Obstetrics and Gynecology

9th Edition

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Preface

To prepare a textbook in obstetrics-gynecology that provides basic information for medical students and that also serves as a reference for beginning residents and practicing physicians in several specialties is a challenging project. It is difficult to strike an appropriate medium between a brief outline of the material and a comprehensive, all-inclusive text which contains not only basic material, but that which is necessary for the practicing specialist. We have once more resisted the temptation to expand the book. In fact, we have reduced its size by eliminating repetitious material and those portions of the text that added little to the understanding of the conditions under discussion. We have, however, retained the concept of isolating material that is not essential for medical student education, but which may be helpful to those with more advanced knowledge and skills. Much of the material concerning treatment—particularly that which may be too advanced for medical students and junior residents—is in the latter category. As was true of previous editions the emphasis is on reproductive physiology and on the diagnosis and management of conditions that do not require the expertise of a specialist obstetrician-gynecologist.

Outdated illustrations and those that added little to understanding the text have been deleted. Others have been redrawn to make them more informative and many new ones have been added.

The references include comprehensive review articles, which contain extensive bibliographies for those who are interested in advanced study, as well as reports of recent research. A number of classical papers have been included in the references.

Each chapter has been extensively revised or completely rewritten by contributors with expertise in specific areas. Russell K. Laros, Jr., assumed responsibility for much of the material concerning pregnancy and its complications, John H. Mattox supervised the chapters on reproductive endocrinology and infertility, and Michael Hopkins oversaw those on oncology. Following the untimely death of Dr. M.J. Daly, Lisa M. Fromm, Teresita A. McCarty, and Melissa Schiff revised the chapters on the female life cycle and sexual physiology and dysfunction.

An addition that we hope will be helpful to medical students are objectives for each chapter. The objectives, which are modeled after the Instructional Objectives developed by the Educational Committee of the Association of Professors of Gynecology and Obstetrics, define the minimum information that seems appropriate for medical students. Those who wish to learn more can study the advanced material presented and the papers listed in the references.

Once more we hope that *Obstetrics and Gynecology* will continue to serve as a basic textbook for the undifferentiated medical student, for beginning residents in obstetrics-gynecology and those in other programs, and for practicing physicians who treat women patients.

J. Robert Willson
Elsie Reid Carrington

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1

J. Robert Willson

Introduction

Objectives

RATIONALE: Although there have been significant improvements in obstetric care, injuries to and deaths of many mothers, fetuses, and newborn infants are from preventable causes.

The student should be able to:

A. Define *birthrate* and describe changes that have occurred in the birthrate since 1930.

B. Define *maternal death, fetal death, neonatal death,* and *perinatal mortality,* and for each describe how the rate is calculated.

C. List three important causes of maternal, fetal, and neonatal deaths.

D. Describe the potential problems associated with births to unmarried women and to teenagers.

It might appear that physicians who confine their professional activities to the treatment of pregnant women (obstetrics) and patients with dysfunctioning genital organs (gynecology) are limiting their practice rather severely. On the contrary, obstetricians and gynecologists must be familiar with many fields of medicine because their patients vary in age from those newly born to senescent women. It is possible for women with medical conditions such as hypertension, tuberculosis, rheumatic heart disease, diabetes, multiple sclerosis, and a host of others to conceive; and all manner of acute medical and surgical conditions may develop during pregnancy.

Gynecologists must be pediatricians, internists, endocrinologists, and surgeons because they treat females of all ages and often are the first persons consulted because of symptoms that arise in structures other than the genital organs. They must also be familiar with the basic principles of psychiatry and be able to recognize the emotional problems that so frequently manifest themselves in sexual disorders.

Obstetrician-gynecologists often provide considerable amounts of general medical care for their own patients. A survey of Fellows of the American College of Obstetricians and Gynecologists indicated that 57% of those responding serve

as principal providers of medical care for at least half of their patients, and 36% serve as providers for more than half. This is not surprising, as an obstetrician-gynecologist often has provided care for an individual patient before her marriage, during pregnancies, and at regular periodic examinations after childbearing is completed.

