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## COMPARABILITY OF THE DEATH CERTIFICATE AND THE 1986 NATIONAL MORTALITY FOLLOWBACK SURVEY

International Institute for Vital Registration and Statistics  
9650 Rockville Pike  
Bethesda, Maryland 20814-3998  
U.S.A.

## Foreword

In any data collection system, the quality of the information collected should be one of the primary concerns. In a civil registration and vital statistics system, there are a number of important uses to be made of the data, both by individuals and by the various users of the aggregated data. However, the means for assessing the accuracy of the reported vital statistics information is not often easily available. Vital records followback surveys provide one kind of tool for looking at the quality of the information.

Vital records followback surveys are so named because they typically begin with a file of vital records which provide a sampling frame from which a sample of the records are "followed back" to the informant or provider of the information on the record. This technique permits collection of more detailed or different information than can be collected on a registration document, while at the same time allows comparisons between the two data collection methods for selected items appearing in both systems.

This paper reports on a study which compares the demographic data reported on a sample of death certificates with the responses to similar demographic items asked on a questionnaire sent to the informants who had originally provided the data for the death certificates. Although there was no way to tell which of the two sources, registration information or survey response, was correct when they were not in agreement, the measure of disagreement for each item studied serves as an indicator of the quality for that item. Thus, measures of disagreement for items such as age, race, marital status, occupation, and place of death are derived from two different methodologies and at two points in time for a sample of decedents.

This paper is a somewhat abbreviated version of the following report: Poe, Gail et al. Comparability of the death certificate and the 1986 National Mortality Followback Survey. National Center for Health Statistics. VITAL HEALTH STAT 2 (118) 1993.

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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 standard of reliability or precision
- # Figure suppressed to comply with confidentiality requirements

# COMPARABILITY OF THE DEATH CERTIFICATE AND THE 1986 NATIONAL MORTALITY FOLLOWBACK SURVEY

by Gail S. Poe, M.P.H., Division of Vital Statistics; Eve Powell-Griner, Ph.D., formerly with the Office of Vital and Health Statistics; Joseph K. McLaughlin, Ph.D., National Cancer Institute; Paul J. Placek, Ph.D., Office of Vital and Health Statistics; Grey B. Thompson, Ph.D., formerly with the Division of Vital Statistics; and Kathy Robinson, formerly with Information Management Services

## INTRODUCTION

The death certificate is the primary source of annual mortality data in the United States (See appendix I). The validity of cause-of-death information has been studied extensively (1,2), as has the accuracy of the occupation and industry items (3-16). Less information exists on the quality of the remaining information on the death certificate. Two studies have compared Census Bureau Population Study interview responses with death certificate entries (17-20). In 1986, the National Mortality Followback Survey (NMFS) was conducted by the National Center for Health Statistics (NCHS) to provide a large amount of information, most of which is not available elsewhere, on a sample of deaths. These data are useful in assessing the reliability of demographic items reported on the death certificate.

The purpose of this report is to assess the comparability of demographic information obtained from responses on the death certificate with data from the 1986 NMFS, which is an independent source using a different method of data collection, for those items common to both sources. Although it is not possible to discern which source of data is valid, the level of agreement sheds light on the quality of these information systems.

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NOTES: The data collection agent for the survey was the Bureau of the Census. Cosponsors of the survey included the Health Care Financing Administration; the National Cancer Institute; the Indian Health Service; the National Heart, Lung, and Blood Institute; the National Institute on Aging; the National Institute of Child Health and Human Development; the National Institute of Mental Health; the Veterans Administration; and the Office of the Assistant Secretary for Planning and Evaluation in the Office of the Secretary of the Department of Health and Human Services.

This report was prepared in the Division of Vital Statistics of the National Center for Health Statistics. Isadore Seeman, formerly with the Office of Vital and Health Statistics Systems, provided overall project direction; Steven Botman, Office of Research and Methodology, provided guidance in the design of the sampling procedure; Ruth Parsons, Information Management Services, provided guidance on computer programming; Betty Smith, Statistical Resources Branch, Division of Vital Statistics, provided content review. This report was edited by Margaret Avery and typeset by Annette F. Gaidurgis, Publications Branch, Division of Data Services.

## SOURCES AND LIMITATIONS OF DATA

The data presented in this report are based on the 1986 NMFS conducted by the National Center for Health Statistics and on the death certificates filed with State registrars of vital statistics and compiled by NCHS. The 1986 NMFS comprised a nationally representative sample of adults aged 25 years or over who died in 1986. Oregon was not included in the survey because of the State's respondent-consent requirements. The data are, therefore, representative of deaths of adult residents in the United States excluding Oregon. A detailed description of the methods and procedures used in the NMFS has been published (21).

The universe for the 1986 NMFS was composed of all death certificates of decedents 25 years of age or older filed in the United States. The sampling frame consisted of death certificates selected from the 1986 Current Mortality Sample (CMS). The CMS is a 10-percent systematic sample of death certificates received by the State vital statistics offices and transmitted to NCHS about 3 months after the deaths. CMS records were selected for each month of the year. The total sample was 18,733 decedents. This sample included 2,274 deaths selected with certainty (at a sampling rate of 100 percent within the CMS) to meet specific research needs. The groups for which all deaths in the CMS were selected included American Indian, Eskimo, and Aleut decedents; all deaths due to Asthma; deaths due to Ischemic heart disease for males 25-44 years of age and females 25-54 years of age; and deaths for selected cancer sites. Black decedents were oversampled 2.9 times, and decedents under age 55 were oversampled 3.1 times.

The data presented in this report are not weighted. They reflect what actually occurred in the sample rather than estimates of the degree of comparability from an examination of all death certificates for U.S. residents 25 years of age and older dying in 1986.

It is possible, if desired, to prepare weighted estimates of consistency because the public-use data tape contains a weight for each record (22). Because of the oversampling of some groups that generally had slightly lower agreement rates, weighted estimates would have produced slightly higher overall rates of agreement. In the tables, an asterisk is shown for estimates of percents in

which there are fewer than 30 cases in the denominator, because these figures do not meet standards of reliability or precision.

