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# Introduction of birth dose of hepatitis B virus vaccine to the immunization program in Ethiopia: an economic evaluation


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## Background

Hepatitis B Virus (HBV) infection is a major cause of mortality and morbidity in various parts of Africa including Ethiopia. A birth dose of the HBV vaccine has shown to decrease the risk of developing chronic HBV infection and its complications. This study aimed to further explore the cost-effectiveness of a birth dose of HBV vaccine in a medical setting in Ethiopia.

## Methods

An analytic model was constructed using the Markov process (figure 1) to estimate the costs and effects of a birth dose of HBV vaccine against the current practices (Pentavalent vaccine given at 6, 10 and 14 weeks of birth). Analyses were based on Ethiopian epidemiologic, demographic, and cost as well as through review of the current literature. Disability-adjusted life years (DALYs) were used to quantify the health benefits while the costs of the intervention were expressed in 2018 USD.


**Disease Control Priorities-Ethiopia (DCP-E)**

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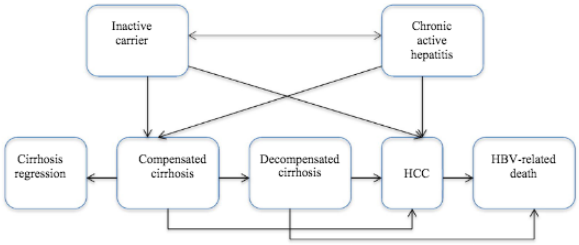


**Figure 1. Markov Process Showing Health States**

## Results

In Ethiopia where the prevalence of HBV among pregnant women is approximately 5%, compared to the current strategy, adding a birth dose of HBV vaccine would present an incremental cost-effectiveness ratio (ICER) of 110 per DALY averted (Table 1).

The ICER estimates were robust over a wide range of epidemiologic, vaccine effectiveness, vaccine coverage and cost parameter inputs.

## Future Directions

Birth dose HB vaccine is a critical prevention strategy that is recommended by the World Health Organization. It is also a critical facet to the national viral hepatitis and prevention guidelines in Ethiopia. Cost-effective preventions such as birth dose explored in this study should be vital priorities for low-income countries such as Ethiopia. Furthermore, with the current revision of the essential health services package, policymakers should consider including the birth dose HBV vaccine.

## References

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Table 1 Cost, effectiveness and incremental cost-effectiveness ratio (ICER) of an additional birth dose of HBV vaccine

| Strategy | Cost (US$) | Incremental costs | Effects (DALYs averted) | Incremental effects (DALYs averted) | ICER |
|---|---|---|---|---|---|
| Without birth dose | 4.0243 | | 0.001417 | | |
| With birth dose | 4.3538 | 0.3295 | 0.004117 | 0.00300 | 110 |

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