Eradication of schistosomiasis in Guangxi, China. Part 3. Community diagnosis of the worst-affected areas and maintenance strategies for the future

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Reported are the results of a community-based assessment of maintenance of schistosomiasis eradication in Guangxi, a large autonomous region of China with a population of 44 million. Eradication of the disease was achieved in 1989 in Guangxi but maintenance costs are rising. We focused on three counties that had the most intense transmission in the past: Binyang, Jingxi, and Yishan. Four instruments were used: in-depth interviews, focus group discussions, a knowledge, attitudes and practices survey, and subsequent community feedback.

In the past, schistosomiasis had serious consequences in Guangxi, decreasing work capacity and restricting marriage and occupational mobility. Since its eradication there have been clear benefits in terms of increased agricultural output and improved farming conditions. Personal habits and traditional manual farming activities in Guangxi would continue to expose a large proportion of the population to environmental risk if the disease were to return. Ignorance about control programme achievements is increasing and is related to youth and inexperience. There was a universal desire in the study counties for more local education about the history of the programme and about the risk of schistosomiasis returning. Snail surveillance is considered important, but people are not willing to volunteer for such work.

Our study methods were novel for Guangxi and community feedback was helpful. Snail checking procedures have been modified to make them more efficient and no snails have been found since 1992. The animal and human stool examinations have ceased and vigilance now concentrates on snails and children (skin tests). The long-term strategy is to make the population invulnerable to future schistosomiasis transmission if the snail vectors return. This means continuing education and making the former endemic counties a high priority for water and sanitation improvements.

Introduction

Reported are the results of a study on maintenance of schistosomiasis eradication in Guangxi, a large autonomous region in the south of China (population, 44 million in 1994). Schistosomiasis was eradicated from Guangxi in 1989 but the region has to maintain this state of affairs in the face of escalating costs and growing ignorance. We focused on the three counties where transmission of the disease was previously the most intense, and used the community diagnosis method (1, 2) to obtain a grassroots perspective on future strategies.

The setting, history, programme, and political economy of schistosomiasis control in Guangxi have been described in the first two parts of this series (3, 4). The post-1949 control work initially relied on active community participation enthusiastically supported by communes and their leaders (5, 6). Guangxi Institute of Parasitic Disease Control (GIPDC) was responsible for providing technical advice, planning, supervising and monitoring the programme, and had become concerned about certain aspects of the changing circumstances in rural areas. For example, after economic reforms that began in 1978, community participation in schistosomiasis control fell away and the 1980s became a decade of economic self-interest. Individualism replaced collectivism in China; now, mass participation has been abandoned altogether. Our study looked forward to the new community environment arising from market socialism in mod-

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Reprint No. 5899
ern China; we analysed community experience, knowledge, attitudes and aspirations in relation to schistosomiasis and the maintenance of its eradication in Guangxi.

Methods

Study area and instruments

We studied the three worst affected counties in Guangxi — Binyang, Jingxi and Yishan — of the 19 that were originally endemic for schistosomiasis (see Fig. 1 in part 1) (3). Yishan subsequently became an administrative township and is now named Yizhou. Four instruments were used: in-depth interviews with key informants; focus group discussions; a knowledge, attitudes and practices (KAP) survey; and subsequent community feedback (1, 2, 7). The interviews and the KAP survey were conducted in 1993, the discussions in 1994, and community feedback in 1995–96.

In-depth interviews

One of us (L.X.) interviewed a total of 32 community leaders from the three counties, including village heads, Chinese Communist Party (CPC) members, women’s organization leaders, teachers, and village doctors. The interviews were informal and on a one-to-one basis, and were recorded on microcassette while an assistant took notes; one of us (S.J.) subsequently reviewed all the recordings. Each interview lasted about 45 min. Some questions were standard for all three counties and others were specific to local conditions. Open-ended general questions led on to a more detailed enquire. Standard questions addressed the following issues: how to improve work on schistosomiasis control and reduce costs; community attitudes and views about the methods used, such as skin tests and snail checking; need for future environmental changes and their costs; problems arising from interaction with control programme workers; views on the payment-incentive system for farmers to maintain snail-free areas; community participation and how this could be carried out; how to make individuals in the community more responsible for their own health, especially to keep their villages free from vector snails; and how to teach school children about the snails and the disease, and encourage them to help keep the area snail-free.

