

# **An Evaluation of the Effectiveness of Mobile Eye Treatment Centre Project in China: A Ten Years Review**

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## I. Introduction

It has been ten years since the Mobile Eye Treatment Centre project has commenced operation in 1996. The Centre is designed to be a self-sufficient facility that can travel to far and remote areas in China to provide eye diseases treatment and cataract surgery to patients living in poverty. The project operates on the principle of mutual cooperation. Each Centre is funded by different funding sources: private donation, charitable foundations, or private companies. The Asian Foundation for Prevention of Blindness and the Hong Kong Society for the Blind are organizers of the project, responsible for fund raising, design, and technical advice. The receiving provinces are responsible for the day-to-day operation and recurrent expenses.

Design of the METC has undergone three revisions. The first four METCs were built on bus chassis. The second four and the later 4 METCs were built on detachable trailers. Cost of the trailer type METC is estimated to be US\$ 220,000, including cost of construction and equipment.

At the end of 2005, there are 12 Mobile Eye Treatment Centres organized by the Asian Foundation for the Prevention of Blindness and the Hong Kong Society for the Blind operating in 12 provinces of China.

In the following sections are brief evaluations on the effectiveness and quality of the

project. The involvement and contributions of government support from the Chinese partner and other parties will be discussed. Recommendation for improvement and future plans of the project will be suggested.

## II. Effectiveness of the Project

The following factors will be assessed in the evaluation of the effectiveness of the project: 1) number of surgeries performed, 2) number of patients reached per annum, and 3) cost of operation. Statistics from 8 provinces in 2005 will be used. In general, most METCs reach the designed target of performing a minimum of 1,000 surgeries per annum. The Guangdong Province leads all provinces in the number of surgeries, with more than 3000 surgeries performed. Table 1 shows the number of surgeries performed since their inception up to 2005.

Name of Province	Year of Commencement of Operation	Surgeries Performed in 2005	Total no. of Surgeries Performed since in operation up to 2005	Average annual surgeries performed since in operation*
Shaanxi	Jan 1996	1,508	9,937	994
Guangdong	May 1998	3,000	16,794	2,399
Jiangsu	Oct 1997	2,000	8,515	1,064
Shandong	Dec 1997	1,655	7,794	974
Heilongjiang	Oct 2003	1,080	2,374	1,187
Shanxi	Oct 2002	1,662	3,876	1,292
Yunnan	Feb 2004	1,000	2,268	1,134
Sichuan	Aug 2002	2,783	5,945	1,982
Total		14,688	57,503	11,026

Table I: Number of Surgeries Performed

\*In the first two years' of operation, the number of surgeries is usually lower due to the provinces concerned need to identify a management and operation system that best suits the province's situation.

### 2.1 No. of Surgeries Performed

A total of 57,503 surgeries were performed from 1996 to 2005 for Sight Care Nos. 1 to 8. For details, please refer to table 1. (The surgeries performed by Sight Care Nos. 9 to 12

were not included as they were in operation in late 2005.) Annual average surgeries performed were 11,026 patients per year. Average number of surgeries performed per vehicle would increase as the provinces develop a viable system that caters to the province unique situation. This is noted in the 2005 figure where all provinces exceed the target of 1,000 surgeries per annum. There are equipment problems with the Heilongjiang Province METC in the initial months, which reduced the operational days available in 2004. The problem has since been resolved. Another reason for the low surgery rate of Heilongjiang is that cataract operation can only be done during the months from mid April to mid October due to the extremely cold weather in winter.

Guangdong tops all provinces with 3,000 surgeries performed in 2005. Considering average annual operational days of 200 days per year, this means that about 15 surgeries were performed on the vehicle daily when in operation. The number of annual operations of other provinces (except for those in operation in late 2005), range from about 1,000 (Shandong) to 2,000 (Sichuan), which means an average daily surgical operation of 5 to 10. (Assuming 200 annual operational days).

Guangdong, Sichuan and Jiangsu top the number of surgeries performed. This tentatively suggested that efficiency of the METC increased with the province's level of development. Factors that affect the number of surgeries performed would include: a) highway network that affects the time needed to travel from one surgical point to another, b) management of the province in selection of cases and pre-surgery support, and c) resources devoted to the project.

