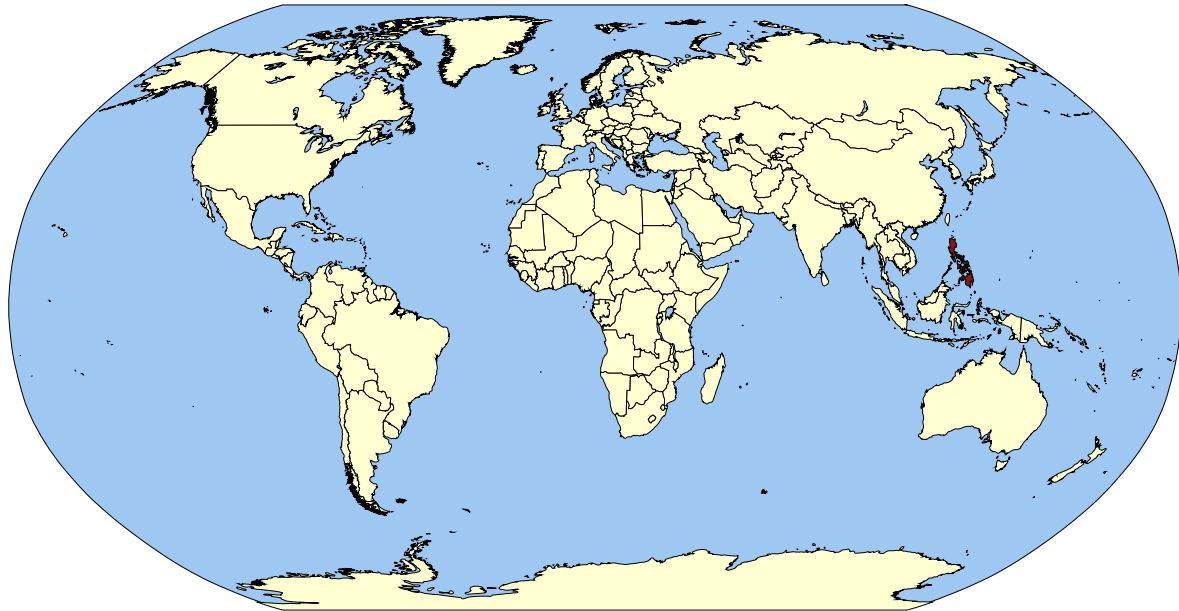


Philippines



A History of Schistosomiasis in the Philippines

Schistosoma japonicum, the only schistosome species in the Philippines, was first described in 1906 among patients at the Philippines General Hospital and among inmates of a Manila prison [1]. In 1937, *Onchomelania quadrasi* was identified as the intermediate host of *S. japonicum* in the Philippines, and mapping projects to locate transmission sites commenced. Such studies revealed that schistosomiasis represented a major threat to public health, and that the known foci of transmission were located in rice-growing areas with no dry season on the islands Leyte, Samar and Mindanao [2]. Research into the distribution and morbidity of schistosomiasis paused during WWII, but an epidemic amongst American and Allied Forces on Leyte island brought the problem back to attention in 1944, and the Department of Health (DOH) resumed mapping by 1951 [1]. New endemic areas have been identified as recently as 2003, when two new foci in two previously unidentified regions were discovered in the North, outside the expected range for *Onchomelania* snails [3].

Schistosomiasis in the Philippines [11]

500,000 school-age children required treatment in 2013

>1% of the population requires preventative chemotherapy for schistosomiasis

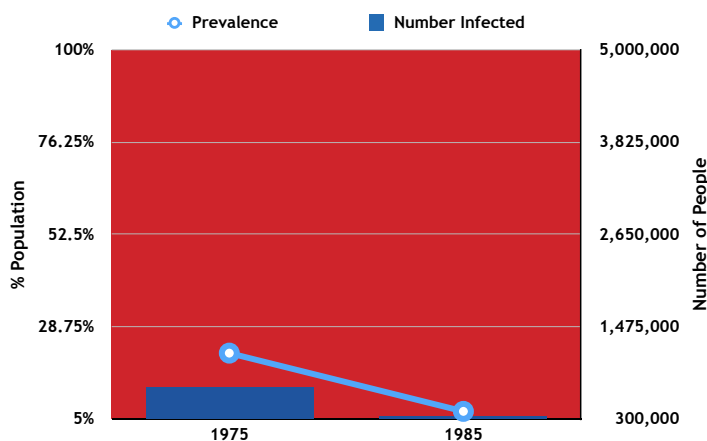
Philippine control programs treated over 800,000 people in 2013.

