CONSIDERATIONS IN USING INDIVIDUAL SOCIOECONOMIC CHARACTERISTICS IN THE ANALYSIS OF MORTALITY

Mary Grace Kovar and James A. Weed
National Center for Health Statistics

In the last paragraph of their APHA monograph Differential Mortality in the United States, Kitagawa and Hauser (1973) gave strong support to the view that the improvement of social-economic conditions would be the most promising route to take in achieving further mortality reduction:

> Perhaps the most important next gain in mortality reduction is to be achieved through improved social-economic conditions rather than through increments to and application of biomedical knowledge. Certainly the biomedical know-how now available is either not available to the lower socioeconomic classes in the United States, or its impact, at this stage in the reduction of mortality, is relatively small compared to what could be achieved through reduction of the gap in levels of living and life styles associated with education, income, occupation, and geographic locale. If the United States is to demonstrate that she is indeed a land of equal opportunity, she must do considerably more to increase equality of opportunity on all fronts which affect the most significant index of effective equalitarianism--the ability to survive--duration of life itself.

These words were written in 1972 and referred to the authors' analyses of the cross-sectional 1960 Matched Records Study and of longitudinal census tract data for the city of Chicago. Socioeconomic differences in mortality were evident at both the individual and aggregate levels of analysis, no matter which indexes of socioeconomic level were employed. However, the longitudinal analysis of aggregated data for Chicago census tracts provided a finding which had special significance for the authors' conclusion regarding the improvement of social-economic conditions. They observed that between 1930 and 1940 there was a general convergence of socioeconomic differentials in the Chicago area, followed by a widening of these differentials between 1940 and 1960. As Kitagawa has more recently noted (1977), other research has also indicated a reversal of the older trend, i.e., now toward increasing socioeconomic differentials in mortality. For example, Lerner and Stutz (1976, 1977) have found widening differentials between 1960 and 1970 for Maryland and for the United States as a whole.

All of the studies which show a recent widening of socioeconomic differentials in the United States have been based solely on aggregate (or areal) data, employing "ecological" methods of analysis. Indeed, the largest part of research on mortality differentials has been based on aggregate data. Hannan and Burstein (1974) have noted that there generally will be a loss of efficiency for estimates from grouped observations. Moreover, using a structural equations perspective, they have shown that grouping of observations may result in biased estimates, depending on the nature of the causal relationships between the grouping criterion and the variables--both dependent and independent--in the model. Their analysis also emphasizes the possibility that grouping may have the effect of magnifying specification error in the micro-model of interest.

In view of these analytical considerations, we suggest that more attention should be given to the development of data systems which can provide individual socioeconomic characteristics in the analysis of trends in mortality. Accordingly, the purpose of this paper is to discuss important issues relating to the design of individual-level data systems with this goal.

Conceptualizing the variables.

One of the first concerns to be dealt with by anyone proposing an individual-level study of socioeconomic differentials in mortality is the problem of how to conceptualize the variables of interest. Generally, the resolution of this problem requires that we keep in mind how the parameter of common interest is calculated. We will usually want to obtain a rate for each socioeconomic group such that the weighted rates sum to the rate for the total population:

$$r_i = \left(\frac{\text{Deaths in class i during time period}}{\text{Population in class i during time period}}\right) xC$$

for each of K classes where each class is defined as a mutually exclusive subgroup of the total population such that

$$R = \text{rate for the total population} = \sum_{i=1}^{K} r_i p_i \text{ where}$$

p_i = proportion ith class is of the total population: $\sum_{i=1}^{K} p_i = 1.$

The problem which is immediately apparent even though the implications are not always realized is that a rate consists of a numerator and a denominator and that the classifications in the numerator and denominator should be identical. In forming an appropriate classification, the system must form classes which

1) are mutually exclusive and exhaustive of the population;
2) answer the question being asked;
3) make it possible to collect the data.

Creating mutually exclusive and exhaustive categories is a problem we always have to confront. The second and third considerations must always be faced as well, but because we are concerned here with mortality there are some extra problems which emerge. Among the socioeconomic characteristics of potential interest, some are fixed regardless of stage in the life cycle, some are stable (or at least relatively so) during adulthood, and some are subject to change over the entire life cycle. Examples of unchanging characteristics are sex, race, and ethnic group. Education and religion are characteristics that are relatively unlikely to change during adulthood, at least after age 25. Those characteristics changing throughout life clearly form the largest group, including age, marital status, size of family, living arrangements, quality of housing, employment status, labor force participation, occupation, income, assets, and residence.

