

613.942  
2253

PN-ABI 503  
72397

FUTURE PROSPECTS FOR VOLUNTARY STERILIZATION

by

R. T. Ravenholt, M.D., M.P.H.  
Director, Office of Population  
Bureau for Development Support  
Agency for International Development  
Washington, D. C.

For Presentation to the  
Fourth International Conference on  
Voluntary Sterilization  
Seoul, Korea  
May 8, 1979

Agency for International Development  
Library  
Room 105 SA-18  
Washington, D.C. 20523

1

Ravenholt, R. T.

613.942  
R253

Agency for International Development.  
Office of Population.

Future prospects for voluntary  
sterilization. R. T. Ravenholt. 1979.  
29 p.

Presented to the Fourth International  
Conference on Voluntary Sterilization,  
Seoul, 1979.

1. Sterilization (Birth control). 2. Contraceptives.
3. Birth control. I. Ravenholt, R. T. II. Title.

1

1'

During the last decade voluntary sterilization has moved from the "ugly duckling" status among contraceptive methods to which it was relegated during the sixties, to become the lovely swan" or leading method of the seventies.

Despite opposition from many adversaries and the ongoing lack of adequate surgical services in most of the world, voluntary sterilization has amply demonstrated its staying power and growing popularity among couples of all races, religions and economic strata.

The extent of its popularity provides additional irrefutable evidence of worldwide demand for reduced child-bearing and indicates a bright future for voluntary sterilization.

Although the surging popularity of voluntary sterilization was evident at the time of the Third International Conference at Tunis three years ago, it was then such a recent phenomenon that it seemed hardly credible to many. But now with three years additional experience under the world's belt a much-improved opportunity exists to study this worldwide phenomenon and learn how to best move to further strengthen action programs.

#### Epidemiology of Voluntary Sterilization

At Tunis it was estimated that 65 million couples were depending on surgical sterilization for fertility control at the end

of 1975 (1). Now, on the basis of latest data and discussions with colleagues, it is estimated that the number of couples depending upon surgical sterilization for fertility control had increased to about 90 million by the end of 1978 (Table 1).

Progress toward greater use of voluntary sterilization was a pervasive worldwide phenomenon during the last three years -- including all continents and most countries, both more and less developed.

Table-1

Estimated Number Couples Controlling Fertility By  
Voluntary Sterilization, by Country and Continent

<u>Geographic Entity</u>	<u>December 31 1975 (millions)</u>	<u>December 31 1978 (millions)</u>
United States	8	12
Canada	1	1
Latin America	2	4
Africa	0.5	1
Europe	4.5	10
India	17	22
China	30	36
Asia, Other	2	4
	<u>65</u>	<u>90</u>

(Includes sterilization by hysterectomy)

Patterns established during the early seventies continued, with the greatest number of new users of sterilization added in the most populous countries of China and India, and with the United States achieving the highest prevalence of use -- more than 35 percent of Married Couples of Reproductive Age (MCRA). (2)

Overall, the approximate proportion of the world's MCRA using surgical sterilization for fertility control increased from 65 million (11.6 percent) of 560 million couples at the end of 1975 to 90 million (15.3 percent) of 590 million couples at the end of 1978.

Estimates of the number of MCRA using each method of fertility control at the end of 1978 are presented in Table 2.

Table-2

Estimated Number of Couples Using Each  
Contraceptive Method

<u>Method</u>	<u>December 31, 1978</u> <u>-----(millions)-----</u>
1. Voluntary Sterilization	90
2. Oral Contraceptives	55
3. Intrauterine Devices	50
4. Condoms	35
5. Other (Spermicides, Diaphragms, Sponges, Injections, etc.)	30
	<hr/>
	260

In addition it is estimated that approximately 25 million abortions were performed during 1978, including 5 million in the People's Republic of China.

During a visit to China in November 1978, the author obtained the following data on voluntary sterilization in China:

- a) Surgical services for voluntary sterilization are generally available through 50,000 commune hospitals and 2000 county hospitals; with women eligible for three weeks paid work leave and men one week when undergoing surgical sterilization. With the intensified move toward the one-child family standard, voluntary sterilization is additionally attractive to many.
- b) In Guangdong Province (population 54 million) approximately 30 percent of MCRA were depending on surgical sterilization at the end of 1977, according to Conrade Li Mai Lin, Leading Member of the Provisional Planned Birth Group.
- c) In Shanghai (population 10.8 million), 480,000 couples (34 percent) of 1.4 million MCRA were using sterilization at the end of 1977, according to Dr. Li Chi, Office of Family Planning for Shanghai.
- d) In Wusih (population 650,000) approximately 20 percent of 75,000 MCRA were using sterilization for fertility control at the end of 1977, according to Yan Ke An, Leading MbMBER of the Birth Planning Group.
- e) In Meishan Project Area, Jiangsu Province, (population 24,000) 32 percent of the MCRA depended upon sterilization.
- f) In Chengtu, capital of Sichuan Province, (population 3.7 million) 44 percent of MCRA were sterilized, according to Dr. Xhang, Provincial Director of Health.

On the basis of these local and provincial data, the nature of China's planned birth program, and experience in many other countries, it is estimated that roughly 30 percent of China's MCRA -- 36 million couples -- depended upon sterilization for fertility control at the end of 1978; and use of voluntary sterilization should increase substantially as China moves additionally toward the one-child family standard.

### India

At the time of the Third International Conference India was intensifying its national sterilization program and it appeared that it might within a few years become the world leader in the proportion of MCRA using this method of fertility control.

