NATIONAL TRAUMATIC OCCUPATIONAL FATALITIES: 1980 - 1985

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Institute for Occupational Safety and Health
Division of Safety Research

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Division of Safety Research
Injury Surveillance Branch
Data Analysis Section

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INTRODUCTION

This report describes U.S. traumatic occupational fatalities for the 6-year period from 1980 through 1985. The Division of Safety Research (DSR) of the National Institute for Occupational Safety and Health (NIOSH) has constructed a database as part of its National Traumatic Occupational Fatality (NTOF) project. This database contains information from death certificates for work-related deaths recorded in the U.S. since the beginning of 1980. NIOSH plans to continue collecting information on work-related deaths and assembling such deaths in the NTOF database at least until 1990.

This report describes traumatic occupational deaths occurring during the first 6-years of the project and provides information on these deaths at the national and state levels, as well as by occupation and industry. Characteristics of fatally injured workers are also described. Tables indicate which industries in each state have a high risk of fatal injury at work. While this report does not present tests of hypotheses about why specific states or industries have greater numbers or higher rates of traumatic occupational fatalities, it does provide the descriptive background required by injury prevention professionals to direct additional research. Furthermore, the data presented suggests where intervention activities need to be directed. This information also provides a basis for justifying occupational injury prevention programs and measuring their successes or failures.

NTOF DATABASE

The NTOF database consists of information from death certificates of workers who died as a result of traumatic occupational injuries. Two factors affect case ascertainment for the NTOF database. First, NIOSH does not request death certificates for a known set of deaths. Second, NIOSH relies on the states to identify and provide copies of death certificates that meet the NTOF case criteria.

Death certificates were chosen as a source of information because they are available for all who died, regardless of their state of residence, occupation, industry of employment, size of firm, or other factors that limit reporting of death and inclusion in alternate sources such as workers' compensation claims or Occupational Safety and Health Administration fatality files. Death certificates include information concerning the fatal injury as well as demographic characteristics of those who died, and generally follow a standard format across the U.S. Because NTOF information is obtained from all U.S. vital statistics reporting units, it is useful for calculating national rates.[1] However, death certificate information is subject to limitations which must be kept in mind when interpreting the results presented here.

For example, information on death certificates come from multiple sources including next-of-kin, funeral personnel, certifying physicians, medical

examiners, and coroners. This information varies in accuracy so the quality of data in NTOF likewise varies. Information in the NTOF database also depends on the accurate selection of death certificates for inclusion in NTOF, the degree of automation of death certificate data by states, and the ability of states to retrieve and submit selected death certificates. For these reasons, under-ascertainment and misclassification may potentially affect the NTOF data.

All of the 52 U.S. vital statistics reporting units--the 50 states, New York City, and the District of Columbia--participate in the NTOF project by providing copies of death certificates each year that meet the following criteria:

- Age at death--16 years or older,
- An "external" cause of death from the International Classification of Diseases 9th Edition (ICD-9) within the range of E800-E999, reported as immediate, underlying or contributory,
- A positive response to the "injury at work" item on the certificate.

All but two states use computerized mortality files to begin to identify death certificates that meet the NTOF case criteria. However, only two of the three case criteria utilized by NIOSH to define traumatic occupational fatalities are standardized, universally automated, and subjected to regular quality control procedures at the state level. These are "age" and "cause of death."

The accuracy of age at death is reviewed by state vital records personnel who regularly compare the dates of birth and death for each individual. The accuracy of information on cause of death, while limited by the certifier's knowledge and completeness of communication, is subject to standardization efforts promulgated by the National Center for Health Statistics (NCHS). State nosologists responsible for coding cause of death information are trained, certified, and follow standard NCHS rules. While errors in coding may occasionally occur, both the states and NCHS perform quality control examinations and correct identified errors, and NCHS penalizes states with unacceptably high error rates. In a few instances the state is not responsible for coding the cause of death information, passing the responsibility to NCHS. Again, NCHS follows regular quality control procedures before returning coded death certificates to the states.

In contrast to age and external cause of death, the injury at work item is not currently reported to NCHS so there is no national guideline for its completion. Instead, the state vital statistics reporting units independently decide when to include an injury at work item, how certifiers are to interpret that item, and how to use the injury at work item for the state mortality files. For example, until 1986, Louisiana certifiers followed local guidelines recommending that the injury at work item be completed only for unintentional deaths. Typically, certifiers receive little formal training in

filling out death certificates, especially "non-standard" elements. Without a standard definition of injury at work, reporting variation is expected. Until a standard definition is proposed and certifiers are trained, the potential for misclassification of the injury at work item will continue.

Since the practices of vital statistics reporting units differ, there are variations that potentially affect which death certificates are submitted to NTOF. For example, New York City (NYC) death certificates do not include an injury at work item. For NYC, only death certificates with narratives that explicitly report that the person who died was injured at a work site are submitted to NTOF. This may result in under-reporting of occupational fatalities and may bias the distribution of deaths reported for NYC. For example, no intentional injury death certificates have been submitted by NYC, yet newspapers regularly report homicides and suicides that have occurred in New York City workplaces.

In all other reporting units, coroner and medical examiner certificates of death do include the injury at work item. However, in some states attending physician or medical certificates of death do not include this item. Because trauma cases should fall under the jurisdiction of a coroner or medical examiner, NTOF cases are generally reported on coroner or medical examiner certificates of death. Both attending physician and medical certificates of death have been identified, though, that are clearly occupational but which do not qualify for inclusion because there is no injury at work item to complete. NTOF may therefore under-report cases where workers did not die immediately from their injuries but were hospitalized, sometimes for extended periods, before dying.

Another aspect of injury at work reporting that may affect the comprehensiveness of NTOF case ascertainment involves one aspect of state automation procedures. Nearly half of the states computerize the injury at work item for state purposes. The others do not automate the item directly, but combine its information with two other death certificate items to identify the location and work-relatedness of unintentional deaths. Since only unintentional deaths are considered in this process, homicides, suicides, and deaths of unknown cause and pending determination are never classified as work-related in these mortality files. To circumvent this problem, each death certificate for individuals 16 years of age and older, with manner of death recorded as intentional, unknown or undetermined, must be manually reviewed by state personnel to see if the injury at work item is marked yes. Those certificates are then duplicated and submitted to DSR. This screening is performed by a broad range of individuals and the lack of agreement found after repeat manual searches of the same certificates suggests that in these situations, the retrieval of death certificates meeting NTOF criteria may not be complete.

The NTOF database includes information on date of birth; date of death; date of injury; time of injury; state and county of death; state and county of residence; race; sex; usual occupation; usual industry; whether or not an autopsy was performed; title of the certifier; location where the injury occurred; description of the injury; and immediate, contributory, and underlying causes of death. The cause of death and injury descriptions from the death certificate are included as narrative literal strings in the file. NIOSH is currently extracting the ICD-9 codes for underlying cause of death by matching cases with NCHS mortality computer tapes. Finally, it should also be noted that death certificates report "usual" occupation and industry which may differ from the occupation or industry in which the worker was engaged at the time of death. This, also, is a current limitation in using death certificates for traumatic occupational mortality surveillance.

METHODS

To determine the fatality incidence in industrial groups, death certificate entries for usual industry of employment were categorized using the 1972 Standard Industrial Classification (SIC) manual of the Office of Management and Budget.[2] For the major divisions of industry--the level at which these data are presented--the SIC is equivalent to the 1970 Bureau of the Census industry classification.[3] Entries for usual occupation were categorized into major 1980 Occupational Classification System groups.[4] Occupation and industry coding was performed using software developed by DSR. This software is currently being validated and compared to codes assigned by Bureau of Census trained coders. Some death certificates lacked adequate employment information. Other entries such as "housewife," "student," and "self-employed" were coded as "not classified" by the computer program. The fatality rates presented by industry exclude victims whose industry was unknown or unclassifiable (13% of all cases) and rates by occupation exclude those victims whose occupation was not coded (20% of all cases).

The denominators used to calculate occupational fatality rates include only employed persons and were selected to provide a common national basis for comparison. Individual states use a variety of methods for determining denominators and, for that reason, may calculate rates that are somewhat different from those presented here. Because no single source of employment data provides information on both geographic location (i.e., state) and the demographic characteristics of workers (e.g., sex, age, and occupation) for each year from 1980 through 1985, several sources of denominator data were used to calculate the various fatality rates presented in this report.

Fatality rates for different demographic characteristics were computed using Bureau of Labor Statistics annual average employment data for the denominator.[5] These denominators are based on yearly random samples of 60,000 households across the United States. Because the employment

values used as denominators for calculating sex-, race-, age-, and occupation-specific fatality rates are estimates, the fatality rates are also estimates. Therefore, 95% confidence intervals for these specific rates were also calculated. The 6-year standard errors for the denominators were approximated by taking the linear combination of the six individual annual standard errors. All covariance terms between the individual annual standard errors were ignored. This resulted in a conservative approximation of the 6-year standard errors for these denominators. These standard errors were used to calculate the confidence intervals (CI) for the fatality rates.[6]

Denominators for calculating state- and industry-specific rates were derived from two Bureau of the Census databases: County Business Patterns Bulletins for 1980-1985[7] and the 1982 Census of Agriculture [8] which estimates farming employment in the Agricultural Production industry (SIC 01 and 02) which is not covered by County Business Patterns Bulletin data. Industry fatality rates calculated using County Business Patterns and the Census of Agriculture are not subject to sampling error and, therefore, confidence intervals were not calculated for industry rates. Annual fatality rates are presented as deaths per 100,000 workers occurring within the appropriate time period and were computed using the following formula:

Fatality rate = (number of fatalities/number of workers) x 100,000

The 6-year fatality rates for the years 1980 through 1985 were calculated using the following formula:

Fatality rate for 1980-1985 = (number of fatalities during 1980-1985/
sum of annual number of workers during 1980-1985) x 100,000

The fatality rates for the nation and states reflect only private sector employment. Although the number of fatalities presented throughout this report includes all types of employment, public sector workers had to be excluded from the numerators when calculating national and state-specific rates because denominators which include public sector employees are not available. Rates were not calculated for states with an average annual number of fatalities less than six to avoid rates based on small numbers of deaths.

To map geographic distributions of industry-specific fatality rates, the rates were grouped into categories. The ranges for each category vary for different maps because of the different rate distributions for different industries. States which had less than six deaths (for whom rates were not calculated) are blank on the maps.

Because fatal injuries often occur to young workers, trauma-related deaths are responsible for many more years of potential life lost than are disease-related deaths.[9] The years of potential life lost (YPLL) before the age of 65 years was calculated for each industry in each state with an average of at least six deaths annually. Although several methods are available for calculating YPLL[10], the method used in this report is based on years of potential employment and corresponds to the denominator used for calculating

fatality rates. Assuming a retirement age of 65 years, the YPLL for each fatal case was calculated by subtracting the victim's age at the time of death from 65. The 6-year YPLL rates for 1980 through 1985 were calculated as follows:

YPLL rate for 1980-1985 = (sum of YPLL during 1980-1985/
sum of annual number of workers during 1980-1985) x 100,000

YPLL rates for industries and states, like fatality rates, are presented only for private sector workers. YPLL rates were not calculated when there were less than six deaths in that industry within each state.

RESULTS

Demography

The NTOF surveillance system identified almost 7,000 work-related deaths in each of the 6 years from 1980 through 1985. Ninety-four percent of the workers who died were males and 6% were females. The overall fatality rate for males (11.1 per 100,000 workers with a 95% CI of 10.98, 11.29) was more than 12 times greater than that for females (0.9 per 100,000 workers with a 95% CI of 0.89, 0.93). Unintentional injuries accounted for 81% of all deaths while 13% of the deaths in the workplace were homicides and 3% were suicides (Figure 1). The manner of death differed by sex. Eleven percent of the men who died were intentionally killed in homicides, compared to 39% of the women who died (Figure 2).

