Infant Mortality in Newark, New Jersey

A study of sociodemographic and medical factors

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U.S. INFANT MORTALITY RATES have fallen progressively over the last several decades. In New Jersey, also, they fell about 50 percent between 1945 and 1973 (table 1) and are now close to the U.S. rates (*1*). In contrast, in Newark, the largest city in New Jersey, the rates changed little between 1945 and 1970. Indeed, in the 1960s and early 1970s, Newark had the highest infant mortality rates of any major city in the United States. Between 1970 and 1973, however, rates in Newark for both whites and nonwhites declined, the magnitude of the decline being much greater among nonwhites (table 1). We report the results of an examination of certain sociodemographic and medical variables that might relate to the changing trends in this city.

Materials and Methods

The ethnic distribution of the population of Newark, a metropolitan industrial area of about 380,000 people, altered very dramatically between the midforties and 1970. In the midforties, approximately 90 percent of the population was white, while in 1970, 55 percent was black, 10 percent Hispanic, and 35 percent white. In addition, a greater proportion of the city's nonwhites

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Table 1. General infant mortality rates for New Jersey and Newark, with white and nonwhite rates for Newark, 1945–73

Year [1]	New Jersey	Newark		
		Total	White	Nonwhite
1945	32.1	38.1	NA	NA
1950	25.1	30.2	NA	NA
1953	23.6	29.7	21.9	40.9
1955	24.4	35.5	23.7	47.4
1960	24.5	38.3	25.3	48.0
1966	22.4	39.6	23.9	44.7
1967	22.2	42.2	26.1	45.7
1968	21.6	37.0	21.4	39.9
1969	20.2	37.8	23.9	44.7
1970	20.0	32.1	23.4	37.2
1971	18.8	34.5	22.1	40.8
1972	18.3	26.7	16.7	32.3
1973	17.2	24.6	19.8	26.0

[1] No 1974 or 1975 rates are included because 1974 and 1975 data for Newark were incomplete when the study was initiated. Also, 1974 and 1975 Newark rates are not comparable with those for 1945–73 because of changes in the definition of infant mortality.

NOTE: NA—not available.

were under the age of 25 than among nonwhites in the nation (*2*).

Using vital statistics data on magnetic tapes provided by the Division of Vital Statistics of the New Jersey State Department of Health, we analyzed all registered live births and infant deaths that took place among Newark residents between January 1, 1970, and December 31, 1973, regardless of the place of occurrence.

The sociodemographic and medical variables that we investigated were age and race of the mother, legitimacy of the birth, sex of the baby and weight at birth, and the mother's prenatal care—particularly the trimester in which prenatal care was started.

Under the definition of prematurity used in this study, all babies weighing less than 2,500 gm at birth are included without regard to gestational period, since the date of the mother's last menstrual period was not known in most cases, and an error of plus or minus 2 weeks occurs in estimates made at delivery. Henceforth, premature infants will be referred to as low-birth-weight (LBW) babies.

Study Population

In 1970 there were 37,651 white and 56,978 nonwhite 12–50 year old females in Newark (*2*). Of the white females, 10.6 percent were 12–15 years old, 33.6 percent 16–25, 27.6 percent 26–39, and 28.2 percent 40–50. Of the nonwhite females, 12.0 percent were 12–15 years old, 36.9 percent 16–25, 30.6 percent 26–39, and 20.6 percent 40–50. Between 1970 and 1973, the total Newark population decreased by 2 percent, but no estimates by age and ethnicity are available (*3*). Thus, the magnitude of error in the calculated rates, based on the 1970 population for succeeding years, would be minimal and have no significant effect on interpretation of the data.

In our analyses, the mother's race and age and baby's year of birth were the standard controlling variables, along with one other study variable for the years 1970–73. The chi square test and tests for linear trends in proportions and frequencies according to Armitage (*4*) were used.