Unfortunately, physicians cannot respond adequately to the steadily increasing demands for obstetric-gynecologic care. In fact, they cannot even cope with all serious problems. For example, in 1989 about 7000 women died with cancer of the cervix, a disease that can be diagnosed so early that it can be eradicated almost without exception. The deaths occurred because these women were not screened for early cellular changes. An additional 3000 died of other malignant uterine tumors; most of them might have been treated successfully had they consulted their doctors early. In the same year, 43,000 women died of breast cancer, another malignancy that can be diagnosed in its earliest stages by effective techniques that are not yet readily available to all women.

Unfortunately, lung cancer, a preventable disease, is increasing in women. In 1989 about 49,000 women died of this disease, an increase from about 36,000 in 1984. Lung cancer has surpassed breast cancer as a cause of death in women.

In 1987 there were 251 maternal deaths, most of them preventable; 24,627 neonatal deaths; and 29,349 fetal deaths, many of these also preventable. There are vast unmet needs in general nutrition and health care and in health education, notably in sex and family living.

Obstetric-gynecologic care can be improved and made more available and acceptable to women of any economic or social class through the development of *health care teams* composed of obstetrician-gynecologists, nurse-midwives, obstetric-gynecologic nurse practitioners, and specially trained aides. Each can be made responsible for the area of care that is appropriate on the basis of training and ability. For example, the nurse-midwife can provide much of the prenatal care and education for *all* pregnant women and delivery and the care after delivery for those in whom normal deliveries are anticipated. Nurse-midwives or trained obstetric-gynecologic nurses can provide contraceptive counseling, perform periodic health examinations on well women, diagnose and treat minor gynecologic conditions such as vaginitis, and be responsible for a comprehensive health education program. With such capable associates, physicians could concentrate on women with high-risk pregnancies and with gynecologic problems that require their special skills; they would serve as immediately available consultants to associates working in their offices and be responsible for women who require special care during labor and delivery and for gynecologic operations.

Such teams can extend care into areas where there are no physicians, with nonphysician workers serving as screening and triage agents who refer women needing special care to an appropriate physician. It is essential that such a system be organized to deliver medical care to women of all socioeconomic classes. The model is not one that is appropriate only for poor women.

FACILITIES FOR OBSTETRIC CARE

Most births occur in hospitals, but more and more women are requesting out-of-hospital confinement. In 1940 1,043,631 births occurred outside hospitals. By 1980 this number was reduced to 35,888 and by 1987 to 35,288. More out-of-hospital births are now conducted by midwives and fewer by physicians than in years past. In 1980 11,093 of these births were conducted by midwives and 11,992 by physicians; for 12,776 the attendant was not stated. Comparable figures for 1987 were 15,465 by midwives, 8,132 by physicians, and 11,691 by "others."

HOSPITAL OBSTETRIC SERVICES

The remarkable decreases in maternal and perinatal mortality and morbidity were achieved not only by increasing the number of skilled obstetrician-gynecologists but also by simultaneously im-

proving hospital obstetric services that in the past had been unorganized and in which obstetric practice was unregulated. Most hospital obstetric services are now organized; staff privileges are awarded on the basis of competence, and most hospitals make available essential services and equipment designed to make labor and delivery safe.

A national survey of maternity care by the American College of Obstetricians and Gynecologists pointed out several important inadequacies in hospitals in which infants are delivered. As a general rule the facilities provided by hospitals in which fewer than 2000 infants are delivered yearly are less adequate than those with larger services. Constant 24-hour coverage of the labor-delivery area was provided by registered nurses in almost all large services but in only 40% of hospitals with fewer than 250 deliveries each year. In 93% of hospitals with large services, emergency cesarean section could be performed in less than 40 minutes; this was possible in only 63% of hospitals with small services. In addition, intensive newborn care by experienced pediatricians was more readily available in larger hospitals.

In recent years perinatal centers, which have the facilities and personnel to manage the most complicated pregnancies, have been developed. More and more physicians, both family practitioners and obstetrician-gynecologists, are using such centers. They either perform deliveries in facilities in which consultation is readily available or transfer women with problems that cannot be managed safely in smaller hospitals. The end result is an improved outcome for both mothers and their infants.

