**Project title:** Improving health quality and wellbeing of the economically marginalized populations in Southeast Asia: An initiative towards the introduction of a human hookworm vaccine (IIHHVac)

**Project summary:**

Hookworm disease is the leading cause of iron deficiency anemia in the world’s poorest regions [1]. It is a major socioeconomic and public health concern. It is estimated that 600 million people are chronically infected, with up to 135,000 deaths annually [2]. Most infections occur in the Asian region (60-70 million people in each), followed by Nigeria and the Democratic Republic of Congo in Africa and Brazil (30-40 million people in each) [3]. The economic burden of chronic hookworm infection is estimated at 4.5 million DALYs annually [4] and is among the most important neglected tropical disease [5].

Southeast Asia (SEA) has a large percentage of populations living in rural and remote areas where hookworm infection is common [6]. These areas generally have poor sanitation and access to untreated water, which increase the opportunity of hookworm transmission and infection. Hookworm infection has been associated with impaired learning and decrease in productivity [7]. Eradicating hookworm disease will have the potential to improve the health quality and well-being of the economically marginalized communities living especially in the remote areas of SEA.

Here, we propose an initiative to explore the possibility of introducing hookworm vaccine to the vulnerable communities in the SEA using select communities in Malaysia as a starting point.

Hookworm disease is highly endemic in certain communities in Malaysia with prevalence of 3.0–44.7%. It is notable especially amongst the underprivileged or minority communities such as the Orang Asli (aborigine) children [8-11], amongst Indians living in estates [12], amongst multiracial communities living in the squatter areas [13] and in poor Malay living in traditional villages [14, 15] in which sanitation is poor.

The excellent availability of research infrastructure, efficient technical support coupled with the presence of local expertise with well-connected regional counterparts makes Malaysia an ideal study site. The model developed and knowledge gained from the study can be expanded to other SEA countries, where hookworm disease is highly endemic.

Published reports have suggested that the Sabin Vaccine Institute (SVI) at Baylor College of Medicine, Houston, Texas, USA has developed lead vaccine targets against the hookworm disease. The Phase II trials of the vaccine started in November 2012 with volunteers receiving 3 injections over 4 months and will be monitored for an additional 12 months ([http://www.sabin.org/updates/pressreleases/clinical-trials-first-ever-human-hookworm-vaccine-advance](http://www.sabin.org/updates/pressreleases/clinical-trials-first-ever-human-hookworm-vaccine-advance)).
In anticipation of the need to undertake similar studies in the SEA, we propose here to:

1) Undertake a study to update the epidemiology, prevalence and risk factors of hookworm infections targeted for vaccination among the economically disadvantaged communities in rural areas of Peninsular Malaysia with focus on the *Orang Asli* communities and the native communities of Sarawak and Sabah in Malaysia.

2) Identify potential cohorts for the eventual vaccine trials

3) Estimate the cost-impact of vaccine introduction among the identified communities

4) Determine community perception and acceptance of vaccine

5) Identify, characterize and full genome sequencing of vaccine-targeted hookworm species from the identified communities

6) Develop diagnostic tools and competency to detect the various hookworm species needed for eventual assessment of vaccine efficacy.

7) Identify additional potential vaccine targets from hookworm species identified from the communities

*As taken from original proposal template, question 5.

References