Distributions by race indicate that 86% of the fatally injured workers were white, 5% of whom were Hispanic. Eleven percent of those who died were classified as black and 3% were classified as "other races". Other races included Asians and Pacific Islanders (1.5%) and American Indians and Alaskan Natives (0.5%). Fatality rates by race were higher for blacks (7.7 per 100,000 workers with a 95% CI: 7.51, 7.93) and for other races (7.6 per 100,000 workers with a 95% CI: 6.88, 8.32) than for whites (6.5 per 100,000 workers with a 95% CI: 6.43, 6.57).

Age distributions show the greatest number of deaths occurred among workers 20 to 34 years of age (Figure 3); however, the highest fatality rate was for workers 70 years of age or older (Figure 4).

Occupation and Industry

Distributions and rates of traumatic occupational fatalities for the period 1980 through 1985 were calculated by occupation and industry categories. Twenty percent of the workers who died were not classified by occupation and 13% were not categorized by industry due to insufficient or missing information on death certificates or coding limitations. These deaths are included in the frequency distributions (Figures 5 and 7) but are excluded from the rate calculations (Figures 6 and 8). The occupation and industry category titles on Figures 5 through 7 have been shortened for presentation purposes.

The occupation categories with the greatest number of deaths were Craftsmen and Kindred Workers (17.0%), Transportation Operatives (15.3%), Farmers (11.1%) and Non-farm Laborers (10.6%) (Figure 5). The fewest fatalities were among Clerical Workers (1.4%). Fatality rates per 100,000 workers were highest for Transportation Operatives (23.5), Farmers (21.7), and Non-farm Laborers (15.8) (Figure 6).

The industry divisions with the greatest number of deaths were Transportation, Communication, and Public Utilities (17.5%), Construction (14.9%), Manufacturing (12.8%), and Agriculture, Forestry, and Fishing (11.0%) (Figure 7). The smallest number of fatalities occurred in the Wholesale Trade (0.8%), and the Finance, Insurance, and Real Estate industries (1.0%). Fatality rates per 100,000 workers were highest in the industries of Mining (31.9), Transportation, Communication, and Public Utilities (25.4), Construction (24.0) and Agriculture, Forestry, and Fishing (20.7) (Figure 8). About 8% of those who died were Public Administration workers, but fatality rates for this group could not be calculated due to lack of corresponding denominator data.

A comparison of NTOF fatality rates for industry groups with rates generated from national private sector occupational fatality surveillance data from the Bureau of Labor Statistics showed remarkably similar rankings.[11] These rankings can be used to prioritize high risk industries for further study or to focus intervention strategies.

Geography

The greatest numbers of deaths in this time period occurred in Texas and California (Table 1) and the fewest were in Rhode Island and Vermont. The distribution of fatality rates by state is shown in Table 1 and Figure 9. Alaska and Wyoming had the highest fatality rates (34.2 and 32.5 per 100,000 respectively), while Massachusetts and Connecticut had the lowest (2.4 and 1.6 per 100,000 respectively). The overall rate of fatal work-related injuries for the private sector during 1980 through 1985 was 7.9 per 100,000 workers.

The annual average YPLL and YPLL rate for each state are presented in Table 2. The overall YPLL rate for the private sector work force was 199 years per 100,000 workers. Alaska had the highest YPLL rate (996 per 100,000 workers) and Connecticut had the lowest (40 per 100,000 workers).

Mortality Trends

For the 6-year period, 1980 through 1985, the number of traumatic occupational fatalities reported in NTOF averaged nearly 7,000 per year. (Numbers of deaths in this paragraph were rounded to the nearest hundredth). Because of the suspected underenumeration, this number should be considered as a lower bound for the actual number of traumatic occupational fatalities. The number of fatalities in the U.S. decreased steadily from about 7,700 in 1980 to 6,100 in 1983, then increased slightly to 6,400 in 1985. Comparing 1980 to 1985 there was a decrease of 16.9% in the number of deaths (Figure 10).

Fatality rates for occupational deaths (private sector) decreased consistently each year from 1980 to 1985. The decrease from 9.2 per 100,000 workers in 1980 to 7.0 in 1985 represents a 23.9% decrease in traumatic occupational fatality rates in the U.S. work force over the 6-year period (Figure 11). These data indicate that there has been a decreasing rate of fatal injuries among U.S. workers. Unfortunately, these data do not identify the cause of this decrease. Numerous factors--such as economic conditions, employment trends, changes in reporting by states, prevention efforts, and changes in labor force composition--could have contributed to the decrease in fatality rates.

Industry- and State-Specific Fatalities

Figures 12 and 13 show the 1980 through 1985 secular trends in the numbers and rates of fatalities in each industrial division. For each industry, a map (Figures 14-20) shows the distribution of fatality rates by state. Wholesale Trade and Finance, Insurance, and Real Estate Industries were not mapped because of the small number of states which had sufficient numbers of deaths to permit rate calculations.

Tables 1 and 2 present the annual average number, rate, YPLL, and YPLL rate of traumatic occupational fatalities for each state and for the entire United States, within each industrial division. This information allows comparisons between states and between industries within states. (YPLL and YPLL rates are not calculated for states in which the average annual number of fatalities was less than six).

DISCUSSION AND CONCLUSIONS

These analyses identify worker groups at elevated risk of work-related fatal injuries and call attention to the work-related premature loss of life. These findings are very useful in setting priorities and directing efforts in safety research and occupational injury prevention.

With regard to demographic characteristics, higher fatality rates are found among males and older workers. Fatality rates are slightly different for each race. However, fatalities appear more likely to occur to males, and 25- to 34-year-old whites. Workers in Alaska and Wyoming have the highest fatality rates, but the largest numbers of fatal injuries occur in California and Texas.

Workers in the Mining and Transportation industries and in the Transportation Operative and Farmer occupations are at greater risk of dying at work. However, the largest number of deaths occur in the Transportation and Construction industries and the Craftsmen and Transportation Operative occupations.

As these analyses have demonstrated, the NTOF database can be used to identify high risk groups of workers. The next steps must include the use of analytic epidemiologic studies to further delineate causative factors affecting the groups. NTOF also allows monitoring of trends in occupational mortality and, consequently, will help evaluate the effectiveness of prevention efforts. Finally, the information presented here is intended to assist health and safety professionals in focusing prevention efforts on those workers who are most likely to suffer fatal occupational injuries.

Priority Setting

To efficiently focus injury prevention efforts, the identification of high risk workers and their jobs is an important first step. While rates are an indication of risk or the probability that a worker may be killed, the actual number of workers killed must also be considered. Intervention strategies prompted by risk alone may fail to save the greatest numbers of lives, while a strategy that targets large numbers of workers at elevated risk may be a more efficient use of resources. Another useful measure for setting priorities is years of potential life lost. This index emphasizes deaths of younger workers. Complementing traditional methods of measuring the impact of occupational mortality, YPLL indicate the social, economic, and personal impact of work-related traumatic death.

As the graphs and tables in this report illustrate, the rank order of different fatality characteristics varies by the measure used. For example, Figures 7 and 8 show that the rank order of industries depends upon whether numbers or rates are considered. As Tables 1 and 2 indicate, YPLL sometimes reveal a different pattern than numbers or rates. Since the ranking of high risk groups--whether demographic, occupational, industrial, or geographic--differ by which of the three measures is used, a comprehensive strategy for prioritizing the allocation of injury prevention resources should consider number of deaths, rates, and years of potential life lost.

Recommendations

These analyses also raise new questions and point to numerous areas where more detailed research is needed. One prominent research question is the reason for the decreasing numbers and rates of traumatic occupational fatalities over the past few years. Are economic conditions or other factors responsible? Are workplaces becoming safer? Or is this only an artifact of case ascertainment procedures?

Because demographic information on the fatally injured workers is now available at the national level, questions concerning demographic differences can be addressed. For example, why is there a pronounced difference in fatality rates by sex? A recent analysis of NTOF data found that men have higher fatality rates than women in every industrial sector, and that occupation accounts for only part of this difference.[12] Further research is

also needed to identify reasons for sex-related differences in the manner of death. Variations in fatality rates by race and age should also be investigated. Why are blacks and other races at higher risk than whites? Why do older workers have such high fatality rates? Do cause of death or employment characteristics vary by race or age? Geographic differences and employment characteristics also need further exploration to determine why workers in specific states, industries, and occupations are at greater risk or whether this is due to reporting variation. These questions must be answered to design and implement the most effective intervention strategies. It is hoped that this report will stimulate further research into these issues. NIOSH's Division of Safety Research is attempting to answer some of the questions generated by these analyses. For example, NIOSH is currently examining sex-specific work-related homicides and suicides. The addition of the ICD-9 codes to the NTOF database will allow detailed analyses of causes of death.

Public sector workers have generally been neglected in national surveillance of work-related injuries because of the lack of denominator data. The impact of excluding these workers from the national fatality rate is also a topic for future research.

Comparative analyses with other sources of fatality data will provide a better understanding of reporting variations among states and limitations of the NTOF data. NTOF files are currently being compared with workers compensation and medical examiner records from several states. The results of these analyses will provide insight to the variations among states in case ascertainment. This will help evaluate reporting variations and biases in the NTOF database. NIOSH will prepare separate reports on these issues as the studies are completed. Future reports, responding to specific needs for more information, will focus on selected high-risk industries such as agriculture and construction. The Division of Safety Research hopes the information presented in this report will be useful as the nation moves closer towards its goal of preventing occupational deaths in the U.S.

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TRAUMATIC OCCUPATIONAL FATALITY DISTRIBUTION BY FATALITY TYPE: U.S., 1980-1985.

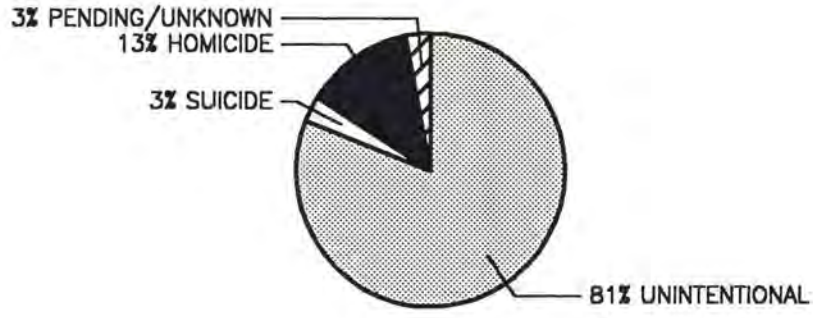


FIGURE 1.

TRAUMATIC OCCUPATIONAL FATALITY DISTRIBUTION BY FATALITY TYPE AND SEX: U.S., 1980-1985.

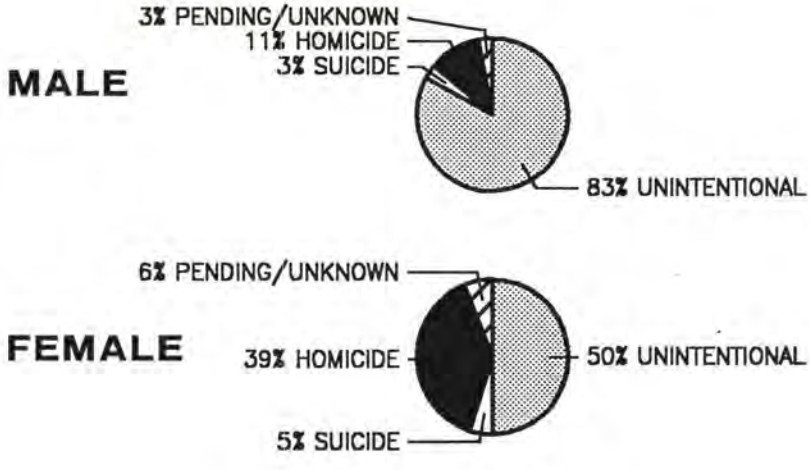


FIGURE 2.

