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Employment During Pregnancy

Legitimate Live Births

United States - 1963

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Statistics on the prevalence of employment during pregnancy and the trimester of pregnancy during which the woman was last employed, according to selected socioeconomic characteristics of the mother. Based on data collected by a questionnaire mailed to a sample of mothers selected from the certificates of legitimate live births in 1963 filed with the National Center for Health Statistics.

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IN THIS REPORT statistics are presented on the prevalence of employment during pregnancy among women who had a legitimate live-born child in 1963. The women are classified by age, color, number of live births, family income in 1962, level of education, husband's employment status and level of education, geographic region, and metropolitan status. Information on whether the employment was full time or part time and on the last trimester of employment during pregnancy is also included.

Almost one-third of the women were employed at some time during pregnancy. Among those for whom this was the first live birth 59 percent were employed; among those who had had previous live births only 22 percent were employed. However, while the employment rates for wives having their first live birth showed wide variation among different age, income, and educational groups, the rates for women who had already had children fluctuated only within a narrow range. The birth of previous children was a more powerful determinant of the rate of employment during pregnancy than any other characteristic for which survey data are available.

Among married women expecting their first child, the highest rates of employment were for those aged 25-29 (71 percent employed), college graduates (82 percent), members of families with a 1962 income of \$7,000-\$9,999 (81 percent), or those whose husbands were employed full time (60 percent). The lowest rates were for those under 20 years (42 percent employed), with only elementary-school education (28 percent), members of families with a 1962 income of under \$3,000 (38 percent), or wives whose husbands were not employed (38 percent).

Among married women expecting a second or subsequent child the highest rates of employment were found among those under 20 years of age (26 percent employed), with no more than an elementary-school education (24 percent), members of families with a 1962 income of \$7,000-\$9,999 (24 percent), or those whose husbands were employed part time (34 percent). The lowest rates were among those aged 30-34 (19 percent employed), college graduates (20 percent), members of families with a 1962 income of \$3,000-\$4,999 (21 percent), or those whose husbands were not employed (18 percent).

SYMBOLS

Data not available-----	---
Category not applicable-----	...
Quantity zero-----	-
Quantity more than 0 but less than 0.05-----	0.0
Figure does not meet standards of reliability or precision-----	*

EMPLOYMENT DURING PREGNANCY

Mary Grace Kovar, *Division of Vital Statistics*

INTRODUCTION

There are several reasons for interest in the proportion of women who are employed during their pregnancy. First is the medical aspect. Various studies—mostly in Great Britain¹—have indicated that the chance of a successful pregnancy is significantly lowered if the woman worked during her pregnancy. The evidence indicates that women who were employed had a higher rate of prematurity as measured either by birth weight or by period of gestation than women who did only housework. Although the present study is limited to women whose pregnancy resulted in a live birth and thus furnishes no information on other outcomes of pregnancy, it does provide an estimate of the extent of employment during pregnancy.

The second reason is that the proportion of women in the labor force has been increasing in recent years, and the increase has been particularly rapid for married women with children. In 1940, only 9 percent of all married women with children under 18 years of age worked outside the home, but by 1964 this proportion had increased to 35 percent.² Also, 22 percent of the mothers with children under 3 years of age were in the labor force by 1964. Therefore, any information on women's work habits is of interest.

Finally, there is the effect that a woman's work experience may have on the number and the spacing of her children. Studies, particularly the Growth of American Families Study of 1955,³ have indicated that women who have worked since they were married have fewer

children than women who have not. Women who worked during pregnancy are only a fraction of those who have worked at any time since marriage, but it has been possible here to distinguish those who worked during the pregnancy preceding the birth of their first child from those who worked during later pregnancies; the differences in these rates of employment are substantial.

It should be strongly emphasized that the statistics presented in this report refer only to women who had a live birth in 1963 which was either reported or inferred as being legitimate. Excluded from the survey data are women who were pregnant in 1963 but who did not give birth until 1964 and women who gave birth in 1963 to children who were either reported or inferred to be illegitimate. (The method of inferring legitimacy for States which do not have the item on the birth certificate is given in Appendix II.) The employment rates in this report, therefore, should not be interpreted as being rates for all women who were pregnant in 1963.

SOURCES AND LIMITATIONS OF THE DATA

The data contained in this report are based on a survey of women who had legitimate live births in 1963. The statistics are based on information recorded on the birth certificates and on responses to a questionnaire mailed to the mother of the child selected in the sample.

Information about the age of the mother, live-birth order, color, geographic region, and

metropolitan status was obtained from the birth certificate and is therefore uniformly available for all mothers.

Information about the family income, education of the mother and the father, father's employment at the time of the child's birth, and the mother's employment during pregnancy was obtained from the questionnaire sent to the mother and is therefore subject to errors of inaccurate or incomplete response.

A sample of 4,096 births was selected from the certificates of birth filed with the National Center for Health Statistics. From this, 316 were excluded because the birth was either recorded as, or inferred to be, illegitimate. Therefore, the sample of legitimate births included in the survey was 3,780.

In addition to the mothers who were excluded because their births were illegitimate, there is one other small group of mothers for whom data are not available. In the second half of 1963, Missouri withdrew from the survey for technical reasons; thus no questionnaires were mailed to 45 mothers in Missouri who should have been included in the survey. In addition, questionnaires were not mailed to nine mothers who either had no usable mailing address recorded on the certificate or who were living outside the United States at the time the questionnaires were mailed, although they had given birth within the United States. Both groups of women were within the scope of the survey and the available data on them are included in this report. Therefore, in some tables these women are shown in a separate category, but in other tables they are distributed as the mothers who were queried, since there is no reason to believe that the reason for their exclusion is related to the variables presented in this report. The estimated number of births and the size of the sample are shown in table I of Appendix I.

As is true for all surveys and in particular for mail surveys, a certain proportion of the women did not respond to the initial questionnaire. The problem was handled by a series of procedures. First, two followup questionnaires were sent at 2-week intervals, one by certified mail and one by regular mail. Second, if the mother's address was in one of the Bureau of the Census' primary sampling units, interviewers em-

ployed by the Bureau tried to interview the mother either by telephone or by personal interview. The response achieved by these methods is shown in table II of Appendix I.

After all of the responses had been received, coded, and edited, the statistics were adjusted for both item and unit nonresponse by imputing to nonrespondents the characteristics of similar respondents. The technique is discussed in Appendix I of this report and a detailed description can be found in an earlier report in this series.⁴ Appendix I also contains tables of sampling errors for statistics presented in this report.

Definitions of terms are given in Appendix II, and Appendix III is a facsimile of the Standard Certificate of Live Birth and of the questionnaire which was mailed to the mothers.

SELECTED FINDINGS

Approximately 31 percent of the women who had a legitimate live birth in 1963 were employed outside the home at some time during pregnancy. The woman for whom this was the first pregnancy resulting in a liveborn child was more likely to be employed than the woman who had previously had children; 59 percent of the former group were employed compared with only 22 percent of the latter.

Almost half (47 percent) of the wives who worked were still employed during the third trimester of pregnancy. An additional 32 percent reported that they did not work after the second trimester and 14 percent did not work after the first trimester. The remaining 7 percent of the women did not report a termination date.

The majority of the women (73 percent) were employed full time only. Approximately 20 percent worked only part time and about 8 percent reported both full-time and part-time employment. Among those reporting both full-time and part-time employment, 69 percent were employed during the third trimester.

Employment rates during pregnancy increased as the woman's level of education increased. Among women for whom this was the first live birth, 28 percent of those with an elementary-school education, 66 percent of the high-school graduates, and 82 percent of the college graduates were employed. Among women for whom this was the second or later birth, only

20-24 percent were employed at any educational level.

Employment rates also increased as family income increased. Approximately 27 percent of the wives in families with a 1962 income of under \$3,000 were employed during pregnancy, compared with 38 percent of the wives in families with an income of \$10,000 or over. The parallel increase of employment and income was much more pronounced for white wives than for nonwhite wives.

A higher rate of employment during pregnancy was also observed when the husband was working part time at the time of the child's birth than when he was working full time or was unemployed.

NATURE OF THE POPULATION

The population from which this sample was selected is women who had a legitimate liveborn child during 1963. Because these women were having children, they were a young population. A third of them were aged 20-24. More than three-fourths were under 30 at the time of the birth which brought them into the survey. Among wives having their first birth, 93 percent were under 30; among those who were already mothers, 68 percent were under 30.

About 87 percent of the wives were white. Among those for whom this was the first child, 92 percent were white; among those having a second or later child, 86 percent.

Partly because they were young, their family income was relatively low. Almost half, 49 percent, were members of families with a 1962 income of under \$5,000. If this was the first birth, 54 percent reported an income of under \$5,000; for those with previous children, 47 percent. About 44 percent of the white wives and 83 percent of the nonwhite wives were members of families with a 1962 income of under \$5,000.

The largest group of wives (42 percent) were high-school graduates with no education beyond high school. Wives having their first child were somewhat better educated (48 percent were high-school graduates) than those who had had previous children (40 percent were high-school graduates). About 44 percent of the white wives were high-school graduates with no further education, while

only 30 percent of the nonwhite wives had completed high school.

