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An Evaluation of California's Inferred Birth Statistics for Unmarried Women

The quality and reliability of birth statistics for unmarried women based on inferential data are evaluated in this methodological study.

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Symbols

- - -	Data not available
. . .	Category not applicable
-	Quantity zero
0.0	Quantity more than zero but less than 0.05
Z	Quantity more than zero but less than 500 where numbers are rounded to thousands
*	Figure does not meet standards of reliability or precision

An Evaluation of California's Inferred Birth Statistics for Unmarried Women

by Beth Berkov, California Department of Health Services

Introduction and summary

Background

National estimates of births to unmarried women, or nonmarital births, have been prepared since 1938 as part of the basic vital statistics program of the United States. The data have limitations and reflect problems in collecting information about a sensitive subject. Nevertheless, the information continues to be in strong demand and widely used. It sheds light on important social and demographic changes, some of which are unprecedented in the United States; it makes possible the study of certain consequences of the changes, and it provides a measure of the need for social and health services.[1-3] Experience has shown that statistics on nonmarital births can be compiled from birth certificates at the same time that safeguards effectively protect the privacy and interests of the children and parents involved.

The National Center for Health Statistics (NCHS) recently changed its method for making national estimates of nonmarital births. Beginning with 1980 data, the estimates incorporate inferentially derived data from nine States that do not ask a marital status question on the birth certificate (nonreporting States).[4] In 1980 these States were California, Connecticut, Maryland, Michigan, Montana, Nevada, New York, Ohio, and Texas. This approach is a major departure from the method used before 1980, which was based only on data from States with a marital status question on the birth certificate (reporting States), and which assumed that these States represented entire geographic divisions. That is, the nonreporting States were assumed to have the same proportion of births to unmarried women as the reporting States in a geographic division.

Inferential methods are used to produce data on births to unmarried women in nonreporting States. They are generally based on a comparison of the surname given to the child with the surnames reported for the parents, supplemented in some States with information from hospitals or with paternity statements when available. There is considerable variation among the nonreporting States in the specific inferential criteria used. This variation occurs because nonreporting States differ among themselves and from the reporting States in the extent to which there is restriction on unmarried mothers either naming a father on the birth certificate or giving his surname to the child.

NOTE: Stephanie Ventura, in the Division of Vital Statistics, contributed to the preparation of this report. Peer review was provided by Kenneth Harris, Office of Research and Methodology.

The recent NCHS decision to use inferential data in making national estimates introduces certain problems of comparability due to the varying criteria employed. However, it has the advantage that it eliminates bias stemming from the assumption of similarity between reporting and nonreporting States.[5,6] Since 1965, about one-third of the Nation's births have occurred in nonreporting States. It was not feasible for NCHS to include inferred data from these States in national estimates prior to 1980. Had this been done, however, the result would have been higher estimates of nonmarital births to white women and somewhat different trends, particularly in the early 1970's, when legal abortion was more readily accessible in nonreporting than in reporting States.[6-8]

Although the overall extent of nonreporting has remained about the same, there has been a recent shift in the reporting status of specific States. (See appendix I.) In 1978, NCHS changed the question on the U.S. Standard Certificate of Live Birth from "Legitimate (yes or no)" to "Is mother married? (yes or no)." It was hoped that the change in terminology would result in increased reporting. By 1980, five previously nonreporting States (Georgia, Idaho, Massachusetts, New Mexico, and Vermont) did add a marital status question to the birth certificate. However, two large States (Michigan and Texas) dropped the legitimacy question and did not substitute a question on marital status. As a result, the proportion of all births occurring in nonreporting States remained at the relatively high level of about one-third.

California's birth certificate has not included a legitmacy or marital status question since 1918. However, various county health departments developed inferential methods in the 1950's, and an inferential method has been applied on a statewide basis since 1966. (See appendix II.) The classification of California births into marital and nonmarital categories has been the basis for important and widely used findings.[9]

Because the inferential criteria developed in California are based on relatively liberal regulations for the child's surname and for listing the father's surname, there has been continuing concern that the data might overestimate nonmarital births. This possibility was investigated in several earlier studies. These studies showed with reasonable certainty that the California data had remained valid through 1975 but that validity in subsequent years could not be assumed because of the possibility of changing practices in reporting information on birth certificates.[10]

Purpose of this study

With the decision to incorporate inferential data into official national estimates, it became particularly important to know what happened to the California data after 1975. Nonmarital birth rates are relatively high in California. The State total of 86,142 nonmarital births in 1980 was 13 percent of all nonmarital births occurring nationally and 33 percent of the Nation's nonmarital births identified by an inferential method.

Overestimation is suspected and continuing study of the California data is necessary because the State inferential method cannot avoid heavy dependence on the way the mother signed the birth certificate as informant for the record. Since 1945, a California Attorney General's opinion has been in effect that an unmarried mother may give any surname she wishes to her child. In addition, unlike many States, California makes no effort to prevent an unmarried mother from naming the father of the child; consequently, name of father is withheld on relatively few birth certificates filed in the State. Most unmarried mothers identify a father on the birth record and give his surname to the child with the only indication that the birth may be out-of-wedlock being the surname signed by the mother. It is possible that married mothers' use of their maiden surnames in signing birth certificates will increase substantially. If so, overestimation of nonmarital births will result. Although such overestimation had not occurred through 1975, the possibility of its subsequent development was the major consideration of this study. Because overestimation is more likely in California than elsewhere as a result of the nonrestrictive inferential method used, continued ruling out of overestimation for California gives reasonable assurance that the same is true for inferential data from other States.

Summary of methods and findings

Three main methods were used to test the inferred data for California in this and in previous evaluation studies. They are as follows: (1) Comparison with data derived from hospital records; (2) comparison with data obtained from other States in the West in which a marital status question is included on the birth certificate; and (3) review of representative samples of birth certificates consisting of detailed recoding and some followup of the information used to infer marital status. Overestimation was not detected through any of these methods.

In this study, the main source of false positives (births erroneously inferred nonmarital) was the signing of maiden surnames by married mothers. However, all indications were that the net effect of false positives on incidence estimates was approximately zero, because they were balanced by an approximately equal number of false negatives (nonmarital births missed by the inferential criteria).

Three findings of the present study give particularly strong evidence of the continued accuracy of the data:

1. In one county of the State where detailed data were obtained permitting comparison of hospital and inferential classifications, the inferential method classified as nonmarital 93.1 percent of the 1,534 births identified to be nonmarital by the hospital. False positives amounted to 95 births erroneously inferred nonmarital, but these were balanced by 106 false negatives.
2. Between 1975 and 1979, all measures of nonmarital births (numbers, ratios, and estimated rates) showed less increase in California, where the data were inferred, than in five States in the West where data came from explicit marital status questions (Arizona, Colorado, Hawaii, Oregon, and Washington). In other words, the concern that the inferential method would result in overestimation of nonmarital births in California was not sustained.
3. Marriage records in which the bride and groom matched the mother and father were not located for any of a sample of 57 births inferred nonmarital. In sharp contrast, such marriage records were located for half of a control sample of births inferred marital. (The marriage record search was made in a central file which did not include records of marriages occurring outside California or a relatively large group of "nonlicensed" marriages.)

Because of the nature of inferential methods, questions of validity will always arise. The inferred data for California have been evaluated to an unusual extent, more so than data collected by direct report. The evaluations have shown repeatedly that the data were accurate. Increases in the use of maiden surnames by married mothers or other changes in reporting practices may to some extent invalidate the data collected by the inferential method in the future. This should not, however, be assumed to be the case without careful analysis. What has been learned from the studies in California is that *a priori* doubts regarding the validity of the inferential method were not warranted.

Comparison of hospital and birth certificate information

Methods and sources

One method of evaluation found practical in earlier studies was the comparison of birth statistics for unmarried women compiled from hospital sources with the same statistics compiled from birth certificates by the inferential method. The approach was practical because many hospitals prepare chronological lists, or logs, of deliveries on a current routine basis. For various reasons, including the fact that special services may be required or that special precautions may be taken to avoid newspaper or other public announcement of the birth, an indication that the birth is nonmarital may be part of the information logged. If the log includes this information, nonmarital births can be counted and hospital statistics compiled without the costly abstracting of medical records. Compilation of data from hospital logs requires considerable time, which limits the number of hospitals that can be studied. The time is required mainly to determine which hospitals maintain usable logs and to obtain necessary approvals for research access to the logs when summary data are not regularly compiled by the hospital for its own purposes. Using data from logs, cross-checks were made for six hospitals in various parts of the State in previous evaluation studies.

In the present evaluation study, cross-check data were obtained for a larger number of hospitals. To minimize the extent to which individual hospital records would need to be examined, an effort was made to locate research or health department projects for which the necessary information had already been compiled for other purposes.

Using both information from logs and data from other sources, it was possible to obtain information from 23 hospitals. Nine hospitals constituted almost all the hospitals doing deliveries in Santa Clara County; the other 14 hospitals were scattered throughout the State. Data for various years from 1977 through 1980 were obtained. Over 7,000 births within Santa Clara County and over 50,000 births outside Santa Clara County were included. The nearly complete coverage of the one county substantially improved the study results.

Data for the 23 hospitals were derived from different sources. One problem arising from the use of variously derived information regards the definition of nonmarital birth. The definition of nonmarital birth intended and approximated by the California inferential method is one for which the biologic parents of the child are not married to each other.