During the following fiscal year, April 1, 1976 to March 31, 1977, India performed more than 8 million sterilization procedures, which increased the prevalence of surgical sterilization to about 24 percent of MCRA.

But most unfortunately, by design or misdirection of program, a number of the Indian States engaged in coercive practices which caused severe backlash against the sterilization program, contributed to the downfall of Indira Gandhi's government, and has had unfortunate repercussions for voluntary sterilization programs in many other countries.

World reaction to the Indian incident vividly documents the fact that the foremost threat to the further development and use of voluntary sterilization is coercion.

We must do all in our power to protect individuals and programs from all attempts at coercion, no matter how enthusiastically well meaning the promoters may seem.

The emphasis must always be upon education and services, education and services, education and services.

Since 1976, India's sterilization program has been hobbled and recent evidence indicates decreased prevalence of contraceptive use in 1978 compared with 1977.

Extensive unmet demand for female sterilization still exists in India, but success in raising voluntary sterilization levels depends upon large improvements in the availability and quality of sterilization services.

Unfortunately, India has failed to implement a well balanced family planning program. Oral contraceptives and lubricated condoms have not yet been made generally and appropriately available.

#### United States

While China and India have continued to lead in the number of sterilizations performed, the United States has achieved the highest prevalence of sterilization use -- by more than 35 percent of MCRA (2) -- and has been particularly active in development and dissemination of improved surgical technology to trained surgeons and programs in developing countries (Table 3, Figures 1 and 2) (3).

An important advance during the last three years has been the development of simplified and less expensive

laparoscopic equipment built around the Falope Ring and eliminating the hazards associated with use of electro-cautery within the abdomen.

A.I.D. purchased 1000 of these simplified laparoscopes during the fall of 1978, and many of you in the audience are now using this equipment. At this conference we seek feedback on your experience to guide us in further purchases.

Voluntary sterilization was an intensely sensitive issue in Washington and elsewhere during 1976 and 1977, as adversaries of family planning made repeated and determined attempts to block assistance for voluntary sterilization.

Fortunately, with strong support from many of you, those adversary attacks were defeated and A.I.D. support for voluntary sterilization programs has been progressively strengthened.

During the last year and a half political resistance to voluntary sterilization has greatly ameliorated and we have been able to give this action additional priority within the A.I.D. budget (Table 4).

At least in the United States and in AID, voluntary sterilization is now a well accepted means of fertility control.

#### Efficiency of Voluntary Sterilization

The key reason for this rapid improvement in the political climate for voluntary sterilization in the United States and in many other countries is the rapidly growing

understanding of the sheer efficiency of voluntary sterilization for control of fertility as a contributor to accelerated national development.

The fact that each sterilization (by average age and parity) prevents at least two births places voluntary sterilization in an efficiency class by itself among contraceptive methods. And the fact that this form of contraception has negligible side effects after the acute surgical effects have subsided has gained it much additional favor as the side effects accompanying continued use of other contraceptives have been more fully measured and understood.

Calculations by the author and others (Attachment A) have indicated that Child Acquisition Costs (CAC) for each child are roughly ten times the annual per capita Gross National product in each country.

In Bangladesh and many other poor countries with a per capita GNP of approximately \$100 per annum, it costs the parents and/or the society roughly \$1,000 per child for the food, shelter, clothing, health care, education and job creation activities needed to bring a child from birth to the age and work capability that the young person can become predominantly self-sufficient.

The approximate age at which self-sufficiency occurs varies by social pattern, being ordinarily at a lesser age in developing countries.

In the United States, with a per capita GNP of approximately \$7,500, average Child Acquisition Costs are calculated

as roughly \$75,000 per child when educational costs during the many years preceeding independent earning capability are included.

Each participant in this Conference may find it useful and interesting to calculate familial and national Child Acquisition Costs somewhat as presented in Attachment A.

The potential of voluntary sterilization for economic and social development is indicated by the following calculation:

Number sterilizations performed x 2 (births prevented by each sterilization) x per capita GNP x 10 (usual CAC factor) = the Child Acquisition Costs if these births were not prevented.

With the data available for 1978, when at least five million sterilizations were performed in developing countries (including China), and with the average per capita GNP about \$250 for the developing world, one can calculate the Child Acquisition Cost savings of this action:

5,000,000 sterilizations performed in developing countries during 1978 x 2 (births averted per sterilization) x \$250 (average per capita GNP in the developing world) x 10 (usual CAC factor) = \$25 billion Child Acquisition Cost savings as a consequence of the 10 million unwanted births averted by performance of 5 million voluntary sterilizations in developing countries during 1978.

The potential of voluntary sterilization for improved development of families and societies is truly phenomenal.

And as the developmental efficiency of voluntary sterilization becomes more generally realized, world appreciation for this means of contraception will increase.

#### Reversibility of Voluntary Sterilization

Considerable progress has been made since the meeting at Tunis toward improved reversibility of surgical sterilization through meticulous reconstructive surgery of previously interrupted fallopian tubes and vas deferens (4).

In the best of circumstances surgical success rates for reversal of fertility now approximate 75 percent. Such reconstructive surgery in women is being facilitated by the shift from electrocautery to tubal rings and clips; and further improvements are anticipated.

When patients can be assured of a high probability of success should reversal of fertility subsequently be desired, it is likely that a considerable number of persons of lower age and parentage will avail themselves of the many advantages of voluntary sterilization.

The Office of Population of A.I.D. is supporting a research and training unit at the Johns Hopkins University aimed at perfecting and disseminating the requisite skills, equipment and support for reversal of sterilization.

We anticipate that each major country will need at least one Sterilization Reversal Center.

