Epidemiology of Youth Suicide in California and the United States

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September 15, 2001

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Executive Summary

Youth suicide is a major public health problem. Death by suicide is among the leading causes of deaths among adolescents and young adults. In California, suicide accounts for as much as 13.4% of all deaths among those aged 20-24 years. However, youth suicide is, as well as other violent deaths (accidents and homicides) preventable.

California's youth suicide mortality parallels those of the nation. Youth suicide risk does not appear as high as those are in late adulthood. However, among youth in California, suicide mortality increases as the age of the youth increases, regardless of the gender and ethnicity of the youth (Figure1).

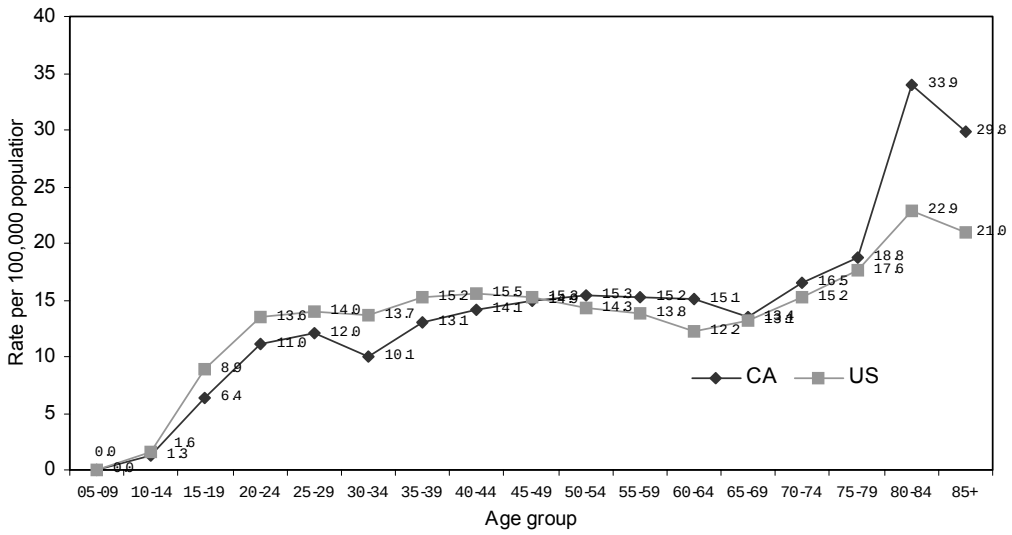

Figure I. Suicide death rates by age: United States and California, 1998.

Data Source: NCHS Vital Statistics System for numbers of deaths, Bureau of Census for population estimates. Statistics compiled by the Office of Statistics and Programming, NCIPC, CDC.

Among adolescents and young adults in California, suicide mortality is consistently higher for males than it is for females, regardless of ethnicity. Overall, youth suicide mortality has been on the decline for the past two decades (Figure II and III). However, suicide mortality rates among early teen females are on a slow but steady increase (Figure III).

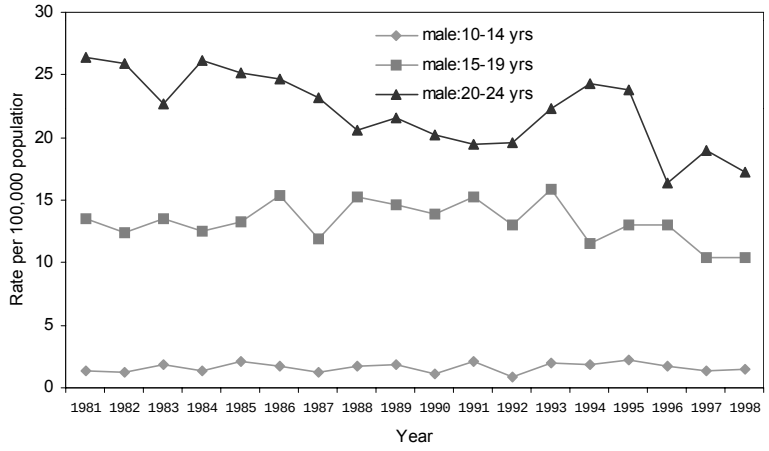

Figure II. Suicide rates for male youth: California, 1981-98.

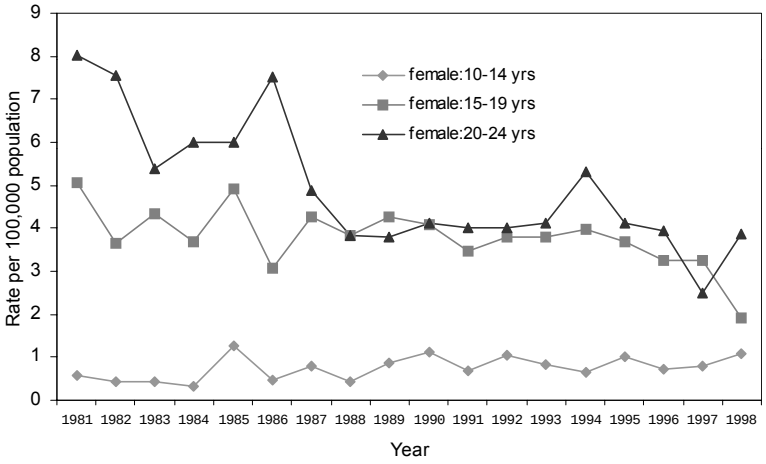

Figure III. Suicide rates for female youth: California, 1981-98.

Data Source: NCHS Vital Statistics System for numbers of deaths, Bureau of Census for population estimates. Statistics compiled by the Office of Statistics and Programming, NCIPC, CDC.

The suicide rate is highest among American Indian/Alaska Native youth, followed by Euro-American, African American, Hispanic, and Asian/Pacific Islander youth (Figure 2). Explanations for these varying degrees of suicide rates across ethnic groups have been proposed, including but not limited to acculturative stress, cultural/social norms about suicides, and racial and social bias in recording suicide victims by medical examiners. However, these explanations are still inconclusive.

