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IMPLEMENTATION COMPLETION REPORT  
(IDA-23170)

ON A

CREDIT

IN THE AMOUNT OF SDR 95.9 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR AN

INFECTIOUS AND ENDEMIC DISEASE CONTROL PROJECT

DECEMBER 27, 2002

**Human Development Sector Unit  
East Asia and Pacific Region**

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### CURRENCY EQUIVALENTS

(Exchange Rate Effective December 2002)

Currency Unit = Chinese Yuan

Y 8.30 = US\$ 1.00

US\$ 1.00 = Y 0.12

### FISCAL YEAR

January 1 to December 21

### ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
DALY	Daily Adjusted Life Year
DOTS	Directly Observed Treatment, Short-Course
DSP	Disease Surveillance Point
HIV	Human Immunodeficiency Virus
IDA	International Development Association
IEDC	Infectious and Endemic Disease Control Project
STD	Sexually Transmitted Disease
TB	Tuberculosis
TCC	Tuberculosis Control Center
WHO	World Health Organization

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**CHINA**  
**CN-INFECTIOUS AND ENDEMIC DISEASE CONTROL PROJECT**

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<i>Project ID:</i> P003624	<i>Project Name:</i> CN-INFECTIOUS DISEASES (HLTH5)
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<i>ICR Type:</i> Core ICR	<i>Report Date:</i> December 26, 2002

## 1. Project Data

*Name:* CN-INFECTIOUS DISEASES (HLTH5)      *L/C/TF Number:* IDA-23170  
*Country/Department:* CHINA      *Region:* East Asia and Pacific Region  
*Sector/subsector:* Health (100%)

### KEY DATES

	<i>Original</i>	<i>Revised/Actual</i>
<i>PCD:</i> 08/16/1990	<i>Effective:</i>	04/30/1992
<i>Appraisal:</i> 05/17/1991	<i>MTR:</i>	06/01/1997
<i>Approval:</i> 12/12/1991	<i>Closing:</i> 06/30/1999	06/30/2002

*Borrower/Implementing Agency:* Ministry of Finance/Ministry of Health and Provincial Governments  
*Other Partners:*

STAFF	Current	At Appraisal
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## 2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

*Outcome:* S  
*Sustainability:* L  
*Institutional Development Impact:* SU  
*Bank Performance:* HS  
*Borrower Performance:* S

*Quality at Entry:* QAG (if available)      ICR  
*Project at Risk at Any Time:* No

## 3. Assessment of Development Objective and Design, and of Quality at Entry

### 3.1 Original Objective:

The project had three principal objectives at appraisal. The first set of objectives concerned tuberculosis (TB) control, for which the project aimed to:

- improve case finding from 35% to 70%; and
- increase the cure rate of initially treated smear-positive patients in the participating provinces from less than 50% to over 90%.

As a result of the above, the project would help China to avoid about 100,000 premature deaths a year for the next several decades and a similar number of new infectious TB cases.

The second set of objectives related to schistosomiasis control, for which the project aimed to:

- decrease the prevalence of infection in the population in endemic areas by 40%, reducing the number of patients from about 1.5 million in 1989 to approximately 0.9 million in 1996;
- decrease the prevalence of infection in cattle and water buffalo by 40%, reducing the number of infected animals from 200,000 in 1989 to about 120,000 in 1996;
- decrease the snail infection rate and the density of infected snails in the high transmission areas by 50% to 60%, thus reducing the transmission of infection.

These efforts were meant to reduce the incidence of acute and advanced cases of schistosomiasis and bring down disease prevalence to a level at which an affordable maintenance strategy would be appropriate.

The project also contained an operational research component at the central level. This aimed at spurring research on infectious diseases other than TB and schistosomiasis, including HIV and other sexually transmitted diseases (STDs), and to support studies on hepatitis and how to achieve control of Hepatitis B through immunization. No discrete outcome indicators were listed for this component in the main text of the Staff Appraisal Report but the annex to the report contained a detailed note on the specific operational research and related efforts that were to be carried out. These included steps to strengthen the control of STDs; support for surveillance for HIV/AIDS; and support for serological surveys on hepatitis and research related to piloting a vaccination scheme for Hepatitis B.

The project objectives were entirely consistent with the country health strategy of the Bank, which focused on strengthening public health management, dealing with the unfinished agenda of infectious diseases, helping China to manage the health transition, and assisting China in reforming the health system in ways that would make it more equitable.

The project was also completely appropriate to the health circumstances of China at the time. A 1990 Bank health sector report found that constrained public health funding in the 1980s and a new emphasis on "payment-for-service" threatened to erode previous achievements against communicable diseases. Health services for diseases of public health importance were becoming less effective in some areas and less accessible to some segments of the population because of cost.

In this context, progress against two especially important diseases, tuberculosis and schistosomiasis, had stagnated in the 1980s. Tuberculosis killed 380,000 Chinese in 1989, was the largest single cause of adult death, and most severely affected the poorest communities. One and a half million Chinese were infected with schistosomiasis in 1989 and 40 million people were at risk. Reversing previous achievements, schistosomiasis was increasing in endemicity and the number of acute infections was rising.

The other infectious diseases addressed in this project were also of considerable importance. In 1992, there were over 120 million carriers of Hepatitis B, over 10 million people infected with Hepatitis B, and around 300,000 people a year dying of causes related to Hepatitis B. Sexually transmitted diseases, which had

been virtually eliminated in China in the 1960s, began to increase in the early 1980s, with 200,000 new cases reported annually. HIV prevalence rates were still low. However, prevalence was beginning to rise in injecting drug users in Yunnan Province and a surveillance system for HIV was only just being established.

The project objectives were clear, as were indicators for measuring achievement of the two main components. The project was also well focused. Essentially, it aimed at improving the control programs for two diseases of considerable public health importance.

Despite its clear focus, the project was very ambitious in scope. It aimed to change significantly the manner in which China carried out schistosomiasis control and to help China implement an almost entirely new paradigm for TB control. In addition, schistosomiasis control was to be implemented in eight regions, affecting about 40 million people and the new TB program – Directly Observed Treatment, Short Course (DOTS) - would be put in place in twelve provinces. The new approach to TB control had previously been used in only a few of China's cities, and implementing it on the scale planned would require important managerial and institutional changes across much of China.

Implementing the project successfully would also require important revisions to the Chinese approach to financing disease control and cooperation among many agencies and many levels of government. The Bank was the only financier of the project but development, implementation, and supervision of the project would also require effective cooperation with the World Health Organization (WHO).

In addition, successful implementation of the project would require a new commitment by the Chinese to TB control. Schistosomiasis had strong political support and had been the subject of writings by Chairman Mao and at the time the project was first being prepared, the Chinese were keenly interested in focusing it on schistosomiasis. Only as project development proceeded did strong ownership for the TB component emerge, encouraged by a small group of officials that recognized the critical nature of the TB problem.

In addition, at the same time, China was requiring that provinces and counties that took advantage of IDA credits had to repay them. During project preparation, the Bank considered this to be a major constraint to ensuring that funds would flow to the poorest places that most needed it. China was also operating at the time on the notion that patients should pay for treatment, even treatment for active TB disease.

Project design and implementation would also be made more complicated by the increasing market orientation of China, the increasing fiscal decentralization of China, and by the reduction of financing of public health activities in much of the country, as noted above.

The development of this project followed important sector work and three other projects that were ongoing, the first of which was near completion. Another project was being prepared simultaneously with this one. The Staff Appraisal Report pointed to the lessons of the ongoing projects, including the need to: carefully review construction and equipment; ensure the provision of technical assistance for key activities; adequately provide for operational research; and budget carefully for recurrent costs. It also noted the importance of having very clear agreements between the central and provincial governments about key administrative and financial matters and reforms.

For all of the above reasons, the project must be seen as one that had very ambitious goals that were to be achieved in a very complicated environment. It must also be understood that the Bank and some government partners wanted to use the project as a wedge for important reforms in health financing and reforms in the Chinese approach to public health services for the poor. The Bank and WHO also hoped

that the TB efforts included in this project would be a model for the world on how to implement effectively the DOTS approach to TB control.

### *3.2 Revised Objective.*

The project objectives remained intact throughout the life of the project. However, there was some revision to the project in 1996 related to a reallocation that the region approved internally. In addition, the project closing date was extended in June 1999 from June 30, 1999 to June 30, 2001. In August 1999, the Board was asked to approve a reallocation of credit proceeds. In January 2000, the Region internally approved an additional reallocation and in December 2000 the Bank extended the project for a second time, to June 30, 2002. These actions are discussed further below.

