



October 2006

DATA SUMMARY No. DS06-10000

Work-related deaths in California are examined in this special report.

Highlights

- California ranked #1 in the nation for the number of work-related deaths in 2004, but ranked #45 for work-related death rates.
Accidents or unintentional injuries were the leading cause of work-related deaths.
Assaults (homicides) were the second leading cause of work-related deaths.
Disparities in work-related mortality by gender, by race and ethnicity, and by age group were found.
April 28th has been established as national Workers' Memorial Day to remember those who died on the job.

Work-Related Mortality California, 2000-2004

By Jim Sutocky

Introduction

Approximately 5,000-6,000 workers die annually in the United States (U.S.) due to work-related illnesses and injuries. Responsibility for collecting information and reporting data on work-related accidents, injuries, illnesses, and fatalities is shared by several federal and state agencies. These include the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics (NCHS) and the National Institute for Occupational Safety and Health (NIOSH), and the U.S. Department of Labor's Bureau of Labor Statistics (BLS) and Occupational Health and Safety Administration (OSHA). The State counterparts of these federal agencies are the California Department of Health Services (CDHS), Center for Health Statistics (CHS), and the California Department of Industrial Relations (CDIR), Division of Labor Statistics and Research (DLSR) and the Division of Occupational Safety and Health (Cal-OSHA). According to the OSHA, an injury or illness is considered work-related if an event or exposure in the work environment caused or contributed to the condition or significantly aggravated a preexisting condition.

The CDC monitors deaths from occupational injuries through the National Traumatic Occupational Fatalities (NTOF) surveillance system. The NTOF contains information obtained from State vital statistics reporting on death certificates. For a case to be included in NTOF, the death certificate must meet three criteria: (1) the decedent must be aged 16 or older; (2) the external cause of death is classified as International Classification of Diseases, Tenth Revision (ICD-10) codes V01-Y98; and (3) the "Injury at Work" item on the death certificate must be marked positive by the certifier.

The BLS' Census of Fatal Occupational Injuries (CFOI) uses multiple data sources including death certificates, workers' compensation reports, reports to various state and federal regulatory agencies, police reports, coroner and medical examiner records, and newspaper reports to identify and verify work-related fatalities. To ensure that fatalities are work-related, cases are substantiated with two or more independent source documents, or a source document and a follow-up questionnaire. According to data compiled by the BLS, California ranked #1 in the nation

for the number of work-related deaths in 2004, accounting for eight percent (n=467) of the nation's 5,764 work-related deaths enumerated by the CFOI.⁸ However, in terms of the annual work-related fatality rate, California ranked 45.5 nationally in 2004 (2.4 deaths per 100,000 workers).⁹

Methods

Mortality data for the 2000-2004 time period were extracted from the Death Statistical Master Files (DSMF) maintained by the California Department of Health Services (CDHS), Center for Health Statistics (CHS).¹⁰ A death was identified as work-related by a "Yes" indicated in the "Injured at Work" checkbox on the California death certificate, consistent with the CDC's NTOF methodology. The underlying cause of death, defined by the World Health Organization as the disease or injury that initiated the train of events leading directly to death, was tabulated by ICD-10 code.¹¹

Mortality rates per 100,000 population aged 18 and older were age-adjusted by the direct method using population denominator data supplied by the California Department of Finance.¹² The 2000 U.S. Standard Population adjustment weights for persons aged 18 years and over used in the calculation of age-adjusted mortality rates were obtained from the NCHS.¹³ Ninety-five percent confidence intervals and relative standard errors (RSE) were also calculated to provide measures of variability and of reliability of the rates and as a means for testing the statistical significance of differences in rates between race-ethnic and gender populations.¹⁴ A linear regression model was used to determine the statistical significance of time trends in death rates.¹⁵

Comparison data for California for 2000-2003 were obtained from CFOI data tables published by the CDIR and revised 2004 data were obtained from the federal BLS.^{16,7}

Results

Overall Trend

Although 197 more work-related deaths were identified from California death certificates than the CFOI for the 2000-2002 time period, the CFOI reported 100 more deaths than the DSMFs for 2003 and 2004 (Table 1, Figure 1). For the five-year period 2000-2004 there was an overall net difference of 97 (3.6 percent) in the number of deaths reported between the two sources.

The DSMF data indicate that age-adjusted work-related death rates declined significantly from 2.5 per 100,000 population in 2000 to 1.6 per 100,000 in 2004. This trend was also observed in the CFOI data, with rates declining significantly from 2.2 per 100,000 population in 2000 to 1.7 per 100,000 in 2004. Significant differences were found between the age-adjusted rates generated by the DSMF and the CFOI for 2000 and 2001, but the differences for 2002, 2003, and 2004 were not statistically significant.

Table 1. Work-Related Deaths and Death Rates by Data Source, California 2000-2004

	2000		2001		2002		2003		2004		TOTAL	
	N	Rate ³	N	Rate ³	N	Rate ³	N	Rate ³	N	Rate ³	N	Rate ⁴
DSMF ¹	622	2.5	580	2.3	531	2.1	396	1.5	427	1.6	2,566	2.0
CFOI ²	553	2.2	505	2.0	478	1.8	456	1.7	467	1.7	2,459	1.9

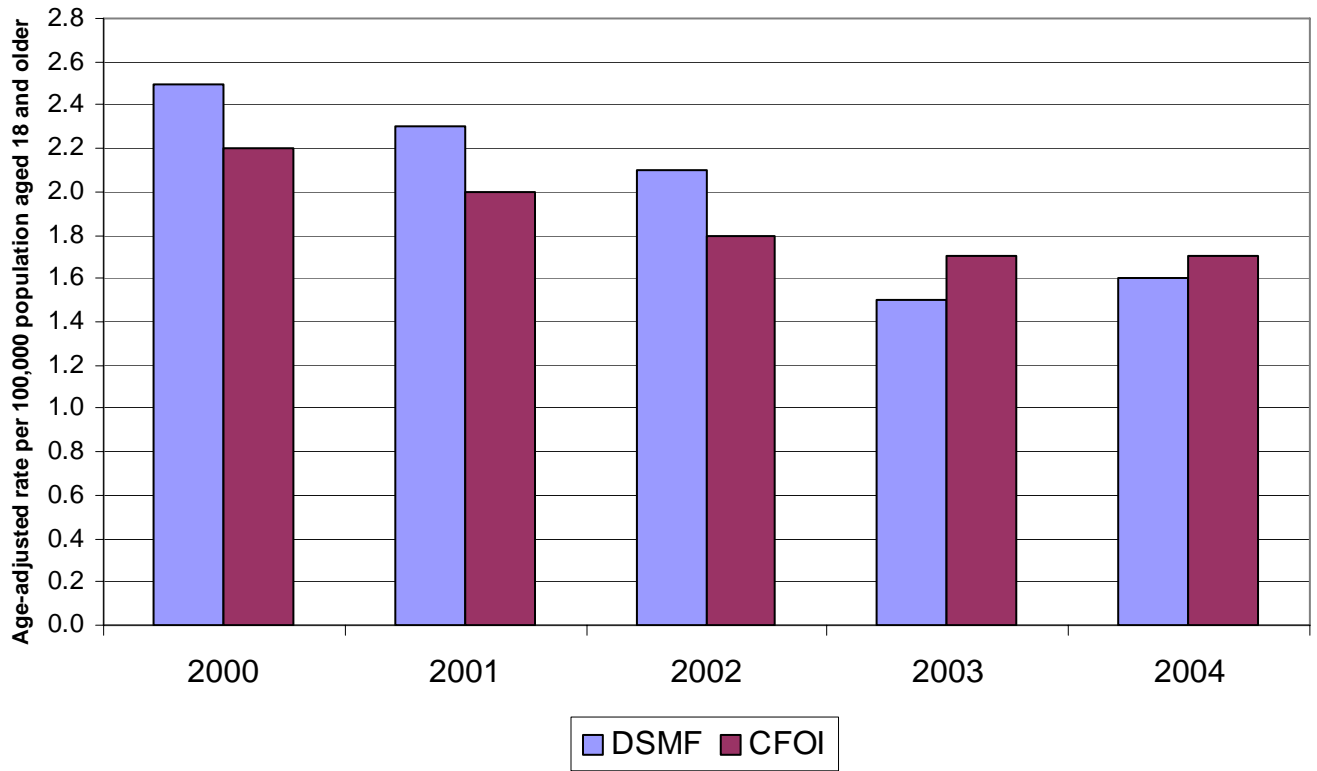
¹ California Department of Health Services, Death Statistical Master Files.

² U.S. Department of Labor, Census of Fatal Occupational Injuries.

³ Age-adjusted rate per 100,000 population aged 18 years and older.

⁴ Five-year average age-adjusted rate per 100,000 population aged 18 years and older.

**Figure 1. Work-Related Death Rates by Data Source
California, 2000-2004**



Underlying Causes of Work-Related Deaths

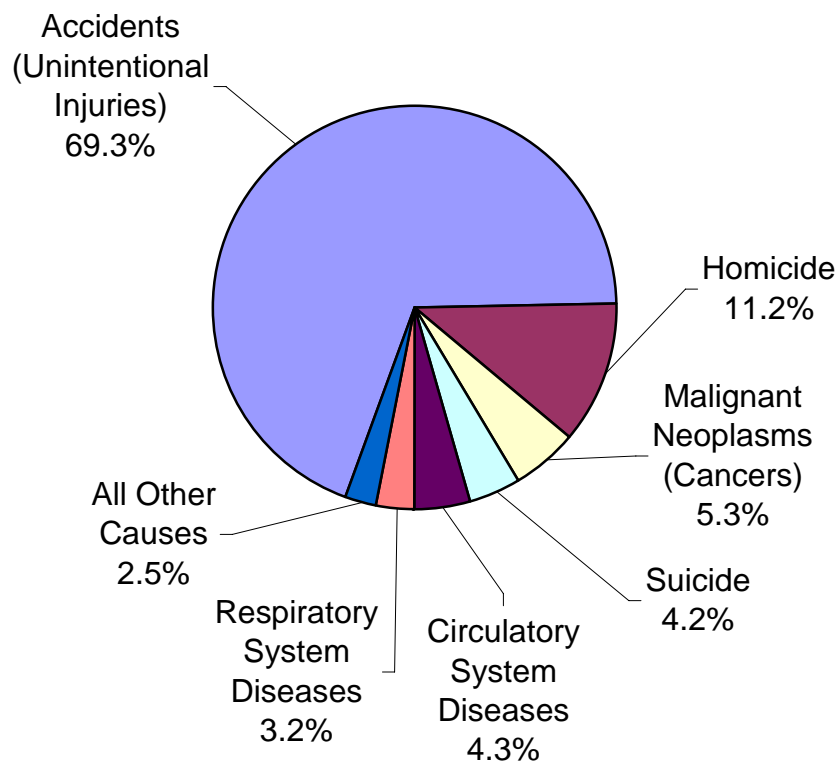
Table 2. Work-Related Deaths by Group Causes of Death, California 2000-2004

ICD-10 CODES	CAUSE OF DEATH	FREQ	PCT
V01-X59, Y85, Y86, Y89.0, Y89.9	Accidents (Unintentional Injuries)	1,771	69.3
X85-Y09, Y87.1	Assaults (Homicide)	286	11.2
C00-C97	Malignant Neoplasms (Cancers)	136	5.3
I00-I99	Circulatory System Diseases	111	4.3
X60-X84, Y87.0	Suicide	108	4.2
J00-J99	Respiratory System Diseases	81	3.2
	All Other Causes	63	2.5
	Total	2,556	100.0

SOURCE: California Department of Health Services, Death Statistical Master Files.

