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PROSTAGLANDINS IN FAMILY PLANNING STRATEGY

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World Need for Improved Fertility Control

With a world population of 3.7 billion on January 1, 1970, and with an average of 36 births and 15 deaths per 1000 population this year -- the difference in births (133 million) and deaths (55 million) (1) is increasing the world by:

- 78 million this year
- 1½ million this week
- 210,000 this day
- 9,000 this hour

Continuation of this gross imbalance of births and deaths and the current rate of population increase of 2.1% per annum, would increase world population to more than 7 billion by the year 2000.

Furthermore, the preponderance of young people in the present population ensures a massive growth in world population for additional decades even if a net reproduction rate of unity were achieved very rapidly. For example, if a net reproduction rate of unity were achieved by 1980, and maintained thereafter, the population would nevertheless continue to increase until about 2050 and would then number 5.6 billion, (2) (3) if current mortality trends continued.

With these world population dynamics in view, and the concomitants of past and current excess reproduction -- starvation and malnutrition in many countries, only 52% of the world population literate, and an average GNP of only \$156 per capita, the need for corrective action is urgent. (4)

Strategy for Improved Control of World Fertility

In response to the objective need for improved control of fertility -- to correct the imbalance between births and deaths and to protect the health and well-being of individual families -- many governments and international organizations, have launched population programs.

The U. S. Agency for International Development, acting upon directives from the President (5) and the Congress (6), has since 1965 developed a rapidly growing program of assistance to population and family planning (4) programs in less developed countries .

The principal considerations underlying A.I.D.'s population and family planning strategy are that:

"The ultimate goal of this program is to improve the health, well-being and economic status of the peoples of the developing countries by improving the conditions of human reproduction in these societies. We propose to move toward this goal by support of broad gauge population and family planning programs, designed to make family planning information and services fully available to all elements of these societies so that women everywhere need reproduce only if and when they choose.

"The pattern seems clear that in those countries where women need not reproduce except if and when they choose (meaning they have access to hindsight (abortion) as well as foresight (contraceptive) methods of fertility control), the situation is encouraging. In Japan and several countries of Eastern Europe the net reproduction rate has fallen below 1, and social concern has shifted from the problem of too-great reproduction to concern for the possibly too-low reproduction rate. Certainly the high rates of abortion, even where illegal, as in the developed areas of Europe and the United States, and also throughout the developing world, bear witness to the determination of women in all cultures to limit their reproduction. Many women, whose foresight, knowledge, and means prove inadequate to prevent conception, will pay whatever they can and risk their lives to terminate pregnancies which they deem undesirable for reasons best known to them.

"Because the extent of availability of family planning information and means is now usually a dominant determinant in the complex of forces influencing reproductive behavior, no definitive studies nor final judgments of additional measures which may ultimately be needed to achieve a desired rate of population growth can be made in advance of the full extension of family planning services. But as family planning information and services are made appropriately available, key impediments to optimal utilization of such services can be identified. Thereupon research studies should be performed as needed to overcome recognized obstacles and for advancement of the program. Naturally, many non-clinical actions, such as rational alteration of legal and fiscal codes, should be taken concurrently with clinical actions to enhance the effectiveness of the population and family planning program.

"Regardless of what special measures may ultimately be needed for optimal regulation of fertility, it is clear that the main element initially in any population planning and control program should be the extension of family planning information and means to all elements of the population. It seems reasonable to believe that when women throughout the world need reproduce only if and when they choose, then the many intense family and social problems generated by unplanned, unwanted, and poorly cared for children will be greatly ameliorated and the now acute problem of too rapid population growth will be reduced to manageable proportions." (7).

Help has been given in response to specific requests from governments of more than 30 less developed countries and to organizations such as the International Planned Parenthood Federation, The Population Council, The Pathfinder Fund, and the United Nations, for their work in these and many other developing countries.

Programs eligible for assistance are those in which individual participation is wholly voluntary and in which each individual is free to choose methods of family planning in keeping with his or her beliefs, (8) culture, and personal wishes.

Approaches to control of fertility must be geared and tailored to demand factors -- what is accepted and used is more important than what family planning program administrators sometimes arbitrarily consider to

be best for their clientele. Delivery systems and fertility control methods must, therefore, be made as safe as possible within the "demand" constraints of what is acceptable to men and women.

