COST-EFFECTIVENESS OF VACCINE DEVELOPMENT AND ENVIRONMENTAL CONTROL AGAINST DENGUE IN SOUTHEAST ASIA
Sua JA1, Shepard DS2, Halstead S2
1Brandeis University, Waltham, MA, USA; 2Rockefeller Foundation, Rockville, MD, USA

OBJECTIVE: Dengue infection is a major public health problem in tropical countries, home to 2.5 billion persons. Every year, tens of millions of people get infected and many of them develop acute disease with temporary disability. While improved treatment has lowered the case fatality rate, the high incidence of the disease keeps the absolute burden of death high. Southeast Asia (SEA) is a particularly vulnerable region, where most of the dengue cases occur. Environmental control intervention to control mosquito breeding is expensive, erratic, and very difficult to sustain. A dengue vaccine, currently in steps of development, appears to be a promising public health intervention to dengue control. We conducted a cost-effectiveness analysis (CEA) to evaluate the net health benefits and costs of administering dengue vaccination to annual birth cohorts in SEA.

METHOD: We updated and improved a CEA model published in 1993 by two of the authors. The model was validated to the epidemiological and economic data for the SEA region, where 529 million people live. The target of the vaccination was the cohort of 12 million children born in SEA each year. We assumed 2 doses of vaccine would be required to provide lifetime protection with 95% efficacy. We also assumed a dose cost of $5. We compared the impact of vaccination against the current situation and against a comprehensive vector control program. We used a societal perspective and the cohort lifetime as the timeframe and discounted Disability Adjusted Life Years (DALYS) and economic outcomes at an annual real rate of 3%.

RESULTS: Providing vaccination to a birth cohort in SEA would cost $389 per QALY saved. A comprehensive environmental control program was less favorable ($5,000 per QALY gained).

CONCLUSIONS: Dengue vaccination appears to be a very cost-effective strategy to control dengue. This finding supports the need to accelerate the development and commercialization of an efficacious dengue vaccine.