EXTENT OF EMPLOYMENT

The question from which the data on employment were obtained was a double one (fig. 1). The design permitted the woman who had been employed to report not only whether she had worked full time or part time but also to give the date when she had stopped working. The trimester of pregnancy was then computed by comparing the date of last employment with the date of birth.

Table 1 is a cross-classification of these responses by color. Approximately 68 percent of the women reported that they had not worked at all during their pregnancy. Information on employment was not available for just over 1 percent of the wives who, for reasons already explained, were not sent a questionnaire. Thus, among married women who had a live birth in 1963, 31 percent reported that they had been employed outside the home at some time during pregnancy.

Most of the wives who were employed during pregnancy, 73 percent, worked full time only; an additional 20 percent worked only part time while the remainder reported that they had worked both full time and part time during the course of their pregnancy. These proportions are consistent with estimates published by the Bureau of Labor Statistics, even though the definitions and methods of deriving the data are different. According to a survey conducted in March 1964, 75 percent of the married women, whose husbands were present and who were employed in nonagricultural occupations, worked full time and 25 percent, part time.⁵

Among all the women who were employed, 14 percent did not work after the first trimester of pregnancy, 32 percent did not work after the second trimester, 47 percent worked during the third trimester, and 7 percent of the women did not indicate a termination date for their employment. Among the women who worked only full time or only part time, about one-third stopped working during the second trimester of their pregnancy and almost half, 46 and 43 percent, respectively, worked into the third trimester.

Were you employed outside your home at any time during your recent pregnancy?

YES (Answer a and b below) NO

a. Did you work full time at all during your recent pregnancy? b. Did you work part time at all during your recent pregnancy?

YES NO YES NO

↓ ↓

When did you stop working full time? When did you stop working part time?

Month	Day	Year
		19 ____

Month	Day	Year
		19 ____

Figure 1. The question on employment during pregnancy, asked of mothers of legitimate live-born children.

Approximately 8 percent of the employed wives worked both full time and part time. A majority of these women, 69 percent, reported that they had worked during the third trimester of pregnancy, a significantly higher percentage than in the other two groups. It is possible that these were women who had been working full time and changed to part-time work as their pregnancies advanced. It is also possible that they were women who took whatever job they could find, whether it was full time or part time.

A slightly higher proportion of nonwhite than of white wives worked during pregnancy, 34 percent of nonwhite women and 31 percent of white women, and among the employed wives, a higher proportion of nonwhite women worked into the third trimester (53 percent of nonwhite and 46 percent of white women). Also a higher proportion of the employed nonwhite women worked part time than did the white women. Again these findings are consistent with labor force statistics; at any given time, relatively more nonwhite than white women are in the labor force and relatively more nonwhite women are employed part time.

Two factors that might be expected to affect whether a woman works during her pregnancy are her age and the number of previous liveborn children. Table 2 shows the extent of the mother's employment by age and color and table 3, by live-birth order and color. Table 4 shows the percentage employed in each age class crossed with each live-birth order.

A higher percentage of young women worked during pregnancy than of older women. Approximately 37 percent of the women under age 25 were employed at some time during their pregnancy, 30 percent of those aged 25-29, 23 percent of those 30-34, and 21 percent of those 35 years of age and over. This pattern of employment by age is accounted for by the decrease in the proportion of those working full time; the proportions of women working part time or both part time and full time remained relatively constant for each age group.

Since 87 percent of the legitimate births in the United States in 1963 were to white wives, they dominate any discussion of the total population. Therefore, it is necessary to look at the data for nonwhite wives separately as their employment pattern was quite different.

Table A. Percentage of wives employed during pregnancy, by color and age of mother: United States, 1963 legitimate live births

Age of mother	All mothers	White	Non-white
	Percentage		
All ages---	31	31	34
Under 20 years---	37	36	38
20-24 years-----	37	38	25
25-29 years-----	30	29	37
30-34 years-----	23	20	39
35+ years-----	21	18	39

It has already been noted that more nonwhite married women were employed during pregnancy and that a higher proportion of these women worked part time than did white wives. The distribution of employment rates by age for nonwhite married women is entirely different from that for white married women (table A). Among white women the highest employment rate was for the age group 20-24 years in which 38 percent were employed during pregnancy. The rate then dropped steadily until only 18 percent of the group aged 35 and over were employed. In contrast, among nonwhite women the lowest employment rate was found among the women aged 20-24 where 25 percent were employed, while the rate was higher among both the older and the younger women. Among nonwhite women under age 20 and age 25 or over, the rate of employment by age was remarkably stable, varying only from 37 to 39 percent.

As table B shows, the patterns of employment by live-birth order and color were also different. While the highest percentage of married women, whether white or nonwhite, worked during the pregnancy that preceded their first live birth, the patterns of employment during pregnancies of successive birth orders for the two color groups were quite distinct. For white women the employment rates fell with each succeeding pregnancy to a low of 13 percent for women expecting their fifth or later child. On the other hand, the employment rate among nonwhite women, after

decreasing to a low of 29 percent for those expecting their third or fourth child, increased to 34 percent for women expecting a fifth or later child.

Table 4 shows that the decrease in the employment rate with the increase in age is largely due to the higher proportion of higher order births at the later ages. Within each birth order the percentage of women employed did not change much with age. However, within each age group, the percentage employed during pregnancy was high for first births, dropped sharply between first and second births, and decreased slowly thereafter. Regardless of age, proportionally more married women worked during the pregnancy preceding their first live birth than during later pregnancies. Among white wives the differences in employment rates by age between those having a first birth and those having a second or later birth were large enough to be statistically significant. Among nonwhite wives there is no statistically valid evidence either way.

Because this examination of employment rates, based on information from the birth certificate, reveals that the two variables which most affect the rate of employment during pregnancy are color and whether this was a first or a higher order live birth, these two variables are shown in all the tables that follow. As an introduction table 5 shows the same data as table 4 with rates computed for second and higher birth orders combined.

Table B. Percentage of wives employed during pregnancy, by color and live-birth order: United States, 1963 legitimate live births

Live-birth order	All mothers	White	Non-white
	Percentage		
All birth orders----	31	31	34
First child-----	58	59	43
Second child-----	26	25	33
Third child-----	22	22	29
Fourth child-----	19	17	29
Fifth child and over-----	18	13	34

Region and Residence

There was no significant difference among the four regions in the percentage of women working during pregnancy (table 6). There were, however, slightly more women working during pregnancy in metropolitan areas, particularly in the South and North Central Region.

In the South the employment rate among white women was lower than the average for the United States, particularly among women having first births and among women living in nonmetropolitan areas. Among nonwhite women living in the South, however, the employment rate was higher than the national average, particularly for women having second or higher order births. It is important to remember that the number of nonwhite women living in the South and having second or higher order births was almost half the number of the nonwhite women having any legitimate birth in 1963. If these women are removed from the population, the employment rate for the rest of the nonwhite women is 30 percent as compared with 31 percent for the U.S. total for white women, and the employment rate for nonwhite women having a second or later child is 24 percent as compared with the U.S. total of 20 percent for white women having a second or later child. In other words, although national estimates of employment during pregnancy show a differential by color, the higher rate of employment among nonwhite women is a function of the exceptionally high rate of employment among nonwhite women residing in the South and having a second or later birth.

Income, Father's Employment Status, and Education

The income referred to in this report is the total income during 1962 of all the family members who were living together at the time of the baby's birth in 1963. In the framework of this definition, the family income will be higher for a given husband's income if the wife is gainfully employed than if she is not.

Although no data are available for 1962, there is information from the Current Population Survey of March 1963 about the earnings of married women, whose husbands were present,

and the percent which these women contributed to the family income. These data are shown in table C. In no income group did the wife's earnings account for as much as one-third of the family income and in most income groups her earnings accounted for less than one-sixth of the total family income. The average was just over one-fifth. It is therefore unlikely that removing the wife's contribution would lower the total family income by more than one income group, and in many cases there would be no change.

In addition, for the population being considered in this report, that is, wives who had babies in 1963, it is entirely possible that their contribution to the family income would be less than that of all married women because they would be more likely to have worked only part of the year. These were predominantly young women with high labor force mobility rates. They were of an age when school leaving, marriage, childbirth, and the husband's change of occupation would affect their labor force participation. Thus, it is likely that the family income in 1962 does not reflect a complete year of the wife's earnings.

Table C. Earnings of married women, husband present, as a percent of family income in 1962

Family income	Median percent of family income accounted for by wife's earnings
All incomes-----	21.1
Under \$2,000-----	4.8
\$2,000-\$2,999-----	12.2
\$3,000-\$4,999-----	15.6
\$5,000-\$6,999-----	17.0
\$7,000-\$9,999-----	26.1
\$10,000-\$14,999-----	28.7
\$15,000 and over-----	20.8

SOURCE: U.S. Department of Labor, Special Labor Force Report, No. 40, Table W, p. A-23.

With this background, the data shown in table 7—the percentage of women employed by family income—are perhaps more meaningful. The employment rates during pregnancy increased as income rose, from 27 percent of the wives employed in families with a 1962 income of under \$3,000 to 38 percent of the wives employed in families with an income of \$10,000 or more in 1962. This was true for both white and nonwhite women. However, in each income group the proportion of nonwhite wives working was higher than the proportion of white wives working, in spite of the fact that more nonwhite women were having second or higher order births.