KAP survey

The KAP survey included 1816 respondents drawn from four groups: men, women, adults and school-children (chuzhong-gaozhong). The population sampled lived in areas known to have had endemic schistosomiasis transmission within Binyang, Jingxi, and Yishan counties. We chose villages known to have been severely affected, and went house-to-house, randomly choosing one respondent per household and one respondent from each village field where there were workers at the time of the visit. We asked about experience and knowledge concerning schistosomiasis and its control, habits and work known to lead to exposure, and willingness to assist with schistosomiasis control. The questionnaires were pre-tested and modified to exclude ambiguity and confusion; interviewers were trained to avoid leading questions and used local languages, recording answers in Chinese. The questionnaires were checked each day and problems resolved by repeat visits if needed. The interviews lasted 30 min and were carried out at home or in the farm fields.

Focus group discussions

Focus group discussions (FGD) were held in each county separately for peasants, students, and teachers: such groups will be important in future control strategies. The 1994 FGD helped to confirm the results of the 1993 in-depth interviews and KAP survey. Discussions (each of 45–60 min) were facilitated by one of us (L.X.); an assistant took notes and all discussions were tape-recorded and reviewed later by another investigator (S.J.). Nine focus groups were held involving a total of 77 people. Each group had 7–11 members, with the size varying according to the availability of participants. The largest groups were for the schoolchildren; peasant groups were chosen at random and met in the home of one of them; and student and teacher groups were from the same schools.

Community feedback

One of us (L.X.) returned to each community in 1995 and 1996 and conferred again with all the leaders encountered in the interviews, and with many others as well. Meetings were informal and notes were written afterwards.

Analysis

The results of the in-depth interviews and focus group discussions were analysed separately from field notes and tape-recordings. A quantitative database (SPSS) was used to code answers and test for associations. We prepared written summaries of tape recordings and explored the text as well as field notes.
to identify recurring themes and concerns, noting any unusual opinions or ideas. For community feedback we analysed the notes written up after meetings. KAP questionnaires were post-coded, entered on a computer using FoxBase, edited for errors, and converted to SPSS format using DBMSCopy. Variables were then renamed in English and values recoded from Chinese characters into numerical format using the SPSS autorecode procedure, decoded, and assigned value labels in English. Data were analysed using SPSS, Epi Info, Microstat and StatXact software to calculate and compare means, proportions and odds ratios (OR), and make statistical inferences. Egret software was used for multiple logistic regression analysis.

**Results**

**In-depth interviews**

All 32 community leaders named higher labour productivity and better sanitation as benefits after schistosomiasis control began in 1954. Agricultural output increased and sanitation improved with the construction of communal toilets. Since the 1970s, many households have installed toilets at their own expense. All the community leaders mentioned safer drinking-water and stated that the population was healthier because of schistosomiasis control; many people used to die from the disease and it weakened the health of the majority of people. Most noted a link between the lower incidence of other infections and of parasitic diseases and schistosomiasis control.

All said that schistosomiasis control had an enormous economic impact on rural life, which one doctor encapsulated as “less suffering . . . and more income”, and noted that environmental work had improved drainage by an elaborate network of ditches, incorporated into irrigation and drainage canals for agriculture. Half of the leaders said irrigation boosted agriculture; eight added that the changed environment created by the control programme led to more farming land and more rice production. Schistosomiasis control also promoted production of methane from human and animal wastes, and this gas is now widely used for cooking and lighting in all three counties.

The leaders also mentioned the significant sociodemographic changes brought about by schistosomiasis control. Two leaders and a village doctor said that expansion of farming land and more rice production increased the population. Also, child mortality declined, as noted by 10 leaders in all three counties. The rise in population was further boosted by other factors. In the past, men in schistosomiasis-endemic villages found it difficult to find wives because the matchmakers could not induce girls to live in such villages. Also, although schistosomiasis is curable, ignorance in the past led farmers to assume it was caused by evil spirits and to flee endemic villages in fear. Schistosomiasis control had other demographic effects. Young men now find it easier to join the People’s Liberation Army, which would previously not take them because of schistosomiasis. Better health enables people to look elsewhere for jobs that pay more money now that the free labour market permits peasants to go to cities for temporary work.