### *3.3 Original Components:*

The project had three components.

**The first component was tuberculosis control.** The project aimed in twelve provinces, covering about half of China's population, to expand and improve free provision of tuberculosis diagnostic services; free provision of anti-tuberculosis chemotherapy to reduce the sources of infection; and to improve case management by the adoption of a revised standard tuberculosis registry, reporting forms and supervisory protocol. The project also aimed at institutional strengthening through: the establishment of a National Tuberculosis Project Office and Tuberculosis Control Center; reorganizing and upgrading provincial tuberculosis control programs; implementing a tuberculosis policy package of administrative, technical and financial reforms to improve the systems by which the TB dispensaries in participating provinces are financed and managed; and operational research on management, economic, social and epidemiological factors to improve tuberculosis control and the preparation of future health programs. Initially, these activities were to be carried out from 1992 to 1998.

**The second component was support to the national schistosomiasis control program.** This was to take place from 1992 to 1996 in eight provinces and was to consist of schistosomiasis control through case identification and treatment of infected individuals by mass and selective chemotherapy; identification of infected animals; and snail control by mollusciciding. The project also aimed at institutional development through strengthening schistosomiasis control program offices and institutes; improving the surveillance system; improving monitoring and evaluation systems; and undertaking studies, through a Joint Research Management Committee, of the management, economic, social and epidemiological factors related to improving schistosomiasis control in different settings in China.

**The last component supported operational research.** It aimed to support a program of research into alternatives for improving surveillance and control of key infectious diseases, other than TB and schistosomiasis, including STDs and HIV, as well as epidemiological studies on effective control of hepatitis B virus through immunization.

The project components were well suited to meet the project objectives. They were well designed technically and the technical matters of the project were laid out in great detail. The Staff Appraisal Report, in fact, read almost like a manual for TB and schistosomiasis control in China. In addition, the proposed project elements were carefully related to administrative and institutional reforms at different levels of government. For the most part, the project also took careful account of the lessons of previous projects. Equipment lists were carefully set out. Technical assistance was provided for key activities. There was an extensive program of operational research that was given very serious attention. Recurrent

cost issues and sustainability were considered with extreme care and the project called for memoranda of understanding to be signed between the central and provincial governments concerning the “policy package” for the new approaches to the control of both schistosomiasis and TB.

#### *3.4 Revised Components.*

The project components did not change significantly during the life of the project. However, there were a number of modifications of the scope of the project, as noted above. In March 1996, the Region approved a reallocation of proceeds that took savings from reduced drug costs and exchange rate changes and allocated them to the costs of: case detection and management for TB; civil works for TB dispensaries in two poor provinces; the costs of drug quality control, health education and program supervision for TB; and the costs of environmental modification works for schistosomiasis control. Although the reallocation concerned more than five percent of the total project costs, the Region approved the changes internally since it considered the changes to the Development Credit Agreement to be minor. The main justification for these changes was the need to enhance case finding for TB control and the need to focus more attention on environmental modification for schistosomiasis control given the unanticipated rapid rates of reduction of endemicity. It had become apparent that problems of counterpart financing were at risk of seriously constraining TB case finding and management and this reallocation was aimed largely at trying to enhance these efforts, particularly in the poorer performing provinces.

In June 1999, the Region approved an extension of the Closing Date by two years. This was based on the findings of the mid-term review that suggested extra attention still needed to be paid to sustainability and extra time was needed in some provinces to increase the rate of TB case finding. The extension was also meant to help consolidate some of the gains in schistosomiasis control and assist some provinces in dealing with problems of annual fluctuations of water level and difficulties of disease control among migrant populations. This extension was made as the Bank worked on another possible reallocation that was to come shortly thereafter.

In August 1999, the Board approved amendments to the project. At this time, SDR 9.6 million was reallocated from cost savings and cancellation of activities no longer needed and put into TB drugs, a TB prevalence study, additional environmental modifications for schistosomiasis control, and repairs of TB dispensaries and schistosomiasis offices that were needed because of recent flooding.

In January 2000, the Region approved another reallocation. SDR 140,000 was reallocated from goods that were no longer needed at the central level to activities needed to evaluate the project’s impact and help ensure project sustainability. These activities were within the scope of the project and concerned only a small amount of IDA funds, so the Region did not seek Board approval for these changes.

A final one year extension of the closing date was granted in December 2000 and the closing date was changed from June 30, 2001 to June 30, 2002. This extension was justified on the need to bridge a possible gap between this project and another TB project that was being developed. It was also meant to help the central government continue to work on ensuring program sustainability.

#### *3.5 Quality at Entry*

The quality at entry was satisfactory overall and extremely good in many ways. The technical preparation of the project was extensive, done very well by people of exceptional technical competence on all sides, and made completely central to the overall preparation effort. Technical matters were also documented in great detail in the Staff Appraisal Report. Careful institutional analyses were done to allow for the design of the administrative, financial, and managerial changes that would be needed to introduce DOTS and the revised

approach to schistosomiasis. Equipment and drug lists were carefully drawn up. No social or environmental assessments were done, but they were not being done at this time for health projects. There were no substantive conditions of effectiveness that would have suggested that the project was not as fully prepared as it should have been.

Most of the assumptions about the factors that would effect project implementation turned out to be realistic. However, the 70% target for case finding for TB turned out to be overoptimistic. This was probably higher than some places could realistically achieve. In addition, data collected during implementation suggests that case detection at the time of appraisal may have been closer to 20%, rather than the 35% given as the baseline. It also appears that insufficient attention was paid during project preparation to the capacity differences across the many governmental units with which the project would have to work and how those differences might be addressed during project implementation and supervision. Both Chinese and Bank officials focused their attention on the new approaches to disease control that were embodied in the project. They may not have emphasized sufficiently in project design the considerable differences in administrative capacity across China's provinces, prefectures, and counties and what that would mean for the implementation of a project as large as this one.

#### **4. Achievement of Objective and Outputs**

##### *4.1 Outcome/achievement of objective:*

The achievement of project objectives was highly satisfactory in many respects. However, it is being rated as satisfactory overall since the sustainability of neither the TB program nor the schistosomiasis program can be assured. In addition, while case finding for TB improved significantly and is now about 50%, it is still lower than one could have expected, even if the goal for TB case finding may have been set unrealistically high at 70%.

The project was approved in December 1991, became effective in April 1992, and closed on June 30, 2002. The project met all of its targets, except on case detection for TB control, but took three years longer than planned originally. All project components were implemented largely as planned, but with some increase in the scope of tuberculosis case finding and management and greater attention to environmental modification and mollusciciding for schistosomiasis than planned initially. In addition, the project has had a major impact on Chinese institutions and the manner in which tuberculosis control is carried out and financed. It also strengthened the schistosomiasis program that had been waning and financed operational research that was instrumental in helping China to add a publicly financed Hepatitis B immunization program to its national immunization efforts. These would be substantial achievements in any environment, but they must be considered especially significant in the context within which this project was designed and implemented.

Nonetheless, the project took considerably longer to implement than planned. The project also faced important problems of counterpart financing. Some counties in Sichuan province dropped out of the project because they felt they could not afford to participate in it. There was also important variance in TB case finding and in schistosomiasis control across the provinces and across counties within provinces. Procurement was a source of problems for many years and an important part of the equipment that was procured in the early years was of poor quality. In addition, while the many gains of the project are likely to be sustained, sustainability is not guaranteed, given the nature of public finance in China, the manner in which China finances its health activities, and the fact that China has so far only taken some steps that might ensure the sustainability of the many very effective results of this project.

#### *4.2 Outputs by components:*

##### **Component I: Tuberculosis Control Program (US\$102.5 million at appraisal, US\$122.5 million actual)**

This component was successfully implemented in most regards, achieving nearly all of its goals. It is rated satisfactory despite the very high cure rates for TB that were achieved because of the continuing gaps in case finding and the uncertainty of financial sustainability.

The project covered 1,156 counties in 13 provinces, compared to an initial target of 1,211 counties in 12 provinces. (A new province was created from part of one of the original project provinces). The project covered an estimated 560 million people and 100% of the counties and population in all project provinces except Sichuan.

By the end of the project the cure rate of new smear positive TB patients was 95.6%, compared to 52% before the project. The rate of case finding was about 50%, compared to about 35% before the project.

