

A.I.D.'s Research Program
to Develop New and Improved Means
of Fertility Control

by

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Mr. Chairman and Members of the Committee. I thank you for this opportunity to participate in your discussion of research on means of fertility control as such research relates to population program assistance in developing countries. For the past nine years I have been deeply involved in A.I.D.'s contraceptive development program. First, in charge of the Office of Population's Research programs and subsequently over the past year as Associate Director and Deputy Director of the Office of Population.

Among the issues I propose to discuss in my testimony are the following:

1. The role of improved means of fertility control in solution of population problems in developing countries.
2. A description of A.I.D.'s contraceptive development research program.
3. A discussion of the potential of future improvements in such means of fertility control as they relate to developing countries.
4. Recommendations relating to future support of research on reproduction and contraceptive development.

The Role of Previous Improvements in Fertility Control Technology

A decade ago the Agency for International Development selected biomedical research on improved means of fertility

control as a high priority activity. This decision was based on the premise that the nature of available fertility control technology is a highly important determinant of fertility control behavior and of the time and fiscal requirements needed for a fertility control program to achieve its objectives.

I believe the experience of the past decade has vindicated the correctness of this decision. Emerging evidence on the effectiveness of family planning programs has demonstrated the power of technology to radically improve the cost effectiveness of such programs. There is now considerable evidence which demonstrates the profound impact of evolutionary improvements in fertility control technology on effectiveness of family planning programs and therefore on fertility in many cultures.

This evidence includes examination of fertility changes in the past century and more recently studies of the impact of fertility control technology on family planning practices, program and fertility in a variety of settings and cultures in developing countries. There is considerable evidence that family planning programs or commercial or other private channels which offer a wide variety of techniques of fertility control are more successful than those relying on only a few methods. It would appear that different methods appeal to different individuals. For example, oral contraceptive users are younger than IUD acceptors and a still older group prefer sterilization.

In 1970 with Drs. Ravenholt and Piotrow, we prepared a table demonstrating the implications of technology for the nature and cost of fertility control programs as is shown in table 1. Although reality is undoubtedly somewhat more complex than this table, continuing experience with family planning programs has demonstrated its validity to a large degree. There are few if any examples of countries which have solved problems of excess fertility relying solely on what we described as tier 2 technology, that is local vaginal methods such as condoms, and diaphragms together with traditional methods such as abstinence, coitus interruptus, and rhythm and with limited availability of surgical sterilization.

The introduction of what we called tier 3 technology, that is, the previous methods plus pill and IUD, resulted in large increases in use of contraception and improved control of fertility in virtually all settings. Use of tier 4 technology, i.e., the previous methods plus legal surgical abortion, usually results in a further important impact on fertility. It is difficult if not impossible to identify a country where tier 4 technology is generally available which is not well on the way to solution of its problems of excess fertility.

It would appear that introduction of each technology results in a kind of staircase phenomenon. Although a few individuals may abandon a method previously adopted, the net result is a great increase in total prevalence of use of family planning.

For example, in a carefully studied area of Bangladesh, the Matlab Thana, introduction of pills and IUDs resulted in an increase in use of effective means of fertility control from about one percent to over 15 percent in the short span of only a few months. However, to insure further increases in adoption of means of fertility control it was necessary to introduce additional means. When injectables and surgical sterilization were offered, prevalence of usage quickly rose to close to 30 percent. Of course, there is considerable variation between settings. In some areas of rural Indonesia, reliance on pill and IUD alone has resulted in adoption by close to two-thirds of eligible couples.