An example of the change is indicated in a report of the outcome of obstetric care in Iowa hospitals of several levels of sophistication. Level Ia maternity units, in which fewer than 500 deliveries are conducted each year, are staffed by family physicians. Obstetricians and pediatricians staff level Ib institutions. All level I hospitals are designed to serve only low-risk obstetric patients and healthy newborn infants. Level II maternity units serve patients at moderate risk, and intensive obstetric and perinatal care is available in level III hospitals. Although 37% of deliveries are now conducted in level I units, the percentage of neonatal deaths in these hospitals has declined substantially. Neonatal mortality rates were 2.7/1000 live births in level Ia hospitals, 4.6 in level Ib hospitals, 5.5 in level II hospitals, and 17.6 in level III hospitals. More and more mothers with serious complications are being transferred to hospitals that are better equipped to manage the problems. Transfers can be made during pregnancy when a condition such as diabetes or hypertension is recognized or during labor when the need for a higher level of care becomes necessary.

ALTERNATIVE BIRTH CENTERS

The increasing use of technologic innovations during normal labor has led many women to seek less complicated alternative methods of obstetric care. They reason that a completely normal pregnancy and delivery can be managed successfully by a qualified nurse-midwife, without interference and without mechanical monitoring equipment, both of which are used frequently in scientifically oriented labor-delivery suites.

Alternative birth centers are specifically designed for women whose pregnancies have been uncomplicated and for whom normal labor and delivery is anticipated. The centers are alike in that the atmosphere is more like that of a home than a hospital. The patients labor and deliver in a comfortable bed where they remain with the newborn infant until they are discharged, usually within a few hours. Their families can be with them. The centers are staffed by personnel who are both well trained and experienced in providing care during labor and who support the concept of helping the perfectly normal pregnant woman have her baby as naturally as possible. The labor can be managed by nurse-midwives or physicians, and either can conduct the delivery.

Hospital-based centers are usually located near or within the regular labor-delivery area, which permits prompt consultation with a physician

whenever it is necessary and immediate transfer when a complication arises. Freestanding centers have agreements with physicians and nearby hospitals that permit the immediate transfer of patients when a complication develops. They also are prepared to provide emergency care during transfer. Such precautions are essential because from 15% to 25% of carefully screened patients develop complications during labor or after delivery that require more sophisticated care than can be provided in an alternative birth center.

Many of the problems that arise during labor can be anticipated and prevented by careful patient selection. Only women in whom completely normal pregnancy, labor, and delivery are anticipated should be selected for care at a center. Some of them will be transferred during pregnancy, for example, when the membranes rupture prematurely, if an abnormal position is diagnosed, if hypertension is recognized, if bleeding occurs, or if labor begins prematurely. The most common reasons for transfer during labor are failure to progress, abnormal fetal position, and fetal distress.

The results of delivery in alternative birth centers in which patients are properly screened, in which meticulous care is provided during labor and delivery, and from which patients with complications are transferred to hospitals promptly are excellent. The overall intrapartum and neonatal mortality rate in 11,814 women who were admitted for labor and delivery in 84 birth centers was 1.3 per 1000 births. About 16% were transferred to a hospital because of intrapartum or early postpartum complications. The cesarean section rate was 4.4%. There were no maternal deaths.

Because the cost of obstetric care for women with normal pregnancies in birth centers is about half that for hospital delivery, it seems likely that more women will seek care in low-risk units.

HOME DELIVERY

Conversely, home delivery is far from safe. Neither the necessary safety support nor an adequate number of competent attendants is available, and transfer to a hospital when a complication arises is usually delayed. Few trained midwives or physicians will agree to perform deliveries in the home. This has led to the appearance of untrained birth attendants who are willing to do so. In many instances their only qualifications are that they have had children themselves or that they have assisted others in having babies. As might be anticipated, the results can be disastrous. In the states that maintain statistics concerning outcome of delivery, perinatal mortality is from two to five times higher in home than in hospital delivery.

BIRTHRATES

The *birthrate*, the number of live births per 1000 population, varies from year to year, depending on a multitude of factors. The rate fell progressively from 30 in 1910 to 18.4 in 1933. It is interesting that this low rate was attained before the present sophisticated contraceptive methods were available and undoubtedly represents a calculated mass decision to prevent pregnancy because of the severe financial depression.