At the end of 2001, about 98% of the population of the participating provinces was covered by DOTS. During the project period, more than nine million people were examined as TB suspects. About 2.04 million people were detected and registered as having active TB, of whom about 1.46 million were smear positive. There were also other signs of success: the number of new smear positive patients increased steadily until the last year of the project and the ratio of new cases to retreatment cases fell continuously from being almost 1 to 1 at the start of the project to being almost 5 to 1 at the end of the project.

The prevalence of TB declined by 36.1% or about 4.1% annually. This was below the 60% or 10% annually that was projected at the beginning of the project but which was almost certainly overoptimistic, as noted earlier. However, this compares very favorably to a decline of only 3.1%, or 0.1% annually in non-project areas. The figure also compares very favorably with results in other countries.

In terms of impact on sector policies and institutions, the project must be deemed an important success. China embraced the DOTS package in the project provinces. This included important changes, which have been institutionalized, in the method of diagnosis, standardized treatment, supervision of therapy, the establishment and use of laboratories, and the methods for monitoring and reporting on cases and their treatment. China also moved in the project provinces to free financing of diagnosis and treatment, which it is now adopting in additional provinces. Tens of thousands of people were trained in the new approach to TB and institutions at all levels of government were strengthened in their management of TB control. Health promotion for TB was also enhanced considerably and operational research produced some important findings that were of immediate value for program implementation.

Despite important successes, it is important to note that there was considerable variance in achievements across the provinces, caused partly by counterpart funding issues and their impact on incentives for case finding and supervision. The best performing provinces financially were Hainan, Liaoning, and Hubei, which allocated more than the planned counterpart funds. Five provinces, including Hebei, Shandong, Guangdong, Chongqing, and Gansu also allocated provincial level counterpart funds as required. However, Heilongjiang only allocated about 38% of its planned expenditures because the special fund for TB control was allocated to infrastructure. At the county level, Xinjiang, Guangdong, and Hebei allocated more than 90% of planned expenditures, while Gansu and Sichuan only allocated less than 70% of planned

expenditures. Case finding also varied across province, from less than 30% in Gansu and Shandong to over 70% in Xinjiang and Hainan. Cure rates were uniformly excellent, which reflected the exceptional attention paid in the DOTS approach both in general and in China to proper treatment. If patients were referred to the TB dispensaries, their treatment was overwhelmingly successful.

In addition, there were problems for some time of poor quality equipment. Dealing with the floating population remained a problem throughout the project, as did referrals from hospitals, many of which continued to treat patients, often poorly, instead of referring them to TB dispensaries, as they should have done. It was also difficult to ensure a sufficient number of well-trained staff for TB work, despite the training done. The quality of microscopy and the monitoring of that quality took some time to achieve the agreed standard, but had largely reached desired levels by the end of the project.

**Component II: Schistosomiasis Control Component (US\$ 145.4 million at appraisal, US\$139.7 million actual)**

This component was very successful in meeting its targets. It is also rated satisfactory, however, because of lingering questions about sustainability, both financial and in terms of human resources for work on schistosomiasis control. This component was to be implemented from 1992 to 1998. Five of the provinces completed project financed activities by 1998 but three provinces carried out project financed activities until 2001.

At the end of the project, all targets had been exceeded. There was an almost 49% reduction in prevalence of human infection compared to a target of 40%, the positive rate of fecal examination in villagers decreased by about 55%, there was a 47% reduction in livestock infection, compared to the 40% target, and snail density was reduced by over 70% in all areas, compared to a target of 50 to 60%. The density of snails, in fact, was reduced by 75% in high endemicity areas, 90% in medium endemicity areas, and about 88% in low endemicity areas. Related to the above, the number of persons infected dropped from about 1.64 million before the project to 0.82 million in 2001. The estimated number of infected cattle fell from about 200,000 to 60,000. Over the life of the project, about 63 million people were screened and almost 19 million received chemotherapy. About 3.9 billion square meters of snail infested areas were treated.

In addition, health education had a significant effect, with awareness of schistosomiasis and ways to avoid it rising to between 72% and 99% for different groups, compared to less than 67% for any group in 1992. The most significant gains were made among school children, who are a high-risk group due to frequent contact with water. In addition, in the national pilot areas, people's willingness to receive chemotherapy for themselves and their cattle became nearly universal. Endemic areas were reduced continuously. Zhejiang Province eliminated schistosomiasis in 1995 and by the end of the project, 47 counties met the criteria for transmission control and 82 counties reached the criteria for transmission interruption.

The project also had a salient impact on sector policies. The project aimed to reduce morbidity and improve the cost effectiveness of the program through greater attention to morbidity control through chemotherapy and more selective use of mollusciciding and environmental modification. These changes were largely accomplished by the project, although the aims were modified after the mid-term review when it was agreed that some additional attention would be paid to a limited number of environmental modification schemes that would be financed by the project. Some other technical aspects were also refined as experience was gained under the project. In medium endemicity districts, the screening method was changed to sero-immunological testing and the size of the population to be screened was increased. Because of concern with reinfection in areas with lower than 15% prevalence, chemotherapy was continued temporarily after mass chemotherapy. It is interesting to note that relations between the Bank and China

concerning this project were excellent and there was strong agreement, as well, on almost all of the technical approaches of the project. The only area in which the Chinese Government and the Bank were not in agreement, and over which there was heated debate, concerned very different perceptions about the value of environmental modification for snail control. Both sides, however, seemed to be satisfied with the revised approach taken after the mid-term review. In the end, the complimentary uses of morbidity control and snail control, as applied to areas by level of prevalence, was successful in meeting project aims and met the concerns of both the Bank and the Chinese.

The project had important impacts on institutional development as well. Governmental organizations at all levels that work on schistosomiasis were strengthened through training and work on the enhanced approach to disease control. There were important improvements in health education and the establishment of a network for it.

In addition, very impressive operational research was done on schistosomiasis, in ways that also helped to build the capacity for scientific research and its management in China. The Joint Research Management Committee solicited proposals for research and then funded a set of them after careful review. The outcomes of some of this research were important to enhancing disease control.

Of course, there were some aspects of implementation of this component that were not implemented completely as planned. For this component, as well as TB control, there were problems with the procurement of equipment of good quality and delays in the procurement of some equipment. There was also important variation across provinces in the pace and quality of their efforts in schistosomiasis control. The operational research program financed some very important work, done in a manner that built research capacity. However, it had some problems with quantity over quality, a lack of links between those who funded research and those who carried out research, and some research could not be done for lack of counterpart funds. In addition, there remain problems with how to address fluctuating water levels and the floating population.

Virtually all important endemic areas for schistosomiasis were covered by the project. Thus, outcome comparisons are not made here between project and non-project areas.

### **Component III: (Central) Operational Research Component (US\$4.0 million at appraisal, US\$2.7 million actual)**

Research is included in many Bank assisted projects. However, it is very common that this research is not done as planned, not supervised very rigorously, and has little impact. Compared to what often happens in Bank funded project research and in absolute terms, this component was very successful and was implemented in most respects in a highly satisfactory manner that met its aims. This success appears to have stemmed from the approach taken to this component: it was treated from the time of project identification to its conclusion as an important component; it was prepared seriously; Chinese researchers were twinned with some of the best researchers in the world; the component was supervised by other competent people; the component was an important focus of the mid-term review; and the outputs of some of the research had clear and important links to enhancing disease control efforts. Some of the major activities financed under the project are noted below.

A serological survey of hepatitis was conducted by the Disease Control Department and the China Academy of Preventive Medicine. This was carried out on a sample of 68,000 individuals from 435 villages/cities decided by 145 national Disease Surveillance Points (DSPs) in 30 provinces. The results of this study were instrumental in helping China to understand for the first time the nature and magnitude of

its serious problem of hepatitis.

The survey also encouraged China to launch a Hepatitis B Vaccine Delivery Pilot Program that was conducted in Chong Zhou and surroundings. Originally, this program was linked to studying parental willingness to pay for vaccination for their children. Ultimately, this effort was instrumental in helping China to establish a program for universal childhood immunization against Hepatitis B at government expense.

The government considerably improved sentinel surveillance for STDs under this component, as well. Although not all provinces were covered by this surveillance, the sites did cover a population of more than 35 million. A number of studies on STDs were also done. The improved knowledge gained through this work and training related to it helped China to better address the rise of these diseases, which is important both for its own sake and for control of HIV/AIDS.

An HIV/AIDS surveillance system was enhanced at 42 sentinel sites in 23 provinces. Twice yearly surveys began to give China evidence about the spread of HIV that it lacked before. This element of the project ultimately fed into the development of the HIV/AIDS project that the Bank is helping to finance.

