Data from the
NATIONAL VITAL STATISTICS SYSTEM

Series 22
Number 15

Infant Mortality Rates: Relationships With Mother's Reproductive History

United States

Statistics on infant mortality rates according to mother's previous reproductive experience particularly whether she had had a previous child die in infancy or a fetal death and according to selected socioeconomic factors. Based on data collected by a questionnaire mailed to mothers of infant deaths. Samples selected from records of births and infant deaths in 1964, 1965, and 1966 which were transmitted to the National Center for Health Statistics.

DHEW Publication No. (HSM) 73-1976

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service

Health Services and Mental Health Administration
National Center for Health Statistics
Rockville, Md. April 1973

Vital and Health Statistics-Series 22-No. 15

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
Price 85 cents domestic postpaid or 60 cents GPO Bookstore

NATIONAL CENTER FOR HEALTH STATISTICS

DIVISION OF VITAL STATISTICS

Vital and Health Statistics-Series 22-No. 15

DHEW Publication No. (HSM) 73-1976
Library of Congress Catalog Card Number 72-600224

CONTENTS

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	*

INFANT MORTALITY RATES:

RELATIONSHIPS WITH MOTHER'S REPRODUCTIVE HISTORY

Brian MacMahon, M.D., *Department of Epidemiology, Harvard School of Public Health,*
Mary Grace Kovar, *Office of Statistical Methods National Center for Health Statistics,* and
Jacob J. Feldman, Ph.D., *Department of Biostatistics, Harvard School of Public Health*

INTRODUCTION

The National Natality Survey (NNS) and the National Infant Mortality Survey (NIMS) of 1964-66 were designed to obtain information not available from routine vital records for samples representative of all United States births (NNS) and infant deaths (NIMS). Data are presented in this report on the distribution of single, live-born, legitimate infants according to certain characteristics of the mother's previous reproductive experience—in particular, the frequency of previous fetal or infant deaths.

In addition, the fact that information was obtained in similar ways in the two surveys enables the estimates of national distributions derived from each of the surveys to be used as numerators (infant deaths) and denominators (births) for the estimation of national infant mortality rates for subgroups of the population. Data from the two surveys have been used previously to provide national estimates of infant mortality rates by socioeconomic status. In this report infant mortality rates for single, legitimate infants are presented by age of mother, birth order, and whether or not the mother had experienced previous fetal or infant deaths.

SOURCE OF DATA

The sources of the data used in this report and their limitations are described in detail in appendix I and will only be summarized here.

The NNS was based on a one in 1,000 probability sample of birth certificates received by the National Center of Health Statistics from 54 registration areas of the United States. The sample numbered 11,331 births. The NIMS sample, numbering 2,490 infant deaths, was a one in 110 sample of all registered infant deaths. Infants known or inferred to be illegitimate were excluded from analyses of both surveys. The report on socioeconomic status was therefore based on 10,395 legitimate births and 2,160 deaths of legitimate infants. For the analyses in this report it was also necessary to exclude infants who were twins or triplets, since a difference between the two surveys in the rules for coding birth order in cases of multiple births led to inconsistency on this variable. There were 196 twins or triplets in the NNS sample and 161 among the infant deaths, exclusion of which left 10,199 single-born legitimate births and 1,999 deaths of single-born legitimate infants.

The primary source of information on the variables used in this report was a questionnaire

mailed to the mothers. Usable questionnaires were returned for 89 percent of the births and 88 percent of the infant deaths. Where data were not available for individual sample members they were imputed, using information from similar sample members for whom the relevant data were available. The method of imputation is described in appendix I. Also described there is the procedure for assignment of weights to individual sample members based on the representation of the sample within categories derived from variables for which information was available nationally for all births or infant deaths. The objective, both of the weighting procedure and of the information imputing, was to improve the estimates of total United States births and infant deaths.

Data on birth weight were not collected for the NIMS sample in 1966. Tabulations involving this variable are therefore based on births and deaths in 1964 and 1965 only.

METHODS

Estimates of the distribution of live births with respect to the frequency with which the mothers reported previous reproductive loss and other characteristics are based only on the NNS sample.

For estimation of infant mortality rates, the national estimates of the distributions of births and infant deaths with respect to a particular variable or variables derived from the two samples were used as denominators and numerators, respectively.

Estimates of numbers of births are shown in the tables as annual averages, rounded to the nearest 1,000. However, the infant mortality rates and percentages shown in the tables were computed on the unrounded estimates of the total births or deaths in the period.

In the tables, estimates of the number of births are not shown for cells with less than 5,000 annual births, and estimates of infant mortality rates are not given for cells in which the average annual number of births was less than 25,000. Approximate sampling errors of the estimated numbers and rates are given in tables VIII through XI of appendix I.

The number of black infants in the two surveys is such that, while most estimates of infant mortality rates by single variables are reasonably reliable, few cross-tabulations can be made. For races other than white or black even marginal rates are unreliable, and no separate estimates are given for this group of infants. Races other than white or black are, however, included in the data for "all races."

FINDINGS

Previous Infant Death

Of the mothers of single, live-born, legitimate infants, 5.4 percent reported that they had had a previous live-born infant die under 1 year of age. The proportion of mothers reporting a previous infant death was approximately twice as high for black as for white infants (10.6 and 4.7 percent, respectively). The proportion of mothers who had had a previous infant death increased markedly with birth order of the sample child (table 1) and age of the mother (table 2). The higher frequency of previous infants death among black mothers, is however, seen within specific subcategories of both these variables.

Infant mortality rates were approximately two and a half times as high among infants born to mothers who had had a previous infant death as among those born to mothers without a previous infant death (figure 1). Within each birth order or maternal age group in which there are sufficient numbers to compute reliable rates, differences according to presence or absence of previous infant deaths were of the same order of magnitude as those in the overall rates (tables 1 and 2). The increased infant mortality rates associated with prior infant death were present in both racial groups, although relatively more pronounced among the white infants than among the black infants. Numbers are inadequate for examination of the effects on infant mortality of previous infant death, race, and birth order or maternal age in combination, but in those subcategories in which there are adequate numbers there was consistently an excess mortality for infants born to mothers with a previous infant death.

Tables 3-5 present data on the frequency of previous infant deaths according to three indexes of socioeconomic status—family income, education of mother, and education of father. The

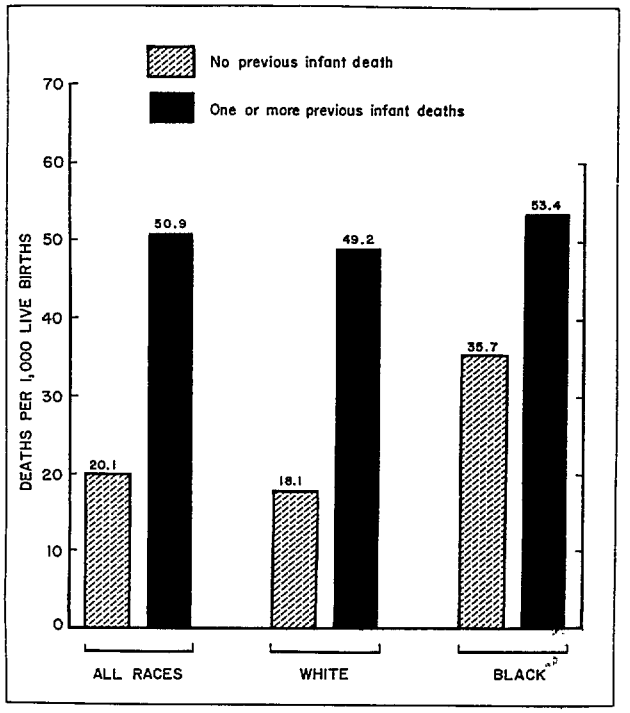


Figure 1. Estimated infant mortality rates according to whether the mother had or had not had a previous infant death, by race of infant.

probability of there having been a previous infant death was highest in the lower socioeconomic groups. This trend is more clearly evident in the data on parental education (tables 4 and 5) than in those on family income (table 3)—particularly among white infants. The trend no doubt reflects both the higher average birth order of the sample births in the lower socioeconomic groups and the high infant mortality rate in these categories. These tables also show that the difference in infant mortality rates between infants whose mothers had had a prior infant death and those whose mothers had not was at least as great within socioeconomic subcategories as in the overall rates. Illustrative data are given in figure 2.

Examination of the data on cause of death, age at death, and birth weight is restricted to white infants, since all these associations are confounded by racial differences and numbers are inadequate for separate analysis of the data for black infants. Table 6 shows that the differential in mortality rates according to whether or not the mother had had a previous infant death was present for most causes of death, although the discrepancy was relatively greater for deaths ascribed to hemolytic disease of the newborn, postnatal asphyxia and atelectasis, immaturity unqualified, or certain diseases of early infancy. As would therefore be expected, the differential was greatest for deaths in the first day of life, although it is seen for deaths throughout the first year (table 7 and figure 3).

The proportion of mothers who had had a previous infant death was approximately twice as high for live-born infants weighing 2,500 grams or less as for those weighing more than 2,500 grams (table 8). The high infant mortality rate among infants born to mothers with a previous infant death is, therefore, due in part to a high frequency of low

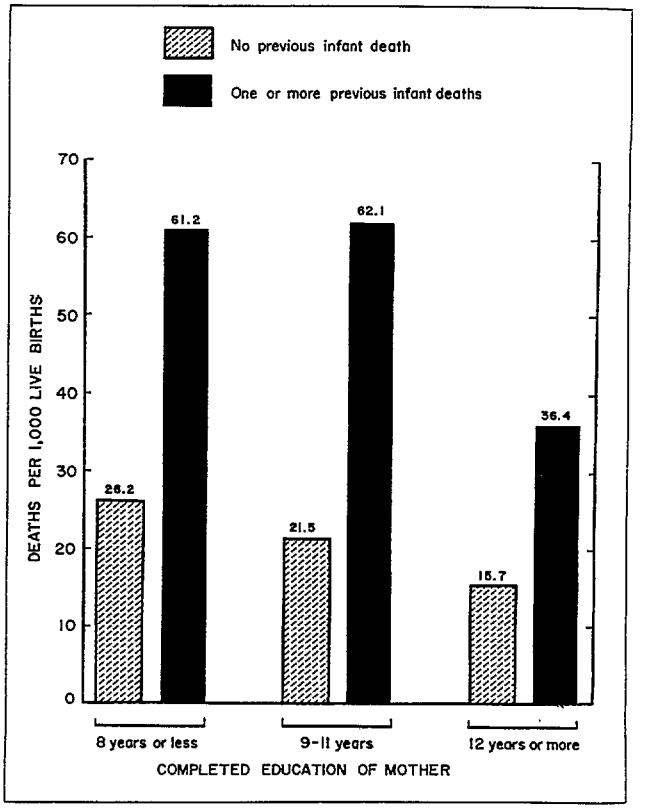


Figure 2. Estimated infant mortality rates for white infants according to whether the mother had or had not had a previous infant death, by completed education of mother.

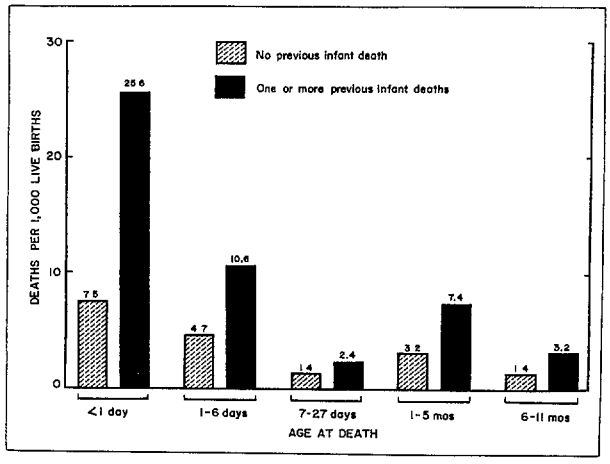


Figure 3. Estimated infant mortality rates for white infants according to whether the mother had or had not had a previous infant death, by age at death of infant.

birth weight, as the data on cause of death would indicate. Nevertheless, even among infants weighing more than 2,500 grams the mortality rate was greater for those whose mothers had experienced a previous infant loss than for those whose mothers had not.

Previous Fetal Death

Twenty-two percent of the mothers reported having had a fetal death in a previous pregnancy (table 9). The proportion is again greater among the mothers of black than of white infants, but the differential is considerably smaller than in the case of previous infant deaths, particularly when specific categories of birth order (table 9) or maternal age (table 10) are compared.

Infant mortality was higher for infants whose mothers did than for those whose mothers did not report a previous fetal death (figure 4). The differential was again smaller than that associated with reporting of prior infant death but, nevertheless, the overall infant mortality rate for infants whose mothers reported one or more fetal deaths was almost twice as high as the rate for those whose mothers did not report any fetal deaths. Again, the differential is evident within subcategories by race (figure 4), birth order (table 9), and maternal age (table 10).

Association between socioeconomic status and the frequency of previous fetal death is less strong than that between socioeconomic status and previous infant death. Indeed, the direction of relationship is not consistent between the three indexes of socioeconomic status. Table 11 shows increasing frequency of fetal death with increase in income among mothers who later had a live-born child, but tables 12 and 13 show decreasing frequency with increase in parental education. In all three tables, however, the differential in mortality rates for infants of mothers with and without fetal death is seen within all socioeconomic categories.

Because more mothers reported previous fetal deaths (22 percent) than previous infant deaths (5 percent), the numbers are large enough to permit comparison of mortality rates among infants of mothers who reported only one and those who reported two or more fetal deaths. The data are given in table A. In both racial groups, mortality rates for infants whose mothers reported two or more fetal deaths were substantially higher than for those whose mothers reported only one.

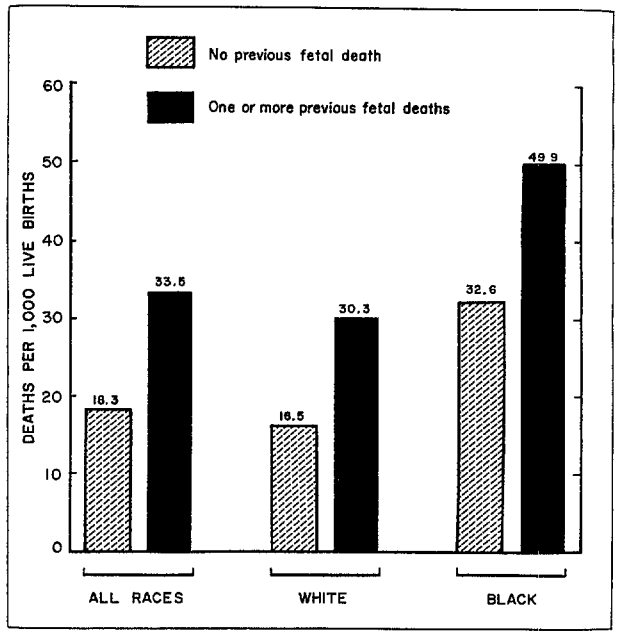


Figure 4. Estimated infant mortality rates according to whether the mother had or had not had a fetal death, by race of infant.