An NMFS questionnaire was mailed to the death certificate informant, usually the decedent's next of kin or another person familiar with the decedent. A followup questionnaire was mailed for nonresponding cases. Telephone and personal interviews were attempted for cases where there was no mail response.

Following data collection, the questionnaire data and the CMS information were matched to the Multiple Cause of Death File. The primary matching criterion was that State of occurrence and death certificate number were identical; the secondary criterion was that demographic items such as sex, date of death, age, race, and underlying cause of death matched. The primary criterion could not be applied to Nebraska, Nevada, or New Mexico, because these States renumber the death certificates. Therefore, it is likely that for these three States there were some cases in which an incorrect Multiple Cause of Death File death certificate was matched to the questionnaire. Because inclusion of these States increases the likelihood that differences in data from the certificate and the questionnaire may be due to matching errors, they are excluded from this report. The total number of cases excluded because they were from Nevada, New Mexico, and Nebraska is 285.

The overall response rate for the survey was 88.6 percent. In addition, there was item nonresponse for both the death certificate and the questionnaire. Also, not all States collect, code, and report all variables. Table A shows, for each variable included in this report, the States that report that variable. For each variable included in this report, table B shows:

- the number of sample cases for the reporting States
- the death certificate item completion rate
- the number of questionnaires completed
- the questionnaire item response rate
- the questionnaire effective item response rate (the percent of cases in the reporting States for which there was a questionnaire entry for the item)
- the effective item response rate for both the questionnaire and death certificate (the percent of all cases in the reporting States that have a response for the item for both the death certificate and the questionnaire)

The effective response rate for both the questionnaire and the death certificate was between 82.3 and 86.6 percent for all items except veteran status, which was 75.7.

For all variables in this report, with the exception of veteran status, the responses from the Multiple Cause of Death File are compared with those from the questionnaire. Because veteran status is not included in

the Multiple Cause of Death File, this variable was taken from the CMS.

In presenting the percents of responses agreeing in tables C-J, the percents are based on the number of cases in which there is a response to both the questionnaire and the death certificate. Cases in which entries for an item are blank, illegible, or otherwise unusable for either the questionnaire or the death certificate are excluded from both the numerator and denominator of the percents.

In comparing the two data sources, information from death certificates was used as the denominator. That is, agreement levels reflect the degree to which next-of-kin information on the questionnaire matches that from the death certificate. Percent agreements shown are based on the groupings shown. For example, where percent agreement is shown for the 25-29-year age group, this means the number of cases in which the age on both the death certificate and the questionnaire is in the range 25-29 divided by the number of cases in which the age on the death certificate is in the range 25-29. Similarly, where the percent agreement is shown for an occupation or industry category such as "managerial and professional," this percent is for the group as shown—not for less aggregated levels.

Sources of error for both the death certificate and questionnaire include reporting errors, coding errors, and processing errors. Except for occupation and industry, conceptually the variables are the same for both sources. The death certificate asked for the "usual" occupation and industry, and the questionnaire requested information on longest held occupation and industry in which the decedent worked for pay. "Usual occupation" on the death certificate is defined as the kind of work the decedent did during most of his or her working life. In addition, the place-of-death variables differ somewhat between the two sources. For the questionnaire, the respondent was simply asked, "Where did the person die?" For the death certificate, the place of death variable is based on the location of death, which may be at a hospital, en route to or on arrival at a hospital, or at some other place. If a hospital was cited, a distinction is made among decedents pronounced dead in the hospital or other institution, those dead on arrival, outpatients or emergency room patients, and inpatients.

With respect to age, Hispanic origin, marital status, occupation, industry, and veteran status, coding instructions are essentially the same for both sources. Occupation and industry were coded according to standard occupation and industry codes (23). There were differences in coding race: On the death certificate, entries such as "Mexican," "Cuban," and "other Hispanic" were coded as "white"; on the questionnaire, such entries were coded as "other." Moreover, responses that were not

Table A. Registration areas reporting age, race, Hispanic origin, marital status, occupation, industry, place of death, and veteran status on the death certificate: United States, 1986

<i>Area</i> <sup>1</sup>	<i>Age</i>	<i>Race</i>	<i>Hispanic origin</i>	<i>Marital status</i>	<i>Occupation</i>	<i>Industry</i>	<i>Place of death</i>	<i>Veteran status</i>
Alabama . . . . .	X	X		X				
Alaska . . . . .	X	X		X			X	X
Arizona . . . . .	X	X	X	X			X	X
Arkansas . . . . .	X	X	X	X			X	X
California . . . . .	X	X	X	X				
Colorado . . . . .	X	X	X	X	X	X	X	X
Connecticut . . . . .	X	X		X			X	X
Delaware . . . . .	X	X		X				X
District of Columbia . . . . .	X	X		X				X
Florida . . . . .	X	X		X			X	
Georgia . . . . .	X	X	X	X	X	X	X	X
Hawaii . . . . .	X	X	X	X			X	X
Idaho . . . . .	X	X		X			X	X
Illinois . . . . .	X	X	X	X			X	X
Indiana . . . . .	X	X	X	X	X	X	X	X
Iowa . . . . .	X	X		X			X	X
Kansas . . . . .	X	X	X	X	X	X	X	X
Kentucky . . . . .	X	X		X	X	X	X	
Louisiana . . . . .	X	X		X			X	X
Maine . . . . .	X	X		X	X	X	X	X
Maryland . . . . .	X	X		X				X
Massachusetts . . . . .	X	X		X				X
Michigan . . . . .	X	X		X			X	X
Minnesota . . . . .	X	X		X				X
Mississippi . . . . .	X	X	X	X			X	X
Missouri . . . . .	X	X		X	X	X	X	X
Montana . . . . .	X	X		X			X	X
New Hampshire . . . . .	X	X		X	X	X	X	X
New Jersey . . . . .	X	X	X	X			X	
New York . . . . .	X	X	X	X			X	
North Carolina . . . . .	X	X		X			X	X
North Dakota . . . . .	X	X	X	X			X	X
Ohio . . . . .	X	X	X	X	X	X	X	X
Oklahoma . . . . .	X	X		X	X	X		
Pennsylvania . . . . .	X	X		X			X	X
Rhode Island . . . . .	X	X		X	X	X	X	X
South Carolina . . . . .	X	X		X	X	X	X	X
South Dakota . . . . .	X	X		X			X	
Tennessee . . . . .	X	X		X	X	X	X	X
Texas . . . . .	X	X	X	X				X
Utah . . . . .	X	X	X	X	X	X	X	X
Vermont . . . . .	X	X		X	X	X	X	X
Virginia . . . . .	X	X		X			X	X
Washington . . . . .	X	X		X			X	X
West Virginia . . . . .	X	X		X			X	X
Wisconsin . . . . .	X	X		X	X	X	X	X
Wyoming . . . . .	X	X	X	X			X	X