### Availability of Surgical Services

At Tunis three years ago I analyzed the numbers of trained personnel and surgical facilities needed to extend voluntary sterilization throughout the developing world, and concluded that approximately five surgical clinics were needed per million population to rapidly handle the backlog of demand.

Later, in a stable low birth rate population, less than half as many clinics would be needed.

During the last three years much has been done (Tables 3, 4, Figures 1, 2) but availability of quality surgical services still falls far short of what is needed in most countries; and action toward creation of these services has only recently begun in Africa.

The developing countries which have made the greatest progress in providing voluntary sterilization surgical services to their entire populations are, China (with such services available in 50,000 Commune and 2,000 County hospitals), Korea, Thailand, Tunisia, India, Colombia, Cuba, Singapore, Panama, and El Salvador. Other countries, such as Mexico, are now moving rapidly but have a considerable way to go before surgical services will be generally available.

Our emphasis must always be upon provision of adequate services, in the knowledge that if we accomplish that task well then the success of the voluntary sterilization movement will be assured.

We must emphasize service goals while eschewing acceptor targets.

### Future Prospects for Voluntary Sterilization

At the time of the Third International Conference -- with India and China intensifying their surgical sterilization programs and with the rapidly increasing popularity of voluntary sterilization in the United States, Korea, Thailand, The Philippines, Colombia and many other countries, it seemed that the use of this method might double within five years -- to about 130 million couples by the end of 1980.

But it is now clear that world performance will probably fall at least 20 million short of that estimate (Table 5) -- most of which shortfall can be attributed to the negative reaction to the use of coercion in India which has slowed the speed with which many countries have implemented service programs.

Not only did the negative reaction to coercion in India result in a shortfall of at least 10 million sterilizations there during these last several years, but negative reaction ripples in many other countries diminished the number of procedures performed in those countries by an estimated 10 million.

Also the probable performance trajectory during the early 1980's has been lowered (Table 5) so that a special effort will be necessary to fully meet demand for sterilization by 1985, which if rapidly and well done could increase the number of couples using voluntary sterilization to the level of about 150 million by the mid-eighties.

With full availability of quality surgical services and optimal educational activities it is likely that prevalence of use of voluntary sterilization for fertility control will greatly increase in virtually all countries though the levels attained will naturally vary considerably.

Because use of surgical sterilization interplays so greatly with use of other methods and changing duration of marriage, one cannot calculate the precise impact of this method upon fertility. But because the greater dependability of V.S. to some extent balances the lower age and parity of couples using other methods, one may perhaps best assume each method will impact fertility roughly proportionate to its prevalence of use.

Knowledge of national populations, birth rates and death rates has improved considerably during the last several years. Latest estimates for each country and the world are presented in Table 6 and in Figures 3 - 5.

As indicated, the world birth rate was estimated at 27.4 for 1977; and on the basis of the proportion of couples using voluntary sterilization it appears that roughly one third of the decrease in the birth rate from the traditional level of 50 was due to voluntary sterilization: That there were approximately 30 million fewer births in 1977 because of the 80+ million couples then using voluntary sterilization.

Truly, voluntary sterilization is already making a great contribution to solution of excess fertility problems.

Table 3  
AID Funded Laparoscope Placements by Year

Country	1972	1973	1974	1975	1976	1977	1978	April 30 1979	Total
Afghanistan				1	1	1	2		5
Antigua				1					1
Argentina							3		3
Bangladesh		1	3					1	5
Barbados			2						2
Brazil		2		3	2	1	2	1	11
Bolivia				3					3
Burma							1		1
Chile		2	3	8	14	2	4		34
Colombia		5	23	2			3	143	175
Costa Rica	2	3	13		3		1		22
Dominican Republic						5			5
Ecuador	1	2					3	10	16
Egypt			6	17	6	4	5	1	39
Gambia			1	1					2
Ghana				1	1		1		3
Guatemala		4	3	4	1	6	9	3	30
Grenada				1					1
Guyana			1						1
Honduras		1		1	4	3	4		13
Haiti				2		1			3
India	3	6	14	23	18	6		3	73
Iran		2		2	1				5
Indonesia		1	3	3	6	24	10	100	147
Jordan			1	1	1	1			4
Jamaica		4		4				15	23
Kenya			2				1		3
Kyrgyz Republic			1						1
Korea		4	3	9	56	20	2	2	96
Lebanon		1		1		1			3
Lesotho							1		1
Liberia			1						1
Malaysia	1	1	4	3	3	1	1	1	15
Mexico		1	2	7		43	42	15	110
Morocco						1	2	5	8
Nepal	1	1	3	12					17
Netherlands Antilles			1			1		1	3
New Guinea			1						1
Nicaragua				6	1	1	2		10
Nigeria				5		1	2		8
Pakistan		1	6	7	30	3	10		57
Peru		1	5	2	4	4	1		17
Panama	1	1			3	3			8
Paraguay					2	1	3		6
Philippines		7	36	12			1		56
Portugal							1		1
Saudi Arabia				1					1
Santa Lucia				1	1				2
Senegal				1					1
Sierra Leone							1		1
Singapore		2	3	2	3	1			11
Sri Lanka					1	1	3		5
St. Kitts				1					1
Syria						2	2		4
El Salvador	3	4	1	9	1	7	9	3	37
Sudan					1	6	3	2	12
Taiwan		2	6	1	2	1			12
Tanzania						1	1	1	3
Thailand	1	3	19	14	9	1			47
Trinidad			3	1					4
Tunisia				1	3	5	17	20	46
Turkey		2	7			4			13
Uruguay						2	3	2	7
Venezuela			1			2			3
Vietnam			1						1
Zambia							1		1
Zaire						1	1		2
	13	64	179	174	178	169	158	329	1263