It frequently was not clear whether hospital information on marital status, particularly data from admission records rather than logs, corresponded to that definition. Interviews conducted with hospital staff indicated that information obtained from logs or personal interviews probably was closer to a definition based on biologic parentage than information abstracted from medical records was. Hospital staff reported that there was considerable openness about childbearing outside marriage and that much of the information used in current logs had been volunteered by the mothers. The admission form, which frequently is the only source of marital status information in the medical record, may reflect legal marital status and not be consistent with the information on biologic parentage obtained by staff having closer contact with the mother on the delivery service. It should be noted, however, that *legal* marital status is the information sought by the marital status question in reporting States. No evaluation has been made of the accuracy of reporting of marital status on any reporting form, either in this study of inferred marital status data or in other studies of births by marital status.

The sources of data for the 23 hospitals are as follows.

1. *Nine hospitals in Santa Clara County.* The Santa Clara County Health Department enlisted the cooperation of local hospitals for the study period from February through July 1980. The Department obtained information derived from hospital logs (some specially kept for this study) for 9 of the 11 hospitals providing delivery services in the county.

   The local health department compiled detailed statistics for 8 of the 9 participating hospitals by coding both hospital and birth certificate information. These 8 hospitals accounted for 71 percent of all births and 83 percent of nonmarital births occurring in the county in 1980. The data on race and Mexican origin in table 1 show the general similarity between births in these hospitals and all births in California.

   The other participating hospital, which accounted for 3 percent of all births and 4 percent of nonmarital births in the county in 1980, compiled its own summary data. Detailed data are not available for that hospital, and therefore it is not included in some of the analysis.

   The two hospitals not included in the study had relatively low proportions of nonmarital births (table 1). One of these hospitals chose not to participate in the study. The other hospital chose to participate but, due largely to reorganization and staff turnover, found it impossible to be accurate and consistent in providing the necessary information.

   It should be noted that all hospitals in Santa Clara County were given a full description of the purposes and scope of the study and understood how the information was to be used. It was understood that the data were to be compiled for only

a limited period in the first part of 1980, that identifiable information for individuals would be used only to compile statistics, and that individual information obtained for the study would be destroyed as soon as the study report was completed.

2. *One large public hospital in Los Angeles.* For many years, this hospital has maintained a delivery log from which the hospital compiles data on nonmarital births. This information was used in earlier evaluation studies and has provided a continuing check on the possibility of breakdown in the inferential method.

   Data compiled by the hospital are not available by race or other characteristics. However, State-compiled data show that about 90 percent of births in the hospital are to women who report themselves on the birth certificate to be of Mexican, Mexican-American, or other Hispanic origin.

3. *Eight hospitals in a research study.* A study of the effects of abortion on the outcome of subsequent pregnancies was conducted by staff in the California Department of Health Services.[11] Data were obtained both by interviewing women in the hospital (76 percent of study subjects) and by abstracting medical records when personal interviews were not possible (24 percent of study subjects). Marital status, one item of information collected in the study, was specifically defined in terms of whether the biologic parents were married to each other.

   Only women terminating first and second pregnancies by either live birth or spontaneous fetal death were included in the study. To obtain statistics comparable to State data inferred from other items on the birth certificate, special tabulations were obtained for the 12,450 study subjects who delivered a first or second live birth in one of eight hospitals in 1977.

   A total of 18,426 first and second live births occurred in the eight hospitals during the study period, but only 12,450 were studied. This loss of eligible study subjects was due exclusively to workload limits. (Only one interviewer-abstracter was employed in each hospital.) No other selective processes are known to have influenced the inclusion or exclusion of study subjects in the eight hospitals.

4. *Five hospitals in a pilot study.* Medical records were abstracted for small numbers of births occurring in eight hospitals in different parts of the State during 1979. Pilot study data were used only for the five hospitals from which data had not already been obtained through either the Santa Clara County study or the study of the effects of abortion on subsequent pregnancy outcomes.

   The pilot study was carried out by the Center for Health Statistics, California Department of Health Services. It was the exploratory stage of a subsequent study to evaluate medical information reported on California birth certificates. Study data were collected 1 year or more after the birth occurred and were derived entirely from medical records.

Findings of the cross-check with hospital data

The findings for the 23 hospitals supported the conclusion that, from 1975 through 1980, the inferential method applied in California remained valid and did not result in overestimation of nonmarital births. Regardless of whether the data came from the relatively complete inclusion of hospitals in Santa Clara County or from one of the hospitals in a different part of the State, there was close agreement between hospital estimates and inferentially derived estimates.

The findings for the hospitals grouped according to the source from which the hospital data were obtained are summarized in figure 1, and the findings for each hospital are shown in tables 2 and 3. For 18 hospitals, the percent nonmarital from the hospital source was equal to or higher than the estimate inferred by county coding from birth certificates (or State coding in the case of hospital 9). For five hospitals the relationship was reversed, with the hospital estimate being somewhat lower than the inferential estimate.

The close agreement in overall estimates by hospital reflected a high level of agreement in the classification of individual cases. Detailed data available for eight hospitals in Santa Clara County showed that among the 7,285 study births, there was agreement as to marital or nonmarital classification for 7,084 births, or 97.2 percent (table A).

The hospital classification showed 1,534 of the births in the Santa Clara County study to be nonmarital. The inferential method classified 1,428 of these births, or 93.1 percent, as nonmarital. On the assumption that the hospital classification was correct, 95 births were considered false positives (marital births erroneously classified as nonmarital) by the inferential method. The false positives were balanced, however, by 106 false negatives (births shown by the hospital as nonmarital but classified marital).

A particular concern in the present study was the extent to which false positives occurred in the inferred data because of married mothers' use of maiden surnames in signing birth certificates. In Santa Clara County most of the false positives (88 of the 95 cases) were due to this cause. However, the study also found that these 88 cases represented only 8 percent of the birth certificates in which the mother had signed her maiden surname (1,095 births); 92 percent of the birth certificates signed this way actually were for nonmarital births.

Data in table A show the extent to which each inferential criterion correctly indentified the mother's marital status. The missed nonmarital births (false negatives) came about equally from birth certificates in which either the mother signed the father's surname or a record clerk or the father was the informant. In general, the comparison with hospital data confirmed the accuracy of most inferences about marital status made from birth certificate information.

Differences were found in the characteristics of false positives and false negatives. The false positive group was more likely to include white and older mothers (table 4). However, because both error groups were small, the differences had

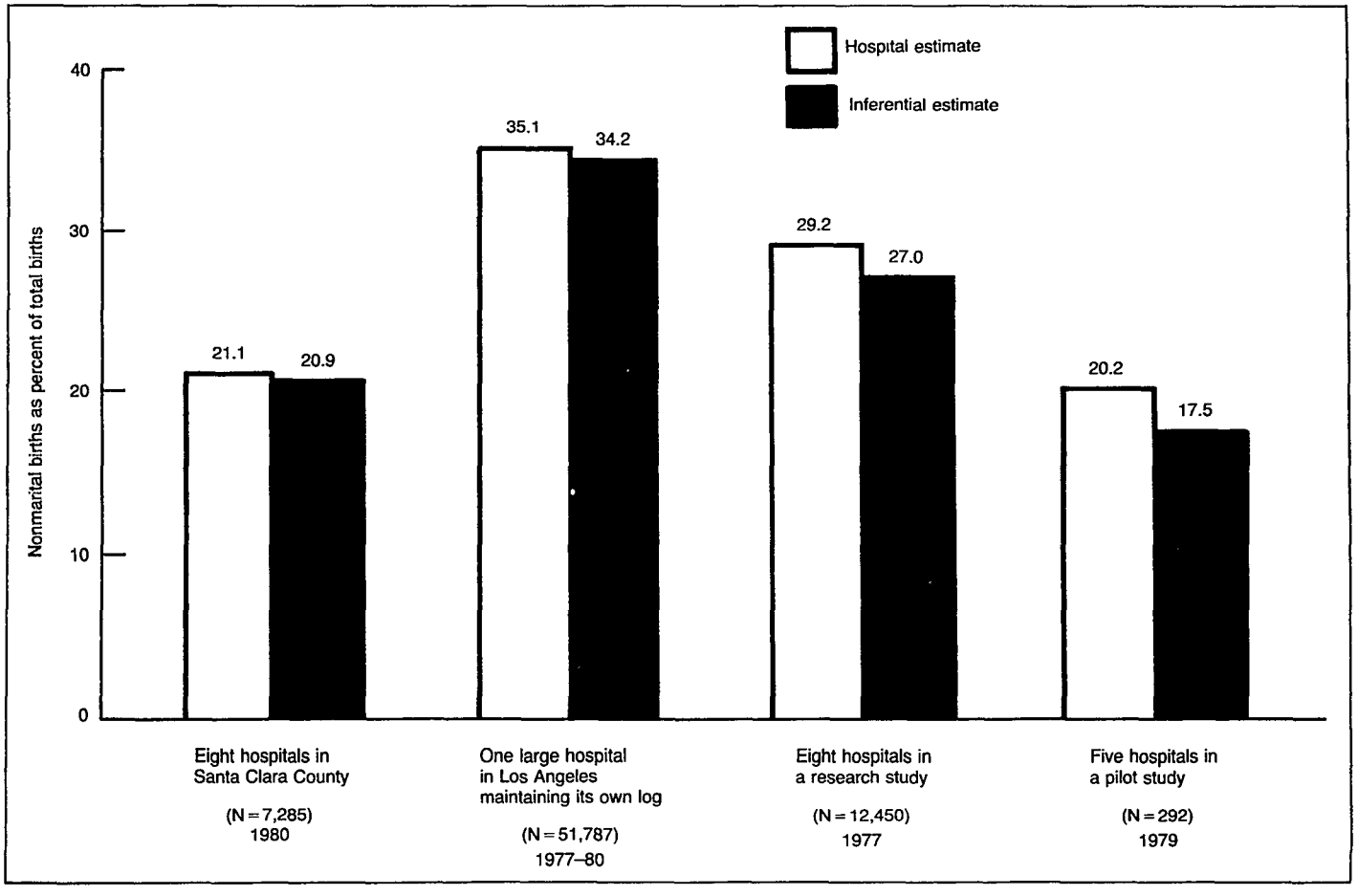

Figure 1. Percent of births to unmarried women for study hospitals, by source of data and method of estimation

