HBsAg) during pregnancy and a high percentage of infants born to HBsAg-positive women complete post-exposure prophylaxis to prevent hepatitis B virus (HBV) infection. However, gaps remain in the identification of HBsAg-positive pregnant women and their infants and their subsequent case management.

**Methods:** To evaluate the completeness of identification of HBsAg-positive pregnant women and birth dose hepatitis B vaccine administration, the presence and use of admission orders for birth dose administration, and the extent of appropriate prophylaxis of infants born to HBsAg-positive and unknown HBsAg status mothers, we conducted medical record reviews of 3058 maternal and infant pairs at 58 Wisconsin birthing hospitals that cumulatively delivered 90% of Wisconsin's 2010 birth cohort.

**Results:** Ninety-six percent of maternal records included a documented HBsAg test result for the current pregnancy and 88% of infant records included a documented maternal HBsAg test result. Four infants (0.15%) were born to HBsAg-positive women; all four infants received appropriate prophylaxis: hepatitis B immunoglobulin (HBIG) and a dose of hepatitis B vaccine within 12 hours of birth. Among 382 infants born to women with HBsAg-unknown status, only 135 (35%) received appropriate prophylaxis: a dose of hepatitis B vaccine within 12 hours of birth or a dose of hepatitis B vaccine and HBIG within 12 hours of birth for infants weighing <2,000 g. Eighty-two percent of infants received a dose of hepatitis B vaccine prior to hospital discharge.

**Conclusions:** Birthing hospitals must ensure that infants born to women with unknown HBsAg status receive appropriate prophylaxis to prevent HBV infection. All infants, regardless of maternal HBsAg status, should receive a dose of hepatitis B vaccine before hospital discharge to serve as a 'safety net' to prevent perinatal infection among infants born to HBsAg-positive women who are not identified.

## BACKGROUND

- Hepatitis B virus (HBV) is a major cause of acute and chronic hepatitis, cirrhosis and primary hepatocellular carcinoma.
- HBV infection varies in prevalence among subpopulations in Wisconsin and is highly prevalent among immigrants/refugees from areas of high HBV endemicity.
- Transmission from mother to infant during birth or infancy is common.
- Without prophylaxis with hepatitis B immunoglobulin (HBIG) and hepatitis B vaccine, 70-90% of infants born to women who are hepatitis B surface antigen- (HBsAg) positive will become infected with HBV.<sup>1</sup>
- Approximately 90% of these infants will become chronically infected and about 25% of those chronically infected will die prematurely from cirrhosis or hepatocellular carcinoma.
- During 1990, the Advisory Committee on Immunization Practices recommended universal screening of pregnant women for HBV infection.<sup>2</sup>
- During 2005, the Centers for Disease Control and Prevention (CDC) recommended that hepatitis B vaccine be administered to all newborns before hospital discharge.
- National estimates indicate about 95% of pregnant women are tested for HBsAg prenatally and a high percentage of infants born to HBsAg-positive women are completing post-exposure prophylaxis.<sup>3</sup>
- However, gaps remain in the identification of HBsAg-positive pregnant women and their infants and their subsequent case management.

## OBJECTIVE

- To evaluate the completeness of identification of HBsAg-positive pregnant women, birth dose hepatitis B vaccine administration, admission orders for birth dose administration and appropriate prophylaxis of infants born to HBsAg-positive women and women with unknown HBsAg status.