Table 4

A.I.D. SUPPORT FOR VOLUNTARY STERILIZATION  
 FY 1970 - FY 1979  
 (In \$ thousands)

	FY 70	FY 71	FY 72	FY 73	FY 74	FY 75	FY 76/79	FY 77	FY 78	Estimated FY 79	Total
<u>Goal #3 Biomedical Research</u>											
International Fertility Research Program, Inc. (Project 0537)	-	N/A	N/A	-	375	674	250	800	900	1,000	3,899
Battelle Memorial Institute (Project 0538)	-	N/A	N/A	-	129	96	118	105	-	-	448
Univ. of Minnesota & Northwestern Univ - PARFR (Project 0546)	-	-	N/A	-	-	-	225	180	300	300	1,005
<u>Goal #4 Services and Commodities</u>											
The Pathfinder Fund (Project 0807)	-	N/A	N/A	N/A	350	448	600	750	400	650	3,198
International Planned Parenthood Federation (Project 0838)	N/A	N/A	N/A	N/A	1,000	1,112	1,254	1,750	2,100	2,200	9,416
Family Planning International Assistance, PPIA (Project 0955)	-	N/A	N/A	-	443	413	1,200	2,010	1,400	1,700	7,166
Association for Voluntary Sterilization, Inc. (Project 0968)	-	-	876	1,000	1,250	1,850	1,000	3,450	9,500	7,600	28,526
<u>Goal #6 Training of Surgeons</u>											
Johns Hopkins Program for International Education in Gynecology and Obstetrics (Project 0604)	-	-	-	1,800 <sup>2/</sup>	2,500	600	5,631	5,000	4,300	4,500	24,331
<u>Asia</u>											
Bangladesh	-	-	-	N/A	-0-	-0-	125	-0-	1,000	1,500	2,625
Indonesia	N/A	N/A	N/A	N/A	30	30	77	90	600	700	1,527
Nepal	N/A	N/A	N/A	N/A	250	150	175	-0-	400	600	1,575
Pakistan	N/A	N/A	N/A	N/A	40	40	40	-0-	-0-	500	620
Philippines	N/A	N/A	N/A	N/A	-0-	95	1,031	650	530	600	2,906
Thailand	N/A	N/A	N/A	N/A	75	100	1,214	1,825	1,500	1,800	6,514
<u>Near East</u>											
Morocco	N/A	N/A	N/A	N/A	-0-	-0-	-0-	-0-	200	200	400
Tunisia	N/A	N/A	N/A	N/A	80	110	120	300	400	500	1,510
<u>Latin America</u>											
El Salvador	N/A	N/A	N/A	N/A	13	40	10	200	300	100	663
Haiti	-	-	-	-	-	-0-	-0-	-0-	100	200	300
Jamaica	N/A	N/A	N/A	N/A	-0-	-0-	-0-	90	200	200	490
Panama	N/A	N/A	N/A	N/A	-0-	-0-	-0-	-0-	100	100	200
<b>Total</b>	<b>N/A</b>	<b>N/A</b>	<b>876</b>	<b>2,800</b>	<b>6,535</b>	<b>5,758</b>	<b>13,070</b>	<b>19,200</b>	<b>24,230</b>	<b>24,950</b>	<b>97,419</b>

<sup>2/</sup> Contracts with the University of Pittsburgh, Washington University, American University of Beirut and Johns Hopkins University to train LDC physicians in the latest techniques of clinical fertility management (including sterilization).

Table 5

Estimated Number Couples Depending Upon Surgical  
Sterilization for Control of Fertility

Year's End	World Population (billions)	Estimated Number of MCRA's * (millions)	Estimated No. MCRA Using Surgical Sterilization (millions)	Percent MCRA Using Surgical Sterilization
1950	2.7	378	3	0.8
1960	3.0	420	5	1.2
1965	3.3	462	7	1.5
1970	3.6	504	15	3.0
1975	4.0	560	65	11.6
1980	4.3	602	105	17.4
1985	4.6	644	150	23.3

(Includes hysterectomies)

\* For simplicity, the calculations are based upon the assumption that one-seventh (14 percent) of the general world population are married women of reproductive age (MCRA).

TABLE 1 1978 Mid Year Population, 1965 and 1977 Crude Birth Rates, Percentage Decline and Data Sources for World, Regions and Countries or Territories