All said that the control programme and snail surveillance should continue but agreed that no one is willing now to give free labour for collective community work. The leaders were asked what modifications they would like. Most had no idea, but five said that the government should build more irrigation canals; they associated schistosomiasis control in the past with community participation, especially during the 1960s and 1970s. During that period thousands of rural labourers constructed drainage canals since voluntary community projects and free labour were also used for snail detection. When asked how to get people involved, all the community leaders said it was difficult because moral incentives for collective service were gradually abandoned after 1978 when profit maximization was encouraged, while self-interest now prevails.

The community leaders’ responses revealed concern for the ignorance about the disease among the rural population today. A total of 29 leaders said people should be told about the suffering caused by schistosomiasis and about the history of control programme, and be made aware of the control benefits such as good health and a higher standard of living. There was consensus about the need for more health education in schools, and some suggested it should begin in grade five. Most said they educate their own families about schistosomiasis; half had no idea if there was ongoing health education to get people involved; and all said education was insufficient at schistosomiasis control stations. Some other suggestions about providing information were orthodox. Four (CPC members or village heads) suggested use of public loudspeakers, which are still employed in many villages in Guangxi. Mass meetings, another traditional Chinese method of propaganda, were advocated by 20 of the leaders; public talks were also mentioned. One-third suggested pamphlets and wall posters and most suggested films or video. Some proposed that CPC members and village heads should be the first to become involved in schistosomiasis control. Village doctors and teachers
suggested involving production brigade leaders and said that doctors should talk to the people about schistosomiasis and show parasite samples.

The majority of leaders (23) said that government directives should be sent to each household making it compulsory to participate in the schistosomiasis programme. Three suggested using village funds to pay villagers to work on schistosomiasis control; one said that farmers should contribute money to repair drainage canals because they gain the most. Another suggestion was that farmers should be made responsible for snail detection in their own fields. There was no doubt that it is now difficult to get people involved in communal work; however, only one person said that farmers should be given rewards for finding snails. Seven stressed that the community should be regularly reminded that benefits would be seen only in the long-term.

The leaders noted that since introduction of the post-1978 rural reforms important changes had been made for collectively owned land of the previous commune system and that the commune’s role as an administrative unit was finally abolished in 1985. Rural reforms began with implementation of a “household responsibility system”. In the 1990s this type of production system, based on household contracts, was replaced by a leasehold system (fentian daohu) in which a parcel of collectively owned land was leased to each family for 30 years. Guangxi farmers now enjoy full autonomy on use of their land. Community participation in schistosomiasis control was stopped by the practice of farming by individual families. Most leaders said that farmers are now more interested in their private activities than in public service and it is now very hard to carry out collective snail detection. A teacher commented that people are not so obedient to government officials as they used to be. Everyone said that people think of money all the time and some added they “now bargain for everything”. Three said social values had deteriorated. Apparently village labour is now depleted because of the new mobility to better jobs elsewhere.

KAP survey

The study population. Study participants included 1816 persons aged 12–85 years and a male to female ratio of 55:45 (Fig. 1). Occupations were recorded as peasant (77%), student (21%), teacher (2%) or other (<1%). Both sexes were represented in all occupations, with a similar proportion of made and female peasants (78% versus 75%), relatively fewer male students (18% versus 24%) and relatively more male teachers (3% versus 1%).

The formal education of the participants was limited: none (12%), 1–3 years (12%), 4–6 years (44%), 7–9 years (28%), and ≥10 years (6%). The educational level of the younger participants was usually greater, with 41% of those aged 12–29 years having had post-primary schooling, in contrast to only 26% of those aged ≥30 years. Relatively fewer females had had post-primary schooling (27% versus 39%, \( \chi^2 \) test = 26.7, \( P < 0.0001 \)), a difference more pronounced among the older age groups (Table 1). Reported daily income averaged 2.6 yuan, ranging from 4.5 yuan for Yishan to 1.2 yuan for Jingxi (Table 2). Those aged ≥30 years had higher incomes than 20–29-year-olds (mean, 3.7 yuan versus 3.0 yuan). Males reported much higher incomes than females in each of the counties (\( P < 0.006 \); Table 2). Respondents with post-primary education earned more than the less educated (mean, 2.3 yuan versus 3.0 yuan, \( P < 0.001 \)).