NOTES: Includes data for persons aged 18 years and older who had "Injured At Work" item on the death certificate checked "Yes".

**Figure 2. Work-Related Deaths
Among Persons Aged 18 Years and Older
By ICD-10 Group Cause of Death
California 2000-2004**



SOURCE: California Department of Health Services, Death Statistical Master Files.

As shown in Table 2 and Figure 2, accidents or unintentional injuries were the leading group cause of work-related deaths among adults aged 18 years and older according to death certificate data. Accidental injuries accounted for nearly 70 percent of all work-related deaths in California during the five-year time period 2000-2004. Of these deaths, transport accidents (ICD-10 codes V01-V99) accounted for 42 percent (n=683), exposure to inanimate mechanical forces (codes W20-W49) accounted for 21 percent (n=336), and falls (codes W00-W19) accounted for 18 percent (n=291) (see Appendix Tables A-1 and A-2 for details).

Assault (homicide) was the second leading group cause of work-related deaths in California, accounting for 11 percent (n=286) of all work-related deaths during the 2000-2004 time period. Nearly 80 percent of these deaths (n=228) involved the use of firearms (see Appendix Table A-3 for details). Assault by other and unspecified firearm discharge (ICD-10 code X95) was the most frequently listed single underlying cause of death (n=169) for all work-related deaths in California.

Malignant neoplasms (cancers) were the third leading group cause of work-related deaths in California for 2000-2004, accounting for five percent (n=136) of all work-related deaths (see Appendix Table A-4 for details). Mesothelioma (ICD-10 group code C45) accounted for 73 percent (n=99) of all work-related cancer deaths.

Diseases of the circulatory system (ICD-10 codes I00-I99) constituted the fourth leading group cause of work-related deaths in California, accounting for 4 percent (n=111) of all work-related deaths (see Appendix Table A-5 for complete details). Chronic ischemic heart disease (ICD-10 group code I25) accounted for 50 percent of all work-related circulatory system disease deaths (n=56), and acute myocardial infarction (ICD-10 group code I21) accounted for another 20 percent (n=22).

Suicide (intentional self-injury) was the fifth leading group cause of work-related deaths in California during 2000-2004, accounting for 4 percent (n=108) of all work-related deaths (see Appendix Table A-6 for complete details). Nearly half of these self-inflicted deaths (n=51; 47 percent) involved the use of firearms, and one-third (n=37; 34 percent) involved hanging, strangulation, or suffocation.

Diseases of the respiratory system (ICD-10 codes J00-J99) constituted the sixth leading group cause of work-related deaths in California for 2000-2004, accounting for 3 percent (n=81) of all work-related deaths (see Appendix Table A-7 for complete details). Pneumoconiosis (ICD-10 codes J60-J66) accounted for nearly half of these deaths (n=40; 49 percent), chronic lower respiratory diseases (ICD-10 codes J40-J47) accounted for 25 percent (n=20), and other interstitial pulmonary diseases (ICD-10 code J84) accounted for 18 percent (n=15).

All other causes of death not included in the ICD-10 code groups referenced by the six leading causes above accounted for 2.5 percent (n=63) of all work-related deaths during the 2000-2004 time period. These included diseases of the nervous system (n=10), other events of undetermined intent (n=10), and other ill-defined and unspecified causes of mortality (n=6) (see Appendix Table A-7 for complete details).

Work-Related Deaths by Age Group

Using the age groupings for calculating age-adjusted death rates, the 45-64 year-old age group experienced the greatest number of work-related deaths (n=825) for the 2000-2004 time period, followed by the 35-44 year-old group (n=625) (Table 3, Figure 3). In terms of work-related death rates, these two age groups experienced similar five-year average age-specific rates (2.2 per 100,000 population).

Work-related death rates for persons aged 25-34 declined significantly from 2.3 per 100,000 in 2000 to 1.2 per 100,000 in 2004. Significant declines in work-related death rates were also found for persons aged 45-64 (from 2.8 per 100,000 in 2000 to 1.8 in 2004) and for those aged 65 years and older (from 2.5 per 100,000 in 2000 to 1.6 in 2004).

Table 3. Work-Related Deaths By Age Group, California 2000-2004

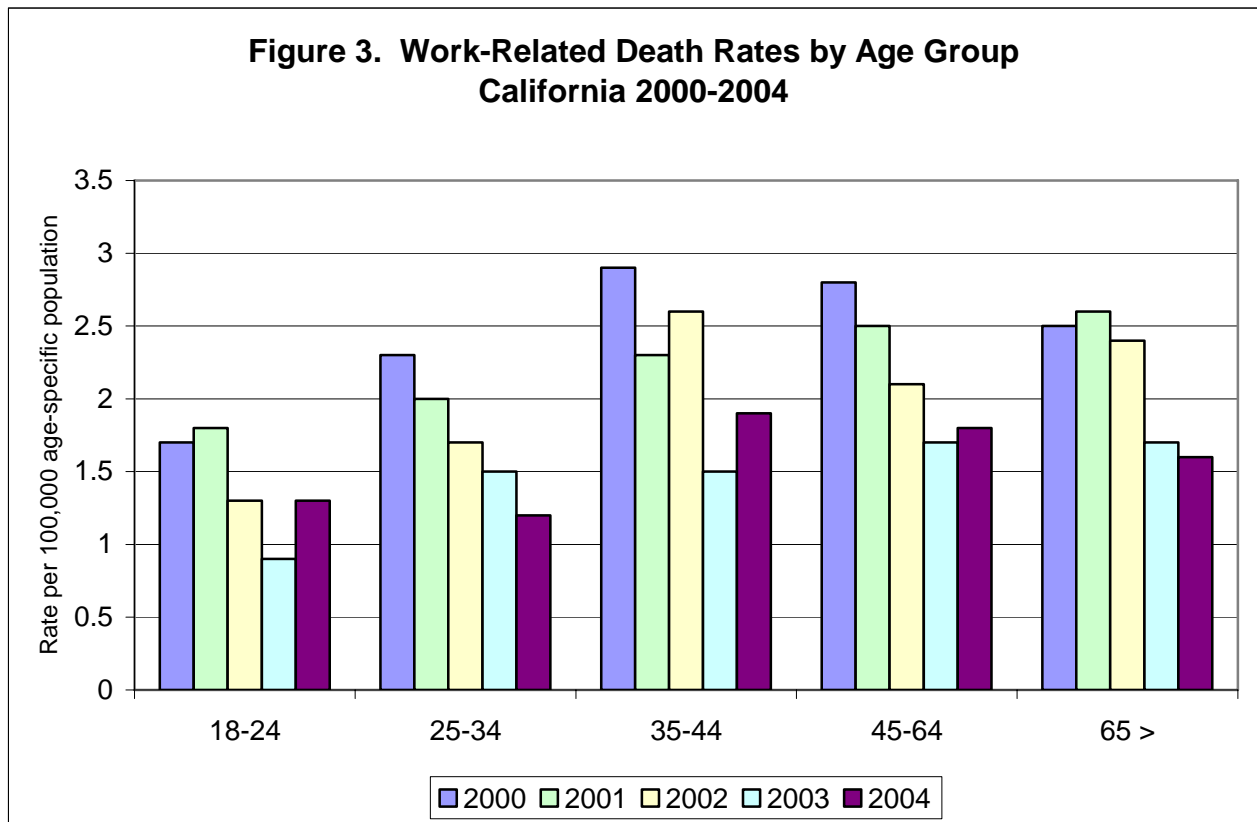
Age Group	2000		2001		2002		2003		2004		Trend
	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	
18-24	57	1.7	63	1.8	46	1.3	33	0.9	47	1.3	ns
25-34	120	2.3	105	2	88	1.7	78	1.5	61	1.2	Sig. -
35-44	157	2.9	129	2.3	147	2.6	83	1.5	109	1.9	ns
45-64	199	2.8	185	2.5	159	2.1	136	1.7	146	1.8	Sig. -
65 >	89	2.5	98	2.6	91	2.4	66	1.7	64	1.6	Sig. -
Total ²	622	2.5	580	2.3	531	2.1	396	1.5	427	1.6	Sig. -

SOURCE: California Department of Health Services, Death Statistical Master Files, 2000-2004.

NOTES: ¹ Age-specific rate per 100,000 population.

² Age-adjusted rate per 100,000 population.

Sig. - Statistically significant decline in death rates; ns Not statistically significant.



Work-Related Deaths by Age Group and by Cause

Work-related death rates for all age groups under 65 years of age were highest for accidents, assaults, and suicides (Table 4). Work-related death rates for persons aged 65 years and older were highest for accidents, cancers, and respiratory system diseases.

Among all age groups the leading causes of work-related accident deaths were transport accidents (ICD-10 codes V01-V99), followed by exposure to inanimate mechanical forces (codes W20-W49), and falls (codes W00-W19) except for persons aged 65 and older where falls were the second leading cause of work-related accident deaths (see Appendix Table A-2 for details). The highest five-year average work-related accident death rate was for persons aged 35-44 (1.74 per 100,000).

Work-related assault (homicide) rates were highest among persons aged 25-34 (0.27 per 100,000), followed by those aged 45-64 (0.26 per 100,000) (see Appendix Table A-3 for details). As noted previously, work-related homicides involving firearms accounted for nearly 80 percent of these deaths overall. Work-related suicide rates were highest among persons aged 18-24 (0.11 per 100,000), followed by those aged 35-44 (0.10 per 100,000) (see Appendix Table A-6 for details).

Work-related cancers, diseases of the circulatory system, and diseases of the respiratory system had a greater impact on progressively older age groups (see Appendix Tables A-4, A-5, and A-7 for details).

Work-related deaths due to all other causes (n=63) are detailed by age group in Appendix Table A-8.

Table 4. Work-Related Deaths and Death Rates by Age Group and by Cause, California 2000-2004

AGE GROUPS	Accidents		Assaults		Cancers		Circulatory	
	N	RATE ¹	N	RATE ¹	N	RATE ¹	N	RATE ¹
18 - 24	183	1.04	37	****	0	0.00	2	****
25 - 34	350	1.32	71	****	0	0.00	5	****
35 - 44	489	1.74	67	****	6	****	15	****
45 - 64	598	1.57	99	****	26	****	41	****
65 >	151	0.78	12	****	104	0.54	48	****
Total ²	1,771	1.37	286	0.22	136	0.11	111	0.09

AGE GROUPS	Suicide		Respiratory		All Other Causes		TOTAL	
	N	RATE ¹	N	RATE ¹	N	RATE ¹	N	RATE ¹
18 - 24	19	****	0	0.00	5	****	246	1.40
25 - 34	19	****	0	0.00	7	****	452	1.71
35 - 44	28	****	3	****	17	****	625	2.23
45 - 64	34	****	7	****	20	****	825	2.16
65 >	8	****	71	****	14	****	408	2.12
Total ²	108	0.08	81	****	63	****	2,556	1.97

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

NOTES: ¹ Five-year average age-specific rate per 100,000 population.

² Five-year average age-adjusted rate per 100,000 population.

**** Statistically unreliable rate based on small number of events.

Trends by Cause and by Age Group

The only statistically significant trend observed in work-related accident death rates was for persons aged 25-34 years, a decline from 1.66 per 100,000 in 2000 to 1.01 per 100,000 in 2004 (Table 4a, Figure 4a). Work-related accident death rates were highest for persons aged 35-44 years in 2000, 2002, and 2004. In 2001 and 2003, the highest work-related accident death rates were observed for persons aged 45-64 years. The overall downward trend in age-adjusted death rates for work-related accidents from 1.68 per 100,000 in 2000 to 1.23 per 100,000 in 2004 was not statistically significant.