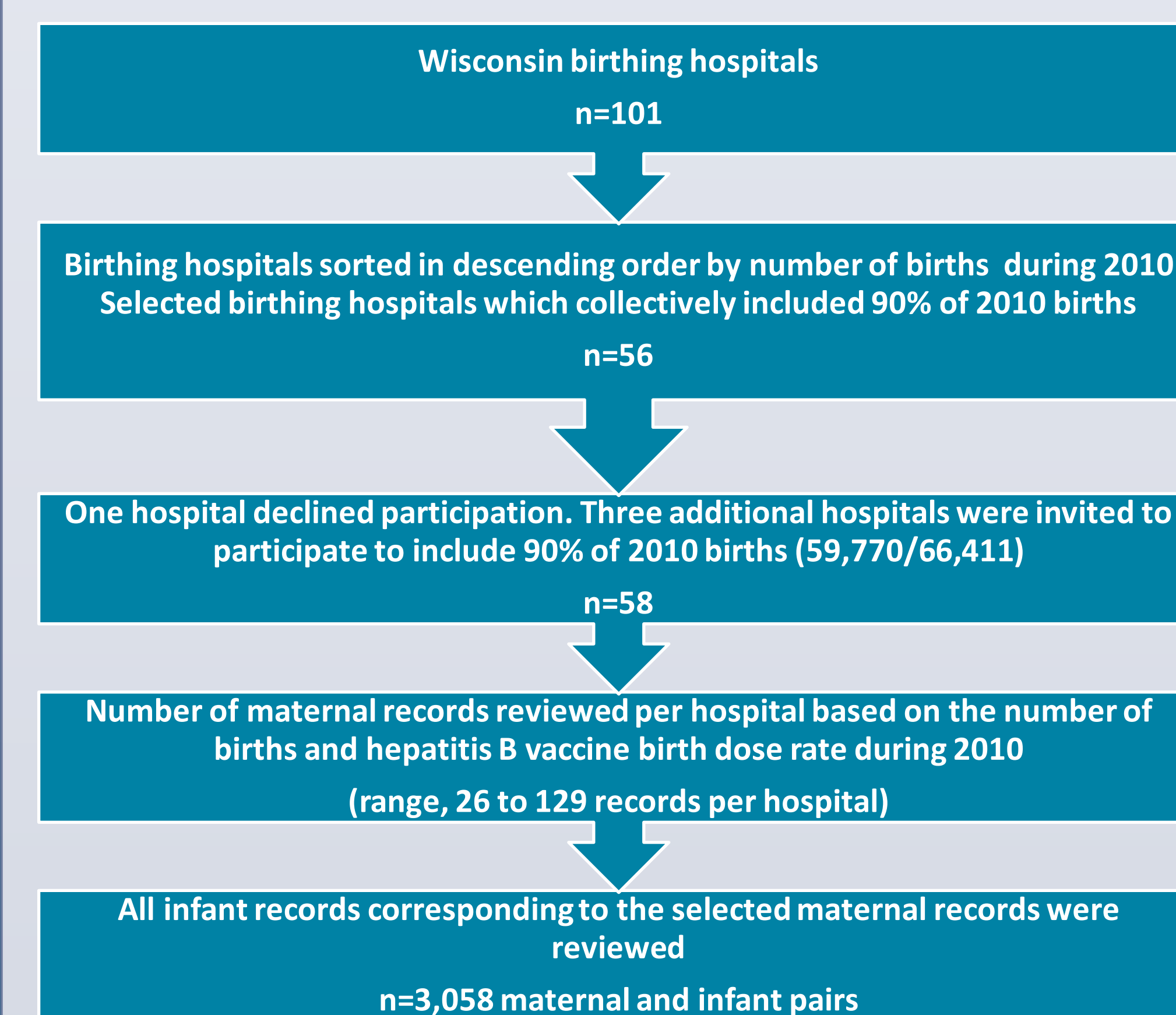
## METHODS

- Medical record reviews were conducted at hospitals that cumulatively delivered 90% of the Wisconsin birth cohort during 2010.
- Maternal and infant hospital medical records were reviewed for: the presence of maternal HBsAg test results (including the test date), administration of hepatitis B vaccine and HBIG within 12 hours of birth to infants born to HBsAg-positive women, administration of hepatitis B vaccine within 12 hours of birth to infants born to HBsAg-unknown status women, administration of a dose of hepatitis B vaccine to all infants prior to hospital discharge, insurance status, type of attending provider and patient demographic data.

### Sampling Methods

- We used the number of births during 2010 (by hospital) from Vital Records<sup>4</sup> to select the Wisconsin birthing hospitals that accounted for 90% (59,770/66,411) of births during 2010.
- Birthing hospitals were sorted by the number of live births during 2010. Those with the highest volume were selected in order from greatest to least until the selection cumulatively represented 90% of the birth cohort (Figure 1). Thus 58 hospitals were selected.
- The number of paired (maternal and infant) medical records to review at each hospital was generated using the number of births during 2010 at each hospital, the hepatitis B birth dose rate (by hospital) from a 2010 survey of Wisconsin birthing hospitals (unpublished) and a sample size table provided by CDC (range, 26 to 129 records per hospital).