Results

Live births, general fertility, and age-specific birth rates. In terms of general fertility rates (the number of live births per 1,000 females in the population aged 12–50 years), nonwhites had 20 to 25 percent higher rates than whites for the years 1970–73 (table 2). Between 1970 and 1973, a decline of 27 percent occurred in the white general fertility rates and a decline of 19 percent in the nonwhite. In the 12–15 year age group, birth rates among nonwhites during this period were four to five times higher than among whites. Furthermore, in the 16–25 year age group, nonwhites continued to experience higher birth rates than whites (about 30 percent higher). After age 25, the racial difference in age-specific birth rates narrowed considerably, the rates for whites even being higher in certain years than those for nonwhites (table 2). Data not included in table 2 showed a preponderance of female births among both whites and nonwhites up to age 25, whereas the reverse was true after that age.

Low-birth-weight babies. LBW babies are known to be the major factor in infant mortality (*5,6*). A matched-pair study in 1969 of the causes of infant mortality in Newark showed that 25 percent of infant deaths were due to accidents and unattended infections at home, and the rest could mainly be ascribed to low birth weight. The study cases and the control cases were matched for mother's age, parity, ethnicity, and education and for baby's sex and the hospital of delivery (personal communication from Dr. Ann Browder, School of Public Health and Community Medicine, University of Washington, Seattle, 1972).

Among nonwhites in Newark, the total number of LBW babies was 3.5 times greater than among whites, the rate of LBW babies per 1,000 females of childbearing age in the population was 2.3 times greater, and the percentage of LBW babies among live born infants was 1.8 times greater. However, as table 3 shows, the differences in the trend for these parameters for whites over time were not statistically significant (*4*).

Among nonwhites, LBW rates were three to six times higher than among whites in the 12–15 year age group and two to three times higher in the 16–25 and 26–39 year age groups, but almost the same in the 40–50 year age group. Time-trend analysis showed a decline between 1970 and 1973 in LBW babies for both whites and nonwhites in all age groups ($P = 0.05$) except for the group 12–15 years. However, the magnitude of the decline was not statistically different between whites and nonwhites. The age-specific decline in LBW rates reflected the overall decrease in fertility, but there was no change in the proportion of LBW babies among live-born infants. And LBW babies, who contribute significantly to infant mortality, were born more frequently to nonwhites than whites in Newark (table 3).

LBW and infant deaths. Although in 1972 and 1973, low birth weights were more than twice as common in Newark in nonwhite babies as in white, the LBW white baby had a substantially increased risk of dying as

compared with the nonwhite baby. The following table shows the ethnic differences in mortality rates (deaths per 1,000 live-born infants) for Newark LBW infants dying under 1 week of age and under 1 year of age in the period 1970–73.

Year	*LBW infants dying under 1 week of age*		*LBW infants dying under 1 year of age*	
	White	*Nonwhite*	*White*	*Nonwhite*
1970	136.6	161.4	215.8	243.2
1971	174.9	168.3	266.2	257.0
1972	142.2	122.6	204.4	210.0
1973	152.0	107.6	253.3	181.0

Time-trend analysis showed no significant decline between 1970 and 1973 in the death rates of white babies under 1 week and under 1 year of age. However, for nonwhite infants, a statistically significant decline was noted in deaths under 1 week ($P = 0.01$) and deaths under 1 year ($P = 0.05$). This relatively marked decreased risk of death among nonwhite LBW babies as compared with white is similar to that reported by Berger and associates (*7*).

Illegitimacy rates. Among both whites and nonwhites, illegitimacy rates decreased with an increase in the mothers' ages (table 4); the percentage of decrease was about the same for both groups. Time-trend analysis for total illegitimate births showed no significant change between 1970 and 1973 for whites, but a significant increase for nonwhites ($P = 0.05$). Indeed, in 1973, about four of seven live births among nonwhites were illegitimate, compared with one of seven among whites. Further analysis showed that among nonwhites as compared with whites, illegitimacy rates were 1½ times higher in the 12–15 year age group and 2 to 3 times higher in all other age groups. Practically all births among the 12–15 year old nonwhites were illegitimate.