Table 4a. Work-Related Accident Deaths and Death Rates By Age Group, California 2000-2004

Age Group	2000		2001		2002		2003		2004		Trend
	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	
18-24	43	1.27	41	1.19	39	1.11	24	0.67	36	0.98	ns
25-34	87	1.66	86	1.63	64	1.21	60	1.14	53	1.01	Sig. -
35-44	126	2.29	90	1.62	116	2.07	61	1.08	96	1.69	ns
45-64	128	1.82	136	1.86	109	1.43	110	1.38	115	1.40	ns
65 >	35	0.96	36	0.96	34	0.88	16	****	30	0.75	n/a
Total ²	419	1.68	389	1.52	362	1.39	271	1.01	330	1.23	ns

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

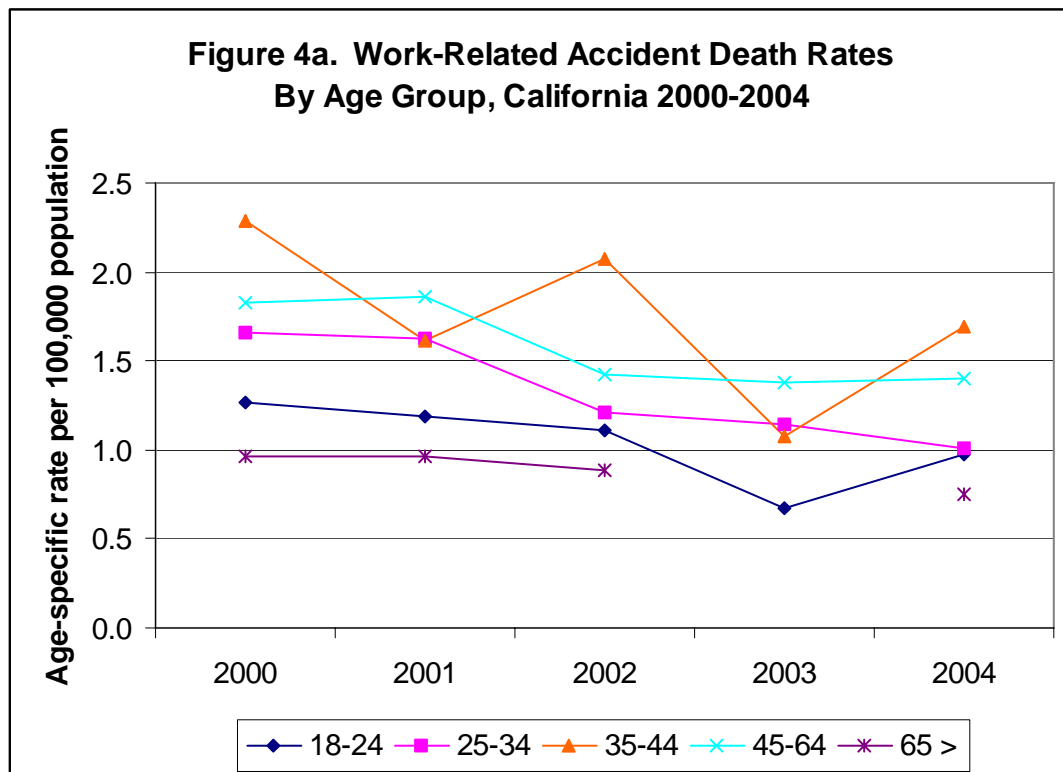
NOTES: ¹ Age-specific rate per 100,000 population.

² Age-adjusted rate per 100,000 population.

Sig. - Statistically significant decline in death rates; ns Not statistically significant;

n/a Data not available for computing trend analysis.

**** Statistically unreliable rate based on small number of events.



The only statistically significant trend observed for work-related assault death rates was the overall age-adjusted rate, which declined from 0.30 per 100,000 population in 2000 to 0.14 per 100,000 in 2004 (Table 4b, Figure 4b). Five years of reliable data were not available for computing trend analyses based on age-specific death rates for any age grouping. The highest reliable work-related assault death rate was observed for persons aged 45-64 in 2000 (0.46 per 100,000).

Table 4b. Work-Related Assault Deaths and Death Rates By Age Group, California 2000-2004

Age Group	2000		2001		2002		2003		2004		Trend
	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	
18-24	7	****	15	****	2	****	5	****	8	****	n/a
25-34	21	0.40	13	****	16	****	14	****	7	****	n/a
35-44	16	****	18	****	20	0.36	8	****	5	****	n/a
45-64	32	0.46	20	0.27	19	****	12	****	16	****	n/a
65 >	2	****	5	****	2	****	1	****	2	****	n/a
Total ²	78	0.30	71	0.28	59	0.22	40	0.15	38	0.14	Sig. -

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

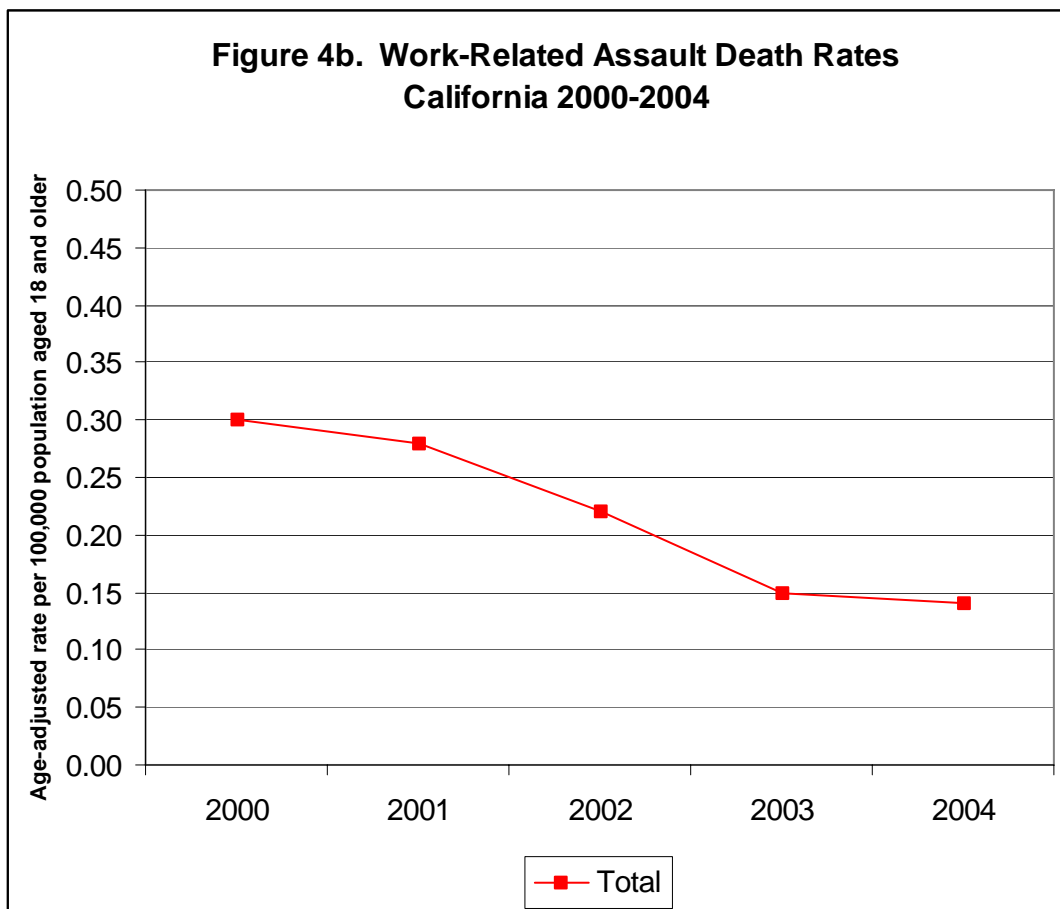
NOTES: ¹ Age-specific rate per 100,000 population.

² Age-adjusted rate per 100,000 population.

Sig. - Statistically significant decline in death rates;

n/a Data not available for computing trend analysis.

**** Statistically unreliable rate based on small number of events.



The only statistically significant trend observed for work-related cancer death rates was the overall age-adjusted rate, which declined from 0.14 per 100,000 population in 2000 to 0.09 per 100,000 in 2004 (Table 4c, Figure 4c). No work-related malignant cancer deaths were reported in any year for persons aged 18-24, or for persons aged 25-34. Five years of reliable data were not available for computing trend analyses based on age-specific death rates for the 35-44 and 45-64 age groupings. The highest reliable work-related cancer death rates were observed for persons aged 65 and older, and there was no statistically significant trend.

Table 4c. Work-Related Cancer Deaths and Death Rates By Age Group, California 2000-2004

Age Group	2000		2001		2002		2003		2004		Trend
	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	
18-24	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	ns
25-34	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	ns
35-44	2	****	2	****	0	0.00	1	****	1	****	n/a
45-64	8	****	8	****	4	****	5	****	1	****	n/a
65 >	20	0.55	20	0.53	22	0.57	22	0.56	20	0.50	ns
Total ²	30	0.14	30	0.13	26	0.11	28	0.12	22	0.09	Sig. -

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

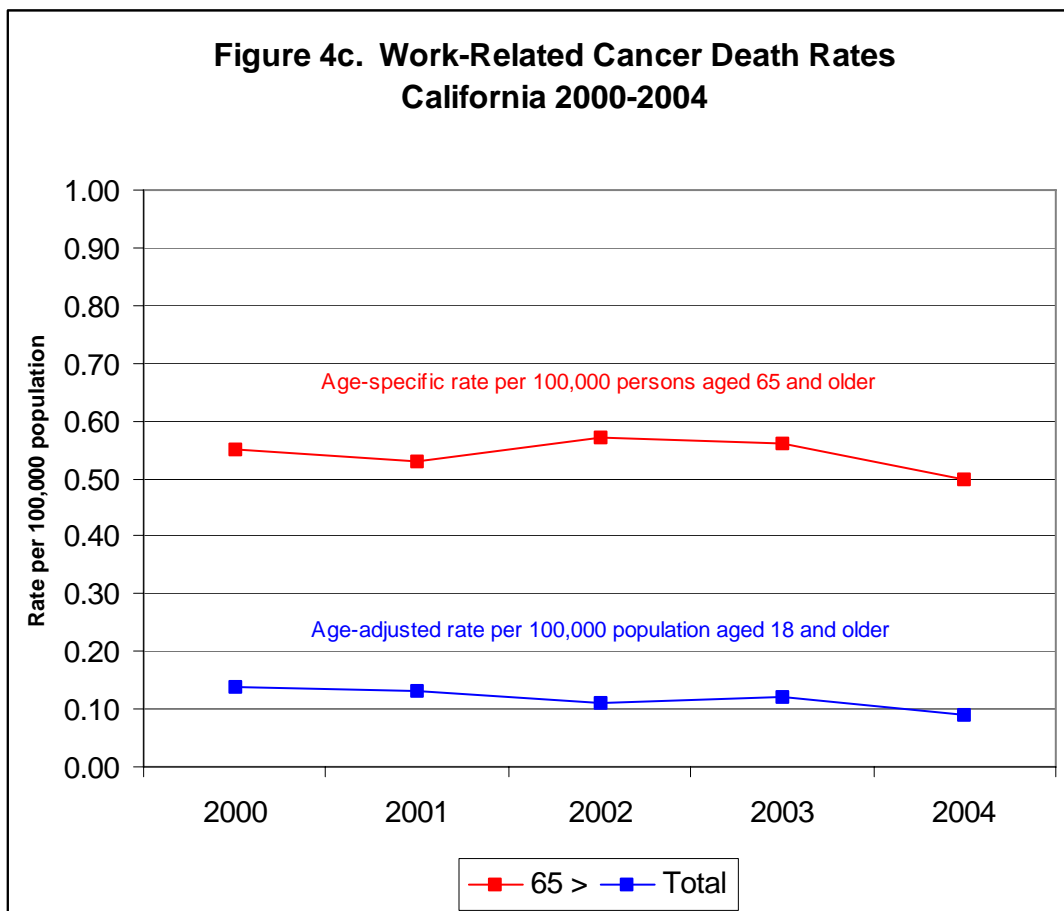
NOTES: ¹ Age-specific rate per 100,000 population.