**Figure 1. Selection of Wisconsin birthing hospitals to receive a site visit and the number of medical records to review at each birthing hospital.**



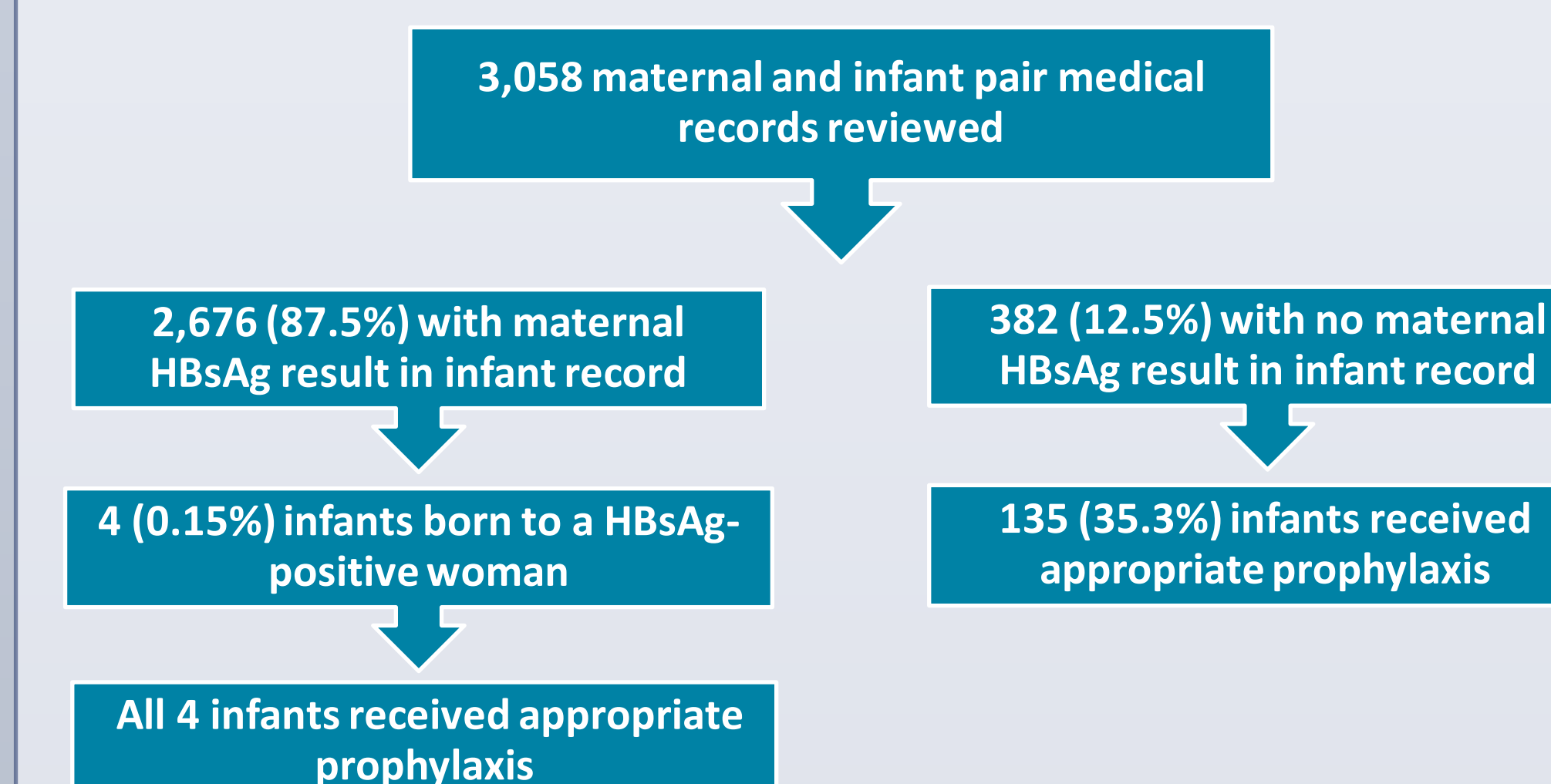
### Site Visits and Data Abstraction

- Each hospital was provided with instructions regarding proper selection of the paired medical records, which included, listing 2010 births in alphabetical order according to birth mother's last name, pulling every fifth record until the requested number of records was reached, and then pulling the corresponding infant medical records.
- If a selected woman gave birth to multiple infants (e.g., twins), we reviewed the medical record for each infant born to her.
- Medical record abstraction forms were either completed on site (41 hospitals) or through review of hospital-specific data that was sent electronically (17 hospitals).
- Site visits were conducted at hospitals that sent data electronically after analyzing and summarizing their hospital-specific data.

