A Closer Look At Race Differentials In California's Infant Mortality, 1965-67

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TWO CONCERNS within the California State department of Public Health have prompted a review of race differentials in California's infant mortality as measured by the State's vital statistics.

The first concern is the strikingly low infant death rates for Americans of Chinese and Japanese descent, which have long been noted in the available vital statistics for both California and the United States. Their 1967 rates (table 1) are among the lowest recorded in the world today, yet little effort has been made to explain them. Of the U.S. live births, 44 percent of the Chinese and 40 percent of the Japanese are in California. If the low infant death rates among the oriental races are valid, it is desirable for epidemiologists in the State bureau of maternal and child health to examine California's vital data with particular attention to socioeconomic, demographic, and cause-of-death variables.

The second concern is that although the U.S. infant death rates show American Indians to be at high risk, California's rates for American Indians in the 1960's were low. In 1967 the infant death rate for Indians in California was even lower than for the Chinese and Japanese Americans (table 1). The State has a resident Indian population estimated to be in excess of 100,000, of which more than half live in urban areas. The bureau of maternal and child health administers a rural Indian health project and is organizing an urban project. There is need for reliable health indexes, including infant mortality rates, for the Indian population in the State.

Infant losses are represented by the infant death rate in its commonly used form, which is the ratio of registered deaths of infants during a specified period to the live births registered during the same period—referred to subsequently in this paper as the conventional rate. The numerator and denominator of this rate are obtained from two separate sets of records, and rates can be derived only for characteristics that appear in both records, such as place of residence, color or race, and sex.

Recently, a new look at the validity of California's conventional rate of infant deaths by race

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Table 1. Conventional [1] infant death rates per 1,000 live births, by race, California and United States, 1967

Race	California	United States
All races	19.6	22.4
White	18.8	19.7
Negro	30.1	37.5
Indian [2]	11.1	30.8
Chinese	15.8	9.5
Japanese	13.2	10.7
Other races	6.8	15.9

[1] Ratio of infant deaths to live births, 1967, by place of residence.
[2] Includes infant deaths among Aleuts and Eskimos.
SOURCES: References 3 and 4.

was made possible when the State's department of public health linked live birth and infant death records on computer tape for 1965 through 1967. These combined records permitted the following analyses:

1. With the race variable from the records of both live births and infant deaths available on computer tape, comparison could be made of the number of infant deaths coded to one race on the birth record and to another race on the death record.

2. A direct measure of the probability of infant loss could be obtained by deriving cohort mortality rates that follow the mortality experience of a particular group (cohort) of infants (for example, those born in 1967) from birth to 1 year of age in successive calendar years. By using the race variable from the birth record in both the numerator and denominator of the rate, any effect on the rate caused by inconsistencies between the birth and death records concerning race could be avoided.

Our purpose is to present the results of a cross-classification of race codes on live birth and death records for infant deaths and to comment on the reasons for the differences found. We also present conventional and cohort infant mortality rates, by race and age at death, that show substantial differences between these rates for the nonwhite races other than Negro. These differences in rates result mainly from differences in the reporting of race on the birth and death records.

Comparison of Race Classification

Results from the comparison of race codes on live birth and death records for 20,464 infants born in California in 1965 through 1967 are shown in table 2. For infants with one or both parents coded American Indian on the birth record, 60.8 percent were coded white on the death record; similarly, 39.2 percent of the Japanese and 13.7 percent of the Chinese were coded white. To understand why there are differences in the coded statistical variable for race of infant derived from California's birth and death records, it is necessary to consider both the registration practices and applicable coding rules.

Birth record. In California the attending physician is legally responsible for obtaining the personal data on the birth record, but this responsibility is usually assumed by others on the hospital staff. Two items of information are requested on the birth record: color or race of mother and

Table 2. Comparability of race coded on linked birth-infant death records, California, 1965–67 birth cohort

Race coded on death record	Race coded on birth record						
	Total	White	Negro	Indian	Chinese	Japanese	Other
Number infant deaths, all races	20,464	16,801	2,885	148	117	240	273
White	17,209	16,752	88	90	16	94	169
Negro	2,831	30	2,796	3	0	1	1
Indian	61	5	1	54	0	0	1
Chinese	100	1	0	0	97	0	2
Japanese	151	2	0	0	1	137	11
Other races	112	11	0	1	3	8	89
Percentage distribution, all races	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White	84.1	99.7	3.0	60.8	13.7	39.2	61.9
Negro	13.8	.2	96.9	2.0	.....	.4	.4
Indian	.3	(1)	(1)	36.5	.....	.....	.4
Chinese	.5	(1)	.....	.....	82.9	.....	.7
Japanese	.7	(1)	.....	.....	.9	57.1	4.0
Other races	.5	(1)	.....	.7	2.6	3.3	32.6

[1] Less than 0.1 percent.

color or race of father. The mother of the child usually responds to these questions.

