Family Planning and Maternal and Child Health

Jae Mo Yang

Department of Preventive Medicine & Public Health
Yonsei University College of Medicine, Seoul, Korea
(Received for Publication: 15, Aug. 1970)

I. INTRODUCTION

Family planning or planned parenthood is the reproductive behavior of individual couples so planned that every pregnancy and childbirth is wanted. It involves three problems: the spacing of children, the number of children, and the quality of health. The ultimate purpose of family planning is the betterment of family life.

Maternal and child health is concerned with the third family planning problem, that of the health of both parent and children, but its ultimate purpose is so closely related to family planning that the two fields can not be thought separate. The issue then, is not why but how to integrate them. This paper is thus intended to review what is known about the maternal and child health aspects of family planning and to offer proposals on the integration of these two services.

II. MATERNAL AND CHILD HEALTH ASPECTS OF FAMILY PLANNING

Most family planning programs in developing countries advocate late marriage, proper spacing, and termination of childbearing at about the age of 30–34, all of which are intended to lead to a smaller family-size pattern. Such a practice would not only provide a greater chance of fulfilling parental responsibility but would also have tremendous impact on the reduction of maternal mortality, fetal loss, and infant mortality.

Such an impact could be more apparent when the program is directed to special poverty stricken groups and toward prevention of birth of out-of-wedlock children.

Extensive family planning programs in developing countries have unprecedentedly increased, through screening and follow-up services, the number of women exposed to health examinations particularly for gynecological abnormalities. The reports and data to support the above generalizations are as follows:

A. Maternal Health:

1. Generally the risk of childbearing becomes greater as maternal age decreases below 20, or increases beyond 30 years (Perkin, 1968).

2. Increased puerperal mortality and morbidity rates have long been known to result from repeated pregnancies (Yerushalmy, et al. 1940). In 1960, puerperal deaths were 22.7 per 100,000 live births for women under 20 years, 20.7, 29.8, 50.3, 92.8 and 138.7 for women is successively older 5-year cohorts, and 289.5 for those 45 years and older (Vital Statistics 1960).

3. Wright reports that in 1962–63 in Ceylon, pregnancies among women age 35–39, 40–44 and 45–49 carried risks of dying that exceeded the mean maternal risks by factors of 1.5, 2.0 and 3.3 respectively (Wright 1968). Wo-
men thirty-five years of age and over accounted for 16 per cent of all births and 26 per cent of all maternal deaths in Ceylon.

4. Perkin reports that in Thailand in 1963, women aged 30 and over accounted for over 42 per cent of total births and 57 per cent of all reported maternal deaths. Without the pregnancies of women 35 years of age and over, there would have been 22 per cent fewer births and 38 per cent fewer maternal deaths (Perkin 1969).

5. The above mentioned reports indicate that fewer births in the over 35 age group would have had, a material effect on maternal mortality. In the judgement of obstetric authorities, this relationship results not merely from advancing age, but from multiparity as well. “These two factors, advanced age and advanced parity (number of previous births) may occasionally act independently of each other to increase the risk of childbearing but usually their effects are additive” (Eastman and Hellman 1964, p. 4).

6. The persistence to this day of these relationships is demonstrated by the following table, drawn from an analysis of nearly 350,000 births prepared especially by the Obstetrical Statistical Co-operative for this report. (Table 1)

7. The somatic consequences of repeated pregnancies may also be exemplified by the clear association between the incidence of cancer of the cervix and high parity due to repeated injuries to the cervix during child-birth which may contribute to the development of malignant tumors and, thus, to a higher mortality rate (Peller 1952).

8. Older mothers also experience more obstetrical complications. Data from Women’s Hospital in Bangkok, Thiland (Table 2) show clearly the increase in complicated deliveries with advancing maternal age (Perkin 1969). Complicated deliveries rose from 11.2 per cent for women age 20~24 to 19.9 per cent for women age 35~39, a 77 per cent increase.