Region and Country	1978 Population (In 000)	Data Source*	Crude Birth Rate		Percent Decline in CBR 1965-77
			1965	1977	
WORLD TOTAL	4,232,084		34.6	27.4	-20.3
LESS DEVELOPED REGIONS	3,112,375		40.3	31.6	-21.6
MORE DEVELOPED REGIONS	1,119,709		18.7	15.7	-16.0
AFRICA	437,363		47.6	45.8	- 3.8
EASTERN AFRICA	124,919		48.6	47.6	- 2.1
Burundi	4,050	NS	46.1	41.0	-11.1
Comoros	316	EV	45.0	44.0	- 2.2
Djibouti	285	IR	42.0	42.0	0
Ethiopia	30,953	EV	50.0	49.0	- 2.0
Kenya	14,846	EV	50.0	50.0	0
Madagascar	3,252	EV	50.0	50.0	0
Malawi	5,449	EV	51.0	51.0	0
Mauritius	925	CR	35.4	25.3	-25.7
Mozambique	9,751	EV	43.0	43.0	0
Reunion	490	CR	42.0	25.7	-38.8
Rwanda	4,612	EV	50.0	50.0	0
Seychelles	61	CR	37.7	25.9	-31.3
Somalia	3,403	EV	47.0	47.0	0
Southern Rhodesia	6,957	EV	48.0	48.0	0
Tanzania	16,435	NS	50.0	47.0	- 6.0
Uganda	12,718	EC	46.0	46.0	0
Zambia	5,415	EV	50.0	50.0	0
MIDDLE AFRICA	49,329		45.9	44.4	- 3.3
Angola	6,468	EV	49.0	47.0	- 4.1
Cameroon	8,018	EV	42.0	42.0	0
Central African Empire	2,314	EV	45.0	43.0	- 4.4
Chad	4,285	EV	45.0	44.0	- 2.2
Congo	1,453	EV	44.0	45.0	+ 2.3
Equatorial Guinea	328	EV	37.0	39.0	+ 5.4
Gabon	536	EV	32.0	32.0	0
Sao Tome and Principe	82	CR	53.3	45.0	-15.6
Zaire	26,345	EV	47.0	45.0	- 4.3
NORTHERN AFRICA	103,602		46.6	43.0	- 7.7
Algeria	18,474	CR	49.0	47.8	- 2.4
Egypt	39,364	CR	44.0	37.7	-14.3
Libya	2,762	NS	46.6	44.7	- 4.1
Morocco	18,319	NS	49.0	47.0	- 4.1
Sudan	17,306	EV	49.0	48.0	- 2.0
Tunisia	6,235	CR	41.3	35.4	-12.3
Western Sahara	142	EV	45.0	45.0	0
SOUTHERN AFRICA	30,905		40.1	38.6	- 4.5
Botswana	729	EC	45.0	44.0	- 2.2
Lesotho	1,276	EC	38.0	39.0	+ 2.6
Namibia	964	EV	45.0	45.0	0
South Africa	27,414	EV	40.0	39.0	- 5.0
Swaziland	532	EV	50.0	49.0	- 2.0

TABLE 1. 1978 Mid Year Population, 1965 and 1977 Crude Birth Rates, Percentage Decline and Data Sources for World, Regions and Countries or Territories (Continued)

Region and Country	1978 Population (In 000)	Data Source*	Crude Birth Rate		Percent Decline in CBR 1965-77
			1965	1977	
<b>WESTERN AFRICA</b>	<b>128,113</b>		<b>49.7</b>	<b>48.7</b>	<b>- 2.0</b>
Benin	3,379	EY	50.0	49.0	- 2.0
Cape Verde	315	CR	41.3	27.6	-33.2
Gambia	566	EY	47.0	47.0	0
Ghana	10,695	NS	50.0	47.0	- 6.0
Guinea	4,696	EY	47.0	46.0	- 2.1
Guinea-Bissau	619	EY	40.0	40.0	0
Ivory Coast	7,379	EY	50.0	49.0	- 2.0
Liberia	1,717	NS	51.0	50.0	- 2.0
Mali	6,256	EY	50.0	50.0	0
Mauritania	1,529	EY	50.0	50.0	0
Niger	4,978	EY	52.0	52.0	0
Nigeria	68,383	EY	50.0	49.0	- 2.0
St. Helena	6	IR	34.6	20.0	-42.2
Senegal	5,399	NS	48.0	47.0	- 2.1
Sierra Leone	3,274	EY	46.0	46.0	0
Togo	2,414	EY	51.0	50.0	- 2.0
Upper Volta	6,498	EY	50.0	49.0	- 2.0
<b>LATIN AMERICA</b>	<b>349,849</b>		<b>39.3</b>	<b>33.9</b>	<b>-13.7</b>
<b>CARIBBEAN</b>	<b>29,176</b>		<b>38.0</b>	<b>27.3</b>	<b>-26.8</b>
Antigua	73	CR	29.4	19.7	-33.0
Bahamas	227	CR	31.9	24.8	-22.3
Barbados	252	CR	26.1	18.6	-28.7
British Virgin Islands	13	CR	26.5	21.5	-18.9
Cayman Islands	14	IR	25.5	21.5	-15.7
Cuba	9,745	CR	34.2	17.7	-48.2
Dominica	82	CR	42.7	21.8	-48.9
Dominican Republic	5,104	NS	47.0	36.0	-23.4
Grenada	110	CR	30.5	27.4	-10.2
Guadeloupe	352	CR	33.7	17.3	-48.7
Haiti	5,558	EY	43.0	43.0	0
Jamaica	2,170	CR	39.6	30.0	-24.2
Martinique	315	CR	35.0	14.6	-58.6
Montserrat	15	CR	27.4	16.9	-38.3
Netherlands Antilles	245	IR	27.3	20.0	-26.7
Puerto Rico	3,396	CR	30.7	23.0	-25.1
St. Kitts-Nevis- Anguilla	71	CR	32.3	24.4	-24.5
St. Lucia	118	CR	45.5	35.0	-23.1
St. Vincent Trinidad and Tobago	101	CR	42.9	32.7	-23.3
Turks and Caicos Islands	6	IR	30.1	29.3	- 2.7
U.S. Virgin Islands	99	CR	45.9	25.6	-42.0

B

TABLE 1. 1978 Mid Year Population, 1965 and 1977 Crude Birth Rates, Percentage Decline and Data Sources for World, Regions and Countries or Territories (Continued)