Table A. Estimated average annual number of live births, percent in which the mother reported a previous fetal death, and infant deaths per 1,000 live births, by number of previous fetal deaths reported and race of infant: United States, 1964-66 legitimate, single births

Race of infant	All infants	Number of previous fetal deaths		
		None	One	Two or more
	Average annual live births in thousands			
All races	3,417	2,647	528	242
White	2,961	2,315	447	198
Black	402	287	74	42
	Percent distribution			
All races	100.0	77.5	15.4	7.1
White	100.0	78.2	15.1	6.7
Black	100.0	71.3	18.3	10.3
	Infant deaths per thousand live births			
All races	21.7	18.3	28.8	43.6
White	19.5	16.5	27.4	36.9
Black	37.6	32.6	37.1	72.6

Tables 14-16 give data on the relationship of infant mortality to previous fetal death by cause of death, age at death, and birth weight, for white infants. The differential in mortality rates according to whether or not the mother had had zero, one, or two or more previous fetal deaths was much greater in those causes leading to early death—birth injuries, postnatal asphyxia and atelectasis, hemolytic disease of the newborn, immaturity unqualified, and diseases of early infancy (table 14)—and consequently among deaths in the first week of life (table 15). The percentage of mothers who reported a previous fetal death was higher among the mothers of infants weighing 2,500 grams or less than among those of infants weighing between 2,501 and 4,000 grams, but it was also high among mothers whose infants weighed over 4,000 grams (table 16). However, the differential in mortality rates between infants whose mothers had had and those whose mothers had not had a fetal death was substantial only among the infants weighing 3,000 grams or less.

Live-Birth Order

The definition of live-birth order used here is the number of live births to the mother including the sample child. Infant mortality rates by birth order and race are given in table 1, and the data for whites are illustrated in figure 5. For white infants the lowest mortality rate occurred among first births and the highest rate in the highest birth order category. There was, however, no trend between birth orders two and five. Among black infants, no consistent trend of mortality with change in birth order can be discerned (table 1), but numbers are small and the pattern of relationship cannot be determined reliably in these data.

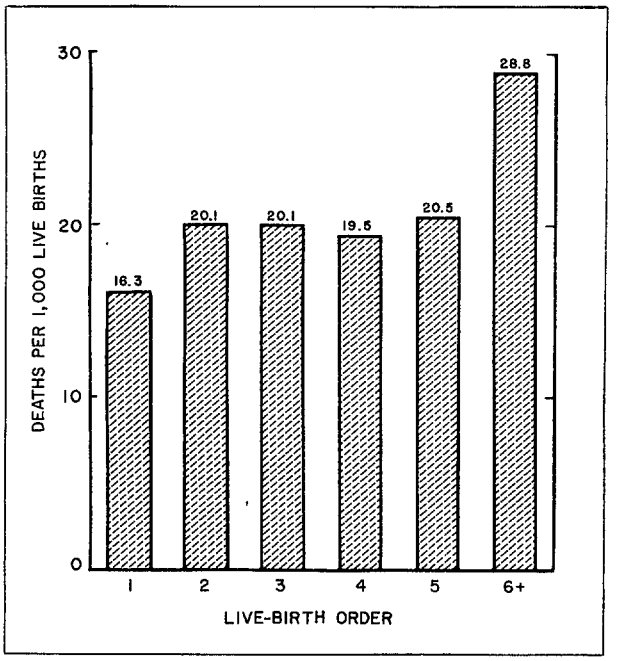


Figure 5. Estimated infant mortality rates for white infants, by live-birth order.

The relationship of mortality rates to birth order is considered within categories of socioeconomic status in tables 17-19. Because of the lack of difference in infant mortality rates among the three highest categories of socioeconomic status—noted in the previous report[1] and seen in the earlier tables of this report—these categories have been combined in these and subsequent tables. The patterns are not entirely consistent among the three tables, but in general it can be said that the increase in infant mortality rates with birth order is seen in each socioeconomic group, and that the high mortality rates of infants in the lower socioeconomic categories are seen in all birth orders.

Birth order and cause of death are examined in table 20. The table shows data for white infants only because of the instability of the rates for other racial groups. There were some variations between causes of death in the strength of their associations with birth order, but the consistency of the direction of the relationship is remarkable considering the different biologic mechanisms of these causes of death.

For white infants, association of mortality rates with birth order is examined according to age of the infant at death in table 21. The general pattern of association observed for all infant deaths is seen in all five subdivisions by age at death.

Age of Mother

The relationship of infant mortality to age of mother was considered in the report on socioeconomic status.[1] The overall data for the particular samples used here (i.e., after exclusion of multiple births) are given in table 2, and show that rates tended to be highest among children born to the youngest mothers (under 20) and to those of the oldest (35 and over). This was true in all socioeconomic groups examined. Similarly, the decline in infant mortality with increasing socioeconomic status was seen in all maternal age categories.

The relationship of mortality to birth order and maternal age simultaneously is examined in table 22. Again limiting the data to white infants because of small numbers in other races, the overall patterns seen for maternal age and for birth order in table margins are both generally reflected in the body of the table, indicating the independence of the two associations. Of significance is the high infant mortality rate for the second infants born to mothers under 20 years of age.

Mortality by age of mother and cause of death for white infants is examined in table 23. It is seen that some causes of death contributed predominantly to one or the other of the two peaks of the maternal age association. Thus, high mortality rates for the infants of mothers under 20 were characteristic of deaths due to infective and parasitic deseases, pneumonia and other respiratory diseases, and immaturity unqualified, while deaths due to congenital malformations, birth injuries, and hemolytic disease contributed most heavily to the high rates for infants of older mothers. Some cause categories—notably postnatal asphyxia and atelectasis and to some extent congenital malformations and immaturity unqualified—contributed to both peaks.

Table 24 gives mortality rates by age of mother according to infant's age at death. The U-shaped pattern of association with maternal age exhibited by all infant deaths is seen within all age-at-death groups under one month. For deaths at 1-11 months, the oldest maternal age group did not show the usual increase over the younger ages.

COMMENT

The only previous national data for the United States on the relationship of infant mortality risk to history of previous reproductive loss come from a study of births during January-March of 1950 conducted by the National Office of Vital Statistics.[2] The data were limited to deaths under 28 days and to relationship to prior fetal death. Somewhat more recent data for Upstate New York in 1959-1960 provided information on risk of late fetal and infant death, but the infant mortality data were again restricted to deaths under 28 days and no information was available on history of death of previous live-born infants.[3] Neither of these sources provides data by cause of death. A study of births in England and Wales in 1949 and 1950 gives data on all infant deaths by cause of death, but no distinction is drawn between history of prior fetal death and of prior deaths of live-born infants.[4]

Insofar as the results of these three previous studies can be compared with the present findings, the overall conclusions are quite similar—a history of reproductive loss in an earlier pregnancy of the mother increases the risk of infant death by a factor of two or three. The present data indicate that while either prior fetal death or prior infant death is associated with increased infant mortality and both are associated with particular causes of death, particularly causes of very early death, there are nevertheless some differences in their implications. Previous infant death is a better predictor than is previous fetal death of a subsequent death due to infectious disease or to accident, and in general to deaths after the first month of life. Such an observation is perhaps not unexpected. It complements the data from New York State[3] which show that previous fetal death is an even better predictor of late fetal death than of early infant death.

The wide variety of causes of death that are associated with previous fetal or infant death suggests that many mechanisms are involved. Previous fetal or infant deaths are indexes of families whose infants are at high risk of death and for any particular family, the mechanism may be social, biological, or both.

Finding a lower infant mortality rate in first than in subsequent birth orders was somewhat unexpected, since most previous studies have suggested that the mortality rate is higher in first than in second births. In the United States in 1950, neonatal death rates (deaths up to age 28 days) for the first, second, and third birth orders were 19.1, 17.8, and 19.7 per 1,000, respectively.[2] In England and Wales at the same time, overall infant mortality rates were 25.2, 23.9, and 29.6 per 1,000 in the first three birth orders.[4] Separated by age at death, as in table B, the British data showed that the high mortality rate for first births was a consequence of high rates in the early neonatal period.

Table B. Infant mortality rates by birth order and age at death: England and Wales, 1949-50

Age of infant at death	Birth order			
	1	2	3	4
	Rate per 1,000 live births			
Less than 1 week----------	14.3	10.8	12.9	14.2
1-4 weeks------	3.0	2.7	3.3	4.0
1 month-1 year-	7.9	10.3	13.3	15.6

However, a study of United States live births in 1960 showed neonatal mortality rates of 16.4, 17.4, and 17.1 in the first three birth orders.[5] As in the present data, the favorable experience of first births was more marked for white than for black infants. The fact that the rate for first births is relatively lower in the present study than in the 1960 study may result from the exclusion of illegitimate infants, since illegitimate infants have high infant mortality rates and are disproportionately represented among first births. Illegitimate infants were included in the 1960 and 1950 United States studies but, like the present study, the British study was based on legitimate single-born infants. It seems likely that a greater decline in mortality rates for first-born infants than for later-born infants accounts for at least part of the difference between the earlier and the two more recent studies. The present data indicate that relatively favorable experience of first births is not limited to the neonatal period.

REFERENCES

[1]MacMahon, B.; Kovar, M.G.; and Feldman, J.J.: Infant mortality rates by socioeconomic status. United States, 1964-66. *Vital and Health Statistics.* Series 22-No. 14, DHEW Pub. No. (HSM) 72-1044, Washington. U.S. Government Printing Office, Mar. 1972.

[2]Loeb, J.: Weight at birth and survival of newborn, by age of mother and total-birth order: United States, early 1950. *Vital Statistics—Special Reports,* Vol. 42, No. 2. Public Health Service. Washington, D.C., Aug. 1958.

[3]Shapiro, S.; Schlesinger, E.R.; and Nesbitt, E.L., Jr.: Infant and perinatal mortality in the United States. *Vital and Health Statistics.* Public Health Service. Washington. PHS Pub. No. 1000-Series 3-No. 4, U.S. Government Printing Office, Oct. 1965.

[4]Heady, J.A. and Heasman, M.A.: *Social and Biological Factors in Infant Mortality.* Studies in Medical and Population Subjects No. 15. General Register Office. London. Her Majesty's Stationery Office, 1959.

[5]Chase, H.C.: A study of infant mortality from linked records. Comparison of neonatal mortality from two cohort studies. *Vital and Health Statistics.* Series 20-No. 13, DHEW Pub. No. (HSM) 72-1056, Washington. U.S. Government Printing Office, June 1972.

———— o o o ————

LIST OF DETAILED TABLES

LIST OF DETAIL TABLES—Con.

Table 1. Estimated average annual number of live births and infant deaths per 1,000 live births according to whether a previous infant death was reported for the mother, and percent of mothers of live births with a previous infant death, by live-birth order and race of infant: United States, 1964-66 legitimate, single births

Race and live-birth order	Live births				Infant deaths		
	All infants	Previous infant death		Percent with previous infant death	All infants	Previous infant death	
		No	Yes			No	Yes
All races	Number in thousands				Rate per 1,000 live births		
All birth orders	3,417	3,232	185	5.4	21.7	20.1	50.9
First	1,004	1,004	-	-	18.1	18.0	-
Second	857	845	12	1.4	22.0	20.8	*
Third	610	575	35	5.8	22.2	19.9	59.7
Fourth	392	356	36	9.1	21.2	19.5	37.8
Fifth	228	199	29	12.8	25.2	24.0	33.4
Sixth or more	326	254	72	22.1	29.7	23.9	50.3
White							
All birth orders	2,961	2,823	138	4.7	19.5	18.1	49.2
First	907	907	-	-	16.3	16.3	-
Second	759	748	11	1.4	20.1	19.1	*
Third	536	504	31	5.9	20.1	18.0	53.0
Fourth	342	312	31	9.0	19.5	17.6	38.0
Fifth	191	169	22	11.3	20.5	19.5	*
Sixth or more	226	183	43	19.1	28.8	22.7	54.4
Black							
All birth orders	402	360	43	10.6	37.6	35.7	53.4
First	83	83	-	-	38.1	38.1	-
Second	81	80	*	*	39.4	36.2	*
Third	66	63	*	*	39.5	36.3	*
Fourth	45	41	5	10.5	34.2	33.7	*
Fifth	33	26	7	21.0	51.4	51.4	*
Sixth or more	94	68	26	27.5	31.1	27.1	41.6

Table 2. Estimated average annual number of live births and infant deaths per 1,000 live births according to whether a previous infant death was reported for the mother, and percent of mothers of live births with a previous infant death, by age of mother and race of infant: United States, 1964-66 legitimate, single births

Race of infant and age of mother	Live births				Infant deaths		
	All infants	Previous infant death		Percent with previous infant death	All infants	Previous infant death	
		No	Yes			No	Yes
	Number in thousands				Rate per 1,000 live births		
All races							
All ages	3,417	3,232	185	5.4	21.7	20.1	50.9
Under 20 years	468	462	5	1.2	28.0	26.3	*
20-24 years	1,237	1,194	43	3.5	19.5	18.1	56.9
25-29 years	878	823	55	6.2	20.0	18.4	43.8
30-34 years	494	452	42	8.4	21.5	19.8	39.9
35 years and over	340	300	40	11.7	26.3	23.3	48.4
White							
All ages	2,961	2,823	138	4.7	19.5	18.1	49.2
Under 20 years	393	389	*	*	23.6	22.1	*
20-24 years	1,082	1,048	34	3.1	17.8	16.7	52.2
25-29 years	771	729	42	5.4	17.8	16.8	34.1
30-34 years	425	396	29	6.9	20.3	18.1	50.0
35 years and over	290	261	29	10.0	24.1	21.3	49.4
Black							
All ages	402	360	43	10.6	37.6	35.7	53.4
Under 20 years	70	69	*	*	52.0	50.0	*
20-24 years	136	128	9	6.2	33.0	30.0	*
25-29 years	91	78	13	14.0	39.0	33.9	*
30-34 years	59	48	11	18.7	29.5	32.4	*
35 years and over	45	36	9	19.1	37.0	37.3	*

Table 3. Estimated average annual number of live births and infant deaths per 1,000 live births according to whether a previous infant death was reported for the mother, and percent of mothers of live births with a previous infant death, by family income and race of infant: United States, 1964-66 legitimate, single births