² Age-adjusted rate per 100,000 population.

Sig. - Statistically significant decline in death rates;

n/a Data not available for computing trend analysis.

**** Statistically unreliable rate based on small number of events.



Five years of reliable data for work-related circulatory system disease death rates by age group were not available for trend analyses (Table 4d). Total age-adjusted death rates for work-related circulatory system diseases ranged from 0.13 per 100,000 in 2000 to 0.11 per 100,000 in 2001.

Table 4d. Work-Related Circulatory Disease Deaths and Death Rates By Age Group, California 2000-2004

Age Group	2000		2001		2002		2003		2004		Trend
	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	
18-24	1	****	1	****	0	0.00	0	0.00	0	0.00	n/a
25-34	2	****	0	0.00	3	****	0	0.00	0	0.00	n/a
35-44	4	****	3	****	5	****	2	****	1	****	n/a
45-64	11	****	10	****	9	****	5	****	6	****	n/a
65 >	12	****	11	****	12	****	9	****	4	****	n/a
Total ²	30	0.13	25	0.11	29	0.12	16	****	11	****	n/a

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

NOTES: ¹ Age-specific rate per 100,000 population.

² Age-adjusted rate per 100,000 population.

n/a Data not available for computing trend analysis.

**** Statistically unreliable rate based on small number of events.

Reliable data were not available for conducting trend analyses by age group for work-related suicide rates (Table 4e). Age-adjusted work-related suicide rates for the total population aged 18 and older were 0.12 per 100,000 each year 2000-2002, and rates for 2003-2004 were unreliable due to the small number of events.

Table 4e. Work-Related Suicide Deaths and Death Rates By Age Group, California 2000-2004

Age Group	2000		2001		2002		2003		2004		Trend
	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	
18-24	5	****	6	****	4	****	2	****	2	****	n/a
25-34	7	****	5	****	5	****	2	****	0	0.00	n/a
35-44	6	****	10	****	5	****	5	****	2	****	n/a
45-64	10	****	7	****	12	****	2	****	3	****	n/a
65 >	2	****	2	****	4	****	0	0.00	0	0.00	n/a
Total ²	30	0.12	30	0.12	30	0.12	11	****	7	****	n/a

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

NOTES: ¹ Age-specific rate per 100,000 population.

² Age-adjusted rate per 100,000 population.

n/a Data not available for computing trend analysis.

**** Statistically unreliable rate based on small number of events.

Reliable data were also unavailable for conducting trend analyses for work-related respiratory disease death rates by age group (Table 4f). No work-related respiratory disease deaths were reported among 18-24 year-olds or among 25-34 year-olds in any year between 2000 and 2004. The only reliable data were for the total population aged 18 years and older for 2000 and 2001, when there were 20 work-related respiratory disease deaths each year at a rate of .09 per 100,000.

Table 4f. Work-Related Respiratory Disease Deaths and Death Rates By Age Group, California 2000-2004

Age Group	2000		2001		2002		2003		2004		Trend
	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	
18-24	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	n/a
25-34	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	n/a
35-44	1	****	0	0.00	0	0.00	1	****	1	****	n/a
45-64	4	****	1	****	2	****	0	0.00	0	0.00	n/a
65 >	15	****	19	****	14	****	15	****	8	****	n/a
Total ²	20	0.09	20	0.09	16	****	16	****	9	****	n/a

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

NOTES: ¹ Age-specific rate per 100,000 population.

² Age-adjusted rate per 100,000 population.

n/a Data not available for computing trend analysis.

**** Statistically unreliable rate based on small number of events.

No significant trends were found for all other causes of work-related deaths by age group for 2000-2004 (Table 4g).

Table 4g. All Other Causes of Work-Related Deaths and Death Rates By Age Group, California 2000-2004

Age Group	2000		2001		2002		2003		2004		Trend
	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	N	Rate ¹	
18-24	1	****	0	0.00	1	****	2	****	1	****	n/a
25-34	3	****	1	****	0	0.00	2	****	1	****	n/a
35-44	2	****	6	****	1	****	5	****	3	****	n/a
45-64	6	****	3	****	4	****	2	****	5	****	n/a
65 >	3	****	5	****	3	****	3	****	0	0.00	n/a
Total ²	15	****	15	****	9	****	14	****	10	****	n/a

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

NOTES: ¹ Age-specific rate per 100,000 population.

² Age-adjusted rate per 100,000 population.

n/a Data not available for computing trend analysis.

**** Statistically unreliable rate based on small number of events.

Work-Related Deaths by Sex and by Age Group

Disparities in work-related deaths and death rates are evident across gender and age groups (Table 5, Figure 5). Males experienced 13 times more work-related deaths than females for 2000-2004, and an age-adjusted work-related death rate that was nearly three times greater than that for females. In every category of work-related deaths, males experienced significantly greater numbers than females across all age groups and causes (Table 5a). Most death rates by sex and age group by cause were unreliable due to small numbers of events and relative standard errors (RSE) greater than 23 percent.

Table 5. Work-Related Deaths and Death Rates by Sex and by Age Group, California 2000-2004

AGE GROUPS	MALE		FEMALE	
	N	RATE ¹	N	RATE ¹
18 - 24	233	2.53	13	****
25 - 34	415	3.05	37	****
35 - 44	584	4.10	41	****
45 - 64	757	4.05	68	****
65 >	382	4.66	26	****
Total ²	2,371	3.79	185	1.41

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

NOTES: ¹ Five-year average age-specific rate per 100,000 population.

² Five-year average age-adjusted rate per 100,000 population.

**** Statistically unreliable rate based on small number of events.

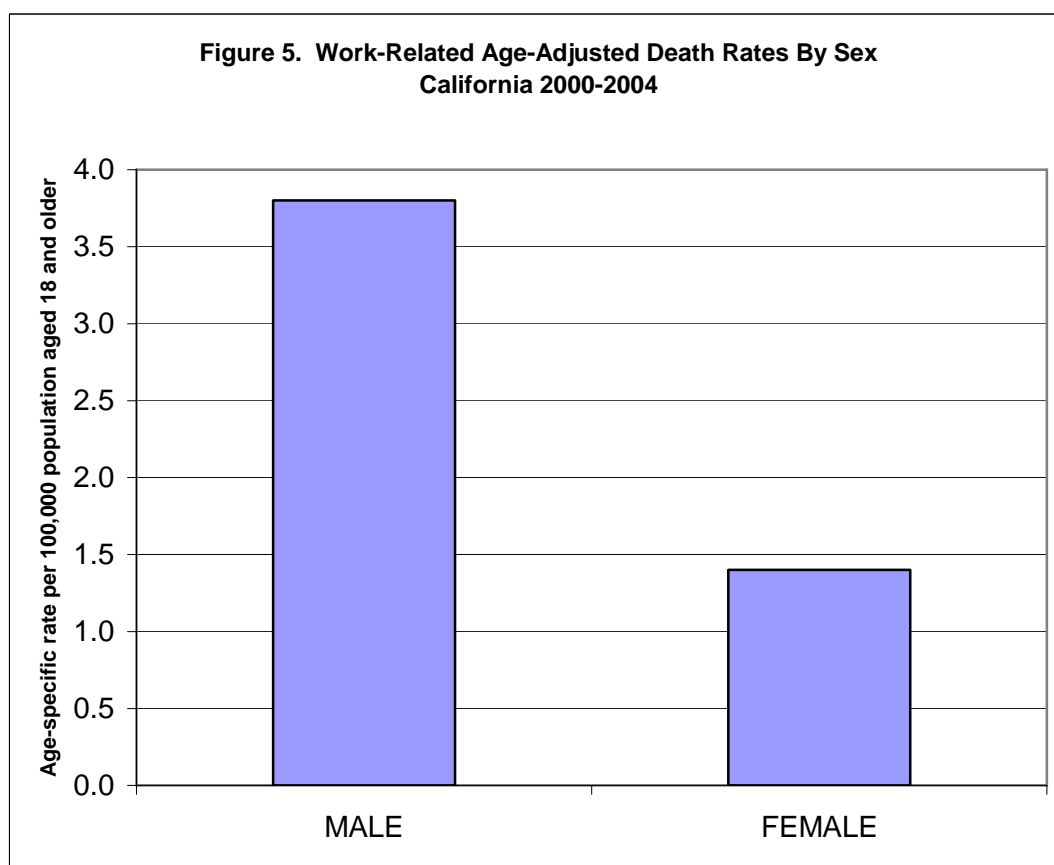


Table 5a. Work-Related Deaths and Death Rates by Sex, by Age Group and by Cause, California 2000-2004

AGE GROUPS	ACCIDENTS				ASSAULT (HOMICIDE)			
	MALE		FEMALE		MALE		FEMALE	
	N	RATE ¹	N	RATE ¹	N	RATE ¹	N	RATE ¹
18 - 24	175	1.90	8	****	34	****	3	****
25 - 34	325	2.39	25	****	60	****	11	****
35 - 44	467	3.28	22	****	53	****	14	****
45 - 64	559	2.99	39	****	81	****	18	****
65 >	133	1.62	18	****	12	****	0	0.00
Total ²	1,659	2.60	112	0.20	240	0.40	46	0.10

AGE GROUPS	MALIGNANT CANCERS				SUICIDE			
	MALE		FEMALE		MALE		FEMALE	
	N	RATE ¹	N	RATE ¹	N	RATE ¹	N	RATE ¹
18 - 24	0	0.00	0	0.00	18	****	1	****
25 - 34	0	0.00	0	0.00	19	****	0	0.00
35 - 44	5	****	1	****	26	****	2	****
45 - 64	26	****	0	0.00	31	****	3	****
65 >	101	1.23	3	****	7	****	1	****
Total ²	132	0.30	4	****	101	0.15	7	****

AGE GROUPS	CIRCULATORY DISEASES				RESPIRATORY DISEASES			
	MALE		FEMALE		MALE		FEMALE	
	N	RATE ¹	N	RATE ¹	N	RATE ¹	N	RATE ¹
18 - 24	2	****	0	0.0	0	0.00	0	0.00
25 - 34	4	****	1	****	0	0.00	0	0.00
35 - 44	15	****	0	0.0	3	****	0	0.00
45 - 64	35	****	6	****	7	****	0	0.00
65 >	45	****	3	****	70	****	1	****
Total ²	101	0.18	10	****	80	****	1	****

AGE GROUPS	ALL OTHER CAUSES			
	MALE		FEMALE	
	N	RATE ¹	N	RATE ¹
18 - 24	4	****	1	****
25 - 34	7	****	0	0.0
35 - 44	15	****	2	****
45 - 64	18	****	2	****
65 >	14	****	0	0.0
Total ²	58	****	5	****

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

NOTES: ¹ Five-year average age-specific rate per 100,000 population.

