

CHAPTER 7

DISCUSSION, POLICY IMPLICATIONS AND CONCLUSION

The Chinese government has consistently accorded high priority to controlling schistosomiasis, and has used its considerable political and administrative powers to support program activities and to mobilize program staff and the general public since the start of the program in 1956. In the 1950's, regarding the severity of the disease to the people and the public health importance in the early stage of the program, there was no question as to the urgently needed manpower and other resources so as to alleviate the sufferings of large numbers of people. However, just as mentioned in the analysis of the previous chapters, financial constraints occurred during the 1980's when the policy makers were enjoying achievements attained in the past and less attention was paid to the hardship of continuing the program.

One of the factors contributing to the early success of the schistosomiasis control program has been the whole-hearted commitment of the local community to the control program. This enthusiasm was due on the one hand to the experience of suffering from the disease, and on the other to the political and administrative influence. However, following the rapid social and economic changes of the whole society, the traditions of devotion to public health of the early years could gradually change as new societal values and norms get established. The zero-paid labor contribution from the community members is no longer the way which could be adopted.

As has been discussed in the earlier chapters, one of the most important uses of cost information is for planning and administrative purposes. We focused our discussions on analyzing the resource adequacy, the implication from cost analysis on resource adequacy and the policy implication on how to fill up the "gap" between resource requirement and resource availability. We have finished our discussion on the cost analysis of control options and assessment of the program financing. The following discussion focuses on the policy implications of program financing.

7.1 The epidemiologic perspective:

It will be unrealistic if we do not consider the epidemiological situations while talking about the policy implications for financing the control program. The current schistosomiasis control program is in full swing under the World Bank Loan program control strategy, with which the priority is on morbidity control using large scale chemotherapy, plus limited focal mollusciciding and environmental modification to control the snails.

1. The World Bank strategy is considered to be the most cost effective one among the alternatives. Ideally, compared with the available control measures, chemotherapy has the most immediate effect

on the prevalence and morbidity of the population. From the previous analysis, we understand that it is also cheaper to implement from the economist's point of view. Theoretically speaking, if the coverage of chemotherapy to infection sources, including local residents, migrant population, domestic and wild animals, could reach a satisfactory level, so that the snails could not be reinfected, the transmission of the disease is thus interrupted. But the area involved is so large that the present coverage rate can hardly have a satisfactory effect. The main reservoirs of schistosomiasis - the infected migrant fishermen and the infected domestic animals (cattle and pigs) - move around the endemic areas and are hardly covered satisfactorily by the chemotherapy campaign. As a consequence, the snail-infested beaches are constantly being contaminated by the faeces of those infection sources.

Based on the above reason, if we over-emphasize mass chemotherapy to the population while less attention is given to the snails, it is readily predictable that the morbidity of the population should be decreased after a continuous chemotherapy campaign. However, the snails on the lake beaches are seldom touched and they are still the source of infection to the local residents and animals when they move around the area. For example, Wu *et al* (1993) pointed out that reinfections after treatment are frequent. In his study in the same Dongting Lake area of Hunan Province, the reinfection rate among 740 treated persons was 12.9% one year afterwards. They suggested that factors associated with reinfection were age, sex, water contact and the distance from home to snail habitats. As a result, re-infections quite frequently occur after the mass chemotherapy. This is one of the weaknesses of the strategy which the WHO expert committee also recognizes (WHO, 1993). The results of the chemotherapy campaign in China showed the infection and the morbidity rates of the population could be reduced to different extent. It is, therefore, doubtful whether these reductions in prevalence and morbidity of the population could be sustained in a longer run.

The results of studies on the effectiveness of chemotherapy vary in the context of the Dongting Lake areas. For example, Tan *et al* (1993) reported the surveillance of three villages after the chemotherapy campaign, showing fluctuation of both the infection of the local residents and the snails. Another study carried out by Wu *et al* (1993) demonstrated that after three years chemotherapy campaign, the reduction of the infection rates among the residents were 62.9% in the selective group chemotherapy group, 59.2% in the selective chemotherapy plus mollusciciding group and 14.1% in the selected population group in which only diagnostically confirmed cases are treated, respectively. However, they also found that there was no significant change of either the snail density or the infection of the snails.