## 2.2 Cost Per Patient for Vehicle Cost.

Assuming a life expectancy of 15 years for the vehicle, and an annual average surgery of 1,378 patients per year, each METC would perform a minimum of 20,670 surgeries during its life span.

Assuming cost of the vehicle at US\$220,000, cost of the vehicle per patient would be US\$10.64 per patient. This cost is donated by charitable organisations or benevolent individuals, which otherwise will not be available without organization of the project.

## 2.3 Cost Per Surgery

It is part of the donation agreement that charges of surgeries performed on METC would cover material costs, expenses for hospital stay, plus a minimal amount of vehicle

maintenance and operational costs, and must not be over RMB\$1,000.00 (US\$125). This figure is about one-third of the normal hospitals charges for similar surgeries which range from RMB3,000 to RMB5,500 (US\$375 to US\$687.50). The receiving provinces also have to agree to provide a minimum of 10% of free cataract surgeries to the most needy patients, and fee reductions to patients according to their level of poverty.

Table II lists the number of fee reduction surgery cases of the eight provinces until year 2005

Province	Standard Charges (RMB)	Total No. of Surgeries Performed	No. of Surgeries with Fee Reduction	No. of Free Surgeries	Total No. of Surgeries with Fee Reduction	Total Amt. of Fee Reduction
Shaanxi	RMB700 <sup>1</sup> (US\$87.5)	9,937	8,937 (89.94%)	1,000 (10.06%)	9,937 (100%)	RMB3,827,950 (US\$478,493.75)
Guangdong	800 (US\$100)	16,794	4,518 (26.90%)	3,112 (18.53%)	7,630 (45.43%)	RMB4,296,800 (US\$537,100.00)
Jiangsu	800 (US\$100)	8,515	7,337 (86.16%)	1,178 (13.84%)	8,515 (100%)	RMB3,877,200 (US\$484,650.00)
Shandong	700 (US\$87.5)	7,794	0 (0%)	908 (10.28%)	908 (10.28%)	RMB635,600 (US\$79,450.00)
Heilongjiang	1,000 (US\$125)	2,374	119 (5.01%)	298 (12.56%)	417 (17.57%)	RMB357,500 (US\$44,687.50)
Shanxi	500 (US\$62.5)	3,876	2,926 (75.9%)	950 (24.1%)	3,876 (100%)	RMB1,206,500 (US\$150,812.50)
Yunnan	600 (US\$75)	2,268	149 (6.57%)	2,119 (93.43%)	2,268 (100%)	RMB1,316,100 (US\$164,512.50)
Sichuan	800 (US\$100)	5,945	809 (13.61%)	5,136 (86.39%)	5,945 (100%)	RMB4,432,400 (US\$554,050.00)
Total		57,503	24,795	14,701	39,496 (61.71%)	RMB19,950,050 US\$2,493,756.20

Table II: Number of Subsidized Cases

<sup>1</sup>Fees reduced from RMB 700 to RMB600, with effect from 2005.

All provinces are able to achieve the target to provide at least 10% of free cataract surgeries to patients in need. Of the 57,503 patients served, 24,795 patients, or 61.71% received subsidy for their surgeries, 14,701 (or 18.23%) of them received free surgery. (partial or full subsidy of their surgical fees). Four provinces, Jiangsu, Shaanxi, Shanxi, Sichuan and Yunnan, achieved a remarkable rate of 100% in providing subsidized or free surgeries to all patients. Guangdong leads all provinces in the number of subsidized surgical cases and the amount of subsidies provided.

Considering Shaanxi, Shanxi and Yunnan are three of the less affluent provinces and Guangdong, Sichuan and Jiangsu the more developed ones among the eight provinces, it can be interpreted that the Mobile Eye Treatment Centre Project is able to provide cataract surgery at costs significantly lowered than ordinary hospitals would charge. The project is able to reach the most needed patients living in remote areas of both the affluent and the less affluent provinces, who otherwise would not be able to have any opportunities of restoring their eye-sight.

### 3. Quality of the Project

The quality of surgery will be assessed by the rate of success, nature of surgery and number of average post-surgery hospital stay. The data is listed in Table III.