A.I.D.'s Biomedical Research Program Seeking Improved Means of Fertility Control

A.I.D.'s program to develop improved technology for control of fertility in developing countries has operated in a fashion consistent with the principle that A.I.D. population assistance will be provided only to programs which are voluntary and seek to make it possible for individuals and families to regulate their fertility in keeping with their personal desires. Any research on fertility control technology sponsored by A.I.D. seeks methods consistent with their exercise of individual choice. The A.I.D. research program has been directed toward applied rather than basic research and has pursued relatively few leads in depth rather than

attempting to explore all possible approaches. Relevance to needs of developing countries has been a consideration of paramount importance in the selection of topics for research. To this end, A.I.D.'s deep involvement in family planning delivery systems and its network of population officers distributed throughout the developing countries has been invaluable in ensuring the selection of relevant research.

Between fiscal year 1967 and fiscal year 1977, A.I.D. has applied \$52 million toward development of more effective means of fertility control. Table 2 shows the major projects funded by this program. Largely resulting from research on improvements in existing technology, a number of advancements are proving of crucial value to family planning programs in developing countries.

Funds have been applied in three areas. First, research on new means including work which could result in a once a month self-administered method of fertility control. Second, research to improve currently available means of fertility control. Third, comparative clinical trials of means of fertility control under use conditions in less developed countries.

1. Research on New Means of Fertility Control. Of various characteristics relating to the nature of the fertility control modality, two are of signal importance to the efficiency and effectiveness of family planning programs in less developed countries. First, the time of use relative to conception and

second, the requirement for administration relative to clinical or self-application.

Since fiscal year 1967, about \$16 million has been focused on research to develop new means of fertility control including studies which could lead to a once a month self-administered method. The following studies has been funded:

Corpus Luteum and Anti-Progestin Studies - A.I.D. has obligated \$4.8 million for over 40 studies seeking new ways to control corpus luteum function and block progestational activity.

Releasing Factor Studies - Between fiscal 1970 and 1975 Dr. Roger Guillemin of the Salk Institute received \$4.4 million from A.I.D. for research to develop inhibitors of gonadotropin releasing factors as contraceptive agents. Because of the long-term and expensive nature of this work, current support is being provided by the National Institutes of Health. Although their ultimate utility as means of fertility control remains to be demonstrated, these compounds are likely to be orally active and might be developed into a method singularly devoid of untoward side effects. Dr. Guillemin has just received the Nobel Prize, awarded in part for the work supported by A.I.D.

Prostaglandins - Since fiscal 1968, A.I.D. has obligated about \$6 million for prostaglandin studies which have included research on new means of measurement, new approaches to prostaglandin synthesis, studies of formulation and delivery methodology, compound screening, studies of the effects of

prostaglandins on mammalian and primate reproductive physiology, human clinical trials and a prostaglandin information service. This work has been carried out at fifteen institutions, either funded directly or through a program coordinated by the Worcester Foundation for Experimental Biology. Organizations receiving support have included Harvard, Makerere University (Uganda), The Royal Veterinary College (Sweden), Oxford, the University of North Carolina, Johns Hopkins, Washington University (St. Louis), Wisconsin, the University of Singapore, and George Washington University.

Although further testing and developing is necessary, these compounds and their analogs appear to be most promising as a means of regulating or inducing the menses when used up to a week after the expected menses and as a means of pregnancy termination in the second trimester.

Recent Studies. Additional work on new means of fertility control funded since fiscal year 1976 includes studies at Johns Hopkins University of thyrotropin releasing hormones as a means of ensuring postpartum infertility. It is hoped that this compound will both ensure full lactation--a potential benefit for the infant, and the infertility associated with lactation.

Another program funded in fiscal 1977 is partial support of the work of the Population Council's International Committee for Contraceptive Research. This program is studying new long-acting ways of delivering contraceptive steroids through vaginal

rings and implants, immunologic approaches to temporary sterilization and a number of other approaches to fertility control.

2. Research to Improve Current Means. Since fiscal year 1967, about \$16.5 million has been provided to support research with the objective of improving the current means of fertility control which are now available. Work has been carried out on a number of techniques including:

Oral Contraceptives - A.I.D. has confined its research efforts to studies of safety and side effects of steroidal contraception in developing countries. Since fiscal year 1970, \$2.1 million has been obligated to study health effects of oral contraceptive use in developing countries.

