WILLIAMS

OBSTETRICS

by

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ELEVENTH EDITION

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This volume represents the Eleventh Edition of *Williams* OBSTETRICS, the first six of which were written by the late J. Whitridge Williams, Professor of Obstetrics in Johns Hopkins University, and Obstetrician-in-Chief to the Johns Hopkins Hospital from 1896 to 1931; and the seventh, eighth and ninth of which were prepared by the late Henricus J. Stander, Professor of Obstetrics and Gynecology in Cornell University and Obstetrician and Gynecologist-in-Chief to the New York Hospital from 1931 to 1948; and the tenth of which was prepared by the present author, Nicholson J. Eastman.

TO THE
RESIDENTS, ASSISTANT RESIDENTS AND INTERNES
WHO HAVE SERVED IN THE
DEPARTMENT OF OBSTETRICS
OF THE
JOHNS HOPKINS HOSPITAL
SINCE ITS INCEPTION IN 1896 TO THE PRESENT DAY,
THIS VOLUME IS DEDICATED
WITH AFFECTION AND GRATITUDE

Preface

Obstetrics marches on; and during the brief span of six years since the last edition of this work was published, many noteworthy advances have been made. Some of these are of major importance and constitute true milestones of progress. While others may be more circumscribed in significance, their sum total has strengthened immeasurably our general armamentarium. In keeping with the tradition of this text, it is the main purpose of the present edition to incorporate these many advances to the end that this work will continue to be a modern, as well as comprehensive, textbook for both medical students and practitioners.

The new chapter on "Psychiatric Aspects of Pregnancy and Childbirth" reflects the growing belief that psychologic attitudes toward childbearing have an important bearing not only on many physical phenomena in pregnancy and labor but also on future mother-child relationships and on the family pattern in general. Written by a psychiatrist of vast experience in the field, readers will find this section, I believe, one of the most lucid, sensible and readable presentations of the subject which has appeared. My indebtedness to Dr. Leo Kanner for preparing this chapter is great.

Other sections which have been written *de novo* include those on: obstetric shock, fibrinogenopenia, the treatment of abruptio, the investigation and management of habitual abortion, uterine inertia, anemia, rupture of the cesarean section scar, postmaturity, hypotensive drugs, trichlorethylene, Normorphine, the prognosis of labor, premature spontaneous rupture of the membranes, the time factor in labor, indirect placentography, adrenocortical hormones, uterine blood flow, placental microscopy, retrolental fibroplasia, water metabolism, calcium and iron metabolism, most of the section on hydatidiform mole, chorioadenoma destruens and choriocarcinoma, almost all of the several sections on endocrinology and much of those portions of the book which deal with embryology. In addition, many coincidental diseases, not mentioned in previous editions, have been added. Several changes in terminology have been introduced, notably the more logical terms, "transverse lie" and "shoulder presentation" instead of "transverse presentation." Countless minor additions and alterations are also incorporated.

Despite these additions, many new illustrations, and the use of a larger, more legible type in this edition, the deletion of superfluous and outdated material has made it possible to keep the length of the book at approximately the same number of pages as in the previous edition.

An especial effort has been exerted to make the bibliographies useful working tools for further study. To this end, preference has been given to review articles and to recent papers which review the literature, especially those in easily accessible journals. In the case of the less common coincidental diseases, at least one article is always cited which, in turn, will usually provide further references. As in the previous edition, a few old classics of the obstetric literature are still retained.

It is a pleasure, as well as a duty, to acknowledge the help which I have received from many friends. Thus, I am deeply indebted to Dr. George W. Bartelmez for revising the chapters dealing with embryology; to Dr. Georgeanna Seegar Jones for rewriting the several sections on endocrinology; to Dr. Samuel R. M. Reynolds for providing valuable material on placental dynamics; to Dr. Roy G

Holly for revising the sections on iron metabolism and anemia; to Dr. Milton S. Sacks for additional material on Rh incompatibility; and to Dr. R. Gordon Douglas for bringing the statistics at New York Lying-In Hospital up-to-date.