Race and family income	Live births				Infant deaths		
	All infants	Previous infant death		Percent with previous infant death	All infants	Previous infant death	
		No	Yes			No	Yes
	Number in thousands				Rate per 1,000 live births		
All races							
All incomes	3,417	3,232	185	5.4	21.7	20.1	50.9
Less than $3,000	679	627	52	7.6	30.5	28.0	61.1
$3,000-$4,999	767	723	44	5.7	23.7	21.9	54.4
$5,000-$6,999	871	826	45	5.2	17.2	15.8	41.7
$7,000-$9,999	701	675	26	3.7	18.7	17.6	47.5
$10,000 or more	399	380	18	4.6	18.3	17.2	*
White							
All incomes	2,961	2,823	138	4.7	19.5	18.1	49.2
Less than $3,000	461	439	22	4.8	26.0	23.9	*
$3,000-$4,999	660	624	36	5.5	28.0	19.4	44.3
$5,000-$6,999	794	754	40	5.0	16.9	15.4	45.3
$7,000-$9,999	666	643	23	3.4	18.0	16.9	*
$10,000 or more	381	364	17	4.5	17.7	16.6	*
Black							
All incomes	402	360	43	10.6	37.6	35.7	53.4
Less than $3,000	202	175	27	13.3	40.4	38.2	54.7
$3,000-$4,999	94	88	7	7.4	44.6	40.3	*
$5,000-$6,999	67	62	5	6.8	20.9	21.8	*
$7,000-$9,999	27	24	*	*	36.1	*	*
$10,000 or more	12	11	*	*	*	*	*

Table 4. Estimated average annual number of live births and infant deaths per 1,000 live births according to whether a previous infant death was reported for the mother, and percent of mothers of live births with a previous infant death, by education of mother and race of infant: United States, 1964-66 legitimate, single births

Race of infant and education of mother	Live births				Infant deaths		
	All infants	Previous infant death		Percent with previous infant death	All infants	Previous infant death	
		No	Yes			No	Yes
	Number in thousands				Rate per 1,000 live births		
All races							
All levels	3,417	3,232	185	5.4	21.7	20.1	50.9
8 years or less	415	360	55	13.2	32.9	29.6	54.6
9-11 years	851	799	53	6.2	26.7	24.2	63.9
12 years	1,495	1,440	55	3.7	18.3	17.3	44.9
13-15 years	419	405	15	3.5	14.4	13.9	*
16 years or more	235	228	7	3.2	18.9	18.9	*
White							
All levels	2,961	2,823	138	4.7	19.5	18.1	49.2
8 years or less	315	283	32	10.2	29.8	26.2	61.2
9-11 years	693	655	38	5.4	23.7	21.5	62.1
12 years	1,349	1,302	48	3.5	16.9	16.0	41.2
13-15 years	386	372	14	3.5	13.6	13.2	*
16 years or more	219	212	7	3.1	18.8	18.7	*
Black							
All levels	402	360	43	10.6	37.6	35.7	53.4
8 years or less	90	69	21	23.4	44.0	45.1	*
9-11 years	145	131	14	9.4	40.5	37.5	*
12 years	130	123	7	5.1	32.9	31.2	*
13-15 years	26	25	*	*	27.5	27.1	*
16 years or more	12	12	*	*	*	*	*

Table 5. Estimated average annual number of live births and infant deaths per 1,000 live births according to whether a previous infant death was reported for the mother, and percent of mothers of live births with a previous infant death, by education of father and race of infant: United States, 1964-66 legitimate, single births

Race of infant and education of father	Live births				Infant deaths		
	All infants	Previous infant death		Percent with previous infant death	All infants	Previous infant death	
		No	Yes			No	Yes
	Number in thousands				Rate per 1,000 live births		
All races							
All levels	3,417	3,232	185	5.4	21.7	20.1	50.9
8 years or less	558	503	56	10.0	30.8	27.7	58.2
9-11 years	718	666	52	7.2	26.5	24.9	46.5
12 years	1,241	1,190	51	4.1	18.0	16.7	50.0
13-15 years	416	407	9	2.2	19.1	17.5	*
16 years or more	483	467	17	3.5	16.0	15.8	*
White							
All levels	2,961	2,823	138	4.7	19.5	18.1	49.2
8 years or less	424	392	33	7.7	28.5	25.2	67.4
9-11 years	590	553	37	6.3	23.1	21.9	41.3
12 years	1,108	1,064	44	4.0	16.6	15.3	46.5
13-15 years	379	371	8	2.1	17.4	16.1	*
16 years or more	459	443	16	3.5	15.7	15.4	*
Black							
All levels	402	360	43	10.6	37.6	35.7	53.4
8 years or less	121	100	22	17.8	39.3	38.9	*
9-11 years	116	103	13	11.4	43.2	41.4	*
12 years	118	112	6	5.3	31.4	29.3	*
13-15 years	31	30	*	*	36.8	31.6	*
16 years or more	16	16	*	*	*	*	*

Table 6. Estimated infant deaths per 1,000 live births for white infants, by cause of death and whether a previous infant death was reported for the mother: United States, 1964-66 legitimate, single births

Cause of death	All infant deaths	Previous infant death	
		No	Yes
	Rate per 1,000 live births		
All causes	19.5	18.1	49.2
Infective and parasitic diseases (001-138)	0.2	0.1	0.5
Influenza, pneumonia and all other diseases of the respiratory system (470-475,480-493,500-527,763)	2.4	2.3	4.3
Gastritis, duodenitis and all other diseases of the digestive system (530-587)	0.5	0.5	0.8
Congenital malformations (750-759)	3.7	3.5	6.7
Birth injuries (760-761)	1.8	1.7	3.8
Postnatal asphyxia and atelectasis (762)	3.3	2.9	11.6
Hemolytic disease of newborn (770)	0.4	0.3	2.1
Immaturity, unqualified (776)	2.6	2.4	6.4
Certain diseases of early infancy[1] (765,769, 771-774)	3.0	2.8	9.0
Accidents (E800-E962)	0.8	0.8	1.3
Residual All other causes	1.0	0.9	2.7

[1]Includes neonatal disorders arising from certain diseases of the mother during pregnancy; ill-defined diseases peculiar to early infancy; immaturity with mention of other subsidiary condition; and other diseases peculiar to early infancy not already shown. Ill-defined diseases peculiar to early infancy account for about 60 percent of these deaths.

Table 7. Estimated infant deaths per 1,000 live births for white infants, by age at death of sample child and whether a previous infant death was reported for the mother: United States, 1964-66 legitimate, single births

Age at death	All infant deaths	Previous infant death	
		No	Yes
	Rate per 1,000 live births		
Less than 1 year	19.5	18.1	49.2
Less than 1 day	8.4	7.5	25.6
1-6 days	5.0	4.7	10.6
7-27 days	1.4	1.4	2.4
1-5 months	3.4	3.2	7.4
6-11 months	1.5	1.4	3.2

Table 8. Estimated average annual number of live births and infant deaths per 1,000 live births for white infants according to whether a previous infant death was reported for the mother, and percent of mothers of live births with a previous infant death, by birth weight: United States, 1964-65 legitimate, single births

Birth weight in grams	Live births				Infant deaths		
	All infants	Previous infant death		Percent with previous infant death	All infants	Previous infant death	
		No	Yes			No	Yes
	Number in thousands				Rate per 1,000 live births		
All weights	3,037	2,886	151	5.0	20.0	18.6	46.9
2,500 grams or less	188	169	20	10.5	192.4	187.1	*
2,501-3,000 grams	510	482	28	5.4	18.3	18.0	24.3
3,001-4,000 grams	2,051	1,965	86	4.2	6.3	5.8	16.9
4,001 grams or more	289	271	18	6.2	7.6	7.0	*

Table 9. Estimated average annual number of live births and infant deaths per 1,000 live births according to whether a previous fetal death was reported for the mother, and percent of mothers of live births with a previous fetal death, by live-birth order and race of infant: United States, 1964-66 legitimate, single births

Race and live-birth order	Live births				Infant deaths		
	All infants	Previous fetal death		Percent with previous fetal death	All infants	Previous fetal death	
		No	Yes			No	Yes
	Number in thousands				Rate per 1,000 live births		
All races							
All birth orders	3,417	2,647	769	22.5	21.7	18.3	33.5
First	1,004	900	104	10.4	18.1	15.3	41.5
Second	857	689	168	19.6	22.0	18.8	34.9
Third	610	450	160	26.3	22.2	20.0	28.4
Fourth	392	276	115	29.5	21.2	18.2	28.2
Fifth	228	143	85	37.4	25.2	24.0	27.4
Sixth or more	326	189	136	41.9	29.7	22.6	39.7
White							
All birth orders	2,961	2,315	646	21.8	19.5	16.5	30.3
First	907	816	91	10.0	16.3	14.2	35.5
Second	759	611	148	19.5	20.1	17.4	30.9
Third	536	396	140	26.1	20.1	17.8	26.6
Fourth	342	239	103	30.1	19.5	16.1	27.4
Fifth	191	120	71	37.3	20.5	19.6	22.2
Sixth or more	226	134	92	40.9	28.8	21.4	39.3
Black							
All birth orders	402	287	115	28.7	37.6	32.6	49.9
First	83	73	10	12.1	38.1	28.6	*
Second	81	63	18	22.3	39.4	32.6	*
Third	66	47	19	28.4	39.5	38.4	*
Fourth	45	33	12	27.6	34.2	34.0	*
Fifth	33	19	13	40.4	51.4	*	*
Sixth or more	94	51	43	45.4	31.1	25.0	38.3

Table 10. Estimated average annual number of live births and infant deaths per 1,000 live births according to whether a previous fetal death was reported for the mother, and percent of mothers of live births with a previous fetal death, by age of mother and race of infant: United States, 1964-66 legitimate, single births

Race of infant and age of mother	Live births				Infant deaths		
	All infants	Previous fetal death		Percent with previous fetal death	All infants	Previous fetal death	
		No	Yes			No	Yes
	Number in thousands				Rate per 1,000 live births		
All races							
All ages	3,417	2,647	769	22.5	21.7	18.3	33.5
Under 20 years	468	433	35	7.6	28.0	24.5	70.5
20-24 years	1,237	1,047	190	15.4	19.5	17.1	32.6
25-29 years	878	636	242	27.6	20.0	16.9	28.0
30-34 years	494	336	158	32.0	21.5	16.3	32.4
35 years and over	340	196	144	42.3	26.3	19.1	35.9
White							
All ages	2,961	2,315	646	21.8	19.5	16.5	30.3
Under 20 years	393	365	28	7.1	23.6	20.7	61.4
20-24 years	1,082	925	157	14.2	17.8	15.7	30.4
25-29 years	771	565	206	26.7	17.8	15.4	24.4
30-34 years	425	292	133	31.3	20.3	16.3	29.0
35 years and over	290	168	121	41.9	24.1	16.6	34.6
Black							
All ages	402	287	115	28.7	37.6	32.6	49.9
Under 20 years	70	64	7	9.9	52.0	46.2	*
20-24 years	136	106	30	22.1	33.0	29.4	45.6
25-29 years	91	57	34	36.9	39.0	31.3	52.0
30-34 years	59	36	24	40.2	29.5	17.9	*
35 years and over	45	24	21	46.2	37.0	*	*

Table 11. Estimated average annual number of live births and infant deaths per 1,000 live births according to whether a previous fetal death was reported for the mother, and percent of mothers of live births with a previous fetal death, by family income and race of infant: United States, 1964-66 legitimate, single births

Race and family income	Live births				Infant deaths		
	All infants	Previous fetal death		Percent with previous fetal death	All infants	Previous fetal death	
		No	Yes			No	Yes
	Number in thousands				Rate per 1,000 live births		
All races							
All incomes	3,417	2,647	769	22.5	21.7	18.3	33.5
Less than $3,000	679	547	133	19.5	30.5	26.6	46.9
$3,000-$4,999	767	601	166	21.6	23.7	20.4	35.7
$5,000-$6,999	871	684	188	21.5	17.2	14.2	27.8
$7,000-$9,999	701	518	183	26.1	18.7	14.9	29.4
$10,000 or more	399	298	101	25.3	18.3	14.3	29.9
White							
All incomes	2,961	2,315	646	21.8	19.5	16.5	30.3
Less than $3,000	461	391	70	15.1	26.0	22.6	45.4
$3,000-$4,999	660	524	136	20.6	20.8	18.2	30.8
$5,000-$6,999	794	625	169	21.3	16.9	14.1	27.3
$7,000-$9,999	666	492	173	26.0	18.0	14.4	28.5
$10,000 or more	381	283	97	25.6	17.7	14.3	27.4
Black							
All incomes	402	287	115	28.7	37.6	32.6	49.9
Less than $3,000	202	141	60	29.9	40.4	37.1	48.1
$3,000-$4,999	94	66	28	30.1	44.6	39.2	57.0
$5,000-$6,999	67	51	16	24.1	20.9	15.6	*
$7,000-$9,999	27	19	8	30.9	36.1	*	*
$10,000 or more	12	10	*	*	*	*	*

Table 12. Estimated average annual number of live births and infant deaths per 1,000 live births according to whether a previous fetal death was reported for the mother, and percent of mothers of live births with a previous fetal death, by education of mother and race of infant: United States, 1964-66 legitimate, single births

Race of infant and education of mother	Live births				Infant deaths		
	All infants	Previous fetal death		Percent with previous fetal death	All infants	Previous fetal death	
		No	Yes			No	Yes
	Number in thousands				Rate per 1,000 live births		
All races							
All levels	3,417	2,647	769	22.5	21.7	18.3	33.5
8 years or less	415	303	113	27.1	32.9	27.5	47.5
9-11 years	851	650	201	23.6	26.7	23.3	37.9
12 years	1,495	1,174	321	21.5	18.3	15.3	29.2
13-15 years	419	329	90	21.5	14.4	11.9	23.5
16 years or more	235	191	44	18.7	18.9	16.6	29.2
White							
All levels	2,961	2,315	646	21.8	19.5	16.5	30.3
8 years of less	315	236	79	25.0	29.8	24.1	46.7
9-11 years	693	535	158	22.7	23.7	20.2	35.6
12 years	1,349	1,065	284	21.1	16.9	14.3	26.5
13-15 years	386	303	83	21.6	13.6	11.8	20.3
16 years or more	219	177	42	19.2	18.8	17.2	25.3
Black							
All levels	402	287	115	28.7	37.6	32.6	49.9
8 years or less	90	57	33	36.5	44.0	42.0	47.5
9-11 years	145	104	41	28.4	40.5	38.7	45.1
12 years	130	95	34	26.5	32.9	26.7	50.2
13-15 years	26	20	6	21.7	27.5	*	*
16 years or more	12	11	*	*	*	*	*