#### *4.3 Net Present Value/Economic rate of return:*

The economic rate of return was not calculated for this project at the time of appraisal nor was it calculated after its closure. However, analysis was conducted into the costs and benefits of the Tuberculosis and Schistosomiasis components (see Annex 3). Calculations done for TB, show that the cost per DALY saved for new TB cases was RMB 55 for this project; 75 for the MOH project and 152 for non-project areas. The cost ratios were similar for retreatment cases.

#### *4.4 Financial rate of return:*

Not applicable.

#### *4.5 Institutional development impact:*

The project had a major impact on institutional development, as noted in Section 4.2 and which is elaborated on below.

For TB, there was a significant improvement in the national TB control network, with the establishment of a National Tuberculosis Project Office and the Tuberculosis Control Center (TCC), and organizing and upgrading the tuberculosis dispensaries in each province.

The implementation of DOTS provided a major process improvement that enabled further development and more cost-effective use of key assets of the TB program, including staff, training, and laboratories. The concept of smear microscopy-based diagnosis was very beneficial to TB control. Approaches to surveillance, drug procurement, drug distribution, drug therapy, and case management and the recording of it, were all improved in ways that have been institutionalized to a large extent. The implementation of the *Tuberculosis Policy Package* of administrative, technical and financial reforms for TB control was a major development that is being continued. Project financed operational research into the management, economic, social and epidemiological factors related to tuberculosis control in different settings in China helped pave the way for sounder program expansion.

Establishment of a National schistosomiasis control program office with additional staff, facilities and

budgets and strengthening of provincial endemic disease control divisions and subsidiary schistosomiasis institutes to manage the program allowed for strong provincial coverage of the program. Improvement of the disease surveillance system and monitoring and evaluation systems for schistosomiasis will provide reliable epidemiological data to adjust and target control activities in the future. The program of operational research on schistosomiasis led to improvements in the management of public health research in China. The establishment of the Joint Research Management Committee helped to ensure that Chinese researchers would be developed and mobilized in a manner increasingly consistent with best global practice, while working with some of the best researchers anywhere.

As noted earlier, enhancing the surveillance system for STDs and HIV/AIDS was a major boost to institutional development and set the basis for more rigorous and innovative approaches to the control of STDs, a better understanding of the AIDS epidemic, and the launching of some efforts to control HIV/AIDS. The Hepatitis B research and pilot project had an exceptional impact by ultimately leading to the start of a full fledged immunization program for Hepatitis B at government expense.

In addition to the above, the project had a major impact overall on the manner in which China deals with infectious disease control. First, the project helped to attract considerable attention of senior policy makers to disease control and assisted them in better understanding the public health importance of infectious diseases and the need for government to support this control in a larger and more effective way. Second, the project led to the Government's establishing a special national government allocation for TB that did not exist before. The Government also committed to financing the cost of drugs for smear positive patients, which was a major change in policy.

## **5. Major Factors Affecting Implementation and Outcome**

### *5.1 Factors outside the control of government or implementing agency:*

Several such factors arose over the life of the project. First, there was a change in the exchange rate between the dollar and the Chinese currency. At the time of project appraisal, US\$1 could buy 5.33 RMB. From 1993 to 1994, the US\$/RMB rate went from US\$1:Y 5.8 to US\$1:Y 8.6. In addition, changes in the SDR/US\$ exchange rate meant that the total credit funds available for the project went from US\$129.6 million equivalent at appraisal to US\$133.2 million. These changes created a surplus of dollars for the project. However, it also meant that additional counterpart funding would be required if the government were to be able to use these dollars.

Second, the government was able to procure many drugs at a lower cost than originally estimated. It was originally estimated, for example, that TB drugs would cost about US\$57 per course of treatment. However, it turned out to cost only US\$22. This was a major source of unallocated funds that were ultimately used to finance additional efforts in case detection and management for TB.

Third, as the project was being implemented, the Stop TB program was being established and China was a major focus of its efforts. China participated at a very senior level in the launch of the Stop TB movement in April 2000, and the Director General of WHO herself met the Vice-Minister of Finance and the Minister of Health of China at the meeting. It appears that the place of China in the Stop TB movement had a salient impact on China's commitment to TB control under this project and contributed to the development of a follow-on project. Later in 2000, in fact, the State Council convened a video conference on TB for all provincial governors, to further boost support for TB control.

### *5.2 Factors generally subject to government control:*

In many respects, various levels of government exhibited high levels of commitment to enhanced control of schistosomiasis and TB throughout the life of the project. The major changes, improvements, and successes of the project could not have occurred without continuous high level encouragement by government. It must also be noted that the Chinese Government made an important commitment in this project to “free diagnosis and treatment”. This will certainly have a bearing on the expansion of the TB control program, as well as future debate about financing the control of infectious diseases more generally.

However, the lack of counterpart funds by lower levels of government was a problem throughout the project. This stems from the lack of funds in some counties and provinces and the relatively poor management of their funding for the project. According to 2000 data, for example, the main problem of counterpart financing surfaced at the county level, with funding reaching only 65% of the planned level, on average.

### *5.3 Factors generally subject to implementing agency control:*

The implementing agencies deserve considerable credit for the manner in which they managed the significant reforms that were needed to implement this project. Nonetheless, there were two factors that were within their control to a large extent that constrained implementation. The first was the manner in which early procurement was handled. The lack of a good market survey for some items, poor preparation of some procurement documents and the handling of procurement by staff who were inexperienced with World Bank procedures contributed to procurement delays and the procurement of low quality equipment. (This was also induced partly by forces outside their control that encouraged procurement of local goods.) There was also important turnover of staff throughout the project. Some of this could be managed more effectively by implementing agencies, although some efforts to deal with this clearly require that these agencies work with others to improve the incentive structure.

### *5.4 Costs and financing:*

The total project cost at appraisal was US\$271 million equivalent. This was to be financed by an IDA credit of SDR 95.9 million, equal at the time to US\$129.6 million. The provincial governments were to contribute US\$139.2 million equivalent to financing the provincial components of the project. The central government was to finance US\$2.2 million equivalent for the central component. The final total project cost of US\$264.9 million is 97.7% of the total cost that was estimated at appraisal. This small change in total project cost was due to the exchange rate fluctuation between the SDR and US\$ from appraisal to project closing, although 100% of the credit (SDR 95.5 million) was expended. The final financing for the project was US\$126.7 million from IDA, US\$137.5 million from the provincial governments, and US\$0.7 million from the central government.

There were a number of factors that affected the costs of the project and its financing plan. Among the most important were the fact that drugs cost considerably less than planned initially, that the SDR appreciated against the dollar and that the dollar appreciated against the Yuan. These changes meant that more dollars would be available for the project, but that more Yuan would be needed to take advantage of those dollars.

The actual expenditure by component was US\$129.7 million for TB, compared to US\$102.5 million at appraisal, US\$139.7 million for schistosomiasis, compared to US\$145.4 million at appraisal, and for the

central component, US\$2.7 million equivalent, compared to US\$4 million equivalent at appraisal. As noted earlier, much of the increased expenditure on TB was used for improving case detection and management, and was financed largely by savings on the cost of drugs. Those savings stemmed from the reduced need for drugs to the delayed start up of TB efforts, rapid decline in endemicity of schistosomiasis, and much lower than expected cost of drugs that were procured domestically.

As noted elsewhere, the project took three years longer to implement than planned initially, although an important part of the schistosomiasis component was implemented on schedule. The delays largely stemmed from problems of counterpart financing and slowness in start up and early implementation of the TB component, as it proved difficult to overcome reluctance to shift to the new way of carrying out TB control.

## **6. Sustainability**

### *6.1 Rationale for sustainability rating:*

As suggested earlier and discussed further below, the gains of the project are likely to be sustained. However, a number of important questions about sustainability remain.

Hepatitis B vaccination has been added to the Government's expanded program on immunization and newborns are immunized for free at the expense of the central government. The progress made in surveillance for STDs and HIV/AIDS will likely be expanded.

China has considerable experience with schistosomiasis control and has refined its techniques for that control over time. There is good knowledge of schistosomiasis and how to treat it, prevent transmission, and modify environments to try to reduce transmission. The approach is technically sustainable.

As noted earlier, the project led to major progress in establishing a new paradigm for TB control through DOTS. Institutions were established, people were trained, registers were put into use, new diagnostic techniques became central, and staff were trained for all of this effort. The new approach to TB control is now widely used in China and is largely institutionalized. In the project area, the professional staff working in TB control institutions played a leading role in moving diagnosis from being largely reliant on X-ray examination to focusing more properly on smear microscopy.

