Assessing the Value of Dengue Vaccine TAK- 003: A Cost-Effectiveness Study in Malaysia

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INTRODUCTION

- Dengue is a viral infection that impacts individuals of all age groups and presents a significant health and societal burden in Malaysia.
- In August 2024, there were 83,131 recorded dengue fever cases compared to 66,224 cases for the same period in 2023 indicating significant increasing burden in Malaysia.¹
- The novel dengue vaccine, TAK-003, has shown to provide long-term safety and efficacy up to 4.5 years against symptomatic and hospitalized dengue cases, based on the TIDES study involving over 20,000 children and adolescents.²
- Deterministic sensitivity analyses (DSA) were conducted to assess the impact of varying parameter values on incremental cost from a payer perspective (Figure 3)
- Parameters were tested with ±25% variations. However, expansion factor was tested with a variation referenced to a published literature.⁶
- Given a variation of ±25%, the probability of symptoms (given second infection) is associated with most significant impact of –USD28M to -USD418M. This indicates that the second symptomatic dengue infection is a crucial parameter influencing the outcomes.
- TAK-003 has been given approval by Malaysia's Drug Control Authority (DCA) for use among individuals aged four years and older.³
- Evaluating the cost-effectiveness of TAK-003 reveals its pivotal role in reducing healthcare costs, preventing hospitalizations, and improving societal burden.

OBJECTIVE

• This study aims to estimate the cost-effectiveness of implementing vaccination with TAK-003 compared to no vaccination in a national vaccination program in Malaysia.

METHODS

- A static model with a dynamic component was developed to evaluate the impact of vaccination with TAK-003 on epidemiologic, economic and quality-of-life outcomes. This model captured the effects of both direct and indirect protection.
- The model was calibrated to local confirmed age-specific dengue case incidence from 2014 to 2023.
- A published study showed the highest incidence rate occurred in people aged 0-14 years.⁴ Simulations of various vaccination strategies from ages 7 to 13, revealed that the most significant public health impact was achieved through initiating routine vaccination at age 7.⁵
- Therefore, routine vaccination of 7-year-olds with TAK-003 compared with no vaccination was assessed over a time horizon of 20 years from both a payer and societal perspective.

• All scenarios examined in the deterministic sensitivity analysis demonstrated cost savings, regardless of variations in the parameters.

FIGURE 3: INCREMENTAL COST (PAYER PERSPECTIVE)



Eff: Efficacy; Prob: Probability; Inf: Infections; Nb: Number; Med: medical; USD: United States Dollar

SCENARIO ANALYSIS

- Probabilistic sensitivity analysis (PSA) was conducted using 500 iterations and resulted in a 96.8% probability of TAK-003 being dominant vs. no vaccination, given a willingness-to-pay threshold of 1 GDP per capita (USD 11,993) (Figure 4).
- Both deterministic and probabilistic sensitivity analyses were conducted to assess the robustness and variability of the outcomes.

RESULTS

PUBLIC HEALTH IMPACT

• Routine vaccination of 7-year-olds with TAK-003 at 85.9% coverage resulted in estimated reductions of 39% symptomatic and 43% hospitalized dengue cases compared with no vaccination.

ECONOMIC IMPACT

- Under an illustrative vaccine price of USD25/dose, the vaccination strategy was cost-saving accounting to USD205M from a payer and USD719M from a societal perspective, respectively, over 20 years. (Figure 1)
- The savings included direct medical costs, indirect medical costs, productivity loss and costs related to school absenteeism, after accounting for the cost of vaccination and vaccine administration cost (Figure 2)

Societal

1600

1400

1200



FIGURE 4: COST-EFFECTIVENESS PLANE – ICER PER DALY AVOIDED (PAYER PERSPECTIVE)



USD: United States Dollar; ICER: Incremental Cost-Effectiveness Ratio; DALY: Disability-adjusted life year



CONCLUSION

Implementing TAK-003 in the national immunization program in Malaysia may result in significant cost savings attributed to a reduced number of symptomatic and hospitalized cases compared to no vaccination. Attaining a high vaccination coverage at younger age and combined with existing dengue control activities, may reduce the disease burden of dengue infection in the country.

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DISCLOSURES

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DISCLAIMER

This poster is intended for healthcare and HEOR professionals only.

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