

BACKGROUND

PERINATAL HEPATITIS B

- Pregnant women should be universally screened for hepatitis B surface antigen (HBsAg) during each pregnancy to prevent perinatal transmission of hepatitis B virus (HBV) to their infant
- Infants born to HBV-infected women are at risk for perinatal HBV transmission and subsequent chronic liver disease
- Appropriate and timely immunoprophylaxis of HBV-exposed infants is up to 95% effective in preventing infection
- Immunoprophylaxis includes: the hepatitis B immunoglobulin (HBIG) and HBV vaccine birth dose within 12 hours of birth, followed by completion of HBV vaccine series (Figure 1)



NJDOH PERINATAL HEPATITIS B PREVENTION PROGRAM (PHBPP)

- Identifies HBsAg positive (+) pregnant women and their infants to ensure appropriate clinical management (i.e. immunoprophylaxis) (Fig. 2)
- According to CDC, only half of the 800-1000/year expected infants born to HBsAg + women in NJ are identified
- In 2009, PHBPP began using NJDOH's electronic web-based Communicable Disease Reporting and Surveillance System (CDRSS) for surveillance and case management; CDRSS is also used for other reportable communicable diseases

OBJECTIVES

- Describe NJ's comprehensive perinatal HBV surveillance and case management system for HBV-infected mothers and their infants
- Evaluate the sensitivity of case reporting HBV-infected mothers
- Describe the vaccination and post-vaccine serology rates of HBV-exposed infants

METHODS

DATA SOURCES

- Surveillance data from CDRSS for:
 - HBV-infected women, who were reported during prenatal period and delivered a liveborn infant (LBI) from Jan. 1, 2010 through Dec. 31, 2011
 - Infants born Jan. 1, 2010 through Dec. 31, 2011 to HBV-infected women
 - All HBV cases from hepatitis B surveillance reported through Dec. 31, 2011

B. Hospital discharge data from the NJ Discharge Data Collection System for admissions during Jan. 1, 2010 through Dec. 31, 2011