Prenatal care and low birth weight. Prenatal care is believed to have a profound impact on the outcome of pregnancy. Both the start of prenatal care in relation to time of conception and the number of visits for such care are considered critical (*8*). Table 5 shows that between 1970 and 1973 the percentage of whites of all age groups who delivered LBW or normal-weight infants without having had prenatal care or whose prenatal care status was unknown declined substantially. In general, a greater percentage of white females who delivered normal-weight babies received prenatal care in the first two trimesters of pregnancy in the years 1970–1973 than those who delivered LBW infants. Conversely, a smaller proportion of white females who delivered normal-weight babies were in the no-prenatal-care or prenatal-care-not-recorded categories. The data for nonwhites were harder to interpret because the status of prenatal care of a higher percentage was unknown. Apparently, however, a greater percentage of the nonwhite Newark residents who delivered infants of normal birth weight and low birth weight in 1973 had received prenatal care in the first two trimesters of their pregnancies than of those who delivered in 1970.

Table 2. Total live births and birth rates for white and nonwhite Newark residents, by age group of mothers, 1970–73

Age group of mothers, births, and rates [1]	*1970*	*1971*	*1972*	*1973*
		White		
12–50				
Live births	3,323	3,162	2,758	2,426
Birth rate	88.3	84.0	73.3	64.4
12–15				
Live births	43	30	39	26
Birth rate	10.7	7.5	9.7	6.5
16–25				
Live births	1,954	1,884	1,611	1,392
Birth rate	154.6	149.1	127.5	110.1
26–39				
Live births	1,253	1,185	1,079	980
Birth rate	120.6	114.0	103.8	94.3
40–50				
Live births	73	63	29	28
Birth rate	6.9	5.9	2.9	2.6
		Nonwhite		
12–50				
Live births	6,155	5,719	5,036	4,837
Birth rate	108.0	100.4	88.4	88.9
12–15				
Live births	247	237	228	229
Birth rate	36.2	34.7	33.4	33.6
16–25				
Live births	4,013	3,735	3,303	3,219
Birth rate	190.9	177.7	157.1	153.1
26–39				
Live births	1,822	1,694	1,452	1,343
Birth rate	104.7	97.3	83.4	77.2
40–50				
Live births	73	53	53	46
Birth rate	6.2	4.5	4.5	3.9

[1] Births per 1,000 females in the respective age group, ethnic group, and year.

NOTE: The number of live births and the birth rates are based on all births to Newark residents, regardless of the place of birth.

Table 3. Low-birth-weight (LBW) babies, by age and ethnic group of mothers, Newark residents, 1970–73

Age group of mother and measures of LBW	1970	1971	1972	1973
	White			
12–50				
LBW babies	280	263	225	204
LBW rate	7.4	7.0	5.9	5.4
Percent of live born	8.4	8.3	8.1	8.4
12–15				
LBW babies	5	4	6	0
LBW rate	1.2	1.0	1.5	0.0
Percent of live born	11.6	13.3	15.4	0.0
16–25				
LBW babies	168	161	135	120
LBW rate	13.3	12.7	10.7	9.5
Percent of live born	8.6	8.5	8.4	8.6
26–39				
LBW babies	96	91	81	80
LBW rate	9.2	8.7	7.8	7.7
Percent of live born	7.7	7.7	7.5	8.2
40–50				
LBW babies	11	7	3	4
LBW rate	1.0	0.7	0.3	0.4
Percent of live born	15.1	11.1	10.3	14.3
	Nonwhite			
12–50				
LBW babies	954	891	775	734
LBW rate	16.7	15.6	13.6	12.9
Percent of live born	15.5	15.6	15.4	15.2
12–15				
LBW babies	51	51	33	43
LBW rate	7.5	7.5	4.8	6.3
Percent of live born	20.6	21.5	14.5	18.8
16–25				
LBW babies	636	600	521	491
LBW rate	30.3	28.5	24.8	23.4
Percent of live born	15.8	16.1	15.8	15.2
26–39				
LBW babies	253	232	206	192
LBW rate	14.5	13.3	11.8	11.0
Percent of live born	13.8	13.7	14.2	14.3
40–50				
LBW babies	14	8	15	8
LBW rate	1.2	0.7	1.3	0.7
Percent of live born	19.2	15.1	28.3	17.4

NOTE: The rates represent the number of LBW babies born to Newark residents in the respective year per 1,000 female residents of childbearing age in the respective age group, by ethnicity. The percentages are based on the total live births in the respective year to residents in the respective age group, by ethnicity. The numbers, rates, and percentages are based on the total births to Newark residents in the respective category, regardless of the place of birth.