Table 1. Maternal Deaths by Age and Parity in 348,393 Live Births, 1951~1961

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Deaths/10,000 births</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 20</td>
<td>5.1</td>
</tr>
<tr>
<td>20~29</td>
<td>6.6</td>
</tr>
<tr>
<td>30~39</td>
<td>13.8</td>
</tr>
<tr>
<td>40 and over</td>
<td>34.3</td>
</tr>
<tr>
<td>All mothers</td>
<td>8.7</td>
</tr>
</tbody>
</table>

(No previous births: 4.4, 1~3 previous births: 5.2, 4 and more: 13.2)

(Source: Obstetrical Statistical Co-operative)

Table 2. Complicated Deliveries* by Age of Mother Women’s Hospital, Bankgkok, Thailand, 1964

<table>
<thead>
<tr>
<th>Maternal age</th>
<th>Deliveries</th>
<th>Complicated Deliveries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per cent</td>
</tr>
<tr>
<td>15~19</td>
<td>1,521</td>
<td>203</td>
</tr>
<tr>
<td>20~24</td>
<td>6,198</td>
<td>693</td>
</tr>
<tr>
<td>25~29</td>
<td>5,956</td>
<td>832</td>
</tr>
<tr>
<td>30~34</td>
<td>2,835</td>
<td>445</td>
</tr>
<tr>
<td>35~39</td>
<td>1,294</td>
<td>257</td>
</tr>
<tr>
<td>40~44</td>
<td>444</td>
<td>104</td>
</tr>
<tr>
<td>45~49</td>
<td>47</td>
<td>10</td>
</tr>
</tbody>
</table>

(No previous births: 15.2, 1~3 previous births: 15.7, 4 and more: 19.9)

* Includes placenta praevia, antepartum hemorrhage, postpartum hemorrhage, dystocia, abnormal presentation, fetal distress, toxemia. (Source: Perkin)

9. Fear of an unwanted pregnancy may become an important pathological focus in the
marital relationship. "This fear may be intensified in a woman who already has several children, and who regards the advent of another child as a calamity, since she feels that her total energies are involved in taking care of her present family. This pregnancy, therefore, looms as a threat of physical break down to her, and hence, a threat to the security of her entire family as well." (Laidlaw 1960)

10. The high incidence of abortion (Gehhard, et al. 1958; Calderone 1958; Hong 1966) may be taken as indicative of the wide-spread rejection of pregnancy-and of the widely prevalent anxiety over becoming pregnant. The increased risk to maternal health-somatic and emotional- associated with illegal abortion is likewise apparent. It is significant that the pattern of abortion per 100 pregnancies increases with increasing age and parity (United Nations 1954; Hong 1966).

11. The calculation of deaths following abortion in New York City from 1945 to 1961 shown increases both in absolute numbers and as a percentage of puerperal deaths (Janovski, et al. 1963).

12. Hong reports that 36 per cent of respondents experienced some discomfort or complaint following their induced abortion, in 16% one complaint, 10% two complaints, and the remaining 10% three or more complaints: and that the incidence of complication increased with higher pregnancy order, advancing age of wife, and longer duration of the pregnancy (Hong 1966).

13. Deferment or avoidance of pregnancy has long been advised in the presence of specific disease entities which would be further aggravated by pregnancy.

An incomplete list, as defined by various authorities (Greenhill 1954; Jeffcoate 1957; MacLeod 1955 and Howkins 1956, among many others) includes the following: (Source: Jaffe and Polgar 1967)

Cancer
Cardio-vascular-renal disease
Chronic pyelitis
Diabetes mellitus
Epilepsy
Grave degree of anemia
Hemolytic disease (Rh incompatibility, etc.)
Hypertension
Multiple sclerosis and other neurological conditions

Jae Mo Yang

Table 3. Induced Abortions per 100 Completed Pregnancies in Specified Five Year Time Intervals, by Age Group of Women in Years Indicated in Seoul, Korea