The long chapter on the toxemias of pregnancy has been reviewed critically by Dr. Leon C. Chesley and many modern developments included. Likewise, the chapter on multiple pregnancy has been brought up-to-date by Dr. Alan F. Guttmacher. Assistance in the form of suggestions or new material has also been received from Dr. Schuyler G. Kohl and Dr. Charles M. McLane (x-ray pelvimetry), Dr. Leslie V. Dill (antepartal care), Dr. Kermit E. Krantz (neural anatomy), and Dr. Eleanor Hunt, of the Children's Bureau (statistical data in Chapter 1).

In the over-all revision, the assistance of Dr. Louis M. Hellman has been invaluable. He has revised the section on analgesia and anesthesia, on uterine inertia, on rupture of the cesarean section scar and on placental morphology; and he has contributed much statistical data from his own Clinic. Together with his secretary, Miss Mary J. Fitzpatrick, he has checked many of the bibliographies. In addition, he has shared many other tedious chores with me and my debt to him is unbounded. Dr. Robert E. L. Nesbitt, of my own Clinic, has also been extremely helpful in preparing new material; and I am deeply grateful to him.

To Miss Juliana Duffy, my secretary, I am immeasurably indebted not only for typing the greater portion of the new manuscript but also for many hours of work on the bibliographies. Miss Dorothy Vonderwish, who helped me with the previous edition, has carried out the onerous task of preparing the index, for which I am deeply grateful. Likewise, I am obliged to Mrs. Ranice W. Birch Davis, Director of the Department of Art as Applied to Medicine in the Johns Hopkins University School of Medicine, for providing a number of new illustrations.

Finally, it is a pleasant duty to thank Appleton-Century-Crofts, Inc., especially Mr. George A. McDermott, for the meticulous attention which they have given to the preparation of this volume.

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OBSTETRICS

CONTENTS

Section One: ORIENTATION

1

Obstetrics in Broad Perspective

Definition. *Obstetrics* is that branch of medicine which deals with parturition, its antecedents and its sequels. It is concerned principally, therefore, with the phenomena and management of pregnancy, labor and the puerperium, under both normal and abnormal circumstances. In England the older term *midwifery* carries the same connotation as obstetrics, and the two words are used synonymously. In the United States, however, owing to inadequate supervision and regulation of midwives, the practice of these attendants has long been conducted rather surreptitiously and, in the main, is held in disrepute. Here, accordingly, "midwifery" carries with it a certain stigma which does not obtain in England and elsewhere. The German word for obstetrics is *Geburtshilfe;* and the French, *obstétrique.*

The word *obstetrics* is derived from the Latin term *obstetrix,* meaning *midwife.* The etymology of obstetrix, however, is obscure. Most dictionaries connect it with the verb *obstare,* which means *to stand by or in front of.* The rationale of this derivation would be that the midwife stood by or in front of the parturient. This etymology has long been attacked by Seligmann who believed that the word was originally *adstetrix* and that the *ad* had been changed to *ob.* If this etymology is correct, then obstetrix would mean *the woman assisting the parturient.* The fact that on certain inscriptions *obstetrix* is also spelled *opstetrix* has led to the conjecture that it was derived from *ops,* that is, *aid,* and *stare,* and had the meaning of *the woman rendering aid.* According to Temkin, the most likely interpretation is that obstetrix meant *the woman who stood by the parturient.* Whether this alluded merely to the midwife's standing in front of, or near, the parturient, or whether it carried the additional connotation of rendering aid, is not clear.

The term *obstetrics* is of relatively recent usage. Thus, the Oxford English Dictionary gives the earliest example from a book published in 1819; and the same source observes that in 1828 it was necessary to apologize for the use of the word *obstetrician.* Kindred terms are, however, much older. Thus, *obstetricate* occurs in English works published as early as 1623; *obstetricatory,* in 1640; *obstetricious,* in 1645; and *obstetrical,* in 1775. These terms were often used figuratively. As an example of such usage the adjective *obstetric* appears in Pope's *Dunciad* (1742) in the famous couplet:

> There all the Learn'd shall at the labour stand,
> And Douglas lend his soft, obstetric hand.

The much older term *midwifery* was used instead of *obstetrics* until the latter part of the nineteenth century both in the United States and Great Britain. It is derived from the Middle English *mid,* meaning *with,* plus *wif,* meaning wife in the sense of a *woman;* that is, the "with-woman." The term *midwife* was used as early as 1303; and *midwifery,* in 1483.