Experience and knowledge about schistosomiasis and its control. Many of the study participants

Fig. 1. Age and sex distributions of the KAP study participants.
Table 1: Post-primary education of the study population, by age group and sex, Guangxi, 1993

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>No.</th>
<th>M</th>
<th>F</th>
<th>% with &gt;6 years of schooling</th>
<th>Z test</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-19</td>
<td>258</td>
<td>271</td>
<td>36.0</td>
<td>35.1</td>
<td>0.24</td>
<td>0.4144</td>
</tr>
<tr>
<td>20-29</td>
<td>212</td>
<td>151</td>
<td>53.3</td>
<td>45.0</td>
<td>1.56</td>
<td>0.0295</td>
</tr>
<tr>
<td>30-39</td>
<td>160</td>
<td>112</td>
<td>55.6</td>
<td>35.7</td>
<td>3.24</td>
<td>0.0006</td>
</tr>
<tr>
<td>40-49</td>
<td>159</td>
<td>126</td>
<td>31.4</td>
<td>10.3</td>
<td>4.27</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>50-59</td>
<td>121</td>
<td>68</td>
<td>28.1</td>
<td>2.9</td>
<td>4.24</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>&gt;60</td>
<td>91</td>
<td>87</td>
<td>8.8</td>
<td>0.0</td>
<td>2.83</td>
<td>0.0023</td>
</tr>
</tbody>
</table>

* Z test for statistical significance of the difference between the proportions of males and females with >6 years of schooling.

(33%) had never heard of schistosomiasis. Among the 1210 who had heard of the disease, 26% had learned about it at school, and 88% knew someone in their village who had had it; 70% knew at least one manifestation, 76% knew how people become infected, 78% knew how the disease is transmitted, and 84% knew where snails breed. In this respect, males always knew more than females. Whether or not participants had heard about schistosomiasis was related to their county, age, sex and educational level (Fig. 2). A multivariate logistic regression revealed the relative strength of these significant associations (Table 3); positive determinants were age ≥30 years (odds ratio, OR = 15.7), living in Yishan or Binyang county, post-primary education, and being male. Education and age interacted significantly: the older educated knew much more than their younger less educated counterparts.

Table 2: Mean daily income of study participants, by county and sex, Guangxi, 1993

<table>
<thead>
<tr>
<th>Category</th>
<th>n</th>
<th>Mean income (yuan) ± SD</th>
<th>Sex difference* (t-test; P-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>County 02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>400</td>
<td>4.8 ± 3.7</td>
<td>2.77; 0.006</td>
</tr>
<tr>
<td>Females</td>
<td>220</td>
<td>3.9 ± 3.2</td>
<td></td>
</tr>
<tr>
<td>Both</td>
<td>620</td>
<td>4.5 ± 3.5</td>
<td></td>
</tr>
<tr>
<td>County 08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>319</td>
<td>1.7 ± 3.6</td>
<td>4.64; &lt;0.001</td>
</tr>
<tr>
<td>Females</td>
<td>322</td>
<td>0.7 ± 1.4</td>
<td></td>
</tr>
<tr>
<td>Both</td>
<td>641</td>
<td>1.2 ± 2.8</td>
<td></td>
</tr>
<tr>
<td>County 12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>282</td>
<td>2.4 ± 3.3</td>
<td>3.1; 0.002</td>
</tr>
<tr>
<td>Females</td>
<td>273</td>
<td>1.6 ± 2.6</td>
<td></td>
</tr>
<tr>
<td>Both</td>
<td>555</td>
<td>2.0 ± 3.0</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>1816</td>
<td>2.6 ± 3.4</td>
<td></td>
</tr>
</tbody>
</table>

* t-Test with pooled variance estimate and two-tailed estimate of probability.

All of the above multivariate associations were similar among the subset of 1210 respondents who had heard of schistosomiasis and also had accurate knowledge of both the effect of the disease and its transmission (53%) (Table 4). Many people had participated in the schistosomiasis control programme: 794 volunteered, 43 were ordered to help, and 94 reported both. More males had volunteered than females (66% versus 34%). The middle-age and education groups also had volunteered more than others.