Chemotherapy application in field should be improved, especially for use for mobile populations of fishermen, boatmen, herdsmen etc on and around the lake, and for farm cattle and buffaloes pastured on the lake beaches. Those are the important targets for improving the coverage and effectiveness of chemotherapy.

2. Elimination of the vector snails in the lake regions where schistosomiasis is most severely endemic is impossible in the current situation. This is because that on the one hand, the past experiences of snail control through large area embankment is non-applicable in order to keep the ecological balances, and on the other hand, the economic irrational and environmental detrimental effects of large scale mollusciciding prevent it from wide application. Further, the areas of snail habitat are ever increasing in the river and lake areas due to the deposition of silt from the upper reaches of the rivers. For the environmental and economic considerations, it is impossible to pursue large scale chemical mollusciciding in those areas.

3. Schistosomiasis is a "poor" disease which affects the poor most and will be eliminated along with the socio-economic development of the endemic areas. One convincing example is the elimination of the disease in Japan. Their experiences include the changes of the residents' behavior, environmental modification by cementization of the snail infested canals and ditches and active cooperation from the residents in the control efforts. However, the people's ignorance and economic difficulty in the endemic areas in China make them go to the snail infested areas for fishing, grass cutting (as a form of fertilizer) and even swimming. Farm cattle and water buffaloes rather than farming machines are used as farming power, which are pastured in the snail ridden beaches freely. Their faeces with snail eggs are important sources of contamination to snails. In this sense, economic development and the awareness of the residents in the poor rural areas are also closely linked to the elimination of the disease.

4. The adoption of control strategies in the corresponding endemic areas are quite complicated and involve difficult technical questions which will not be discussed in this paper in detail. But from the economic point of view, it gives us some important hints that no single strategy currently being used in the schistosomiasis control program is omnipotent in dealing with the endemic situation. It still leaves us the space for improving resource allocation and utilization so that the available limited resources could be utilized in the most efficient way. We should also realize that the endemic situations after the finish of the World Bank loan program are not so optimistic that less resources will be needed to tackle the situation, because the snails are still there and they are shedding cercariae which will pose great risk to the residents as usual, and the behavior of the people will not change very significantly and the reinfections are thus very high. We have enough reasons to think in advance what should we do in regard to resource mobilization and utilization.

7.2 Policy implications of program financing:

It is well-recognized that schistosomiasis is a disease deserving much effort for intervention. Especially in the case of schistosomiasis japonica in China, the experiences of the impact of the disease to lives and agricultural production are still firmly stick in the memory of the people. It is due to this that governments at different levels have asserted great efforts and resources in fighting

the "god of plague".

1. Priority and multi-sectoral collaboration for the control program:

Financing from the government sources is the essential for the implementing and continuing the program. For the health care planners and policy makers, it is important to still put the disease control in priority among the social development and health care policy. From the equity concern, the government intervention is highly justified, as the disease affects mostly the rural poor. Health care planners have the responsibility to make the resource allocation administrators (eg, the officials in the Ministry of Finance) fully aware the health and productivity impacts of the disease. It is also important for the health administrators and policy makers to study the impacts of economic adjustment or structural reforms on the resource availability to the control program, thus further analyze the consequences to the control program.

It should be argued that the schistosomiasis control program is also an integrated part of the agriculture development. The endemic areas in China are all located in the fertile agricultural areas which are the principal production bases of grains, fish and other food products. The protection of the production force is an investment in the agriculture production, and even far more than the ordinary investment with even higher return.

Health policy makers are called upon to systematically analyze the impact of economic reforms now occurring in the countryside about their possible effects on public health. For example, the ever increasing mobilization of the farming population around the endemic and non-endemic areas will greatly increase the difficulties in the intervention scheme. Some of them may have positive effects for the control program, e.g. that the rapid industrialization in some areas may absorb some of the extra manpower from agriculture to industry, thus reduce the possibility of getting infection.

The past successes of the China's schistosomiasis control program rely heavily on the multi-sectoral collaboration of government departments such as the public health, agriculture, water conservancy, animal husbandry, transportation, chemical industry and public security, which form the leading groups at different government levels (see also Figure 1.2). As the control of the disease is not solely a medical problem, it requires the concerted efforts from different sectors of the society. One of the striking examples is that during 1985-1987 when the central government leading group for schistosomiasis control was disbanded, the endemic conditions were speedily worsen in the following years. One of the advantages of the leading group are to put all the concerned government department together for the concerted efforts of controlling the disease. But however, the future collaboration on the control program among different departments will be getting more and more difficult as the program itself could not produce direct economic benefit.