Table A. Number and percent distribution of study births by hospital classification, according to inferential classification: 8 hospitals in Santa Clara County, February–July, 1980

Inferential classification and birth certificate information from which inferred	*Hospital classification*		
	All live births	*Non-marital*	*Marital*
		Number	
All live births	7,285	1,534	5,751
Inferred nonmarital	1,523	1,428	95
Father's name withheld	273	273	-
Mother signed maiden surname	1,095	1,007	88
Mother signed other surname	155	148	7
Inferred marital[1]	5,762	106	5,656
Mother signed father's surname	4,670	31	4,639
Father signed as informant	854	35	819
Record clerk signed as informant	207	39	168
Other[1]	31	1	30
		Percent distribution	
All live births	100.0	21.1	78.9
Inferred nonmarital	100.0	93.8	6.2
Father's name withheld	100.0	100.0	-
Mother signed maiden surname	100.0	92.0	8.0
Mother signed other surname	100.0	95.5	4.5
Inferred marital[1]	100.0	1.8	98.2
Mother signed father's surname	100.0	0.7	99.3
Father signed as informant	100.0	4.1	95.9
Record clerk signed as informant	100.0	18.8	81.2
Other[1]	100.0	3.2	96.8

[1] Inferred marital on the basis of special rule 4 or 5. (See appendix II.)

relatively little influence on overall distributions by race and age. Knowledge of the differences will assist in making appropriate uses and interpretations of the data.

Inferential criteria applied to mothers of Hispanic origin

An increasing proportion of births in California are to mothers of Hispanic origin. In 1980, mothers reporting themselves as being of Hispanic origin on the birth certificate accounted for 29 percent of all births in the State and 36 percent of the nonmarital births. Of the Hispanic-origin mothers, 91 percent reported themselves as Mexican or Mexican-American.

Because they account for such a large proportion of nonmarital births, a particularly important question is whether the inferential criteria as applied to Hispanic-origin mothers accurately separates the married from the unmarried. The cross-check with hospital records provides evidence that the inferential criteria do make a reasonably accurate separation and that there are no particular problems in applying the inferential criteria to births of Hispanic parentage. Hospital and inferential estimates of nonmarital births in eight hospitals in Santa Clara County showed close agreement when examined specifically for women who reported themselves as Mexican or Mexican-American (table 2). Similar close agreement also was found for the large public hospital in Los Angeles (hospital A), where 90 percent of the births were to women of Mexican, Mexican-American, or other Hispanic origin (table 3).

Additional evidence indicating that there are no major problems in applying the inferential criteria to Hispanic women in California came from a recent interview study with mothers of Mexican origin in Los Angeles County.[12] The study was carried out under the direction of Professor David Heer of the University of Southern California. Despite study limitations, information was provided about a number of important, previously unmeasured, and difficult-to-measure characteristics of Mexican-origin families with new babies. These included the specific marital ties of the parents and the extent to which nonmarital births were to couples living together in consensual unions (that is, cases in which the mother indicated that she considered the father to be her spouse, even though they were not legally married).

The sampling universe for this study consisted of birth certificates filed in Los Angeles from August 1980 through March 1981. Separate samples were taken for mothers born in and outside the United States. Interviews were conducted in the home about 2 months after the birth, in Spanish if appropriate.

The study experienced almost a 50-percent loss from its original sample of birth certificates. This was due less to refusals (9.5 percent of the weighted sample) than to various other problems, such as mother moved to unknown location, address not located, no contact after third attempt, or name never assigned to interviewer due to time limits or other administrative difficulties.[13] It does not seem likely that the families lost from the sample had more stable marital characteristics than those interviewed.

Of births for which one or both parents were reported of Mexican or Mexican-American origin, it was found that 25 percent of the mothers were not legally married to the father. The 25 percent comprised 8 percent living in consensual unions, 1 percent living with a partner not considered to be a spouse, and 16 percent with no partner present.[12]

The overall 25 percent not legally married in the interview study was almost exactly the same as the inferential estimate of the percent nonmarital derived from birth certificates for all mothers in California who reported themselves of Mexican or Mexican-American origin in 1980. Although there are differences in definition and coverage between study and State estimates, these results do not suggest error in the inferred nonmarital birth data for Hispanic mothers. The interview study illustrates a type of information about marital ties that is much needed as a supplement to the general marital-nonmarital classification of births.

Comparison of California birth data for unmarried women with data for other States

Methods and sources

California's inferred birth data for unmarried women were compared with data for five States in the West where information was derived from an explicit birth certificate question (Arizona, Colorado, Hawaii, Oregon, and Washington) and with other selected States and groups of States. The comparison was made using data from an alternate, unofficial set of birth estimates by marital status for States. The data were developed originally to study the impact of legal abortion on fertility. They incorporate inferred data obtained directly from nonreporting States and reported data compiled either by NCHS or by the reporting States. Referred to in this report as the "interstate study," the data previously included information for the years 1965 and 1970–75. They were updated for 1976–79 as part of this study. The purpose was to make the evaluation of California's data as current as possible and also to obtain national estimates of nonmarital births for the full decade of the 1970's that would incorporate inferred data and thus be comparable to the estimates NCHS now is preparing for the 1980's.

In this study, three measures of nonmarital childbearing were used to make comparisons between California and other States. They are numbers, ratios (nonmarital births per 1,000 total births), and estimated rates (nonmarital births per 1,000 unmarried women in specific age groups). Rates were estimated to avoid the confusion that would result if State trends were compared using only numbers and ratios, which do not reflect differences in population. Denominators for rates were estimated using sources and methods that are described briefly in appendix III.

Unmarried women are defined in the interstate study as women who are single, divorced, widowed, and married but separated. This differs from the NCHS definition, in which separated women are considered to be married. Reasons for the different definition of unmarried women and its effects on rates are discussed in detail elsewhere.[6-8] The difference will not be important for comparisons made in this report but should be recognized in any additional use of the data.

Further documentation of methods and sources used in the interstate study, including discussion of race classification in the birth data, is given elsewhere.[9]

Previous evaluations based on interstate comparisons

Ever since they first were compiled in the mid-1960's, evidence of the credibility of California's inferred nonmarital birth data has come from comparisons with findings for other States and the Nation, and particularly from comparisons with reporting States in the West (figure 2). Comparisons made for 1970 and earlier years demonstrated that a relatively high nonmarital birth rate, particularly for white women, was characteristic of States in the West, regardless of whether the State data were inferred or reported. (Data for 1970 are shown in table 5.)

California is one of several States in the West where abortion services were legal and widely used by the end of 1970. In 1971, the inferred estimate of nonmarital births for California showed a drop in response to the availability of legal abortion similar to that shown in the reported data from Hawaii, Washington, and Oregon (figure 2) and in the inferred data from New York, where early legalization of abortion also had occurred (table 6).[14]

California data for 1974 and 1975 were questioned when they indicated a rise in nonmarital birth rates for women in age groups 20–24 and 25–34. The rise among older women in the mid-1970's shown by the California data was of particular concern because it, more than an earlier rise among teenagers, might have resulted from an increase in the use of maiden surnames by married women. Thus it might have been spurious. It became clear that the increase was likely to be real when interstate data used in an earlier evaluation study showed that a similar pattern of rise had occurred in 1974 and 1975 in the reporting States of Hawaii, Oregon, and Washington.[10] Since 1977, there has been a rise in the rate of nonmarital births for women aged 20–34 years in the United States according to data compiled by NCHS.[4,15]