Weight distribution of babies. Table 6 shows the percentage distribution by weight of all babies born in the years 1970–73 to white and nonwhite Newark residents, regardless of where the birth occurred. Time-trend analysis showed no statistically significant change ($P = <0.05$) in the frequency distribution of either white or nonwhite babies between 1970 and 1973 for any of the weight categories. Thus, the weight of babies, per se, was not a major contributing factor in the decline in infant mortality observed between 1970 and 1973.

Infant mortality by place of death. Newark's population has changed with time, as have the medical institutions providing its care. In 1971 and 1972, newborn intensive care units affording specialized care for high-risk newborns were established in Newark at the Beth Israel Medical Center, United Hospitals, and the Martland Hospital (three of the four major hospitals in the city). Because Newark residents deliver at hospitals both in Newark and surrounding communities, we sought to determine whether place of death was a significant factor in the reduced infant mortality among nonwhites.

Because the three intensive care centers became fully operational only in 1972, a mortality breakdown by weight of the baby at the time of admission was unavailable. Furthermore, the proportion of high-risk infants admitted to these centers could not be ascertained from the available data. Therefore, we had to use the total infant mortality experience for Newark for our analysis.

Table 4. Percentages of total live births to Newark white and nonwhite residents that were illegitimate, by age group of mother, 1970–73

Ethnic and age group of mother	1970	1971	1972	1973
White				
12–50	14.2	14.9	14.8	15.1
12–15	62.8	70.0	53.8	65.4
16–25	18.0	18.1	16.9	17.4
26–39	7.0	8.9	10.5	10.7
40–50	8.2	4.8	6.9	10.7
Nonwhite				
12–50	47.2	51.1	54.9	57.8
12–15	98.8	98.7	97.4	97.4
16–25	53.7	57.5	61.8	64.8
26–39	27.1	31.1	33.6	35.2
40–50	19.2	24.5	28.3	28.3

NOTE: The percentages are based on the total live births in the respective year to Newark residents of the respective ethnic and age group, regardless of the place of birth.

There was no statistically significant change between 1970 and 1973 in the proportion of total infant deaths of either white or nonwhite Newark residents that could be accounted for by deaths occurring in Newark (table 7). The chi square test and time-trend analyses of infant mortality between 1970 and 1973 showed no statistically significant change among whites. However, among nonwhites, as already noted, the chi square test showed highly significant declines between 1970 and 1973 ($P = <0.001$), as did time-trend analysis ($P = 0.001$).

Table 5. Percentage distribution of infants born to white and nonwhite Newark residents, by age group of mother, prenatal care, and birth weight, 1970–73