The coding rules used by the State public health department's bureau of vital statistics registration to determine the race classification of births are essentially the same as those used by the National Center for Health Statistics in preparing national vital statistics. The instructions contain these provisions:

1. The race of the mother and father are determined separately according to the following rules:

a. If the racial entry is a mixture of white with any other race, the nonwhite race is coded

b. If the racial entry is a mixture of Negro with any other race, Negro is coded

c. If the racial entry is oriental or Mongolian or similar, the name and birthplace are used to determine the correct race

d. If the racial entry is an Indian tribe (appropriate lists are provided), the race is coded American Indian

2. The race of the child is determined by applying rules 1*a* and 1*b* to the combination of race classifications of the parents.

3. If the parents are of two different nonwhite races other than Negro, the child is coded to the race of the father.

Death record. The death record carries an item on color or race of decedent, in this instance the infant. The funeral director is responsible for completing those parts of the record that call for personal information about the deceased. The informant may be the mother, father, or someone else who has knowledge of the facts. The entry for color or race of decedent is coded according to rules 1*a* through 1*d* stated for births.

In California the local registrars have instructed hospital personnel and funeral directors to accept the response of the informant to the questions concerning color or race on the vital records. Further, if color or race is stated to be "white" or "Caucasian," the State coders accept this entry for race without further corroboration or review of name or birthplace.

Circumstances that could increase the likelihood of differences in the recorded race became evident in reviewing copies of 60 matched records in which the infant was coded Chinese, Japanese, or Indian on the birth record and white on the death record. Of these, a high proportion had the following characteristics: (*a*) 73 percent showed that parentage was mixed white and nonwhite and (*b*) 63 percent showed that the mother was the respondent on the birth record and the father on the death record.

Conventional and Cohort Rates

California's conventional and cohort infant mortality rates, by race and age at death for the years 1965–67, are shown in table 3. A 3-year period was used to provide stability in the rates for the less populous racial groups. The conventional rates in table 3 were adjusted for the changing numbers of births, according to the procedures described by Moriyama and Greville (*1*), but this did not change any rate by more than 0.1 per 1,000 live births.

The accuracy of the cohort infant mortality rate

Table 3. Live births and infant, neonatal, and postneonatal death rates per 1,000 live births, by race, derived by conventional and birth cohort methods, California, 1965–67

Race	Live births [1]	Infant death rate [2]		Neonatal death rate [3]		Postneonatal death rate [4]	
		Conventional [5]	Cohort [6]	Conventional	Cohort	Conventional	Cohort
All races	1,029,764	20.8	20.6	15.4	15.4	5.5	5.2
White	897,248	19.9	19.3	14.8	14.5	5.2	4.9
Negro	95,541	32.1	32.3	23.2	23.9	9.1	8.6
Indian	5,243	13.9	29.0	6.6	16.6	7.4	12.6
Chinese	7,527	12.9	16.1	9.3	11.8	3.6	4.3
Japanese	11,062	13.6	22.0	10.8	18.0	2.9	4.0
Other races	13,143	9.1	21.3	6.5	16.1	2.6	5.3

[1] Live births occurring in California.

[2] Infant deaths, 0 through 11 months per 1,000 live births.

[3] Neonatal deaths under 28 days per 1,000 live births.

[4] Postneonatal deaths 28 days through 11 months per 1,000 survivors of 28 or more days.

[5] Ratio of infant deaths to live births in 1965–67, adjusted for changing number of births by method described in reference 1.

[6] Rate computed by using estimate of complete followup (table 4) in numerator.

Table 4. Number and percentage distribution of infant deaths, by type of record, race, and age at death, California, 1965–67 birth cohort

Race and age at death	Estimated total with complete followup	Number of infant deaths			Percentage distribution		
		Linked records	Unlinked records [1]	Estimated delayed registration [2]	Linked records	Unlinked records	Estimated delayed registration
All races	21,163	20,464	407	292	96.7	1.9	1.4
Under 28 days	15,850	15,368	322	160	97.0	2.0	1.0
28 days-11 months	5,313	5,096	85	132	95.9	1.6	2.5
White	17,281	16,802	245	234	97.2	1.4	1.4
Under 28 days	12,982	12,687	184	111	97.7	1.4	.9
28 days–11 months	4,299	4,115	61	123	95.7	1.4	2.9
Negro	3,086	2,884	160	42	93.5	5.1	1.4
Under 28 days	2,281	2,112	136	33	92.6	6.0	1.4
28 days–11 months	805	772	24	9	95.9	3.0	1.1
Indian	152	148	1	3	97.4	.6	2.0
Under 28 days	87	83	1	3	95.4	1.2	3.4
28 days–11 months	65	65	0	0	100.0	.....	.....
Chinese	121	116	1	4	95.9	.8	3.3
Under 28 days	89	84	1	4	94.4	1.1	4.5
28 days–11 months	32	32	0	0	100.0	.....	.....
Japanese	243	241	0	2	99.2	.....	.8
Under 28 days	199	197	0	2	99.0	.....	1.0
28 days–11 months	44	44	0	0	100.0	.....	.....
Other races	280	273	0	7	97.5	.....	2.5
Under 28 days	212	205	0	7	96.7	.....	3.3
28 days–11 months	68	68	0	0	100.0	.....	.....