The data for nonwhite women are too meager for detailed discussion by income group since only 17 percent of the nonwhite legitimate births were in families with income of \$5,000 or more and the median income was under \$3,000. For white births, however, the median family income was in the group \$5,000-\$6,999, and 56 percent of the births were in families with a 1962 income of \$5,000 or more.

Among the white wives the employment rate increased 11 percentage points from the lowest to the highest income group; 26 percent of the women in families with a 1962 income of under \$3,000 were employed during their pregnancy while in families with an income of \$10,000 or more 37 percent were employed. Among the 2.4 million white women having a second or later birth the difference was only 5 percentage points. Thus, among the 0.9 million women having their first live birth the difference was much greater. When the family income was under \$3,000, 41 percent were employed; when the family income was \$10,000 or more, 77 percent were employed.

In addition to questions on the mother's employment during pregnancy, the questionnaire included an item on whether the husband had been employed at the time of the child's birth and whether his employment was full time or part time. The vast majority of the wives (87 percent) reported that their husbands were employed full time (table 8). Only 7 percent reported that their husbands were not employed and 5 percent that their husbands were employed part time. In general, the highest rate of employment during

pregnancy was observed when the husband worked part time and the lowest rate occurred when he was unemployed. However, for first births the highest employment rate was among women whose husbands worked full time. This may be a function of age. A woman having her first child whose husband is employed part time may be young and married to a student who can work only part time. Financial security is not solely dependent on his earnings. A woman having a second or later child whose husband is working part time may be older and need to work for financial reasons. This, however, does not explain the low employment rate among women whose husbands were not employed.

It has been noted in other studies that employment rates among women increase with higher levels of education.⁶ The general increase is also true for women's employment during pregnancy. However, the increase is entirely due to the employment of women pregnant with their first child. As tables D and 9 show, the employment rate among women who were already mothers may actually have decreased somewhat as their level of education increased. However, among wives expecting a first child only 28 percent of those with no more than an elementary-school education were employed during pregnancy while 82 percent of those who were college graduates were employed. In addition, the proportion of women expecting a first child was higher with each subsequent level of education and therefore exerted more influence on the overall rate.

There is some evidence that nonwhite mothers (that is, nonwhite wives with at least one previous liveborn child) at both educational extremes were more likely to be employed during pregnancy than white mothers, while the proportions for those with a high-school education, whether high school was completed or not, were more nearly comparable. Among women with only an elementary-school education 18 percent of the white mothers and 43 percent of the nonwhite mothers were employed during pregnancy. For women with at least some college training the employment rates were 20 percent for the white mothers and 46 percent for the nonwhite mothers. Among those who had at least some high-school education but who had not gone on to college, 21 percent of the white mothers and 25 percent of the nonwhite mothers

Table D. Percentages of wives employed during pregnancy having first child and having second or later child, and percentage of all wives having first child, by educational level of mother: United States, 1963 legitimate live births

Educational level of mother	Percentage of wives employed			Percentage of all wives having first child
	Total	First child	Second child or later	
All levels-----	31	58	22	26
Elementary-----	25	28	24	10
High school:				
1-3 years-----	23	32	21	21
4 years-----	35	66	22	30
College:				
1-3 years-----	37	64	24	32
4+ years-----	43	82	20	37

were employed. The employment rates of white mothers did not change much with educational attainment. However, the employment rate of non-white mothers did change. It is possible that economic and social pressures are much stronger on these women.

Using data from the 1960 census, Kiser and Frank⁷ examined a number of factors in an attempt to explain the fact that fertility among nonwhite college women is lower than among white college women even though the overall fertility of non-white women is higher than of white women. Among the factors was employment status. They found that:

For all women and for those classified as "married and husband present," the percentage in the labor force among those 22-24 years old reporting one to three or four or more years of college was considerably higher among nonwhite than among white women. Thus at ages 25-29 the proportions in the labor force among women "married and husband present" and reporting four or more years of college were 35 percent for whites and 66 percent for nonwhites. The data also throw light on the reason why fertility of nonwhite college women surpasses that of white college women at ages under

25. It will be noted that at age 20-21 the proportion of women in the labor force was lower for nonwhites than for whites among those reporting one to three or four years of college. At ages 22-24 the difference is in the other direction but the gap was not as wide as at ages 25 and over.

Thus, these findings support those from the present study on two important points. First, the highly educated nonwhite woman is more likely to continue working after marriage and childbirth than the highly educated white woman; second, the very young married nonwhite woman is less likely to be employed than the young married white woman.

Table 10 shows the wife's rate of employment during pregnancy according to her husband's level of education. The increased rate of employment with higher levels of education which was evident for the wife's own education almost disappeared when the women were classified by their husband's educational level. The wife's likelihood of working during pregnancy appears to be influenced more by her own educational attainment than by her husband's; however, several factors are operating to conceal differences which become apparent upon closer examination.

Table E. Percentage of wives employed during pregnancy, and percentage of wives having first child, by educational level of wife and of husband: United States, 1963 legitimate live births

Educational level	Wife's education	Husband's education	Wife's education	Husband's education
	Percentage of wives employed		Percentage of wives having first child	
Elementary-----	24.7	27.7	9.8	13.0
High school:				
1-3 years-----	23.2	30.7	21.2	24.7
4 years-----	34.9	31.7	30.0	29.3
College:				
1-3 years-----	36.7	38.7	32.1	33.9
4+ years-----	43.1	30.4	37.0	28.8

First, among women having their first child, employment rates did increase as the husband's level of education increased, but the difference in employment rates was not as great when the women were classified by their husband's educational level as by their own. Second, among women having a second or later child, there was an apparent decrease in employment rates as the husband's level of education increased. Finally, the percentage of women having a first birth did not change as much when the women were classified according to their husband's level of education as it did when they were classified according to their own educational attainment (table E), and women were more likely to work during the first pregnancy resulting in a live birth than during later pregnancies regardless of other factors. Thus,

the increase in the employment rate for increased levels of the wife's education was heightened by the parallel increase in the percentage having their first live birth. However, since the percentage having a first live birth did not increase in the same fashion when the women were classified by their husband's education, there was not the same reinforcement.

The high rate of employment during pregnancy of nonwhite mothers whose husbands were in the lowest and highest educational categories and the relatively low rate for those whose husbands had some high-school training was similar to the pattern for the mother's own education. For white mothers the reverse seemed true, although there was considerably less variation in their employment rates.

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Table 1. Number of mothers and percent distribution of mothers, by last trimester of pregnancy during which they were employed according to color of mother and employment status: United States, 1963 legitimate live births

Color and employment status	Number of mothers in thousands	Total	Not employed	Trimester				Unknown
				First	Second	Third	Unknown	
<u>All mothers</u>		Percent distribution						
Total-----	3,797	100.0	67.5	4.3	9.9	14.6	2.2	1.4
Not employed-----	2,564	100.0	100.0	...	...	...	...	---
Employed-----	1,179	100.0	...	14.0	31.7	47.1	7.2	---
Full time only-----	855	100.0	...	15.3	32.8	45.9	5.9	---
Both full and part time---	91	100.0	...	0.8	22.0	69.2	8.0	---
Part time only-----	232	100.0	...	14.1	31.6	42.5	11.7	---
Unknown-----	55	100.0	---	---	---	---	---	100.0
<u>White</u>								
Total-----	3,315	100.0	67.8	4.4	10.0	14.1	2.1	1.5
Not employed-----	2,248	100.0	100.0	...	...	...	...	---
Employed-----	1,016	100.0	...	14.5	32.7	46.1	6.7	---
Full time only-----	755	100.0	...	16.2	33.5	44.5	5.8	---
Both full and part time---	83	100.0	...	-	24.1	69.6	6.2	---
Part time only-----	178	100.0	...	14.0	33.1	42.2	10.8	---
Unknown-----	51	100.0	---	---	---	---	---	100.0
<u>Nonwhite</u>								
Total-----	482	100.0	65.5	3.6	8.8	17.8	3.5	0.8
Not employed-----	316	100.0	100.0	...	...	...	...	---
Employed-----	163	100.0	...	10.8	26.1	52.7	10.4	---
Full time only-----	100	100.0	...	8.8	27.8	56.7	6.8	---
Both full and part time---	8	100.0	...	*	*	*	*	---
Part time only-----	55	100.0	...	14.7	26.8	43.8	14.8	---
Unknown-----	4	100.0	---	---	---	---	---	100.0

Table 2. Number of mothers and percent distribution of mothers, by employment status according to color and age of mother: United States, 1963 legitimate live births

