



# Increasing the volume of cataract surgery: an experience in rural China



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## Cataract: the situation in China

Eighteen per cent of the world's blind people live in China. The country is home to one of the world's largest populations of blind people, an estimated 6.6 million. Cataract is the number one cause of blindness in China, accounting for nearly 50 per cent of all cases. China is also estimated to have the world's most rapidly ageing population. By 2020, the country's elderly population is expected to increase by 90 per cent and reach 240 million people. In 2005, about 600,000 cataract operations were performed in China, compared to 1.5 million LASIK operations. The cataract surgical rate (CSR) in China is around 450-460, compared to 3,700 in India.

## What is wrong with China's cataract services?

From the facts listed above, it is easy to see the gravity of China's cataract situation today. The country's rapidly ageing population compounds the problem. While China's economy has been developing fast, its basic social services have lagged behind, particularly health care services in rural areas. Ninety percent of the rural population (about 700 million) is marginalised in the country's health care system. The reform of China's health system since the 1980s has not resulted in sufficient government investment. Government expenditure on health made up only 17 per cent of the country's total health expenditures in 2004, compared to 40 per cent in 1980.<sup>1</sup> The government is gradually reducing its subsidy to public hospitals; these hospitals are now becoming increasingly profit-oriented and target primarily the rich.

The low CSR in China is mainly caused by a serious imbalance between hospital charges for cataract surgery and patients' ability to pay.<sup>2</sup> In rural western China, the average annual net income per capita is about US \$224 (RMB 1,854.9),<sup>3</sup> while charges for cataract surgery at the county hospital level vary from US \$200 to US \$300. These prices rise to US \$380-500 at provincial hospitals and vary between US \$630 and US \$1,000 in larger cities such as Beijing and Shanghai. It is generally accepted that a simple cataract operation in China can cost patients as much as one year's income. When indirect costs such as travel and accommodation are taken into account, it becomes virtually impossible for



A follow-up examination for a cataract patient by a doctor from Wuzhishan Eye Hospital, CHINA

Xie Weilin/ORBIS

rural patients to get cataract surgery in a large city. That is why it is not uncommon in China to see a well-equipped hospital with competent cataract surgeons, but very few patients. In a provincial level hospital that ORBIS staff visited last year, the department of ophthalmology was fully equipped with advanced technology and had 24 ophthalmologists, but less than 100 cataract operations were performed a year. The minimum price for a cataract operation at this hospital was US \$400 (i.e. twice the average annual income).

The situation of cataract services in rural areas is even worse than in provincial hospitals. There is a vicious circle in county hospitals: hospitals try to charge patients as much as the government Bureau of Price Management allows; the high price makes cataract surgery less attractive to patients; fewer patients means fewer opportunities for doctors to practise their surgical skills and improve quality of care; low quality makes doctors less trusted by patients, therefore fewer patients come to the hospital; this in turn means that the hospital desperately needs to make up its deficit by imposing higher price for cataract surgery.

A number of health authorities and organisations concerned with the prevention of blindness offer free cataract operations to cope with China's growing cataract problem. This is done via initiatives such as 'Health Express', various surgical buses, and other one-off programmes. While highly commendable, such initiatives can create a tidal wave of problems for local eye care providers, who are left with no patients

when free operations cease to be available. New patients are determined to wait for the next external intervention and are very reluctant to undergo any form of paid surgery. This places severe limitations on the future development prospects and the long-term survival chances of hospitals in these areas, as no government, organisation, or individual can afford to provide free cataract services on a permanent basis.

## Lessons from the ORBIS field practice

ORBIS International has been fighting avoidable blindness in China since 1982. As ORBIS progressively shifts its focus to China's rural areas, where there is a pressing need for improvement in blindness prevention programmes, our projects focus increasingly on training local ophthalmologists and nurses to serve these underserved populations.