<sup>1</sup> Oregon, Nebraska, Nevada, and New Mexico were excluded from the comparability analysis in this report because Oregon's confidentiality requirements precluded its participation in the 1986 National Mortality Followback Survey, and the primary matching criteria could not be applied for the other three States because they reissue death certificate numbers after the processing of the Current Mortality Sample.

Table B. Number of death certificates and completed National Mortality Followback Survey questionnaires for reporting States and response rates by selected variables: United States, 1986

Variable	Death certificate		Completed questionnaire			Questionnaire and certificate
	Total	Item completion <sup>1</sup>	Total	Item response <sup>2</sup>	Effective item response <sup>3</sup>	Effective item response <sup>4</sup>
	Number	Percent	Number	Percent	Percent	Percent
Age . . . . .	18,448	99.8	16,339	97.9	86.7	86.5
Race . . . . .	18,448	<sup>5</sup> 99.9	16,339	97.9	86.7	86.6
Hispanic origin . . . . .	8,356	98.0	7,568	94.1	85.2	83.7
Marital status . . . . .	18,448	99.3	16,339	97.6	86.5	86.0
Occupation . . . . .	4,525	96.3	4,177	95.1	87.8	84.7
Industry . . . . .	4,525	96.3	4,177	92.4	85.3	82.3
Place of death . . . . .	13,580	99.8	11,895	98.1	85.9	85.7
Veteran status . . . . .	14,050	87.9	12,422	96.6	85.4	75.7

NOTES: Oregon, Nebraska, Nevada, and New Mexico were excluded from the comparability analysis in this report because Oregon's confidentiality requirements precluded its participation in the 1986 National Mortality Followback Survey, and the primary matching criteria could not be applied for the other three States because they reissue death certificate numbers after the processing of the Current Mortality Sample.

The denominators of these rates exclude the number of cases in those States that did not code or collect this information on the death certificate. See table A for specific States.

<sup>1</sup>Cases for which a final death certificate was not matched were classified as nonresponses.

<sup>2</sup>Percent of filled questionnaires in the reporting States for which there was a substantive questionnaire entry for the item.

<sup>3</sup>Percent of all cases in the reporting States for which there was a substantive questionnaire entry for the item.

<sup>4</sup>Percent of all cases in the reporting States for which there was a substantive response for the item for both the death certificate and the questionnaire.

<sup>5</sup>For 1986, the number of death certificates for which race was unknown, not stated, or not classifiable was 0.2 percent of the total deaths (for all States and registration areas). Death certificates with race entry not stated are assigned to a racial designation as follows: If the preceding record is coded "white," the code assignment is "white"; if the code is "other than white," the assignment is "black."

exactly one of the four major races were classified by coders in most cases as one of the four major races on the death certificate, whereas they were left as "other" on the questionnaire.

Copies of the U.S. Standard Death Certificate, the instructions for completing the certificate, and the respondent questionnaire items are included in this report as appendixes.

## FINDINGS

### AGE

There was only 77.5-percent agreement on exact age of decedent (table C). The agreement was highest for decedents 25-29 years of age (85.9 percent) as reported on the death certificate, and lowest for decedents 70-79 years of age (74.0 percent).

There was a strong relationship between percent agreeing on exact age in number of years and the interval between the death and the survey: There was 85.5-percent agreement for the shortest interval of 22-25 weeks, and only 67.0-percent agreement for the interval of 52 or more weeks. This relationship was observed for most 10-year age groups.

There was greater agreement in age for white decedents (81.6 percent) than for black (67.1 percent) or American Indian, Eskimo, and Aleut (70.8 percent) decedents. There

was greater agreement for white decedents for each 10-year age group than for any other racial group. (Hereafter in this report the category "American Indian, Eskimo, and Aleut" will be referred to as "American Indian.")

There was greater agreement (83.0 percent for all decedents) when the death certificate informant was the spouse, as compared with other relatives or nonrelatives. When the decedent's spouse was both the death certificate informant and the respondent to the questionnaire, the agreement was far higher (84.8 percent) than when this was not the case (73.7 percent). This greater correspondence was observed for all 10-year decedent age groups examined.

For 92.7 percent of the cases, the age was either the same or only 1 year different on the death certificate and questionnaire (data not shown). There was a slight tendency for the questionnaire age response to be older than the age on the death certificate. For 10.2 percent of the cases, the age was 1 year older on the questionnaire. For 5.0 percent of the cases, the age was 1 year younger on the questionnaire. Within 2 years there was 95.7-percent agreement, and within 5 years there was 98.2-percent agreement on decedent's age.