TRAUMATIC OCCUPATIONAL FATALITY DISTRIBUTION BY AGE: U.S., 1980-1985.

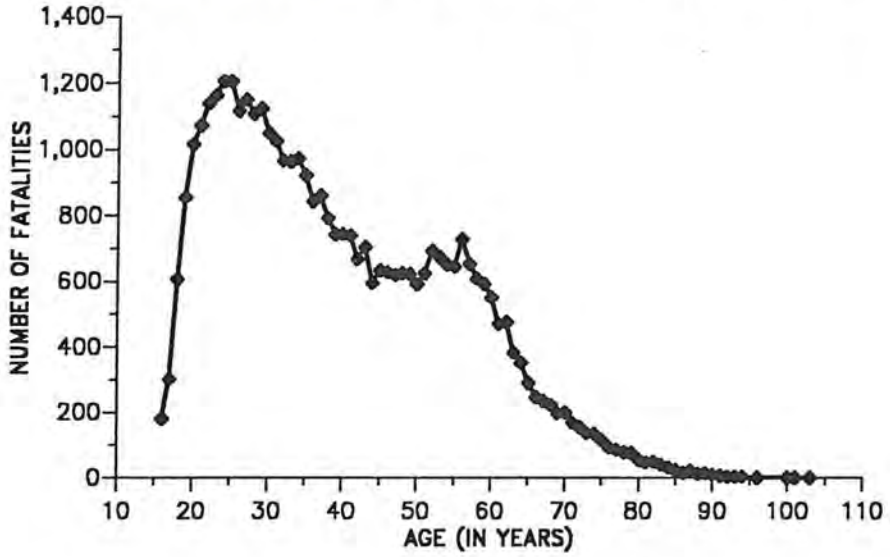


FIGURE 3.

TRAUMATIC OCCUPATIONAL FATALITY RATES WITH 95% CONFIDENCE INTERVALS, BY AGE GROUPS: U.S., 1980-1985.

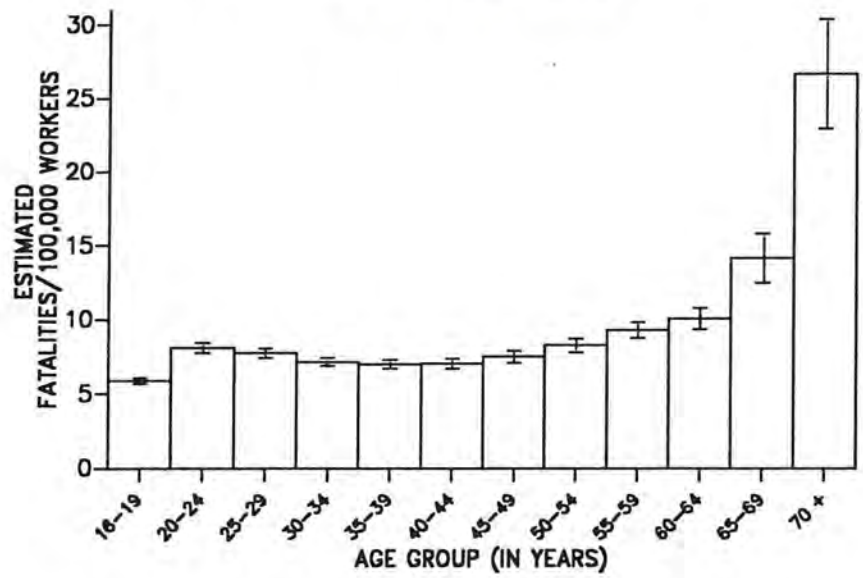


FIGURE 4.

TRAUMATIC OCCUPATIONAL FATALITY DISTRIBUTION BY OCCUPATION: U.S., 1980-1985.

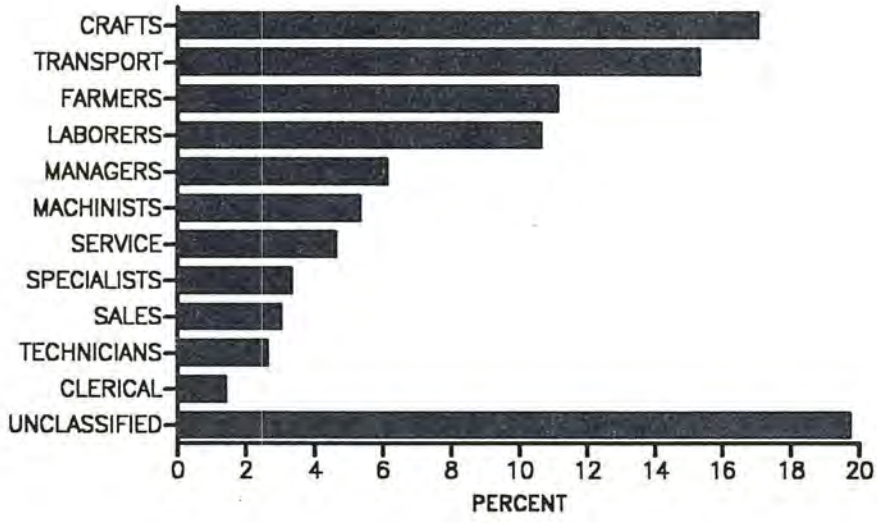
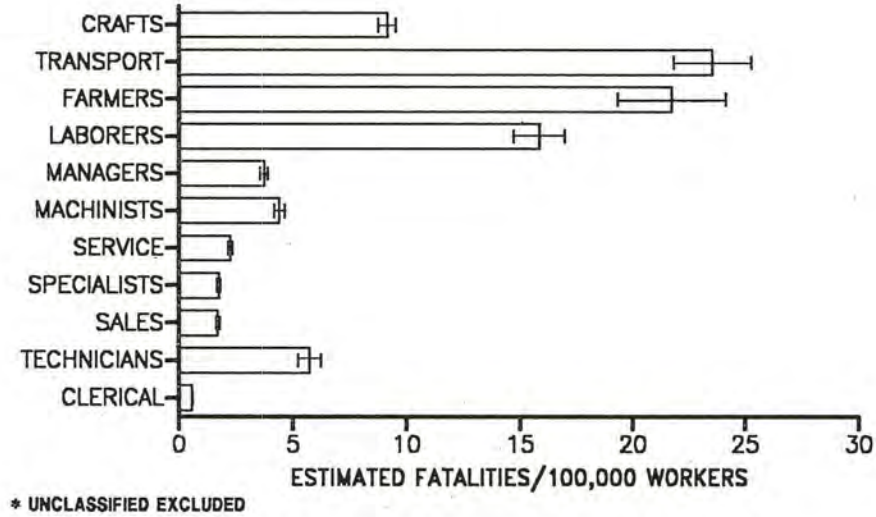


FIGURE 5.

TRAUMATIC OCCUPATIONAL FATALITY RATES WITH 95% CONFIDENCE INTERVALS, BY OCCUPATION: U.S., 1980-1985.*



* UNCLASSIFIED EXCLUDED

FIGURE 6.

TRAUMATIC OCCUPATIONAL FATALITY DISTRIBUTION BY INDUSTRIAL DIVISION: U.S., 1980-1985.

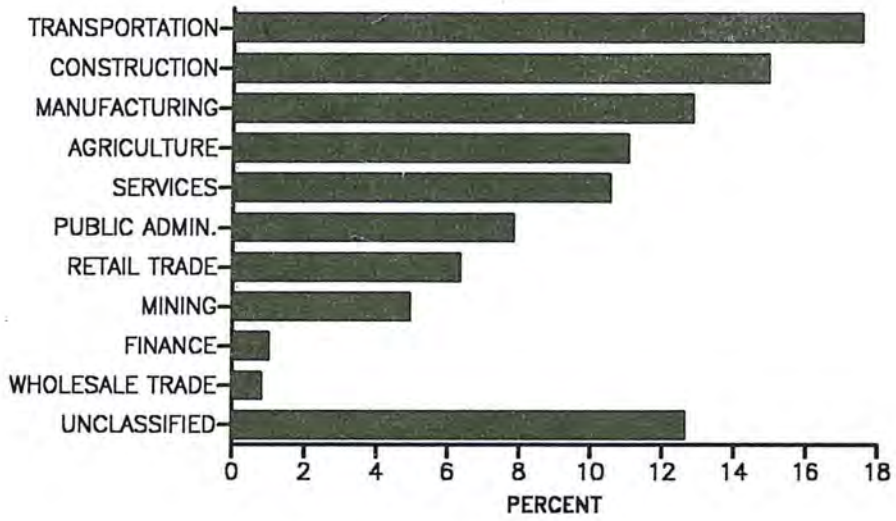
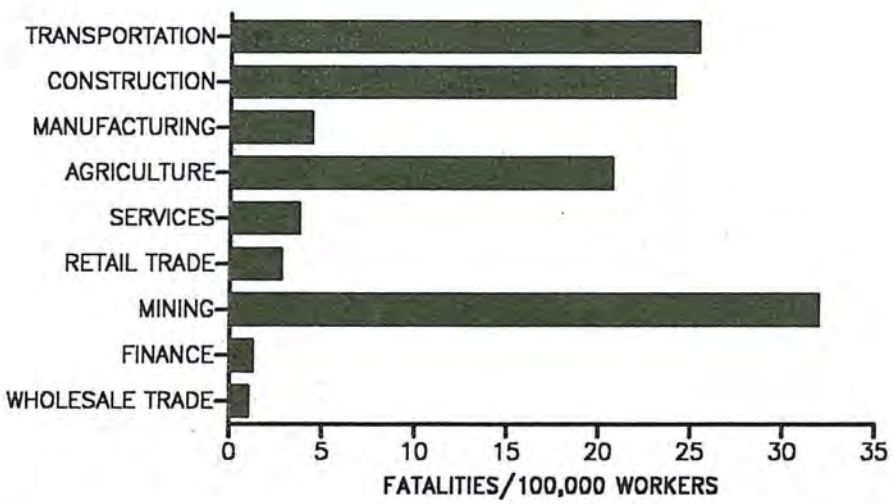


FIGURE 7.

TRAUMATIC OCCUPATIONAL FATALITY RATES BY INDUSTRIAL DIVISION: U.S., 1980-1985.*



* PUBLIC ADMINISTRATION AND UNCLASSIFIED EXCLUDED

FIGURE 8.

PRIVATE SECTOR FATALITY RATES: U.S., 1980-1985.