Age group of mother and trimester of pregnancy care began	1970		1971		1972		1973	
	LBW	NBW	LBW	NBW	LBW	NBW	LBW	NBW
White								
12–15								
No care or NR	0.0	15.8	25.0	34.6	16.7	18.2	0.0	3.8
1st	100.0	57.9	25.0	46.2	16.7	39.4	0.0	34.6
2d	0.0	18.4	25.0	15.4	50.0	30.3	0.0	38.5
3d	0.0	7.9	25.0	3.8	16.7	12.1	0.0	23.1
16–25								
No care or NR	20.6	14.4	16.8	11.9	18.0	8.5	8.1	7.8
1st	50.3	61.6	50.9	61.0	52.6	58.7	47.6	61.9
2d	20.6	14.9	23.6	17.1	21.0	24.9	26.6	21.7
3d	8.5	9.1	8.7	10.0	8.3	7.9	12.9	8.6
26–39								
No care or NR	27.4	14.7	13.5	10.0	14.3	7.5	12.6	7.9
1st	58.9	65.2	65.2	69.9	61.0	63.6	60.8	69.2
2d	12.6	14.9	14.6	15.1	22.1	23.7	17.7	19.8
3d	7.4	5.2	6.7	4.9	2.6	5.1	8.9	3.1
40–50								
No care or NR	0.0	17.7	14.3	12.5	0.0	3.8	25.0	8.3
1st	100.0	69.3	71.4	73.0	0.0	46.1	25.0	62.5
2d	0.0	4.8	14.3	10.4	100.0	46.1	50.0	29.2
3d	0.0	8.1	0.0	5.3	0.0	3.8	0.0	0.0
Nonwhite								
12–15								
No care or NR	45.1	43.9	54.9	44.1	34.4	65.5	30.2	20.4
1st	25.5	18.4	11.8	18.8	18.8	10.9	18.6	18.8
2d	15.7	22.4	21.6	18.8	28.1	16.4	25.6	36.0
3d	13.7	15.3	11.8	18.3	18.8	10.9	25.6	24.7
16–25								
No care or NR	40.1	26.7	38.7	67.1	34.5	60.8	30.4	22.0
1st	17.5	21.9	21.1	11.4	20.9	12.5	25.9	34.1
2d	24.3	30.8	24.1	12.9	26.4	15.8	27.9	29.8
3d	17.3	20.6	16.0	8.6	18.2	10.9	15.8	14.1
26–39								
No care or NR	39.3	26.4	40.0	71.1	35.3	22.9	33.5	25.3
1st	25.0	31.4	29.1	14.0	33.3	42.5	34.6	40.5
2d	21.8	27.7	23.2	11.2	23.0	23.0	23.6	26.2
3d	13.9	14.5	7.7	3.7	8.3	11.6	8.4	8.1
40–50								
No care or NR	35.7	27.1	12.5	50.0	21.4	26.3	0.0	25.3
1st	21.4	22.0	12.5	7.1	28.6	31.6	62.5	39.5
2d	28.6	32.2	50.0	28.6	28.6	34.2	37.5	28.9
3d	14.3	18.6	25.0	14.3	21.4	10.5	0.0	5.3

NOTE: LBW—low birth weight; NBW—normal birth weight; NR—not recorded. Because of rounding, the 4 percentages for the 4 categories of prenatal care may not add to 100 for each group of infants classified by age group of mother, birth-weight category, and year of birth.

Discussion

Low birth weight is the single most important risk factor in neonatal mortality, accounting for 65 to 75 percent of all neonatal deaths (*6,9*). For LBW infants the risk of death is 34 to 37 times greater than that of normal-birth-weight infants (*9*). Furthermore, Chase's New York data (*10*) and the studies of Susser and associates (*5*) show that birth weight is a good predictor of perinatal mortality. Birth weight, rather than duration of pregnancy, has been unequivocally demonstrated to be the major factor in perinatal mortality. For example, multiple regression analyses have shown that birth weight contributes 90 percent or more to the variance in perinatal mortality, whereas fetal age contributes no more than 5 percent, and the interaction between birth weight and fetal age contributes only 2 to 3 percent (*5*). Such data strengthen the hypothesis that birth weight may be the crucial intervening variable between the circumstances of pregnancy and mortality.

Table 6. Percentage distribution of babies born to Newark white and nonwhite residents, by weight 1970–73 [1]

Birth weight of babies (gm)	Percent of babies in ethnic group born in—			
	1970	1971	1972	1973
White				
Less than 1,500	0.9	1.2	0.7	1.2
1,501–2,000	1.6	1.3	1.9	1.4
2,001–2,500	5.7	5.4	5.7	6.1
2,501–3,000	20.6	21.7	20.7	19.2
3,001–3,500	38.9	39.5	39.3	40.5
3,501–4,500	31.2	30.0	30.2	30.2
4,501 and over	1.2	0.9	1.6	1.2
Nonwhite				
Less than 1,500	3.2	3.0	2.8	2.2
1,501–2,000	3.2	3.5	2.9	3.3
2,001–2,500	9.8	8.8	10.1	10.0
2,501–3,000	26.6	27.0	27.5	25.7
3,001–3,500	36.6	37.1	37.5	37.5
3,501–4,500	20.1	20.1	18.7	20.6
4,501 and over	0.6	0.6	0.5	0.6

[1] Includes babies born to Newark residents both in and outside of Newark. Percentages for ethnic group for a calendar year may not add to 100 because of rounding.

