SIMULATION OF AN EPIDEMIC; DEVELOPMENT OF CONTROL STRATEGIES OF SCHISTOSOMIASIS

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Schistosomiasis is a vector-borne parasitic epidemic currently affecting about 250 million people and constitutes a serious public health problem in many countries. In Egypt alone, the estimated annual loss due to this disease is about $560 million dollars.

The life-cycle of schistosomes involves two incubation periods, one in human beings, another in snails. We found that in this case, it is most appropriate to use a newly developed modeling technique - the Delay-Line Model approach for the population dynamics. Our model can easily and naturally handle the time delays inherent in this system. It is easy to simulate and easy to modify on SNAP - a conversational drawing program that enables a user to create a topological network using a light pen and CRT. Data for simulation are taken from field work study results in Khuzestan, Iran.

Certain control measures are available. Such measures include chemotherapy, pesticides for vector control, environmental engineering measures, and sanitary engineering measures. However, as pointed out by expert researchers in this disease, application of a single method cannot lead to eradication, and the greatest need now appears to be the considered implementation of different combinations of control measures based upon well founded data, and their proper evaluation. Based on our model and using theoretical stability considerations as well as some heuristics derived from simulations, a set of combinations of control measures is presented.