

CHAPTER

1

The Epidemiologic Foundations of Abortion Practice

Of The Signs of Conception (From Book I, Chapter III, of Des Maladies Des Femmes Grosses Et Accouchées by Francis Mauriceau, Paris, 1668)

"I will not trouble myself to make a recital of a great number of signs of conception . . . , but only the most essential and ordinary, by which a Chirurgion may be assured of it; of which some may be presently perceived, others not till afterwards. . . .

'She may know whether she retains the Seeds, if she perceives nothing flow down from the womb after Copulation: The Woman some few months after perceives also some small pain about her Navel, and some little commotions in the bottom of her Belly, caused by the womb's closing itself to retain the Seeds . . . the light pain of the Navel comes from the Blader [sic] of the Urine . . . which is a little agitated. . . .

'These are the signs of Conceptions. . . . Besides these signs, there are others which cannot be known till some time after, as when the Woman begins to have loathings, having no other Distemper, loseth her appetite to meats which she did love: longs to eate [sic] strange things, to which she was not accustomed, which happens according to the quality of the humors predominating in her, and with which she abounds: She hath often nauseatings and vomitings, which continue a long time: The Tearms [sic] stopping, no other cause appearing, having always been in good order; her Breasts swell, wax hard, and cause pain, from the flowing of the blood and humours to them, wanting their ordinary evacuation . . . the Navel starts, her Nipples are very obscure or dark colored, with a yellow livid circle round about: her Eyes are dejected and hollow, the whites of them dull and

2 The Epidemiologic Foundations of Abortion Practice

troubled: her blood when she hath conceived some time, is always bad, because of the superfluties of it not being purged, as accustomed, is altered and corrupted by their mixture.

'All these signs concurring in Woman who hath used copulation, or the most part of them together and successively, according to their seasons; we may pass judgment, that she hath conceived, notwithstanding that many of them may happen upon the suppression of the terms, which usually produce the like.'

(Translation by Hugh Chamberlen, M.D., 1673)

A subject as controversial as abortion invites both confusion and narrow partisanship among medical practitioners and in the public at large. Sometimes the debate centers on whether abortions should be performed or whether women should seek them; sometimes it focuses on the circumstances under which abortions should be performed. Doctors conduct intense debates on the techniques of abortion and the qualifications of those who perform them. It is sometimes difficult to capture a broad view of the problem in any philosophical, historical, or medical sense. However, abortion is a subject that has concerned human beings for thousands of years and appears to become more complex each day.

It may be helpful to remember that pregnancy, first of all, is a biologic event happening to an individual woman; that induced abortion, or operative abortion, is a medical/surgical event happening to an individual woman at her initiative; that it is possible only in the presence of an intrauterine pregnancy occurring in an individual woman; and that pregnancy is a biologic condition with a risk of death. It is true that pregnancy and abortion may have certain philosophical, moral, emotional, or social consequences and that the practice of abortion has an identifiable history in human affairs. All of these are valid and important subjects, and anyone who purports to provide abortion services should be aware of them.

The emphasis in this book, however, is on the medical and public health aspects of abortion; it is also on the care of the individual patient.

The context of abortion practice, while it may occur with a backdrop of social and political controversy, is eminently medical. It is medical because women can die from pregnancy, and it is medical because they can die from abortion. The context is epidemiologic, also, because pregnancy is a community as well as an individual phenomenon; so is abortion. Pregnancy as a condition being experienced by individuals can directly affect half the human species, women, and it indirectly affects the rest. Not all women become pregnant, but most are susceptible to pregnancy. Women who are in the reproductive ages (generally regarded as ages

15–45, inclusive) comprise the population at risk. This includes those who have only sporadic sexual activity.

Susceptibility and *risk* are examples of epidemiologic terms. *Epidemiology* may be defined as the study of the distribution and determinants of health and illness in the human community. Population epidemiology relates the effects of fertility on the distribution and determinants of health and illness, and *vice versa*.¹ The study of the health effects of pregnancy and abortion is within the province of population epidemiology.

From an epidemiologic point of view, we may say that a woman who is *fecund* (capable of becoming pregnant) and who engages in coitus with a fertile man at the time of maximum susceptibility (shortly after ovulation) is “exposed to the risk” of pregnancy. Looking at the community in general, the women in the reproductive ages who are fecund and exposed to the risk of pregnancy constitute a population at risk in the same way that, for example, a group of people who have not been vaccinated against smallpox constitute a population at risk for smallpox.

Among the population at risk, we can describe an *incidence* of pregnancy (the number of new “cases”) and the *prevalence* of pregnancy (the number of cases at any particular time). A case-finding technique for pregnancy can include a urine screening test or pelvic examination just as we might give someone a tuberculin skin test or take a chest radiograph for tuberculosis. A screening examination may lead to a diagnosis of pregnancy. In fact, pregnancy may have certain signs and symptoms, just as do mumps and measles. Laboratory studies can be done that establish the diagnosis of pregnancy and document certain physiological changes that accompany pregnancy. There may be certain complications specifically associated with pregnancy. Many of these can be fatal.

Pregnancy can be prevented by a wide variety of methods of variable effectiveness. However, prevention usually involves health behavior, a kind of behavior described by sociologists that involves anticipation of illness and the search for methods of prevention. Illness behavior, on the other hand, is the result of someone searching for medical or surgical treatment of an existing condition, in this case, pregnancy. Illness behavior includes the request for or acceptance of treatment of the condition.

The treatment of pregnancy can take various forms. The medical management of pregnancy is usually called prenatal care; the physician does not intervene surgically in the pregnancy but monitors certain aspects of the woman’s health, including blood pressure. Surgical intervention may occur early if the woman desires to terminate the pregnancy or if

her life is in immediate danger; it may occur late, as in cesarean section, if the pregnancy is desired. The woman may benefit from or require supportive psychotherapy; for example, she may benefit from problem pregnancy counseling if she has difficulty deciding what to do about the pregnancy, abortion counseling if she wishes to terminate the pregnancy, and psychiatric treatment if she experiences a postpartum psychosis.

If this analysis seems to veer uncomfortably close to suggesting that pregnancy is a kind of illness, it does: Many, if not all, aspects of pregnancy can be understood best in terms of the cognitive framework of illness.² It helps us understand, for example, why women all over the world seek some form of treatment of pregnancy whether they are happily pregnant or not.³⁻⁷ It helps us understand why the Cuna Indians of San Blas Island, the Tikopia of the South Pacific, the inhabitants of Tepoztlán, the Araucanian Indians, and many other tribal peoples regard pregnancy as an illness.⁸⁻¹⁴ The people of Tzintzuntzan, among others in Latin America, say that a woman who is pregnant “*esta enferma*” (is sick) and that when she is delivering her baby she “*se alivia*” (gets well) or (in the Peruvian Amazon Basin) “*esta curando*” (is healing).¹⁵ It helps us understand why Devereux found abortion practiced in 420 societies, leading him to conclude that “abortion is an absolutely universal phenomenon.”^{16, 17} It helps us understand why women will subject themselves to violence in order to interrupt pregnancy, and why this has been observed in many cultures.¹⁸ It helps us understand why Western society has invented an entire medical specialty, obstetrics, devoted to the intensive medical care of women who are pregnant, so as to assure their survival. Modern obstetrics is also concerned with assuring that women with desired pregnancies have healthy babies, but the first emphasis has been on saving the woman’s life and minimizing her impairment from the risks and complications of pregnancy.

Curiously, American obstetrics has held a paradoxical view of pregnancy in spite of this wholehearted and highly successful commitment to saving the lives of pregnant women. In the chapter concerning prenatal care in Eastman and Hellman’s standard textbook, *Williams’ Obstetrics*, the authors wrote

From a biologic point of view pregnancy and labor represent the highest function of the female reproductive system and *a priori* should be considered a normal process. But when we recall the manifold changes which occur in the maternal organism it is apparent that the borderline between health and disease is less distinctly marked during gestation than at other times, and derangement so slight as to be of little consequence under ordinary circumstances may readily be the precursor of pathologic conditions which may seriously threaten the life of the mother or the child or both. *It accordingly becomes necessary to keep pregnant patients under strict supervision and to be constantly*

on the alert for the appearance of untoward symptoms [emphasis supplied]. . . . It is in the prevention of such calamities [as eclampsia and dystocia] that care and supervision of the pregnant woman has been found to be of such value. *Indeed, antepartum care is an absolute necessity if a substantial number of women are to avoid disaster; and it is helpful to all* [emphasis supplied].¹⁹

The authors then describe in detail a very sound regimen of antepartum care. The implications of this passage are clear: Pregnancy is normal—the “highest function” of a woman’s reproductive system. Ergo, that highest function is not reached while a woman remains not pregnant. Yet the risks of serious morbidity and mortality are so much increased over the nonpregnant state that constant medical supervision is required when pregnancy occurs, particularly at the extreme ends of the reproductive spectrum.^{19–22} If the risks were not so considerable, there would be no need for medical supervision.

There is a contradiction here: Pregnancy is a process in which the normal (nonpregnant) physiology is markedly altered for a time and a process that carries a significantly higher risk of morbidity and mortality than nonpregnancy. But if nonpregnancy is normal, how is it possible that pregnancy also is normal? Answer: If we say it is normal, it is normal. Of course, Eastman and Hellman are seeking primarily to describe the difference between an uncomplicated (normal) pregnancy and a complicated (abnormal) pregnancy, a highly useful distinction in the context of obstetric practice. However, their highest function argument is extended by others to define a woman as most “normal” when she is pregnant or delivering a baby.

It would appear that part of the reason for the ambivalence about viewing pregnancy as normal and a state that requires constant supervision is that many physicians accept, implicitly or explicitly, the widely shared teleological definition of a woman as essentially a reproductive machine. One physician suggested that *woman* be defined as “a uterus surrounded by a supporting organism and a directing personality.”²³ Adherence to this perspective clearly tends to inhibit critical examination of the corollary assumption that human pregnancy is not only normal but also an especially desirable event from the viewpoint of the woman’s physiological, psychological, and social functioning and that failure (or, worse, refusal) to become or remain pregnant is, therefore, pathologic. In this context, it is not surprising that even the major textbooks of obstetrics pay little or no attention to how a woman feels when she is pregnant, how she feels after an abortion, and whether she regarded her pregnancy as normal or desirable.

Suchman has pointed out that the way an individual perceives his health status may be more predictive of how he behaves in the face

of illness than the actual medical diagnosis.²⁴ However, physicians trained in the Western tradition of medical practice tend to be much more disease oriented than patient oriented. Thus, their definitions of normality and abnormality tend to be stated in terms of the physician's perceptions and cognitive categories rather than those of the patient.²⁵

The institutionalized view of pregnancy as a hypernormal state is perpetuated and enhanced by the linguistic categories of medical education and practice. The typical, routine pregnancy in a young and otherwise healthy woman is called a normal pregnancy unless it is complicated by various problems, such as preeclampsia, hydramnios, threatened abortion, abruptio placentae, hypofibrinogenemia, amniotic fluid embolism, or any one of the other numerous clinical syndromes associated with pregnancy.

"Normality" has always been subject to arbitrary social definition. In fact, anthropologist Ruth Benedict once proposed that normality is culturally defined.²⁶ She gave examples of behavior in Kwakiutl society that, while considered normal in that culture, would be considered unhealthy and delusional to the point of being psychotic in Western society. Anthropologist Margaret Mead later suggested that the question with health is whether it is regarded as an existing average or an ideal or goal to be attained.²⁷ In Western society, it tends to be the latter.

If "normal" health is defined as the existing average, however, it is likely to have a different connotation than if it is regarded as a goal to be attained. For example, if almost every child in the village has such a heavy roundworm burden that his stools look like spaghetti, and the existing average is taken as normal, it is normal for a child to have worms.

Using the same analysis, we can say that it was normal for the Cocos-Keeling Island women and it is normal for Shipibo Indian women to be pregnant for 25% to 30% of their reproductive years (and therefore relatively normal to be pregnant).^{28, 29} By comparison, the average suburban American woman may expect to be pregnant for only 5% of her fertile years. For the American woman, it is quite a bit less normal to be pregnant.

Medical sociologist David Mechanic points out that many diseases are not defined as illness states because they occur so frequently as to be regarded as the common state of humanity.³⁰ Perhaps pregnancy is such a condition, and its ubiquity previously had certain advantages for the human species.

Our culturally defined linguistic categories have accordingly come to shape our perceptions of biologic reality and thereby reinforce patterns with survival value.^{31, 32} There has been some cultural lag, however, with respect to our view of pregnancy. We cling to the outmoded view of pregnancy as women's highest, most normal function, even though

Western medicine has begun treating pregnancy as a specialized kind of illness and various authors have called attention to the pathologic features of pregnancy.³³⁻³⁵ In 1668, Mauriceau referred to it as "a disease of nine months' duration" (*maladie de neuf mois*).³⁶ In any case, its resemblance to other illness states is no stranger to women, and it displays many nonspecific features of illness.

In terms of cultural function, Western society already defines pregnancy as an illness for which it has devised specific treatment programs ranging from medical management in the form of prenatal care to surgical intervention in the forms of abortion and cesarean section. These treatment programs have had positive results, which the patients themselves recognize and seek out whenever they can afford it.

When the specialty of obstetrics began developing in the early part of this century, for example, maternal mortality began a dramatic decline. In 1930, maternity directly or indirectly caused 11% of all deaths in women aged 15 to 45, whereas this proportion had declined to 3% by 1959.³⁷ Part of the decline was related to better living conditions and nutrition. However, a significant part of the decline arose from the increasingly effective medical management of pregnancy, including the prevention and treatment of eclampsia, postpartum hemorrhage, and postpartum infection.^{38, 39} Successful surgical intervention, including cesarean section, in the cases of soft tissue and bony dystocia, also saved many lives. Studies regarding the disadvantages for both mother and offspring when there are short birth intervals have found that these improvements in mortality may also be the consequence of greater practice of fertility control, with resultant smaller completed family size and greater intervals between births.⁴⁰⁻⁴⁸ Indeed, the greater normality of pregnancies in recent years (*i.e.*, fewer complications and risks to the average mother) is certainly to some extent the result of a greater prevalence of normal nonpregnancy.

In the United States, the combination of factors, including longer birth intervals and fewer total pregnancies in the average fecund woman, has resulted in a lowering of the maternal mortality rate from 680 per 100,000 in the early 1920s to the present 11.1 per 100,000 live births.^{49, 50} The risks of serious morbidity and mortality have always been a part of pregnancy and may continue to be for some time, but some authors have contended that mortality rates can be brought still lower.⁵¹⁻⁵³

Clearly, the view that pregnancy is a woman's most normal state has low survival value for the individual in terms of our growing understanding of the risks inherent in pregnancy, and it has a decreasing survival value for the species in the context of rapid population growth. Instead of being adaptive, the view of pregnancy as normal—or, rather,

as a modified state of health—has become maladaptive both for individuals and for the species. Moreover, it does not explain the biologic and social realities that accompany pregnancy.

However, this analysis leaves us with the dilemma of having to cope with varying concepts of what is normal, what is health, what is illness, and what is disease.

In defining health and illness, anthropologist Steven Polgar uses the World Health Organization definition of health as the starting point; that is, not only the absence of disease and symptoms but also the presence of a sense of complete physical, mental, and social well-being.⁵⁴ He goes on to define illness as temporary or permanent impairment of functioning or appearance that need not be restricted to a decrease in the ability to function in ordinary ways. This definition is concerned with the person as a member of a group as well as with his or her biologic function.

Polgar also points out that explanations of illness serve, among other things, to indicate courses of preventive and curative action as well as to explain reality. Defining pregnancy as an illness would appear to be consistent with Polgar's definition.

There may be a difference between the disease entity as diagnosed by the physician, however, and illness as experienced by the person.⁵⁵ As has been noted, health status as perceived by the patient may be more important in determining behavior in the context of illness than the correct medical diagnosis itself.

If the patient who is pregnant perceives herself as ill, for example, this may be much more important in terms of pregnancy outcome than the view of the physician that she is not.⁵⁶ Moreover, Engel points out that the presence of a complaint (*i.e.*, symptoms of pregnancy) must be regarded as presumptive evidence of disease.⁵⁷

The symptomatic aspects of pregnancy, while based on certain physiological changes, are undoubtedly accentuated when the pregnancy is unwanted or when it occurs in the context of disturbed interpersonal relationships or other forms of stress. This has been demonstrated by Grimm, Rosengren, Davids, Poffenberger, and other investigators.⁵⁸⁻⁷⁰ Sontag and others have suggested that this may also have adverse effects on the fetus.⁷¹⁻⁷⁶ There is clearly an interaction between physiological changes, cultural patterns, and psychological stress, and this is particularly true when the pregnancy does not occur under socially approved circumstances. Accordingly, it appears that "unwantedness" may be regarded as a major complication of pregnancy, with surgical intervention in the form of abortion as the indicated treatment rather than medical management, as would be the case with a wanted pregnancy.⁷⁷

In spite of a woman's desire to terminate a pregnancy or a certain physiological basis for a sense of physical illness or discomfort, the

behavior and statements of health professionals often summarize the predominant view that it is not the woman's physical condition or the fact of pregnancy that is the "illness," but her thinking that is "diseased."⁷⁸

Since in Western culture pregnancy has traditionally been defined as normal and the desire to terminate a pregnancy as pathologic, it follows that every woman who wants an abortion must need to have her head examined. That is exactly what happened in the late 1960s, when liberalized abortion laws required psychiatric consultation for women seeking legal abortion.

According to this logic, deviation from the accepted norm of pregnancy, especially once the pregnancy has begun, is *prima facie* evidence of abnormality. Thus, psychoanalyst May Romm once declared that intense conflict about a pregnancy or about giving birth to a child is "psychopathological."⁷⁹ The treatment suggested for women with these allegedly psychopathologic tendencies was, variously, psychotherapy, marriage, offering the baby for adoption, or some combination of these measures.

In fact, a woman seeking an abortion is making a circumstantial self-definition of pregnancy as an illness for which she considers the appropriate treatment to be abortion. In Mechanic's terminology, she is displaying "illness behavior."⁸⁰ Similarly, the woman who perceives the signs and symptoms of a wanted pregnancy may also display illness behavior and seek medical attention in the form of prenatal care.

Newman has described certain kinds of ritualistic and symbolic communications with pregnant women by nonphysicians that imply urgency and danger while calling attention to the status of pregnancy.^{81, 82} These communications, while tacitly or unconsciously recognizing the pregnancy itself as an illness, may be seen as magical attempts to ward off such unhealthy or dangerous patterns of thinking by ritual affirmation of the pregnant status.

In medical practice, pregnancy is treated as a specialized form of illness even though physicians regard it as normal. This may be seen as an example of cognitive dissonance.⁸³

If illness is ordinarily viewed as a departure from the usual state of well-being, it is *a priori*, therefore, not normal.

The basis for these contradictions lies in the medical profession's failure to recognize the biosocial nature of illness and treatment and the role of the patient in their determination.⁸⁴⁻⁸⁸ Recognition of the patient's role in the identification of illness and the choice of treatment invades the realm of professional exclusivity with its attendant prestige and status. This dilemma becomes particularly acute when a pregnant woman defines her own pregnancy as an illness for which she considers the appropriate treatment to be abortion.

Some studies have found that from 750,000 to more than 1 million births annually in the United States are unwanted by one or both parents.⁸⁹ Other studies indicate that reasons for a large proportion of unwanted births are primarily those that may be broadly defined as socioeconomic. Either the additional child results in increased economic hardship for the family unit, or the birth occurs in the context of disturbed social relationships, or there is some variation on this theme.⁹⁰⁻⁹⁷ In addition to a large number of unwanted births, over 1.5 million abortions occur annually in the United States, with 300 abortions per 1000 known pregnancies.^{98,99} A study of motivations for abortion has found that the majority are sought for socioeconomic reasons.¹⁰⁰ Women seeking abortion seldom give the real reason for doing so to investigators studying this issue. The impression from clinical practice is that all but a few women seek abortions for reasons that can be broadly defined as socioeconomic, and many cite strictly economic reasons. Small-scale studies have supported this pattern, but national studies of this issue have not been done.^{96, 97}

It appears that one third of all pregnant American women each year define pregnancy as an illness for which they regard the appropriate treatment to be abortion. The illness is not just biologic but is also social and economic; it is not just social but has a biologic basis in fact.

In view of these facts and analyses, it appears to be helpful to note those features, or parameters, of pregnancy that coincide with our traditional cognitive framework for illness, to see how well it fits. The test of the strength of the hypothesis lies in whether it explains reality and whether it predicts events.