The Birth Rate. The magnitude of obstetrics as a branch of medical practice is shown by the number of registered births each year. This figure for the United States in 1953 was 3,902,120. In 1954, for the first time in the country's history, the number of births exceeded four million. As may be seen in Figure 1-1, the birth rate rose sharply during, and immediately after, World War II from an average level of about 19 births per 1,000 population in the nineteen thirties to a peak of

26.6 in 1947. This was due, in general, to altered economic, social and psychologic circumstances and, more specifically, to a greatly increased marriage rate. The record high marriage rate of 16.3 per 1,000 population set in 1946 was followed by the high birth rate of 26.6 per 1,000 in 1947. This all-time peak in marriage rates, comparing with only 7.9 per 1,000 in 1932, and 9.2 in 1954, is attributed to postwar demobilization and favorable economic conditions.

Since 1947 the birth rate for the total population has declined somewhat but has maintained itself at about 25 per 1,000, the figure for 1953. But the birth rate for the nonwhite has shown no such decrease. On the other hand, as indicated in Figure 1-1, it has risen persistently since 1946 to reach a level of 34.1 in 1953, a figure almost 50 per cent higher than the white, which was 24.0 in that year.

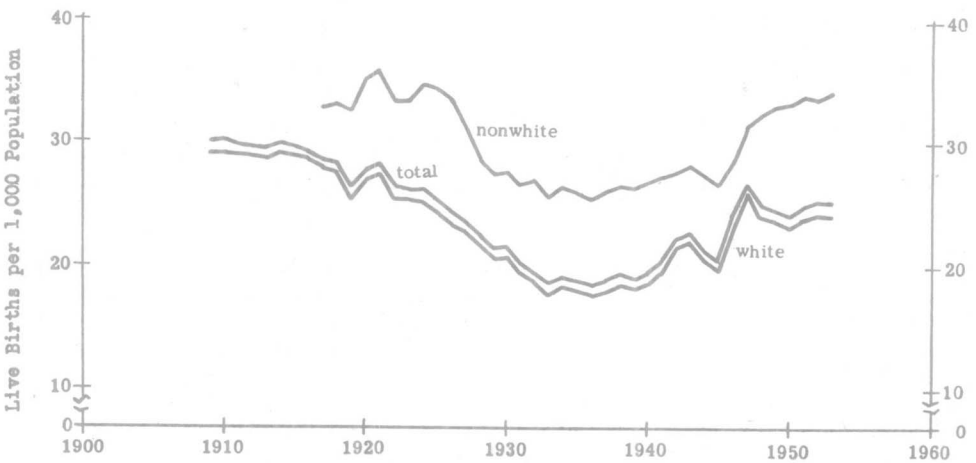

Fig. 1-1. Birth rate, United States, 1909-1953. (Department of Health, Education and Welfare. Social Security Administration. Children's Bureau. Based on data from the National Office of Vital Statistics.)

Aims of Obstetrics. The transcendent objective of obstetrics is that every pregnancy culminate in a healthy mother and healthy baby. It strives to reduce to a very minimum the number of women and infants who die as a result of the reproductive process or who are left injured therefrom. It aims further to minimize the discomforts of pregnancy, labor and the puerperium; and at the same time so to safeguard and ease the whole course that both mother and child will conclude the experience in a healthy state, both physically and mentally. But if it is hoped to reduce the number of mothers and infants who die in the birth process, it first becomes desirable to know how many such deaths take place in this country annually and under what circumstances they occur.

Maternal Mortality. Maternal mortality rates in the United States are expressed officially by the National Office of Vital Statistics in terms of the number of maternal deaths per 10,000 live births. The number of women who died in 1953 as the direct result of childbearing was 2,380 in the course of 3,902,120 live births, giving a mortality rate of 6.1. Perhaps a better visualization of what was taking place may be had if it be considered that for every 1,000 live births in 1953, 0.6 women died. As may be seen in Figure 1-2, there has been a dramatic reduction in the maternal mortality during the past two decades from a plateau above 60 in white women before 1930 to a level of approximately one-fourteenth that rate in

1953, the rate in white women for the latter year being 4.4. The corresponding figures for the nonwhite were 117.0 in 1930 and 16.6 in 1953. Since the latter figure is one-seventh of the former it is clear that the fall in maternal mortality in the nonwhite has been less pronounced than in the white, indeed, just one-half as