Fertility Control Technology Tiers

Evolutionary changes in fertility control technology during the last century, and implications for fertility control programs are presented in Table 1
(9)

The highly determinative influence of fertility control technology on the effectiveness and efficiency of family planning programs is inescapably apparent from studies of family planning practices and programs in many cultures.

Second Tier Technology

It is noteworthy that although the advent of Second Tier fertility control technology had a considerable impact on fertility control practices and birth rates in developed countries before 1960, attempts at application of these methods in less developed countries, such as India, achieved little success.
(10, 11)

Third Tier Technology

But with the advent of Third Tier Technology in the 1960's, (addition of oral contraceptives and intrauterine devices), and intensified programs for their adoption in many less developed countries, especially in Asia, the prospects for effective control of fertility through family planning programs improved greatly.
(12)

Through the combined action of many organizations and countries the best available preconceptive means of fertility control (oral contraceptives, intrauterine devices, condoms and sterilization) are now becoming available to people of all socio-economic classes in developing countries; though they are not yet truly available to the majority of those needing them.

A.I.D. has placed particular initial emphasis upon actions aimed at making Third Tier Technology more generally available, ⁽¹³⁾ and is now providing more than one million monthly cycles of oral contraceptives each month for distribution to more than 50 countries ⁽⁴⁾ (figure 1).

Despite initial logistical difficulties and widespread dissemination of alarmist rumors during the last two years, mainly generated in and from the U.S.A., demand for oral contraceptives is increasing substantially throughout the world. Among women having full knowledge and choice of foremost means of contraception, the majority ordinarily prefer oral contraceptives.

The impact of family planning programs using Third Tier Technology upon birth rates is already appreciable: in small city states, such as Singapore and Hong Kong, birth rates are now near the 20 mark, and in larger populations, such as Taiwan, South Korea, Malaysia, and Central America, a substantial drop in birth rates has also occurred ^(4,9,12,14) (Table 2). But the birth rates of massive populations in Asia and Africa remain near ⁽⁴⁾ traditional levels, and the need for more rapid and effective action is urgent.

The fact that there will be approximately 78 million more births than deaths in the world this year indicates the magnitude of the need for improved control of fertility. But, on the other hand, the fact that the world birth rate is now approximately 36, down from the traditional levels of about 50 births per 1000 population (Table 3), indicates that the world has advanced about two-fifths of the way on the long journey from reproductive slavery -- when no effective control was exercised over fertility -- to the modern era of reproductive freedom -- when women and couples will reproduce only if and when they wish and births and deaths will be balanced at an optimal level.

The principal ways in which fertility is now being constrained are indicated in Table 4.

Fourth Tier Technology

Malcolm Potts, Medical Secretary of the International Planned Parenthood Federation, has stated:

"The termination of pregnancy is one of the oldest and one of the commonest forms of fertility control. No human community has ever shown a marked fall in the birth-rate without a significant recourse to induced abortion and it is unlikely that, in the foreseeable future, contraceptive procedures alone will provide a sufficient measure of population control in developing nations wishing to lower the birth-rate.

"Observation suggests that abortion is an acceptable form of fertility control for the individual, although it is frequently condemned by the community. Many people find it easier to initiate action to deal with a reality rather than take precautions against the possibility of pregnancy. A woman who has had one abortion is more ready to have a second one. The majority of women will resort to the operation in the face of religious and legal sanctions, and will accept considerable pain, danger, and expense to achieve their aims." (19)

Although the growing use of oral contraceptives and other effective preconceptive means of fertility control is reducing the need for abortion in many areas, simultaneous increase in awareness of the need for better control of fertility; and reduction of legal constraints on abortion in countries such as Great Britain, Singapore, and the United States, is increasing use of this method.

The widespread use of abortion in virtually every country, often despite intense religious and legal opposition, and despite lack of adequate clinical services, is powerful evidence of the great need women have for a postconceptive means of fertility control.

As in New York this past summer, everywhere that legal constraints on abortion have been removed there has been a large increase in the use of this means of fertility control -- even without organized programs to provide abortion services.

Where intelligent programs have been developed to provide inexpensive and readily accessible abortion services on an outpatient basis, experience has demonstrated this means of fertility control to be both safe and popular.

New technology, such as Karman's development of a small bore plastic catheter for vacuum curettage, which can be used without cervical dilatation or anesthesia, considerably simplifies the surgical termination of pregnancy.