² Five-year average age-adjusted rate per 100,000 population.

**** Statistically unreliable rate based on small number of events.

Work-Related Deaths by Race and Ethnicity

Most death rates by race/ethnicity and by cause of death were unreliable due to the small number of events and RSE values greater than 23 percent. Among racial and ethnic populations for whom reliable five-year average age-adjusted death rates could be calculated, Hispanics/Latinos experienced the highest work-related death rates (2.22 per 100,000 population), followed by Whites (2.16 per 100,000), African Americans/Blacks (1.69 per 100,000), and Asians (1.09 per 100,000) (Table 6). Hispanics/Latinos had the highest work-related accident death rate (1.67 per 100,000), followed by Whites (1.49 per 100,000).

Table 6. Work-Related Deaths and Death Rates by Race/Ethnicity and by Cause, California 2000-2004

RACE/ETHNICITY	Accidents		Assaults		Cancers		Circulatory	
	N	RATE ¹	N	RATE ¹	N	RATE ¹	N	RATE ¹
White	946	1.49	98	****	107	0.71	79	****
Hispanic/Latino	634	1.67	99	****	22	****	12	****
Asian	90	****	55	****	1	****	8	****
African American/Black	73	****	31	****	6	****	10	****
American Indian/Alaska Native	12	****	0	0.00	0	0.00	0	0.00
Multirace	8	****	2	****	0	0.00	1	****
Pacific Islander	8	****	1	****	0	0	1	****
Total	1,771	1.37	286	0.22	136	0.11	111	0.09

RACE/ETHNICITY	Suicide		Respiratory		All Other Causes		TOTAL	
	N	RATE ¹	N	RATE ¹	N	RATE ¹	N	RATE ¹
White	78	****	58	****	41	****	1,407	2.16
Hispanic/Latino	17	****	12	****	12	****	808	2.22
Asian	7	****	3	****	3	****	167	1.09
African American/Black	2	****	6	****	6	****	134	1.69
American Indian/Alaska Native	1	****	2	****	1	****	16	****
Multirace	2	****	0	0.00	0	0.00	13	****
Pacific Islander	1	****	0	0.00	0	0.00	11	****
Total	108	0.08	81	****	63	****	2,556	1.97

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

NOTES: ¹ Five-year average age-adjusted rate per 100,000 population.

**** Statistically unreliable rate based on small number of events.

Table 6a. Work-Related Deaths and Death Rates by Race/Ethnicity and by Age Group, California 2000-2004

RACE/ETHNICITY	18-24		25-34		35-44		45-64		65 & Older	
	N	RATE ¹	N	RATE ¹	N	RATE ¹	N	RATE ¹	N	RATE ¹
White	116	1.88	174	1.78	321	2.44	494	2.23	302	2.30
Hispanic/Latino	101	1.33	201	1.81	235	2.63	210	2.56	61	****
Asian	15	****	34	****	30	****	72	****	16	****
African American/Black	8	****	30	****	32	****	38	****	26	****
American Indian/Alaska Native	2	****	4	****	3	****	4	****	3	****
Multirace	3	****	5	****	3	****	2	****	0	0.00
Pacific Islander	1	****	4	****	1	****	5	****	0	0.00
Total	246	1.40	452	1.71	625	2.23	825	2.16	408	2.12

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

NOTES: ¹ Five-year average age-specific rate per 100,000 population.

**** Statistically unreliable rate based on small number of events.

Examined by race/ethnicity and age group, the only valid comparisons that can be made are for Whites and Hispanics/Latinos (Table 6a). Whites aged 18-64 experienced a higher work-related death rate than Hispanics/Latinos (1.88 versus 1.33 per 100,000, respectively), but this was not a statistically significant difference. Hispanics/Latinos aged 25-34, 35-44, and 45-64 experienced higher work-related death rates than non-Hispanic Whites, but none of these differences were statistically significant. The highest valid work-related death rate for persons aged 65 and older was found for Whites (2.30 per 100,000 population).

Work-Related Deaths by Nativity Status (Native-Born and Foreign-Born)

California population data by place of birth (nativity) and age group were not available for calculating work-related death rates (i.e., native-born versus foreign-born). However, frequency counts show that there were twice as many work-related deaths among native-born persons aged 18 and older (n=1,666; 65.2 percent) than foreign-born persons (n=881; 34.5 percent) (Table 7).

Table 7. Work-Related Deaths by Nativity and by Age Group, California 2000-2004

AGE GROUPS	NATIVE-BORN		FOREIGN-BORN		UNKNOWN	
	N	PCT ¹	N	PCT ¹	N	PCT ¹
18 - 24	154	6.0	91	3.6	1	0.0
25 - 34	248	9.7	203	7.9	1	0.0
35 - 44	381	14.9	242	9.5	2	0.1
45 - 64	545	21.3	277	10.8	3	0.1
65 >	338	13.2	68	2.7	2	0.1
Total ²	1,666	65.2	881	34.5	9	0.4

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

NOTES: ¹ Percent of total (n=2,556).

Work-Related Deaths by County of Residence

Reliable work-related death rates were found for only five California counties (Table 8). San Bernardino had the highest five-year average work-related death rate (2.64 per 100,000 population), followed closely by Riverside (2.60 per 100,000). San Diego had the third highest death rate (1.73 per 100,000), Los Angeles the fourth highest (1.65 per 100,000), and the fifth highest was Orange (1.23 per 100,000).

Out-of-state residents accounted for a total of 149 work-related deaths in California during the 2000-2004 time period. Of these, a total of 11 work-related deaths occurred in California among residents of Mexico, five from Canada, and 11 from other countries. The remaining 122 deaths occurred among residents of other states: 19 from Nevada; 14 from Arizona; 14 from Texas; 12 from Washington; and seven from Oregon.

Table 8. Work-Related Deaths and Death Rates By County of Residence, California 2000-2004

COUNTY	2000	2001	2002	2003	2004	TOTAL	RATE ¹
SAN BERNARDINO	41	40	34	17	33	165	2.64
RIVERSIDE	40	36	24	28	27	155	2.60
SAN DIEGO	43	41	43	30	35	192	1.73
LOS ANGELES	146	114	126	111	93	590	1.65
ORANGE	36	35	25	21	17	134	1.23
KERN	23	21	21	13	14	92	****
FRESNO	16	23	18	15	15	87	****
SACRAMENTO	17	19	15	11	11	73	****
SANTA CLARA	20	15	7	7	10	59	****
ALAMEDA	12	14	14	9	7	56	****
SAN JOAQUIN	11	10	20	4	10	55	****
CONTRA COSTA	7	14	7	8	12	48	****
VENTURA	16	7	8	7	10	48	****
SAN LUIS OBISPO	13	9	8	6	3	39	****
STANISLAUS	9	12	7	4	7	39	****
TULARE	4	12	8	8	6	38	****
SHASTA	7	5	10	6	5	33	****
SOLANO	9	3	7	7	7	33	****
MERCED	5	11	6	5	5	32	****
MONTEREY	4	4	9	6	9	32	****
SAN MATEO	4	7	9	7	4	31	****
SANTA BARBARA	5	7	7	3	7	29	****
SAN FRANCISCO	8	4	2	4	8	26	****
SONOMA	6	9	7	2	2	26	****
NAPA	5	3	4	6	7	25	****
KINGS	9	8	1	2	3	23	****
IMPERIAL	7	4	6	1	3	21	****
PLACER	5	3	8	3	2	21	****
MADERA	3	7	4	2	1	17	****
SANTA CRUZ	1	8	6	2	0	17	****
HUMBOLDT	7	1	2	4	2	16	****
YOLO	2	5	4	1	4	16	****
SUTTER	6	3	0	3	3	15	****
BUTTE	2	6	1	3	0	12	****
CALAVERAS	1	4	2	0	3	10	****
EL DORADO	4	1	1	1	1	8	****
MARIN	1	2	2	0	3	8	****
NEVADA	4	1	2	0	1	8	****
TEHAMA	2	2	1	3	0	8	****
LAKE	2	2	1	2	0	7	****
MENDOCINO	3	3	1	0	0	7	****
TUOLUMNE	1	2	1	1	2	7	****
SISKIYOU	1	3	0	0	2	6	****
LASSEN	0	1	3	1	0	5	****
SAN BENITO	1	2	0	0	2	5	****
COLUSA	0	1	1	1	1	4	****
GLENN	1	1	0	1	1	4	****
INYO	0	1	2	1	0	4	****
MARIPOSA	1	1	0	2	0	4	****
TRINITY	0	1	2	1	0	4	****
MODOC	0	1	0	1	1	3	****
AMADOR	1	1	0	0	0	2	****
MONO	1	0	0	0	1	2	****
PLUMAS	0	0	1	1	0	2	****
YUBA	0	1	0	0	1	2	****
DEL NORTE	0	0	0	1	0	1	****
SIERRA	1	0	0	0	0	1	****
ALPINE	0	0	0	0	0	0	****
TOTAL CA RESIDENTS	574	551	498	383	401	2,407	1.86

Discussion

Multiple systems for identifying and monitoring work-related injuries and deaths are currently in place, each developed for different purposes using different definitions and methods, and each providing different information and data. Although no single data source provides a “gold standard” for identifying and characterizing occupational injuries and deaths, reporting via the injury-at-work item on the death certificate remains a viable and cost-effective method for conducting statewide and county-level surveillance of work-related mortality.¹⁷⁻¹⁹

Previous reports have described patterns of occupational mortality and associated risk factors by occupation and industry, while other studies have examined direct and indirect costs associated with occupational illnesses and injuries in California.²⁰⁻²³ Based on specific recommendations from these studies, efforts to improve the quality of death certificate data have resulted in the availability of more timely and accurate data on work-related deaths in California.^{24,25}

This report focused on underlying causes of work-related deaths gathered from information available on death certificates, and provided detailed data by age group, gender, race/ethnicity, nativity, and county of residence of the decedent. Key findings of this study indicate that:

- a total of 2,556 work-related deaths occurred in California among persons aged 18 and older during the five-year period 2000-2004 (Table 1);
- work-related death rates in California declined significantly between 2000 and 2004 (Table 1);
- accidents or unintentional injuries were the leading group cause of work-related deaths in California, with no significant trend in death rates between 2000 and 2004 (Tables 2 and 4a);
- the leading causes of work-related accident deaths in California involved transport accidents (Appendix Tables A-1 and A-2);
- assaults or homicides were the second leading group cause of work-related deaths in California, with death rates declining significantly between 2000 and 2004 (Tables 2 and 4b);
- firearms were involved in 80 percent of all work-related homicides and 47 percent of all work-related suicides in California (Appendix Table A-3);
- ICD-10 code X95 (assault by other and unspecified firearm discharge) was the most frequently occurring single cause-of-death code in California (Appendix Tables A-1 through A-8);
- work-related malignant cancer death rates in California declined significantly between 2000 and 2004 (Table 4c);
- mesothelioma (ICD-10 code C45) was the leading cause of work-related cancer deaths in California (Appendix Table A-4);
- 35-44 year-olds experienced the highest work-related death rates overall in California (Table 3);
- males accounted for 93 percent of all work-related deaths in California, and experienced death rates that were three times greater than females (Tables 5 and 5a);
- Hispanics/Latinos experienced the highest work-related death rates in California, followed by Whites (Tables 6 and 6a);
- native-born persons in California experienced significantly higher work-related death rates than foreign-born persons (Table 7);
- five Southern California counties (San Bernardino, Riverside, San Diego, Los Angeles, and Orange) experienced the highest reliable work-related death rates for 2000-2004 (Table 8).