<table>
<thead>
<tr>
<th>Age Group</th>
<th>1940~44</th>
<th>1944~49</th>
<th>1950~54</th>
<th>1955~59</th>
<th>1960~64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 20</td>
<td>0.0</td>
<td>0.0</td>
<td>2.1</td>
<td>6.3</td>
<td>b</td>
</tr>
<tr>
<td>20~24</td>
<td>0.2</td>
<td>0.6</td>
<td>2.1</td>
<td>3.8</td>
<td>8.1</td>
</tr>
<tr>
<td>25~29</td>
<td>a</td>
<td>1.6</td>
<td>2.7</td>
<td>2.4</td>
<td>17.9</td>
</tr>
<tr>
<td>30~34</td>
<td>a</td>
<td>a</td>
<td>6.1</td>
<td>14.4</td>
<td>38.6</td>
</tr>
<tr>
<td>35~39</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>24.1</td>
<td>58.0</td>
</tr>
<tr>
<td>40~44</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>50.0</td>
</tr>
</tbody>
</table>

a) Past the reproductive age in 1964 and therefore not represented in the survey.
b) Too young for representation in the survey. (Source: Hong)

Table 4. Number and Per cent of Women with Induced Abortion by Parity in Seoul, Korea

<table>
<thead>
<tr>
<th>Parity</th>
<th>Number of Women Interviewed</th>
<th>No. of Women with Induced Abortion</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>182</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>424</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>493</td>
<td>26</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>514</td>
<td>58</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>457</td>
<td>101</td>
<td>22</td>
</tr>
<tr>
<td>6</td>
<td>363</td>
<td>118</td>
<td>33</td>
</tr>
<tr>
<td>7 or more</td>
<td>265</td>
<td>132</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>3,204</td>
<td>743</td>
<td>25</td>
</tr>
</tbody>
</table>

(Source: Hong)
Family Planning and Maternal and Child Health

Nephritis
Obstetrical injuries (e.g., repeated caesarian section, vesico-vaginal fistula, previous operation for prolapse)
Parkinson’s disease
Psychoses and neuroses
Pseudo-hypertropic muscular dystrophy
Recurrent abortion
Repeated toxemias of pregnancy
Rheumatic heart disease
Syphilis

In clinical practice, pregnancy has also been contra-indicated for a period of time after an operation or debilitating illness of any kind. The present development of medicine allows for a successful completion of a desired pregnancy for women with many of these conditions when optimal medical and home care are provided. But the large proportion of women who cannot expect optimal care or who, prefer not to take the risks, should certainly be given the oppor tunity to secure contraceptive therapy.

B. Fetal and Infant Health:

The risk of stillbirths, neonatal and post-neonatal mortality also increases with both advancing maternal age and increasing parity as shown by the following reports:

1. According to the reports of the U.S.A. Department of Health, Education and Welfare the fetal mortality is high for primiparous, lowest with the second birth and rises again sharply beginning with third birth. A sixth or subsequent child faces almost three times the risk of stillbirth of a second child, and twice the risk of a first. Within each five-year maternal age group, the same trend is revealed, namely, the fetal death rate is lower for the second born within each age group and increases progressively thereafter. (Table 5)

2. Perkin also reports that the frequency of

<table>
<thead>
<tr>
<th>Maternal Age (Years)</th>
<th>Births</th>
<th>Stillbirth Number</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 20</td>
<td>2,295</td>
<td>27</td>
<td>1.2</td>
</tr>
<tr>
<td>20-29</td>
<td>13,179</td>
<td>137</td>
<td>1.0</td>
</tr>
<tr>
<td>30-34</td>
<td>3,626</td>
<td>66</td>
<td>1.7</td>
</tr>
<tr>
<td>35 and over</td>
<td>1,990</td>
<td>66</td>
<td>3.3</td>
</tr>
</tbody>
</table>

(Source: Perkin)

Table 5. Fetal Mortality by Birth Order-Average Ratio Per 1,000 Live Births For 1956, 1958 and 1961.

Table 6. Maternal Age, Parity and Stillbirths, Women’s Hospital, Bangkok, Thailand, 1967

Table 7. Rate of Stillbirths Per 1,000 Births by Maternal Age and Parity: Data Are Based on the 1956 Vital Statistics in Japan

3. Potter, et al., (1965) in their study of fetal wastage in the Punjab, documented a
highly significant correlation between increasing fetal death rates and increasing order of pregnancy.