Intrauterine Devices - A.I.D. has supported research at the Battelle Memorial Institute and the International Fertility Research Program. Current IUD studies are focusing on causes of early discontinuation (i.e., pain and bleeding) and on an IUD which could be used immediately post partum.

Sterilization - Recent development with A.I.D. support of single aperture laparoscopic sterilization with tubal (Hulka-Clemens) clips and (Yoon) Fallope rings now permits female sterilization to be done under local anesthesia and on an outpatient basis while avoiding the two main hazards of laparoscopic female sterilization--general anesthesia and electro-cautery. These methods, together with minilaparotomy which has been extensively studied with A.I.D. support, are

now in widespread use in LDCs. Sterilization, with an estimated 80 million users in 1977, is now the most prevalent single means of fertility control. Recent introduction of the "laprocator", a simplified laparoscope developed for LDC conditions, shows promise at simplifying maintenance and cutting costs.

A.I.D. is sponsoring a number of experimental approaches to new techniques of female sterilization which can be carried out through the cervix without need for an operation.

A.I.D. sponsored studies are also seeking a more reversible means of male sterilization and simplified means of male sterilization for field use. This work includes studies of non-surgical male sterilization by injection of the vas and implantation of reversible vas valves.

Program for Applied Research on Fertility Regulation (PARFR) - Beginning in fiscal year 1972, The University of Minnesota and subsequently Northwestern University have received \$5.3 million to coordinate a contract program of awards of up to \$66,000 annually to a number of investigators to carry out applied research on improved means of fertility control. The PARFR program has supported 62 projects and is currently managing 33 active subcontracts. Among current PARFR studies, the most promising relate to; use of vas injection as a non-surgical means of male sterilization, use of "tissue glues" as a non-surgical means of female sterilization, a long-acting biodegradable steroidal contraceptive and a soft water absorbent collagen sponge as a vaginal barrier method of fertility control.

3. Field Studies. Between fiscal 1967 and 1977 A.I.D. has obligated \$19 million to study and evaluate the efficacy and risks of various fertility control methods when used in the less developed countries. The focus of this effort is the epidemiologic evaluation of the success and performance characteristics of currently available and new methods under use conditions in the field by a network of collaborating investigators. These field studies have also made it possible to carry out double blind trials of new methods in the same clinic setting.

Beginning in fiscal year 1967, A.I.D. supported the development of the International IUD Program of the Pathfinder Fund. This \$1.5 million field study of IUD performance characteristics has provided high quality comparative data from 40 countries. Uniform records and centralized data processing have allowed the determination of which performance patterns are related to IUD's user and clinic characteristics. For example, the highly important category of removals because of bleeding or pain has been shown to be more related to individual clinics providing contraceptive services than to the individual device.

To extend the availability of a clinical network for field trials, an International Fertility Research Program (IFRP) was initiated in fiscal year 1971. Up to fiscal year 1977, a total of \$16.3 million has been provided to the IFRP to support conduct of collaborative field trials of new IUDs,

sterilization techniques, barrier methods, prostaglandins and pharmacologic contraceptives in many countries.

Coordination With Other Programs

I believe there are excellent mechanisms to exchange information on research in reproduction which have greatly benefitted the field. These include the Federal Interagency Committee on Population Research and international meetings sponsored by a variety of organizations.

A.I.D.'s effort to improve communication of research findings is extensive. In addition to the \$52 million obligated by A.I.D. for research to develop new means of fertility control, \$6 million has been provided to the Population Information Program to make up-to-date research findings available to research scientists, policy makers, and family planning program administrators in developing countries through a series of Population Reports.

The International Fertility Research Program prepares over 100 scientific articles and reports annually. In addition, IFRP participates in, and/or sponsors, numerous conferences and workshops. IFRP is the co-sponsor and publisher of the International Journal of Gynecology and Obstetrics together with the International Federation of Gynecology and Obstetrics.