Table 13. Estimated average annual number of live births and infant deaths per 1,000 live births according to whether a previous fetal death was reported for the mother, and percent of mothers of live births with a previous fetal death, by education of father and race of infant: United States, 1964-66 legitimate, single births

Race of infant and education of father	Live births				Infant deaths		
	All infants	Previous fetal death		Percent with previous fetal death	All infants	Previous fetal death	
		No	Yes			No	Yes
	Number in thousands				Rate per 1,000 live births		
All races							
All levels	3,417	2,647	769	22.5	21.7	18.3	33.5
8 years or less	558	399	159	28.5	30.8	26.9	40.6
9-11 years	718	565	153	21.3	26.5	22.6	41.1
12 years	1,241	973	268	21.6	18.0	15.1	28.8
13-15 years	416	329	87	20.8	19.1	16.2	30.0
16 years or more	483	381	103	21.2	16.0	13.3	26.1
White							
All levels	2,961	2,315	646	21.8	19.5	16.5	30.3
8 years or less	424	316	109	25.6	28.5	24.1	41.0
9-11 years	590	464	126	21.4	23.1	19.8	35.1
12 years	1,108	875	233	21.0	16.6	13.8	26.8
13-15 years	379	298	81	21.3	17.4	15.1	26.3
16 years or more	459	361	97	21.2	15.7	13.4	23.9
Black							
All levels	402	287	115	28.7	37.6	32.6	49.9
8 years or less	121	72	49	40.7	39.3	40.5	37.5
9-11 years	116	91	25	21.9	43.2	35.8	69.8
12 years	118	86	32	26.9	31.4	27.0	43.4
13-15 years	31	26	5	16.6	36.8	27.3	*
16 years or more	16	13	*	*	*	*	*

Table 14. Estimated infant deaths per 1,000 live births for white infants, by cause of death and number of previous fetal deaths reported for the mother: United States, 1964-66 legitimate, single births

Cause of death	All infants	Number of previous fetal deaths		
		None	One	Two or more
	Rate per 1,000 live births			
All causes	19.5	16.5	27.4	36.9
Infective and parasitic diseases (001-138)	0.2	0.1	0.2	0.2
Influenza, pneumonia and all other diseases of the respiratory system (470-475, 480-493, 500-527, 763)	2.4	2.2	2.6	3.4
Gastritis, duodenitis and all other diseases of the digestive system (530-587)	0.5	0.5	0.3	0.4
Congenital malformations (750-759)	3.7	3.4	4.1	6.1
Birth injuries (760-761)	1.8	1.5	2.5	3.5
Postnatal asphyxia and atelectasis (762)	3.3	2.4	5.6	8.2
Hemolytic disease of newborn (770)	0.4	0.3	0.5	1.1
Immaturity, unqualified (776)	2.6	2.1	3.5	6.8
Certain diseases of early infancy[1] (765, 769, 771-774)	3.0	2.2	6.0	6.3
Accidents (E800-E962)	0.8	0.8	1.2	0.2
Residual All other causes	1.0	1.0	1.1	0.9

[1]Includes neonatal disorders arising from certain diseases of the mother during pregnancy; ill-defined diseases peculiar to early infancy; immaturity with mention of other subsidiary condition; and other diseases peculiar to early infancy not already shown. Ill-defined diseases peculiar to early infancy account for about 60 percent of these deaths.

Table 15. Estimated infant deaths per 1,000 live births for white infants, by age at death of sample child and number of previous fetal deaths reported for the mother: United States, 1964-66 legitimate, single births

Age at death	All infants	Number of previous fetal deaths		
		None	One	Two or more
	Rate per 1,000 live births			
Less than 1 year	19.5	16.5	27.4	36.9
Less than 1 day	8.4	6.5	13.4	19.1
1-6 days	5.0	4.3	6.6	9.1
7-27 days	1.4	1.3	1.6	2.2
1-5 months	3.4	3.1	4.5	4.3
6-11 months	1.5	1.4	1.2	2.2

Table 16. Estimated average annual number of live births and infant deaths per 1,000 live births for white infants according to whether a previous fetal death was reported for the mother, and percent of mothers of live births with a previous fetal death, by birth weight: United States, 1964-65 legitimate, single births

Birth weight in grams	Live births				Infant deaths		
	All infants	Previous fetal death		Percent with previous fetal death	All infants	Previous fetal death	
		No	Yes			No	Yes
	Number in thousands				Rate per 1,000 live births		
All weights	3,037	2,357	681	22.4	20.0	17.0	30.3
2,500 grams or less	188	137	51	27.2	192.4	167.8	258.1
2,501-3,000 grams	510	403	106	20.8	18.3	14.7	32.1
3,001-4,000 grams	2,051	1,610	440	21.5	6.3	6.0	7.4
4,001 grams or more	289	206	82	28.6	7.6	7.1	8.8

Table 17. Estimated average annual number of live births and infant deaths per 1,000 live births, by live-birth order, family income, and race of infant: United States, 1964-66 legitimate, single births

Race and live-birth order	Live births				Infant deaths			
	All infants	Family income			All infants	Family income		
		Less than $3,000	$3,000-$4,999	$5,000 or more		Less than $3,000	$3,000-$4,999	$5,000 or more
	Number in thousands				Rate per 1,000 live births			
All races								
All birth orders	3,417	679	767	1,971	21.7	30.5	23.7	17.9
First	1,004	247	230	526	18.1	22.9	18.4	15.6
Second	857	146	201	510	22.0	32.6	23.9	18.2
Third	610	87	139	385	22.2	40.2	25.9	16.8
Fourth	392	58	86	248	21.2	26.7	23.4	19.1
Fifth	228	44	48	136	25.2	33.9	25.9	22.2
Sixth or more	326	98	64	165	29.7	38.8	36.4	21.8
White								
All birth orders	2,961	461	660	1,840	19.5	26.0	20.8	17.5
First	907	205	210	492	16.3	20.5	15.4	15.0
Second	759	103	176	480	20.1	25.0	23.3	17.8
Third	536	56	118	362	20.1	36.3	22.6	16.7
Fourth	342	33	70	239	19.5	19.1	21.9	18.8
Fifth	191	25	43	123	20.5	22.4	17.1	21.4
Sixth or more	226	39	43	144	28.8	51.0	34.0	21.1
Black								
All birth orders	402	202	94	106	37.6	40.4	44.6	26.1
First	83	40	19	25	38.1	36.0	*	31.4
Second	81	39	19	22	39.4	49.2	*	*
Third	66	28	17	20	39.5	45.5	*	*
Fourth	45	23	14	8	34.2	*	*	*
Fifth	33	17	5	11	51.4	*	*	*
Sixth or more	94	55	20	19	31.1	32.3	*	*

Table 18. Estimated average annual number of live births and infant deaths per 1,000 live births, by live-birth order, education of mother, and race of infant: United States, 1964-66 legitimate, single births

Race and live-birth order	Live births				Infant deaths			
	All infants	Education of mother			All infants	Education of mother		
		Grade 8 or less	Grades 9-11	Grade 12 or more		Grade 8 or less	Grades 9-11	Grade 12 or more
	Number in thousands				Rate per 1,000 live births			
All races								
All birth orders	3,417	415	851	2,150	21.7	32.9	26.7	17.6
First	1,004	61	224	719	18.1	29.9	22.3	15.7
Second	857	73	200	584	22.0	29.6	30.7	18.0
Third	610	65	166	379	22.2	36.0	26.3	18.1
Fourth	392	58	105	228	21.2	29.1	22.7	18.4
Fifth	228	46	69	113	25.2	26.2	25.8	24.5
Sixth or more	326	112	86	128	29.7	39.7	35.1	17.4
White								
All birth orders	2,961	315	693	1,954	19.5	29.8	23.7	16.4
First	907	55	194	658	16.3	27.5	19.4	14.5
Second	759	60	165	534	20.1	23.8	28.3	17.1
Third	536	54	143	338	20.1	29.6	21.6	17.9
Fourth	342	47	86	209	19.5	26.6	21.2	17.2
Fifth	191	35	52	104	20.5	20.6	21.2	20.2
Sixth or more	226	63	52	111	28.8	45.0	37.3	15.5
Black								
All birth orders	402	90	145	167	37.6	44.0	40.5	31.6
First	83	5	26	52	38.1	*	44.4	32.6
Second	81	11	31	39	39.4	*	44.9	28.9
Third	66	10	21	35	39.5	*	*	22.3
Fourth	45	10	18	17	34.2	*	*	*
Fifth	33	8	16	8	51.4	*	*	*
Sixth or more	94	45	33	16	31.1	30.9	33.4	*

Table 19. Estimated average annual number of live births and infant deaths per 1,000 live births, by live-birth order, education offather, and race of infant: United States, 1964-66 legitimate, single births

Race and live-birth order	Live births				Infant deaths			
	All infants	Education of father			All infants	Education of father		
		Grade 8 or less	Grades 9-11	Grade 12 or more		Grade 8 or less	Grades 9-11	Grade 12 or more
All races	Number in thousands				Rate per 1,000 live births			
All birth orders	3,417	558	718	2,141	21.7	30.8	26.5	17.8
First	1,004	90	196	717	18.1	33.8	24.8	14.2
Second	857	107	177	573	22.0	32.8	25.6	18.9
Third	610	95	135	380	22.2	29.8	22.5	20.2
Fourth	392	76	82	234	21.2	21.3	28.2	18.7
Fifth	228	60	57	110	25.2	27.7	27.3	22.9
Sixth or more	326	129	70	126	29.7	34.7	38.6	19.7
White								
All birth orders	2,961	424	590	1,946	19.5	28.5	23.1	16.5
First	907	81	167	658	16.3	32.4	21.8	12.9
Second	759	92	147	520	20.1	28.8	22.1	18.0
Third	536	78	114	343	20.1	26.4	18.3	19.2
Fourth	342	58	71	213	19.5	21.4	26.3	16.7
Fifth	191	44	46	101	20.5	20.7	21.0	20.3
Sixth or more	226	71	45	110	28.8	36.5	40.4	19.0
Black								
All birth orders	402	121	116	165	37.6	39.3	43.2	32.4
First	83	8	27	48	38.1	*	43.9	32.3
Second	81	12	26	43	39.4	*	43.7	27.8
Third	66	15	19	32	39.5	*	*	30.5
Fourth	45	17	10	19	34.2	*	*	*
Fifth	33	14	11	8	51.4	*	*	*
Sixth or more	94	55	24	15	31.1	31.4	*	*

Table 20. Estimated infant deaths per 1,000 live births for white infants, by live-birth order and cause of death: United States, 1964-66 legitimate, single births

Cause of death	All birth orders	Live-birth order					
		First	Second	Third	Fourth	Fifth	Sixth or more
	Rate per 1,000 live births						
All causes	19.5	16.3	20.1	20.1	19.5	20.5	28.8
Infective and parasitic diseases (001-138)	0.2	0.1	0.1	0.2	0.1	0.4	0.2
Influenza, pneumonia and all other diseases of the respiratory system (470-475, 480-493, 500-527, 763)	2.4	1.7	2.8	2.8	2.2	2.1	2.9
Gastritis, duodenitis and all other diseases of the digestive system (530-587)	0.5	0.5	0.3	0.4	0.5	0.2	1.3
Congenital malformations (750-759)	3.7	3.2	3.6	4.3	2.6	3.3	6.2
Birth injuries (760-761)	1.8	1.5	1.5	1.6	2.5	1.7	2.9
Postnatal asphyxia and atelectasis (762)	3.3	2.5	3.5	3.0	3.7	3.9	5.2
Hemolytic disease of newborn (770)	0.4	0.0	0.4	0.6	0.6	1.1	0.3
Immaturity, unqualified (776)	2.6	2.6	2.8	2.3	3.0	2.5	2.4
Certain diseases of early infancy[1] (765, 769, 771-774)	3.0	2.6	3.3	3.0	2.5	2.9	5.0
Accidents (E800-E962)	0.6	0.6	0.5	0.9	0.4	0.2	1.0
Residual—All other causes	1.2	1.0	1.2	1.0	1.3	2.3	1.3

[1]Includes neonatal disorders arising from certain diseases of the mother during pregnancy; ill-defined diseases peculiar to early infancy; immaturity with mention of other subsidiary condition; and other diseases peculiar to early infancy not already shown. Ill-defined diseases peculiar to early infancy account for about 60 percent of these deaths.