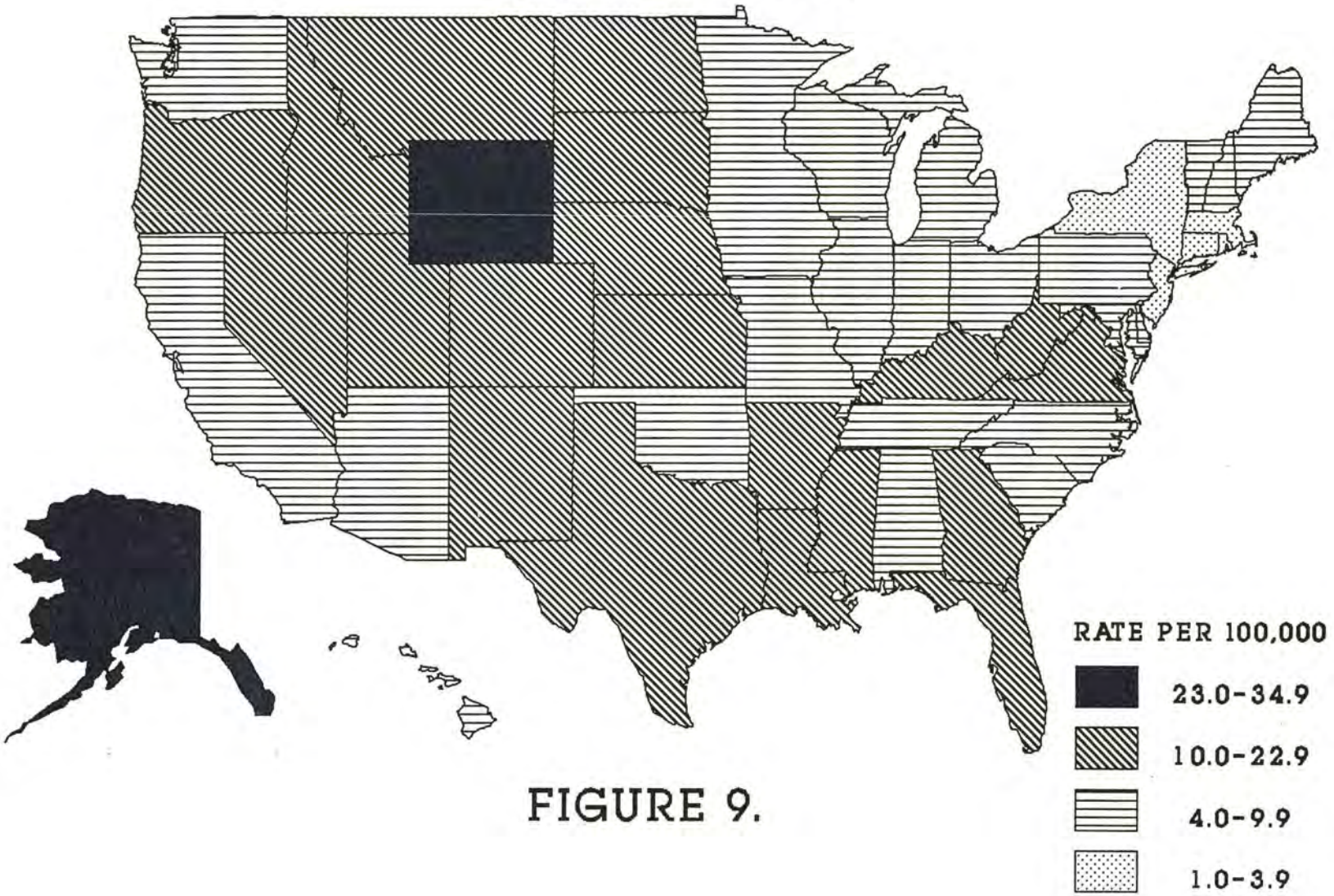


FIGURE 9.

TRAUMATIC OCCUPATIONAL FATALITY TOTALS BY YEAR: U.S., 1980-1985.

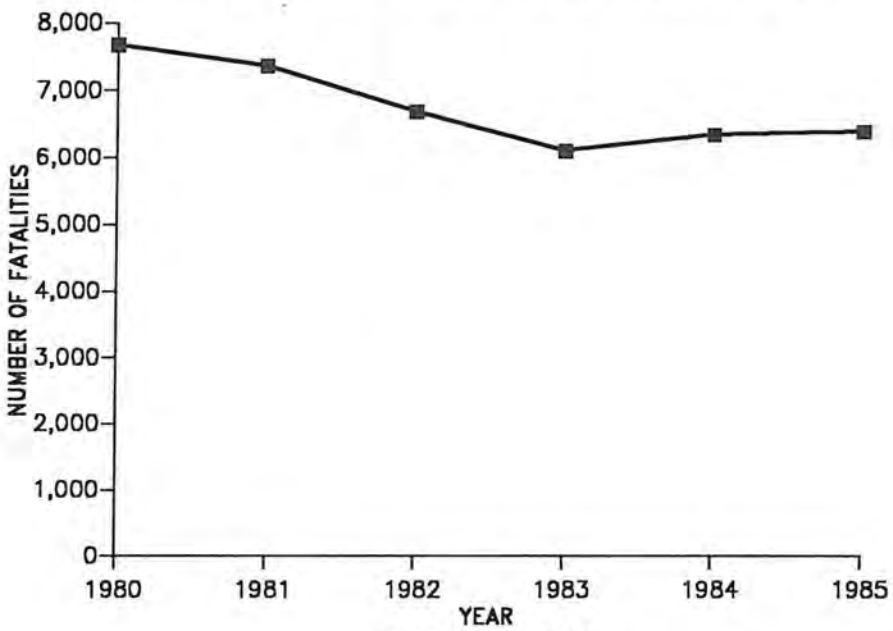


FIGURE 10.

PRIVATE SECTOR TRAUMATIC OCCUPATIONAL FATALITY RATES BY YEAR: U.S., 1980-1985.

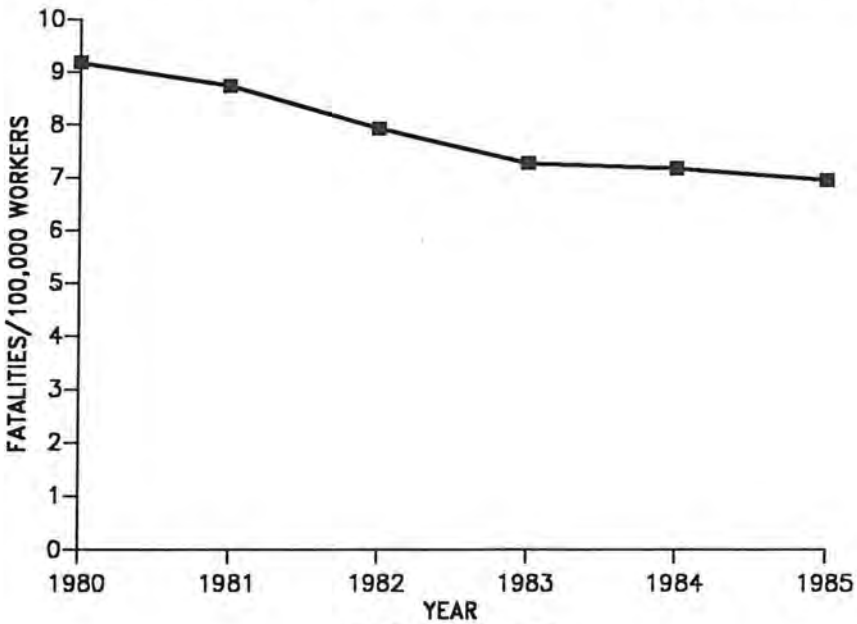


FIGURE 11.

PRIVATE SECTOR FATALITY TOTALS BY INDUSTRIAL GROUP: U.S., 1980-1985.

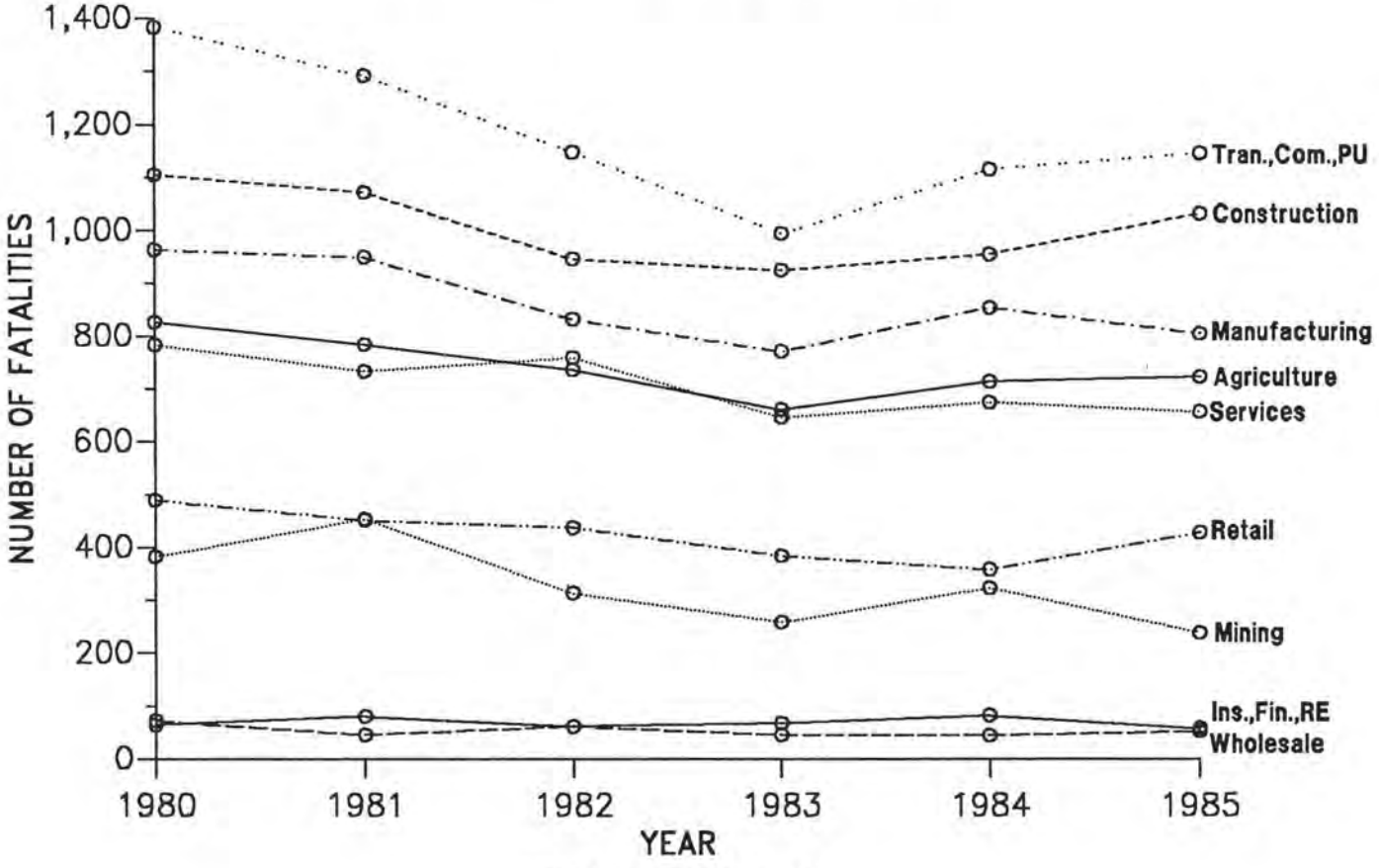


FIGURE 12.

PRIVATE SECTOR FATALITY RATES BY INDUSTRIAL GROUP: U.S., 1980-1985.