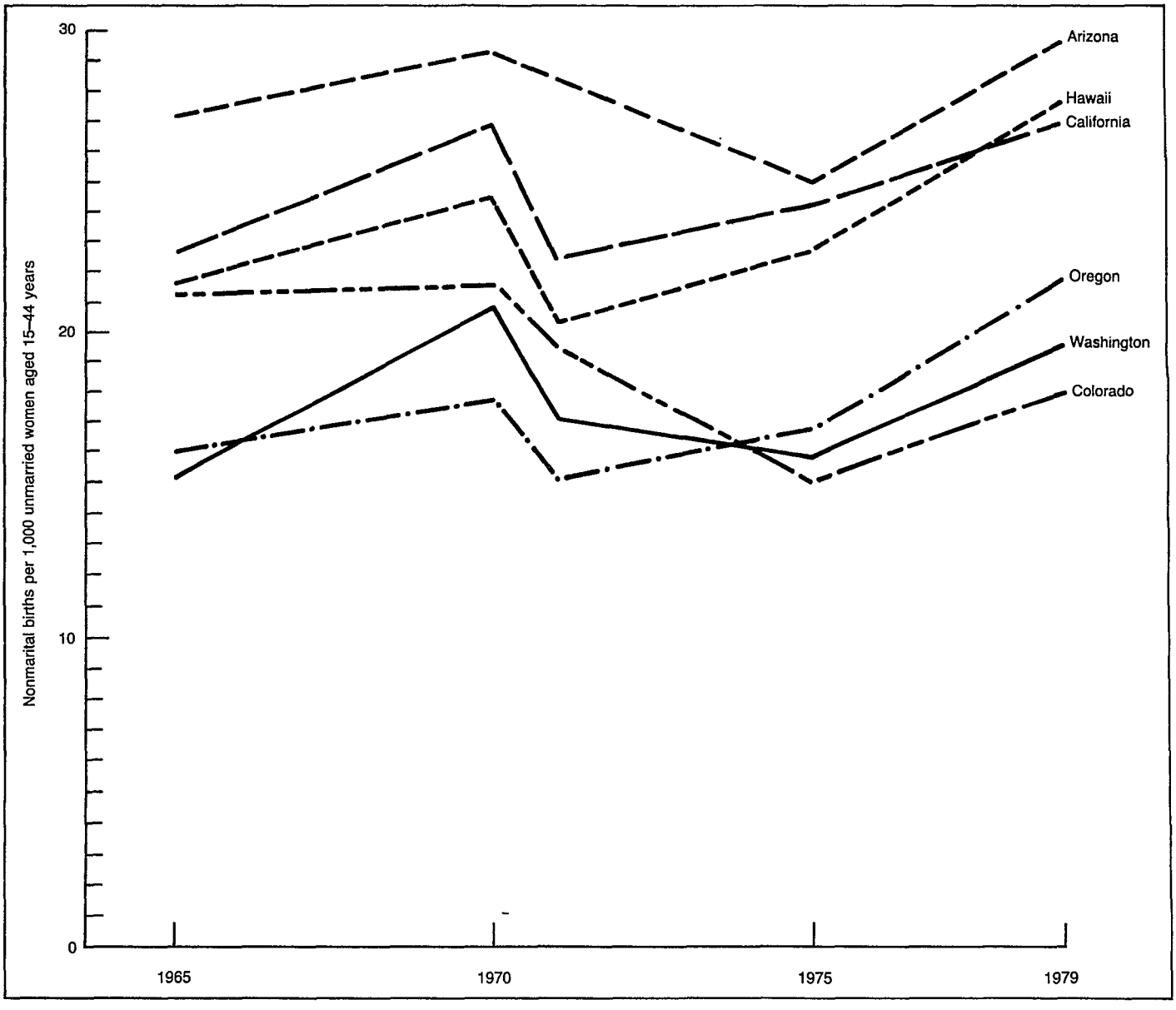

Figure 2. Estimated birth rates for unmarried women: California and 5 selected reporting States in the West, selected years, 1965–79

Interstate comparisons updated through 1979

The present updating of the interstate study showed even more clearly than earlier comparisons that there was nothing unique about the trend in California. The comparison of California with five reporting States in the West showed that all of these States experienced rises in nonmarital birth rates between 1975 and 1979 (figure 2). Generally, in each State, the increases were greater for white women than for women of all other races (table B) and were experienced by women age 20 and over as well as by teenagers (table 6). With respect to the accuracy of California's inferred data, the key finding was that the increase between 1975 and 1979 in all measures of nonmarital births (numbers, rates, and ratios) was smaller in California than in the five reporting States (table B). This finding is the opposite of what would be expected if California's inferential method were breaking down because of increasing use of maiden surnames by married women.

The updating of the interstate study extends a unique statistical series that goes back to 1965. In the series, trends can be traced that shed further light on the accuracy of the inferred data, and that also are of considerable general interest. The trends for California, selected States, certain groupings of States, and the United States are summarized in table 6. Two general points are noted from the data:

- States where abortion remained illegal until after the 1973 Supreme Court decision later repeated the same pattern of decline in nonmarital birth rates that first was observed in 1971 in the States with early legalization of abortion. By 1975 both types of States had experienced a decline in the rate, which had increased again by 1979.
- Although individual State trends varied, nonreporting States as a group and reporting States as a group showed approximately the same increase in nonmarital birth rates between 1975 and 1979 (9.5 percent increase in nonreporting States and 9.9 percent in reporting States).

Table B. Estimated number, rate, and ratio of births to unmarried women in 1979 and percent change between 1975 and 1979, by race of mother and State: California and 5 selected reporting States in the West

[Rates per 1,000 unmarried women aged 15–44 years; ratios per 1,000 total live births. Unmarried women are those who are single, divorced, widowed, and married but separated]

Race and State	1979			Percent change between 1975 and 1979		
	Number	Rate	Ratio	Number	Rate	Ratio
Total						
California	74,500	27.1	196.5	40.9	11.5	17.9
Arizona	8,000	29.7	171.1	51.8	18.8	28.6
Colorado	5,800	18.0	123.5	51.1	18.4	28.6
Hawaii	2,900	27.5	163.7	48.1	23.9	32.7
Oregon	5,600	21.8	134.7	65.6	29.8	32.8
Washington	8,200	19.7	126.9	59.8	23.9	26.3
White						
California	53,000	23.8	165.4	45.0	17.2	23.5
Arizona	5,100	21.9	129.3	54.8	21.0	31.5
Colorado	4,800	16.0	110.1	52.2	20.3	31.1
Hawaii	700	19.9	122.5	46.5	25.2	38.1
Oregon	4,900	20.4	125.5	69.6	34.2	37.2
Washington	6,400	17.2	111.5	62.4	28.4	30.1
All other						
California	21,500	41.0	365.6	31.9	-6.8	-0.7
Arizona	2,900	77.8	395.0	46.9	13.1	23.1
Colorado	1,000	45.4	283.9	46.2	9.7	7.3
Hawaii	2,200	31.6	184.2	48.6	22.5	29.7
Oregon	700	41.9	275.1	41.9	0.7	1.5
Washington	1,700	42.3	261.3	50.6	3.9	5.4

Nonmarital birth rates, 1970 and 1979

In interpreting the recent renewed rise in nonmarital birth rates, it is important to note that for the United States and for most States, nonreporting as well as reporting, the nonmarital birth rate in 1979 was either below or only slightly above what it was in the peak year of 1970. This does not suggest any spurious increase in the inferred data from nonreporting States. It does suggest that the data reflect what actually happened, which probably was a balancing of forces: The downward influence of legal abortion compensating for such trends as increased sexual intercourse among teenagers and an increased tendency for women aged 20 and over to choose to bear a child outside marriage.[10,14]

California is one of the States that showed a small rise in the rate of nonmarital births during the decade. The rate in 1979 was 27.1, only slightly higher than the rate of 26.8 in 1970.

The findings for the reporting States in the West were more variable and suggest that completeness and accuracy of reported data may have changed more than completeness and accuracy of the inferred data for California. The findings for Oregon and Washington support this interpretation. Oregon, which had the lowest rate of any of the selected Western States in 1970 (17.9), showed the greatest increase in the decade, with a rate of 21.8 in 1979. Washington, on the other hand, started the decade with a higher rate than Oregon had (21.0), but showed an overall decline and ended the decade below Oregon with a rate of 19.7 in 1979. Nonreporting by certain hospitals was a problem in Washington in the late 1970's. Thus it seems likely that at least part of Washington's decline came from deterioration in reporting. (It should be noted that reporting in Washington has improved since 1980, when the birth certificate question was changed to ask about marital status rather than legitimacy status.) Although there is no direct evidence on the subject, it also seems possible that at least part of the increase in Oregon and other reporting States came from an improvement in reporting. No reporting problems among Oregon hospitals are known to have existed in the late 1970's. In general, there probably was a decrease during the decade in the tendency to conceal out-of-wedlock status in completing birth certificates. Although this tendency is difficult to study and is not well documented, misreporting in the mid-1950's was demonstrated for some adopted children in Washington.[16]

Review of representative samples of birth certificates

Methods and sources

One approach taken in earlier evaluation studies and repeated in the present study was the selection and review of representative samples of birth certificates classified by the inferential method. In earlier studies, samples for 1967, 1970, 1974, and 1975 were reviewed. For the current study, samples for 1977 and 1979 were reviewed.

The review of representative samples of birth certificates does not by itself add any information about the accuracy with which marital status was inferred, but several important purposes related to evaluation of the data are accomplished during a review. The accuracy with which inferential criteria were applied in the routine coding of birth certificates is checked, as is the question of whether these criteria need change. In the review, a special coding is done to determine the frequency with which specific criteria and combinations of criteria have been applied and to show in detail the type of information that has been reported. Groups of certificates that may be misclassified and that possibly could be followed up by other means are identified. One means of followup explored in this study was a cross-check with marriage records for a systematic subsample of the general sample of birth certificates.

The concepts and methods applied in the current review were generally similar to those used previously. Births to married as well as unmarried women were included, but the latter were sampled at a heavier rate in order to obtain sufficient numbers. For each sample case, a full copy of the birth certificate was obtained and all information related to marital status was coded in detail.

Because there has been virtually no change in either the identifying items on the California birth certificate or the policies that influence the identification of fathers and the naming of children, there has been relatively little basis for changing the inferential criteria that have been applied in the State since 1966. Nevertheless, some revisions were made following each previous sample review. The revisions resulted in either simplified rules that were found to affect relatively few cases or new rules aimed at avoiding overestimation of nonmarital births by classifying borderline categories as marital rather than nonmarital. The inferential criteria used in California in 1983 are essentially the same as those used in the sample study periods, 1977 and 1979.

Findings of review of birth certificate samples

The review of samples for 1977 and 1979 showed a very low level of error due to inaccurate application of inferential criteria in the routine coding of birth certificates. There was an almost exact balancing of false positives (births incorrectly coded nonmarital) and false negatives (births incorrectly coded marital). Neither of these error groups amounted to more than 1 percent of the total births classified nonmarital, and they balanced each other for a zero net effect (table 7).