Enumeration and monitoring of work-related deaths is only as accurate as the surveillance systems designed to capture that information, and enhanced data collection should be a 21st Century public health priority.²⁶ The BLS Occupational Injury and Illness Classification System (OIICS) provides a set

of procedures for recording and monitoring information relating to an occupational injury, illness, or fatality, and enables data users and health and safety professionals to assess and improve workplace environments.²⁷ The Healthy People 2010 (HP2010) initiative Focus Area 20 on occupational safety and health includes eleven objectives targeting reductions in work-related injuries, diseases, and deaths.³ Objective 20-1a seeks to reduce deaths from work-related injuries to no more than 3.2 per 100,000 workers aged 16 years and older. Monitoring this objective is expected to be accomplished using CFOI data available through the CDC's DATA2010 system.²⁸ Some CFOI data for California are available from the BLS and the CDIR, but these data do not provide death rates per 100,000 workers aged 16 years and older that could be used to track California's progress in achieving the HP2010 objective 20-1a.^{8,29} Finally, the National Occupational Research Agenda (NORA) established consensus research priorities that address new, emerging technologies and work environments designed to protect worker safety and health in the 21st Century.³⁰

Workers' Memorial Day, April 28th, was established to remember those workers who died or were injured on the job. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5516a1.htm>

Healthy People 2010 objective 20-1 calls for a reduction in the work-related death rate to no more than 3.2 per 100,000 workers aged 16 years and older. For more information please visit: <http://www.healthypeople.gov/Document/html/tracking/od20.htm>

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Appendix I. Statistical Data Tables

Table A-1. Work-related deaths caused by accidents (unintentional injuries), by ICD-10 codes, California 2000-2004.

Table A-2. Work-related accident deaths by cause and by age group, California 2000-2004.

Table A-3. Work-related deaths caused by assaults (homicides), by cause and by age group, California 2000-2004.

Table A-4. Work-related deaths caused by malignant neoplasms (cancers), by cause and by age group, California 2000-2004.

Table A-5. Work-related deaths caused by diseases of the circulatory system, by cause and by age group, California 2000-2004.

Table A-6. Work-related deaths caused by suicides, by cause and by age group, California 2000-2004.

Table A-7. Work-related deaths caused by diseases of the respiratory system, by cause and by age group, California 2000-2004.

Table A-8. Work-related deaths by all other causes, by cause and by age group, California 2000-2004.

Table A-1. Work-Related Deaths Caused by Accidents (Unintentional Injuries), by ICD-10 Code Groups, California 2000-2004.

V01 - V99	Transport accidents	N	PCT
V892	Person injured in unspecified motor vehicle accident, traffic	61	
V031	Pedestrian injured in collision with car, pick-up truck or van	52	
V877	Person injured in collision between other specified motor vehicles (traffic)	46	
V959	Unspecified aircraft accident injuring occupant	36	
V685	Occupant of heavy transport vehicle injured in noncollision transport accident, driver	32	
V435	Car occupant injured in collision with car, pick-up truck or van, driver	24	
V645	Occupant of heavy transport vehicle injured in collision with heavy transport vehicle or bus, driver	24	
V950	Helicopter accident injuring occupant	24	
V041	Pedestrian injured in collision with heavy transport vehicle or bus	22	
V899	Person injured in unspecified vehicle accident	21	
V585	Occupant of pick-up truck or van injured in noncollision transport accident, driver	20	
V040	Pedestrian injured in collision with heavy transport vehicle or bus	19	
V535	Occupant of pick-up truck or van injured in collision with car, pick-up truck or van, driver	18	
V958	Other aircraft accidents injuring occupant	17	
V092	Pedestrian injured in traffic accident involving other and unspecified motor vehicles	16	
V475	Car occupant injured in collision with fixed or stationary object, driver	16	
V030	Pedestrian injured in collision with car, pick-up truck or van	14	
V575	Occupant of pick-up truck or van injured in collision with fixed or stationary object, driver	14	
V675	Occupant of heavy transport vehicle injured in collision with fixed or stationary object, driver	14	
V485	Car occupant injured in noncollision transport accident, driver	12	
V090	Pedestrian injured in nontraffic accident involving other and unspecified motor vehicles	10	
V234	Motorcycle rider injured in collision with car, pick-up truck or van, driver	10	
V635	Occupant of heavy transport vehicle injured in collision with car, pick-up truck or van, driver	10	
V545	Occupant of pick-up truck or van injured in collision with heavy transport vehicle or bus, driver	9	
V586	Occupant of pick-up truck or van injured in noncollision transport accident, passenger	8	
V849	Unspecified occupant of special agricultural vehicle injured in nontraffic accident	7	
V694	Driver injured in collision with other and unspecified motor vehicles in traffic accident	7	
V594	Driver injured in collision with other and unspecified motor vehicles in traffic accident	6	
V595	Passenger injured in collision with other and unspecified motor vehicles in traffic accident	6	
V695	Passenger injured in collision with other and unspecified motor vehicles in traffic accident	6	
V486	Car occupant injured in noncollision transport accident, passenger	6	
V099	Pedestrian injured in unspecified transport accident	5	
V436	Car occupant injured in collision with car, pick-up truck or van, passenger	5	
V872	Person injured in collision between car and pickup truck or van (traffic)	5	
V952	Accident to other private fixed wing aircraft, injuring occupant	5	
V699	Occupant [any] of heavy transport vehicle injured in unspecified traffic accident	5	
V059	Pedestrian injured in collision with railway train or railway vehicle, unspecified whether traffic or nontraffic accident	4	
V800	Rider or occupant injured by fall from or being thrown from animal or animal-drawn vehicle in noncollision accident	4	

V845	Driver of special agricultural vehicle injured in nontraffic accident	4
V536	Occupant of pick-up truck or van injured in collision with car, pick-up truck or van, passenger	4
V686	Occupant of heavy transport vehicle injured in noncollision transport accident, passenger	4
V589	Occupant of pick-up truck or van injured in noncollision transport accident, unspecified occupant	4
V939	Accident on board watercraft without accident to watercraft, not causing drowning and submersion	4
V953	Accident to commercial fixed-wing aircraft, injuring occupant	4
V494	Driver injured in collision with other and unspecified motor vehicles in traffic accident	3
V495	Passenger injured in collision with other and unspecified motor vehicles in traffic accident	3
V499	Car occupant [any] injured in unspecified traffic accident	3
V546	Occupant of pick-up truck or van injured in collision with heavy transport vehicle or bus, passenger	3
V599	Occupant [any] of pickup truck or van injured in unspecified traffic accident	3
V840	Driver of special agricultural vehicle injured in traffic accident	3
V850	Driver of special construction vehicle injured in traffic accident	3
V909	Accident to watercraft causing drowning and submersion, unspecified watercraft	3
V972	Parachutist injured in air transport accident	3
V294	Driver injured in collision with other and unspecified motor vehicles in traffic accident	3
V689	Occupant of heavy transport vehicle injured in noncollision transport accident, unspecified occupant	3
V539	Occupant of pickup truck or van injured in collision with car, pickup truck or van, unspecified occupant	3
V039	Pedestrian injured in collision with car, pick-up truck or van, unspecified whether traffic or nontraffic accident	2
V050	Pedestrian injured in collision with railway train or railway vehicle, nontraffic accident	2
V060	Pedestrian injured in collision with other nonmotor vehicle, nontraffic accident	2
V220	Motorcycle rider injured in collision with two- or three-wheeled motor vehicle, driver	2
V274	Motorcycle rider injured in collision with fixed or stationary object, driver	2
V439	Car occupant injured in collision with car, pick-up truck or van, unspecified car occupant	2
V445	Car occupant injured in collision with heavy transport vehicle or bus, driver	2
V455	Car occupant injured in collision with railway train or railway vehicle, driver	2
V470	Car occupant injured in collision with fixed or stationary object, driver	2
V479	Car occupant injured in collision with fixed or stationary object, unspecified car occupant	2
V489	Car occupant injured in noncollision transport accident, unspecified car occupant	2
V576	Occupant of pick-up truck or van injured in collision with fixed or stationary object, passenger	2
V598	Occupant [any] of pick-up truck or van injured in other specified transport accidents	2
V655	Occupant of heavy transport vehicle injured in collision with railway train or railway vehicle, driver	2
V696	Unspecified occupant of heavy transport vehicle injured in collision with other and unspecified motor vehicles	2
V865	Driver of all-terrain or other off-road motor vehicle injured in nontraffic accident	2
V874	Person injured in collision between car and heavy transport vehicle (traffic)	2
V890	Person injured in unspecified motor vehicle accident, nontraffic	2
V549	Occupant of pickup truck or van injured in collision with heavy transport vehicle or bus, unspecified occupant	2
V555	Occupant of pickup truck or van injured in collision with railway train or railway vehicle, driver	2
V649	Occupant of heavy transport vehicle injured in collision with heavy transport vehicle or bus, unspecified occupant	2
V929	Water-transport-related drowning and submersion without accident to watercraft, unspecified watercraft	2
V091	Pedestrian injured in unspecified nontraffic accident	1
V093	Pedestrian injured in unspecified traffic accident	1

V139	Pedal cyclist injured in collision with car, pick-up truck or van, unspecified pedal cyclist	1
V199	Pedal cyclist [any] injured in unspecified traffic accident	1
V244	Motorcycle rider injured in collision with heavy transport vehicle or bus, driver	1
V284	Motorcycle rider injured in noncollision transport accident, driver	1
V290	Driver injured in collision with other and unspecified motor vehicles in nontraffic accident	1
V407	Car occupant injured in collision with pedestrian or animal, person on outside of vehicle	1
V425	Car occupant injured in collision with two- or three-wheeled motor vehicle, driver	1
V473	Car occupant injured in collision with fixed or stationary object, unspecified car occupant	1
V482	Car occupant injured in noncollision transport accident, person on outside of vehicle	1
V498	Car occupant [any] injured in other specified transport accidents	1
V559	Occupant of pickup truck or van injured in collision with railway train or railway vehicle, unspecified occupant	1
V580	Occupant of pickup truck or van injured in noncollision transport accident, driver	1
V581	Occupant of pickup truck or van injured in noncollision transport accident, passenger	1
V583	Occupant of pickup truck or van injured in noncollision transport accident, unspecified occupant	1
V593	Occupant [any] of pickup truck or van injured in unspecified nontraffic accident	1
V644	Occupant of heavy transport vehicle injured in collision with heavy transport vehicle or bus, while boarding or alighting	1
V646	Occupant of heavy transport vehicle injured in collision with heavy transport vehicle or bus, passenger	1
V650	Occupant of heavy transport vehicle injured in collision with railway train or railway vehicle, driver	1
V659	Occupant of heavy transport vehicle injured in collision with railway train or railway vehicle, unspecified occupant	1
V677	Occupant of heavy transport vehicle injured in collision with fixed or stationary object, person on outside of vehicle	1
V679	Occupant of heavy transport vehicle injured in collision with fixed or stationary object, unspecified occupant	1
V680	Occupant of heavy transport vehicle injured in noncollision transport accident, driver	1
V681	Occupant of heavy transport vehicle injured in noncollision transport accident, passenger	1
V683	Occupant of heavy transport vehicle injured in noncollision transport accident, unspecified occupant	1
V698	Occupant [any] of heavy transport vehicle injured in other specified transport accidents	1
V735	Bus occupant injured in collision with car, pick-up truck or van, driver	1
V745	Bus occupant injured in collision with heavy transport vehicle or bus, driver	1
V775	Bus occupant injured in collision with fixed or stationary object, driver	1
V812	Occupant of railway train or railway vehicle injured in collision with or hit by rolling stock	1
V846	Passenger of special agricultural vehicle injured in nontraffic accident	1
V851	Passenger of special construction vehicle injured in traffic accident	1
V859	Unspecified occupant of special construction vehicle injured in nontraffic accident	1
V860	Driver of all-terrain or other offroad motor vehicle injured in traffic accident	1
V866	Passenger of all-terrain or other off-road motor vehicle injured in nontraffic accident	1
V869	Unspecified occupant of all-terrain or other offroad motor vehicle injured in nontraffic accident	1
V870	Person injured in collision between car and two- or three-wheeled motor vehicle (traffic)	1
V876	Person injured in collision between railway train or railway vehicle and car (traffic)	1
V878	Person injured in other specified noncollision transport accidents involving motor vehicle (traffic)	1
V887	Person injured in collision between other specified motor vehicles, nontraffic	1
V902	Accident to watercraft causing drowning and submersion, fishing boat	1
V913	Accident to watercraft causing other injury, other powered watercraft	1
V919	Accident to watercraft causing other injury, unspecified watercraft	1