The Program for Applied Research on Fertility Regulation also sponsors scientific workshops and publications. So far five workshops have been held, bringing together leading national and international scientists and clinicians repre-

senting an array of disciplines to present their experiences and exchange ideas on the following topics: Hysteroscopic Sterilization; Control of Male Fertility; Advances in Female Sterilization Techniques: Risks, Benefits, and Controversies in Fertility Control; and Reversal of Sterilization. PARFR is also supporting a workshop sponsored by the National Academy of Sciences/Institute of Laboratory Animal Resources on Animal Models for Research on Contraception and Fertility to be held in 1978. The proceedings of each workshop are published.

Although A.I.D.'s fertility research program is focused at the applied end of the research spectrum, there is also a need for increased knowledge and basic research concerning human reproductive processes.

The major institutional sources of funds for both applied and basic research in reproductive biology and contraceptive development are governments, private foundations, international organizations, pharmaceutical firms and universities. Research is being carried out in government laboratories, universities, private research laboratories and at pharmaceutical firms.

In fiscal 1976, \$57.3 million was obligated by U. S. Federal agencies for research on reproductive biology and contraceptive development. The bulk of these funds are provided by the Department of Health, Education, and Welfare, principally through the National Institutes of Health's Center for Population Research

which supports a broad program of fundamental biomedical research, including research on neuroendocrinology, reproductive hormones, biosynthesis of steroids and biological measurements. More directed research includes studies of the oviduct, the ovum and blastocyst, the corpus luteum, spermatozoa, fertilization and product development of drugs and devices.

The Ford Foundation has for many years provided institutional support and training for research in reproductive biology both in the U. S. and overseas. Ford programs have included support of research on gonadotropin releasing factors, IUDs, and sterilization.

The Population Council has also been a long term contributor to research in reproductive biology and has a large intramural program. Major areas of interest have included studies of antiprogestins, immunology of reproduction, field studies of IUDs, new IUD designs including the copper-T and considerable work on continuous low dosage steroidal contraception including slow release devices such as implants. The Population Council has recently established an International Committee for Contraceptive Research to pursue promising leads for product development.

Other U. S. foundations, including Rockefeller, Sloane, and Scaife provide support in this field.

Pharmaceutical firms have made and continue to work on new contraceptives. Companies such as Lilly, Ortho, Mead Johnson,

Wyeth, Warner-Lambert, Searle, Park Davis, Syntex, Ayerst, Hoffmann-LaRoche, Schering, and Upjohn have made major investments in contraceptive research. Djerassi estimates five major firms expended more than \$68 million on contraceptive research in the 1965-1969 period.

The World Health Organization has recently moved to expand its program of research and training in human reproduction. This program has included establishment of WHO Research and Training Centers, conduct of collaborative clinical trials, goal oriented task forces to develop specific means of fertility control, and a contract and grant support program.

In the past A.I.D. has not provided any direct funding to the World Health Organization's Research Program on Reproduction and Contraceptive Development. A small amount of funds have been provided to WHO by the UN Fund for Population Activities which is funded by donor contributions from many countries including the U. S. through A.I.D. Although we are generally supportive of the WHO program, a number of concerns have influenced our posture concerning funding:

(1) It is our view that WHO has had adequate funds from other sources to pursue the important leads within each task force area as they relate to contraceptive development.

(2) An orderly growth of this program is appropriate-- The suggested addition of \$5 million or about a one-third increase in one year might lead to inefficiencies and support of lower quality work.

(3) The large research effort in reproduction has distorted the WHO program in population in that WHO has failed to mount a substantial effort to reach poor people with family planning services in developing countries. WHO has been slow to encourage adoption of innovative community based family planning programs and use of paramedical personnel. It has preferred to focus on a sophisticated research program which provides a significant proportion of its support to universities and institutions in developed countries including United States.