From their analyses, Kitagawa and Hauser (1973) drew the conclusion that "education is probably the single most important indicator of socioeconomic status for mortality analysis." (p.179) Education was the measure they used to calculate excess deaths--the deaths which would not have occurred if the estimated age-specific death rates of white men (or women) who had completed at least one year of college had prevailed in each color-education subgroup of men (or women). It seems reasonable to infer that the usefulness of education as an indicator of socioeconomic status derives considerably from the stability of a person's educational level over adulthood.

If the characteristic of interest is one which changes over the life cycle, then the time reference is critical. For example, the question "Do mortality rates differ by income?" is deceptively simple and laden with traps for the unwary. The question must be clarified by stipulating a time frame. Specifically, we might refer to income at the time of death, but if we do so, we must be aware of the fact that two-thirds of the deaths in the United States are deaths after the 65th birthday when the majority of people are retired and probably have reduced incomes. For persons who die younger, it is possible that many such persons had to quit working because of the disability which led to death and consequently had unusually low incomes during the last year of life. Alternatively, we could be interested in maximum income earned during adulthood, or average annual income throughout adulthood. In the latter instances, it would be difficult to avoid expressing income in constant dollars. To study stress due to reduced income, the magnitude of the income reduction and the interval since it occurred would both be needed. To answer other types of questions, it might be necessary to obtain income of family during childhood, to supplement information on family background. In addition, it may be essential to distinguish between family income and individual income, because family size and relationships also change over time, and some people never do have any individual income. The answers to such questions will dictate the kinds of data one attempts to collect, and in turn the method of data collection. Viewed from the opposite direction, the limitations of the data collection system will modify the amount and type of data which can be collected, and the analytical design as well.

Data Collection Systems: A Typology.

It is useful to organize our discussion of issues related to the study of socioeconomic differentials in mortality by setting up a typology of possible mechanisms for collecting data on individual socioeconomic characteristics, as follows:

- Single systems: Numerator and denominator from the same source
  - Longitudinal
    - Population Registers
    - Prospective Studies designed for special purposes
  - Cross-sectional
    - Census of population
    - Interview surveys
      - Regular interview survey
      - Multiplicity survey
- Dual systems: Numerator and denominator from independent sources
  - Longitudinal
  - Cross-sectional
    - Record Matching
    - Follow-back surveys
      - Denominator from existing system
      - Denominator from special questions or systems

Single system longitudinal.

Longitudinal systems are those in which a cohort is defined by a characteristic or characteristics common to the group (born in a certain year, living in a specified area, members of a union) and the study group so defined is observed until the event of interest, in this case death, occurs. In a cohort study some of the relevant events may or may not have occurred at the time the cohort is defined but

death will not have occurred and the investigator must wait.

In theory, longitudinal systems are by far the best means of collecting data for differential mortality analysis. Data can be recorded on a continuing basis as people age so that there are no recall problems due to forgetfulness or bias because of later events.

The major disadvantages are due to the length of time involved. If data are needed to answer a current question, setting up a longitudinal data system now will not be useful. The cost of a longitudinal system is large as a staff has to be maintained over many years and the staff will change over the years as people involved in the original plan move on. Members of the cohort may be lost to observation unless very carefully followed and, if lost, must be traced to reduce bias.

Many of these disadvantages may be overcome if it is possible to tap into an existing system and utilize the data already collected.

In some countries there is a population register for the entire population which has to be updated each time an individual moves, changes jobs, or when other specified events occur.

The United States does not maintain a comprehensive population register. There are, however, a number of special registers which people stay on continuously. The Medical Follow-up Agency makes the medical experience of the general military-veteran population available and maintains a registry of 16,000 pairs of veteran twins as a subsidiary resource. There are disease registers, of which the cancer registers are probably best known. There are categorical program registers such as the Medicare recipients. There are registers maintained by some unions and professional organizations. For the most part these have not been utilized to study socioeconomic differentials in mortality and many of them in their present form cannot be used because the socioeconomic data are not recorded. It should be possible to add at least education to the data collected and thus increase their usefulness.

Prospective studies are designed for the specific purpose of following a cohort and recording observations about its members over a long period of time. They could be extremely useful for analysis of socioeconomic differentials if they were designed for that purpose, as the data are usually very carefully collected and recorded for the study participants.