## RESULTS

- Site visits were conducted at 58 of the 101 Wisconsin birthing hospitals and medical records for 4.6% (3,058/66,411) of the 2010 Wisconsin birth cohort were reviewed.
- Among 3,058 maternal and infant pair records reviewed, 2,928 (95.7%) had a documented HBsAg test result in the maternal record for the current pregnancy and 2,676 (87.5%) had a documented maternal HBsAg test result in the infant record.
- Among 2,676 infants born to women with a documented HBsAg test result in the infant record, four (0.15%) were born to HBsAg-positive women, each at a different birthing hospital.
- All four infants received appropriate prophylaxis: HBIG and a dose of hepatitis B vaccine within 12 hours of birth (Figure 2).

**Figure 2. Documentation of the maternal hepatitis B surface antigen (HBsAg) test result in the infant medical record and prophylaxis of infants at risk for hepatitis B virus infection.**



- There were 382 infants born to women with HBsAg-unknown status based on the absence of a maternal HBsAg test result in the infant medical record.
- Among these 382 infants, 135 (35.3%) received appropriate prophylaxis: a dose of hepatitis B vaccine within 12 hours of birth or a dose of hepatitis B vaccine and HBIG within 12 hours of birth for infants weighing <2,000 g.
- Among 3,046 infants with information available, 2,486 (81.6%) received a dose of hepatitis B vaccine prior to hospital discharge (birth dose).
- Among 560 infants who did not receive a birth dose of hepatitis B vaccine, 276 (49.3%) had a documented guardian refusal in the medical record.
- Infants born to mothers with an obstetrician as attending provider were more likely to receive a birth dose of hepatitis B vaccine (1,920/2,331;82.4%) compared to infants born to mothers with a family practitioner (349/440;79.3%) as attending provider ( $P = .145$ ), though this difference was not statistically significant (Table).
- Infants born to mothers with private health insurance (1,534/1,951;78.6%) were less likely to receive a birth dose of hepatitis B vaccine compared to infants born to mothers with Medicaid coverage (830/946;87.7%) ( $P < .0001$ ).
- There was no statistically significant difference in birth dose receipt rate by race ( $P = .126$ ).
- Hepatitis B vaccine birth dose was administered following admission orders for 92.8% (2,239/2,414) of infants who received the birth dose.

**Table. Characteristics of women who delivered an infant at a Wisconsin birthing hospital, 2010.**

Characteristic	n	No. with birth dose (%)	P Value
Attending provider			
Obstetrician	2331	1920 (82.4)	.145
Family practitioner	440	349 (79.3)	
Maternal insurance status			
Private	1951	1534 (78.6)	<.0001
Medicaid	946	830 (87.7)	
Race			
White	2426	1964 (81.0)	.126
Non-white*	249	212 (85.1)	

\*Includes African American, Asian, American Indian or Alaska Native, and Native Hawaiian or other Pacific Islander race categories.

## LIMITATIONS

- Personnel who conducted medical record abstraction varied, with the majority of abstractions conducted by Division of Public Health staff and the remainder by hospital personnel. This may have resulted in some inconsistencies in abstraction.
- This study was not designed to follow infants born to HBsAg-positive women to determine perinatal HBV infection rate and thus examine outcomes of interventions.
- Our study included birthing hospitals which collectively accounted for 90% of the 2010 birth cohort; however, 43 hospitals were not included.

## CONCLUSIONS

- Wisconsin birthing hospitals included in this evaluation provided appropriate prophylaxis to all infants born to HBsAg-positive women, though only 35% of infants born to women with unknown status received appropriate prophylaxis. Birthing hospitals must ensure that each infant born to an HBsAg-positive woman or a woman with unknown HBsAg status receives appropriate prophylaxis.
- Documentation of prenatal HBsAg test results was more complete among maternal records (96%) than infant records (88%). It is important to document the maternal HBsAg test result in the infant medical record to alert the child's physician of the need for timely prophylaxis against HBV infection, when it is indicated.
- The percentage of infants who received a birth dose of hepatitis B vaccine was relatively high (81.6%). Birthing hospitals should ensure that each infant receives a birth dose of hepatitis B vaccine and educate parents regarding the importance of on-schedule immunization.
- The majority of birthing hospitals have admission orders to administer the hepatitis B vaccine birth dose. Birthing hospitals should develop a written hospital policy for universal hepatitis B vaccine administration to infants before hospital discharge to reinforce their admission orders.

## REFERENCES

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