Region and Country	1978 Population (In 000)	Data Source*	Crude Birth Rate		Percent Decline in CBR 1965-77
			1965	1977	
<b>MIDDLE AMERICA</b>	87,620		44.6	38.8	-13.0
Belize	153	IR	43.0	38.7	-10.0
Costa Rica	2,121	CR	44.9	29.7	-33.9
El Salvador	4,522	CR	46.9	41.7	-11.1
Guatemala	6,651	CR	45.3	42.6	-6.0
Honduras	3,402	EV	51.0	48.0	-5.9
Mexico	66,530	IR	44.0	38.0	-13.5
Nicaragua	2,382	EV	50.0	49.0	-2.0
Panama	1,919	CR	38.4	28.8	-25.0
Panama Canal Zone	40	CR	19.7	14.8	-24.9
<b>TEMPERATE</b>					
<b>SOUTH AMERICA</b>	40,182		24.6	22.9	-6.9
Argentina	25,449	CR	21.7	22.7	+4.5
Chile	10,828	CR	32.3	23.9	-25.0
Uruguay	2,905	CR	22.2	21.2	-4.5
<b>TROPICAL</b>					
<b>SOUTH AMERICA</b>	192,871		40.1	34.3	-13.2
Bolivia	5,125	NS	47.0	47.0	0
Brazil	119,473	NS	39.0	34.0	-12.8
Colombia	25,668	NS	44.0	29.0	-34.1
Ecuador	7,569	EV	45.0	43.0	-4.4
French Guiana	60	EV	39.0	36.0	-7.7
Guyana	832	CR	39.4	25.7	-32.2
Paraguay	2,893	NS	44.0	40.0	-9.1
Peru	16,904	NS	42.6	39.7	-6.8
Surinam	447	CR	39.9	36.9	-7.5
Venezuela	13,900	IR	43.5	36.4	-16.5
<b>NORTH AMERICA</b>	242,171		19.6	15.3	-21.9
Bermuda	58	CR	23.1	15.2	-34.2
Canada	23,527	CR	21.3	15.5	-27.2
Greenland	50	CR	43.5	17.3	-60.2
St. Pierre & Miquelon	6	CR	29.1	16.6	-43.0
United States	218,530	CR	19.4	15.3	-21.1
<b>EAST ASIA</b>	1,115,060		30.9	18.3	-40.8
China	922,683	EV	32.0	18.0	-43.8
Hong Kong	4,570	CR	29.6	17.6	-40.9
Japan	114,927	CR	18.8	15.4	-18.1
Korea, North	17,078	EV	39.0	32.0	-17.9
Korea, South	37,019	NS	36.0	24.0	-33.3
Macao	293	EV	29.0	25.0	-13.8
Mongolia	1,575	EV	42.0	33.0	-9.5
Taiwan	16,924	CR	32.7	23.0	-29.7

TABLE 1. 1978 Mid Year Population, 1965 and 1977 Crude Birth Rates, Percentage Decline and Data Sources for World, Regions and Countries or Territories (Continued)

Region and Country	1978 Population (In 000)	Data Source*	Crude Birth Rate		Percent Decline in CBR 1965-77
			1965	1977	
<b>SOUTH ASIA</b>	1,323,923		44.0	36.0	-18.2
<b>EASTERN SOUTH ASIA</b>	338,783		44.0	34.8	-20.9
Brunei	187	CR	41.0	28.4	-30.7
Burma	32,519	EV	41.0	39.0	- 4.9
Indonesia	138,828	NS	46.0	34.0	-26.1
Kampuchea	8,860	EV	48.0	47.0	- 2.1
Laos	3,546	EV	45.0	44.0	- 2.2
Malaysia	13,333	CR	37.7	31.0	-17.8
Philippines	46,060	NS	44.0	36.0	-18.2
Singapore	2,335	CR	30.7	16.3	-45.3
Thailand	44,780	NS	44.0	31.0	-29.5
Vietnam	48,340	EV	42.0	36.0	-14.3
<b>MIDDLE SOUTH ASIA</b>	893,148		44.2	36.2	-18.1
Afghanistan	20,481	NS	49.0	49.0	0
Bangladesh	85,563	NS	49.0	47.0	- 4.1
Bhutan	1,262	EV	45.0	44.0	- 2.2
India	646,016	NS	43.0	33.0	-23.3
Iran	35,275	NS	46.0	42.0	- 8.7
Maldives	144	IR	50.1	45.3	- 9.5
Nepal	13,539	NS	47.0	47.0	0
Pakistan	76,730	NS	48.0	45.0	- 6.3
Sri Lanka	14,138	CR	33.1	27.0	-18.4
<b>WESTERN SOUTH ASIA</b>	91,987		43.9	39.0	-11.2
Bahrain	284	EV	43.0	43.0	0
Cyprus	645	IR	24.5	19.5	-20.0
Gaza Strip	423	EV	50.0	49.0	- 2.0
Iraq	12,452	EV	48.9	47.8	- 2.2
Israel	3,625	CR	25.8	25.1	+ 1.2
Jordan	2,956	NS	47.5	46.9	- 1.3
Kuwait	1,198	IR	46.3	43.3	- 6.5
Lebanon	2,843	EV	41.0	40.0	- 2.4
Oman	843	EV	50.0	50.0	0
Qatar	101	EV	50.0	50.0	0
Saudi Arabia	7,858	EV	50.0	50.0	0
Syria	8,091	EV	48.0	47.0	- 2.1
Turkey	42,710	NS	41.0	31.0	-24.4
United Arab Emirates	248	EV	50.0	50.0	0
Yemen	5,804	EV	50.0	50.0	0
Yemen, Democratic	1,846	EV	50.0	50.0	0

20

TABLE 1. 1978 Mid Year Population, 1965 and 1977 Crude Birth Rates, Percentage Decline and Data Sources for World, Regions and Countries or Territories (Continued)

