

Family Planning: A Growing Gap

While population growth continues to boom in developing countries, costs of providing family planning services are rising, international donations are stagnant, and private sector participation has declined, according to speakers at a recent symposium on contraceptive innovations held at the National Academy of Sciences.

Shortages of technology do not appear to be the problem. "We are at the dawn of a new era of contraceptive technology," said Sheldon Segal of the Rockefeller Foundation. A variety of promising new approaches and improvements on old ones are either available or in the late stages of development.

But speakers at the meeting, which was sponsored by the Committee on Population of the Commission on Behavioral and Social Sciences and Education, made it clear that no technology, however cheap, safe, and effective, can achieve widespread adoption without well-designed and accessible services, well trained personnel, and extensive

public education.

Continued expansion of family planning programs in the next 20 years will require more than a tripling of annual expenditures—from \$3 billion to well over \$9 billion in 1988 dollars, based on a very low estimate of \$18 per couple per year, according to Duff Gillespie of the Agency for International Development (AID). This assumes that the proportion of married women in developing countries using contraception will rise from 40% to 57% by 2010. The number of women "at risk" for pregnancy will double, to 1.3 billion, during that time.

Unfortunately, according to Gillespie, the donor share of costs is expected to decline, as it has been doing (in constant dollars) for some years. It is estimated that 80% of the needed increases will have to come from local governments and the private sector. More costs will have to be borne by users, and financial incentives will be needed to make the market more attractive to the

private sector and encourage local production of contraceptives.

At present, only three developing countries—China, Indonesia, and Mexico—are supplying most of their own needs, even though 20 countries have use rates that would justify local production, according to Gordon Perkin of the Program for Appropriate Technology in Health. Some countries, such as Bangladesh, would like to manufacture condoms, but so long as they are getting free supplies from international agencies there is little incentive to do so.

Moreover, investments in contraceptive research by private companies in the United States have plummeted because of inhibitory federal regulations and skyrocketing costs of liability insurance. International expenditures in reproductive research total only about \$200 million, with \$50 million devoted to applied research on contraception. Segal said it is difficult for new scientists to enter the field, and the number of researchers is so small that "many decisions are made on the basis of a single scientific report."

In spite of these difficulties, there is now a great array of contraceptive technologies available. The biggest new development has been the introduction 5 years ago of the implant Norplant, developed by the Population Council. The highly reliable implant, which is based on progestin and lasts 5 years, is now used by about 250,000 women. The main drawback, as with most new devices for women, is irregular bleeding. Planned improvements include development of a biodegradable implant.

Segal reported that several other technologies are nearing readiness for application. One is the abortifacient RU486 (mifepristone) which, when administered with a prostaglandin, is almost 100% effective in preventing implantation of a fertilized egg if taken within 2 weeks after a missed period. So far, it has been approved in China and France.

Under development is a 90-day vaccine that interrupts the action of human chorionic gonadotropin. This is now the subject of several clinical trials, including a large one in India, and could be ready in the next decade, said Segal. (Scientists recently reported success with guinea pigs using a vaccine based on antigens instead of hormones; but this is many years away from possible human application.)

Things are not going well, however, on the male contraceptive front, where the condom remains the only proven reversible method. The most promising is Gossypol, which inhibits sperm production. It can now only be administered as an injection or

Candidates' Heroes



Deborah Barnes



Ken Heinen

Asked during last week's presidential debate to name some contemporary American "heroes" who should inspire young people today, both candidates named a scientist, among others. Michael Dukakis chose Jonas Salk (left) while George Bush named Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases. Said Dukakis: "I can think of doctors and scientists—Jonas Salk who, for example, discovered a vaccine which cured one of the most dread diseases we ever had, and he's a hero." George Bush said "I think of Dr. Fauci, probably never heard of him. You did? He's a very fine researcher, top doctor at the National Institutes of Health, working hard on doing something about research on this disease of AIDS."

implant, and Chinese studies have found it may cause reductions in serum potassium. If a good Gossypol pill does not materialize, said Segal, "the outlook is bleak."

Speakers reiterated that the best way to reduce the number of abortions is through contraception. Jacqueline Forrest of the Guttmacher Institute said that according to a U.S. study, 67% of unwanted pregnancies occurred with nonusers of contraceptives. She said that if all the nonusers switched to a highly effective contraceptive, abortions would drop by 58%.

Eliminating unwanted pregnancies does not solve the larger problem of motivation, particularly in sub-Saharan Africa. For example, Esther Boohene of the Zimbabwe National Family Planning Council said family planning services now cover 85% of Zimbabwe. But women are still averaging seven births apiece and, because of advances in curbing infant mortality, there has been no decline in fertility. Birth control pills are in great demand, but women use them for spacing children rather than having fewer of them. Condom use is limited, as it is throughout Africa.