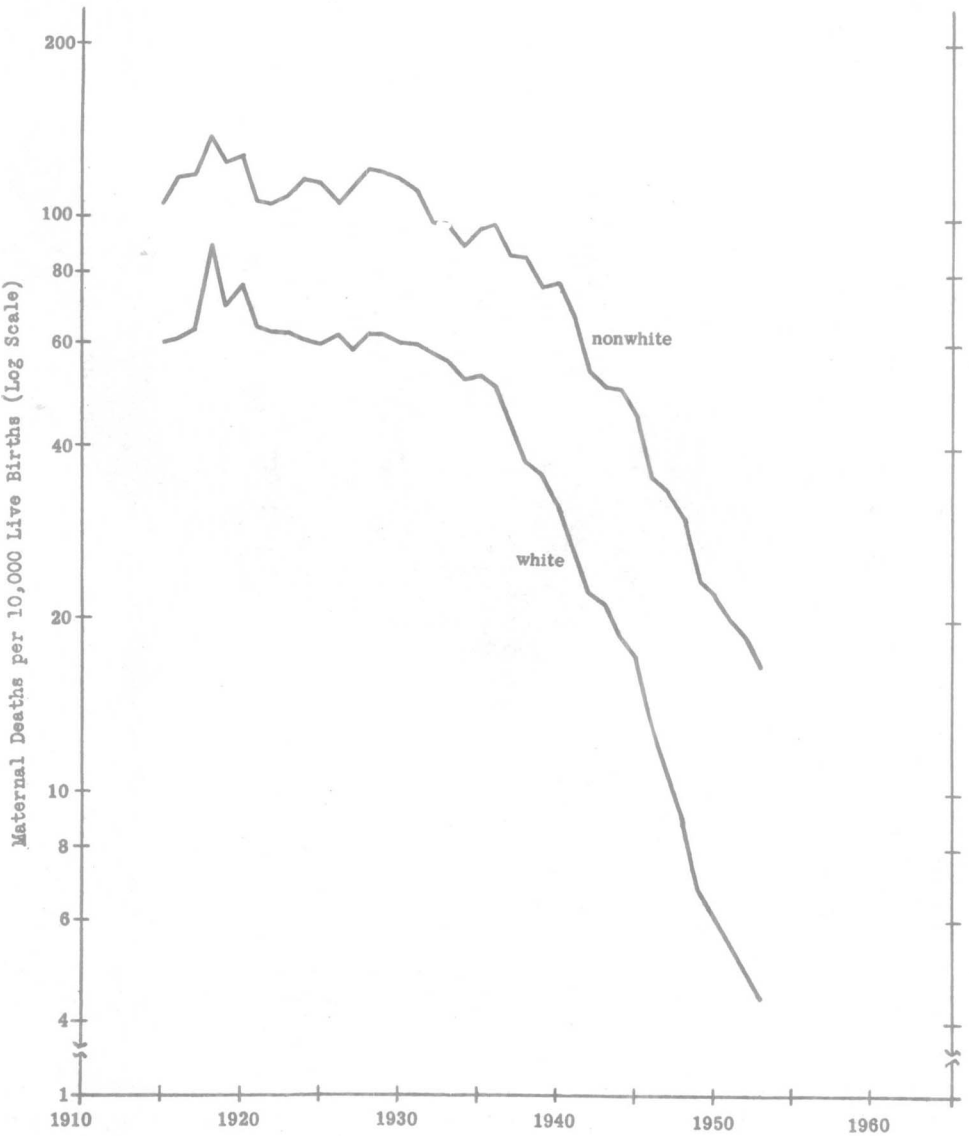

Fig. 1-2. Maternal mortality, 1915-1953, United States Birth Registration Area. (Department of Health, Education and Welfare. Social Security Administration. Children's Bureau. Based on data from the National Office of Vital Statistics.)

great. Nevertheless, the over-all reduction is a superb achievement and the reasons for it will be discussed in subsequent paragraphs.

Maternal mortality rates vary greatly in different parts of the United States, as indicated for the year 1951-1952 in Figure 1-3. If the specific figures for certain areas are compared, indeed, the difference will be found to be severalfold. Thus,

while 13 northern states had rates between 1.9 and 4.8, the corresponding figures for 12 southern states were 9.3 and 19.8. The reason for this difference is made manifest, in part, by figures already cited, namely, the high mortality rate of 16.6 in nonwhite in contrast to the figure of 4.4 for the white, the rate in the nonwhite being almost four times that in the white. Figure 1-4 complements the above statement by showing that those states which have the highest maternal mortality rates have, in general, the largest proportion of nonwhite births.