Table 21. Estimated infant deaths per 1,000 live births for white infants, by live-birth order and age at death: United States, 1964-66 legitimate, single births

Live-birth order	Age at death					
	Less than 1 year	Less than 1 day	1-6 days	7-27 days	1-5 months	6-11 months
	Rate per 1,000 live births					
All birth orders	19.5	8.4	5.0	1.4	3.4	1.5
First	16.3	6.7	4.9	1.3	2.4	1.0
Second	20.1	9.3	4.6	1.3	3.7	1.2
Third	20.1	7.8	5.1	1.5	3.6	2.1
Fourth	19.5	8.2	5.1	1.4	3.5	1.3
Fifth	20.5	9.8	4.4	1.0	3.4	1.9
Sixth or more	28.8	12.6	6.0	2.5	4.9	2.8

Table 22. Estimated average annual number of live births and infant deaths per 1,000 live births, by age of mother, live-birth order, and race of infant: United States, 1964-66 legitimate, single births

Race and live-birth order	Live births						Infant deaths					
	All ages	Age of mother in years					All ages	Age of mother in years				
		Under 20	20-24	25-29	30-34	35 and over		Under 20	20-24	25-29	30-34	35 and over
	Number in thousands						Rate per 1,000 live births					
All races												
All birth orders	3,417	468	1,237	878	494	340	21.7	28.0	19.5	20.0	21.5	26.3
First	1,004	335	478	135	38	17	18.1	21.7	15.1	14.4	27.3	*
Second	857	107	424	223	72	31	22.0	39.0	20.4	17.0	19.0	28.5
Third	610	21	215	218	105	52	22.2	*	23.3	20.6	16.9	21.1
Fourth	392	5	81	147	98	62	21.2	*	23.9	20.1	20.1	16.9
Fifth	228	*	26	75	73	43	25.2	*	31.4	26.8	21.3	24.2
Sixth or more	326	*	12	81	108	125	29.7	*	*	29.3	26.3	31.7
White												
All birth orders	2,961	393	1,082	771	425	290	19.5	23.6	17.8	17.8	20.3	24.1
First	907	295	438	125	35	15	16.3	20.1	14.1	11.7	25.6	*
Second	759	82	380	206	64	27	20.1	30.5	19.5	16.7	17.3	29.0
Third	536	13	180	198	97	47	20.1	*	21.4	18.7	17.5	17.1
Fourth	342	*	61	132	89	58	19.5	*	22.3	18.8	19.2	16.7
Fifth	191	*	17	62	67	45	20.5	*	*	18.9	18.5	26.4
Sixth or more	226	*	6	47	74	98	28.8	*	*	30.1	26.8	29.2
Black												
All birth orders	402	70	136	91	59	45	37.6	52.0	33.0	39.0	29.5	37.0
First	83	39	33	8	*	*	38.1	34.0	31.4	*	*	*
Second	81	22	39	11	6	*	39.4	*	27.6	*	*	*
Third	66	8	32	17	6	*	39.5	*	36.5	*	*	*
Fourth	45	*	19	13	7	*	34.2	*	*	*	*	*
Fifth	33	*	9	11	5	8	51.4	*	*	*	*	*
Sixth or more	94	*	5	32	32	25	31.1	*	*	28.1	25.5	36.0

Table 23. Estimated infant deaths per 1,000 live births for white infants, by age of mother and cause of death: United States, 1964-66 legitimate, single births

Cause of death	All ages	Age of mother in years				
		Under 20	20-24	25-29	30-34	35 and over
	Rate per 1,000 live births					
All causes	19.5	23.6	17.8	17.8	20.3	24.1
Infective and parasitic diseases--(001-138)	0.2	0.4	0.1	0.2	0.1	0.0
Influenza, pneumonia and all other diseases of the respiratory system--(470-475,480-493,500-527,764)	2.4	4.0	2.1	2.5	2.0	1.4
Gastritis, duodenitis and all other diseases of the digestive system ---(530-587)	0.5	0.8	0.4	0.2	0.8	0.6
Congenital malformations----------(750-759)	3.7	3.9	3.3	3.4	3.9	5.2
Birth injuries----------(760-761)	1.8	1.4	1.6	1.8	1.8	2.8
Postnatal asphyxia and atelectasis----(762)	3.3	4.4	2.7	2.6	3.9	4.7
Hemolytic disease of newborn----------(770)	0.4	0.1	0.4	0.2	0.5	1.0
Immaturity, unqualified----------(776)	2.6	4.0	2.2	2.4	2.5	3.2
Certain diseases of early infancy[1]----------(765,769,771-774)	3.0	3.1	2.8	3.0	3.4	3.8
Accidents----------(E800-E962)	0.6	0.6	0.8	0.6	0.4	0.6
Residual----------All other causes	1.2	0.9	1.5	1.1	1.1	0.8

[1]Includes neonatal disorders arising from certain diseases of the mother during pregnancy; ill-defined diseases peculiar to early infancy; immaturity with mention of other subsidiary condition; and other diseases peculiar to early infancy not already shown. Ill-defined diseases peculiar to early infancy account for about 60 percent of these deaths.

Table 24. Estimated infant deaths per 1,000 live births for white infants, by age of mother and age at death: United States, 1964-66 legitimate, single births

Age of mother	Age at death					
	Less than 1 year	Less than 1 day	1-6 days	7-27 days	1-5 months	6-11 months
	Rate per 1,000 live births					
All ages	19.5	8.4	5.0	1.4	3.4	1.5
Under 20 years	23.6	9.2	5.9	1.5	5.4	1.7
20-24 years	17.8	7.7	4.5	1.2	2.9	1.5
25-29 years	17.8	7.7	4.1	1.5	3.3	1.2
30-34 years	20.3	8.7	5.6	1.5	2.8	1.6
35 years and over	24.1	11.1	6.6	1.8	3.1	1.5

APPENDIX I

SOURCES AND LIMITATIONS OF DATA

Background of This Report

This report presents data on infant mortality rates for 1964-66 for legitimate infants. Ordinarily, infant mortality rates based on all births and infant deaths registered in the United States are published in *Vital Statistics of the United States.*[3] These regularly published statistics are limited to the amount of information recorded and coded on the birth and death certificates. This report presents data on infant deaths classified by family income and completed education of the mother and father—variables not available in the regularly published statistics. The data were collected as part of the 1964-66 National Infant Mortality Survey (NIMS) and the 1964-66 National Natality Survey (NNS). The survey design of the latter precluded obtaining information on illegitimate births.

Sources of Data

The first sources of data for the survey were the death certificates and the birth certificates of infants. From the death certificate, information such as age of deceased, sex, race, place of death, usual place of residence, and cause of death was obtained. From the birth certificate, information such as sex of child, residence of father and mother, age of father and mother, and race of father and mother was obtained.

The second sources of data were mail questionnaires. For infant deaths, questionnaires were mailed to the persons who provided the funeral director with personal information about the deceased infant for recording on the death certificate. This was usually the mother. For births, the questionnaires were mailed to the mothers.

In the NIMS, for those deaths occurring in 1964 and 1965, a form was also sent to hospitals and institutions in which infants died, to hospitals where infants were born, and to any other hospitals or institutions at which the infants received medical care. If infants died in hospitals or institutions, the name of the hospital or institution in which death occurred was recorded on the death certificate. The name of the hospital where an infant was born and the names of hospitals or institutions where an infant received medical care were derived from responses on the informant questionnaire. Hospitals or institutions to which a form had been sent also provided the names of other hospitals or institutions in which the infant had received medical care in some instances.

Sample Design

The sampling frame for the 1964-66 NIMS was the Current Mortality Sample (CMS)—a 10-percent systematic sample of death certificates received each month by the National Center for Health Statistics from the 54 registration areas in the United States. The sample for the 1964-66 NIMS was a probability sample of 1 out of every 11 deaths under 1 year of age included in the CMS in 1964, 1965, and 1966. This procedure yielded an overall selection rate of approximately 1 out of every 110 infant deaths registered in the United States. Of a total of 2,490 infant deaths in the 1964-66 NIMS, 2,160 were inferred to be legitimate. In the case of infant deaths, legitimacy status is not recorded on the death certificate; legitimacy status was inferred from information on the death certificate and on the questionnaire. The

method of making such inferences, as it pertains to infant deaths, is further defined and explained in appendix II. Table I shows the number of deaths of all infants and the number of deaths of legitimate infants included in the 1964-66 NIMS.

The sampling frame for the 1964-66 NNS was the file of microfilm birth certificates received each month by the National Center for Health Statistics from the 54 registration areas in the United States. As a general rule, each registration area assigns a number to each certificate prior to or during the filming of the birth record. The certificates are numbered consecutively from the first to the last birth occurring during the year.

The sampling for the survey was based on a probability design which made use of these numbers on the birth records. Each 1,000 records constituted a primary sampling unit. Within each 1,000 records, one record was chosen at random. Thus, a sample of 1 out of every 1,000 births was selected from the records for each registration area.

The national sample included a total of 11,331 births. Of these, 647 were reported as illegitimate in the 36 registration areas which record legitimacy status, and 289 others in the 19 areas which do not record legitimacy status were inferred to be illegitimate. The mothers of these 936 illegitimate births were not sent questionnaires. A total of 10,395 legitimate births were therefore included in the survey. Questionnaires were not sent to 70 additional mothers because the birth was registered in the State of New Mexico which did not participate in the survey, to 9 mothers because the birth was registered in the State of California and they were already in the sample of a State survey, and to 10 mothers either because their residence was outside the United States or because no mailing address was obtainable. Thus, a final sample of mothers to whom questionnaires were mailed numbered 10,306.

Table I. Total number of infant deaths in the United States and the number of infant deaths in the National Infant Mortality Survey, 1964-66

Number of infant deaths	Total	Year		
		1964	1965	1966
Total count of infant deaths in the United States[1] . .	278 165	99,783	92,866	85,516
Number of infant deaths selected in the sample	2,490	888	830	772
Number of deaths of legitimate infants	2,160	764	733	633

[1] See reference 3.

Table II shows the total number of births registered in the United States and the number in the 1964-66 NNS.

The Death Certificate, the Birth Certificate, the Questionnaire, and the Hospital Form

As mentioned previously, the death certificate and the birth certificate were the first sources of data for this report. Although not all States use the exact Standard Certificate of Death or the Standard Certificate of Live Birth, both of which are shown in appendix III, all States do include on their certificates items requesting the basic information used in this report. There were no sample cases for which information was missing for the items on the death certificates which were used in this report. In most cases, all items on the birth certificates were answered adequately. There were, however, some birth certificates chosen for the 1964-66 NNS for which information was missing for certain items. Table III shows the number and percentage of birth certificates on which certain items were not answered.

As already noted, in addition to data derived from the death certificates and from the birth certificates, data used in this report were derived from questionnaires sent to persons who provided the funeral director with personal information about the deceased infant (the death certificate informant) and from questionnaires sent to mothers.

The questionnaire sent to the death certificate informant asked for information about the infant who died, information about other children born to the mother, a listing of other members of the household who usually lived with the mother at the time of birth of the deceased infant, employment of mother during

Table II. Total number of births in the United States and the number of births in the National Natality Survey, 1964-66

Number of births	Total	Year		
		1964	1965	1966
Total count of births in the United States	11,393,000	4,027,000	3,760,000	3,606,000
Number of births selected in the sample	11,331	4,025	3,702	3,604
Number of illegitimate births excluded from survey	936	282	345	309
Number of legitimate births in survey	10,395	3,743	3,357	3,295
Number of births from New Mexico and California	79	26	22	31
Other	10		3	7
Number of births for which questionnaire was mailed	10,306	3,717	3,332	3,257

Table III. Number and percentage of birth certificates on which certain items were not answered in the National Natality Survey, 1964-66

Item	Number	Percentage
Age of mother	3	.0
Race of mother	7	.1
Race of father	49	.5
Race of child	9	.1
Sex of child	1	.0
Number of children born alive:		
Now living	43	.4
Now dead	199	1.9
Previous fetal deaths	310	3.0
Completed weeks of pregnancy	678	6.5
Birth weight	25	.2

NOTE—Base: 10,395 legitimate live births.

pregnancy, family income during the previous calendar year, education of mother and of father, and information on health insurance coverage for maternity care.

The questionnaire sent to the mother of a legitimate birth asked questions identical to those on the NIMS, so that comparable data on these items were obtained from both surveys. In addition, information was sought on the mother's expected future fertility.

For the NIMS, the form sent to the hospitals and institutions in 1964 and 1965 asked for information on length of pregnancy and weight of baby at birth, specific details regarding episodes of care provided by that hospital or institution for the infant (such as cause and duration of illness), and for the names and addresses of any other hospitals in which the infant might have been a patient.

Collection of Data

For both the 1964-66 NIMS and the 1964-66 NNS, the principal method of data collection was a mail survey.

For the 1964-66 NIMS, the primary source of information was the person who provided the funeral director with the personal information about the deceased for recording on the death certificate (the death certificate informant). The mailing address of the death record informant is usually reported on the death certificate. For infant deaths, the informant is usually the mother; however, information was accepted from the father, maternal grandmother, and paternal grandmother (in that order) if the mother was not available to complete the questionnaire. For those cases where the name or address of the informant was not available on the death certificate or additional sources of information were required, a letter was sent to the funeral director requesting the address of the informant and/or names and addresses of other relatives of the deceased infant to whom a questionnaire might be sent.

For the 1964-66 NNS, questionnaires were mailed to the mothers of legitimate infants, using the address of the mother recorded as her usual place of residence. Information was accepted from other respondents only if there was no possibility of obtaining it from the mother.

For both surveys, there were followup procedures when there was no response to the original queries. If after 2 to 3 weeks no response was received from a death certificate informant, a funeral director, or a mother of a legitimate live birth, the first followup mailing was sent by certified mail. If no response was received to the first followup mailing within 3 weeks, a second followup occurred by regular mail; however, no second followup mailing was made to funeral directors. If no response was received from the second followup mailing, there was additional provision for collecting information by use of telephone or by personal interview carried out by the U.S. Bureau of the Census if the person resided in one of the primary sampling units designated by the Bureau of the Census.

For the 2,160 legitimate infant deaths in the 1964-66 NIMS, the response rate was 88 percent. For the 10,395 legitimate births in the 1964-66 NNS, the response rate was 89 percent.

Table IV shows the number and percent of respondents to the questionnaires sent to death certificate informants by selected characteristics of legitimate infants who died in 1964-65. Response rates by characteristics of deceased infants could not be calculated for 1966 because the information was not coded.

Table V shows the number of mothers of legitimate births in the survey and the percent responding to the questionnaire by selected characteristics of the mothers of legitimate births.

Nonresponse and Imputation for Missing Data

A "nonresponse" represents a major problem in any survey. Nonresponse in the 1964-66 NIMS was defined to include those cases for which an informant was not identified from the death certificate and the funeral director was unable to provide names and addresses of relatives of the deceased infant to whom a questionnaire might be sent, those cases for which questionnaires were returned but were uncodable, those cases for which there was no response at all by mail or by interview, those cases for which the informant was not queried for other reasons, and those cases for which there was a refusal to answer the questionnaire.

Nonresponse in the 1964-66 NNS was defined to include those cases for which no questionnaire was mailed if the birth certificate was filed in New Mexico, those cases for which no questionnaires were mailed because no usable mailing address was obtained, the mothers resided outside the United States or were included in the California survey, those cases for which no questionnaire was returned after all followup procedures had been completed, and those cases for which questionnaires were returned but were not usable.

All of the above cases for which no information from the questionnaires was available or usable are referred to as "unit nonresponses." Imputation was carried out for "unit nonresponses" according to the following specifications.

