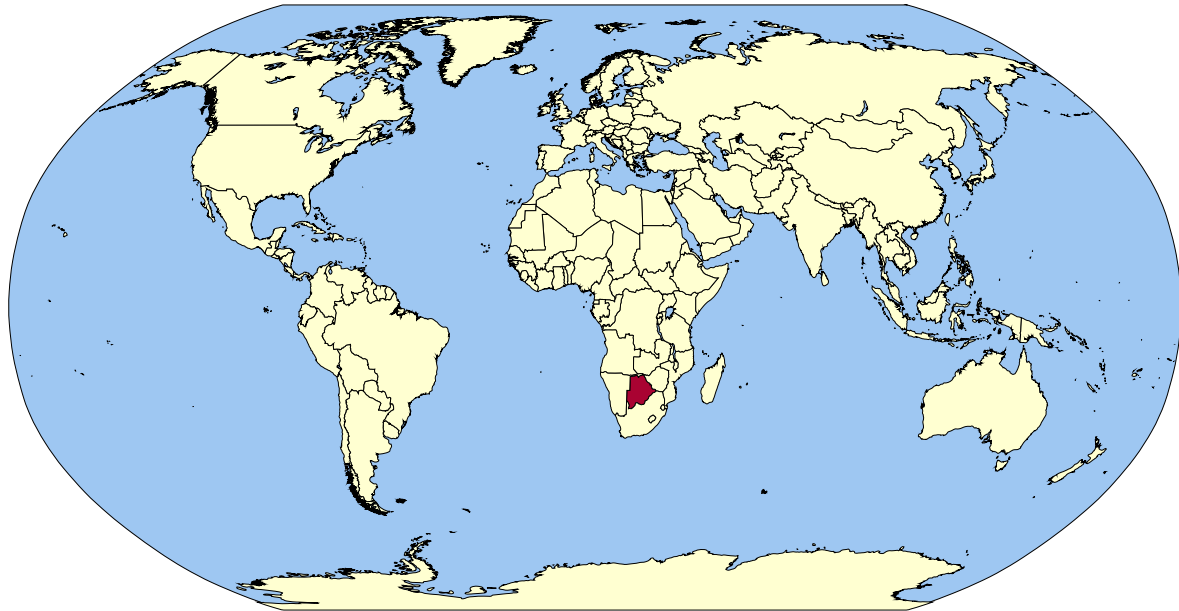


Botswana



The History of Schistosomiasis in Botswana

Botswana was formerly the British protectorate of “Bechuanaland” until achieving independence in 1966 [1]. The first cases of schistosomiasis were reported in 1929 [2]. By 1955 a broad-scale survey revealed sporadic endemicity of *Schistosoma haematobium* throughout the country, with specific hotspots in locations known to have high immigration of workers from schistosome-endemic regions of South Africa [2]. *S. mansoni* was reported from Botswana as early as 1965 [2], with very few anecdotal reports of sporadic *S. mansoni* cases before then [3].

On a larger scale, there has been no evidence of a national-scale schistosomiasis control program in Botswana. The first national survey in Botswana was conducted between 1976 and 1978. The results showed an overall country-level prevalence for schistosomiasis of 14.7% [2]. The most recent schistosomiasis countrywide estimates in Botswana report 12.1% (with a confidence interval of 5.9-27.7%), with *S. haematobium* estimated at 9.4% prevalence and *S. mansoni* at 2.8% countrywide [5], indicating little overall change in prevalence at the national scale. The World Health Organization reports 168,000 people still requiring treatment for schistosomiasis in Botswana in 2013 [6].

Schistosomiasis in Botswana [6]

170,201 people required schistosomiasis treatment in 2014

12% of the population requires preventative chemotherapy for schistosomiasis

The first cases of schistosomiasis in Botswana were reported in 1929



Overview of Botswana [1]

- » Population in 2015: 2,182,719
- » Official Language: English
- » Capital: Gaborone
- » Parliamentary Republic
- » Percentage of Population with Access to Improved Drinking Water in 2015: 96.2%
- » Percentage of Population with Access to Improved Sanitation in 2015: 63.4%

Botswana's Geography and Schistosomiasis

Man-made and natural changes in hydrology have influenced schistosomiasis transmission in Botswana. The eastern part of Botswana contained many small dams by the 1980's, and *S. haematobium* transmission is thought to be correlated with the presence of these dams [2]. *S. mansoni* transmission has been limited to an area known as the Okavango Delta, in Ngamiland district, where prevalence increased from 3.1% in 1965 to >80% in focal hotspots by 1983 and dropped substantially again by 1991 to 6.7% [4]. These increases and decreases in prevalence were thought to correspond to natural changes in the hydrology of the region. The Okavango Delta is a large wetland extending from the East African Rift Valley. The delta experiences pronounced cyclical changes in inundation, depending on decadal (and longer) climatic cycles. In 2008, Appleton and colleagues postulated that the increases in *S. mansoni* prevalence in the region occurred during decades experiencing exceptionally high inundation and the subsequent decline in prevalence back to the single digits (~6.7% in 1991) was correlated with a period of drought and exceptionally low inundation [3].

Water and Sanitation

The water and sanitation situation in Botswana is impressive: 96% of the population has access to improved water and 63% has access to improved sanitation in 2014. However, life expectancy at birth remains low, even for African standards, at 48 years old for males and 47 for females [1]. Four decades of civilian leadership, progressive politics, political stability, and strong economic activities based on diamond/mineral mining and tourism has made Botswana one of the most stable economies in Africa. With regard to other disease issues besides schistosomiasis, Botswana has one of the highest HIV rates in the world, but also one of the most progressive and comprehensive programs for dealing with HIV/AIDS [1].

Schistosomiasis Control in Botswana

The first national survey in Botswana was conducted between 1976 and 1978. The results showed an overall country-level prevalence for schistosomiasis of 14.7% [2]. The most recent schistosomiasis countrywide estimates

in Botswana report 12.1% (with a confidence interval of 5.9-27.7%), indicating little overall change in prevalence at the national scale. Another contributing factor to the declining *S. mansoni* prevalence in Ngamiland during the 1980's and 1990's was the local control program, set up in Ngamiland district in 1985, supported by the World Health Organization and the McConnell-Clark Foundation (New York), with a goal to reduce infections in the district by 75% and to reduce severe infection (defined as > 100 eggs/g feces) by 90% [3]. The local prevalence in the area of the control program dropped from 28% (4% heavy infection) in 1986 to 6.7% (0.01% heavy infection) in 1991, and intestinal schistosomiasis was deemed no longer a major public health problem in the district, so the program was discontinued in 1993 [3]. The program focused on case detection by the Kato-Katz method, and treatment with 40mg/kg praziquantel for those found to be positive (test-and-treat strategy) as well as integrated transmission control, with special emphasis on improving infrastructure for supplying safe water and sanitation. Infrastructure was improved locally during the 1980's and 1990's in the main populated area in the region, Maun, which shifted from a village lifestyle to an urban or "town" lifestyle. Some authors attribute the program's success to the change in lifestyle that reduced exposure to contaminated water [3]. Prevalence estimates specific to the Maun area were not available for the 2000's, preventing assessment of the long-term success of the focal control program. It is interesting to note, however, that Appleton and colleagues predicted a period of wetter years in the decades after the turn of the millennium and another schistosomiasis outbreak in the Okavango by the year 2020 [3]. It would be interesting to assess this prediction in the coming years.

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