Most couples were forced to delay starting their families because of World II, but the birthrate started upward in 1940 and rose steeply after 1945, reaching a peak of 26.6 in 1947. It was 25 with 4,254,784 births in 1957 and 23.3 with 4,268,326 births in 1961. The birthrate continued to fall, reaching 17.8 with 3,520,959 births in 1967.

An increase in the number of births was anticipated because of the large number of young people who were born during the "baby boom" years. The number of women between the ages of 15 and 45 years increased from 42,336,000 in 1970 to about 56,000,000 in 1985. However, the anticipated increase in births did not occur. By 1975 the birthrate had decreased to 14.8 with 3,144,198 births. In recent years total births have increased slightly, but the birthrate appears to have stabilized. In 1980 the birthrate was 15.9,

and 3,612,258 live births were registered. Comparable figures for 1987 were 15.7 and 3,809,394.

There is no certain way of predicting the reproductive rates for the future, but some increase in the *number* of births is inevitable. Even though birthrates remain low, an increasing number of women will enter the childbearing years. In addition, the births may increase because women who have postponed pregnancy and are now in their late twenties and thirties will become pregnant and because a slight increase in family size may again become popular.

The *fertility rate*, the births per 1000 women between the ages of 15 and 45 years, is a better indication of reproductive patterns than the birthrate. It, too, is decreasing.

Even the fertility rate does not provide complete information concerning pregnancy because it does not include spontaneous and induced abortions.

BIRTHS TO UNMARRIED WOMEN

Both the number and ratio (number of births per 1000 unmarried women) of births to unmarried women are increasing. In 1950 there were 141,600 (ratio 39.8); in 1960, 224,300 (ratio 52.7); in 1970, 398,700 (ratio 106.9); and in 1977, 515,700 (ratio 155). The numbers continue to increase. In 1987 933,013 unmarried women bore children (ratio 244.9). Of these, 498,645 were white (ratio 166.6), and 399,144 were black (ratio 622.1).

The reported births represent only a small fraction of total out-of-wedlock conceptions. Estimates based on correlating the wedding date with the date the first child is born indicate that more than 50% of women of all ages are already pregnant at the time of their marriage. In addition, many births to unmarried women are not reported as such.

The availability of contraception and elective abortion has neither reduced the problem nor prevented recurrence. In 1987 474,631 unmarried women had their first child, 234,398 their second, 124,716 their third, 55,172 their fourth, and 39,851 their fifth or more.

TEENAGE PREGNANCY

Pregnancy in an unmarried woman is a problem at any age, but it may be disastrous to a teenager. Before legal abortion became available, the alternatives were to remain pregnant and either marry, give the baby up for adoption, or in some cases, keep the baby. None of these alternatives was a satisfactory solution in most instances. Teenage marriages, particularly those forced by pregnancies, are notoriously unsuccessful, and the alternative of remaining pregnant is often considered unacceptable or impossible by most young women. Whatever the choice, the result was disrupted education, which too often was not resumed; broken marriages; and often repeated pregnancies.

Fetal, neonatal, and postneonatal death rates are higher in teenage pregnancies than in those of mature married women. The highest mortalities occur in young women of the lowest socioeconomic groups, those who have had the least education, and those who have had more than one baby before they reach the age of 20 years.

The solution is far more complex than a simplistic approach of making contraceptives available to all girls entering their teens. Most young girls have little accurate and useful information concerning reproduction and, in many communities, no way of learning more. Parents are likely to avoid sexual discussions; and either there are no effective sex education courses in schools, or they do not include instruction in contraception. Some girls may be forced into premature sexual activity by the pressure of their peers; others are seeking love and attention, which they think they can get in no other way. Some have unprotected coitus because they know little about contraception and counseling is not available to them. Others fail to use contraceptives because of an unconscious wish to become pregnant to fill an emo-

tional need. Pregnancy in more mature unmarried women often is a result of carelessness in the use of contraception.

The obvious solution, and it will not come soon, is basic and effective sex education at home and in schools, opportunities to discuss personal problems of sex and reproduction with understanding parents and counselors, and readily available contraception for those who are sexually active.

Counseling also is important for teenage girls who already have conceived. The initial decision is between abortion and remaining pregnant. Those who choose the latter must be permitted to continue their education. They, as well as those who select abortion, need continuing counseling and the best medical care.