Table 7. Total infant mortality among Newark residents and infant mortality based only on deaths occurring in Newark, 1970–73

Deaths of Newark residents and mortality rates	1970	1971	1972	1973
White infants				
Total deaths	78	70	46	48
Mortality rate	23.4	22.1	16.7	19.8
Deaths in Newark	65	61	36	37
Percent of total white infant deaths	83.3	87.1	78.2	77.1
Mortality rate	19.6	19.3	13.1	15.3
Nonwhite infants				
Total deaths	233	234	163	126
Mortality rate	37.2	40.8	32.3	26.0
Deaths in Newark	219	220	154	117
Percent of total nonwhite infant deaths	94.0	94.0	94.4	92.8
Mortality rate	35.6	38.5	30.6	24.2

A series of interrelated social problems, including poverty, poor nutrition, low educational level, inadequate hygiene, crowded homes, illegitimacy, and lack of prenatal care, have generally been associated with an increased incidence of LBW infants and of infant mortality (*10*). The role of some of these factors (for example, illegitimacy) as independent variables, however, is not settled (*10–13*).

The incidence of low birth weight is inversely related to social class in all nations, irrespective of race (*11*). As a discriminator of obstetric performance, social class has remained surprisingly sensitive. A social class V (lowest class) mother, for example, is more at risk of having LBW infants than is her contemporary in social classes I and II (highest classes). A substantially higher proportion of nonwhites than of whites in Newark are found in social classes IV and V; about 65 percent of the nonwhite households have incomes of less than $7,000 per year, compared with 35 percent of the white households (*3*). Lower socioeconomic levels, coupled with lower educational levels, could contribute considerably to the much higher LBW and infant mortality rates among nonwhites, although the specific mechanisms through which these factors operate is currently unclear.

In Newark, the rates of LBW babies for nonwhite women of all ages were very high; in contrast, among whites, high rates were found only for very young women and older women—a result similar to that reported by Wallace (*12*). As noted in other studies (*5,10*), the large number and high rate of LBW babies among nonwhites undoubtedly contributed significantly to their high infant mortality rates.

Illegitimacy, which has been strongly associated with LBW babies (*13*), was two to three times greater in Newark among nonwhites of all ages than among whites. Indeed, among nonwhites, 58 percent of all births in 1973 in Newark were illegitimate, compared with 15 percent of those among whites. Furthermore, the proportion of illegitimate births among total nonwhite births increased considerably between 1970 and 1973. Despite this increase, nonwhite LBW rates have not changed. Yet infant mortality rates for nonwhites have fallen, a fact suggesting that illegitimacy per se may play

only a limited role in both fetal weight and infant mortality. Keller, in a recent study, also questions the independent role of illegitimacy in neonatal mortality (*14*).

Illegitimate births as a proportion of total births to white Newark residents increased only slightly between 1970 and 1973. The pattern of illegitimacy among Newark whites, unlike that among nonwhites, differed only slightly from that for the U.S. population as a whole, for which illegitimacy rates for all age groups over 20 years have declined, having increased only among females 15–19 years old (*15*).

In any case, among nonwhites, but not among whites, a significant decline in infant mortality was noted between 1970 and 1973. This decline cannot be attributed to a reduced rate of LBW babies, changes in the proportion of babies born to mothers in unfavorable age groups, changes in illegitimacy rates, or changes in the percentage distribution of weights at birth. The decline in infant mortality among nonwhites occurred without significant changes in many of the risk factors.

Possibly the lowered general fertility rate in Newark removed from later nonwhite birth cohorts those mothers whose babies could be at high risk of infant mortality. Furthermore, among nonwhites, improvements in housing or nutrition (*3,20*), changes in socioeconomic status (*21*), in the health delivery systems (*22*), or in family planning (*23*) may have influenced the results, since each of these factors may affect infant mortality rates (*3,20,21*). However, if these were major factors, they would likely be reflected either in a lowered frequency of LBW babies or in an increase in the mean birth weight, and neither of these things happened.