- Using ICD-9 diagnosis codes, women with LBI deliveries and a HBV diagnosis

DATA ANALYSIS

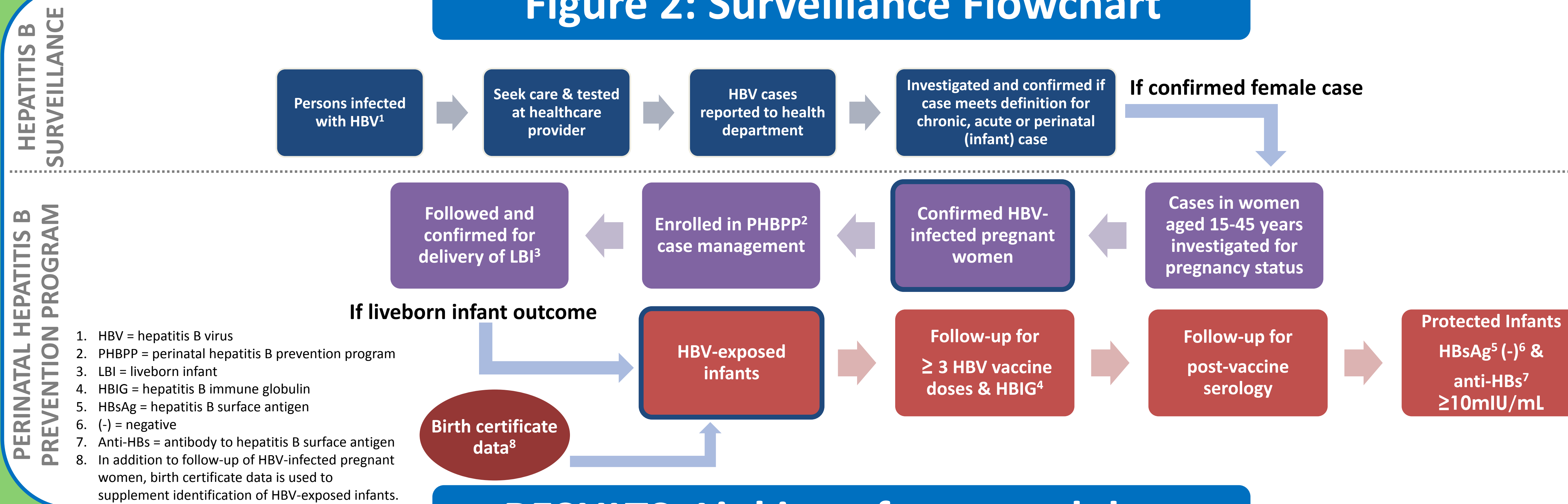
A. LINKING OF MATERNAL DATA

- Using capture-recapture method to identify further cases of HBV-infected mothers, hospital discharge data was matched to surveillance data using Link Plus 2.0 and manually reviewed
- Matching variables: Mother's first name, last name, date of birth and date of delivery or admission

B. ANALYSIS OF INFANT CLINICAL OUTCOMES

- Infant case management completion, including receipt of HBIG, birth dose, vaccination series and serology testing analyzed using SAS 9.2

Figure 2: Surveillance Flowchart



- HBV = hepatitis B virus
- PHBPP = perinatal hepatitis B prevention program
- LBI = liveborn infant
- HBIG = hepatitis B immune globulin
- HBsAg = hepatitis B surface antigen
- (-) = negative
- Anti-HBs = antibody to hepatitis B surface antigen
- In addition to follow-up of HBV-infected pregnant women, birth certificate data is used to supplement identification of HBV-exposed infants.