There are two methodological problems with many of the prospective surveys now underway which make it impossible to draw inferences about socioeconomic differentials for the total population at risk. The first is that they are not probability samples. Many consist solely of white males who volunteer for the study and then remain participants on a voluntary basis. Some are restricted by the condition that the participants be healthy when the study began. The second problem is the well-known Hawthorne effect--the act of observing may change the characteristic being observed. The participants in a study usually receive some benefit from participation and the benefit is often early diagnosis or receipt of services which may affect the risk of death.

This is not to say that the prospective studies now underway are not useful or that a prospective study could not be designed to analyze socioeconomic differentials. The present studies are extremely useful for many purposes such as the study of physiological change. A study designed for socioeconomic analysis should be a probability sample of a defined population, must take into account the possible effects of observation on the participants, must have careful follow-up procedures for dropouts and analytical procedures for allowing for the dropouts, must be large enough to detect differences among the socioeconomic classes of interest, and must be well-funded over a period long enough for data collection and analysis.

Single system cross-sectional.

Cross-sectional studies are those in which data on the event of interest and the relevant variables all relate to the same point in time although the time reference may be extended through recall. When a single source is used to collect numerator and denominator data, the number of people who died and their characteristics must be obtained at the same time data on the population at risk is obtained. Collecting data on decedents in this fashion presents a number of methodological difficulties.

Any demographer knows that we have far better definitions of socioeconomic variables and far better data available for fertility than we do for mortality. One reason is the reality of funding; there has been far more funding for fertility research than for mortality research. A second, and more subtle reason, is that, given the paucity of information on either birth or death certificates, it is far easier to collect additional data on births than on deaths.

The usual method of collecting socioeconomic data is through a household interview census or survey. Such a survey works well for births, which are associated with family dissolution. It is possible through interviewing people in households to identify children by date of birth and collect the data of interest. In almost all cases the mother is living; in most cases the child is also. Contrast that with conducting household interviews to collect data on persons who died, say, within the year.

Two-thirds of the decedents in the United States are age 65 and over. In 1960, 4 percent of the population age 65 and over were residents of institutions, and 22 percent lived either

alone or with non-relatives. If there were no differential in death rates by living arrangements, that is, if death rates for people not living in families were the same as rates for people living in families, 22 percent of the elderly decedents would be missed on a census because there would be no surviving family member in the household to report for them and an additional 4 percent would be missed on an interview survey which did not cover residents of institutions.

However, death rates are not the same for elderly people in each type of living arrangement. In 1962-3, 23 percent of the elderly decedents were residents of institutions. Thirteen percent lived alone, and 4 percent lived with non-relatives. A question on the census would have missed 13-17 percent of the elderly decedents and a household survey would have missed 41 percent. Any analysis of death rates by socioeconomic status would be biased to the extent that socioeconomic status was associated with living arrangements. And that association does exist; people living alone or with non-relatives are poorer and less educated than those in families.

Among younger adults, the proportions living alone or in institutions are much lower but the differential death rates by living arrangement still exist. An additional problem is that when death occurs a household sometimes breaks up and reforms. The surviving member(s) move(s) in with someone else. There is no one in the original household left to interview. We do not have data on the extent of household reformation.

If a child dies, the household usually remains and data could be collected. Since deaths of children are rare events, the number of interviews required to yield a sufficient number of deaths for reliable estimates would be very large with consequent high cost.

One point that has been touched on needs to be stated explicitly. Age is important when considering the data needed and the best method of collecting it. Children are almost always living in families and their socioeconomic characteristics are those of the family. Adults under age 65 are usually living in families and the socioeconomic data of interest may be individual or family characteristics. Adults age 65 and over frequently are not living in families, the socioeconomic data of interest may be individual or family and may be current or from some time when they were eligible for employment, and household surveys do not include residents of institutions.

It is a shame that the household interview survey is not useful, as response rates for the continuing national surveys remain at approximately 95 percent. The effective ongoing data collection systems exist, but the disintegration of household of decedents and the fact that death is a rare event--on a population basis--preclude using this mechanism to collect data for the analysis of socioeconomic differentials in mortality.

A relatively new development in interview surveys is the multiplicity survey in which household respondents are asked to report not only for their own household members but also for a specified set of relatives (Sirken and Royston, 1970, 1973).

The advantages of a multiplicity survey are:

A. Smaller sampling errors than conventional survey;

B. Reduced response bias for decedents who lived alone at time of death, as a surviving relative in another household can report for them;

C. Can include institutional decedents.

The disadvantages of a multiplicity survey are:

A. Interviewer must collect the additional items;

B. Estimation and weighting procedures require carefully defined information;

   1. Household weight requires knowledge of the number of households containing persons eligible to report the death.

   2. Person weight requires knowledge of (a) the total number of persons eligible to report the death, and (b) the number of eligible persons living with the respondent. This is easier to collect because no knowledge is required of the location of other eligible persons.