Region and Country	1978 Population (In 000)	Data Source*	Crude Birth Rate		Percent Decline in CBR 1965-77
			1965	1977	
EUROPE	741,543		18.3	15.8	-13.7
EASTERN EUROPE	369,537		17.7	18.1	+ 2.3
Bulgaria	8,879	CR	15.3	16.1	+ 5.2
Czechoslovakia	15,140	CR	16.4	18.7	+14.0
German Democratic Republic	16,763	CR	16.5	13.3	-19.4
Hungary	10,690	CR	13.1	16.7	+27.5
Poland	35,050	CR	17.3	19.1	+10.4
Romania	21,873	CR	14.6	19.5	+33.6
USSR	261,142	CR	18.4	18.2	- 1.1
NORTHERN EUROPE	81,718		18.0	12.4	-31.1
Channel Islands	126	CR	17.9	11.4	-36.3
Denmark	5,100	CR	18.0	12.2	-32.2
Faroe Islands	42	CR	24.0	18.3	-23.8
Finland	4,751	CR	17.1	13.9	-18.7
Iceland	225	CR	24.6	17.8	-27.6
Ireland	3,231	CR	22.1	21.4	- 3.2
Isle of Man	62	CR	14.9	10.9	-25.8
Norway	4,053	CR	17.8	12.5	-29.8
Sweden	8,278	CR	15.9	11.6	-27.0
United Kingdom	55,850	CR	18.1	11.3	-34.8
SOUTHERN EUROPE	137,665		20.4	16.1	-21.1
Albania	2,679	CR	35.2	30.0	-14.3
Andorra	31	CR	20.2	16.5	-18.3
Gibraltar	31	CR	27.0	17.0	-37.0
Greece	9,312	CR	17.7	15.4	-13.0
Italy	55,650	CR	19.1	13.2	-30.9
Malta	334	CR	17.5	18.0	+ 2.3
Portugal	9,920	CR	22.9	19.5	-14.8
San Marino	21	CR	16.4	14.8	- 9.8
Spain	36,716	CR	21.1	18.0	-14.7
Yugoslavia	21,971	CR	21.0	17.7	-15.7
WESTERN EUROPE	152,623		17.9	11.7	-34.6
Austria	7,517	CR	17.9	11.3	-36.9
Belgium	9,840	CR	16.4	12.4	-24.4
France	53,300	CR	17.8	14.0	-21.3
Germany Federal Republic	61,299	CR	17.7	9.5	-46.3
Liechtenstein	25	CR	20.6	15.9	-22.3
Luxembourg	356	CR	16.0	11.4	-28.8
Monaco	25	CR	21.1	3.2	-81.1
Netherlands	13,917	CR	19.9	12.5	-37.2
Switzerland	5,344	CR	19.1	11.5	-39.3

21

TABLE 1. 1978 Mid Year Population, 1965 and 1977 Crude Birth Rates, Percentage Decline and Data Sources for World, Regions and Countries or Territories (Continued)

Region and Country	1978 Population (In 000)	Data Source*	Crude Birth Rate		Percent Decline in CBR 1965-77
			1965	1977	
OCEANIA	22,170		24.6	20.7	-15.9
American Samoa	30	CR	43.6	36.5	-16.3
Australia	14,201	CR	19.5	16.1	-17.9
Cook Islands	20	CR	40.8	27.4	-32.3
Fiji	610	CR	35.9	21.5	-40.1
French Polynesia	141	IR	46.4	36.9	-20.5
Gilbert Islands	71	IR	24.0	22.0	- 8.3
Guam	93	CR	34.0	32.8	- 3.5
Nauru	8	CR	44.1	19.8	-55.1
New Caledonia	138	IR	33.9	29.0	-14.5
New Hebrides	101	EY	45.0	37.0	-17.8
New Zealand	3,182	CR	22.9	17.7	-22.7
Pacific Islands	130	IR	35.2	29.2	-17.0
Papua-New Guinea	2,976	EY	43.0	41.0	- 4.7
Samoa	154	IR	38.0	35.0	- 7.9
Solomon Islands	212	IR	36.0	36.0	0
Tonga	92	IR	34.2	21.5	-37.0
Wallis and Futuna Islands	11	IR	44.0	43.0	- 2.3

\*Data Sources:

- CR = Rates Calculated from Complete Registration System.  
 EC = Estimates obtained from Census Data.  
 NS = Rates obtained from National Representative Survey.  
 IR = Rates obtained from Incomplete Registration System but deemed plausible to indicate trend.  
 EY = Estimates derived from variety of sources.

Compiled by R. T. Ravenholt, Director and John C. Chao, Demographer  
 in consultation with James W. Brackett, Chief, Demography Division  
 With assistance of Alisare G. Fitzgerald, Statistical Assistant  
 Office of Population, USAID  
 Washington, D.C., March 2, 1979

72





# Memorandum

Attachment A

: See Distribution

DATE: November 30, 1976

FROM : PHA/POP, R. T. Ravenholt



SUBJECT: Cost Benefit Ratio of Voluntary Surgical Sterilization

Recent experience in Mexico brought strongly to mind the extraordinary cost-benefit efficiency of voluntary surgical sterilization.

At the Sanatoria Balmori Clinic in Guadalajara, an outpatient clinic operated under the auspices of the Mexican Social Security Administration a well trained surgeon with laparoscopic equipment and several assistants performed 17 female sterilizations during a three hour session on Friday, 5 November 1976.