The role of prenatal care in the decline of infant mortality between 1970 and 1973 is hard to interpret because of the large number of women delivering both LBW and normal-weight infants for whom the status of prenatal care is unknown. The percentage of such women, however, declined between 1970 and 1973, particularly among whites. It may well be that the proportion of nonwhites receiving prenatal care actually increased during the period and that such care affected the survival of nonwhite infants. However, if increased prenatal care did affect survival, it did so without changing the distribution of weights among newborns. The notion that routine prenatal care will reduce the rate of LBW babies and thus lower infant mortality may be too facile (*7,16*). Indeed, under controlled conditions, a high-protein, high-caloric supplement during pregnancy has not been associated with beneficial intrauterine effects (*17,18*). Possibly, of course, the quality of prenatal care improved between 1970 and 1973, for example, because of fetal monitoring (*19*); or an increase in the mean gestational period may have occurred that favorably influenced infant mortality, even though the pattern of weight distribution among newborns did not change.

Newborn intensive care units have been found to reduce infant mortality (*16,24,25*). This was the case among Newark nonwhites between 1970 and 1973, the major decline in infant mortality being noticed within 1 week of birth. However, the smaller decline in infant mortality among whites appears to suggest that factors other than these intensive care units contributed to the nonwhite decline. Indeed, the nonwhite LBW infants experienced a lower mortality than the white, a result previously reported by others (*7,26*). It seems likely that whites have always had more ready access to competent postnatal care in Newark, even in the absence of intensive care units, whereas nonwhites have achieved access to such care only in the last few years. Thus, nonwhites would show a greater benefit from the combined effects of better care and the simultaneous availability of postnatal intensive care units.

In 1974, Sweden's infant mortality rate was 9.2, Finland's was 10.1, and the Netherlands' was 11.0, and the associated LBW rates were 4 to 5 percent (*27*). These rates are substantially below those for whites both in Newark and in the United States. It seems to us that in Newark, better care shortly before, during, and after delivery would virtually equalize nonwhite and white infant mortality rates. The preliminary data from 1974 and 1975 indicate that the infant mortality rate in Newark has continued to decline and that the infant mortality gap between whites and nonwhites has been further reduced. The Scandinavian data suggest that what is needed now in Newark and throughout the United States is an intensive focus on the causes of low birth weight. There is growing evidence that in the United States, neither prenatal care per se, nor protein-caloric supplementation, will necessarily significantly affect birth weights (*8,17,18,27*). If this is so and if low birth weight accounts for most neonatal deaths, then, at present, infant mortality rates can only be reduced to a certain degree by conventional postnatal and prenatal care. Additional reductions will be achieved only when the factors leading to low birth weight are more precisely defined and corrected.

Two case-control studies (*28,29*) recently reported from our Department of Preventive Medicine and Community Health showed that at parturition, the levels of blood vitamins (B complex, A, and C) were similar in mothers of normal-weight infants and of low-birth-weight infants. The cord blood vitamins and trace metal levels of LBW infants were like those of infants of normal weight except for significantly lower folate, B_{12}, pantothenate, calcium, and iron. It would be interesting to see whether specific prenatal supplementation with

these nutrients would reduce the incidence of low-birthweight babies.

Summary

Newark, a metropolitan industrial town, experienced the highest infant mortality of any major city in the United States in the 1960s and early 1970s. Between 1970 and 1973, however, infant mortality among nonwhites in this city declined strikingly. This decline could not be directly related to declines (*a*) in birth rates, (*b*) in the proportions of babies of low birth weight, (*c*) in the proportions of babies born to mothers in unfavorable age groups, (*d*) in the general fertility rates, or (*e*) in the illegitimacy rates. The decline may have been related (*a*) to the removal from childbearing cohorts of the group of females in the population—as yet undefined—whose babies would have been at high risk of infant mortality, (*b*) to the falling birth rate, (*c*) to better or more frequent prenatal care, (*d*) to better postnatal care—or to all of these factors. The study data suggest a multifactorial basis for the precipitous decline and also suggest that further major reductions in infant mortality among both nonwhites and whites will require better definition of the causes of low birth weight.

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