Color and age of mother	Number of mothers in thousands	Total	Employment status					Unknown
			Not employed	Total employed	Full time only	Both full time and part time	Part time only	
<u>All mothers</u>		Percent distribution						
All ages-	3,797	100.0	67.5	31.0	22.5	2.4	6.1	1.4
Under 20 years-	468	100.0	61.4	36.5	27.1	1.8	7.6	2.1
20-24 years----	1,354	100.0	61.6	36.7	28.6	3.2	4.9	1.8
25-29 years----	992	100.0	69.3	29.6	20.7	1.9	7.1	1.0
30-34 years----	583	100.0	76.6	22.8	14.4	2.1	6.4	0.6
35+ years-----	402	100.0	76.9	21.1	12.9	2.2	6.0	2.0
<u>White</u>								
All ages-	3,315	100.0	67.8	30.6	22.8	2.5	5.4	1.5
Under 20 years-	407	100.0	61.7	36.2	28.3	2.1	5.8	2.1
20-24 years----	1,197	100.0	59.9	38.1	30.7	3.4	4.0	2.0
25-29 years----	861	100.0	70.5	28.6	19.4	2.0	7.2	0.9
30-34 years----	505	100.0	78.9	20.4	13.1	2.2	5.1	0.6
35+ years-----	345	100.0	79.5	18.2	11.3	1.5	5.3	2.3
<u>Nonwhite</u>								
All ages-	482	100.0	65.5	33.7	20.7	1.7	11.3	0.8
Under 20 years-	60	100.0	59.8	38.3	18.9	-	19.4	1.9
20-24 years----	156	100.0	74.6	25.4	12.7	1.4	11.3	-
25-29 years----	131	100.0	61.4	36.5	29.1	1.1	6.2	2.1
30-34 years----	78	100.0	61.5	38.5	22.8	1.2	14.4	-
35+ years-----	57	100.0	61.2	38.8	22.4	6.1	10.2	-

Table 3. Number of mothers and percent distribution of mothers, by employment status according to color and live-birth order: United States, 1963 legitimate live births

Color and live-birth order	Number of mothers in thousands	Total	Employment status					Unknown
			Not employed	Total employed	Full time only	Both full time and part time	Part time only	
<u>All mothers</u>		Percent distribution						
Total----	3,797	100.0	67.5	31.0	22.5	2.4	6.1	1.4
First child----	989	100.0	40.8	57.5	46.9	5.0	5.5	1.7
Second child---	912	100.0	72.9	25.6	17.5	1.6	6.5	1.4
Third child----	714	100.0	76.4	22.4	13.9	1.5	7.0	1.2
Fourth child---	494	100.0	80.0	18.8	11.8	2.1	4.9	1.1
Fifth child and over-----	688	100.0	80.5	17.9	10.7	0.8	6.5	1.6
<u>White</u>								
Total----	3,315	100.0	67.8	30.6	22.8	2.5	5.4	1.5
First child----	910	100.0	39.4	58.7	48.3	5.4	5.1	1.9
Second child---	823	100.0	73.6	24.9	17.5	1.5	5.9	1.6
Third child----	639	100.0	77.1	21.7	14.0	1.5	6.2	1.2
Fourth child---	425	100.0	81.8	17.2	11.3	2.2	3.6	1.1
Fifth child and over-----	517	100.0	85.7	12.6	6.5	0.6	5.4	1.7
<u>Nonwhite</u>								
Total----	482	100.0	65.5	33.7	20.7	1.7	11.3	0.8
First child----	79	100.0	57.4	42.6	31.0	1.4	10.3	-
Second child---	89	100.0	67.1	32.9	17.5	2.9	12.5	-
Third child----	74	100.0	69.9	28.6	13.3	1.6	13.7	1.5
Fourth child---	69	100.0	69.3	29.2	15.2	1.7	12.3	1.5
Fifth child and over-----	171	100.0	64.9	34.1	23.1	1.2	9.7	1.0

Table 4. Number of mothers and percentage of mothers employed during pregnancy, by age of mother and live-birth order: United States, 1963 legitimate live births

Age of mother	Live-birth order					
	Total	1	2	3	4	5 and over
Number of mothers in thousands						
All ages-----	3,797	989	912	714	494	688
Under 20 years-----	468	321	111	30	*	*
20-24 years-----	1,354	470	461	252	121	50
25-29 years-----	992	125	241	233	192	201
30-34 years-----	583	53	68	126	117	220
35 years and over-----	402	*	31	73	62	216
Percentage of mothers employed during pregnancy						
All ages-----	31.5	58.5	26.0	22.7	19.1	18.2
Under 20 years-----	37.3	42.4	26.8	19.9	*	*
20-24 years-----	37.3	65.8	24.7	20.3	17.5	16.8
25-29 years-----	29.9	70.8	29.4	22.9	19.0	23.9
30-34 years-----	23.0	67.6	28.5	22.8	19.8	12.2
35 years and over-----	21.5	*	10.5	30.9	19.5	19.2

Table 5. Number of mothers and percentage of mothers employed during pregnancy, by color, live-birth order, and age of mother: United States, 1963 legitimate live births

Age of mother	All mothers			White			Nonwhite		
	Total	First child	Second child and over	Total	First child	Second child and over	Total	First child	Second child and over
Number of mothers in thousands									
All ages-----	3,797	989	2,808	3,315	910	2,405	482	79	403
Under 20 years-----	468	321	146	407	291	116	60	30	30
20-24 years-----	1,354	470	883	1,197	435	762	156	35	121
25-29 years-----	992	125	867	861	119	742	131	*	125
30-34 years-----	583	53	530	505	46	458	78	*	72
35 years and over-----	402	*	382	345	*	327	57	*	56
Percentage of mothers employed during pregnancy									
All ages-----	31.5	58.5	22.0	31.1	59.9	20.3	34.0	42.6	32.3
Under 20 years-----	37.3	42.4	26.0	37.0	43.1	21.9	39.1	35.9	42.3
20-24 years-----	37.3	65.8	22.0	38.9	68.0	22.2	25.4	39.4	21.3
25-29 years-----	29.9	70.8	24.1	28.8	72.5	21.9	37.3	*	37.3
30-34 years-----	23.0	67.6	18.5	20.5	65.0	16.0	38.5	*	34.2
35 years and over-----	21.5	*	20.8	18.6	*	17.9	38.8	*	37.5

Table 6. Number of mothers and percentage of mothers employed during pregnancy, by color, live-birth order, geographic region, and metropolitan status: United States, 1963 legitimate live births

Region and metropolitan status	All mothers			White			Nonwhite		
	Total	First child	Second child and over	Total	First child	Second child and over	Total	First child	Second child and over
Number of mothers in thousands									
All regions-----	3,797	989	2,808	3,315	910	2,405	482	79	403
Metropolitan-----	2,453	679	1,774	2,138	619	1,519	315	60	255
Nonmetropolitan-----	1,345	310	1,035	1,178	291	886	167	*	148
Northeast-----	877	240	638	796	224	572	81	*	66
Metropolitan-----	700	201	499	625	186	438	75	*	60
Nonmetropolitan-----	178	39	139	171	38	134	*	*	*
North Central-----	1,090	267	824	1,016	257	759	75	*	65
Metropolitan-----	675	169	506	610	160	450	65	*	56
Nonmetropolitan-----	415	98	317	406	97	309	*	*	*
South-----	1,189	290	900	924	248	676	265	41	224
Metropolitan-----	607	161	446	482	135	347	125	26	99
Nonmetropolitan-----	582	129	454	442	113	329	140	*	124
West-----	640	193	447	579	181	398	61	*	49
Metropolitan-----	471	149	322	421	138	283	50	*	39
Nonmetropolitan-----	169	44	125	158	43	115	*	*	*
Percentage of mothers employed during pregnancy									
All regions-----	31.5	58.5	22.0	31.1	59.9	20.3	34.0	42.6	32.3
Metropolitan-----	32.6	61.1	21.8	32.8	62.9	20.6	31.4	42.2	28.8
Nonmetropolitan-----	29.4	52.7	22.5	28.1	53.3	19.8	39.0	*	38.3
Northeast-----	31.5	65.1	18.9	31.8	66.0	18.3	29.0	*	23.6
Metropolitan-----	31.7	64.3	18.5	32.2	65.5	18.0	27.8	*	22.5
Nonmetropolitan-----	30.9	69.0	20.3	30.4	68.3	19.6	*	*	*
North Central-----	31.4	62.2	21.7	31.5	63.5	20.9	30.6	*	30.7
Metropolitan-----	33.0	66.0	22.2	33.6	67.9	21.6	27.8	*	26.8
Nonmetropolitan-----	28.9	55.6	20.9	28.4	56.3	19.9	*	*	*
South-----	31.0	48.2	25.5	28.8	49.7	21.2	38.6	39.2	38.5
Metropolitan-----	33.3	50.5	27.0	31.9	53.6	23.4	38.6	34.2	39.7
Nonmetropolitan-----	28.7	45.3	23.9	25.5	44.9	18.8	38.6	*	37.5
West-----	32.4	60.9	20.2	33.2	61.4	20.5	24.7	*	17.7
Metropolitan-----	32.7	62.9	18.8	33.8	63.3	19.5	23.1	*	13.2
Nonmetropolitan-----	31.8	54.2	23.9	31.8	55.5	22.9	*	*	*

Table 7. Number of mothers and percentage of mothers employed during pregnancy, by color, live-birth order, and 1962 family income: United States, 1963 legitimate live births