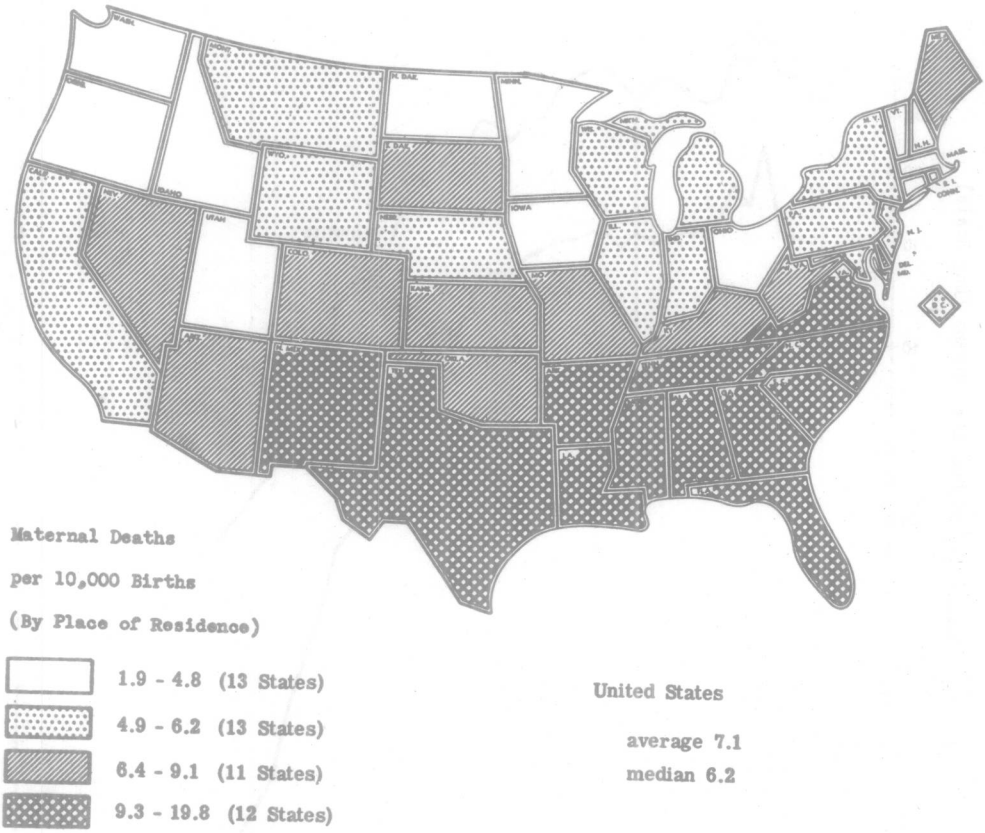

Fig. 1-3. Maternal mortality rates, United States, 1951-1952, by place of residence. (Department of Health, Education and Welfare. Social Security Administration. Children's Bureau. Based on data from the National Office of Vital Statistics.)

The principal reason for the high death rates among our nonwhite mothers in southern states is shown in Figure 1-5. It now becomes clear that the same states (excepting the District of Columbia) parallel one another in (a) a high proportion of nonwhite mothers, (b) a high proportion of births with no medical attendant, and (c) a high maternal mortality. Let it be noted further that the phrase "birth with no medical attendant" must be construed with its full implications. Almost always it means also dire poverty, faulty health education poor hygiene, dietary deficiencies, no antepartal care, and delivery in a shack with no provisions for emergencies and at the hands of an inferior attendant—either the next-door neighbor, or an untrained midwife. In sum, the high maternal mortality rates shown in Figure 1-3 for southern states become understandable in view of the

large proportion of nonwhites in those areas coupled with the unfavorable environmental conditions and lack of medical attention which they experience. A vigorous attack on this problem is being made by many agencies.