(4) The Department of State and A.I.D. have pursued a policy of providing all population assistance to the specialized agencies of the UN through the UNFPA. This has been part of a consistent effort to strengthen the UNFPA to allow it to conduct a coordinated, collaborative and balanced population program within the UN system and to make it a strong and effective advocate of family planning throughout the UN system and the developing countries. We believe the UNFPA should be allowed to decide upon the best use of scarce population funds including the U. S. contribution. Provision of direct population assistance to a UN specialized agency would have the long run effect of undermining the UNFPA. The prospect of 20 or 30 countries providing support to four or five UN specialized agencies working in population would obviously result in an uncoordinated UN program in the population area.

(5) The projected large increase in NIH funding of \$13 million

(to \$59 million in FY 1979 from \$46 million in FY 1978) should allow more adequate support for U. S. scientists working in this field. This seems a more appropriate channel of funding for U. S. scientists than from A.I.D. via the WHO.

Should Congress decide that additional funds for biomedical research on reproduction and contraceptive development should be spent by A.I.D., A.I.D. would plan to provide these funds to a number of programs now carrying out reproductive biology and contraceptive development research and to the UNFPA which in turn could provide them to the WHO's research program.

Doubtless the multiple sources of support and plurality of investigators in reproductive research is healthy. Different funding agencies and investigators have different philosophies and objectives. For example, much of NIH support goes to a broad program of less directed work mainly carried out at universities. The university worker cannot be expected to carry out product development and bring a new contraceptive to the marketplace.

Pharmaceutical firms are skilled in product development, formulation research, and the conduct of animal toxicology and clinical trials needed to establish safety and meet the requirements of drug regulatory agencies. On the other hand, they are not interested in means of fertility control unlikely to result in a marketable product, e.g., a new surgical sterilization technique or work on steroidal compounds.

which no longer have patent protection. Surgical equipment firms are interested in devices whereas the ethical drug firms specialize in pharmaceuticals. Drug firm executives in the U. S. consider stringent FDA regulation of new contraceptives to be an important deterrent factor in the corporate decision to invest in this area and state that current patent and antitrust regulations discourage more active partnership with governmental funding agencies.

The Potential Impact of Future Improvements in Means of Fertility Control

I believe there is ample evidence from the past 20 years that development of new means of fertility control has had a highly important perhaps even determinative impact on the effectiveness of family planning programs and therefore on the current rapid declines in fertility now occurring in developing countries.

Means of fertility control must be acceptable to both individuals and to society. Furthermore, they must be as safe as possible, demographically effective and practical for use in family planning programs--from the point of view of administrative feasibility and cost effectiveness. Therefore, development of a variety of means of fertility control suited to conditions in developing countries has been essential to the success of LDC family planning programs. There has been considerable favorable evolution of this technology in the past two decades. Dr. R. T. Ravenholt, Director of the Office of Population has

assessed the situation as follows: "We are moving from the time when crucial technological deficiencies and therefore uncertainties concerning family planning program strategies prevailed to a time when adequate technologies for the control of fertility are available along with generally understood and agreed on strategies to promote their availability and use." In short the considerable progress of the past two decades means that the marginal utility of future innovations is somewhat diminished.

There appears to be ample evidence that use of the major available fertility control technologies particularly the five major modalities, i.e., oral contraceptives, IUDs, sterilization, abortion, and local methods particularly condoms, are close to adequate, although not ideal, means for virtually all if not all developing country settings. However, there may be other reasons why improved fertility control technology would be useful.

One reason which has been advanced relates to cost. However, this is not a particularly compelling reason. The cost of contraceptive commodities is a small proportion of the total cost of delivering family planning services. A.I.D. purchased oral contraceptives delivered in country cost about \$2 for a year's supply for an individual. IUDs cost less than \$.40 each, condoms cost about \$.02 each, a kit to do mini-lap female sterilization costs \$104 and a Menstrual Regulation

syringe which is good for 50 to 100 procedures costs about \$7. Clearly reductions in cost would be useful but they do not appear to offer impressive advantages.

