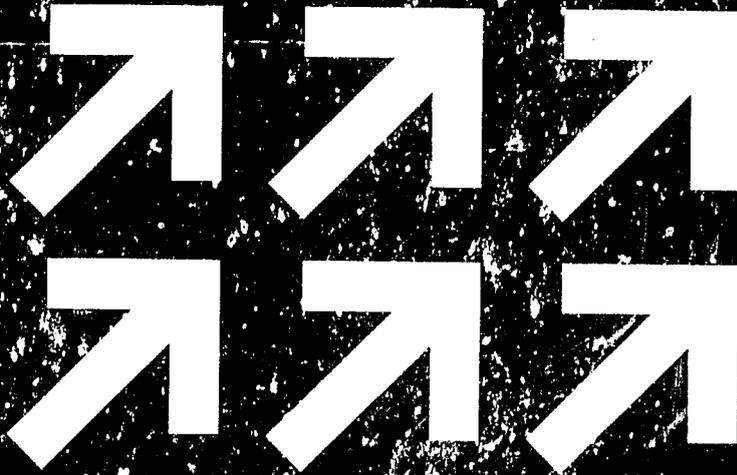


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Reproductive Health Education and Technology:

Issues and Future Directions



edited by

Ronald H. Magarick
Ronald T. Burkman

JHPIEGO 

The Johns Hopkins Program for
International Education in Gynecology and Obstetrics

Reproductive Health Education and Technology:

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The challenge of Health for All, as exemplified by reproductive health, is a formidable one. It requires nothing less than mobilization of the world community at large . . . governments, nongovernmental organizations, universities and scientific institutions, multilateral and bilateral organizations, leaders in health and other sectors, but first and foremost, people themselves. I firmly believe that by accelerating sustained and concerted action, by un-failing constancy and determination, and by genuine international solidarity, humanity can attain its developmental goals and the goal of Health for All. Health is not everything, but everything else without health is nothing.

Dr. Halfdan Mahler
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Preface

Reproductive health is a key component of overall health. Unless mothers and their offspring achieve as optimal an outcome as possible, the task of maintaining or improving health in later life becomes a more formidable task. The overall goal of the Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO) is to improve the reproductive health of families in developing countries through education and training. JHPIEGO improves reproductive health by increasing the availability of effective reproductive health care, particularly family planning services. To evaluate and advocate the diffusion of new reproductive health technologies and instructional techniques into medical practice and physician and nursing education in developing countries, JHPIEGO periodically convenes technology meetings. This book documents the meeting "Reproductive Health Education and Technology: Issues and Future Directions," held in collaboration with the World Health Organization from January 25-28, 1987 in Lausanne, Switzerland.

The major goal of the meeting was to review the state of the art in reproductive health education and to explore technological advances and new educational approaches. As a result, it is anticipated that JHPIEGO, its grantees, and other meeting participants will be better able to make informed programmatic decisions.

The major objectives of the meeting were to:

1. Review emerging technology in fertility management (e.g. Copper T 380A, NORPLANT[®]) and how the new technology could affect training and service delivery programs.
2. Review the current status of major reproductive health problems, e.g., AIDS and other sexually transmitted diseases, high-risk pregnancy, and women at high reproductive risk, to better allow JHPIEGO and its project directors to incorporate relevant information into educational programs and also to modify service delivery approaches.
3. Review emerging technologies in education and new instructional media which might make overall reproductive health education more effective.
4. Review approaches for strengthening reproductive health curricula in medical and nursing education.

The timing in many ways was opportune:

1. Fertility management technology is changing. The new technology and devices must be integrated into reproductive health training programs such as JHPIEGO.

2. Significant health problems are emerging such as AIDS and other sexually transmitted diseases that affect reproductive health programs.
3. New strategies for effecting improved reproductive care are emerging such as child survival interventions that should be further integrated into reproductive health programs.
4. New educational technologies have evolved that have relevance and should be evaluated for applicability in reproductive health programs.

Participants from 20 developing countries, the United States, Canada, England, and Switzerland including 11 representatives of the World Health Organization attended the meeting and were active participants and respondents. This volume presents the results of the conference deliberations and recommendations. It is hoped that these proceedings will enable decision makers to critically evaluate and put into practice appropriate new reproductive health technologies, and as a result the delivery of reproductive health care to families all over the world will be improved.

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JHPIEGO is also very appreciative of the support of the Agency for International Development, and in particular to Dr. Nyle C. Brady, Senior Assistant Administrator for Science and Technology, and to Dr. Roy Jacobstein, Medical Officer, Office of Population, both of whom participated in the meeting and contributed to its success.

Sincere thanks also go to Kendall Smith for typing the manuscript, to Christine Bury for assistance in proofing and editing, and to Robert Lande for assistance in editing and design.

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Keynote Addresses



Reproductive Health and Primary Health Care

Halfdan Mahler, M.D.

“Health” in Reproductive Health

Reproductive health, and I underline the word *health*, fits very well with WHO's concepts, since it focuses on health which clearly is more than “absence of disease and infirmity.” The time is opportune to emphasize health in relation to the reproductive process, particularly as we are approaching the tenth year since the social goal of Health for All was born and unannouncedly adopted in the Thirtieth World Health Assembly by all member states as their most important social goal for the century.

Many of the issues in reproductive health reflect the increasingly general acceptance in recent decades of the view that the health of parents, fathers and mothers, in addition to factors and conditions during pregnancy, childbirth, and the newborn period, profoundly influence the physical and psychosocial development of the child, the health of the adult, and ultimately the health of future generations. The felicitous words of William Wordsworth “The Child is father of the Man” speak well for the continuum of the cycle of reproduction, growth, and development. Healthy children need healthy parents, and they will, in turn, be the mothers and fathers of healthy people. That healthy people are an essential source for socioeconomic development is now progressively accepted; what is less well appreciated is the fact that, in the final analysis, human health and well-being are in themselves the ultimate goal of all our developmental efforts. Let us not forget that good health is indeed a *sine qua non* for personal, intellectual, and spiritual development. Indeed it is at the very heart of the quality of life of individuals and families.

Yet the disturbing realities of today's world are such that millions of women start their pregnancies in poverty, poor social status, and ill health. Ill health and malnutrition during pregnancy, ill-timed and closely spaced pregnancies, infections (including sexually transmitted disease), and complications of preg-

nancy and childbirth all threaten their health and lives. These factors—together with abuse of drugs, alcohol, and smoking—all adversely affect the health of women and the outcome of pregnancy, as well as the immediate health of the infants and their future chance of survival or potential for healthy development.

The Context of Reproductive Health

These facts clearly point to the need to view reproductive health issues in the broadest possible sense, in the context of social, cultural, economic, technological, and environmental aspects: both prenatal and postnatal environments. Despite impressive improvements in the health situation of mothers and children in the past decades, in many developing countries the levels of maternal, infant, and childhood mortality and morbidity remain appallingly high. In fact, the epidemiological gradients of these morbidities and mortalities between and within countries are the most telling and disturbing indicators of existing disparities, inequalities, and gross social injustice in health and development. The most striking disparities remain in the indicators of maternal health. The differential in maternal mortality rates from the most deprived to the most privileged countries is more than two hundredfold. For a variety of reasons this neglected area of maternal health has not captured the media attention it deserves, although more recently the concerns and the actions of WHO and other interested parties have been echoed more widely by international as well as national authorities concerned: a welcome trend!

Impelled by their deep concern for this and similar unacceptable tragic health situations, in 1977, the member states of WHO unanimously decided that “the main social target of governments and WHO in the coming decades should be the attainment by all the people of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life.” This is popularly known as “health for all by the year 2000.” This implies that *all* people in *all* countries should have the level of health which will enable them to work productively and to participate actively in the social life of the community in which they live. It certainly does not imply that by the year 2000 nobody will be sick or disabled. What it does imply is that people will use health promotion and disease prevention measures to ensure that people everywhere will be born in good health; that children and adolescents will grow and develop to their full potential; that the antecedents of adult ill health will be prevented in childhood by healthy lifestyles, healthy environments, and socially supportive policies; and that children and adolescents will grow up to become healthy adults and healthy parents, who in turn will grow old in social harmony and will die in spiritual dignity. Reproductive health is therefore a crucial link in this chain of health for all.

The Global Strategy of “Health for All”

How are we going to reach this ambitious goal of “Health for All”? Have we been able to accelerate appropriate action? Are we going to be successful

in the face of the present world situation with economic crises, poverty, imbalances of population growth, natural and manmade disasters, and what is worse, crisis in the faith of people in their own development, prevailing in many influential circles of today's world? Faced with these questions, let me take you back to Alma Ata in 1978 which showed us a promising way. Governments and the international community decided that primary health care was a feasible road towards attainment of health for all and subsequently, in 1979, made a major historical decision by adopting a Global Strategy for Health for All. The strategy is a way towards health with profound social and economic implications. It goes far beyond the straggle to remain alive, because health and development mean very much more than surviving in misery. The strategy supports people so that they can assume growing responsibility for determining *their* own health destiny as well as that of *their* children, and in so doing contribute to their own socioeconomic destiny. Clearly it involves many sectors in addition to the health sector. What is more, it aims at helping all people everywhere to take initiatives, encouraging them and supporting them as required. In particular, it supports people in knowing their own strengths and how to use them, as well as in knowing when and for what purpose to turn to others. An essential feature of the strategy is the care of families, and essential to that are respect for the status of women and the provision of maternal and child care including family planning.

Where are we now with these strategies for health for all? In spite of the difficult socioeconomic situation in many parts of the world, it is heartening to see that the national and international strategies for health for all have not only begun, but are really moving and in so doing are swaying people, families, communities, governments, nongovernmental organizations, the scientific and academic community, and international organizations in a solidarity move towards health for all by the year 2000. We witnessed that positive start in late 1986 when the Thirty-Ninth World Health Assembly reviewed the reports of 149 member states—more than 90 percent of all member states—who gave genuine proof of their political commitment to the goal of health for all because they did report with a remarkable frankness their successes and their failures. By this optimistic note I am not claiming that monitoring and reporting is all that needs to be done to give effect to strategies. What I am claiming is that we have come a long way in beginning to put into action the values, concepts, and ideas that governments and WHO have collectively agreed upon, and this is very true both for industrialized as well as for developing countries. Thus, the evaluation shows that the health-for-all train is moving in the right direction even if the pessimists and cynics are reluctant to catch it. What we have to do now is to accelerate its movement and prevent it from getting off the track.

Reproductive Health in the Global Strategy

Running through various facets of reproductive health and indeed maternal and child health, including family planning, there is a key thread—**education**: education of adolescents and parents-to-be, particularly education of girls and women; education of families; education of children; education of a string of health workers including leaders in health and in the medical profession, nurses and midwives, primary health care workers, traditional birth attendants, and many others. We must not forget education of workers in other sectors: policymakers, the public at large, community leaders, religious leaders . . . ; the list is long. Scientific knowledge and information on reproductive health has to form the basis of the content of consistent messages in reproductive health. In all cases these need to be adapted to the social and cultural context and have to be very sensitive to the needs and values of individuals and families. The content of the message and its level of sophistication will naturally vary depending upon the audience being addressed. In delivering the message, the present advances in educational technology and communication media should be tapped to their maximum. Numbers are not enough when it comes to the education of health teams; just as important are their technical competence and their social attunement to the needs and preferences of the people they are expected to serve and not to subjugate. This implies skills for technical interventions, skills for communication, as well as a profoundly humane approach to health promotion, disease prevention, care, and cure.

Surely the strengthening of national capabilities for developing human resources for health to meet the priorities of countries, as defined by themselves, is a decisive step in the long-term process towards self-reliance. This development of human resources, backed up by other aspects of a self-sustaining health infrastructure, in addition to the development of relevant technologies, will take us a long way towards improved reproductive health.

Technology in Primary Health Care and Family Planning

I would like to emphasize that in primary health care there is just one type of technology that counts, namely, *appropriate* technology, and by this I mean a technology that is scientifically sound, operationally applicable, socio-culturally acceptable, and economically feasible. Appropriate technology is important in all components of primary health care and particularly so in the complex and broad field of maternal and child health including family planning. The World Health Organization, in recent years, has been active in developing a wide range of technologies for primary health care, as related to maternal and child health including family planning, and in supporting member states in adapting and applying them. A few examples are: simplified techniques for home-based monitoring of pregnancies by families and health workers to identify high-risk cases, locally assembled simple home delivery kits, measurement of chest circumference with color-coded tape as a substitute

for weighing newborn babies, alternative approaches to thermal control of the newborn, and essential obstetric care at the first referral level. All of this is in addition to various measures of disease control technology.

In view of the importance of technology in family planning, WHO, in 1972, established the Special Programme of Research, Development and Research Training in Human Reproduction. This programme serves as an example of how WHO can help to support country health strategies by responding to their needs. The WHO Special Programme addresses three main areas of research needs in developing countries: the need to make available new and improved methods of fertility regulation that would be more appropriate than existing methods, the need to improve the performance and safety of currently available methods, and the need to promote national self-reliance to undertake research in family planning relevant to the country's needs.

There were days when we were searching for the ideal contraceptive, the magic bullet that would do it all. Now the field of contraceptive research is much wiser. The method that will suit everyone, everywhere, every time will probably never be there. Even for the same user, different periods in life impose different needs. The WHO Special Programme is thus pursuing different leads, for men as well as women, and will identify different methods, each of which will have its place for a certain sector of users within each country's health strategy. Examples of methods that have reached an advanced stage include: the steroid-releasing vaginal ring, new monthly injectables, and antifertility vaccines both for men and women.

Reproductive Health Challenges

In the face of marked social and environmental changes, new concerns emerge, as is seen for example in the field of adolescent health and maturation. The decreasing age of onset of puberty noted in Europe after the Second World War—with, for instance, the onset of menstruation occurring three months earlier for each decade—clearly has important implications for health and social programs. It has been well documented that pregnancy in adolescence is associated with a significantly increased risk to the health of the mother and of her newborn infant. In recent years, through multicenter studies, WHO has collected scientific information on the maturation trends of boys and girls in different parts of the world. It has developed alternative approaches (which are essential in both developing and industrialized societies) to deal with reproductive health and the health problems of lifestyle and behavior (such as eating habits, smoking, and drug abuse) which occur during this critical period of transition from childhood to adulthood.

I believe WHO can be proud of the consistent manner in which it has faced the challenge of maternal and child health and family planning as a key element of primary health care, basing its policies for action on scientific knowledge without being subjugated by the winds of fashion and fluctuations of times. We have recognized, for example, that the patterns of family for-

mation, timing and spacing of pregnancies, and family size all have important influences on the health of the family as a whole, with striking effects on maternal and child health. What is more, we have supported countries in carrying out their own family planning programs, based on their own national policies, that are consistent with those policies and program principles they adopted collectively in WHO.

The fact that issues involved in reproductive health, and indeed in maternal and child health including family planning, are complex and multifaceted should not deter us from sustained action in all directions. We have to face the challenge of existing problems. At the same time, we must not hesitate to face the new problems boldly. In the case of AIDS, a tremendous new public health challenge, we have not hesitated. AIDS calls for a balanced blend of aggressive efforts to inform and motivate the public; to inform and educate health workers; as well as to promote research, enlightened social policy, prevention and care, a socially supportive environment, and inputs from many disciplines--the kind of blend that is so necessary for reproductive health as well.

Meeting the Challenge

In the face of the challenge of maternal and child health including family planning, it is too tempting to fall into the trap of easy solutions or to concentrate on one period of life at the expense of others, forgetting that individuals and families cannot be cared for in a fragmented manner. Women of childbearing age and their children require continuity of care and a range of locally selected health interventions that are permanently available at the primary level, backed up with referral care for those at higher risk. There is no magic solution or shortcut. The answer is to follow the principles of primary health care and to promote long-term, sustainable measures--not only intersectoral integrated strategies, but integrated action within the health sector. And I humbly submit that WHO's Programme of Maternal and Child Health including family planning is supporting countries to do precisely that.

The challenge of Health for All, as exemplified by reproductive health, is a formidable one. It requires nothing less than mobilization of the world community at large . . . governments, nongovernmental organizations, universities and scientific institutions, multilateral and bilateral organizations, leaders in health and other sectors, but first and foremost, people themselves. I firmly believe that by accelerating sustained and concerted action, by un-failing constancy and determination, and by genuine international solidarity, humanity can attain its developmental goals and the goal of Health for All. Health is not everything, but everything else without health is nothing.



The Role of the Agency for International Development in Technology Transfer to Developing Countries

Nyle C. Brady, Ph.D.

The importance of technology creation, adaptation, and transfer to the development process cannot be overstated. Technology and its transfer represent a major component of AID's development assistance program precisely because they continue to offer so much for positively altering millions of lives throughout the world.

I say "continue to offer" because we already have seen the dramatic impact that technological innovations can have. These innovations have occurred in many sectors of development. Their introduction and dissemination have improved the quality of living in many countries. They have saved lives and given hope that the cycle of poverty, hunger, despair, and premature death can be broken.

"New technology" frequently connotes expensive, "high-tech" efforts to solve esoteric problems, but the best new technologies often have been simple, relatively inexpensive means of solving age-old problems. For example, in agriculture, new, high-yielding seeds, developed as a result of small investments in research at two fledgling centers, sparked the Green Revolution and led to food self-reliance for many nations. In health and child survival, oral rehydration therapy—which employs a mixture of water, sugar, and common salts—is a new but simple health technology that dramatically reduces infant and child mortality. In at least one country, Egypt, the mortality rate from diarrhea has already gone down in areas where ORT is used. Vitamin A in megadose capsule form has been shown in one controlled study to reduce childhood mortality and diarrheal and respiratory diseases, as well as to correct night blindness. There is no question that people will adopt a new

technology if they can understand it and if they can see that it is to their advantage.

AID's Role in Technology Transfer

AID continues to take a leadership role in supporting the development, adaptation, and diffusion of new technologies. For example, priority research attention is being given to the development and testing of a malaria vaccine and an improved measles vaccine.

Some have assumed that there is an abundance of technology just waiting to be used, and that is true. There are many innovations that seem to have potential, and we have to ask ourselves why they aren't being adopted by developing countries. Part of the task is to try to determine why people are not using technologies that they logically ought to use. We need research to help identify why people are not using some of the new technologies, and to help determine how to educate those people in the appropriate use of some of the new innovations. We also need to educate ourselves further about the cultures of the people with whom we deal.

When truly effective, low-cost technologies are made available, and when people are informed of their availability, the developing countries' citizens are as apt to adopt these technologies as are their industrial-country counterparts. AID works in concert with leaders and scientists to determine which technologies are amenable to transfer and which will need to be modified or improved before their adoption will occur. AID also helps support research to create new, or improve existing, technologies, and then helps developing countries apply the technologies as they come along.

In family planning, there is an array of biomedical research for new contraceptive technology that offers much promise. This research is at various stages of development. There are methods still in the *early* stages of development such as contraceptive vaccines and different approaches to nonsurgical sterilization. In the *middle* stages of development are such methods as the 90-day microsphere injectable contraceptive. Finally, there are methods which are already *well developed* and in various stages of introduction and general use such as the Copper T-380A IUD and the NORPLANT[®] subdermal contraceptive implant. AID does not use its resources to support the general dissemination of any of these new technologies until Food and Drug Administration approval is obtained.

In addition to biomedical research, AID supports demographic and other social science research as well as operations research. Such activity has been valuable in enabling us to further delineate the relationship between child spacing and child survival. It is now clear that child survival is enhanced and maternal mortality and morbidity are diminished when births are well spaced. Evidence from the World Fertility Survey supports this contention. A baby born less than two years after its next older sibling is twice as likely to die as a baby born after at least a two-year interval. The older sibling is also more likely to die when the subsequent birth interval is short. In many

countries, proper birth spacing alone could prevent one in every five infant deaths. Maternal mortality would also be greatly reduced. For these reasons we include child spacing as one of the primary elements in our child survival program. These facts are inherent in the notion of reproductive risk, an idea that JHPIEGO has emphasized in its training programs.

AID's focus continues to be on the creation and application of technologies appropriate to the developing countries. AID does this in concert with appropriate professional personnel from the developing countries.

"Appropriate technology" does not in any way imply "second-class" technology or *only* "simple" technology. It does imply, however, that the technology must offer the promise of improving a great number of lives in a cost-effective manner. Thus, for example, vaccine development is an "expensive," high-technology endeavor. Effective vaccines, once developed, however, are "inexpensive" in terms of very low costs per person immunized when targeted against significant problems.

I mentioned costs. In the best of all worlds this would not be a consideration. Regrettably we *must* consider costs in our programs. Paradoxically, however, it is in a milieu of stationary or diminished funding levels that technology creation and transfer holds so much promise. This is because of its potential to effect major improvements at a relatively low cost per assisted person.

AID collaborates with multilateral development institutions and other donors in all sectors of development. This collaboration helps avoid duplication of effort and tends to utilize the comparative advantage of each organization.

One example of effective collaboration is the work of WHO, UNICEF, and AID on immunizations and oral rehydration therapy. Another example is the cooperation between WHO and AID in contraceptive research, involving both technical collaboration and joint project support on contraceptive development, safety, and efficacy, and on natural family planning.

Technology Transfer As It Relates to the JHPIEGO Program

There are a number of ways in which JHPIEGO has been and will continue to be involved with technology transfer and institutionalization. Early on, JHPIEGO contributed to significant advances in the development of new surgical techniques and instrumentation. These helped voluntary surgical sterilization become a safer, simpler, and less expensive option for thousands of women who chose this form of contraception. Furthermore, this innovation—and training in its use and application—allowed other aspects of women's reproductive health to be addressed. Thus in Africa, where infertility can often be a major problem, many women who would not have been able to have children now are able to do so thanks to the efforts of JHPIEGO-trained physicians.

With its more recent emphasis on curriculum development in both medical and nursing schools, and on broad postgraduate training for physicians in reproductive health, JHPIEGO is contributing importantly to the building of institutional capacity, as well as transferring technology. It is clear that

as more students are trained and as physicians and nurses are retrained, the reproductive health of women and the overall lot of families cannot help but improve.

JHPIEGO's present exploration of the use of satellite technology for distance learning is another example of the potential of high technology to meet our objectives in development. It is a technology particularly suited to JHPIEGO's training activities, and it offers the possibility of reaching even more trainees in a cost-effective manner.

The very act of training per se is a form of technology transfer. The degree to which that training is utilized, passed on to other trainees, and structured into the health care training or delivery system of a country will be the degree to which it becomes institutionalized. Thus training, under the best circumstances, will have a multiplier effect.

In summary, the impact of JHPIEGO's work over the years is obvious. There have been almost 40,000 trainees from over 4,000 institutions in 122 countries. Over 400 medical schools and almost 200 nursing schools have faculty members who have been trained and are themselves involved in training others. This is an accomplishment of which JHPIEGO can justly be proud. We in AID appreciate JHPIEGO's efforts and achievements, and we look forward to further success as JHPIEGO helps institutionalize reproductive health training and continues to create and disseminate appropriate technology as it becomes available.



**Issues and
Controversies in
Reproductive Health:
Impact on
Medical Education
and Training**

Major Technological Issues in Fertility Management

Theodore M. King, M.D., Ph.D.

Fertility management technology is being shaped by the trend towards the development of community-based family planning programs in less developed countries that strive to make contraceptives accessible and easy to use. In the United States, contraceptive development continues to be influenced by the long and expensive testing requirements of the Food and Drug Administration and by concerns over the medical-legal situation relating to product liability.

In some areas of the world, family planning has made significant progress from the late 1960s and early 1970s. Singapore's family planning program has been highly successful! Since 1975, the total fertility rate has fallen below replacement levels (Table 1). In response, the government of Singapore is now taking a pronatalist stance and is attempting to provide incentives to couples to have more children.¹

Despite Singapore's success, global population will continue to increase, and it is estimated that between the year 2000 and the year 2025 the world will number in excess of 8 billion. Much of this growth will occur in the developing world; so that while in 1980, 74 percent of the world's population was in developing countries, by the year 2100, 87 percent of the world's population will be in the developing world (Table 2).

The family planning methods that are now employed continue to place great emphasis on sterilization. When female and male sterilization methods are combined, it is by far the largest and most common approach to the prevention of unwanted pregnancies. One out of six couples in the world uses sterilization to prevent pregnancy. A total of 95 million couples (Table 3) are protected by voluntary female sterilization, and about 40 million are protected by male sterilization.² Sixty million women use the IUD, which ranks second as a contraceptive method, and 50 million use oral contraceptives. Sterilization also ranks first in the United States among modern methods of birth control. Approximately 1 million sterilizations are performed every

Table 1
Total Fertility Rate in Singapore
1957-1985*

YEAR	TOTAL FERTILITY RATE
1957	6.4
1965	4.6
1970	3.1
1975	BELOW REPLACEMENT LEVEL
1985	1.6

* Decline largely confined to the upper socioeconomic groups

Source: Family Planning that went too far. *Lancet* 6 December 1986; p. 1328.

year in the United States, 60 percent on women and 40 percent on men. Despite these high numbers, there are still sizable percentages of the reproductive-age population not using contraceptive methods. Furthermore, the failure rates that we see with our current contraceptive approaches are significant (Table 4). For example, the condom has approximately a 10 percent failure rate, diaphragms 19 percent, and periodic abstinence in excess of 20 percent. These failure rates as well as those for oral contraceptives (2 percent) and the IUD (5 percent) indicate the need for further technological improvements in existing methods, as well as development of more efficient methods that do not have significant side effects.

Oral Contraceptives: Overview

There has been considerable progress made with the oral contraceptive, which is the most widely used reversible method of contraception in most developed and developing countries. Early preparations contained a progestin and 100 micrograms or more of estrogen. Today, however, most pills contain a maximum of 50 micrograms of estrogen, and the low-dose pill contains

Table 2
World Population Projections
(in Millions)

YEAR	WORLD	DEVELOPING COUNTRIES
1980	4,435	3,298 (74%)
2000	6,147	4,884 (79%)
2025	8,298	6,941 (84%)
2050	9,780	8,400 (86%)
2100	10,870	9,463 (87%)

1984 World Bank Estimates and Projections

Table 3
Estimated Number of Married Women of Reproductive Age (MWRA) Voluntarily Sterilized for Contraceptive Purposes Worldwide, 1984

	% of MWRA	Number of MWRA (in 1,000s)
DEVELOPING COUNTRIES		
AFRICA (sub-Saharan)	1	500
ASIA & PACIFIC		
China	27	46,400
India	14	20,000
Other Asia	6	7,300
All region	17	73,700
LATIN AMERICA & CARIBBEAN		
Brazil	18	3,200
Mexico	14	1,500
All other	10	2,700
All region	14	7,400
MIDDLE EAST & NORTH AFRICA		
	1	700
Subtotal	14	82,300
DEVELOPED COUNTRIES		
United States	17	6,000
United Kingdom	10	900
All other	4	5,900
Subtotal	7	12,800
WORLD	12	95,100

Source: Liskin L, Rinehart W: Minilaparotomy and laparoscopy: safe, effective and widely used. *Population Reports* May 1985; Series C, No. 9, p. 127.

only 30 to 35 micrograms. Recent concern regarding possible adverse changes in lipid and carbohydrate metabolism seen in some combination-oral contraceptive users has resulted in a reduction in the progestin content used in OCs. This has led to the development of a new generation of low-dose progestins which seem to have little adverse effect on blood lipid concentration and none on carbohydrate metabolism.

With the reduction in estrogen and progestin content in most pills, epidemiological studies^{34,35,6} generally fail to find an association between cerebral vascular accidents, heart attacks, or pulmonary emboli with the use of oral contraceptives, or, if an association is found, it is confined to high-risk groups.

Table 4
Percentage of Women Who Experience Contraceptive Failure Within The First Year of Use, By Method

METHOD	PERCENTAGE
ORAL CONTRACEPTIVE	2
IUD	5
CONDOM	10
SPERMICIDES	18
DIAPHRAGM	19
PERIODIC ABSTINENCE	24
TUBAL STERILIZATION	0.4
VASECTOMY	0.4

Adapted from Hatcher RA et al: *Contraceptive Technology 1986-1987*. 13th revised edition: New York, Irvington Publishers, Inc., 1986, p. 102.

These epidemiological studies⁷ have demonstrated the following:

1. Oral contraception confers important health benefits.
2. The associated risks are less if pills contain lower doses of estrogen and probably progestin.
3. Morbidity is reduced if women over 35 years of age who smoke do not use the pill.

It thus appears that the changes in the composition of oral contraceptives have been successful in reducing the risk of cardiovascular disease.

Neoplasia and Oral Contraception

There has been increasing attention to the role of oral contraceptives in neoplastic disease.⁸ A recent review⁹ of the subject generally concluded that using the pill decreases the overall risk of cancer. This is particularly true for ovarian and endometrial cancer. In fact, pill use seems to reduce by half the risk of getting both of these types of cancer. Some studies have also shown that the longer the pill is used, the lower the risk of endometrial cancer.

The relationship between the pill and cervical cancer is much less clear. Although most studies conclude that long-term OC use is associated with an increased risk of cervical neoplasia that is directly proportional to the length of OC use, it is unclear as to whether it is the pill causing the cancer or one or all of several other factors involved. For example, women who have multiple sexual partners or women who have husbands who have multiple sexual partners may be at a significantly increased risk of cervical cancer, probably as a result of some agent that is transmitted sexually and is carcinogenic. In addition, age of first intercourse, smoking, frequency of Pap smears, and use or nonuse of barrier methods of contraception also seem to be factors that must be taken into consideration. Thus, researchers generally conclude that

it is impossible to say for certain whether pill use increases the risk of cervical cancer or whether the many other factors mentioned are the cause.

Also, recent studies^{10,11} in the United Kingdom have reported up to a fourfold increase in hepatocellular carcinoma, a very rare carcinoma found in long-term OC users. Again, the validity of these conclusions has been challenged by some researchers who question the study design.

Oral Contraception and Breast Neoplasia

There is conflicting information concerning the effects of oral contraception on breast neoplasia. The demonstration of protection in OC users from some hormonal-dependent tumors such as endometrial cancer and ovarian cancer has not been found to exist for breast neoplasia. This seems to indicate that we must still consider the problem of latency. Birth control pills were developed and put into use approximately 27 years ago; a woman who was at that time 18 years old is now only 45. Therefore, sufficient years have not elapsed to overcome the potential problem of latency. Further, there have been no data reported in any of the breast cancer studies that would indicate a dose response. Furthermore, we can't gain agreement on what constitutes a weak progestin or a very strong progestin. Also, conflicting results have been reported in the four most recent studies of oral contraception and breast neoplasia. The Cancer and Steroid Hormone (CASH) Study¹² of the Centers for Disease Control and the National Institute of Child Health and Development, the largest study completed to date, was unable to demonstrate any association between the use of oral contraceptives and the relative risk of breast cancer (Table 5). In this study, 4,711 breast cancer patients were matched with 4,676 controls. Shortly after this study was published, a national study¹³ from Sweden and Norway appeared that found an association between breast cancer and long-term use of oral contraceptives. This study involved some 422 cases of breast cancer and 722 controls. Almost simultaneously, a national study¹⁴ from New Zealand appeared that also seemed to indicate a positive relationship. A hospital-based North American (United States and Canada) study also failed to find a significant increase in the relative risk of breast cancer associated with OC use among the 521 breast cancer patients under age 45 and the 521 matched controls studied.¹⁵ No studies have consistently identified the same subgroup as being at a higher risk of breast cancer. That absence of consistency provides strong evidence that something other than oral contraceptive use may be influencing the study subjects' breast cancer risk. Further research is needed to examine the risks among the various subgroups of OC users.

Oral Contraceptives and Lipoproteins

The effect of oral contraceptives on the lipoproteins and the lipid profiles of oral contraceptive users is a matter of increasing concern because of the potential influence on atherosclerotic heart disease. Elevated levels of serum cholesterol are associated with arteriosclerosis. In the blood, cholesterol is

Table 5
Relative Risks of Breast Cancer Associated with OC Use at a Young Age and Before First Birth from Four Recent Studies†

Potential Risk Factors	CASH ¹² cases = 4,711 controls = 4,676	New ¹¹ Zealand cases = 433 controls = 897	North ¹³ American cases = 521 controls = 521	Scandinavian ¹⁴ cases = 422 controls = 722
Ever Use	1.0	0.94	0.9	—
Use Before First Birth				
Ever use	1.0	0.83	0.6	—
≥ 3 years	1.0	—	—	—
≥ 6 years	—	0.55	—	—
≥ 7 years	—	—	1.4	—
≥ 8 years	—	—	—	2.2*
Use Before Age 25				
Ever use	—	—	1.0	—
≥ 5 years	—	—	1.1	—
≥ 8 years	—	—	—	2.7
≥ 10 years	—	0.8	—	—
≥ 10 years	—	1.3	—	—
Total Years of Use				
≥ 10 years	—	0.96	—	—
≥ 12 years	—	—	—	2.2*
≥ 15 years	0.6*	—	—	—

† Each study examined the potential risk factors differently. The relative risk estimates presented here are for the maximum duration of use in each category.

* Statistically significant risk

¹² < 20 years at first use

¹³ 20-24 years at first use

Source: Conflicting results on OCS and breast cancer. *Outlook* March 1987; p. 6.

combined with lipoproteins. Generally, it has been found that estrogens increase high-density lipoproteins (HDL), which is a beneficial change. Most progestins produce opposite effects; that is, they lower HDL and eliminate LDL, which are not beneficial changes. It has been found that the degree to which lipoproteins are affected varies with different progestational agents and with the dosages in which they are found in different OC agents. For example, hyperlipidemia, particularly increased LDL, has been found to be associated with an increased risk of atherosclerotic heart disease. High-density lipoprotein, however, has been shown to be protective against atherosclerotic heart disease. It appears¹⁶ that fewer lipid changes occur with the low-dose oral contraceptives. In addition, preliminary data with the new generation of progestins seem to show fewer effects on blood lipid concentration in the

Table 6
 Estimated Annual Number of Deaths† due to
 Various Contraceptive Methods or to Pregnancy if
 Method Fails
 (Within One Year of Use)

Method	Age					
	15-19	20-24	25-29	30-34	35-39	40-44
No Method	3.6	6.1	7.4	13.9	20.8	22.6
Pill/Nonsmokers	1.3	1.4	1.4	2.2	4.5	7.1
Pill/Smokers	1.5	1.6	1.6	10.8	13.4	58.9
IUD	0.9	1.0	1.2	1.4	2.0	1.9
Diaphragm or Condom	1.1	1.6	2.0	3.0	5.0	4.2

† Number of deaths among 100,000 nonsterile women.

Source: FDA revises guidelines for oral contraceptive labeling. *Outlook* September 1987; p. 9.

usual contraceptive dosages. Regardless of whatever negative influence is identified, the number of individuals who experience atherosclerotic heart disease while taking OCs appears exceedingly low, particularly if OCs are used by women who do not have underlying cardiovascular risk factors such as hypertension, hypercholesterolemia, obesity, or diabetes.

Mortality Associated with Oral Contraceptives

Some 500 deaths occur annually among the estimated 10 million oral contraceptive users in the U.S. In the United States, deliveries are viewed as being quite safe; approximately 500 deaths occur in 3 million births. This is small in comparison to the thousands of our citizens who die as a result of highway accidents, suicide, and lung cancer. An examination of the deaths in our 10 million users of oral contraceptives indicates that one could avoid these deaths by eliminating use of oral contraceptives in the older age groups, avoiding the use of OCs in smokers, in individuals who are obese or have hypertension, elevated total cholesterol, or evidence of systemic diseases associated with vasculitis. Of the 500 deaths, approximately 430 of them are in women who smoke who are 35 years of age or older. Therefore, if these very high-risk groups would avoid oral contraceptive use, we would have only approximately 70 deaths in 10 million users of oral contraceptives, which would make this method even more safe. Recently developed FDA labeling guidelines for OCs emphasize that—with the exception of OC users over the age of 39 who smoke—mortality associated with any method of fertility control is less than that associated with childbirth (Table 6).

Approximately a half-million women in developing countries die each year from pregnancy and childbirth-related causes. Although oral contraceptives and some of the other contraceptive methods involve slightly increased health risks, these risks are extremely small compared to the risk of dying from

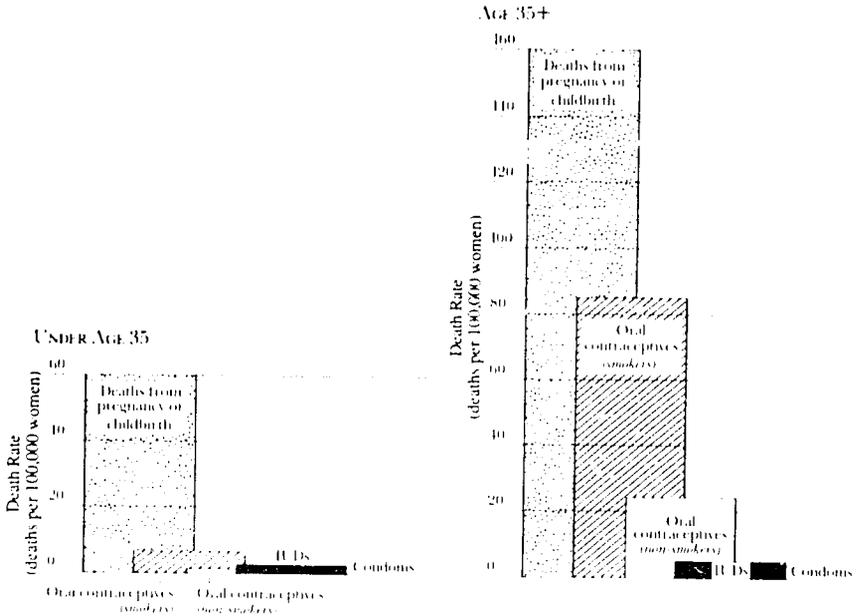


Fig. 1. A comparison of estimated death rates for younger and older women from pregnancy or childbirth versus side effects of various contraceptive methods.

SOURCE: IMPACT Project, *Family Planning Saves Lives*

(Washington, D.C.: Population Reference Bureau, 1986).

Based on Rinehart, W. and Kols, A. with Moore, S.H., "Healthier Mothers and Children Through Family Planning," *Population Reports*, Series 7, Number 27, May-June 1984 (Baltimore, Maryland: Population Information Program, The Johns Hopkins University).

pregnancy and childbirth-related causes. Figure 1 estimates death rates for younger and older women in developing countries from pregnancy or childbirth versus mortality associated with various contraceptive methods. These data indicate that women who effectively use oral contraceptives or other family planning methods to avoid pregnancy have a high likelihood of avoiding pregnancy-related illness and death.¹⁷

Intrauterine Contraception

Sixty million women throughout the world use the intrauterine device. Forty million IUD users in China use unmedicated devices, metal rings, or other types that have been developed locally. In the rest of the world, copper-releasing IUDs have begun to replace the unmedicated Lippes Loop as the IUD most in use. IUDs experienced great difficulties in the United States in the 1970s with the mounting lawsuits relating to problems of pelvic infection associated with the Dalkon Shield. In September 1985, the Ortho Pharmaceutical Corporation stopped the sale of the Lippes Loop in the United States because of economic considerations. Searle Pharmaceuticals followed with an announcement on January 31, 1986, that it would discontinue US sales of

its two IUD products, the Cu-7 and the Tatum-T. Both companies cited economic reasons for their decision, as well as difficulty in obtaining liability insurance. The companies emphasized that withdrawal was not based on medical concerns nor had the Food and Drug Administration requested that they stop production of the devices. Furthermore, the international availability of the devices was not affected. As a result, in September 1986, the Agency for International Development convened a panel of 11 family planning experts to develop guidelines for international IUD use. The panel members agreed that Searle's decision to discontinue US marketing of their IUDs was economically motivated and should not be misconstrued as due to a problem with IUD safety. The panel members also agreed the IUD is a safe, effective, and appropriate contraceptive for many women. They supported AID's plans to continue providing IUDs to family planning programs around the world. The AID panel concluded that, in general, "the IUD is most appropriate for parous women, especially those who do not want more children but do not choose or cannot obtain sterilization. An IUD is not the first choice of contraceptive method recommended for women who have an increased risk of STD."¹¹ They noted that the IUD is particularly suited for those in monogamous relationships who have little or no risk for pelvic inflammatory disease or future infertility.