The current review showed continuation of past trends in the frequency with which various inferential criteria provide the main basis for classifying births as nonmarital (table 8). Withholding the father's name on the birth certificate is particularly frequent in California for births in which adoption is planned. Reflecting a decline in adoptions, there has been a fairly steady decline in the proportion of births classified nonmarital because the father's name was withheld. This has been accompanied by a steady increase in the proportion classified nonmarital because the mother signed her maiden surname as the informant for the birth record. As a proportion of all births classified nonmarital, those classified only on the basis of maiden surname signature increased from 36.3 percent in 1967 to 65.5 percent in 1979. This proportion varied by race and ethnic origin; in 1979, it was slightly under one-half for white mothers not having Spanish surnames and approximately three-fourths for both white mothers with Spanish surnames and black mothers.

Cross-check with marriage records

From these findings about the basis for nonmarital classification, questions arise about the data that cannot be answered without obtaining additional information from sources independent of the birth certificate. The main sources of independent information for this study, discussed earlier, were the cross-check with hospital records and the comparison with data from reporting States in the West. Both gave strong evidence that most of the births classified nonmarital on the basis of the mother's signature actually were births to women not married to the father of the child. Further support for this conclusion was obtained from a cross-check with marriage records carried out in connection with the review of birth certificates.

A small but representative subsample of 48 marital births and 57 nonmarital births was obtained by systematically selecting 1 in 25 births from the general sample of 1979 births. Search for a marriage record of the parents listed on the birth certificate was made in the files of the Vital Statistics Branch, California Department of Health Services.

This cross-check approach has the advantage that when a marriage record of the parents is located for a birth classified nonmarital, it establishes clearly that the birth was misclassified. However, if a marriage record is not located, it does not rule out the possibility that the parents actually were married. The marriage may have occurred outside California or it may have been nonlicensed. Nonlicensed marriages were not included in the statewide file of marriage records until 1982. These marriages have become increasingly frequent in California in recent years, amounting to approximately 20 percent of all marriages occurring in the State in 1980. A description of these marriages is given in appendix IV.

Incompleteness of the marriage files was considered a serious limitation, and until recently search for a marriage record was relatively difficult and expensive. Therefore, in the current study, only the approach of matching birth and marriage records was explored. It proved more productive than expected. A key element in making the findings definitive was the inclusion of marital births as a control group. This gave a basis for evaluating what was found for the nonmarital births.

The main finding of the cross-check was that marriage records in which the bride and groom matched the mother and father were located for half of the marital births but none of the nonmarital births. Marriage records in which the bride matched the mother but the groom did not match the father were located for one of the marital births and for five of the nonmarital births (table 9).

Conclusions about what percent of each group was not married cannot be drawn because of incomplete marriage files. Although marriage records were found for half of the mothers inferred to be married, it is notable that for mothers inferred not married to the father of the child (the definition of nonmarital birth used in California), the only marriage records found were those in which the groom and father clearly were different people. These findings do not suggest that a large proportion of births to married couples have been misclassified as nonmarital in the California data.

Conclusion

The classification of births by marital status of mother produces information that has unique value as an indicator of social change and as a tool in the study of infant mortality and other risks to children. The history and use of this information for California is detailed elsewhere.[9] Strong evidence of need for the information is given by the fact that inferential methods for compiling it were developed independently in almost all States where an explicit marital status question was not asked.

It is likely that States will continue for some time to compile birth data classified by marital status. Whether data collection is done by direct means, as in reporting States, or by inferential methods, as in nonreporting States, the data must be evaluated to be used appropriately.

Evaluations of the inferred data for California have shown repeatedly that *a priori* doubts about the method were not warranted and that the data remained of high quality at least through 1980. However, it does not follow that this necessarily will continue to be true in the future. In general, inferred data are not to be preferred to reported data. Inferred data are more costly to compile. In addition, as demonstrated in this study, evaluation of inferred data depends heavily on the availability of reported data with which to make comparisons. Therefore, based on these evaluations, the author recommends that efforts should be made to retain and expand usage of the marital status item on birth certificates and to consider inferential methods only as an alternative.

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Table 1. Number of live births, and percent distribution of all births and percent of all births inferred nonmarital, by race and Mexican origin of mother: California and Santa Clara County hospitals, 1980

[California data by place of residence; Santa Clara County data by place of occurrence]

Marital status, race, and Mexican origin of mother[1]	*California*	*Santa Clara County*		
		All hospitals[2]	*8 study hospitals*	*2 non-participating hospitals*
Total		Number		
Live births	402,720	22,782	16,262	5,669
		Percent distribution		
All races	100.0	100.0	100.0	100.0
White, not Mexican	56.8	60.8	60.0	65.7
White, Mexican	25.8	24.2	24.4	19.8
Black	8.6	5.1	5.5	4.7
Other	6.8	9.6	9.9	9.5
Unknown	2.0	0.3	0.2	0.4
Nonmarital births[3]		Number		
Live births	83,373	4,075	3,362	526
Nonmarital births as percent of total births		Percent		
All races	20.7	17.9	20.7	9.3
White, not Mexican	14.5	12.3	14.1	7.3
White, Mexican	25.2	29.8	34.3	14.6
Black	56.5	48.8	55.7	24.9
Other	9.4	6.9	7.7	3.9
Unknown	22.5	21.3	22.5	15.0

[1] Includes Mexican-American.
[2] Figures include 599 total births and 144 nonmarital births occurring in one other study hospital that compiled its own summary data. Figures also include 195 total births and 35 nonmarital births occurring outside of hospitals and 57 total births and 8 nonmarital births occurring in hospitals not usually providing delivery service. These data are not shown separately.
[3] Inferential coding by State agency.

Table 2. Number of live births, and number and percent nonmarital, by hospital and inferential classification, race and Mexican origin of mother, and hospital: 9 hospitals in Santa Clara County, February–July 1980

[State-coded data include all births occurring in study hospitals during the period February through July 1980. Hospital and county inferential data are mostly for these months, but some hospitals started participation in mid-January or mid-February and ended participation in mid-June or mid-July; Hospital 4 ended participation in mid-May]

Race and Mexican origin of mother[1] and hospital	Hospital classification			Inferential					
				County coding[2]			State coding		
	All live births	Nonmarital		All live births	Nonmarital		All live births	Nonmarital	
		Number	Percent		Number	Percent		Number	Percent
All races:									
Total, 9 hospitals	7,615	1,616	21.2	---	---	---	8,219	1,708	20.8
Total, 8 hospitals	7,285	1,534	21.1	7,285	1,523	20.9	7,911	1,639	20.7
Hospital 1	486	205	42.2	486	203	41.8	640	258	40.3
Hospital 2	1,494	171	11.4	1,494	166	11.1	1,479	162	11.0
Hospital 3	1,520	81	5.3	1,520	80	5.3	1,572	82	5.2
Hospital 4	169	14	8.3	169	16	9.5	377	41	10.9
Hospital 5	897	254	28.3	897	247	27.5	950	261	27.5
Hospital 6	928	263	28.3	928	267	28.8	1,011	280	27.7
Hospital 7	1,167	231	19.8	1,167	235	20.1	1,215	249	20.5
Hospital 8	624	315	50.5	624	309	49.5	667	306	45.9
Hospital 9	330	82	24.8	---	---	---	308	69	22.4
White, not Mexican:									
Total, 8 hospitals	4,486	612	13.6	4,486	614	13.7	4,840	670	13.8
Hospital 1	145	50	34.5	145	48	33.1	202	64	31.7
Hospital 2	1,066	112	10.5	1,066	110	10.3	1,058	111	10.5
Hospital 3	1,331	64	4.8	1,331	63	4.7	1,356	62	4.6
Hospital 4	147	10	6.8	147	11	7.5	323	29	9.0
Hospital 5	450	116	25.8	450	111	24.7	492	124	25.2
Hospital 6	408	86	21.1	408	88	21.6	425	90	21.2
Hospital 7	721	74	10.3	721	83	11.5	743	88	11.8
Hospital 8	218	100	45.9	218	100	45.9	241	102	42.3
White, Mexican:									
Total, 8 hospitals	1,644	579	35.2	1,644	581	35.3	1,895	654	34.5
Hospital 1	223	102	45.7	223	101	45.3	316	141	44.6
Hospital 2	154	32	20.8	154	33	21.4	159	30	18.9
Hospital 3	85	10	11.8	85	9	10.6	101	9	8.9
Hospital 4	13	3	23.1	13	3	23.1	37	9	24.3
Hospital 5	372	121	32.5	372	121	32.5	384	123	32.0
Hospital 6	350	130	37.1	350	132	37.7	401	146	36.4
Hospital 7	164	27	16.5	164	30	18.3	180	39	21.7
Hospital 8	283	154	54.4	283	152	53.7	317	157	49.5
Black:									
Total, 8 hospitals	419	256	61.1	419	245	58.5	440	252	57.3
Hospital 1	48	33	68.8	48	34	70.8	62	42	67.7
Hospital 2	40	19	47.5	40	17	42.5	39	16	41.0
Hospital 3	20	3	15.0	20	3	15.0	20	2	10.0
Hospital 4	3	-	-	3	1	33.0	5	1	20.0
Hospital 5	15	7	46.7	15	6	40.0	15	5	33.3
Hospital 6	69	38	55.1	69	37	53.6	70	36	51.4
Hospital 7	168	114	67.9	168	108	64.3	172	111	64.5
Hospital 8	56	42	75.0	56	39	69.6	57	39	68.4
Other:									
Total, 8 hospitals	736	87	11.8	736	83	11.3	736	63	8.6
Hospital 1	70	21	30.0	70	20	28.6	60	11	18.3
Hospital 2	234	7	3.0	234	6	2.6	223	5	2.2
Hospital 3	84	4	4.8	84	5	6.0	95	9	9.5
Hospital 4	6	1	16.7	6	1	16.7	12	2	16.7
Hospital 5	60	10	16.7	60	9	15.0	59	9	15.3
Hospital 6	101	9	8.9	101	10	9.9	115	8	7.0
Hospital 7	114	16	14.0	114	14	12.3	120	11	9.2
Hospital 8	67	19	28.4	67	18	26.9	52	8	15.4

[1]Includes Mexican-American.
[2]County-compiled data by race and Mexican origin available for only 8 of the 9 hospitals.