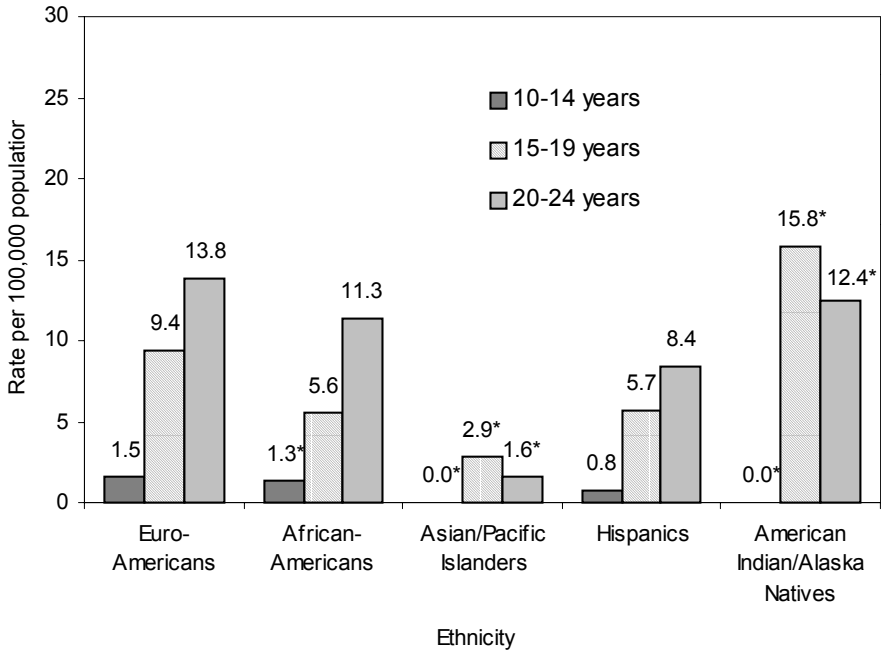

Figure IV. Youth suicide rate by age group and ethnicity. California, 1996-98.

Data Source: NCHS Vital Statistics System for numbers of deaths, Bureau of Census for population estimates. Statistics compiled by the Office of Statistics and Programming, NCIPC, CDC.

Firearm use is the most lethal among all suicide methods. Nevertheless, it is the most prevalent method used for suicide among youth in California, with a greater use found among late teens and young adults.

The statistical data point to a number of areas for future interventions aimed at preventing youth suicide. It is recommended that measures to ensure secure storage of firearm and/or restrict possession of firearm among youth be enforced. Further research is needed to clarify gender, ethnic, cultural differences in the prevalence of youth suicides. Understanding risk and protective factors specific to the gender, ethnicity, and cultural background of the youth is essential to develop effective intervention policies. Intervention should target at early teens as well as late teens and its components should be address developmental, cultural and gender issues appropriate to the youth.

Epidemiology of Youth Suicide in California and the United States

Introduction

Youth suicide is a major public health problem that has drawn substantial public attention in the United States. Persons under age 25 accounted for 15% of all suicides in 1998 (Centers for Disease Control, 2001). In response to this problem, Healthy People 2010 Initiative has made the reduction of adolescent suicide one of its main objectives (Department of Health and Human Services, 2000). The prevention of suicide begins by identifying the population at risk. To that end, this paper will present current official statistics about the levels, trends, and other correlates of youth suicide in California. The focus of the presented material will be the description of three subgroups of youth population, i.e., 10-14 years (early adolescents), 15-19 years (late adolescents), and 20-24 years (young adults). Where necessary, the paper will also provide comparisons between California statistics with statistics of the United States.

The goal of this paper is threefold: First, it aims at disseminating information that facilitates the understanding of the prevalence of youth suicide in California. Second, it aims at providing information that may be utilized by local policy makers, educators, and health professionals in planning and implementing effective suicide prevention programs for California youth. For these purposes, local statistics such as state- and county-level data are presented where appropriate. Third, and finally, the current paper compares and contrasts suicide rates among youth in California with those of the nation to place the issue of youth suicide in California in a broader, comparative context.

Definitions of suicidal behaviors

Suicidal behaviors include completed suicide, attempted suicide and suicidal ideation. Completed suicide refers to death from self-inflicted injury where there is evidence that the person intended to kill himself/herself. Completed suicide is coded on U.S. death certificates as E950 through E959 in the International Classification of Disease-9th Revision (World Health Organization, 1977). Suicide attempt refers to a behavior with a nonfatal outcome, for which there is explicit or implicit evidence that the person intended to kill himself/herself at some (nonzero) level. A suicide attempt may or may not result in injuries. Suicidal ideation refers to self-reported thoughts of engaging in suicidal behavior. Thoughts that are less explicit in terms of wanting to take one's life (wanting to be dead, not wanting to awake) are often considered as indications of "passive" suicide ideation (Pearson, et al., 2001). The current paper's primary focus is on presenting the epidemiology (the distribution of disease in a variety of populations) of completed suicide among youth. However, readers interested in attempted suicides and suicide ideation should refer to *Youth Suicide Prevention – Understanding Risk Factors of Youth Suicide and Strategies for Preventing Youth Suicide* for further information.

Obtaining suicide statistics

Information on suicide deaths is compiled by the National Center for Health Statistics (NCHS) Mortality Branch from data submitted by each individual state. State-level statistics are obtained from death certificates submitted by coroners and medical examiners in each jurisdiction across the nation. The NCHS publishes these data in the *Vital Statistics of the United States* annually. The data have recently become available in the CDC's National Center for Injury Prevention and Control website WISQARS (Web-based Injury Statistics Query and Reporting System) that provide customized injury-related mortality data. Many death certificate

dates become available only after a two-year delay, the data are up to three years old. Consequently, the year 1998 is the most recent year for which final official statistics are available from NCHS.

Youth Suicides in California

The suicide mortality rates vary by demographic characteristics such as age, gender, and ethnicity of the youth as well as older population. The following section reviews the current suicide mortality among California youth with respect to these demographic characteristics.

Suicide mortality in California population of all age groups

As Figure 1 indicates, the patterns of suicide rates across all age groups were similar for California and the overall United States in 1998. For California and the U.S., older adult age groupings had the highest suicide rates among all other age groups. However, the examination of the overall patterns across all age groups suggests that the peaks in the suicide rates are bimodal. That is, suicide rates peak in young adulthood, remain stable or decline somewhat in the middle to late adulthood, and increase again in the older age groups. This is consistent with the observation of National data by McIntosh et al (1994).