Despite these achievements and the extent to which they appear to have become institutionalized, they still face risks to sustainability. The first is the continued training of committed staff. China will need to promote TB and schistosomiasis control for many, many years. The older generation of China's world class specialists in schistosomiasis and TB will not be able to work on these diseases forever. China must ensure that a new generation of leaders and competent staff in these diseases is trained, nurtured, and given encouragement to work with these efforts for substantial periods of time. Both programs have faced important turnover in their key staff during the life of this project that was not helpful to project implementation.

Schistosomiasis also faces some important social risks. Control of this disease had depended partly on collective action by citizens groups. As collective approaches to problem solving in China decline, it will be increasingly difficult to mobilize some of the human resources needed for some aspects of schistosomiasis control.

In addition, sustaining the control of both TB and schistosomiasis faces important financial risks. The

arrangements now in place by which the central government takes financial responsibility for TB drugs appears to be sustainable. However, the overall sustainability of the program also depends on funds from other levels of government and some of them may either lack commitment to TB or simply not be able to muster the funds for it. In addition, some levels of government fail to budget all of the funds they need for continuing their TB program, and continue to look to project funds for a part of their TB control budget. In some respects, they have made the sustainability of their programs partly dependent on the new TB control project.

The schistosomiasis program also faces some financial risks. Praziquantel is not expensive and therapy for infection costs only US\$0.36. However, individuals who are infected will have to pay for their own treatment, although they will largely be poor and rural people. In addition, counties will have to purchase molluscicide. This is expensive and they will need to maintain a strong commitment to schistosomiasis control to sustain the program financially. It is worrisome that as this project ended, the government was set to make a major cut in the budget for schistosomiasis control, equal to 78 million RMB. It is not clear how that gap will be filled.

Ultimately, of course, the sustainability of the TB and schistosomiasis programs will depend largely on the route that China chooses for its overall health financing system. This is still in flux, but some measures are being considered that would provide government assistance for the establishment of a health insurance scheme for the rural poor. Even with this, however, other measures would be necessary to ensure the long run financing of public goods in health, including, for example, some aspects of TB and schistosomiasis control.

#### *6.2 Transition arrangement to regular operations:*

The Bank and the Borrower had a deep concern from project identification with the manner in which schistosomiasis and TB were financed and could be financially sustained. They were both preoccupied with this concern throughout the life of the project, a preoccupation made greater by the problems of counterpart financing noted earlier. Much of the “transition to regular operations” was done through the institutionalization of the paradigm shifts that occurred in the control of schistosomiasis and TB and related management arrangements, training, improvement of labs and strengthening of operational research. Other efforts at transition occurred through a continuous dialogue between China and the Bank on the financing of health in China. In addition, the Bank encouraged China in 1999 to undertake a major effort at assessing the sustainability of the disease control efforts that were financed through the project. This was to be based on reviews at the central and provincial levels that would set the basis for action plans. In the end, however, as noted in the preceding section, the enhanced approaches to both TB and schistosomiasis control appear to be technically and institutionally sustainable. Rather, the main constraint to their “regular operations” in the future will be financial and will depend, as also noted above, on broader issues of health financing and the relations in that realm between different levels of government.

## **7. Bank and Borrower Performance**

### **Bank**

#### *7.1 Lending:*

The Bank’s performance during project preparation was very good and was noted as such by the Borrower. It built on the government’s interest to try to expand the project to include TB, which is of immense importance to China but which was being neglected and suffering reversals. It linked the design of the project to the challenges facing the health system in China and tried to use the design to address some key health financing issues. The Bank team, including outstanding technical specialists, worked closely with

the Chinese teams leading preparation. The Bank team also paid particular attention to the technical issues involved in preparation and appraisal. The documentation of the Bank's work throughout the lending cycle was exemplary.

### *7.2 Supervision:*

The Bank's work on project supervision was very good and perceived by the Borrower to be outstanding, as well, except for some concern on the part of the Borrower that the Bank was not sensitive enough to the types of equipment that would work best locally. Supervision efforts were led by Bank Headquarters staff with considerable country, sector and Bank knowledge and there was great continuity of staffing. Technical supervision was carried out by an eminent schistosomiasis expert for one component and by WHO for the TB component. In doing this work, WHO collaborated with other key TB organizations, including the Dutch TB Association (KNCV). Originally, the Bank paid for some of the WHO work but later, given the importance of China to world TB goals, WHO itself bore the cost of technical supervision, including the posting of a TB expert to their Beijing office to provide continual help and advice to the Chinese. Procurement was originally handled by the Bank from Washington, but was later mostly handled from Beijing.

Supervision reporting and communications with the client were always clear and well focused. The ratings of the project were consistently rigorous and seemed to match real project progress. The mid-term review was rather late. However, it was documented very well, focused on key issues, and was used by all parties for a revision of the project and reallocation of project proceeds. The technical content of supervision was excellent. All parties understood that the project was financing major technical and related institutional changes and focused supervision extraordinarily on the technical and institutional steps needed to achieve project objectives and adopt new paradigms for disease control. The Bank rigorously and pro-actively focused on the financial problems of the project and on key matters that related to technical quality of disease control efforts. In a manner rarely done in the Bank, even the operational research component was supervised by competent people as an important project element and was also the subject of major work at the mid-term review.

### *7.3 Overall Bank performance:*

Overall Bank performance was excellent, for all of the reasons noted above. There are three areas, however, in which it might have been improved, although they are not so fundamental that they negate the highly satisfactory rating given to the Bank's overall work on this project. First, there were procurement problems throughout the project and the Bank's work on procurement could have been enhanced if it had supervised procurement activities at an earlier stage from Beijing. In that case, the Bank could have been available in real time to help China overcome some of the shortcomings faced with procurement. Second, the Bank could have supported the excellent technical supervision better if the Task Manager was able to work more closely and more frequently with the technical supervision efforts in order to bring together more completely the various financial, technical, and institutional issues related to the project. Of course, the Task Manager had responsibility for a number of activities in China and moving in these directions may have required that he obtain additional assistance from the Bank for some of those other activities. Third, related to this, the Bank might also have formally supervised the project more than once a year. Given the magnitude of the changes that the project was trying to assist, and the challenges of health financing in China, the Bank should have carried out at least two supervision visits per year and work with China to make that an acceptable mode of operation for all parties.

## **Borrower**

### *7.4 Preparation:*

The Borrower's work on preparation was very good. The Borrower constituted teams of very competent staff to work closely with the Bank and its technical colleagues from WHO to do very detailed work on project preparation. Those in government who recognized the importance of TB control created consensus around the inclusion of TB control in the project.

### *7.5 Government implementation performance:*

With the exception of problems of counterpart financing, largely under the control of provincial bureaus of finance, the implementation performance of various levels of government was very good. They showed commitment to the aims of the project in important ways. They encouraged sound action. They supervised efforts with a pro-active focus on problems and on poorer performing areas. They collaborated very effectively with the Bank and other partners.

### *7.6 Implementing Agency:*

The work of the implementing agencies was also generally very good. The Bureau of Health at the central and provincial levels did very good work. The TB dispensaries performed very well. One area of potential improvement would have been for implementing agencies to have acted earlier to mainstream TB control in the overall health system.

### *7.7 Overall Borrower performance:*

Overall Borrower performance was excellent in many regards but is rated as satisfactory because of the continual problems of counterpart financing and the uncertainty concerning financial sustainability of TB and schistosomiasis control.

## **8. Lessons Learned**

The key lessons learned from this project are as follows:

- **Political Commitment is Central** – The control of TB and schistosomiasis was a political as well as a technical issue. The success of the project was determined in an important way by the political commitment shown from central to local levels to TB and schistosomiasis control.
- **Technical Content Counts** – Another critical key to the success of this project was the extent to which the participants in project development, implementation, and supervision focused on the technical content of the operation and the quality of technical work. There are no half cures for TB and the idea of doing the “right thing, the right way” guided this project throughout.
- **Institutional Context is Critical** – To the credit of those working on this effort, they also understood that technical content was a necessary condition for success, but not a sufficient one. Thus, they also focused careful attention on the administrative, managerial, and financial changes that would be needed to implement the project.
- **High Quality Supervision is Essential** – Project supervision was carried out throughout the life of this project by very competent people who knew the Bank, knew China, and knew their subject matter at

the highest levels. They were credible to the Borrower. They brought global best practice to China, which China appreciated. They never relented from a strong focus on technical soundness and quality. Perhaps this reflected the sensible demands of China for first class collaborators. However, this level of competence is a model that should be more widely appreciated in development assistance.