4. According to Matsunaga’s report (1969), the rate of stillbirths per 1,000 births in 1966 was lowest (20) at maternal age 25–29 and parity two, and highest (114) at age 25–29 and parity seven. (Table 7)

5. The report of the Obstetrical Statistical Co-operative (1961), based on 65,885 discharges at 16 hospitals in the U.S.A. reveals a similar positive relationship between birth order and perinatal (fetal and neonatal) mortality. Among white women, perinatal mortality hovered around 2.6% for first through fourth births, then jumped to 3.8 for fifth births, 4.7% for sixth and 5.6% for seventh births. Among non-white women, the trend was similar, but the rates were uniformly almost double those among whites (Jaffe and Polgar 1967).

6. The comprehensive investigations of Heady and Morris (1959) in Britain included almost 1,500,000 births and fetal deaths registered in 1949 and 1950, and all deaths of infants born in those years. According to their report, “the stillbirth rate... was high in primiparae, low in mothers of second and third children and rose again with greater parities.” The post-neonatal mortality rate (deaths at 4 weeks to 1 year) was similar among first and second born, but rose with maternal parity: it was high in children born to young mothers, particularly those with large families for their age. The pattern of neonatal mortality “resembled that of stillbirth in that there were high rate for the children of ‘elderly primiparae’ and of ‘grand multiparae’.” In reviewing these findings, Tietze (1963) concludes that effective fertility control tends to reduce mortality by reducing neonatal and post-neonatal mortality among children of young mothers, and stillbirth and neonatal mortality through lowering the incidence of grand multiparity.

7. A study of infant deaths in a Korean rural area confirmed a relationship between increasing parity and more infant deaths. Infant mortality rates increased from 68 for second births to 79 for fifth births, and to 186 for ninth order births (Park 1962).

8. Eighteen years ago, the New York Academy of Medicine reached the conclusion that child-spacing should be recognized as a medical indication for contraception (New York Academy of Medicine 1946). In clinical practice, the interval between births consistently been regarded as critically important to the health and wellbeing of both mother and child. This is made clear in many obstetrical and gynecological texts: a typical statement is that of Jeffcoate (1957): “If a woman has too many children too frequently, she has no time to recover from one before she is faced with the next.”

9. Classic papers by Eastman (1944) and Yeruschalm (1945) have shown that stillbirth rates are higher when the interval between a birth and a subsequent conception is relatively short, irrespective of the parity or the age of the mother.

10. More recently, these relationships have been investigated by the British Medical Research Council, London Hospital. Risks for neonatal and post-neonatal mortality and for prematurity are particularly high for young mothers with large families for their age - i.e. those who started child-bearing early and had several pregnancies in rapid succession, one after another (Heady and Morris 1955).

11. These observations are supported by a study in Philadelphia (Bishop 1964) based on 16,000 consecutive deliveries. The incidence of premature births there were found to increase significantly when the interval between pregnancies was less than one year, as the following
Family Planning and Maternal and Child Health

Table 8. Relationship of Prematurity to Period Since Previous Pregnancy

<table>
<thead>
<tr>
<th>Interval</th>
<th>% Premature Births</th>
</tr>
</thead>
<tbody>
<tr>
<td>No previous pregnancy</td>
<td>11.4</td>
</tr>
<tr>
<td>More than 23 months</td>
<td>7.8</td>
</tr>
<tr>
<td>12~23 months</td>
<td>10.3</td>
</tr>
<tr>
<td>Less than 12 months</td>
<td>18.0</td>
</tr>
</tbody>
</table>

The table makes clear,

12. Illsley (1967) reports that either parity or maternal age have been found to be associated with higher risks of anencephaly, hydrocephaly, spina bifida and deformed births in general, in a number of separate investigations.

13. Impairments in the mother-child relationship, with subsequent emotional pathology, have been related to the rejection of the child whose conception was unwanted (Menninger 1943), and, in particular, to the consequences of attempted abortion (Caplan 1954). The association of behaviour disorders with excess fertility is indicated by the finding that significantly higher proportions of delinquents came from crowded homes than did non-delinquents matched by age, intelligence, ethnic origin, and residence in underprivileged neighbourhoods (Glueck and Glueck 1950).