ILLNESS PARAMETERS OF PREGNANCY

The following illness parameters of the condition of pregnancy may be described:

1. *Etiology*
Fertilization and implantation of ovum
2. *Pathogenesis*
Host-parasite relationship
3. *Pathophysiology*
Displacement and compression of abdominal contents
Ureteral dilatation¹⁰¹
Increased venous pressure^{102, 103}
Increased estrogen and progesterone levels¹⁰⁴
Elevated basal metabolism rate¹⁰⁵
Glycosuria¹⁰⁶
Increased aldosterone secretion¹⁰⁷

Sodium and water retention¹⁰⁸⁻¹¹⁰

Decreased CO₂¹¹¹

Hypercoagulability of blood^{112, 113}

Increased blood volume^{114, 115}

Bone marrow hyperplasia¹¹⁶

Increased renal blood flow¹¹⁷

Increased glomerular filtration rate^{118, 119}

Increased hepatic metabolic activity¹²⁰

4. *Clinical manifestations*

Subclinical phase followed by distinct clinical signs and symptoms, which provide the basis for clinical diagnosis. Diagnosis may be also obtained through gross examination of the products of conception.

POSITIVE SIGNS OF PREGNANCY.^{111, 121}

Hearing and counting the fetal heart beat

Perception of active fetal movements by the examiner

Radiologic recognition of the fetal skeleton

Sonographic recognition of the fetal parts

PROBABLE SIGNS OF PREGNANCY.^{111, 121}

Enlargement of the abdomen

Changes in the size, shape, and consistency of the uterus

Changes in the cervix

Braxton Hicks contractions

Ballottement

Outlining the fetus

Positive hormonal test for pregnancy

PRESUMPTIVE SIGNS AND SYMPTOMS OF PREGNANCY.^{111, 121}

Cessation of menses

Changes in the breasts

Nausea and vomiting¹²²

Discoloration of the mucous membranes of the vagina and vulva

Pigmentation of the skin and development of abdominal striae

Urinary disturbances

Fatigue

Perception of fetal movements

OTHER SYMPTOMS OF PREGNANCY.^{111, 121, 123}

Pica^{124, 125}

Increased irritability¹²⁶
 Marked fluctuations in libido¹²⁷
 Leg cramps
 Abdominal pain
 Backache
 Dyspnea

5. *Laboratory findings*

Chorionic gonadotropin present^{128, 129}
 Hyperlipemia¹³⁰
 Decreased serum calcium¹³¹
 Decreased serum iron¹³²
 Decreased hemoglobin¹³³
 Increased iron-binding capacity¹³⁴
 Decreased serum folic acid¹³⁵⁻¹³⁷
 Increased serum copper¹³⁸
 Increased neutrophil alkaline phosphatase^{139, 140}
 Alterations in serum protein pattern; decreased immunoglobulin G^{141, 142}
 Increased fibrinogen levels^{143, 144}
 Positive C-reactive protein¹⁴⁵
 Bacteriuria¹⁴⁶
 Histologic study of the products of conception

6. *Complications*

Both acute and subacute exacerbations specifically associated with conception and pregnancy^{111, 121}
 Diseases of the trophoblast: benign—hydatidiform mole; malignant—chorioadenoma destruens, choriocarcinoma^{147, 148}
 Preeclampsia¹⁴⁹
 Eclampsia
 Anemia
 Placenta previa
 Placenta accreta^{150, 151}
 Abruptio placentae
 Hypofibrinogenemia
 Acute fatty liver^{152, 153}
 Dystocia
 Uterine rupture¹⁵⁴⁻¹⁵⁶
 Amniotic fluid embolism¹⁵⁷⁻¹⁵⁹
 Diabetes
 Urinary tract infection
 Multiple pregnancy

Ectopic pregnancy^{160, 161}
Hyperemesis gravidarum
Displacement of the uterus
Thromboembolic disease¹⁶²
Puerperal psychosis
Hemorrhage
Puerperal infection
Retention of placenta
Placenta percreta¹⁶³
Uterine dysfunction
Sickle cell crisis¹⁶⁴
Right ovarian vein syndrome^{165, 166}

7. *Differential diagnosis*^{111, 121, 123}

Requires distinction between

- Uncomplicated pregnancy
- Hydatidiform mole
- Pseudocyesis
- Hematometra
- Uterine sarcoma
- Enlargement of uterus due to interstitial or submucous myomas
- Extrauterine tumors

8. *Treatment*

Medical management in the form of prenatal care
Early surgical intervention in the form of abortion
Late surgical intervention in such a form as cesarean section
Supportive psychotherapy

9. *Prognosis*

Characteristic duration, which varies within certain limits; recovery, which may be spontaneous or induced; definable recovery rate; and risk of permanent or temporary sequelae. The case fatality rate varies according to the patient's general health status and the availability of effective medical care, and pregnancy can be listed as a cause of death. Its recurrence is episodic among survivors not practicing effective preventive measures.

10. *Epidemiology*

Universally occurring among females
Susceptibility highly variable and dependent on both biologic and nonbiologic factors. A fecund woman engaging in coitus with a fertile man at the time of

maximum susceptibility is said to be exposed to the risk of pregnancy.

Definable population at risk, an incidence of both conception and pregnancy among the population at risk, a point prevalence and period prevalence of pregnancy, and periodicity in the latter three characteristics^{167, 168}

Community case-finding techniques: urine screening test for the detection of pregnancy, followed by referral of patients for appropriate treatment

11. *Prevention*

A wide variety of methods of variable effectiveness, including abstinence and sterilization¹⁶⁹

12. *Behavioral aspects*

Health behavior in anticipation or prevention of pregnancy

Illness behavior in seeking medical or surgical treatment for an existing pregnancy

Participation in a sick role¹⁷⁰⁻¹⁷⁶

Other overlaid functions, such as status affirmation¹⁷⁷⁻¹⁸⁰

OTHER PATHOLOGIC FEATURES OF PREGNANCY

The relationship between the gravid female and the fetoplacental unit can be understood best as one of host and parasite. Local and systemic defense mechanisms on the part of the host may include increased uterine circulation, uterine contraction, increased blood volume, and a variety of other reactions, including isoimmunization. Billingham has suggested that parturition may represent an immunologic rejection similar to rejection of a homograft.¹⁸¹ Aggressive mechanisms on the part of the fetoplacental unit include local invasion by the syncytial trophoblast, which is initially protected from maternal immunorejection; compression of the abdominal viscera and vessels; rupture of the uterus or establishment of ectopic pregnancy; elaboration of a luteotropic hormone; and nutritional competition with the host.^{182, 183} Kaplan and Grumbach hypothesize that the increased maternal resistance to insulin produced by the placental lactogen has the effect of sparing glucose for transfer to the fetus.¹⁸⁴ Page has speculated that the placenta elaborates a substance that results in an increased placental blood perfusion by producing maternal hypertension, leading, in turn, to the development of preeclampsia and eclampsia.¹⁸⁵

Cameron enumerates several conditions on which the successful existence of a parasite depends: penetration into the host, adequate

conditions of survival within the host, protective mechanisms of the parasite against the defenses of the host, and absence of effective reaction of the host.¹⁸⁶ Conditions of penetration into and persistence within the host are known as invasiveness. The capacity of parasites to produce disease is referred to as pathogenicity, while virulence is the measure of this capacity.¹⁸⁷ These features do not depend exclusively on the parasite but rather are determined by the interaction between parasite and host.

In this context, it may be seen that pregnancy, while exhibiting certain neoplastic characteristics, including actual malignancy at times, is most easily categorized as a host-parasite relationship. To this end, the effect of medical treatment, as in other parasitic conditions, is aimed at three fundamental goals: the blocking of the deleterious effects of the parasite or its destruction, the facilitation of the action of host systemic defense mechanisms, and the improvement of the general conditions of the host, which in itself results in an increase in defense mechanisms.¹⁸⁸ The institutional arrangements and technology through which such goals are identified and accomplished may be regarded as cultural adaptations that augment maternal biologic adaptations.

The idea that pregnancy could be considered a pathologic process does not seem at first to be consistent with the continued survival of the human species for the past million or more years. However, any biologic event, and particularly disease process, can be considered in the light of adaptive responses that result in species survival and, secondarily, survival of the individual organism.¹⁸⁹⁻¹⁹¹ In this respect, pregnancy is a highly successful biologic adaptation to the survival needs of the species, although its survival value is changing under conditions of rapid population growth.^{192, 193} As is true of other adaptations, it may have disadvantages for all or a portion of the individuals in that species.

Engel dealt with part of the theoretical aspects of this problem in his proposal that grief be considered a disease; he pointed out that grief is normal only in a statistical sense of being common.¹⁹⁴ It is not normal in the sense of total health. If disease is considered to be part of an adaptive process, though, grief can be more properly viewed as a disease. If the adaptive process is successful, recovery occurs and the patient reaches a state of health. If it is not successful, more illness or even death results.

Wolf also viewed disease as response or adaptation to noxious forces in the environment, as a reaction to, rather than an effect of, noxious forces.¹⁹⁵

The concepts developed by Engel and Wolf would be consistent with the view of pregnancy presented here, that is, that pregnancy has been a biosocial and particularly biologic adaptation to the survival needs

of the species in the general sense and is an individual physiological adaptation in interaction with the fetoplacental unit. The latter physiological adaptations may, as we have seen, result in either a spontaneous recovery or serious impairment and death.

The best-known example of another biologic adaptation with species survival advantages and individual disadvantages is sickle cell trait and sickle cell disease of West Africa.¹⁹⁶ Heterozygous inheritance results in protection against lethal falciparum malaria, but homozygous inheritance is itself lethal for the small proportion of people who receive it. Pregnancy seems to be in the same general category: It has had outstanding survival advantages for the species but definite and often lethal disadvantages for individuals experiencing it. Our persistence in calling it normal in the face of these facts has been a cultural adaptation with a high survival value for the species until recently.

The present situation is changed in three significant respects from previous human evolutionary experience:

1. A greater assurance of individual survival has reduced anxiety that the majority of a given couple's offspring will not survive to adulthood.
2. Technological developments, such as effective contraception and safe abortion techniques, now provide choices and offer perspectives about pregnancy that previously were unavailable or, at least, less obvious.
3. Under current conditions of phenomenal human population growth, normal (*i.e.*, unlimited) reproduction, if anything, endangers survival of the human species and other species as well.

The preceding discussion allows us to view pregnancy in the context of both individual human illness and species adaptation. Pregnancy is viewed, by Western society at least, as a normal phenomenon to be distinguished from illness states, even though defining pregnancy as normal neither explains what we know about pregnancy nor predicts events surrounding pregnancy. The strength of any hypothesis is its utility in dealing with reality. The hypothesis that pregnancy is merely an altered state of normal health does not meet this test, nor does the null hypothesis that pregnancy is not an illness.

The questions become these: Does the hypothesis that pregnancy is an illness explain the fact that people everywhere often seek its prevention, whatever the effectiveness of their methods, and have done so since the earliest historical times?¹⁹⁷⁻²⁰¹ Does it explain the fact that once pregnancy occurs, important physiological changes take place, subjective

symptoms appear, and a significant excess risk of death is experienced? Does it explain the fact that medical supervision will be sought whether the pregnancy is desired or not? Does it explain the fact that this is true in nearly all human cultures and that the same cultures respond by the maintenance of rituals, procedures, and specialized persons or skills in order to meet the demand for supervision or assistance of some kind?²⁰²⁻²⁰⁴ Does it explain the fact that these activities continue in spite of countless and repeated assertions that pregnancy is normal?

Pregnancy may not be an illness. If it is not, though, one must ask: In what way is it not an illness? In fact, human pregnancy can be viewed as an episodic, moderately extended chronic condition with a definable mortality risk to which females are uniquely, although not uniformly, susceptible and to which the following obtain:

It is almost entirely preventable through the use of effective contraception and is entirely so through sterilization or abstinence.

When not prevented, it is the individual result of a set of species-specific biosocial adaptations with a changing significance for species survival.

It is a neoplastic, endoparasitic (*i.e.*, neoparasitic) autoinfection of relatively high pathogenicity and low average virulence, which is localized, self-limited, and nontransmissible.

It may be defined as an illness requiring medical supervision through cultural traditions (functional or explicit) or individual illness behavior.

It may be treated with a variety of surgical and medical procedures and with supportive psychotherapy, as indicated.

It may be tolerated, sought, or valued for the purposes of reproduction, self-expression, or status affirmation.

It has an excellent prognosis for spontaneous recovery if managed under careful medical supervision.

EPIDEMIOLOGY OF ABORTION

Having established the individual and community phenomenon of pregnancy as a subject within the scope of medical epidemiology, we may examine the comparative risks of pregnancy, its prevention, and alternative treatment programs. Recognizing fully that the study of

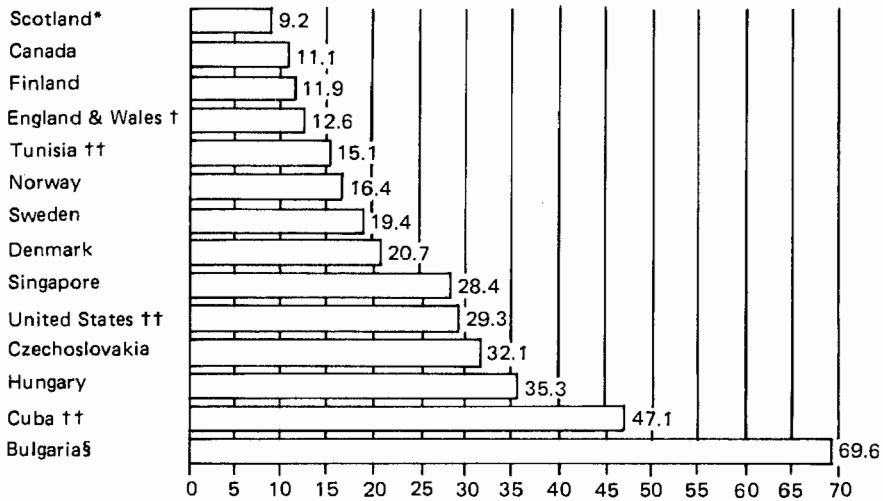


Fig. 1-1. The 1981 rates of legal abortion per 1000 women aged 15 to 44 are shown for various countries. (Tietze C: *Induced Abortion: A World Review, 1983*, 5th ed. New York, The Population Council Inc., 1983)

* Includes abortions in England to Scottish women.

† Residents only.

‡ 1979.

§ 1980.

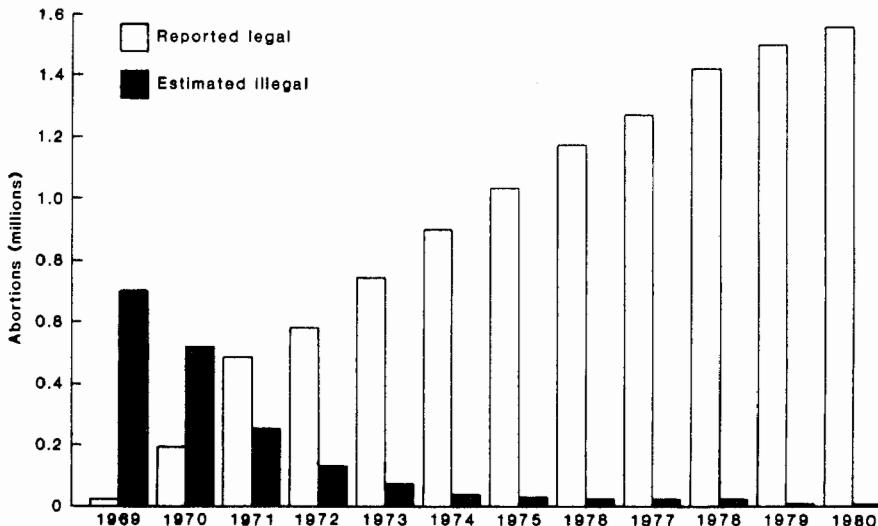


Fig. 1-2. Legal and illegal abortions in the United States. 1969-1980. (Cates W Jr: *Legal abortion: The public health record. Science* 215:1586, 1982)

TABLE 1-1. Legal Abortions per 1000 Women Aged 15 to 44 Years—Selected Countries, 1977-1981

Country	Year	Abortion Policy	Abortion Rate
Netherlands*	1981	R	6.0
Scotland†	1981	S	9.2
Finland	1981	S	11.9
England and Wales*	1981	S	12.6
Norway	1981	R	16.4
Sweden	1981	R	19.4
Denmark	1981	R	20.7
German Democratic Republic	1977	R	22.5
United States	1980	S	29.3
Czechoslovakia	1981	R	32.1
Hungary	1981	S	35.3
Bulgaria	1979	S	69.6

* Residents only.

† Including residents of Scotland aborted in England.

(R, on request; S, social or social-medical indication); (Tietze C: Induced Abortion: A World Review, 1983. New York, The Population Council Inc., 1983)

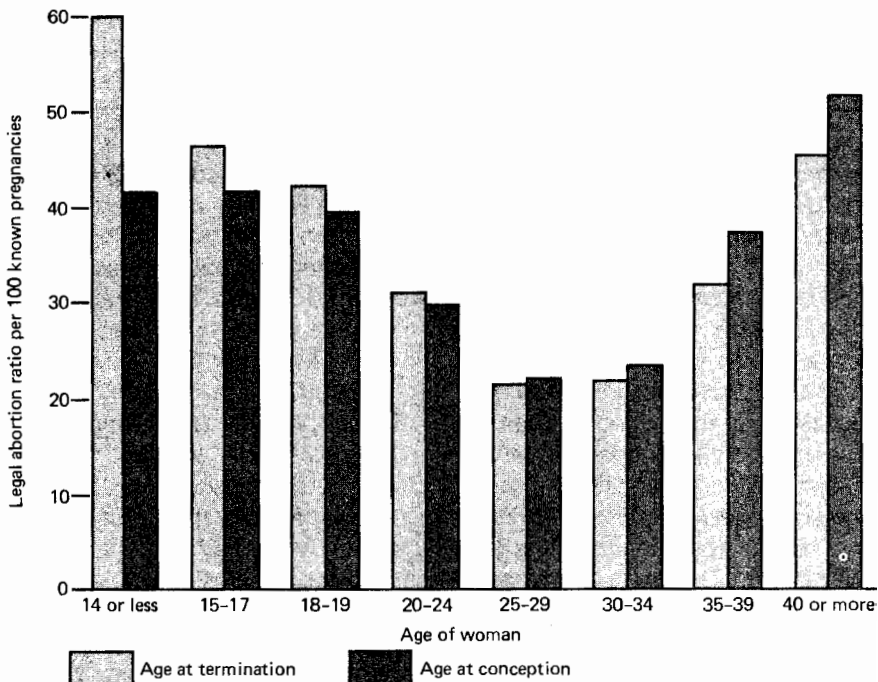


Fig. 1-3. Legal abortion ratios per 100 known pregnancies by age at termination and by age at conception—United States, 1980. (Tietze C: Induced Abortion: A World Review, 1983, 5th ed. New York, The Population Council Inc., 1983)

reproductive risks traditionally includes perinatal, neonatal, and infant mortality risks, we must regard them as outside the scope of the present work.