Name of Provinces	Types of Surgery		Rate of Success	Average Post-surgery. Hospital Stay
	ICCE ( %)	IOL (%)		
Shaanxi	2.5%	97.5%	99.3%	1.05 days <sup>2</sup>
Guangdong	1%	99%	99.9%	1.02 days
Jiangsu	1.6%	98.4%	99.2%	2 days
Shandong	N/A	N/A	N/A	“
Heilongjiang	1%	99%	99.2%	“
Shanxi	3%	97%	99%	“
Yunnan	1%	99%	99.5%	“
Sichuan	2%	98%	99%	1.03 days
Hubei	1.1%	98.9%	99.6%	1.3 days
Hunan	0.9%	99.1%	99.8%	1.5 days

<sup>2</sup> Patients are required to stay in the hospital for 24 hrs. observation and then discharged. Figure represents low rate of complication.

Guizhou	1.2%	98.8%	99.5%	1.2 days
Hebei	1%	99%	99.7%	1.4 days

Table III: Types of Surgeries Performed, Rate of Success and Post-Surgery Hospital Stay

The majority of surgeries performed were IOL implant (over 99%), with reported successful rate of over 99%. Several factors contribute to the high successful rate:

1) Only top and well experienced ophthalmologists were selected to perform on the METCs, 2) most provinces adopted a rigorous pre-surgical assessment procedure that is equivalent to the hospital routine, 3) thorough sterilization processes were carried out prior to surgery, and 4) Facilities of the METCs provide a safe environment for surgical operation.

According to the statistics provided by the 12 provinces, average stay is 1.6 days for post-operation observation which is necessary as many patients travelled from their villages where follow-up consultations are difficult. In general, rate of complication is low, fewer than 2%.

It can be concluded that cataract surgeries performed on the METCs are compatible to those performed at general hospitals located in big municipalities but at a fraction of their costs.

#### IV. Involvement from Chinese Governments and Other Parties

Dedication from related personnel and resources allocation from the Chinese partners and other parties are other significant factors that may affect performance of the METCs.

Table IV. listed the involvement of different provincial authorities and annual resources allocation:

Name of Provinces	Annual Provincial Allocation	Regular METC Personnel supported by Provinces	Medical Teams	Name of Departments In-charge	Involvement of Outside Partnerships
Shaanxi	Support from PDPF's own funds	1 driver and 1 nurse	Ophthalmologists at associate professor rank & above from provincial/ municipal hospitals	PDPF assisted by PDH	Appeal for community & municipal support and donations
Guangdong	Support from PDPF's own funds	1 driver and 2 nurses	ditto	PDPF assisted by PDH	Appeal for community & municipal support and donation
Jiangsu	Support from provincial hospitals' own fund	1 driver and 1 nurse	ditto	PDH assisted by PDPF	N/A
Shandong	Annual Allocation of US\$13,750 from Provincial Charitable Funds	1 driver and 1 nurse	ditto	PDPF assisted by PDH	Appeal for support from provincial charitable foundation
Heilong-Jiang	Annual Allocation from	1 driver and 1 nurse	Ophthalmologists at associate professor rank or	PDH assisted by Provincial	Coordinate with projects supported by

	Provincial Government for Vehicle Maintenance		above from Provincial Hospitals	Office on Prevention of Blindness	CBM and Provincial Red Cross
Shanxi	RMB 150,000 (U.S. 18,750) from Provincial Government and subsidy to poor patients' operation	1 Driver and 1 Nurse	ditto	PDH assisted by PDPF	Coordinate with CBM, Lions Clubs International, Orbis for Subsidy support
Yunnan	Support from PDH and PDPF	1 Driver and 1 Nurse	ditto	PDH assisted by PDPF	Community Support
Sichuan	Support from Hospital's own funds	1 Driver and 1 Nurse	5 professor rank Ophthalmologists from Provincial Red Cross Hospital	Provincial Red Cross, assisted by PDH and PDPF	Heart to Heart International, USA
Hubei	Annual allocation of RMB200,000 (US\$25,000) from Provincial Government for annual operation and subsidy to poor patients	1 driver and 1 nurse	Ophthalmologists From Provincial Hospitals	PDPF assisted by PDH	Community Support