1962 family income	All mothers			White			Nonwhite		
	Total	First child	Second child and over	Total	First child	Second child and over	Total	First child	Second child and over
Number of mothers in thousands									
All incomes-----	3,797	989	2,808	3,315	910	2,405	482	79	403
Under \$3,000-----	819	257	562	570	217	353	249	40	209
\$3,000-\$4,999-----	1,030	276	755	879	252	627	151	24	127
\$5,000-\$6,999-----	920	201	718	876	194	682	44	*	36
\$7,000-\$9,999-----	667	154	513	645	148	497	22	*	*
\$10,000 and over-----	306	85	222	294	83	211	*	*	*
Unknown-----	55	17	38	51	17	34	4	---	4
Percentage of mothers employed during pregnancy									
All incomes-----	31.5	58.5	22.0	31.1	59.9	20.3	34.0	42.6	32.3
Under \$3,000-----	27.0	38.1	21.9	26.4	40.9	17.5	28.3	22.8	29.3
\$3,000-\$4,999-----	29.5	53.3	20.8	28.5	53.2	18.7	35.3	55.1	31.5
\$5,000-\$6,999-----	31.8	67.2	21.8	31.3	66.9	21.2	41.5	*	34.4
\$7,000-\$9,999-----	36.9	80.9	23.8	36.1	80.2	22.9	63.5	*	*
\$10,000 and over-----	37.5	75.4	23.1	36.8	76.8	20.9	*	*	*
Unknown-----	---	---	---	---	---	---	---	---	---

Table 8. Number of mothers and percentage of mothers employed during pregnancy, by color, live-birth order, and employment status of father: United States, 1963 legitimate live births

Employment status of father	All mothers			White			Nonwhite		
	Total	First child	Second child and over	Total	First child	Second child and over	Total	First child	Second child and over
Number of mothers in thousands									
All fathers-----	3,797	989	2,808	3,315	910	2,405	482	79	403
Not employed-----	273	67	206	200	57	144	73	*	63
Employed part time-----	206	47	159	147	43	104	59	*	55
Employed full time-----	3,263	858	2,405	2,917	794	2,123	346	64	282
Unknown-----	55	17	38	51	17	34	4	-	4
Percentage of mothers employed during pregnancy									
All fathers-----	31.5	58.5	22.0	31.1	59.9	20.3	34.0	42.6	32.3
Not employed-----	22.5	38.1	17.5	24.2	41.4	17.4	17.9	*	17.6
Employed part time-----	37.8	51.7	33.7	34.2	54.7	25.7	46.7	*	48.7
Employed full time-----	31.8	60.4	21.6	31.4	61.5	20.2	35.2	47.6	32.4
Unknown-----	---	---	---	---	---	---	---	---	---

Table 9. Number of mothers and percentage of mothers employed during pregnancy, by color, live-birth order, and educational level of mother: United States, 1963 legitimate live births

Educational level of mother	All mothers			White			Nonwhite		
	Total	First child	Second child and over	Total	First child	Second child and over	Total	First child	Second child and over
Number of mothers in thousands									
All levels-----	3,797	989	2,808	3,315	910	2,405	482	79	403
Elementary-----	488	48	440	375	43	332	113	*	108
High school-----	2,525	676	1,848	2,217	619	1,598	308	58	250
1-3 years-----	928	197	731	767	177	590	161	20	140
4 years-----	1,597	479	1,118	1,450	442	1,008	147	37	110
College-----	730	248	482	673	232	440	58	16	41
1-3 years-----	461	148	312	414	136	277	47	*	35
4+ years-----	270	100	170	259	96	163	*	*	*
Unknown-----	55	17	38	51	17	34	*	*	*
Percentage of mothers employed during pregnancy									
All levels-----	31.0	57.5	21.7	30.6	58.7	20.0	33.7	42.6	32.0
Elementary-----	24.7	27.9	24.4	19.8	31.1	18.3	41.2	*	43.0
High school-----	30.6	55.9	21.3	30.7	56.5	20.7	30.0	49.9	25.4
1-3 years-----	23.2	32.3	20.7	22.9	32.6	19.9	24.6	29.7	23.8
4 years-----	34.9	65.7	21.8	34.8	66.1	21.1	35.9	61.0	27.4
College-----	39.1	71.2	22.5	38.9	74.1	20.3	41.4	30.0	45.9
1-3 years-----	36.7	64.0	23.8	36.1	67.3	20.8	41.8	*	47.0
4+ years-----	43.1	81.9	20.3	43.3	83.8	19.5	*	*	*
Unknown-----	---	---	---	---	---	---	---	---	---

Table 10. Number of mothers and percentage of mothers employed during pregnancy, by color, live-birth order, and educational level of father: United States, 1963 legitimate live births

Educational level of father	All mothers			White			Nonwhite		
	Total	First child	Second child and over	Total	First child	Second child and over	Total	First child	Second child and over
. Number of mothers in thousand									
All levels-----	3,797	989	2,808	3,315	910	2,405	482	79	403
Elementary-----	647	84	564	476	74	402	171	*	162
High school-----	2,081	572	1,509	1,830	521	1,309	251	51	200
1-3 years-----	821	203	617	686	192	494	134	*	123
4 years-----	1,261	369	892	1,144	329	815	117	40	77
College-----	1,014	316	697	958	298	659	56	18	38
1-3 years-----	472	160	311	435	148	288	36	*	24
4+ years-----	542	156	386	522	151	372	20	*	*
Unknown-----	55	17	38	51	17	34	*	*	*
Percentage of mothers employed during pregnancy									
All levels-----	31.0	57.5	21.7	30.6	58.7	20.0	33.7	42.6	32.0
Elementary-----	27.7	43.6	25.3	22.3	43.5	18.4	42.8	*	42.7
High school-----	31.3	54.5	22.5	32.1	55.9	22.6	25.6	40.7	21.7
1-3 years-----	30.7	47.9	25.1	32.6	48.8	26.3	21.3	*	20.2
4 years-----	31.7	58.2	20.8	31.8	60.1	20.4	30.5	42.6	24.1
College-----	34.3	69.5	18.3	33.7	70.8	16.8	44.9	47.4	43.7
1-3 years-----	38.7	69.1	23.1	37.6	70.4	20.8	51.9	*	51.1
4+ years-----	30.4	69.9	14.4	30.4	71.3	13.7	32.0	*	*
Unknown-----	---	---	---	---	---	---	---	---	---

APPENDIX I

TECHNICAL NOTES ON METHODS

Background of This Report

This report presents estimates of the percentage of women employed at some time during the pregnancy which resulted in a live birth in 1963. It is based on data collected in the 1963 National Natality Survey. The survey, which was conducted by the Division of Health Records Statistics of the National Center for Health Statistics (in part under contract with the Division of Radiological Health, Public Health Service), was designed primarily to provide national estimates of the amount and type of exposure to ionizing radiation experienced by women during pregnancy. In addition to obtaining radiation data from physicians and medical facilities, certain socioeconomic and demographic data which were thought to be relevant to the study were obtained from the mothers. All of the information contained in this report was obtained from the certificates of live birth and from the mothers' responses. Various kinds of information from physicians and medical facilities are being published in separate reports in this series.

The basic source of information was the birth certificate; a questionnaire asking for more information was mailed to each mother. Additional mailings were made when the original was not returned or was returned incomplete. Finally, when there was no response after three mailings, a personal interview was attempted by Bureau of the Census interviewers if the mother was a resident of a primary sampling unit of the Bureau of the Census.

Sample Design

The sampling frame for the 1963 National Natality Survey was the file of microfilms of birth records received each month by the National Center for Health Statistics from the 54 birth registration areas of the United States. As a general rule, for each registration area these microfilm images are assigned a number prior to or during filming of the birth record. Each thousand consecutive images are defined as a "reel" and assigned a reel number starting from zero. Within each reel, the images are numbered from 1 to 1,000.

The sampling for the survey was based on a probability design which made use of these preassigned reel and image numbers on the birth records. Each reel of the microfilm copies of the birth certificates constituted a primary sampling unit. Within each reel one record was chosen at random. Thus, a sample of 1 out of 1,000 births was selected from the monthly shipment of records from the registration areas.

The national sample included a total of 4,096 births for the year 1963. Of these 4,096 births, 214 were reported as illegitimate on the birth record. However, legitimacy is reported in only 35 of the 54 registration areas in the United States. Hence, a procedure was developed to infer legitimacy on the basis of indirect evidence on the birth certificate for the 19 registration areas not reporting this item. If the surname of the father on the birth record was different from the surname of the child or if the surname of the father was not reported, the birth was imputed to be illegitimate. On the basis of this procedure, 102 births in the sample were inferred to be illegitimate in addition to those mentioned above.

The mothers of these 316 illegitimate births plus the mothers of an additional 54 births were not queried. The State of Missouri withdrew from the survey after June 1963, so that the 45 births selected in the sample from Missouri for the period July through December 1963 were excluded from the survey. Nine additional births were excluded from the survey either because residence was outside the United States or because no usable mailing address was available. Thus, the final sample of mothers to whom questionnaires were mailed was 3,726. Table I shows the size of the original sample drawn from the birth records and the final sample of mothers to whom questionnaires were mailed.

The Birth Certificate and Questionnaire

Facsimiles of the Standard Certificate of Live Birth and of the questionnaire used in the survey are shown in Appendix III.