[1] Race taken from death certificate.

[2] Race and age estimated on basis of proportions found in special study of delayed registration for 1968 cohort.

depends on the successful linking of records and the completeness of registering both live births and infant deaths. Reasons for failure to identify deaths before 1 year of age in a cohort of live births have been discussed in considerable detail by Chase (*2*) in her study of infant mortality from linked records for the 1960 live birth cohort in the United States, and they need not be repeated here.

For the California 1965–67 live birth cohort, followup of infant deaths is estimated to be 96.7 percent complete (table 4). Another 1.9 percent of identified infant death records showed that the births were in California during the study period, but they have not yet been matched with the birth records. An estimated 1.4 percent of infant deaths were not identified because they were registered 15 to 24 months after the end of the study period and the records were not available when the linked computer tape files were assembled. This estimate of missed records is based on a special study of the delayed registration of infant deaths for the 1968 birth cohort. The number of infant deaths that are not recorded in the vital statistics system at any time is unknown, but it is thought to be small. The cohort rates in table 3 were computed by using an estimate of the complete followup of infant deaths (table 4) in the numerator.

Cohort neonatal and infant mortality rates for the Chinese and Japanese are considerably higher than the conventional rates. The Japanese, instead of having a very favorable outcome of pregnancy, have higher cohort rates than the whites. The Chinese cohort rates are higher than the conventional rates, but remain the lowest of any racial group. Neonatal and postneonatal rates for the Indian cohort are greater than for the whites; the postneonatal rate is greater by 2.5-fold.

Discussion

The reasons for the inconsistencies in reporting of race on the vital records are complex. There are differences in the questions asked, in the settings in which the questions are asked, and sometimes different persons respond to the questions. Consistency is further complicated because mixed white-nonwhite parentage is involved to a considerable degree, and the personal wishes of the mother and father in responding to the color or race questions are respected. Cohort infant mortality rates derived from linked live birth-infant death records with the race variable from the birth

record avoid the problem of inconsistent reporting.

For California, the cohort mortality rates show a more valid relationship between racial groups. The infant mortality rate for Japanese Americans is not as low as originally indicated; however, the favorable outcome of pregnancy for Chinese Americans contrasts strongly with the adverse experience of Negroes and American Indians. Assessing the association between biological, medical, and social factors and infant mortality in these contrasting groups is important.

California's vital statistics data offer increasingly better opportunities for detailed examination of infant mortality in racial and ethnic groups. Besides providing for more accurate data on the race variable, the linkage of records of live births and infant deaths makes available for study a number of additional variables, such as mother's age, order of birth, birth weight, length of gestation, interval between births, legitimacy, and occupation of father. Spanish surname of the child is coded by computer program—21 percent of the white babies born in California have a Spanish surname.

Other variables which will be available when the 1970 birth cohort is linked to infant deaths are (*a*) the race of the mother and the father separately, (*b*) the birthplace of the mother, and (*c*) the census tract of the mother's residence in metropolitan areas. Study of birth cohorts for 3 to 5 years will permit considerable partitioning of these characteristics for the less numerous racial and ethnic groups. More detailed studies of the association of various factors with the infant and perinatal mortality in racial and ethnic groups will be made with the California data.

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In California's conventional rates of infant deaths by race, which are derived from two independent records of live births and deaths, the loss of infants with Chinese, Japanese, and Indian parentage has been greatly underestimated. This low estimate resulted from a significant discrepancy between reporting of race on the birth and death records. Some infants coded as white from responses to the item of color or race of decedent on the death record were classified as nonwhite on the birth record from the responses to color or race of mother and color or race of father.

This problem is avoided in cohort mortality rates by race derived from linked live birth-infant death records where the race variable is from the birth record.

Cohort neonatal and infant mortality rates calculated for 1965–67 births are higher than the conventional rates for the nonwhite races other than Negro. For example, the cohort and conventional infant death rates per 1,000 live births for Japanese are 22.0 and 13.6; for Chinese, 16.1 and 12.9; and for Indians, 29.0 and 13.9.