The major concern with the use of IUDs has been the potential increase in the risks of pelvic inflammatory disease (PID) and infertility. Recent IUD studies suggest that women who use copper-bearing devices, particularly married women in primarily monogamous relationships, are at relatively little risk of developing PID or tubal infertility.^{12,13}

Women with multiple partners, particularly nulliparous women, who are already at risk of sexually transmitted diseases, are not good candidates for IUDs. They should be made fully aware of the increased risk of PID and tubal infertility associated with IUD use under these circumstances.

The IUD now being distributed by AID is the Copper T-380A, a contraceptive developed by the Population Council, which was approved by the US Food and Drug Administration in November 1984. Marketing of this device in the United States began in October 1987.

The Copper T-380A consists of a small inert polyethylene "T" with copper wire wound around the stem and a copper sleeve fitted tightly on each half of the crossbar. The exposed surface area of the copper is 380 square millimeters. The copper sleeves on the crossbar make the 380A more effective than its predecessor, the T-200. By introducing more copper high in the uterus, the new IUD can be small yet provide better protection from pregnancy than larger nonmedicated IUDs. In extensive clinical trials conducted by the Population Council, the Copper T-380A has been associated with an annual pregnancy rate of less than 1 per 100 woman years of use—about the same as oral contraceptives. The FDA has approved a time limit of four years for the Copper T-380A.

Levonorgestrel-Releasing IUDs

We have great expectations for the levonorgestrel-releasing devices, particularly the ones that release 20 micrograms of levonorgestrel daily. The Population Council and the World Health Organization are testing IUDs that contain this substance. The Population Council's version releases 2 micrograms of levonorgestrel every day and has an effective life of five years. This dosage of levonorgestrel does not prevent ovulation, but it decreases bleeding by 40 to 60 percent. Initial results of trials in Scandinavia have shown very high effectiveness of this device and reduced loss of blood. The results also show that the incidence of pelvic inflammatory disease associated with this device may be lower than that for inert devices and copper-bearing IUDs.²²

Intrauterine Device Use in Developing Countries

Based on what is currently known about IUDs, the following appears prudent to recommend to those responsible for IUD service and training programs in developing countries:

1. The IUD is a safe and effective form of contraception for properly selected patients.
2. All contraceptives have side effects and risks. The major risks associated with the IUD are pelvic inflammatory disease (salpingitis) and tubal infertility.
3. The above major risks become much more significant in women already at risk for PID or sexually transmitted disease (STD). Such women include those who are young, have more than one sexual partner (and/or have partners who have more than one partner), have had prior episodes of STD, or prior episodes of PID.
4. Current data suggest that the major risks (PID, tubal infertility) are the lowest when parous women with only one sexual partner and no history of PID/STD are prescribed copper-bearing devices.
5. Since tubal infertility is a known sequela, the IUD should not be the first choice for a woman who wants children but has none.
6. Since the risk of PID associated with the IUD is highest within the first month after insertion or reinsertion, IUD acceptors should be apprised of this and a means of follow-up should be available if problems occur.
7. Current data suggest that the Copper T-380A has lower failure rates, higher continuation rates, and lower medical removal rates than other IUDs.
8. The role of prophylactic antibiotics and use of the IUD in women at risk for AIDS has not been settled. Programs should keep abreast of any new developments.

Natural Family Planning

Kits are now available that allow a woman to perform immunoassays on her morning urine to test for changes in levels of marker hormones, such as luteinizing hormone and pregnanediol glucuronide, that indicate the time of ovulation. Human sperm can live in the cervix and uterus for at least two days, so the assays must be effective enough to detect ovulation at least three or four days in advance for couples who want to practice natural family planning.²³ Improvements in the methods of periodic abstinence that shorten the number of days during which a couple must abstain will remove one of the major reasons for the low levels of acceptance and high discontinuation rates.

NORPLANT[®]

There has been great excitement among those in the population field with the development of NORPLANT[®] by the Population Council. NORPLANT[®] consists of six Silastic[®] capsules containing levonorgestrel that are inserted under the skin on the inner aspect of the upper arm. The levonorgestrel diffuses through the plastic surface of the capsules and into the surrounding tissue. The capsules prevent nearly all pregnancies for five years. Then they must be replaced. NORPLANT[®] II, a two-rod system, is now being tested. The pregnancy rate with NORPLANT[®] is similar to oral contraceptives, and it has a continuation rate similar to intrauterine devices. The major difficulty has been menstrual cycle disruption; about 60 percent²⁴ of the users have irregular cycles in the first year of use. The technical problems with this approach include training of workers for the sterile insertion and removal of the implants and making absolutely certain to avoid the use of these implants in pregnant women by inserting them in the first seven days of the cycle.

The Population Council plans to apply for US approval of the six-capsule version of NORPLANT[®] in 1988. NORPLANT[®] implants have been approved for marketing in Finland, Sweden, Ecuador, the Dominican Republic, Indonesia, Thailand, Colombia, and China, and applications are pending elsewhere.

RU 486

Recently, a new experimental drug RU 486 was developed by a French company, Roussel-UCLAF. RU 486 is a synthetic 19-nor steroid. It is both a progesterone antagonist and, at higher doses, a cortisol antagonist.

RU 486 is an antiprogestosterone that blocks the action of progesterone, a hormone needed by the endometrium to maintain early pregnancy. Also known by its WHO international nonproprietary name, mifepristone, RU 486 induces menstruation when administered in the luteal phase of the menstrual cycle.

This steroid has a prolonged plasma half-life and is efficacious when administered one day a month. As an example, in female rhesus monkeys that

received RU 486, 5 milligrams per kilogram on cycle day 25, no pregnancies occurred. The vehicle-treated control animals had a 28 percent pregnancy rate. This work was done by Dr. Lynnette K. Nieman²⁵ at the National Institutes of Health (NIH). She is currently studying the effects of RU 486 on the physiology of the reproductive cycle. NIH is also supporting the study of RU 486 as a contraceptive, as well as the drug's use in various endocrine diseases such as Cushing's Syndrome and endometriosis.

In January 1987, Nieman et al.²⁵ reported on the use of RU 486 as an oral contraceptive in women. A single oral dose at 10 milligrams per kilogram given in the midluteal phase induced menses within 72 hours of intake in women with normal cycles who were at no risk for pregnancy. Simultaneous treatment with human chorionic gonadotropin did not block the action of this steroid antagonist. There was no effect on subsequent menses in these women. There was evidence of a decrease in serum progesterone after treatment with RU 486 which demonstrated clear evidence that RU 486 serves as a luteolytic agent. With the data that have been presented, it appears that an agent may soon be available that is a one-dose-a-month oral contraceptive, free of many of the concerns that one has with oral contraceptives.

Inhibin

In the future, Inhibin A and B, that are produced by the granulosa cells of the ovaries and the Sertoli cells of the testes and act to suppress FSH secretion, may well serve as a contraceptive, particularly for men. Inhibin has recently been purified. There now has to be full definition of its physiologic role. It is quite likely that it will be considered in the fertility regulation arena within the coming five years. FSH is necessary for normal spermatogenesis. Inhibin stops the production of sperm without impeding the synthesis of androgens that might cause loss of libido. It is currently being tested in animals.

Conclusion

It is expensive to undertake contraceptive development, and U.S. Food and Drug Administration approval takes many years. In the United States we face major problems with product liability and the medico-legal situation. Given the funding and time required to develop new contraceptives, the major advances in fertility management in the next ten years will more likely be in the refinement of contraceptives already available rather than in the invention of new contraceptives.

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Evolving Technology in Fertility Management: Impact on Reproductive Health

This session focused on new trends in contraception and their potential impact on reproductive health training programs. Noting that complications of unwanted or even wanted pregnancies in most developing countries occur much more frequently than any complication from the use of contraception, there was consensus that more effort must be made to publicize contraceptive benefits.

One discussant urged careful consideration of any new research on the interactions between contraception and the potential transmission of HIV suggesting contraceptive benefit be weighed against the possible risk of the transmission of HIV.

Speakers urged that training programs change to respond to the increasing number of options that are now or will soon be available for clients around the world. For example, vaginal rings are expected to be in use in two to three years, and if NORPLANT[®] is fully approved, an increasing number of providers must receive training in insertion and removal techniques as well as in counseling regarding side effects.

It was suggested that JHPIEGO in its training stress the use of the Copper T-380A IUD and eventually NORPLANT[®] to complement sterilization. For example, these approaches could be used in lieu of employing surgical sterilization for women at high medical or surgical risk. In addition, these methods might be viewed as a step just prior to sterilization. Some of the newer contraceptive implants also hold promise for patients with serious difficulties with IUDs or other injectables. Caution was expressed about providing implants like NORPLANT[®] in rural communities due to side effects such as breakthrough bleeding. Speakers noted that backup medical systems must be in place when these newer contraceptives are introduced in the communities; otherwise, the associated side effects could result in a reduction in contraceptive use due to patient dissatisfaction.

It was noted that many of the harmful side effects of oral contraceptives have been markedly minimized over the years as the dosages of either estrogens or progestogens have been reduced. There is considerable evidence now that oral contraceptives provide a protective effect against a large range of diseases, including endometrial and ovarian cancer. It was agreed that health workers should be thoroughly informed about the protective effects of oral contraceptives so that these workers will be able to assist in patient counseling and education.

Participants urged that continued attention in training programs be given to the role of breastfeeding and its relationship to child spacing. Health workers should be taught the contraceptive benefits of breastfeeding, and this information should be included in JHPIEGO educational programs.

A participant from Thailand, noting the wide acceptance of sterilization in that country, urged that countries having widespread sterilization programs should also develop training programs on microsurgery in order to develop a cadre of personnel who can reverse sterilization procedures when requests occur. JHPIEGO was complimented on its role in developing such programs.

Speakers also emphasized developing appropriate health education programs for consumers. A speaker noted that in his practice he sees many side effects of contraception due to poor consumer knowledge about methods. It was urged that medical professionals receive increasing training in appropriate ways to educate consumers regarding the appropriate use of contraception.

Traditional birth attendants (TBAs) were identified as an important group needing training. (This group works primarily in rural areas, delivering up to 80 percent of babies in many African countries.) These TBAs are an important source of client education.

Finally, a discussant urged those in attendance to put in careful balance the risk-benefit ratio of contraception. This individual noted that there seems to be an excess concern by the medical profession about the extremely rare side effects of contraception, yet little concern about some of the newer technologies that have been introduced into the developing countries and have been accepted without much attention to what the risks and complications might be. The examples cited included the introduction of baby bottles, the practice in obstetrical services of separating the baby from the mother (following Western medical practice), the practice of putting the baby into a newborn nursery, and the increasingly high rate of caesarean sections, even in developing countries. The participants complimented JHPIEGO on its training of physicians to understand the appropriateness, or inappropriateness, of some of the newer technologies for developing countries.



The Risk Approach for Maternal and Child Health Care

Mark A. Belsey, M.D., M.P.H.

Clinicians have used the concept of risk to identify profiles of women who are at high risk of complications during pregnancy. These complications include postpartum hemorrhage, eclampsia, ruptured uterus, and death. A risk factor is defined as one link in a chain of associations that lead to an illness—or is an indicator of such a link.¹ Many risk factors have been identified which apply to maternal and child health. These factors include the following:

- Poverty
- Poor birth spacing
- Late or early reproductive age
- Maternal malnutrition
- High parity
- Short stature
- Poor maternal weight gain

In examining the risk approach concept, it is evident that some risk factors are associated with many outcomes. For example, illiteracy is associated with maternal death, perinatal death, or infant death—whereas some risk factors such as hypertension, high age, and short stature all operate together to affect only one outcome (Figure 1).

Perhaps the most important concept that has emerged over the last ten years in the risk approach is the concept of “relative risk.” Relative risk is the adverse event rate associated with a risk factor divided by the adverse event rate without that risk factor present. It is a measure of the strength of the association between risk factor and outcome. As an example, a relative risk of 1.3 means a 30 percent excess risk among people with that particular risk factor or factors. Sometimes this concept is referred to as the “odds ratio” when the study is not a prospective study or a cohort study but rather a case-control retrospective study. Figure 2 illustrates the relative risk concept.

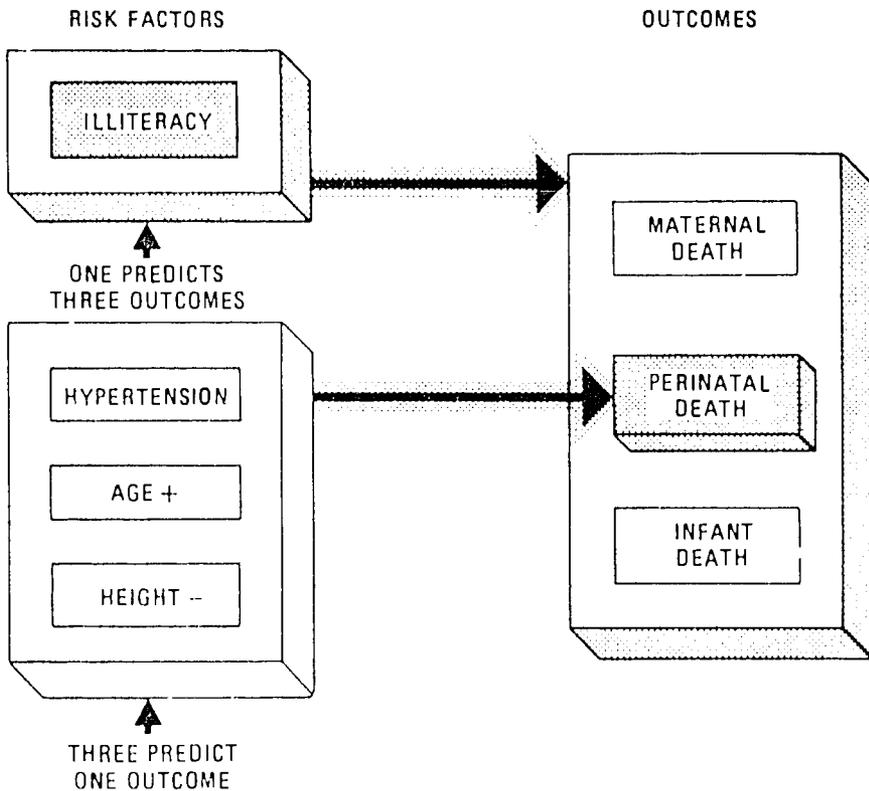


Fig. 1. The relationship between risk factors and outcomes: an outcome can also be a risk factor.

Notes: This is only a selection of possible risk factors. Combinations of risk factors have complex relationships).
 Source: Reference 1, Page 13.

“False Positives” and “False Negatives”

The concept of false positives and false negatives is important to understand in the risk approach. A problem in the risk approach is that a risk factor is not just present in those who have the disease but also in those who do not have the disease. Thus, the objective in the risk approach is to minimize the false positives and the false negatives so that “sensitivity” and “specificity” are obtained, that is, a high rate of predicting with the factor for those who come down with the problem and a high rate of excluding those who do not have the factor from developing the particular condition. The effectiveness of the risk factor or factors at predicting the outcome will depend on the proportion of “correct” or “true” associations. Thus, the “ideal” risk factor would virtually always be associated with the unwanted outcome, and the absence of this “ideal” risk factor would virtually always be associated with the more favorable outcome.

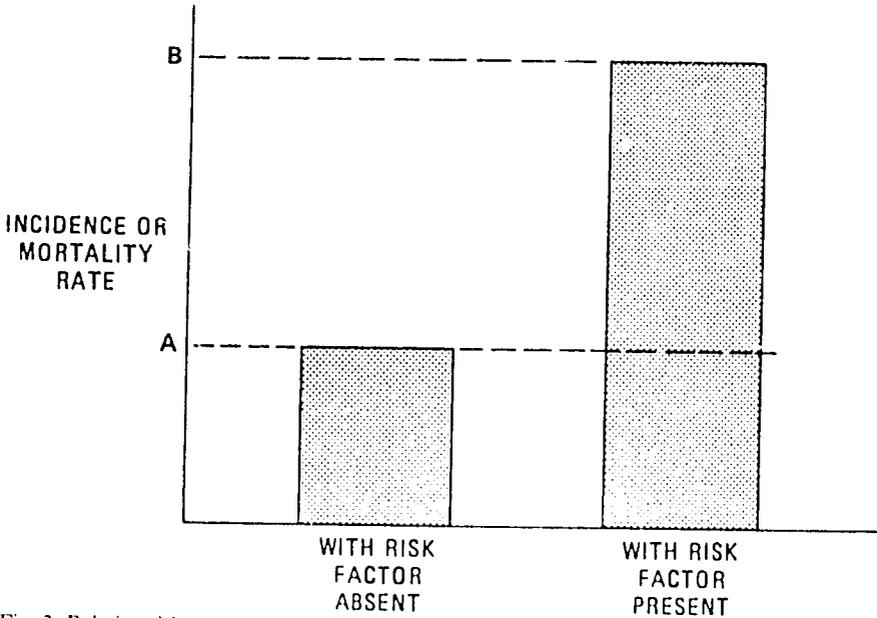


Fig. 2. Relative risk

Note: The relative risk is sometimes called the "odds ratio" In the example it is $\frac{B}{A}$.
Source: Reference 1, Page 22.

The establishment of a cutoff point is common in risk strategies. We have seen this in Dugald Baird's work in Aberdeen regarding the question of height of women as a surrogate of the adequacy of the pelvic outlet.^{3,4,5} In fact, different studies have shown cutoff figures anywhere from 140 centimeters to 155.5 centimeters. The cutoff point in any particular setting is something that needs to be determined locally. This will then result in the best mix of true positives and true negatives.

Distribution of Risk

All populations have a distribution of risk. There are some groups who have "zero" risk. There is almost no individual who has zero risk, and there are some individuals who have very high risk. The implications for this in terms of health services can be seen in terms of the apportionment of care to different levels at risk. An individual at risk level 1, which is low (Figure 3), is unlikely to get into difficulty if she is seen and cared for by health care workers who use relatively simple instruments and simple technologies. However, the individual at the higher end of the scale should be referred to higher levels of the health delivery system.

A risk system should refer the appropriate level of care for the appropriate level of need. For example, in countries where traditional birth attendants

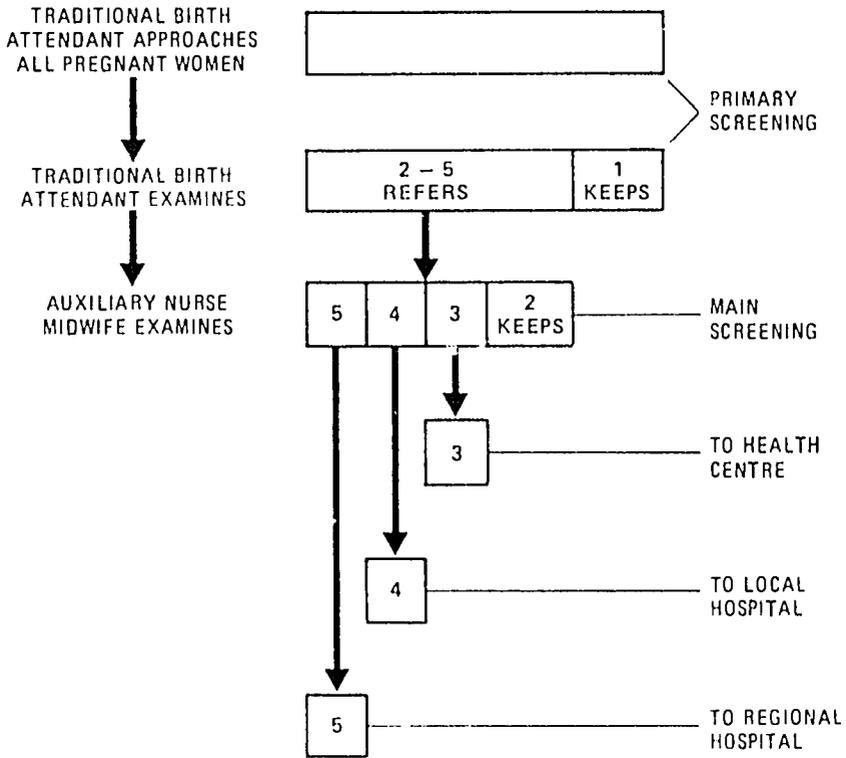


Fig. 3. Screening for risk using scores 1-5.

Notes: In this example no significance is attached to population size at each step. In actuality this is dictated by a balance of resources (facilities, skills, technology, etc) and scores—reflecting risks. At each step some mothers refuse further referral and some mistakes are made. Source: Reference 1, Page 28.

(TBAs) are predominant, this cadre can be trained to identify certain categories of risks. The TBAs can in turn refer more difficult cases to auxiliary nurse-midwives who can in turn refer the difficult cases to senior nurses, physicians, or specialized high-risk centers (Figure 4). The risk approach application as just described is now functioning in a number of countries, including Zimbabwe. The TBAs are trained to understand the concept of risk. In fact, in most health centers, the risk factors are posted on the walls to alert both health care providers and clients.

The Concept of Attributable Risk

Attributable risk is the proportion of the problem that would disappear if that particular factor were eliminated in the population. Attributable risk is based on the following concepts:¹

- The frequency of the unwanted outcome when the risk factor is present
- The frequency of the unwanted outcome when the risk factor is absent
- The frequency of occurrence of the risk factor in the community

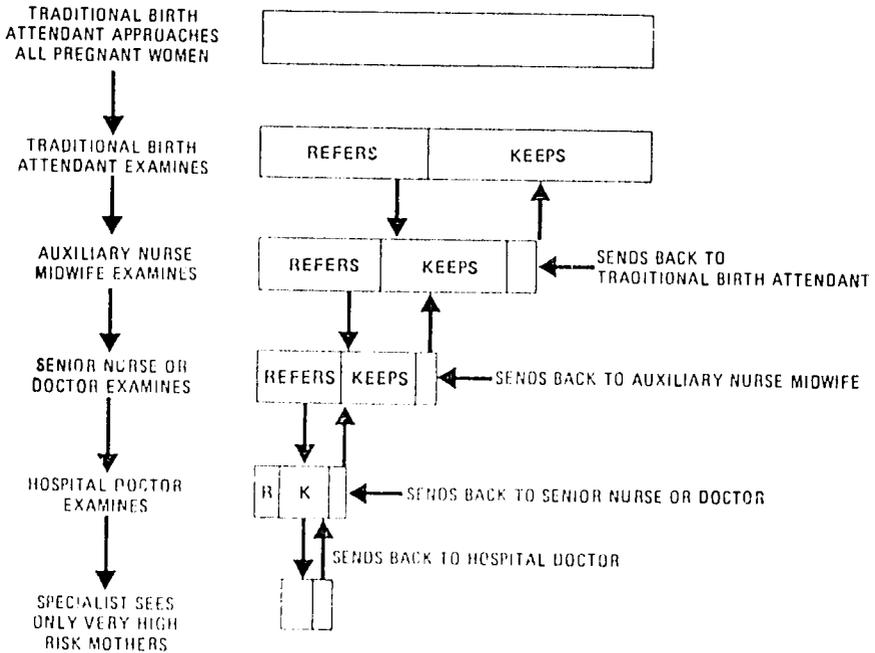


Fig. 4. The theory of screening for risk referral during pregnancy.

Notes: In this example no significance is attached to population size at each step. In actuality this is dictated by a balance of resources (facilities, skills, technology, etc) and risk. At each step some mothers refuse further referral and some mistakes are made. Source: Reference 1, Page 27.

Attributable risk can be seen in the case of adolescent pregnancy. For example, a certain proportion of maternal mortality would be decreased if one had an effective program of information, education, training, and services for adolescents to prevent the occurrence of adolescent pregnancy. Attributable risk will vary from one setting to another setting. It is very much dependent upon the proportion of the population with that risk factor. As one example, the relative risk of a woman with a positive serology for syphilis having a stillbirth is roughly between 5 and 9, whether this woman is in Philadelphia, Ethiopia, or Zambia. What differs is not the relative risk between different settings, but the proportion of women who have a positive serology. So for example, in looking at some of the early syphilis data from the classic articles from the early fifties in Philadelphia, about 12 to 18 percent of stillbirths in one large-scale study could have been attributed to syphilis. In Ethiopia, in contrast, roughly 30 to 40 percent of stillbirths can be attributed to syphilis. Looking at similar data and assuming that the data are of reasonable quality, we estimate that roughly 4 percent of stillbirths in Kenya can be attributed to syphilis.

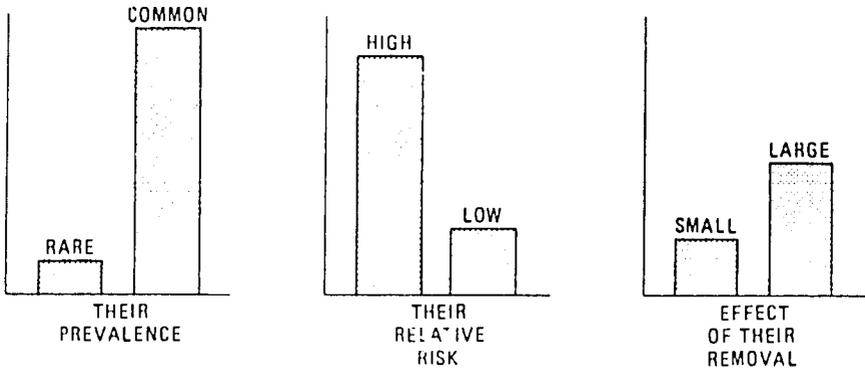


Fig. 5. Attributable risk: effect on the community of the removal of two risk factors.

Note: Attributable risk is based on the assumption of a causal relationship between risk factor and outcome.

Source: Reference 1, Page 23.

The importance of attributable risk is based on the interaction between the prevalence of a risk factor and the relative risk and what the effect would be upon removal of the risk factor. For example, the removal of a risk factor that is very common—even if it has a low relative risk of 1.5, that is, a 50 percent increase of risk for adverse outcome in those with the factor—may have a very significant effect because of that risk factor's high prevalence (Figure 5). An example of attributable risk can be seen in the relationship between oral contraceptives and hepatomas of the liver. Users of oral contraceptives have a very high relative risk of developing hepatomas; anywhere from 20 to 50, which is one of the highest relative risks published. Yet the phenomenon is so rare that focusing on it would have an exceedingly small impact in the overall problem of liver tumors.

Applying the Risk Approach

The implications of the risk approach extend beyond the health clinic and the identification of cases for clinical management. Figure 6 illustrates eight different levels for action based upon the risk approach, both inside and outside the formal health care system. Once it is decided what the risk factors are and what portion of the problem is attributed to them, health care providers have to look at those factors and decide at which level in the system to operate. For example, for the issue of adolescent pregnancy, if in fact access to information and education is thought to be important and has an effect in the reduction of the problem, then activity at the intersectoral level (educational strategies, educational methods, etc.) would be called for. At the same time, there are things that can be done at the family level. For example, TBAs can be trained to take a history and identify young women who had difficulties in past labors. They can even go around carrying a walking stick that is cut off at 1.5 meters. If the woman is shorter than the walking stick, then the TBA must refer her because she has a high risk of

		3	4	5	6	7	
		INCREASING COVERAGE	IMPROVING REFERRAL	MODIFYING RISK FACTORS	LOCAL REORGAN- IZATION AND TRAINING	REGIONAL AND NATIONAL REORGAN- IZATION AND TRAINING	
		RISK SCREENING INCREASES COVERAGE	RISK DATA OR SCORES MEAN NEEDS AND SKILLS ARE BETTER MATCHED	TREATING HIGH BLOOD PRESSURE OR DIABETES. FOR EXAMPLE	CHANGING SKILLS AND FACILITIES TO MATCH NEEDS	CHANGING SKILLS AND FACILITIES TO MATCH NEEDS	
1	2	WITHIN THE FORMAL HEALTH CARE SYSTEM					8
SELF AND FAMILY CARE	LOCAL COMMUNITY CARE						INTERSECTORAL POLICY
SCREENING SELF AND FAMILY FOR RISK FAMILY HEALTH EDUCATION	COMMUNITY DEVELOPMENT, LOCAL CARE						REFLECTS DISTRIBUTION OF NEED AND RISK FACTORS SUCH AS POVERTY, OVER- CROWDING AND MALNUTRITION

Fig. 6. Some uses of the risk approach inside and outside the formal health care system.

Source: Reference 1, Page 43.

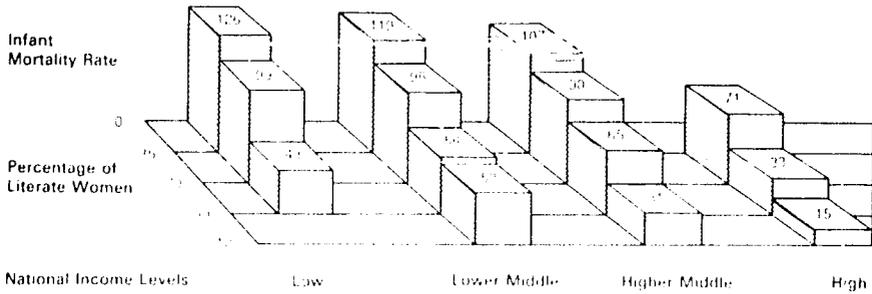


Fig. 7. Infant Mortality and Women's Literacy, by Broad Income Groups

In each income group, countries with a higher proportion of literate women have an infant mortality rate considerably lower than countries with a low level of female literacy.
 Source: Reference 6 Page 10

having cephalopelvic disproportion, and would have a high risk of a long labor because she is short. Simple techniques for identifying anemia are also available. For example, a technique that requires only a solution of copper sulfate and a finger prick can be used. If the blood drops to the bottom of the solution then the woman can be considered not anemic, and if the blood floats and then disperses, she is anemic. Thus, simple technologies can operate at different levels, not just within the health system.

Risk Factors and Fertility

Recently, I have been focusing much of my attention on what I call my three dollars for maternal and child health and family planning. If I had only three dollars to allocate for MCH services, where would I allocate them? The first dollar would be for women's education. An examination of the data from the World Fertility Survey, or a series of studies on infant mortality, even if we adjust for social class and geographic area, shows the impact of education (Figure 7). So, even without a change in income levels, a change in educational levels will have a major impact on infant mortality and on the appropriate use of health services.

The second dollar goes to women's income-generating activity. Why? Because generating women's income will give women decision-making power. It will change their social position. It will change their ability to use that income for themselves and for their families. Women tend to use their income for the overall family as well as for themselves and their own health.

The third dollar goes for MCH and family planning services, but the fact is that you need those first two dollars to ensure that there is not discrimination against women, that they do grow to an appropriate height, that they are not discriminated against in health care, that they are well nourished, and that they do not work during pregnancy to the point where they have no energy left to take care of the pregnancy and their own health.

Summary

The risk approach offers a technique that is adaptable in a variety of settings. The evidence that has been accumulating on some of these biological factors and fertility variables such as birth interval, maternal age, and parity seems to be relatively constant between different settings, both developed and developing. This strategy then needs to be tested. The prevalence of these factors in the community needs to be identified so that an appropriate risk approach strategy can be set up in a particular country; the criteria and standards of other countries may not be applicable in the local setting.

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Specific Strategies for Reaching and Managing High-Risk Groups

This session focused on approaches, strategies, and possible changes in policy that allow health providers to reach populations who are at high reproductive risk. Such groups were defined to be:

- High-parity women
- Women recently postpartum
- Women of advanced age
- Young women
- Women with acute or chronic health problems

In many developing countries large percentages of women do not receive any antenatal care. For example, a participant from Egypt pointed out that more than 60 percent of the women in his country fall into this category. Speakers urged that a community approach be taken towards reaching these high-risk women. For example, WHO is experimenting with a technique for identifying high-risk individuals—the home-based mother's record. This record can be adapted to any setting based on risks present in the community by utilizing existing data. The record can be used by nonliterate traditional birth attendants and nonliterate community members.

Other strategies were also discussed that have been utilized in attempts to modify reproductive risk. A speaker from the Cameroon pointed out that the national women's organization has been utilized to motivate high-risk pregnant women to come to clinics for antenatal care. Nurses in the Cameroon are also trained in the high-risk approach and high-risk identification. When traveling to rural villages, these nurses identify women at high reproductive risk, and refer them to clinics.

Reaching young people presents two major problems. First, they are often not reached at all. Second, if they do use services, they are often reluctant to return because of the treatment received from the health care providers. Speakers noted that one of the greatest barriers to overcome is insensitivity among the physicians and nurses providing services. To overcome the prob-

lem, WHO organizes training programs to sensitize health care providers in key positions in developing countries to the health care needs of this group.

The role of education in reducing reproductive risk was highlighted. An example was given of a pregnancy prevention program for young people in Baltimore that provides reproductive health services. The program has been able to reduce pregnancies in the experimental schools, while there has been a marked increase in the control schools. There was also a delay of seven months in the onset of first sexual experience in the experimental schools compared to the control schools. Thus, it was noted that education plays a great role in preventive health care, and it was urged that more attention be focused on it.

A speaker from Brazil discussed strategies being used (both direct and indirect) to reach and manage high-reproductive-risk groups in his country. Strategies include the following:

- Organization of courses for medical and nursing students in reproductive health.
- Development of a curriculum on reproductive health for medical and nursing school faculty.
- Organization of national meetings for medical school representatives which stress the importance of integrating family planning into the medical school curriculum. (The Brazilian Medical Education Association has accepted the recommendations of their meetings, including the integration of family planning into medical school curricula.)
- Organization of seminars to inform leading executives and community opinion leaders about reproductive health and its impact upon the health of the population.
- Organization of educational programs for commercial and industrial organizations regarding the value of family planning services for employees and their families.
- Organization of clinics that provide reproductive health services to young people.

Many speakers urged that in the use of the high-risk approach, there should be linkage to the community through consumer education to prevent people from becoming high-risk. Strategies include educating parents and teachers to be sensitive to the difficulties that young people face in reproductive health, and working with nongovernmental organizations like youth councils to develop programs of reproductive health education. It was urged that fathers and husbands also be educated to understand pregnancy and the process of pregnancy.

Speakers emphasized the importance of training traditional birth attendants (TBAs). Both in Nigeria and in Zimbabwe, TBAs have been trained successfully in identification of high-risk women and in referral of these women for treatment.

A speaker noted that for most developing countries, programs of community-based distribution are an approach to solving the problem of high morbidity and mortality in rural areas. They are particularly important since the infrastructure, facilities, and manpower do not exist for the delivery of comprehensive reproductive health care services to these rural areas.

In summary, risk factors that affect maternal-child health outcomes can readily be identified. Unfortunately, effective strategies to modify risks have not fully evolved in many countries. Innovative programs, e.g., pregnancy prevention programs directed towards young people that involve the community, have shown some positive outcomes. Education of health care workers to overcome their biases may also be of importance in effectively developing programs to manage or reduce risk factors. Participants agreed that continued efforts must be made to identify strategies that will reduce reproductive risk.



Appropriate Reproductive Health Skills and Knowledge for Physicians and Nurses in Primary Health Care Settings

W. Henry Mosley, M.D., M.P.H.

Reproductive health care encompasses both the management of uncontrolled fertility as well as the promotion of child survival. Because fertility control is discussed elsewhere, the focus of this paper is on child survival program strategies.

The magnitude of the problem of infant and child mortality may be illustrated by observing that of the 129 million babies born annually, 14.4 million will die before reaching the age of five years.¹ This represents almost 40,000 deaths among infants and young children each day. Eighty-six percent of all births, but 98 percent of all infant and child deaths in the world, are in developing countries. In most of these countries, 40 to 60 percent of all deaths annually are among children under five years. By contrast, less than 2 percent of deaths in the developed countries occur this early in life.

There are wide disparities in the levels of infant and child mortality among different regions of the developing world as shown in Table 1. At one extreme, East Asia (including China) with 1.1 billion people contributes 22 million births and 0.9 million infant and child deaths annually. At the other extreme, Africa with only half this population (555 million) not only produces slightly more births (25 million) but also accounts for almost five times more infant and child deaths (4.3 million). Closely following Africa is South Asia with 1.5 billion people contributing 17 million births and 7.1 million infant and child deaths annually.

In planning for interventions to improve this situation, the seemingly logical approach is to search for diseases that are amenable to simple technological interventions. One such analysis is presented in Table 2. This compilation, developed from vital registration data from a number of developing countries,

Table 1
World Demographic Estimates 1985

	Millions		
	Population	Births	Infant and child deaths (under five years)
World Total	4,837	129	14.4
Developed Countries	1,174	18	0.3
Developing Countries	3,663	111	14.1
West Asia	109	4	0.4
South Asia	1,456	47	7.1
East Asia	1,129	22	0.9
Africa	555	25	4.3
Latin America	405	15	1.0

West Asia - Asia west of Iran

East Asia - China, the Koreas, Mongolia, and Hong Kong

South Asia - The rest of Asia

Source: L. Goldstone (Reference 1).

suggests that the vast majority of infant and child deaths are due to diarrhea, immunizable diseases, respiratory infections, and malnutrition.² Considering the technological interventions that we have in hand and their potential effectiveness if appropriately used, the table suggests that as many as two-thirds of the infant and child deaths may be prevented by basic health care

Table 2
Potential Reduction In Infant and Child Deaths

Disease	Estimated no. of deaths	Interventions	Effectiveness	Potential reduction
Immunizable diseases	3.3-5 million	Vaccines	80-95%	3-4.5 million
Pneumonia/lower respiratory infection	4 million	Penicillin	50%	2 million
Low birth weight, malnutrition	3 million	Maternal supplements Treat infections Contraception	30%	1 million
Diarrhoea	5 million	ORT	50-75%	2.5-3.5 million
Deaths	15 million		Reduction:	10 million

Source: Rohde, Reference 2.

programs incorporating oral rehydration therapy, immunizations, penicillin and other treatments for infections, dietary supplements, and contraception. It is from this type of analysis that the international community has embarked upon a worldwide child survival program promoting, for example, basic technologies including growth monitoring, oral rehydration therapy, breast-feeding promotion, and immunizations. This particular group of interventions has been given the acronym GOBI by UNICEF.³

Determinants of Child Survival

While these basic interventions are important elements in any child survival program, the promotion and preservation of child health actually involves a more complex process. The best way to demonstrate this is to look at children over their early lives rather than to focus on diseases. Some of the best longitudinal studies of infants and young children were carried out by Leonardo Mata in Costa Rica.⁴ Figure 1 depicts a typical growth chart of a child from Mata's studies. This illustrates the growth of a child from birth through the first three years of life in comparison to the average expected growth of children according to international standards. Typical of a substantial proportion of children in the developing world, the child began life with a low birth weight. Growth was normal through the first five months of life during the period of breast-feeding; however, with weaning, the child was afflicted with multiple episodes of diarrhea and respiratory infections as well as parasitic infestations. This resulted in progressively severe growth retardation so that by the age of three this child's weight was only about 70 percent of the expected median weight-for-age. While the growth chart shown in Figure 1 is often called a "road-to-health" card, the child's course shown here is better described as "the road to death."

It should be apparent from Figure 1 that while mortality is the terminal event in a child's life, it is most often the cumulative consequence of multiple disease processes and only rarely the result of a single isolated disease episode. In this context, Figure 2 is a schematic diagram provided to illustrate the fact that growth retardation actually begins from the moment of conception and that depletion of maternal nutritional reserves—reserves that are important for the nurturing of the fetus during pregnancy as well as for breast-feeding—most often has its origin during the course of pregnancy in the impoverished mother.