Demographic Impact of Abortion

Despite many difficulties in accurate assessment of the impact of abortion upon fertility patterns -- because of many unreported abortions, variations in age and parity of women using this method, and frequent substitution between use of pre and postconceptive means of fertility control -- the usual low birth rates in countries where abortions are freely available, and changes in birth rates following changes in abortion laws leave little doubt that abortion does ordinarily have a powerful demographic impact.

Birth rates in Japan and in Eastern European countries where abortion has been readily available upon demand, have consistently been among the lowest in the world. In fact, as birth rates have fallen to low levels in these countries, public and official attitudes have become rather strongly pronatalist and laws have been modified accordingly. (21,22)

The most striking evidence of the powerful influence of abortion policies and practices upon fertility patterns is provided by the changes in the Romanian birth rate relative to changes in availability of abortion (Figure 2). In 1966, when Romania had the highest abortion rate (60 per 1000 population) and the lowest birth rate (12.8 per 1000 population) of any country in the world, the Romanian Council of State issued a decree "limiting abortion to cases endangering life, where there is a risk of congenital deformity, after rape, for women over 45 years of age, for mothers supporting four or more children, or those physically, psychologically or emotionally incapacitated." (21)

In conjunction with the reversed abortion policy, family allowances were increased and taxes raised for childless individuals, and official importation of contraceptives ceased.

The impact on birth rates was dramatic, with a veritable avalanche of births nine months later -- from 19,000 births in December 1966 (birth rate 12.8) to 63,000 in July 1967 (birth rate 38.7).⁽²¹⁾

In many other countries the demographic effects of abortion, although less dramatic than Romania, have nevertheless been pervasive and important.

Kirk has pointed out that means used outside of the official family planning program -- particularly abortion -- often make important contributions to the total demographic effect of such a program.⁽²⁴⁾ For example, in Korea, about 50% of the impressive decline in crude birth rate from 42 to 33 between 1961 and 1968 is reckoned to be due to the official IUD program. Equally important are the use of pills, sterilization and abortion -- the latter being used to terminate 19% of all pregnancies in 1967 and 1968.⁽²⁵⁾ A first result of a family planning program may be to increase awareness of the possibility of and need for fertility control; and it may cause an initial upsurge in use of all methods -- particularly abortion.

Even with widespread use of contraception there will remain an appreciable demand for postconceptive means of fertility control to cope with failures of reversible contraceptives. With the average of a two-child family requisite to resolve the population crisis, many years of fertile life ordinarily follow the last wanted pregnancy.

It has been demonstrated that even for women using intrauterine devices and having only a 2.8% per annum pregnancy failure rate, roughly

40 percent of these women would experience an unwanted pregnancy subsequent to completion of their desired family size by age 25. ^(26,27) These calculations are substantiated by empirical data in the United States, presented by ⁽²⁸⁾ Ryder and Westoff. Although contraception was used by 84% of their non-sterile sample, one-third of women who intended no more pregnancies reported that they had already had (at least) one unwanted child. This figure is undoubtedly an underestimate, considering a future period at risk of pregnancy, as well as the likelihood of the rationalization of response. Present reversible preconceptive means of fertility control are therefore inadequate for the control of fertility even in developed countries and surely inadequate for resolution of excess fertility problems in developing countries.

Safety of individual women is also a factor necessitating use of postconceptive means of fertility control. Probably the safest approach to fertility control for the woman is for either partner to obtain a surgical sterilization following the achievement of the desired family ⁽²⁹⁾ size. Use of reversible means of fertility control carries a risk from the method and/or from the hazards of pregnancy and delivery following contraceptive failure. The relative importance of this risk varies -- the hazard from the method is predominant in the case of highly effective means such as oral contraceptives, and the hazard from unwanted pregnancy is predominant for safer but less effective means, such as the condom or diaphragm. In a country with a maternal mortality of about 25 maternal deaths per 100,000 live births use of effective reversible contraceptives entails a risk of about 1-5 deaths per 100,000 users annually. In a less

developed country where there may be more than 500 maternal deaths per 100,000 live births, obstetric risk is predominant and dependence solely upon reversible contraceptives for fertility control will subject many women to the hazards of pregnancy and may result in more than 100 deaths per 100,000 users annually. However, an appreciable decrease in mortality results when an entirely safe preconceptive means of fertility control is backed up with a postconceptive means used under safe conditions. By use of this family planning program strategy, reduction in overall risk to life to less than 1 death per 100,000 fecund women per year is possible in developed countries. In less developed countries (where surgical termination of pregnancy is less safe) the overall risk to women would be higher but would still likely be lower than if sole reliance were placed on reversible contraceptives. (9,30,31)