No research has been done yet on whether the multiplicity approach will be useful for collecting socioeconomic data. Research to date has focused on how well the death itself has been reported and the basic demographic data.

Dual system longitudinal

It is possible to ascertain the fact of death from an independent source, usually the death certificate, and match that record with the records from a longitudinal data system or with record collected at some time in the past. This has in fact been done in epidemiological studies and has been especially useful in determining whether exposure to environmental conditions results in increased death risks.

Determining whether death has occurred and, if so, where (so that the death certificate can be located) is difficult and tedious. This has led to proposals for a National Death Index--a computerized register of all deaths occurring each year in the United States which could be used to ascertain whether an individual has died and in what State. Such a system would have all the problems inherent in any matching study but could greatly expand the potential

for socioeconomic analysis by providing the means for matching records from a census or survey with death records each succeeding year.

Dual system cross-sectional.

These systems, in which data on deaths are collected from the death registration system (or from surveys using it as a sampling frame) and data on the population are collected from another system, have been the only sources of National data on individual characteristics for the analysis of socioeconomic differentials in mortality.

The 1960 Matched Records Study is the prime example for the United States of using record linkage to provide nationwide information on socioeconomic differentials in mortality. The particular social and economic characteristics collected in the 1960 census, available on either Stage I records (complete enumeration) or Stage II records (25 percent sample), basically determined the operationalization of the social and economic differentials studied.

There was a total of 534,623 death certificates received by the National Center for Health Statistics in the period of May through August 1960. These deaths were taken as the universe in order to reduce the problems of matching death certificates to census schedules obtained in April 1960. To further reduce the cost of the manual search for matching records, half of the white decedents 65-74 were eliminated, and four-fifths of the white decedents over 74 were eliminated. This left a total of 340,033 death certificates to be matched to census schedules.

Next, the Bureau of the Census searched the complete enumeration schedules (Stage I) to link the 100 percent enumeration items with the death certificate information supplied by NCHS. Finally, those decedents matched with the first stage were matched to the second stage of the census, which contained much fuller socioeconomic information for a 25 percent sample of the population. As the Table 1 shows, 77 percent of the death certificates were matched to the 100 percent enumeration schedules. Of these 24 percent were matched with the sample enumeration schedules. Thus, about 18 percent of the decedents were available with full socioeconomic information. Among nonwhite decedents, the number of certificates not matched with Stage I schedules was about 50 percent higher than among white decedents. The potential for a racial bias is quite clear.

In order to estimate the "match bias" produced by failure to link certain decedents with Stage I schedules, the National Center for Health Statistics carried out a follow-back survey on a sample of decedents taken from the 340,033 decedents originally matched. It was intended that the results of this survey would enable researchers to make appropriate adjustments for bias, provided that the survey itself had minimal response bias. As it happened, although the census match rate was only 77 percent, the mail survey had a total response rate of 88 percent, and the personal interview follow-ups raised this to 94 percent (Table 2). When the response rates for unmatched white decedents were compared to those for the matched white decedents, it was found that the response rate varied between 87 and 93 percent (depending on the age group) for the unmatched group, and between 94 and 95 percent for the matched group. Thus there was very little relationship between match status of a decedent and the survey response for that individual. Moreover, the response rate for the matched group was somewhat higher than that for the total census schedule linkage to certificates. Kitagawa and Hauser concluded that

> The wide variations in nonmatch rates indicate that mortality differentials based on matched deaths alone would be subject to significant distortion and demonstrate the need for estimates of the social and economic characteristics of unmatched decedents.

As a result, the authors were forced to develop rather complex estimates of mortality ratios. Their decision not to calculate standard error estimates was also partly determined by the complexity of the ratio calculation procedure. And, of course, they were limited in analysis by the data available on the census. Essentially, socioeconomic status at time of death was the only information available for analysis.

The inability to match records for certain population subgroups is a reminder that there are serious biases using the census as a denominator for some forms of socioeconomic and mortality analysis, due to underenumeration on the census. Kitagawa and Hauser pointed out that differentials originally observed were reduced after they made corrections and that matching problems were especially serious for certain age, color, education, marital status and cause of death categories (TB, cirrhosis, accidents, and suicide). A recent paper by Rives demonstrates the effect of the 1970 census underenumeration on the life tables for the black population (Rives, 1977).

