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## #217 - Designing Innovative Solutions to Service Unreached Populations in Communicable Disease Control in the Philippines

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### Objectives/aims

We propose a cluster randomized controlled trial to determine the acceptability and adoption of a package of early community directed dengue vector control interventions that includes an early warning system based on disease forecast, regular community education, a proactive integrated vector management and disease surveillance in decreasing Aedes mosquito burden and dengue related morbidity and mortality.

Disease forecasts will be from analysis of remote sensing data on climate and temperature, along with social listening and search trends, based on modeling on hospital case records.

Control areas will rely on the national operational dengue control interventions. Focus group discussions will be conducted to determine acceptability. Degree of adoption will be determined using data from household mosquito burden indices and dengue morbidity and mortality rates.

<https://doh.gov.ph/national-dengue-prevention-and-control-program>

### Methods

Advance Early Dengue Detection and Exploration Service

AEDES was conceptualized to be a data-driven early warning system for detecting dengue epidemics in the Philippines. The innovative use of data, as it travels along

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its value chain from creation to transformation into actionable insights, underpins the overall workflow of AEDES. Furthermore, by leveraging the three main disciplines of analytics - Descriptive, Predictive, and Prescriptive, AEDES facilitates a holistic approach to dengue prevention and control and empowers its intended users to make informed decisions. It was recognized in the NASA Space Apps Challenge in 2019 for Best Use of Data.

This is a cluster randomized controlled trial. AEDES app will identify the location of Dengue high risk villages in Zamboanga City. Assuming 50 individuals per barangay can be recruited, 10 villages are needed to be randomized either to the intervention group (5 villages) or the non-intervention group (5 villages). This will achieve a power of 80% for detecting a difference in proportions of 0.15 between the two groups at a two sided p value of 0.05.

### **Main findings**

The Philippines is fourth in the dengue burden in Southeast Asia. In the past 30 years, the incidence increased by 24.4% while the mortality rates increased by 29.2%. With an annual estimate of 842,867 clinically diagnosed dengue cases in the country, this translates to \$345 million in direct medical cost. (6, Wartel).

The Department of Health Dengue Prevention and Control Program includes sentinel based disease surveillance, case management and diagnosis, integrated vector management (IVM), outbreak response, health promotion and advocacy and research. (4). Incorporating emerging technologies like the dengue forecasting models and community directed implementation strategies holds great promise.

Provided with these effective tools, implementation is a big challenge. Key factors contributing to failure include lack of knowledge about disease transmission and prevention, low levels of community participation, lack of local leadership and lack of financial incentives (24). By engaging community leaders and members in co-creation of the implementation strategy, these factors that hinder implementation are addressed ensuring improved outcomes and sustainability. (22).

We expect that the community directed approach to program implementation will be acceptable to stakeholders.

We also expect that by improving monitoring methodologies, necessary lead time can be provided to prepare, plan, allocate resources through historical modeling of case trends.

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By adopting the proactive based program, educating the public and encouraging community involvement in dengue prevention and control, it will result in lower dengue cases and dengue related deaths, and lower Aedes mosquito burden indices in forecasted high risk areas.

The results will encourage adoption of new technologies, collaboration between health and non-health sectors and cooperation of the communities in a unified effort to prevent and control dengue.

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