Several interesting differences between the suicide rates for California and for the United States can also be observed. The increase in youth suicide rates through the mid-20s are somewhat less extreme for California than for the United States. However, there is a drastic increase in the suicide rate by 1.8 times in the transition from the ages of the late 70s and the early 80s. This results in considerably higher suicide death rates for California than for the nation among the oldest age groups (80 years and older).

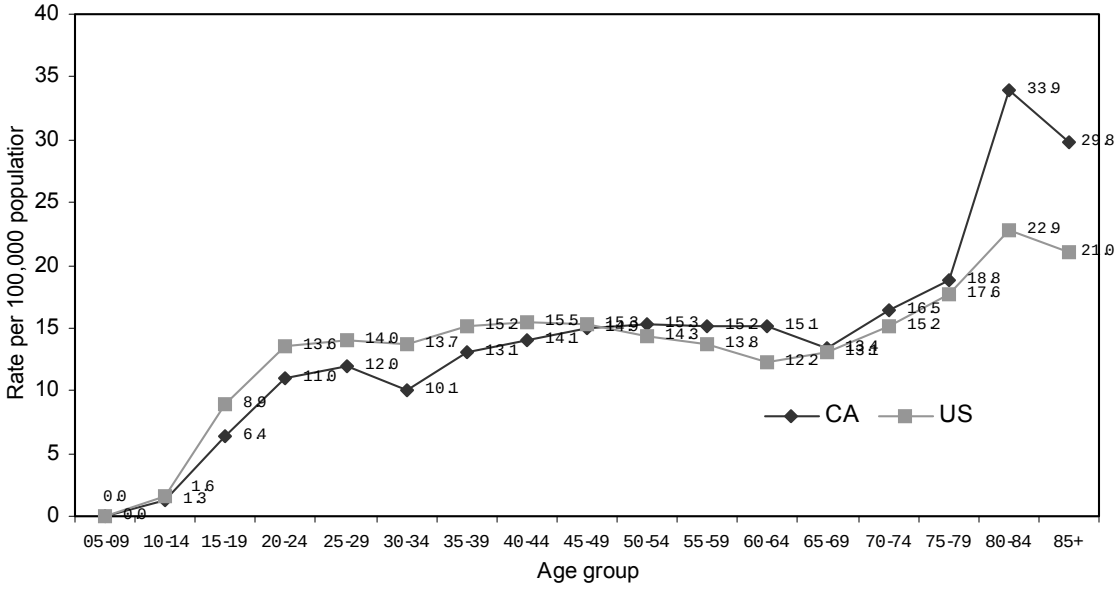

Figure 1. Suicide death rates by age: United States and California, 1998.

Note. Data Source: NCHS Vital Statistics System for numbers of deaths, Bureau of Census for population estimates. Statistics compiled by the Office of Statistics and Programming, NCIPC, CDC.

Youth suicide mortality levels by age and gender

A closer look at youth age groups shows that the patterns of change in youth suicide rates vary as a function of age. The level of suicide mortality increases drastically as age increases. As Table 1 indicates, among California teens, the overall suicide mortality rate for 15- to 19-year-olds was 4.9 times higher than for the younger 10- to 14-year old age group in 1998. This is comparable to the 5.6 times increase for these age groups in the U.S. adolescents (see Table 2). The suicide mortality rate continues to increase by 1.7 times when these 15- to 19-year-old adolescents were compared with young adults aged between 20- to 24-years old. And, as before, the California trends parallel the overall U.S. trends (1.5 times increase between these age groups, i.e. late adolescents and young adults). The increase in suicide mortality with age can be observed for both female and male youth in California.

Males, regardless of age group, have consistently higher suicide death rate than females. The difference in the suicide death rates between males and females among the youth age groups in consideration were male to female ratios of 1.4 to 1, 5.4 to 1, and 4.5 to 1 for 10-14-year olds, 15-19-year-olds, and 20-24-year olds respectively. These trends are consistent with the overall U.S. youth, who had male to female ratios of 2.7 to 1, 5.0, to 1, and 6.0 to 1 for youth aged 10-14, 15-19, and 20-24, respectively. (Please note that the percentage estimates made for the samples less than 20 should be interpreted with caution. These estimates are indicated with * in the Tables).

Table 1. Youth suicide deaths in California by age group and gender, 1998.

Age group	Male			Female			% of all suicides	Total /100,000
	# of Suicide deaths	Population	Suicide death rate /100,000	# of suicide deaths	Population	Suicide death rate /100,000		
10-14	18*	1,176,962	1.52*	12*	1,119,641	1.07*	0.9%*	1.3
15-19	126	1,204,931	10.46	21	1,086,367	1.93	4.3%	6.4
20-24	206	1,191,599	17.29	40	1,036,973	3.86	7.2%	11.0

Table 2. Youth suicide deaths in the United States by age group and gender. 1998.

Age group	Male			Female			% of all suicides	Total /100,000
	# of Suicide deaths	Population	Suicide death rate /100,000	# of suicide deaths	Population	Suicide death rate /100,000		
10-14	234	9,854,788	2.4	83	9,387,020	0.9	1%	1.6
15-19	1,463	10,045,566	14.6	274	9,493,761	2.9	7%	8.9
20-24	2,069	8,996,110	23.0	329	8,678,024	3.8	9%	13.6

Data Source: NCHS Vital Statistics System for numbers of deaths, Bureau of Census for population estimates. Statistics compiled by the Office of Statistics and Programming, NCIPC, CDC.