Tietze has estimated that as many as 55 million abortions may be performed in the world each year, although he adds that variable reporting methods, where they exist, make such figures highly speculative.²⁰⁵ Abortion policies and abortion rates vary significantly from country to country (Fig. 1-1, Table 1-1).^{206, 207}

In the United States, the abortion *rate* has risen from approximately 0.13 per 1000 women aged 15 to 44 years in 1963 to 29.3 in 1980, when over 1.5 million abortions were obtained by American women (Fig. 1-2).^{208, 209} The abortion *ratio* in the United States has risen during that time from approximately 1.3 abortions per 1000 live births to 428, and from 1.3 abortions per 1000 known pregnancies in 1963 to 300 abortions per 1000 known pregnancies in 1980.²¹⁰⁻²¹³ Abortion ratios have tended to be higher among women at the extreme ends of the

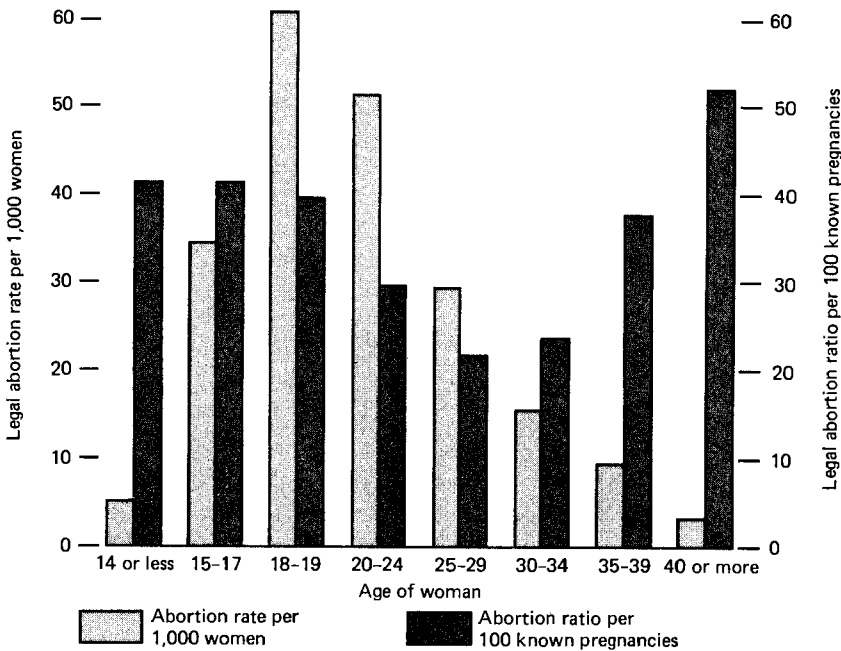


Fig. 1-4. Legal abortion rates per 1000 women and abortion ratios per 100 known pregnancies by age at conception—United States, 1980. (Tietze C: Induced Abortion: A World Review, 1983, 5th ed. New York, The Population Council Inc., 1983)

TABLE 1-2. Reported Legal Abortions Obtained by Teenagers, Percent Distribution, and Abortion Ratio: United States, 1977

Age	Percent Distribution		Abortion Ratio*
	Separate	Cumulative	
13	0.7	0.7	1070
14	3.1	3.8	718
15	7.2	11.0	612
16	13.8	24.8	529
17	19.1	43.9	581
18	28.5	72.4	457
19	27.6	100.0	

* Abortions per 1000 live births.

(With permission from Cates W Jr: Abortions for teenagers. In Hodgson JE (ed): *Abortion and Sterilization: Medical and Social Aspects*. New York, Grune & Stratton, 1981. Copyright: Academic Press Inc. (London) Ltd)

reproductive spectrum (Figs. 1-3 and 1-4). Abortion ratios are twice as high, or higher, for women aged 14 and under and 40 and over as for women between the ages of 25 and 29; a larger proportion of the relatively small numbers of pregnancies occurring among these groups is terminated (Table 1-2).²¹⁴

The significance of this for overall reproductive health is great, since a disproportionate share of maternal mortality exclusive of abortion deaths arises from pregnancies carried to term by women in these age-groups, particularly the older women.^{215,216} This is offset to some extent by the tendency of women in these groups, particularly teenagers, to have abortions at more advanced stages of gestation, when the risks of abortion are greater (Fig. 1-5).

Since 1940, however, both maternal mortality ratios (excluding abortion deaths) and abortion mortality ratios have declined (Figs. 1-6 and 1-7).^{217,218} Abortion mortality ratios have declined more rapidly than maternal mortality ratios, and they have declined precipitously since 1967 to 1970, the years in which state abortion laws, beginning in Colorado, were liberalized.^{219, 220} Prior to that time, deaths due to septic abortion, especially, were a serious public health problem, especially for the poor and minorities.²²¹⁻²²⁸ In 1967, the mortality rate (per 100,000 live births) due to septic abortion was 1.5 for whites and 10.2 for non-whites.²²² In 1965, Gold and co-workers reported that nearly 50% of all maternal mortality in New York City was due to complications arising from abortion during some periods, and this figure exceeded 60% for Puerto Ricans.²²⁹

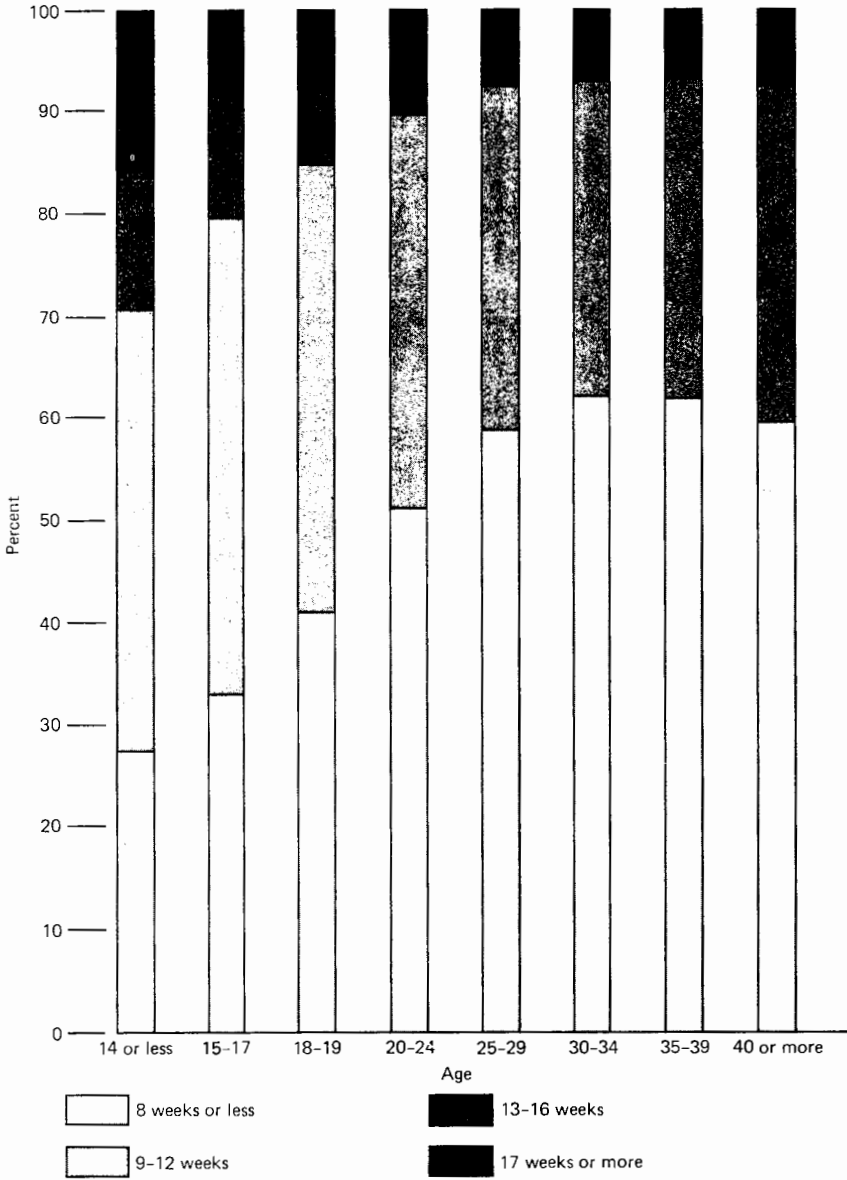


Fig. 1-5. Percent distribution of legal abortions by weeks of gestation and woman's age—New York State, 1980. (Tietze C: *Induced Abortion: A World Review*, 1983, 5th ed. New York, The Population Council Inc., 1983)

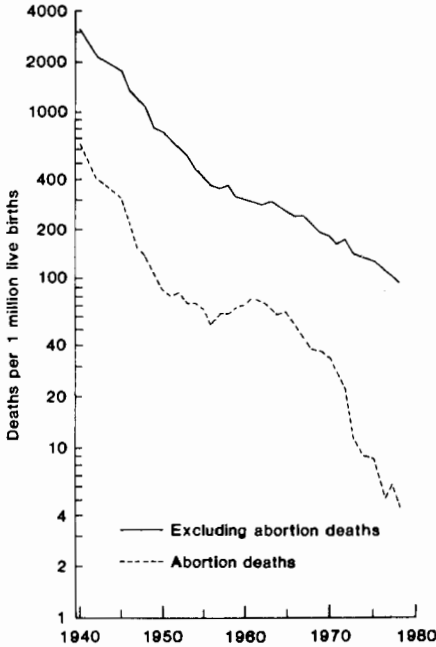


Fig. 1-6. Maternal mortality ratios (excluding abortion deaths) and abortion mortality ratios for the United States from 1940 to 1978. The maternal mortality ratio excluding abortion equals total maternal deaths minus abortion deaths. The abortion mortality ratios are deaths per 1 million live births. (Cates W Jr: Legal abortion: The public health record. *Science* 215:1586, 1982)

In fact, the overall number of deaths due to abortions of all types, including spontaneous abortions, has declined in the United States since 1970 (Fig. 1-8). In addition, serious morbidity due to illegal abortion has declined significantly.²³⁰

The most important state law changes occurred in New York's law in 1970, and declines in New York abortion mortality and morbidity were among the most dramatic.²³¹ From 1973 to 1983, New York had no deaths from illegal abortion; in 1978, despite the fact that nearly 106,000 abortions were performed there, only one death due to abortion occurred in New York City.*²³²

As the result of these important changes, induced abortion has become not only the most common operation but also one of the safest operations performed in the United States, with half the risk of death

* Pakter J, personal communication.

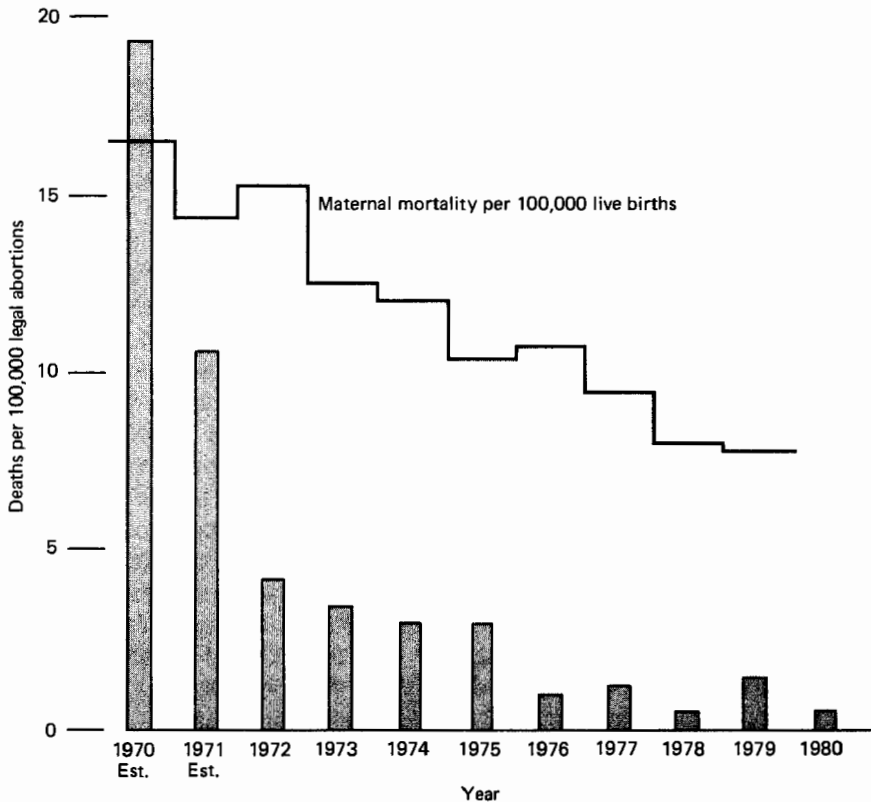


Fig. 1-7. Deaths per 100,000 legal abortions and maternal mortality per 100,000 live births—United States, 1970–1980. (Tietze C: *Induced Abortion: A World Review*, 1983, 5th ed. New York, The Population Council Inc., 1983)

associated with tonsillectomy and one one-hundredth the risk of death associated with appendectomy.²³³ In 1978, the overall death-to-case rate for legally induced abortions fell to 0.5 per 100,000 abortions, whereas the death-to-case rate for term delivery resulting in live birth, excluding abortion and not including deaths due to ectopic pregnancy, molar pregnancy, and fetal deaths, was 8 per 100,000 live births, making the risk of death due to pregnancy untreated by abortion 16 times greater than the risk of death due to abortion.²³⁴ An overall comparison of death-to-case rates for abortion and pregnancy for the years 1972 to 1978 shows the risk of death per 100,000 events to be 1.9 for abortion versus 11 for live birth.²³⁵

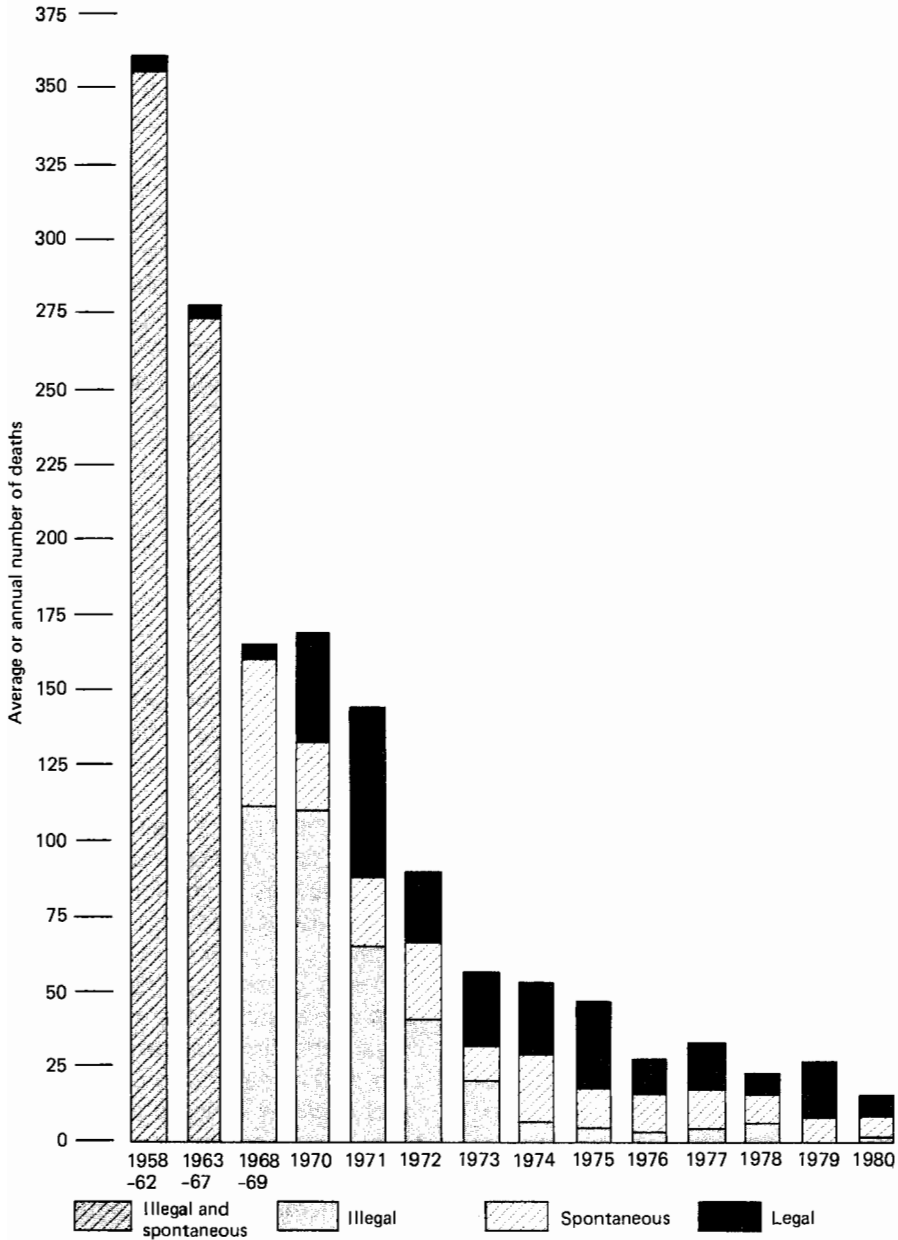


Fig. 1-8. Number of deaths associated with abortion by type of abortion—United States, 1958–1980. (Tietze C: *Induced Abortion: A World Review*, 1983, 5th ed. New York, The Population Council Inc., 1983)

TABLE 1-3. Death-to-Case Rate for Legal Abortions, by Weeks of Gestation: United States, 1972 to 1978

Weeks of Gestation	Deaths*	Abortions†	Rate‡	Relative Risk§
≤8	13	2,749,725	0.5	1.0
9 to 10	24	1,705,478	1.4	2.8
11 to 12	20	883,932	2.3	4.6
13 to 15	20	300,186	6.7	13.4
16 to 20	47	338,488	13.9	27.8
≥21	12	68,584	17.5	35.0
Totals	136	6,046,393	2.2	

* Excludes deaths from ectopic pregnancy.

† Based on distribution of 4,292,615 abortions (71.0%) with weeks of gestation known.

‡ Deaths per 100,000 abortions.

§ Based on index rate for ≤8 menstrual weeks' gestation of 0.5 per 100,000 abortions. (Centers for Disease Control: Abortion Surveillance, 1978, November 1980)

In fact, through at least the first 16 weeks of pregnancy, abortion is the safest treatment of a pregnancy with respect to a woman's chances of survival.²³⁶ For pregnant teenagers, abortion is at least five times safer with respect to survival than term pregnancy.²³⁷ Because of the higher risk of having a delivery by cesarean section, nulliparous teenagers carrying to term experience a considerably increased risk of major morbidity and mortality over those who choose abortion.²³⁸⁻²⁴⁰ Fortier has even recommended that a consent form be signed by women who choose the greater dangers of term pregnancy.²⁴¹

While overall mortality due to abortion is low, complication and death-to-case rates vary according to the week of gestation in which the abortion is performed and the procedure used.²⁴² For example, the death-to-case rate for legal abortion from 1972 to 1978 was 35 times greater for abortions performed at 21 or more menstrual weeks' gestation than for those performed at 8 or less menstrual weeks' gestation (Table 1-3). Complication rates per 100 patients studied from 1971 to 1975 showed a similar trend (Fig. 1-9). A comparison with maternal mortality shows that for the period 1972 to 1980, abortion mortality was less through 15 menstrual weeks' gestation but greater than maternal mortality after that point (Fig. 1-10). Tietze notes that mortality increased 30% with each week of gestation, although Cates and Grimes estimate a 50% increase in the mortality rate per week.^{243, 244}

The Centers for Disease Control (CDC) point out, however, that the type of abortion method affects the abortion death-to-case rate. For example, from 1972 to 1978, instillation procedures were 1½ to two times as likely to result in death as instrumental evacuation procedures in

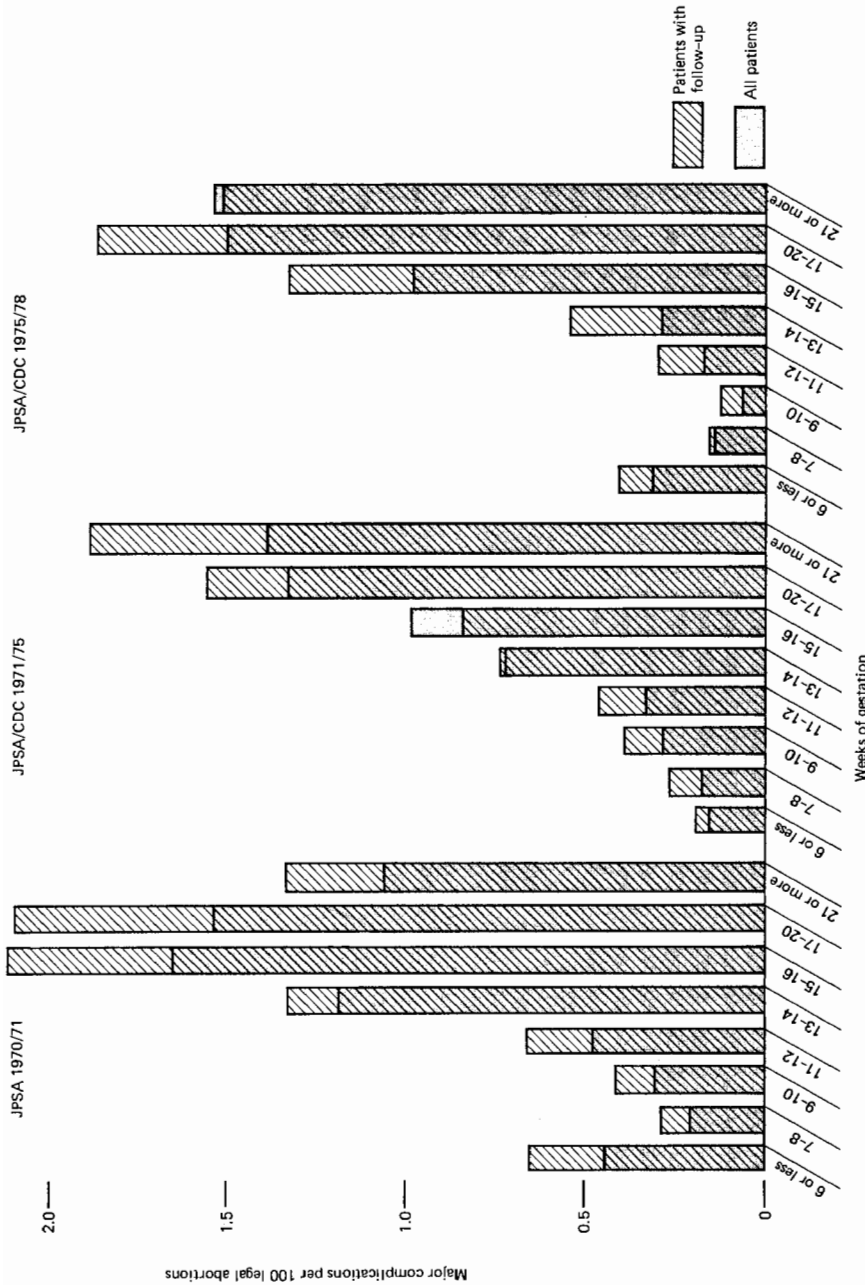


Fig. 1-9. Major complications per 100 legal abortions without preexisting complications and/or concurrent sterilization by weeks of gestation: United States, 1970-1971, 1971-1975, 1975-1978. (Tietze C: Induced Abortion: A World Review, 1983, 5th ed. New York, The Population Council Inc., 1983)