The remarkable development assistance efficiency of this action came strongly to mind as I reflected upon the fact that this action probably averted at least 34 births, and what the alternative development inputs would have to be to bring a birth cohort of 34 children to adult independent status.

Today, I enlisted Carl Hemmer's assistance in attempting to calculate the cost-benefit ratio of a Surgical Team Day devoted to voluntary sterilization; and wish to share our working notes with you and elicit your comments.

As a working standard we assumed that a well trained and supplied Surgical Sterilization Team could on the average perform 15 sterilizations per working day and operate at least 200 days per year. And also assumed that the average sterilization would avert at least two births. \*

## Input Costs

The Office of Population of AID, after consultation with professional colleagues in allied organizations and in developing countries, is proposing to provide Institutional Service Cost Reimbursement (ISCR)

\* The exact average number of births averted by each sterilization is a function of the natural fecundity of the couple, especially the age and parity of the woman and the greater or lesser availability and use of alternative means of fertility control.



Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

25

at the rate of \$10 for each female sterilization performed. If this level of payment (which will vary somewhat by country) is used then the ISCR to the relevant institution would be \$150 per Surgical Sterilization Team Day \* and that figure is used as the family planning input standard against which to calculate the developmental equivalence benefits.

Developmental Costs Averted by the Operation of One Surgical Sterilization Team Day

We attempted to answer the question: What developmental costs are averted if a cohort of 30 births is prevented by the operation of a Surgical Sterilization Team for one day in Bangladesh where the per capita GNP is approximately \$100 per year.

A. Health Costs

Costs of prenatal delivery, and postpartum care incident to 30 pregnancies. These costs are roughly estimated to be 1/10 of the annual per capita GNP, or \$10 per pregnancy in Bangladesh and \$300 for the 30 pregnancies averted by one Surgical Team Day.

Costs of Infant and Child Health Care for 30 children to age 10. Cost per child per 10 years assumed to be roughly equal to 1/10 the annual per capita GNP, which in Bangladesh would be \$10 per child or \$300 for the cohort of 30 children for 10 years.

B. Food Costs are calculated on the assumption that annual food costs per child equal half the per capita GNP in an LDC; which in Bangladesh would be \$50 per child per year, and \$1,500 for 30 children per year. If 10 years of childhood dependency is assumed then the food costs for 30 dependent childhoods in Bangladesh would be \$15,000.

C. Costs of Shelter, Clothing and Other Household Necessities are calculated on the assumption that these costs are roughly one-fifth of the annual per capita GNP per child per year; which in Bangladesh would be \$20 per child per year and \$6,000 for 30 children for 10 years.

D. Costs of Education were calculated on the assumptions that each child would require a minimum of four years schooling; and that 30 children would require one teacher and a classroom.

---

\* To this figure of \$150 per Surgical Team Day should be added the start up training and equipment costs roughly estimated at \$2,000 per surgical clinic.

The cost of training a teacher was assumed to be approximately 6 times the per capita GNP; which in Bangladesh would be \$600; and it was assumed that teaching 30 children for four years would occupy about 1/8 of a teacher's professional life. Hence, pro rata teacher training costs for 30 children would be roughly \$75

The cost of employing a teacher for four years to teach 30 children was calculated on the basis that the teacher's salary was twice the per capita GNP per annum; which in Bangladesh would be \$200 per annum and \$800 for four years.

The costs of schoolroom facilities and supplies were estimated to be roughly \$125 for 30 children for 4 years; which would bring total educational costs for 30 children for four years to \$1,000.

- E. Costs of Creating Employment were calculated on the assumption that employment would have to be created for one-half of the persons "not born" (15) and that capital costs of job creation per worker would equal roughly twice the per capita GNP; which in Bangladesh would be \$200 per worker or \$3,000 for the cohort of 30 non-births.

In Summary, one Surgical Sterilization Team working for one day in Bangladesh at a cost of \$150 (ISCR) and performing 15 sterilizations and averting 30 births, would obviate the need for the following kinds and amounts of alternative developmental assistance costs during the following ten years.

A. <u>Health Care Costs</u>	
Maternal Care	\$300
Infant and Child Care	300
B. <u>Food Costs</u>	15,000
C. <u>Shelter, Clothing, Misc. Costs</u>	6,000
D. <u>Educational Costs</u>	1,000
E. <u>Employment Creation Costs</u>	<u>3,000</u>
	Total \$25,600

According to this rough calculation the cost benefit efficiency of the proposed support for voluntary sterilization is approximately 170 times greater (in the subsequent 10 years) than the aggregate of development assistance needed to care for and educate the children which would be born if such family planning assistance is not made available.

Distribution:

Please let me have your comments.

AA/PHA	F. Pinkham
DA/PHA	A. Furman
DA/PHA	E. MacManus
PHA/PRS	D. McMakin
PHA/POB	Senior Staff

## References

1. Ravenholt, R. T.  
"World Epidemiology and Potential Fertility  
Impact of Voluntary Sterilization Services"  
Proceedings of the Third International Conference  
on Voluntary Sterilization, Tunis, 1976  
Association for Voluntary Sterilization, New York
2. Lubell, I.  
Personal Communication
3. Ravenholt, R. T., Wiley, A. T., Glenn, D. N.,  
Speidel, J. J.  
"Use of Surgical Laparoscopy for Fertility Management  
Overseas"  
Endoscopy in Gynecology  
Edited by Phillips, J. M.  
American Association of Gynecologic Laparoscopists  
1978
4. Sciarra, J. J., Zatuchni, G. I., Speidel, J. J., Editors  
Reversal of Sterilization  
Harper and Row, Hagerstown, Maryland, 1978