Hunan	Annual allocation of RMB200,000 (US\$25,000) from Provincial Government and subsidy to poor patients	1 driver and 1 nurse	Ophthalmologists from Provincial Hospitals	PDPF assisted by PDH	Community Support
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\*PDH = Provincial Department of Health;

\*PDPF = Provincial Disabled Persons' Federation

Table IV. Provincial Involvement and Annual Resources Allocation

Most METCs are either supervised by the Provincial Department of Health or Provincial Disabled Persons' Federation. Four provinces, (Shangdong, Shanxi, Hubei and Hunan) received regular annual allocation from Government for the vehicle's operational and maintenance expenses. Most provinces appeal to the local communities and local government for additional support on medical subsidy. Methods employed including publicity from mass media, commitment from the related counties/regions to provide the necessary resources, and collaboration with other prevention of blindness projects, such as CBM, Red Cross, Lions Sight First Projects, etc.

For the two provinces that have the highest number of surgeries (Guangdong and Sichuan), no regular allocations were received. In these two apparent affluent provinces, the managing parties are able to provide the necessary staff and resources to cover the expenditure.

Four conclusions can be drawn from the above data:

- 1) All provinces show a high level of dedication and commitment to the METC project, judging from the amount of resources allocation, level of ophthalmologists that perform the operation, and the efforts to appeal for additional resources.
- 2) The METC project integrates well into the province's overall efforts on prevention of blindness, indicated by the efforts to coordinate with other prevention of blindness

programmes.

- 3) The METC project is an effective tool for public education and community appeal, indicated by the amount of community support and subsidy received.
- 4) The METC Project has helped train a considerable number of ophthalmologists at county level hospitals.

#### V. Recommendation for Improvement

Although the METC project has gain prominence and recognition in the serving provinces in China, the project is little known among the Hong Kong community and on an international level when compared with projects of similar nature, such as Orbis and the Health Express Train, even though the number of sight restoration surgeries carried out by METCs annually are significantly higher than the latter two projects. Several reasons contribute to this situation:

First is the lack of publicity. The Organizers, the Asian Foundation for the Prevention of Blindness and the Hong Kong Society for the Blind appeals to major corporations, charity trusts, and well-to-do individuals for donation of construction costs of METCs, and there are few systematic and well designed public campaign to draw public attention to existence and work of the project.

Second is the lack of public involvement. This also relates to the lack of publicity. Opportunities should be provided for the Hong Kong and international community to experience and participate in the project, such as serving as volunteers, sponsoring patients' medical subsidy, etc. There is a need for regular promotion and scheduled activities relating to the project.

With increased public awareness of the project, funds would be raised to provide regular upgrading of equipment and to ensure all patients in need could receive the necessary treatment.

Efforts are being made to approach organisations such as the Outstanding Young Persons Association and Students of Medical Faculty of the Hong Kong University appealing for their support in sending volunteers to visit patients and to assist in the operation of the METC at

counties/villages where surgeries are conducted.

## VI. Conclusion

The Mobile Eye Treatment Centre Project, organized by the Asian Foundation for the Prevention of Blindness and the Hong Kong Society for the Blind, and supported by different funding resources, has become a vital and integral part of the prevention of blindness programmes in China.

With 12 METCs in full operation in year 2006, it is expected that the project can perform over 24,000 cataract surgeries to needy patients at a fraction of the costs of the local hospitals. The free subsidy scheme ensures that the most needy patients are included. Substantial number of ophthalmologists at county level has been trained thus upgrading their skills to perform cataract surgery.

The METC project has the advantage of agility and flexibility, able to travel to remote and most deprived areas of the provinces to provide sight restoration cataract surgeries to patients. The project has achieved the reputation of providing safe and high quality cataract surgery at a fraction of the normal costs in hospitals. Subsidies and free surgeries will be provided to patients that cannot afford the minimal cost.

The project is cost effective in that it mobilizes and coordinates resources from different parties in the prevention of blindness efforts. The project will be able to draw more international and public attention with more intentional effort from the Asian Foundation for Prevention of Blindness and the Hong Kong Society for the Blind to promote the project in Hong Kong locally and to the international community.