- **Operational Research can Make a Valuable Difference** – As noted earlier, this project was a model of how to design, carry out and supervise operational research in a way that builds research capacity and provides valuable learning for program development
- **Incentives Matter** – This project took careful account of the incentives that would be needed to encourage the new approach to TB treatment to be successful. As in other countries, free diagnosis and treatment of TB patients was critical to project success. In addition, project implementation was encouraged by giving incentives to providers at the local and dispensary level. Clearly, the Chinese health system has not yet found how to create incentives strong enough to ensure that hospitals refer their patients to TB dispensaries as they should, or themselves treat properly with DOTS.
- **Careful Attention Needs to be Paid to Differences in Implementation Capacity Across the Agencies Involved** – Project implementation was constrained by administrative and financial weaknesses that arose among some agencies involved in the project throughout project implementation. Although both the Bank and the Borrower focused supervision on the poor performers, project implementation might have been enhanced if the design of the project had included from the start of implementation additional mechanisms and assistance for poorly performing entities.
- **DOTS Can Work on a Large Scale** – As noted earlier, WHO and the Bank wanted to use this project as a model for how DOTS could be implemented on a large scale. This project has provided many lessons for TB control that are now being used elsewhere. It has also provided many detailed lessons for further efforts at TB control in China. Documenting those lessons is beyond the scope of this report and it would be extremely valuable for China and WHO to assess and report on the detailed lessons of this project for TB control in other countries.

## 9. Partner Comments

*(a) Borrower/implementing agency:*

This project was the first disease control project in China utilizing the World Bank loan, by providing free diagnosis and treatment to patients for the first time in China. In the ten years implementation from 1992 to 2001, all the activities under the different project components were fulfilled, and satisfactory results and experiences were achieved under the support of World Bank, WHO and under the experts of national and provincial levels, especially the participation and management of governments from central level done to county level.

### 1. Best practice and achievements

#### TB control component.

The policies and strategies developed during the implementation of the project are including expanding DOTS strategy, implementing the whole course intermittent chemotherapy regimens, establishing drug supply system to provide blister-package anti-TB drugs suitable to the field situation in China, formulating the diagnostic procedure of sputum microscopy in combination with chest X-ray, and conducting directly observed treatment (DOT) by village health workers.

The project provided free diagnosis to all TB suspects and free treatment to infectious pulmonary TB patients with directly observed therapy with short course. The recording and reporting system and TB patient referral management system were established and improved. The drugs were procured and supplied uniformly. Large scale, multi-level staff training was continuously and effectively carried out and the supervisions level by level ensured the successful implementation of the project. The project management system was established and strengthened in implementing the project. Project supervision had played a very important role in ensuring the quality of implementation and facilitating the progress of the project. Extensive social mobilization and health education had been carried out during the implementation of the project. The government at each level had made sound commitment on TB control and prioritized TB as their major disease to control.

#### Schistosomiasis control component.

Approaches for schistosomiasis control were comprehensive and multi-sector involved. Free diagnosis and treatment with different methodology were delivered to the human beings and the cattle/water buffalo based on the detailed criteria for different epidemiological stratification. Snail survey was carried out annually in spring and autumn using systemic sampling method. Different methods were used in different epidemic areas according to the criteria for stratification. Mollusciciding was provided to areas with infected snail. Large scale environmental modification projects for permanent snail elimination were implemented including digging new ditches and filling up the old ones, storing water for breeding aquatics, making concreted irrigation ditches, transforming sluice gate, and establishment of protection areas, etc. Achievements from operational research supported by JRMC were rich. Many of those have a higher academic level and have provided valuable information to the field control activities and promoted the progress of the control programme. Some of the achievements have been applied in the field control activities.

#### Central component on operational research.

A serological survey of hepatitis was carried out. The results of this study were instrumental to understand for the first time the nature and magnitude of the serious problem of hepatitis. The survey also encouraged the government to launch a Hepatitis B Vaccine Delivery Pilot Program. The sentinel surveillance for sexually transmitted diseases was improved significantly. A number of studies on sexually transmitted diseases were also done. A HIV/AIDS surveillance system was enhanced at 42 sentinel sites in 23 provinces. Twice yearly surveys began to give evidence about the spread of HIV.

### **2. Main constraints**

Lack of experience in setting up project targets and indicators was one of the constraints encountered for project evaluation. Uneven project progress existed among project provinces. The referral of patients needs to be strengthened for TB control. Professional staff and their capability need to be strengthened. Measures to guarantee the quality of procured equipment was insufficient. It was difficult to conduct disease control in floating population. The sustainability of the project was not fully predicted and considered.

### **3. Main experiences**

The experiences have been recognized by the related international organizations and spread in other developing countries. The TB control project in China was highly appraised as the model of TB control in developing countries even in the whole world. The government commitment and awareness are guarantee of successful implementation of the project. Free diagnosis and treatment is the key to success. Good service mechanism and necessary incentive system were the essential conditions for the project success. Strengthened health promotion to mobilize the whole society in participation of the project was the powerful measure to success. Expanding international communication and cooperation, drawing advanced

experiences, renovating concepts and fulfilling control approaches.

#### **4. Main challenges**

For the TB control component the challenges are how to expand the DOTS strategy in the whole country and to ensure the quality of DOTS especially in remote and mountainous areas. Case finding is still not satisfactory because referral system is not functioning very effectively. More professional staff needs to be trained because of staff turning over. Mobile population is increasing and they bring new challenge on case-finding and case management. Multi-drug resistance is still a threat to TB control in China, based on the prevalence surveys. HIV/AIDS is increasing very fast and is the risk for the achievement of TB control if it is not managed properly.

For the schistosomiasis control component the challenges are how to sustain the project achievements. Natural environment and transmission patterns in lake areas in the provinces due to the difficulty in control of water level, complicated topography of the environment, uneasy of traffic in mountainous areas, as well as under development in economy, have been hard nuts in the control activities. Potential risk for transmission of schistosomiasis still exists owing to the fact that practically no change in the environment of snail infested areas. With the increase of mobile population and frequent trades for livestock, the re-infection rate of humans and animals is still high which caused the severity of the infection, and the prevalence of schistosomiasis might be fluctuated at any time.

*(b) Cofinanciers:*

None.

*(c) Other partners (NGOs/private sector):*

None.

#### **10. Additional Information**

The Borrower prepared a series of excellent and detailed completion reports for the project. They are noted in the list of key project documents in the annexes. The overwhelming majority of data used in this report is taken from the government's completion reports and surveys on which they are based.

## Annex 1. Key Performance Indicators/Log Frame Matrix

### Outcome / Impact Indicators:

**Table 1.1 Tuberculosis Control Component**

Indicator/Matrix	Target at Appraisal	Baseline (1990)	Actual/Latest Estimate	Percentage Change
<b>1. Prevalence of Smear-Positive TB (per 100,000 people) (#)</b>				
Project-wide (12 provinces)	Reduce by 50%-60%	142	79	-44.4
Gansu		75	79	+5.3
Guangdong		112	107	-4.5
Hainan		260	79	-69.8
Hebei		131	79	-39.7
Heilongjiang		121	73	-39.7
Hubei		175	79	-54.9
Hunan		179	79	-55.9
Liaoning		89	56	-36.5
Ningxia		168	79	-53.0
Shandong		60	95	+58.3
Sichuan		217	141	-35.0
Xinjiang		194	128	-34.0
<b>2. Case-Detection Rate (# smear-positive cases plus relapses, per 100,000 people) (%)</b>				
Project-wide	Increase from 35% to 70%	15.9	47.8	+200.6
Gansu		11.1	26.8	+141.4
Guangdong		7.6	58.0	+663.2
Hainan		4.8	76.8	+1,500.0
Hebei		10.6	43.7	+312.3
Heilongjiang		26.8	58.0	+116.4
Hubei		28.6	50.0	+74.8
Hunan		19.5	48.6	+149.2
Liaoning		14.0	33.4	+138.6
Ningxia		13.4	35.9	+167.9
Shandong		11.2	29.4	+162.5
Sichuan		15.9	45.2	+184.3
Xinjiang		11.1	81.8	+636.9
<b>3. Cure Rate (new smear-positive and relapses cured plus treatment completed) (%)</b>				
Project-wide	Increase from < 50% to > 90%	71.8	95.6%	+33.1
Gansu		44.3	96.9	+118.7
Guangdong		47.2	95.8	+103.0
Hainan		51.7	94.6	+83.0
Hebei		69.8	98.3	+40.8
Heilongjiang		67.1	95.0	+41.6
Hubei		67.1	95.8	+42.8
Hunan		84.7	93.3	+10.2
Liaoning		31.4	95.9	+205.4
Ningxia		65.9	96.9	+47.5
Shandong		87.7	95.1	+8.4
Sichuan		77.7	94.7	+21.9
Xinjiang		80.7	96.6	+19.7

Sources: National Tuberculosis Prevalence Survey (1990); National Tuberculosis Prevalence Survey (2000).