An important objective in counseling is to provide the patient with an understanding of why she became pregnant and to help her develop the motivation to prevent a recurrence. Without such motivation, as many as 50% of teenagers will be pregnant within a year after delivery. Teenagers are more likely to conceive soon after a pregnancy than are more mature women.

MATERNAL MORTALITY

A *maternal death* is the death of any woman from any cause during pregnancy or within 42 days of the termination of pregnancy, irrespective of the duration of pregnancy or its site. A *direct obstetric death* is one resulting from a complication of pregnancy itself—from intervention, from omissions of or incorrect treatment, or from a chain of events resulting from any of the preceding. An example is a death from postpartum hemorrhage. An *indirect obstetric death* is one resulting from a disease that had existed previously or that developed during pregnancy, but the course of which was aggravated by the physiologic effects of pregnancy. An example is serious rheumatic heart disease with decompensation during the period of maximum cardiac stress. A *nonobstetric death* is one resulting from an incidental cause unrelated to pregnancy. Examples of nonobstetric death are one resulting from injuries sustained in an automobile accident or death from a brain tumor.

The *maternal mortality* is the number of maternal deaths from direct causes per 100,000 live births as indicated in the following equation:

$$\frac{\text{Number of direct maternal deaths}}{\text{Total live births}} \times 100{,}000 = \text{Maternal mortality}$$

Maternal death rates vary considerably in different parts of the country and with different classes of patients. The mortality is higher in nonwhite patients than in either white nonprivate or white private patients. This undoubtedly occurs because the nonwhite patients include the most impoverished and least educated people in the United States. There is a higher incidence of medical complications such as essential hypertension, anemia, malnutrition, and preeclampsia-eclampsia among this group of patients, and these conditions often remain untreated. The patients frequently do not seek prenatal care and enter the hospital only after labor has begun; if they do register in clinics, they often appear late in pregnancy, attend irregularly, and cannot afford adequate diets and medications.

The death rate is highest in urban communities and in the southeastern states, where the concentration of nonwhite patients and those of low economic status is greatest. Maternal mortality is lowest in the Northwest, parts of New England, and the upper Midwest, where the population is more homogeneous with fewer blacks and less poverty and malnutrition. Reduction in maternal mortality therefore must be a concern of educators, sociologists, and economists, as well as physicians.

The maternal mortality in 1930 was more than 600/100,000 live births. The rate has fallen steadily to a level of 36.9 in 1961, 18.8 in 1971, 8.5 in 1981, and 7.2 in 1986. The causes of the 272 maternal deaths in 1987 are listed in Table 1-1.

Tabulations of causes of maternal mortality do

TABLE 1-1 Causes of maternal deaths (1987)

Cause	Total number
Puerperal complications	75
Toxemia	40
Ectopic pregnancy	36
Hemorrhage	27
Abortion	15
Other direct causes	59
Indirect causes	20

not reflect the overlap of all responsible contributing factors because they include only the primary cause listed on the death certificate. For example, most deaths listed as "abortion" are caused by infection; and many women who die of puerperal sepsis also had hemorrhage following delivery, which may represent a major factor in their deaths. In addition, indirect and nonobstetric deaths may be listed under specific causes such as heart disease and may not appear as deaths of pregnant or recently delivered women.

The reduced maternal death rate is a result of many factors, which include an increase in hospital deliveries, the development of perinatal centers, the availability of blood, and the ability to treat infection effectively. In addition, there are many more highly trained and skillful obstetricians in all parts of the United States with whom general practitioners can consult when a complication develops. Most hospital staffs are organized and have established rules by which obstetric practice in the institution is governed. Those without special training and experience are required to seek consultation for serious complications and for abnormalities of labor. This is in contrast to the previous situation, when any staff member, regardless of ability, was permitted to perform any type of operative procedure or manage any complication without seeking help.

An important factor in the reduction of maternal mortality was the development of state and local Maternal Mortality Review Committees in the early 1930s. The complete care of each pregnant woman who dies is reviewed by a committee of obstetrician-gynecologists who determine the cause and assign responsibility for the death to the primary physician, the consultant, the patient, the institution, or the community. The principal reason for these committees is physician education, and the result has been a dramatic reduction in maternal mortality. Maternal Mortality Review Committees represent the first organized peer review system to be developed in the United States.