RESULTS: Linking of maternal data

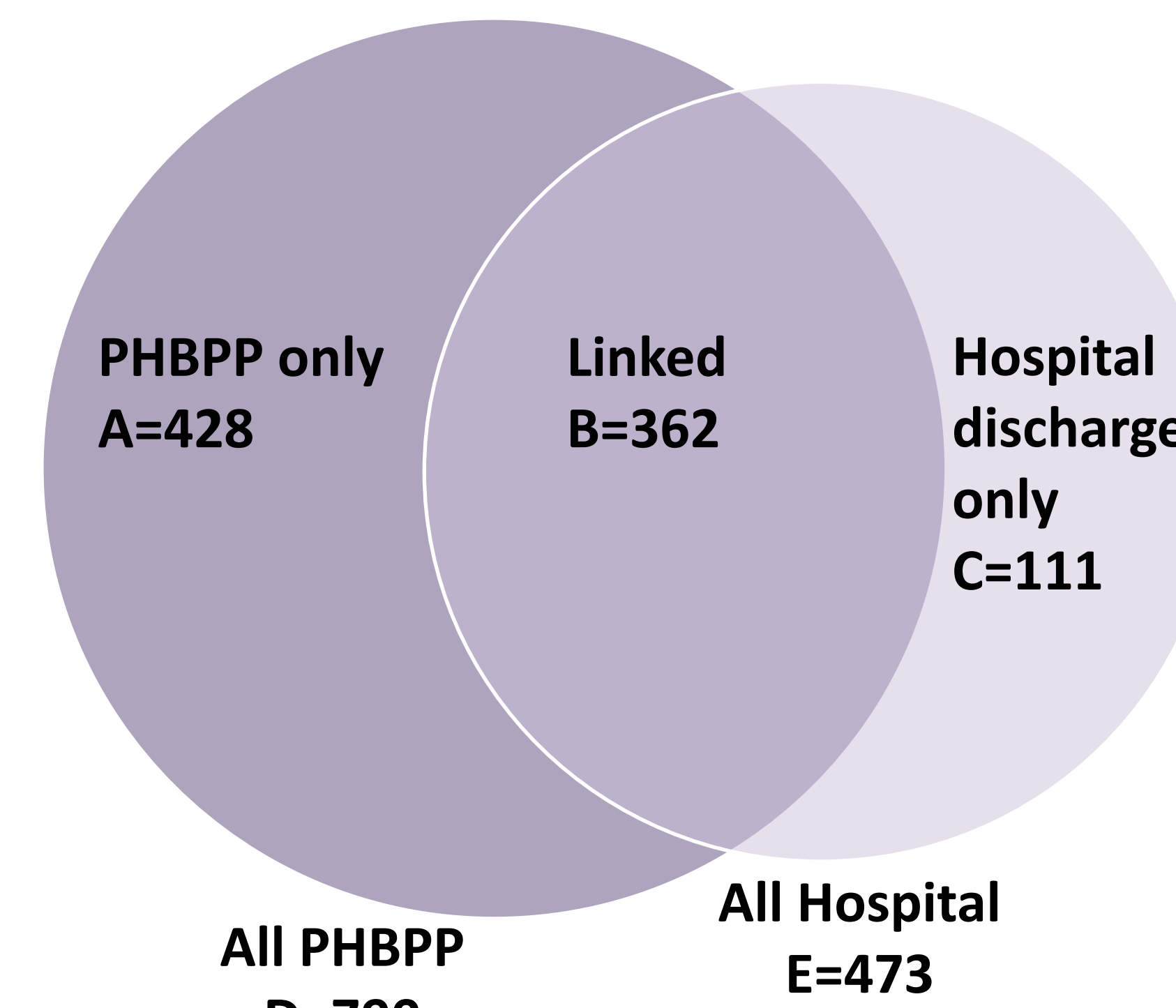
PHBPP SURVEILLANCE DATA

- 790 (Fig 3: D) LBI deliveries of women with HBV infection reported during their prenatal period

TABLE 1: DEMOGRAPHICS OF HBV-INFECTED MOTHERS

	All PHBPP (D)	Hospital discharge only (C)
	n (%)	n (%)
TOTAL	790 (100)	111 (100)
RACE		
American Indian & Alaskan Native	1 (0.1)	1 (0.9)
Asian	292 (37.0)	26 (23.4)
Black	193 (24.4)	28 (25.2)
Other/Unknown	188 (23.8)	20 (18.0)
White	116 (14.7)	36 (32.4)
ETHNICITY		
Hispanic	52 (6.6)	16 (14.4)
Non-Hispanic	541 (68.5)	88 (79.3)
Other/Unknown	197 (25.0)	7 (6.3)

Fig. 3: Capture –Recapture of HBV-infected mothers



HOSPITAL DISCHARGE DATA

- 197,184 LBI deliveries in NJ hospitals from Jan. 1, 2010 through Dec. 31, 2011
- 473 (Fig. 3: E) of these were deliveries of women with a HBV diagnosis