Interesting additional information on those problems comes from another matching study which immediately followed the Kitagawa and Hauser study. Records on psychiatric admissions in Louisiana and Maryland were matched with the census data for those two States. In this population, which was heavily weighted with poor people, black people, and people who had a high probability of being outside the mainstream of residing in nuclear households (the categories where underenumeration is a problem), the match rate was only 67 percent and the poorest rate for any diagnostic category was for alcoholics.

Finally, I'd like to note that you can only do a matching study when there is complete enumeration of the popualtion denominator to

match against. Heretofore, that has meant that matching studies of adult mortality could only be done every ten years--when there is a decennial census. The introduction of the quinquennial census will reduce this to every five years. The long intervals between censuses is a problem in areal studies as well.

Matching studies for infant mortality can be done at any time by matching against the birth certificate. The only disadvantage then is that one is limited to the information recorded on the two certificates. The birth certificate, unlike the death certificate, does have education on it. Because the birth and death occur so closely in time, are both recorded through the vital statistics registration system, and usually occur in the same State, problems of matching are vastly reduced. In comparison with matching problems on adult mortality, they are virtually eliminated.

In follow-back surveys, the numerator is a sample of the decedents and the denominator is from an independent data-collection system. The denominator can be from another set of records, a census, or from an independent population survey.

A national mortality survey was in operation at the National Center for Health Statistics on a continuing basis from 1961-1968 (in addition to the 1960 follow-back which supplemented the census match).

The procedure used in collecting the numerator data in this survey took advantage of the Current Mortality Sample, a 10 percent sample of deaths submitted by each State each month. This 10 percent sample was subsequently subsampled at a sampling rate of one out of 33, producing an overall rate of 1 out of 330 deaths registered in the United States. A mail survey then was the principal method of data collection. The primary source of information was the person who provided the funeral director with the personal information about the deceased for recording on the death certificate. The mailing address of the death record informant is usually reported on the death record but each primary source informant, attending physician, funeral director was asked to identify other persons who might be able to complete the questionnaire. Therefore, information was also collected from a secondary source if the primary source could not provide all of the requested information. There were also provisions for collecting missing information by other means; these included telephone and personal interviews which were carried out by the Bureau of the Census. Followup mailings were routinely sent to persons not responding, and other mailings were made to obtain complete and consistent information on the forms rejected as inadequate in a concurrent editing procedure. A poststratified ratio estimation procedure was used to make estimates.

The response rates for these surveys were about 90 percent; about 10 percent of the forms mailed to the informants either did not reach the informant or were not returned (Tables 3 and 4). The basic demographic information was available from the death certificate regardless of response and that information was used for imputation of the missing data.

The great advantage of collecting numerator data by this method (in addition to the high response rates and the provision for going to another source if the first one didn't know the information) is that questions asked on the follow-back survey can be matched precisely to the questions asked on the denominator data source. Wording and recall periods can be synchronized. Classification problems are minimized.

It is therefore possible to ask questions on a follow-back survey precisely as they are asked on the decennial census so that the concepts and categories are precisely the same without the necessity of matching. It is also possible to ask questions for infant deaths precisely as they are worded on the birth certificate.

However, by far the most flexible, and perhaps the most interesting, method of collecting denominator data is to have a concurrent survey especially designed to collect the data or to add special questions to an ongoing survey. Both approaches have been used.

In 1964-1966, the National Infant Mortality Survey--a follow-back based on infant death certificates--was in the field. During the same time period, the National Natality Survey--a follow-back based on birth certificates--was in the field to collect the denominator data. Response rates were high on both surveys (Tables 5 and 6). In June 1965 special questions were added to the Current Population Survey to serve as a denominator for the Natality Survey. The result was two sets of data on socioeconomic characteristics:

1964-66 National Infant Mortality Survey	Numerator
1964-66 National Natality Survey	Denominator
and	
1964-66 National Natality Survey	Numerator
June 1965 Current Population Survey	Denominator

Later, the 1966-68 Mortality Survey was devoted to questions on smoking. The same questions were asked on the Current Population Survey to provide precisely matched denominator data. Both surveys included questions on past history as well as current status.

In general, such an approach offers enormous flexibility for research. The matching of the

questions and the recall periods means that problems of recall, for example, are the same for both surveys. And you are not limited to the status at time of death; you can collect data about past history. The disadvantage is denominator data. Undercounting may still exist in an interview survey and residents of institutions are not included. However, they can be excluded from the numerator so that the universes are the same.