Specifically, as implementing the current schistosomiasis control program is going to encounter enormous financial constraints, the health care planners should establish specific targets and plans for the control program based on the economic principles and practices. The following points and steps are suggested to the health care planners to take and consider.

a. The government should use the limited financial resources from the government side in the priority areas. It is suggested that a classification criteria could be established so that the endemic areas could be classified into different categories of priority according to their social economic conditions, the perceived needs from the community and the infected, the knowledge, attitude and practice of schistosomiasis control, and the willingness and ability to finance the local control practice etc. Based on those priorities, part or full responsibility could be take up accordingly. For example, in some endemic areas, the impact of the disease to the people is well perceived and the economic condition of the areas is sound enough, the government may ask the local government and community to take up all the responsibilities. While in some endemic areas where they are not so well off but the people are stricken seriously by the disease, the program may take up more of the responsibilities. This is designed to maximize the benefit of the limited resources available while produce more alternative resource sources.

b. The limited financial resources from the government side should be used in a efficient way, which requires that the most cost effective ways of control be identified. It is realized from our analysis that snail control, although a necessary integrated part of the control strategy, is the most expensive means in terms of either the provider and community costs. The government, for example, may ask the local community to take up all or part of the costs for snail control. For chemotherapy operations, cost sharing may be an alternative for relieving the government financial constraints, which will be discussed in the later section in more detail.

c. Multi-sectoral collaboration for the control activities could be realized through different feasible ways. One of the urgent problems for the control program is that the very high cost of the molluscicides, which may be reduced through the efforts of the industrial sector. The pharmaceutical bureau also has a place in the control program. The production of chemotherapy drug - praziquantel -- should be guaranteed and the price should be reduced.

2. Combination of strategies:

From the previous analysis, we realized that each control option has its pros and cons in the economic sense. Mass chemotherapy is cheap in delivery, because no resource is consumed for detecting positive cases. However, if the infection rate is not very high, say about 10%, drug wastage will be substantial. Since manpower is relatively cheap in China, the principal part of the costs for chemotherapy is for purchasing drugs, which is currently under the

support of the World Bank Loan (see Table 7.1).

Selected population chemotherapy, on the other hand, is very expensive in terms of diagnosis costs. Although the accuracy in selecting the target for chemotherapy is greatly improved compared with mass chemotherapy, there are still some missing and false positive cases, depending on the sensitivity and specificity of the tests. Unfortunately, there is no completely satisfactory test available which could meet the standard of fast, simple and accurate diagnosis in field use. The high cost of this option makes it economically doubtful.

Snail control could hardly be used individually in the control program, which should be combined with other treatment schemes so that the infection rate and morbidity of the population could be reduced. Further, from our analysis in Chapter 5, we realized that molluscicides are very expensive. If there is no extra support, the available resource of the national program can not afford to treat all the high risk snail infested habitats in the endemic areas. Environmental modification is only applicable to the suitable places and if applicable, the total economic costs are quite high.

It is therefore reasonable, from the economic point of view, to combine the available control alternatives in the most cost-effective way, so that the highest marginal cost-effectiveness ratio could be obtained. In the following illustration, if we use the quantity of work of Hunan Province in 1991 as an example, we could see the changes of resource requirement by changing the combination of control measures (Figure 7.1).

Figure 7.1 Illustration of Resource Requirement by Changing Combination of Control Measures (Cost in RMBY1,000)

Example	Chemotherapy		Mollusciding		Total Costs
	No.	Cost	Unit	Cost	
(1)	159,279	1,529	92,978,262	9,297	10,826
(2)	318,558	3,058	65,084,783	6,508	9,566
(3)	477,837	4,587	46,489,131	4,648	9,236

Notes: Example (1) = The actual work quantity and estimated costs in 1991;

Example (2) = Chemotherapy increased by 100% while mollusciciding decreased by 30% based on 1991;

Example (3) = Chemotherapy increased by 200% while mollusciciding decreased by 50% based on 1991.

