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Estimating Annual Births to HBsAg-Positive Women in Texas

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Presentation Outline

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- Hepatitis B Epidemiology
- Hepatitis B Post-Exposure Prophylaxis (PEP)
- Perinatal Hepatitis B Prevention Program (PHBPP) Overview
- Hepatitis B Case and Incidence Projection Analysis
  - Introduction
  - Methods
  - Results
  - Discussion
  - Conclusion

DISCLAIMER

The information presented today is based current preliminary data and on CDC's recent guidance. Information is subject to change.

May 23, 2024

Hepatitis B Epidemiology

1. Hepatitis B is a vaccine-preventable liver infection caused by the hepatitis B virus (HBV).
2. HBV is transmitted by parenteral or mucosal exposure to HBsAg-positive body fluids from persons who have acute or chronic HBV infection[1].
3. According to the Centers for Disease Control and Prevention (CDC) in 2021, an estimated 850,000 to 2 million persons have chronic HBV infection[2] in the United States.
4. Mother-to-child transmission usually occurs through blood exposure during labor and delivery.
5. Every year, an estimated 25,000 infants are born to women infected with hepatitis B in the United States[3].

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Hepatitis B
Post-Exposure Prophylaxis (PEP)

1. Appropriate and timely prophylaxis may prevent acute HBV infection and subsequent development of chronic infection or liver disease.

2. PEP comprises of Hepatitis B vaccine and hepatitis B immune globulin (HBIG) at birth, followed by completion of the Hepatitis B vaccine series[2].

3. Infants should receive PEP within 12 hours of birth.

4. Providing appropriate PEP within 12 hours of birth can prevent initial transmission of hep b to these infants 85-95% of the time[3].

5. Without timely PEP at birth, approximately 40% of infants born to hepatitis B positive women become chronically infected[3].

6. Approximately one-fourth of infants chronically infected may die prematurely later in life from liver failure or liver cancer[3].

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Perinatal Hepatitis B Prevention Program (PHBPP) Overview

1. The CDC funds Perinatal Hepatitis B Prevention Programs to identify HBsAg-positive pregnant women and perform case management for women and infants in the state.

2. Within Texas, The Perinatal Hepatitis B Prevention program case management is performed by the responsible entities (REs). REs comprise of local and regional health departments and are responsible for immunization services for a specific geographical area.

3. CDC creates models to estimate the expected number of annual births to HBsAg-positive pregnant women in the United States[4].

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Hepatitis B Case and Incidence Projection Analysis Introduction

1. Perinatal hepatitis B has been a nationally notifiable disease since 1995, but the number of reported cases has not been reliable for monitoring purposes.
2. Based on one of the CDC models, DSHS created a similar estimate to calculate the expected number of annual births to HBsAg-positive pregnant women in Texas.
3. These estimates help identify HBsAg-positive women, and their infants, and set goal towards prevention of mother-to-child transmission of hepatitis B.

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Hepatitis B Case and Incidence Projection Analysis Introduction

DSHS estimated the incidence rate and number of births to HBsAg-positive women for each Responsible Entity (RE) in the Texas Immunization program.

Projections help REs with program planning and development to:

1. Identify and analyze trends of births to HBsAg-positive women in Texas.
2. Improve screening and identification of pregnant HBsAg-positive women.
3. Identify the quality and limitations of disease reporting.

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Hepatitis B Case and Incidence Projection Analysis Methods

- **Analysis population and timeframe**: Newborn infants in Texas between 2017 to 2023.
- **Data sources**: Live birth data from DSHS Vital Statistic records and Texas Demographic Center and Perinatal HBsAg birth data from the Texas PHBPP.
- **Statistical analysis**: Predictive regression analysis was calculated using SAS (Statistical Analysis System) 9.4 and Microsoft Excel.
  - Adjusted incidence rate and 95% confidence interval was calculated.

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Hepatitis B Case and Incidence Projection Analysis Results

1. The estimated projected incidence rate of births to HBsAg-positive women for 2024 is 1.37 per 1,000 births (95% CI: 0.54-3.48).
2. Estimated projected number of births to HBsAg-positive women for 2024 is 617 (95% CI: 243-1572 births).
3. The reported number of births to HBsAg-positive women is increased from 2023 to 2024.
4. Results also show that the incidence rate of births to HBsAg-positive women increased from 2023 to 2024.