Youth suicide mortality levels by age and ethnicity

Youth suicide mortality increases with age across different ethnic groups. Figures 2 and 3 show suicide rates of youth age groups by ethnicity (See Table A in Appendixes for a summary of numbers and rates of suicides for each group). Note that the categories of Euro-American, African-American, Asian/Pacific Islander, and American Indian/Alaska Native youth exclude Hispanic ethnicity whereas Hispanic ethnicity may include any race category. Similar to the youth population as a whole, suicide rates tend to increase with youth's age across all ethnicities. The overall pattern of suicide rates across all ethnicities for California youth is similar to the U.S. counterparts. However, the suicide mortality rates for Asian American and American Indian/Alaska Native youth appear to have lower suicide mortality in 20-24 year-olds than their younger counterparts. This may possibly be due to the unreliable rates computed for fewer than 20 deaths for these groups in 1996-98. Across all age groups, among California youth, American Indian/Alaska Natives have the highest suicide mortality, followed by Euro-Americans, African-Americans, Hispanics, and Asian/Pacific Islanders.

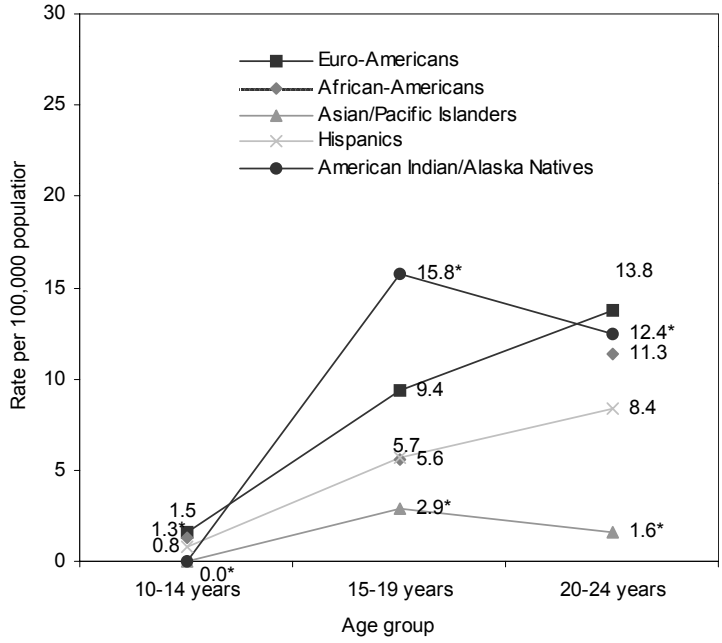

Figure 2. Youth suicide rate by age group and ethnicity in California, 1996-98.

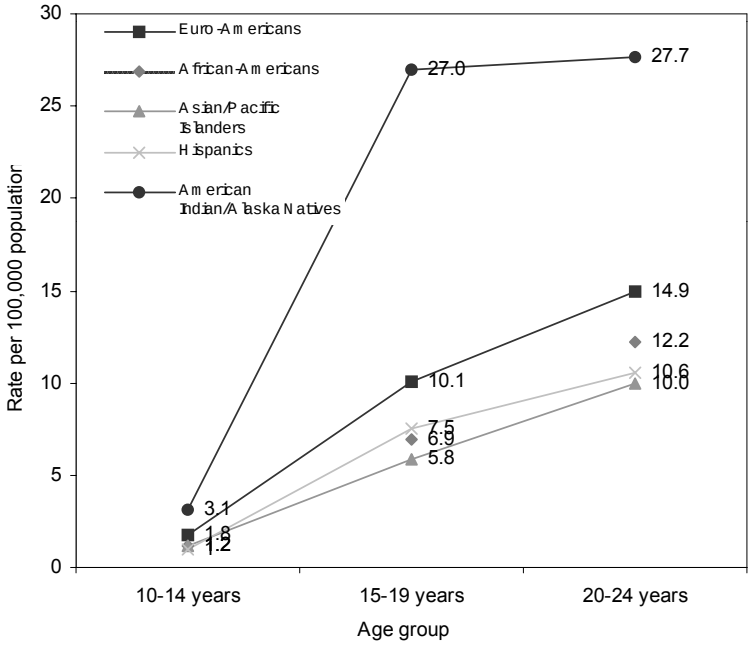

Figure 3. Youth suicide rate by age group and ethnicity in the United States, 1996-98.

Data Source: NCHS Vital Statistics System for numbers of deaths, Bureau of Census for population estimates. Statistics compiled by the Office of Statistics and Programming, NCIPC, CDC.

Several explanations for these varying degrees of suicide rates across different ethnic groups have been proposed (see Wyche & Rotheram-Borus, 1990 for a comprehensive review of literature). For instance, Gibbs (1988) argues that deaths classified as 'unintentional injuries' (e.g., deaths due to drug overdoses, motor vehicle accidents) and 'homicides' may be disguised suicides among African-Americans and Hispanics. In this vein, Peck (1983-84) pointed to the possible systematic racial and social class bias in the recording process of suicide victims of non-white individuals by medical examiners. Others suggest that social stress such as poverty and unemployment, acculturative stress, cultural/social norms about deaths and suicides could be risk factors unique to ethnic minority youth.

Youth Suicide Trends in California, 1981-1998

Even though California's suicide death rates varied from 1980 through 1998, overall, there was a decrease in suicide rates during this period (California Department of Health Services, 1998). Adjusted death rates of the overall California population between the years 1980 and 1996 had a significant decrease for males as well as females. In fact, California met the year 2000 national health's objective of less than 10.5 age-adjusted suicide deaths per 100,000 population in 1996. Indeed, the age-adjusted suicide rate for California in 1998 was 9.6 per 100,000 living population. This broad unit of analysis, however, does not provide insight into the suicide rates of separate sub-populations. More specifically, it is unknown if these population-wide decreases in suicide are also found in the youth.

Youth suicide death rates over the past 18 years changed differentially depending on age and gender. The Figures below reveal the trends of suicide death rates in California and the United States between 1981 and 1998 for each of the youth age groups, 10-14 years (early

adolescents), 15-19 years (late adolescents), and 20-24 years (young adults). Overall, across all the youth age groups and over time, the suicide death rate has been substantially higher for male youth than female youth. Males, regardless of age group, also exhibited more fluctuation from year to year than did their female counterparts. And, as previously discussed, the older age groups tend to have higher suicide rates than younger groups, regardless of gender and across all time points.

As Figure 4 suggests, young adult males in California are better off than their national counterparts with respect to suicide mortality trends. Overall, the rate for young adult males in the United States remained somewhat stable and high, whereas their counterparts in California showed a decrease over years, expanding the difference between their rates and that for the U.S. The rate for young adult females remained relatively stable and lower than their male counterparts over the years for both California and for the United States.