Speakers said cultural values and attitudes are critical in determining contraceptive acceptance, and misinformation and myths can easily sabotage a program. In Bangladesh, for instance, there has been resistance to vasectomy because men believe it will prevent hard work, disqualify them from an Islamic burial, and impair potency.

In Kenya, said Susan Philliber of the State University of New York (New Paltz), over 50% of women believe both oral contraceptives and sterilization to be harmful. Other fears relate to religious taboos, as in Tunisia where irregular bleeding may interfere with fasting and praying.

Philliber related that in many countries women do not like to touch their own genitals, which rules out vaginal inserts. Skin implants are well accepted in cultures where scarification is common, and monthly injections (which have been available for years) are appropriate in areas where immunization is associated with good health.

Worldwide, education seems to be the most important variable in predicting family size. The more educated a woman is, the fewer children she will have.

Despite the advances in contraceptive technology, then, the overall picture is not bright. The potential demand for services promises to become overwhelming in the coming years. Malcom Potts of Family Health International said half the world population is now below marriage age. "I predict there will be more abortions in the next 10 years than any decade in human history."

■ CONSTANCE HOLDEN

Let 100 Million Trees Bloom

With the hot summer of 1988 still smoldering in memory, researchers, legislators, and conservationists increasingly are turning to reforestation as a potential answer to offsetting the greenhouse effect (*Science*, 7 October, p. 19).

Last week, the American Forestry Association unveiled an effort called Global ReLeaf to encourage the American public to plant 100 million new trees over the next 4 years. The association launched the program by planting a willow oak tree on Pennsylvania Avenue near the White House, one of 12,000 empty spaces in the nation's capital that the association says could use a tree. Officials of the U.S. Forest Service and the Department of Agriculture were on hand to endorse the program.

An additional 100 million trees would remove about 18 million tons of carbon dioxide from the atmosphere each year, association executive vice president R. Neil Sampson said. Those planted in urban areas would also help shade residences, leading to a savings in air conditioning costs of \$4 billion a year, he said.

Since an estimated 6 billion tons of carbon dioxide from fossil fuels enters the atmosphere each year, Global ReLeaf is only a modest beginning.

"We won't . . . halt the current trend of global warming in its tracks by planting trees," Sampson said. "But we'll change our own lives, and the quality of our communities, for the better. And we will take a small

step toward curing a worldwide environmental problem."

Norton D. Strommen, chief meteorologist for the Agriculture Department's World Agricultural Outlook Board agrees that Global ReLeaf "won't make a big dent. It's only a start, but if you never start, you never reach your goal." Strommen recommends planting long-lived trees such as oaks to tie up the carbon that much longer.

Global ReLeaf also hopes to mobilize public opinion behind legislation such as the National Energy Policy Act, introduced by Senator Timothy E. Wirth (D-CO), and the Global Warming Prevention Act of 1988, introduced by Representative Claudine Schneider (R-RI). The Wirth bill calls for the federal government to monitor existing tropical forests and develop country-by-country reforestation plans. The Agency for International Development would have new money to aid tropical countries in reforestation efforts. Countries that do not develop an acceptable plan for conserving forests would find the U.S. officers of international development banks, such as World Bank, opposing their loan applications.

Schneider's bill echoes much of Wirth's, and mandates a study of existing forest use in the United States. It also calls for study of the value of increased urban tree planting to reduce air conditioning needs in buildings and cool off urban heat islands, which are 3° to 5°C hotter than surrounding areas.

■ GREGORY BYRNE

NSF Pauses to Assess Engineering Centers

The National Science Foundation has asked for an outside evaluation of its engineering research centers before deciding on the future of the program. NSF director Erich Bloch says he has asked National Academy of Engineering president Robert M. White, in effect, to reconvene the NAE panel that helped NSF shape the program to undertake a comprehensive review of the centers.

Bloch said at a National Science Board meeting on 14 October that NSF has established 18 of the centers over the last 4 years and "It is time to draw back a little" and take a careful look at the program. He noted that the foundation was getting toward the end of the program "as envisioned in the beginning." The NAE panel suggested that NSF establish 25 of the centers in a first round. Bloch says the question the foundation hopes that the panel will help answer is "What should the strategy be after we reach

25 [centers]."

The engineering research centers have been the subject of continued controversy mainly because they were perceived as potentially diverting resources from NSF's traditional support of research by individual investigators. The centers were established to encourage interdisciplinary research and are based on partnerships involving universities, industry, and state and local government.

Bloch said the NAE panel will have broad latitude in conducting its review, but will be asked to evaluate how well the program has fulfilled the purposes laid down for it, and in particular how well it has served the universities, industry, engineering education, and the engineering profession generally. The group has been asked to complete its work and make its recommendations by late spring.

■ JOHN WALSH