Fifth Tier Technology

In 1968, Ravenholt defined the most essential missing element in fertility control technology to be: "a non-toxic and completely effective substance or method which when self-administered on a single occasion would ensure the non-pregnant state at completion of a monthly cycle" -- (8) and since then A.I.D. has obligated more than \$10 million for support of research aimed at development of such methods. (4)

The logic underlying this choice of principal research goal for A.I.D.'s contraceptive development program is indicated by Table 5. Studies of world fertility patterns and family planning programs had made it apparent that two foremost determinants of the efficacy of a fertility control method for the implementation of family planning programs in developing countries were the time of use required (relative to conception)

and the requirements for administration (relative to clinical or self application).

Effective use of preconceptive (contraceptive) means of fertility control requires the exercise of foresight. For many individuals, particularly in developed countries, these methods have been quite successful. But for many others in all societies and particularly in the less developed countries, use of foresight means of fertility control is difficult and reliance solely on these means is therewith less efficient and more expensive. For these groups, access to postconceptive (hindsight) means of fertility control is imperative for adequate control of fertility.

It seemed clear that development of an additional method which would fall in quadrants A, B or C (Table 5) could have only a modest impact upon the efficiency of family planning programs because it would have to compete with previous methods with similar potential and limitations with respect to time of and requirements for administration.

On the other hand, it was also clear that the development of a substance or method which could be self-administered to control fertility after exposure to or recognition of pregnancy would fill the void in quadrant D, establish Fifth Tier Technology, and produce a quantum increase in the speed and effectiveness with which family planning could be extended around the globe.

Prostaglandins

Following initial reports of successful termination of pregnancies (32-35) with the parenteral administration of prostaglandins, A. I. D. made available substantial additional resources for support of research and (36) development of prostaglandins; and recognition of the acute need for a

self-administrable postconceptive means of fertility control prompted Speidel and Ravenholt to publish the suggestion that "there should be rapid exploration of present leads suggesting a potential for safe and effective administration of these substances (prostaglandins) by the vaginal route -- e.g., by tampon or suppository."⁽³⁷⁾

Despite the pessimism of some⁽³⁸⁾ this suggestion was rapidly acted upon by Karim⁽³⁹⁾ and others; and the remarkable success of their initial attempts at such administration have been reported at this conference.⁽⁴⁰⁾

These findings have demonstrated that 'flight is possible' -- that self-administration of a postconceptive means of fertility control is an imminent reality -- that the era of Fifth Tier Technology will begin within a few years.

However, several years of intensive research and development will be required to establish this new technology on a sound basis. Prostaglandins will require careful evaluation to measure advantages and disadvantages as compared with other methods of fertility control. They must be examined from the point of view of safety to the individual and their cost and effectiveness in family planning programs.

It is likely that use of prostaglandins instead of surgical abortion for postconceptive control of fertility will reduce hazards from infection, bleeding, perforation, and cervical trauma, which even under the best conditions sometimes complicate the introduction of any foreign body into the uterus.

The time required for termination of pregnancy by prostaglandin administered intravenously is much greater than that necessary for surgical intervention. For an early pregnancy an average of about seven hours is required, and for the later pregnancies the time required is often doubled. (41) However, prostaglandins do offer a time advantage over the use of intra-amniotic saline injection for termination of more advanced pregnancies -- which often require more than 48 hours for completion. (19)

Occasionally attempts at emptying the pregnant uterus with prostaglandin are ineffective or not completely effective, and surgical intervention becomes a necessity; however prostaglandins should make it possible to reserve the use of relatively scarce highly skilled medical care personnel for complicated cases.

Nausea, vomiting and diarrhea may occur in patients for whom prostaglandin is employed to terminate a pregnancy. (34) Although such untoward symptoms may complicate administration of prostaglandins, they may also be viewed as a safety factor which protects women from injudicious use of these substances.

Other metabolic effects of prostaglandins which will require careful evaluation relate to possible inflammatory responses, effects on platlet adhesiveness, (42) effects on endocrine, cardiovascular, ocular and central nervous systems. The relatively rapid metabolism of prostaglandins, at least the natural compounds, suggests that these problems may not be a serious obstacle to safe and effective use.

Use of systemic abortifacients, such as prostaglandins, requires careful assessment with respect to possible teratogenic risk prior to allowing their use without immediately available surgical backup for

termination of therapeutic failures. Should self-administration of prostaglandins become a reality, as appears likely, it will become additionally imperative that they be entirely safe with respect to mutagenicity and teratogenicity.