As Figure 5 shows, in contrast to the declines in the rates for young adult males, the trend for late adolescent males is somewhat mixed. The trends for late adolescent females in California suggest that the rate has slowly decreased, but remained stable over time.

As Figure 6 suggests, the rates for early adolescents are significantly lower than late adolescents and young adults at all time points. However, unlike for older youth in which the rates are either in decline or stable, the rates for young adolescent females and males in both California and the United States as a whole have been somewhat on the increase over the past 18 years. The rates for early adolescent females are substantially lower than their male counterparts for both California and the U.S. However, the rates for these females in California have been on the increase at a slow but steady rate for the past 18 years as well as their U.S. counterparts.

In summary, the age-adjusted suicide rates for California as a whole have substantially declined over the past two decades. However, among youths, i.e., early adolescents (10-14 year-olds), late adolescents (15-19 year-olds) and young adults (20-24 year-olds), this rate of decline has only been found among young adult males. Moreover, for younger adolescents, especially among females, the rate has been increasing to a lesser extent over time.

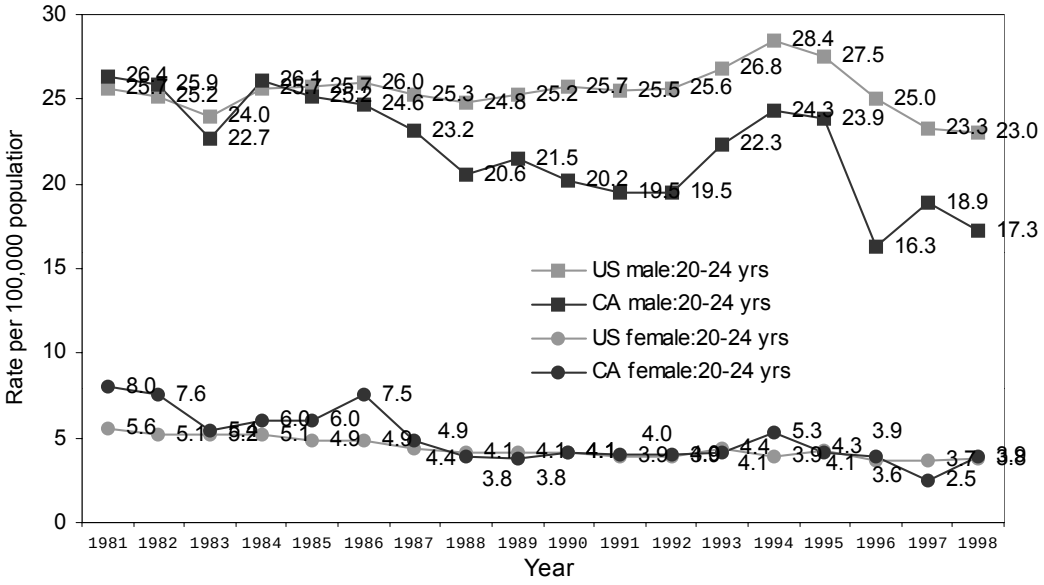

Figure 4. Suicide death rates among 20-24 year old youth by gender: California and the United States, 1981-98.

Data Source: NCHS Vital Statistics System for numbers of deaths, Bureau of Census for population estimates. Statistics compiled by the Office of Statistics and Programming, NCIPC, CDC.

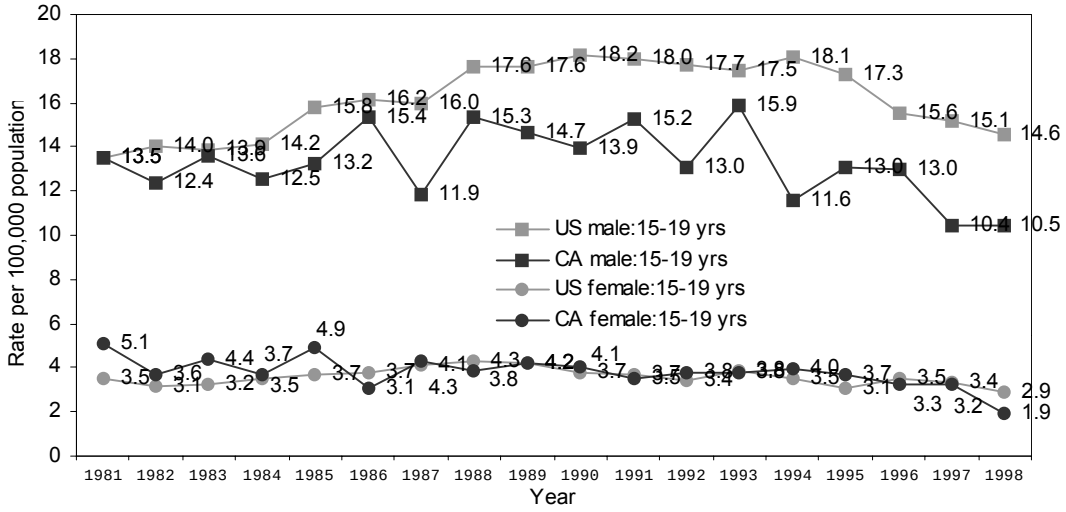

Figure 5. Suicide death rates among 15-19 year old youth by gender: California and the United States, 1981-98.