Although not all States use the standard certificate, most do include the basic information used in this report. The major exception is legitimacy (item 23)

Table I. Total number of births in the United States and the number in the survey of mothers: 1963 National Natality Survey

Item	Size
Total count of births in the United States-----	4,098,000
Number of births selected in the sample-----	4,096
Number of births excluded from survey:	
Number of illegitimate births-----	316
Number of births from Missouri:	
July-December 1963-----	45
Other-----	9
Number of births included for the survey of mothers-----	3,726

which is not reported in 19 States. The procedure which was developed to overcome this omission is discussed under sample design.

The questionnaire sent to the mother was designed primarily to obtain names and addresses of any physicians and medical facilities which she visited during the year in addition to those named on the birth certificate. In addition, there were six questions concerning the family income during 1962 (the last calendar year before the birth), the educational attainment of the parents, the father's employment status at the time of the birth, and the mother's employment at any time during her pregnancy.

Collection of Data

Data for the 1963 National Natality Survey were collected primarily by mail. Using the addresses given on the birth certificate, questionnaires were sent to the mother, the physician who delivered the baby, and the medical facility where the baby was born.

For these mothers, followup procedures consisted of a certified mailing 2 weeks after the initial mailing and a regular first-class mailing 3 weeks after the certified mail. Telephone or personal interviews were conducted by Bureau of the Census interviewers with mothers who did not respond after all three mailings and who lived in one of the field survey areas of the Current Population Survey program of the Bureau of the Census. These procedures resulted in a response rate of 86.4 percent from mothers included in the survey (table II).

Processing of Data

The completed questionnaires were edited and coded in accordance with predetermined specifications. The questionnaires were checked both for completeness and for consistency of response. If the reported data

were inadequate for certain essential items, further mail inquiries were made to obtain them.

After the edited and coded data had been transcribed onto punchcards the data were processed on electronic computers. The computer processing included consistency checks, interval edits, assignment of weights, and imputation for missing data.⁴

Nonresponse and Imputation of Missing Data

Failure to obtain response represents one of the main sources of error in a survey. The extent of non-response and imputation of missing data in the 1963 natality survey are discussed below.

A total of 508 mothers, or 13.6 percent, had not responded after all followup procedures were completed. Included among the 508 are 28 respondents who returned the questionnaires substantially incomplete; for the purposes of processing the data, these respondents were treated in the same manner as the women who did not respond at all. A large proportion of this non-response was accounted for by mothers in the younger ages. Almost 57.6 percent of the 508 mothers not responding, compared with 45.0 percent of the respondents, were less than 25 years of age (table III).

Besides these mothers who did not respond at all by mail or interview ("unit nonresponse"), those who returned questionnaires but omitted part of the information also affect the quality of data derived from the survey. Nonresponse to items on questionnaires returned by mothers was minimal in most instances and accounted for no more than 3.1 percent of the respondents for any single item. Table IV shows the percent not ascertained for specified items by age of mother and live-birth order. The principal problem of incompleteness in the returned questionnaires arose from failure to obtain information about the total income of the family, a problem which was found disproportionately among mothers under 25 years of age among

Table II. Response received from mothers by mailing waves: 1963 National Natality Survey

Response status	Mothers
Total included in survey-----	3,726
	Percent
Total response-----	86.4
Response to original mail-----	45.3
Response to second mail (certified)-	29.0
Response to third mail-----	6.8
Response to interview-----	5.1
Total nonresponse-----	13.6

Table III. Number and percent distribution by age, for respondents and nonrespondents to the survey: 1963 National Natality Survey

Age of mother	Total		Respondents		Nonrespondents	
	Number	Percent	Number	Percent	Number	Percent
All ages-----	3,726	100.0	3,218	100.0	508	100.0
Under 20 years-----	488	13.1	373	11.6	115	22.6
20-24 years-----	1,252	33.6	1,074	33.4	178	35.0
25-29 years-----	1,056	28.3	948	29.5	108	21.3
30-34 years-----	549	14.7	486	15.1	63	12.4
35 years and over-----	381	10.2	337	10.4	44	8.7

mothers who were having their first birth or fifth or later birth.

Statistics derived from the survey of mothers were adjusted for unit nonresponse by imputing to nonrespondents the characteristics of similar respondents. Similar respondents were mothers who responded to later mailings within each of the 24 age-of-mother, color, and live-birth-order groups. Two assumptions are inherent in this imputation procedure. First the three birth record characteristics—age of mother, color, and live-birth order—which are available for responding as well as nonresponding mothers are related to the socioeconomic characteristics. Second the nonrespondents are more like those who responded to the later mailings than those who responded to the first

mail. The latter assumption is based on the pattern of response by mailing waves observed in relation to the educational and income level of the respondents.

Thus, an array of known values was established in the computer using the respondents to later mailings within the 24 age, color, and birth-order groups as the population from which values were imputed to the nonrespondents. Values in the cells of the array were continually replaced by successive known values as the file of records was processed; as a nonresponse record was read, values from the last known record in the appropriate cell of the array were imputed to the nonresponse record.

Data are also adjusted for item nonresponse. Imputation procedures for missing data on questionnaires

Table IV. Number and percent of respondents for whom specified items were not ascertained, by age of mother and live-birth order: 1963 National Natality Survey

Age of mother and live-birth order	Total number of respondents	Family income	Educa- tion of mother	Educa- tion of father	Mother's employ- ment status	Father's employ- ment status
Total-----	3,218	3.1	0.2	0.8	0.1	0.7
Percent not ascertained						
<u>Age of mother</u>						
Under 20 years-----	373	6.2	-	0.3	-	0.8
20-24 years-----	1,074	3.0	0.1	0.6	-	0.8
25-29 years-----	948	1.8	0.3	0.8	0.1	0.3
30-34 years-----	486	3.3	0.6	1.0	0.4	1.4
35 years and over-----	337	3.9	0.3	1.2	-	0.3
<u>Live-birth order</u>						
First child-----	864	4.2	-	0.2	-	0.6
Second child-----	777	2.1	-	0.4	-	0.4
Third child-----	595	2.4	0.2	1.3	-	1.0
Fourth child-----	409	2.2	0.5	1.0	-	0.7
Fifth child and over-----	573	4.5	0.9	1.4	0.5	1.0

returned by mothers were based on the premise that "the presence of several correlated variables permits a reasonably good prediction of the missing variable...."⁸

Thus, missing data for items on employment of father, education of father, and family income were imputed on the computer on the same principle as for unit nonresponse, that is, imputation was made by assigning within homogeneous groups the characteristics of respondents to later mailings with known data to those respondents with missing data. Age, color, and birth order used for imputation of unit nonresponse was also used for imputation of missing data on employment of father. Missing information on education of father was imputed using age of father and education of mother. Missing information on family income was imputed using age and education of father.

Missing data on the employment status of mother during pregnancy for three cases and on the education of mother for eight cases were imputed arbitrarily.

Birth Records

With the exception of color of child for births selected from New Jersey, age of father, and completed weeks of pregnancy, the information on the birth record was in most cases complete. During 1962 the item on color of child was removed from the New Jersey birth record. Although this item was replaced in late 1962, almost all births occurring during 1963 were registered on birth records not containing the question on color. Thus, information on color of child was missing on approximately 100 records from New Jersey selected in the sample. Imputation for color of child was carried out by means of a procedure using detailed geographic information on place of residence of mother and proportion of nonwhite population in that location according to the 1960 census.

In addition, information on completed weeks of pregnancy was unknown on 214 birth records; number of previous fetal deaths was unknown for 92 records; and age of father was missing on 255 records. Imputation for these items was also carried out on the computer by substituting known values from the age, color, and birth-order array described earlier. For items such as birth weight, sex of child, and birthplace of mother, where the number of unknown cases was small, imputation was made arbitrarily.

Estimation

Statistics based on the survey are estimates prepared by the use of a post-stratified ratio estimation procedure. The purpose of ratio estimation is to take into account available relevant information in the estimation process, thereby reducing the variability of the estimate. This procedure was carried out for each of the following 24 groups:

Group	Color and age	Live-birth order
<u>White</u>		
1	Under 20 years	1
2	Under 20 years	2+
3	20-24 years	1
4	20-24 years	2
5	20-24 years	3+
6	25-29 years	1
7	25-29 years	2
8	25-29 years	3-4
9	25-29 years	5+
10	30-34 years	1-2
11	30-34 years	3-4
12	30-34 years	5+
13	35 years or more	1-4
14	35 years or more	5+
<u>Nonwhite</u>		
15	Under 20 years	1
16	Under 20 years	2+
17	20-24 years	1-2
18	20-24 years	3+
19	25-29 years	1-2
20	25-29 years	3-4
21	25-29 years	5+
22	30-34 years	1-4
23	30-34 years	5+
24	35 years or more	ALL

For each group, the ratio of the number of births in the United States in 1963 (based on a 50-percent sample) to the number of births in the sample was determined.⁹ These 24 ratios comprised the sample weights used in estimating national totals for each of the 24 groups. The effect of this ratio adjustment was to make the estimates from the sample consistent with the complete count of births for each of the groups used in the estimation procedure.

Thus estimates of characteristics from the sample are produced using the following formula:

$$X^i = \sum_{i=1}^{24} \frac{x_i}{y_i} Y_i$$

where

X^i is the estimate of the number of births with a particular characteristic in group i ,

- x_i is the count of sample births with the characteristic in group i ,
- y_i is the count of all sample births in group i , and
- Y_i is the total number of births in group i , based on the 50-percent sample.