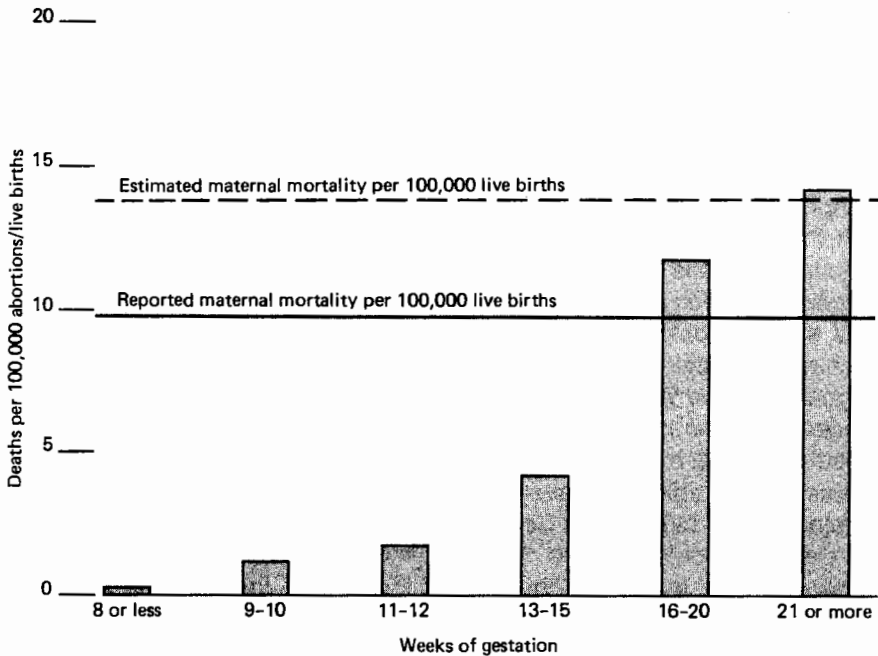


Fig. 1-10. Deaths per 100,000 legal abortions by weeks of gestation and maternal mortality per 100,000 live births—United States, 1972–1980. (Tietze C: *Induced Abortion: A World Review*, 1983, 5th ed. New York, The Population Council Inc., 1983)

second-trimester patients, while hysterectomy/hysterotomy procedures were up to 12 times more likely to result in death for the same intervals (Table 1-4). During the first trimester, hysterectomy/hysterotomy carries a risk of death 100 times greater than routine vacuum aspiration abortion (Table 1-5).^{245, 246} It is clear that hysterectomy/hysterotomy cannot be defended as a method of abortion.

Approximately 96% of all first-trimester abortions in the United States are performed by instrumental evacuation, including vacuum aspiration and curettage.²⁴⁷ Minor controversies exist as to whether it is acceptable to perform these procedures prior to the certain diagnosis of pregnancy, but the death-to-case rate appears to be exceedingly low, in the range of 0.1 per 100,000 procedures, or 1 per million.*

In second-trimester abortion, however, considerable debate continues regarding the safest and most appropriate method of abortion. The debate was initiated, to some degree, by the publication in 1972 of

* Cates W Jr, personal communication.

TABLE 1-4. Death-to-Case Rate* for Legal Abortions, by Type of Procedure and Weeks of Gestation: United States, 1972 to 1978

Type of Procedure	Weeks of Gestation						Total
	≤8	9-10	11-12	13-15	16-20	≥21	
Curettage	0.4	1.3	2.3				1.0
Dilatation and evacuation				5.6	14.1	13.5	7.7
Instillation (Saline)	0.0	0.0	0.0	8.2	14.2	19.5	12.3
(Prostaglandin and other agents†)	(0.0)	(0.0)	(0.0)	(2.2)	(17.6)	(17.1)	(13.9)
Hysterotomy/hysterectomy	(0.0)	(0.0)	(0.0)	(24.8)	(6.4)	(26.7)	(9.0)
Total‡	0.0	55.5	37.2	68.3	45.2	147.3	42.8
	0.4	1.4	2.4	8.2	15.2	22.1	2.2

* Deaths per 100,000 abortions, based on distributions of abortions with type of procedure and weeks of gestation known.

† Denominators for rates include abortions reported as type of procedure "other" (1% of all abortions with procedure known).

‡ Includes deaths with type of procedure "other" and unknown.

(Centers for Disease Control: Abortion Surveillance, 1978, November 1980)

TABLE 1-5. Deaths From Vaginal Termination and From Hysterotomy/Hysterectomy (Combined Figures): England and Wales, 1969 to 1977

Year	No. Vaginal Terminations	Deaths	Rate per 100,000		Deaths	Rate per 100,000 Procedures
			Procedures	No. Hysterotomies and Hysterectomies		
1969	38,948	4	10.3	12,845	11	85.6
1970	68,703	7	10.2	14,159	6	42.4
1971	110,498	5	4.5	12,482	6	48.0
1972	132,819	8	6.0	9,203	6	65.2
1973	134,069	1	0.7	6,041	2	33.1
1974	150,004	5	3.3	4,098	1	24.4
1975	127,281	2	1.6	2,482	0	
1976	117,761	1	0.8	1,940	0	
1977	121,165	3	2.5	1,560	4	256.4

(With permission from Diggory P: Hysterotomy and hysterectomy as abortion techniques. In Hodgson JE (ed): Abortion and Sterilization: Medical and Social Aspects. New York, Grune & Stratton, 1981. Copyright: Academic Press Inc. (London) Ltd)

the results of the study by the Joint Program for the Study of Abortion (JPSA), sponsored by the Population Council. The JPSA study showed, to the disbelief of many, that instrumental evacuation procedures performed in the early part of the second trimester had lower complication rates than instillation procedures performed in the early second trimester.

ter.²⁴⁸ At about the same time, the use of prostaglandins for second-trimester abortion was introduced.²⁴⁹ The new drugs were greeted with enthusiasm.^{250, 251} However, important complications began to be reported, including a higher incidence of retained placenta, cervical trauma, severe gastrointestinal side-effects, infection, hemorrhage, sudden death, and live births.²⁵²⁻²⁵⁵ While investigators of prostaglandins acknowledged the limitations and dangers of the drugs, they also cited bias in comparative studies and such advantages as no danger of hypernatremia associated with hypertonic saline administration, a lower incidence of disseminated intravascular coagulation (DIC) syndrome, and a shorter injection-to-abortion interval.²⁵⁶⁻²⁵⁹

Since deaths due to both saline and prostaglandin instillations fell to small numbers during the 1972 to 1978 interval, complication rates were compared (Table 1-6). One study of prostaglandin F_{2α} (PGF_{2α}) showed three times the risk of hemorrhage, four times the risk of convulsion, over two times the relative risk of significant fever, and an overall risk of major complications of 1.6 when compared with saline.²⁶⁰ Another review found that while PGF_{2α} acts more quickly than saline, it produces more of other kinds of complications, including an increase (5 to 40 times) in the risk of live-born fetuses.²⁶¹

New studies by the CDC, however, began to show lower complication rates for second-trimester dilatation and evacuation (D & E) procedures than either major instillation technique. The major complication rate for saline instillations was found to be over 2.5 times that of

TABLE 1-6. Legal Abortion Deaths* by Type of Procedure and Weeks of Gestation: United States, 1972 to 1978

Type of Procedure	Weeks of Gestation						Total
	≤8	9-10	11-12	13-15	16-20	≥21	
Curettage	12	22	19				53
Dilatation and evacuation				10	7	1	18
Instillation				5	36	9	50
(Saline)				(1)	(31)	(6)	(38)
(Prostaglandin)				(3)	(5)	(1)	(9)
(Other agents)				(1)	(0)	(2)	(3)
Hysterotomy/hysterectomy	0	2	1	3	2	1	9
Other†	1	0	0	2	2	1	6
Total	13	24	20	20	47	12	136

* Excludes deaths from ectopic pregnancy.

† Includes two deaths with unknown type of procedure, one at 13 to 15 weeks and one at 16 to 20 weeks of gestation.

(Centers for Disease Control: Abortion Surveillance, 1978, November 1980)

D & E, and a lower major complication rate for D & E by comparison with instillation procedures was found from 13 through 16 menstrual weeks (Tables 1-7 through 1-9).²⁶²

Emphasizing growing evidence of the safety of D & E procedures in the early second trimester, CDC investigators stressed the reduction in complication rates that could result from performing D & E during the "gray zone" of 13 to 16 weeks rather than postponing abortion for later instillation procedures (Fig. 1-11).²⁶³⁻²⁶⁸ In fact, a randomized clinical trial of D & E versus PGF_{2α} instillation for patients seeking second-trimester abortions resulted in a 7% major complication rate for the prostaglandin patients versus none for the D & E patients; the PGF_{2α} patients were 2.3 times more likely to experience complications requiring treatment.²⁶⁹

By 1978, D & E had become the most common method of second-trimester abortion; it was used for 82% of all procedures performed in the 13- to 15-week interval, and it accounted for 22% of all procedures in the 16- to 20-week gestation interval.²⁷⁰

One important question that has arisen concerning D & E abortion but relevant to other abortion methods is the comparative safety of different settings. Most second-trimester abortions have been performed in hospital settings; in fact, the Alan Guttmacher Institute reported in 1981 that 67% of 1978 second-trimester abortions occurred in hospital settings.²⁷¹ By contrast, 75% of all first-trimester abortions occurred outside of hospitals.²⁷² A preliminary review of hospital and nonhospital death-to-case rates in abortions of 12 or less menstrual weeks' gestation showed

TABLE 1-7. Numbers of Patients and Major Complication Rates per 100 Abortions for Suction Curettage and Instillation Procedures, by Weeks of Gestation

Weeks Gestation	Suction Curettage		Intrauterine Instillation		Significance Tests for Difference Between Rates
	No. Patients	Major Complications	No. Patients	Major Complications	
0 to 6	4,659	0.28			
7 to 8	19,340	0.23			
9 to 10	21,542	0.39			
11 to 12	11,956	0.51			
13 to 14	4,351	0.71	1,100	2.27	p 0.001
15 to 16	1,409	0.92	2,542	1.77	p 0.05
17 to 20	590	0.85	7,004	1.81	p 0.10
21 to 24			1,572	2.04	

(With permission from Grimes DA, Schulz KF, Cates W Jr, et al: The Joint Program for the Study of Abortion/CDC: A preliminary report. In Hern WM, Andrikopoulos B (eds): Abortion in the Seventies. New York, National Abortion Federation, 1977)

TABLE 1-8. Total and Major Complications per 100 Women, by Gestation, Procedure, and Sterilization, for Total Patients and for Patients With Follow-up (FU): United States, 1971 to 1975

Gestation (Weeks), Procedure, and Sterilization	Total Complications		Major Complications	
	Total Patients	Patients With FU	Total Patients	Patients With FU
All Patients				
6 or less	7.2	10.3	0.4	0.6
7 to 8	4.7	6.6	0.3	0.4
9 to 10	5.6	7.7	0.4	0.6
11 to 12	8.2	9.9	0.8	1.0
13 to 14	17.0	18.1	1.4	1.6
15 to 16	33.1	36.2	1.9	2.1
17 to 20	39.9	47.4	2.2	2.5
21 or more	<u>36.1</u>	<u>47.5</u>	<u>2.3</u>	<u>2.9</u>
All gestations	12.3	14.9	0.8	1.0
Patients Without Preexisting Complications or Concurrent Sterilization				
6 or less	7.2	10.3	0.2	0.3
7 to 8	4.4	6.1	0.2	0.3
9 to 10	5.3	7.3	0.4	0.5
11 to 12	7.7	9.1	0.6	0.8
13 to 14	16.4	17.0	1.0	1.1
15 to 16	33.1	35.7	1.4	1.5
17 to 20	39.7	46.7	1.9	2.3
21 or more	<u>34.6</u>	<u>45.2</u>	<u>1.7</u>	<u>2.2</u>
All gestations	12.1	14.5	0.7	0.8
Procedure*				
Suction curettage†‡	4.7	6.5	0.3	0.4
D & E†‡§	5.5	6.7	0.6	0.6
Saline†‡	38.0	47.0	1.7	2.1
Prostaglandin†‡	53.1	54.5	2.8	2.6
Hysterotomy*#	47.0	48.1	13.9	15.2
Hysterectomy	49.5	48.8	13.4	13.4
Suction Curettage*†‡				
6 or less	6.0	9.2	0.2	0.3
7 to 8	4.0	5.7	0.2	0.3
9 to 10	4.7	6.6	0.3	0.4
11 to 12	5.2	6.5	0.4	0.6
D & E*†‡§				
13 to 16	5.6	6.8	0.6	0.7
17 or more	4.8	5.3	0.5	0.5
Saline*†‡ 				
13 to 16	42.1	50.9	1.7	1.7
17 or more	36.3	45.4	1.7	2.2
Prostaglandin*†‡ 				
13 to 16	55.0	55.5	2.8	2.1
17 or more	51.9	53.9	2.8	3.0

(continued)

TABLE 1-8. Total and Major Complications per 100 Women, by Gestation, Procedure, and Sterilization, for Total Patients and for Patients With Follow-up (FU): United States, 1971 to 1975 (continued)

Gestation (Weeks), Procedure, and Sterilization	Total Complications		Major Complications	
	Total Patients	Patients With FU	Total Patients	Patients With FU
Tubal Sterilization*†**				
Not done	4.7	6.5	0.3	0.4
By laparotomy	22.6	24.5	3.2	3.1
By laparoscopy	7.6	8.5	0.8	1.2

* Without preexisting complications.

† At 12 weeks' gestation or earlier.

‡ Without tubal sterilization.

§ Dilatation and evacuation at 13 weeks' gestation or later.

|| Intra-amniotic instillation.

* With tubal sterilization.

** Aborted by suction curettage.

(With permission from Cates W Jr, Grimes DA: Morbidity and mortality of abortion in the United States. In Hodgson JE (ed): Abortion and Sterilization: Medical and Social Aspects. New York, Grune & Stratton, 1981. Copyright: Academic Press Inc. (London) Ltd.)

TABLE 1-9. Comparison of Outcomes of Dilatation and Evacuation, Intra-amniotic Instillation of Hypertonic Saline, and Intra-amniotic Instillation of Prostaglandin F_{2α} for Induced Abortions Performed at ≥13 Weeks' Gestation

Outcomes	D & E	Intra-amniotic Instillation	
		Saline	PGF _{2α}
Effectiveness			
Success rate	99.9	97.6	92.5
Induction-abortion time (hr)	0.5	29.2	24.8
Specific Complications*			
Incomplete abortion	0.90	28.27	36.10
Hemorrhage	0.71	1.86	5.80
Transfusion	0.19	0.96	1.53
Cervical laceration or fistula	1.16	0.55	0.64
Convulsion	0.02	0.08	0.32
Uterine perforation	0.32	0.05	0.16
Any Complication	5.83	37.45	53.26

* Complications per 100 procedures.

(With permission from Cates W Jr, Grimes DA: Morbidity and mortality of abortion in the United States. In Hodgson JE (ed): Abortion and Sterilization: Medical and Social Aspects. New York, Grune & Stratton, 1981. Copyright: Academic Press Inc. (London) Ltd.)

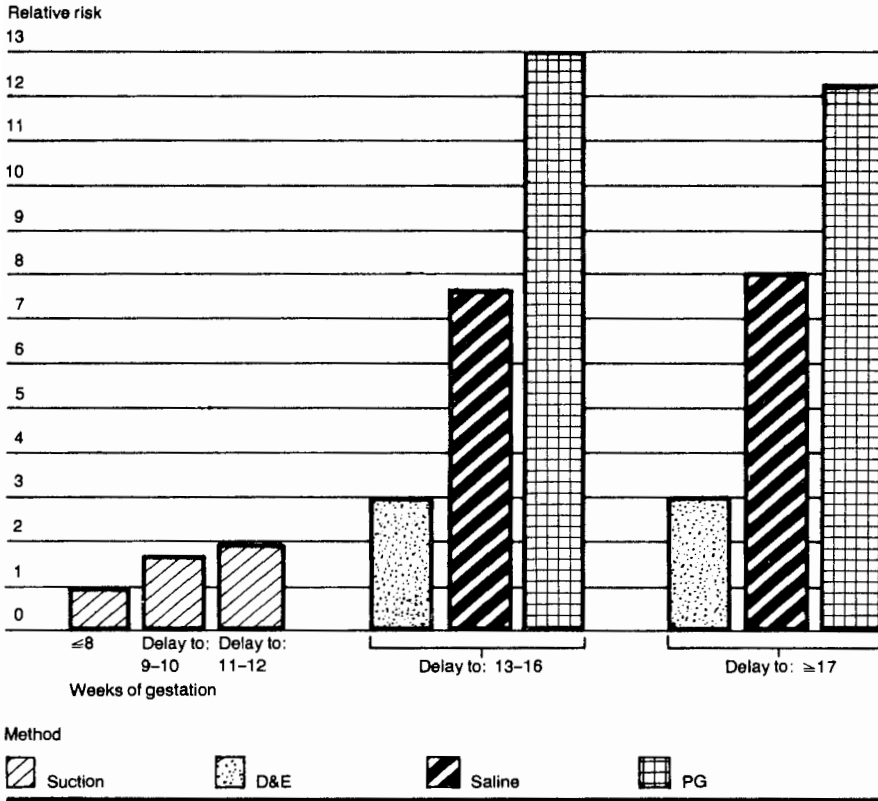


Fig. 1-11. Relative risk of major abortion-related morbidity due to length of gestation and choice of method, compared with the risk associated with suction at ≤ 8 weeks' gestation. (Cates W Jr, Schulz KF, Grimes DA et al: The effect of delay and method choice on the risk of abortion morbidity. *Fam Plann Perspect* 9:266, 1977)

a slightly lower rate for nonhospital abortions.²⁷³ Factors limiting interpretation of these differences, however, included small numbers and inability to control for confounding factors other than concurrent sterilization and medical problems among the hospital patients. A subsequent study showed identical death-to-case rates of 0.7 per 100,000 procedures for both hospital and nonhospital first-trimester abortions.²⁷⁴

A study focusing on mortality rates for second-trimester D & E procedures performed in hospitals compared with those performed in clinics found a higher death-to-case rate in the hospital procedures.²⁷⁵ However, there are several reasons why these differences may not reflect a true comparison: The numbers are small; there may have been selective underreporting of deaths from either kind of facility; the true denomi-

nators are not known; women who have their abortions in clinics may be healthier or different in other ways from those having their abortions in hospitals; D & E abortions performed in hospitals may occur later in pregnancy than those performed in clinics, resulting in higher complication rates on that basis alone; and physicians performing second-trimester D & E abortions in clinics may be more experienced than those performing them in hospitals.