Mortality data are commonly tabulated by 5-year age groups for analytic purposes. An error of 1 year on the

Table C. Percent of informant questionnaires in agreement with corresponding death certificate with regard to age, by age of decedent on death certificate and by race on survey questionnaire, interval between death and survey, and relationship of informant to decedent: National Mortality Followback Survey, 1986

Case characteristics	Age of decedent on certificate								
	25 years and over	25-29 years	30-39 years	40-49 years	50-59 years	60-69 years	70-79 years	80-89 years	90 years and over
All cases	77.5	85.9	81.0	81.0	77.5	77.2	74.0	75.4	78.2
Race									
White	81.6	87.7	83.6	83.6	81.9	83.4	78.7	79.2	82.1
Black	67.1	80.9	75.1	73.6	67.7	66.5	62.5	62.4	64.9
American Indian	70.8	*76.2	68.2	69.8	73.8	67.7	72.0	75.4	*59.3
Interval between death and survey									
22-25 weeks	85.5	74.4	87.4	93.7	90.5	88.0	84.4	81.5	82.4
26-29 weeks	84.2	95.2	87.2	86.2	84.6	83.4	82.9	81.7	85.1
30-32 weeks	85.0	96.6	84.3	89.8	89.4	85.5	81.0	83.6	83.7
33-35 weeks	81.0	89.6	85.6	83.5	79.1	82.7	75.4	80.9	81.8
36-38 weeks	75.4	87.8	80.5	84.0	76.4	73.8	71.5	70.3	74.2
39-41 weeks	73.9	84.5	76.6	78.0	75.4	72.4	67.7	72.5	76.7
42-44 weeks	70.5	79.5	80.0	71.8	72.6	68.9	64.9	67.6	71.0
45-47 weeks	70.5	82.5	77.8	74.8	67.1	64.4	66.4	70.9	67.2
48-51 weeks	69.5	81.8	74.3	71.3	61.5	68.6	68.1	68.8	69.6
52 weeks or longer	67.0	80.9	72.1	68.6	68.0	70.1	65.0	56.7	62.5
Relationship									
Decedent was death certificate informant's-									
Spouse	83.0	86.2	84.9	85.9	83.2	83.7	81.1	79.1	80.0
Parent	82.9	87.7	81.5	79.8	74.6	*95.2	*91.7	*85.7	*83.3
Child	73.1	*100.0	*65.0	75.6	65.2	69.9	69.2	77.4	78.0
Sibling	66.3	75.0	73.3	61.9	55.4	72.5	59.2	66.7	*90.9
Other relative	61.1	*50.0	53.3	*61.1	*72.2	68.3	57.1	59.9	66.3
Nonrelative	74.1	*84.6	71.0	73.8	76.2	84.4	72.5	65.4	81.3
Death certificate informant and survey respondent were-									
Both decedent's spouse	84.8	90.5	87.8	88.3	84.6	85.7	82.1	80.4	82.7
Not both decedent's spouse	73.7	85.0	77.6	74.9	70.5	70.3	68.8	74.2	77.9

NOTE: Oregon, Nebraska, Nevada, and New Mexico were excluded from the comparability analysis in this report because Oregon's confidentiality requirements precluded its participation in the 1986 National Mortality Followback Survey, and the primary matching criteria could not be applied for the other three States because they reissue death certificate numbers after the processing of the Current Mortality Sample.

death certificate would result in a difference in the tabulations only when the correct age fell within another age interval. For 5-year age groups, there was 93.4-percent agreement (table 1). When the death certificate informant was the spouse, the agreement was 95.3 percent for 5-year age groups. When both the death certificate informant and the questionnaire respondent were the spouse, the agreement for 5-year age groups was 96.0 percent.

#### RACE

Overall, there was a high level of agreement (97.9 percent) on race between the death certificate and the questionnaire (table D). However, for those reported to be American Indian on the death certificate, the level of

agreement was lower (92.9 percent). Of the 7.1 percent of cases reported as American Indian on the death certificate but as another race on the questionnaire, most (80.0 percent) were identified as being white in the questionnaire (table 2).

Unweighted data indicate that there were 92 more (21.8 percent more) American Indian decedents reported in the questionnaire than on the death certificate. Of the 122 cases identified as American Indian in the questionnaire but not as American Indian on the death certificate, 70.5 percent were identified on the death certificate as white, and 27.9 percent as black.

The increased reporting of American Indian on the questionnaire occurred for all of the intervals between

death and survey and for all relationships examined between the death certificate informant and the decedent. Even when both the informant and the questionnaire respondent were the decedent's spouse, 21.3 percent more American Indian decedents were reported in the questionnaire than on the death certificate.

#### HISPANIC ORIGIN

There was 98.9-percent overall consistency in reporting Hispanic origin between the death certificate and the questionnaire (table E). A high level of consistency was

observed for both Hispanic origin (97.1 percent) and non-Hispanic origin (99.0), as well as for all races, intervals between death and survey, and relationships between informant and decedent examined.

Of the 1.1 percent of cases in which there was disagreement, 88.5 percent were cases in which the origin on the death certificate was non-Hispanic and the origin in the questionnaire was Hispanic (table 3). This resulted in 19.6 percent more Hispanic decedents being reported in the survey, based on unweighted data. Higher reporting of Hispanic decedents in the questionnaire

Table D. Percent of informant questionnaires in agreement with corresponding death certificate with regard to race, by race of decedent on death certificate and by age at death, interval between death and survey, and relationship of informant to decedent: National Mortality Followback Survey, 1986

<i>Case characteristics</i>	<i>Race of decedent on certificate</i>			
	<i>All races</i>	<i>White</i>	<i>Black</i>	<i>American Indian</i>
All cases . . . . .	97.9	98.2	98.0	92.9
<b>Age</b>				
Under 30 . . . . .	96.5	96.8	96.2	*90.5
30-39 years . . . . .	96.7	96.7	97.5	95.7
40-49 years . . . . .	97.3	97.3	98.5	91.3
50-59 years . . . . .	97.7	98.1	98.5	88.9
60-69 years . . . . .	98.3	98.6	98.2	95.4
70-79 years . . . . .	98.3	98.7	98.1	92.9
80-89 years . . . . .	98.5	98.8	98.4	92.5
90 years and over . . . . .	98.3	98.8	97.0	*96.4
<b>Interval between death and survey</b>				
22-25 weeks . . . . .	99.1	99.0	99.2	*100.0
26-29 weeks . . . . .	98.7	99.0	98.8	95.0
30-32 weeks . . . . .	98.8	99.2	98.3	89.5
33-35 weeks . . . . .	98.0	98.5	97.7	91.7
36-38 weeks . . . . .	97.7	98.2	97.5	91.5
39-41 weeks . . . . .	97.8	97.5	98.9	96.8
42-44 weeks . . . . .	96.7	96.7	96.8	95.3
45-47 weeks . . . . .	96.5	96.7	97.4	*80.8
48-51 weeks . . . . .	96.9	97.3	98.1	*86.2
52 weeks or longer . . . . .	97.9	98.0	98.8	*100.0
<b>Relationship</b>				
Decedent was death certificate informant's-				
Spouse . . . . .	98.2	98.6	98.1	91.1
Parent . . . . .	97.4	97.0	98.5	*96.4
Child . . . . .	98.0	98.1	98.4	96.2
Sibling . . . . .	96.2	96.3	96.8	*88.5
Other relative . . . . .	97.9	98.6	97.7	*90.9
Nonrelative . . . . .	96.6	97.1	98.9	*86.7
Death certificate informant and survey respondent were-				
Both decedent's spouse . . . . .	98.4	98.7	98.2	90.4
Not both decedent's spouse . . . . .	97.7	97.9	98.2	93.3