Data in the 1964-66 NIMS were adjusted for unit nonresponse by imputing for a decedent for whom no questionnaire was returned the data for a decedent for whom a questionnaire was returned. The imputation was carried out in the following manner. Four subgroups were defined:

Table IV. Number and percent responding to informant questionnaire by selected characteristics of deceased legitimate infants in the National Infant Mortality Survey, 1964-66

Characteristics of deceased infants	Total number of legitimate infants, 1964-66	Total number of legitimate infants, 1964-65	Percent of 1964-65 infants on which response was received
Total	2,160	1,497	87.9
Race			
White	1,707	1,164	88.7
Black	418	302	86.4
Other races	35	31	71.0
Region			
Northeast	450	302	90.7
North Central	626	439	89.5
South	749	515	89.3
West	335	241	78.4
Metropolitan status			
Metropolitan	1,330	907	88.9
Nonmetropolitan	830	590	86.4
Cause of death			
Infective and parasitic diseases 001-138	15	10	90.0
Influenza and pneumonia, except pneumonia of newborn 480-493	230	173	87.3
Other diseases of respiratory system 510-522, 525-527	48	33	97.0
Gastritis, duodenitis, enteritis, and colitis, except diarrhea of newborn 543, 571, 572	45	35	80.0
Other diseases of digestive system 530-542, 544-553, 573-587	20	13	92.3
Congenital malformations 750-759	346	232	92.7
Birth injuries 760, 761	180	135	92.6
Postnatal asphyxia and atelectasis 762	358	244	84.8
Hemolytic disease of newborn (erythroblastosis) 770	35	22	81.8
Immaturity, unqualified 776	337	231	89.2
Certain diseases of early infancy 760-776	335	224	84.8
Symptoms and ill-defined conditions 780-793, 795	53	36	83.3
Accidents E800-E962	75	52	78.8
Residual	83	57	91.2
Age at death			
Under 1 day	917	613	88.3
1-6 days	525	361	89.5
7-27 days	155	105	85.7
28 days-5 months	400	293	87.4
6-11 months	163	125	84.8

Table V. Number and percent responding by selected characteristics of mothers in the National Natality Survey, 1964-66

Characteristic of mother	Number in survey	Percent responding
Total	10,395	88.8
Age		
Under 20 years	1,466	82.5
20-24 years	3,698	88.7
25-29 years	2,617	90.7
30-34 years	1,562	90.7
35 years and over	1,052	90.5
Color		
White	9,096	89.5
All other	1,299	84.0
Live-birth order		
First	3,009	88.7
Second	2,596	89.4
Third	1,852	89.4
Fourth	1,208	89.1
Fifth or higher	1,730	87.2
Region of residence		
Northeast	2,445	92.8
North Central	2,968	91.4
South	3,246	87.1
West	1,736	82.0
Metropolitan status		
Inside SMSA	6,682	90.4
Outside SMSA	3,713	85.9

white males, white females, all other males, and all other females. The data required to assign a case to one of these four groups were complete on all death certificates selected for the 1964-66 NIMS, regardless of whether there was a response to the mail questionnaire. After the close of the survey, the complete file of records of infant deaths was put in random order. This file included those records which were unit responses as well as those records which were unit nonresponses. Imputation was carried out by imputing to a nonresponse record the values found for the last previous record for which there was a response and which fell into the same one of the four imputation groups.

For the 1964-66 NNS, imputation of information in instances of unit nonresponse was carried out through a similar procedure, except that (1) only legitimate infants were included, and (2) there were 24 imputation classes based on age of mother, live-birth order, and color of mother. These characteristics are recorded on the birth certificate and were therefore available for all sample cases whether a questionnaire was returned or not. The 24 imputation classes were defined as follows:

Group	Color and age	Live-birth order
	White	
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 and over	1-4
14	35 years and over	5+
	All other	
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 and over	All

Besides those cases referred to as "unit nonresponses," there were cases for which questionnaires were returned but certain information was missing. The missing information is referred to as "item nonresponse."

For the 1964-66 NIMS, there were several possible actions when item nonresponse occurred. These included editing-in the information on the missing items if it could be obtained from another part of the questionnaire, other forms, letters accompanying forms, or the death certificate; sending a special letter to the person who answered the questionnaire asking for the missing information; or referring the case to the study director for review, after which either a special letter was sent asking for the missing information, a phone call or personal interview was carried out by the Bureau of the Census, a form was sent to the funeral director asking for the names and addresses of relatives of the deceased infant to whom informant questionnaires might be sent, or the case was closed.

If a special letter was sent asking for the missing information and it was not returned or was returned but the information asked for was not provided, the case was also referred to the study director for review, whereupon either a phone call or personal interview was carried out by the Bureau of the Census, a form was sent to the funeral director asking for the names and addresses of relatives of the deceased so new informants could be queried, or the case was closed.

For the 1964-66 NNS, actions taken when item nonresponse occurred included editing-in the missing information if it could be supplied from another part of the questionnaire or the birth certificate; sending a special letter to the person who answered the questionnaire asking for the missing information; or referring the case to the study director for review after which either a special letter was sent asking for the missing information, a phone call or personal interview was carried out by the Bureau of the Census, or the case was closed.

Data in the 1964-66 NIMS were adjusted for item nonresponse in a manner different from that applied to unit nonresponse. Imputation for item nonresponse was carried out by taking into consideration the information provided for other items on the questionnaire which was pertinent to the missing information. For example, if there was missing information for the question on family income in the last calendar year previous to the year of death, information given by the informant on the household listing and information provided on education of the father would be considered if it were available. In such a case, the last previous questionnaire for which the responses for household listings and for education of father were coded in the same categories as those on the questionnaire with the missing information was chosen. The value for the item on which there was missing information was then taken from this last previous record and imputed to the item where there was missing information. This method of imputation was carried out for each case of item nonresponse. It should be emphasized that household listing and education of father were not the only items considered when imputation was carried out for a missing item nor were they the only items used to impute family income for all cases for which information was missing on family income. Rather, for item nonresponse each item of each case for which there was missing information was considered individually. Possible bias in selecting the last previous record was avoided by the random ordering of the records which was done between each step of the imputation procedure.

Table VI shows the nonresponse rates for some items from the 1964-65 NIMS questionnaire. Nonresponse rates are for 1964-65 only because, as mentioned previously, in 1966 whether there was or was not a response to the questionnaire for each individual case was not coded. As can be seen in table VI, the item for which nonresponse rates were highest was family income (information not obtained for 7.3 percent of the respondents to the questionnaire).

Table VI. Item nonresponse rates for selected items on the National Infant Mortality Survey, 1964-65

Item	Number	Percent
Family income	96	7.3
Year of birth of mother	45	3.4
Educational attainment of father	29	2.2
Year of first marriage	26	2.0
Educational attainment of mother	9	0.7
Previous fetal deaths	9	0.7
Employment during pregnancy	5	0.4
Total children ever born alive	1	0.1
Total children not now alive	2	0.2

NOTE.—Base: 1,316 unit responses, legitimate births only.

For the 1964-66 NNS, item nonresponse rates were generally low—usually less than 1 percent. Most of the item nonresponses were imputed on the basis of information available elsewhere on the birth certificate or questionnaire. For example, mother's age as recorded on the birth certificate was used to impute her year of birth when she had not completed that questionnaire item. Other items with very low nonresponse rates (less than 0.5 percent) were imputed arbitrarily. Five items with fairly high nonresponse rates were imputed in the computer by procedures similar to those used for unit imputation on the basis of matrices designed specifically for each item. For example, education of father was imputed by using age of father and education of mother; family income was imputed by using age of father and education of father.

Table VII shows the nonresponse rates for some items from the 1964-66 NNS questionnaire.

Weighting Procedures for National Estimates

Statistics on infant deaths and births in this report are national estimates prepared by use of a postsurvey, stratified ratio estimation procedure. This estimation procedure, which takes into account the total number of registered infant deaths for the 1964-66 NIMS and the total number of registered births estimated from a 50-percent sample for the 1964-66 NNS, reduces the sampling error by making the sample more representative of the population of all infant deaths or of all births than would be expected to occur by random sampling alone.

Table VII. Item nonresponse rates for selected items on the National Natality Survey, 1964-66

Item	Number	Percent
Age of father	61	.7
Educational attainment of father	78	.8
Educational attainment of mother	15	.2
Year of first marriage	35	.4
Employment during pregnancy	13	.1
Family income	231	2.5

NOTE.—Base: 9,232 unit responses, legitimate births only.

For the 1964-66 NIMS, for each of the four groups that were used for imputation, the national count of all registered infant deaths for the appropriate year was obtained from *Vital Statistics of the United States.*[3] A weight for each group was then calculated by dividing the number of sample deaths in each group into the number of registered deaths in each group for each year of the survey. The product of the weight and the sample count equals the national total of infant deaths for that group.

For the 1964-66 NNS, for each of the 24 groups that were used for imputation, the national count of registered births estimated from a 50-percent sample was obtained from *Vital Statistics of the United States.*[4] A weight for each group was then calculated by dividing the number of sample births in each group into the number of registered births in each group for each year of the survey. The product of the weight and the sample count equals the national total of births for that group.

The effect of these weighting procedures is to make the estimates from the 1964-66 NIMS sample more consistent with the estimates of the total number of registered infant deaths and to make the estimates from the 1964-66 NNS more consistent with the estimates of births based on the 50-percent sample, for each of the groups used in the estimation procedure. However, since data in this report refer only to deaths and births of legitimate infants, the estimates in this report are not comparable to the total numbers of births and infant deaths reported in *Vital Statistics of the United States,* since the latter include all deaths and births, legitimate and illegitimate.

Estimates of characteristics are produced from a sample using the following formulas:

1964-66 National Infant Mortality Survey

$$X_i' = \sum_{i=1}^{4} \frac{x_i}{y_i} Y_i$$

1964-66 National Natality Survey

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

where

X_i' is the estimate of the number of deaths or births with a particular characteristic in group i,

x_i is the count of sample deaths or births with the characteristic in group i,

y_i is the count of all sample deaths or births in group i, and

Y_i is the total number of registered deaths in group i, or the total number of registered births in group i based on the 50-percent sample.

Reliability of Estimates

Since the statistics derived from a survey are estimates based on a sample, they may differ from the figures that would have been obtained had a total count been made using the same questionnaire and procedures.

The probability design of the sample for these surveys 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 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 and about 99 out of 100 that the difference is less than three times the standard error.

Estimates of sampling variability for the statistics derived from each 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 systematic biases in the data. A general discussion of the development and evaluation of a replication technique for estimating variance has been published elsewhere.[5] However, the procedures and computations required to estimate variances by this method are briefly described below.

For both surveys, each record from the entire file of records in the survey 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 for the entire sample were applied separately to each of the resulting half samples.

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

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

where

x' is the estimate of X based on the entire sample, and

x'' is the estimate of X based on half sample i.

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

1. *Estimates of aggregates*: Approximate standard errors for estimates of aggregates which are not derived from the groups used in ratio estimation, such as the number of infant deaths or births to families where the father was a high school graduate, are given in table VIII if the estimate refers to deaths and in table IX if the estimate refers to births. There are no standard errors for estimates of aggregates if the estimates are derived from the groups used in ratio estimation.

Table VIII. Approximate standard errors for estimated numbers shown in this report, 1964-66 National Infant Mortality Survey

Size of estimate	1964-65		1964-66	
	Standard error	Relative standard error	Standard error	Relative standard error
250	110	44.0	98	39.2
500	165	33.0	142	28.4
1,000	230	23.0	181	18.1
1,500	270	18.0	233	15.5
2,000	310	15.5	260	13.0
3,000	385	12.8	320	10.7
4,000	455	11.4	380	9.5
5,000	485	9.7	405	8.1
10,000	630	6.3	466	4 7
15,000	700	4.7	533	3.6
20,000	800	4.0	600	3.0
30,000	960	3.2	767	2.6

Table IX. Approximate standard errors for estimated numbers shown in this report, 1964-66 National Natality Survey

Size of estimate	1964-65		1964-66	
	Standard error	Relative standard error	Standard error	Relative standard error
5,000	1,800	36.0	1,490	[1]29.8
10,000	2,368	23.7	1,960	19.6
15,000	2,682	17.9	2,220	14.8
20,000	2,948	14.7	2,440	12.2
25,000	3,293	13.2	2,725	10.9
50,000	4,531	9.1	3,750	7.5
75,000	5,437	7.2	4,500	6.0
100,000	5,933	5.9	4,910	4.9
150,000	7,069	4.7	5,850	3.9
200,000	7,975	4.0	6,600	3.3
250,000	8,670	3.5	7,175	2.9
300,000	9,171	3.1	7,590	2.5
500,000	12,204	2.4	10,100	2.0
700,000	15,309	2.2	12,670	1.8
1,000,000	15,950	1.6	13,200	1.3

2. *Estimates of rates*: Approximate standard errors for estimated rates, such as the number of infant deaths to the number of births, are determined in the following way. When the rate is an estimate which was not derived from the classes used in ratio estimation, such as the infant mortality rate for families with incomes of under $3,000, the approximate standard errors are given in table X when the rate was based on 2 years of data, and in table XI when the rate was based on 3 years of data. When the rate is an estimate which was derived from the classes used in ratio estimation, such as the infant mortality rate for white infants, there are no standard errors.
3. *Difference between two sample estimates*: The standard error of a difference between two sample estimates is approximately the square root of the sum of the squares of the standard error of the two estimates. 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 cases where the characteristics are correlated.

In addition to sampling errors, survey results are subject to errors in conceptual formulation, ambiguities and misinterpretations arising from the wording of the questions, biases due to nonresponse or incomplete response, and errors in coding, editing, and tabulation. There is no way of computing the magnitude of these errors.

Errors in conceptual formulation and ambiguities of the 1964-66 NNS were reduced by pretesting the questionnaire before initiating the survey. The steps taken to reduce biases due to nonresponse in each survey were discussed in the section of this appendix, "Nonresponse and Imputation for Missing Data." Errors in tabulation were reduced, if not eliminated, by cross-checking the tabulations and by comparing data from each survey with data from other sources when available.

Rounding of Numbers

In this report, estimates of aggregates are rounded to the nearest thousand. The original

Table X. Approximate standard errors of infant mortality rates based on 2 years of data

Average annual number of live births	Infant mortality rate per 1,000 live births										
	5	10	20	30	40	50	60	70	80	90	100
	Standard error expressed as rate										
10,000									27.3	29.6	32.5
15,000				11.6	14.8	15.6	18.1	20.3	21.8	24.0	25.8
25,000		4.9	7.3	8.6	10.5	12.0	13.6	15.3	16.7	18.1	19.6
50,000	2.3	3.6	4.9	6.1	7.3	8.5	9.6	10.7	11.9	12.2	13.6
100,000	1.7	2.3	3.4	4.3	5.3	5.8	6.2	6.7	7.2	7.7	8.6
150,000	1.2	1.8	2.8	3.4	3.9	4.3	4.7	5.0	5.5	5.9	6.9
250,000	1.0	1.5	2.1	2.4	2.7	2.9	3.3	3.7	4.0	4.5	5.0
500,000	.9	1.0	1.2	1.5	2.2	2.4	2.4	2.7	3.1		
1,000,000	.5	.6	.9	1.1	1.5						

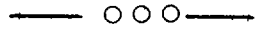
NOTE.—Numerator: 1964-65 National Infant Mortality Survey; Denominator: 1964-65 National Natality Survey.