V920	Water-transport-related drowning and submersion without accident to watercraft, merchant ship	1	
V951	Ultralight, microlight or powered glider accident injuring occupant	1	
V970	Occupant of aircraft injured in other specified air transport accidents	1	
	Transport accidents (V01 - V99) subtotal	772	43.6%
W00 - W19 Falls		N	PCT
W13	Fall from, out of or through building or structure	67	
W19	Unspecified fall	59	
W11	Fall on and from ladder	43	
W18	Other fall on same level	43	
W17	Other fall from one level to another	39	
W14	Fall from tree	17	
W12	Fall on and from scaffolding	16	
W01	Fall on same level from slipping, tripping and stumbling	5	
W10	Fall on and from stairs and steps	5	
W16	Diving or jumping into water causing injury other than drowning or submersion	2	
W02	Fall involving ice skates, skis, roller skates or skateboards	2	
W06	Fall involving bed	1	
W07	Fall involving chair	1	
W08	Fall involving other furniture	1	
	Falls (W00 -W19) subtotal	302	17.1%
W20 - W49 Exposure to inanimate mechanical forces			
W20	Struck by thrown, projected or falling object	97	
W31	Contact with other and unspecified machinery	86	
W24	Contact with lifting and transmission devices, NEC	51	
W30	Contact with agricultural machinery	37	
W23	Caught, crushed, jammed or pinched in or between objects	33	
W22	Striking against or struck by other objects	15	
W40	Explosion of other materials	12	
W34	Discharge from other and unspecified firearms	7	
W49	Exposure to other and unspecified inanimate mechanical forces	3	
W33	Rifle, shotgun and larger firearm discharge	3	
W26	Contact with knife, sword or dagger	2	
W32	Handgun discharge	2	
W27	Contact with nonpowered hand tool	1	
W28	Contact with powered lawnmower	1	
W29	Contact with other powered hand tools and household machinery	1	
W36	Explosion and rupture of gas cylinder	2	
W37	Explosion and rupture of pressurized tyre, pipe or hose	1	
W38	Explosion and rupture of other specified pressurized devices	1	
	Exposure to inanimate mechanical forces (W20 - W49) subtotal	355	20.0%

		N	PCT
W50 - W64 Exposure to animate forces			
W55	Bitten or struck by other mammals	5	
W64	Exposure to other and unspecified animate mechanical forces	1	
Exposure to animate forces (W50 - W64) subtotal		6	0.3%
W65 - W74 Accidental drowning and submersion			
W67	Drowning and submersion while in swimming pool	8	
W68	Drowning and submersion following fall into swimming pool	8	
W74	Unspecified drowning and submersion	8	
W69	Drowning and submersion while in natural water	5	
W73	Other specified drowning and submersion	3	
W70	Drowning and submersion following fall into natural water	2	
W65	Drowning and submersion while in bathtub	1	
Accidental drowning and submersion (W65 - W74) subtotal		35	2.0%
W75 - W84 Other accidental threats to breathing			
W84	Unspecified threat to breathing	8	
W81	Confined to or trapped in a low oxygen environment	6	
W76	Other accidental hanging and strangulation	4	
W77	Threat to breathing due to cave-in, falling earth and other substances	4	
W83	Other specified threats to breathing	4	
W79	Inhalation and ingestion of food causing obstruction of respiratory tract	3	
W78	Inhalation of gastric contents	2	
W80	Inhalation and ingestion of other objects causing obstruction of respiratory tract	2	
Other accidental threats to breathing (W75 - W84) subtotal		33	1.9%
W85 - W99 Exposure to electric current, radiation, and extreme ambient air temperature and pressure			
W87	Exposure to unspecified electric current	41	
W86	Exposure to other specified electric current	26	
W85	Exposure to electric transmission lines	21	
Exposure to electric current, radiation, and extreme ambient air temperature and pressure (W85 - W99) subtotal		88	5.0%
X00 - X09 Exposure to smoke, fire, and flames			
X00	Exposure to uncontrolled fire in building or structure	8	
X09	Exposure to unspecified smoke, fire and flames	3	
X08	Exposure to other specified smoke, fire and flames	2	
X01	Exposure to uncontrolled fire, not in building or structure	1	
X06	Exposure to ignition or melting of other clothing and apparel	1	
Exposure to smoke, fire, and flames (X00 - X09) subtotal		15	0.8%

	N	PCT
X10 - X19 Contact with heat and hot substances		
X12 Contact with other hot fluids	1	0.1%
X20 - X29 Contact with venomous animals and plants		
X23 Contact with hornets, wasps and bees	2	0.1%
X30 - X39 Exposure to forces of nature		
X30 Exposure to excessive natural heat	11	
X34 Victim of earthquake	2	
X33 Victim of lightning	1	
X36 Victim of avalanche, landslide and other earth movements	1	
X39 Exposure to other and unspecified forces of nature	1	
Exposure to forces of nature (X30 - X39) subtotal	16	0.9%
X40 - X49 Accidental poisoning by and exposure to noxious substances		
X47 Accidental poisoning by and exposure to other gases and vapours	18	
X44 Accidental poisoning by and exposure to other and unspecified drugs, medicaments and biological substances	17	
X42 Accidental poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], NEC	15	
X41 Accidental poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, NEC	13	
X45 Accidental poisoning by and exposure to alcohol	3	
X46 Accidental poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapours	1	
X49 Accidental poisoning by and exposure to other and unspecified chemicals and noxious substances	1	
Accidental poisoning by and exposure to noxious substances (X40 - X49) subtotal	68	3.8%
X58 - X59 Accidental exposure to other and unspecified factors		
X59 Exposure to unspecified factor	26	
X58 Exposure to other specified factors	3	
Accidental exposure to other and unspecified factors (X58 - X59) subtotal	29	1.6%
Y85 - Y86 Sequelae of external causes of morbidity and mortality		
Y86 Sequelae of other accidents	31	
Y850 Sequelae of motor vehicle accident	16	
Y859 Sequelae of other and unspecified transport accidents	2	
Sequelae of external causes of morbidity and mortality (Y85 - Y89) subtotal	49	2.8%
WORK-RELATED ACCIDENTS TOTAL (V01 - X59, Y85, Y86, Y89.0, Y89.9)	1,771	100.0%

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

Table A-2. Work-Related Deaths Caused by Accidents, by Cause and by Age Group, California 2000-2004.

ICD-10 CODE	DESCRIPTION	18-24	25-34	35-44	45-64	65 >	Total	Pct
V01 - V99	Transport accidents	78	177	201	261	55	772	43.6%
W20 - W49	Exposure to inanimate mechanical forces	53	68	90	121	23	355	20.0
W00 - W19	Falls	15	44	77	115	51	302	17.1
W85 - W99	Exposure to electric current, radiation, or extreme air temperature	13	24	30	19	2	88	5.0
X40 - X49	Accidental poisoning by and exposure to noxious substances	3	15	29	20	1	68	3.8
Y85 - Y86	Sequelae of external causes of morbidity and mortality	0	1	13	22	13	49	2.8
W65 - W74	Accidental drowning and submersion	6	7	14	7	1	35	2.0
W75 - W84	Other accidental threats to breathing	9	2	13	8	1	33	1.9
X58 - X59	Accidental exposure to other and unspecified factors	2	5	15	7	0	29	1.6
X30 - X39	Exposure to forces of nature	2	3	3	7	1	16	0.9
X00 - X09	Exposure to smoke, fire, and flames	1	3	1	9	1	15	0.8
W50 - W64	Exposure to animate forces	1	1	2	1	1	6	0.3
X20 - X29	Contact with venomous animals and plants	0	0	1	0	1	2	0.1
X10 - X19	Contact with heat and hot substances	0	0	0	1	0	1	0.1
ACCIDENTS (V01-X59,Y85,Y86,Y89.0,Y89.9) SUBTOTAL		183	350	489	598	151	1,771	100.0%

Table A-3. Work-Related Deaths Caused by Assaults (Homicides), by Cause and by Age Group, California 2000-2004

ICD-10 CODE	DESCRIPTION	18-24	25-34	35-44	45-64	65 >	Total	Pct
X95	Assault by other and unspecified firearm discharge	23	43	41	56	6	169	59.1%
X93	Assault by handgun discharge	5	15	14	11	1	46	16.1
X99	Assault by sharp object	5	4	4	12	0	25	8.7
X94	Assault by rifle, shotgun and larger firearm discharge	1	5	2	5	0	13	4.5
Y09	Assault by unspecified means	1	1	1	6	3	12	2.4
Y08	Assault by other specified means	1	1	2	0	0	4	1.4
Y871	Sequelae of assault	0	0	1	1	2	4	1.4
Y00	Assault by blunt object	0	0	0	2	0	2	0.7
Y04	Assault by bodily force	1	0	0	1	0	2	0.7
Y03	Assault by crashing of motor vehicle	0	0	1	0	0	1	0.3
Y069	Assault by unspecified person	0	0	0	1	0	1	0.3
TOTAL (X85 – Y09, Y87.1)		37	71	67	99	12	286	100.0%

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

Table A-4. Work-Related Deaths Caused by Malignant Neoplasms (Cancers), by Cause and by Age Group, California 2000-2004

ICD-10 CODE	DESCRIPTION	18-24	25-34	35-44	45-64	65 >	Total	Pct
C459	Mesothelioma, unspecified	0	0	2	15	59	76	55.9%
C349	Malignant neoplasm of bronchus or lung, unspecified	0	0	0	2	15	17	12.5
C450	Mesothelioma of pleura	0	0	1	1	8	10	7.4
C457	Mesothelioma of other sites	0	0	0	1	9	10	7.4
C679	Malignant neoplasm of bladder, unspecified	0	0	1	0	3	4	2.9
C451	Mesothelioma of peritoneum	0	0	1	1	1	3	2.2
C384	Malignant neoplasm of pleura	0	0	0	1	1	2	1.5
C80	Malignant neoplasm without specification of site	0	0	0	0	2	2	1.5
C859	Non-Hodgkin's lymphoma, unspecified type	0	0	0	1	1	2	1.5
C159	Malignant neoplasm of esophagus, unspecified	0	0	1	0	0	1	0.7
C189	Malignant neoplasm of colon, unspecified	0	0	0	0	1	1	0.7
C20	Malignant neoplasm of rectum	0	0	0	0	1	1	0.7
C220	Liver cell carcinoma	0	0	0	0	1	1	0.7
C229	Malignant neoplasm of liver, unspecified	0	0	0	1	0	1	0.7
C439	Malignant neoplasm of skin, unspecified	0	0	0	1	0	1	0.7
C499	Malignant neoplasm of connective and soft tissue, unspecified	0	0	0	0	1	1	0.7
C719	Malignant neoplasm of brain, unspecified	0	0	0	1	0	1	0.7
C740	Malignant neoplasm of cortex of adrenal gland, unspecified	0	0	0	0	1	1	0.7
C819	Hodgkin's disease, unspecified	0	0	0	1	0	1	0.7
TOTAL (C00 – C97)		0	0	6	26	104	136	100.0%