Overview of the Philippines [12]

- » Population in 2015: 100,998,376
- » Official Languages: Filipino and English
- » Capital: Manila
- » Republic
- » Percentage of Population with Access to Improved Drinking Water in 2015: 91.8%
- » Percentage of Population with Access to Improved Sanitation in 2015: 73.9%

Prevalence Over the Years

The first countrywide statistics on the human disease prevalence for schistosomiasis were published in 1975, indicating that an estimated 700,000 people were infected and over 5 million people were at risk for infection, corresponding to a 21.9% prevalence - the historical recorded peak [2,4]. In 1976 0.9% of the country's national health budget was allocated to schistosomiasis control with a staff of nearly 8700 people [5]. By 1985, it was estimated that while 5 million people remained at risk, there were 345,000 people infected, representing a national prevalence of 6.9% [4]. This illustrates a marked decrease in prevalence, even as the Philippines population grew rapidly. In 2003, prevalence was estimated at 0.3% but showed a slight resurgence, and by 2010 prevalence was estimated at 0.6% [6]. However, the Philippine Department of Health reports an average national prevalence of 2.5% as of 2008 (DOH). The disease is still endemic in 12 of 17 regions [7].



Prevalence Declines Over a Decade

Prevalence rates in Philippines decreased after the revamping of a control program in 1976. The bars represent the number of people infected while the line represents the prevalence rates. Despite control efforts, the total population at risk -- 5 million people -- remained the same, as shown by the red background.

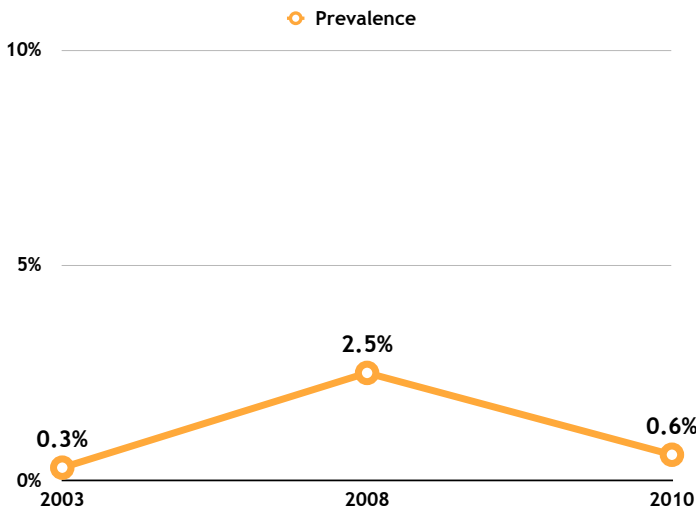
Although prevalence rates have dropped to below 1%, the disease is still endemic to 12 out of 17 regions.