From the standpoint of developing intervention strategies, it is useful to consider this intense exposure to infectious diseases and nutritional deficiencies as largely the result of five basic biosocial mechanisms that directly influence the risk of morbidity and mortality in infants and young children.⁵ These are the following:

1. *Maternal Factors.* The maternal factors are maternal age, parity, and birth interval, each of which has been shown in numerous studies to exert an independent influence on pregnancy outcome and infant survival

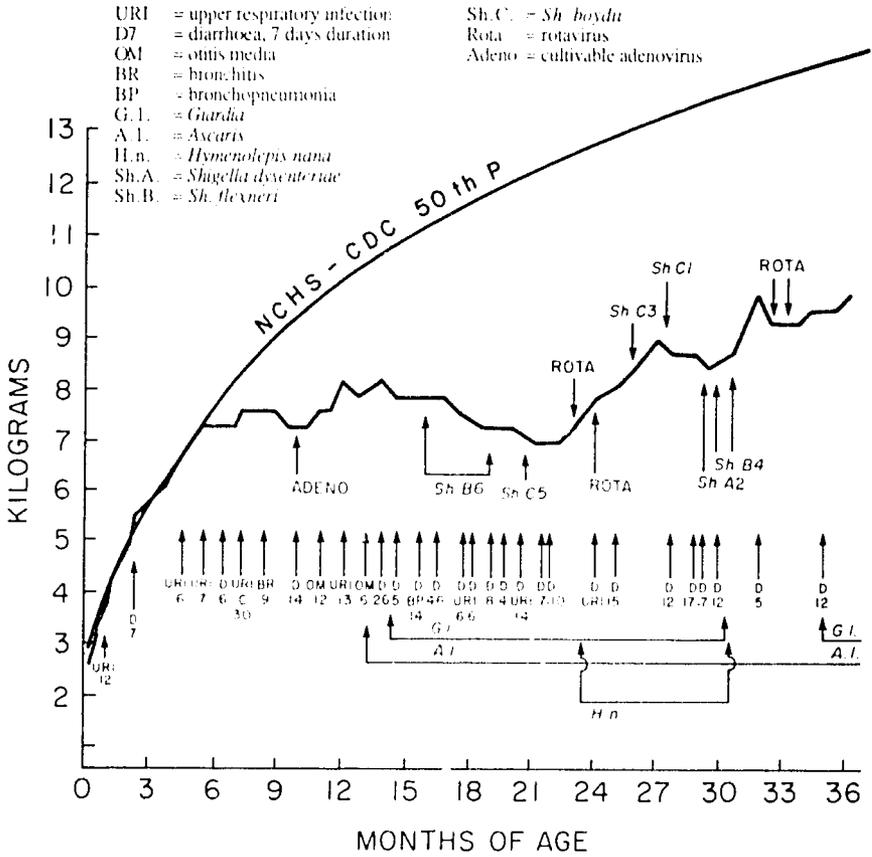


Fig. 1: Enteric infections, diarrhoeal episodes and weight curve of a low-birth-weight child exclusively breast-fed for several months.

Source: Mata, Reference 4.

through their effects on maternal health and fetal growth and development.

2. *Environmental Contamination.* This relates to the transmission of infectious agents, through the air for respiratory diseases; through food, water, and fingers for the diarrheas and other intestinal diseases; through the skin for skin infections and some parasitic diseases like scabies and hookworm disease; and by insect vectors for malaria and other parasitic diseases as well as for viral diseases.
3. *Nutrient Deficiency.* This relates to the lack of an adequate and balanced diet for the mother during pregnancy as well as for the child throughout the early period of growth and development. Included here is breast-feeding.
4. *Injury.* This relates to physical injuries, burns, and poisoning.

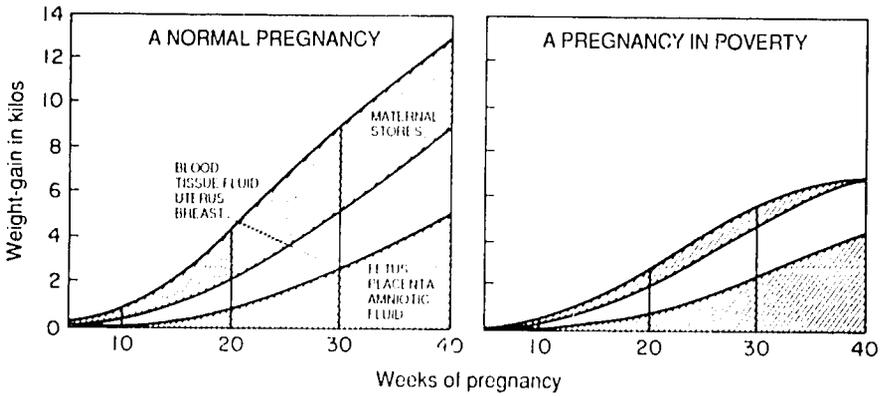


Fig. 2. Effect of poverty on weight-gain in pregnancy.

Failure to gain sufficient weight in pregnancy increases the risk of maternal depletion, low birth-weights, and infant mortality.

Source: Breast-Feeding, Fertility and Contraception, edited for the International Planned Parenthood Federation by Ronald I. Kleinmann and Pramilla Senanayake, IPPF, 1984.

5. *Personal Illness Control.* This includes both the measures that healthy individuals take to prevent or avoid disease—measures such as immunizations or antenatal and childbirth care—as well as medical treatments selected to cure diseases.

Figure 3 is a schematic diagram showing how these five groups of proximate determinants operate to affect the health and survival of infants and young children. This figure highlights the fact that all of the social and economic factors in households and communities must operate through these five basic mechanisms in order to influence the risk of disease and outcome of disease processes.

The Production of Health

This conceptualization of the problem provides a rationale for a more comprehensive reproductive health intervention strategy. To begin with, families, mothers in particular, should be recognized as the primary *producers* of healthy children. This approach should replace the more traditional biomedical view of pregnant women and sick children as *consumers* of services. A mother will act on her knowledge and beliefs, utilizing the skills and resources at her command, to take whatever steps she considers appropriate and necessary to protect her health and the health of her child. The role of the health system in a reproductive health program is to facilitate mothers' roles in the production and maintenance of healthy offspring, primarily by adding to their base of knowledge and skills and, where necessary, by providing resources for selected technical interventions that will be effectively available to all women.

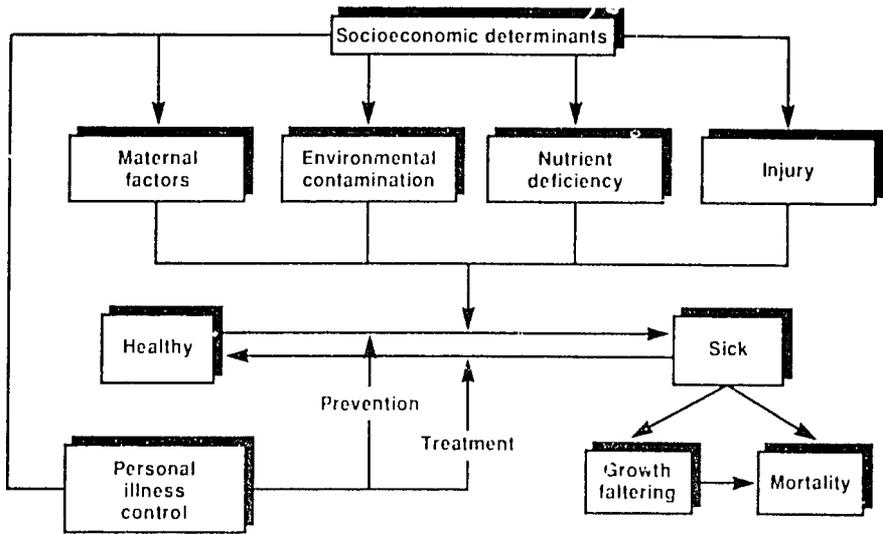


Fig. 3. Operation of the five groups of proximate determinants on the health dynamics of a population.

Source: Reprinted with the permission of the Population Council, from W. Henry Mosley and Lincoln C. Chen, eds., *Child Survival: Strategies for Research*, Supplement to Vol. 10 of *Population and Development Review* (New York: The Population Council, 1984), P. 29, Figure 2.

A Reproductive Health Strategy

The key premise underlying a reproductive health program is that it should be population-based, designed to reach out actively to every reproductive-age woman in the community rather than designed to follow the more typical pattern of Western medical systems that are institution-based and which passively wait for sick clients to appear for services. A good way to define the essential elements of a reproductive health program is to look at the range of actions that women take throughout their reproductive life cycle in an attempt to produce healthy offspring, and determine what information, skills, resources, and technical assistance they need to better achieve their goals. This cycle is outlined in Table 3. Four stages can be identified: preconception, pregnancy, childbirth, and postnatal. Because most women in developing countries have multiple births, they pass through these stages several times during their reproductive lives.

The first stage, preconception, must include sex education and premarital counseling for all adolescents in an effort to prevent the high reproductive risk to young women and their infants that is associated with adolescent pregnancy. Contraceptive counseling and services will be essential for those who require it.

In order for women to protect their own health and that of their fetuses during the stage of pregnancy, they will need information, guidance, and counseling on most aspects of their daily lives. Too often in the institution-

Table 3
**Stages in the Reproductive Life Cycle
 With Maternal Practices influencing Child Survival**

- I. Preconception
 1. Conception-delaying actions
 - postponement of marriage
 - birth-spacing behavior
 - contraception
 - abstinence
 - breast-feeding
- II. Pregnancy
 2. Specific preventive practices to "protect" pregnancy
 - traditional practices
 - e.g., dietary restrictions, rituals
 - modern practices
 - prenatal care
 3. Treatments selected for sickness/complications
 - traditional
 - modern
 4. Dietary practices
 - food taboos
 5. Work activities
 - physical demands of work (energy use)
 6. Other behaviors
 - smoking, use of drugs, etc.
- III. Childbirth
 7. Place selected for childbirth—hygienic conditions
 - home
 - health facility
 8. Attendant selected for childbirth
 - self/family
 - traditional birth attendant
 - qualified midwife/physician
- IV. Postnatal
 9. Breast feeding practices
 - use of colostrum
 - duration of full/partial breast-feeding
 - pattern of breast-feeding (demand/schedule/nighttime)
 10. Supplementary feeding of infant
 - type/timing/amounts of food offered
 - special infant foods
 - use of bottle feeding
 11. Dietary practices of mother
 - food taboos/restrictions/supplements during breast feeding
 12. Household hygienic practices
 - source/storage/uses of water (amounts/quality)
 - cleaning practices including use of soap for infant, self, hands, utensils, baby bottles, clothing, bedding, diapers, and general environment
 - hygiene in food preparation/serving/storage
 - use of latrine/toilet

Table 3 continued

13. Specific preventive practices
 - traditional: taboos/rituals (circumcision, etc.)
 - modern: postpartum/well-child care, immunization, vitamins, etc.
 - contraception
14. Sickness care practices
 - traditional: food restrictions, traditional medicines, rituals, etc.
 - modern.
15. Activities (work) of mother
 - time of resuming usual household work
 - time of resuming outside work
 - care of infant during work
 - place of care (home or work)
 - delegation of care (sibling/relative)—unqualified or qualified caretaker

based approach, prenatal care involves a limited examination of certain biological parameters such as weight gain, blood pressure, hematocrit, urinalysis, fetal status, and pelvic adequacy, followed by the provision of a few technologies such as vitamins, iron, and occasionally tetanus toxoid immunization. In large measure, this clinic-based approach only detects problems after they become manifest. What is required in developing country settings is a population-based approach—which assesses the social norms in terms of dietary practices, food taboos, physical activity, and other traditional behaviors which mothers engage in—to influence the outcome of pregnancy. On the basis of this, an effective reproductive health program must provide education not only to the individual women but also to husbands and community leaders to build a base of social support to discourage behaviors such as food restrictions or excessive work that would adversely affect pregnancy outcome, while encouraging practices that would promote the production of a healthy child.

A critical stage is childbirth. At the present time, for the majority of women in the developing world, home deliveries are the norm and probably in most cases the only attendants are relatives and immediate family members. An effective reproductive health care program, then, must again have a population-based outreach activity that provides every mother with essential information necessary to assure the safest possible delivery under her own household conditions. Furthermore, mothers and their relatives should be made aware of critical signs and symptoms of potential complications during delivery so that they can seek professional assistance if necessary. Coupled with this there must be essential backup services available on a 24-hour basis. A range of levels of technical support may be provided for childbirth care depending on the existing circumstances. This may include the utilization of trained traditional birth attendants or auxiliary midwives or qualified nurse-midwives. The most crucial factor assuring that this component of a reproductive health program is effective is not so much the level of technical training that a birth attendant may have but rather the strength of management and supervision provided by the health care organization to assure that

the birth attendants maintain their skills, and to assure that these attendants are actually available and utilized by women in need. It is undoubtedly the lack of these management skills that has resulted in the low effectiveness of so many primary health care programs.

In the postnatal stage, a mother needs effective knowledge about a whole range of practical household activities that are critical to the promotion of her health and the health of her infant. This encompasses not only the usual attention given to breast-feeding and supplementary feeding practices for the child but also attention to dietary practices of the mother as well as general household hygienic behavior. Critically important here are the specific measures taken to prevent or treat sicknesses. Currently, many institution-based maternal and child health care programs offer modern technologies such as immunizations, vitamins, antibiotics, and drugs in a passive manner, giving little attention to educating mothers about disease causation and what they can do themselves to prevent recurrences. A population-based reproductive health program should recognize that each society has its own view of the causes of disease and its own store of traditional preventive and sickness care practices. Although some may be useful, many practices may not only be ineffective, they may also be dangerous to the health of the mother and child. These practices must be identified and patterns of behavior changed through community education and motivation programs. Mothers and their families need to become aware of the means to prevent and appropriately treat a wide range of common conditions such as skin and eye infections, simple wounds, minor respiratory infections, and intestinal parasites. They also need to become aware of the use of ORT in the treatment of diarrhea and chloroquine in the treatment of malaria.

Finally, a population-based program must give attention to the social context in which it operates. For example, mothers may be away from the home for extended periods with child-care responsibility delegated to other caretakers. If this is the case, there must be a provision for incorporating these caretakers into the program activities.

Summary

In recent years, increasing worldwide attention has been directed to the excessive infant and child mortality in the developing world. Although historically high mortality might have been attributed to poor economic conditions, we can see from the experiences of many relatively poor nations such as China, Sri Lanka, Costa Rica, Cuba, and the state of Kerala in India that health conditions are not inextricably linked to the levels of national income. Rather, the key factor is the structure and organization of social services including health systems that have a population-based strategy built on the principle of equity.

Families, particularly mothers, are the primary producers of health in all societies. The role of a health system should be to strengthen families' capacities and skills in producing health and, where essential, to provide the

technical resources and backup to facilitate this process. Traditionally, the Western medical care model has had a passive, institution-based structure. We have learned from national family planning programs that effective health strategies must be population-based with an active extension program. This same approach will be essential to promote child survival.

The critical component of an effective reproductive health care program is trained and qualified manpower at every level. As has been detailed in this paper, these persons will require not only a traditional biomedical education but also the skills to translate this education into effective population-based programs. This will require basic and continuing education in the following three areas:

1. The technical aspects of community-wide interventions to assist mothers in preventing and/or treating a wide range of common infectious and parasitic diseases and nutritional deficiencies. This would include, but not be limited to, interventions such as oral rehydration therapy, immunizations, growth monitoring, and breast-feeding, as well as the management of pregnancy and contraception.
2. Communication methods to effectively educate and motivate women, families, and communities to change and improve traditional health behaviors.
3. Program management techniques concentrating on methods to design, implement, supervise, and evaluate large-scale population-based programs.

New curricula and innovative approaches to basic training and continuing education will be essential to meet these requirements, given the magnitude of the need for reproductive health care in the developing world.

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Multidisciplinary Approaches to Reproductive Health

Denys V. I. Fairweather, M.D., F.R.C.O.G.

Introduction

The subject of reproductive health has many facets, and among those the issues of education and technology are clearly important in terms of our ability to improve maternal and child care throughout the world. I propose to use the theme of multidisciplinary approaches to share with you some of my observations culled from over 35 years of involvement in the field of reproductive health, in both the developed and the developing world, both as a practitioner and a teacher, and also as one who has been privileged to hold senior volunteer offices in two international federations working in the field. Over the years, I am afraid I have become a little cynical about the great facility that groups such as ours have for making statements, declarations, and resolutions that are then passed during appropriate meetings by our colleagues with murmurs of approval and noddings of heads, but which in many parts of the world still produce negligible or no changes in patterns of maternal and child health care. The reason for this, at least in some cases, is the *failure to achieve change in the attitudes* of not only health professionals but also community, religious, educational, and political leaders—to name but a few.

The Multidisciplinary Approach

The Alma Ata Declaration of 1978 stated that "Primary Health Care 'relied' at local and referral levels on health workers, including physicians, nurses, midwives, auxiliaries and community workers as applicable, as well as traditional practitioners as needed, suitably trained socially and technically to work as a *health team* and to respond to the expressed health needs of the community." This *multidisciplinary health team*, however, needs (as stated) "to respond to community needs." But within that community element, in my view, lies another vital multidisciplinary array (teachers, religious leaders, politicians, etc.) that we should recognize and involve in our training pro-

grams, not only to enable better formulation and expression of community needs but also to better sensitize the health professionals to these needs. In the family planning field, I introduced this approach in 1971 through a WHO working group¹ and subsequently by means of a Training Development Feasibility Study.² The multidisciplinary approach was used to design courses and train course leaders to provide participants with the following: a basic core of knowledge (but not the detail required by specialist practitioners); an awareness of attitudes of different religious and cultural groups within the community; the opportunities for developing understanding of their own attitudes and roles and those of others; and an understanding of the problems, methods, and processes of communication which may be involved between the disciplines and with the public. In addition to members from the medical, nursing, education, and social work professions (both trained and in training, senior and junior), we involved clergy, probation officers, marriage counselors, police, local government administrators, and youth workers. Our evaluation and follow-up (which extended over a year after each course) confirmed the courses' value and showed evidence of improved communication between disciplines, which often resulted in more effective provision of help to couples in need. Participants stressed that their work had been influenced by improved understanding of the availability and functioning of other medical and paramedical services. Interesting observations concerning the attitudes of the different disciplines proved revealing, and it was apparent that change did take place. This was particularly noticeable after the courses held at student levels where it was considered by some that the medical students were already regarding themselves as doctors and on a different plane from the others. After the third day, however, these same students seemed to be doing their best to dispel this myth of superiority.

With respect to the medical profession, teachers in university departments inevitably exert a major influence on the development of attitudes and practice, and regrettably during training, judging by the resistance of our profession to accept change, not enough emphasis is placed on the need to review and, if necessary, *change both attitudes and practice* so that they remain relevant to the current needs and expectations of the public we serve. There is a natural tendency for new generations of teachers (in whatever sphere one may choose) to start teaching a course in a certain way because that is the way they were taught. Here we must of course acknowledge that innovation in medical education probably began at Johns Hopkins near the end of the last century. So, it is not surprising to see them today in this JHPIEGO initiative. Still, however, too many programs fail to emphasize to student doctors how they fit into the community, the importance of interpersonal relationships, and how the well-being of the individual both influences and is influenced by society. This type of approach is, to my mind, extremely important because it recognizes the fact that there is a need to expose the doctor in training to nonmedical teachers beyond the usually accepted group of nonclinical basic scientists. I., 1975, I wrote in an educational journal series on *Trends in*

*Tertiary Education*³ that "what we need to produce from our medical schools today are doctors who are skilled not only in medical knowledge and techniques but individuals who have the ability to communicate, to listen and to understand and then advise. The doctor has always enjoyed a rather special place in society and in the community but he or she must recognize nowadays that the concept of the 'health team' with the doctor as only one component and not necessarily in the leader position, is a logical and desirable development." Twelve years later, I confess that even in my own school I am fighting to change entrenched attitudes—not just those of my senior contemporaries but, unfortunately, often similar attitudes in much younger colleagues.

In responding to reproductive health needs we must harness all available health manpower resources to reduce the unacceptably high rates of maternal and infant mortality and morbidity in many parts of the world. For example, at the 1985 FIGO Congress, the Federation Assembly endorsed a resolution calling on member associations to encourage the inclusion of TBAs in health teams. Professional obstetricians and midwife groups in many parts of the world are, however, still extremely resistant to promoting this alliance. When one considers that in the developing world between 60 percent and 80 percent of all births are attended by TBAs and that fully trained professional medical personnel are hardly ever seen in vast tracts of these countries, it seems incredible that these professionals should view attempts to upgrade the skills of the TBAs with such indifference or even hostility. Here again I believe it is the responsibility of the medical teachers in every country to give a positive lead by practical example and via local projects to bring about change in the professional attitudes. Medical teachers should also encourage the TBAs to accept *change in their attitudes and practices*.

Multidisciplinary Training Approaches

Professional attitudes (especially those of doctors and midwives) influence the prospects for introducing beneficial techniques to wider application throughout the world. Depending upon the circumstances, there is a range of relevance. At the TBA level, there is the introduction of concepts of sterile procedures and the instruction in first-aid measures for the control of hemorrhage. At the other end of the scale, there is the acknowledgment that many procedures traditionally considered the "doctor's province" may be performed equally well (and often better) by midwives and even by specifically trained nonmedical personnel. Although it may be unthinkable by some, I am aware that the concept of midwives performing caesarean sections is already being tested. I personally have no illusions about the ability of any individual to be trained to carry out skilled medical tasks without necessarily having had a formal medical training. Indeed, I am one of those in my own country and hospital who have for years encouraged and facilitated (often with the disapproval of my colleagues) the extension of midwife skills and practice. Our multidisciplinary approaches must continue to encompass the

concept that just because certain tasks or procedures have traditionally been performed by one specific health care discipline group, that does not mean that they cannot be carried out by members of other discipline groups.

In 1975 in the article³ to which I referred earlier, I also noted that "the basic drawback in present training methods was that by continuing to segregate and compartmentalize the individual groups in training, we do nothing to avoid the 'hang-ups' which develop because of failure of individuals from one group to know and understand the objectives, responsibilities and problems of other groups." I suggested that by applying the principle of multidisciplinary training groups to new recruits we would encourage them to form their opinions and views having the benefit of discussions within mixed groups of different backgrounds. Here again, I am afraid that I have seen only very limited uptake of this type of approach. Of course, I know that it is extremely difficult to program this sort of multidisciplinary course where one has to fit in with existing established single-discipline courses to enable integration of participants.

Fostering the Multidisciplinary Approach to Reproductive Health

I would like to address the following question: How can the international community of medical teachers in reproductive health use existing channels to the greatest effect to produce the changes in attitudes and practice to which we are pointing and also demonstrate our commitment to multidisciplinary approaches and solutions? We need to operate on three levels—international, national, and local.

On the international scene there are many organizations involved in the field of reproductive health. Globally, WHO has the most obvious profile, but it does and indeed must work closely with other agencies with more specific professional affiliations—the midwives through the International Confederation of Midwives, the pediatricians through the International Pediatric Association, and the obstetricians through the International Federation of Gynecology and Obstetrics (FIGO), as well as with other special interest groupings such as IPPF, UNICEF, Family Health International, and fund providers such as UNFPA, USAID, the World Bank, etc. The structure of all these organizations varies, and sometimes regrettably, coordination of activities is minimal. We need to make the best use of dwindling resources—both human and financial—by fostering more cross-organization discussion and activities. It is to this end that for the past few years the Joint WHO/FIGO Task Force for the promotion of maternal and child health (including FP) in primary health care was established under the chairmanship of Professor Mahmoud Fathalla. This group now serves as a liaison between the international organizations while also pursuing a specific work plan—within which much emphasis is placed on aspects of teaching, advocacy, and the dissemination of relevant information to a multidisciplinary network. We hope that soon this approach will begin to demonstrate its effect in improved

communication and also, hopefully, in its ability to identify and channel funds from a variety of sources to appropriate initiatives.

International professional and special interest bodies are almost always based on representation from a federated type of structure that comprises national associates, affiliates, etc. These national bodies seek to look after and publicize the particular views, policies, and so on of the specific discipline group. In turn, these national bodies draw their membership from the individuals practicing in various localities in the country, and in some instances they come together to form local associations. Thus in the field of obstetrics and gynecology in the United Kingdom, I belong to a local London obstetrical and gynecological society and also to a smaller hospital/district grouping. (I also happen to belong to the Royal College of Obstetricians and Gynaecologists, the national body which in turn sends its representatives to FIGO.) But I give this illustration to emphasize how far removed it is possible for an individual professional to be from international and even national opinion-forming scenes. We all know, however, that unless communications are good with the actual worker/practitioner in the specialty, we cannot hope to reflect opinions adequately and encourage introduction of new views or practice.

Other health professional specialist bodies have similar groupings at national and local levels, and thus the problems of organizing useful interdiscipline contacts are apparent. When it comes to communication with the non-health professional groups locally and nationally, it is clear that unless there is really strong motivation nothing will happen, and when finally one looks critically at the actual mechanisms for professional contacts with the local community—the consumers—the present-day scene is fairly bleak in most countries. As a result, we have seen in the developed world over the years the upsurge of so-called “pressure groups” that tend, not without reason, to highlight the aloofness especially of the medical profession and often to take stances that are felt to be extreme and uninformed. We—the medical teachers—must recognize that contact with these groups will often be beneficial in alerting us to the real reasons for concern and at the same time give us an opportunity to make positive input to provide factual information on particular medical issues.

Communication: the Key

What, you may justifiably ask, has all this got to do with multidisciplinary approaches to reproductive health? I suppose that I am really making a plea for people like you and me to lead by example—but not only in our national and international roles. We must also demonstrate practically to our students—undergraduate and postgraduate—that we place equal importance on our ability to communicate and work with our potential patients as we do on our ability to communicate and work with fellow professionals in our own and other disciplines. By doing this, those of us privileged to work also on the international scene can encourage and deliver more practical action at

the grassroots level and perhaps fewer words, weighty resolutions, and statements of intent.

Communication is the key to what we are all about. We need to interpret the term *multidisciplinary* in the broadest possible sense when we are considering our strategies for teaching and implementation of changing technologies, and at all times we must remember the people whom we aim to serve. I can do no better than to leave you with the words of Elise Ottensen Jensen, the great Swedish family planning pioneer born just 100 years ago—the words that for years (in the form of an old IPPF poster) I kept on the wall opposite my desk:

“We can learn from the people . . .
We must listen to them and get our ideas from them . . .
We do not know everything!”

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Integrating Reproductive Health and Primary Health Care

This session focused on changes that might be required to bring about the integration of reproductive health and primary health care in developing countries. The need for integrating reproductive and primary health care topics in medical and nursing school curricula was emphasized. Participants agreed that typically curricula in training institutions are based on Western models, are theoretical, and are not community-oriented. They urged that increased emphasis be placed on integrating preventive concepts into medical and nursing school curricula.

One participant felt that the emphasis on retraining must end, and called for a radical change in the basic curriculum of schools of medicine and nursing. Suggested is the development of practical curricula, relevant teaching materials, and the retraining of faculty in modern teaching technologies. Also recommended is that students have hands-on clinical experience (for example, in treating diarrhea or in IUD insertion) that would prepare them for conditions in the field.

Another discussant felt that the major problem with health programs in developing countries is managerial more than technical. The challenge from the curriculum standpoint is how to interest faculty and students in managerial issues. The challenge for training institutions is to make material scientifically acceptable and interesting to the medical and nursing students, who typically want to learn the latest in science and technical information, not managerial skills, in order to provide reproductive health services. To respond to this problem, it was noted that WHO is in the process of developing training materials on topics such as child survival interventions that have strong managerial components but also are scientifically acceptable. This speaker believes that this is the greatest challenge in developing curricula for institutions both in the developed and developing world.

Also emphasized was the importance of student's learning supervisory and logistic skills as part of their training. One speaker emphasized that if primary health care programs are to work, the essentials of logistics must be taught,

such as proper storage of pharmaceuticals, calculation of supply requirements, explanation of expiration dates of commodities, including making students aware that pharmaceutical products, including oral contraceptives, have a limited shelf life. It was suggested that the social service year of training might be the best point for teaching students both logistic and supervisory skills.

While major attention was focused on medical and nursing personnel, it was noted that equal attention must be paid to the cadre of personnel, such as traditional birth attendants, who implement many of the services. Therefore, programs must also be developed to reach these groups.

There was concern that in many countries a progressive decline has been seen in the percentage of ministry of health budgets being made available for preventive health activities. While budgets may be shrinking, a participant called for the careful examination of health resource allocations. For example, it was noted that in one country, the amount of money that is spent on open heart surgery could have immunized every child in that country against measles. The open heart surgery unit in one year operates on 80 patients and saves 40 lives, while about 200,000 children die of measles. Thus, resource allocation is a major factor to consider when assessing the development of reproductive health and primary health care programs.

In summary, participants agreed that basic principles of primary health care promotion should include concentrating efforts on *preventive health* rather than curative medicine and placing the emphasis of the program into the *community* rather than within traditional health care facilities. To apply these principles on a widespread basis will require radical alterations in the curricula of most health care training institutions as well as significant changes in systems of health care delivery.



**AIDS
and Other
Sexually Transmitted
Diseases:
Implications for
Reproductive Health**



The Global AIDS Situation

Jonathan M. Mann, M.D., M.P.H.

When the Acquired Immunodeficiency Syndrome (AIDS) was first recognized in 1981, it appeared that the disease was limited to a single country and to a single risk group. In fact, even in 1981 this was not true. Now, as a result of a series of national and international research efforts during the past several years, the global scope and magnitude of the epidemic of human immunodeficiency virus (HIV) is much clearer. We now realize that the HIV epidemic is an international health problem of extraordinary scope and unprecedented urgency. We also recognize that due to the particular features of HIV infection, the entire range of health sector activities must be aware of and respond to HIV-related questions and problems.

AIDS: The Global Picture

As of December 1982, only 711 AIDS cases had been reported from 16 countries. However, by 29 February 1988, 81,433 cases were reported to the World Health Organization from 133 countries, representing all continents. Reticence in reporting of cases from some areas, combined with under-recognition of AIDS and under-reporting to national authorities, has meant that the number of reported cases represents only a fraction of the total cases to date. WHO considers the number of countries officially reporting cases to be more indicative of the geographical extent and more relevant to an assessment of the scope of the HIV pandemic than the number of reported cases.

The Americas

Of the total of 60,409 reported cases, 88 percent (53,069) were from the United States, where the "classic" epidemiology of the disease was first described. In this "Western" epidemiological picture, homosexual and bisexual men and intravenous drug users are primarily affected, along with smaller numbers of blood transfusion recipients, persons with hemophilia, children of infected mothers, and heterosexual partners of infected persons. In the United States, an estimated 1.5 million persons are infected with HIV. The U.S. Public Health Service has predicted that approximately 270,000

AIDS cases will have occurred in the United States by 1991, with most of these new cases emerging from the large group of already infected persons.

Other countries reporting substantial numbers of AIDS cases in the Americas include: Brazil (2,325), Canada (1,488) Haiti (912), Mexico (713), The Dominican Republic (352), and Trinidad and Tobago (206). However, an additional 35 countries have reported from 1 to 163 cases.

Europe

Europe has reported 10,245 cases from 27 countries. The largest numbers of AIDS cases were reported from France (3,073), the Federal Republic of Germany (1,760), Italy (1,411), and the United Kingdom (1,227). Additional countries reporting 100 or more cases include: Austria (139), Belgium (297), Denmark (228), the Netherlands (420), Spain (718), Sweden (165) and Switzerland (355). Only one country in the European region reported no cases: Albania. Eight Eastern European countries and the USSR together reported 59 AIDS cases.

Most countries in Europe are now experiencing an epidemic of HIV infection. Current estimates of the total number of HIV-infected persons in Europe range from 500,000 to 1 million. Based on current trends, an estimated 25,000 to 30,000 AIDS cases are expected in Europe (cumulative) by the end of 1988.

Asia

HIV has only started to appear in Asia. A small number of AIDS cases have been reported from Japan (59), Thailand (12), The Philippines (10), India (9), Hong Kong (9), Singapore (7), Sri Lanka (2), China (2), Malaysia (2), Indonesia (1), Taiwan (1), and Tonga (1). These cases have either been related to imported blood and blood products, or to sexual transmission among persons with high-risk behaviors (female or male prostitutes). Serosurveys have so far demonstrated little or no evidence of HIV infection in general Asian populations, yet infections have occurred among members of particular risk groups. The current extent of HIV penetration into Asia is unknown; the opportunity for protection of Asia against widespread dissemination of HIV is evident and may be vital to the future of that continent.

Oceania

The 826 cases so far reported from Oceania are nearly all from Australia (758) and New Zealand (66), and are typical of "Western" epidemiological patterns.

Africa

No area of the world is more affected by HIV than Africa, in terms of the proportion of the healthy population already infected and probable numbers of AIDS cases. Central, Eastern, and parts of Southern Africa are experiencing epidemic HIV infection, and there is increasing evidence regarding a West

African focus of additional human retroviral infections (HIV-2). In Africa, the epidemic of clinically recognizable AIDS appears to have started recently, between 1975 and 1980. The geographical scope and intensity of HIV infection in Africa is difficult to assess, due to limited infectious disease surveillance and laboratory serodiagnostic capabilities and lack of a widely accepted clinical case definition for AIDS.

The proportion of healthy urban adults with serological evidence of HIV infection in the countries from AIDS-epidemic regions of Africa ranges from 2 to over 20 percent, although many of the studies have involved rather small and selected populations. The annual incidence of clinical AIDS in some Central African cities is at least 500 to 1,000 per million population.

While the basic modes of HIV transmission in Africa are identical to those in the developed world (sexual, blood contact, perinatal), several important regional variations exist. The dominant mode of HIV transmission in Africa is sexual, involving heterosexual transmission (infected man to woman; infected woman to man) of the virus. Not surprisingly, the male to female ratio among AIDS cases or among HIV-infected persons is approximately 1:1, and HIV seroprevalence rates among African women prostitutes are quite high, generally ranging from 25 to 90 percent. Once HIV is introduced into a heterosexually active population, rates of HIV infection may rise dramatically. Thus in 1980-81, 4 percent of female prostitutes in one African city had antibodies to HIV; by 1985-86, 59 percent were seropositive.

The importance of blood transfusions for HIV transmission in Africa is suggested by the high proportion of infected (although healthy) blood donors, which reaches 5 to 18 percent in some areas. While practices for collecting and transfusing blood vary widely throughout Africa, screening of donors for HIV infection is not yet universally performed, and storage and processing facilities may be insufficient.

While intravenous drug use is virtually absent in most of Africa, the problem of HIV transmission through contaminated needles exists in other ways. Any needle or other skin-piercing instrument that becomes contaminated with the blood of one person and is then used, without proper sterilization, to pierce the skin of another person can become a vehicle for HIV transmission. The problem in Africa particularly involves injections given for medical purposes, such as for treatment of malaria, fevers, diarrhea, or other common problems. While such injections are probably not a very efficient route for HIV transmission, persons receiving large numbers of injections, especially in peripheral, poorly equipped clinics, in paramedical or nonmedical settings, may be exposed to and infected with HIV. Fortunately, current evidence suggests that HIV is not being spread through childhood vaccination programs, in large part due to the longstanding and aggressive efforts to ensure clean needles and syringes in these vital public health programs.

Since HIV is heterosexually transmitted, pregnant women are among those in Africa who are likely to be HIV infected, with resulting transmission of the virus to their children, either before, during, or shortly after birth. While

the efficiency of mother-to-child spread is presently unknown, in areas of Africa where 10 percent or more of pregnant women are HIV seropositive, as many as 5 percent of all newborns may be HIV infected from birth. Pediatric AIDS, particularly difficult to recognize where malnutrition and respiratory and gastrointestinal infections are common, is an increasing problem in Africa.

Finally, despite important socioeconomic and environmental differences in household, occupational, and other settings in Africa compared with Europe and North America, there is no epidemiological evidence to support casual contact transmission or transmission through mosquitoes or other insects.

Worldwide

WHO estimates that there have been approximately 150,000 AIDS cases worldwide since the beginning of the epidemic and that between 5 and 10 million persons are infected with HIV.

Natural History of HIV Infection

Scientific knowledge about the natural history of HIV infection is limited to the five-to-seven-year observation period that has elapsed since AIDS was first described. However, three major HIV-associated outcomes have already been distinguished: (1) AIDS, (2) AIDS-related illnesses, and (3) HIV-neurological disease. The disease AIDS reflects profound damage to the immune system, with resulting opportunistic infections and malignancies. In this sense, AIDS is the most severe manifestation thus far observed of the immunosuppressive effect of HIV. The AIDS-related illnesses involve symptoms and signs of ill health of varying severity, including chronic fevers, profound weight loss, chronic diarrhea, and swollen lymph glands. More recently, HIV has been implicated in infection and disease of the nervous system involving progressive dementia. Finally, it is likely that other disease manifestations of HIV infection will become apparent during the next five to ten years.

During a five-year period, 10 to 30 percent of all HIV-infected persons can be expected to develop AIDS. An additional 20 to 50 percent will develop AIDS-related illnesses. The proportion of infected persons who will develop HIV neurological disease (particularly dementia) is unknown, but an epidemic of progressive neurological disease among HIV-infected persons must be considered a possibility.

As a result, from the 5 to 10 million persons already infected with HIV worldwide, between 500,000 and 3 million AIDS cases are likely to emerge during the next five years, along with 1 to 5 million cases of AIDS-related illnesses and an unknown number of neurological illnesses.

Impact Beyond the Health Statistics

The personal, social, and economic costs of the HIV epidemic are enormous. Uncertainties regarding prognosis, along with fears and realities of exposure and ostracism, may lead HIV-infected but asymptomatic persons to experience higher levels of stress than AIDS patients themselves. The family structure

and function is threatened both by infection and by the loss of mothers and fathers. The social and economic fabric is dramatically affected by the epidemic of illness and death among productive individuals aged 20 to 40. This phenomenon is typical of AIDS epidemiology in industrialized and developing countries. In Africa, social and economic development may be threatened by the loss, particularly among the urban elites, of a substantial proportion of persons aged 20 to 40. The direct economic costs of AIDS are also enormous. For example, in the United States the total cost of direct medical care for AIDS patients in 1991 is estimated to reach 16 billion dollars. In some Central African hospitals, 20 to 50 percent of adult patients on medical wards have AIDS or other HIV-related conditions, placing an additional burden upon already limited health care systems. The combined impact of the HIV pandemic, of AIDS, AIDS-related diseases, and neurological disease upon health care, insurance and legal systems, economic and social development, and indeed upon entire cultures and populations is already extraordinary and will become increasingly profound.

Throughout the world, personal and public reaction to AIDS has been considerable. Fears of AIDS and stigmatization of different groups (homosexual men, hemophiliacs, Africans, Westerners, female prostitutes) have become common phenomena. However, this remarkable global response has been generated by only 50,000 AIDS cases in the United States, 10,000 cases in Europe, and a relatively few reported cases in many other countries. Individual, family, group, and social tragedies are occurring regularly as a result of fears, most often unjustified, of HIV infection and its spread. Throughout the world, tremendous social pressures and tension are being generated by AIDS and AIDS-related concerns. Therefore, it must be anticipated that in the future social stresses—resulting from the occurrence of 270,000 AIDS cases in the United States by 1991, 25,000 to 30,000 European AIDS cases by late 1988, and increasing worldwide infections—may be correspondingly great. Proposed restrictions on HIV-infected workers and international travelers, along with the unfortunate tendency to blame "others" for HIV, suggest some additional international aspects associated with the HIV pandemic.