Maternal mortality can be reduced even further. It should be possible at least to eliminate deaths from hemorrhage and infection, both of which can be prevented or treated if they occur. Deaths from abortion can be reduced to a minimum by making reliable contraceptive methods and legal abortion available to everyone who wants them. There may be an irreducible minimum of obstetric deaths, but it can only be reached if every physician concentrates on preventing or detecting and correcting potentially lethal abnormalities and if the facilities in which pregnant women are treated are optimal.

PERINATAL MORTALITY (Fig. 1-1)

A *fetal death* is the death before or during birth of a fetus weighing 500 g or more. No heartbeat, cord pulsation, respiratory activity, or movement of voluntary muscle can be detected after birth. If the weight is unknown, fetal death is diagnosed if the pregnancy duration is of 20 completed weeks or more as measured from the first day of the last normal menstrual period.

A *liveborn infant* is one in which signs of life, including breathing, cord pulsation, heartbeat, or voluntary muscle movement, can be detected after its complete expulsion from the vagina. A *neonatal death* is the death within the first 28 days of life of a liveborn infant weighing at least 500 g or after 20 completed weeks of pregnancy. A *hebdomadal death* is the death within the first 7 days of life of a liveborn infant weighing 500 g or more.

The term *perinatal death* is an inclusive one, indicating the death of a fetus weighing 500 g or more before or during labor and of a liveborn infant within the first 28 days of life.

The *fetal mortality* is the number of fetal deaths per 1000 births of liveborn *and* dead-born infants.

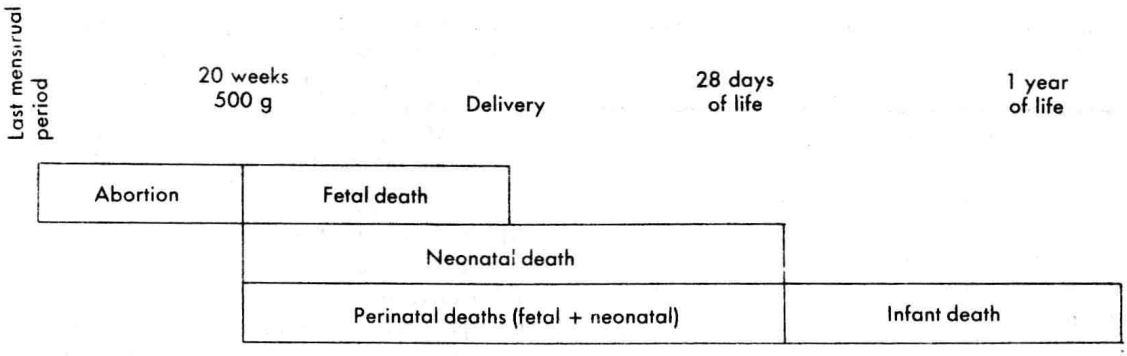

Fig. 1-1 Abortion, perinatal, and infant mortality.

The *neonatal mortality* is the number of deaths per 1000 births of *liveborn* infants. The *perinatal mortality* is the number of fetal plus the number of neonatal deaths per 1000 births of live and dead infants. *Infant mortality* includes deaths that occur between the twenty-eighth day and the end of the first year of life.

Most states require that the deaths of all infants born after 20 or more weeks of pregnancy be reported; in some states it is necessary to report deaths from pregnancies of less than 20 weeks' duration.

There are many reasons for perinatal deaths; some deaths, such as those associated with hypertension and other acute and chronic diseases in the mother, complications of labor, infections, and birth injuries, can often be prevented. Those caused by congenital malformation, cord entanglement, and certain disorders of placental function cannot yet be controlled. The latter, however, are in the minority.

Fetal deaths. The World Health Organization has recommended the term *fetal death* to replace the older terms, *stillbirth* and *abortion*. Fetal deaths are classified as follows:

Group I: Early fetal deaths—less than 20 completed weeks of pregnancy
Group II: Intermediate fetal deaths—20 to 27 completed weeks of pregnancy
Group III: Late fetal deaths—28 or more completed weeks of pregnancy
Group IV: Unclassified

In 1987 there were 29,349 fetal deaths of 20 weeks or more. The *fetal mortality ratio* was 7.7/1000 births.