The above table tells us that under the limits of budget, the resource gap could be shortened by changing the combination of strategy, if it is applicable to the situation. Of course, the actual epidemiological conditions should be one of the principal factors for

consideration of control options and the cost-effectiveness should be guaranteed.

3. Delivery structure:

The current schistosomiasis control program is still a vertical structure, within which a portion of the limited resources goes to the personnel and infrastructure of the anti-schistosomiasis institutions. Regarding to the safety of the chemotherapy drug, there are possibilities to integrate the chemotherapy operation into the work of village doctors who are responsible for the primary health care of the responsible villagers.

Schistosomiasis control is long term process which requires the hard struggle of many generations. As the current program will meet enormous financial difficulties in the near future, the integration of the delivery of chemotherapy into the existing primary health care system will be an option to solve the problem which deserves further studies. However, it should be recognized that managerial skill and monitoring and evaluating system are very important if it is to be implemented.

4. Community participation and cost sharing:

Nowadays, there are much talk about the community participation and cost sharing in the health care programs. In the context of financing the schistosomiasis control in China, we really need some new thinking regarding to the difficulties of raising resources for the continuing of the program.

a. Community participation:

Community participation in the schistosomiasis control program was well-experienced in the past. Thousands of farmers were mobilized and organized to participate in the snail control environmental modification projects and great achievements had been achieved. However, the obvious policy defects in the past under the central planning system were that very little attention was paid to the total social cost of the program. It is perceived that a considerable amount of the labor is wasted. Under the current new economic system, it is obvious that the old mode of community participation is no longer valid. It is justified in the previous chapters that those projects with both economic and snail control benefits will be easier to be accepted, as those have been implemented in the endemic areas like snail control combined with fish raising, snail control integrated into forestation of the lake beaches etc. Further studies to the cost - effectiveness and cost benefits of different control options are much deserved.

b. Cost sharing of chemotherapy:

As we have mentioned in the previous chapters, chemotherapy is the most important control measures for controlling the diseases. We

also realized that drug is the principal cost component in the Chinese context. As the number to be chemotherapied is quite substantial each year, the financial burden to the provider is hard to bear in the long term. However, the unit price of per dosage drug is only RMBY5.5, which is about half of the daily income of a labor in the countryside. It is therefore believed that there are much space for the cost sharing of the expenditure of chemotherapy.

- Payment for the chemotherapy drug will not affect much of the equity concern for controlling the disease, as the cost accounts only a very minor part of the total income of the local residents.

- Cost sharing could ne possible to improve the efficiency of chemotherapy. As has been indicated, reinfections after chemotherapy are quite high in the endemic areas, and most of the reinfections are avoidable. Because free treatment is offered to all the infected in the endemic areas, the efficiency of treatment will be reduced. On the contrary, if the residents have to pay when they get infected, they will take up some of the responsibility by avoiding contacting infested water, thus reduce infection.

- When it is to introduce cost sharing concepts into the control program, careful studies should be carried out before hand as to the willingness and ability to pay, the knowledge, attitude and practice (KAP) of the local residents and other social economic factors which will affect the implementation of cost sharing. Another aspect to be considered for cost sharing is the fact that majority of the chronic schistosomiasis infections are asymptotic in the early stage. Their willingness to pay for chemotherapy is dubious even if they have the need to accept chemotherapy but they may not have the demand. This is one of the classical problems of economics for intervention against public health problems. Even though, that also depends on the KAP of the local residents as indicated above which deserves systematic studies and should be focused on the efficiency and equity concerns of the diseases control program.

c. Cost sharing of molluscicides with local communities:

The previous analyses told us that the moluscicides for snail control is indeed very expensive. If all the costs of purchasing the chemical should be borne by the program alone, it will be very difficult to maintain the controlling activities to a rational level. There is also space for cost sharing by the local communities who have the ability to pay for part of the cost of purchasing molluscicides.

4. Drug and molluscicides production policy:

In chapter 5, we examined the cost components of different chemotherapy and snail control options and got to know that praziquantel constitute the principal part of the mass and selective group chemotherapy alternatives; and molluscicides are the main resources consumed in focal mollusciciding operations. Therefore, praziquantel and the molluscicides are the two most important resources

for the control program. This is also reflected in the following table which demonstrates the expenditure categories of the World Bank loan in Hunan Province.