NOTE: Oregon, Nebraska, Nevada, and New Mexico were excluded from the comparability analysis in this report because Oregon's confidentiality requirements precluded its participation in the 1986 National Mortality Followback Survey, and the primary matching criteria could not be applied for the other three States because they reissue death certificate numbers after the processing of the Current Mortality Sample.

Table E. Percent of informant questionnaires in agreement with corresponding death certificate with regard to Hispanic origin, by Hispanic origin of decedent on death certificate and by race on survey questionnaire, interval between death and survey, and relationship of informant to decedent: National Mortality Followback Survey, 1986

Case characteristics	Hispanic origin of decedent on certificate		
	All origins	Hispanic origin	Non-Hispanic origin
All cases	98.9	97.1	99.0
Race			
White	99.0	97.7	99.1
Black	99.4	*100.0	99.4
American Indian	94.3	*100.0	94.3
Interval between death and survey			
22-25 weeks	98.8	*90.9	99.0
26-29 weeks	99.3	100.0	99.3
30-32 weeks	99.1	*100.0	99.1
33-35 weeks	99.6	*96.6	99.7
36-38 weeks	99.0	94.4	99.2
39-41 weeks	98.7	100.0	98.6
42-44 weeks	98.9	95.1	99.1
45-47 weeks	98.3	*100.0	98.2
48-51 weeks	97.4	*91.7	97.8
52 weeks or longer	98.6	97.7	98.7
Relationship			
Decedent was death certificate informant's-			
Spouse	99.2	97.3	99.2
Parent	98.5	100.0	98.4
Child	98.8	100.0	98.8
Sibling	98.2	*96.4	98.4
Other relative	99.3	*100.0	99.3
Nonrelative	98.2	*94.4	98.4
Death certificate informant and survey respondent were-			
Both decedent's spouse	99.4	97.6	99.4
Not both decedent's spouse	98.7	96.6	98.8

NOTES: Oregon, Nebraska, Nevada, and New Mexico were excluded from the comparability analysis in this report because Oregon's confidentiality requirements precluded its participation in the 1986 National Mortality Followback Survey, and the primary matching criteria could not be applied for the other three States because they reissue death certificate numbers after the processing of the Current Mortality Sample.

occurred for all races, intervals, and relationships of informant to decedent examined. When both the death certificate informant and the questionnaire respondent were the decedent's spouse, there were 11.8 percent more Hispanic decedents reported in the questionnaire.

#### Marital status

There was also a high level of consistency of reporting between the death certificate and the questionnaire on marital status of the decedent (95.0 percent) (table F). There was agreement in 98.4 percent of the cases for "married" marital status, but only 87.1 percent agreement for "divorced" marital status.

The agreement on marital status was 96.6 percent for white decedents, 90.6 percent for black decedents, and 92.9 percent for American Indian decedents. There was a slight decline in agreement on marital status as the interval between death and survey increased.

There was almost total agreement (99.3 percent) when the death certificate informant was the decedent's spouse. When the decedent's spouse was both the death certificate informant and the questionnaire respondent, the agreement rate was 99.6 percent. When this was not the case, the agreement rate was 92.6 percent.

Table F. Percent of informant questionnaires in agreement with corresponding death certificate with regard to marital status, by marital status of decedent on death certificate and by race on survey questionnaire, interval between death and survey, and relationship of informant to decedent: National Mortality Followback Survey, 1986

Case characteristics	Marital status of decedent on certificate				
	All marital statuses	Married	Widowed	Divorced	Never married
All cases	95.0	98.4	93.1	87.1	92.9
Race					
White . . . . .	96.6	99.0	95.6	90.7	94.0
Black . . . . .	90.6	96.4	87.3	76.6	91.1
American Indian . . . . .	92.9	98.2	92.5	83.0	87.7
Interval between death and survey					
22-25 weeks . . . . .	96.1	99.1	94.1	88.8	94.3
26-29 weeks . . . . .	97.2	99.4	95.6	92.2	96.1
30-32 weeks . . . . .	96.1	99.1	92.9	90.6	96.7
33-35 weeks . . . . .	96.5	99.3	94.2	89.7	95.8
36-38 weeks . . . . .	94.5	97.9	92.1	89.2	91.5
39-41 weeks . . . . .	93.7	97.3	92.4	89.2	87.8
42-44 weeks . . . . .	93.0	97.0	91.3	82.8	92.5
45-47 weeks . . . . .	92.6	97.0	92.3	80.7	89.0
48-51 weeks . . . . .	92.8	98.4	90.9	79.2	89.7
52 weeks or longer . . . . .	94.0	98.6	93.3	77.4	93.0
Relationship					
Decedent was death certificate informant's-					
Spouse . . . . .	99.3	99.4	...	87.5	...
Parent . . . . .	92.1	93.9	80.7	87.9	94.8
Child . . . . .	93.6	95.6	95.6	84.6	78.9
Sibling . . . . .	91.8	89.6	86.0	93.3	94.7
Other relative . . . . .	90.4	93.9	92.0	83.3	88.0
Nonrelative . . . . .	88.0	93.2	86.2	84.3	89.2
Death certificate informant and survey respondent were-					
Both decedent's spouse . . . . .	99.6	99.7	...	50.0	...
Not both decedent's spouse . . . . .	92.6	94.8	93.2	87.4	93.1

NOTES: Oregon, Nebraska, Nevada, and New Mexico were excluded from the comparability analysis in this report because Oregon's confidentiality requirements precluded its participation in the 1986 National Mortality Followback Survey, and the primary matching criteria could not be applied for the other three States because they reissue death certificate numbers after the processing of the Current Mortality Sample.