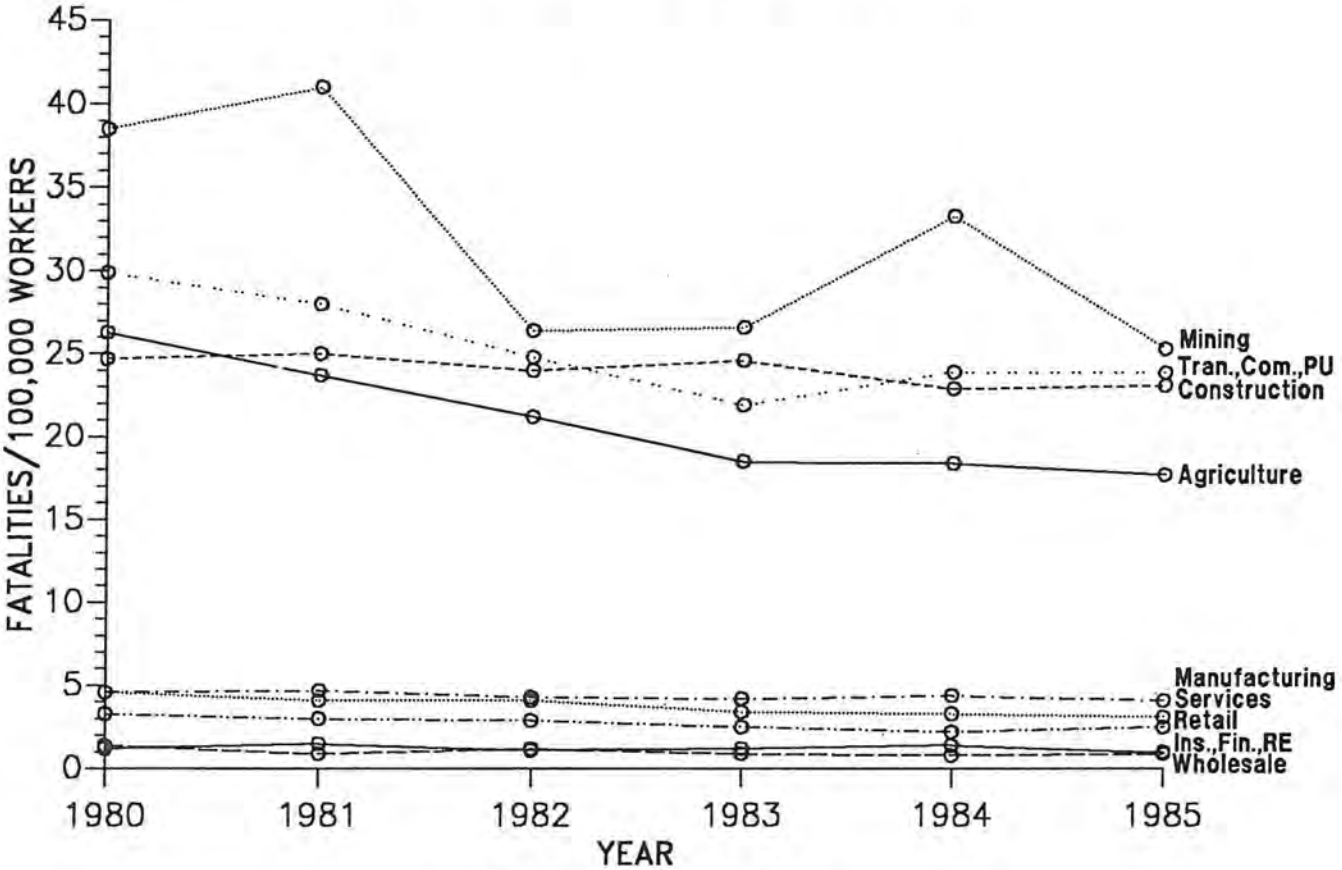


FIGURE 13.

FATALITY RATES FOR AGRICULTURE, FORESTRY, AND FISHING: U.S., 1980-1985.

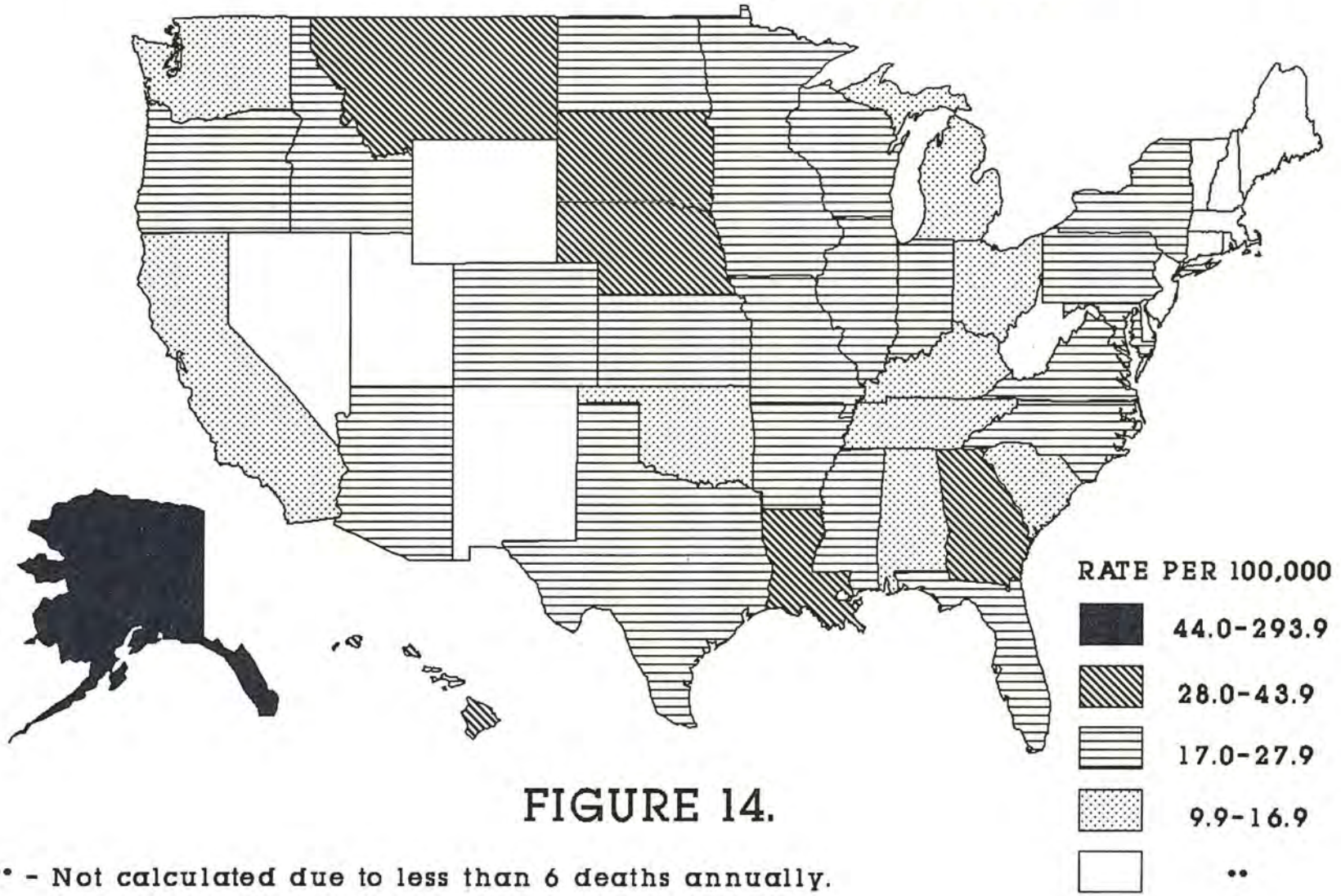


FIGURE 14.

•• - Not calculated due to less than 6 deaths annually.

FATALITY RATES FOR MINING: U.S., 1980-1985.

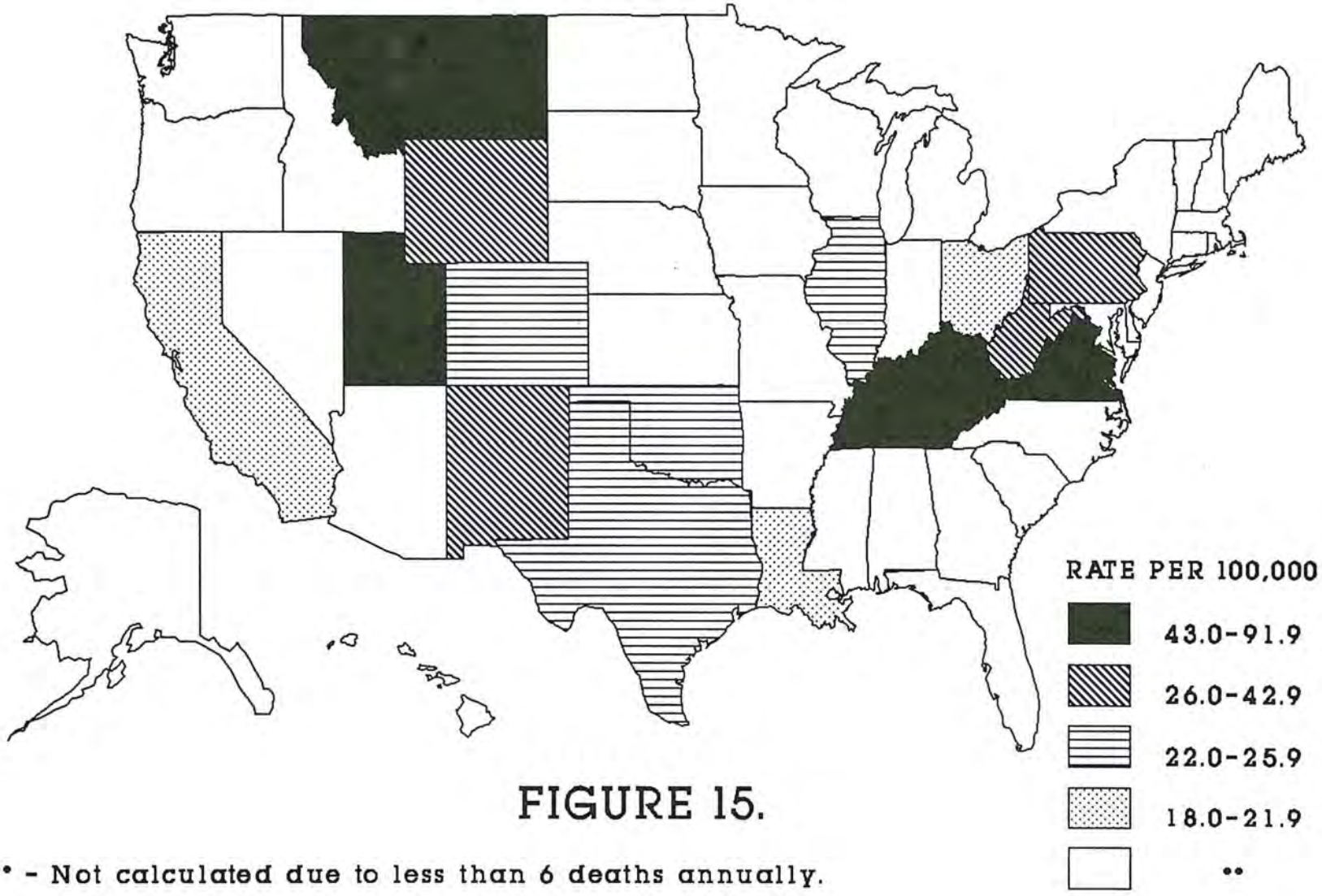


FIGURE 15.

** - Not calculated due to less than 6 deaths annually.

FATALITY RATES FOR CONSTRUCTION: U.S., 1980-1985.