Table 3. Number of live births, and number and percent nonmarital, by hospital and inferential classification, source of data, and hospital: 14 hospitals in California, selected years, 1977–80

Source of hospital data, year,[1] and hospital[2]	Hospital			Inferential[3]		
	All live births	Nonmarital		All live births	Nonmarital	
		Number	Percent		Number	Percent
Hospital log,[4] 1977–80	51,787	18,199	35.1	51,622	17,634	34.2
A, 1980	12,762	5,246	41.1	12,708	4,918	38.7
A, 1979	13,210	4,704	35.6	12,969	4,514	34.8
A, 1978	12,389	4,210	34.0	12,572	4,072	32.4
A, 1977	13,426	4,039	30.1	13,373	4,130	30.9
Research study,[5] 1977	12,450	3,633	29.2	18,426	4,893	27.0
B, 1977	1,366	280	20.5	1,672	316	18.9
C, 1977	1,289	541	42.0	2,128	840	39.5
D, 1977	1,715	248	14.5	1,966	310	15.8
E, 1977	2,192	736	33.6	2,483	809	32.6
F, 1977	1,871	833	44.5	2,301	1,051	45.7
G, 1977	1,785	376	21.1	4,023	632	15.7
H, 1977	533	175	32.8	833	272	32.7
I, 1977	1,699	444	26.1	3,020	753	24.9
Pilot study,[6] 1979	292	59	20.2	292	51	17.5
J, 1979	51	19	37.3	51	18	35.3
K, 1979	83	6	7.2	83	6	7.2
L, 1979	51	18	35.3	51	18	35.3
M, 1979	56	2	3.6	56	1	1.8
N, 1979	51	14	27.5	51	8	15.7

[1]For hospital A, data are for fiscal year ending June 30 of year shown; for hospitals B, C, and I, data are for the calendar year; for other hospitals, data are for selected study period within calendar year.
[2]Hospitals A and D, E, F, G, are in Los Angeles County; H-L, in the Sacramento or Central Valley; B, C, M, and N, in the San Francisco Bay Area: Hospitals A, E, F, H, J, L, and N are county- or State-owned hospitals; the remainder are private nonprofit hospitals.
[3]Inferential data compiled by California Department of Health Services. For hospitals B-I, data refer only to first and second live births.
[4]Data compiled by hospital for all live births.
[5]Interviews and record abstracts for samples of first and second live births.
[6]Record abstracts for samples of live births.

NOTE: The difference between hospital and inferential counts of total live births is discussed in the text.

Table 4. Number of nonmarital live births and percent distributions by race and Mexican origin of mother and by age of mother, according to source of nonmarital classification: 8 hospitals in Santa Clara County, February–July 1980

Race and Mexican origin of mother[1] and age	Nonmarital by either or both sources			Nonmarital by each source independently	
	Hospital and inferential agree	Hospital only (false negative)	Inferential only (false positive)	Hospital	Inferential
			Number		
All nonmarital births	1,428	106	95	1,534	1,523
			Percent distribution		
All races	100.0	100.0	100.0	100.0	100.0
White, not Mexican	39.4	47.2	54.7	39.9	40.3
White, Mexican	38.3	30.2	35.8	37.7	38.1
Black	16.7	17.0	7.4	16.7	16.1
Other	5.7	5.7	2.1	5.7	5.4
All ages	100.0	100.0	100.0	100.0	100.0
Under 15 years	1.0	1.0	-	1.0	1.0
15–17 years	15.0	12.3	3.2	14.8	14.2
18–19 years	20.0	15.1	13.7	19.7	19.6
20–24 years	37.2	34.9	25.3	37.0	36.4
25–29 years	16.8	24.5	27.4	17.3	17.5
30–34 years	7.5	9.4	24.2	7.8	8.4
35 years and over	2.5	2.8	6.3	2.5	2.9

[1]Includes Mexican-American.

Table 5. Estimated nonmarital birth rates and rankings, by race of mother and source of data: United States and selected States and regions, 1970

[Rates per 1,000 unmarried women aged 15–44 years]

Area	All races				White			
	Interstate study		NCHS		Interstate study		NCHS	
	Rate	Rank among all States or regions	Rate	Rank among reporting States	Rate	Rank among all States or regions	Rate	Rank among reporting States
California	26.8	17	---	---	21.5	2	---	---
Arizona	29.3	14	27.8	14	21.1	3	19.4	1
Colorado	21.7	28	19.8	26	19.5	5	17.3	5
Hawaii	24.6	22	23.1	19	21.9	1	18.7	3
Oregon	17.9	38	16.9	33	16.3	13	15.3	8
Washington	21.0	30	20.3	24	18.5	9	17.2	6.5
West	25.0	2	---	---	20.2	1	---	---
South	30.7	1	---	---	12.8	3	---	---
North Central	23.9	3	---	---	14.2	2	---	---
Northeast	22.0	4	---	---	12.5	4	---	---
United States	25.7	...	26.4	...	14.5	...	13.9	...

NOTE: For interstate study rates, unmarried women are those who are single, divorced, widowed, and married but separated; for NCHS rates, they are single, divorced, and widowed women only. (See text and references 6-8 for discussion of inclusion or exclusion of separated women among those exposed to the risk of nonmarital birth.)

Table 6. Estimated nonmarital birth rates and percent changes over time, by age of mother: United States, selected States, and groups of States, selected years, 1965–79

[Rates per 1,000 unmarried women in specified group]

Age of mother and area	Rate					Percent change in rate			
	1965	1970	1971	1975	1979	1965–1970	1970–1971	1971–1975	1975–1979
All ages 15–44 years									
California[1]	22.6	26.8	22.4	24.3	27.1	18.6	-16.4	8.5	11.5
Arizona	27.1	29.3	28.4	25.0	29.7	8.1	-3.1	-12.0	18.8
Colorado	21.3	21.7	19.6	15.2	18.0	1.9	-9.7	-22.4	18.4
Hawaii	21.6	24.6	20.3	22.2	27.5	13.9	-17.5	9.4	23.9
Oregon	16.1	17.9	15.2	16.8	21.8	11.2	-15.1	10.5	29.8
Washington	15.2	21.0	17.3	15.9	19.7	38.2	-17.6	-8.1	23.9
Connecticut	15.3	19.6	17.4	16.1	19.5	28.1	-11.2	-7.5	21.1
Georgia	32.7	30.0	29.0	24.6	22.3	-8.3	-3.3	-15.2	-9.3
Maryland	---	30.7	28.3	24.1	29.1	---	-7.8	-14.8	20.7
Massachusetts	9.5	12.9	11.1	11.1	14.3	35.8	-14.0	-	28.8
New York	21.7	27.6	22.9	23.9	24.2	27.2	-17.0	4.4	1.3
Ohio	18.4	23.1	22.0	21.5	24.8	25.5	-4.8	-2.3	15.3
Texas	22.2	25.0	25.6	23.6	24.0	12.6	2.4	-7.8	1.7
Abortion States[2]	23.5	27.1	23.7	23.6	25.9	15.3	-12.5	-0.4	9.7
Nonabortion States	21.5	24.9	24.5	22.3	24.5	15.8	-1.6	-9.0	9.9
Nonreporting States[3]	---	---	---	22.2	24.3	---	---	---	9.5
Reporting States	---	---	---	23.2	25.5	---	---	---	9.9
United States, interstate study estimate	22.2	25.7	24.2	22.8	25.0	15.8	-5.8	-5.8	9.6
United States, NCHS	23.4	26.4	25.5	24.5	27.2	12.8	-3.4	-3.9	11.0
15–19 years									
California[1]	18.0	24.0	20.5	24.4	27.5	33.3	-14.6	19.0	12.7
Arizona	20.6	23.5	24.4	24.9	31.1	14.1	3.8	2.0	24.9
Colorado	15.6	19.5	18.6	16.9	21.1	25.0	-4.6	-9.1	24.9
Hawaii	13.9	22.1	18.6	20.8	27.4	59.0	-15.8	11.8	31.7
Oregon	12.8	16.8	14.4	16.6	21.6	31.3	-14.3	15.3	30.1
Washington	11.2	18.8	16.0	15.7	20.4	67.9	-14.9	-1.9	29.9
Connecticut	9.4	16.0	14.3	15.8	18.7	70.2	-10.6	10.5	18.4
Georgia	29.0	30.9	30.7	28.7	26.3	6.6	-0.6	-6.5	-8.4
Maryland	---	31.7	30.3	26.2	29.6	---	-4.4	-13.5	13.0
Massachusetts	7.7	11.6	11.0	12.2	15.5	50.6	-5.2	10.9	27.0
New York	15.3	22.4	19.0	21.8	22.7	46.4	-15.2	14.7	4.1
Ohio	14.8	20.6	20.6	23.0	25.6	39.2	-	11.7	11.3
Texas	17.5	22.8	23.8	26.0	26.8	30.3	4.4	9.2	3.1
Abortion States[2]	18.7	24.7	22.2	24.4	26.6	32.1	-10.1	9.9	9.0
Nonabortion States	17.1	22.6	22.7	24.3	26.4	32.2	0.4	7.0	8.6
Nonreporting States[3]	---	---	---	22.3	24.3	---	---	---	9.0
Reporting States	---	---	---	25.4	27.4	---	---	---	7.9
United States, interstate study estimate	17.6	23.3	22.5	24.3	26.4	32.4	-3.4	8.0	8.6
United States, NCHS	16.7	22.4	22.3	23.9	26.4	34.1	-0.4	7.2	10.5
20–24 years									
California[1]	39.8	40.5	32.1	34.1	38.8	1.8	-20.7	6.2	13.8
Arizona	50.8	46.8	40.6	34.7	40.9	-7.9	-13.2	-14.5	17.9
Colorado	41.0	34.9	28.5	20.2	24.5	-14.9	-18.3	-29.1	21.3
Hawaii	36.7	33.3	26.5	30.0	35.3	-9.3	-20.4	13.2	17.7
Oregon	30.0	26.2	21.6	22.7	31.2	-12.7	-17.6	5.1	37.4
Washington	28.8	32.2	24.6	21.9	27.8	11.8	-23.6	-11.0	26.9
Connecticut	27.7	27.9	23.0	20.9	26.7	0.7	-17.6	-9.1	27.8
Georgia	54.1	43.0	39.9	32.5	32.3	-20.5	-7.2	-18.5	-0.6
Maryland	---	41.1	37.0	34.2	43.5	---	-10.0	-7.6	27.2
Massachusetts	16.3	18.1	13.9	13.2	18.3	11.0	-23.2	-5.0	38.6
New York	38.7	41.4	31.7	32.4	34.0	7.0	-23.4	2.2	4.9
Ohio	31.9	34.5	29.8	27.2	34.9	8.1	-13.6	-8.7	28.3
Texas	40.1	38.9	37.6	30.7	33.2	-3.0	-3.3	-18.4	8.1
United States, interstate study estimate	40.3	39.9	32.8	31.9	36.9	-1.0	-17.8	-2.7	15.7
United States, NCHS	36.2	36.8	33.6	28.1	33.9	1.7	-8.7	-16.4	20.6