Among the inconsistent cases, 12.9 percent had "divorced" reported on the death certificate. Of these 207 cases, 124 cases (59.9 percent) reported questionnaire marital status as "married," 52 cases (25.1 percent) "widowed," and 31 cases (15.0 percent) "never married" (table 4).

#### OCCUPATION

The overall percent agreement for occupation based on the major occupation groups shown was only 71.0 percent (table G). As reported on the death certificate, the rate was lowest for managerial and professional occupations (57.6 percent) and highest for farming occupations (81.9 percent). The consistency of reporting

was not appreciably affected by race of decedent, interval between death and survey, or relationship of informant to decedent.

For all occupational categories except managerial and professional, the percent of decedents in the category was about the same or higher for the questionnaire than for the death certificate. Based on unweighted data, comparisons showed 6.1 percent more technical, sales, and administrative; 1.3 percent more service; 16.3 percent more farming; 5.2 percent more production, craft, and repair; 1.1 percent more operators, fabricators, and laborers; and 80.6 percent more members of the Armed Forces on the questionnaire than on the death certificate

Table G. Percent of informant questionnaires in agreement with corresponding death certificate with regard to occupation, by occupation of decedent on death certificate and by race on survey questionnaire, interval between death and survey, and relationship of informant to decedent: National Mortality Followback Survey, 1986

Case characteristics	Occupation of decedent on certificate							
	All occupations	Managerial and professional	Technical sales, and administrative	Service	Farming	Precision production, craft, and repair	Operators, fabricators, and laborers	Armed Forces
All cases . . . . .	71.0	57.6	71.0	75.8	81.9	69.5	74.2	69.4
Race								
White . . . . .	70.4	57.4	72.0	69.3	82.5	70.2	76.7	73.3
Black . . . . .	73.6	61.3	69.4	82.6	79.7	68.8	70.4	40.0
American Indian . . . . .	65.6	62.5	28.6	71.4	88.9	60.0	69.6	-
Interval between death and survey								
22-25 weeks . . . . .	69.6	55.6	65.6	73.9	87.5	66.7	75.5	75.0
26-29 weeks . . . . .	72.5	57.1	76.6	76.1	76.3	61.2	81.1	85.7
30-32 weeks . . . . .	66.8	56.8	61.1	65.1	90.6	71.7	67.0	80.0
33-35 weeks . . . . .	73.9	60.5	75.6	70.5	79.3	79.4	80.6	100.0
36-38 weeks . . . . .	70.4	51.9	81.7	84.6	73.7	66.7	67.3	66.7
39-41 weeks . . . . .	67.8	53.5	68.3	72.2	95.2	65.8	68.1	42.9
42-44 weeks . . . . .	77.3	71.0	69.8	81.1	81.0	87.1	77.6	66.7
45-47 weeks . . . . .	70.7	53.6	57.1	75.0	91.7	79.3	74.5	50.0
48-51 weeks . . . . .	70.0	54.5	53.8	94.4	100.0	30.0	76.9	100.0
52 weeks or longer . . . . .	60.0	100.0	60.0	83.3	33.3	50.0	55.6	-
Relationship								
Decedent was death certificate informant's-								
Spouse . . . . .	69.6	57.9	67.0	69.3	83.0	68.0	75.4	90.0
Parent . . . . .	67.0	43.3	66.7	69.0	69.2	68.8	75.9	-
Child . . . . .	67.3	57.1	75.0	69.4	85.7	47.1	69.7	25.0
Sibling . . . . .	71.8	62.5	62.5	78.9	42.9	83.3	75.0	-
Other relative . . . . .	81.1	66.7	88.9	100.0	90.0	66.7	66.7	100.0
Nonrelative . . . . .	65.5	25.0	80.0	100.0	-	50.0	77.8	100.0
Death certificate informant and survey respondent were-								
Both decedent's spouse . . . . .	69.7	58.2	66.9	67.0	83.8	67.4	76.8	89.5
Not both decedent's spouse . . . . .	72.0	56.2	73.5	79.5	81.6	71.7	73.0	53.3

NOTES: Oregon, Nebraska, Nevada, and New Mexico were excluded from the comparability analysis in this report because Oregon's confidentiality requirements precluded its participation in the 1986 National Mortality Followback Survey, and the primary matching criteria could not be applied for the other three States because they reissue death certificate numbers after the processing of the Current Mortality Sample.

(table 5). However, there were 26.8 percent fewer decedents recorded as "managerial and professional" on the questionnaire. When the decedent's spouse was both the death certificate informant and the questionnaire respondent, there were 23.6 percent fewer decedents recorded as "managerial and professional" on the questionnaire.

#### INDUSTRY

The rate of agreement between the death certificate and the questionnaire based on the major groupings shown was about the same for industry (74.4 percent) as for occupation (table H). The agreement rate was highest for the mining industry (79.5 percent) and lowest for the

public administration industry (62.3 percent). There was no essential difference in consistency of reporting by race of decedent or by whether the spouse of the decedent was both the death certificate informant and the questionnaire respondent. The number of sample cases is too small to assess differences across intervals between death and survey, or by relationship of informant to decedent (table 6).

In spite of the overall relatively low level of agreement between the questionnaire and the death certificate on industry, the marginal distributions of industries for the questionnaire and death certificate were very similar (table 6).