Some authorities have stated a considerable increase in research on safety of contraceptives is needed. Certainly continuing improvements in an surveillance of safety of contraceptives, as with all drugs and devices, is essential, and additional knowledge concerning the risks and benefits of various means of fertility control in LDCs is needed. However, an examination of the relative risks of various means of fertility control when used in less developed countries suggests that the benefits of current methods of fertility regulation far outweigh the risks in these particular settings where other risks relating to reproduction (particularly the risk of childbearing) are so high. Available data suggests that all of the major means of fertility control are safer than use of no method in an LDC with the possible exception of pill use by women over age 40 with predisposing factors toward thromboembolism such as heavy cigarette smoking. Continuing study of the currently available methods of fertility control is necessary to detect any unforeseen hazard, but such studies will also be required for any new methods and excessive risks of current methods in the LDC setting is not currently known to be a compelling reason to develop improved means for use in these settings.

Although safety, cost effectiveness and acceptability of current means of fertility control are reasonably satisfactory for LDC use at present, improvements are still possible. A number of new means of fertility control could have very significant impact. Among them are: (1) a substance or method which could be self-administered to control fertility on a once-a-month basis, (2) non-surgical and reversible sterilization techniques (3) an oral or injectable contraceptive which is completely safe and devoid of side effects, (4) an IUD totally free of side effects and (5) an implant, injection or method offering protection for one or several years.

I believe the speed and likelihood of these advances is quite unpredictable. The time, difficulty, and uncertainty of developing a new means of fertility control is not generally appreciated. For example, the National Institutes of Health's, Center for Population Research has spent approximately \$280 million over the past dozen years and although much new knowledge has resulted as yet no important means of fertility control has come into use as a result of this research. The World Health Organizations program has spent about \$50 million since 1972 and although some research which they are supporting such as that on prostaglandins is very promising, as yet no method developed by WHO has come into wide spread use. This comment is not meant to be critical of these programs but to point out the cost, time and difficulty of developing new means of fertility control.

One reason for the slowness of developing new means of fertility control is lack of basic knowledge about reproductive biological processes. Another reason is the drug and device regulation slows translation of new leads into clinically usable methods and availability of new methods on the market. Exceptional conservatism of the U. S. Food and Drug Administration (e.g. in ignoring the advice of their expert advisory committee in turning down Depo Provera) also hampers availability of methods considered safe and effective in many other countries. The Food and Drug Administration also has more stringent requirements for contraceptive testing compared to other drugs based mainly on the consideration that the drugs may be used more or less continuously for many years and that they will be administered to otherwise healthy individuals.

There seems to be little doubt that the time required to bring a new contraceptive product to the market place has been considerably extended in the past 15 years. An Ortho Corporation spokesman commented that he felt that development time for a new fertility control drug is generally now eight to ten years. A former president of Syntex Research estimated a 15 year time span for the emergence of a new contraceptive drug. The cost of bringing a new contraceptive product to the market cannot be estimated accurately, individual estimates by leading experts include the figures of \$11 million, \$18 million and \$20 million for each new contraceptive product.

Recommendations

What then are my summary views relating to support of reproductive and contraceptive development research. First in absolute terms this research field appears to have been relegated relatively low priority amongst all medical research. For example, the fiscal year 1978 NIH budget of \$2.8 billion includes \$867 million for research on cancer, \$446 million for heart disease, \$258 million for arthritis but only \$46 million for reproduction and contraceptive development. Compared to other health research and national priorities I strongly endorse a significant increase in funding.

However, compared to other uses of population funds, I feel that the current level of funding and current balance of funding is approximately correct.