At this point, only the complication rates of outpatient case series can provide evidence of trends, but far more experience and larger numbers will be necessary for a more accurate comparison of morbidity and mortality rates.²⁷⁶⁻²⁹³

Another controversy concerning both first- and second-trimester abortions involves the type of cervical dilatation that is preferable: rigid dilators or laminaria.²⁹⁴ Numerous case series and a few comparative studies have been done, but firm conclusions concerning comparative infection rates, effects on future reproduction, and other complication rates have not been established.²⁹⁵⁻³¹⁰ In a study of 15,438 women experiencing first-trimester abortion, CDC investigators found that laminaria use for dilatation showed a "strong protective effect" in the prevention of cervical lacerations.³¹¹ Increasingly, laminaria have been used to augment cervical dilatation during second-trimester instillation abortion procedures, and they are increasingly used for second-trimester D & E procedures.³¹² However, they are not favored by most outpatient abortion providers for first-trimester procedures.³¹³

ANESTHESIA IN ABORTION

Following a case report of two deaths due to paracervical block during first-trimester abortions in 1974, the CDC identified three others.^{314, 315} The investigators concluded that the accurate administration of appropriate doses of the anesthetic agent is the best way to prevent fatal reactions, but they also suggested that the use of chloroprocaine might be preferable to that of lidocaine because it is metabolized more rapidly.

Blanco and colleagues found that patients in whom laminaria were used for cervical dilatation experienced significantly more rapid absorption of lidocaine, which reached higher blood levels, than did patients who had not received laminaria treatment.³¹⁶ The CDC interpretations take on more significance, in this case, when laminaria are used.

In reviewing death-to-case rates for general versus local anesthesia in patients receiving first-trimester abortions during the period from 1972 to 1977, CDC investigators found a two to four times greater risk of death

TABLE 1-10. Rates and Relative Risks of Selected Complications Associated With Local and General Anesthesia for Suction Curettage at ≤ 12 Weeks' Gestation

Complication	Rate*		Relative Risk†	95% Confidence Interval	Standardized Relative Risk‡	95% Confidence Interval for Standardized Relative Risk
	Local	General				
Uterine hemorrhage	0.32	0.54	1.7§	1.3 to 2.2	2.3§	1.7 to 3.2
Uterine perforation	0.13	0.29	2.2§	1.5 to 3.2	1.8	1.1 to 2.9
Intra-abdominal hemorrhage	0.01	0.05	8.2*	2.2 to 30.0	**	**
Cervical injury	0.59	1.73	2.9§	2.5 to 3.5	1.9§	1.6 to 2.3
Fever $\geq 38^{\circ}\text{C}$ for ≥ 1 day	0.85	0.55	0.6§	0.5 to 0.8	0.5§	0.4 to 0.7
Fever $\geq 38^{\circ}\text{C}$ for ≥ 3 days	0.15	0.07	0.5	0.3 to 0.9	0.4	0.2 to 0.9

* Complications per 100 abortions.

† Risk of general anesthesia compared to local anesthesia.

‡ Risk of general anesthesia compared to local anesthesia after exclusion from analysis of women with preexisting conditions and women who underwent abortions as inpatients with simultaneous standardization for type of institution and patient follow-up observation.

§ $p < 0.001$.

|| $p < 0.05$.

* $p < 0.01$.

** Too few cases for standardization.

(Grimes DA, Schulz KF, Cates W Jr et al: Local versus general anesthesia: Which is safer for performing suction curettage abortions? Am J Obstet Gynecol 135:1030, 1979)

associated with the use of general anesthesia.³¹⁷ In another study, general anesthesia was found twice as likely to be associated with uterine perforation and cervical injury (Table 1-10).³¹⁸ The relative risk of blood transfusion, cervical suture, and major surgery was 3.9, 2.1, and 7.6, respectively, for general anesthesia compared with local anesthesia for patients having abortions at 12 menstrual weeks' gestation or less (Table 1-11). Patients having local anesthesia were more likely to have other, less catastrophic, complications, such as postoperative fever.

COMBINATION OF STERILIZATION AND ABORTION

According to a study by Shepard, sterilization by way of an abdominal incision at the time of abortion carries a significantly increased risk of morbidity than the same procedure when abortion is not being performed.³¹⁹ Concurrent sterilization by hysterectomy similarly carries considerably more risk, whereas endoscopic concurrent sterilization has relatively lower complication rates. Fishburne and co-workers, Powe and McGee, and Kwak and co-workers have all reported series of combined procedures with few major complications, although the incidence of uterine perforation, with one patient requiring hysterectomy, appears to be considerably higher among patients having concurrent abortion and sterilization.³²⁰⁻³²²

More recently, a review of ten deaths resulting from pulmonary embolism in women experiencing abortion revealed that all but one of the eight with embolism proved at autopsy had received general anesthesia and that four of the eight had experienced concurrent sterilization at the time of the abortion.³²³ The fact that hypercoagulability during and after pregnancy has been documented by previous research was noted by the investigators.

It would appear that the extraordinary safety of abortion by instrumental evacuation is compromised seriously by concurrent sterilization, but more information is necessary to make an accurate evaluation of the relative risks of interval versus concurrent sterilization.

COMPARATIVE MORTALITY RISKS OF PREGNANCY PREVENTION AND TREATMENT ALTERNATIVES

While it is seldom, if ever, stated in medical textbooks, the aim of all medical treatment should be to prevent suffering and death when-

TABLE 1-11. Rates and Relative Risks of Selected Treatments of Complications Associated With Local and General Anesthesia for Suction Curettage at ≥ 12 Weeks' Gestation

Treatment	Rate*		Relative Risk†	95% Confidence Interval	Standardized Relative Risk‡	95% Confidence Interval for Standardized Relative Risk
	Local	General				
Blood transfusion	0.02	0.12	5.0§	2.5 to 10.1	3.9	1.5 to 10.0
Cervical suture	0.46	1.52	3.3§	2.7 to 3.9	2.1§	1.7 to 2.5
Laparotomy, hysterotomy, or hysterectomy	0.03	0.13	4.3§	2.2 to 8.3	7.6§	3.0 to 19.4

* Treatments per 100 abortions.

† Risk of general anesthesia compared with local anesthesia.

‡ Risk of general anesthesia compared with local anesthesia after women with preexisting conditions and women who underwent abortions as inpatients were excluded from analysis, with simultaneous standardization for type of institution and patient follow-up observation.

§ $p < 0.001$.

^{||} $p < 0.01$.

(Grimes DA, Schulz KF, Cates W Jr et al: Local versus general anesthesia: Which is safer for performing suction curettage abortions? Am J Obstet Gynecol 135:1030, 1979)

ever possible and to apply the least harmful remedy for illness consistent with survival of the patient. It probably will be generations before the medical profession applies this standard to pregnancy, since many of its members persist in the notion that pregnancy and childbirth are uniformly desirable objectives for all women.

If we are to apply this standard to the prevention and treatment of pregnancy, however, we may make a rational assessment of the risks and survival benefits of various methods of fertility control in comparison with the risks of unplanned and continued pregnancy.

First, we must recognize that various contraceptive measures have certain risks associated with them: Oral contraceptive use may include risks of thromboembolism and heart attack, placement of an intrauterine device (IUD) may bring a risk of pelvic infection, laparoscopic tubal sterilization may have risks of injury to abdominal viscera, and so forth. Aside from the direct risks of reversible or permanent contraception, residual risks may include the remote possibility of death due to pregnancy resulting from method failure. The latter possibility is greater with the less efficient modes of contraception, such as the barrier methods.

Balanced against this are the risks of death due to untreated pregnancy (in which the woman receives not even prenatal care); pregnancy continued to term under medical supervision, including those pregnancies treated with late surgical intervention, such as cesarean section or forceps delivery; and pregnancy treated with early surgical intervention, as in the case of induced abortion. As we have seen, the latter category includes a wide variety of risk levels, according to abortion method, length of gestation when the abortion is performed, skill of the operator, type of anesthesia, and so forth.

As a rule, women do not make decisions about pregnancy prevention or treatment on the basis of statistical evaluations and medical advice but rather on the basis of personal attitudes and necessities. At times, medical considerations enter into the picture, but decisions are usually made on the basis of such factors as desire or lack of desire for parenthood, stability of relationships, educational status, emotional status, or economic status, among others.

It is desirable and necessary, however, for health-care providers and physicians in particular to be familiar with the relative risks and combinations. Knowledge of these risk alternatives is essential to the proper conduct of medical practice, and it is very helpful to the patient who wants to know.

To this end, Tietze developed a table of risks comparing the mortality consequences of term pregnancy, contraception, and induced abortion on the basis of information available in 1969.³²⁴ Tietze and associates have continued to refine this method of analysis and have

reached the conclusion that the lowest possible risk is experienced by women using barrier methods of contraception backed up by early abortion to terminate pregnancies resulting from method failure.³²⁵⁻³²⁷ A more recent study by Ory, using new data, including corrected maternal mortality rates, current abortion mortality rates, and information concerning the effects of smoking on contraceptive mortality, reinforces this conclusion.³²⁸ Depending on the age-group, the next lowest risk categories are in barrier methods alone, abortion alone, IUD only, and oral contraceptives only in women who do not smoke. Women who use no contraception and are subjected to the risks of term birth have greater risks, up to the age of 35, than those who use any method of fertility control. After the age of 40, women who take oral contraceptives but do not smoke have the highest mortality risk except for women 35 and over who smoke and use oral contraceptives. Women in the latter category account for a very large proportion of reproductive mortality, and the mortality risk of combining smoking and oral contraceptive use appears to extend to teenagers (Plate 1-1, Table 1-12).

In another approach, Beral recently proposed the construction of a reproductive mortality rate including pregnancy-related deaths and contraceptive deaths.³²⁹ Pregnancy-related deaths include those due to spontaneous and induced abortion, ectopic pregnancy, and all other deaths related to pregnancy; contraceptive deaths include all those due to contraception and sterilization.

A review of reproductive mortality trends for the United States for the years 1955, 1965, and 1975 shows a steady decline in this aggregate mortality rate (Fig. 1-12).³³⁰ Ectopic pregnancy remained in the vicinity of 5% of pregnancy-related deaths throughout, the proportion of abortion deaths dropped from 18% to 5% of pregnancy-related deaths, and the proportion of contraceptive deaths due to oral contraceptive use rose from 0 to 45%. The authors estimate that total reproductive mortality would be reduced by one third if women over the age of 35, especially those who smoke, would avoid using oral contraceptives. They point out that methods used for preventing pregnancy now cause almost as many deaths as pregnancy itself.

BEHAVIORAL ASPECTS OF ABORTION AND ABORTION MORTALITY

Among the most perplexing problems encountered by abortion-service providers are those of repeat abortion, delay in seeking abortion, and postabortion contraceptive acceptance or refusal. Since studies show, for example, that delay in the performance of abortion results in important

TABLE 1-12. Annual Number of Birth-related, Method-related, and Total Deaths Associated With Control of Fertility per 100,000 Nonsterile Women, by Fertility Control Method, According to Age-group

Method of Control and Outcome	Age-group					
	15-19	20-24	25-29	30-34	35-39	40-44
No control, birth-related	7.0	7.4	9.1	14.8	25.7	28.2
Abortion, method-related	0.5	1.1	1.3	1.9	1.8	1.1
Pill/nonsmoker	0.5	0.7	1.1	2.1	14.1	32.0
Birth-related	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.4)
Method-related	(0.3)	(0.5)	(0.9)	(1.9)	(13.8)	(31.6)
Pill/smoker	2.4	3.6	6.8	13.7	51.4	117.6
Birth-related	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.4)
Method-related	(2.2)	(3.4)	(6.6)	(13.5)	(51.1)	(117.2)
IUD only	1.3	1.1	1.3	1.3	1.9	2.1
Birth-related	(0.5)	(0.3)	(0.3)	(0.3)	(0.5)	(0.7)
Method-related	(0.8)	(0.8)	(1.0)	(1.0)	(1.4)	(1.4)
Condom, birth-related	1.1	1.6	0.7	0.2	0.3	0.4
Diaphragm/spermicide, birth-related	1.9	1.2	1.2	1.3	2.2	2.8
Condom and abortion, method-related	0.1	0.1	0.1	•	•	•
Rhythm, birth-related	2.5	1.6	1.6	1.7	2.9	3.6

*Fewer than 0.1.

(Ory H: Mortality associated with fertility and fertility control: 1983. *Fam Plann Perspect* 15:57, 1983)

increases in abortion mortality risks, it is an accepted goal of abortion-service providers to see patients early in pregnancy, when the risks of abortion are lower.³³¹ Aside from unnecessary delays as the result of misinformation provided by health providers, bureaucratic problems, lack of facilities, or official obstruction of abortion services by governmental agencies, an important component of delay is in the abortion patient's own behavior.

Bracken and Kasl have reviewed numerous studies on delay in seeking abortion.³³² Important components of delay include youth, unmarried status, first pregnancy, a history of unprotected coitus, and denial of pregnancy.³³³⁻³⁵² Citing methodologic problems with all existing studies, Bracken and Kasl describe five stages in the decision process with regard to unwanted pregnancy and abortion: (1) acknowledgement of pregnancy, (2) formulation of alternative outcomes—delivery or abortion,

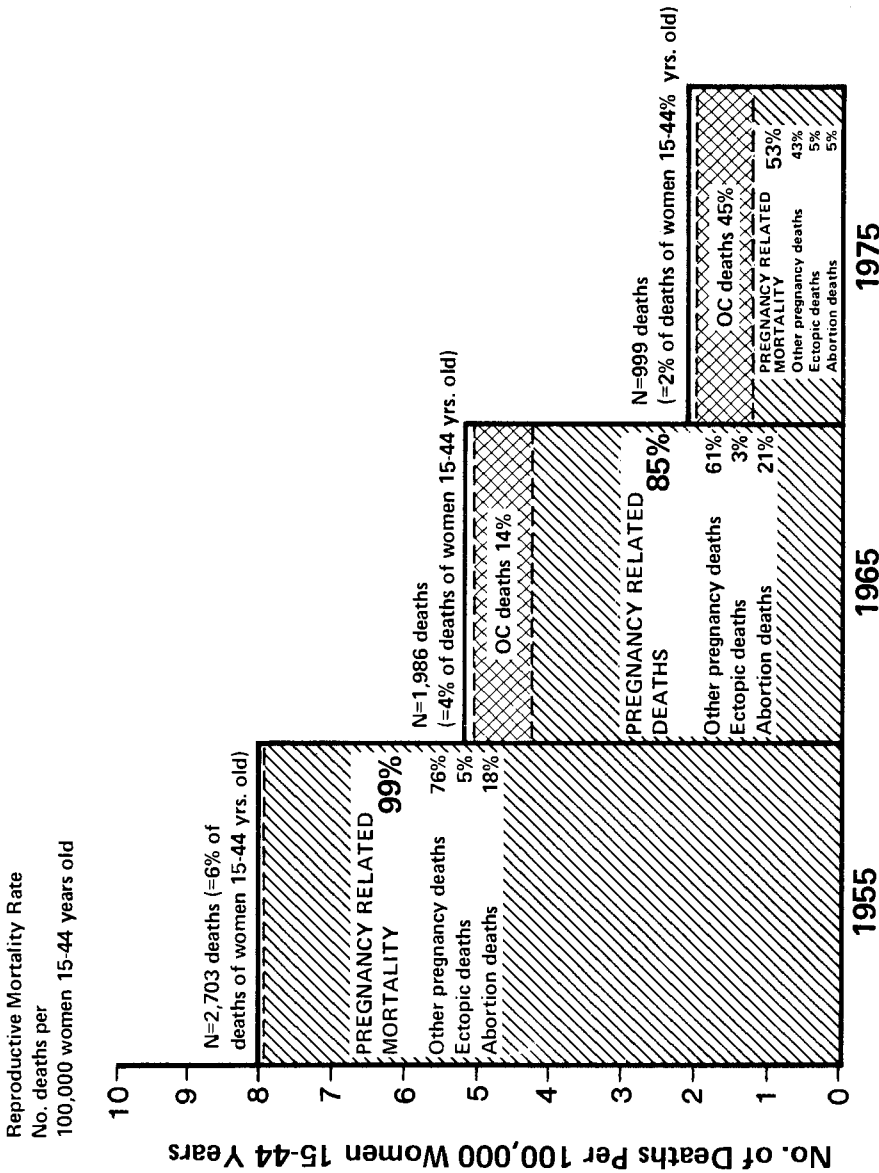


Fig. 1-12. Reproductive mortality in the United States for 1955, 1965, and 1975. (OC, oral contraceptive) (Sachs BP, Layde PM, Rubin GL et al: Reproductive mortality in the United States. JAMA 247:2789, 1982. Copyright © 1982, American Medical Association)

TABLE 1-12. Annual Number of Birth-related, Method-related, and Total Deaths Associated With Control of Fertility per 100,000 Nonsterile Women, by Fertility Control Method, According to Age-group

Method of Control and Outcome	Age-group					
	15-19	20-24	25-29	30-34	35-39	40-44
No control, birth-related	7.0	7.4	9.1	14.8	25.7	28.2
Abortion, method-related	0.5	1.1	1.3	1.9	1.8	1.1
Pill/nonsmoker	0.5	0.7	1.1	2.1	14.1	32.0
Birth-related	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.4)
Method-related	(0.3)	(0.5)	(0.9)	(1.9)	(13.8)	(31.6)
Pill/smoker	2.4	3.6	6.8	13.7	51.4	117.6
Birth-related	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.4)
Method-related	(2.2)	(3.4)	(6.6)	(13.5)	(51.1)	(117.2)
IUD only	1.3	1.1	1.3	1.3	1.9	2.1
Birth-related	(0.5)	(0.3)	(0.3)	(0.3)	(0.5)	(0.7)
Method-related	(0.8)	(0.8)	(1.0)	(1.0)	(1.4)	(1.4)
Condom, birth-related	1.1	1.6	0.7	0.2	0.3	0.4
Diaphragm/spermicide, birth-related	1.9	1.2	1.2	1.3	2.2	2.8
Condom and abortion, method-related	0.1	0.1	0.1	•	•	•
Rhythm, birth-related	2.5	1.6	1.6	1.7	2.9	3.6

*Fewer than 0.1.

(Ory H: Mortality associated with fertility and fertility control: 1983. *Fam Plann Perspect* 15:57, 1983)

increases in abortion mortality risks, it is an accepted goal of abortion-service providers to see patients early in pregnancy, when the risks of abortion are lower.³³¹ Aside from unnecessary delays as the result of misinformation provided by health providers, bureaucratic problems, lack of facilities, or official obstruction of abortion services by governmental agencies, an important component of delay is in the abortion patient's own behavior.