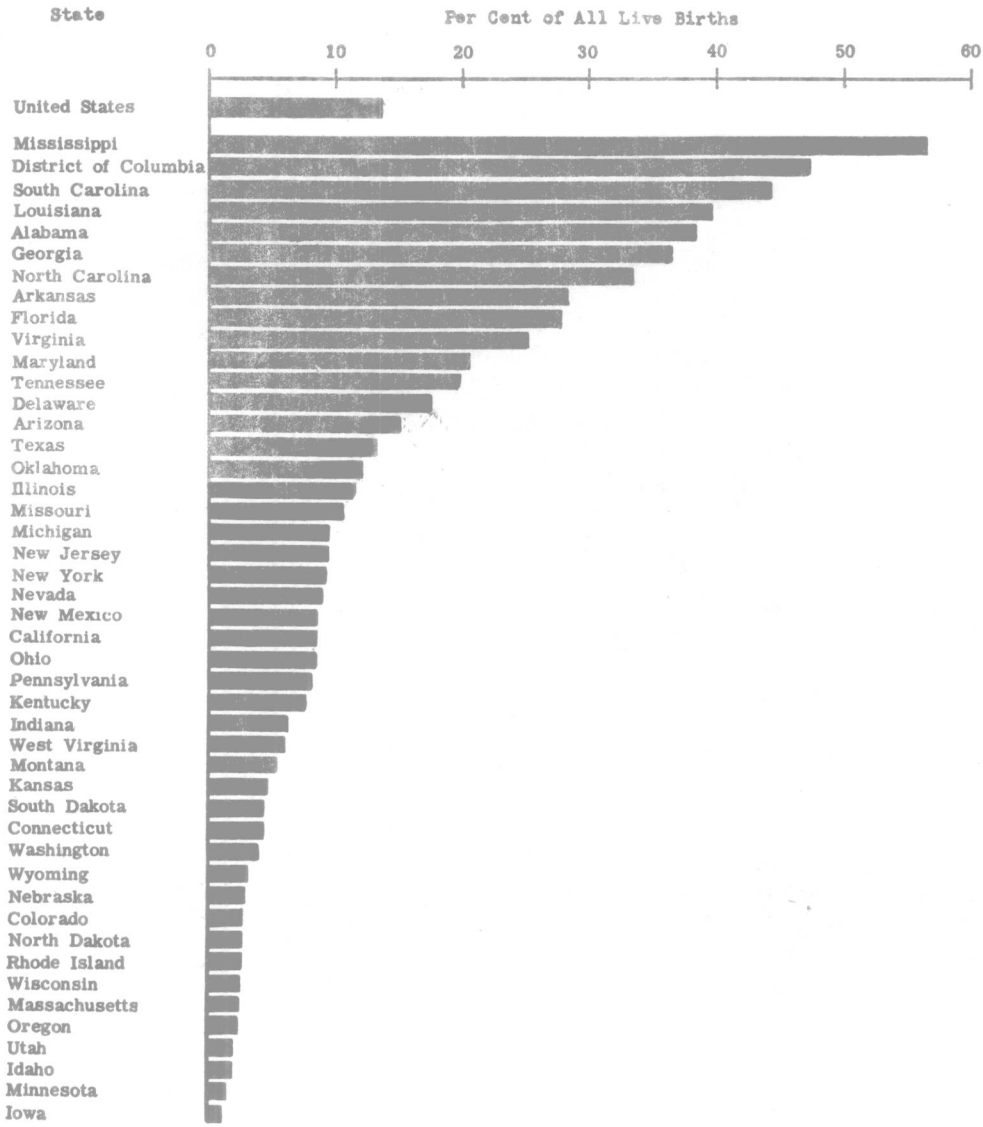

Fig. 1-4. Live births to nonwhite mothers as per cent of all live births, 1952, by place of residence, states having less than one per cent being omitted. (Department of Health, Education and Welfare. Social Security Administration. Children's Bureau. Based on data from the National Office of Vital Statistics.)