Global AIDS Prevention and Control

The magnitude of the HIV pandemic and its broad impact have been seriously underestimated and underappreciated. However, during the second half of 1986, a major shift of perspective and opinion occurred in many North American, European, and African countries. For example, in the United Kingdom, France, Italy, and the United States, statements by prominent health officials and dramatically increased financial commitments for AIDS prevention programs testify to a growing awareness of the scope of the HIV problem at national levels. An evolution in perspective regarding AIDS can be observed at the personal, group, social, national, and international levels. The initial response to AIDS usually involves denial and an effort to minimize

the problem, often through comparison of the numbers of AIDS cases with deaths from already well-described public health problems. Then, as the number of AIDS cases increases rapidly and estimates of the number of persons already infected with HIV in the population are developed and publicized, the HIV problem commands further attention. Finally, once the potential is recognized for HIV to involve major segments of the population, including those who may have previously considered themselves without risk, the epidemic nature and urgency of the HIV situation generate political commitment and a willingness to act. Africa provides just one specific example of this generic evolution in perceptions about AIDS. AIDS was first recognized in Africa in late 1983. As epidemiological data became available during 1984 and 1985, the scope and intensity of the HIV situation in many African countries became clearer, yet AIDS was not recognized or accepted as a health problem. Finally, at a WHO regional meeting on AIDS in Brazzaville in November 1986, representatives from 37 countries discussed AIDS openly and agreed that action to control the epidemic of AIDS in Africa had to be given the highest priority.

In May 1986, citing "intensive international interest and concern" about AIDS, the 39th World Health Assembly formally approved the creation of an AIDS programme within WHO. In November 1986, the director-general of the World Health Organization announced that in the same spirit and with the same dedication that characterized WHO's global smallpox eradication programme, WHO was now committed to the more urgent, difficult, and complex challenge of global AIDS prevention and control.

General Concepts

While the international HIV situation is dynamic, agreement exists on the fundamental concepts and principal components of global AIDS prevention and control.

The fundamental concepts include the following:

- HIV infection is an international health problem.
- Infection with HIV is an adverse health outcome of profound personal, family, and social importance.
- HIV infections threaten the limited gains in health that have been achieved in several areas of the developing world.
- Neither vaccine nor therapy for widespread use is likely to become available for at least several years.
- The HIV global control effort will be long term and will likely last beyond our generation.
- HIV prevention and control programs must be integrated with primary health care.
- The HIV pandemic represents an unprecedented challenge to public health which mandates a response of unprecedented creativity, energy, and resources.

Principal Components

The principal components of global AIDS prevention and control are

- Strong national AIDS prevention and control programs
- International leadership, coordination, and cooperation

WHO Global Programme on AIDS

The Global Programme on AIDS has been created as the vehicle for the World Health Organization's critical role in global AIDS prevention and control. The Global Programme on AIDS is supporting the development of strong national AIDS prevention and control programs, in over 120 countries, is providing international leadership, and is assuring global coordination and cooperation.

AIDS and Family Planning

AIDS control, as part of primary health care, is going to need the expertise, resources, knowledge, and infrastructure that family planning has created. In addition, there will be the inevitable impact of AIDS and HIV infections on family planning. The following are just a few areas:

1. *Contraceptive choices*—Clients may be faced with the choice between a contraceptive that has a higher efficiency for contraception and a contraceptive (such as the condom) which, we hope, has a high efficiency against HIV transmission.
2. *Injections and instruments*—It will be necessary to ensure that any procedure that involves cutting the skin and all injections are done in a way that does not contribute to the transmission of HIV. In other words, it will be necessary to make sure that needles, syringes, and instruments are sterile.
3. *New Challenges*—HIV-infected women will come to clinics and providers will need to know how to counsel these infected women both about their own health and about the health of those around them. This is a very complex and difficult area because of the uncertainties and because of the personal tragedies that can go along with HIV infection.
4. *Interactions Between Contraceptive Methods*—When people use certain forms of contraception (such as the injectables and IUDs), there may be interactions that would make HIV infection more likely to be a problem. Giving certain forms of contraception to someone who is already HIV-infected may increase certain risks for the HIV-infected person, or it may increase the risks of transmission.

From the AIDS viewpoint, we need family planning programs. These programs have the expertise and knowledge in human sexuality that are essential to our ability to struggle against AIDS. We do not have a vaccine, but we have education. We have a lot of knowledge, but we do not have the magic bullet. The WHO Global Programme on AIDS welcomes the oppor-

tunity to learn from and cooperate with family planning researchers, practitioners, and programs.

Summary

AIDS is a global problem. It is a problem throughout the world. It is the result of infection where the virus is severe for the individual, for the family, for the group, and for the society. AIDS threatens the health gains that have been achieved in the developing world. There is no vaccine yet; there is no therapy yet. We are engaging in the beginning of a long-term struggle in dealing with a virus and its consequences. Even if transmission stopped now, we would have to deal with the consequences of the virus infection for several generations to come. Because of all this, the struggle against AIDS must be integrated into primary health care. This must be a long-term viable approach, not simply a short-term campaign against AIDS. Finally, AIDS represents a challenge of extraordinary urgency which is going to require a response of unprecedented creativity, energy, and resources.



The Impact of AIDS on Family Planning Programs

Panelists endorsed the need for JHPIEGO to become more active in developing AIDS education programs. The rationale for this involvement includes the following points:

- Family planning and reproductive health centers are often the first line of health care in developing countries. Health workers must be able to provide accurate information to clients on how to avoid contracting or spreading HIV.
- Sexual intercourse, particularly in the developing countries, is a major mode of transmission of HIV. Family planning programs deal with women and men in the reproductive age groups, the groups most affected by AIDS and other sexually transmitted diseases.
- Condoms and spermicides, which are major means of protection against HIV, are provided in family planning service programs.
- HIV can be transmitted from mother to fetus during pregnancy or childbirth. Women at high risk to contract the virus need to be counseled by trained workers regarding possible risks to themselves and to the survival of their children.

The serological confirmation of HIV infection presents a problem in many developing countries. Panelists pointed out that very few laboratories in developing countries, particularly in Africa, are equipped to screen for HIV. Due to the unavailability of an inexpensive diagnostic test for HIV, most health workers in developing countries have to rely on clinical rather than serological diagnosis of AIDS.

In addition, ministries of health in developing countries typically do not have sufficient funds allocated in their annual budgets to cover the cost of mass HIV screening programs. To combat the problem of AIDS in developing countries, participants agreed that attention should be given to the development of rapid, inexpensive diagnostic tests, a vaccine, and a drug which could be used to treat the condition. Speakers urged that a field test (analogous

to the slide test for gonorrhoea) be developed that could identify HIV, rather than relying on the sophisticated and expensive ELISA test.

Regarding whether family planning workers have to take special precautions when using needles or other instruments in order to prevent the transmission of HIV, panelists agreed that special precautions are not required. Emphasized was a need for thorough sterilization of all instruments including syringes. It was noted that HIV is sensitive to the usual types of sterilization procedures, such as heat sterilization, and soaking types of solutions, such as the glutaraldehydes.

Speakers cautioned against the use of disposable needles in developing countries, expressing fear that because of lack of supply, health personnel might use disposable needles repeatedly, therefore spreading HIV. In this regard, it was recommended that family planning donor agencies develop new programs and types of support to respond to the AIDS crisis. For example, donor agencies might consider providing needles and syringes. In the past, very few donor agencies have provided these commodities to developing country family planning programs.

The possible relationships between family planning methods and HIV transmission were also addressed. Speakers urged that further research be conducted on the interactions between contraception and AIDS. While condoms appear to be an effective barrier against HIV transmission, there has been no published research results on what the relationships might be between the IUD and HIV transmission. There are also no data on the relationship between the spread of HIV and needles used in providing injectable contraceptives.

Finally, speakers emphasized that JHPIEGO should provide information to health care professionals on measures to prevent the transmission of HIV. Such information could be included in training modules on AIDS developed by JHPIEGO. It was urged that JHPIEGO also direct its educational efforts toward policymakers to help guide them in formulating policies to combat the disease. In its training programs, JHPIEGO should also emphasize preventive measures such as equipment sterilization and the proper use and handling of blood products.



The Worldwide Impact of Sexually Transmitted Diseases on Reproductive Health

Andre Meheus, M.D., D.P.H., Ph.D.

Introduction

The epidemiology of sexually transmitted diseases (STDs) and their impact on reproductive health has been well studied in the industrialized world, but sexually transmitted disease-related infertility is not a major public health problem in the industrialized countries. On the other hand, the sequelae of STDs cause considerable morbidity and even mortality in the developing world, but their link with STDs has been poorly studied. This is the classical paradox between the North and the South which is evidenced in nearly all health problems. I shall first discuss infertility and focus mainly on developing countries, and subsequently shall review STD epidemiology and its role in reproductive health.

Definition of Infertility

The popular definition of infertility which is also the one most often used by demographers is "childlessness". A couple may not have a living child due to primary infertility, pregnancy wastage, or even infant or child mortality. For public health purposes, we should make a distinction between infertility and pregnancy wastage because the etiology is different and so the control strategies are different. Nevertheless, the demographic concepts are useful for estimating the size of the infertility problem in an area, and if we speak about demographic data, we have available data from the World Fertility Survey which allow international comparisons.¹

Epidemiology of Infertility

Table 1 shows the rate of childlessness in married women 40-49 years old. The mean rate for the 27 countries studied is 3.4 percent. Indonesia has one

Table 1
**Percentage of Women Age 40-49, Continuously Married for at Least Five Years,
 Who are Childless. World Fertility Survey Reports, 1974-1979**

Place	Date	Number of Women Surveyed	Percentage Childless
<u>AFRICA</u>			
Kenya	1977-78	1,079	2.7
Lesotho	1977	587	5.5
Senegal	1978	622	3.1
Sudan	1978	478	6.3
<u>ASIA & PACIFIC</u>			
Bangladesh	1975-76	826	2.2
Fiji	1977	955	4.3
Indonesia	1976	1,728	6.7
Korea, Rep. of	1974	1,285	1.3
Malaysia	1974	1,461	2.7
Nepal	1976	988	3.1
Pakistan	1975	990	2.8
Philippines	1978	2,390	2.1
Sri Lanka	1975	1,661	2.8
Thailand	1975	906	2.3
<u>LATIN AMERICA & CARIBBEAN</u>			
Colombia	1976	620	2.9
Costa Rica	1976	648	2.2
Dominican Republic	1975	334	4.5
Guyana	1975	663	5.3
Haiti	1977	412	3.2
Jamaica	1975-76	511	6.5
Mexico	1976-77	1,188	3.5
Panama	1976	601	2.7
Paraguay	1979	627	3.2
Peru	1977-78	1,294	2.0
Trinidad & Tobago	1977	648	4.9
<u>MIDDLE EAST</u>			
Jordan	1976	722	2.2
Syria	1978	970	2.9

Source: Vaessen M: (World Fertility Survey) (Analysis of WFS infecundity and childless data). Table appeared in Sherris JD, Fox G: Infertility and sexually transmitted diseases: a public health challenge. *Population Reports*, Series L, No. 4, Baltimore, Johns Hopkins University Population Information Program, July 1983.

Table 2
**Population Size, Infertility, and Fertility Shortfall
 In 22 Countries of Sub-Saharan Africa**

Country	1980 population (millions)	Percent of women childless (45-49*)	Shortfall in total fertility caused by infertility (births per woman)**
Nigeria	90.0	8.3	.6
Zaire	28.3	20.5	1.9
Sudan	18.4	8.7	.6
Tanzania	17.9	10.4	.8
Kenya	15.9	6.7	.4
Ghana	11.7	2.6	0.0
Mozambique	10.5	13.8	1.2
Cameroon	8.4	14.7	1.3
Ivory Coast	8.0	9.9	.8
Angola	7.1	11.5	.9
Mali	6.9	7.7	.5
Burkina Faso	6.9	5.9	.3
Zambia	5.8	14.0	1.2
Senegal	5.7	4.0	.1
Niger	5.3	8.9	.6
Guinea	5.0	6.0	.3
Chad	4.5	11.0	.9
Burundi	4.1	3.0	0.0
Central African R.	2.3	17.3	1.6
Congo	1.5	20.5	1.9
Lesotho	1.3	4.1	.1
Gabon	.5	32.0	3.2
Weighted mean, all countries	(270.0)	10.1	.8

* Or closest age group.

** Estimated difference between total fertility associated with 3% older women childless and total fertility associated by regression to level of childlessness recorded for older women in the most recent census or survey in that country.

Source: Frank O. Sterility in women in sub-Saharan Africa. *IPPF Medical Bulletin* 1987; 21:6-8.

of the highest rates (6.7 percent); the lowest is in Korea (1.3 percent). Although the numbers surveyed in Table 1 are not very large, this does not mean that primary infertility is not a priority health problem in some areas. Table 2 shows the rate of childlessness for 22 African countries.² The countries are classified according to their population. The highest population is in Nigeria and the lowest is in Gabon. For one of these African countries (Gabon) childlessness is as high as 32 percent. The Congo has a rate of 20 percent, Tanzania 10 percent, and Zaire 20 percent. We have very high rates of primary infertility in a number of countries in the so-called "infertility belt" which extends from Gabon in the west up to southwestern Sudan in the east. The

same table shows the shortfall in total fertility due to childlessness. The mean total fertility rate is 7.3 births per woman in developing countries. In countries like Gabon, the shortfall is as high as 3.2 which means the total fertility decreases to 4.1 in that country.

Clinicians know that there exists a nearly irreducible core of involuntary infertility related to chromosomal or congenital or endocrinological abnormalities affecting both men and women. The core is generally estimated at around 5 percent of all couples. African countries are far above this core level. This fact indicates that acquired infertility, which is of infectious origin, must be very frequent. The World Fertility Survey also collected data on the percentage of non-contracepting, nonpregnant women continuously married for the last five years who do not report live births in the last five years. This figure gives an estimate of secondary infertility. Data for Asia and the Pacific as well as the mean for 27 surveyed countries are presented in Figure 1. Infertility increases with age, and the difference from country to country can be seen. Of the countries surveyed, Indonesia again has the highest rate among women over 30 years of age.

In industrialized countries, even though the rates of involuntary infertility and ectopic pregnancy are not that high, it is important to note that these rates have been continuously rising in the sixties and seventies, parallel with the rise in STD incidence. From 1965 to 1978 in the United States, the percentage of infertile couples in which the woman is 25 to 29 years old increased from less than 5 percent to approximately 7 percent in whites and from 5 percent up to 12 percent in the black population. In the United States, ectopic pregnancy rates increased from 1970, and now the ectopic pregnancy rate is 14 per 1,000 reported pregnancies (Figure 2). In the ectopic pregnancy rate in the United States, there is a clear race differential. Ectopic pregnancy rates increase with age, from the 15-to-24-years age group up to 35 to 44 years, and for each age group the race differential applies.³ It is important to note that in ectopic pregnancy the condition still has a considerable case fatality. There was a decrease in case fatality rates for ectopic pregnancy in the United States from approximately 35 per 10,000 ectopic pregnancies in 1970 to a level of around 5 per 10,000 in the 1980s. With an annual incidence of 70,000 ectopic pregnancies in the United States, we should observe between 30 and 40 deaths annually due to ectopic pregnancy.

Aside from the study of infertility as a whole and the study of ectopic pregnancy, it is important to make a distinction between primary and secondary infertility because such a distinction may give some clues as to the etiology of infertility. The World Health Organization has undertaken epidemiological studies at the community level to determine the amount and type, be it primary or secondary, of infertility. Table 3 summarizes data obtained in five countries: Benin, Cameroon, Tanzania, India (Chandigarh), and Thailand. In all five countries surveyed, secondary infertility is higher than primary infertility. For nearly all countries, there is practically no difference between urban and rural areas. If we compare individual countries, there is a considerable difference in the amount of primary and secondary

ASIA & PACIFIC

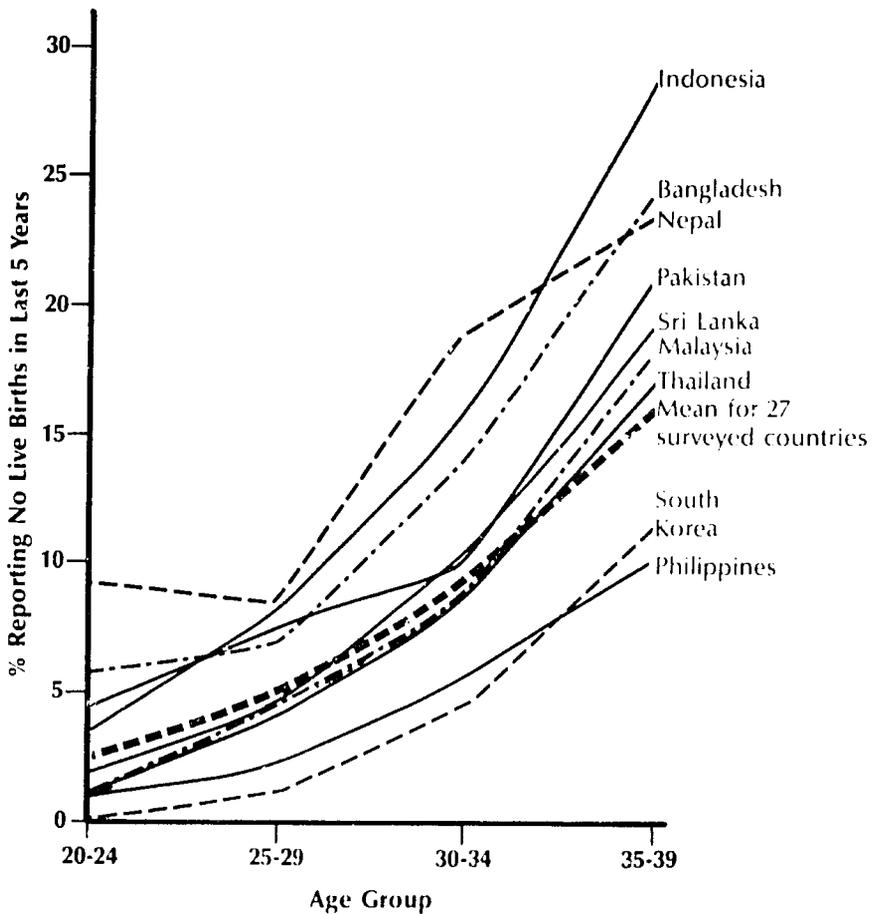


Fig. 1. Percentage of Nonconceiving, Nonpregnant Women, Continuously Married for Last Five Years, Reporting No Live Births in Last Five Years, by Age Group, World Fertility Survey Reports, 1974-1979.

Source: Vaessen M: (World Fertility Survey) (Analysis of WFS infecundity and childlessness data). Figure appeared in Sherris JD, Fox G: Infertility and sexually transmitted diseases: a public health challenge. *Population Reports*, Series L, No. 4, Baltimore, Johns Hopkins University Population Information Program, July 1983.

infertility. There are very low percentages in Chandigarh, India (2.3 and 3.7 for primary and 5.9 and 6.5 for secondary infertility in urban and rural areas, respectively). So Chandigarh clearly has no infertility problem. On the other hand, in Cameroon, primary infertility is at 12 percent and secondary infertility is at 33 percent. Part of Cameroon is situated in the "infertility belt."

Etiology of Infertility

Once the amount of infertility has been determined, next comes of course the question of what is the diagnostic category. The direct causes of infertility

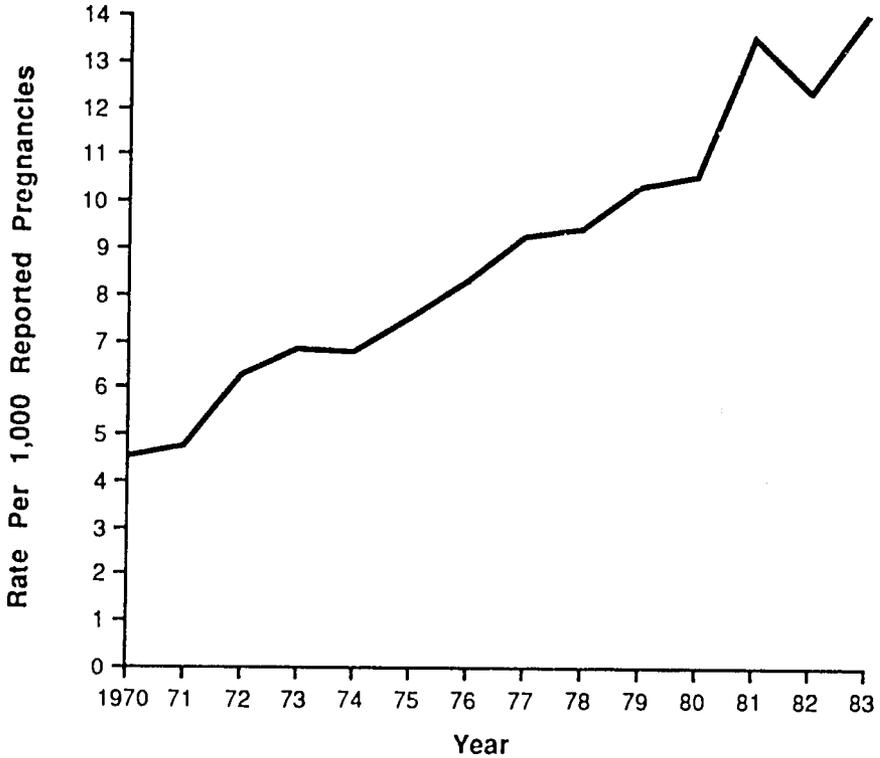


Fig. 2. Ectopic pregnancy rates for females ages 15-44, by year: United States, 1970-1983.

Source: Centers for Disease Control: Ectopic pregnancy in the US, 1970-1983. *Morbidity and Mortality Weekly Report* 1986; 35(25S):28SS-37SS.

in the female are well known: ovulation disorders, blockage of the fallopian tubes, uterine or cervical abnormalities, or endometriosis.⁴ The World Health Organization undertook a multicenter study to determine the pattern of diagnostic category in patients coming to gynecologic clinics.⁵ In Table 4

Table 3
Primary and Secondary Infertility in WHO Community Surveys

Country	Primary infertility (%)		Secondary infertility (%)	
	urban	rural	urban	rural
Benin	2.9	2.9	10.9	9.4
Cameroon	—	12.0	—	33.0
Tanzania	4.6	3.7	19.7	18.8
India (Chandigarh)	2.3	3.7	5.9	6.5
Thailand	3.3	2.1	13.6	12.0

Source: WHO, unpublished data.

Table 4
Specific Diagnoses of Infertility in Females (In Percentages).

	Developed countries	Asia	Africa
No demonstrable cause	40	31	16
Bilateral tubal occlusion	11	14	49
Pelvic adhesions	13	13	24
Acquired tubal abnormality	12	12	12
Anovulatory regular cycles	10	9	14
Anovulatory oligomenorrhoeae	9	7	3
Ovulatory oligomenorrhoeae	7	11	4
Hyperprolactinaemia	7	7	5
Endometriosis	6	10	1

Source: Adapted from Cates W et al: Worldwide patterns of infertility. Is Africa different? *Lancet* 1985; ii: 596-598.

diagnostic categories of infertility are shown in females for developed countries, Asia, and Africa. The first considerable difference is in "no demonstrable cause": 40 percent in developed countries, but only 16 percent in Africa. So with most cases, the cause is found for infertility in Africa. If we group diagnostic categories that are infection-related—such as bilateral tubal occlusion, pelvic adhesions, and acquired tubal abnormality—results are as follows: 36 percent of such diagnoses in developed countries, 39 percent in Asia, and 85 percent in Africa.

So far we have discussed infertility and ectopic pregnancy as a complication or a main sequela of upper genital tract infection, but what is the initial cause of this process?

We have to look at the natural history of these conditions that must have started as infections of the lower genital tract. These infections are mainly due to a number of sexually transmitted microorganisms. Reviews of the epidemiology of STDs in developed and developing countries have been published.^{6, 7} In Figure 3, the incidence of gonorrhoea and of syphilis is presented for the United States. The enormous epidemic of gonorrhoea starting in the late fifties and increasing exponentially till 1975 can be clearly seen. Since 1975 the epidemic has come under control and has leveled off slightly. As an index of change in sexual behavior, it is expected that gonorrhoea incidence should decrease dramatically, in response to the fear of AIDS. A considerable decrease of rectal gonorrhoea in homosexual males has been reported. But for the population as a whole, there is as yet no indication of a dramatic decrease in gonorrhoea incidence and hence of a marked change in sexual behavior. Also shown in Figure 3 are incidence rates for syphilis which are now at a low level. There was recently an increase in the United States of congenital

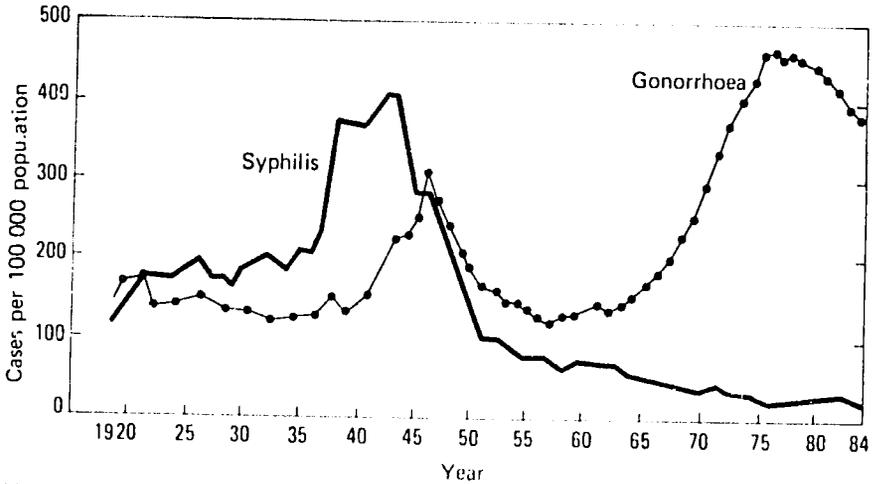


Fig. 3. Reported incidence of gonorrhoea and syphilis (all stages) in the United States of America, 1919-1984.

Source: World Health Organization, WHO Expert Committee on Venereal Diseases and Treponematoses. Technical Report Series No. 736. Geneva, 1986.

syphilis which is not well explained and which is now under further investigation.⁹

If we look at the ratio of male to female cases, an important change appears for gonorrhoea. The ratio of 3 male cases to 1 female in 1965 decreased to approximately 1.4 male to 1 female in 1973 and in subsequent years. This change in sex ratio of cases demonstrates the effect of gonorrhoea control in the United States which was implemented in the early seventies. A strategy of systematic case-finding for gonorrhoea was implemented in family planning clinics and other health care facilities, and these data hint at the significant effectiveness of that strategy. A similar trend for gonorrhoea is seen in Canada, where the infection came under control at the end of the seventies, leveled off to a plateau, and decreased since 1981. It is interesting to study the incidence of gonorrhoea in the Scandinavian countries because they initiated comprehensive STD control programs. Gonorrhoea came under control in Sweden in 1971. There was a spectacular decrease in the incidence of gonorrhoea in young girls in Sweden from 1965 to 1975. This decrease of gonorrhoea in teenage girls was probably related to sexual behavioral change as a result of health education campaigns targeted at STD prevention and contraception during the sixties. In the industrialized countries, gonorrhoea came under control, but this is not the case for chlamydial infections. We do not have good data on the incidence of chlamydial infections, but we can use data from the United Kingdom on nongonococcal urethritis (NGU): Approximately 40 percent of nongonococcal urethritis has a chlamydial etiology. We can see in Figure 4 that, although gonorrhoea was clearly under control in the seventies and eighties, nongonococcal urethritis (and hence chlamydial

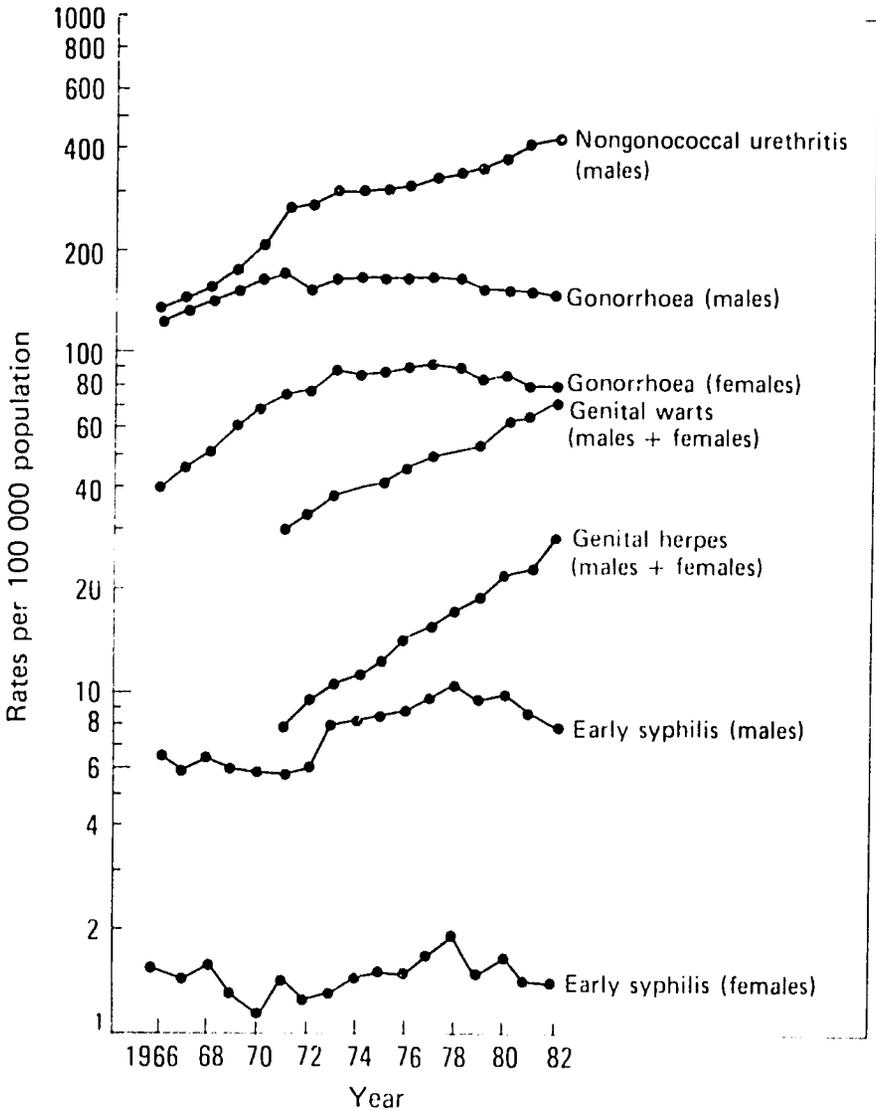


Fig. 4. Reported incidence of gonorrhoea, syphilis, and other selected sexually transmitted diseases in England and Wales, 1966-1982.

Source: World Health Organization, WHO Expert Committee on Venereal Diseases and Treponematoses. Technical Report Series No. 736. Geneva, 1986.

infection) continued to rise. Of course, a higher awareness that chlamydia is an important STD, together with better diagnostic facilities for the condition, could have biased to some extent the data on chlamydial epidemiology. Comparative data on STD incidence are available for the United Kingdom (Figure 4). On this semilogarithmic scale, relative frequencies of STDs are shown. Incidence of NGU, which largely reflects chlamydial infection, is

Table 5
Prevalence of Gonorrhea and of Positive Serological Test For Syphilis
In Specific Groups of Women In Developing Countries

Country	Type of patient	Patients with gonorrhea (%)	Patients with positive serology (%)	
			VDRL/RPR ^a	MHA-TP/FTA-ABS ^b
Cameroon	PN ^c	15.0		
Central African Rep.	PN	9.5	9.5 ^d	
Chile	PN		3.5	
Ethiopia	PN		12.7	10.9
Gambia	PN	6.7		
Jamaica	PN	11.0		
Kenya	FP ^e	17.0	0	2.0
Rwanda	PN		4.4	
Senegal	GP ^f	3.0		
Swaziland	PN	3.9	10.0 ^d	33.3
Zaire	PN		20.0	2.0
Zambia	PN		14.3	12.5

^a Venereal diseases research laboratory test/rapid plasma card test.

^b Micro-haemagglutination assay for *T. pallidum*/fluorescent treponemal antibody absorption test.

^c Pregnant women attending prenatal clinics.

^d Endemic foci of yaws present.

^e Women attending family planning clinics.

^f General population sample.

Source: World Health Organization: *WHO Expert Committee on Venereal Diseases and Treponematoses*, Technical Report Series No. 736. Geneva, WHO, 1986.

highest. Gonorrhea and herpes are considerably less frequent, and syphilis has become a rare disease in industrialized countries.

For developing countries, we cannot review any data on incidence of sexually transmitted diseases because these data are not available. Thus, we have to rely upon prevalence data on gonorrhea, syphilis, or chlamydia, for instance, in populations of women of reproductive age. Based on these prevalence data, we can have an estimate at least of the size of the STD problem. Table 5 summarizes the prevalence of gonorrhea and a positive syphilis serology in prenatal clinic in a number of developing countries. Prevalence of gonorrhea in pregnant women ranges from 3.9 to 15 percent, with a very high rate in sub-Saharan Africa. Since transmission from mother to newborn is at least 30 percent, this means that the incidence of gonococcal ophthalmia neonatorum should be between 1 and 5 percent in Africa, if no ocular prophylaxis is used. In Africa, 20 to 80 percent of gonorrhea is due to PPNG strains which are totally resistant to penicillin. In these cases, treatment is often a problem because the alternative antibiotics for penicillin are often not available. Clearly, it is urgent that ocular prophylaxis in newborns be implemented, otherwise gonococcal neonatal conjunctivitis could again become a major blinding disease. Besides gonorrhea, it is interesting to study the prev-

alence of a positive syphilis serology (Table 5). In some countries, mainly in eastern and southern Africa, very high rates of VDRL/RPR positivity (10–14 percent), which are confirmed by TPHA, are found; this indicates a considerable risk for congenital syphilis. Prevalence of chlamydial infection is currently being studied. In pregnant women, based on both culture and microimmunofluorescence tests, a prevalence rate of 29 percent was found in Nairobi, Kenya,¹⁰ and of 15 percent in Gabon (Frost E, unpublished data). These data indicate that chlamydial infections must be at least as frequent as gonorrhea in African countries.

Etiology of Salpingitis

Excellent epidemiological and etiological studies on pelvic inflammatory disease were done in Lund, Sweden.^{11,12} The etiologic spectrum of salpingitis in the industrialized world (and surely also in most of the developing countries) indicates the overwhelming importance of STD-organisms. In Sweden, in women 15 to 24 years old, the etiology is as follows: *C. trachomatis* in 40–60 percent, *N. gonorrhoeae* in 15–18 percent, *M. hominis* in 10–15 percent, anaerobes in 3–5 percent, and unknown etiology in 10–15 percent. The spectrum of the etiology of salpingitis depends on the spectrum of cervical infection and selection of patients. In Scandinavian countries, chlamydial cervical infection is three to five times more frequent than gonococcal infection, and approximately the same rate is found for salpingitis. The overall annual incidence of salpingitis rose slightly in Sweden between 1960 and 1975. Salpingitis incidence is not equally distributed in all sexually active groups. It is mainly in the very young groups (15 to 19 and 20 to 24 years old) that we find the highest incidence. If we look at salpingitis incidence in teenagers and correct the figure for sexual activity, we see that the younger the girl is, the higher the risk for getting acute salpingitis.¹² Why should this be so? Apparently, a very young age is correlated with high-risk sexual behavior, but there are also age-specific changes in humoral factors and in the functional cervical barrier. A very important factor to consider is the association between salpingitis and contraceptive use. In Sweden the overall incidence of salpingitis in women 20 to 29 years old was 1.4 per 100 women/years.¹¹ For IUD users the rate was 5.2, and for oral contraceptive users the rate was 0.9 per 100 women/years. This means that the relative risk for salpingitis is between 3 and 4 for IUD use (depending on number of partners and type of IUD), and between 0.6 and 0.7 in the case of oral contraceptive use.

The relationship between salpingitis and tubal infertility was also clearly established by the Lund group.¹² The risk of tubal infertility after one, two, or three episodes of salpingitis was 11 percent, 23 percent, and 54 percent, respectively.

The etiologic spectrum of salpingitis in developing countries is not so well studied. Data are influenced by selection bias in patients and, even more, by the availability of laboratory facilities. In a number of older studies from Africa, it is the gonococcus that is mainly implicated, and data published

Table 6
Chlamydial Antibodies (As Percentage) in
Acute Salpingitis Cases and Infertile and Pregnant Women

Condition	Number	Chlamydial antibodies	
		> 1/64	≥ 1/512
Acute salpingitis	38	73.7	48.3
Tubal infertility	48	83.0	35.4
Non-tubal infertility	8	37.8	0.0
Pregnancy	116	29.7	0.0

Source: Meheus A, Remers J, Collet M, et al. *Chlamydia trachomatis* in women with acute salpingitis and infertility in Central Africa. In Ortel D, Ridgway G, Schachter J, Taylor-Robinson D, Ward M. *Chlamydial Infections*. Proceedings of the Sixth International Symposium on Human Chlamydial Infections. Cambridge University Press, 1986. pp. 241-244.

show that 38 to 46 percent of cases of salpingitis could be related to gonorrhea.⁶ We conducted studies on the etiology of salpingitis and of infertility in Gabon, the country with the highest infertility rate in the world.¹¹ The gonococcal and chlamydial isolation rate based on the culture of cervical secretions in patients with acute salpingitis was 23 percent for gonorrhea and 21 percent for chlamydial infection. This points clearly to the importance of both infections in the etiology of salpingitis. Presence and level of chlamydial antibodies were studied in patients with acute salpingitis, patients with tubal or nontubal infertility, and in a control group of pregnant women (Table 6). In acute salpingitis and tubal infertility patients, chlamydial antibodies at a titre of 1/64 or higher are significantly more frequent than these antibodies are in the control group. The difference is still more pronounced if a titre of 1/512 is taken as the cutoff point.

These data on chlamydial serology from Gabon and from another study in the Gambia¹⁴ indicate that *C. trachomatis* infections must play a major role in salpingitis and tubal infertility in Africa.

Conclusion

There is a clear link between acquired infertility and STD-related upper genital tract infections. In both developed and developing countries, gonococcal and chlamydial infections (which often occur concomitantly) are major etiological factors. Other factors that must be considered in some settings are poor obstetric care and illegal abortions.

Infertility in the couple most often has important psychological and social repercussions and causes personal tragedies. If infertility is a community health problem, it has severe social implications and can even delay socio-economic development. The success of infertility treatment is very unsatisfactory; therefore, prevention should be the aim. The main component of

prevention of infertility is the implementation of an effective STD control program.^{15,16}

Family planning programs have a major role in STD control, particularly in women. Health education, prophylactic methods, early detection of infections, as well as adequate management of cases and contacts of complicated and uncomplicated sexually transmitted genital infections should therefore be part of family planning services.

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Sexually Transmitted Diseases: Implications for Family Planning Programs

Family planning centers have an important role to play in identification and treatment of sexually transmitted diseases. For example, a participant from WHO suggested that a major new policy initiative in family planning programs, particularly those which are part of an integrated program of maternal and child health and family planning, should be the treatment of sexually transmitted diseases. This participant noted that in some parts of Africa, gonococcus isolates had been found in 20 percent of women visiting maternal and child health antenatal clinics. The panelist emphasized that the MCH clinic is "untapped as a means for control of STDs."

Another discussant urged greater attention to the relationships between sexually transmitted diseases and the healthy outcome of pregnancy, noting that sexually transmitted diseases seem to be responsible for premature rupture of the membranes, premature delivery, and low birth weight. Since approximately 40 percent of the cases of low birth weight children in some African countries can be attributed to sexually transmitted diseases, increased emphasis on GC screening in maternal and child health/family planning clinics is recommended. In addition, sexually transmitted diseases are a major cause of infertility, another important reason for screening for STDs in MCH/family planning clinics.

A participant from Nigeria pointed out that regular screening for STDs is not available at his center due to the cost of laboratory tests and the equipment required to perform such testing. This participant urged the development of standing orders for health practitioners, particularly those working in rural areas who do not have access to microscopes or laboratory testing equipment. Where screening is unavailable, it was suggested that patients who are being treated for suspected gonorrhea also be treated simultaneously for chlamydia, since these infections often coexist.