If it takes fifteen years and \$15 million to develop a new means of fertility control and if such means, as is likely, will have only a limited impact on family planning program effectiveness then one must be wary of diverting scarce population funds away from service programs into research. Research on human reproduction and contraceptive development in 1976 received about \$110 million from all private and public sources around the world.

This can be compared with an estimate of \$258 million of grant funds available in fiscal 1976 from all donor sources to support all population activities including service programs.

Of this amount about \$26 million was devoted to research on reproduction and contraceptive development. Therefore only \$232 million was available in fiscal 1976 for the about 400 million couples of reproductive age among the 2 billion population living in developing countries (exclusive of the People's Republic of China). Of these 400 million couples only about half will require family planning at any one time since 10 or 15 percent will be subfecund or infertile, another 10 percent pregnant or wishing to become pregnant and perhaps 20 percent are not married or are not sexually active. Since about \$10 per couple is required to provide family planning on an annual basis this implies an annual requirement for \$2 billion to cover the LDC population. This is essentially the same as the UN calculation of \$1 per capita being needed for family planning on an annual basis.

The \$232 million of grant funds from donors is supplemented by funds allocated by LDCs themselves, even so, it is likely that only \$500 million or so is available -- about one fourth of the needed amount. Therefore, it is my view that it is relatively more important to provide additional support to family planning services and other population programs in developing countries than to increase the research figure significantly over \$110 million.

We estimate that currently less than half the couples of reproductive age in developing countries have any reasonable

access to modern contraception. Although improved means of fertility control would be of value, it is more important to provide the currently available means of fertility control (which have been substantially improved in the past 20 years) to couples in less developed countries. Today, usage of contraception in developing countries is by about 25% of eligible couples. If less than half of eligible couples have any access at all to family planning it would seem of highest priority to make it available and thereby make the option to use modern fertility control a reality. Delivery of family planning is now generally a well understood process which has proven successful in multiple countries and cultures. It is my personal view that provision of \$500 million per year, about one fourth the amount required to bring family planning to the 2 billion in LDCs eligible for A.I.D. assistance, would be an appropriate level of U.S. support for these programs. And that about 5% of this amount i.e., \$25 million should be spent annually as A.I.D.'s contribution to support of research on reproduction and contraceptive development.

Development of an important new contraceptive is a time consuming, uncertain, and costly endeavor, and it must be emphasized it is a difficult endeavor. Simply vastly increasing the amount of money devoted to contraceptive development research does not insure success anymore than it has insured success in curing cancer or heart disease where vastly larger sums have

been invested. However, relative to other medical concerns, it has been a neglected field and relative to other calls on national resources, it deserves additional support. However, in my view not at the expense of other population activities.

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 CONCEPTIVES 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 ORAL CONTRACEPTIVES AND INTRAUTERINE DEVICES.	SOME REGULATION OF SEXUAL ACTIVITY; CONTINUED EMPHASIS ON EDUCATION AND PROVISION OF CONTRA-CEPTIVES AND FAMILY PLANNING SERVICES THROUGH MEDICAL AND NON-MEDICAL FACILITIES.
2	BEFORE 1960	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.

◆ RAVENHOLT, R.T., PIOTROW, P.T., SPEIDEL, J.J.
USE OF ORAL CONTRACEPTIVES A DECADE OF CONTROVERSY.
INT'L J. GYN. OBST. 8:941, NOVEMBER 1970.