It has been apparent that the achievement of adequate fertility control throughout the world by extension of Third and Fourth Tier Technology alone would require additional expenditures of more than a billion dollars per annum, mostly in the developing countries. Calculations by Frederiksen, et al., indicate that current average family planning program costs, for extension of current technology in the less developed countries, ordinarily exceeds 15 dollars per birth averted. ⁽⁴³⁾ (Table 6).

Furthermore, the development of an adequate clinical delivery system for application of current methods of fertility control would require a great deal of time -- which would greatly compound the population problem.

Fortunately, it now appears probable that prostaglandin "post-conceptives" for self-administration will become available within a few years.

Therewith, along with current methods, extension of effective fertility control throughout the world during the current decade becomes a reasonable probability -- with profound effects upon health, fertility patterns, socio-economic development, education, cultural patterns, and the nature and stability of political systems.

With prostaglandin tampons and vaginal suppositories fully available throughout the world, along with other means of fertility control, women will be able to defend themselves completely against unwanted pregnancy.

Therewith many ancient scourges will be ameliorated:

- kwashiorkor and child mortality from malnutrition will become a vanishing phenomenon as women gain fully the ability to protect their babes in arms from the chief threat to their survival and well being -- an unwanted and too-soon next pregnancy.
- child neglect and child abuse will become a much less common phenomenon when each baby born represents at least nine months of demonstrated maternal desire and commitment, rather than often being an unwanted and inescapable consequence of momentary passion and anachronistic hyperfecundity.
- tuberculosis and many other diseases of crowding, will recede as household and community crowding diminishes with improved control of fertility.
- juvenile delinquency, and adult criminality, as well as many other forms of social disorder, will decline along with the decrease in births of unwanted and poorly cared for children, and decreased pressure on community resources.

The combination of urgent world need for a new means of fertility control, the evidence presented here that such a breakthrough is now occurring, and the view of what rapid extension of effective fertility control can contribute to human well-being, makes this an historic conference.

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TABLE 1⁹

BIRTH CONTROL TECHNOLOGY AND IMPLICATIONS FOR FAMILY PLANNING PROGRAMS

Technology Tiers	Advent of Method	Methods Generally Available	Family Planning Program Needs
5	1970s?	Methods listed below plus: "a non-toxic and completely effective substance or method which when self-administered on a single occasion would ensure the non-pregnant state at completion of a monthly cycle."	Minimal regulation of sexual activity. Reduced need for education. Main emphasis on ensuring availability of contraceptives and post contraceptives through medical and non-medical facilities.
4	1970s	Methods listed below plus legal surgical abortion.	Slight regulation of sexual activity. Less emphasis on education. Main emphasis on provision of contraceptive services through medical and non-medical facilities and abortion services through medical facilities.
3	1960s	Methods listed below plus intra-uterine devices and oral contraceptives.	Some regulation of sexual activity; continued emphasis on education and provision of contraceptives and family planning services through medical and non-medical facilities.
2	After 1870	Methods listed below plus condoms, diaphragms, vaginal chemicals, rhythm, and surgical sterilization.	Considerable regulation of sexual activity; emphasis on education and provision of materials and services through medical and non-medical facilities.
1	Before 1870	Abstinence, coitus interruptus, delayed marriage and non-marriage, crude vaginal barriers (e.g., sponges) douching, and illegal abortion.	Strict regulation of sexual activity. Emphasis on education.

TABLE 2

FERTILITY MEASURES FOR HONG KONG AND TAIWAN

1961 - 1967 (1968)

	<u>HONG KONG</u>					<u>TAIWAN</u>				
	1961	1965	1966	1967	1968	1961	1965	1966	1967	1968
Crude Birth Rates	35.5	28.8	25.8	24.6	21.3	37.7	32.1	30.6	29.3	28.8
Age Specific Birth Rates				0						
15-19	47	41	29	29	27*	45	36	38	41	41
20-24	238	252	213	178	158	248	261	262	263	256
25-29	313	318	291	268	243	341	326	316	305	309
30-34	231	211	203	201	170	246	195	180	165	161
35-39	139	122	111	123	102	156	100	87	74	68
40-44	57	39	42	40	35	71	41	36	30	26
45-49	9	3	3	6	2	10	6	6	5	4

Source: Studies in Family Planning, 44:10,16. August 1969.