Questions were raised on the relationship between prophylactic antibiotic use and intrauterine devices. Discussants noted that there are some data which indicate that prophylactic antibiotic use decreases the risk of PID and related complications in IUD users. Studies are currently being conducted as to whether giving antibiotics at the time of insertion will diminish the problem. The results of this WHO-supported research should be disseminated to practitioners when completed.

Another issue was the appropriateness of the IUD in areas where chlamydia or gonorrhea is endemic. It appears that for certain groups the IUD is not an appropriate method, such as for women who have multiple sexual partners. Good client selection, screening, and counseling were emphasized.

Participants commended JIPIEGO on organizing sexually transmitted diseases training programs for staff of family planning clinics. These speakers emphasized that in developing countries, in order to gain acceptance for family planning, programs must also include the management of infertility and sexually transmitted disease. Participants also suggested that donor agencies provide laboratory equipment and materials such as microscopes, slides, and Gram stain reagents so that clinics can test for sexually transmitted diseases.

Finally, there was general agreement that if the cost of managing sexually transmitted diseases in developing countries is assessed in terms of hospitalization, infertility, pelvic inflammatory disease, ectopic pregnancy, and low birth weight infants, STD screening would be very cost effective. It was recommended that the focal point for screening be maternal and child health and family planning centers.



**Strengthening
Reproductive Health
Curricula in
Medical and
Nursing Education**

Mobilizing Support for Reproductive Health and Activating Change at the National and Institutional Level

O.A. Ladipo, M.B.B.Ch., F.R.C.O.G., F.M.C.O.G.

Introduction

Until very recently reproductive health services in most developing countries have been, to a large extent, influenced by political factors rather than by meaningful state or national planning to meet the needs of the masses. Such services—even though inadequate and appalling—are concentrated in urban communities. The rural area, where about 70–75 percent of the masses live, has been excluded from reproductive health services. At best, the rural communities have health centers built by government or communal effort (often staffed by paramedicals) which lack the essential equipment and drugs to provide optimal reproductive health care.

In most developing countries, primary health care and the need to achieve health for all by the year 2000 is currently the focal point of government health policy in an effort to make essential health services available to the majority of the population, particularly the disadvantaged in rural and peri-urban areas. One of the eight major components of the primary health care concept is the improvement of reproductive health care through a well-articulated system that ensures integration of maternal and child care and family planning. In simple terms, reproductive health can be described as the parents' ability to produce progeny who will develop into physically, mentally, and socially normal individuals. In turn, these individuals will be likely to repeat their parents' experience in the process of further procreation. Indeed an optimal genetic background and a favorable environment are essential prerequisites for reproductive health.

In the traditional communities, reproductive health services are not readily available. Thus, it is imperative that those responsible for reproductive health policy and the delivery of reproductive health services should be concerned

with community health. Those responsible should adopt the concept of primary health care—promotive, preventive, curative, and rehabilitative health care that is made universally accessible within a community to individuals and to their families. This health care should be implemented by means acceptable to community members, with the full participation of community members, and at a cost that the community and the nation can afford. Family planning per se is preventive reproductive health care, and despite the myriad benefits of family planning to the individual, to the family, and to society, African leaders have until recently had no definite policy on population and family planning (though many African leaders formally endorsed the 1978 Alma Ata agreement). Rather, most governments have expressed anxiety over low population densities and high levels of reproductive failure. Increasing population has been viewed as beneficial, an aid in national development and in the creation of a national identity and an international presence. Until recently, laws in most African countries regarding fertility control were restrictive, especially in Francophone countries.

In contemporary Africa, most countries are in the second phase of demographic transition, with falling death rates and stable or even increasing birth rates. Without effective modern contraception, the population size will increase rapidly and will have a profoundly negative effect on socioeconomic development and health. Africa has the highest population growth rate in the world, currently estimated at 3.1 percent. The high fertility that characterizes the region has obvious adverse demographic implications in view of the appallingly slow economic growth and the poor health services. A rapidly growing population means more than a short-term sacrifice of per capita income growth. It can mean the loss of long-term potential for higher economic growth and higher standards of living. Rapid population growth can also mean higher maternal and child mortality and morbidity, further degradation of the natural environment where there is already population pressure, tighter constraints on extending education and basic health care beyond current rudimentary levels, and falling wages as the labor force grows more rapidly than complementary investments.¹ Most sub-Saharan governments are currently faced with these problems, and hence it is not surprising that today (unlike the situation at the 1974 World Population Conference in Bucharest when only three African countries—Botswana, Ghana, and Kenya—supported a slowing of population growth) more than three-fourths of sub-Saharan governments officially support family planning with specific efforts to reduce birth rates. The sudden awareness in recent times that development and family planning have synergistic roles has compelled most governments to initiate the processes for legislating a population policy.

In spite of these encouraging events, family planning programs are still in their infancy in most sub-Saharan African countries. An evaluation of family planning program effort in 93 developing countries revealed that 27 of the 42 countries that were rated very weak or zero (on a scale measuring policy initiatives, service activities, record keeping, and the availability of fertility-

Table 1
Contraceptive Prevalence In Different Regions of the World

Region	Number of Countries With Prevalence		
	Under 20%	20-40%	Over 40%
Sub-Saharan African	8	3	6
Asia and Pacific	3	3	4
Latin America and Caribbean	1	8	9
Middle East and North Africa	1	4	1
Europe and USA	0	0	17

Source: London K., Cushing, J., and Rustin, B., *Fertility and Family Planning Surveys: An update. Population Reports, Series M, No. 8*, Baltimore, Johns Hopkins University Population Information Program, September-October 1985, p. 298.

control services) were in sub-Saharan Africa.² Other countries within the subregion fell into the next lowest category of program effort. The same analysis showed rates of contraceptive prevalence in sub-Saharan Africa that ranged from 1 percent to 14 percent of women of reproductive age.

The World Fertility Survey (WFS) and contraceptive prevalence surveys (commissioned by UNFPA and USAID and conducted from mid 1970 to 1985) revealed that the lowest prevalence rate in contraceptive use is found largely in Africa (Table 1). Countries such as Cameroon, the Ivory Coast, Mauritania, Senegal, and Somalia have prevalence rates of under 5 percent. Among African countries with national data, the highest prevalence was in Zimbabwe at 40 percent, Botswana at 29 percent, and Benin at 20 percent.

The 1981/82 Nigerian Fertility Survey revealed that only 6.2 percent of the women exposed to the risk of childbearing were using any form of contraception at the time of the survey.³

In an attempt to mobilize support for reproductive health and activate changes at the national and institutional level, research scientists can play a major role by ensuring that their research findings are made available to governments at the appropriate level—be it national, state, or local government. By making research findings available, priorities that are collectively appropriate could be chosen and a national beneficial program with practical application could be jointly implemented and evaluated. Furthermore, by highlighting the factors responsible for high mortality, morbidity, and reproductive failure, research findings can be utilized both to mobilize communities and to influence community acceptance of family planning services. In this context, community participation along with accelerated reproductive health education is a *sine qua non* for positively influencing community acceptance of planned parenthood. In most developing countries, institutions can play a key role by conducting relevant, inexpensive research and by revising their

curriculum content for the training of physicians and nonphysicians who will ultimately practice in the urban and rural environment.

Research to Influence Government Policy

Without any doubt, the greatest obstacle to family planning in Africa is the lack of political and financial commitment by national governments. The major cost of family planning is still borne by bilateral and multi-lateral agencies as well as by local voluntary or private organizations. Based on my experience in Nigeria, I believe that a strong government commitment to the legitimacy of family planning can best be achieved through research studies that can be used to change the ideas and policies of decision makers. This will include studies that demonstrate unquestionably the problems resulting from high fertility and nonuse of family planning. These may be demographic, health, economic, or social problems. A second group of studies will be those that demonstrate the best approach to use when presenting research findings to policymakers so that appropriate political and financial commitments by the governments can be achieved.

The most common and generally reliable sources of demographic data are census data and national fertility surveys complemented by special institutional zonal studies. One in every four sub-Saharan African is a Nigerian, hence an in-depth consideration of Nigeria will be presented to illustrate our efforts in mobilizing support and activating change at the national level.

Population Dynamics and Reproductive Biodata

Nigeria, with 100-105 million people and an annual population growth rate of 3.0 percent, is one of the most populous and fastest growing countries in the world. Although the income per capita is estimated at about \$680, in many ways Nigeria's health, social, and economic conditions are similar to those of the poorest countries in the world. Life expectancy at birth rose from about 36 years in 1950 to 50 years in 1986.

Over the same period, the death rate fell from 27 to about 17/1000 persons. The crude birth rate remains high at 47/1000 and the total fertility rate of 6.3 is one of the highest in the world. At this rate of growth, the Nigerian population would double in 23 years. Nigerian women tend to marry young with an average age of 16.3 years, and women tend to remain exposed to pregnancy throughout their reproductive years except during lactation. These patterns may be encouraged by the prevalence of the polygamous type of union, which is practiced by about 42.6 percent of the population.⁷ Given a continuation of high fertility, Nigeria would have a population of almost 163 million people in the year 2000 and 281 million people by the year 2015. Even more alarming is that in 50 years from now the Nigerian population could equal the current population of the rest of sub-Saharan Africa, i.e., 454 million people. With the drastic reduction in oil revenue, there is visible evidence that Nigeria's economic growth has stagnated and that rapid population growth is exacerbating many economic problems. The most obvious

of these problems are the increasing levels of unemployment and underemployment. In addition, increasing population has led to a growing demand for fuel, food, water, accommodation, health services, education, and social services that cannot be met by the government.

Internal migration, especially from rural to urban areas, has been one of the important demographic themes of modern Nigeria. Compounding this problem is international migration by people from neighboring African countries seeking job opportunities outside their own depressed economies.

Before the population of Nigeria could stop growing, the fertility rate of about 6.3 births per woman would have to drop to slightly over 2 births per woman, or what is termed replacement level fertility. It is pertinent to note, however, that the population would continue to grow because an interval is required to achieve this fertility replacement level and because there exists an internal momentum due to the large proportion of children under 15 years of age.

Important research findings that can effect a change of policy are those regarding the influence of high fertility on maternal and infant mortality and morbidity. Relatively inexpensive studies such as the maternity care monitoring and reproductive age mortality studies reveal that the major causes of death of mothers of reproductive age relate to childbearing. A review of 40,693 deliveries (70 percent of deliveries in health institutions in Ibadan) in 1982 revealed a maternal mortality rate of 3.1/1,000 which is approximately 40 times that of England and Wales.⁶ Reports of maternal mortality from other states in Nigeria show a range between 6.8 and 10/1,000 deliveries.^{6,7} These studies clearly indicate the need for improved reproductive health services. Mothers with no antenatal care who were admitted as emergency cases constitute 61.5 percent of these maternal deaths. In the Ibadan study, antenatal care reduced the risk of maternal mortality twelvefold. Maternal mortality was highest in the adolescent age group and also in the highly parous women aged 30 years or more.⁸ In a study in Zaria, Nigeria,⁸ young teenage girls constituted 6 percent of the survey population and 30 percent of the 174 maternal deaths; the highly parous older women made up 10 percent of the survey population and 20 percent of the maternal deaths. It is well established that maternal mortality increases with maternal age and parity, hence this high-risk group could benefit from effective contraception.

In most African countries, hospitals report a significant caseload of induced abortion and its complications. In Benin City, Nigeria, over 60 percent of induced abortions were performed on adolescent girls.⁹ In Ghana, 45 percent of the first pregnancies of women delivering in the hospital ended in an induced abortion.¹⁰ Complications of illegal abortions are known to account for 4 to 70 percent of maternal deaths in hospitals in developing countries and for an unknown number of additional deaths outside the hospital setting.¹¹ These research results indicate an urgent need for improved reproductive health education, free access to contraceptive services by high-risk groups, and recognition of adolescent problems and needs by policymakers.

Perinatal mortality rates in African countries are also very high. From the Zaria study,⁸ perinatal death rates per 1,000 singleton deliveries were 180 for the young teenage girls and 150 for the highly parous groups. Another striking observation in the Zaria study was the influence of family size on child survival. A total of 15,156 women already had had at least one previous birth at the time they first reported to the hospital for care, and only 8,739 (58 percent) had all their children still alive, with this proportion decreasing from 80 percent in women with only one previous birth to 50 percent in those with four previous births and only 6 percent in women with nine or more previous births. It was particularly striking that above Para-7 the average number of children alive was virtually constant, implying that one birth equals one death thereafter. Thirty percent of children born to young teenage mothers were of low birth weight with a 1 in 5 chance of perinatal death. In Kenya, babies born to teenage mothers have a 50 percent greater chance of dying than those whose mothers are 20-29 years old. Infant mortality increases when mothers are over the age of 35 because their babies run an increased risk of congenital abnormalities. Therefore it is important to stress to policymakers that better spacing and timing of births and reduction in the number of births are important factors contributing to reduced infant and child mortality.

Family Planning Knowledge, Attitude, and Practice

Although there is a visible increase in the demand for contraception in the urban areas, studies in rural areas such as the CBD (Community-Based Distribution) Project in Oyo State, Nigeria,²² indicate that knowledge and practice of modern family planning are generally low due to limited *education* and *services*. Interest in surgical contraception is nonexistent before age 35, or below Para-7. In fact, in the Oyo State study, only 2.5 percent of the sample had ever used contraception and only 1.5 percent were current users. Although the overall fertility displayed may be regarded as quite high, spacing of children by postpartum abstinence was 35 months, and the average length of amenorrhea was 19 months.

Trained village health workers were used to introduce family planning information and services, and the approval of family planning increased from 20 percent to 50 percent over a two-year period. The desire to postpone the next pregnancy beyond the period of postpartum abstinence increased from 15 percent to 34 percent. Knowledge of modern contraceptives increased from 24 percent to 45 percent. It is estimated that contraceptive use has increased to 13 percent and that this cadre of personnel is the best option for improving reproductive health services in rural communities. This information should be valuable to policymakers who are interested in developing cost-effective reproductive health programs.

Infertility

Infertile unions in Africa may result in marital instability and varying degrees of emotional and psychological problems. Several African countries have levels of infertility above 10 percent, and studies indicate that infection is a major cause of infertility in Africa.^{13,14} There is a cause-effect relationship between sexually transmitted diseases, pelvic inflammatory disease, and infertility. What is yet unrecognized by Africans is that contraception to prevent unwanted pregnancy, or the use of barrier methods and spermicides that protect against STDs, is a good preventive practice to ensure that the user's reproductive potential is uncompromised.

Use of Research to Influence Policymakers

The appalling reproductive data presented should be used by scientists to mobilize support for reproductive health and to activate change at the national level. Though the effect of high fertility on health and socioeconomic level is obvious, the scientist must solicit the views and opinions of various categories of people who are essential in the formulation and implementation of family planning policies.

Decision Makers

At the central level, the important decision makers to whom the research data should be addressed include policymakers, legislators, women's organizations, politicians, program administrators, and religious leaders. It is essential to reach these groups because any decision to legislate a change in the law or population policy would be made at this level. The views of the various groups would be reconciled before effective law was enacted. The RAPID presentation to decision makers in Nigeria (a series of graphic presentations on the effect of population growth on Nigeria's social and economic development) has strengthened the government's positive posture in enacting a population policy.

Decisions made at the community level involve community leaders, traditional chiefs, obas, and thought leaders whose acceptance of the concept of family planning is essential to the success of village programs where high fertility is the norm. Although many of these peripheral leaders have little or no formal education, they are intelligent and extremely receptive, and they are committed to initiating any health program that will improve their quality of life. In introducing family planning, the scientist or government agent should identify priority needs of the community and, in consultation with the community leaders, should decide on the best approach to introduce the concept of modern family planning. In general, it is best introduced as an integrated program. Reference to traditional methods of family planning, e.g., lime salts, copper rings, sponges, etc., often helps to strengthen the introduction of family planning and eclipse the concept that family planning is an imported idea.

The Service Providers

The service providers that must be mobilized for effective reproductive health care include the medical practitioners, nurses, pharmacists, village health workers, and other allied staff. Ironically, over the years, the medical staff have been one of the greatest obstacles to providing family planning information or services. One of the obvious reasons is the visible tendency of physicians practicing in developing countries to improve their skills in the management of the casualties of obstetric neglect and, consciously or subconsciously, to fail to recognize the fundamental factors that determine the pathology. Our efficient casualty services at the tertiary level might even obscure the basic problems and delay an active response from those who have the privilege to redirect resources and bring about the much desired change. Medical practitioners frequently view medical practice as curative care, often oblivious to the cost-effectiveness of preventive health care. There is need, therefore, to orient these practitioners to the fundamental issues that are responsible for poor reproductive health, i.e., low quality of life, high parity, birth to very young or very old women, too short birth intervals, malnutrition, and so on. Another striking observation from a study of physician attitudes and family planning in Nigeria¹⁵ was that only about half of the physicians in the study were providing family planning. Obstetricians and gynecologists and general practitioners were more likely to provide methods to their patients than were other types of physicians. The physicians were concerned about population growth and favored family planning, yet a substantial minority believed family planning is foreign to the culture and that it promotes promiscuity. Physicians were reluctant to promote family planning on a wide scale; many disapproved of the provision of oral contraceptives or IUDs by non-physicians. It was interesting, however, that the average desired family size for currently married respondents was 4.2.

For nurses attending training programs at the University College Hospital, pretests on reproductive health issues consistently show paucity of knowledge. The majority (84 percent) score less than 50 percent. These observations indicate tremendous gaps in knowledge, obviously reflecting on the curriculum. Effective mobilization of the medical team requires, therefore, additional training opportunities in family planning and population-related subjects as well as a change in the preservice curriculum.

The Consumer

Even though the profound effect of population on health and the socio-economic status of the nation is obvious to the scientist, the consumer of the services must be involved in the decision-making process. The consumer must express a need for these services and must understand how they can lead to a reduction of high fertility and the poor quality of life. The high rate of illegal abortion in most African countries indicates the urgent need for contraception in the high-risk groups.

At the community level, understanding consumer needs and helping consumers to solve their problems is fundamental to the acceptance of modern contraception. From the Oyo State CBD project, very positive and practical benefits resulted from integrating family planning with basic health services. Not only does this make the initiation of the topic of child spacing acceptable at the village level—it also allows family planning to be associated with a very much appreciated service. It allows the CBD workers to justify their promotion of family planning through an emphasis on its health benefits. Open and cross-sex communication about family planning is very difficult in the rural community. So, it is important to have both male and female community agents introduce and promote modern contraceptives in the rural area. In addition, it appears that any use of contraception by the health workers greatly increases the ability of the agent to influence others. In general, satisfied consumers are also effective proponents of contraception.

Delivery of Family Planning Services

Comprehensive animal and field studies on a variety of contraceptives are to a large extent influencing acceptance of contraceptives. However, to facilitate acceptance of new preparations, scientists in each country must undertake clinical and, when necessary, biochemical studies to ensure that new preparations are acceptable to their respective populations and drug regulatory bodies. This is without prejudice to the data available from the drug manufacturers. It is from such results that controversial issues can be effectively resolved. Known side effects should be presented in the proper context in view of the profound effect such adverse publicity can have on contraceptive acceptance and continuation rate. The consumers should be aware of the rarity of major side effects and of the fact that these side effects are less likely to cause maternal death than a planned or unplanned pregnancy. Indeed, adequate publicity given to the health advantages of contraceptives will help to minimize the morbid fear emanating from sporadic publications of occasional contraceptive side effects.

Whether family planning services are delivered by physicians or nonphysicians, the major determinant of whether such personnel significantly influence the consumer depends on their level of training, competence, and ability to inspire and motivate the client. Hence, there is a need for institutional strengthening to provide ideal training programs for different groups of service providers.

Contraceptive commodities should be made available at both rural and urban centers, and both fixed and alternate service delivery programs such as the CBD and the market-based project would ensure improved contraceptive usage. Currently the need and demand for contraception far outweigh the supply, especially in rural communities.

Role of Nongovernmental Organizations

The pioneering efforts of family planning associations and voluntary organizations have shown that one of the most effective strategies to secure the commitment of decision makers lies in building public support for family planning activities.¹⁶

To complement the efforts of the research scientist, nongovernmental organizations with minimal bureaucratic constraints should mobilize support for family planning through various programs such as

1. Public enlightenment programs
2. Factory workers' programs
3. Women's programs
4. Training programs for service providers

Activating Change at the Institutional Level

All medical institutions established for the training of medical personnel have a statutory role to conduct research, provide training, and provide service. Therefore research findings emanating from these institutions should not only be utilized to influence decision makers but also to evolve a curriculum for training that would ensure that all graduates acquire enough knowledge and skills in reproductive health issues. What is the current state of the medical school curriculum? In Nigeria, for example, reproductive-health-related topics are taught during integrated posting in obstetrics and gynecology. The duration of the integrated posting varies from 12 weeks at the Lagos University Teaching Hospital to as high as 24 weeks at the University of Ibadan; others have an average of 16 hours. In Nigerian medical schools, until recently, only a one-hour lecture was given on contraception. In Ibadan, unlike other medical schools, students spend 2 weeks in the Fertility Research Clinic.

In 1985, JHPIEGO sponsored a curriculum workshop for heads of obstetrics and gynecology units, representatives of federal and state ministries of health, as well as deans and provosts of colleges of medicine. A review of existing institutional curricula indicated the following:

1. Inadequate theoretical knowledge of individual methods of contraception due to inadequate allocation of lecture hours and omission of important topics in the lecture schedule.
2. Inadequate exposure to family planning clinical procedures due to defects in the curriculum and lack of functional clinics.
3. Reproductive health is not an area of defined priority during the period of rotational internship.

Participants at the workshop were of the consensus that there is an urgent need to accelerate reproductive health education by restructuring the medical school curriculum. They were equally unanimous that clinic-based services should be established and strengthened to provide an optimum climate for

training the undergraduates, the resident staff, and the graduate and graduating nurse-midwives. This effort in manpower development will complement the effort of a government currently favorably disposed to formulating a national population policy.

It is pertinent to acknowledge JHPIEGO, Pathfinder, and WIHO for their support for family planning training programs prior to the federal government initiative. These training programs provided a forum for dialogue as well as a model for the acquisition of skills that could be replicated in other parts of the country.

Conclusion

Although there is growing awareness by most developing countries that unchecked population growth is a major deterrent to socioeconomic development, there is a need for social scientists and population experts to help governments to evolve a national population policy and program. Research findings are effective tools in bringing about desired change in reproductive behavior and utilization of reproductive health services. There is a need for governments to initiate national information and education programs to ensure positive reproductive health knowledge, attitudes, and practices. Effective circumvention of cultural barriers depends on informed, motivated, and involved individuals and communities. In recognizing that almost half of the population in any developing country is very young, with the majority already inclined to having relatively fewer children than their parents, it seems rational that special programs focused on this group are most urgently needed for the long-term objective of effecting lasting changes in fertility value systems.

Each government should assist in the crusade for improved reproductive health care by legislating acceptable policies and providing adequate funding for effective programs that would meet the needs of the community.

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Trends in Medical Education and Curriculum Revision in the United States

Robert E. Reynolds, M.D., Dr.P.H.

I wish to offer some thoughts and observations on what is happening in American medicine and particularly in American medical education. Four areas will be discussed. The first will be a description of some of the dominant forces in American medicine today; second, an examination of how these factors are influencing American medical education; third, the trends in American medical education in response to these factors; and fourth, developments at two medical schools in America (Harvard and Hopkins) that may be typical of other schools.

Background and Problems in United States Medicine

There are nine factors in American medicine that need to be noted here. First, and perhaps foremost, is the growing surplus of physicians in America. This is in stark contrast to perhaps 15 or 20 years ago when the United States government became convinced that there was a shortage of physicians in America. The government invested a great deal of money in encouraging the existing medical schools to increase their class size, and they actually encouraged the inauguration of a number of new medical schools. Today the government is saying quite the opposite: we have too many physicians; they cost society too much; and we should reduce class sizes in our medical schools and perhaps even close a few schools. The government is also questioning the influx of foreign medical graduates and their effect on the pool of physicians in America.

The second feature is the rise of the corporate practice of medicine and managed care systems. Ten or 15 years ago the American physician was typically a solo entrepreneur or perhaps a member of a small group practice. The trend today is more and more towards the physician's working as an employee for a large group practice, for a health maintenance organization,

for a hospital, or for a chain of hospitals. Hence, the corporate practice of medicine is becoming the dominant theme in place of the solo practice of medicine.

Third is the explosion of biomedical research and new technologies in medicine that have a direct impact on the quality of medical care, but secondarily have an escalating effect on the costs of medical care to the public and on the complexities of medical education. One only has to look at artificial limbs, coronary care units, transplantations, CAT scanners, magnetic resonance image scanners, and positive electron tomography to note but a few of the amazing modalities for diagnosis and treatment of disease newly available to our patients.

The fourth factor is the malpractice crisis. I refer here to the steeply rising number of claims by patients against their physicians and/or hospitals and the rising size of the settlements of these claims. Reflected in this, of course, is the rise in insurance premiums that hospitals and physicians are required to pay. These contribute to the increasing costs of medical care and defensive medicine. The increasing costs in both these areas have a strongly negative impact both on medical care and on medical education.

The fifth factor is the tarnished image of the physician in America. It was not so long ago that the typical American physician was fatherly, gray haired, soft-spoken, caring, self-sacrificing, and rather threadbare. Today the image seems to be that of one who is much younger, is more technologically oriented, who is emotionally distant from his/her patient, and is interested in driving a Mercedes rather than an old Chevrolet.

The sixth point is reflected in the rise in for-profit medicine. Chains of for-profit hospitals and physician groups are becoming increasingly important factors in our American medical system. Today cash flow, expense control, and market share have become the name of the game in American medicine instead of the best possible care for each patient regardless of cost.

The seventh point is related to the physician surplus, and especially the question of the number of foreign medical graduates immigrating to the United States for practice. Recent figures show that about 20 percent of the newly licensed physicians in America each year are foreign medical graduates. Furthermore, some 17 percent of the residency slots in American hospitals are filled by foreign medical graduates. So, this trend will continue.

The eighth point relates to the growing liaison between industry and the world of medical science. By this I refer to the dazzling dividends of research and breakthroughs in medical science, and the scramble to transform these research findings and new developments into commercial products or new services. Our faculty are entering into this fray. There are profits to be made. Those profits are to be shared by the individual scientist, his/her university, and his/her industrial sponsor. This colors the university and its faculty relations in ways which alter the traditions of academia in dubious ways.

The ninth and final point is the changing relationship of the patient to his/her physician. No longer the passive recipient of care, the patient is assuming

an increasingly active role vis-a-vis the physician as regards the choice of facilities, tests, therapies, and consultations—as well as the financing mechanisms and responsibilities for this health care.

These nine factors describe some of the dominant forces changing and shaping American medicine today and for the next decade.

Background and Problems in United States Medical Education

There are several strong forces actively impacting upon medical education today. First, there is rising dissatisfaction with the current curriculum in medical education and with the teaching methods. By this I mean the venerable practice of laying on the students fact, after fact, after fact, and requiring the students to memorize these facts with little attempt to consider or point out their clinical relevance. The perceived emphasis is on facts rather than on knowledge and on science rather than on caring. These two issues are bantered back and forth between faculty and students, and have become the focus of a good deal of criticism of our current curricula. At the same time, the numbers of applications to medical schools are now actually diminishing in the United States. This certainly reflects a diminished interest on the part of the bright young people of America to enter medicine. About 20 years ago, there were 3.2 young people in the country competing for every one slot open in a freshman medical class somewhere in the United States. The ratio is now down to 1.9 from 3.2, although there actually are more slots available because there are more medical schools with larger class sizes today. Many educators have the feeling that some of the best and brightest—who may have gone into medicine if they had been faced with the decision a decade or two ago—are deciding today not to go into medicine, but are choosing physics, engineering, computer sciences, and other fields.

Second, there is a reduction in government financing of medical education, including the financial support of housestaff training through Medicare and the financing of student loans. Today the tuition at Johns Hopkins is \$12,600 per year. We estimate it costs \$25,000 per year to be a student at Hopkins, including tuition. The average indebtedness of a student at graduation is now approximately \$38,000. This must inevitably have an effect on the choice of specialty, the choice of location for practice, and perhaps even a diminishing effect on student interest in entering academic medicine.

Third (and this is a positive feature) is the rise in the number of females and minority students in our classes in the United States. Some 20 years ago, less than 5 percent of our medical students were female. Currently, it is close to 35 percent. The percentage of minority students is about 6 to 8 percent. By minority students in the United States, we refer to Blacks, Hispanics, Orientals, and Native Americans.

The fourth feature is the rather arbitrary separation between the undergraduate medical education of the first four years and the postgraduate training program. There are those, particularly in the faculty, who feel that the arbitrary separation diminishes the potential for continuity in the edu-

educational process. Furthermore, medical schools are urged to become more involved in the curriculum of the postgraduate training programs and exert greater influence on these issues.

The fifth factor is the competition for the available time of the faculty. In theory the faculty are primarily appointed to teach. Surprisingly, they are not often paid to teach. They are paid from funds derived from research grants and from clinical practice. This makes it very difficult to obtain a commitment from the faculty to spend time and effort on teaching; they understand too well that the incentives for promotion and income are focused on research grants and on practice income. This is a balance that we need to redress.

The last item in this category is the growing tension between teaching hospitals on the one hand and faculty and students on the other hand. In the "good old days" when teaching, patient care, and clinical research were mixed together without regard to funding sources, there were few problems between faculty and students and their teaching hospital. In the economic world of today there are financial pressures on hospitals that make it difficult for them to continue providing the undefined but substantial support of teaching programs that were conducted essentially for free in the past. As hospitals more and more are being financially pinched and are being called on to account for their costs, the educational component of the teaching hospital has become more visible and vulnerable.

These are some of the issues in the world of medical education that have come into focus recently.

Current Trends in United States Medical Education

In the early 1980s the Association of American Medical Colleges undertook a large study of these medical education issues, sponsored by the Henry J. Kaiser Family Foundation. They interviewed students and faculty from around the nation in medical schools, and spoke with professional societies; they also spoke with laypeople and politicians. They published a lengthy report entitled *Physicians for the Twenty-first Century: Report of the Project Panel on the General Professional Education of the Physician and College Preparation for Medicine*. In this document the Panel members have made several assumptions for the future which are useful to note in order to understand their conclusions and recommendations. These assumptions relate to the pressures on medical education and on medical practice in the future.

First, the rapid changes in biomedical technology will continue and probably quicken.

Second, chemical, mechanical, and electronic technologies available for the prevention and treatment of disease will become ever more complex, more powerful, effective, costly, and sometimes dangerous.

Third, the medical practice utilizing these technologies will require more, not less, education and specialization.

Fourth, there will be an increasing recognition that many factors determining health and illness are not directly influenced by interventions in the health care system, but are consequences of lifestyle, environment, and poverty.

Fifth, the principal providers of health services in the near future are likely to be physicians employed by large corporations or by health service organizations covering specific population groups, such as health maintenance organizations.

Sixth, the environment of medical practice and medical education will be heavily influenced by the agencies that pay for health services and shape their delivery. As concerns for health care costs become more acute, the goals of medicine and medical education will become less and less congruent with the goals of financial control. An intensification of many of the ethical dilemmas that we face today will result.

Based on these assumptions and the information from their interviews, the Panel members have come to several conclusions and recommendations:

First, the Panel members have noted that the purposes of a general professional education should be the acquisition of knowledge, but these purposes should also include the acquisition of the skills, values, and attitudes necessary for all physicians. These purposes should encompass the acquisition not only of the concepts and principles derived from a knowledge of the natural sciences, but also the acquisition of those concepts and principles derived from a knowledge of the social sciences and humanities. These purposes should include also the acquisition of the values and attitudes that promote caring and concern for the individual, as well as for his society; and they should include the acquisition of skills in the collection of information about patients, rapport with patients, application of the scientific method to analysis, synthesis and management of clinical problems, the identification and clinical appraisal of relevant literature and clinical evidence, and a continuation of effective learning. In this regard, the Panel members have gone on to recommend the following:

1. A shift in emphasis toward a better balance between the acquisition of factual knowledge and the acquisition of skills, attitudes, and values
2. A better description of the proper prerequisites for medical education
3. An amending of the curriculum to adapt to changes in demography (i.e., the aging of our population) and in health care systems, and to prepare for involvement with social problems such as drug abuse and alcoholism
4. An increase in emphasis on health promotion and disease prevention

The second set of conclusions has dealt with the prerequisites for medical education. The Panel members have noted the current trend towards premature specialization in college life and toward excessive emphasis on undergraduate sciences and the Medical College Aptitude Test, with the resultant failure to obtain a broad, rigorous education. In this regard, they have rec-

ommended that students seek a broader college education and that medical schools modify admissions requirements to reflect this and require some evidence of scholarly achievement in college. They have recommended improvements in the criteria for entrance into medical school and a clearer communication of those criteria to the undergraduate colleges.

Third, with regard to acquiring learning skills, the Panel members have noted that physicians need to be able to learn continually throughout their professional lives, and the Panel members have recommended that the faculty select students who have demonstrated a capacity for self-directed learning. The Panel members have also recommended a reduction in classroom hours (one of the favorite pleas of students) and a greater emphasis on independent learning and problem solving opportunities. Furthermore, they have recommended the development of improved evaluation and testing methods, and a heavier utilization of the information sciences and computer technology in the teaching and learning process.

Fourth, the members of the Panel have attempted to define what should be accomplished in the clinical clerkship years of a basic medical education. They have recommended that the faculty should study and specify the content of the clinical curriculum and specify its goals. These criteria should be enforced and supported by the deans and hospital executives. There should be a teaching faculty who have the time and the preparation as teachers to undertake this. Students should be given the benefit of the results of their tests for feedback purposes. Clinical time should be used to broaden the education of the student and not to encourage premature specialization in one field or another. Last, the basic sciences and the clinical sciences should be blended together to make the clinical education more relevant.

Finally, the Panel members have made some remarks about ways to enhance the faculty involvement in medical education. Commenting on the competition between teaching time and time for research and practice, they have suggested that deans should intensify their efforts to develop interdisciplinary teaching teams in medical education. There should be a separate budget for teaching, although this seldom occurs in medical schools today. Faculty should be encouraged to serve as mentors to individual students, and the faculty should adopt some of the newer technologies in teaching and student assessment.

Developments at Harvard and Johns Hopkins

The Report was published in November 1984 and many responsible faculties in America are seriously studying the conclusions and recommendations in the process of evaluating their own schools. For example, in the early 1980s Harvard underwent a study of its curriculum and developed a proposal for an experimental curriculum which began two years ago. Twenty-five students were randomly chosen to enter the experimental curriculum, which attempted to augment the traditional biomedical science of the first two years with heavy doses of behavioral and socioeconomic medicine, but utilized computer technology and a considerable amount of self-directed learning. This program is

in the second year now and the jury is still out on how successful it will be and whether it can be successfully replicated.

At Johns Hopkins we have appointed a high-level faculty committee to study and perhaps revamp our traditional curriculum. In light of the tremendous amount of time and effort now devoted to teaching the basic sciences and the departmental involvement in the course work and classroom hours, this may be difficult to accomplish. A reexamination of our ethics course is also under way. Recently, we have inaugurated a campus-wide program in cultural affairs in an attempt to blend the influence of biomedical science with the arts and letters and music as they relate to medicine and society.

These are examples of how two bastions of academic research and medical education in America are trying to redress the balance described earlier, the balance between fact and knowledge and the balance between science and caring. Undoubtedly some other medical schools are further along, but we all have serious work ahead to accomplish the goals noted by the Panel.

Summary

As one last comment, I could not help but contrast in my mind this morning the current difficulties in Nigeria and Kenya and other developing countries, with those in America. I have asked whether there are any similarities. Although there seems to be a stark contrast between the problems in the organization and delivery of health services to their populations and the appropriate education and training of the health professionals in the developing countries and what I have just described here in America, I would suggest that there is a core of issues that is quite similar for all societies. Some of these issues are the following:

1. What are the functional definitions of health and illness, and how do they affect society? What is health and what is nonhealth?
2. Who is responsible for individual health? The individual? His/her family? His/her community, society, the government? What mix of responsibilities is there?
3. What are the best ways of promoting and achieving individual good health, and the best ways of educating and motivating the individuals for its pursuit?
4. What are the resources available to secure good health? By this is meant the broad group of resources: food, water supply, sanitation, medicines, and health services. Who shall decide the rationing of these resources and on what basis?
5. What are the social, economic, religious, or political impediments in any given society that obstruct or delay the achievement of the targeted levels of health, and how can those circumstances be ameliorated?

It seems that these are fundamental questions that all societies have to face, directly or indirectly, regardless of their individual levels of health, power, education, or wealth. I think that is what brings us all here today.

This is certainly not to minimize the problems described so poignantly this morning, for they are great indeed, but rather to underscore the common threads weaving together the worldwide community of mankind as its individual societies struggle separately or, in the case of JHPIEGO and the World Health Organization, struggle together to improve the health and well-being of their citizens.

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Strategies for Bringing About Change in Curriculum

The discussion focused on the approaches to bringing about change in reproductive health curricula in medical and nursing schools. It was agreed that curricula content must be changed, and that influencing decision makers is a major approach to instituting curricular change. However, decision makers are a large constituency, including community leaders, students, academicians, as well as political leaders.

Many speakers provided examples of successful approaches to curriculum change. For example, in Thailand in 1981, the Ministry of Health and the Chulalongkorn Hospital Faculty of Medicine with support from JHPIEGO organized a workshop for the deans of the seven Thai medical schools. They agreed on a revised competency-based curriculum in reproductive health for the medical students which has since been implemented in all seven medical schools.

An example of another approach to curriculum change was cited by a participant from Mexico. The Association of Mexican Medical Schools (AM-FEM) with support from JHPIEGO sponsors a program for medical students. The objective of the course is to prepare future physicians to be family planning promoters, changing their attitudes towards and building their knowledge and interest in family planning. The program has now been integrated in over 34 Mexican medical schools and has reached over 20,000 medical students. It was suggested that this practical educational approach is one model to introduce or improve the teaching of family planning at the university level. The model appears effective, replicable, and not exceedingly expensive. (The estimated cost per trainee for the 15-hour course was under \$20 U.S.)

The importance of developing new service systems which permit students to put their new skills into practice was noted by a number of participants. The example was cited of nursing students being taught family planning skills, but having no place to utilize these skills in traditional curative delivery systems.

There was debate over the difficulty in changing university curriculum. One speaker noted that it is typically the university senate and council that approve curriculum change, and it is difficult for individual faculty to bring about change. Another speaker countered that while it is true that university curriculum is based on overall criteria approved by the university, each department head has flexibility within the course hours provided by the university senate. This participant noted that reproductive health topics should be an important part of the obstetrical and gynecological component of medical school education, with particular emphasis on both the contraceptive and noncontraceptive benefits of child-spacing methods, including the relationship between child spacing and maternal and infant mortality and morbidity.

In summary, there was general agreement among participants that

- JHPIEGO should continue to concentrate its efforts on developing programs to reach decision makers such as deans and directors of medical and nursing schools to help convince them of the need for continuing to integrate reproductive health and child survival components into medical and nursing school curricula.
- Nursing and medical schools must upgrade and revise curricula to include reproductive health/family planning and primary health care.
- Medical and nursing students are captive audiences with respect to family planning, and are in a position to convince others.
- Any alteration of the curricula must also be reflected by an alteration of service delivery programs, so students may practice their newly acquired skills.
- University officials need to be convinced of the need for curricular change.
- Indigenous research can be used to change attitudes of university officials and policymakers.
- Lecturers should incorporate reproductive health/family planning problems/issues into their regular lectures.



Reproductive Health: What and Where in Nursing Education

Carol J. Gray, R.N., Ed.D.

Reproductive Health in Basic Nursing Education

The definition of *reproductive health* used in basic nursing education essentially might be *limited* to those aspects of health concerned with the process of reproduction *or in its broadest sense* might be interpreted to encompass all aspects of *family* health and, in particular, the health of the mother and child. The latter interpretation would include consideration of fertility, conception, pregnancy, childbirth, child health, and family planning—and would be interpreted as such in most university-based programs.

