



PHISH: INTENSIFIED SURVEILLANCE FOR THE CONTROL OF SOIL-TRANSMITTED HELMINTHIASES AND OTHER NEGLECTED TROPICAL DISEASES IN THE PHILIPPINES.

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BACKGROUND



OBJECTIVE

Proof-of-concept study to estimate the magnitude and heterogeneity of intestinal parasitic infections in Palawan using serological and molecular assays of archived samples collected from health facilities.

Soil-transmitted helminthiases (STH), an infection caused by *Ascaris lumbricoides*, *Trichuris trichiura*, and Hookworms (*Ancylostoma duodenale* and *Necator americanus*). These are the world's most common parasitic infections among children in poor communities, resulting in cognitive impairment, malnutrition, and growth deficits (Hotez et al. 2006). In the Philippines, STH remains a significant public health concern. There is a downward trend in STH prevalence. Nationwide surveys published in 2005 indicate a cumulative prevalence (positivity to at least one type of STH) of 66%-67%. A baseline study for the Integrated Helminth Control Program (IHCP) of the Department of Health (DOH) in 2006 revealed a cumulative prevalence of 54% (23% high intensity) (Belizario et al. 2009).

The national prevalence survey from 2013 to 2015 (82 of 84 provinces, 26,171 stool samples) disclosed a cumulative prevalence of 28%. Despite years of MDA, these numbers are higher than the 20% target by the WHO to realize morbidity control (report on the National Prevalence Survey of STH and Schistosomiasis, RITM, 2015; Matingo et al. 2017). To assess the effectiveness of future STH control programs, through monitoring of the prevalence and intensity of infections is necessary. Given that the traditional Kato-Katz microscopic technique recommended by the WHO to diagnose STH loses sensitivity for low intensity infections, more sensitive methods that combine laboratory and epidemiological data are warranted.

A seroprevalence study conducted in 2002 in the province of Leyte suggests that 24.6% sampled participants were tested positive to population ages 7-30 years old (Mei-Zu et al. 2010). Another NTD is filariasis, a vector-borne disease caused by a filarial worm transmitted via mosquito bite causing permanent and long-term disability. In 1998, the Department of Health (DOH) consolidated report seen a 9.7% per 1000 population were tested positive for filaria (DOH 2018). Palawan is identified as filaria endemic areas, however no updated prevalence survey to confirm the continuous transmission of the disease in the island. Lastly, the presence of Yaws which is caused by a bacteria *Treponema* spp. is known to be an endemic NTD in the Philippines. According to World Health Organization (WHO 2019) 75-80% of cases were seen among young population from depressed areas which infection occurs when an individual had skin to skin contact from lesion or open wounds of an infected individual (Dofitas et al. 2020).

It is vital to rigorously monitor the prevalence and intensity of infections. More sensitive methods that combine laboratory, epidemiological, and mapping data are needed. Based on our previous collaborative research work on surveillance of malaria infections in Palawan (Enhanced Surveillance for Control and Elimination of Malaria in the Philippines; ENSURE), retrospective samples will be utilized to employ novel serological methods to identify STH exposure, and perform cutting-edge spatial mapping techniques to define areas where infections are occurring. We will then conduct a prospective study to evaluate our findings against parasitological and molecular methods. Meanwhile, other Neglected Tropical Diseases (NTD) eg; Taeniasis, Filariasis and Yaws were also seen to cause burden on high-risk population including individuals and families residing at geographically isolated and disadvantaged areas (GIDA). Control and prevention measures to prevent these NTD's has been utilized by creating programs and policies. However, an effective monitoring system and methodologies should be applied to determine the progress of the implemented intervention.



METHODOLOGY

Cross-Sectional Survey



Clustered sampling in the four barangays to obtain a total of 100 households (approximately 2,000 individuals), based on the 2015 WHO guideline with additional number for withdrawal and loss-to-follow-up (WHO 2015).

Serological Analysis



Archived DBS samples (number of samples and year collected) from the ENSURE study and from samples collected in the cross-sectional survey will be assayed using antigen-specific multiplex analysis (serological assay) to detect antibodies for *A. lumbricoides*, *T. trichura*, *Ancylostoma* spp., *Strongyloides stercoralis*, *N. americanus*, *Taenia* spp., *Taenia* spp., *Toxoplasma* spp., *Wuchereria bancrofti*, *Brugia malayi* and *Treponema pallidum* using antigen-coupled Magplex beads from LSHTM.

Risk Maps

Information from serological data of the archived blood spots and blood collection from the cross-sectional survey will be combined with the geo-location of households (including those from the ENSURE study) and results of stool examinations and molecular analysis. This will be integrated with satellite-based, remote sensing data (e.g., LANDSAT) to identify environmental risk factors for exposure to STH and to develop predictive risk maps. This will be augmented with the local knowledge and perceptions of infections with STH and WASH from cross-sectional survey.

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