**Attitude to the schistosomiasis control programme.**

Overall, 79% of the 1210 persons who knew about schistosomiasis were willing to help the control programme. Females were less prepared to help than males (72% versus 83%). The willingness of people to assist increased with their educational level, and a

![Fig. 2. Distribution of knowledge about schistosomiasis exhibited by the study participants, by age, sex, and educational level.](image-url)

Table 3: Relationship between the age, sex, educational level and county of study participants and whether they had heard about schistosomiasis

<table>
<thead>
<tr>
<th>Factor</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age: ≥30 years vs 12–29</td>
<td>15.7 (11.2–22.1)</td>
</tr>
<tr>
<td>County: (Y or B) vs J</td>
<td>11.5 (8.7–15.3)</td>
</tr>
<tr>
<td>Educational level: ≥6 years vs 0–6 years</td>
<td>3.6 (2.6–5.0)</td>
</tr>
<tr>
<td>Sex: male vs female</td>
<td>2.7 (2.1–3.5)</td>
</tr>
<tr>
<td>(Age group)/(educational category)</td>
<td></td>
</tr>
<tr>
<td>Older/Ed' vs Younger/Ed'</td>
<td>16.2 (9.8–26.6)</td>
</tr>
<tr>
<td>Older/Ed' vs Younger/Ed</td>
<td>4.5 (2.7–7.5)</td>
</tr>
<tr>
<td>Older/Ed' vs Older/Ed</td>
<td>1.1 (0.6–1.7)</td>
</tr>
</tbody>
</table>

* Based on a logistic regression analysis; likelihood ratio statistic on 6 degrees of freedom = 987.789; P < 0.001 for each term in the model (Egret software).

**Eradication of schistosomiasis in Guangxi, China. Part 3**
Table 4: Relationship between the age, sex, educational level and county of the study participants and accurate knowledge about schistosomiasis and its transmission

<table>
<thead>
<tr>
<th>Factor</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age: &gt;30 years vs 12–29 years</td>
<td>7.8 (6.7–10.7)</td>
</tr>
<tr>
<td>County: (Y or B) vs J</td>
<td>2.9 (3.7–2.3)</td>
</tr>
<tr>
<td>Educational level: &gt;6 years vs 0–6 years</td>
<td>2.7 (1.9–4.0)</td>
</tr>
<tr>
<td>Sex: male vs female</td>
<td>2.3 (2.9–1.9)</td>
</tr>
<tr>
<td>(Age group)/(educational category)</td>
<td></td>
</tr>
<tr>
<td>Older/Ed+ vs Younger/Ed−</td>
<td>10.5 (7.1–15.5)</td>
</tr>
<tr>
<td>Older/Ed+ vs Older/Ed−</td>
<td>3.8 (2.7–5.5)</td>
</tr>
<tr>
<td>Older/Ed− vs Younger/Ed+</td>
<td>1.3 (1.0–1.9)</td>
</tr>
</tbody>
</table>

* Knew at least one manifestation of the disease, and how it is acquired and transmitted, and where snails breed. Analysis by logistic regression (Egret software); likelihood ratio statistic on 6 degrees of freedom = 593.699; P < 0.004 for each term in the model.

* Figures in parentheses are 95% confidence intervals.

* Y = Yishan, B = Binyang, J = Jingxi.

* Older = >30 years; younger = 12–29 years. Ed+ = >6 years of education; Ed− = 0–6 years of education.

Significant linear trend was exhibited (P < 0.00001); 89% of those with >10 years of education were prepared to help compared with only 68% of those with no formal schooling. Students were the least likely to offer help (66%) compared with 80–97% for other occupation categories. The two age group extremes (12–19 years and >60 years) were far less willing to help the control programme than others (OR = 0.25) and less willing to help any snail control elements (Fig. 3). Occupational categories and sex had a bearing on snail control activities, with students and females less willing to help than others.

Intention to be tested for the disease (63%) or concern about it (87%) had no significant relationship with occupation; age was also unrelated, the intention to be tested increased with educational level (P = 0.002). Concern about the disease did not correlate with educational level or age; females were less worried (84% versus 89%), but as likely as males to intend to be tested.

**Behavioural factors related to risk of schistosomiasis.**

Some persons (25%) used safe water from a well to wash clothes but most used river water (71%) and a few used a pond (2%) or spring (2%). For bathing, people more often used water from a well (48%) but others went to a river (50%), spring (2%), or pond (<1%). Few people bathed in the morning (1%), some did so between noon and mid-afternoon (12%), and most did so in the evening or at night (87%); females bathed more at night and males more in the evening (OR = 1.9). Use of a toilet to defaecate was usual at home (98%) but not in the field (17%).

Many people (n = 753) swim in a river during summer (42%), especially males (OR = 5.2) and adolescents (OR = 2.6). The median frequency of swimming was once per day, usually around noon (42%), evening (27%), or night (23%). The potential for transmission also arises when people wade through water to fish, as reported by 50%, especially males (OR = 2.8), including all occupations and age groups. Transmission could also result from contact with surface water, as reported by the 86% of the participants who planted rice, while 70% reported that their oxen were infected. All occupations, with students relatively less so, and both sexes, plant rice.