A brief reference to the recent curriculum/program developments in nursing education might suggest the context in which nursing moved from the narrow to broader interpretation of the definition. As nursing in the mid 1950s and early 1960s determined the need to phase out hospital-based diploma programs and to move into institutions of higher education, they introduced a major curriculum thrust as well. Many models of nursing curricula were developed that focused on health, e.g., health promotion and disease prevention, in contrast to the medical model that has focused on disease and pathology.

The concept of reproductive health used by our faculty incorporates the life-long approach to health maintenance. The underlying principle, simply put, is that if one is to have a healthy child, one must be a healthy person.

The sequence of learning experiences focuses first on the young woman at menarche, on adolescent nutrition, and on health promotion. The concept of family is important, as is the need for adequate support and for control of one's life. The father is a focal point when possible or, in his absence, the term *significant other* enters into the application of principles to family-centered care.¹

The Johns Hopkins University School of Nursing faculty believe that what is called "reproductive health" cannot be understood in isolation from the

rest of social life: family structures, religious beliefs, ethnic or national heritage, or culture. Therefore, before the student considers reproductive health, he/she must complete a course of study that provides an essential foundation for professional education in nursing. Through studies of the humanities and the social and natural sciences, students gain a greater understanding of man and his world. Additionally, the environment in which health care is practiced is a critical factor in determining what a curriculum should include.

The Health Care Environment

The changing environment of health care was clearly articulated at the Second Joint Meeting of the European Health Policy Forum and the World Health Organization in 1984 and is appropriate yet today. I quote Dr. Jan E. Blanpain of Leuven University (cited in the *International Journal of Technology Assessment in Health Care*, Cambridge University Press—a major new journal concerned with the generation, evaluation, diffusion, and use of health care technology through international exchange of information).

“The morbidity problems that health services confront today are different in nature, volume and mix compared with those of yesterday. The technology available to health professionals (and increasingly to lay people) is changing dramatically. It (technology) rapidly becomes obsolete and is constantly replaced by new and often better techniques, usually at a greater expense, which in turn fuels the cost problem in health care. These phenomena are but a few examples of the array of forces which are impinging, in synergy, upon today’s health care scene . . .

“Cost containment is probably *the* foremost issue because it not only directly affects the resources devoted to health care, but also reflects abandonment of policy of continuously expanding social coverage at any cost . . .”

Introducing Reproductive Health in Nursing Curriculum

Beyond the concern for general education and the health care environment, faculty believe that a basic understanding of research and technology are requisite to the introduction of reproductive health content. Two courses are offered to achieve that end. First, through a course, Systems and Technology, students consider the utility as well as the ethical dilemmas wrought by technological advances in health care, including diagnostic and monitoring devices, computerized data bases, information retrieval systems, as well as physiological life support systems. Second and concurrently, the course in research provides students with the opportunity to review selected research literature and to critique it as well. Within the course, students are introduced to the research process and major research designs—including experimental and quasi-experimental studies—and to the rigor necessary to carry out scientific inquiry. Given that requisite knowledge base, two courses—Nursing the Child-Bearing Family and Nursing for Child Health—are offered concurrently, both of which integrate concepts of reproductive health.

Nursing the Child-Bearing Family

This course introduces the student to contemporary perspectives on the health care of women during normal pregnancy ("Pregnancy, a normal life process!") as well as during the intrapartal and postpartal periods. Course content incorporates the growth and development of the fetus and the mother's needs for health teaching and nutritional care during the entire child-bearing experience. Emphasis is placed on the nursing aspects of care for the mother and her infant within the family context. Health problems and issues related to pregnancy and selected high-risk situations are addressed. Maternal-infant interaction and parental bonding are emphasized. Continuity of care is stressed as the mother and child return to the home and the community. Students practice within the in-patient setting under clinical supervision. They have the opportunity to care for patients throughout the prenatal period and to make home visits to selected patients for follow-up care.³

Nursing for Child Health

Students study the unique developmental and health problems of infants, children, and adolescents. Drawing on their knowledge of normal health assessment, students consider the wide variety of needs of children who experience a change in health status. The more common and the more serious health problems are considered in light of the demands placed on the child and his family. The impact of illness and hospitalization and the particular demands surrounding acute and chronic illness in children are discussed from theoretical and applied perspectives.

Students identify and implement appropriate nursing interventions using the nursing process—assessment, planning, implementation, and evaluation—in the clinical situation within a pediatric setting. The goal of the course is to develop perspectives on wellness, short-term acute illness, and chronic illness in children. Emphasis is placed on family-centered care that incorporates teaching and health counseling. Continuity of patient care—regardless of setting—is stressed. A comprehensive approach to child care is emphasized, and the course addresses the utilization of a health team approach and incorporates the use of community resources for the benefit of the child and his family.³

By highlighting selected components of the entire curriculum, including the maternal-child component, I have provided a synopsis of the way in which reproductive health is offered in one basic nursing education program.

Curriculum Accreditation

In the United States, the curricula supporting the first professional degree in nursing are influenced by a national accrediting agency, the National League for Nursing Criteria for Accreditation.⁴ The uniqueness of a curriculum is influenced by the mission of the university and the philosophy of the school's faculty.

Professional standards and legislation also influence the curriculum. The American Nurses' Association's "Standards for Practice"⁵ and the state of Maryland's "Nurse Practice Act"⁶ directly affect quality of care and scope of practice expected of graduates nationally and locally, and therefore have direct bearing on the curriculum.

Finally, approval of a health care facility by the Joint Commission for Accreditation of Hospitals influences the selection of clinical practice sites. Hence, the curriculum, at the undergraduate level, is significantly influenced by a variety of external forces.

Instructional Approaches in Nursing Education

Educational technology/instructional media used to supplement lectures, seminars, and clinical conferences include primarily the use of videotapes:

1. *The Amazing Newborn*, T. Berry Brazelton, Developmental Pediatrician;
2. *Assessment of Gestational Age: Dubowitz Scale*, Multiple Factor Scale, superseded WHO's weight estimate single factor evaluation;
3. *Breast Feeding*; and
4. *Born Dying*, ethical issues associated with a multiply handicapped child—congenital anomalies/pressures by people on mothers'/nurses' feelings.

The first three videotapes are viewed independently at the student's leisure rather than during class time—a precious commodity. The fourth required videotape is presented to the class. Because of the profound ethical issues presented, faculty believe that immediate discussion opportunities are necessary. Hence, educational technology provides, in part, opportunity for faculty to encourage independent study, thereby gaining for themselves that "precious commodity"—to which speakers earlier referred—TIME.

Practice technologies to which our students are introduced for purposes of hospital care include, but are not limited to, selected diagnostic and monitoring devices, e.g., treatment modalities; intravenous therapy with drip-medication for pregnancy induced preeclampsia; fetal blood sampling/monitoring for pH; also epidural anesthesia, general anesthesiology, and monitoring for hypervolemia and hypovolemia. With the exception of intravenous therapy taught in the nursing practice laboratory, all others require on-site clinical observation and demonstration.

Options to Improve Reproductive Health Content

What options are available to us to improve reproductive health content in basic nursing education? Curriculum evaluation and modification are ongoing. Within the context of the United States, there has been and continues to be endless opportunity to change curricula. Even though several external agencies lend a major influence to curricular design and content, they all encourage program evaluation and, if appropriate, change.

The question of education for reproductive health is complex. The answer to the question of content doesn't come simply with updating it to parallel developments in biomedical technology and theory development—although certainly those new technologies, research outcomes, and theoretical formulations are of obvious consequence to curriculum planning.

Content derives from institutional philosophy, mission, program purpose, and objectives. It is generally accepted in the United States in nursing circles that baccalaureate education has as its purpose the preparation of generalists. Specialization occurs at the graduate level—be it for reproductive health or another practice orientation. Might the time be right to change the purpose of undergraduate education at the baccalaureate level? I think not. The increasing complexity of health care—more specifically of nursing care—underscores the need to reaffirm that purpose.

Reproductive Health Content in a Changing Environment

Issues and problems in reproductive health have been well articulated—such as the acquired immune deficiency syndrome and sexually transmitted diseases. The literature addresses promises of technology versus what society can afford; the problem of technological assessment in the context of a country's social, economic, and religious value system; quality of life over survival; the issues of scarce resources to extend biological life or active life⁷; values clarification—and another issue: technical feasibility versus social desirability. There emerge “changing values regarding conception and birth . . . the paradox that declining birth rates give rise to extreme expectations regarding heroic efforts either to enable procreation or to save an only child who becomes fatally ill.”⁸ The issue of technical feasibility vs. social desirability involves for example implants, transplants, and artificial organs.

In this milieu, nursing education continues to expand its horizons. Its goal is to educate individuals to be competent in clinical practice and to be committed to scholarship and humane practice. Nursing education aims to provide a broad education that will enable individuals to interact effectively with all who influence the development of fiscal and health policy as well as with professional care providers. Content, therefore, derives from that goal. Basic nursing education sets the groundwork—but it is at the graduate level that preparation of the reproductive health nurse clinician/practitioner occurs.

A critical measure of curriculum/content effectiveness is one that goes beyond the students' performance in multiple-choice teacher-made/standardized examinations. A real measure of effective curriculum/content may be realized in the evaluation of human outcomes, i.e., the improvement of morbidity and mortality statistics, the reduction of teenage pregnancies, fetal deaths, and maternal deaths.

The number of participants in JHPIEGO programs makes evident the broad interest throughout the world in reproductive health education. I am more keenly aware that there continue to be unmet needs. Troubling questions and issues concerning reproductive health transcend national boundaries.

Despite cultural, institutional, economic, and demographic differences within our countries, reproductive health issues apply commonly to all—perhaps in different measure/scope—but universally we must all address concerns about the management of pregnancy, delivery, and the postdelivery period, as well as those concerns regarding care of the newborn. Reproductive health for all includes provision of adequate nutrition, improved health status, reduced risk factors, increased public/professional awareness, and improved services.

The solution to the human problems still existing will come not from simple change in curriculum content, or unilateral national or discipline-based action, but through collaboration—in education and practice—of the diverse providers of health care: medical and nursing care providers; allied health professionals; decision makers in government, industry, and health care organizations; as well as members of the “scholarly” disciplines such as law, economics, ethics, engineering, sociology, psychology, and history. The question of content options to improve reproductive health is therefore too narrow. The process and the interface with other key health providers are essential corollaries to the content question.

Summary and Conclusion

University-based basic nursing education supports (generally) the definition of reproductive health that encompasses all aspects of family health with consideration given to fertility, conception, pregnancy, childbirth and child health, and family planning. Teaching methods enable students generally to achieve the objectives of undergraduate education and to fulfill the purpose of university-based basic nursing education: the development of clinically competent generalists. Were faculty to utilize more fully available educational technologies and encourage independent study, perhaps the pressure of time constraint felt by the majority would diminish significantly and content expansion in the areas of epidemiology, infectious diseases, and selected other emerging health issues might be possible. Faculty might then be able to devote greater time to scholarly pursuits and practice. Additionally, in academic health centers, there is an opportunity for shared interdisciplinary health education and collaborative practice that should be pursued in timely fashion.

Opportunities to improve content are ever present. By keeping a finger on the pulse of the world (maintaining a global view) and by taking advantage of the opportunities associated with international dialogue—via satellite, microcomputers, or international meetings—we will be able to improve content. The problems are compelling and the solutions require international and interdisciplinary pursuit.

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Graduate Nurses: Meeting Reproductive Health Needs in the Community

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The promotion of the concept of family welfare, responsible parenthood, and family planning in the nursing curriculum was mandated by the president of the Philippines in 1972. In that year, all schools of medicine and nursing were directed to prepare, plan, and implement the integration of family planning into their curricula and require from graduates competency in family planning as a prerequisite for the appropriate licensing examination. In 1973, the Ministry of Health and the College of Public Health in the Philippines in collaboration with the World Health Organization started to conduct a series of workshops on population dynamics, family health, and human sexuality for faculty members of nursing schools to help them prepare for the integration of family planning into the curriculum. A teaching guide entitled *Guide for the Teaching of Population Dynamics, in Family Health and Human Sexuality in Nursing and Midwifery Curricula* was published in 1973 and distributed in the schools.

The most recent census conducted in the Philippines was in 1980. The population of the Philippines at that time was 48.1 million, making it the eighth largest country in Asia and the seventeenth largest country in the world. The government of the Philippines recognized that population pressures were one of the ten leading problems in the country. Nursing educators, as well as nurses engaged in delivery of services, recognize the urgent need to revise the nursing curriculum in order to prepare sensitive graduates who are able to meet the reproductive health needs of the population. In addition, since in the Philippines nurses comprise a major proportion of the manpower for family planning services, the nurses' ability to provide family planning services is crucial in the implementation of the population program of the country.

Strategies for Curriculum Revision

In 1986, the University of the Philippines Institute of Public Health was granted the authority by the Commission on Population to conduct a nationwide survey of public and private nursing colleges in order to arrive at a systematic description and documentation of the integration of family planning in the nursing curriculum. The following were assessed:

1. What and how family planning concepts and skills are taught in nursing schools.
2. The population/family planning knowledge and attitudes of 1986 nursing graduates.
3. Facilitating factors and constraints in the teaching/learning of population/family planning.
4. Perceived learning/training needs of 1986 nurse graduates and faculty in the area of population.
5. The scope of population/family planning questions included in the 1985 Board Examination for Nurses.
6. Respondents' suggestions/plans for strengthening the population/family planning component in the nursing curriculum.

Population and Sample

Twenty-eight out of 120 schools of nursing participated in the study. The sample population included 428 nurse graduates representing 21.8 percent of graduates of the sample schools or 11.2 percent of the total graduates of March/April 1986; 64 faculty responsible for teaching/supervision of the population/family planning component, and 28 deans also participated.

In designing the instruments, a technical committee (representing lead agencies in family planning services/training) was convened. This committee included representatives of the Ministry of Health; the Commission on Population; the Nursing Professional Regulation Commission; the Ministry of Education, Culture, and Sports; the Institute of Maternal and Child Health; the Association of Deans of Philippine Nursing Colleges; and the Philippine Nurses' Association.

Findings

Data were obtained through questionnaire, interviews, review of syllabi, and inspection of teaching materials. The following are the key study findings:

- i. Population/Family Planning Component of the Nursing Curriculum
 - a. *Content and Approaches*
 - (1) All schools use the survey approach in teaching population/family planning, integrating the content in community health nursing and/or maternal and child nursing.
 - (2) Of the listed essential content of population/family planning, some schools do not include information, education, and communication (IEC); counseling; and management of family planning services.

b. *Family Planning Practicum*

- (1) All schools make use of community facilities such as city and rural health centers for their students' practicum on family planning. These resources also include government hospitals with family planning clinics. In addition, experiences in family planning service delivery are integrated most frequently during the community health nursing practicum and in assignments to inpatient and outpatient obstetrical units.
- (2) All the health centers or hospitals promote contraceptive pills and the IUD. The majority promote the condom, sterilization, and Natural Family Planning methods. The method least promoted was spermicides.
- (3) Eleven schools had exclusive use of clinical facilities. The rest shared the resources simultaneously with other nursing and non-nursing schools such as midwifery, medicine, medical technology, and social work.
- (4) Deans of government schools allowed their students to provide all contraceptive methods.
- (5) Deans were also selective of their students' experiences/activities. Motivating potential acceptors and giving instruction on Natural Family Planning were cited by all.
- (6) Activities that 50 percent or less of the deans permitted their students to carry out were the following:
 - Issuing of a resupply of condoms and pills to clients
 - Instructing new pill and condom users
 - Caring for patients before and after sterilization or IUD insertion
- (7) Activities that more than 50 percent of the graduates were able to perform included the following:
 - Motivating potential female acceptors
 - Demonstrating/explaining different methods
 - Taking a client history
 - Motivating potential male acceptors
- (8) Activities in which less than one third of graduates had experience included the following:
 - Assisting in IUD insertion
 - Issuing resupply of pills/condoms
- (9) No school made the clinic staff solely responsible for students' practice. Supervision of students' experience was a cooperative effort of faculty and clinic staff in 75 percent of the schools. The rest of the schools relied solely on their faculty to provide the supervision.

c. *Instructional Support*

- (1) In general, schools relied on their nursing faculty to be responsible for the teaching of population/family planning with backup support from other resources such as their non-nursing faculty, the faculty from other educational programs, and private medical practitioners.

- (2) The majority of the faculty who teach population/family planning had participated in a basic family planning course and had participated in course work pertaining to human sexuality, motivation, and counseling. Areas in which few of the faculty had been trained included management of family planning services, KAP surveys, and population dynamics/demography. The training and work experiences of faculty indicated that, generally, faculty were prepared to teach population/family planning.
 - (3) The five instructional methods frequently used by faculty were lecture/discussion, supplemented by visual aids/printed materials, demonstrations, group discussion/conference, and simulation games including role play. Materials infrequently used were audiotapes as well as projected materials such as transparencies and still and motion pictures.
 - (4) At least half of the schools had tape recorders as well as slide/still or motion projectors. Two-thirds of the schools had working overhead projectors.
 - (5) Library resources included reference materials on population, the reproductive system, and contraceptive methods, as well as newsletters and studies on population/family planning, handouts, and teaching guides. Library materials on the management of family planning services were not available in about half (13) of the schools surveyed.
2. Population/Family Planning Knowledge, Attitudes, and Perceived Competencies of the 1986 Nurse Graduates - To determine their knowledge, attitudes, and perceived competence in population/family planning, the graduates were requested to respond to a 100-item test and to a checklist to appraise their competencies. The areas tested were population concepts, programs, and thrusts; assessment of clients; family planning technology; and management of family planning services.
- a. *Knowledge*
 - (1) The mean score of graduates was 42.7 percent with a range of 60. Catholic school graduates demonstrated the highest scores; government school graduates seemed to be least knowledgeable with a mean score of 37.3 percent.
 - (2) Graduates were able to respond to at least 50 percent of the questions on the assessment of clients. Areas that indicated limited knowledge (31-46 percent of items) included family planning methods, population concepts, and management of family planning services.
 - b. *Attitudes*
 - (1) The majority of the graduates agreed on the following: A population/family planning program is needed as part of the strategy for national development. There should be government funding for population/family planning. Pregnancy prevention is not a sin. Nursing students should have knowledge of family planning.

- (2) Further, although the majority accepted the right of a couple to choose methods, they thought the choice should be limited to methods acceptable to the nurse. Only about one-third felt comfortable in discussing sexual terms with the opposite sex. One-third were against starting sex education in early childhood.
 - (3) Natural Family Planning was the preferred contraceptive method of graduates.
3. Factors Influencing Teaching/Learning of Population/Family Planning
- a. *Curriculum*
 - (1) The majority of the nurse graduates felt that the inclusion of family planning in the nursing curriculum was "important." The content was perceived as "just right" by less than one half of the graduates; others felt it was "too much."
 - (2) One-third of the graduates perceived themselves as "partially or not competent" in performing family planning tasks/activities.
 - b. *Faculty and Deans*
 - (1) Faculty had a mean score of 60.4 percent on the 100-item knowledge test on population concepts and programs. The mean differences of scores between faculty in government schools and faculty in private schools were not found to be significant.
 - (2) All but one faculty member accepted the need for integration of family planning in the nursing curriculum. Fifty percent of the deans indicated that family planning conflicted with their religion/philosophy.
 - (3) The six topics (out of 14 possible topics) that the majority of the faculty perceived themselves competent to discuss were reproductive physiology, the contraceptive pill, human sexuality, responsible parenthood, Natural Family Planning, and motivation. A high proportion of the faculty rated themselves slightly competent or not competent to discuss the IUD, sterilization, and counteracting rumors and misconceptions.
 - (4) The majority of the deans and faculty expected nurses to be competent in assessing the health of clients, in motivating potential acceptors, in educating clients on all methods, and in providing premarital counseling.
4. Problems/Difficulties Identified by Respondents
- a. Budgetary restrictions were noted by most schools. These restrictions resulted in the limited availability of instructional materials and operational audio-visual aids, as well as in limited supplies and equipment available for the delivery of family planning services.
 - b. The nonacceptance of family planning by school authorities was seen as a constraint and as an influential factor in the deans' and faculties' attitudes and in the students' learning about family planning. Fifty percent of the deans faced a conflict between their beliefs and religion and family planning.

- c. Family planning clinic staff were perceived to hold negative attitudes regarding the presence of students in their clinics. These attitudes may be related to an overload of students, lack of competence in supervision, lack of communications between clinic staff and faculty, or undefined objectives for the practicum.
5. Scope of Population/Family Planning Questions in the Board Examination for Nurses - Eight questions on population/family planning, representing 2 percent of all questions, were integrated in three subjects, namely, Maternal and Child Nursing, Mental Health and Psychiatric Nursing, Community Health and Communicable Disease Nursing.
6. Respondents' Suggestions/Plans for Strengthening the Population/Family Planning Component in the Nursing Curriculum
 - a. Key measures identified by respondents included the following:
 - (1) Upgrading of faculty's competence in teaching population/family planning through training
 - (2) Tapping personnel of population/family planning service agencies as teaching resources
 - (3) Strengthening the students' practicum by better planning by faculty and services staff, strengthening supervision, and providing adequate logistic support to facilitate field work
 - (4) Upgrading of instructional and clinical resources
 - b. Some deans plan to undertake steps to strengthen the family planning component of their program through
 - (1) Resolution of feelings towards family planning
 - (2) Improvement of faculty's competence in teaching family planning by encouraging and supporting their faculty to participate in training programs
 - (3) Initiation of projects on family planning in their schools/university clinics in order to provide experiences for their students
 - (4) Closer follow-up of the integration of the family planning component
 - (5) Linkage of the nursing program with community programs and resources

Conclusions

Based on survey results, a starting point has been established to further improve and expand the teaching of reproductive health in nursing schools in the Philippines. Findings of this study are now being used to develop training programs for new graduates of nursing schools who are entering the health delivery system. Results of the appraisal of the faculty competence and attitude in population/family planning will be used in designing continuing education programs in reproductive health for faculty. Data from the 1985 Nursing Board Exam questions are being used to recommend, to the Board of Nursing, approaches that would strengthen the evaluation of the graduate's competence in this area of service delivery. Our experience in the

Philippines in developing a survey to assess the reproductive health component of the nursing curriculum, as well as faculty and institutional needs, can serve as a model for other countries.

Teaching Reproductive Health in Nursing Schools: Supportive and Limiting Factors

This discussion focused on factors that facilitate or limit the teaching of reproductive health in nursing schools in developing countries, as well as on approaches to upgrade the skills of nurses already in the field. There was general agreement on the need for development of curriculum that is problem- and competency-based, geared to country needs, and not based on traditional Western models.

A participant from Kenya noted the need for integrating family planning into the curricula of all nursing schools in the country. This individual recommended that a competency-based curriculum be developed so that when nurses graduate, they are prepared to perform specific family planning skills.

A participant from Nigeria reported that only a small proportion of the more than 1,000 nurse and midwifery tutors working in the 56 schools of nursing and 62 schools of midwifery throughout the country have been exposed to current concepts of reproductive health. The speaker emphasized the importance of designing in-service education programs to meet the training needs of this group. She noted that groups like JHPIEGO and the Pathfinder Fund—in collaboration with the nursing schools, the Nursing/Midwifery Council of Nigeria, and the West African College of Nursing—have developed plans to upgrade the didactic and clinical skills of these faculty.

A participant from Zimbabwe explained that since the development of a national policy on family planning in that country, a program has been organized to systematically integrate the teaching of reproductive health into the curriculum of all nursing schools. In addition, in-service education programs for practicing nurses are also in the process of being organized with the support of JHPIEGO.

The Zimbabwe strategy has a number of approaches. One is to offer an in-service course of four weeks to update the reproductive health knowledge of all nursing faculty. In this course, strategies for integrating reproductive

health into the curriculum are reviewed. Another approach is to organize in-service programs in reproductive health for all supervising nurses and nursing administrators, including those who are hospital- and community-based. These nurses then return to their home institutions and organize local in-service programs.

A discussant urged that in planning curricula, not only should accrediting bodies, professional associations, and students be involved, but also the ministries of health and the community, e.g., those who really use the products of education.

Finally, it was noted that in some countries, guidelines for curriculum change are in existence. What is now needed is the necessary support, financial resources, and political will to bring about the changes.



Prospects for Adopting International Guidelines and Certification for the Teaching of Reproductive Health

The purpose of this discussion was to explore whether there is a need to formally promote training in reproductive health by introducing certification. Panelists discussed the role of international organizations in initiating guidelines for reproductive health training certification. The panel and audience were unanimous that certification is premature and would be difficult to implement, although broad, flexible guidelines might be useful especially if such efforts began on a modest scale. The consensus was that integration of reproductive health into medical and nursing school curricula is more important, and that JHPIEGO has a particularly important role to play in this regard and in the development of local or national guidelines.

The panelists pointed out that the development of international guidelines and certification relative to reproductive health poses many problems. For example, because of differences among cultures and regions of the world, it would be difficult to develop certification. There is also a sensitivity to family planning programs in some countries, and insisting that one must be certified in reproductive health, including family planning, might pose a problem.

There was also concern that international certification might lead to increasing sophistication in health service delivery in developing countries, yet fail to really meet the needs of the country. Another concern was whether the certificate would be for competence or for attendance or both. In addition, it is unclear who would be certified: physicians, nurse-tutors, traditional birth attendants, etc.

A speaker pointed out that there is no true definition of what we mean by reproductive health. As an example, in Europe there is a European Association for Reproductive Health whose goals and objectives are different from those discussed at the meeting. Thus, a clear definition of the meaning of reproductive health must be developed.

In summary, participants agreed that the development of international guidelines and certification relative to reproductive health is a complex issue, and that certification by any international body is not appropriate at this time.



**Emerging
Technologies
in Reproductive
Health Education
and Training**



Advances in the Technology of Education

Charles W. Dohner, Ph.D.

Definitions

Educational technology is a term with imprecise meaning. Definitions range from media used in instruction (including materials such as slides, simulations, television, videotapes, computers, and satellites) to learning systems and educational philosophies (such as student-centered learning, problem-based learning, and lecture/demonstration). Since "media" is a commonly used word, the definition given by Schwen (1977)¹ seems appropriate for our consideration. *Media* is

"the replicable means, forms, or vehicles by which instruction is formatted, stored, and delivered to the learner."

With this definition of media in mind, the following definition of educational technology is suggested:

Educational technology is the application of media (which formats, stores, and delivers information) for the purpose of facilitating the teaching and learning process.

Within the framework of this discussion, educational technology will include the written word, audiotapes, slides, videotapes, computer simulations, videodiscs, satellites, etc. This paper is organized around the effectiveness, advances, future obstacles, and criteria related to the selection and appropriate use of educational technology.

Effectiveness of Educational Technology

A considerable amount of research has taken place in the past two decades attempting to compare learning outcomes using different media. An examination of the studies points out the complexity of the learning process as well as the difficulty of assessing the relative merits of various technologies. Levie and Dickie (1973)² concluded that most learning outcomes could be achieved

by instruction presented by any of a variety of different media. Jamison et al. (1974)³ compared research on traditional instruction and instruction via computers, television, and radio. They found no significant differences among these methods. A meta-analysis of media research by Kulik et al. (1979)⁴ found some small but consistent benefits associated with the use of "newer" media such as computer-based instruction in college environments. However, these advantages tended to disappear when the same instructor prepared both treatments and the impact of novelty dissipated.

Foley (1983)⁵ reviewed studies of simulations, television, and self-instructional programs and found that students saved time and that there was an apparent transfer of learning to patients when these methods were used. In the area of television, Foley (1983)⁵ concluded that "while much has been written about the merits of television, little has been done to assess its merits systematically." Some studies were examined in which television was reported to be as effective as a lecture-demonstration. Its use in continuing medical education (CME) has also been surveyed, but there has been little conclusive evidence about its value. Marshall and Alexander (1976)⁶ concluded that the best use of television in CME may be to motivate physicians to seek additional medical information. In 25 studies reviewed by Foley⁵, 10 revealed that self-instruction was better than traditional instruction in knowledge acquisition by low-ability groups. Fifteen studies disclosed no differences in achievement. The expected advantages of self-instructional materials (including making explicit the behavioral objectives, the opportunity for self-pacing, and systematic feedback) do not seem to be reflected in any increases in retention.

Clark and Solomon (1986)⁷, after surveying the entire history of media research, concluded that "general media comparisons and studies pertaining to their overall instructional impact have yielded little that warrants optimism." They further noted that the medium itself was not seen as the cause of the advantage gained in those few studies where dramatic changes were observed, but rather "the introduction of a new medium often allows the production of high-quality materials and novel experiences, or leads to organizational and practice changes not otherwise afforded."

Where does this leave us in terms of selecting appropriate educational technology? One thing seems clear: *The research indicates that in terms of knowledge gain, one medium is no better than another.* The most important lessons from the comprehensive analysis by Clark and Solomon (1986)⁷ are the following:

1. Past research on media has shown quite clearly that no medium enhances learning more than any other medium regardless of learning task, learner traits, symbolic elements, or curriculum content.
2. Any new technology is likely to teach better than its predecessors because it is generally accompanied by better prepared instructional materials and its novelty engages learners.

3. Future research on media should be conducted in the context of and with reference to similar questions in the general cognitive sciences.
4. In the future, researchers might ask not only how and why a medium operates in instruction and learning but also why it should be used at all.

The final ethical issue raised by the history of media use in teaching is the pattern of its use by educators. In the past there has been a *pattern of adoption by schools in response to external pressures from commercial and community special interests rather than as a result of an identified and expressed need*. Most new media are not developed with educational applications as their foremost goal. Consequently, decisions to adopt them occur before there is clear evidence about their efficacy or the availability of superior materials. This was certainly the case with television and is as clearly the case with microcomputers. Although the enthusiasm that surrounds the introduction of a new medium lends a certain currency and legitimacy to schools, it also takes scarce resources away from already identified priorities.

This is not to imply, however, that the very availability of television or computers is in itself a poor justification for their demands on the educational system. The conscientious researcher may, on occasion, recommend that schools postpone their entry into a "higher tech" era before a number of basic questions have been addressed. For example, we need to know how the media would support instructional objectives, other roles it takes on, what the teachers' role will be if students receive most of their instruction from a medium, and how already overburdened instructors will accommodate the special demands of newer media. The development of media in education should be aimed at the improvement of the education, not the glorification of the media. Questions to be asked are not only what technology, for whom, and so forth, but also **why this technology now?**

Technological Advances

There is currently an expanding use of computers, videodiscs, and computer imaging. During a time of fast changing technology, some of the older media tend to take the back seat, such as print (in the forms of books, syllabi, journal articles, or posters), the lecture, discussion, tapes, slides, self-instruction, and motion pictures. We should not neglect the valuable contribution these strategies can make to the instructional process.

In the United States, computers are fast becoming a classroom fixture. A recent article in *U.S. News and World Report* (November 10, 1986) reported that in elementary and secondary schools from 1983 to 1985:

- The number of computers jumped from 250,000 to 1,000,000.
- Three fourths of the 33,000 schools that had not previously used the machines began to do so.

- The proportion of elementary schools with five or more computers jumped from 7 percent to 54 percent; secondary schools with 15 or more computers increased from 10 percent to 56 percent.
- The time computer-using high-school students spend at terminals each week nearly doubled to 90 minutes.
- The number of students using computers jumped from 4.5 million in 1983 to 15 million in 1985.
- The distribution of computer time in our public schools was 33 percent for computer programming, 32 percent for drill and practice, 15 percent for word processing, and 14 percent for discovery and problem solving.

At the University of Washington School of Medicine, students' experience with computers has been steadily increasing, at least over the last three years. Currently, 60 percent can program in one language, 40 percent have used computers in instruction, and 25 percent have their own computer. Although we have some medical school faculty experimenting with the use of computers in instruction, the majority of faculty are only beginning to become familiar with the new technology. This year several faculty development workshops are being offered to introduce faculty to the use of computers and applications of selected software packages. Several faculty are currently experimenting with the applications of computers to teaching. Although 24 computer clinical simulations have been developed primarily for the continuing education of physicians, only one clinical department is conducting a study of the effectiveness of computer simulations in the teaching of third-year clerkship students. Faculty are applying three-dimensional imaging to the teaching of anatomy, physiology, and diagnostic procedures.

The use of videotapes holds considerable promise as a means of giving feedback to students in their initial experience in taking histories, performing physical examinations, and acquiring factual information. For areas where rapid access to a large quantity of slides, videotapes, and X-rays is needed (such as in hematology), the videodisc holds some exciting possibilities. It has been estimated, however, that it requires up to 400 hours to develop 1 hour of computer simulations and computer/videodisc instruction. The initial outlay of hardware for three-dimensional imaging requires a start-up cost of between \$50,000 to \$100,000. Therefore, the development and production costs are expensive.

Although the advent of the microcomputer is by no means a panacea for the shortcomings of medical education, it is a supplement that can enhance learning. It gives opportunities for creative instructional designers to provide individualized, self-paced learning experiences. When used appropriately, the microcomputer can free instructors from many of the routine, time-consuming instructional tasks. As a supplement to instruction it can expand the depth and add breadth to the learning experiences. In terms of clinical instruction, the development of computerized clinical cases has the potential for enhancing problem-solving skills. The use of computerized clinical cases has the further

benefit of making available standardized learning experiences, thus solving to some extent a learning problem that has constantly faced clinical teaching. With respect to evaluation, the microcomputer makes it possible for individual faculty to have easy and economical access to personal and institutionalized test-item banks for examination development. However, when projected as a means for replacement of the teacher as either a tutor or a significant instructional aid, the development cost is high and the software is undeveloped. The use of expert systems can provide for referencing textbooks and journals. The use of these systems can also provide for linkages between patient symptoms and large data bases of information on drugs and management protocols.

Combining computers with videodisc technology makes possible quick access to hundreds of slides, videotapes, and other data. This technology allows for standardization of learning experiences across several teaching sites and an increase in the lifelike quality of simulations. The primary disadvantages of this technology are the high cost of its initial development and its tendency to become quickly outdated.

Although it is beyond the scope of this paper to summarize the various applications of computers in health sciences teaching, Lippman (1985)⁹ describes ten representative examples of both computer-assisted instruction and computer simulation experiments in medical schools. The biggest advantage, he maintains, is that learning takes place in a shorter period of time.

Experiments using the satellite for interactive teaching at the University of Washington have demonstrated the feasibility and acceptability of this technology for instruction. Complete courses, consultation, program coordination, admission interviewing, and minority recruitment have been successfully done via satellite. Selected problems in distance learning can be addressed through this means.

Future Developments

We live in a world that is increasingly dependent on forms of communication never before available. As educators, we need to anticipate these new developments and assess their potential application to teaching and learning.

The Institute for the Future, in Menlo Park, has listed the following twelve most important technologies, in order of importance, that will have a significant impact on medicine in the near future:

1. Communications/computers
2. Transplants/artificial organs
3. Magnetic resonance imaging
4. Monoclonal antibodies/DNA probes
5. Endoscopy/in-vivo monitoring
6. Home diagnostic tools
7. Vaccine/drug delivery
8. Human gene therapy
9. Mental health

10. Lasers
11. Surgical advances
12. Positron emission tomography

Wedemeyer (1986)¹⁰ discusses the following five developments that are driving forces in our telecommunication-based world:

Cellular Telephone Technology

The new computerized switches and the quality of the signal will tie mobile users into both local and global telephone networks. This will present new opportunities for consultations and communications. In the near future, schools will be able to page faculty anywhere in the United States.

Cable television technology (advances in interactive cable) allows greater freedom of choice, conferencing, video delivery, and interactive instruction. For example, multivision in Japan incorporates cable television and videodiscs for educational applications. The market is creating its potential and holds the key to interactive services.

Fiber Optic Technology

Beyond coaxial-cable-based television, the broadband information utility is possible through fiber optics. American Telephone and Telegraph plans to build the first lightwave communication system under the Atlantic and Pacific oceans. By 1988, laser beams traveling through two pairs of glass fibers will carry the equivalent of 37,800 simultaneous overseas, underwater routes for a total of 21,000 miles. Bell Laboratories System can transmit 1 billion bits of information (the equivalent of 20 digital television channels, 14,000 telephone conversations, or 100 average novels) each second. Fiber optics may provide an attractive alternative to satellite communication for some applications.

Satellite Technology

Communication satellites now connect the most remote spots of the world. A new generation of satellites could lead to a fivefold increase in satellite communication capabilities in the 1990s. Orbiting space satellites could conceivably lead to reduction in cost.

Computer Technology

This technology has and will continue to develop at a mind-boggling pace. In just the past ten years, the cost of memory has gone from \$600,000 to \$1,000 on a microcomputer. In addition to the fast expansion of power, computers will be knowledge processors as compared to data processors. Spin-off from artificial intelligence research such as medical information expert systems will enhance the diagnostic and treatment protocols, to say nothing of the implication of computers that we can talk with or that will automatically translate foreign languages in real time.

Optical Disc Technology

The technology of optical discs will undoubtedly have a potential impact upon education. When coupled with computers, the newer compact discs hold promise of a highly factored solution to information storage problems and educational problems. According to Wedemeyer (1986),¹⁰ three trends will continue in the near future:

1. Telecommunication miniaturization
2. Digital integration
3. Networking efficiency

In the next five years, a new generation of personal computers will offer users document and graphic design tools and artificial intelligence software. By the year 2000, personal computers will have 8 billion bits of main memory, and they will be affordable by almost everyone. What all this will finally mean is increased efficiency and flexibility in telecommunications on a scale that can scarcely be imagined. Schools will need to take advantage of the new environment and train people to be computer literate.

Videotapes have replaced movies as an educational medium. In a similar way it is conceivable that voice interaction with the computer may significantly replace the keyboard. The new technologies no doubt have the potential to drastically change the learning environment and to steer it in the direction of increased individualized, self-paced learning and "schools without walls."

Obstacles to Use of Educational Technologies

Several obstacles to the use of new educational technology become readily apparent. The application of educational technology requires change, and there is a natural resistance to change. The cost of the hardware is often prohibitive. In instances where this is not a problem, money is often not available to support the development and ongoing updating of learning materials. Most new educational technologies require support people beyond the normal faculty, secretarial, and laboratory personnel. The lack of compatible hardware is often a problem that makes it difficult to adapt materials from one center to another.

More serious than the cost of hardware is the lack of computer learning material. Faculty tend to want ownership of their own instructional material, thus transportability from one school, environment, or culture is not always acceptable. There is a lack of faculty incentive to spend the time and energy on developing new learning material. Professional and financial rewards are not generally as frequently given for this type of activity.

Faculty attitudes and the values faculty hold regarding how students learn are often at odds with new educational technologies. For example, faculty value their roles as the expert disseminators of information more than they value their roles as resources and facilitators of learning.

Some may find it both difficult to learn and uncomfortable to use the computer, thus causing a natural resistance to this instructional medium. Faculty may give lip service to the need for developing lifelong learning, yet they find it counter to their values to provide independent learning experiences for students. The "not-invented-here" syndrome is a frequent attitude held by faculty, especially if the educational technology may come from a foreign country or a highly competitive institution.

Most innovations in education require some change in the organizational structure of how faculties go about their teaching responsibilities. This may impinge upon faculty time, physical space, and other resources. These obstacles, when associated with lack of evidence for increased effectiveness of learning, often make innovations difficult or at best short-lived.

Selection Criteria for Appropriate Educational Technology

Selecting appropriate educational technology is one of the most challenging decisions facing educational planners. The process is not an exact one, and there are few clear-cut rules to follow. It is situational, relational, and dynamic. In most cases, appropriateness is a matter of degree. The same technology may have appropriate and inappropriate features with reference to a given instructional situation and environment. The best that can be done is to weigh the criteria and settle for trade-offs.

In short, appropriate technology is an approach rather than a set of specific techniques. It is intimately involved with educational objectives, principles of learning, technology availability, and individual values. The following five dimensions of educational technology are important considerations for determining selection criteria.