TABLE 2

A.I.D. SPONSORED RESEARCH FOR MORE EFFECTIVE MEANS OF FERTILITY CONTROL
FISCAL YEARS 1967 - 1975

	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>TO</u>	<u>1977</u>	<u>TOTAL</u>
<u>Research to Develop New Means</u>													
<u>Corpus Luteum Studies:</u>													
Worcester Foundation	---	109,000	---	---	99,000	---	---	---	---	---	---	---	208,000
NICHD-CPR	---	---	1,510,000	53,000	---	---	---	---	---	---	---	---	1,563,000
<u>Antiprogestins:</u>													
Population Council	---	---	3,000,000	---	---	---	---	---	---	---	---	---	3,000,000
<u>Prostaglandins:</u>													
Worcester Foundation	---	---	---	2,980,000	---	---	---	---	---	---	---	---	2,980,000
University of Wisconsin	---	---	---	---	227,000	---	---	---	---	---	---	---	227,000
Washington University	---	---	---	---	293,000	---	---	128,000	186,000	201,000	50,000	200,000	1,058,000
Makerere University	---	---	---	---	821,000	---	---	---	---	---	---	---	821,000
University of Singapore	---	---	---	---	---	---	475,000	---	---	---	---	---	475,000
Other	---	---	---	---	217,000	150,000	---	---	---	---	---	---	367,000
<u>Gonadotropin Releasing Factor</u>													
<u>Inhibitors:</u>													
Salk Institute	---	---	---	2,255,000	---	---	2,150,000	---	---	---	---	---	4,405,000
Prolongation of Lactational	---	---	---	---	---	---	---	---	---	---	---	---	---
Infertility--JHopkins	---	---	---	---	---	---	---	---	---	---	250,000	250,000	500,000
ICCR--Pop Council	---	---	---	---	---	---	---	---	---	---	---	310,000	310,000
Subtotal													15,914,000
<u>Research to Improve Current Means</u>													
<u>Intrauterine Devices:</u>													
Battelle Memorial Institute	---	---	---	150,000	495,000	---	874,000	---	---	---	---	---	1,519,000
Other	---	---	---	---	12,000	---	---	---	---	---	---	---	12,000
IFRP, Inc.	---	---	---	---	---	---	---	---	210,000	200,000	100,000	275,000	785,000
<u>Contraceptive Safety:</u>													
Southwest Foundation	---	---	---	913,000	---	---	1,226,000	---	---	---	---	---	2,139,000

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	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>TQ</u>	<u>1977</u>	<u>TOTAL</u>
Contraceptive & Disease Prophylaxis Agent: University of Pittsburgh	---	---	---	581,000	---	---	138,000	---	---	--	--	--	719,000
Sterilization and Surgical Equipment and Training:													
Battelle Memorial Institute	---	---	---	---	830,000	199,000	---	392,000	---	266,000	70,000	272,000	2,029,000
University of North Carolina	---	---	79,000	---	135,000	---	---	---	---	--	--	--	214,000
Johns Hopkins University	---	---	---	---	---	1,954,000	158,000	---	---	235,000	68,000	350,000	2,765,000
University of Colorado	---	---	---	---	---	---	76,000	---	---	--	--	165,000	241,000
Small Grants Program Applied Research on Fertility Regulation:													
University of Minnesota & Northwestern U.	---	---	---	---	---	3,350,000	---	---	---	500,000	250,000	1,175,000	5,275,000
Other	97,000	108,000	103,000	99,000	182,000	66,000	48,000	100,000	---	74,000	140,000	42,000	1,059,000
<u>Subtotal</u>													16,757,000
<u>Field Trials</u>													
International IUD Program: Pathfinder Fund	194,000	---	1,289,000	---	---	---	---	---	---	--	--	--	1,483,000
International Fertility Research Program:													
IFRP	---	---	---	---	3,106,000	1,800,000	---	1,500,000	2,695,000	3,000,000	--	4,246,000	16,347,000
Conventional Contraceptive Studies	---	346,000	440,000	340,000	---	---	---	---	---	--	--	--	1,126,000
<u>Subtotal</u>													18,956,000
<u>TOTAL</u>	<u>291,000</u>	<u>563,000</u>	<u>6,421,000</u>	<u>7,371,000</u>	<u>6,417,000</u>	<u>7,519,000</u>	<u>5,145,000</u>	<u>2,120,000</u>	<u>3,091,000</u>	<u>4,476,000</u>	<u>928,000</u>	<u>7,285,000</u>	<u>51,627,000</u>

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