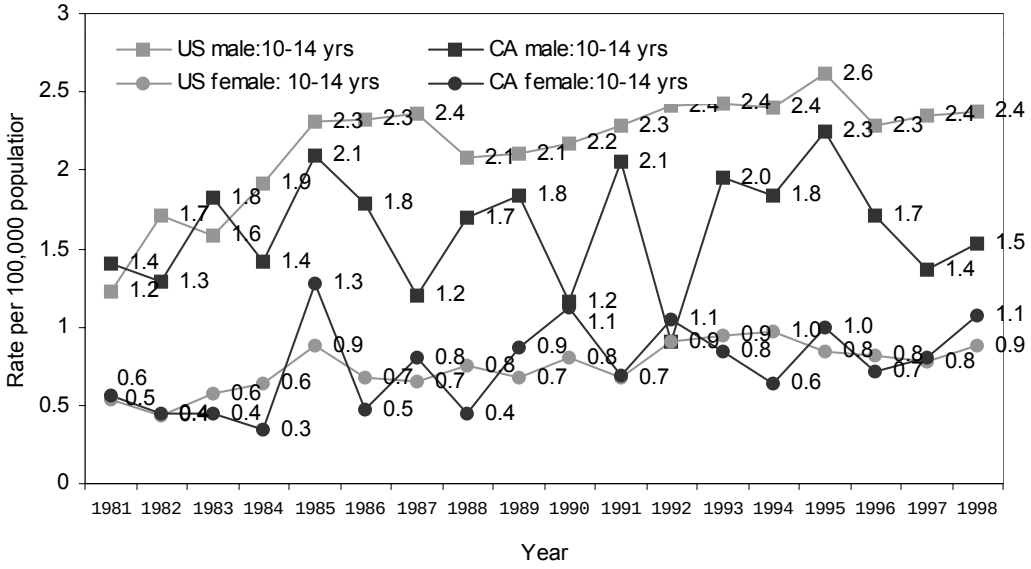

Figure 6. Suicide death rates among 10-14 year old youth by gender: California and the United States, 1981-98.

Data Source: NCHS Vital Statistics System for numbers of deaths, Bureau of Census for population estimates. Statistics compiled by the Office of Statistics and Programming, NCIPC, CDC.

Leading Cause of Deaths among California Youth

An examination of youth suicide in the context of all other leading causes of deaths would allow us to understand the significance of the youth suicide as a major public health problem. Among all age groups, deaths due to suicide have historically been one of the leading causes of death in California as well as in the United States (California Department of Health Services, 1998). In the United States, suicide ranks ninth among the leading causes of death across all age groups. However, for young people 15-24 years of age, suicide ranks third among the leading causes of deaths following unintentional injury and homicide. According to *the Surgeon General's Call to Action to Prevent Suicide* (U.S. Public Health Service, 1999), the number of suicide deaths for teenagers and young adults in the United States in 1996 were more than deaths from cancer, heart disease, AIDS, birth defects, stroke, pneumonia, and influenza, and chronic lung disease *combined*. Although it is beyond the scope of this paper, the significance of youth suicide as an important public health problem becomes even more apparent when high rates of non-lethal suicidal behaviors such as attempted suicide are taken into consideration (e.g., Gould & Kramer, 2001).

Youth suicide as a violent death

As Table 3 shows, the three primary causes of death among California population as a whole are heart disease, cancer (malignant neoplasm), and stroke (cerebrovascular diseases). The high rankings of these causes are primarily accounted for by deaths by these causes among the elderly 65 and older in California. The "disease-based" causes of deaths such as these are prevalent in middle age and older adulthood in California.

On the other hand, among California youth, none of these three causes rank in the top three causes of deaths, except for those 10-14 years of age in which small numbers of deaths occur. Youths die almost exclusively from "violent deaths" i.e., deaths due to accidents (labeled as "unintentional injury and adverse effects"), homicides, and suicides. For youth in California, as well as in the United States, suicide ranks high among the leading causes of deaths. The ranking is considerably higher for youth age groups than for the whole population in California (ranked 9th) as well as for the older adults (ranked 9th among 55-64 years of age). These tendencies are consistent with those for the nation.

How do youth age groups compare to each other? Among both 15-19 and 20-24 year-old California youth, suicide is the third leading cause of death, ranking below only accidents (unintentional injuries) and homicides. For the youth aged 10-14 years, these three violent causes of death (i.e., accidents, suicide, and homicide) combined account for almost half of their deaths (47%) in California. By the time these early adolescents reach later adolescence and young adulthood, this proportion increases to 76% of all deaths. Again, this trend is similar to that of the United States.

Suicide mortality in youth

Although suicide is described above as a significant component of adolescent deaths in combination with other violent deaths, the contribution of suicide alone to adolescent mortality is substantial among California youth as well as the U.S. youth as a whole. For instance, in 1998, the proportion of all deaths that were suicides in California was limited to only 1.5%. However, among the youth aged 10-14, 15-19 and 20-24, suicide deaths account for 6.4%, 10.7% and 13.4% of all deaths, respectively. This is comparable to the U.S. population of youth as a whole.

In summary, for adolescents and young adults in California as well as in the United States, suicide and other violent deaths are the primary causes of mortality. These causes contribute a considerably larger proportion to the overall deaths among these young age groups than for the same causes in the overall population or older age groups. Most importantly, these violent deaths among youth are preventable. Effective prevention interventions could potentially reduce a substantial number of lives of youth lost in these violent deaths.

Table 3. Top Five Ranking Causes of Deaths among California Youth by Age, 1998.

Age Group	10-14	15-19	20-24	Total
Total deaths	470	1,378	1,804	225,450
Rank				
1	Unintentional Injury and Adv. Effects 145	Unintentional Injury and Adv. Effects 524	Unintentional Injury and Adv. Effects 636	Heart Disease 69,747
2	Malignant Neoplasms 78	Homicide & Legal Int. 397	Homicide & Legal Int. 466	Malignant Neoplasms 51,428
3	Homicide & Legal Int. 47	Suicide 147	Suicide 246	Cerebro-vascular 16,512
4	Suicide 30	Malignant Neoplasms 87	Malignant Neoplasms 143	Pneumonia & Influenza 13,378
5	Congenital Anomalies 29	Congenital Anomalies 32	Heart Disease 60	Bronchitis Emphysema Asthma 12,341
9	-	-	-	Suicide 3,415

Data Source: NCHS Vital Statistics System for numbers of deaths, Bureau of Census for population estimates. Statistics compiled by the Office of Statistics and Programming, NCIPC, CDC.