Educational Dimension

The simple, most important question to ask in determining appropriateness is, What is the learner to learn? Of all the possible and important aspects of reproductive health, educational planners must decide upon the highest priorities. These can be classified as (1) information or knowledge; (2) competencies, skills, or procedures; and (3) personal attributes and values. It is highly unlikely that one educational technology will be appropriate for all the above learning objectives. Although the use of satellite technology may be an excellent means for motivation or conveying information across long distances, it is not likely to be the most appropriate medium for learning problem solving and surgical procedures.

Curriculum Structure

The structure of the curriculum in a given institution may be based on entirely different assumptions about learning that will dictate the appropriateness of different technologies. There has been an increased recognition of the importance of individual differences in both style and pace of learning. The organ-system approach to curriculum development has encompassed the

concept of the integration of the basic sciences and clinical sciences. More recently, there has been activity on an international scale to organize student learning around patient problems and community health in contrast to the traditional basic science learning followed by clinical experience. This approach proposes to transfer the responsibility for learning onto the student, thus relegating the instructor to a role of facilitating student learning and discovery rather than one of being an expert and disseminator of information. A curriculum structured around the traditional approach—first learning basic science followed by the clinical sciences—may find the use of the lecture/demonstration and videotapes the most appropriate media. Those who believe in problem-based learning may find small tutorial groups and simulated patients (both real and computerized) the most appropriate. The learning outcomes expected and the structure of learning experiences are extremely important criteria for selecting educational technologies.

Learning Principles

Students learn best if properly motivated, either intrinsically or extrinsically. Relating instruction to learner goals, stressing relevance of material, and teaching enthusiastically are strong motivating factors. Student acquisition of information is facilitated by clarity of expectations, organization of content, repetition, and mental imagery. It has been widely accepted that learning takes place best when students are actively involved in the learning process. Therefore, simulations, problem-based experiences, group interactions, and projects are helpful strategies. Students increase learning through reinforcement and immediate feedback. Proper and frequent critique, feedback, and self-examination opportunities enhance the learning process. When selecting media, it is essential to ask questions relating to whether or not the medium is congruent with sound learning principles.

Technology Dimension

With the exception of a few situations, cost is an important factor when considering high technologies such as computers, videodiscs, and satellite education. Although the decreased cost of hardware is making microcomputers within the reach of more and more educational enterprises, the cost in faculty time to produce learning material, manage the process, and modify programs is not insignificant. The increased simplification and availability of software and authoring systems, however, are substantially reducing cost. Development of authoring languages, modification of software to meet specific learning needs, and management of the learning experiences require additional support personnel when higher technologies are incorporated on a large scale.

Availability of maintenance capability, especially in developing countries, must be considered when selecting educational technologies. It is not unusual to find high-technology equipment inactive due to the inadequate maintenance.

Psychosocial Dimension

Many educational innovations fail to be implemented or continued due to their incongruity with the values of faculty, of students, or of the administration. All technological choices are value-laden whether the decision makers realize it or not. Educational technologies, to be successful, must be appropriate to learning objectives, curriculum structure, and learning principles. These technologies must also be technologically feasible and congruent with individual and cultural values.

Summary

The research on the relative effectiveness of various educational technologies suggests that there is no one best medium for instruction. Although there are some indications that high technology may shorten the learning time and increase motivation for learning, no medium enhances learning more than another regardless of the learning tasks, learner traits, curriculum content, or learning situations.

Technology may be more important in the practice of medicine than it is in teaching and learning about how to practice medicine. Patient care is where technology is making the greatest impact. Education is where technology is least effective.

Appropriateness of educational technology is a matter of degree, with the same technology frequently having both appropriate and inappropriate features in a given situation. When selecting appropriate technology, consideration needs to be given to the learning objectives, curriculum structure, learning principles, technological feasibility, social acceptability, and cost-effectiveness.

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The Teaching of Reproductive Health by Computer-Assisted Learning Systems and Interactive Videodisc Technology

Ronald H. Magarick, Ph.D.
Charles Galbraith, B.S.

Over the last five years, there has been a revolution in the development of new educational technologies and specialized learning systems. Health care educators receive almost daily announcements of computerized instructional systems and new interactive videodisc approaches to learning. Some of these new technologies and approaches may be suitable for use in reproductive health training programs in developing countries. In fact, a number of authorities have expressed the opinion that the major means by which developing countries can bring about major improvements in the level of education is through the use of technological innovations. The outgoing rector of the United Nations University, Dr. Soedjatmoko, has said that poorer nations will not have the money to build classrooms—much less hire teachers—as global population explodes. The remedy proposed by Soedjatmoko: Use technology to deliver instruction.

He states, “We have not begun to mine the educational use of television or video as a learning tool. What has become clear is that the methods that we use to impart education are too expensive. To hope that a simple replication of existing methods and hardware—classrooms, schools and so forth—can keep up with the population increase is an illusion.”¹

Similarly, the chairman emeritus of Control Data Corporation, William C. Norris, speaking at the Society for Applied Learning Technology’s ninth annual conference, stated, “Realistically, there is no way that developing countries can make adequate economic and social progress without improvement in education and training on a massive scale . . . primarily because of

the critical shortage of qualified teachers, the only feasible way of achieving these goals is with computer based education."¹

This paper provides a brief overview of current and potential applications of computer-assisted instructional (CAI) systems and interactive videodisc technology in reproductive health training programs.

Microcomputers in Reproductive Health Education

Those working in reproductive health are focusing increasing attention on the microcomputer for information dissemination and training.^{2,3} For example, in October 1985, an organization called POPLAC was organized primarily by the Latin American and Caribbean Bureau of AID's Office of Population. POPLAC is a nonprofit organization of over 500 individuals and institutions that use microcomputers for population and family planning activities in developing countries. A major purpose of POPLAC includes stimulating the use of microcomputers and other new instructional technologies in population and development programs.

Although at this point there is a limited amount of computer software available for use in reproductive health training programs, an increasing number of organizations are beginning to develop appropriate material. For example, Omni Education has developed patient simulation cases in obstetrics and gynecology, for use by medical students and resident physicians. Wyeth International has developed two computer programs that allow clinicians to review their knowledge of reproduction and contraception. With the aid of these programs, the individual clinician, using both simulated and actual cases, is able to propose the best contraceptive method for the client. Creative Infomatics, Inc., a producer of a series of center index publications on reproductive health, has recently placed the information on diskettes for easy retrieval by clinicians in family planning and reproductive health settings.

Successful applications of CAI systems have been demonstrated in obstetrics and gynecology. These applications have been described in recent articles in the *American Journal of Obstetrics and Gynecology*.⁴ Programs have recently been developed on labor management and on antepartum fetal monitoring.⁵

Recognizing the value of CAI, the American College of Obstetrics and Gynecology is also in the process of developing computer-aided patient simulations on such topics as breast masses and placenta previa. These programs will be available on a subscription basis in mid-1988. In reproductive health, clinical training software has been developed by National Capitol Systems in Virginia on contraception, nutrition, and other primary health care topics. At JHPIEGO, some of the previously-named programs as well as a computer-based tutorial distributed by Elsevier Science Publishing Company, entitled "Understanding Biostatistics," will soon be integrated into the JHPIEGO course "Academic Skills in Reproductive Health," to assist with the teaching of biostatistics. In addition, JHPIEGO-supported training programs in Nigeria and in other regions of the world are planning to use, on a pilot basis, CAI modules in their own training programs.

Microcomputer Training for Developing-Country Professionals

The Social Development Center at the University of Chicago offers both basic and advanced training to developing-country professionals on the use of microcomputers in population programs. Two-to-four-week workshops are offered on such topics as "Use of Microcomputers for Social and Demographic Research" and "Use of Microcomputers for Survey and Social Research and Evaluation." In 1987, in response to the rapid increase in the number of persons in developing countries with basic training in microcomputers, the Social Development Center began to emphasize intermediate and advanced-level courses.

Developing-country managers have also received training in microcomputers at workshops offered by Columbia University's Center for Population and Family Health in New York.⁷

Computer-Assisted Learning in Developing Countries

Computer technology is rapidly becoming available throughout the developing world. Groups like the United Nations Fund for Population Activities (UNFPA), the World Health Organization, and the Agency for International Development have all been supplying computers at some level to educational programs in developing countries.⁸ A recently completed survey⁹ of health training institutions in developing countries showed that 45 percent of 125 survey respondents reported access to at least one microcomputer; greatest access (68 percent) was in Asia. No respondents reported using CAI in their training, but nearly all wished to begin integrating this method of training in their programs.

The benefits of integrating CAI in developing-country training programs are clear. Microcomputers have been shown to enhance instruction. Lesson reinforcement, individual repetition, and drill and practice sessions can be individually tailored to meet specific needs of a particular culture or language.¹⁰

Computers in nursing education have demonstrated the increased efficiency and effectiveness of computer-assisted instruction. Studies have also shown that computers can decrease instructional cost, especially if learners need repetitive, remedial practice and review.¹¹

For the above reasons, computer software in reproductive health will be in great demand as soon as it becomes available. This demand will be underscored by the fact that CAI in reproductive health can supplement the work of live teachers, who are often in limited supply in developing countries. The demand will be particularly great in Asia, where computers are widely available in training institutions.

Interactive Videodisc Technology

Interactive videodisc technology is a new and growing technology which over the next five years may be suitable for use in developing countries, particularly since it can increase the efficiency of training, can teach students

who are geographically scattered, and can supplement the work of live teachers, particularly when the latter are scarce. In the United States interactive video sales are expected to increase to 75,000 units in 1988, a 50 percent increase over the total installed as of 1987. By 1992, it is expected that 248,000 units (worth 1.2 billion dollars) will be sold yearly."

An interactive videodisc work station consists of a videodisc player, a television monitor, and a microcomputer. The equipment fits easily on a desktop. This technology allows tremendous amounts of data to be transferred on a simple compact disc (which looks like a phonograph record). A 12-inch disc is capable of storing 54,000 slides, 556 five-hundred-page textbooks, or one-half hour of continuous motion video. Videodiscs are read by laser, so there is virtually no physical wear. The 54,000 stored frames or visuals can be randomly accessed almost immediately. Each side of the videodisc has two sound tracks. One use of this feature is to record programs in two languages and thereby increase the potential audience reach.

Interactive videodisc systems can be an efficient and convenient means of delivering individualized instruction.¹⁰ These systems can be operated by students and can provide self-paced instruction. Unlimited review and practice are also possible. Pretest and post-test use provides information to the learner regarding mastery of course objectives and rate of progress.

Interactive videodisc is recommended when:

- Formal classroom training is difficult or impossible to schedule
- Trainees require remedial training
- There is wide variation in trainee skill levels
- Qualified instructors are limited or not available
- Hands-on practice or simulation is required
- There is a need for documented records of performance or practice.

Interactive Video and Reproductive Health Education

Interactive video offers individualized, flexible simulation-based training. Because it teaches through practice and is able to duplicate patient situations by showing pictures of real patients, this medium is particularly suited for clinical training in reproductive health. The viewer can actually "work up the patient" and prescribe therapies by touching selections on the screen. When the simulation is over, the viewer can see an explanation of the case and compare his/her decisions to experts' decisions. Development of videodiscs on vasectomy, female sterilization, and management of pelvic infection would be particularly useful for training.

At this point, few videodiscs are available for the teaching of reproductive health. Omni Education has developed a pilot interactive videodisc program on oral contraceptives that will be used in some JHPHEGO training programs. There are a number of vendors producing interactive videodiscs for training and education, and it can be expected that suitable videodiscs will soon be commercially available for reproductive health training. In addition, in Guat-

emala, a major initiative is being undertaken by APROFAM, a private family planning organization with support from the Agency for International Development through the Johns Hopkins University Population Communication Services project. A regional video production center is being developed that will offer, to health and development agencies, high-quality videos at a low cost. It is expected that within the next few years this center may adapt clinical training videos in reproductive health to the interactive videodisc format.

In summary, interactive videodisc technology holds great potential. This technology could substitute for live instructors in situations where the latter are scarce, where students are many and scattered, or where high efficiency of training is essential. Where patient caseloads are limited, this technology could supplement clinical training. Because of this wide-ranging potential, there should be continued exploration of interactive video in reproductive health education.

Conclusion

The time is nearly upon us when, through the use of technological approaches such as computer-assisted instruction and videodiscs, medical and nursing educators in developing countries may have access to the same current scientific information that is available to educators in the more developed countries. The challenge facing reproductive health educators in the coming decade will be to analyze carefully the new learning approaches and software, and decide with our colleagues in the developing countries which methods are most appropriate. Those working in reproductive health training programs can do much to accelerate these new learning approaches and thereby expand the dissemination of reproductive health information to medical and nursing institutions throughout the developing world.

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Production of Videos for Continuing Education in Reproductive Health

Maria Cristina Rosales

APROFAM is a private family planning organization that has worked in Guatemala for the last 22 years. Over the last 4 years, APROFAM has produced educational materials that cover such topics as maternal and child care, methods of family planning, and community involvement in family planning.

A variety of media have been utilized in education activities, but special emphasis has been placed on video in continuing education programs sponsored by APROFAM. Video is very valuable in reproductive health training. Although video does not replace practical clinical training, it does serve to reinforce clinical techniques and expose students to new developments in medical technology. Video also enables students to observe clinical procedures without actually being in the operating rooms.

Video Production in Developing Countries

Surveys carried out by APROFAM, both at national and international levels, have shown that there are many institutions that are interested in obtaining high-quality video material for use in reproductive health education programs. Since few agencies in the developing world were producing such materials, APROFAM successfully obtained support in 1987 from the Agency for International Development through the Johns Hopkins University/Population Communication Services Project for the creation of Centro Regional de Audiovisuales (CREA), a regional video production center that will operate out of Guatemala and will offer to health and development agencies in Guatemala, as well as throughout the region, high-quality videos at a cost expected to be competitive with or lower than those commercially available.

In the production of the materials, CREA will follow the basic processes and principles¹ required for a successful communication project as developed

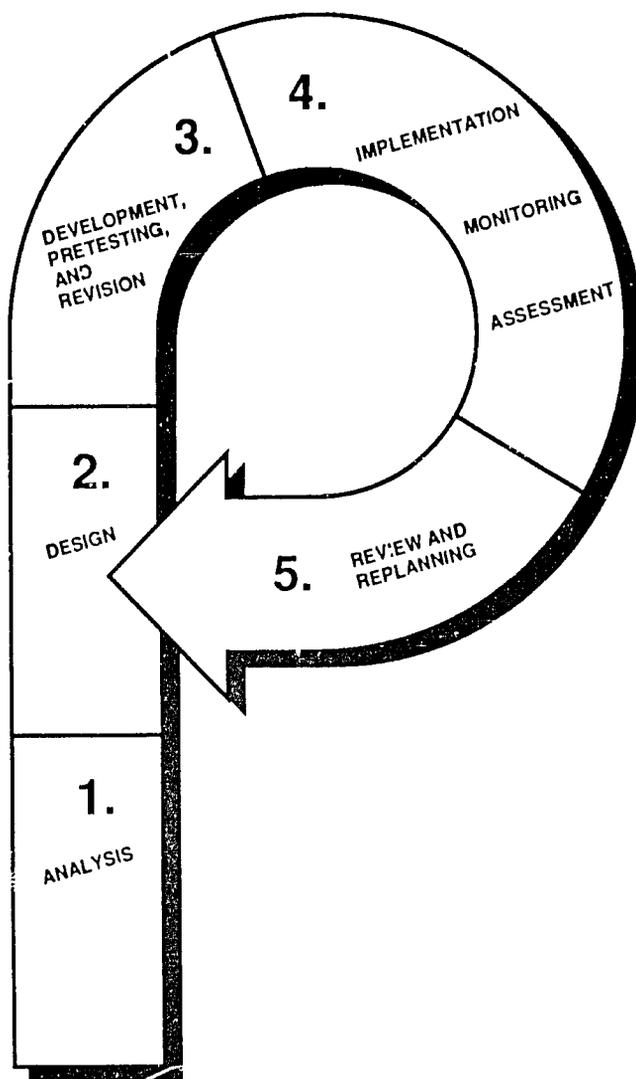


Fig. 1. Basic Processes and Principles for Population/Family Planning Communication.

Source: Population Communication Services, Population Information Program: Basic processes and principles for population/family planning communication. Baltimore, The Johns Hopkins University.

by the Johns Hopkins University Population Communication Project (Figure 1). This includes the following six basic steps to guarantee the achievement of communication goals and effectiveness of materials produced:

1. Analysis

- Review potential audiences
- Assess existing policies and programs

- Select sponsoring institutions
 - Evaluate communication resources
2. Design
 - Decide on objectives
 - Identify audiences
 - Develop messages
 - Select media
 - Plan for interpersonal reinforcement
 - Draw up action plan
 3. Development, pretesting, and revision
 - Develop message concepts
 - Pretest with audience
 - Complete messages and materials
 - Pretest with audience
 - Retest existing materials
 4. Implementation
 - Implement action plan
 - Monitor outputs
 - Measure impact
 5. Review and replanning
 - Analyze overall impact
 - Replan future activities
 6. Continuity over time
 - Plan for continuity
 - Adjust to changing audience needs

The Centro Regional de Audiovisuales is expected to be fully operational in early 1988. When operational, CREA will be in a position to develop films and videos for agencies throughout the region. Films and videos suitable to each country's particular needs can then be produced. The video center will have the highest quality advanced videotape technology on the market. Half-inch Betacam cameras and one-inch editing facilities will be available. The center will be able to produce 16-mm materials which later can be transferred to the PAL and SECAM systems. This center will produce high-quality clinical training and patient education films for distribution not only throughout Latin America but also for possible worldwide use.

Availability of Video Equipment in Developing Countries

An important question to ask regarding video production is, "What video equipment is available to play the tapes in developing countries?" In a survey² recently completed, it was shown that 78 percent of the respondents from those medical schools and teaching institutions surveyed in Africa, Asia, Latin America, and the Near East (Table 1) reported access to some video equipment, and 66 percent of these respondents reported using videos in

Table 1
 Percentage of Respondents Reporting Access to Any Type
 of Video Equipment By Region

REGION	PERCENTAGE OF RESPONDENTS
AFRICA	54% (15)
ASIA	89 (25)
LATIN AMERICA	83 (49)
NEAR EAST	90 (9)
TOTAL	78% (98)

Source: Magarick RH, Dean D: An international assessment of instructional equipment for the teaching of reproductive health. Paper presented at the 115th Annual Meeting of the American Public Health Association, New Orleans, October 1987.

training. This seems to imply that if video equipment is present, trainers are able to obtain software for use in educational programs.

Summary

In summary, CREA will soon be producing educational videos to help improve the teaching of reproductive health. CREA is prepared to respond to requests from both developing countries and donor organizations for assistance. Further information can be obtained by writing to the following address:

Director
 Centro Regional de Audiovisuales - CREA
 Avenida Las Americas 16-47, Zona 14
 Guatemala City, Guatemala 01014
 Telephones: (502-2) 373107 (502-2) 371545
 Fax: (502-2) 373107

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Technologies in Training and Educational Programs for Developing Countries

The discussion focused on identifying new educational technologies that are most applicable to reproductive health educational programs in developing countries. Speakers urged that prior to introducing any new technology into medical and nursing schools, faculty must be trained to use the technology. Students also must be given a thorough orientation to the new types of learning experiences.

Speakers stated that materials such as videotapes are very useful for teaching, but must be adapted for use in developing countries. Participants noted that video players are now available in most regions of the world. In Zimbabwe, players are being placed at provincial health centers and libraries so that health professionals have access to current information. In Guatemala, a video production center is being developed at APROFAM to produce videotapes about reproductive health for distribution throughout Latin America and perhaps to other regions of the world. It was emphasized that while video presentations are important to supplement faculty, they cannot replace faculty. A faculty member must always be available to discuss and highlight information on the tapes.

Regarding computer simulations in medical and nursing education, speakers noted that these are still at the experimental stages and are just beginning to be integrated into medical and nursing education in the United States. This type of learning experience seems to hold promise for individual student instruction. It was suggested that JHIPEGO consider this technology when it is more developed and when microcomputers become more available in developing countries.

Speakers were very optimistic about the future of optical discs. (A normal 10-inch size disc holds about 55,000 pages, equivalent to two sets of the *Encyclopedia Britannica*.) These relatively inexpensive discs, players, and

monitors offer the opportunity to provide resource materials that otherwise would not be available to many institutions throughout the world.

A speaker suggested that one of the problems in introducing new technologies to university faculty is their frequent lack of formal training in teaching or designing curriculum and instructional objectives. Before attempting to introduce new technologies, one should first introduce the methods of appropriate teaching and education. JHPIEGO's involvement in faculty development programs was noted. One of JHPIEGO's most successful programs has been the academic skills course in which young faculty are introduced to teaching methods and curriculum development. This type of course seems to have raised the level of teaching of reproductive health in some countries.

A speaker suggested that JHPIEGO might consider supporting pilot projects to develop instructional materials. Institutions would prepare and develop material for use on a regional or national basis. JHPIEGO might provide technical assistance and advice on how to develop the materials.

One speaker warned that sophisticated technology would be vulnerable to fluctuating current and power failures in developing countries. Further, it was emphasized that whenever new technological equipment is introduced in a country, maintenance facilities must also be available.

Finally, speakers from Latin America and Africa noted that, despite the technological gap between the developed and developing countries, developing countries should actively seek to obtain appropriate new technology and adapt it for use. Many felt it is the obligation of leading faculty in the developing countries to activate the interest of their institutions and governments in the new technology and to take the lead in developing materials for local use.



Distance Learning in Medical Education

Distance Learning by Television and Radio: Approaches and Considerations

Jim Stevenson, Ph.D.

To teach anyone anything is difficult. Those of us who have been involved in any form of education know this. There is the seeming impossibility of getting points across; the constraints of time, the inattention of our pupils, and the inappropriate places in which we are required to teach. Even teaching our own children can be a grueling experience. There is no greater danger to sanity than facing a seven-year-old who cannot, or more likely will not, learn to tell the time.

To learn is even more difficult. We have all reached a certain position in life by learning, but looking back, we feel that it has been a pretty random process. Most of the things we know, we seem to have picked up by accident or through a kind of cerebral osmosis. We can all remember the odd brilliant teacher in our youth or the stimulating lecturer at a conference, but in the main, our experiences are generally hard and lonely in the mastery of facts and skills coupled with a porridge of boredom in schoolrooms, lecture theaters, and perhaps even international conferences.

Even so, the traditional teaching/learning environment of a university campus is an excellent place for the acquisition of knowledge and skills and for intellectual development. Professionals in the developed North have, at one time or another, been through such an environment. But for most people in the world, particularly in the developing world, it remains an unobtainable luxury. One can be critical of our medical schools and universities, but it is a sophisticated criticism based on assumptions of high excellence. Universities in the developed North and West are good places to be, and we all recognize this. So for the purposes of this paper, they might be regarded as a norm—a basis on which to build concepts of learning at a distance.

The Nature of the Learning Environment

The medical student or qualified practitioner in a first-class university or teaching hospital is bombarded with inputs which he/she uses almost unconsciously. Whether the inputs be from books, lectures, patients, operating theaters, laboratories, or coffee bars, the result is one of total immersion. Doctors, scholars, and students learn to swim in a rich lake of learning, a complex mixture of formal and nonformal situations, a mix of theory, practice, experiment, and test. Such learning environments could truly be said to be multimedia. Any other learning environment is, by degrees, less than this. And one of the extreme examples is of a student studying alone at a distance from his or her tutors. Such distance learning situations are increasing, not only because of economic and educational necessity, but because such systems can work. But inputs, the richness and the media are limited. The term *multimedia* is often used for such teaching systems, but when multimedia is used to describe a mixture of correspondence courses and broadcasting, what we really mean is "limited multimedia," often severely limited to tri-media and even bi-media.

In these learning systems much academic time has been devoted to analyzing each medium and making comparisons. It is often a hopeless task rather like comparing ham and eggs with apple pie—they taste different, but they both reach the same destination. It is also unfair to compare one medium, say television, with another, say print, when the total teaching package is 90 percent print and 10 percent television. In different countries these ratios will be different. All we can really do is draw up a few broad guidelines. Mine relate to nonliterary television and radio in distance learning, i.e., when television programs are delivered over the air and used by the students as a learning resource.

The Learning Medium

By and large, people can learn through any medium. Communication can be difficult, but much can be done. You can communicate news, a warning, or terror through police sirens or beacon fires, for example, but it would be difficult to teach surgery in this way. You could learn particle physics by semaphore or Morse code, but it would take some time. People can and do communicate by many means: verbal, nonverbal, visual, tactile, and through the newer technologies in ways never dreamed of until only yesterday.

We have all seen good, often riveting television and listened with fascination to radio. But television, or any medium, does not lend itself instantly to education or entertainment. Often it seems to do the reverse. A camera pointed at an event records only a fragment of the reality. Watching opera on television is not the same as being there. The campus lecture recorded on television as a straight lecture is less fun to watch than a live performance. It all seems smaller and farther away. War, sports, music, and education are all diminished by television. The same can often be said of radio and indeed of any other

communications medium. It is often like looking down the wrong end of a telescope. So why do we get so excited by television? What is it that makes us lean forward? Why do people think it is a powerful teaching tool? Because it can be, but we have to love it and work on it if it is to be effective.

Television in Medical Education

In higher education, particularly in the sciences and medicine, I think television can achieve five main things.

First, it can take us to places beyond our own limited environment. We are all now familiar with the Arctic, the jungles, the deserts, and their inhabitants. We have all been, at least we feel we have been, to the depths of the oceans and to outer space. We have even been very small and explored the close-up world of biology and medicine.

Secondly, television can bring us close to the giants in our field. We can see philosophers, doctors and painters almost in the flesh talking to us. It is the very intensity of such programs that enhances our impressions of such people. What they tell us remains with us, for somehow it is a privilege to see them and to listen to them.

Thirdly, television can show us experiments and demonstrations that would be expensive, dangerous or just impossible to do in the classroom.

Fourthly, through the technologies of animation and visual effects, concepts can be explained that would be quite difficult to do in the classroom.

And finally, by observing carefully, television can teach specific skills: how to mend your motorcycle, how to look after your plants or dogs, how to deliver a baby, how to fill teeth. The camera can go into places where the eye, or at least the class's eyes, can hardly reach. It releases the teacher from the constraints of the bench or operating theater.

With transmitted television, though, there has been one big problem for the serious learner. Television is ephemeral, and in the main, programs in the past have been viewed by the student only once. On the other hand, books can be reread and learned. Practical work can be discussed and reworked for hours. But until relatively recently, broadcasts arrived instantly and were gone in minutes. Only an impression remained. Home recording and the banking of recordings in schools and universities has, of course, changed this ephemerality somewhat. But we still seem to live with the legacy of the past. Programs are, in the main, made for one viewing with a beginning, a middle and an end. They tell a story at a pace that people can enjoy. They are perfectly effective in this format, but at the higher level, other formats specifically designed for repetitive replay and extended in-depth learning have not, so far, been tried and tested.

If we are to go down this road—to create video or audio material for repetitive replay—then certain changes have to be made in the material. These changes will produce a different product from a conventional program. Perhaps it will be more like a textbook than a novel. Perhaps it will be in small segments. Perhaps it will require other parallel activities. Perhaps, in the case

of television, it will have more emphasis on pictures than on words. Perhaps it will be what the historians call primary resource material. There are many routes to follow, and this is a major challenge for those who would develop distance learning systems, particularly at the professional level.

Program Considerations and Concerns

Whichever program format we choose to use, there are two major areas of concern that we need constantly to address.

The first area of concern is technical quality. In the developed North, it would be foolish to make the assumption that because our audience is committed to learning a subject, it is likely to tolerate shoddy material. The audience that watches educational television is the same one that watches drama, light entertainment, news, and sports on the same screen. It expects the picture to be in focus and properly lighted. On radio it expects high quality sound, often in stereo. It expects not to be jarred by discontinuity. Scenes must edit together to provide the same smooth effect as with any other good program. We do not tolerate amateur brain surgery. So why should we tolerate poor communication, especially with a medium as expensive as television? The question of technical quality is even more important when the material in question is designed for repetitive replay by a student. On second, third, and even fourth viewing, pictures and words receive considerable scrutiny. Mistakes will become obvious, if not annoying. Ideally, the material should be of such depth that the student will get more out of it with each replay, not less. Poorly assembled material can, under scrutiny, become educationally counterproductive.

The second area of concern, which (certainly in North America and Western Europe) bedevils broadcasting and the production of quality programs, is cost. Television is a labor-intensive industry using people with many skills. There are cameramen, sound recordists, designers, model makers, editors, lighting engineers, producers, administrators and, most expensive of all, medical practitioners hired by the hour! But when everything is weighed together, the advantages of using broadcasts become apparent, and quite often (as with the brilliant lecturer in the classroom) there are moments of pure delight.

So what does the student require of audio and video from which he/she is expecting to learn? It almost goes without saying that objectives have to be set. "At the end of the programs, the student will be able to . . .," "will have acquired . . ." etc. Too often a broadcast is made without this consideration. I think we need to be very specific about objectives even in the event that a program is used in a different way from that originally intended. We also have to know why we are making a program and why it is on television or radio anyway. Would a written piece be just as good or better? Would some television work better on radio? I have often watched an educational television program and enormously enhanced my understanding of it by closing my eyes. Similarly, much educational radio cries out for pictures, and though it is often said that good radio creates pictures in the mind that are

better than television. I cannot really believe this for programs in the areas of science or medicine.

It is also important, in my view, to preserve open-endedness in some programs to make them interpretable by different people at different levels. There is no reason at all why both students and Nobel laureates should not take pleasure from the same material. A complex piece of science can create a sense of wonder in a nonspecialist and at the same time be valuable detail to a scholar. Children watching a film of rabbits outside their burrow see only furry bunnies. The same film shown to behavioral scientists creates quite different impressions and carries different messages—at least we are told so! In short, if a broadcast can be regarded as “source material,” it has a greater chance of being used flexibly and preserved longer than if it is merely a secondhand interpretation.

“Interactive” Learning by “Satellite”

I now want to turn to two buzz words that are all the rage in these late 1980s. They are the words *interactive* and *satellite*.

It is easy to dismiss both by implying that they hardly warrant the attention that they are currently given. After all, a communication satellite is only a tall transmission mast. And educational interactivity has been around since Socrates.

Interactive learning in the new technology sense has developed only recently. It rose with the videocassette and developed with the home computer. But what is interaction? Some people would maintain that if a student switches off his/her cassette for a moment of thought and switches it on again, he/she is interacting with it. This is clearly nonsense. It is as impossible to interact with a cassette, or even a computer, as it is with a motor car. Machines do what you tell them to do. They do not interact with you. Similarly, the videodisc, a much heralded interactive medium, is (even at its most imaginative use) no more interactive with the student than is a library. A student can certainly delve into a library, a data base, or a videodisc, but interaction is hardly the word. The best teaching always raises questions, and we were certainly taught as young producers to create television programs that reached out of the screen to grab the student. This might create excitement but hardly interaction. Interaction in education can only be between people.

Teachers and students interact, often disastrously. Students interact with each other, often very enjoyably. To conduct such interaction at a distance is hard. And for those who work in educational broadcasting, communication has almost always been one-way. There has, of course, been feedback. Broadcasters talk to the audience, receive advice, and develop joint policies with the users of education. But the broadcasts themselves have been only delivered. Satellites and their cousins, cables, are beginning to explore a change in that.

Two simple examples, one from Project SHARE and a second from a consortium of teaching hospitals in London, might illustrate this. The Higher Education for Development Cooperation in Ireland mounted a series of lec-

tures on the subject of water resources and delivered these live by satellite to the University of Amman in Jordan. After each lecture, Jordan used an audio link to ask questions of the lecturer or expert panel. The link was established by terrestrial line from Ireland to the UK and then via satellite from the UK to Jordan.

With the distance learning systems of the Charing Cross and Westminster Medical School, presentations are given live each day to students in eight teaching hospitals in London. The students and teachers are released from the time-consuming business of travel. Interactivity is preserved, and the bond between clinical practice and medical theory is strengthened.

To someone brought up in the traditions of broadcasting, this is rather odd stuff, but the important point is that comparisons of this type of interactive television with broadcasting are irrelevant. This is pure point-to-point interaction—a genuine live exchange between people at a distance. This is not television. It is conversation.

Another SHARE example is the ambitious multinational, multisatellite project from the Miami Children's Hospital. Literally thousands of physicians in countries throughout South and Central America with links to Spain and Africa were involved in live seminars. In the seminars, each presentation was followed by questions, more so in fact than might have been expected had the audience all been in one room—even if such a room could be imagined.

What characterized the presentations from Miami and also the daily presentations in the teaching hospitals in London was the mixture of recorded video or film professionally knitted into live presentations with questions. The sense of interaction was very present.

Exploring the Future of Distance Learning

Now let us extrapolate from what we have in terms of traditional distance education through television and radio forward to the experimental interactive systems and to what we might have in the mid 1990s. A major constraint on broadcasters in all developed countries is air time and frequency. There is hardly any room left. The 24 hours of every day are nearly full, and the airwaves are crowded with almost overlapping allocated frequencies. For example, in North London last week, I counted 19 VHF radio channels, at least 10 of which were illegal. Satellite and cable solve both these constraints—time and frequency. Suddenly it seems possible to extend our systems to hundreds of channels. For satellite delivery the only problem for broadcasters is to persuade people to buy the receiving antennae and governments to allow individual or at least institutional reception. The problem for a cable system is to lay the cable network. So, if the audience can tune to many channels, whether video or audio, then some of the problems for the educational broadcaster and the interactive systems user go away.

Perhaps the most important point to emerge from Project SHARE and from the London hospital development is that, through satellite technology and cable, people and institutes can now communicate using television in

ways that previously were only given to the more powerful interest groups. There is a growing awareness of potential for uniting scholars, health practitioners, and educational specialists. A second point amply illustrated by SHARE and the hospitals is two-way rather than one-way communication. This is a characteristic to be fostered and developed. Education, television, and radio have all been traditionally one-way, and it would be a pity if the accent of the developing satellite and cable systems were primarily to be one of delivery rather than exchange. Thirdly, SHARE has emphasized again what satellites can do well. They can facilitate communication over vast distances into awkward terrain. They have a live and immediate quality that terrestrial broadcasting can lack. What we have to be careful of is that they are used appropriately. We must always ask the question "Why are we doing this?" and not be afraid of the answer.

So a projected view into the 1990s - with educational television and radio, teaching and learning at a distance, open learning and all that that implies - is exciting and developing. My own guess is that interactivity through these media will increase. Satellites will probably be the key to this, but cable systems carry much potential. Certainly global talk will grow as well as global gossip - the casual, nonformal exchanges between us all. Some of it, like the classrooms of our youth, will be extremely boring. Some will be very expensive, some cheap. Many people will learn through the development of these media, and as they learn, the media themselves will develop.

The challenge for us is to extend what we know about the techniques and the technology of communication into those areas of the world that desperately need education for their own development and survival. The technology is almost there. The problem is to use it.

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Experiences in Distance Education and Telemedicine Between Canada, Kenya, Uganda, and the West Indies

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Because of Canada's large size, its frequently severe climatic conditions, and its widely dispersed population, the provision of health and education services for remote and isolated areas has always been a challenge. Distance medical and allied health education programs have been developing since the early fifties and, over the years, traditional programs and courses have been supplemented by the use of radio broadcasts, audiotapes, and videotapes. A limited number of live television courses have been offered on public television networks.

These delivery media for distance teaching all have a major shortcoming in that they do not provide the opportunity for immediate interaction between student and tutor.¹ Over the years there has been a continuing debate on the question of the best medium to utilize to provide distance education. There are those who strongly believe that live two-way television is necessary. Others advocate one-way television and two-way audio, while still others point to the high cost of television and claim that interactive voice-only systems provide highly cost-effective results.

Memorial University's Telemedicine Centre

Memorial University of Newfoundland (MUN) has had a tradition of outreach since it was established, and it was with enthusiasm that the Faculty of Medicine at MUN participated in a satellite experiment in 1977. The Communications Technology Satellite, or Hermes as it was called in Canada, was a joint US/Canada effort that, for the first time, provided Canadians with an opportunity to explore the use of that technology in distance education

and in the provision of remote medical care. Memorial's Telemedicine Centre experiment involved a one-way television, two-way interactive audio configuration. Four remote communities were linked to the university at St. John's in Newfoundland.²

Continuing education courses for physicians and other health professionals were offered, administrative and committee meetings were facilitated, and there was a limited transmission of medical data including electrocardiograms (ECG) and still pictures by slow-scan television (SSTV).

While this project demonstrated clearly the effectiveness of one-way live television and interactive audio, it was concluded that most of the educational material could have been delivered by audio alone, and it was clear that multipoint television with interactive audio would not be economically feasible in the province for the foreseeable future. Since 1977 the Telemedicine Centre has directed its efforts to the development of interactive audio networks for the delivery of education programs and the transmission of medical data.³

The Telemedicine Centre now has a province-wide, 4-wire dedicated teleconference system (TCS) linking 95 sites in 54 communities. The system uses public telephone ground-based circuits and, at each site, microphones and a speaker. At the beginning, satellite channels were used to reach a few remote sites in the north and oil rigs off the coast in the Atlantic. Now only the latter require satellite links. The technical configuration of the TCS allows for simultaneous programming in four separate divisions and a 2-4-wire bridge permits up to four external telephone sites to participate by dial-up in any given session.

Certain "add-ons" including SSTV and telewriters are used at some sites to supplement the audio system. To support patient care, ECG and electroencephalograms are now transmitted province-wide, and SSTV has a limited use in transmitting X-rays and other pictures.

In the past five years, MUN has participated in a number of national and international teleconference projects, including a project involving the Royal College of Physicians and Surgeons of Canada and the Toronto General Hospital with the participation of all 16 Canadian medical schools.

The African Connection

Canadian medical academics, along with those from other countries, played a significant role in the development of the School of Medicine at the University of Nairobi, Kenya, in the sixties and seventies. Subsequent to this, a Memorial project supported by the Canadian International Development Agency was initiated to provide support for the pediatric department at Makerere University in Kampala, Uganda. This was called the Child Health and Medical Education Programme (CHAMP).

Because of Memorial's success with teleconferencing, in 1982 a teleconference link between Nairobi and Kampala was proposed. The plan was to seek help from the medical faculty at Nairobi for the medical school in Kampala and to improve communications generally between the two medical

schools. Although this was considered to be technically feasible, it was not possible to proceed with the project in 1982.

In 1985, when Intelsat and the International Institute of Communications established the SHARE (Satellites for Health and Rural Education) project to celebrate the 20th anniversary of the establishment of Intelsat, the telemedicine group at Memorial saw an opportunity to establish the link not only between Nairobi and Kampala but also to provide a teleconference link between those two East African countries and Memorial University in Canada. With the involvement and collaboration of Teleglobe Canada, Post & Telegraphs of Kenya and Uganda, and Intelsat, a teleconference project was initiated with Nairobi in December 1985 and with Kampala in February 1986.

The technical system consisted of a 4-wire (private line) link between the university in St. John's and the Teleglobe gateway terminal near Montreal, Quebec. From this international gateway terminal, the circuits included those of Intelsat to Nairobi, and locally there was a 4-wire link to the University of Nairobi provided by Kenya Post and Telegraphs. The link to Kampala used microwave circuits of Uganda Post & Telegraphs. In Kampala, a 4-wire dedicated circuit was provided to the medical school. Microphones and speakers were used at each of the participating sites. Technically, the system has worked extremely well with minor problems being promptly dealt with by the various organizations responsible for the communications links.

Programming

The system has been used for teaching sessions, administrative meetings, and a variety of other applications. Tables 1-4 give a detailed breakdown of programming. The Hospital for Sick Children in Toronto and pediatric faculty of the University of Toronto have contributed many programs, as did the Janeway Child Health Centre in St. John's and Memorial's discipline of pediatrics. EEGs were transmitted from Nairobi for two months and from Kampala for ten months; approximately 100 tracings have been transmitted, and these can be interpreted with confidence by electroencephalographers.