Table H. Percent of informant questionnaires in agreement with corresponding death certificate with regard to industry, by industry of decedent on death certificate and by race on survey questionnaire, interval between death and survey, and relationship of informant to decedent: National Mortality Followback Survey, 1986

Case characteristics	Industry of decedent on certificate										
	All industries	Agriculture, forestry, and fisheries	Mining	Construction	Manufacturing	Transportation, communications, and other public utilities	Trade	Finance, insurance, and real estate	Services	Public administration	Armed Forces
All cases	74.4	78.4	79.5	74.3	77.0	75.2	69.6	73.6	75.0	62.3	68.4
Race											
White	74.3	77.1	78.0	78.7	77.1	76.4	70.5	77.1	71.1	64.9	68.8
Black	75.2	80.7	*100.0	64.1	76.2	71.7	65.6	*57.1	82.7	*61.5	*60.0
American Indians	72.6	*87.5	*100.0	*66.7	*85.7	*66.7	*75.0	*50.0	*75.0	*33.3	*-
Interval between death and survey											
22-25 weeks	75.6	*86.4	*100.0	*80.0	75.0	*78.3	*69.0	*75.0	69.6	*66.7	*100.0
26-29 weeks	77.7	75.7	*57.1	66.7	83.3	73.9	69.1	*83.3	81.7	*79.2	*83.3
30-32 weeks	75.3	86.7	*75.0	*72.4	78.0	*74.1	77.1	*76.9	72.0	*58.8	*66.7
33-35 weeks	75.1	*77.8	*88.9	83.8	82.4	75.0	65.2	*76.9	69.4	*60.0	*100.0
36-38 weeks	70.8	68.4	*87.5	62.5	73.6	79.4	67.6	*84.6	70.6	*52.9	*50.0
39-41 weeks	73.4	*89.5	*40.0	*80.8	74.6	*88.4	77.1	*60.0	72.1	*73.3	*42.9
42-44 weeks	70.7	*77.3	*100.0	*79.3	62.7	*64.3	65.8	*63.6	76.8	*64.3	*66.7
45-47 weeks	74.9	*91.7	*100.0	*94.4	70.3	*83.3	*52.4	*50.0	84.6	*40.0	*50.0
48-51 weeks	76.3	*100.0	*-	*50.0	80.0	*66.7	*71.4	*80.0	90.3	*25.0	*100.0
52 weeks or longer	68.3	*28.6	*-	*40.0	*75.0	*100.0	*100.0	*-	*81.8	*-	*-
Relationship											
Decedent was death certificate informant's-											
Spouse	75.2	77.7	*70.8	77.9	*76.8	77.8	68.5	82.4	74.4	65.4	*89.5
Parent	66.3	*70.0	*50.0	*70.4	72.2	*66.7	*59.3	*60.0	64.4	*60.0	*33.3
Child	77.3	*90.0	*100.0	*66.7	83.3	*75.0	*77.8	*60.0	75.5	*62.5	*50.0
Sibling	75.6	*42.9	*100.0	*83.3	*75.0	*71.4	*62.5	*100.0	*83.3	*100.0	*-
Other relative	80.0	*88.9	*100.0	*50.0	*75.0	*60.0	*77.8	*100.0	*85.7	*-	*100.0
Nonrelative	81.5	*-	*-	*50.0	*83.3	*100.0	*100.0	*100.0	*75.0	*100.0	*100.0
Death certificate informant and survey respondent were-											
Both decedent's											
spouse	75.4	77.5	*71.4	77.6	78.4	78.6	66.4	84.4	72.3	67.6	*88.9
Not both decedent's											
spouse	74.0	79.7	*85.0	72.1	75.8	73.0	71.7	61.5	76.4	51.9	*58.8

NOTE: Oregon, Nebraska, Nevada, and New Mexico were excluded from the comparability analysis in this report because Oregon's confidentiality requirements precluded its participation in the 1986 National Mortality Followback Survey, and the primary matching criteria could not be applied for the other three States because they reissue death certificate numbers after the processing of the Current Mortality Sample.

## VETERAN STATUS

The agreement between the death certificate and the questionnaire on veteran status was high (96.7 percent) (table J). However, the rate of agreement for nonveterans was higher than for veterans (98.3 percent versus 90.7 percent). There was no essential difference in the rate of agreement by race of decedent, interval between death and survey, relationship of death certificate informant to decedent, or whether the spouse was both the death certificate informant and the questionnaire respondent.

The percent reported as veteran was about the same for both the death certificate and the questionnaire (20.5 percent and 19.9 percent, respectively) (table 7). Of the 349 cases in disagreement on veteran status, 202 (57.9 percent) classified the decedent as a veteran on the death certificate but as a nonveteran in the questionnaire, and 147 (42.1 percent) classified the decedent as a nonveteran on the death certificate but as a veteran on the questionnaire.

## PLACE OF DEATH

The consistency rate for hospital deaths (including inpatient, outpatient, and emergency room patient) was 88.3 percent (table K). Among those with "hospital inpatient" reported on the death certificate as place of death, questionnaire responses reported approximately 87 percent died in the hospital excluding the emergency room, and 8.5 percent died in the hospital emergency room. Among those classified on the death certificate as "hospital outpatient or in the emergency room," over one-third (36.5 percent) were recorded on the questionnaire as having died at their own home, another's home, or another place.

For those classified according to the death certificate as dead on arrival (DOA) at the hospital, questionnaire responses showed 46.0 percent as having died in their own home, 20.3 percent in another place, and 4.9 percent in another's home.