*1968 Age Specific Birth Rates as calculated by K.C. Chan, Research Director, Family Planning Association Hong Kong (personal communications to the authors).

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(1, 15-18)

TABLE 4

Fecundity of World's Women

(780 million women, age 15-44, approximate prevalence figures, 1970)

	<u>In millions</u>
1. Unmarried, widowed, or otherwise not cohabiting *	180
2. Physiological infertility and subfertility *	115
3. Infertile because of gestation, parturition, abortion, and lactation **	220
4. Using Third Tier (preconceptive) means for control of fertility (complete effectiveness equivalents):	
a) Surgical sterilization	20
b) Oral Contraceptives	22
c) Intra-uterine devices	6
d) Condoms	18
e) Vaginal diaphragm or chemical	4
f) Other methods, (rhythm, douche, etc.)	<u>15</u>
	<u>Total 3rd Tier 85</u>
5. Fecund women cohabiting and not specifically protected from pregnancy.	180

* Age	<u>Total women (millions)</u>	<u>Percent cohabiting</u>	<u>Number cohabiting (millions)</u>	<u>% Infertile</u>	<u>Infertile women (millions)</u>
15-19	173	50	87	15	13
20-24	154	75	116	5	6
25-29	136	92	125	10	12
30-34	120	92	110	15	17
35-39	104	85	88	30	26
40-44	<u>93</u>	80	<u>74</u>	.55	<u>41</u>
Totals	<u>780</u>		<u>600</u>		<u>115</u>

** Assumes 9 months post partum infertility, 4 months infertility with each abortion. Includes 30 million induced abortions, spontaneous abortion assumed to occur in 15% of all conceptions.

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TABLE 5

PRINCIPAL MEANS OF FERTILITY CONTROL
 (by time of and requirements for
 administration)

	Preconceptive	Postconceptive
Clinical Application Required	<p>A</p> <p>Intrauterine devices Surgical sterilization Vaginal diaphragm ? Oral Contraceptives</p>	<p>B</p> <p>Surgical abortion Prostaglandins (intravenous adminis- tration - January, 1970)</p>
Self- Adminis- tration Feasible	<p>C</p> <p>Abstinence non-coitus rhythm coitus interruptus Condoms Vaginal sponge, douche, foams, etc. ? Oral Contraceptives</p>	<p>D</p> <p>Prostaglandins (Vaginal administration- September, 1970)</p>

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(4, 43)

