

Analysis finds control of snail hosts critical to schistosomiasis elimination

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A fresh-water snail that can serve as host for schistosome parasites. Credit: Susanne Sokolow.

Schistosomiasis (also known as snail fever) affects more than 250 million people worldwide.

Individuals become infected after skin contact with the schistosome parasite in contaminated water, and, without treatment, experience chronic ill-health subsequently. Schistosomiasis control programs have had limited success, despite the availability in recent decades of specific drugs. A study published in *PLOS Neglected Tropical Diseases* reports that successful control programs over the past century relied, at least in part, on reducing the freshwater snails that are an essential host in the parasite life cycle.

Susanne Sokolow, from a dual appointment at Stanford University Hopkins Marine Station in Pacific Grove and the University of California Santa Barbara, USA, and colleagues evaluated large-scale attempts at schistosomiasis control over the past century and across the globe to identify factors associated with success. They compiled historical information on control tactics

and quantitative outcomes for all 83 countries and territories in which schistosomiasis was allegedly endemic during the 20th century. Control strategies included engineering solutions (for example, sanitation infrastructure or wetland drainage), snail control, mass drug administrations (MDA) with praziquantel, or combinations of these.

The researchers found that 19 programs that used widespread snail control, either alone or in conjunction with drug administration, reduced schistosomiasis prevalence (i.e., the proportion of the population that had the disease) by over 90%. On the other hand, 29 programs that used little or no snail control reduced the disease by less than 40%.

In addition, they found that ecological, economic, and political factors also contributed to successful schistosomiasis elimination. For example, snail control was most common and widespread in wealthier countries and in those that started control earlier in the 20th century (which probably had better health infrastructure). Examples of countries that successfully eliminated schistosomiasis include Iran, Japan, Lebanon, and Puerto Rico.

According to the researchers, after the discovery of the anti-schistosomal drug praziquantel about 40 years ago, hope for widespread elimination of the disease rose, and snail control was considered old-fashioned. In line with this, most current schistosomiasis control efforts emphasize MDA using praziquantel over snail control.

The finding here—that snail control has been the most effective way to reduce schistosomiasis prevalence to date—"call into question the wisdom of current approaches", say the researchers. On the other hand, they emphasize that drug therapy can have dramatic benefits for infected individuals and as such should be part of any strategy. They therefore conclude that "combining drug-based control programs with affordable snail control

seems the best strategy for eliminating schistosomiasis".

Discussing how to control snails, the researchers call the use of expensive and toxic molluscicides (chemicals that kill snails, and the most common strategy used in the past) "neither feasible nor desirable for many poor countries where schistosomiasis is now endemic". Mentioning that biological control efforts (i.e., the introduction of snail predators or competitor species resistant to schistosomes) have shown some promise, they call for "fostering research directed toward the development of creative, safe and cheap tools to target the snail intermediate host".

More information: *PLOS Neglected Tropical Diseases*, [DOI: 10.1371/journal.pntd.0004794](https://doi.org/10.1371/journal.pntd.0004794)

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