Table 7.2 Expenditure categories of World Bank Loan in Hunan Province

Category	Amounts (US\$)	Proportion(%)
Equipment	2,000,400	11.99
Praziquantel	7,133,300	42.73
Molluscicides	7,103,300	42.55
Operational research	257,600	1.51
Technical assistance	117,100	0.71
Training	84,400	0.51
Total	16,696,000	100.00

Source: MOPH (1992)

It could be seen from the Table that drugs and molluscicides constitute more than 85 percent of the total loan. This will have important policy implications for the program planners and managers.

a. Currently, the chemotherapy drug - praziquantel, is being produced by a South Korean factory who won the international bid. At the same time, the domestic production lines are still producing the drug but oriented for export. When the loan finishes by the end of 1996, the program has two alternatives to get the drug. One is to use foreign exchange to continue purchasing from the foreign company or other international market. This will be a inferior choice because foreign exchange for a developing country like China is very treasurable and it will be very difficult for a primary health program to use the foreign exchange which should be provided in the long run. The other alternative is to use the domestic products, which should be the optimal choice. It may be that in the short run, the domestic produced drug is more expensive than the foreign one, for which they won the bid in a cheaper bidding. But in the long run, it will be a more reliable supply in the domestic market. The problem to be solved here is the collaboration between the Ministry of Health and the Bureau of Pharmaceutics, which is stemmed from the row in granting the bid.

b. The molluscicide niclosamide currently being used is produced by a domestic factory that won the bid. However, this molluscicide is much more expensive than the previously used one, the NaPCP. The problem is that if there is no support from the loan, the

program can not afford this chemical to treat the same area of snail habitats as at present does. There are several ways to approach this problem.

(a) Resuming use of NaPCP. It is not a rational choice in the long run, as NaPCP is a chemical which is more harmful to the environment and to the workers involved in the mollusciciding process. But if there is no other way to solve the financial problem, this molluscicide can still be used in some situations.

(b) Continuing use of niclosamide. Niclosamide is a world wide applied molluscicide and recommended by WHO, which is more effective and environment only friendly than NaPCP. If the government financing in the future could be maintained at a sustainable level, this molluscicide could be used.

(c) Reducing the extent of using molluscides. The application of molluscicides should be concentrated to the high risk areas and used as efficiently as possible.

(d) Community financing for mollusciciding. Along with the reform and development process in the rural area, economic conditions are being improved very fast in some endemic areas. It is an alternative to ask the local communities who have the willingness and ability to finance to pay for some or all of the costs of mollusciciding, for example, the township factories and some rich villages may be asked to take the financial responsibility in the areas.

7.3 Limitations of the study:

The present study is an attempt to use economic principles of cost analysis for the purpose of planning and financing the current schistosomiasis control program after the termination of the World Bank Loan program in China. As we have realized, there are several limitations in the study. First, resource adequacy is closely related to the utilization of the resource, which is the efficiency of utilizing the available resources. However in this study, the efficiency of resource utilization in the program is not touched upon, which is one of the defects of the study. Secondly, the study only shows a simple way of cost analysis in the study of program budgeting and financing. It should be realized that there are many factors affecting the program financing, while cost is only one of them. Thirdly, the limitation of time and data available make many of the in-depth analyses impossible, which requires future work.

7.4 Conclusion:

Using the simulated and actual cost data of the schistosomiasis control program in China, the paper simulated and analyzed the resource adequacy after the termination of the World Bank Loan program under different scenarios. It is concluded that financial constraints would happen once the Bank loan finishes. Government financing for the

program would be inadequate even to maintain the level before the start of the loan program. Further, in reviewing the financing mechanisms of the current control program, it is realized that government financing is unlikely to increase substantially based on the situational analysis. On the other hand, the current attempt to integrate snail control into agricultural or aquaculture production projects are evaluated high as an alternative financing for continuing the program. External financing was not and will not be the principal and reliable financing mechanism for China's Schistosomiasis control program. Based on the above analysis, some important policy implications for the current financing problems of the program are derived and discussed. It is recommended that the health planner should still put the control of the disease in a high priority. New delivery structure to integrate the control program into primary health care should be probed. Community involvement for the local control activities should be encouraged. The current drug/molluscides production/importing policies should be reviewed. The domestic production line of praziquantel is suggested to open, while the factory for producing niclosamide should continue their production but reduce the cost.