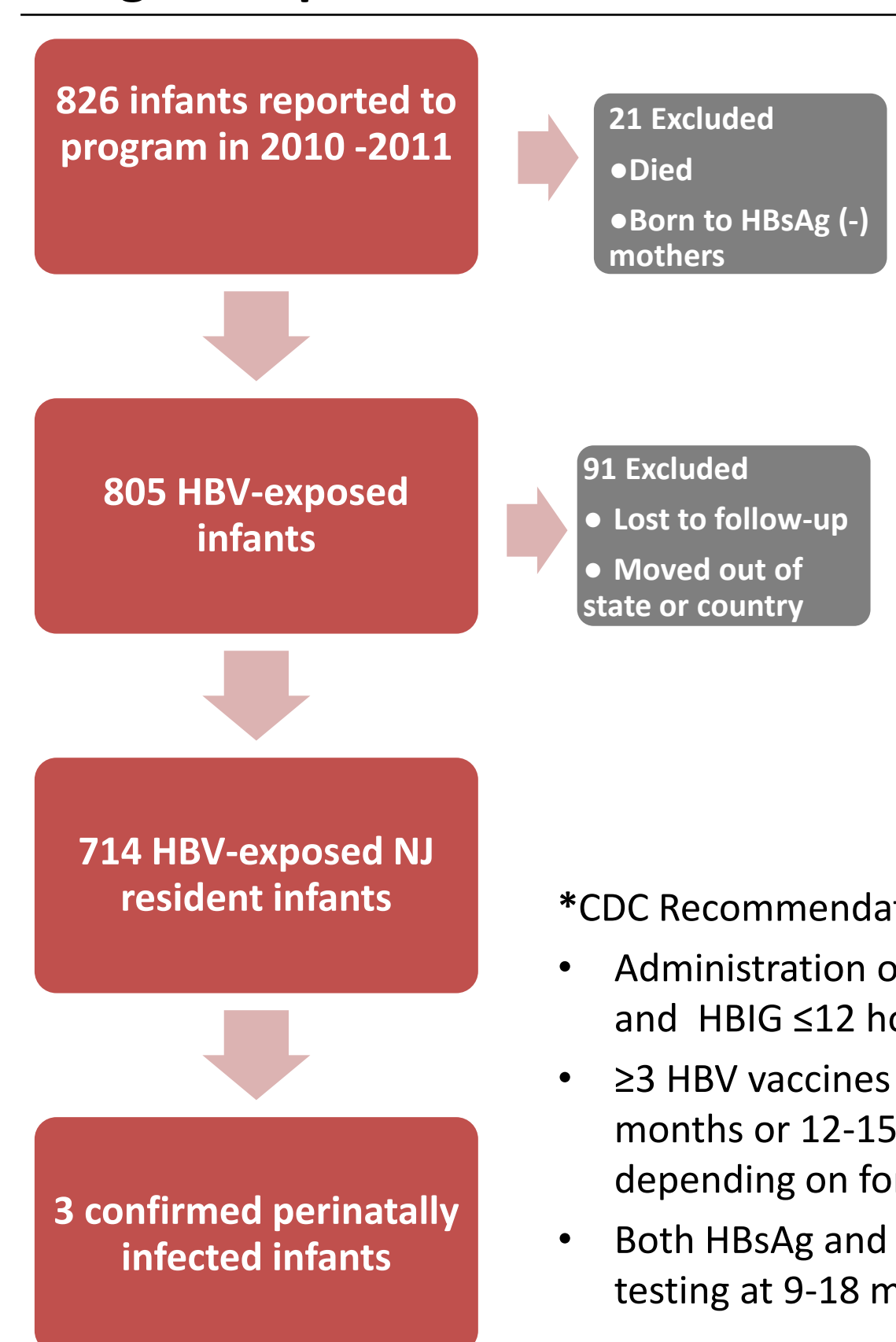
HOSPITAL DISCHARGE ONLY (NOT MATCHED)

- 111 (Fig 3: C) HBV-infected women, who delivered a LBI, were found in the hospital discharge data but not in the PHBPP data
- 49/111 were found among all HBV cases data from hepatitis B surveillance. The status of these cases were:
 - 17 not cases
 - 3 out-of-state residents
 - 22 confirmed or probable cases

RESULTS: Analysis of infant outcomes

REPORTED HBV-EXPOSED INFANTS

Fig. 4: Reported Infants Flowchart



- *CDC Recommendations
 - Administration of HBV dose 1 and HBIG ≤12 hours of birth
 - ≥3 HBV vaccine doses by 6 months or 12-15 months depending on formulation
 - Both HBsAg and Anti-HBs testing at 9-18 months
- **62 infants born in 2011 < 1 year of age when data analyzed

IMMUNOPROPHYLAXIS COMPLETION*

Fig. 5: HBV Vaccine dose 1 & HBIG Coverage by Age in Days* (n=805)