Bracken and Kasl have reviewed numerous studies on delay in seeking abortion.³³² Important components of delay include youth, unmarried status, first pregnancy, a history of unprotected coitus, and denial of pregnancy.³³³⁻³⁵² Citing methodologic problems with all existing studies, Bracken and Kasl describe five stages in the decision process with regard to unwanted pregnancy and abortion: (1) acknowledgement of pregnancy, (2) formulation of alternative outcomes—delivery or abortion,

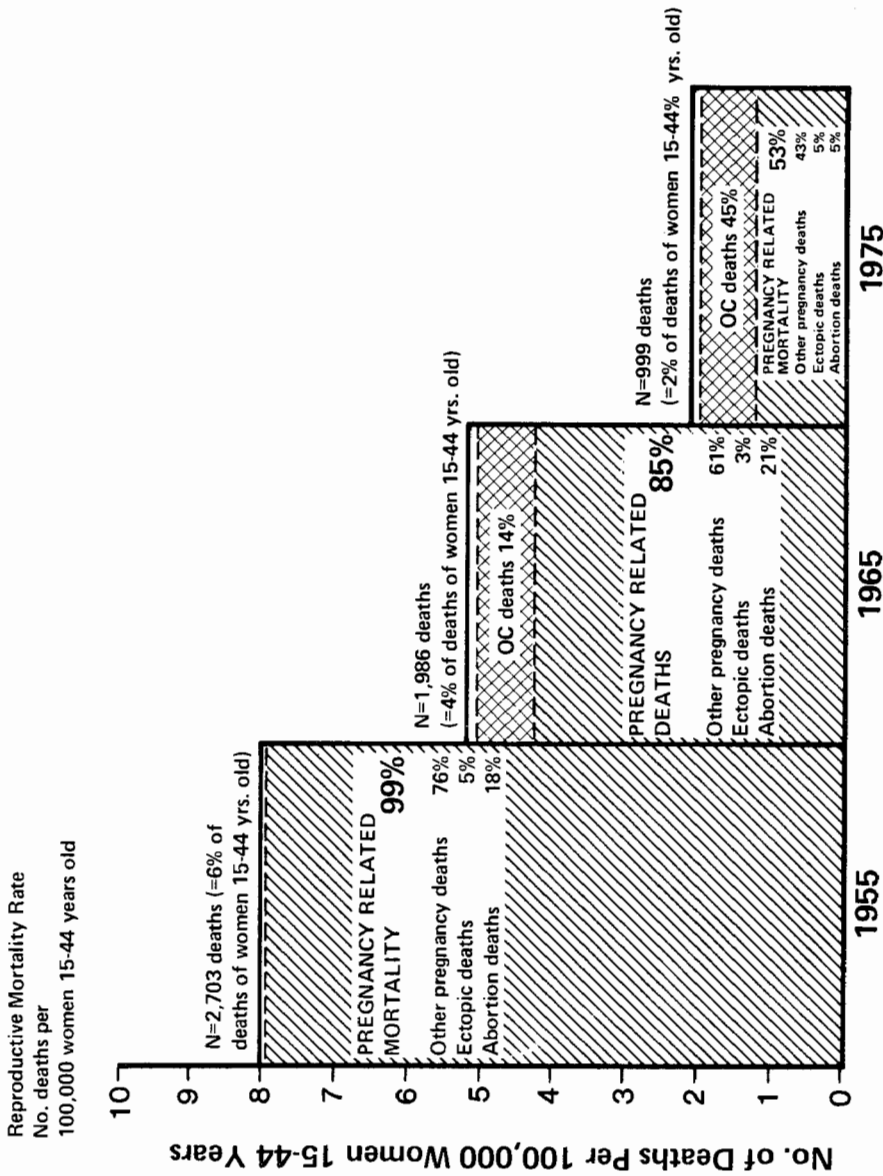


Fig. 1-12. Reproductive mortality in the United States for 1955, 1965, and 1975. (OC, oral contraceptive) (Sachs BP, Layde PM, Rubin GL et al: Reproductive mortality in the United States. JAMA 247:2789, 1982. Copyright © 1982, American Medical Association)

(3) selection of delivery or abortion, (4) commitment to chosen outcome, and (5) adherence to the decision. The authors recommend prospective studies of this decision process to understand better decision making in unwanted pregnancy. David adds another category to the model proposed by Bracken and Kasl for women whose decisions are characteristically delayed, such as the poor, minority women, and teenagers.³⁵³

In studying behavioral factors leading to abortion deaths, investigators from the CDC identified four principal "behavioral risk factors" that could contribute to an abortion death.³⁵⁴ These included (1) community factors, such as lack of services or laws requiring parental consent; (2) patient factors, such as delay in seeking abortion or treatment of complications; (3) physician factors, such as inadequate diagnosis or treatment; and (4) health-care facility factors, such as unskilled personnel, inadequate equipment, or inappropriate policies. It was found that two or more behavioral risk factors contributed to the risk of death in 64% of the deaths studied (Fig. 1-13). Nearly half of the deaths due to legal abortion were the consequence of delay in obtaining abortion until past the 13th week of gestation. In half or nearly half of the deaths due to illegal abortion, risks of death were increased by inappropriate physician treatment and by delays in seeking treatment for an obvious complication.

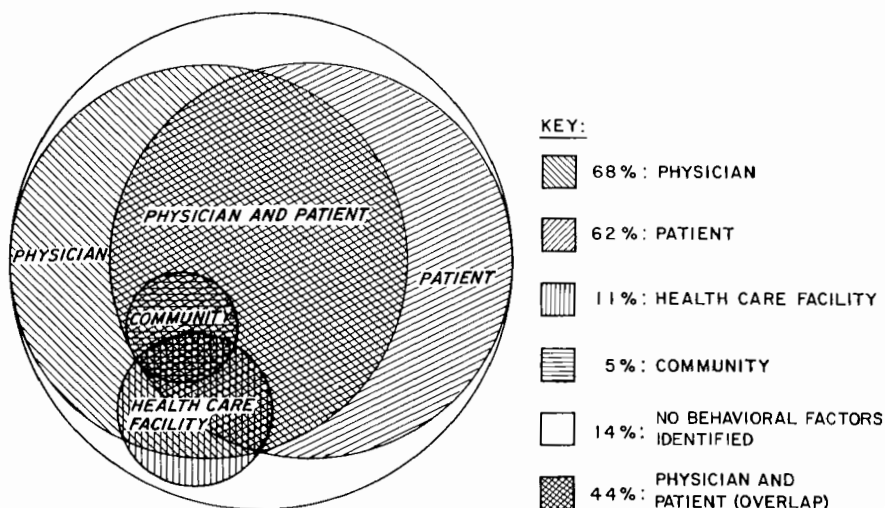


Fig. 1-13. Percent distribution of abortion-related deaths in 1975 to 1977, by those responsible for performance problems. (Selik RM, Cates W Jr, Tyler CW Jr: Behavioral factors contributing to abortion deaths: A new approach to mortality studies. *Obstet Gynecol* 58:631, 1981)

REPEAT ABORTION

Within a few months after liberalization of New York's abortion law, abortion providers in New York City began encountering women returning for repeat abortions, raising concerns that women would use contraception less effectively when there was easy access to abortion services. By July 1972, 2.5% of all procedures had been repeat abortions.³⁵⁵ However, Tietze concluded that the rising rate of repeat abortion was principally a reflection of the increasing number of women who had first abortions and, being fertile, were at risk of having repeat abortions with subsequent pregnancies.³⁵⁶ He cited several reasons why they might be at higher risk than women who had not had abortions:

The age distribution of women who have had abortions is different from those who have not, with women in the first category more likely to be in the prime reproductive age range.

Women who have had abortions are more likely to be sexually active than those who have not had abortions.

Women who have had abortions are more likely to be able to conceive than women who have not had abortions.

Women who have had abortions are more likely to accept abortion as a means of avoiding a term pregnancy.

While a few women may use abortion instead of contraception for fertility control, many more have difficulty in obtaining contraception and using it effectively.³⁵⁷

In a study based on linked records of abortion patients obtaining repeat abortions in Hawaii, Steinhoff and associates found no evidence that access to abortion resulted in a decline in the use of contraception.³⁵⁸ Steinhoff confirmed an earlier study showing two patterns in abortion use among the women studied.³⁵⁹ One group of women used abortion as a supplement to other family planning methods by postponing first births or by preventing later births after the second child. The second group tended to seek abortions to prevent higher parity order births and, to a lesser degree, to postpone lower parity order births. The first group tended to have higher socioeconomic status than the second group. It was concluded that the repeat abortion rate was not likely to be lower with contraceptives currently available and that teenagers and women with low socioeconomic status are more likely to have difficulty controlling their fertility without access to abortion.

A study by Schneider and Thompson of a small number of women seeking repeat abortions concluded that these women are more likely

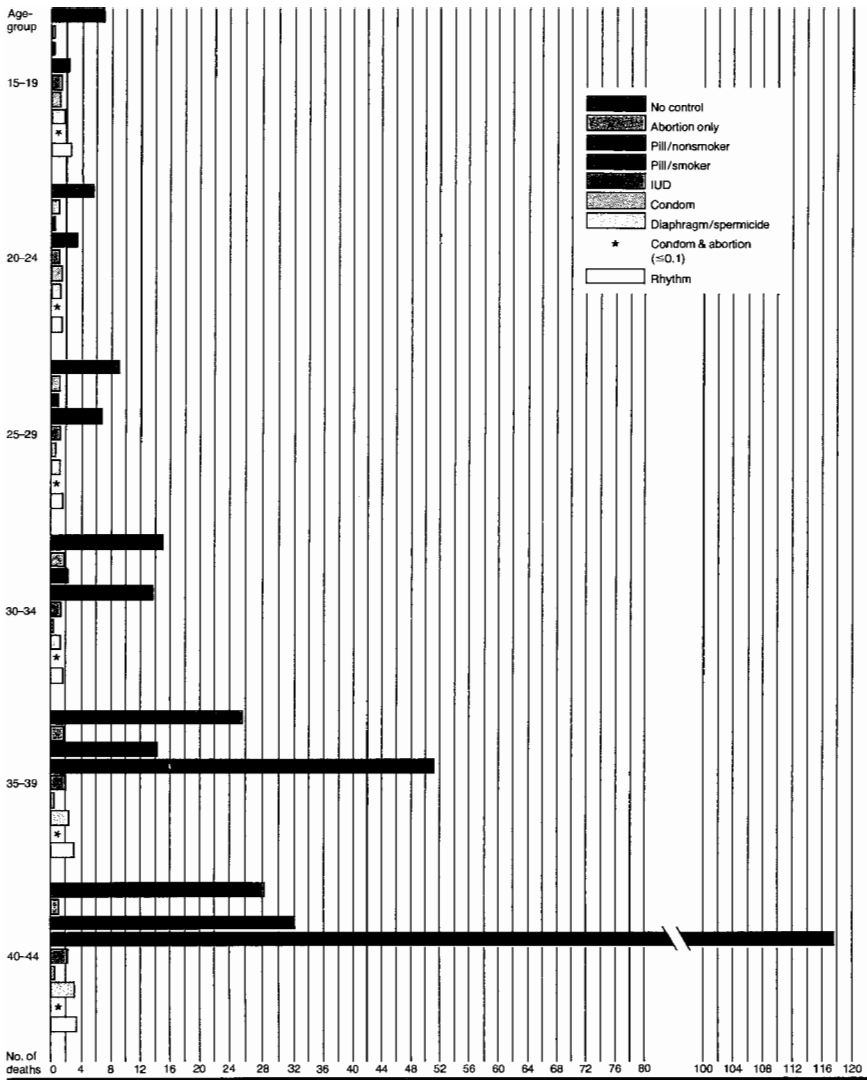


Plate 1-1. Annual number of deaths associated with fertility and fertility control methods per 100,000 nonsterile women, by age-group. (Ory H: Mortality associated with fertility and fertility control: 1983. Fam Plann Perspect 15:57, 1983)

to use contraception than women who are about to have a first abortion but are less likely to do so than sexually active nonpregnant women. The authors interpret their results to mean that women are more likely to use contraception effectively for a short time after the abortion because of the abortion experience and not the counseling they may receive but that contraceptive use declines until it is less than that seen in women without abortion experience.³⁶⁰

By contrast, Howe and co-workers found that women about to have a repeat abortion were more likely to have used contraception in an effort to prevent the current pregnancy than were women having their first abortions.³⁶¹ Three fourths of the women studied did not perceive or wish to use abortion as a primary method of fertility control.

POSTABORTION CONTRACEPTIVE USE

Howe's results are confirmed by other studies showing more effective contraceptive use following abortion.³⁶² Margolis and colleagues found that 93% of patients at Preterm Clinic in Washington, DC, accepted a method of contraception immediately following abortion and that 78% were using one of the more effective methods (pill, IUD, or sterilization) 6 months after the abortion.³⁶³ A later study performed at the same institution found that 93% were using contraception at the time of the postabortion follow-up examination and all but 10% were using either oral contraceptives or IUDs.³⁶⁴ There is no evidence that most women who have abortions continue to rely on them for fertility control.³⁶⁵

CONCLUSION

An essential approach to the question of abortion practice is asking the larger conceptual question: Why are we doing this? How is the practice of performing abortions connected to the rest of the traditions of medical diagnosis, treatment, and prevention of illness? Is the interruption of pregnancy an anomaly in the history of medicine? How do we explain the overwhelming demand among women of all cultures for special rituals, treatments, and institutions dealing with pregnancy, whether the pregnancies are desired or not? How do we explain the fact that women who have legal abortions under medical supervision are more likely to survive pregnancy than those who carry pregnancy to term, especially if pregnancy is "normal," as we have been taught to believe?

If pregnancy is “normal,” how can we justify abortion? If pregnancy is defined as an “illness,” how is that consistent with past or continued survival of the human species? What do these questions have to do with the provision of abortion services, the choice of abortion methods, and the attitudes of society toward abortion services?

In fact, these questions have a great deal to do with abortion practice. Unless we answer them, we have no comprehensible theory by which we can understand the history, context, or substance of our actions and knowledge about abortion. In this chapter, I have tried to show that there is an epidemiologic foundation for abortion practice that derives from our existing knowledge about the etiology, physiology, clinical course, prevention and treatment alternatives, and life risks associated with pregnancy. This epidemiologic foundation easily embraces information as disparate as the data we have about the community phenomena of pregnancy and abortion as well as the range of individual choices that determine the occurrence and outcome of pregnancy experience.

In reviewing the enormous range of information we have, we may arrive at several important perspectives that help us understand our alternatives in treating both desired and undesired pregnancies:

- Pregnancy should be seen as a biocultural event in the context of other human illnesses.
- The prevention and treatment of pregnancy should be seen as biocultural events in the context of other forms of health care.
- The open recognition and treatment of pregnancy as an illness would be consistent with the individual self-interest of those experiencing pregnancy, good standards of medical practice, and the continued survival of human and other species.
- The treatment of pregnancy should be tailored to the specific needs of the individual woman, with her safety and her desires as the highest priorities.
- The choice of treatment of pregnancy should occur in the context of the normal evaluation of medical treatment; that is to say the safest and most appropriate treatment should be chosen on the basis of the patient’s safety and long-term risks and not according to the convenience of health-care providers or political ideology.³⁶⁵
- Due to the comparative mortality risks of induced abortion and term birth, abortion is the indicated treatment of choice for pregnancy unless pregnancy is desired for the purpose

of reproduction.³⁶⁶ In this sense, the distinction between elective and therapeutic abortions is false; all abortions are therapeutic. The elective treatment of pregnancy is the medical management or late surgical intervention of continued pregnancy to assure survival of the pregnant woman through parturition and the puerperium.

There is no social, political, or economic justification for withholding the treatment of choice in pregnancy.

REFERENCES

1. Omran AR: Population epidemiology. *Am J Public Health* 64:674, 1974
2. Hern WM: The illness parameters of pregnancy. *Soc Sci Med* 9:365, 1975
3. Benedict B: Social regulation of fertility. In Harrison GA, Boyce AJ (eds): *The Structure of Human Populations*. Oxford, Clarendon Press, 1972
4. Ford CS: *A Comparative Study of Human Reproduction*. New Haven, Human Relations Area File Press, 1964
5. Nag M: *Factors Affecting Human Fertility in Nonindustrial Societies: A Cross-Cultural Study*. New Haven, Human Relations Area File Press, 1976
6. Lorimer F: *Culture and Human Fertility*. New York, UNESCO, 1954
7. Browner C: The management of early pregnancy: Colombian folk concepts of fertility control. *Soc Sci Med (B)* 14:25, 1980
8. Stout DB: *San Blas Cuna Acculturation: An Introduction*. New York, Viking Fund Publications in Anthropology, No. 9, 1957
9. Mead M, Newton N: Cultural patterning of perinatal behavior. In Richardson S, Guttmacher AF (eds): *Childbearing: Its Social and Psychological Aspects*, p. 142. Baltimore, Williams & Wilkins, 1967
10. Newton N: The effect of psychological environment on childbirth: Combined cross-cultural and experimental approach. *J Cross Cult Psychol* 1:85, 1970
11. Firth R: *We the Tikopia*. Boston, Beacon press, 1963
12. Firth R: *Social Change in Tikopia*. New York, Macmillan, 1959
13. Lewis O: *Tepoztlán: Village in Mexico*, Chap 6, p 69. New York, Holt, Rinehart & Winston, 1967
14. Hilger I: *Araucanian Child Life and Its Cultural Background*, Smithsonian Institution Miscellaneous Collections, No. 113, 1957
15. Foster GM, Anderson BG: *Medical Anthropology*, p 285. New York, John Wiley & Sons, 1978
16. Devereux G: A typological study of abortion in 350 primitive, ancient and preindustrial societies. In Rosen H (ed): *Abortion in America*, p 97. Boston, Beacon Press, 1967
17. Devereux G: *A Study of Abortion in Primitive Societies*. New York, Julian Press, 1955
18. Shain RN: Abortion practices and attitudes in cross-cultural perspective. *Am J Obstet Gynecol* 142:245, 1982

19. Eastman NJ, Hellman LM: *Williams' Obstetrics*, 12th ed, Chap 12, p 337. New York, Appleton-Century-Crofts, 1961
20. Yerushalmy J, Palmer CE, Kramer M: Studies in childbirth mortality: 2. Age and parity in childbirth fatality. *Public Health Rep* 55:1195, 1940
21. Perkin GW: Assessment of reproductive risk in nonpregnant women. *Am J Obstet Gynecol* 101:709, 1968
22. Menken J: The health and social consequences of teenage childbearing. *Fam Plann Perspect* 4:45, 1972
23. Calderone M (ed): *Abortion in the United States*, p 118. New York, Harper-Hoeber, 1958
24. Suchman EA: Social patterns of illness and medical care. *J Health Hum Behav* 6:2, 1965
25. Lewis A: Health as a social concept. *Br J Soc* 4:109, 1953
26. Benedict R: Anthropology and the abnormal. *J Genet Psychol* 10:59, 1934
27. Mead M: *Cultural Patterns and Technical Change*, p 229. New York, Mentor Books, 1963
28. Smith TE: The Cocos-Keeling Islands: A demographic laboratory. *Popul Stud* 16:94, 1960
29. Hern WM: High fertility in a Peruvian Amazon Indian village. *Hum Ecol* 5:355, 1977
30. Mechanic D: *Medical Sociology*, p 16. New York, Free Press, 1968
31. Carroll JB (ed): *Language, thought, and reality: Selected Writings of Benjamin Lee Whorf*. Cambridge, MIT Press, 1964
32. Frake CO: The diagnosis of disease among the Subanum of Mindanao. In Hymes D (ed): *Language in Culture and Society*, p 192. New York, Harper & Row, 1964
33. Hern WM: Is pregnancy really normal? *Fam Plann Perspect* 3:5, 1971
34. DeLee JB, Greenhill JP: *Principles and Practice of Obstetrics*, 8th ed, p xiii. Philadelphia, WB Saunders, 1943
35. Freeman MG: Obstetric triage in indigent women. *Obstet Gynecol* 36:919, 1970
36. Mauriceau F: *Des Maladies des Femmes Grosses et Accouchées*, p 105. Paris, Charles Coignard, 1668. (English translation by Chamberlen H: *The Accomplished Midwife, Treating of the Diseases of Women with Child, and in Child-bed*. London, John Darby, 1673)
37. Lerner M, Anderson OW: *Health Progress in the United States: 1900-1960*, Chap 4, p 34. Chicago, University of Chicago Press, 1963
38. Willson JR: Health care for women: Present deficiencies and future needs. *Obstet Gynecol* 36:178, 1970
39. Marmol JG, Scriggens AL, Vollman RF: History of maternal mortality study committees in the United States. *Obstet Gynecol* 34:123, 1969
40. Yerushalmy J: On the interval between successive births and its effect on the survival of infants. *Hum Biol* 17:65, 1945
41. Yerushalmy J: Neonatal mortality by order of birth and age of parents. *Am J Hyg* 28:244, 1938
42. Westoff CF, Potter, RG, Sagi PC: *The Third Child*, Chap 6. Princeton, Princeton University Press, 1963
43. Jaffe FS, Polgar S: Epidemiological indications for fertility control. *J Christ Med Assoc Ind (Suppl)*, p 12, 1967