Comments

One of the main objectives of the Memorial SHARE project is the transfer of expertise and technology to the University of Nairobi and Makerere University so that these two organizations can have a functioning teleconference system after the SHARE project is finished. It is also anticipated that other East African countries may participate in such a permanent system.¹

Although circuits were available 24 hours a day, the actual time used was limited by time zone constraints. This will be a significant consideration for future international interactive distance education projects. Because of pressures on the time of African medical faculty and their daily patterns of practice, it has been difficult for them to give the time they wish to the project.

Table 1
Hours of Programming: Memorial/East Africa Teleconference Circuit

Category	Dec. 9/85– Jan. 13/86* Hours	Jan. 13/86– Dec. 31/86 Hours
Education Programs	—	72.75
EEG Transmissions (approximately 100 tracings)	2.2	104.00
EEG Training	6.5	5.00
CHAMP Business – Local	—	9.05
CHAMP – Evaluation/Training Week	—	5.83
Dial-Up Calls** (other than education program)	1.0	70.00
Technical Testing	2.0	10.40
Program Planning and Project Administration	14.5	27.17
Other		
Opening Ceremonies	—	1.00
Student Placement	—	2.33
Meetings – Ongoing project and other faculty involvement	—	3.00
Canadian Broadcasting Interview	—	.80
Kampala/Nairobi Programs	—	9.00
Project Supervision from Canada	—	4.50
Pharmacy Discussion Group	—	1.50
Other Visits	—	5.83
Planning Presentations	—	4.25
Meeting School Children	—	1.50
TOTALS	26.2	337.91

* Official Opening

** See Table 2 for types of calls

The 2-4-wire link has facilitated programs being given from Toronto, Montreal, Sudbury, and Halifax in Canada. A number of sessions originated in Kampala or Nairobi. Many were of the interactive case discussion type.

The West Indies Connection

In June 1986 the Memorial SHARE project was extended to include a trial that linked Memorial's Teleconference System to the University of the West Indies, Jamaica Campus, and through UWIDITE (University of West Indies Distance Teaching Experiment) system, six other island countries in the Caribbean. The technical configuration allowed the Telemedicine Centre automatically to switch the Teleglobe gateway signal to Africa or the West Indies as required. Tables 5 and 6 list the programs with the West Indies. Because of the nature of the existing UWIDITE system, there have been some technical problems, but they have not interfered with active programming using voice and, in many instances, slow-scan television. The 4-wire dedicated link to the West Indies had to be terminated at the end of December 1986 because financial support had run out. The departments of surgery and

Table 2
General Categories of Dial Access* Calls

1. Discussions with potential faculty for CHAMP project
2. Discussion regarding travel for visiting faculty
3. Change in curriculum for visiting medical student – enriched one-year tropical medicine
4. Arrangement for delivery of laboratory supplies, medications, and books
5. Contact with Canadian International Development Agency (CIDA), Office of International Affairs, Faculty of Medicine regarding administration of CHAMP project
6. Contact of visiting CHAMP faculty with home laboratories
7. Travel arrangements for nurse from Kampala being sent to Winnipeg and St. John's for course
8. Follow-up conversations with CHAMP faculty who had returned to home laboratories and practices
9. Meeting of World Bank representatives and AMREF regarding rehabilitation or primary care base system
10. Establishment of Nutrition Programmes

* Dial Access – One or more parties (up to four at a time) dialed into the Memorial 2-4-wire bridge and were linked to a St. John's, Nairobi, Kampala teleconference

pediatrics in the two universities will continue using the regular network. Two hours per month, for the next six months, are already booked.

Conclusion

We have concluded that audio teleconferencing is an effective and economic method of supporting and delivering international distance education and telemedicine services. We found that:

- To ensure economic viability, a consortium of users should be sought.

Table 3
Education Programs by Originating Site

Site	=
St. John's, Newfoundland	30
Toronto, Ontario	12
Montreal, Quebec	5
Sudbury, Ontario	2
Kampala (Visitors)	2
Hamilton, Ontario	2
Halifax, Nova Scotia	1
Toronto/St. Anthony	1
Sudbury/St. John's	1

All programs had a co-presenter in Nairobi and, when possible, one from Kampala who gave short presentations on the East African perspective.

Table 4
Memorial University East Africa Teleconference Sessions*
Teaching Sessions

Date	Day	Hour	Topic	Speaker
Jan. 13	Monday		Press Conference	
Jan. 15	Wednesday	1030	Slide Tape/ Meningococcal Toxemia/Severe Dehydration	Dr. Anna Jarvis
Jan. 22	Wednesday	0900	Immunology in Malnutrition	Dr. R. Chandra
Jan. 27	Monday	0900	Febrile Convulsions Status Epilepticus	Dr. G. Ronen
Jan. 29	Wednesday	1000	Major Trauma	Dr. Anna Jarvis
Feb. 10	Monday	0900	Antibiotics in Burn Treatment (Ref. - New Eng. J. of Med. Nov. 28/85)	Dr. S. MacLeod Dr. M. Tweeddale
Feb. 11	Tuesday	0900	A.I.D.S.	Dr. I. Bowmer
Feb. 12	Wednesday	0900	Gamma Globulins	Dr. K. Ali
Feb. 13	Thursday	1030	Hepatitis A	Dr. Ron Gold
Feb. 19	Wednesday	0900	Respiratory Sensitil Virus Etiology of Acute Respiratory Infection	Dr. Reb Morris Dr. E. Wafula
Feb. 24	Monday	0900	Study - Kenya School Children Rheumatic Heart Disease Congenital Health Disease in Children	Dr. Anabuani Dr. J. Sharett
March 5	Wednesday	1030	Antibiotic Update	Dr. Ron Gold
March 10	Monday	0930	Failure to Thrive	Dr. Bob Hillyard
March 19	Wednesday	0930	Neonatal Infection	Dr. Don Reid Dr. A. Patel
March 26	Wednesday	1000	Diabetes	Hillman/Davis/Orinda
March 27	Thursday	1000	Acute Respiratory Infection	Dr. Wafula Dr. Onyengo Dr. Morris
April 3	Thursday	0930	Meningitis	Doug Biggar Anne Nesbitt
April 7	Monday	1000	PRIMARY HEALTH CARE Teaching in Small Hospitals	Dr. R. Orinda Moderator Dr. J. Ross

Table 4 (continued)

Date	Day	Hour	Topic	Speaker
April 17	Thursday	1000	MENTAL RETARDATION IN CHILDREN Management in Kenya	Dr. Muthiga Moderator
			Etiology in Ugandan Children Screening Procedures	Dr. J. Byarugaba Dr. M. Cox
April 23	Wednesday	1000	Peptic Ulcer in Children	Dr. H. Kopelman Dr. J. Meme
April 28	Monday	1100	PRIMARY HEALTH CARE (cont.)	Dr. J. Ross
May 5	Monday	1100	T.B. Short Course Chemotherapy Labrador Situation Somali Situation	Dr. P. Turner Dr. M. Bochout Dr. Onyengo Moderator
May 9	Friday	1030	Immunology and Nutrition (Kampala)	Dr. R. Chandra Dr. Michele Moderator
May 12	Monday	1100	RICKETS How to Diagnose Kenyan Situation	Dr. B. Kaplan Dr. Doris Kinuthia
May 21	Wednesday	1100	ASTHMA IN CHILDHOOD Management Pathophysiology Respiratory Function Tests	Dr. S. Peter Dr. C. Hobeika Dr. E. Onyengo Dr. D. Vaze Dr. E. Wafula
May 22	Thursday	0900	Neurology Case Presentations and Discussion	Dr. Katabira Drs. M. Sadler and A.M. House
		1100	Resuscitation of the Newborn	Dr. R. Odhiambo Dr. R. Bolton

• Illustrative.

- "Add-on" equipment such as telewriters, slow-scan television, and computers can increase the effectiveness of teaching on the narrow band system. Electronic mail can be used for the "delivery" of library resources and for tutor-to-student teaching.
- Coordination at each international site is vital to a successful project. Budgets should include support for at least one local physician organizer to devote a significant amount of time to teleconferencing.

Table 5
 Memorial University SHARE Project
 Hours of Programs
 University of the West Indies
 May 9–December 31, 1986

Type of Program	Hours
Education Programs*	41.00
Planning Meetings—Ongoing Liaisons	4.25
Program Planning	15.00
Technical Test	6.50
Meetings: House, Lalor	4.00
CIDA Proposal	2.00
School Children	1.50
Demonstration: T. Kerr	1.00
FIBRESAT	0.50
TOTAL	<u>75.75</u>

* See breakdown in Table 6

- A teleconference system between Nairobi and Kampala appears feasible and could be used by a variety of agencies and organizations.
- The addition of at least one more East African country would be technically feasible but would depend on interest and funding. An extension to other East African countries is possible using satellite services.
- A number of international audio teleconference networks that might be interrelated appear to be feasible and practicable. Links between North America and Africa seem to be a logical first step.

Table 6
 Education Programs by Category

Category	Hours
Pediatrics	17.5
Surgery	8.5
Endocrinology	4.0
Cardiology	4.0
Infectious Diseases	2.0
Immunology	2.0
Family Medicine	1.0
Teaching Hearing-Impaired Preschoolers	1.0
Agriculture	1.0
TOTAL	<u>41.0</u>

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The Foundation for the International Exchange of Scientific and Cultural Information by Telecommunication

Heinrich Ursprung, Ph.D.

Background of FISCIT

The Foundation for the International Exchange of Scientific and Cultural Information by Telecommunication (FISCIT) was founded in Zurich in 1982 on the initiative primarily of several presidents of U.S. research universities. It had been recognized that academic travel had become increasingly difficult because of severe budgetary restrictions. This occurred at a time of increasing need for academic travel caused by the ever increasing speed of renewal of scientific knowledge. The presidents of the universities felt that modern techniques of telecommunication should be made available to scientists who could not or did not want to travel frequently but preferred (for whatever reason) to employ telecommunication. There are, in fact, many reasons why one may prefer telecommunication over traveling. Three of these reasons are the saving of time, the saving of money, and the elimination of jet lag.

Six research universities founded FISCIT. They are the University of California at Los Angeles (representing the University of California System), Indiana University, the Johns Hopkins University, Hamburg University in the Federal Republic of Germany, the University of London, and the Swiss Federal Institute of Technology in Zurich.

Interactive Learning through FISCIT

We set several goals that we believed could be reached by means of modern telecommunication. I mentioned the goals of saving money and time already, but we had nobler ones. We felt telecommunication in academia could promote

the idea of remote learning, i.e., *interactive learning* that would enable the students to interact with a teacher or with whoever was interacting in the system. We demonstrated how this could be done in a program called "Visiting Statesmen," using an audio link between the United States and the United Kingdom. Briefly, there were three classes of political science students in California who wanted to get to know the prime minister of England. Through FISCIT, a videotape was produced in the home of former Prime Minister Callaghan. This tape was then played to the three classes of students in California and discussed during lecture periods. As a result of these discussions, a number of questions were drafted by these three classes and then, as a climax, there was an audio link established between these three classrooms and Mr. Callaghan's home. The students had become familiar with how Mr. Callaghan looked and how he acted by viewing the tape; and now they talked without seeing him, and asked him the hard questions, live. The students were thrilled by having the opportunity to have their questions answered directly by the prime minister.

Possibilities for Scientific Interaction

We wanted also to explore, and experiment with, the possibility of holding scientific meetings by telecommunication. The day before a recent economic summit in Tokyo, the members of a group of prominent economists gathered in Tokyo, Los Angeles, New York, and Zurich, respectively, for a real-time academic discussion under the auspices of FISCIT. (In fact, FISCIT had organized a similar teleconference on economic forecasting earlier, linking Geneva, London, New York, and Los Angeles.) The techniques used in these conferences included video links via one or more satellites, audio of course, and computer graphics. In short, these were scholarly conferences to which participants did not have to travel. The savings of money, when translated into time, proved that this was an inexpensive way to provide a forum for scientific interaction.

Other Telecommunication Efforts

FISCIT stands by no means alone in this effort to promote telecommunication. Many other organizations—local, regional, national, or global, permanent or ad hoc—have developed an interest in this novel means of scientific communication. In the medical field is Eyesat, a satellite-relayed professional education effort in ophthalmology in Bethesda, Maryland, which broadcasts weekly one-hour programs on a wide range of problems of interest to the practitioner; similar programs exist in pediatrics, surgery, and medicine. These programs, in contrast to the two FISCIT examples I mentioned, are not of an interactive nature with the possibility of having a dialogue, but are, nevertheless, very useful.

Problems and Solutions

Among the several problems that have not been solved to our complete satisfaction is the cost. Television-quality, full-motion videoconferences are considered by many of my faculty as still too expensive. The teleconference studio of the main building of my university is run by the Swiss PTT. We reach Berlin, Bremen, Darmstadt, Dortmund, Dusseldorf, Frankfurt, Hamburg, Hannover, Cologne, Munich, Nurnberg, Stuttgart, Paris, Geneva, Atlanta, Boston, Baltimore, Chicago, Dallas, Houston, Kansas City, Los Angeles, Miami, Nashville, New York, Pittsburgh, Sacramento, San Francisco, San Jose, and Washington, D.C. The current rate is \$1,500/hour for the one-way transatlantic link, twice that amount for the two-way link. This seems reasonable if compared to the costs of a conventional meeting involving air travel, yet many colleagues find it too expensive. Also, some university administrations do not permit faculty to use travel money for telecommunication purposes.

There are techniques available already that permit teleconferencing at much lower cost, and to explore them, and experiment with them, is another goal of FISCIT. For example, one of these low-cost techniques is "slow-scan" transmission. This technique can be handled by conventional telephone links. Combined with the use of electronic blackboards, electronic notepads, and computer graphics, it constitutes a solution for interactive telecommunication at costs that are significantly less than the more elegant full-speed videoconference. FISCIT has used these techniques experimentally between Washington, D.C., and Los Angeles.

It would be a mistake not to mention the difficulty that is crucial: lack of enthusiasm on the side of the user. Consider the example of my own university. After the videoconference studio had begun to function in our main building, a letter was sent to 280 of our university professors, inviting them to use it, and announcing the fact that the Swiss PTT had agreed to provide 50 hours of transatlantic service, each year, free of charge. I had one reply. Since then, users from outside our university have held 150 teleconferences originating in our studio. On the academic side of the spectrum of users, the new way of exchanging scientific and cultural information by telecommunication is a *technology in search of consumers*.

The Future

We are so convinced that there is a future for this novel approach that we are setting out to improve existing facilities even more. One of our current projects is to equip some 20 or more universities around the world with telecommunication equipment that is mutually compatible, and more consumer-friendly than ever. Also, we are examining the possibilities of extending our links. Interest has been voiced by colleagues in Japan and China. We

have, from the very beginning, considered the option of using such links not only in an East-West dimension, but in the North-South dimension as well. Science and education ought not to know borders, and through programs like FISCIT we hope they *will not* know borders.

Distance Teaching for Reproductive Health Education

Ronald H. Magarick, Ph.D.

Distance teaching by satellite technology holds great potential for upgrading the skills and knowledge in reproductive health of professionals working in isolated and rural areas of developing countries. This paper discusses two distance education programs in reproductive health supported by JHPIEGO, one in the West Indies and a second broadcast from Miami to Latin America.

UWIDITE

In 1980, the US Agency for International Development established a rural satellite program (RSP) to investigate the potential uses of satellite-based telecommunications in supporting rural development. One of the three pilot projects established that used teleconferencing networks to link universities and extension learning centers was at the University of the West Indies (UWI). This project, known as UWIDITE (University of the West Indies Distance Teaching Experiment), demonstrates the use of satellites to link UWI's island campuses and extension stations. UWIDITE links three main UWI campuses in Jamaica, Barbados, and Trinidad and three extension campuses in St. Lucia, Dominica, and Antigua (Figure 1). Transmissions originate from Jamaica, which is linked with Trinidad by an INTELSAT satellite. The signal is sent to St. Lucia, the hub of the system, by microwave. From there, the signal goes to Antigua and Dominica by microwave and to Barbados by troposcatter (Figure 2).

UWIDITE is a totally interactive teleconferencing system. The network is a dedicated four-wire telecommunication link with a band width of 300 Hz to 3,000 Hz. Each teleconferencing room is equipped with at least six microphones, two speakers, slow-scan (freeze-frame) television, slow-scan TV equipment, and a telewriter for on-line use. The exception is Montego Bay, which has received only video. In January 1985, personal computers were installed at the campus sites to allow for transmission of files and messages

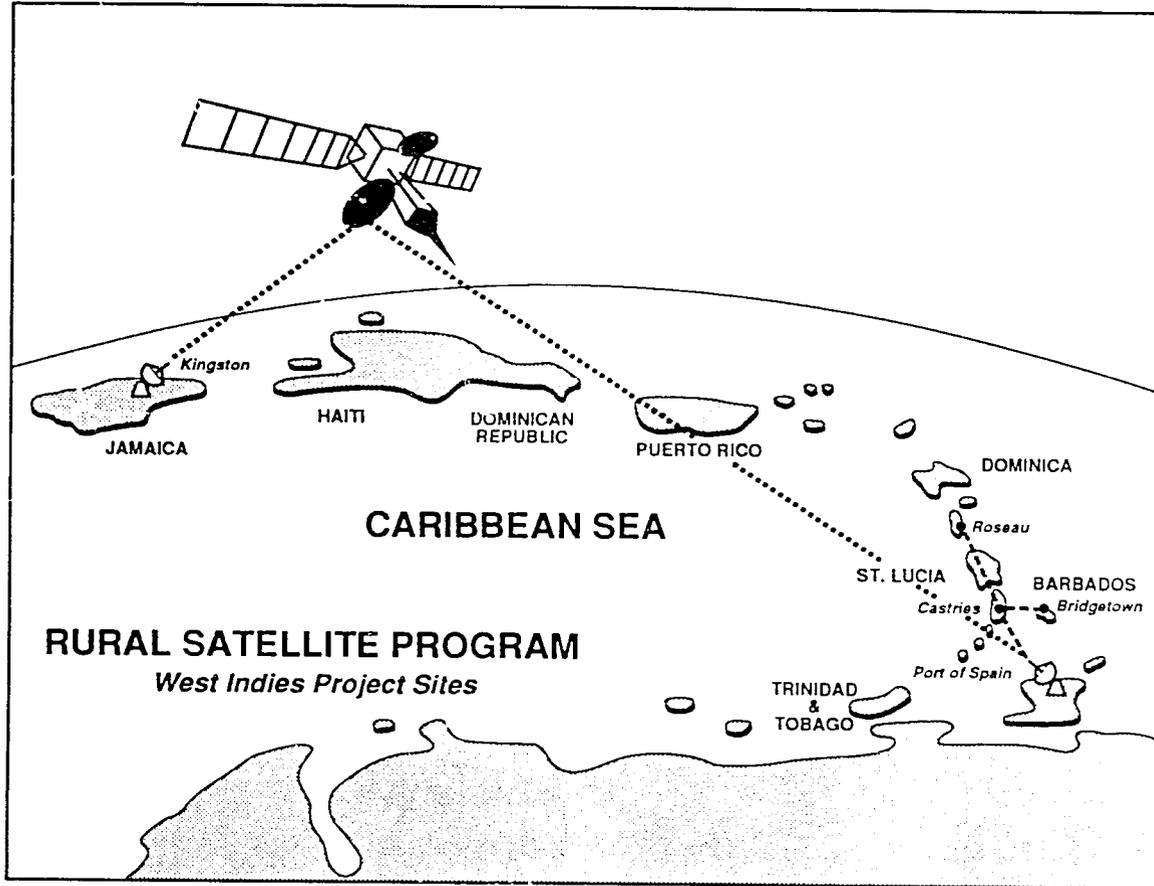


Fig. 1. Broadcast sites of the University of the West Indies Distance Teaching Experiment.

Source: *The AID Rural Satellite Program: An Overview* by Karen Tietjen. A Publication of the AID Rural Satellite Program Produced by The Academy for Educational Development, Washington, D.C., January 1987.

U.W.I.D.I.T.E. TELECOMMUNICATIONS NETWORK

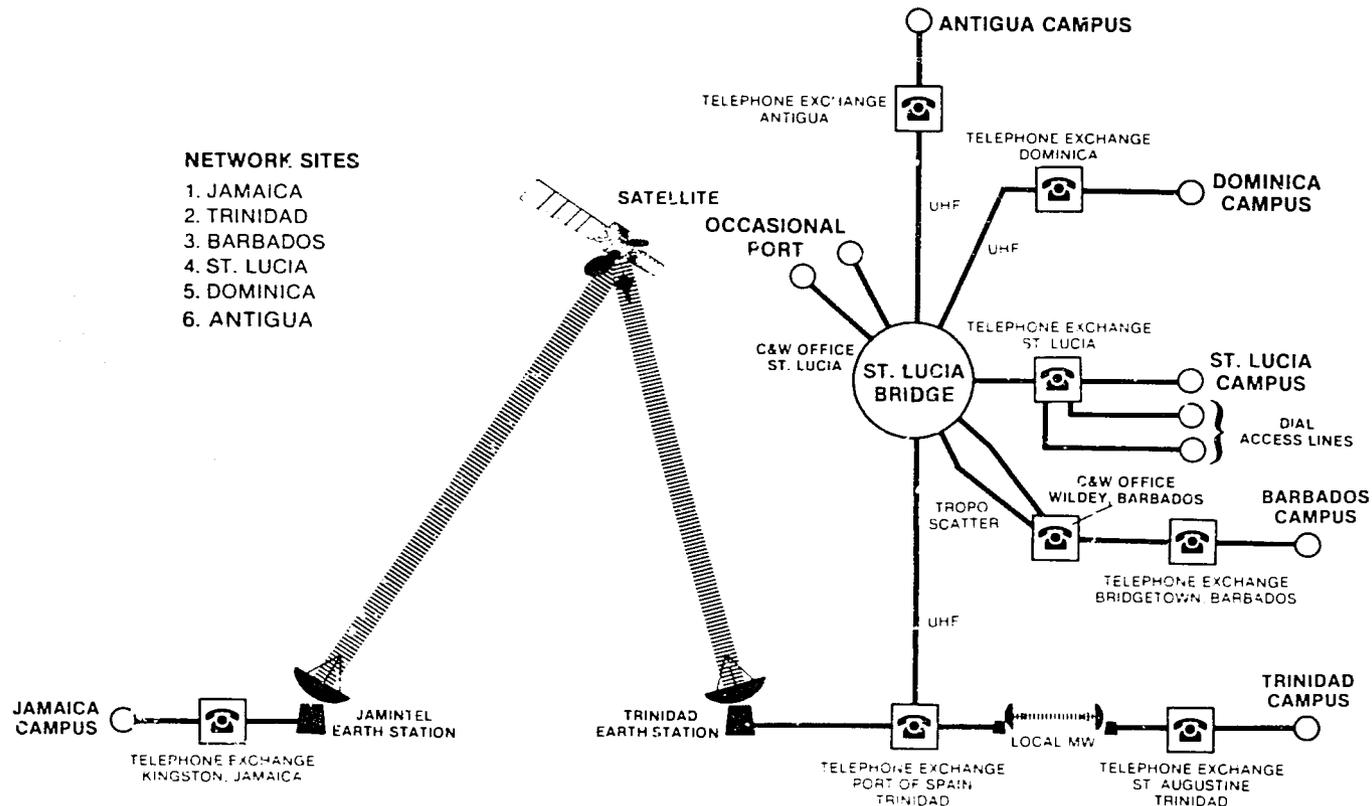


Fig. 2. Telecommunications Network of the University of the West Indies Distance Teaching Experiment.

Source: *The AID Rural Satellite Program: An Overview* by Karen Tietjen, A Publication of the AID Rural Satellite Program Produced by The Academy for Educational Development, Washington, D.C., January 1987.

that are too long to be read over the system. The system also allows confidential conversations between two or more locations.

JHPIEGO has supported the Advanced Training and Research in Fertility Management (ATRFM) Unit of the University of the West Indies in implementing a reproductive health training project that uses the satellite technology. The project is in collaboration with UWIDITE. JHPIEGO courses in reproductive health began in May 1984. As of May 1986, UWIDITE completed ten courses in reproductive health and through this medium has reached 487 physicians, nurses, and students in the six Caribbean islands that participated in the program. Courses are developed by the fertility management unit through periodic meetings with faculty. Four courses for senior nurses, three for physicians, one for postgraduate physicians, and two for undergraduate physicians have been delivered to date. Each course is delivered by a two-hour network session once a week. Each course runs for a period of 10–12 weeks. Course topics include contraception, management of sexually transmitted diseases, and treatment of gynecological problems such as pelvic inflammatory disease. Background reading materials are prepared and sent to each site six weeks before the course begins. The UWIDITE coordinator at each site receives the materials and is responsible for distribution and logistical arrangements. Pretests and post-tests are administered. Participants receive a UWI-approved certificate if they attend 80 percent of the sessions and complete the pretest and post-test. Evaluation of the program revealed the following:

- Participants reported that the satellite courses were as good as or better than face-to-face teaching.
- Participants indicated that their counseling, patient management, and clinical skills were strengthened.
- A significant difference between pretest and post-test scores of participants indicated that the courses were effective in transmitting knowledge.

Three years of experience with the project appears to demonstrate that distance teaching of reproductive health information by satellite can

- Utilize indigenous, experienced faculty resources to reach health professionals over a wide geographic area
- Reach professionals for whom training would not otherwise be available
- Achieve cost savings in travel and other course arrangements
- Accelerate the dissemination of new knowledge in reproductive health care

JHPIEGO/Miami Children's Hospital Teleconference

Based on the positive experience with the UWIDITE program, JHPIEGO began exploring other opportunities to demonstrate the use and efficacy of distance teaching in reproductive health in developing countries. In mid-1986, JHPIEGO learned of a project being sponsored by the Miami Children's

Hospital (MCH) in collaboration with Project SHARE (Satellites for Health and Rural Education) of the International Telecommunications Satellite Organization (INTELSAT). Miami Children's Hospital was broadcasting continuing education programs by satellite to health professionals in Latin America and the Caribbean region. After a series of meetings, JHPIEGO and MCH agreed to collaborate on a conference for nurses on maternal and child health care. The three-day teleconference was directed toward nurses in a variety of primary, secondary, and tertiary care settings. Faculty from Johns Hopkins and from Miami Children's Hospital, as well as other experts in the fields of pediatrics, obstetrics, and gynecology presented advances in maternal and child health and technologies applicable to health care settings in Latin America and the Caribbean. The conference took place from November 6–8, 1986.

JHPIEGO presented the reproductive health component of the three-day teleconference. Topics offered by JHPIEGO speakers included the concept of reproductive risk/reproductive health, maternal position in labor to improve maternal and fetal well-being, contraceptive methods, and techniques of contraceptive counseling. Appropriate technologies for developing countries were emphasized by the JHPIEGO speakers throughout the conference. In order to enhance programming and facilitate communication, the teleconference was broadcast in English and Spanish on separate channels.

The teleconference contrasted with the UWIDITE project in several ways. Programmatically, it was a conference rather than a course that takes place over several weeks. Technologically, it was a television broadcast, not slow scan, and it was not audio interactive, as is the UWIDITE system. Nevertheless, telephone lines were used with the Miami system so that participant questions could be conveyed to the presenters in Miami, who then responded on the air.

Results

It is estimated that the teleconference reached some 10,000 participants in approximately 15 countries throughout Latin America and the Caribbean. The JHPIEGO portion of the teleconference was extremely well received. There were numerous questions from the field on issues relating to the health benefits and risks of contraception. Questions related in particular to the benefits and risks associated with the use of oral contraceptives and the use of the intrauterine device. Although still considered preliminary, data gathered by the Miami Children's Hospital from participants in Colombia, Honduras, and Jamaica seemed to indicate that a large percentage of the participants were satisfied with the educational content and other aspects of the teleconference (Figure 3). Such teleconferencing does seem to be an effective medium for reaching large numbers of individuals in remote locations quickly and effectively. Cost is certainly a consideration. The program with Miami Children's Hospital cost JHPIEGO less than \$10,000. The majority of the expenses

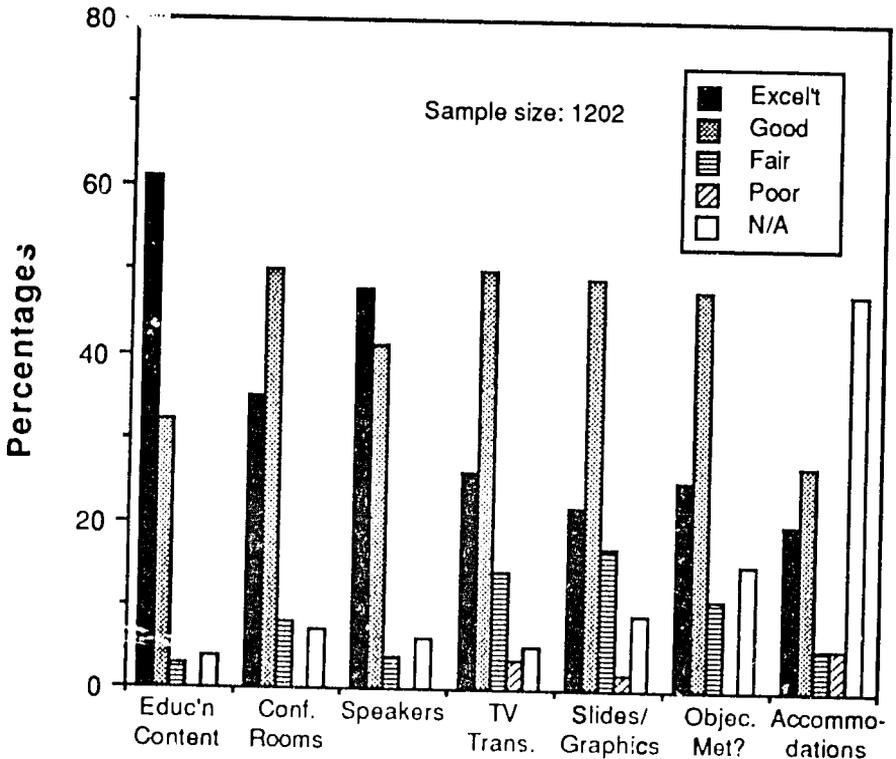


Fig. 3. Viewer evaluation (Colombia, Honduras, Jamaica) of Global Development Network/JHPIEGO Teleconference "Maternal and Child Health Care of the Nursing Professional" Broadcast from Miami, Florida, November 6-8, 1986.

Source: Miami Children's Hospital Global Development Network

were absorbed by MCH. After completion of the teleconference, a short video was produced that highlighted JHPIEGO's participation.

A number of lessons were learned from the teleconference. These include the following:

- There should be a framework for discussion at the receiving end of the teleconference such as roundtables or panels which would allow the participants to discuss the application of the information to local problems.
- At least six months prior to the teleconference, faculty must be oriented to the process, and they must develop appropriate visuals for their presentations.
- Well-developed visuals must be utilized in faculty presentations. Slides that might project well in a lecture room often do not project well over television. In addition, wherever possible, new footage should be shot, or existing footage should be obtained to illustrate lecture content.

Conclusion

The need is great for distance education programs in developing countries where the majority of the population is in remote or rural areas and where human and physical resources are limited. Equally needed are reproductive health education programs that will train health professionals in strategies to prevent or reduce high rates of maternal and infant mortality. The distance learning programs supported by JHPIEGO demonstrate that satellites can bring reproductive health information to widely scattered health personnel in an effective and efficient manner. Additional types of distance learning programs are required. As Shaw has pointed out: "The technology already exists. The cost is affordable. The possibilities are endless."

Reference

1. Shaw WD: *Distance Education via Satellite: A Case Study of the Indonesian Distance Education Satellite System*. Washington, Agency for International Development, January 1987, p. 2.

Issues in Distance Learning

Discussion focused on the different types of distance learning approaches and their cost-effectiveness and appropriateness for use in developing countries. It was urged that the least expensive technology that would permit programs to accomplish their objectives be utilized. This ranges from correspondence courses to live teleconferences.

Participants discussed the differences between live television, slow-scan, and audio-only teleconferences. It was noted that slow-scan and audio-only could be very effective depending upon the content of the program. The technical quality of distance learning programs, regardless of the type, is of enormous importance: the higher the technical quality, the better the communication. Since students in most countries are watching and listening to high-quality television and radio programs, they will not be very satisfied to find poor-quality audio or video programs in a classroom or lecture theater.

It was noted that distance learning programs require a reorientation of faculty, and that faculty must often spend more time preparing for a distance learning presentation than for a regular classroom lecture. For example, faculty need to prepare handouts that are made available to participants in advance of the presentation. In addition, learning objectives and learning goals need to be thoroughly identified prior to the learning activity. Faculty might initially be resistant to participating in distance learning programs by television due to apprehension about making a presentation in a studio before cameras, but this apprehension can be overcome if faculty receive proper orientation.

Continuity in developing distance learning programs was another issue discussed. Participants agreed that continuity is important and that faculty at the distance teaching sites as well as those broadcasting should meet on a periodic basis to review program goals and objectives.

The WAMI (Washington, Alaska, Montana, Idaho) program, which was conducted at the University of Washington in Seattle, was discussed as an example to illustrate the effectiveness of two-way interactive video programs via satellite. This program measured students' performance and found that no real difference could be detected between the amount of learning that

occurred in the classroom at the home center in Seattle and that which occurred in the video teaching centers in Alaska, Idaho, and Montana.

There was much debate regarding the cost of distance learning initiatives. A participant from Kenya indicated that while distance learning might be very useful, most institutions in developing countries would require donor support. The participant expressed fear that if donor support were to be withdrawn, there is little likelihood in her country that the government would continue to support the program. It was generally agreed that JHPIEGO should consider use of lower cost approaches such as audio or radio links and correspondence courses. However, utilization of television linkage on a selective basis to spur special program initiatives could be considered. Extensive use of live television, though, would probably not be cost-effective.

The cost of equipment for distance learning programs was also addressed. A participant from Newfoundland noted that their experience has been that relatively inexpensive audio units (\$1,000 per unit) have been used for over 15 years in the north of Canada with very good results, and he suggested that because of the durability of this equipment and its low cost, it might be suitable for some of the major cities in developing countries. Prior to the provision of any equipment in developing countries, the issue of repair and maintenance must be addressed.

In summary, there was general feeling that carefully phased adoption of selected distance learning approaches might help some less developed countries to bridge the gap between themselves and their more developed country counterparts. Effective use of these new approaches in education will require careful delineation of goals and objectives; care and planning in developing each educational module; and follow-up, evaluation, and modification.

**CONFERENCE SUMMARY
&
LIST OF PARTICIPANTS**

CONFERENCE SUMMARY

Multiple issues in reproductive health, including evolving technology in fertility management, AIDS, and new types of educational approaches were addressed during the meeting "Reproductive Health Education and Technology: Issues and Future Directions." The following is a summary of the major points expressed during the meeting:

Contraception

Both new and existing contraceptives must be evaluated and utilized from the standpoint of the benefit/risk ratio of the particular population served. Risks encountered in developed countries may not be significant in developing countries. The risk of pregnancy may far outweigh the potential health risks of contraception in many settings.

Strategies for Reaching High-Risk Groups

Risk factors that affect maternal and child health can be readily identified for each country. However, effective strategies to modify risks have not fully evolved in many countries. The role of the community in referrals to health care workers, in health education, and in sensitizing leaders to the problems should not be underestimated. Innovative programs, which involve the community, for example, to prevent pregnancy in young women have shown some positive outcomes. Education of health care workers to overcome their biases may be of importance in effectively developing programs to manage or reduce risk factors.

AIDS and Other Sexually Transmitted Diseases

Acquired Immune Deficiency Syndrome (AIDS) is a major health problem of potentially pandemic proportions. Although it is not totally clear what the overall strategy should be to combat this disorder, family planning and reproductive health organizations may be the health care groups best equipped to mount educational programs and preventive health efforts. Sexually transmitted diseases also represent a major contributor to morbidity and mortality; the diagnosis and management of the more common diseases by maternal and child health or family planning health care workers may have a significant impact on disorders such as pelvic inflammatory disease, infertility, ectopic pregnancy, and prematurity.

New Educational Media

Educational technology, such as computer-assisted learning and interactive videodisc approaches, is developing rapidly. Careful, phased adaptation of selected approaches may allow some developing countries to bridge the gap between themselves and the more developed countries. Effective use of these new approaches in education requires careful delineation of goals and objectives, care and planning in developing each educational module, and follow-up, evaluation, and modification; these steps should be included in all educational efforts.

Primary Health Care

Some basic principles of primary health care include concentrating efforts on preventive rather than curative medicine and placing the emphasis of the program on the community rather than on traditional health care facilities. To apply these principles on a widespread basis will require radical alterations in the curricula of most health care training institutions as well as significant changes to systems of health care delivery.

Mobilizing Support for Curriculum Change

A major prerequisite of upgrading the curriculum in educational institutions is to convince decision-makers of the need for change. Decision-makers are a large constituency that includes community and national leaders, academicians, politicians, as well as health care professionals. Indigenous research that demonstrates the need for change is crucial. Unfortunately, many countries lack a core of professionals who know how to assemble data, convince decision-makers, and implement change. Often there is too much attention paid to changing the structure or framework of curricula while significant changes should involve mostly the content. Even if curricular change occurs and new concepts and skills are taught, it is imperative that the health care delivery system be altered enough so that the newly acquired skills can be applied in the clinical setting.

Reproductive Health in Nursing Education

The need for well-trained nurses is expanding worldwide. Nurse training is usually substantially more community-based than that of physicians. Many countries are expanding the clinical roles of nurses, particularly to render reproductive health care. Curriculum revision for nurses and paraprofessionals may require broad-based interdisciplinary teams to develop the goals and objectives of their role in health care systems. Many educational institutions face significant obstacles, such as funding shortfalls and lack of adequately trained tutors. Many nurses, despite being well trained and motivated for community-based services, can find employment only in hospital-based settings. Therefore, any changes in education directed towards expansion of nursing roles will need to address these and other issues.

International Guidelines for Reproductive Health

International guidelines and certification in the field of reproductive health pose many complex issues. The definition of reproductive health varies, there are substantial differences in clinical practice between countries, there is often political sensitivity to many reproductive health issues, there are differences in availability of resources, and the reproductive health technology is constantly changing. Although broad, flexible guidelines for reproductive health practice could be developed on an international basis, the process of international certification would be difficult and lengthy. Given the magnitude of other reproductive health issues and problems, development of international guidelines and certification is not currently of high priority.

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JHPIEGO

The Johns Hopkins Program for International Education in Gynecology and Obstetrics is a nonprofit corporation affiliated with the Johns Hopkins University located in Baltimore, Maryland. Established in 1974, major funding for JHPIEGO programs comes from the Agency for International Development. JHPIEGO is concerned with reproductive health. Reproductive health means that families have healthy children, they have the number of children they want at safe intervals, and mothers complete their childbearing years in good health, able to care for their families. JHPIEGO programs aim to lower reproductive mortality and morbidity in developing countries through expanding the number of health professionals equipped with medical and management skills in reproductive health, particularly family planning. The major goals of JHPIEGO are to update the knowledge, skills, and technology of obstetricians, gynecologists, nurses, and other qualified health professionals in the developing world in reproductive health and to encourage the integration of these methods into the daily practice of these various medical professionals. Another important objective is to make well-demonstrated reproductive health technology available to medical schools and other institutions in the developing world. JHPIEGO programs aim to institutionalize the teaching of reproductive health in medical and nursing school curricula, increase the ability of faculty to deliver sound reproductive health courses, provide pre-service training in reproductive health in medical and nursing schools, and train physicians and nursing personnel in reproductive health with an emphasis on building clinical skills to increase service delivery.

Since 1974, more than 50,000 physicians, nurses, administrators, and medical and nursing students from 122 countries representing more than 5,500 institutions and over 350 medical schools have been reached by JHPIEGO supported programs.

JHPIEGO is ready and willing to respond to any request for training and assistance with curriculum development which may assist in the improvement of reproductive health care.

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