14. It is well known that certain types of chromosome aberrations, such as G trisomy, XXY and XXX occur in strong association with maternal age. Matsunaga (1969) summarized some comparative data in England and Wales and in Japan, in order to show to what extent the incidence of trisomics must have been reduced during the period of from 1939 to 1964 owing to the concentration of childbearing in young ages of 20 to 29 and a rapid transition to a family pattern with one or two children in Japan (Table 9). “The reduction value for Down’s syndrome amounts to 48% in Japan and 27% in England and Wales. Considering that similar reductions must have taken place also for trisomics for D, E and other groups that are frequently responsible for early fetal deaths (WHO, 1966), it is clear that the magnitude of the overall gains is appreciable in these countries.” “In addition, evidence has been accumulating indicating positive correlation with paternal age for certain gene mutations leading to such anomalies as achondroplasia, acrocephalosyndactyly, hemophilia, myositis ossificans and bilateral retinoblastoma. In some of these conditions, the risk of fathers older than 40 years appears to be about ten times as high as that of young fathers (Lenz, 1968).”

Table 9. Relative Decrease in the Incidence of Trisomics Due to Concentration of Childbearing in Young Ages in Britain and Japan: British Data Are Based on Richards, 1967

<table>
<thead>
<tr>
<th>Maternal Age</th>
<th>Per cent of parturient mothers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>England and Wales</td>
</tr>
<tr>
<td></td>
<td>1939</td>
</tr>
<tr>
<td>under 19</td>
<td>4.8</td>
</tr>
<tr>
<td>20~29</td>
<td>54.9</td>
</tr>
<tr>
<td>30~34</td>
<td>23.4</td>
</tr>
<tr>
<td>35~39</td>
<td>12.7</td>
</tr>
<tr>
<td>40 and over</td>
<td>4.4</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
</tr>
<tr>
<td>Mean age</td>
<td>29.2</td>
</tr>
</tbody>
</table>

Expectations of Relative Incidence

| Down’s syndrome | 100 | 78.4 | 100 | 62.4 |
| XXY and XXX     | 100 | 83.2 | 100 | 54.8 |

(Source: Matsunaga)

C. Socio-economic Characteristics:

It was for the poor women that Margaret Sanger, the pioneer of the family planning movement, founder of the IPPF, and who coined the word of “Birth Control” established the
first birth control clinic in New York City in 1912.

Nowadays, family planning is a basic human right, every individual and couple being entitled to such services. However, in many countries, the programs supported by public funds tend to pay special attention to those poor and young women who give birth out-of-wedlock children.

Such a priority given to a target population with special socio-economic characteristics is well justified by the following reports:

1. “Since every index of maternal and infant mortality and morbidity reveals strikingly higher rates among the poor, the medical reasons for fertility control are even more compelling for these families than for the population at large.” (Jaffe and Polgar, 1969)

2. The Expert Committee on Maternal and Child Health of the WHO (1961) has emphasized the interaction between poverty and unfavorable factors in pregnancy: “The poorly nourished woman is often the one who gets or seeks little care during her pregnancy, lives in poor circumstances, is badly housed, ignores of impending obstetrical difficulties, has had many previous and closely spaced pregnancies, has many family problems, knows little of simple sanitation and hygiene, and is in general ignorant or poorly motivated to care for herself.”

3. Lesser (1963) cites a series of studies showing that prematurity rates in Philadelphia, New York and Chicago are two to three times higher in groups with poor or no prenatal care than in groups with adequate prenatal care.

4. Armijo and Monreal (1964) who made an epidemiological study on provoked abortion in Santiago, Chile, concluded “Economic reasons and ignorance of birth control methods appear to be the basic explanations for the alarming upward trend of provoked abortion.”

5. Strikingly high rates of prematurity are also related to decreased levels of maternal hemoglobin, which is more prevalent among poor families with inadequate nutrition (Bishop 1964).

6. To state the obvious, poor mothers are also sick more often with more predisposing conditions than mothers in higher income brackets. “They have a high incidence of anemia, malnutrition, chronic vascular disease, toxemia, contracted pelvis, premature labour and other problems.” (Thompson 1963)

7. On virtually every available measure of maternal and infant mortality and morbidity, the unmarried mother and her child face “significantly higher health risks than the married mother and her child.” (Pakter, et al. 1961 b). Their analysis of out-of wedlock birth in New York City from 1955 to 1959 reveals mortality and morbidity ratios ranging as much as 9 times above the rates for legitimate births. As has been demonstrated in other studies, one of the significant factors implicated in these differentials is the relative lack of adequate timely prenatal care for the unmarried mother.