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

Table A-5 Work-Related Deaths Caused by Diseases of the Circulatory System, by Cause and by Age Group, California 2000-2004

ICD-10		18-24	25-34	35-44	45-64	65 >	Total	Pct
CODE	DESCRIPTION							
I251	Atherosclerotic heart disease	0	11	1	14	17	33	29.7%
I219	Acute myocardial infarction, unspecified	0	1	2	12	7	22	19.8
I250	Atherosclerotic cardiovascular disease, so described	0	0	5	3	13	21	18.9
I119	Hypertensive heart disease without (congestive) heart failure	0	0	2	4	2	8	7.2
I429	Cardiomyopathy, unspecified	0	1	0	1	1	3	2.7
I619	Intracerebral haemorrhage, unspecified	0	1	0	1	1	3	2.7
I64	Stroke, not specified as haemorrhage or infarction	0	0	0	1	2	3	2.7
I517	Cardiomegaly	0	0	1	0	1	2	1.8
I609	Subarachnoid haemorrhage, unspecified	1	0	0	1	0	2	1.8
I629	Intracranial haemorrhage (nontraumatic), unspecified	0	0	0	0	2	2	1.8
I080	Disorders of both mitral and aortic valves	1	0	0	0	0	1	0.9
I258	Other forms of chronic ischaemic heart disease	0	0	0	1	0	1	0.9
I259	Chronic ischaemic heart disease, unspecified	0	0	1	0	0	1	0.9
I269	Pulmonary embolism without mention of acute cor pulmonale	0	0	0	1	0	1	0.9
I270	Primary pulmonary hypertension	0	0	1	0	0	1	0.9
I341	Mitral (valve) prolapse	0	0	1	0	0	1	0.9
I350	Aortic (valve) stenosis	0	0	0	0	1	1	0.9
I420	Dilated cardiomyopathy	0	0	1	0	0	1	0.9
I499	Cardiac arrhythmia, unspecified	0	1	0	0	0	1	0.9
I500	Congestive heart failure	0	0	0	0	1	1	0.9
I709	Generalized and unspecified atherosclerosis	0	0	0	1	0	1	0.9
I710	Dissection of aorta [any part]	0	0	0	1	0	1	0.9
TOTAL (I00 – I99)		2	5	15	41	48	111	100.0%

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

Table A-6. Work-Related Deaths Caused by Suicides, by Cause and by Age Group, California 2000-2004

ICD-10		18-24	25-34	35-44	45-64	65 >	Total	Pct
CODE	DESCRIPTION							
X70	Intentional self-harm by hanging, strangulation and suffocation	8	7	14	7	1	37	34.3%
X72	Intentional self-harm by handgun discharge	3	7	4	13	3	30	27.8
X74	Intentional self-harm by other and unspecified firearm discharge	3	1	1	4	3	12	11.1
X73	Intentional self-harm by rifle, shotgun and larger firearm discharge	4	0	2	3	0	9	8.3
X80	Intentional self-harm by jumping from a high place	1	1	1	2	0	5	4.6
X83	Intentional self-harm by other specified means	0	1	2	0	0	3	2.8
X64	Intentional self-poisoning by and exposure to other and unspecified drugs	0	1	0	0	1	2	1.9
X67	Intentional self-poisoning by and exposure to other gases and vapours	0	1	1	0	0	2	1.9
X69	Intentional self-poisoning by and exposure to other and unspecified chemicals	0	0	0	2	0	2	1.9
X78	Intentional self-harm by sharp object	0	0	0	2	0	2	1.9
X61	Intentional self-poisoning by and exposure to psychotropic drugs	0	0	0	1	0	1	0.9
X62	Intentional self-poisoning by and exposure to narcotics and hallucinogens, NEC	0	0	1	0	0	1	0.9
X82	Intentional self-harm by crashing of motor vehicle	0	0	1	0	0	1	0.9
Y870	Sequelae of intentional self-harm	0	0	1	0	0	1	0.9
TOTAL (X60 – X84, Y87.0)		19	19	28	34	8	108	100.0%

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

Table A-7. Work-Related Deaths Caused by Diseases of the Respiratory System, by Cause and by Age Group, California 2000-2004

ICD-10 CODE	DESCRIPTION	18-24	25-34	35-44	45-64	65 >	Total	Pct
J61	Pneumoconiosis due to asbestos and other mineral fibres	0	0	0	1	36	37	45.7%
J449	Chronic obstructive pulmonary disease, unspecified	0	0	0	1	13	14	17.3
J841	Other interstitial pulmonary diseases with fibrosis	0	0	1	1	11	13	16.0
J448	Other specified chronic obstructive pulmonary disease	0	0	1	0	1	2	2.5
J154	Pneumonia due to other streptococci	0	0	0	0	1	1	1.2
J40	Bronchitis, not specified as acute or chronic	0	0	0	1	0	1	1.2
J439	Emphysema, unspecified	0	0	0	0	1	1	1.2
J459	Asthma, unspecified	0	0	1	0	0	1	1.2
J47	Bronchiectasis	0	0	0	0	1	1	1.2
J60	Coalworker's pneumoconiosis	0	0	0	0	1	1	1.2
J628	Pneumoconiosis due to other dust containing silica	0	0	0	0	1	1	1.2
J64	Unspecified pneumoconiosis	0	0	0	0	1	1	1.2
J680	Bronchitis and pneumonitis due to chemicals, gases, fumes and vapors	0	0	0	1	0	1	1.2
J700	Acute pulmonary manifestations due to radiation	0	0	0	0	1	1	1.2
J840	Alveolar and parietoalveolar conditions	0	0	0	1	0	1	1.2
J849	Interstitial pulmonary disease, unspecified	0	0	0	0	1	1	1.2
J920	Pleural plaque with presence of asbestos	0	0	0	0	1	1	1.2
J984	Other disorders of lung	0	0	0	0	1	1	1.2
J989	Respiratory disorder, unspecified	0	0	0	1	0	1	1.2
TOTAL (J00 – J99)		0	0	3	7	71	81	100.0%

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.

Table A-8. Work-Related Deaths by All Other Causes, by ICD-10 Code, California 2000-2004

ICD-10 CODE	DESCRIPTION	18-24	25-34	35-44	45-64	65 >	Total	Pct
R99	Other ill-defined and unspecified causes of mortality	2	2	2	0	0	6	9.5%
G825	Tetraplegia, unspecified	0	0	0	0	3	3	4.8
G931	Anoxic brain damage, not elsewhere classified	1	0	0	2	0	3	4.8
Y12	Poisoning by and exposure to narcotics and psychodysleptics [hallucinogens]	0	0	2	1	0	3	4.8
Y350	Legal intervention involving firearm discharge	0	2	1	0	0	3	4.8
B171	Acute hepatitis C	0	0	1	0	1	2	3.2
G822	Paraplegia, unspecified	0	0	0	0	2	2	3.2
M512	Other specified intervertebral disc displacement	0	0	2	0	0	2	3.2
Y14	Poisoning by and exposure to other and unspecified drugs, undetermined intent	0	0	1	1	0	2	3.2
Y34	Unspecified event, undetermined intent	0	1	0	1	0	2	3.2
A412	Septicaemia due to unspecified staphylococcus	0	0	0	0	1	1	1.6
B169	Acute hepatitis B without delta agent and without hepatic coma	0	0	0	0	1	1	1.6
B942	Sequelae of viral hepatitis	0	0	0	1	0	1	1.6
D469	Myelodysplastic syndrome, unspecified	0	0	0	0	1	1	1.6
D489	Neoplasm of uncertain or unknown behaviour, unspecified	0	0	0	1	0	1	1.6
D868	Sarcoidosis of other and combined sites	0	0	1	0	0	1	1.6
E145	Unspecified diabetes mellitus with peripheral circulatory complications	0	0	0	1	0	1	1.6
E149	Unspecified diabetes mellitus without complications	0	0	0	0	1	1	1.6
E668	Other obesity	0	0	1	0	0	1	1.6
E859	Amyloidosis, unspecified	0	0	0	0	1	1	1.6
F100	Mental and behavioural disorders due to use of alcohol, acute intoxication	0	0	1	0	0	1	1.6
F102	Mental and behavioural disorders due to use of alcohol, dependence syndrome	0	0	0	1	0	1	1.6
F149	Mental and behavioural disorders due to use of cocaine, unspecified	0	0	0	1	0	1	1.6
F192	Mental and behavioural disorders due to multiple drug use	0	0	0	1	0	1	1.6
F500	Anorexia nervosa	1	0	0	0	0	1	1.6
G35	Multiple sclerosis	0	0	0	1	0	1	1.6
G959	Disease of spinal cord, unspecified	0	0	0	1	0	1	1.6
K631	Perforation of intestine (nontraumatic)	0	0	1	0	0	1	1.6
K769	Liver disease, unspecified	0	0	0	0	1	1	1.6
K861	Other chronic pancreatitis	0	0	0	0	1	1	1.6
M509	Cervical disc disorder, unspecified	0	0	0	1	0	1	1.6
M725	Fasciitis, not elsewhere classified	0	0	0	1	0	1	1.6
N200	Calculus of kidney	0	0	0	1	0	1	1.6
Q231	Congenital insufficiency of aortic valve	0	0	0	1	0	1	1.6
Q279	Congenital malformation of peripheral vascular system, unspecified	0	1	0	0	0	1	1.6
Q282	Arteriovenous malformation of cerebral vessels	0	1	0	0	0	1	1.6
Y20	Hanging, strangulation and suffocation, undetermined intent	0	0	1	0	0	1	1.6%

Table A-8. Work-Related Deaths by All Other Causes, by ICD-10 Code, California 2000-2004, continued

ICD-10		18-24	25-34	35-44	45-64	65 >	Total	Pct
CODE	DESCRIPTION							
Y21	Drowning and submersion, undetermined intent	0	0	1	0	0	1	1.6%
Y30	Falling, jumping or pushed from a high place, undetermined intent	0	0	0	1	0	1	1.6
Y362	War operations involving other explosions and fragments	1	0	0	0	0	1	1.6
Y466	Other and unspecified antiepileptics	0	0	0	1	0	1	1.6
Y836	Removal of other organ (partial) (total)	0	0	1	0	0	1	1.6
Y839	Surgical procedure, unspecified	0	0	1	0	0	1	1.6
Y872	Sequelae of events of undetermined intent	0	0	0	1	0	1	1.6
Y891	Sequelae of war operations	0	0	0	0	1	1	1.6
TOTAL (Residual ICD-10 Codes for All Other Causes)		5	7	17	20	14	63	100.0%

SOURCE: California Department of Health Services, Death Statistical Master Files 2000-2004.