Reliability of Estimates

Since the statistics derived from this survey are estimates based on a sample, they may differ from the figures that would have been obtained had a count of all births in 1963 been conducted using the same questionnaires and procedures. In addition to sampling errors, survey results are subject to errors in conceptual formulation, ambiguities in definitions and in the questionnaire construction, coding errors, biases due to non-response or incomplete response, mistakes in editing, and tabulation errors.

The probability design of the sample for the survey makes possible the calculation of sampling errors. The standard error is a measure of the sampling variation that occurs by chance because only a sample rather than the entire population is surveyed. The chances are about 68 out of 100 that an estimate from the sample differs from the value for the entire population by less than the standard error. The chances are about 95 out of 100 that the difference is less than twice the standard error. The standard error of a difference between two sample estimates is approximately the square root of the sum of squares of each standard error considered separately.

Estimates of sampling variability for the statistics derived from this survey were based on 20 random half-sample replications. This technique yields overall variability through observation of variability among random subsamples of the total sample. It reflects both the error that arises from sampling and a part of the measurement error, but it does not measure any sys-

tematic biases in the data. A general discussion of the development and evaluation of a replication technique for estimating variance has been published elsewhere.¹⁰ However, the procedures and computations required to estimate variances by this method in the 1963 natality survey are briefly described below.

For this survey, each record from the entire file of records was assigned systematically to a random group between 1 and 40. Twenty pairs of random groups were created from these groups. A half sample was formed by randomly selecting one group from each of the 20 pairs. This process was repeated until 20 "replicate half samples" were formed from which variance estimates were derived. The composition of the 20 half samples was determined by an orthogonal plan.

After the composition of each of the half samples was determined, all the estimation procedures used to produce the final estimates from the entire sample were applied separately to each of the resulting half samples.

An estimated variance $S_{x_i}^2$ of an estimated statistic x_i of the parameter X is obtained by applying the following formula:

$$S_{x_i}^2 = \frac{1}{20} \sum_{i=1}^{20} (x_i'' - x_i')^2$$

where

x_i' is the estimate of X based on the entire sample, and x_i'' is the estimate of X based on half sample i .

Rules to determine the approximate standard errors for estimates presented in this report are as follows:

1. *Estimates of aggregates:* Approximate standard errors of estimates of aggregates, such as the number of births with a given characteristic are given in table V.
2. *Estimates of percentages in a percent distribution:* Approximate standard errors for percentages are determined in one of the two following ways, depending upon the source of the base of the percentages:
 - a. Where both numerator and denominator are estimates from the sample data, such as the percentage of wives in the Northeast Region who had their third child in 1963, the approximate standard errors are given in table VI.
 - b. Where the denominator is a value found in one of the 24 ratio estimates cells shown on page 23 and is therefore not subject to sampling error, the relative standard error of the percent is equivalent to the relative standard error of the numerator, which can be obtained directly from table V.

Table V. Approximate standard errors for estimated numbers shown in this report

Size of estimate	Relative standard error	Standard error
25,000-----	16.8	4,200
50,000-----	12.0	6,000
75,000-----	9.8	7,350
100,000-----	8.5	8,500
250,000-----	5.0	12,500
500,000-----	3.3	16,500
750,000-----	2.5	18,750
1,000,000-----	2.0	20,000
1,500,000-----	1.5	22,500

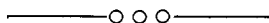
Table VI. Approximate standard error for estimated percents shown in this report

Base of percent	Estimated percent					
	2 or 98	5 or 95	10 or 90	20 or 80	30 or 70	50
	Standard error expressed in percentage points					
30,000-----	2.0	3.1	4.2	5.6	6.4	7.0
50,000-----	1.5	2.4	3.3	4.3	5.0	5.4
100,000-----	1.1	1.7	2.3	3.1	3.5	3.8
250,000-----	0.7	1.1	1.5	1.9	2.2	2.4
500,000-----	0.5	0.7	1.0	1.4	1.6	1.7
1,000,000-----	0.3	0.5	0.7	1.0	1.1	1.2
2,000,000-----	0.2	0.4	0.5	0.7	0.8	0.9
3,000,000-----	0.2	0.3	0.4	0.6	0.6	0.7
4,000,000-----	0.2	0.3	0.4	0.5	0.5	0.6

3. *Difference between two sample estimates:* The standard error of a difference is approximately the square root of the sum of the squares of each standard error considered separately. This formula will represent the actual standard error quite accurately for the difference between separate and uncorrelated characteristics, although it is only a rough approximation in most cases.

Rounding of Numbers

The original tabulations on which the data in this report are based show figures to the nearest whole unit. In the published tables, estimates of aggregates are rounded to the nearest thousand although they are not necessarily accurate to that detail. All percentages, ratios, and averages were computed using unrounded figures.



APPENDIX II

DEFINITIONS OF CERTAIN TERMS USED IN THIS REPORT

Information From the Certificate of Live Birth

Legitimacy status.—For States reporting legitimacy on the birth record, it is recorded from the entry on the birth certificate. For States not reporting legitimacy on the birth record, it is inferred from other evidence on the certificate. The following 16 States did not report legitimacy on the birth record in 1963: Arizona, Arkansas, California, Colorado, Connecticut, Georgia, Idaho, Maryland, Massachusetts, Montana, Nebraska, New Hampshire, New Mexico, New York, Oklahoma, and Vermont.

Live-birth order.—Live-birth order is derived from entries on the birth certificate and refers to the number of children born alive to the mother including the sample child.

Color.—Color is recorded or derived from entries on the birth certificate. The category "white" includes births to parents classified as white, Mexican, or Puerto Rican. Nonwhite births include births to parents classified as Negro, American Indian, Chinese, Japanese, Aleut, Eskimo, Hawaiian, or part-Hawaiian.

Age of mother.—Age of mother is recorded or derived from entries on the birth certificate.

Metropolitan status.—The place of residence of a member of the civilian, noninstitutional population is classified as inside a standard metropolitan statistical area (SMSA) or outside an SMSA according to farm or nonfarm residence.

Region.—For the purpose of classifying the population by geographic area, the States are grouped into four regions. These regions, which correspond to those used by the Bureau of the Census, are as follows:

<i>Region</i>	<i>States Included</i>
Northeast -----	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania
North Central ---	Michigan, Ohio, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas
South -----	Delaware, Maryland, District of Columbia, Virginia, West Virginia,

North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas

West ----- Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Alaska, Washington, Oregon, California, Hawaii

Information From the Questionnaire

Employment status.—This term covers the categories "not employed," "employed full time only," "employed both part time and full time," and "employed part time only."

Mother's employment during pregnancy.—This is defined by the mother's response that she was employed either full time or part time outside the home at any time during pregnancy.

Father's employment.—This is defined by the mother's response concerning whether her husband was employed, either full time or part time, at the time the baby was born. This is employment at the termination of pregnancy as contrasted with the mother's employment at any time during pregnancy.

Educational attainment.—Educational attainment in this report refers to the highest grade of regular school completed. Regular school consists of elementary, high school, and college or university and does not include trade or business schools. Data are derived from the answers to questions concerning the highest grade of school attended by the person and whether or not that grade was completed.

Family income.—Family income refers to the total of all income received during the preceding year by all persons related to each other by blood, marriage, or adoption and living in the household when the baby was born. Income from all sources is included, such as wages, salaries, unemployment compensation, and help from relatives.

Trimester.—This is computed by comparing the date when the mother was last employed with the date of the baby's birth.



APPENDIX III

SOURCE FORMS

Standard Certificate of Live Birth

Form approved.
Budget Bureau No. 68-R374.2.

STATE OF		CERTIFICATE OF LIVE BIRTH		BIRTH No.		
1. PLACE OF BIRTH a. COUNTY		2. USUAL RESIDENCE OF MOTHER (Where does mother live?) a. STATE				
b. CITY, TOWN, OR LOCATION		c. CITY, TOWN, OR LOCATION				
c. NAME OF HOSPITAL OR INSTITUTION <i>(If not in hospital, give street address)</i>		d. STREET ADDRESS				
d. IS PLACE OF BIRTH INSIDE CITY LIMITS? YES <input type="checkbox"/> NO <input type="checkbox"/>		e. IS RESIDENCE INSIDE CITY LIMITS? YES <input type="checkbox"/> NO <input type="checkbox"/>		f. IS RESIDENCE ON A FARM? YES <input type="checkbox"/> NO <input type="checkbox"/>		
CHILD	3. NAME <i>(Type or print)</i> First Middle Last		4. SEX		5a. THIS BIRTH SINGLE <input type="checkbox"/> TWIN <input type="checkbox"/> TRIPLET <input type="checkbox"/>	
	5b. IF TWIN OR TRIPLET, WAS CHILD BORN 1st <input type="checkbox"/> 2d <input type="checkbox"/> 3d <input type="checkbox"/>		6. DATE OF BIRTH Month Day Year			
FATHER	7. NAME First Middle Last		8. COLOR OR RACE			
	9. AGE (At time of this birth) YEARS		10. BIRTHPLACE (State or foreign country)		11a. USUAL OCCUPATION	
MOTHER	12. MAIDEN NAME First Middle Last		13. COLOR OR RACE			
	14. AGE (At time of this birth) YEARS		15. BIRTHPLACE (State or foreign country)		16. PREVIOUS DELIVERIES TO MOTHER (Do NOT include this birth) a. How many OTHER children are now living? b. How many OTHER children were born alive but are now dead? c. How many fetal deaths (includes born dead at ANY time after conception)?	
17. INFORMANT						
18. MOTHER'S MAILING ADDRESS						
I hereby certify that this child was born alive on the date stated above.		18a. SIGNATURE		18b. ATTENDANT AT BIRTH M. D. <input type="checkbox"/> D. O. <input type="checkbox"/> MIDWIFE <input type="checkbox"/> OTHER (Specify)		
19. DATE RECD. BY LOCAL REG.		18c. ADDRESS		18d. DATE SIGNED		
20. REGISTRAR'S SIGNATURE		21. DATE ON WHICH GIVEN NAME ADDED BY (Registrar)				
FOR MEDICAL AND HEALTH USE ONLY <i>(This section MUST be filled out)</i>						
22a. LENGTH OF PREGNANCY COMPLETED WEEKS		22b. WEIGHT AT BIRTH LB. OZ.		23. LEGITIMATE YES <input type="checkbox"/> NO <input type="checkbox"/>		
(SPACE FOR ADDITION OF MEDICAL AND HEALTH ITEMS BY INDIVIDUAL STATES)						