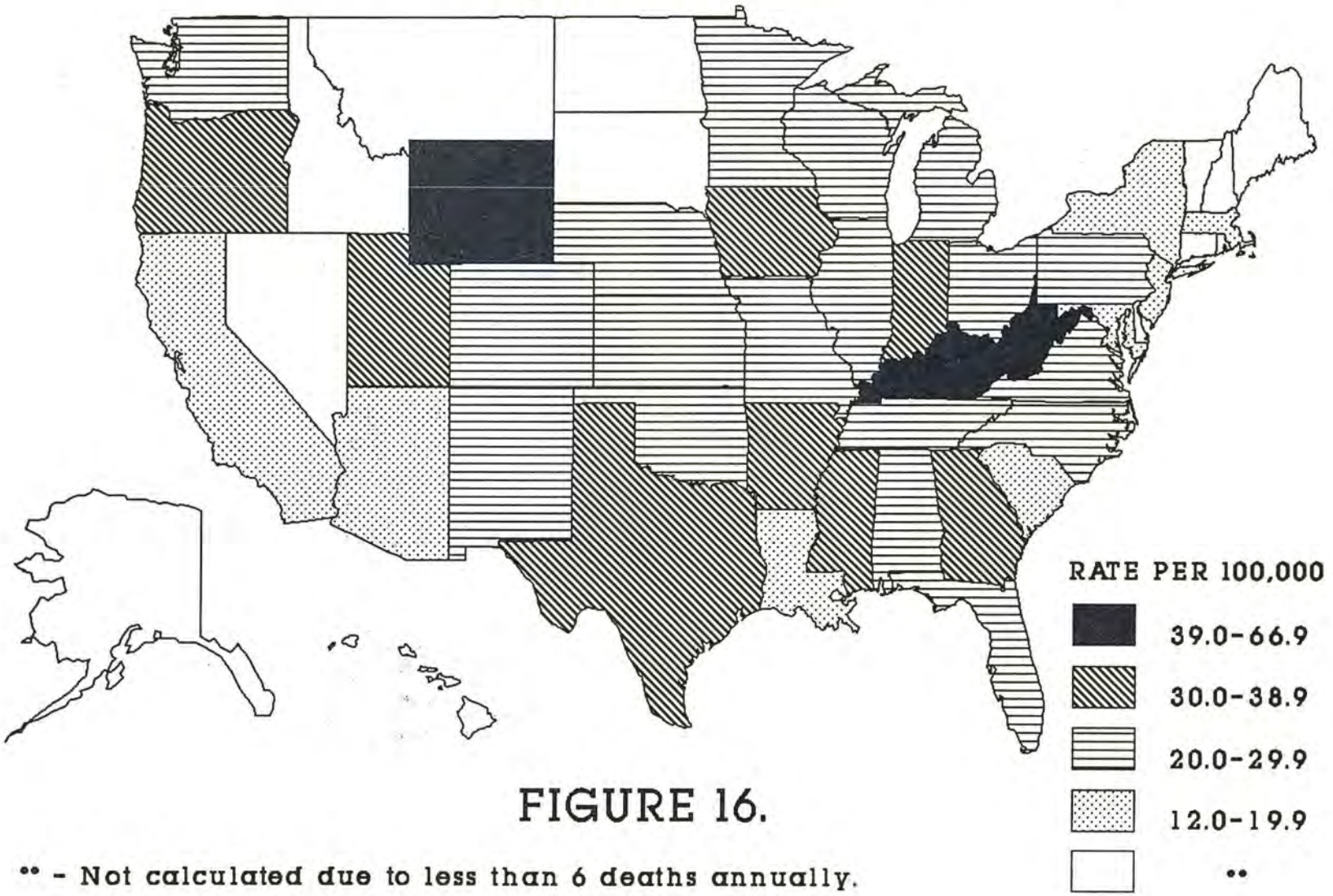


FIGURE 16.

** - Not calculated due to less than 6 deaths annually.

FATALITY RATES FOR MANUFACTURING: U.S., 1980-1985.

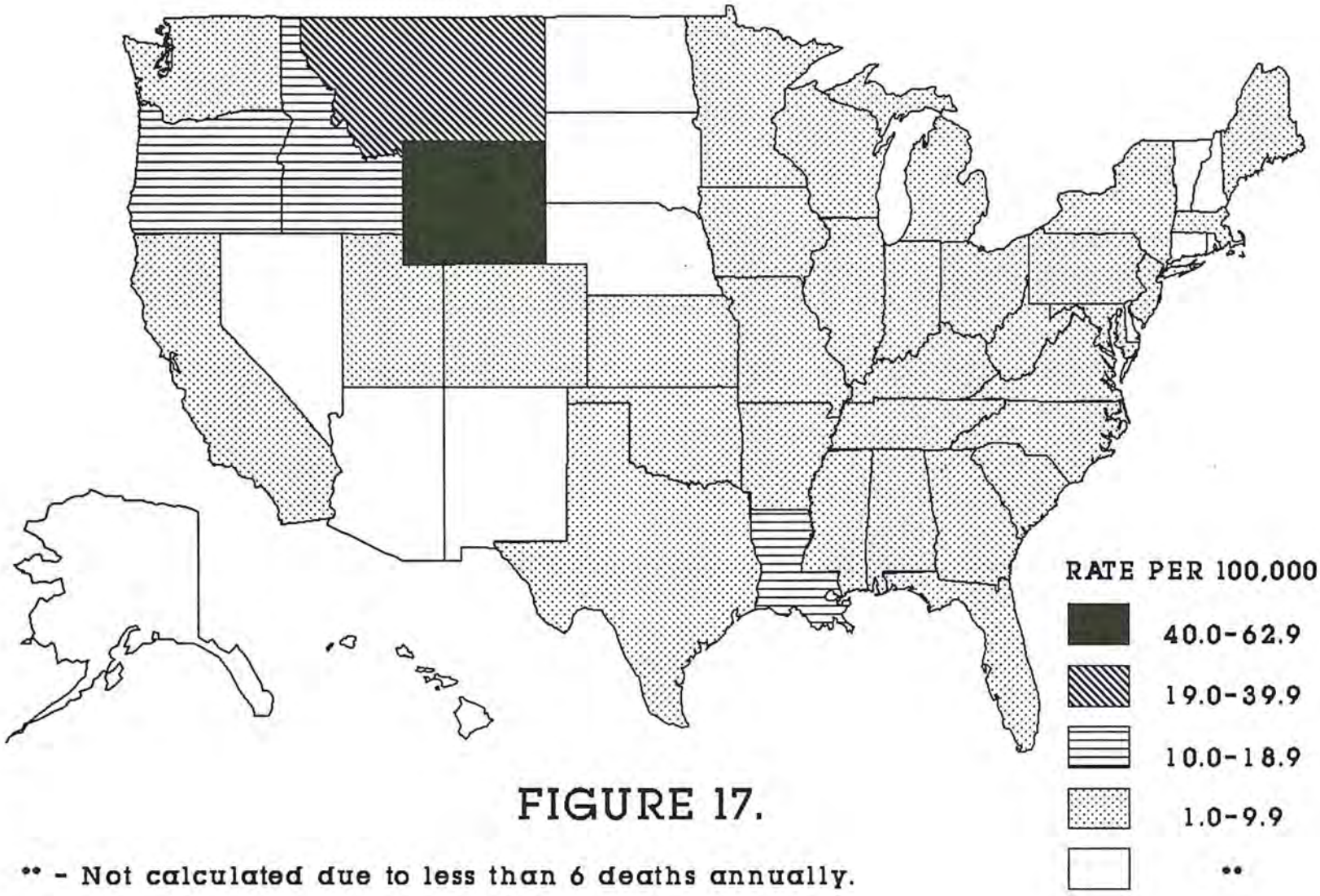


FIGURE 17.

** - Not calculated due to less than 6 deaths annually.

FATALITY RATES FOR TRANSPORT., COMMUN., AND PUBLIC UTILITIES: U.S., 1980-1985.

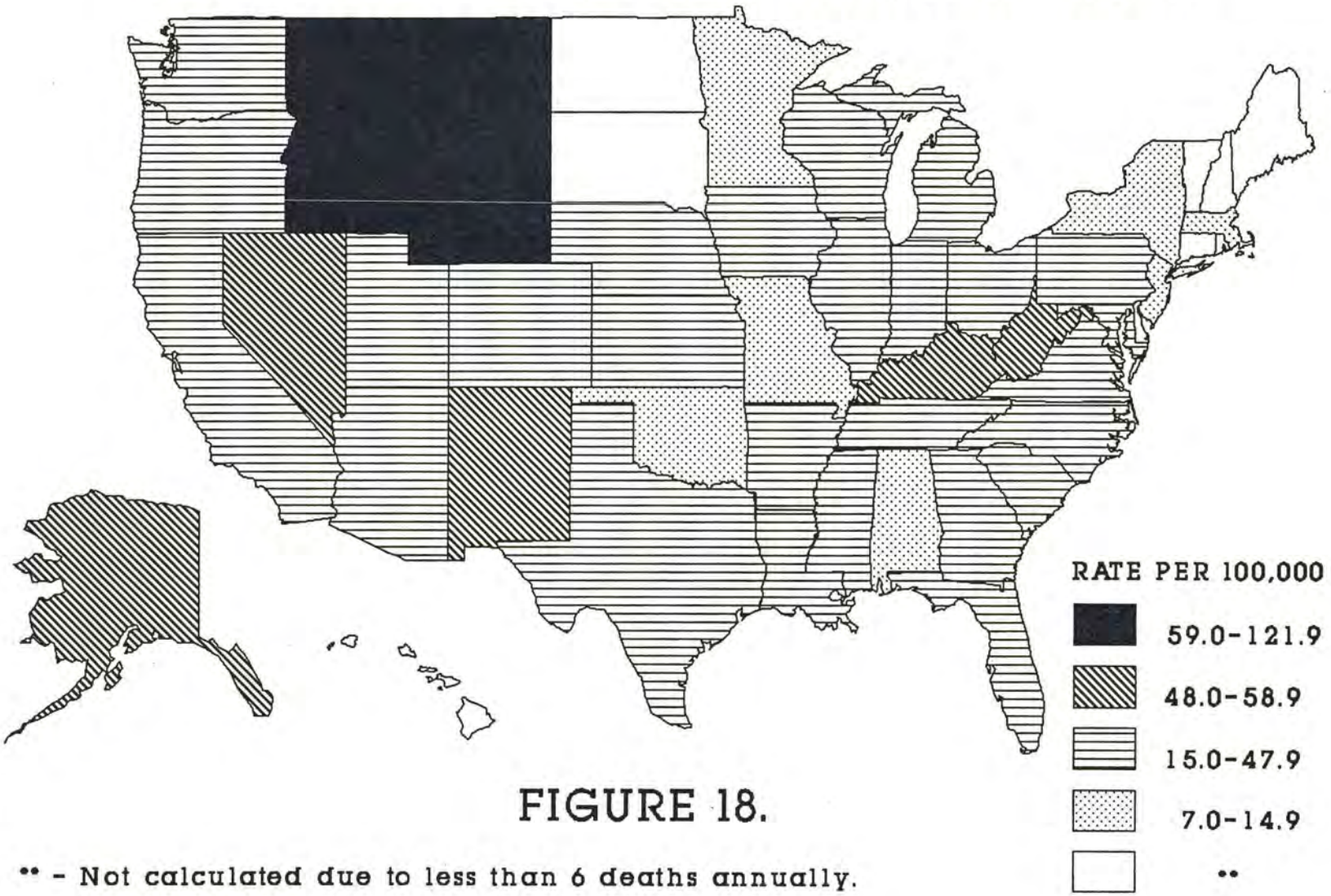


FIGURE 18.

•• - Not calculated due to less than 6 deaths annually.

FATALITY RATES FOR THE RETAIL TRADES: U.S., 1980-1985.