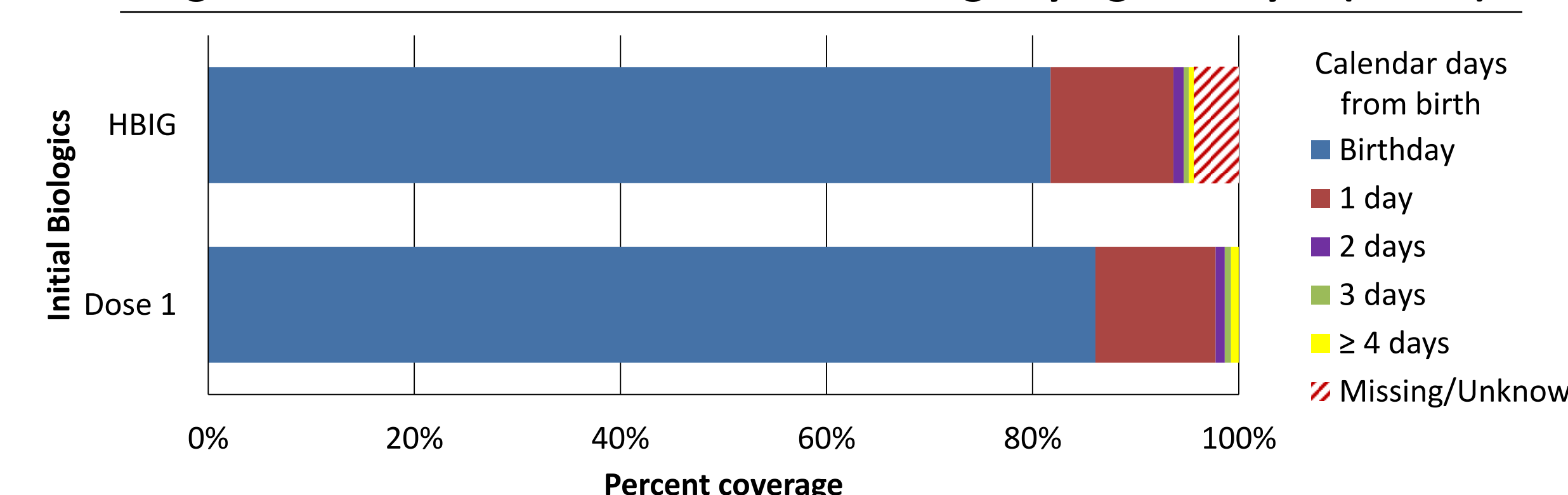
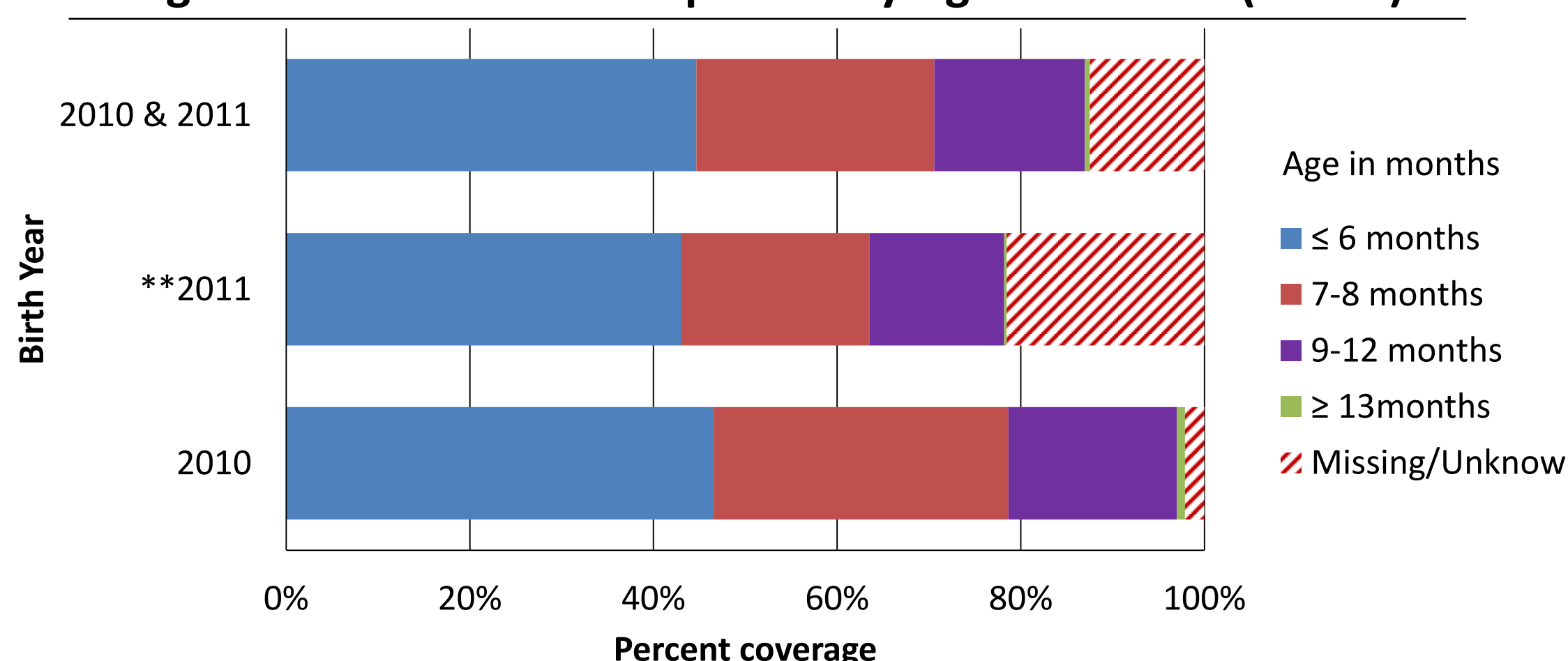