Table XI. Approximate standard errors of infant mortality rates based on 3 years of data

Average annual number of live births	Infant mortality rate per 1,000 live births										
	5	10	20	30	40	50	60	70	80	90	100
	Standard error expressed as rate										
10,000									22.3	24.2	26.5
15,000				9.5	12.1	12.7	14.8	16.6	17.8	19.6	21.1
25,000		4.0	6.0	7.0	8.6	9.8	11.1	12.5	13.6	14.8	16.0
50,000	1.9	2.9	4.0	5.0	6.0	6.9	7.8	8.7	9.7	10.0	11.1
100,000	1.4	1.9	2.8	3.5	4.3	4.7	5.1	5.5	5.9	6.3	7.0
150,000	1.0	1.5	2.3	2.8	3.2	3.5	3.8	4.1	4.5	4.8	5.6
250,000	0.8	1.2	1.7	2.0	2.2	2.4	2.7	3.0	3.3	3.7	4.1
500,000	0.7	0.8	1.0	1.2	1.8	2.0	2.0	2.2	2.5		
1,000,000	0.4	0.5	0.7	0.9	1.2						

NOTE.—Numerator: 1964-66 National Infant Mortality Survey; Denominator: 1964-66 National Natality Survey.

tabulations on which this report is based, however, show figures to the nearest whole unit and all totals, percentages, ratios, and averages in this report were computed using these unrounded figures. The reader should be cautioned that in recomputing these totals, percentages, ratios, and averages by use of the rounded figures, exactly the same result may not occur.



APPENDIX II

DEFINITIONS OF CERTAIN TERMS USED IN THIS REPORT

Education of father.—In both surveys, data on education of father were derived from the questionnaires which asked for the highest grade of school attended and whether or not that grade was completed. Education of father refers to the highest grade of regular school completed. Regular school consists of elementary, high school, and college or university, but does not include trade or business schools.

Education of mother.—Education of mother also refers to the highest grade of regular school completed. Data on education of mother were derived in the same manner as were data on education of father.

Family income.—In both surveys, family income refers to the total of all income received during the calendar year prior to the year during which the birth or the death occurred. Family income was defined to include all income received by the mother and all persons related to the mother by blood, marriage, or adoption, and living in the same household at the time of birth or death. Income from all sources such as wages, salaries, unemployment compensation, rent, interest, dividends, help from relatives, profits and fees from own business or farm, welfare payments, social security payments, and insurance proceeds was asked for.

Age of mother.—In the NNS, age for mother was recorded or derived from entries on the birth certificate. In the NIMS, age of mother was derived from questionnaires which asked for the date of birth of the mother. Age in this report refers to age at last birthday.

Birth weight.—In the NNS, birth weight was recorded or derived from the birth certificate. In the NIMS, birth weight was derived from forms sent to hospitals which had provided care to the deceased infant. This included the hospital at which the birth occurred, other hospitals at which the infant had a period of care, and the hospital at which death occurred, if the death occurred in a hospital. Data on birth weight of deceased infants was available only for infants who died during 1964 and 1965.

In almost all cases, birth weight was recorded in pounds and ounces. It was converted into grams by taking 1 pound equal to 454 grams.

Legitimacy status.—In the NNS, for the 36 areas reporting legitimacy on the birth record, legitimacy of the infant was recorded or derived from the entry on the birth certificate. For areas not reporting legitimacy on the birth record, it was inferred from other evidence on the certificate as, for example, mother, father, and infant all with the same last name, and mother's maiden name is different. In a few cases a reported legitimate birth was changed to an illegitimate birth when the mother stated on the questionnaire that she had never been married. In the NIMS, legitimacy of the infant was inferred by using information on the death certificate and on the questionnaire. If mother, father, and infant all had the same last name, and if mother's maiden name was different from the infant's name on the death certificate, the child was inferred to be legitimate. Legitimacy was also inferred if on a questionnaire the mother was listed as being married, the date of marriage was before or equal to the date of birth of the child, and the father was accounted for in the household listing. On the other hand, if the child had the same last name as the mother and if the father's name was different or not given on the death certificate, illegitimacy was inferred. The child was also inferred as being illegitimate if the mother reported her marital status as single and if no date of marriage was given on the returned questionnaire.

Live birth.—In the NNS, a certificate of live birth was filed when it met the requirements of the following definition adopted by the World Health Organization: A live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which after such separation, breathes or shows any other evidence of life such as beating of heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live-born and a certificate of live birth should be filed.

Previous live births.—In both surveys, data on previous live births to the mother were derived from the questionnaire.

Single birth.—In the NNS, a live birth was identified as a single, twin, or triplet from the item on the certificate of live birth. In the NIMS, the number at birth was derived from the entries on the questionnaires. In 1964 and 1965 the information provided by the mother was supplemented and checked against that provided by the hospital; in 1966 no hospital information was available.

Live-birth order.—In both surveys, live-birth order was derived from the questionnaires. It refers to the number of children born alive to this mother including the sample child.

Previous fetal deaths.—In both surveys, data on previous fetal deaths were derived from the questionnaires. The number of infants born dead and the number of miscarriages were summed to obtain the number of fetal deaths.

Infant death.—An infant death is the death of an infant under 1 year of age.

Age of death.—In the NIMS, the age of the infant at the time of death was recorded or derived from the death certificate.

Previous infant deaths.—In both surveys, data on previous infant deaths were derived from the questionnaires. If the interval in months between date of birth and date of death for any previous child born alive to this mother was less than 12, that infant was coded as an infant death.

Cause of death.—Cause of death was recorded or derived from entries on the death certificate. The coding of cause of death from the entry on the death certificate was in accordance with the specifications of the *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death,* World Health Organization, Vol. I, 1957 (Seventh Revision).

Race.—In the NIMS, race was recorded or derived from entries on the death certificate. The category "white" includes those decedents classified as white, Mexican, or Puerto Rican. The category "black" includes only those decedents reported as Negro. The category "other races" includes decedents reported as Japanese, Aleut, Eskimo, Hawaiian, or Part-hawaiian. In the NNS, race was recorded or derived from entries of the race of the parents on the birth certificate and then classified into the same categories.

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. COUNTY

b. CITY, TOWN, OR LOCATION

c. CITY, TOWN, OR LOCATION

c. NAME OF HOSPITAL OR INSTITUTION (*If not in hospital, give street address*)

d. STREET ADDRESS

d. IS PLACE OF BIRTH INSIDE CITY LIMITS? YES ☐ NO ☐

e. IS RESIDENCE INSIDE CITY LIMITS? YES ☐ NO ☐

f. IS RESIDENCE ON A FARM? YES ☐ NO ☐

CHILD

3. **NAME** (*Type or print*) *First* *Middle* *Last*

4. SEX

5a. THIS BIRTH SINGLE ☐ TWIN ☐ TRIPLET ☐

5b IF TWIN OR TRIPLET, WAS CHILD BORN 1ST ☐ 2D ☐ 3D ☐

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

11b. KIND OF BUSINESS OR INDUSTRY

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 (fetuses 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. ☐ D. O. ☐ MIDWIFE ☐ OTHER (*Specify*)

18c. ADDRESS

18d DATE SIGNED

19. DATE RECD. BY LOCAL REG.

20. REGISTRAR'S SIGNATURE

21. DATE ON WHICH GIVEN NAME ADDED BY (*Registrar*)

FOR MEDICAL AND HEALTH USE ONLY
(*This section MUST be filled out*)

22a. LENGTH OF PREGNANCY COMPLETED WEEKS

22b. WEIGHT AT BIRTH LB. OZ.

23. LEGITIMATE YES ☐ NO ☐

(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

GPO : 1955 O - 335571

Standard Certificate of Death

CERTIFICATE OF DEATH

Form approved. Budget Bureau No. 68-R375.2.

BIRTH NO. STATE OF STATE FILE NO.

1 **PLACE OF DEATH**
a. COUNTY
b. CITY, TOWN, OR LOCATION | c. LENGTH OF STAY IN 1b
d. NAME OF HOSPITAL OR INSTITUTION (*If not in hospital, give street address*)
e. IS PLACE OF DEATH INSIDE CITY LIMITS? YES ☐ NO ☐

2. **USUAL RESIDENCE** (*Where deceased lived. If institution: Residence before admission*)
a. STATE b. COUNTY
c. CITY, TOWN, OR LOCATION
d. STREET ADDRESS
e. IS RESIDENCE INSIDE CITY LIMITS? YES ☐ NO ☐
f. IS RESIDENCE ON A FARM? YES ☐ NO ☐

3 **NAME OF DECEASED** (*Type or print*) *First* *Middle* *Last*
4. DATE OF DEATH *Month* *Day* *Year*
5. SEX
6 COLOR OR RACE
7 MARRIED ☐ NEVER MARRIED ☐ WIDOWED ☐ DIVORCED ☐
8. DATE OF BIRTH
9. AGE (*In years last birthday*) IF UNDER 1 YEAR *Months* *Days* IF UNDER 24 HRS. *Hours* *Min.*
10a. USUAL OCCUPATION (*Give kind of work done during most of working life, even if retired*)
10b. KIND OF BUSINESS OR INDUSTRY
11. BIRTHPLACE (*State or foreign country*)
12. CITIZEN OF WHAT COUNTRY?
13. FATHER'S NAME
14. MOTHER'S MAIDEN NAME
15. WAS DECEASED EVER IN U. S. ARMED FORCES? (*Yes, no, or unknown*) (*If yes, give war or dates of service*)
16. SOCIAL SECURITY NO.
17. **INFORMANT** *Address*

MEDICAL CERTIFICATION

18 **CAUSE OF DEATH** [*Enter only one cause per line for (a), (b), and (c).*]
PART I. DEATH WAS CAUSED BY:
IMMEDIATE CAUSE (a) _____
Conditions, if any, which gave rise to above cause (a), stating the underlying cause last.
DUE TO (b) _____
DUE TO (c) _____
INTERVAL BETWEEN ONSET AND DEATH
PART II. OTHER SIGNIFICANT CONDITIONS CONTRIBUTING TO DEATH BUT NOT RELATED TO THE TERMINAL DISEASE CONDITION GIVEN IN PART I(a)
19. WAS AUTOPSY PERFORMED? YES ☐ NO ☐

20a. ACCIDENT ☐ SUICIDE ☐ HOMICIDE ☐
20b. DESCRIBE HOW INJURY OCCURRED. (*Enter nature of injury in Part I or Part II of item 18.*)
20c TIME OF INJURY *Hour* *a. m.* *p. m.* *Month, Day, Year*
20d INJURY OCCURRED WHILE AT WORK ☐ NOT WHILE AT WORK ☐
20e. PLACE OF INJURY (*e. g., in or about home, farm, factory, street, office bldg., etc.*)
20f. CITY, TOWN, OR LOCATION COUNTY STATE

21 *I attended the deceased from _____, to _____ and last saw her/him alive on _____*
Death occurred at _____ m on the date stated above; and to the best of my knowledge, from the causes stated.

22a. **SIGNATURE** (*Degree or title*)
22b. ADDRESS
22c. DATE SIGNED

23a. BURIAL, CREMATION, REMOVAL (*Specify*)
23b DATE
23c NAME OF CEMETERY OR CREMATORY
23d. LOCATION (*City, town, or county*) (*State*)

24 FUNERAL DIRECTOR ADDRESS
25. DATE RECD. BY LOCAL REG.
26. REGISTRAR'S SIGNATURE

1956 REVISION OF STANDARD CERTIFICATE
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE—PUBLIC HEALTH SERVICE
PHS-768 REV. 11/54

1964-1966 National Natality Survey Questionnaire

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
WASHINGTON, D.C. 20201

NATIONAL CENTER FOR
HEALTH STATISTICS

The U. S. Public Health Service is conducting a national study of families having babies during 1966. In this study, we are particularly interested in learning about the size and types of these families, as well as about other family characteristics. This information is needed in order to better understand the growth and changes taking place in our population. Detailed and accurate information of this type is essential for intelligent planning of programs to improve the Nation's health and welfare.

This national study will be based on information obtained from families which were selected as a sample from among the 4 million families having a baby during 1966. Your family was one of those selected. Please answer the questions on the following pages and return this form in the enclosed postage-free envelope.

As you might expect, statistical accuracy requires that we receive your reply and those of all of the other families in the study. You may be assured that all information which you report about yourself and your family will be kept completely confidential, in accordance with regulations of the U. S. Public Health Service. Your cooperation in this study, which seeks information of importance for the general welfare, is appreciated.

Sincerely yours,

Monroe G. Sirken

Monroe G. Sirken, Ph. D.
Chief, Division of Health
Records Statistics

Name of Child	
Date of Birth	File Number

66M

Form Approved
Budget Bureau No. 68-R823

NATIONAL BIRTH SURVEY

PART I. INFORMATION ABOUT YOUR CHILDREN

In this part, we are interested in knowing about all of the children which have ever been born to you, even if they were by a previous marriage.

1. How many babies have you ever had? (Count all those that were born alive to you at any time.)

☐ 1 ☐ 4 ☐ 7 ☐ 10 or more

☐ 2 ☐ 5 ☐ 8

☐ 3 ☐ 6 ☐ 9

Number

2. Have you ever had any children who have died? (Do not count miscarriages or babies that were born dead.)

☐ NO

☐ YES → Please list below the name, sex, date of birth, and date of death of each such child.

Name of child	Sex	Date of Birth	Date of Death

3. Were any of your children living away from you when your last baby was born? (For example, in the Armed Forces, living with relatives, etc.)

☐ NO

☐ YES → Please list below the name, sex, and date of birth of each such child.

Name of child	Sex	Date of Birth

4. Have you ever had any babies that were born dead?

☐ NO

☐ YES → How many have you ever had?

Number

5. Have you ever had a miscarriage?

☐ NO

☐ YES → How many have you ever had?

Number

6. After each birth, some couples feel that their families are completed, while others expect more children. In your case, do you expect to have more children?

☐ Definitely yes
☐ Probably yes
→ How many more children do you think you will probably have?

☐ Probably no

☐ Definitely no

Number

(GO ON TO PART II) →

PART II. INFORMATION ABOUT YOUR FAMILY

In this part, information is asked about the members of the family who lived with you when your last baby was born.

1. List below everyone who usually lived in your household at the time your last baby was born. Be sure to list yourself, your husband (if he lived at home) and your newborn baby, as well as other children and relatives living with you. Unrelated persons who lived with you, and children who were away at school or college, should be listed. Do not include persons who lived away. (For example, persons in the Armed Forces). Also, do not include persons who were only visiting temporarily at the time your baby was born.