See footnotes at end of table.

Table 6. Estimated nonmarital birth rates and percent changes over time, by age of mother: United States, selected States, and groups of States, selected years, 1965–79—Con.

[Rates per 1,000 unmarried women in specified group]

Age of mother and area	Rate					Percent change in rate			
	1965	1970	1971	1975	1979	1965–1970	1970–1971	1971–1975	1975–1979
Nonreporting States[3]	---	---	---	29.9	34.2	---	---	---	14.4
Reporting States	---	---	---	29.2	35.4	---	---	---	21.2
United States, interstate study estimate	37.6	37.9	33.4	29.5	35.0	0.8	-11.9	-11.7	18.6
United States, NCHS	39.6	38.4	35.5	31.2	37.7	-3.0	-7.6	-2.1	20.8
25–34 years									
California[1]	30.4	29.6	24.6	23.3	25.6	-2.6	-16.9	-5.3	9.9
Arizona	31.9	39.0	34.7	23.7	27.2	22.3	-11.0	-31.7	14.8
Colorado	27.7	18.8	16.8	10.5	13.1	-32.1	-10.6	-37.5	24.8
Hawaii	40.1	31.7	25.8	26.9	32.8	-20.9	-18.6	4.3	21.9
Oregon	22.0	18.0	14.8	16.1	21.6	-18.2	-17.8	8.8	34.2
Washington	23.0	20.4	16.5	14.4	16.8	-11.3	-19.1	-12.7	16.7
Connecticut	28.6	25.8	24.0	15.7	19.4	-9.8	-7.0	-34.6	23.6
Georgia	42.1	24.7	23.1	15.7	16.3	-41.3	-6.5	-32.0	3.8
Maryland	---	27.8	23.7	18.4	27.2	---	-14.7	-22.4	47.8
Massachusetts	11.6	14.3	11.4	9.6	12.2	23.3	-20.3	-15.8	27.1
New York	32.8	36.2	30.4	26.7	25.5	10.4	-16.0	-12.2	-4.5
Ohio	26.3	25.1	24.0	17.5	20.9	-4.6	-4.4	-27.1	19.4
Texas	28.6	22.6	23.6	17.2	17.2	-21.0	4.4	-27.1	-
Abortion States[2]	32.0	30.0	25.9	21.9	23.7	-6.3	-13.7	-15.4	8.2
Nonabortion States	30.4	26.2	26.2	17.9	19.9	-13.8	-	-31.7	11.2
Nonreporting States[3]	---	---	---	21.4	23.1	---	---	---	7.9
Reporting States	---	---	---	18.1	20.4	---	---	---	12.7
United States, interstate study estimate	31.0	27.7	26.1	19.4	21.4	-10.6	-5.8	-25.7	10.3
United States, NCHS	44.4	33.1	30.8	23.9	25.1	-25.4	-6.9	-22.4	5.0
35–44 years									
California[1]	7.5	7.2	6.1	5.4	6.5	-4.0	-15.3	-11.5	20.4
Arizona	13.9	10.2	9.1	5.3	5.9	-26.6	-10.8	-41.8	11.3
Colorado	7.7	4.4	4.3	2.8	2.9	-42.9	-2.3	-34.9	3.6
Hawaii	8.7	5.7	4.0	4.6	5.9	-34.5	-29.8	15.0	28.3
Oregon	4.8	3.6	2.6	3.0	3.4	-25.0	-27.8	15.4	13.3
Washington	4.7	4.6	4.2	3.0	4.4	-2.1	-8.7	-28.6	46.7
Connecticut	5.5	6.5	6.2	4.1	4.3	18.2	-4.6	-33.9	4.9
Georgia	11.9	6.6	6.4	4.1	3.1	-44.5	-3.0	-35.9	-24.4
Maryland	---	6.8	6.1	3.7	4.1	---	-10.3	-39.3	10.8
Massachusetts	2.6	3.2	2.8	2.7	3.2	23.1	-12.5	-3.6	18.5
New York	6.6	7.7	7.5	7.0	7.0	16.7	-2.6	-6.7	-
Ohio	5.9	6.1	4.9	3.5	3.6	3.4	-19.7	-28.6	2.9
Texas	8.1	7.3	7.2	4.8	4.5	-9.9	-1.4	-33.3	-6.3
Abortion States[2]	7.7	6.9	6.3	5.3	5.6	-10.4	-8.7	-15.9	5.7
Nonabortion States	7.7	6.8	6.7	4.4	4.2	-11.7	-1.5	-34.3	-4.5
Nonreporting States[3]	---	---	---	5.2	5.5	---	---	---	5.8
Reporting States	---	---	---	4.4	4.2	---	---	---	-4.5
United States, interstate study estimate	7.7	6.9	6.5	4.7	4.7	-10.4	-5.8	-27.7	-
United States, NCHS	10.2	8.0	7.9	5.9	5.6	-21.6	-1.3	-25.3	-5.1

[1]The rate for 1965 was assumed to be equal to the rate for 1966 because California birth data by marital status are not available prior to 1966.
[2]15 States where abortion was legalized by the end of 1970: Alaska, Arkansas, California, Colorado, Delaware, Hawaii, Kansas, Maryland, New Mexico, New York, North Carolina, Oregon, South Carolina, Virginia, and Washington.
[3]12 States not reporting for most years from 1968 through 1977: California, Connecticut, Georgia, Idaho, Maryland, Massachusetts, Montana, Nevada, New Mexico, New York, Ohio, and Vermont.

NOTE: Unmarried women are defined as those who are single, divorced, widowed, and married but separated. The exception is for NCHS rates for the United States, for which unmarried women include single, divorced, and widowed women only. (See text and references 6-8 for discussion of inclusion or exclusion of separated women among those exposed to the risk of nonmarital birth.)

Table 7. Inferential classification of births by marital status of mother and estimated error: Sample of California births, 1977 and 1979

Item	1979	1977
Nonmarital births		
Number in annual statistics	74,494	64,227
Sampling rate	1/53	1/52
Number in sample	1,418	1,246
False positives:[1]		
Number in sample	14	9
Estimated number in annual statistics	742	468
Estimated percent of nonmarital births in annual statistics	1.0	0.7
False negatives:[2]		
Estimated number in annual statistics	747	502
Estimated percent of nonmarital births in annual statistics	1.0	0.8
Marital births		
Number in annual statistics	304,693	283,349
Sampling rate	1/249	1/251
Number in sample	1,223	1,127
False positives:[2]		
Number in sample	3	2
Estimated number in annual statistics	747	502
Estimated percent of marital births in annual statistics	0.2	0.2
False negatives:[1]		
Estimated number in annual statistics	742	468
Estimated percent of marital births in annual statistics	0.2	0.2

[1]Births erroneously classified nonmarital (should have been classified marital by the inferential criteria). Of the 14 false positives in the 1979 sample, 11 were oversights about surname (3 involving Spanish double surname usage by married women), and 3 were oversights of Asian birthplace of mother. Of the 9 false positives in the 1977 sample, 4 were oversights about surnames (none Spanish), and 5 were oversights of Asian birthplace of mother.
[2]Births erroneously classified marital (should have been classified nonmarital by the inferential criteria). All false negatives in both sample years were oversights about surnames.