**Fig. 3. Distribution of positive reported intention to assist in snail control activities, by age (% of expected frequency = observed/expected frequency by age for each control activity).**

![Fig. 3. Distribution of positive reported intention to assist in snail control activities, by age (% of expected frequency = observed/expected frequency by age for each control activity).](image-url)
**Focus group discussions**

**Peasants.** A total of 22 peasants (14 males, 8 females) took part in the focus group discussions; their ages ranged from 30 years to 80 years. All of those aged >40 years knew about the history of schistosomiasis control in Guangxi. In the worst affected county, Yishan, half the participants had suffered from the disease, and most had seen people with swollen abdomens in the past. Also many from Binyang remembered “big tummies” and knew that it was the first county where the disease was identified in Guangxi (1938). Before the 1950s, many people in Yishan had died from schistosomiasis and people fled from some villages because of fear of the disease. The Yishan group were worried for their children.

Most of the peasants thought that the schistosomiasis control programme should continue, believing that if the snails returned the disease would surely also; they said the work is more complicated than before because village doctors (formerly barefoot doctors) now operate privately and it is harder to get them to monitor disease incidence for the health authorities. The Binyang group said that priority should be given to snail surveillance. The peasants in Jingxi thought it necessary to check for snails and make environmental changes; those in Yishan also mentioned changing the environment, especially to construct new irrigation ditches. Both the Jingxi and Yishan groups stressed a need for household wells and toilets for safer drinking-water and better hygiene.

When asked how the control programme should be continued, the peasants favoured the practices used in the past. In Jingxi they mentioned the benefits of environmental change, the most important of which is the expansion of the planting area by combining snail control with irrigation. The peasants in both Jingxi and Binyang wanted more ditches for irrigation and suggested the government could again provide the materials and they themselves the labour. They also suggested that farmers should check for the presence of snails in their own fields; the peasants in Binyang added that the government should force farmers to check for snails in their own fields since they knew this would be a new policy and would work only if there was support from every level of government. They thought the heads of each government level should send directives from the provincial level to the township level.

Nowadays community participation would be hard to organize in Guangxi; according to the peasant group the breakdown of the former commune structure and the subsequent disappearance of the production team as an organization unit make it difficult to mobilize people. The Binyang group also commented on changing economic circumstances; many households cannot supply voluntary labour because family members are working elsewhere. They suggested a penalty payment for not contributing to voluntary work. Another practical suggestion was the election of a collector from the peer group of peasants in each area. To collect from non-participating households they suggested that a “loss-of-face” approach would be effective. However, the peasants in Binyang and Jingxi also thought people lacked time to volunteer. The Jingxi group said that it was necessary to pay people for community participation in schistosomiasis control work.

All the peasants mentioned the need for health education. The Yishan and Jingxi groups recommended use of cinema, television, and posters for the general public; for children, they suggested telling stories about schistosomiasis and teaching them county history. The Binyang and Jingxi groups said it was important for children to have knowledge about schistosomiasis since it would help them prevent the disease and encourage participation in snail checking and maintenance of irrigation ditches. Some reflected on the past when evening meetings on public health issues were organized and believed that attempts could be made to revive such activities.

**Students.** A total of 31 middle-school students aged 12–15 years took part in focus group discussions. In Binyang only 3 of 10 students had heard of schistosomiasis and they knew about the disease from their families; in Jingxi, only 2 out of 11 students knew about the disease, having heard from old people in the village; only one in Yishan knew, learning about it from his grandfather, who had suffered from schistosomiasis. Most knew nothing about the snails, and all wanted to know more and would be concerned if the disease returned.

The students suggested that they could learn about the disease by visiting exhibitions at schistosomiasis stations; they would like to listen to stories, read about it in posters, and watch television and films. All received health education in school but the classes taught hygiene and did not include schistosomiasis or preventive knowledge about other diseases. Students in Binyang said that they would pass on any knowledge they gained to people at home. All said they would like to take part in snail checking if they were supervised.