Methods of Youth Suicide

Firearm suicides

A related issue in violent deaths among youth is the prevalence of firearm-related injuries and deaths among youth. According to the California Department of Health Services (2001), among 1,848 youth aged 10-19 years old who died of all causes in California, 475 (26%) were killed with a firearm. Among these youth that were killed with a firearm, 74% were categorized as homicides, 21% in suicides, and 3% were unintentional. In 1998 firearm suicides accounted for 57% of youth suicides (10-19 years of age). In terms of its fatality, in 1998, 9 out of 10 suicide attempts with a firearm were fatal, compared to 1 out of 10 suicide attempts by other means. Moreover, in 1998, firearm suicides outnumbered firearm homicides for the first time since 1988.

Methods of suicides: firearm, suffocation, and poisoning

Among California youth aged 10-24 years, in 1996-98, firearm death was the most prevalent method of suicide, followed by suffocation and poisoning, accounting for 54%, 29.1%, and 7% of all suicide deaths, respectively. As Figure 7 shows, in the years 1996-1998, among California youth aged 10-14 years, death due to suffocation slightly outnumbers firearm death. However, among youth 15 years of age and above, firearms becomes the most common method of suicide.

As Table 4 suggests, a similar pattern can be observed for both female and male youth, with a greater proportion of male youth suicides accounted for by firearm death and a greater proportion of female suicides by poisoning across all youth age groups. Again, these overall trends resemble those of the nation for the age group in consideration. The suicide methods

categorized as 'other' includes fall, fire/burn, motor vehicle traffic, drowning/submersion, cut/pierce, and other specified or unspecified causes.

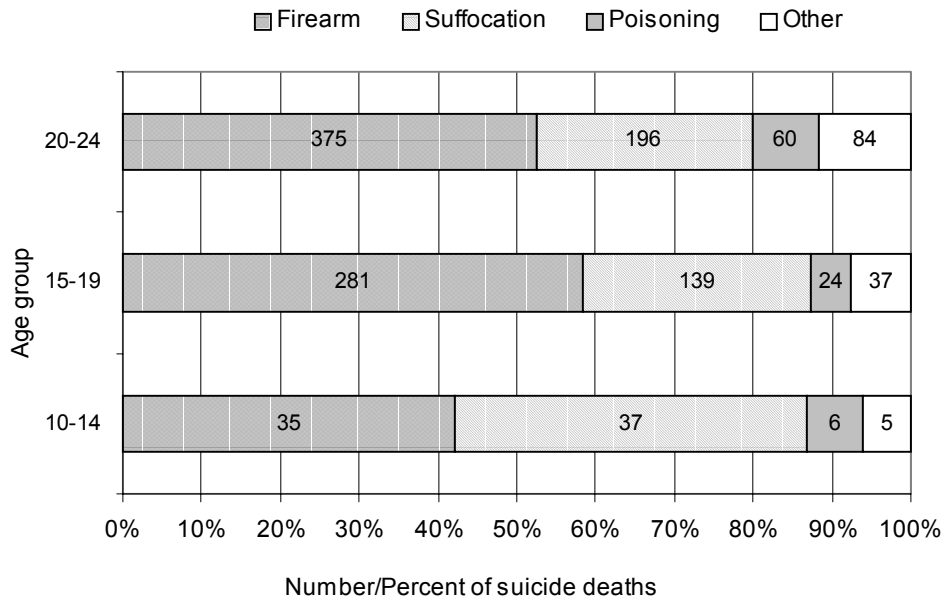

Figure 7. Methods of youth suicide in California, 1996-98.

Data Source: NCHS Vital Statistics System for numbers of deaths, Bureau of Census for population estimates. Statistics compiled by the Office of Statistics and Programming, NCIPC, CDC.

	Female			Male	
Methods	**10-14 years**	**15-19 years**	**20-24 years**	**10-14 years**	**15-19 years**
Firearm	11 (37.9%)	41 (46.6%)	35 (33.7%)	24 (44.4%)	240 (61.1%)
Suffocation	12 (41.4%)	28 (31.8%)	31 (29.8%)	25 (46.3%)	111 (28.2%)
Poisoning	3 (10.3%)	11 (12.5%)	22 (21.2%)	3 (5.6%)	13 (3.3%)
Other	3 (10.2%)	8 (9.0%)	16 (15.5%)	2 (3.8%)	29 (7.4%)

Table 4. Methods of suicide among youth by gender in California, 1996-1998.

Note. Data Source: NCHS Vital Statistics System for numbers of deaths, Bureau of Census for population estimates. Statistics compiled by the Office of Statistics and Programming, NCIPC, CDC.

Geographical Distribution of Youth Suicide

State-level youth suicide rates

In the United States, suicide mortality among adolescents and young adults is highest in the Mountain states of the United States, while it is generally low for Middle Atlantic states. This pattern of the geographical distribution of youth suicide mortality in the United States is similar to that of the population as a whole (See Table C in Appendixes for youth suicide rates and age-adjusted rates). The rate for 1996-98 ranges from the lowest of 4.4 (New Jersey) to the highest of 22.0 (Alaska) per 100, 000 population. The rate for California youth is 6.4 per 100,000 population, seventh lowest among the fifty states and the District of Columbia. Similarly, the age-adjusted suicide rate for the overall population of California (1996-98) was 9.8 per 100,000, the 12th lowest among all other states.

County-level suicide rates of California youth

The youth mortality rate ranged from 0.0 to 15.8 per 100,000 population in the 58 counties in California in 1996-1998 (See Table D in Appendixes for youth suicide rates and age-adjusted suicide rates in California counties). Of the counties with reliable rates (i.e., with 20 or more suicide deaths), the highest youth suicide rate was found in Sonoma (15.8 per 100,000 population) and the lowest in Alameda (4.8 per 100,000 population), a difference in rates by a factor of more than 3 to 1. The overall suicide rate for California youth was 6.4 per 100,000 population.

The number of youth suicide is the largest in the counties with the large cities in Southern California such as Los Angeles, San Diego, and Orange County. With respect to the county population as a whole, the age-adjusted rate for the same period ranged from a low of 5.7

(Imperial) to a high of 23.1 (Sierra) per 100,000 population. Of the counties with reliable age-adjusted rates, Sonoma had the highest age-adjusted rate of 15.1, while Santa Clara had the lowest age-adjusted rate of 7.7 per 100,000 population. Further research on youth risk factors in these counties and socioeconomic variables (e.g., ethnic composition of residents, income levels, unemployment rate, etc.) would be needed to identify possible causes of high and low suicide rates in these counties in California.