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Incidence Projection Analysis Results, 2024

PHR	Incidence	Range of Incidence
Texas	1.37	0.54-3.48
PHR 1	1.74	0.02-147.15
PHR 2/3	1.61	0.71-3.65
PHR 4/5N	0.85	0.00-241.46
PHR 6/5S	4.63	0.16-135.81
PHR 7	0.94	0.70-1.24
PHR 8	4.00	0.00-3,750.27
PHR 9/10	3.47	0.04-317.47
PHR 11	0.16	0.04-0.67

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Case Projection Analysis Results, 2024

PHR	Births	Range of Births
Texas	617	243-1,572
PHR 1	24	0-2,071
PHR 2/3	208	92-470
PHR 4/5N	17	0-4,700
PHR 6/5S	579	20-16,973
PHR 7	48	36-64
PHR 8	196	0-183,385
PHR 9/10	92	1-8,382
PHR 11	6	1-26

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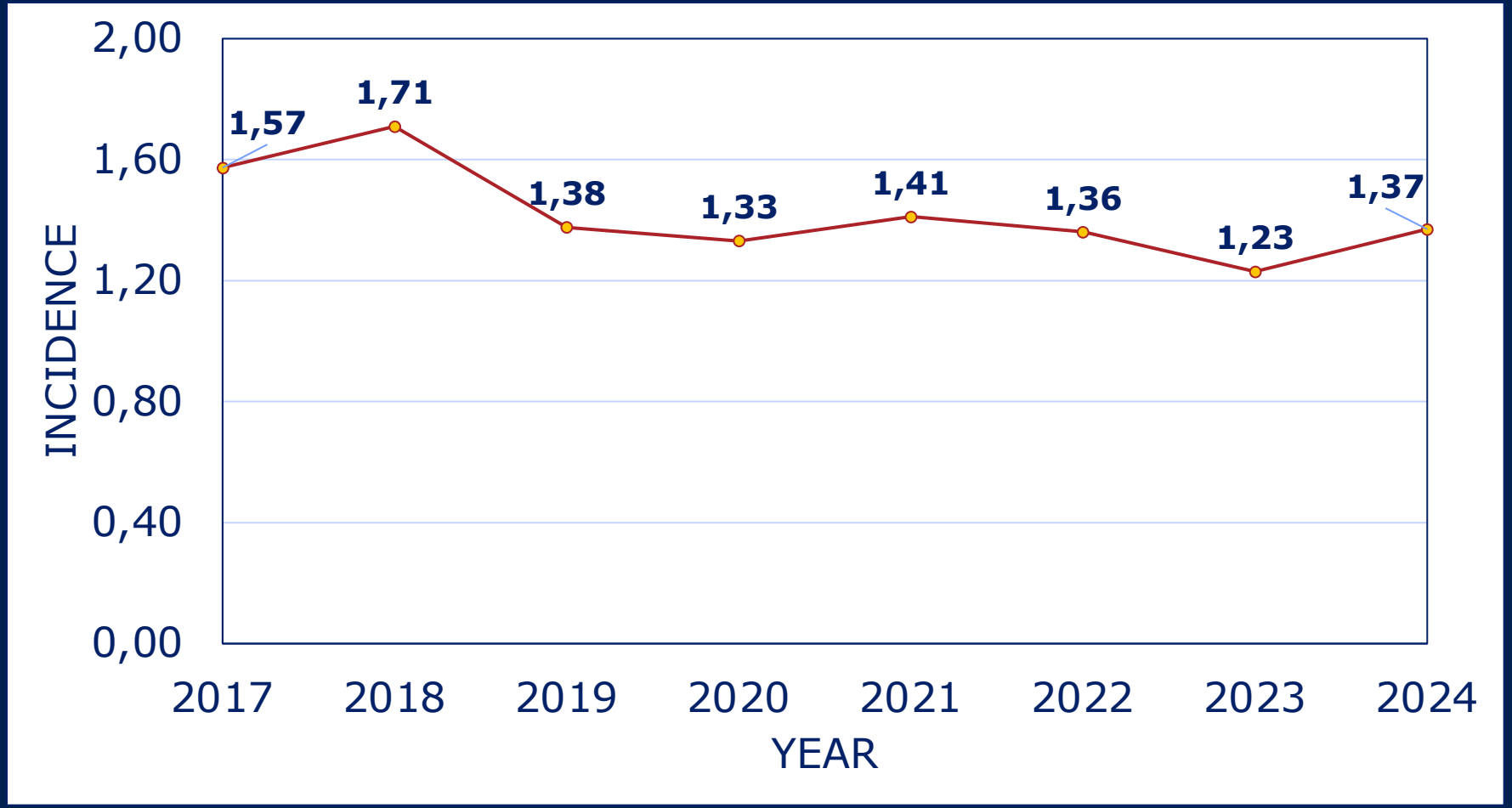
Incidence Rate of births to HBsAg Positive Women in Texas, 2017-2024