In 2000, ORBIS launched a Blindness Prevention Model County Project in Wutai County, Shanxi Province. Ophthalmic equipment was donated to Wutai County Hospital, staff were trained in cataract surgery, and funding was provided to screen for cataract among one-fourth of the county's 360,000 residents. Despite our efforts, the number of cataract operations did not rise substantially. We learned two important lessons from this project. Firstly, we learned that ophthalmic infrastructure, technology, training, and surgical skills, as well as funding for screenings alone, are not

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enough to increase the volume of cataract surgery. Secondly, we learned that affordability is the crucial obstacle that prevents us from finding a long-lasting and effective solution to increase the cataract surgical rate.

As a result, we began to ask questions about how to:

- lower the cost of eye care services so that it is appropriate to the income level in rural areas in China
- maximise benefits to patients while ensuring the sustainability of the local eye care market
- reverse the vicious circle of rural cataract services.

With answers to these questions, ORBIS China implemented a plan to raise public awareness of the importance of eye health and to ensure that quality eye care was readily available, sustainable, and affordable for all.

In March 2004, we initiated a rural project in Xiangyun County, Yunnan Province, to build a modern eye disease prevention centre within the Xiangyun County Hospital, a government hospital. Ten months later, we launched another rural project in Wuzhishan County, in the central highlands of Hainan Province. The project

**Figure 1. Geographic location of Xiangyun and Wuzhishan**



partner, Wuzhishan Eye Hospital, is privately owned but registered as a non-profit NGO hospital. We chose these two dissimilar hospitals in order to explore different ways of increasing the volume of cataract surgery in China.

Xiangyun County has a population of 430,000. There are about 2 million villagers in five surrounding counties where cataract surgery is not available. Before the implementation of the project, Xiangyun County Hospital was the only place to offer extracapsular cataract extraction with intraocular lens implantation (ECCE/IOL). About 200 such operations were performed in the county hospital every year. The price varied between US \$180 and US \$300.

Before 2004, there were no eye care services available in Wuzhishan County (population 1 million including surrounding counties). To receive cataract surgery, patients had to go to the provincial capital Haikou (one day travel), where the price of the operation varied from US \$300 to US \$400.

In both areas, farming is the main productive activity. In 2003, the average annual net income per capita was US \$240 in Xiangyun and US \$217 in Wuzhishan. Given this economic reality, we need to address how eye care services can be made affordable.

We began by building the capacity of both partners (equipment, training, referral network, public awareness), then we introduced a multi-tier pricing system to accommodate people of different income levels. Investigations at the village level revealed that, if the price of the operation was at the most 25 per cent of a person's annual income, people would be willing to pay for the service. Another survey indicated that the price villagers were willing to pay for cataract surgery was equivalent to the price they would get for selling a grown pig at the local market. We also worked out in detail



**Cataract screening in a village. CHINA**

the direct cost of surgery to the hospital. It was encouraging to find out that this direct cost to the hospital (US \$28) always turned out to be lower than what most villagers considered an affordable price: US \$60-75 in Xiangyun and US \$50-60 in Wuzhishan. Direct costs were calculated using inexpensive, locally produced and sourced IOLs, rather than the more expensive supplies promoted by large companies. The margin between direct costs and affordable price indicates where a standard price for a cataract operation can be fixed and it generates net income for the hospital to sustain its services and develop further.

### Result in Wuzhishan

In 2005, at Wuzhishan Eye Hospital, the cost of a cataract operation was in total US \$84.5, of which US \$56.5 was the hospital's fixed indirect cost, which included hospital management costs, salaries, depreciation of equipment, utilities, etc. The direct cost was US \$28, which included:

- US \$16 for IOL (locally produced), suture, and viscoelastics
- US \$6 for medicines
- US \$6 for pre- and post-operative examinations.