Control Programs in the 2nd Half of the 20th Century

By 1952, after initial mapping projects inspired growing concern for the potential problem schistosomiasis posed to human health, the government requested World Health Organization funding for control, and in 1953 the Schistosomiasis Control Pilot Project was established in Leyte [1]. By 1961, the National Schistosomiasis Control Program began with four separate Schistosomiasis Control Teams (SCT). In 1976 this body was reformulated into the Integrated Schistosomiasis Control Program [1]. Prior to the introduction of praziquantel in 1980, the program sought to decrease transmission through snail control and human behavior modification. Improved sanitation also became a central component of the project, but was difficult to sustain, and thus not achieved on a large scale [8]. Beginning in 1982, strategy shifted to mass case finding and selective treatment with praziquantel [1]. From 1990-1995, the program entered a new phase under the governance of the Philippine Health Development Project with backing from the World Bank, intensifying test-and-treat strategies in all endemic areas. During this time, prevalence was reduced from 10% to under 5% by the time funding was greatly reduced in 1995 [3]. Prevalence estimations remained at this low level despite the reduced funding, but elimination remains distant. After 1995, the control strategy shifted from case detection and treatment to MDA. In 2000, the Department of Health officially adopted mass treatment as its central control strategy with the aim of elimination. The new program was designed to deliver mass treatment to all people over age 5, in areas with prevalence exceeding 15% without stool examination. In practice, frequency of administration was dependent upon drug availability [9]. Additionally, this program has been applauded for keeping prevalence rates low, but criticized for its lack of health education and resulting low compliance with MDA's [10]. Recent evidence shows that compliance to MDA is declining, as most people prefer screening and treatment. New efforts to eliminate schistosomiasis from the Philippines call for integrated control that include interventions in treatment, environmental sanitation, snail control, and other preventative actions [3,10]. Pilot programs testing the outcome of new integrated packages are currently under way.

The Current Situation

The most recent national prevalence survey was conducted between 2005 and 2008, and showed that prevalence has declined in general, but hotspots of infection remain in areas characterized by poor sanitary conditions. 80-90% of all cases are concentrated in the Mindanao and Visayas regions [2]. Access to control in and natural events such as typhoons represent current hurdles to comprehensive control [2].



Current Prevalence

Despite a spike in 2008, prevalence rates for schistosomiasis remain low. Philippines is looking to use integrated control efforts to completely eliminate the disease.

References

1. Blas, B. L. *et al.* The schistosomiasis problem in the Philippines: a review. *Parasitol. Int.* **53**, 127-34 (2004).
2. Bergquist, R. & Tanner, M. Controlling schistosomiasis in Southeast Asia: a tale of two countries. *Adv. Parasitol.* **72**, 109-44 (Elsevier Ltd., 2010).
3. Olveda, D. U. *et al.* Bilharzia in the Philippines: past, present, and future. *Int. J. Infect. Dis.* **18**, 52-6 (2014).
4. Utroska, J.A., Chen, M.G., Dixon, H., Yoon, S., Helling-Borda, M., Hogerzeil, H.V., Mott, K. E. *An Estimate of Global Needs for Praziquantel within Schistosomiasis Control Programmes.* *whqlibdoc.who.int* at <http://whqlibdoc.who.int/HQ/1989/WHO_SCHISTO_89.102_Rev1.pdf>
5. Iatroski, L.S. and Davis, A. The schistosomiasis problem in the world: results of a WHO questionnaire survey. *Bull. World Health Organ.* **59**, 115-127 (1981).
6. Rollinson, D. *et al.* Time to set the agenda for schistosomiasis elimination. *Acta Trop.* **128**, 423-440 (2013).
7. Philippines DOH . at <<http://www.doh.gov.ph/content/schistosomiasis-control-program.html>>
8. Ross, A. G. P. *et al.* Road to the elimination of schistosomiasis from Asia: the journey is far from over. *Microbes Infect.* **15**, 858-65 (2013).
9. WHO. Is mass treatment the appropriate schistosomiasis elimination strategy? at <<http://www.who.int/bulletin/volumes/86/10/07-047563/en/>>
10. Leonardo, L. R., Acosta, L. P., Olveda, R. M. & Aligui, G. D. L. Difficulties and strategies in the control of schistosomiasis in the Philippines. *Acta Trop.* **82**, 295-299 (2002).
11. WHO. PCT Databank for Schistosomiasis. at <http://www.who.int/neglected_diseases/preventive_chemotherapy/sch/en/>
12. Central Intelligence Agency. (2015). Philippines. In *The World Factbook.* at <<https://www.cia.gov/library/publications/the-world-factbook/geos/rp.html>>