Table J. Percent of informant questionnaires in agreement with corresponding death certificate with regard to veteran status, by veteran status of decedent on death certificate and by race on survey questionnaire, interval between death and survey, and relationship of informant to decedent: National Mortality Followback Survey, 1986

Case characteristics	Veteran status of decedent on certificate		
	Both statuses	Veteran	Nonveteran
All cases . . . . .	96.7	90.7	98.3
Race			
White . . . . .	96.6	91.2	98.1
Black . . . . .	97.1	90.0	98.5
American Indian . . . . .	96.9	84.6	99.1
Interval between death and survey			
22-25 weeks . . . . .	97.8	94.8	98.8
26-29 weeks . . . . .	96.3	90.5	97.8
30-32 weeks . . . . .	97.0	91.1	98.6
33-35 weeks . . . . .	96.2	88.4	98.3
36-38 weeks . . . . .	96.4	92.2	97.4
39-41 weeks . . . . .	96.8	86.3	99.6
42-44 weeks . . . . .	97.2	92.6	98.2
45-47 weeks . . . . .	97.2	93.9	98.0
48-51 weeks . . . . .	97.1	91.5	98.4
52 weeks or longer . . . . .	94.2	88.1	96.2
Relationship			
Decedent was death certificate informant's-			
Spouse . . . . .	95.9	91.2	97.8
Parent . . . . .	96.8	91.1	98.3
Child . . . . .	97.7	89.5	98.8
Sibling . . . . .	96.9	91.7	98.1
Other relative . . . . .	98.1	90.3	99.1
Nonrelative . . . . .	95.3	84.8	98.2
Death certificate informant and survey respondent were-			
Both decedent's spouse . . . . .	95.8	91.2	97.7
Not both decedent's spouse . . . . .	97.3	90.2	98.5

NOTE: Oregon, Nebraska, Nevada, and New Mexico were excluded from the comparability analysis in this report because Oregon's confidentiality requirements precluded its participation in the 1986 National Mortality Followback Survey, and the primary matching criteria could not be applied for the other three States because they reissue death certificate numbers after the processing of the Current Mortality Sample.

Of those decedents whose death certificates cited their dying in another care institution, 92.9 percent died in a nursing or personal-care home according to the questionnaire, and 4.9 percent died in the hospital. Among those classified as "all other entries" on the death certificate, 72.6 percent were reported as dying in their own home, 17.2 percent in another place, and 6.2 percent in another's home.

#### DISCUSSION

Consistency in reporting between the death certificate and the followup questionnaire was excellent for race, Hispanic origin, marital status, and veteran status. However, in spite of overall high correspondence, there were some areas of lesser agreement for these variables. For example, based on unweighted data, there were 21.8 percent more American Indian decedents reported on the questionnaire than there were on the death certificate.

Similarly, while the overall level of agreement on marital status was 95.0 percent, for those classified as divorced on the death certificate, there was only 87.1-percent agreement with the questionnaire. In addition, in spite of an overall agreement rate of 98.9 percent on Hispanic origin, 19.6 percent more Hispanic decedents were reported on the questionnaire than on the death certificate.

Although the agreement rate for exact age in years was only 77.5 percent, the agreement rose to 92.7 percent for ages within 1 year and to 95.7 percent for ages within 2 years. There seems to be a small bias in the direction of the questionnaire age being older. This might be due to some questionnaire respondents reporting what the decedent's age would have been at the time of the survey rather than what it was at the time of death.

Table K. Number of responses by place of death on death certificate and on National Mortality Followback survey questionnaire: United States, 1986

Response to questionnaire item "Where did the person die?"	Place of death on death certificate								
	Total	Hospital			Status unknown	Hospital status no on certificate	Other care institutions	All other reported entries	Dead on arrival-hospital name not given
		Inpatient	Outpatient or emergency room	Dead on arrival					
All places . . . . .	11,639	5,661	1,101	800	189	1	1,367	2,519	1
Hospital emergency room . . . . .	1,148	480	503	99	35	-	11	20	-
Hospital (excluding emergency room) . . . . .	5,190	4,902	84	16	110	-	56	22	-
On way to hospital . . . . .	235	28	101	76	6	-	2	22	-
Nursing or personal care home . . . . .	1,480	117	11	40	4	-	1,270	38	-
Own home . . . . .	2,564	79	267	368	17	-	5	1,828	-
Other place (undefined) . . . . .	794	52	106	162	17	1	22	433	1
Other's home . . . . .	228	3	29	39	-	-	1	156	-

NOTE: Oregon, Nebraska, Nevada, and New Mexico were excluded from the comparability analysis in this report because Oregon's confidentiality requirements precluded its participation in the 1986 National Mortality Followback Survey, and the primary matching criteria could not be applied for the other three States because they reissue death certificate numbers after the processing of the Current Mortality Sample.

Levels of agreement on age, race, Hispanic origin, marital status, and veteran status were similar to those found in two studies in which Census Bureau Population Study interview responses were compared to death certificate entries (17-20).

The consistency rates in reporting on occupation and industry were 71.0 percent and 74.4 percent, respectively. These low levels are consistent with prior research (3-16). The disagreements were not random for occupation: For all occupational categories except managerial and professional, the percent of decedents in the category was the same or higher for the questionnaire than for the death certificate. However, there were 26.8 percent fewer managers and professionals on the questionnaire. In contrast to occupation, marginal distributions for industry were very similar for the death certificate and the questionnaire.

It is possible that coding differences may have been a significant factor in the lack of correspondence in occupation and industry between the two sources. Coding many occupation and industry entries that were very general such as "telephone" and "farm" was difficult. The source documents were not reviewed to determine whether differences were due to respondent reporting or to coding.

There was good correspondence when the death certificate place of death was "hospital inpatient," but less consistency for entries reported on the death certificate as "hospital outpatient" or "emergency room." There was very good correspondence for entries of health care institutions other than hospitals on the death certificate. Overall, high rates of consistency between the questionnaire and death certificate should add confidence in the interpretation and use of mortality statistics. However, even when marginal distributions are very similar, lower rates of agreement raise concern about

possible biases in the mortality data. For example, American Indian decedents unidentified as such on the death certificate may have different characteristics from those identified as American Indian on the questionnaire. On the other hand, differences in marginal distributions do not necessarily lead to biases in assessing relationships among specific variables. If the data were weighted to produce national estimates of the degree of overall comparability, these rates would be slightly higher in general because there was oversampling of some groups that had lower rates of agreement.

Through the use of the 1986 NMFS, it is possible to explore further the types and possible directions of potential biases in the relationships among variables. Additional analyses could also include examining comparability according to other important control variables including age, sex, and cause of death. The standard death certificate was revised for use starting in 1989. It will be important for the next NMFS, planned for 1993, to investigate whether there are any changes in the levels of consistency in reporting.

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