The maternal mortality rate varies also with quite a different type of factor, namely, the age of the mother, as clearly shown in Figure 1-6. The extremely high mortality encountered by very young, nonwhite mothers is probably of environmental etiology, since such girls receive notoriously poor care and, in addition, are not infrequently the victims of self-induced abortion. In contradistinction, the

tremendous increase in mortality with advancing age, both in whites and nonwhites, can only be explained on the basis of some factor intrinsic in the mother. The increasing frequency of hypertension with advancing years, the higher incidence of uterine neoplasms, and the greater tendency of older uteri to manifest

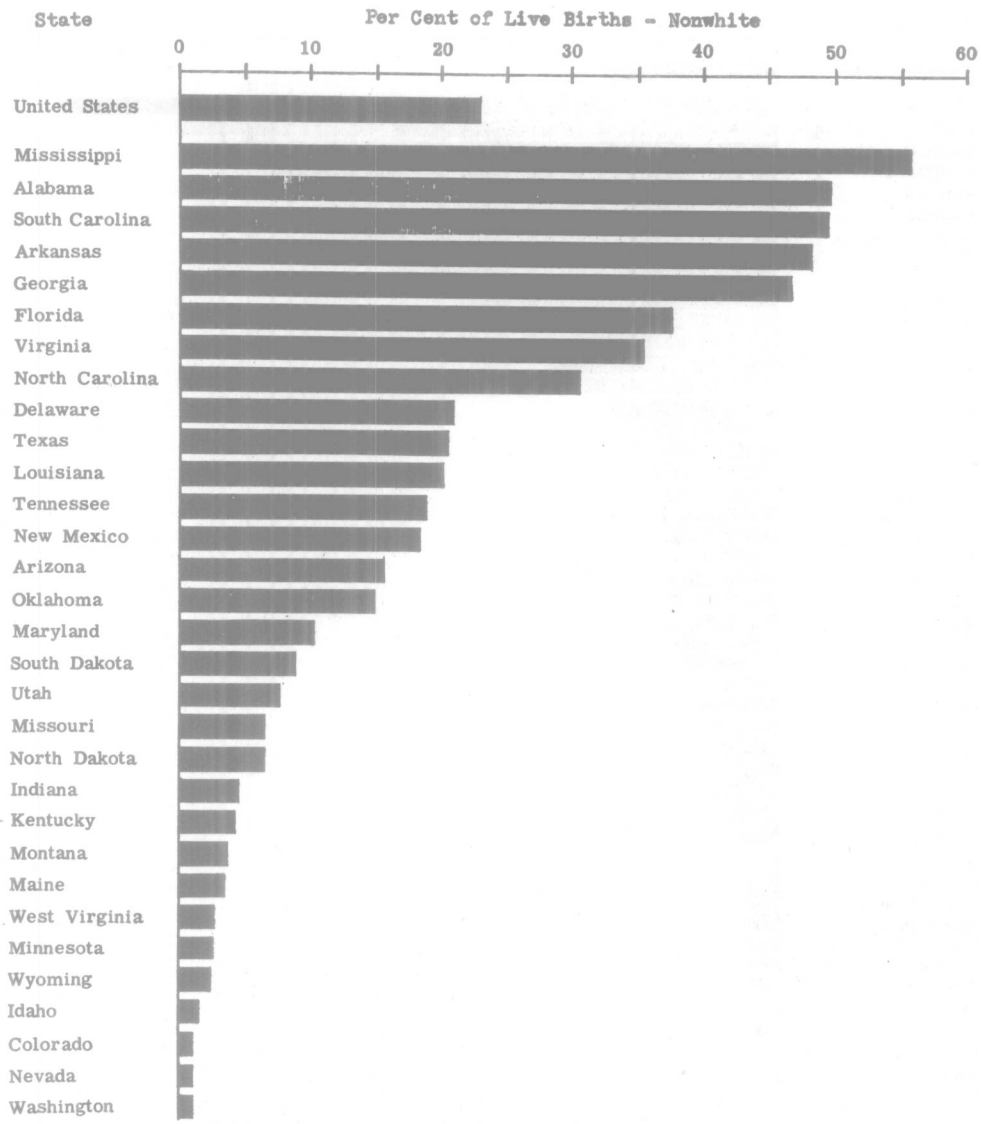

Fig. 1-5. Live births to nonwhite mothers unattended by a physician, 1952, as per cent of live births to nonwhite mothers, by place of residence, states having less than one per cent being omitted. (Department of Health, Education and Welfare. Social Security Administration. Children's Bureau. Based on data from the National Office of Vital Statistics.)

various hemorrhagic complications, all contribute to this effect. The maternal mortality rises also in women who have eight or more infants. These two factors, advanced age and advanced parity (number of previous births), may occasionally act independently of each other to increase the risk of childbearing, but usually