Fig. 6: Vaccine Series Completion by Age in Months (n=714)

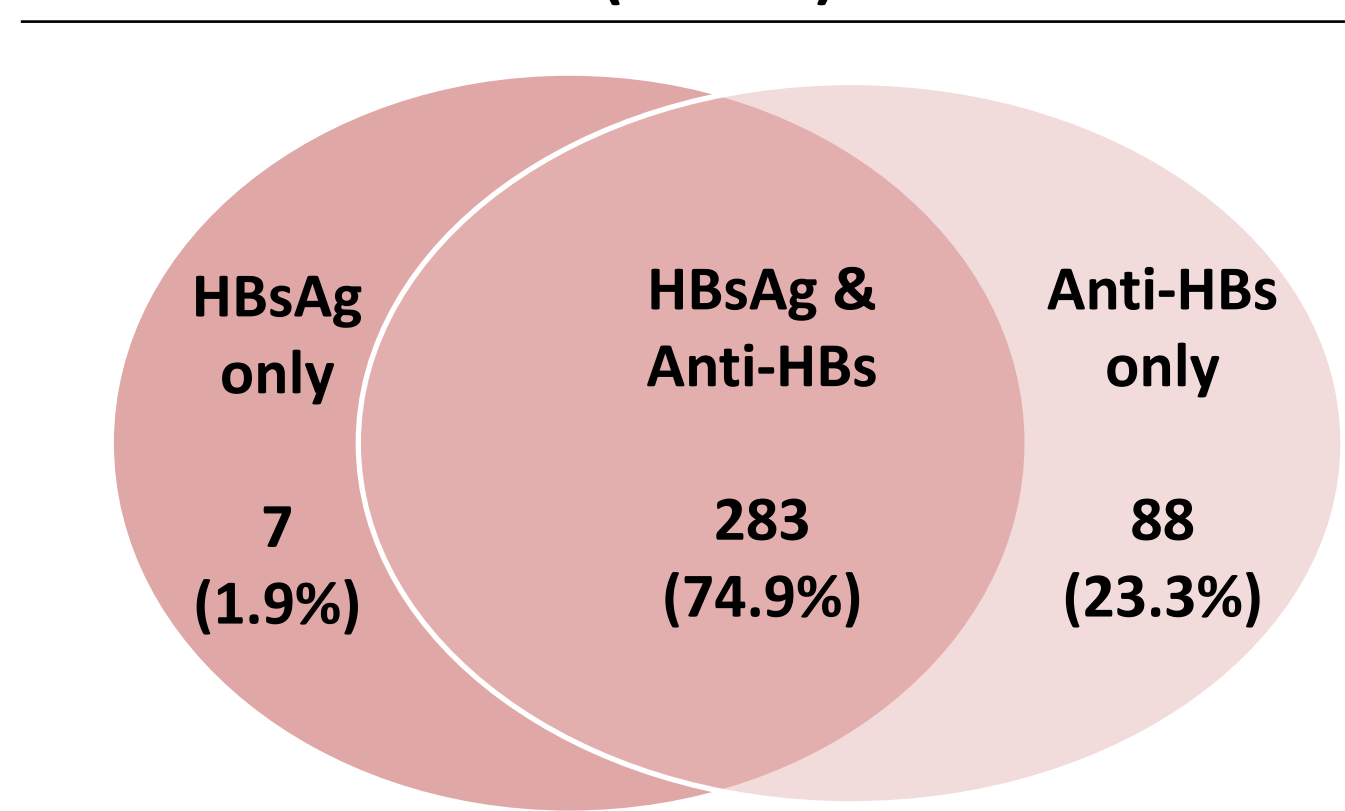


POST-VACCINE SEROLOGY*

Table 2: HBsAg and/or Anti-HBs Serology Completion

BIRTH YEAR	Tested	n (%)
2010 (N=333)	270	(81.1)
2011** (N=381)	108	(28.3)
TOTAL (n=714)**	378	(53.0)

Fig. 7: Specific Serology Tests Completed (n=378)



DISCUSSION

LINKING OF MATERNAL DATA

- In the PHBPP program data (Fig. 3: D), 37% of the women were Asian and 14% White compared to 23% Asian and 32% White in hospital discharge only data (Fig. 3: C). 24% of the women in PHBPP were categorized as Other/Unknown race.
- Differences in proportions of Asian and White race may reflect PHBPP efforts to identify pregnant women from Asian HBV endemic countries
- 111 women in hospital discharge only (Fig. 3: C) and not PHBPP data
- 49/111 women found only in hospital data were found among all HBV cases data from hepatitis B surveillance
- This suggests confirmation of pregnancy status for each pregnancy in a HBV-infected woman is a limiting step for PHBPP enrollment; however, 17/49 were categorized as "not cases" among all HBV cases data from hepatitis B surveillance

ANALYSIS OF INFANT CLINICAL OUTCOMES

- Receipt of HBIG (95.7%) & vaccine birth dose (97.8%) within 1 calendar day of birth was high and close to national rate of 96.8% in 2008
- 23% (Fig. 7) of infants who received post-vaccine serology completed only the Anti-HBs test; CDC recommends both HBsAg and Anti-HBs testing at 9-18 months after completion of vaccine series

LIMITATIONS

- Hospital discharge data is limited by ICD-9 diagnosis coding and not a gold standard to identify all cases
- Exact time for administration of HBV vaccine doses and HBIG not captured and could not be analyzed for receipt within 12 hours