44. Eastman NJ: The effect of the interval between births on a maternal and fetal outlook. *Am J Obstet Gynecol* 47:445, 1944
45. Morris JN, Heady JA: Social and biological factors in infant mortality. *Lancet* 1:343, 1955
46. Morris JN, Heady JA: Social and biological factors in infant mortality: Variation in mortality with mother's age and parity. *J Obstet Gynaecol Br Emp* 66:577, 1959
47. Baird D: The influence of social and economic factors on stillbirths and neonatal deaths. *J Obstet Gynaecol Br Emp* 52:21, 1945
48. Wray JD: Population pressure on families: Family size and child spacing. In Revelle R, Coale AJ, Freymann M et al (eds): *Rapid Population Growth: Consequences and Policy Implications*, Vol II, p 403. Baltimore, Johns Hopkins Press, 1971
49. Lerner, Anderson, *op cit*, p 32
50. National Center for Health Statistics: *Vital Statistics of the United States*, Vol 2, Mortality, 1940 through 1978. Washington, DC, Government Printing Office, 1980
51. Phillips OC, Hulka JF: Obstetric mortality. *Anesthesiology* 26:435, 1965
52. Klein MD, Karten I: Maternal deaths: A health and socioeconomic challenge. *Am J Obstet Gynecol* 110:298, 1971
53. Benaron HB, Tucker BE: The effect of obstetric management and factors beyond clinical control on maternal mortality rates at the Chicago Maternity Center from 1959 to 1963. *Am J Obstet Gynecol* 110:1113, 1971
54. Polgar S: Health. In Sills DL (ed): *International Encyclopedia of the Social Sciences*, pp 330-336. Riverside, NJ, Macmillan, Free Press, Glencoe, 1968
55. Suchman, *op cit*
56. Rosengren WR: Some social psychological aspects of delivery room difficulties. *J Nerv Ment Dis* 132:515, 1961
57. Engel G: A unified concept of health and disease. *Perspect Biol Med* 3:459, 1960
58. Grimm ER: Psychological tension in pregnancy. *Psychosom Med* 23:520, 1961
59. Rosengren WR: Social sources of pregnancy as illness or normality. *Soc Forum* 39:260, 1961
60. Rosengren WR: Social instability and attitudes toward pregnancy as a social role. *Soc Prob* 9:371, 1952
61. Davids A, Rosengren WR: Social stability and psychological adjustment during pregnancy. *Psychosom Med* 24:579, 1962
62. Poffenberger S, Poffenberger T: Intent toward conception and the pregnancy experience. *Am Sociol Rev* 17:616, 1952
63. Davids A, DeVault S: Maternal anxiety during pregnancy and childbirth abnormalities. *Psychosom Med* 24:464, 1962
64. Squier R, Dunbar F: Emotional factors in the course of pregnancy. *Psychosom Med* 8:161, 1946
65. Weil RJ, Tupper C: Personality, life situation, and communication: A study of habitual abortion. *Psychosom Med* 22:448, 1960
66. Benedek T: The psychobiology of pregnancy. In Anthony EJ, Benedek T (eds): *Parenthood: Its Psychology and Psychopathology*, p 137. Boston, Little, Brown & Co, 1970

67. Wortis H, Freedman AM: Maternal stress and premature delivery. *Bull WHO* 26:285, 1962
68. Coppen AJ: Psychosomatic aspects of pre-eclamptic toxæmia. *J Psychosom Res* 2:241, 1958
69. Wiehl DG, Berry K, Tompkins WT: Complications of pregnancy among prenatal patients reporting nervous illness. In Passamanick B (ed): *Epidemiology of Mental Disorders*, Washington, DC, American Association for the Advancement of Science, 1959
70. Zemlick MJ, Watson RI: Maternal attitudes of acceptance and rejection during and after pregnancy. *Am J Orthopsychiatry* 23:570, 1953
71. Sontag LW: Differences in modifiability of fetal behavior and physiology. *Psychosom Med* 6:151, 1944
72. Wile IS, Davis R: The relation of birth to behavior. *Am J Orthopsychiatry* 11:32, 1941
73. Spelt BK: The conditioning of the human fetus in utero. *J Exp Psychol* 38:338, 1948
74. Stott DH: Psychological and mental handicaps in the child following a disturbed pregnancy. *Lancet* 1:1006, 1957
75. Stott DH: Evidence for prenatal impairment of temperament in mentally retarded children. *Vita Hum* 2:125, 1959
76. Newton N, Teeler B, Newton M: Effect of disturbance on labor. *Am J Obstet Gynecol* 101:1096, 1968
77. Cates W, Grimes DA, Smith JC: Abortion as a treatment for unwanted pregnancy: the number two sexually-transmitted condition. *Adv Plann Parent* 12:115, 1978
78. Benedek, *op cit*, p 137
79. Romm M: In Rosen H (ed): *Abortion in America*, Chap 14, p 210. Boston, Beacon Press, 1967
80. Mechanic D, Volkart EH: Stress, illness behavior, and the sick role. *Am Sociol Rev* 26:51, 1961
81. Newman LF: *Culture and Perinatal Environment in American Society*, p 138. Doctoral thesis, Berkeley, California, 1967
82. Newman LF: Folklore of pregnancy: Wives' tales in Contra Costa County, California. *West Folk* 28:112, 1969
83. Festinger L: *A Theory of Cognitive Dissonance*, p 263. Evanston, IL, Rowe & Paterson, 1957
84. Saunders L: *Cultural Difference and Medical Care*. New York, Russell Sage Foundation, 1954
85. Polgar S: Health action in cross-cultural perspective. In Freeman HE, Levine S, Reeder LG (eds): *Handbook of Medical Sociology*, p 397. Englewood Cliffs, NJ, Prentice-Hall, 1963
86. Cassel J: Social science theory as a source of hypothesis in epidemiological research. *Am J Public Health* 54:1482, 1964
87. Cassel J: Health consequences of population density and crowding. In Revelle R, Coale AJ, Freymann M et al (eds): *Rapid Population Growth:*

- Consequences and Policy Implications, Vol II, p 462. Baltimore, Johns Hopkins Press, 1971
88. Nuckolls KB, Cassel J, Kaplan BH: Psychosocial assets, life crisis, and the prognosis of pregnancy. *Am J Epidemiol* 95:431, 1972
 89. Bumpass L, Westoff CF: The "perfect contraceptive" population. *Science* 169:1177, 1970
 90. Sloane RB: The unwanted pregnancy. *N Engl J Med* 280:1206, 1969
 91. Liben F: Minority group clinic patients pregnant out of wedlock. *Am J Public Health* 59:1868, 1969
 92. Furstenberg F Jr, Gordis L, Markowitz M: Birth control knowledge and attitudes among unmarried pregnant adolescents: A preliminary report. *J Mar Fam* 31:34, 1969
 93. Furstenberg F Jr: Premarital pregnancy among black teenagers. *Transaction*, p 52, 1970
 94. Pohlman E: "Wanted" and "unwanted": Toward less ambiguous definition. *Eugen Q* 12:19, 1965
 95. Steele BF, Pollack CB: Psychiatric study of parents who abuse infants and small children. In Helfer RE, Kempe CH (eds): *The Battered Child*, p 103. Chicago, University of Chicago Press, 1968
 96. Armijo R, Monreal T: The epidemiology of provoked abortion in Santiago, Chile. In Muramatsu M, Harper PA (eds): *Population Dynamics*, p 137. Baltimore, Johns Hopkins Press, 1965
 97. Requena M: Social and economic correlates of induced abortion in Santiago, Chile. *Demography* 2:33, 1965
 98. Henshaw S, Forrest JD, Sullivan E et al: Abortion services in the United States: 1979-1980. *Fam Plann Perspect* 14:5, 1982
 99. Tietze C: *Induced Abortion: A World Review*, 1983, 5th ed, p 33. New York, The Population Council, 1983
 100. David HP: Induced abortion: Psychosocial aspects. In Sciarra JJ (ed): *Gynecology and Obstetrics*, Vol 6, Chap 53. Philadelphia, Harper & Row, 1982
 101. Fainstat T: Ureteral dilatation in pregnancy: A review. *Obstet Gynecol Surv* 18:845, 1963
 102. Reid DE: *A Textbook of Obstetrics*, pp 160-217. Philadelphia, WB Saunders, 1962
 103. Douglas BH, Colemann TG, Whittington-Coleman PJ: Circulatory dynamics of pregnancy: IV. Fluid accumulation. *Am J Obstet Gynecol* 108:999, 1970
 104. Hytten FE, Leitch I: *The Physiology of Human Pregnancy*, p 148. Philadelphia, FA Davis, 1963
 105. Sandiford I, Wheeler T: Basal metabolism before, during, and after pregnancy. *J Biol Chem* 62:329, 1924
 106. Sims EAH: Renal function in normal pregnancy. *Clin Obstet Gynecol* 11:461, 1968
 107. Watanabe M, Meeker CI, Gray MJ et al: Secretion rate of aldosterone in normal pregnancy. *J Clin Invest* 42:1619, 1963

108. Abitbol MM: Weight gain in pregnancy. *Am J Obstet Gynecol* 104:140, 1969
109. Reid, *op cit*, p 269
110. Douglas, Colemann, Whittington-Coleman, *op cit*
111. Hellman LM, Pritchard JA: *Williams' Obstetrics*, 14th ed, p 252. New York, Appleton-Century-Crofts, 1971
112. Markarian M, Jackson J: Comparison of the kinetics of clot formation, fibrinogen, fibrinolysis, and hematocrit in pregnant women and adults. *Am J Obstet Gynecol* 101:593, 1968
113. Ygge J: Changes in blood coagulation and fibrinolysis during the puerperium. *Am J Obstet Gynecol* 104:2, 1969
114. Hytten, Leitch, *op cit*, p 24
115. Douglas, Colemann, Whittington-Coleman, *op cit*
116. Rothman D: Folic acid in pregnancy. *Am J Obstet Gynecol* 108:149, 1970
117. Rudolph JH, Wax SH: The 131 I renogram in pregnancy: Normal pregnancy. *Obstet Gynecol* 30:385, 1967
118. Sims EAH, Krantz KE: Serial studies of renal function during pregnancy and the puerperium in normal women. *J Clin Invest* 37:1764, 1958
119. Lindheimer MD, Katz AI: The kidney in pregnancy. *N Engl J Med* 283:1095, 1970
120. Hall DG, Fahim MS, Griffin WT et al: Hepatic metabolic activity related to reproduction. *Am J Obstet Gynecol* 109:744, 1971
121. Pritchard JA, MacDonald PC: *Williams' Obstetrics*, 16th ed. New York, Appleton-Century-Crofts, 1980
122. Brandes JM: First-trimester nausea and vomiting as related to outcome of pregnancy. *Obstet Gynecol* 30:427, 1967
123. Benson RC: *Handbook of Obstetrics and Gynecology*. Los Altos, CA, Lange Medical Publications, 1964
124. Hytten, Leitch, *op cit*, p 129
125. O'Rourke DE, Quinn JG, Nicholson JO et al: Geophagia during pregnancy. *Obstet Gynecol* 29:581, 1967
126. Jessner L, Weigart E, Foy JL: The development of parental attitudes during pregnancy. In Anthony EJ, Benedek T (eds): *Parenthood: Its Psychology and Psychopathology*, pp 209-224. Boston, Little, Brown & Co, 1970
127. *Ibid*
128. Reid, *op cit*, p 160
129. Mizejewski GJ, Quinones J, Baron J: Radioglobulin localization and immunospecificity in the transplanted human choriocarcinoma. *Am J Obstet Gynecol* 111:413, 1971
130. Hellman, Pritchard, *op cit*
131. *Ibid*
132. Apte SV, Iyengar L: Absorption of dietary iron in pregnancy. *Am J Clin Nutr* 23:73, 1970
133. Sturgeon P: Studies of iron requirements in infants: III. Influence of supplemental iron during normal pregnancy on mother and infant. Pt. A. The mother. *Br J Haematol* 5:31, 1959
134. Apte, Iyengar, *op cit*

135. Rothman, *op cit*
136. Kahn SB, Fein S, Rigberg S et al: Correlation of folate metabolism and socio-economic status in pregnancy and in patients taking oral contraceptives. *Am J Obstet Gynecol* 108:931, 1970
137. Iyengar L: Folic acid requirements of Indian pregnant women. *Am J Obstet Gynecol* 111:13, 1971
138. Burrows S, Pekal B: Serum copper and ceruloplasmin in pregnancy. *Am J Obstet Gynecol* 109:907, 1971
139. Polishuk WZ, Diamant YZ, Zuckerman H et al: Leukocyte alkaline phosphatase in pregnancy and the puerperium. *Am J Obstet Gynecol* 107:604, 1970
140. Elder MG, Bonello F, Ellul J: Neutrophil alkaline phosphatase in pregnancy and its relationship to urinary estrogen excretion and serum heat-stable alkaline phosphatase levels. *Am J Obstet Gynecol* 111:319, 1971
141. Maroulis GB, Buckley RH, Younger JB: Serum immunoglobulin concentrations during normal pregnancy. *Am J Obstet Gynecol* 109:971, 1971
142. Mendenhall HW: Serum protein concentrations in pregnancy. *Am J Obstet Gynecol* 106:388, 1970
143. Markarian, Jackson, *op cit*
144. Ygge, *op cit*
145. Connel EB, Connell JT: C-reactive protein in pregnancy and contraception. *Am J Obstet Gynecol* 110:633, 1971
146. Norden CW, Kass EH: Bacteriuria in pregnancy: A critical appraisal. *Ann Rev Med* 19:431, 1968
147. Teoh ES, Dawood MY, Ratnam SS: Epidemiology of hydatidiform mole in Singapore. *Am J Obstet Gynecol* 110:415, 1971
148. Hohe PT, Cochrane CR, Gmelich JT et al: Coexistent trophoblastic tumor and viable pregnancy. *Obstet Gynecol* 38:899, 1971
149. Sims EAH: Pre-eclampsia and related complications of pregnancy. *Am J Obstet Gynecol* 107:154, 1970
150. Weeks LR, Grieg LB: Placenta accreta: A twenty-year review. *Am J Obstet Gynecol* 113:76, 1972
151. Whitham RG, Malberg BJ: Placenta accreta: A case report. *RM Med J* 76:241, 1979
152. Ober WB, Lecompte PM: Acute fatty metamorphosis of the liver associated with pregnancy: A distinctive lesion. *Am J Med* 19:743, 1955
153. Holzbach RT: Acute fatty liver of pregnancy with disseminated intravascular coagulation. *Obstet Gynecol* 43:740, 1974
154. Schrimsky DC, Benson RC: Rupture of the pregnant uterus: A review. *Obstet Gynecol Surv* 33:217, 1978
155. Dainer MJ: Spontaneous uterine rupture. *J Reprod Med* 26:35, 1981
156. DeWane JC, McCubbin JH: Spontaneous rupture of an unscarred uterus at 19 weeks' gestation. *Am J Obstet Gynecol* 141:222, 1981
157. Grimes DA, Cates W Jr, Ziskin LZ et al: Maternal death at term as a late sequela of failed attempted abortion. *Adv Plann Parent* 14:77, 1979
158. Roche WD, Norris HJ: Detection and significance of maternal pulmonary amniotic fluid embolism. *Obstet Gynecol* 43:729, 1974

159. Resnik R, Swartz WH, Plumer MH et al: Amniotic fluid embolism with survival. *Obstet Gynecol* 47:295, 1976
160. Schneider J, Berger CJ, Cattell C: Maternal mortality due to ectopic pregnancy: A review of 102 deaths. *Obstet Gynecol* 49:557, 1977
161. Rubin GL, Cates W Jr, Gold J et al: Fatal ectopic pregnancy after attempted legally induced abortion. *JAMA* 244:1705, 1980
162. Byrne JJ: Thrombophlebitis in pregnancy. *Clin Obstet Gynecol* 13:305, 1970
163. Teteris NJ, Lina AA, Holoday WJ: Placenta percreta. *Obstet Gynecol* 47 (Suppl):15, 1976
164. Perkins RP: Inherited disorders of hemoglobin synthesis and pregnancy. *Am J Obstet Gynecol* 111:120, 1971
165. Reynolds SRM: Right ovarian vein syndrome. *Obstet Gynecol* 37:308, 1971
166. Brown TK, Munsick RA: Puerperal ovarian vein thrombophlebitis: A syndrome. *Am J Obstet Gynecol* 109:263, 1971
167. Erhardt CL, Nelson FG, Pakter J: Seasonal patterns of conception in New York City. *Am J Public Health* 61:2246, 1971
168. Teoh, Dawood, Ratnam, *op cit*
169. Peel J, Potts M: *Textbook of Contraceptive Practice*. London, Cambridge University Press, 1969
170. Mechanic, Volkart, *op cit*
171. Kasl SV, Cobb S: Health behavior, illness behavior, and sick role behavior. *Arch Environ Health* 12:246, 1966
172. Suchman, *op cit*
173. Newman, *op cit*, doctoral thesis
174. Newman, *op cit*, Folklore of pregnancy
175. Lewis *op cit*
176. McKinlay JB: The sick role: Illness and pregnancy. *Soc Sci Med* 6:561, 1972
177. Jessner, Weigart, Foy, *op cit*
178. Mead, Newton, *op cit*
179. Pohlman EH: Motivations in wanting conceptions. In Pohlman EH (ed): *The Psychology of Birth Planning*, pp 48–81. Cambridge, Schenkman Publishing, 1969
180. Himes NE: *Medical History of Contraception*, pp 59–104. New York, Gamut Press, 1963
181. Billingham RE: Transplantation immunity and the maternal-fetal relation. *N Engl J Med* 270:667, 1964
182. Simmons RL, Russell PS: The immunologic problem of pregnancy. *Am J Obstet Gynecol* 85:583, 1963
183. Douthwaite RM, Urbach GI: In vitro antigenicity of trophoblast. *Am J Obstet Gynecol* 109:1023, 1971
184. Kaplan SL, Grumbach MM: Serum chorionic "growth hormone-prolactin" and serum pituitary growth hormone in mother and fetus at term. *J Clin Endocrinol* 25:1370, 1965
185. Page EW: Some evolutionary concepts of human reproduction. *Obstet Gynecol* 30:318, 1967

186. Cameron TWM: Parasites and Parasitism, pp 226–236. New York, John Wiley & Sons, 1956
187. Perez-Tamayo R: Mechanisms of Disease, pp 329–330. Philadelphia, WB Saunders, 1961
188. *Ibid*, p 338
189. Dubos R: Man Adapting, pp 254–279. New Haven, Yale University Press, 1965
190. Cassel J, *op cit*, Social science theory
191. Engel G: A unified concept of health and disease. *Perspect Biol Med* 3:459, 1960
192. Page, *op cit*
193. Torpin R: Placentation and mammalian phylogeny. *Obstet Gynecol* 37:942, 1971
194. Engel G: Is grief a disease? *Psychosom Med* 23:18, 1961
195. Wolf S: Disease as a way of life: Neural integration of systematic pathology. *Perspect Biol Med* 4:288, 1961
196. Medawar PB: The Future of Man, pp 27–34; 95–103. New York, Basic Books, 1960
197. Himes, *op cit*
198. Potts DM: History of contraception. In Sciarra JJ (ed): *Gynecology and Obstetrics*, Vol 6, Chap 8. Philadelphia, Harper & Row, 1982
199. Newman LF: Birth Control: An Anthropological View, No. 27. Reading, MA, Addison-Wesley Modular Publications, 1972
200. Hern WM: Knowledge and use of herbal contraceptives in a Peruvian Amazon village. *Hum Organ* 35:9, 1976
201. Dumond DE: The limitation of human population: A natural history. *Science* 187:713, 1975
202. Hart DV, Rajadhon PA, Coughlin RJ: Southeast Asian Birth Customs: Three Studies in Human Reproduction. New Haven, Human Relations Area File Press, 1965
203. MacCormack CP (ed): *Ethnography of Fertility and Birth*. New York, Academic Press, 1982
204. Spencer RF: Embryology and obstetrics in preindustrial societies. In Landy D (ed): *Culture, Disease, and Healing: Studies in Medical Anthropology*. New York, Macmillan, 1977
205. Tietze, *op cit*, World Review
206. David HP: Abortion policies. In Hodgson JE (ed): *Abortion and Sterilization: Medical and Social Aspects*, p 1. New York, Grune & Stratton, 1981
207. Tietze C: Induced abortion: Epidemiological aspects. In Sciarra JJ (ed): *Gynecology and Obstetrics*, Vol 6, Chap 52. Philadelphia, Harper & Row, 1982
208. Tietze, *op cit*, World Review
209. Henshaw, Forrest, Sullivan et al, *op cit*
210. Tietze, *op cit*, World Review, p 33
211. Henshaw, Forrest, Sullivan et al, *op cit*
212. Tietze, *op cit*, World Review, p 33