**Teachers.** A total of 24 teachers joined focus group discussions. The older teachers in the Yishan group had previously suffered from schistosomiasis, one of whom was the first person to receive treatment for schistosomiasis when he was a middle-school stu-
dent. All thought that schistosomiasis work should continue. In Binyang the teachers said that people still worried that the disease would return and that, in recent years, control work had mainly involved snail checking, testing people, and maintaining ditches. They thought the most important work was snail checking and maintaining ditches. Provision of drinking-water was also necessary and all said their school needed funds to dig a well for students and teachers. For snail checking, the Binyang teachers suggested that health authorities could organize people to participate and that their students could be included, especially during holidays.

All agreed that health education was important. Some said that such education should include a history of schistosomiasis and the danger it presents to health and work; it could be carried out by teaching about how to prevent the disease and visiting schistosomiasis exhibitions. The teachers thought that health education for adults was more difficult because evening meetings had now been abolished and it would thus not be so easy to communicate the information; they stressed that health education was more effective for students than adults. The teachers in Jingxi and Yishan invited health workers to come to the school once a year; all said they were happy to cooperate with health workers and would like to receive posters and pictures.

The teachers used to conduct health education on schistosomiasis but had now stopped doing so. In recent years, however, people have not talked much about schistosomiasis, and public health work declined after the reform policies. Most people now want to be paid for the work they do, but they are still willing to help in community projects. In the past, some teachers in Binyang had checked for snails and carried out skin testing, but not any more. The teachers in Jingxi were willing to participate in control work but stressed that it should involve the whole community, not just the teachers and students.

**Community feedback**

All three study areas want to improve their domestic water supplies and aim to obtain reticulated supplies as soon as possible; they want government support for pumps and water towers and will do the rest themselves. There was also widespread support for redesigning community three-step septic tanks for individual households, and increasing the number of household faecal digesters for the supply of methane. The leaders still felt that some government inputs are required, especially to finance new irrigation and water conservancy projects and rebuild some that have broken down.

For snail surveys, very few people are prepared to work without pay; however, if they are paid they are prepared to help the professional staff. A system of compulsory snail surveillance by farmers of their own land would be impossible to enforce. The farmers welcome health examinations but want to be examined also for other diseases; many would refuse examinations if they were only for schistosomiasis. Everyone welcomed more schistosomiasis health education for the following reasons: to gain knowledge about the disease; to teach the young the history of its control; and to enrich the local culture with feature films that could accompany the educational material.

**Discussion**

Qualitative methods for community diagnosis were quite novel in China in the period 1993–96, especially in Guangxi. Even KAP surveys were relatively new to China, especially for schistosomiasis control and we were the first to use such methods in Guangxi for public health research. It therefore took some time for Chinese members of the study team to adapt since they had to overcome a tendency to favour former styles of information gathering. When the focus group discussions began, two of us attended them at one village but found our presence as foreign guests to be incompatible with the method — the whole village was arrayed in hierarchical formation to meet us and ready to begin the "discussion".

Group discussions are not new in China. This mode of communication has been used by the CPC for the past 40 years to transmit government policies and propaganda; however, the group structure was always hierarchical with respect to the status of the participants. Also, Chinese people have a deep-rooted tradition of cooperative respect for leaders and of following guidance from above. Free expression and the exchange of views in traditional group discussions is subdued by the power relationship between subordinates and superiors and respect for leaders. These constraints were minimized in the focus group method that we employed. All participants belonged to the same peer group and therefore fulfilled the requirement that they should be of equal status (7). Researchers actively encouraged open discussion and avoided attempts to extract guidance and opinions from the participants.

Overall, we detected profound nostalgia for the collectivism of the past and concern about the changes in community attitudes. Clearly rural people in these three counties are undergoing a difficult transition and in group settings the tendency is to say
they will once again work together. However, the individual interviews, the KAP data, and the community feedback show that most people are unwilling to work for the common good at this stage in China’s economic and political history. Revolutionary social cooperation has evolved to evolutionary economic development with individual effort.

The consequences of schistosomiasis were very serious before its eradication, decreasing work capacity and restricting marriage and occupational mobility. The benefits in terms of increased agricultural output and improved farming conditions are very obvious to those old enough to remember the previous state of affairs and are universally acknowledged by them. The KAP data show that rural incomes are still very low, that women are disadvantaged financially and educationally, and that they are at particular risk of schistosomiasis transmission, because 50% still wash clothes in surface waters. Personal habits such as daily bathing and recreational swimming in summer, and traditional manual farming activities would expose a large proportion of the population to environmental risk if the disease returned. The less educated, including women, know less about schistosomiasis and are also at higher risk for some exposures. Education about the disease is needed and widely desired to alert people to the risk of the snails returning and to enrich citizens knowledge about important local history. The desire to improve environmental hygiene, water supplies and irrigation is also very strong, but is tempered by old-style dependence on government support.