Note: The prevalence rates of 1990 and 2000 are not directly comparable, as the sample size was determined on different basis. The 1990 survey was representative for both national level and provincial level, but the 2000 survey was only representative for national level.

**Table 1.2a Schistosomiasis Control Component**

Indicator/Matrix	Target at Appraisal	Baseline (1989)	Actual/Latest Estimate	Percentage Change
<b>1. Prevalence of Infection in the Population in Endemic Areas (%)</b>				
Project-wide (8 provinces)	Reduce by 40%	n.a.	n.a.	Reduced by 48.7%
Anhui		3.71	1.14	-69.3
Hubei		11.20	3.37	-69.9
Hunan		9.13	5.67	-37.9
Jiangsu		0.1558	0.004	-97.4
Jiangxi		7.61	1.30	-82.9
Sichuan		4.38	2.43	-44.5
Yunnan		6.58	2.29	-65.2
Zhejiang		n.a.	n.a.	n.a.
<b>2. Prevalence of Infection in Cattle and Water Buffalo (%)</b>				
Project-wide (8 provinces)	Reduce by 40%			Reduced by 47.1%
Anhui		5.51	3.16	-42.6
Hubei		7.46	1.52	-79.6
Hunan		6.63	5.88	-11.3
Jiangsu		0.32	0.96	-66.7
Jiangxi		4.44	3.43	-22.7
Sichuan		4.31	2.70	-37.4
Yunnan		6.44	1.44	-77.6
Zhejiang		n.a.	n.a.	n.a.

n.a. Not available.

**Table 1.2b Schistosomiasis Control Component**

Indicator/Matrix	Target at Appraisal	Baseline (1989)	Actual/Target Estimate	Percentage Change
<b>3. (a) Natural Infection Rate (%); and (b) Density of Infected Snails in High Transmission Areas (per 0.1 m<sup>2</sup> [figure in parentheses])</b>				
Project-wide (8 provinces)	Reduce by 50%-60%			Reduced by: <ul style="list-style-type: none"> <li>o 75% in High Endemic Areas.</li> <li>o 90% in Medium Endemic Areas.</li> <li>o 87.5% in Low Endemic Areas.</li> </ul>
Anhui		0.12 (0.0027)	0.15 (0.0019)	-25.0 (29.6)
Hubei		1.90 (0.0255)	0.31 (0.0013)	-83.7 (94.9)
Hunan		0.65 (0.0055)	1.23 (0.0035)	-89.2 (36.4)
Jiangsu		0.0917 (0.0002)	0.1300 (0.0001)	-41.8 (50.0)
Jiangxi		0.6772 (0.0047)	0.3824 (0.0012)	-43.5 (74.5)
Sichuan		0.0495 (0.0014)	0.0672 (0.0008)	-35.8 (42.9)
Yunnan		2.06 (0.04)	0 (0)	-100 (100)
Zhejiang		n.a.	n.a.	n.a.

n.a. Not available.

**Input / Output Indicators:**

Indicator/Matrix	Target at Appraisal	Actual
Hepatitis Epidemiology	Conduct serologic surveys in a sample of 50,000 individuals drawn from 145 DSPs and 20,00 additional from special groups (such as patients, blood donors, drug abusers).	Serological survey conducted by DCD/CAPM in sample of 68,000 individuals from 435 villages/cities decided by 145 national DSPs in 30 provinces.
Hepatitis B Immunization	Immunization in three neighboring rural counties of each of the three provinces (Ningxia, Jilin and Sichuan).	<i>Hepatitis B Vaccine Delivery Pilot Program</i> conducted in Chong Zhou and surroundings using a variety of health education methods.
STDs	Strengthen STD surveillance system, test effective health education methods and local training on modern diagnosis and treatment for STDs.	Sentinel surveillance points quality has been enhanced. The sites cover 35,126,700 persons.
HIV/AIDS	Further develop HIV/AIDS surveillance system and set-up surveillance systems in four additional provinces (Gansu, Sichuan, Xinjiang and Hunan).	HIV/AIDS surveillance has been enhanced with a total of 42 sentinel sites in 23 provinces.

## Annex 2. Project Costs and Financing

### Project Cost by Component (in US\$ million equivalent)

Project Cost By Component	Appraisal Estimate US\$ million	Actual/Latest Estimate US\$ million	Percentage of Appraisal
A. Tuberculosis - Control Program	68.20	69.80	102.3
B. Tuberculosis - Institutional Strengthening	34.30	52.70	153.6
C. Schistosomiasis - Control Program	108.40	112.00	103.3
D. Schistosomiasis - Institutional Strengthening	37.00	27.70	74.9
E. Central	4.00	2.70	67.5
<b>Total Baseline Cost</b>	<b>251.90</b>	<b>264.90</b>	
<b>Physical Contingencies</b>	<b>2.50</b>		
<b>Price Contingencies</b>	<b>16.60</b>		
<b>Total Project Costs</b>	<b>271.00</b>	<b>264.90</b>	
<b>Total Financing Required</b>	<b>271.00</b>	<b>264.90</b>	

### Project Costs by Procurement Arrangements (Appraisal Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method				Total Cost
	IFB	NCB	Other	NBF	
Civil Works	-	-	-	10.0	10.0
	-	-	-	(0.0)	(0.0)
Equipment and Vehicles	19.0	1.0	1.6	-	21.6
	(19.0)	(1.0)	(1.6)	-	(21.6)
Drugs	75.0	2.0	6.3	-	83.3
	(75.0)	(2.0)	(6.3)	-	(83.3)
Molluscicides	16.8	2.0	-	-	18.8
	(16.8)	(2.0)	-	-	(18.8)
Health Education Materials	-	-	-	15.3	15.3
	-	-	-	(0.0)	(0.0)
Other Materials	-	-	-	19.9	19.9
	-	-	-	(0.0)	(0.0)
Technical Assistance	-	-	1.8	-	1.8
	-	-	(1.8)	-	(1.8)
Training	-	-	15.3	-	15.3
	-	-	(1.3)	-	(1.3)
Operational Research	-	-	4.6	-	4.6
	-	-	(2.8)	-	(2.8)
Incremental Recurrent Costs	-	-	-	80.4	80.4
	-	-	-	(0.0)	(0.0)
<b>Total</b>	<b>110.8</b>	<b>5.0</b>	<b>29.6</b>	<b>125.6</b>	<b>271.0</b>
	<b>(110.8)</b>	<b>(5.0)</b>	<b>(13.8)</b>	<b>(0.0)</b>	<b>(129.6)</b>

**Notes:**

1/ Figures in parenthesis are the amounts financed by IDA.

2/ Others - Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

3/ NBF - Not Bank financed.

Differences due to rounding.

**Project Costs by Procurement Arrangements (Actual/Latest Estimate) (US\$ million equivalent)**

Expenditure Category	Procurement Method				Total Cost
	ICB	NCB	Other	NBF	
Civil Works	-	-	28.4	-	28.4
	-	-	(19.9)	-	(19.9)
Equipment and Vehicles	23.8	0.3	-	-	24.1
	(23.8)	(0.3)	-	-	(24.1)
Drugs	38.2	-	-	-	38.2
	(38.2)	-	-	-	(38.2)
Molluscicides	35.2	-	-	-	35.2
	(35.2)	-	-	-	(35.2)
Health Education Materials	-	-	1.1	6.1	7.2
	-	-	(1.1)	(0.0)	(1.1)
Other Materials	-	-	-	-	-
	-	-	-	-	-
Technical Assistance	-	-	2.4	-	2.4
	-	-	(2.4)	-	(2.4)
Training	-	-	-	7.7	7.7
	-	-	-	(0.0)	(0.0)
Operational research	-	-	4.9	4.6	9.5
	-	-	(3.2)	(0.0)	(3.2)
Incremental Recurrent Costs	-	-	5.2	107.0	112.2
	-	-	(2.6)	(0.0)	(2.6)
<b>Total</b>	<b>97.2</b>	<b>0.3</b>	<b>42.0</b>	<b>125.4</b>	<b>264.9</b>
	<b>(97.2)</b>	<b>(0.3)</b>	<b>(29.2)</b>	<b>(0.0)</b>	<b>(126.7)</b>

Notes: 1/ Figures in parenthesis are the amounts financed by IDA.  
2/ Others – Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.  
3/ NBF – Not Bank financed.  
Differences due to rounding.

