Prevention of HBV mother to child transmission (MTCT) using HBV three dose vaccination, selective use of HBV birth dose, &treatment of high viral load pregnant women in Uganda

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Introduction

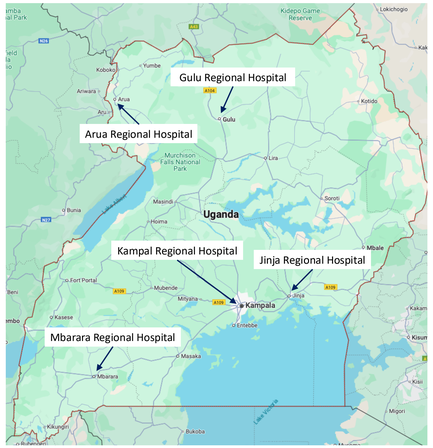
In Uganda ≥80% of all infants have received three doses (3D) of pentavalent vaccines since 2004 and ≥90% since 2013. Hepatitis B virus (HBV) universal birth dose (BD) vaccination of infants started in 2023. However, access to the BD vaccination remains limited and sometimes intermittent outside of the large cities.

Aim

Approximately 58% of annual 1.7 million births occur at home, posing a challenge to the complete rollout of universal BD vaccination. The goal of this project was to evaluate the impact of combining universal 3D infant vaccination with targeted BD vaccination, and antiviral (AV) treatment of mothers to reduce HBV prevalence among infants and meet the World Health Organization's target of a prevalence of ≤0.1% among ≤5-year-olds.

Method

- **Study Design:** 18-month study at 5 maternity hospitals
- **Screening:** All pregnant HIV negative women screened for HBsAg (rapid test)
- **HBsAg+ (n = 660):** Stratified by HBV DNA:
  - High viral load (HVL): ≥20,000 IU/mL
  - Low viral load (LVL): <20,000 IU/mL
  - LVL (<20,000 IU/mL) on antiviral (AV) treatment
- **Treatment:** HVL group received TDF/3TC (in the 3rd trimester for 3 months)
- **Infants of HBsAg positive mothers:** BD vaccine <24 hours + pentavalent 3D series
- **Infants of HBsAg negative mothers (n = 666):** National pentavalent 3D schedule
- **Follow-up:** Infants were tested for HBsAg at 9 months



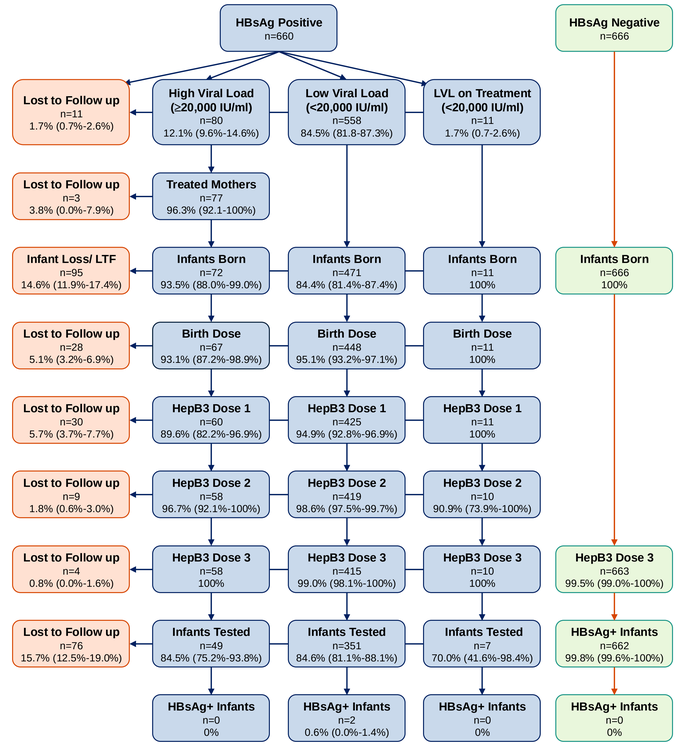
Results

- HBsAg prevalence among pregnant women was 3.46% with the highest prevalence in the Gulu region

	Arua	Gulu	Jinja	Kawempe	Mbarara	Total
Mothers Screened	5,441	3,059	2,635	6,372	1,556	19,063
HBsAg+ Mothers	192	168	89	153	58	660
HBsAg Prevalence	3.53%	5.49%	3.38%	2.40%	3.73%	3.46%

- Among the 660 HBsAg positive mothers 12.6% (95% confidence intervals: 9.6-14.6%) had HVL, 84.5% (81.8-87.3%) had LVL and 1.7% (0.7-2.6%) were already on AV treatment (Figure 1).
- Among the 80 HVL mothers 77 (96.3% (92.1-100%)) initiated antiviral treatment and when combined with HBV BD and HepB3 dose vaccine, no infants were HBsAg positive at 9 months.
- Among the 3 HVL mothers who **did not go on treatment**, one infant tested HBsAg positive after receiving HBV BD but **not** HepB3 dose vaccines.
- LVL mothers (n=558) not already on treatment delivered 471 infants.
  - The majority of lost to follow up mothers were in rural areas due to lost contact & no phone (n=44).
  - Loss of infants (n=30) due to miscarriage, neonatal death, and abortions accounted for additional losses.
  - For infants who initiated HepB3 dose vaccine, compliance for all three doses was >90%.
  - Two infants tested HBsAg+ at nine months – both had received HBV BD and completed the Hep3 Dose series.
- No (tested) infants born to LVL mothers on antiviral treatment were infected with HBsAg at 9 months.
- None of the tested infants born to HBsAg negative mothers were HBsAg infected at 9 months.
- Prevalence of HBsAg among infants born to LVL mothers (not on treatment) was 0.6% (0.0%-1.4%).
- Study prevalence of HBsAg among all infants was 0.19%.
- After adjusting for 96.54% of all mothers being HBsAg negative, the adjusted prevalence of HBsAg among infants was **0.02%** (0.00%-0.04%).

Figure 1. Project patient flow



Conclusions

- More than 96% of all pregnant women in our study were HBsAg negative and none of their infants were HBsAg infected.
- Although HBV MTCT is very low in low viral load mothers (when combined with HBV birth dose and HepB3 vaccination), it is not zero and some transmission will occur.
- With the cost of 3 months of antiviral lower than one PCR test, all HBsAg+ mothers can receive AV forgoing PCR testing.
- Incorporating antiviral treatment into the HBV prophylaxis program allows Uganda to achieve the WHO elimination targets by 2030, while only providing HBV birth dose to infants born to HBsAg positive mothers.

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