TABLE 6

SELECTED MEASURES OF FAMILY PLANNING PROGRAM PERFORMANCE

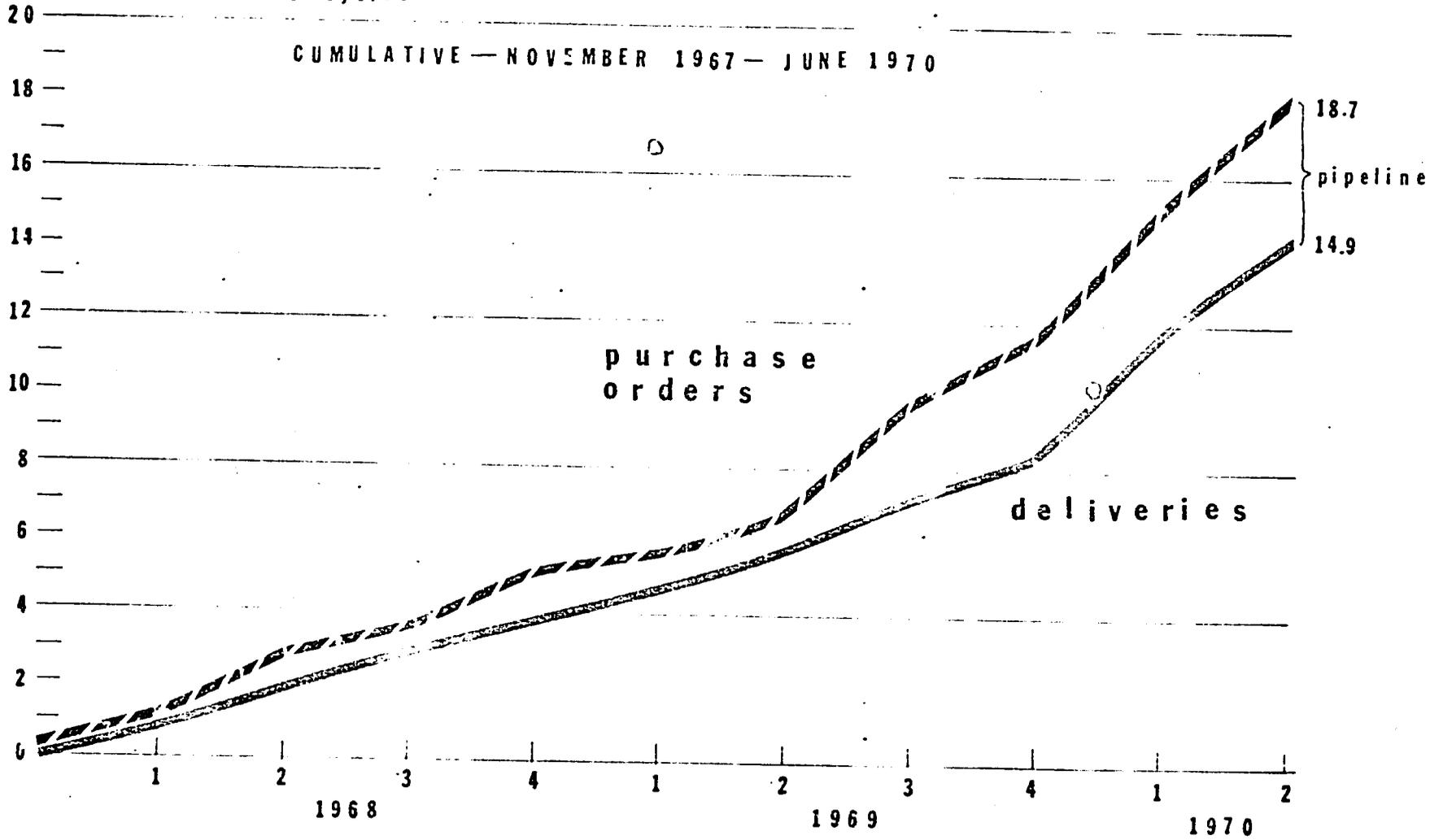
Country	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
<i>-Dollar expenditure per eligible couple-</i>										
Coverage:										
Chile	----	----	----	0.17	0.31	0.79	0.75	1.22	----	----
India	0.04	0.07	0.07	.12	.22	.23	.43	.47	----	----
Korea	----	.10	.17	.32	.39	.70	.73	1.00	----	----
Malaysia	----	----	----	----	----	----	.41	.56	.64	----
Pakistan	----	----	----	----	----	.35	.56	.76	----	----
Taiwan	----	----	----	.09	.33	.29	.33	.42	.44	----
Tunisia	----	----	----	----	----	----	----	1.13	----	----
<i>-Percent of eligible couples contracepting via the program at end of year-</i>										
Acceptance:										
Chile	----	----	----	1.2	4.6	7.2	8.8	12.7	----	----
India	0.4	0.5	1.1	1.6	3.0	4.4	6.3	8.1	----	----
Korea	----	.1	.7	8.1	13.2	18.8	20.4	20.1	23.0	----
Malaysia	----	----	----	----	----	----	.9	4.3	7.0	----
Pakistan	----	----	----	----	----	2.8	7.9	14.0	17.8	----
Taiwan	----	----	----	2.3	6.2	8.9	11.4	13.1	14.0	----
Tunisia	----	----	----	.3	1.8	3.1	3.4	3.9	5.0	----
<i>-Births averted as percent of births expected in absence of program-</i>										
Effectiveness:										
Chile	----	----	----	----	1.3	5.2	8.1	9.8	14.0	----
India	0.2	0.4	0.5	1.0	1.5	2.8	4.1	5.9	7.5	----
Korea	----	----	.1	.6	6.2	10.5	15.2	16.2	15.7	18.1
Malaysia	----	----	----	----	----	----	----	.9	4.4	7.2
Pakistan	----	----	----	----	----	----	2.3	6.5	11.6	14.9
Taiwan	----	----	----	----	1.9	4.9	6.8	8.6	9.5	9.9
Tunisia	----	----	----	----	.3	1.9	3.2	3.5	4.0	5.1
<i>-Dollar expenditure per birth averted-</i>										
Cost-effectiveness:										
Chile	----	----	----	13.99	11.03	19.08	14.30	17.76	----	----
India	11.54	16.35	10.94	12.26	10.88	8.01	8.67	10.60	----	----
Korea	----	47.43	13.90	7.79	7.66	9.36	11.70	19.57	----	----
Malaysia	----	----	----	----	----	----	113.84	33.20	32.99	----
Pakistan	----	----	----	----	----	28.67	16.62	10.68	----	----
Taiwan	----	----	----	10.04	17.30	13.76	14.07	17.20	17.81	----
Tunisia	----	----	----	----	----	----	----	58.63	----	----