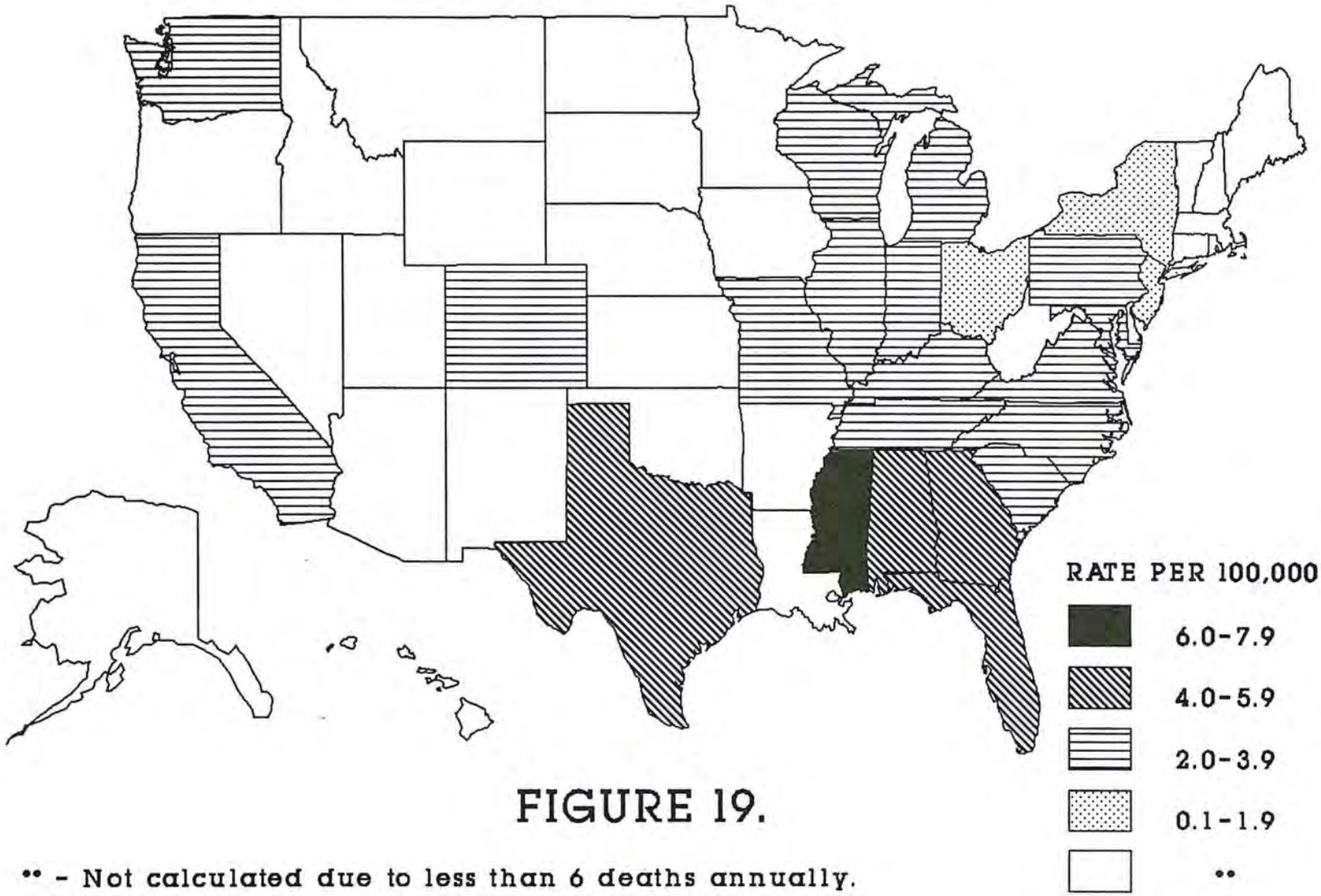


FIGURE 19.

** - Not calculated due to less than 6 deaths annually.

FATALITY RATES FOR SERVICE INDUSTRIES: U.S., 1980-1985.

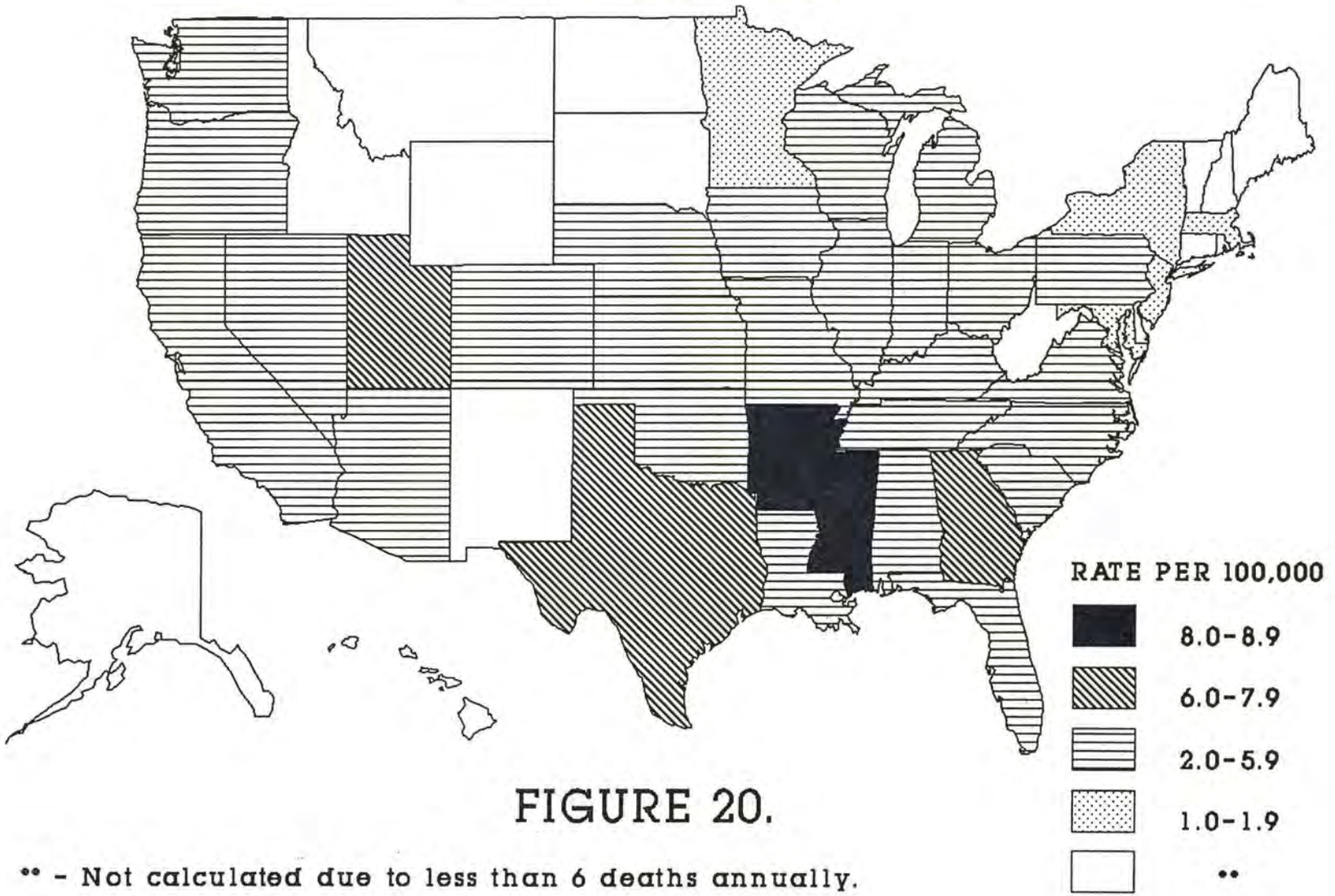


FIGURE 20.