We would like to close with a few considerations other than response rates and matching--considerations which may overwhelm all statistical ones. Most important is cost. A follow-back survey is relatively inexpensive. The sampling frame is available through the continuous registration of deaths, sampling design is easy, estimation procedures are simple, and a mailed questionnaire is the interviewer. Data processing and analysis costs are the same as for other methods. A second consideration is the time it takes to complete a study. Data are more useful if they become available soon after the event of interest.

There is a great need for data for social epidemiology. Programs are being established, e.g., to pay for medical care for people in poverty and to provide services in areas where the median income is low, without enough data to help make intelligent decisions. One result of relying on area data has been that public services are located in areas where the median income is low, although there may be as many or more poor people living in areas with higher median incomes who do not have access to these services.

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TABLE 1

Results of Matching 340,033 Death Records with 1960 Census Records, by Color and Sex: United States, May-August, 1960 Matched Records Study

Result of Census Match Operation	Total	White		All Other	
		Male	Female	Male	Female
Total Deaths in Match Operation	340,033	170,353	106,777	35,012	27,891
Deaths Matched with Stage I Census	262,966	133,921	85,484	23,836	19,725
Percent Matched	77.3	78.6	80.1	68.1	70.7

Source: Kitagawa and Hauser, Differential Mortality in the United States, 1973, p. 187.

TABLE 2

Response to NCHS 1960 Follow-back Survey, for 8,121 Decedents 25 years of age and over, by Color and Sex and Whether or not Matched on Stage I Census Record

Response to NCHS Survey	Total	White		All Other	
		Male	Female	Male	Female
Total Decedents in Survey	8,121	4,199	2,936	542	444
Responded to Survey	7,580	3,936	2,762	483	399
Percent Responded	93.3	93.7	94.1	89.1	89.9
Matched with Census	6,481	3,384	2,379	392	326
Responded to Survey	6,108	3,198	2,257	355	298
Percent Responded	94.2	94.5	94.9	90.6	91.4
Unmatched with Census	1,640	815	557	150	118
Responded to Survey	1,472	738	505	128	101
Percent Responded	89.8	90.6	90.7	85.3	85.6

Source: Kitagawa and Hauser, Differential Mortality in the United States, 1973, pp. 189-190.

TABLE 3

Number of Sample Cases and Percent for Which Response was Received, by Age, Color, and Sex of Decedents: 1962-65 National Mortality Surveys

Age, color, and sex of Decedents	Number	Percent with Responses
All decedents	22,948	90.5
Age in years		
Under 1	2,392	85.1
1-14	423	84.2
15-24	362	88.1
25-44	1,314	89.1
45-54	1,907	88.5
55-64	3,406	88.7
65-74	5,274	91.8
75 and over	7,870	93.1
Color		
White	19,982	91.3
All other	2,966	85.3
Sex		
Male	13,053	90.3
Female	9,895	90.8

Source: Unpublished data from the Division of Vital Statistics, National Center for Health Statistics.

TABLE 4

Number and Percent Responding to Informant Questionnaire in the National Mortality Survey, 1966-68

Year of Survey	Number of Decedents in Sample	Percent with Responses
Total	19,526	92.3
1966	6,391	93.6
1967	6,370	94.8
1968	6,765	88.6

Source: Unpublished data from the Division of Vital Statistics, National Center for Health Statistics

TABLE 5

Number and Percent Responding by Selected Characteristics of Mothers in the National Natality Survey, 1964-66

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

Source: National Center for Health Statistics, Vital and Health Statistics, Series 22, No. 14

TABLE 6

Number and Percent Responding to Informant Questionnaire by Selected Characteristics of Deceased Legitimate Infants in the National Infant Mortality Survey, 1964-65

Characteristics of Deceased Infants	Total Number of Legitimate Infants	Percent with Response
Total	1,497	87.9
Race		
White	1,164	88.7
Black	302	86.4
Other	31	71.0
Region		
Northeast	302	90.7
North Central	439	89.5
South	515	89.3
West	241	76.4
Metropolitan status		
Metropolitan	907	88.9
Nonmetropolitan	590	86.4
Age at death		
Under 1 day	613	88.3
1-6 days	361	89.5
7-27 days	105	85.7
28 days-5 months	293	87.4
6-11 months	125	84.8

Source: National Center for Health Statistics, Vital and Health Statistics, Series 22, No. 14.