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FIGURE 1

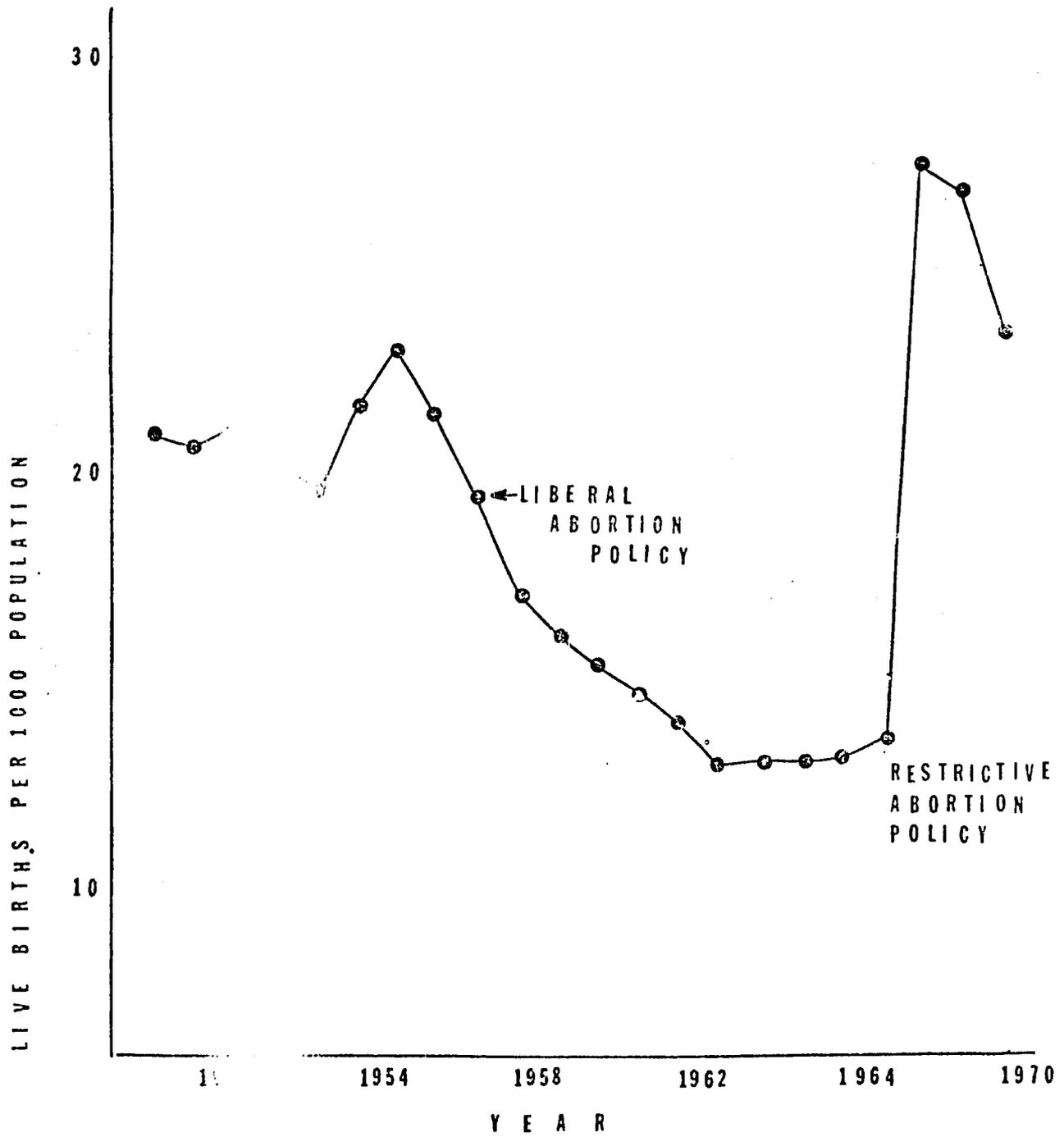
A.I.D. FINANCED ORAL CONTRACEPTIVES⁴

millions of monthly cycles -



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FIGURE 2
ROMANIAN BIRTH RATES^{21,23}



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