8. Similar findings are reported by the North Carolina State Board of Health (Donnelly 1962). During the period from 1957 to 1961, maternal mortality rates there were twice as high for the unmarried (10.6/10,000 live births) than for the married (5.0), while infant death rates for the unmarried (55.3/1,000 live births) were also twice as for the married (28.8).

III. INTEGRATION OF M.C.H. AND FAMILY PLANNING PROGRAMS

Wallace, et al (1968) reports that “There are sound medical and health reasons to look upon family planning as an integral part of comprehensive maternal health care. To establish fam-

--- 73 ---
Family Planning and Maternal and Child Health

ily planning separate from maternal health may result in separating it from its appropriate medical base and from the necessary medical supervision and care."

Such a statement is pertinent in countries where the concept and programs for maternal and child health are already well established and the family planning programs is to be introduced where is not a kind of crash program.

Unfortunately, in most developing countries where population pressure is already serious and does not allow much preparatory time, the M.C.H. program has yet to develop. Though a M.C.H. program is most attractive to public health personnel, it is least attractive to most government leaders responsible for budget allocations in developing countries.

Because the family planning program is recently well supported by both the public and majority of governament, except those area where mortality rate particularly that of infant is still considerably high, we have proposed that the national family planning program be used as a strategic platform for the improvement of maternal and child health (Yang, et al. 1986).

We project that, because of an active national program, eventually all women of childbearing age in Korea will have contact with professional F.P. Workers, and more than one-third of them will have the privilege of free gynecological examinations by qualified doctors within the next few years. The program also provides free treatment for any complication following insertion of an IUD, which includes giving of iron compounds for the treatment of anemia and the provision of antibiotics in treating PID.

Therefore, we would rather look upon M.C.H. as an integral part of comprehensive family planning, and are trying to find the best method of integrating and developing the M.C.H. program under a well established F.P. program. Rosa’s (1967) paper on the “Impact of New Family Planning Approaches on Rural Maternal and Child Health Coverage in Developing Countries: India’s Example” concludes as follows:

“...To date, maternal and child health services in newly developing countries have been covering only a small segment of the population. The high priority of family planning in the economic advancement of these countries, and the development of practical family planning methods which are best approached from the maternal and child health framework, promise to change this. Although the initial pressure adds to the problems of MCH coverage, the additional demand and support will eventually greatly strengthen the work. This MCH coverage is the vanguard of rural health communication and services.”

Wallace, et al. (1968) described, efficient utilization of limited available funds and trained personnel as the administrative advantages of the common nature of the target population and ultimate goals as technical advantages in personal health services. But they also recognized the advantages of provision of F.P. services separate from M.C.H. services. “...Some countries and communities with no or inadequate M.C.H. services undoubtedly have felt that there were urgent economic and political needs for a population control program, and that they could not wait to develop family planning until M.C.H. services were sufficiently expanded and improved.”

In some countries, where political objections to a F.P. program on religious grounds are strong, development under the umbrella of a M.C.H. program is preferable.

One word of caution is necessary against hurried and impatient integration of the two programs which might destroy one that is satisfactorily progressing. We must understand that
building up capable personnel and a good program requires time and that changing horses too frequently may result in waste which can be ill-afforded.

And we also must understand that one well developed program automatically improve the other of the two programs.

REFERENCES


Caplan, Gerald: The disturbance of the mother-child relationship by unsuccessful attempts at abortion. Mental Hygiene, 38, 1(Jan.): 67-80, 1954.

Data provided through the courtesy of Dr. Siripath Watthanakasert, Women’s and Children’s Hospital, Bangkok, Thiland.

Donnelly, James: Personal communication, North Carolina State Board of Health(October 11), 1962.


Family Planning and Maternal and Child Health


Tietze, Christopher: Medical Effects of Human Reproductive Control, paper presented at American Association for the Advancement of Science, Cleveland, December, 1963.