Table 8. Number of nonmarital live births in sample and percent distribution by principal inferential criterion applied, according to race and Spanish surname of mother: California, selected years, 1967–79

Race and Spanish surname[1] of mother and study year	Number in sample	Principal inferential criterion applied[2]: All criteria	Father's name not reported	Child's surname different from father's surname	Mother's signature as informant: Maiden surname	Mother's signature as informant: Different current surname[3]	Other
All races		Percent distribution					
1979	1,404	100.0	13.1	12.6	65.6	8.8	-
1977	1,237	100.0	13.5	13.3	62.5	10.7	-
1975	388	100.0	16.2	16.5	58.5	8.2	0.5
1974	788	100.0	13.2	15.5	58.5	10.8	2.0
1970	565	100.0	20.2	26.3	37.9	12.4	3.2
1967	736	100.0	22.4	26.8	36.3	12.0	2.6
White							
1979	940	100.0	16.4	13.5	61.4	8.7	-
1977	881	100.0	16.5	14.8	57.4	11.4	-
1975	274	100.0	20.4	18.2	54.4	6.2	0.7
1974	517	100.0	17.4	17.6	49.9	12.0	3.1
1970	381	100.0	24.2	28.8	32.3	12.6	2.1
1967	537	100.0	27.9	28.6	29.0	11.2	3.4
White, not Spanish surname:							
1979	472	100.0	21.8	17.4	49.4	11.4	-
1977	468	100.0	20.3	17.9	48.5	13.2	-
White, Spanish surname:							
1979	468	100.0	10.9	9.6	73.5	6.0	-
1977	413	100.0	12.1	11.1	67.6	9.2	-
Black							
1979	382	100.0	4.7	8.9	77.5	8.9	-
1977	329	100.0	5.8	9.7	75.7	8.8	-
1975	108	100.0	5.6	11.1	69.4	13.9	-
1974	257	100.0	3.1	11.7	76.7	8.6	-
1970	167	100.0	9.6	20.4	51.5	13.2	5.4
1967	179	100.0	6.7	20.7	57.5	15.1	-
Other							
1979	82	100.0	14.6	19.5	57.3	8.5	-
1977	27	100.0	11.1	11.1	66.7	11.1	-

[1]Mother's maiden surname classified by Nelson-Collins computer program, which approximates 1970 census classification of Spanish surname.
[2]Criteria shown from left to right in order of priority assigned for cases in which more than one criterion applied.
[3]Different from both maiden surname and father's surname.

NOTE: For 1977 and 1979 samples, excludes births misclassified in routine coding.

Table 9. Findings of search for marriage records for subsamples of births classified nonmarital and marital: California, 1979

Item	Inferential classification: Nonmarital	Marital
Number of births in sample	1,404	1,220
Number of births in subsample	[1]57	48
Number for which one or more marriage record located with mother probably matching bride	5	25
One marriage	4	21
Two marriages	1	3
Three marriages	-	1
Number of probably matching records for mother that also match for father and groom	-	24
Percent of subsample with matching marriage record for mother and father	-	50.0

[1]In 9 of these births, father not identified on birth certificate, and search for marriage record not made.

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Appendix I
Reporting status of States, 1965 and 1970–80

Reporting States are those in which the birth certificate includes a question about the legitimacy of the child or the marital status of the mother.

Reporting 1965 and 1970–80 (30 States and the District of Columbia)

Alabama
Alaska
Delaware
District of Columbia
Florida
Hawaii
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Minnesota
Mississippi
Missouri
New Jersey
North Carolina
North Dakota
Oregon
Pennsylvania
Rhode Island
South Carolina
South Dakota
Tennessee
Utah
Virginia
Washington
West Virginia
Wisconsin
Wyoming

Nonreporting 1965 and 1970–80

California
Connecticut
Georgia[a]
Maryland
Montana
New Mexico[a]
New York

Reporting 1965, nonreporting 1970–80

Nevada[b]
Ohio

Nonreporting 1965, reporting 1970–80

Arizona
Arkansas
Colorado
Nebraska
New Hampshire
Oklahoma

Reporting 1965 and 1970–77, nonreporting 1978–80

Michigan
Texas[c]

Nonreporting 1965 and 1970–1977, reporting 1978–80

Idaho
Massachusetts
Vermont

[a]Started reporting in 1980.

[b]Nonreporting 1971–80.
[c]Reporting 1965 and 1970–76.

Appendix II
Inferential criteria

The inferential criteria used in California for statistical classification of births by marital status in 1977 and 1979 are shown below. These criteria are based on the surnames of the mother, father, child, and informant.

If one of the following criteria were met, the birth was classified out of wedlock; that is, it was inferred that the mother was not married to the father of the child.

1. Father's name is omitted.
2. Mother's signature is only informant signature. Mother uses either:
   a) Maiden surname (mother probably never married), or
   b) Surname different from both her maiden surname and father's surname (mother probably divorced, widowed, or separated and not married to father of child).
3. Child's surname is different from father's surname, and mother does not sign certificate as informant.

All births not meeting the above criteria were inferred to be in wedlock. This includes the following "borderline" or special groups:

1. Informant is someone other than mother or father of child.
2. Mother's signature as the informant indicates Spanish usage for married women. In this usage, the married woman signs a double surname, with her husband's surname followed by her maiden surname. Spanish usage, in which a person's paternal surname is followed by his maternal surname, may also have been used in reporting the name of the child's father. Where appropriate, coders should check the middle name reported for the father because sometimes this is actually his paternal surname—the name the mother has used in signing the certificate.
3. Child is given mother's maiden surname or any other surname, and mother uses father's surname in signing as informant.
4. Child is given double surname or any other surname, and both parents sign as informants with mother using maiden surname.
5. For ethnic groups listed below, if father's name is reported and mother uses only her maiden surname in signing as informant, a special rule is applied. Married women in these groups typically use their maiden and not their husband's surname in signing birth certificates or other documents. The maiden surname may appear before the given name (home country practice) or after the given name (a start on American practice). The special rule is applied if the mother was born outside the United States and her birthplace, race, or ethnicity is given as Chinese, Vietnamese, Cambodian, Laotian, Thai, Korean, or Asian.

Appendix III
Intercensal population estimates

The populations used as denominators to compute birth rates for unmarried women by State are based on unpublished population estimates by age prepared by the U.S. Bureau of the Census using a component method.[17] The percent female, percent white, and percent unmarried were applied to the population estimate for each age group. These percents were derived from the 1970 census, U.S. Bureau of the Census administrative records studies, and the Current Population Survey.

The assumption behind the intercensal estimates is that the proportions unmarried among women in different age and race groups in each State have changed since 1970 in the same direction and by the same relative amounts as indicated for the country as a whole by the Current Population Survey. For California, this assumption was tested by comparison of study proportions with data from the 1980 State Census Summary Tape File 2. This showed close agreement between 1980 State Census proportions unmarried and the study proportions projected to April 1, 1980. (There was less than 2-percent difference for each age group of women except ages 35–44, for which the difference was 3 percent.) Thus, for California, only a small error results from using this assumption about marital status.

Rates for 1975 and 1979 were revised to take into account the results of the 1980 census. Rates for 1971, another intercensal year examined in this report, were not adjusted because the adjustment would have had little effect on the estimated rates and would have required considerable resources that were not available. The 1980 census data used to revise the 1975 and 1979 rates by age were obtained from a 1980 census publication.[19] The 1980 data by race were unpublished estimates consistent with the Office of Management and Budget categories and the 1970 race classification.

The method used for adjusting the 1975 and 1979 population estimates used in this report is identical with that used by the U.S. Bureau of the Census to prepare national intercensal population estimates for the United States.[18] Denominators for the adjusted rates are based on the original study estimates of female populations by age because they incorporate the best estimates presently available of net migration in each State in each intercensal year. The method of adjustment takes into account both the length of time since the 1970 census and the discrepancy between the 1980 census count and the study estimates projected to April 1, 1980. Algebraically, the procedure is as follows:

$$F_{itj} = f_{itj} \cdot \frac{(10-t)\, f_{i,10,j} + t \cdot F_{i,10,j}}{10 \cdot f_{i,10,j}}$$

where

i = each selected State and group of States.

t = 5.25 or 9.25 (number of years from April 1, 1970, to July 1, 1975, and April 1, 1970, to July 1, 1979).

j = age groups 15–44, 15–19, 20–24, 25–34, 35–44; also, 15–44 white, 15–44 all other races.

F_{itj} = revised estimate for State i at time t of number of females in age-race group j; $F_{i,10,j}$ = 1980 census count.

f_{itj} = original study estimate prepared before availability of 1980 census findings; $f_{i,10,j}$ = study estimate projected to April 1, 1980.

NOTE: A list of references follows the text.

Appendix IV
Nonlicensed marriages in California

The following discussion of nonlicensed marriages was abstracted from a detailed report on this topic prepared by the California Center for Health Statistics.[20] Nonlicensed marriages are those in which couples who have been living together are allowed to be married confidentially without obtaining a license or health certificate. The legislation permitting these marriages was adopted in 1878 (Section 4213 of the California Civil Code). Its purpose was to legitimize longstanding relationships of couples and to secure inheritance rights of their children without the embarrassment of a publicly announced wedding. Records were kept only by clergymen performing the marriage, so the number performed each year was unknown.

In the 1960's an increase in unlicensed marriages was indicated from fragmentary data. In 1972, Section 4213 was amended to require reporting to county clerks, who in turn were required to keep sealed records and to report total numbers to the California Department of Health Services. This documented the rapid increase and large volume of nonlicensed marriages between 1972 and 1981 (1,290 to 54,121).[20,21] Although no surveys have been conducted to explain the trend, it seems likely that both convenience and commercial promotion were involved. Legislation effective January 1, 1982, established new requirements for California nonlicensed marriages, including maintenance of a statewide alphabetic index.

NOTE: A list of references follows the text.

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