The total number of fetal deaths cannot be determined accurately because most states do not require the reporting of deaths from pregnancies of less than 20 weeks' duration; 10% to 15% or more of all pregnancies terminate in spontaneous abortion.

The most common causes of fetal deaths are *anoxia* (many of these deaths are associated with abruptio placentae, placenta previa, hypertension, maternal diabetes, prolapsed cord, and abnormal labor), *congenital anomalies,* and *infection*. In one third to one half of fetal deaths no cause can be determined, even though an autopsy is performed.

Neonatal deaths. In 1987, 24,627 liveborn infants died during the first 28 days after birth. The *neonatal mortality rate* was 6.5.

The reduction in the number of neonatal deaths has been less spectacular than that of maternal deaths. The neonatal mortality fell from 39.7 between 1920 and 1924 to 28.8 in 1940, to 20 in 1951, and to 10.9 in 1976.

Because most perinatal deaths occur in low-

birth-weight infants, there are two possible causes f the relatively rapid improvement in recent years: a lower incidence of prematurity and improved care for small infants. The latter is the more likely cause because there has been little decrease in the premature delivery rate.

Clearly, the principal reason for the improvement is that more women with pregnancy complications are now being treated in perinatal centers where specially trained teams provide intensive care both for mothers during pregnancy and labor and for their newborn infants.

Prevention of neonatal mortality. Approximately half of all neonatal deaths occur in premature infants who are unable to cope with the hazards of an independent existence. The most obvious way to reduce neonatal mortality therefore is to reduce the premature delivery rate. Although it is possible to accomplish this in certain patients, our understanding of many of the causes of premature labor is as yet incomplete, and we cannot always prevent it.

Most neonatal deaths occur with *high-risk pregnancies;* therefore it is essential that women with conditions associated with increased perinatal mortality be given special attention during pregnancy and labor. The principal problems of delivery are breech and other malpresentations, prolapsed cord, placenta previa, and abruptio placentae. *High-risk pregnancies are best managed in perinatal centers.*

Pregnancies in unmarried women and pregnancies at the extremes of the reproductive years are accompanied by increased prematurity and fetal and neonatal death rates. It is essential therefore that sexually active teenagers and women who want no more children be provided with reliable contraceptive methods.

Socioeconomic factors in perinatal mortality. Perinatal mortality from all causes is higher in poor women than in middle- and upper-class women. The general health of more affluent women is better, they are better nourished, they have relatively easy access to physicians, and they know how to use medical care facilities. Poor women are likely to be congenitally malnourished and anemic, and they live in unfavorable environments. They are more likely to have more pregnancies at short intervals than are upper-class women. Medical care facilities available to poor women may be limited and inappropriate, and access to these facilities may be difficult. As a consequence, they use the facilities principally for serious acute illnesses rather than for health maintenance.

Adequate prenatal care alone, although obviously important in determining the outcome of high-risk pregnancies, is only a partial solution for the reproductive problems associated with poverty. Poor women must first be adequately fed and housed so they will no longer need to think only in terms of day-to-day existence. Physicians have little control over these aspects of the total problem, but they do have the responsibility of making certain that appropriate medical care facilities are made available and that acceptable educational programs, designed to help women learn to use these facilities, are instituted. Better general health alone will improve the outcome of pregnancy, but even this cannot be accomplished without concomitant social and economic advances.

NONLETHAL EFFECTS OF THE BIRTH PROCESS

Not all infants who are born alive are normal. Approximately 7% of all liveborn infants have structural or functional defects. Less than half of these defects are diagnosed during the early postnatal period; the rest appear weeks or even years later.

It is difficult to determine how many of these conditions could have been prevented by better obstetric care, because many are caused by unrecognized chromosomal conditions or teratogenic stimuli during pregnancy. Many individuals, however, might have been normal had they not been born prematurely, been injured during labor and delivery, or suffered hypoxia. Improvements in these figures must await more information con-

cerning the prevention of premature labor, sensitive instruments that will detect early intrauterine hypoxia, precise methods for determining the need for delivery, and improvements in the treatment of respiratory distress following delivery.

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