**Project Financing by Component (in US\$ million equivalent)**

Component	Appraisal Estimate			Actual/Latest Estimate			Percentage of Appraisal		
	Bank	Govt.	CoF.	Bank	Govt.	CoF.	Bank	Govt.	CoF.
Tuberculosis Control	56.70	56.90		58.90	63.60		103.9	111.8	
Schistosomiasis Control	70.90	82.30		65.80	73.90		92.8	89.8	
Central	2.00	2.20		2.00	0.70		100.0	31.8	

### Annex 3. Economic Costs and Benefits

An *Economic Rate of Return* (ERR) was not calculated at appraisal for this project. However, analysis was conducted into the costs and benefits of the Tuberculosis and Schistosomiasis components.

#### TB Component

In order to get an estimation of the costs and benefits of the TB control program the MOH, together with the Shanghai Medical University, conducted a socioeconomic survey of 17 counties from six provinces. This survey compared the costs and benefits in areas under the Bank project, the MOH project, and non-project areas.

	Cost per Case Detected	Cost per New Smear-Positive Cured	Cost per Retreatment Cured
IEDC (WB)	83	537	769
MOH	133	760	1213
Non-Project	133	1432	2363

According to project analysis into the incremental cost-benefit from IEDC, 1 RMB input into the IEDC project had greater benefits generated than a similar input into the MOH project, both for new smear-positive patients and for retreatments.

	Benefit per 1 RMB Input	
	New Smear-Positive Treated	Retreatment
IEDC Project (WB)	277	118
MOH Project	196	137

Specifically looking at the DOTS program, WB/WHO estimated that successful treatment was achieved with less than US\$100 per patient (on average) in this program. The WHO estimated that US\$15-20 in input could save one healthy life year, which translates out to a return of US\$60 for US\$1 input.

	DALY Lost per Case		Cost per DALY Saved	
	New	Retreatment	New	Retreatment
IEDC Project	0.13	0.62	55	82
MOH Project	0.45	0.59	75	128
Non-Project	0.61	0.92	122	260

#### Schistosomiasis Component

Six counties in six provinces were selected for investigation into the cost-effectiveness of the Schistosomiasis project. Using the year 2000 as an index year, the total input into Schistosomiasis control amounted to approximately 97.2 million Yuan, of which the Bank financed 41% and 59% was financed through counterpart funding. The use of these funds was: 30.19% for case detection and chemotherapy, 55.16% for snail survey and mollusciciding, and 14.67% for other purposes.

From analysis of all six counties (all of which had some differences in incidence, etc) the average costs of efforts to reduce Schistosomiasis are shown in the table below.

Case detection (per person)	12.48
All Control Measures (per person)	41.86
Case Detection and Treatment to reduce human infection rate by 1% (per 100 people)	2,176.72
All Control Measures to reduce human infection rate by 1% (per 100 people)	7,732.42
Reduction of bovine infection rate by 1% (per 100 people)	162,891.10
Mollusciciding to reduce snail infestation area by 10,000 m <sup>2</sup>	35,731.82

Further analysis showed that the average loss versus the cost for treatment in acute chronic and advanced cases was as below:

Case Type	Loss Due to Disease	Cost for Treatment
Acute	992.62	447.04
Chronic	640.47	374.95
Advanced	3,807.80	1,619.85

In keeping with the use of 2000 as the index year, it was calculated that the total benefit from the project was 699.5 million Yuan, with the direct benefit from control measure at 650.6 million Yuan and the benefit from mollusciciding engineering at 48.8 million Yuan. This yields an aggregate cost benefit ratio of 6.20 for the project.

#### Central Operational Research Component

No Cost-Benefit analysis was conducted for this component.

## Annex 4. Bank Inputs

### (a) Missions:

Stage of Project Cycle Month/Year	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating	
	Count	Specialty	Implementation Progress	Development Objective
<b>Identification/Preparation</b>				
08/1990	2	TB, PH		
09/1990	9	TB(2), PH(2), HM, MO, HE, OA(2)		
01/1991	4	TB, PH, HM, HE		
<b>Appraisal/Negotiation</b>				
06/1991 (Appraisal)	7	TB, OA, HM, PH(2), SC, MO		
11/1991 (Negotiations)	4	TB, LC, DO, HM		
<b>Supervision</b>				
04/1991	2	TB, PO		
11/1992	5	PO, PS, TB, MO(2)	1	1
04/1993	7	PS, PO, TB(3), MO (2)	1	1
05/1994	4	PH(2), PS, MO	1	1
10/1994	4	PH, PS, MO, PO	1	1
05/1995	4	EP, PS, TB, MO	S	S
10/1995	8	EP, PH(4), PS, TB, MO	S	S
05/1996	6	EP, PH(3), PS, MO	S	S
11/1996	7	PO, PS, PH(3), TB(2)	S	S
05/1997	9	PO, PS, PH(4), TB(2), MO	S	S
04/1998	8	PO, PH(3), PS, MO, TB(2)	S	HS
03/1999	5	PO, TB(3), PH	S	HS
02/2000	5	PO, TB(2), SC(2)	S	HS
02/2001	2	PO, SC	S	HS
02/2002	6	PO, TB(2), SC(2), PH	S	HS
<b>ICR</b>				

### Specialist Skills:

DO = Disbursement Officer; EP = Epidemiologist; HE = Health Economist; HM = Health Management and Organization Specialist; LC = Legal Counsel; MO = Medical Officer; OA = Operations Analyst; Projects Officer = PO; PH = Public Health Specialist; PS = Parasitologist; SC = Schistosomiasis Specialist; TB = Tuberculosis Specialist.

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Identification/Preparation	n.a.	537,400
Appraisal/Negotiation	n.a.	n.a.
Supervision	n.a.	405,400
ICR	n.a.	
Total	n.a.	942,800

Note: Identification/Preparation includes Appraisal/Negotiation. Supervision includes ICR.

**Annex 5. Ratings for Achievement of Objectives/Outputs of Components**

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	<i>Rating</i>
<input checked="" type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> H <input checked="" type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Sector Policies</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Physical</i>	<input type="radio"/> H <input type="radio"/> SU <input checked="" type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Financial</i>	<input type="radio"/> H <input type="radio"/> SU <input checked="" type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Institutional Development</i>	<input type="radio"/> H <input checked="" type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input type="checkbox"/> <i>Environmental</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
 <i>Social</i>	
<input checked="" type="checkbox"/> <i>Poverty Reduction</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input type="checkbox"/> <i>Gender</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input type="checkbox"/> <i>Public sector management</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA

## Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

### 6.1 Bank performance

#### Rating

- |                                                 |                                     |                         |                         |                          |
|-------------------------------------------------|-------------------------------------|-------------------------|-------------------------|--------------------------|
| <input checked="" type="checkbox"/> Lending     | <input checked="" type="radio"/> HS | <input type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input checked="" type="checkbox"/> Supervision | <input checked="" type="radio"/> HS | <input type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input checked="" type="checkbox"/> Overall     | <input checked="" type="radio"/> HS | <input type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

### 6.2 Borrower performance

#### Rating

- |                                                                           |                          |                                    |                         |                          |
|---------------------------------------------------------------------------|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input checked="" type="checkbox"/> Preparation                           | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input checked="" type="checkbox"/> Government implementation performance | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input checked="" type="checkbox"/> Implementation agency performance     | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input checked="" type="checkbox"/> Overall                               | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

## **Annex 7. List of Supporting Documents**

### World Bank

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13. The Implementation report of AIDS Component of World Bank Loan IEDC Project in China. The Implementation Report of STDs/AIDS Component of World Bank Loan IEDC Project in China.
14. The Report of Mid-Term Evaluation of China IEDC Project Schistosomiasis Component through the World Bank Loan 1992-1996.
15. Tuberculosis Sustainability Report in China. China National Team. 1995.
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17. World Health Organization. Harrison, Tom. Tuberculosis Control in China: A Case Study of the IEDC Project TB Component. WHO Report.











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