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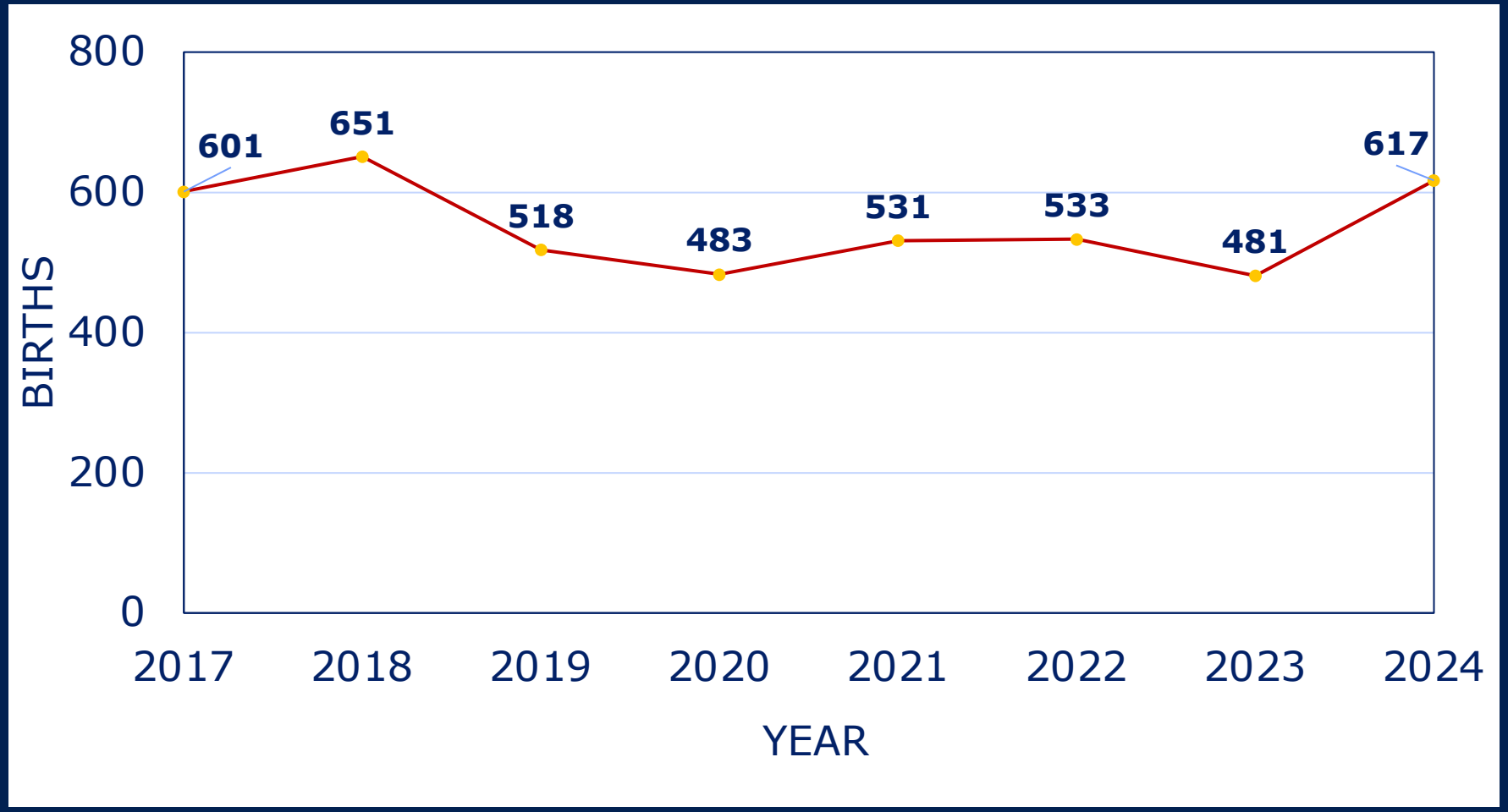
Births to HBsAg Positive Women in Texas, 2017-2024



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Hepatitis B Case and Incidence Projection Analysis Discussion

1. DSHS used data from 2017 to 2023 to estimate the number of HBsAg-births for 2024. DSHS primary estimated projections indicate the observed incidence rates and number of births might change.
2. A limitation of this analysis is the potential under-reporting of HBsAg-positive cases and total births into the Salesforce database. This may lead to variations in the estimates.
3. A strength of this analysis may be reflected in the accuracy of 2023 projections. When DSHS compared the projected incidence rate and total number of births to HBsAg-positive women for 2023 to the actual incidence rate and number of births in 2023, the results were equivalent.

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Hepatitis B Case and Incidence Projection Analysis Conclusion

1. These 2024 estimates help:
    a. REs identify expected number of HBsAg births within the jurisdiction to inform program planning and resource allocation for case management.
    b. Public health programs plan surveillance and outreach activities to improve identification and management of at-risk women and infants.
2. Project next steps include:
    a. Incorporate other projection estimation methods to enhance the accuracy and robustness of the estimates.
    b. Work with REs to promote continuous quality improvement and implement methods to decrease Hepatitis B prevalence among at-risk women.
    c. Stratify live births by mother's country of birth and race and ethnicity to more precisely estimate the number of at-risk infants.

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4. Koneru, A., Schillie, S., Roberts, H., Sirotkin, B., Fenlon, N., Murphy, T. V., & Nelson, N. P. (2019). Estimating annual births to hepatitis B surface antigen–positive women in the United States by using data on maternal country of birth. *Public Health Reports*, *134*(3), 255–263. https://doi.org/10.1177/0033354919836958

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Questions?

Email Questions to Imm.epi@dshs.texas.gov

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Thank you!