Background

- *Taenia solium* infects millions of people in low-income communities throughout Africa, Asia, and Latin America.¹
- The parasite may account for 30% of acquired epilepsy in areas where *T. solium* is endemic.²
- It has been identified as the leading cause of death from food-borne disease resulting in 2.8 million disability-adjusted life years lost.³

Study Population

- Village and schools in poor, rural Tibetan counties in western Sichuan

The majority are small holder farmers raising free range pigs

Disease Burden of Neurocysticercosis in Humans

- Human cysticercosis, a disease of human to human fecal-oral transmission, occurs as the result of the accidental ingestion of eggs of *T. solium*, a porcine tapeworm. These eggs are shed through the feces of humans infected with adult *T. solium* parasites in their GI tracts.
- The aberrant migration of the hatched parasite to the human brain causes neurocysticercosis, the most common treatable cause of symptomatic epilepsy worldwide, causing seizures, headaches, and other debilitating neurological symptoms.
- Nervous system morbidity and cognitive impairment caused by NCC in children during formative elementary school years may lead to poor academic performance, contribute to high-drop out rates and, eventually, propagate cycles of poverty.

Objectives

- Assess the relationship between neurocysticercosis (NCC) caused by *Taenia solium* infection and academic success in school aged children, characterizing cognitive deficits and adverse educational outcomes in probable NCC cases compared to individuals with no evidence of NCC
- Characterize the detrimental economic and social impacts of seizure disorders in adults caused by *Taenia solium* infection using a take home survey
- Characterize potential zoonotic disease transmission patterns between pigs and humans using surveys to aid in the design of future interventions targeted at improving both human and pig health

Objective 1: School-based Surveys

- School serologic surveys show high levels of disease in 5th and 6th grade children. Three schools had serologic evidence of human cysticercosis of 15% or higher.
- Risks factors for childhood infection include owning a pig, feeding pigs human stool, and seeing worms in stool.
- Students with NCC are one year behind healthy classmates.
- Stool studies from a school in Muli County showed that just over 4% of students (16/362) had GI infestations with *T. solium* tapeworms, suggesting possible transmission in school.
- School latrines are often overflowing or soiled and rarely have hand washing stations accessible, increasing the risk for fecal-oral disease transmission.

Future Directions

- Adult exposure, serologic, and stool studies to understand transmission in village settings
- Pig surveys to better understand distribution of infected animals, decrease risk of transmission, and improve pig husbandry
- Design and pilot school and village level interventions to eradicate *T. solium* from behavior change to pig vaccination to scheduled human deworming

References