

## PROJECT SUMMARY

Neurocysticercosis (NCC) is the most common parasitic infection of the central nervous system, and the leading cause of acquired epilepsy in the developing world. It occurs when someone ingests *Taenia solium* eggs passed in the feces of a pork tapeworm carrier. The eggs grow into larvae which then form cysts throughout the body; cysts in the brain are responsible for 30% of seizures in the developing world. In Latin America, over 400,000 people of all ages and socioeconomic classes have symptomatic NCC. Sustainability of control efforts is limited by migration of human tapeworm carriers, persistent conditions for transmission and the enormous reproductive capacity of tapeworms. Our long-term goals are two-fold; 1) to develop an effective, affordable and sustainable strategy for *T. solium* control in endemic areas, and 2) to increase population-based research capacity around neurologic disorders in rural regions of Peru. In this R21 grant, we begin with a feasibility study of targeted screening as a control strategy, and by leveraging the resources of an existing consortium to extend research and MPH training, field experience, and mentorship to two physicians in Puno, Peru.

Field data show spatial clustering of infected pigs around tapeworm carriers. With the short lifespan of pigs raised for consumption, this suggests that infected pigs may mark the presence of a nearby tapeworm carrier. Our specific aims include: 1) To implement and assess targeted screening for human *T. solium* tapeworm carriers in household clusters surrounding infected pigs, and 2) To identify the most effective screening tools for tapeworm carriers in the context of targeted screening. We propose an intervention cohort with two study arms. Communities in the intervention group receive ongoing targeted screening for tapeworm carriers in household clusters around infected pigs, using all available screening tools (history of passing worm segments, O&P, coproantigen ELISA, EITB, and PCR). Communities in the control group receive education about the *T. solium* lifecycle and how to prevent infection. We conduct pig serosurveys in both groups every 5 months, using pig seroprevalence to measure overall transmission, and provide mass tapeworm screening and treatment at study end. Our primary hypothesis is that ongoing targeted screening and treatment of tapeworm carriers will decrease transmission of *T. solium* infection in an endemic area, measured by serial pig seroprevalence. Our secondary hypothesis is that targeted screening around pigs with cysticercosis will increase detection of *T. solium* tapeworms compared to generalized screening in endemic areas. We estimate prevalence of infection among household clusters using latent-class analysis of all screening results. Finally, we use decision-making analysis to determine the most effective screening tool for targeted screening, taking into consideration test performance, cost, and relative accessibility. Our results will guide design of a subsequent large-scale *T. solium* control intervention using the most promising methods identified in this study.