1956 REVISION OF STANDARD CERTIFICATE

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE—PUBLIC HEALTH SERVICE

PHS-796 REV. 11-54

Survey Questionnaire for Mothers



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

PUBLIC HEALTH SERVICE

WASHINGTON 25, D. C.

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The U. S. Public Health Service is doing a national study to find out how much and what kinds of medical and dental care women are receiving during the year before the birth of a child. Nothing is known about the extent of the care received by expectant mothers, even though such care is of the greatest importance for the future health of both mother and baby. A knowledge of what is actually happening throughout the Nation will go a long way in helping to improve the health of mothers and babies.

The information needed for this study will be based on the experience of the mothers of 4,000 babies out of the 4 million born during 1963. These mothers were selected as a random sample of all mothers who have a baby, and you are one of those so selected. We are therefore asking you to answer the questions on the following pages of this form, and to return it to us in the enclosed envelope which requires no postage.

Please notice that in the first part of the form the questions ask about every doctor, dentist, hospital, or clinic from which you received any care during the entire year before your baby was born. Your answers should not be just for the care connected with pregnancy, but for any and all medical and dental care or checkups during these 12 months.

All information about you and your baby will be kept completely confidential. Your answers will be used for health research only and for no other purpose. As you might expect, it is particularly important that we receive your answers and those of all the other 4,000 mothers, since each of you really represents 1,000 mothers.

Your cooperation in this study is deeply appreciated.

Sincerely yours,

O. K. Sagen, Ph. D., Chief
National Vital Statistics Division
National Center for Health Statistics

Name of Child	
Date of Birth	File Number

SURVEY OF MEDICAL AND DENTAL CARE

PART I. SOURCES OF MEDICAL AND DENTAL CARE DURING ONE-YEAR PERIOD BEFORE CHILDBIRTH																						
<p>1. Please provide the information requested below about the physician, chiropractor or midwife who attended you at the recent birth of your child.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">Name</td></tr> <tr><td style="padding: 2px;">Address</td></tr> <tr><td style="padding: 2px;">City (town) and State</td></tr> <tr><td style="padding: 2px;">How many times were you seen by this doctor during the one-year period?</td></tr> </table>	Name	Address	City (town) and State	How many times were you seen by this doctor during the one-year period?	<p>3. Were you seen by a dentist during this one-year period?</p> <p style="text-align: center;"><input type="checkbox"/> YES <input type="checkbox"/> NO (Go on to Question 4)</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Complete a section below for each dentist.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">Name</td></tr> <tr><td style="padding: 2px;">Address</td></tr> <tr><td style="padding: 2px;">I City (town) and State</td></tr> <tr><td style="padding: 2px;">How many times were you seen by this dentist during the one-year period?</td></tr> <tr><td style="padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">Name</td></tr> <tr><td style="padding: 2px;">Address</td></tr> <tr><td style="padding: 2px;">II City (town) and State</td></tr> <tr><td style="padding: 2px;">How many times were you seen by this dentist during the one-year period?</td></tr> </table>	Name	Address	I City (town) and State	How many times were you seen by this dentist during the one-year period?		Name	Address	II City (town) and State	How many times were you seen by this dentist during the one-year period?								
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II City (town) and State																						
How many times were you seen by this dentist during the one-year period?																						
<p>2. Were you seen by any other physician or chiropractor during the one-year period before the recent birth of your child?</p> <p style="text-align: center;"><input type="checkbox"/> YES <input type="checkbox"/> NO (Go on to Question 3)</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Complete a section below for each doctor or chiropractor.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">Name</td></tr> <tr><td style="padding: 2px;">Address</td></tr> <tr><td style="padding: 2px;">I City (town) and State</td></tr> <tr><td style="padding: 2px;">How many times were you seen by this doctor during the one-year period?</td></tr> <tr><td style="padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">Name</td></tr> <tr><td style="padding: 2px;">Address</td></tr> <tr><td style="padding: 2px;">II City (town) and State</td></tr> <tr><td style="padding: 2px;">How many times were you seen by this doctor during the one-year period?</td></tr> <tr><td style="padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">Name</td></tr> <tr><td style="padding: 2px;">Address</td></tr> <tr><td style="padding: 2px;">III City (town) and State</td></tr> <tr><td style="padding: 2px;">How many times were you seen by this doctor during the one-year period?</td></tr> </table>	Name	Address	I City (town) and State	How many times were you seen by this doctor during the one-year period?		Name	Address	II City (town) and State	How many times were you seen by this doctor during the one-year period?		Name	Address	III City (town) and State	How many times were you seen by this doctor during the one-year period?	<p>4. During this one-year period, were you treated or examined in a clinic or hospital not reported above? (Include health checkups at work, visits to mobile health units, etc.)</p> <p style="text-align: center;"><input type="checkbox"/> YES <input type="checkbox"/> NO (Go on to next page)</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Complete a section below for each place where you were treated or examined.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">Name</td></tr> <tr><td style="padding: 2px;">Address</td></tr> <tr><td style="padding: 2px;">I City (town) and State</td></tr> <tr><td style="padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">Name</td></tr> <tr><td style="padding: 2px;">Address</td></tr> <tr><td style="padding: 2px;">II City (town) and State</td></tr> </table>	Name	Address	I City (town) and State		Name	Address	II City (town) and State
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I City (town) and State																						
How many times were you seen by this doctor during the one-year period?																						
Name																						
Address																						
II City (town) and State																						
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Name																						
Address																						
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Name																						
Address																						
I City (town) and State																						
Name																						
Address																						
II City (town) and State																						

PART II. RELATED INFORMATION

1. Were you employed outside your home at any time during your recent pregnancy?

YES (Answer a and b below) NO (Go on to Question 2)

a. Did you work full-time at all during your recent pregnancy?

YES NO

When did you stop working full-time?

Month	Day	Year
		19__

b. Did you work part-time at all during your recent pregnancy?

YES NO

When did you stop working part-time?

Month	Day	Year
		19__

2. What was the highest grade (or year) of regular school that you ever attended? (Circle highest grade attended)

NONE----- 0
 ELEMENTARY SCHOOL---- 1 2 3 4 5 6 7 8
 HIGH SCHOOL----- 1 2 3 4
 COLLEGE----- 1 2 3 4 5 6+

Did you COMPLETE this grade? YES NO

3. What was the highest grade (or year) of regular school that your husband ever attended? (Circle highest grade attended)

NONE----- 0
 ELEMENTARY SCHOOL---- 1 2 3 4 5 6 7 8
 HIGH SCHOOL----- 1 2 3 4
 COLLEGE----- 1 2 3 4 5 6+

Did he COMPLETE this grade? YES NO

4. Was your husband employed at the time of your child's birth?

YES → Was he working (check one) FULL-TIME?
 NO PART-TIME?

5. What kind of work was your husband doing at the time of your child's birth? (If he was not working then, please give information for his last job)
 GIVE FULL DESCRIPTION (For example: grocery clerk, auto mechanic, elementary school teacher)

6. What was the total income of your family during 1962? (Include all income such as wages, salaries, unemployment compensation, help from relatives, etc., received by all members of the family living with you when your baby was born)

NONE \$4,000 - \$4,999
 UNDER \$1,000 \$5,000 - \$6,999
 \$1,000 - \$1,999 \$7,000 - \$9,999
 \$2,000 - \$2,999 \$10,000 - \$14,999
 \$3,000 - \$3,999 \$15,000 OR OVER

7. Where did you live when your baby was born? (Please give your home address)

Number and Street

City (town) and State

County

Is this place on a city lot (or in an apartment building)?

YES NO

(Name and address of person completing this form)

PLEASE USE BACK PAGE FOR COMMENTS

OUTLINE OF REPORT SERIES FOR VITAL AND HEALTH STATISTICS

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