Enter your name on the first line; enter the names of every other person who lived with you, including your newborn baby, on the following lines. (First name) (Last name)	For each person, provide the information requested below.		
	Relationship to you (husband, daughter, son, father-in-law, nephew, stepson, adopted daughter, etc.)	Date of birth Month-Day-Year	Marital Status (for persons 14 years and older). Married Divorced Widowed Separated Single (never married)
	Yourself		

(If more space is needed, please continue on separate sheet)

2. Who was the head of your household?

☐ Your husband

☐ Another person

↓

Name of head

3. What was the total income of your family during 1965? (Include all income of all members of the family listed above even if they were not living together during 1965. Include income from all sources such as wages, salaries, unemployment compensation, help from relatives, profits and fees from own business or farm, welfare payments, Social Security payments, etc.)

☐ None
☐ Under $1000
☐ $1000 - $1999
☐ $2000 - $2999
☐ $3000 - $3999
☐ $4000 - $4999
☐ $5000 - $6999
☐ $7000 - $9999
☐ $10,000 - $14,999
☐ $15,000 or over.

(GO ON TO PART III) →

PART III. INFORMATION ABOUT YOURSELF AND YOUR HUSBAND

In this part, information is requested about you and your husband.

1. Is this your first marriage?

☐ YES → Please give the date of your marriage.

Month	Day	Year

☐ NO → Please give the date of your first marriage.

Month	Day	Year

Please give the date of present marriage.

Month	Day	Year

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

☐ YES → When did you stop working before your baby was born?

☐ NO

Month	Day	Year

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

(Circle highest grade attended)

None---------- 0
Elementary---------- 1 2 3 4 5 6 7 8
High School---------- 1 2 3 4
College---------- 1 2 3 4 5 6+

3a. Did you finish this grade? ☐ YES ☐ NO

PART III. Con.

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

(Circle highest grade attended)

None---------- 0
Elementary---------- 1 2 3 4 5 6 7 8
High School---------- 1 2 3 4
College---------- 1 2 3 4 5 6+

4a. Did he finish this grade? ☐ YES ☐ NO

PART IV. INFORMATION ON HEALTH INSURANCE

In this part, we are interested in finding out whether you were covered by health insurance at any time during your recent pregnancy. Please report on each kind of health insurance protection which you had, whether or not the insurance was used.

1. During your recent pregnancy, did you have health insurance to pay for doctor's bills for office visits or home calls?

☐ YES ☐ NO

2. Did you have health insurance to pay for hospital care at the time of delivery?

☐ YES ☐ NO

3. Did you have health insurance to pay for the doctor's bill for delivery of your baby?

☐ YES ☐ NO

PART V. PERSON COMPLETING THIS FORM

Name of person completing this form

_____

Address

_____

_____

Telephone Number _____

COMMENTS:

PHS-4425-19 (Page 4)
REV. 3/66

GPO 905-486

1964-1966 National Infant Mortality Survey Questionnaire

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
WASHINGTON, D.C. 20201

NATIONAL CENTER FOR
HEALTH STATISTICS

The U. S. Public Health Service is conducting a survey to obtain information about infants who died during 1965. We realize that this is a difficult time; however, your help is needed in dealing with an important problem.

Loss of life among infants, especially in the first few hours or days of life has become a matter of increasing concern among public health workers in the United States. The purpose of this survey is to collect information about the childbearing experiences of mothers who have lost their babies, about the medical facts related to these deaths, and about the personal circumstances of the parents of these infants. This information is being obtained for one out of every 110 infant deaths occurring throughout the country.

This survey is designed to provide facts urgently needed in medical and public health research, the results of which may contribute to saving the lives of babies being born in your own community.

Please complete this form and return it within the next five days. A self-addressed envelope which requires no postage has been provided for your convenience. If you do not have the exact answer to a question, please give your best estimate.

The information you provide will be given confidential treatment and will be used for statistical purposes only. Any published summary will be presented in such a manner that no individual person or family can be identified.

Thank you for your cooperation.

Sincerely yours,

Monroe G. Sirken

Monroe G. Sirken, Ph. D.
Chief, Division of Health
Records Statistics

Name of Deceased Infant _____ File Number _____

I3-1-5

Confidentiality has been assured the individual as published in the Federal Register May 20, 1959

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service - NCHS
Washington, D.C. 20201

Form Approved
B.B. No. 68-R783

1965 INFANT MORTALITY SAMPLE SURVEY

PART I. INFORMATION ABOUT THE INFANT WHO DIED

1. Was the baby in a hospital at the time of death?

☐ Yes ☐ No

2. Was the baby born in a hospital?

☐ Yes ☐ No

3. Please list each hospital in which the baby received care, even if only for a brief period. (Write in name and location of each place; include hospitals in which birth and death took place.)

Name of Hospital	City and State

PART II. INFORMATION ABOUT OTHER CHILDREN

In this part, we are interested in knowing about all of the children which have ever been born to you, including the infant who died.

1. How many babies have you ever had, including the baby who died? (Count all those that were born alive to you at any time.)

☐ 1 ☐ 4 ☐ 7 ☐ 10 or more
☐ 2 ☐ 5 ☐ 8
☐ 3 ☐ 6 ☐ 9

Number

2. Were any of your children living away from you at the time of birth of the baby who died? (For example, living with relatives, etc.)

☐ No ☐ Yes

Please list below the name, sex, and date of birth of each child living away from you.

Name of Child	Sex	Date of Birth Month-Day-Year

3. Have you ever had any babies that were born dead?

☐ No ☐ Yes

How many have you ever had? Number

4. Have you ever had a miscarriage?

☐ No ☐ Yes

How many have you ever had? Number

5. Have you ever had any other children who have died? (Do not count miscarriages or babies that were born dead.)

☐ No ☐ Yes

Please list below the name, sex, date of birth and date of death of each such child.

Name of Child	Sex	Date of Birth Month-Day-Year	Date of Death Month-Day-Year

PART III. INFORMATION ABOUT YOUR FAMILY

In this part, information is asked about the members of the family who lived with you at the time of birth of the baby who died.

1. List below everyone who usually lived in your household at the time your baby was born. Be sure to list yourself, your husband (if he lived at home) as well as other children and relatives living with you. Unrelated persons who lived with you, and children who were temporarily away at school or college, should be listed. Do not include persons who lived away. (For example, do not include persons in the Armed Forces.) Also, do not include persons who were only visiting temporarily at the time your baby was born.

Enter your name on the second line; enter the name of each person who lived with you on the following lines (Last Name) (First Name)	For each person, provide the information requested below			
	Relationship to the dead child (father, sister, aunt, cousin, grandfather, lodger, etc.)	Date of Birth Month-Day-Year	Marital Status (for persons 14 years and older) Married Divorced Widowed Separated Single (never married)	Date of first marriage for each person who was ever married. Month-Day-Year
	Deceased Infant			
	MOTHER			

(IF MORE SPACE IS NEEDED, PLEASE CONTINUE ON BACK PAGE)

2. Who was the head of this household?

☐ The child's father

☐ Another person →

Name of head

3. Have you been married more than once?

☐ No ☐ Yes → Write in date of present marriage.

Month	Day	Year

4. What was the total income of your family during 1964? (Include all income such as wages, salaries, unemployment compensation, help from relatives, etc., received by all members of the family you have listed above.)

☐ None
☐ Under $1,000
☐ $1,000 - $1,999
☐ $2,000 - $2,999
☐ $3,000 - $3,999
☐ $4,000 - $4,999
☐ $5,000 - $6,999
☐ $7,000 - $9,999
☐ $10,000 - $14,999
☐ $15,000 or more

PLEASE CONTINUE ON BACK PAGE

PART IV. INFORMATION ABOUT THE INFANT'S MOTHER AND FATHER

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

☐ YES → When did you stop working before your baby was born?

☐ NO

Month	Day	Year

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

(Circle highest grade attended)

None---------- 0
Elementary---------- 1 2 3 4 5 6 7 8
High School---------- 1 2 3 4
College---------- 1 2 3 4 5 6+

2a. Did you finish this grade? ☐ YES ☐ NO

3. What was the highest grade (or year) of regular school that the child's father ever attended?

(Circle highest grade attended)

None---------- 0
Elementary---------- 1 2 3 4 5 6 7 8
High School---------- 1 2 3 4
College---------- 1 2 3 4 5 6+

3a. Did he finish this grade? ☐ YES ☐ NO

PART V. INFORMATION ON HEALTH INSURANCE

In this part, we are interested in finding out whether you were covered by health insurance at any time during your recent pregnancy. Please report on each kind of health insurance protection which you had, whether or not the insurance was used.

1. During your recent pregnancy, did you have health insurance to pay for doctor's bills for office visits or home calls?

☐ YES ☐ NO

2. Did you have health insurance to pay for hospital care at the time of delivery?

☐ YES ☐ NO

3. Did you have health insurance to pay for the doctor's bill for delivery of your baby?

☐ YES ☐ NO

PART VI. PERSON COMPLETING THIS FORM

Name of person completing this form

_____

Address

_____

Telephone Number

_____

COMMENTS

PHS-4670-15 (page 4)
Rev. 2-65

1964-1965 National Infant Mortality Survey Hospital Form

CONFIDENTIALITY has been assured the individual as published in the Federal Register May 20, 1959

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service - NCHS
Washington, D. C. 20201

Form Approved
Budget Bureau No. 68-R783

NATIONAL MORTALITY SAMPLE SURVEY - 1965

Hospital Report on Infant Death

Name of deceased infant _____ File Number _____

Date of birth _____ Date of death _____

Name of infant's mother _____

Residence of mother _____

Hospital or institution to which request directed _____

(Name) (Location)

PART I. INFORMATION ON DECEASED INFANT FROM HOSPITAL WHICH PROVIDED CARE

A. The birth of the infant: Please provide the following information about the birth of the infant if available from your records.

1. Length of pregnancy _____ completed weeks (OR: Date of last menses _____ Month, Day, Year)
2. Weight at birth _____ lb. _____ oz. (OR: _____ Grams)

B. Periods of care of the infant: Please complete a section below for each episode of care at this hospital. IF BIRTH DID NOT OCCUR IN THIS HOSPITAL, CHECK HERE ☐ and begin with episode II, below.

Periods of Care	Admitted on	Discharged on	Final Diagnoses	Operations Performed
I (Birth Episode)	Birth date	☐ CHECK IF discharge by death; OR specify date: Month _____ Day _____ Year _____	_____ _____ _____ _____ _____ _____ ☐ CHECK IF newborn without immaturity, birth injury, defect, or disease:	_____ _____ _____ _____ _____ _____ _____ Check if none ☐
II	Month _____ Day _____ Year _____	Month _____ Day _____ Year _____	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____ Check if none ☐
III	Month _____ Day _____ Year _____	Month _____ Day _____ Year _____	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____ Check if none ☐

PHS-4670-23
Rev. 2-65

PLEASE TURN PAGE

ID

PART II. CARE OF THE DECEASED INFANT IN OTHER HOSPITALS OR MEDICAL FACILITIES

According to your records or to your personal knowledge, was the deceased infant a patient in any other hospital or medical institution during its life span? (The birth episode is of particular importance, if this did not occur at your hospital.)

☐ YES ☐ No ☐ Unknown

Please list below each other hospital or institution in which the deceased infant received care.

OTHER HOSPITALS OR MEDICAL FACILITIES IN WHICH THE DECEASED CHILD WAS A PATIENT

1. Name of Hospital or Institution _____

   Street Address _____

   City or Place _____ State _____

   Approximate Discharge Date _____

2. Name of Hospital or Institution _____

   Street Address _____

   City or Place _____ State _____

   Approximate Discharge Date _____

REMARKS:

Signature of person completing this form _____

Name of this hospital or institution _____

Your position in this hospital or institution _____

PHS-4670-23 (Page 2)

○ ○ ○

☆ U. S. GOVERNMENT PRINTING OFFICE : 1973 515-212/44

VITAL AND HEALTH STATISTICS PUBLICATION SERIES

Originally Public Health Service Publication No. 1000

Series 1. Programs and collection procedures.—Reports which describe the general programs of the National Center for Health Statistics and its offices and divisions, data collection methods used, definitions, and other material necessary for understanding the data.

Series 2. Data evaluation and methods research.—Studies of new statistical methodology including: experimental tests of new survey methods, studies of vital statistics collection methods, new analytical techniques, objective evaluations of reliability of collected data, contributions to statistical theory.

Series 3. Analytical studies.—Reports presenting analytical or interpretive studies based on vital and health statistics, carrying the analysis further than the expository types of reports in the other series.

Series 4. Documents and committee reports.—Final reports of major committees concerned with vital and health statistics, and documents such as recommended model vital registration laws and revised birth and death certificates.

Series 10. Data from the Health Interview Survey.—Statistics on illness, accidental injuries, disability, use of hospital, medical, dental, and other services, and other health-related topics, based on data collected in a continuing national household interview survey.

Series 11. Data from the Health Examination Survey.—Data from direct examination, testing, and measurement of national samples of the civilian, noninstitutional population provide the basis for two types of reports: (1) estimates of the medically defined prevalence of specific diseases in the United States and the distributions of the population with respect to physical, physiological, and psychological characteristics; and (2) analysis of relationships among the various measurements without reference to an explicit finite universe of persons.

Series 12. Data from the Institutional Population Surveys —Statistics relating to the health characteristics of persons in institutions, and their medical, nursing, and personal care received, based on national samples of establishments providing these services and samples of the residents or patients.

Series 13. Data from the Hospital Discharge Survey.—Statistics relating to discharged patients in short-stay hospitals, based on a sample of patient records in a national sample of hospitals.

Series 14. Data on health resources: manpower and facilities.—Statistics on the numbers, geographic distribution, and characteristics of health resources including physicians, dentists, nurses, other health occupations, hospitals, nursing homes, and outpatient facilities.

Series 20. Data on mortality.—Various statistics on mortality other than as included in regular annual or monthly reports—special analyses by cause of death, age, and other demographic variables, also geographic and time series analyses.

Series 21. Data on natality, marriage, and divorce.—Various statistics on natality, marriage, and divorce other than as included in regular annual or monthly reports—special analyses by demographic variables, also geographic and time series analyses, studies of fertility.

Series 22. Data from the National Natality and Mortality Surveys.—Statistics on characteristics of births and deaths not available from the vital records, based on sample surveys stemming from these records, including such topics as mortality by socioeconomic class, hospital experience in the last year of life, medical care during pregnancy, health insurance coverage, etc.

For a list of titles of reports published in these series, write to:

Office of Information
National Center for Health Statistics
Public Health Service, HSMHA
Rockville, Md. 20852

DHEW Publication No. (HSM) 73-19 76
Series 22 - No. 15

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Public Health Service

HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION

5600 Fishers Lane
Rockville, Maryland 20852

OFFICIAL BUSINESS
Penalty for Private Use, $300

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF HEW

HEW 396

THIRD CLASS
BLK. RT.