** - Not calculated due to less than 6 deaths annually.

TABLE 1. NUMBER AND RATE OF TRAUMATIC OCCUPATIONAL FATALITIES BY STATE AND INDUSTRY: U.S., 1980-1985

		Private Sector		Ag, For, Fish		Mining		Const		Manuf		Trans, Comm		Wholesale		Retail		Fin, Ins, ke		Services	
STATE	N	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE
ALABAMA	98	93	8.4	7	12.5	5	.	16	22.4	24	6.9	10	14.1	1	.	9	4.5	1	.	8	3.8
ALASKA	51	45	34.2	13	293.6	1	.	5	.	2	.	9	57.9	0	.	2	.	0	.	5	.
ARIZONA	59	53	5.9	6	18.0	4	.	13	15.8	5	.	13	26.5	0	.	1	.	1	.	6	2.7
ARKANSAS	85	77	11.8	10	18.5	3	.	10	33.1	13	6.3	15	41.0	0	.	4	.	1	.	11	8.7
CALIFORNIA	739	639	7.1	67	15.9	10	18.9	85	18.4	83	4.0	136	25.6	11	1.9	69	3.9	12	1.7	107	4.7
COLORADO	133	120	10.5	11	26.6	11	24.8	25	29.1	11	5.6	31	40.1	1	.	7	2.6	1	.	12	4.4
CONNECTICUT	21	20	1.6	0	.	0	.	5	.	2	.	3	.	0	.	2	.	1	.	2	.
DELAWARE	17	16	7.0	0	.	0	.	2	.	1	.	4	.	0	.	0	.	0	.	2	.
DIST COLUMBIA	22	19	5.5	0	.	0	.	3	.	1	.	2	.	1	.	3	.	1	.	4	.
FLORIDA	375	339	10.0	28	23.4	2	.	81	29.0	28	5.8	65	29.9	4	.	35	4.3	6	2.0	45	4.9
GEORGIA	259	236	12.4	28	35.4	3	.	40	36.1	46	8.7	45	32.5	2	.	19	4.9	4	.	28	7.5
HAWAII	33	22	6.7	6	43.2	0	.	3	.	1	.	4	.	0	.	2	.	0	.	4	.
IDAHO	55	53	18.2	12	25.0	4	.	5	.	9	18.2	11	72.8	1	.	2	.	1	.	4	.
ILLINOIS	309	293	7.1	33	24.7	8	25.7	42	26.0	39	3.4	51	21.9	3	.	25	3.3	2	.	36	3.5
INDIANA	160	150	8.2	17	18.4	3	.	26	34.1	21	3.4	35	37.8	1	.	10	2.7	2	.	15	4.3
IOWA	99	96	9.6	32	21.0	1	.	14	37.6	9	3.9	16	34.6	1	.	3	.	1	.	11	5.5
KANSAS	89	85	10.2	18	22.1	4	.	12	27.7	11	5.7	18	36.3	1	.	4	.	1	.	10	5.6
KENTUCKY	160	151	14.0	21	14.9	32	66.9	19	42.0	13	5.1	30	57.4	0	.	8	3.8	1	.	9	4.1
LOUISIANA	168	161	12.2	14	33.8	20	20.8	23	19.5	30	15.0	27	23.6	0	.	3	.	1	.	13	4.6
MAINE	30	29	8.2	3	.	0	.	5	.	7	5.9	5	.	0	.	1	.	0	.	3	.
MARYLAND	97	88	6.4	7	21.8	1	.	13	12.3	7	2.7	16	20.9	1	.	7	2.1	1	.	7	1.8
MASSACHUSETTS	62	57	2.4	3	.	0	.	11	12.4	8	1.2	11	9.4	1	.	3	.	0	.	9	1.2
MICHIGAN	167	157	5.5	15	16.9	4	.	20	20.5	24	2.5	28	20.8	2	.	15	2.7	3	.	27	4.1
MINNESOTA	77	74	4.6	27	20.7	1	.	14	20.8	7	1.8	8	9.0	0	.	2	.	1	.	7	1.8
MISSISSIPPI	104	98	14.9	12	21.9	4	.	11	30.5	20	9.7	16	47.4	0	.	9	7.4	1	.	9	8.4
MISSOURI	107	102	5.7	24	19.6	2	.	18	21.3	15	3.5	10	8.3	0	.	8	2.3	1	.	13	3.0
MONTANA	57	54	22.6	12	32.1	6	69.4	5	.	9	39.9	12	74.8	0	.	2	.	0	.	5	.
NEBRASKA	67	65	11.7	29	36.9	1	.	8	29.0	4	.	12	38.4	0	.	1	.	0	.	6	5.0
NEVADA	56	44	12.3	2	.	4	.	5	.	2	.	12	52.8	0	.	4	.	1	.	9	5.3
NEW HAMPSHIRE	19	18	5.1	1	.	1	.	3	.	3	.	4	.	0	.	1	.	0	.	3	.
NEW JERSEY	105	99	3.7	3	.	0	.	19	16.7	11	1.4	22	11.3	1	.	8	1.6	2	.	11	1.7
NEW MEXICO	58	52	14.0	5	.	8	28.4	8	24.0	4	.	13	53.9	1	.	3	.	0	.	4	.
NEW YORK	179	169	2.7	17	19.8	3	.	40	18.2	29	2.0	30	7.2	2	.	6	0.6	2	.	20	1.1
NORTH CAROLINA	194	172	7.9	25	18.0	2	.	27	23.4	29	3.5	31	25.9	3	.	15	3.9	2	.	16	4.4
NORTH DAKOTA	32	31	14.2	12	27.4	3	.	4	.	3	.	5	.	0	.	1	.	0	.	2	.
OHIO	200	190	5.2	16	15.4	6	21.3	30	21.4	34	2.9	46	24.9	1	.	7	0.9	1	.	20	2.4
OKLAHOMA	82	79	7.8	7	9.9	19	24.5	14	24.6	14	7.2	7	10.9	0	.	1	.	1	.	7	3.2
OREGON	108	104	11.9	15	18.2	2	.	13	36.1	32	16.2	18	35.5	1	.	4	.	1	.	9	4.7
PENNSYLVANIA	278	266	6.6	21	23.7	16	34.8	39	21.6	45	3.7	43	19.7	2	.	16	2.2	3	.	31	3.0
RHODE ISLAND	11	11	3.1	1	.	0	.	2	.	1	.	2	.	0	.	1	.	0	.	1	.
SOUTH CAROLINA	76	72	7.0	7	16.0	1	.	12	12.2	13	3.3	9	20.9	1	.	7	3.6	0	.	9	5.6
SOUTH DAKOTA	36	34	15.3	17	35.1	2	.	3	.	2	.	4	.	0	.	1	.	1	.	3	.
TENNESSEE	145	133	8.5	17	15.0	7	76.4	21	27.4	19	4.0	24	32.1	1	.	8	2.9	1	.	12	3.9
TEXAS	781	725	13.2	50	23.1	64	25.5	140	30.3	87	8.3	152	43.3	5	.	57	5.1	9	2.3	76	6.5
UTAH	77	72	15.5	5	.	14	91.0	11	38.1	8	8.8	13	42.1	1	.	2	.	1	.	9	7.4
VERMONT	14	13	7.2	2	.	1	.	2	.	2	.	2	.	0	.	0	.	0	.	1	.
VIRGINIA	216	196	11.3	17	21.4	15	67.1	31	27.5	24	5.9	37	36.0	2	.	11	3.0	2	.	16	3.9
WASHINGTON	136	121	8.8	17	14.9	2	.	19	23.7	28	9.7	20	24.8	0	.	6	2.0	3	.	13	4.0
WEST VIRGINIA	86	82	17.2	3	.	25	42.6	9	41.3	9	9.4	17	58.5	0	.	3	.	0	.	5	.
WISCONSIN	116	111	6.5	27	20.4	1	.	15	25.5	16	3.2	15	19.2	1	.	8	2.3	2	.	14	3.7
WYOMING	53	52	32.5	4	.	9	29.5	8	66.0	6	62.1	14	121.2	0	.	2	.	1	.	5	.
UNITED STATES	6757	6232	7.9	742	20.7	329	31.9	1007	24.1	863	4.4	1181	25.4	54	1.0	426	2.7	70	1.2	710	3.7

NOTE: PRIVATE SECTOR INCLUDES CASES WHERE INDUSTRY WAS UNCLASSIFIED.
N = NUMBER OF DEATHS RATE = NUMBER OF DEATHS/100,000 WORKERS
0 = RATE NOT CALCULATED BECAUSE < 5 DEATHS

TABLE 2. YPLL AND YPLL RATE OF TRAUMATIC OCCUPATIONAL FATALITIES BY STATE AND INDUSTRY: U.S.,1980-1985

STATE	Private Sector		Ag, For, Fish		Mining		Const		Manuf		Trans, Comm		Wholesale		Retail		Fin, Ins, Re		Services	
	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE	N	RATE
ALABAMA	2264	203	132	229	.	.	426	590	543	158	234	343	.	.	180	87	.	.	216	103
ALASKA	1312	996	381	8818	.	.	.	.	.	.	276	1711	.	.	.	.	0	.	.	.
ARIZONA	1402	155	146	478	.	.	363	459	.	.	326	665	0	.	.	.	.	.	172	76
ARKANSAS	1948	300	219	392	.	.	286	916	282	141	383	1046	0	.	.	.	.	.	331	271
CALIFORNIA	16554	185	1712	406	292	552	2195	474	2151	105	3507	663	256	43	1778	101	229	33	2949	129
COLORADO	3363	295	261	651	338	798	732	853	314	165	876	1128	.	.	147	59	.	.	350	124
CONNECTICUT	522	40	0	.	.	.	.	.	.	.	.	.	0	.	.	.	.	.	.	.
DELAWARE	401	174	0	.	.	.	.	.	.	.	.	.	.	.	0	.	.	.	.	.
DIST COLUMBIA	463	133	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FLORIDA	8485	252	724	599	.	.	2229	802	665	141	1683	774	.	.	789	96	133	47	1093	119
GEORGIA	5849	308	511	650	.	.	1109	992	1115	210	1110	809	.	.	478	127	.	.	680	184
HAWAII	541	165	160	1150	.	.	.	.	.	.	.	.	0	.	.	.	0	.	.	.
IDAHO	1355	469	255	517	.	.	.	.	265	527	293	1942	.	.	.	.	.	.	.	.
ILLINOIS	6654	161	508	380	178	584	1010	627	871	78	1244	536	.	.	551	71	.	.	970	96
INDIANA	3615	198	287	315	.	.	681	887	467	75	883	958	.	.	257	71	.	.	377	106
IOWA	2212	221	515	337	.	.	337	927	235	106	444	981	.	.	.	.	.	.	311	152
KANSAS	2217	267	324	402	.	.	315	758	305	164	503	1023	.	.	.	.	.	.	294	173
KENTUCKY	3926	363	372	265	1019	2120	518	1176	309	119	808	1555	0	.	196	94	.	.	237	115
LOUISIANA	4984	378	323	798	706	753	739	634	893	453	813	707	.	.	.	.	.	.	394	136
MAINE	766	222	.	.	0	.	.	.	125	113	.	.	.	.	.	.	0	0	.	.
MARYLAND	2212	162	145	441	.	.	363	336	152	63	418	553	.	.	150	47	.	.	203	52
MASSACHUSETTS	1428	59	.	.	0	.	298	331	180	27	263	228	.	.	.	.	0	.	212	29
MICHIGAN	3889	136	329	370	.	.	492	504	568	59	674	500	.	.	364	64	.	.	717	110
MINNESOTA	1636	102	435	340	.	.	376	547	176	47	148	175	0	.	.	.	.	.	189	48
MISSISSIPPI	2271	344	221	397	.	.	292	810	464	222	363	1054	0	.	180	145	.	.	244	219
MISSOURI	2149	120	309	254	.	.	407	496	343	80	248	199	0	.	153	46	.	.	355	63
MONTANA	1301	547	211	581	183	2172	.	.	237	1092	269	1676	.	.	.	.	0	.	.	.
NEBRASKA	1499	268	501	649	.	.	212	802	.	.	308	1000	0	.	.	.	0	.	180	146
NEVADA	1153	326	.	.	.	.	.	.	.	.	349	1556	0	.	.	.	.	.	223	130
NEW HAMPSHIRE	468	135	.	.	.	.	.	.	.	.	.	.	0	.	.	.	.	.	.	.
NEW JERSEY	2325	88	.	.	0	.	419	376	236	31	521	274	.	.	201	41	.	.	281	43
NEW MEXICO	1348	366	.	.	233	862	238	714	.	.	319	1322	.	.	.	.	0	.	.	.
NEW YORK	3997	64	363	422	.	.	919	424	700	49	709	170	.	.	147	14	.	.	499	27
NORTH CAROLINA	4067	188	459	331	.	.	728	623	662	81	761	640	.	.	318	85	.	.	439	124
NORTH DAKOTA	815	373	203	477	.	.	.	.	.	.	.	.	0	.	.	.	.	.	.	.
OHIO	4568	124	249	234	188	633	706	504	763	65	1207	652	.	.	158	22	.	.	525	62
OKLAHOMA	2282	228	95	145	644	851	386	703	422	226	219	324	.	.	.	.	.	.	195	97
OREGON	2670	306	364	455	.	.	298	817	895	461	437	845	.	.	.	.	.	.	261	134
PENNSYLVANIA	6239	155	375	430	401	873	946	529	985	82	1020	466	.	.	379	51	.	.	752	73
RHODE ISLAND	272	78	.	.	0	.	.	.	.	.	.	.	0	.	.	.	.	.	.	.
SOUTH CAROLINA	1730	170	140	343	.	.	349	354	296	78	218	525	.	.	104	56	0	.	233	139
SOUTH DAKOTA	739	337	305	650	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TENNESSEE	3150	202	300	270	201	2244	536	703	446	93	632	845	.	.	149	53	.	.	288	90
TEXAS	20290	371	1067	494	2123	847	4167	900	2466	236	4125	1173	.	.	1451	129	221	58	2177	187
UTAH	2068	449	.	.	445	2961	320	1142	247	282	359	1147	.	.	.	.	.	.	266	230
VERMONT	351	197	.	.	.	.	.	.	.	.	.	.	0	.	0	.	.	.	.	.
VIRGINIA	4792	277	258	322	428	1892	900	799	553	136	899	868	.	.	264	73	.	.	432	102
WASHINGTON	3026	220	364	324	.	.	476	610	747	257	510	631	0	.	136	47	.	.	367	114
WEST VIRGINIA	2141	451	.	.	708	1207	236	1123	229	231	445	1562	.	.	.	.	.	.	.	.
WISCONSIN	2562	151	424	316	.	.	373	621	415	81	391	488	.	.	173	52	.	.	403	106
WYOMING	1497	939	.	.	314	1048	247	1953	188	2059	338	2999	0	.	.	.	.	.	.	.
UNITED STATES	157765	199	4616	408	10157	986	27001	645	21765	111	30427	654	1271	24	10053	64	1543	28	19193	101

NOTE: PRIVATE SECTOR INCLUDES CASES WHERE INDUSTRY WAS UNCLASSIFIED
N = NUMBER OF YPLLS RATE = YPLL/100,000 WORKERS
0 = YPLL AND YPLL RATE NOT CALCULATED BECAUSE < 5 DEATHS