- Immunoprophylaxis data may not be captured by PHBPP program due to reporting lags and follow-up delays

RECOMMENDATIONS

- Hospital discharge data can be an additional reporting source to identify HBV-infected women, who delivered a LBI
- Training for public health staff regarding the PHBPP surveillance to ensure data quality and completion
- Education and outreach for physicians and public health staff to ensure timely completion of vaccination & post-vaccination serology, particularly HBsAg testing

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REFERENCES

- Armenti, C. Electronic Perinatal Hepatitis B Surveillance and Case Management System. 2010. Poster presented at Council for State and Territorial Epidemiologists Conference.
- CDC. A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices (ACIP) Part 1: Immunization of Infants, Children, and Adolescents. *MMWR Recomm Rep* 2005; 54:1-23.
- CDC. Updated Guidelines for Evaluating Public Health Surveillance Systems. *MMWR Recomm Rep* 2001; 50:1-35.
- CDC. Grantee Immunization Information: Program Annual Report and Progress Assessments. Available at <http://www2a.cdc.gov/nip/grantee/granteeinfo.asp>
- CDC. Recommended immunization schedule for persons aged 0 through 6 years—United States, 2012. Available at: <http://www.cdc.gov/vaccines/schedules/downloads/child/0-6yrs-schedule-pr.pdf>
- Smith, E, Jacques-Carroll J, Walker T, Sirotkin B and Murphy T. The National Perinatal Hepatitis B Prevention Program, 1994-2008. *Pediatrics*; 129(4):609-16.
- CDC. Hepatitis B Information for Health Professionals. Available at <http://www.cdc.gov/hepatitis/HBV/index.htm>. Accessed March 1, 2012.