At the end of 2005, we can see from the table below that the hospital had a net loss

**Table 1. Wuzhishan Eye Hospital cash flow in 2005 (in US \$)**

	Volume of Cataract Surgery	Gross Income	Actual cost (US \$84.5 per operation)	Balance
26 cases (5 per cent) free	26	0	2,197	-2,197
112 cases (21 per cent) at US \$24	112	2,688	9,464	-6,763
128 cases (24 per cent) at US \$36	128	4,608	10,816	-6,184
152 cases (29 per cent) at US \$60	152	9,120	12,844	-3,671
91 cases (17 per cent) at US \$96	91	8,736	7,690	1,099
18 cases (3 per cent) at US \$120	18	2,160	1,521	652
5 cases (0.9 per cent) at US \$180	5	900	423	483
<b>Totals</b>	<b>532</b>	<b>28,212</b>	<b>44,955</b>	<b>-16,581</b>
Income from other treatments		12,198	12,343	-145
<b>Total in year 2005</b>		<b>40,410</b>	<b>57,298</b>	<b>-16,726</b>

**Table 2. Projection of surgical volume and net income for the next two years (in US \$)**

Year	Cataract surgery	Other treatments	Gross income	Expenses	Balance
2004 (actual figures)	102	87	10,958	11,614	-656
2005 (actual figures)	532	569	40,410	57,297	-16,727
2006 (projection)	798	1,500	84,058	79,686	4,372
2007 (projection)	1,064	2,000	109,420	96,586	12,835

of US \$16,727. However, compared to 2004, the number of cataract operations was multiplied by 5.2. Affordable prices, public education, and the estimated 3,000 new cases per year (0.03 per cent of the population) will increase uptake and reduce the unit cost per operation.

One thing merits attention. The Chinese government has acknowledged the unequal access to basic health care services between rural and urban populations, and it introduced in 2003 a new type of Rural Cooperative Medical Scheme (Xinxing Nongcun Hezuo Yiliao, or 'Xinnonghe'). A participant of the cooperative is eligible for reimbursement of 30-40 per cent of the cost of his/her cataract operation. The implementation of the cooperative scheme in Wuzhishan has enabled Wuzhishan Eye Hospital to lower its normal price for cataract surgery by a further 50 per cent. Therefore, the potential to increase the volume of cataract surgery in the future is growing.

### Result in Xiangyun

Along with training for village community health workers, public education among villagers, and a functionally strengthened referral network between county, township, and village, the multi-tier pricing system has increased the hospital's volume of cataract operations, as well as its net income (see Table 3).

The new type of Rural Cooperative Medical Scheme has not yet been implemented in Xiangyun. However, with the support of local government, poor patients are able to get financial assistance to reduce their portion of payment for cataract surgery at the hospital.

Nowadays, in Xiangyun, patients are satisfied because they pay only one-third of the previous price to get cataract surgery done. The hospital management is pleased because net income has been continuously increasing, by 44 per cent in 2004 and by

43 per cent in 2005. The doctor is happy because he is enjoying a good reputation, as his surgical skills and the quality of eye care delivery are continuously improving.

These two projects of ORBIS China, in Xiangyun and in Wuzhishan, have shown that it is not necessary to go looking for patients when the supply and demand sides of the market are in place, and when one adopts a 'small profit and quick turnover' approach to the pricing of surgery. The providers can increase surgical volume by lowering prices and still generate a substantial income.

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**Table 3. Surgical volume and net income of Xiangyun County Hospital (in US \$)**

	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006 (first 3 months)
<b>Number of cataract operations performed</b>	<b>192</b>	<b>206</b>	<b>430</b>	<b>482</b>	<b>180</b>
free surgery	0	0	14	28	5
at US \$62.5	0	0	86	95	18
at US \$100	0	0	170	186	72
at US \$125	0	0	89	89	23
at US \$187.5	122	126	32	36	26
at US \$250 and above	70	80	39	48	38
Gross income	US \$38,356	US \$41,444	US \$37,525	US \$49,554	US \$24,296
Actual cost	US \$30,685	US \$32,326	US \$24,391	US \$30,724	US \$13,363
<b>Balance</b>	<b>US \$7,671</b>	<b>US \$9,118</b>	<b>US \$13,134</b>	<b>US \$18,830</b>	<b>US \$10,933</b>