213. Henshaw, Forrest, Sullivan et al, *op cit*
214. Tietze, *op cit*, World Review, p 5
215. Tietze C, Bongaarts J, Shearer B: Mortality associated with the control of fertility. *Fam Plann Perspect* 8:6, 1976
216. National Center for Health Statistics, *op cit*
217. *Ibid*
218. Cates W Jr, Rochat RW, Grimes DA et al: Legalized abortion: Effect on national trends of maternal and abortion-related mortality (1940 through 1976). *Am J Obstet Gynecol* 132:211, 1978
219. Droegemueller W, Taylor ES, Drose VE: The first year of experience in Colorado with the new abortion law. *Am J Obstet Gynecol* 103:694, 1969
220. Stewart GK, Goldstein P: Therapeutic abortion in California: Effects on septic abortion and maternal mortality. *Obstet Gynecol* 37:510, 1971
221. Fox LP: Abortion deaths in California. *Am J Obstet Gynecol* 98:645, 1967
222. National Center for Health Statistics: Vital Statistics of the United States, 1967, Vol II, Mortality, Pt A, pp 1-40. US Department of Health, Education, and Welfare, 1969
223. Phillips LL, Skrodelis V, Quigley HJ Jr: Intravascular coagulation and fibrinolysis in septic abortion. *Obstet Gynecol* 30:350, 1967
224. Strum WB, Cade R, Shires DL et al: Postabortal septicemia due to *Clostridium welchii*. *Arch Intern Med* 122:73, 1968
225. Rotheram EB Jr, Schick SF: Nonclostridial anaerobic bacteria in septic abortion. *Am J Med* 46:80, 1969
226. Schwarz RH: Septic Abortion, Chap 2. Philadelphia, JB Lippincott, 1968
227. Seward PN, Ballard CA, Ulene AL: The effect of legal abortion on the rate of septic abortion at a large county hospital. *Am J Obstet Gynecol* 115:335, 1973
228. Polgar S, Fried ES: The bad old days: Clandestine abortions among the poor in New York City before liberalization of the abortion law. *Fam Plann Perspect* 8:125, 1976
229. Gold EM, Erhardt CL, Jacobziner H et al: Therapeutic abortions in New York City: A 20 year review. *Am J Public Health* 55:964, 1965
230. Bracken MB, Freeman DH Jr, Hellenbrand K: Hospitalization for medical-legal and other abortions in the United States 1970-1977. *Am J Public Health* 72:30, 1982
231. Pakter J: National trends in the health impact of abortion. In Hern WM, Andrikopoulos B (eds): *Abortion in the Seventies*, p 69. New York, National Abortion Federation, 1977
232. Centers for Disease Control: *Abortion Surveillance 1978*, p 30, November 1980
233. Wennberg JE, Bunker JP, Barnes B: The need for assessing the outcome of common medical practices. *Ann Rev Public Health* 1:277, 1980
234. Cates W, Smith JC, Rochat RW et al: Mortality from abortion and childbirth: Are the statistics biased? *JAMA* 248:192, 1982
235. *Ibid*
236. Cates W Jr, Tietze C: Standardized mortality rates associated with legal abortion: United States, 1972-1975. *Fam Plann Perspect* 10:109, 1978

237. Cates W Jr: Abortions for teenagers. In Hodgson JE (ed): *Abortion and Sterilization: Medical and Social Aspects*. New York, Grune & Stratton, 1981
238. Bottoms SF, Rosen MG, Sokol RJ: The increase in the Caesarean birth rate. *N Engl J Med* 302:559, 1980
239. Duenhoelter JH, Jimenez JM, Baumann G: Pregnancy performance of patients under fifteen years of age. *Obstet Gynecol* 46:49, 1975
240. Pritchard, MacDonald, *op cit*, p 1081
241. Fortier L: What price motherhood? *Adv Plann Parent* 16:14, 1981
242. Berger GS, Tietze C, Pakter J et al: Maternal mortality associated with legal abortion in New York State: July 1, 1970–June 30, 1972. *Obstet Gynecol* 43:315, 1974
243. Tietze, *op cit*, *World Review*, p 92
244. Cates W Jr, Grimes DA: Morbidity and mortality of abortion in the United States. In Hodgson JE (ed): *Abortion and Sterilization: Medical and Social Aspects*. New York, Grune & Stratton, 1981
245. Berger GS, Tietze C, Pakter J et al: *op cit*
246. Diggory P: Hysterotomy and hysterectomy as abortion techniques. In Hodgson JE (ed): *Abortion and Sterilization: Medical and Social Aspects*. New York, Grune & Stratton, 1981
247. Tietze, *op cit*, *World Review*, p 77
248. Tietze C, Lewit S: Joint Program for the Study of Abortion (JPSA): Early medical complications of legal abortion. *Stud Fam Plann* 3:97, 1972
249. Karim SMM: The use of prostaglandins in abortion. In Lewit S (ed): *Abortion Techniques and Services*. Amsterdam, Excerpta Medica, 1972
250. Speroff L: Prostaglandins and abortion. In Osofsky HJ, Osofsky JD (eds): *The Abortion Experience*. Hagerstown, Harper & Row, 1973
251. Brenner WE, Berger GS: Pharmacological methods of inducing midtrimester abortion: Risks and benefits. In *Risks, Benefits, and Controversies in Fertility Control*. Sciarra JJ, Zatuchni GI, Speidel JJ (eds): Hagerstown, Harper & Row, 1978
252. Grimes DA, Schulz KF, Cates W Jr et al: Midtrimester abortion by intra-amniotic prostaglandin $F_{2\alpha}$: Safer than saline? *Obstet Gynecol* 49:612, 1977
253. Wetz AC, Thompson BH, King TM: Posterior cervical rupture following prostaglandin for midtrimester abortion. *Am J Obstet Gynecol* 115:1107, 1973
254. Cates W Jr, Jordaan HVF: Sudden collapse and death of women obtaining abortions induced with prostaglandin $F_{2\alpha}$. *Am J Obstet Gynecol* 133:398, 1979
255. Lee WK, Baggish MS: Live birth as a complication of second trimester abortion induced with intra-amniotic prostaglandin $F_{2\alpha}$. *Adv Plann Parent* 13:7, 1978
256. Droegemueller W: Second trimester abortion. In Hern WM, Andrikopoulos B (eds): *Abortion in the Seventies*. New York, National Abortion Federation, 1977
257. Droegemueller W, Weinstein L, Milzer G: Low-dose prostaglandins for second-trimester abortion. *Contemp Obstet Gynecol* 15:19, 1980
258. Bygdeman M: Comparison of prostaglandin and hypertonic saline for termination of pregnancy. *Obstet Gynecol* 52:424, 1978

259. Bygdeman MA: Prostaglandin procedures. In Berger GS, Brenner WE, Keith LG (eds): Second Trimester Abortion: Perspectives After a Decade of Experience. Boston, John Wright * PSG, 1981
260. Grimes, Schulz, Cates et al, *op cit*
261. Grimes DA, Cates W Jr: The comparative efficacy and safety of intra-amniotic prostaglandin F_{2α} and hypertonic saline for second-trimester abortion: A review and critique. J Reprod Med 22:248, 1979
262. Grimes DA, Schulz KF, Cates W Jr et al: Midtrimester abortion by dilatation and evacuation: A safe and practical alternative. N Engl J Med 296:1141, 1977
263. Grimes DA, Cates W Jr: Gestational age limit of twelve weeks for abortion by curettage. Am J Obstet Gynecol 132:207, 1978
264. Cates W Jr: D & E after 12 weeks: Safe or hazardous? Contemp Obstet Gynecol 13:23, 1979
265. Cates W Jr, Schulz KF, Gold J et al: Complications of surgical evacuation procedures for abortions after 12 weeks' gestation. In Zatuchni GI, Sciarra JJ, Speidel JJ (eds): Pregnancy Termination: Procedures, Safety, and New Developments. Hagerstown, Harper & Row, 1979
266. Cates W Jr, Schulz KF, Grimes DA et al: The effect of delay and method choice on the risk of abortion morbidity. Fam Plann Perspect 9:266, 1977
267. Grimes DA, Cates W Jr: Dilatation and evacuation. In Berger GS, Brenner WE, Keith LG (eds): Second Trimester Abortion: Perspectives After a Decade of Experience. Boston, John Wright * PSG, 1981
268. Cates W Jr, Grimes DA, Schulz KF et al: World Health Organization studies of prostaglandins versus saline as abortifacients: A reappraisal. Obstet Gynecol 52:493, 1978
269. Grimes DA, Hulka JF, McCutchen ME: Midtrimester abortion by dilatation and evacuation versus instillation of prostaglandin F_{2α}: A randomized clinical trial. Am J Obstet Gynecol 137:785, 1980
270. Centers for Disease Control, *op cit*, p 4
271. Henshaw S, Forrest JD, Sullivan E et al: Abortion in the United States, 1978-1979. Fam Plann Perspect 13:6, 1981
272. *Ibid*
273. Grimes DA, Cates W Jr, Tyler CW Jr: Comparative risk of death from legally induced abortion in hospitals and nonhospital facilities. Obstet Gynecol 51:323, 1978
274. Grimes DA, Cates W Jr, Selik RM: Abortion facilities and the risk of death. Fam Plann Perspect 13:30, 1981
275. Cates W Jr, Grimes DA: Deaths from second trimester abortion by dilatation and evacuation: Causes, prevention, facilities. Obstet Gynecol 58:401, 1981
276. Hern WM: Outpatient second-trimester D & E abortion through 24 menstrual weeks' gestation. Adv Plann Parent 16:7, 1981
277. Hern WM, Oakes AG: Multiple laminaria treatment in early midtrimester outpatient suction abortion. Adv Plann Parent 12:93, 1977
278. Hubacker AS: Dilatation and extraction for late second-trimester abortion. Adv Plann Parent 15:119, 1981

279. Altman A, Stubblefield PG, Parker K et al: Midtrimester abortion by laminaria and vacuum evacuation on a teaching service: A review of 789 cases. *Adv Plann Parent* 16:1, 1981
280. Finks AA: Midtrimester abortion. *Lancet* 1:263, 1973
281. Brenner WE, Edelman DA: Dilatation and evacuation at 13 to 15 weeks' gestation versus intra-amniotic saline after 15 weeks' gestation. *Contraception* 10:171, 1974
282. Koplik L: Early midtrimester abortion by curettage. Presented at the 13th annual meeting of the Association of Planned Parenthood Physicians, Los Angeles, April 7, 1975
283. DeLee ST: Termination of pregnancy in the mid-trimester using a new technique: Preliminary report. *Int Surg* 61:545, 1976
284. Hodari AA, Peralta J, Quiroga PJ et al: Dilatation and curettage for second-trimester abortions. *Am J Obstet Gynecol* 127:850, 1977
285. Barr MM: Midtrimester abortions: 12 to 20 weeks by dilatation and evacuation method under local anesthesia. *Adv Plann Parent* 13:16, 1978
286. Burnhill MS: Vaginal second-trimester abortion. In Sciarra JJ, Speidel JJ, Zatuchni GI (eds): *Risks, Benefits, and Controversies in Fertility Control*. Hagerstown, Harper & Row, 1978
287. Hanson MS: Midtrimester abortion: Dilatation and extraction preceded by laminaria. In Zatuchni GI, Sciarra JJ, Speidel JJ (eds): *Pregnancy Termination: Procedures, Safety, and New Developments*. Hagerstown, Harper & Row, 1979
288. Peterson WF: Dilatation and evacuation: Patient evaluation and surgical techniques. In Zatuchni GI, Sciarra JJ, Speidel JJ (eds): *Pregnancy Termination: Procedures, Safety, and New Developments*. Hagerstown, Harper & Row, 1979
289. Van Lith DAF, Beekhuizen W, van Schie KJ: Complications of aspirotomy (AT): A modified dilatation and curettage procedure for terminating early second-trimester pregnancies. In Zatuchni GI, Sciarra JJ, Speidel JJ (eds): *Pregnancy Termination: Procedures, Safety, and New Developments*. Hagerstown, Harper & Row, 1979
290. Grimes DA, Hulka JF: Midtrimester dilatation and evacuation abortion. *South Med J* 73:448, 1980
291. Cadesky KI, Ravinsky E, Lyons ER: Dilatation and evacuation: A preferred method of midtrimester abortion. *Am J Obstet Gynecol* 139:329, 1981
292. Berry FN, Peterson WF: D & E plus suction in midtrimester abortion. *Fem Pat*, 78, November 1978
293. Boyd C: Early midtrimester abortion. Presented at the third annual meeting of the National Abortion Federation, New York, July 1979
294. Stubblefield PG: Laminaria and other adjunctive methods. In Berger GS, Brenner WE, Keith LG (eds): *Second Trimester Abortion: Perspectives After a Decade of Experience*. Boston, 1981 John Wright & PSG, 1981
295. Manabe Y: Laminaria tent for gradual and safe cervical dilatation. *Am J Obstet Gynecol* 110:743, 1971
296. Newton BW: Laminaria tent: Relic of the past or modern medical device? *Am J Obstet Gynecol* 113:442, 1972

297. Eaton CJ, Cohn F, Bollinger CC: Laminaria tent as a cervical dilator prior to aspiration-type therapeutic abortion. *Obstet Gynecol* 39:533, 1972
298. Hale RW, Pion RJ: Laminaria: An underutilized clinical adjunct. *Clin Obstet Gynecol* 15:829, 1972
299. Niswander KR: Laminaria tents as an aid in suction abortion. *Calif Med* 119:11, 1973
300. Golditch IM, Glasser MH: The use of laminaria tents for cervical dilatation prior to vacuum aspiration abortion. *Am J Obstet Gynecol* 119:481, 1974
301. Hern WM: Laminaria in abortion: Use in 1368 patients in first trimester. *RM Med J* 72:390, 1975
302. Hern, Oakes, *op cit*
303. Hern, *op cit*, Outpatient D & E abortion
304. Barr, *op cit*
305. DeLee, *op cit*
306. Bierer I, Steiner V: Termination of pregnancy in the second trimester with the aid of laminaria tents. *Med Gynecol Soc* 6:9, 1972
307. Finks, *op cit*
308. Gold J, Schulz KF, Cates W Jr et al: The safety of laminaria and rigid dilators for cervical dilation prior to suction curettage for first trimester abortion: A comparative analysis. In Stubblefield PG, Naftolin F (eds): *Dilatation of the Uterine Cervix*, p 363. New York, Raven Press, 1980
309. Stubblefield PG, Altman AM, Goldstein SP: Randomized trial of one versus two days of laminaria treatment prior to late midtrimester abortion by uterine evacuation: A pilot study. *Am J Obstet Gynecol* 143:481, 1982
310. Stubblefield PG: Laminaria and other adjunctive methods. In Berger GS, Brenner WE, Keith LG (eds): *Second Trimester Abortion: Perspectives After a Decade of Experience*. Boston, John Wright * PSG, 1981
311. Schulz KF, Grimes DA, Cates W Jr: Cervical injury during suction curettage abortion. Presented at the 20th Annual Scientific Meeting of the Association of Planned Parenthood Professionals, Baltimore, November 19, 1982
312. Landy U, Lewit S: Administrative, counseling, and medical practices in National Abortion Federation facilities. *Fam Plann Perspect* 14:257, 1982
313. *Ibid*
314. Berger GS, Tyler CW, Harrod EK: Maternal deaths associated with paracervical block anesthesia. *Am J Obstet Gynecol* 118:1142, 1974
315. Grimes DA, Cates W Jr: Deaths from paracervical anesthesia used for first-trimester abortion, 1972-1975. *N Engl J Med* 295:1397, 1976
316. Blanco LJ, Reid PR, King TM: Plasma lidocaine levels following paracervical infiltration for aspiration abortion. *Obstet Gynecol* 60:506, 1982
317. Peterson HB, Grimes DA, Cates W Jr et al: Comparative risk of death from induced abortion at ≤ 12 weeks' gestation performed with local versus general anesthesia. *Am J Obstet Gynecol* 141:763, 1981
318. Grimes DA, Schulz KF, Cates W Jr et al: Local versus general anesthesia: Which is safer for performing suction curettage abortions? *Am J Obstet Gynecol* 135:1030, 1979
319. Shepard MK: Female contraceptive sterilization. *Obstet Gynecol Surv* 29:739, 1974

320. Fishburne JI, Edelman DA, Hulka JF et al: Outpatient laparoscopic sterilization with therapeutic abortion versus abortion alone. *Obstet Gynecol* 45:665, 1975
321. Powe CE, McGee JA: Combined outpatient laparoscopic sterilization with therapeutic abortion. *Am J Obstet Gynecol* 126:565, 1976
322. Kwak HM, Moon YK, Song CH et al: Timing of laparoscopic sterilization in abortion patients. *Obstet Gynecol* 56:85, 1980
323. Kimball AM, Hallum AV, Cates W Jr: Deaths caused by pulmonary thromboembolism after legally induced abortion. *Am J Obstet Gynecol* 132:169, 1978
324. Tietze C: Mortality with contraception and induced abortion. *Stud Fam Plann* 45:1, 1969
325. Tietze C, Lewit S: Life risks associated with reversible methods of fertility regulation. *Int J Gynaecol Obstet* 16:456, 1979
326. Tietze, Bongaarts, Shearer, *op cit*
327. Tietze, *op cit*, World Review, p 98
328. Ory HW: Mortality associated with fertility and fertility control: 1983. *Fam Plann Perspect* 15:57, 1983
329. Beral V: Reproductive mortality. *Br Med J* 2:632, 1979
330. Sachs BP, Layde PM, Rubin GL et al: Reproductive mortality in the United States. *JAMA* 247:2789, 1982
331. Cates, Schulz, Grimes et al, *op cit*
332. Bracken MB, Kasl SV: Delay in seeking induced abortion: A review and theoretical analysis. *Am J Obstet Gynecol* 121:1008, 1975
333. Tietze, Lewit, *op cit*, JPSA
334. Bracken MB, Swigar ME: Factors associated with delay in seeking induced abortions. *Am J Obstet Gynecol* 113:301, 1972
335. Johnson FD, Vincent L: Factors affecting gestational age at therapeutic abortion. *Lancet* 2:717, 1973
336. Kerényi TD, Glascock EL, Horowitz ML: Reasons for delayed abortion: Results of four hundred interviews. *Am J Obstet Gynecol* 117:299, 1973
337. Tietze, Lewit, *op cit*, JPSA
338. Bracken, Swigar, *op cit*
339. Mallory GB, Rubenstein LZ, Drosness DL et al: Factors responsible for delay in obtaining interruption of pregnancy. *Obstet Gynecol* 40:556, 1972
340. Chalmers I, Anderson A: Factors affecting gestational age at therapeutic abortion. *Lancet* 1:1324, 1972
341. Johnson, Vincent, *op cit*
342. Kerényi, Glascock, Horowitz, *op cit*
343. Mallory, Rubenstein, Drosness et al, *op cit*
344. Johnson, Vincent, *op cit*
345. Kerényi, Glascock, Horowitz, *op cit*
346. Bracken, Swigar, *op cit*
347. Mallory, Rubenstein, Drosness et al, *op cit*
348. Johnson, Vincent, *op cit*
349. Kaltreider NB: Emotional patterns related to delay in decision to seek legal abortion. *Calif Med* 118:23, 1973

350. Grauer H: A study of contraception as related to unwanted pregnancy. *Can Med Assoc J* 107:739, 1972
351. Kaltreider, *op cit*
352. Bracken MB, Kasl SV: Denial of pregnancy, conflict, and delayed decisions to abort. In *Proceedings of the Fourth International Congress of Psychosomatic Obstetrics and Gynecology*. Basel, S Karger AG, 1975
353. David HP: Induced abortion: Psychosocial aspects. In Sciarra JJ (ed): *Gynecology and Obstetrics*, Vol 6, Chap 53. Philadelphia, Harper & Row, 1982
354. Selik RM, Cates W Jr, Tyler CW Jr: Behavioral factors contributing to abortion deaths: A new approach to mortality studies. *Obstet Gynecol* 58: 631, 1981
355. Daily EF, Nicholas N, Nelson F et al: Repeat abortions in New York City: 1970–1972. *Fam Plann Perspect* 5:89, 1973
356. Tietze C: The “problem” of repeat abortions. *Fam Plann Perspect* 6:148, 1974
357. Tietze C: Repeat abortions: Why more? *Fam Plann Perspect* 10:286, 1978
358. Steinhoff PG, Smith RG, Palmore JA et al: Women who obtain repeat abortions: A study based on record linkage. *Fam Plann Perspect* 11:30, 1979
359. Steinhoff PG: Background characteristics of abortion patients. In Osofsky HJ, Osofsky JD (eds): *The Abortion Experience*, p 206. Hagerstown, Harper & Row, 1973
360. Schneider SM, Thompson DS: Repeat aborters. *Am J Obstet Gynecol* 126:316, 1976
361. Howe B, Kaplan R, English C: Repeat abortions: Blaming the victims. *Am J Public Health* 69:1242, 1979
362. Tietze C: Contraceptive practice in the context of a nonrestrictive abortion law: Age-specific pregnancy rates in New York City, 1971–1973. *Fam Plann Perspect* 7:197, 1975
363. Margolis A, Rindfuss R, Coghlan P et al: Contraception after abortion. *Fam Plann Perspect* 6:56, 1974
364. Miller E, McFarland V, Burnhill MS et al: Impact of the abortion experience on contraceptive acceptance. *Adv Plann Parent* 12:15, 1977
365. Planned Parenthood-World Population Washington Memo, August 3, 1977
366. Hern WM: Pregnancy: Personal blessing, social issue, or epidemic disease? Paper presented at the 10th annual meeting of the International Family Planning Research Association, Phoenix, Arizona, October 25, 1978