The future maintenance strategy cannot rely on mass support. In theory it might be possible to make farmers responsible for snail surveillance on their own land, but China does not yet have the legal institutions to make this viable; peer regulation would be more effective. Guangxi has now changed the snail surveillance methods, adopting a high-risk approach that concentrates on the areas that were previously the most troublesome: river entry and exit points from former foci; and former foci that crossed county boundaries (8, 9). Modifications to the annual procedures have been tested for 3 years and are working well; no snails have been found since 1992. Annual stool examinations have ceased and human surveillance now concentrates on skin testing of schoolchildren. GIPDC has distributed new posters and other educational resources to former endemic counties, and is negotiating with the education bureau to introduce material on schistosomiasis into the school curriculum.

The current long-term strategy is to increase the priority rating of formerly endemic counties when they compete for government support with the other 69 counties of Guangxi for sanitation and water supply improvements. Guangxi eradicated Oncomelania snails once and now aims to protect the population from future schistosomiasis transmission should the snails return. Community consultation by GIPDC using both the traditional and new methods discussed here will continue as these plans are implemented.

**Acknowledgements**

This work was supported by a grant from the WHO/World Bank/UNDP Special Programme for Tropical Disease Research and Training (TDR). We thank present and past Directors at GIPDC, the Guangxi Bureau of Health, and the people of Jingxi, Yishan and Binyang counties for their invaluable support. We also thank Professor F. Schofield for advising us when we planned the community diagnosis. We dedicate this paper to all those who worked on schistosomiasis control in Guangxi over so many years.

**Résumé**

Eradication de la schistosomiase au Guangxi (Chine). Troisième partie. Diagnostic par consultation communautaire dans les régions les plus touchées et stratégies futures pour le maintien de l'éradication

Les auteurs rendent compte des résultats d'une évaluation de l'éradication de la schistosomiase par consultation communautaire dans la région autonome du Guangxi, peuplée de 44 millions d'habitants. Au Guangxi, l'éradication de la schistosomiase est réalisée depuis 1989, mais son maintien coûte de plus en plus cher. Les auteurs se sont intéressés aux trois districts où la transmission avait été la plus intense par le passé, à savoir Binyang, Jingxi et Yishan. Ils ont eu recours à quatre méthodes: entretiens approfondis, groupes de discussion, enquête sur les connaissances, attitudes et pratiques, et entretiens ultérieurs avec des représentants de la communauté.

La schistosomiase a eu de graves conséquences au Guangxi: diminution de la capacité de travail, limitation des mariages et réduction de la mobilité de la main d'œuvre. Depuis que la maladie est éradiquée, les avantages pour la population sont clairs et se traduisent par une augmentation de la production agricole et de meilleures conditions de travail à la ferme. En cas de réapparition de la maladie, les habitudes personnelles et les travaux agricoles manuels qui sont de tradition au Guangxi exposeront une grande partie de la population au risque d'infection. La jeunesse et l'inexpérience de
la population font que les succès du programme de lutte antischistosominenne sont ignorés d'un nombre croissant d'habitants. Dans les districts étudiés, une majorité d'habitants souhaitent pouvoir être mieux informés de la manière dont le programme a été mené et savoir si la maladie risque de réapparaître. On considère que la surveillance des gastéropodes est importante mais on n'est guère désireux d'y participer.

Nos méthodes d'étude ont constitué une nouveauté pour le Guangxi et il nous a été utile de connaître la réaction de la communauté. On a modifié les méthodes de surveillance des gastéropodes pour les rendre plus efficaces. Les gastéropodes n'ont pas réapparu depuis 1992. L'examen des selles humaines et animales n'est plus pratiqué et la vigilance s'exerce désormais sur les gastéropodes et les enfants (tests cutanés). À long terme, la stratégie consiste à faire en sorte que la transmission ne puisse plus avoir lieu au sein de la population au cas où des gastéropodes vecteurs viendraient à réapparaître. Cela implique que l'on assure l'éducation permanente de la population et que l'on accorde la priorité à l'amélioration de l'approvisionnement en eau et de l'assainissement dans les anciennes zones d'endémie.

References