Conclusion

Several conclusions and recommendations can be drawn from the presented statistics on youth suicide in California. Overall, California's youth suicide rates parallel those of the nation as a whole. California's youth suicide risk is not as high as for those in late adulthood. However, the statistics show that the suicide mortality rate increases as the age of the youth increases, regardless of the gender and ethnicity of the youth. Indeed, in California, suicide mortality is among the leading causes of death among youth; ranked third for late teens and young adults and fourth for young teens. Among adolescents and young adults, the suicide mortality rate is consistently higher for males than it is for females, regardless of ethnicity. It should be noted that although overall youth suicide mortality in California has been on the decline for the past two decades, the suicide mortality rates in early teens, especially among females, are on a slow but steady increase.

With respect to the ethnicity of youth suicides, the suicide rate is highest among American Indian/Alaska Native youth, followed by Euro-American, African-American, Hispanic, and Asian/Pacific Islander youth. Firearm use is the most lethal of all suicide methods.

It is the most prevalent method among youth suicides, with a greater use found among late teens and young adults.

The evidence suggests a number of areas for further research and interventions to prevent youth suicide in California. First, measures to ensure secure storage of firearm and/or restrict possession of firearms among youth should be enforced in both households and communities. Second, further research is needed to account for gender, ethnic, and cultural differences in the prevalence of youth suicides. Understanding the protective factors as well as risk factors specific to the gender, ethnicity, and cultural background of the youth is essential to develop effective intervention policies. Finally, the intervention effort to prevent youth suicide should target early teens as well as late teens. To protect the diverse population of California youth against the harm of suicide, it is essential to develop programs and policies that address developmental, cultural, and gender issues.

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Appendixes

Table A. Suicide rates and the number of suicides by age groups: California and the U.S., 1998.

	California			United States		
Age Group	Number of suicide deaths	Population	Suicide death rate	Number of suicide deaths	Population	Suicide death rate
05-09 yrs	0	2697783	0.0	7	19920862	0.0
10-14 yrs	30	2296603	1.3	317	19241808	1.6
15-19 yrs	147	2291298	6.4	1737	19539327	8.9
20-24 yrs	246	2228572	11.0	2398	17674134	13.6
25-29 yrs	297	2477485	12.0	2608	18588115	14.0
30-34 yrs	274	2725290	10.1	2757	20186296	13.7
35-39 yrs	375	2864856	13.1	3439	22625784	15.2
40-44 yrs	370	2627246	14.1	3398	21894075	15.5
45-49 yrs	324	2174274	14.9	2881	18859365	15.3
50-54 yrs	269	1755317	15.3	2250	15725519	14.3
55-59 yrs	200	1314599	15.2	1707	12406909	13.8
60-64 yrs	156	1034322	15.1	1256	10269060	12.2
65-69 yrs	135	1006031	13.4	1259	9593497	13.1
70-74 yrs	153	929446	16.5	1338	8801796	15.2
75-79 yrs	146	777655	18.8	1273	7218007	17.6
80-84 yrs	166	489331	33.9	1082	4734180	22.9
85+ yrs	123	412168	29.8	851	4053652	21.0
Total	3411	30102276	11.3	30558	251332386	12.2

Note. Data Source: NCHS Vital Statistics System for numbers of deaths, Bureau of Census for population estimates. Statistics compiled by the Office of Statistics and Programming, NCIPC, CDC.

Table B. Youth suicide rates and the number of suicides by age and ethnicity: California and the United States, 1996-98.

	European-Americans		African-Americans		Asian/Pacific Islanders		Hispanics		Ame Indians Nat
Age Group	CA	US	CA[a]	US	CA[a]	US	CA	US	CA[a]
					Suicide rates				
10-14 yrs	1.5	1.8	1.3	1.2	0.0	1.2	0.8	1	0.0
15-19 yrs	9.4	10.1	5.6	6.9	2.9	5.8	5.7	7.5	15.8
20-24 yrs	13.8	14.9	11.3	12.2	1.6	10.0	8.4	10.6	12.4
All	8.0	8.8	5.9	6.6	1.4	5.6	5	6.4	9.2
					Number of suicides				
10-14 yrs	45	684	7	101	0	26	20	79	0
15-19 yrs	255	3860	29	585	2	123	149	589	7
20-24 yrs	361	5208	54	908	1	213	222	795	5

Note.

Data Source: NCHS Vital Statistics System for numbers of deaths. Bureau of Census for population estimates.

a. Some or all rates in this category are calculated based on fewer than 20 deaths. Such rates do not meet standards of reliability as utilized by the NCHS in calculations. Such rates are provided for completeness here but are to be viewed with caution.

Table C. Suicide rates among 10- to 24-year old youth and age-adjusted suicide rates: the United States and the District of Columbia, 1996-1998.

State	Number of youth suicides	Youth population*	Youth suicide rates	Age-adjusted rate**
Alabama	210	2,774,068	7.6	11.2
Alaska	100	454,829	22.0	21.5
Arizona	382	2,877,760	13.3	15.8
Arkansas	180	1,656,241	10.9	13.0
California	1279	20,037,651	6.4	9.8
Colorado	311	2,479,774	12.5	15.3
Connecticut	109	1,806,928	6.0	7.6
Delaware	29	430,559	6.7	10.2
District of Columbia	21	252,293	8.3	6.8
Florida	640	8,114,158	7.9	12.7
Georgia	375	4,827,478	7.8	10.8
Hawaii	51	734,805	6.9	10.3
Idaho	112	901,777	12.4	15.3
Illinois	450	7,463,086	6.0	7.8
Indiana	342	3,761,183	9.1	11.5
Iowa	172	1,856,471	9.3	11.0
Kansas	190	1,731,714	11.0	11.9
Kentucky	193	2,547,029	7.6	11.5
Louisiana	305	3,082,477	9.9	11.3
Maine	60	762,012	7.9	12.1
Maryland	209	2,955,208	7.1	9.1
Massachusetts	198	3,393,597	5.8	7.5
Michigan	479	6,240,516	7.7	9.7
Minnesota	262	3,055,924	8.6	9.7
Mississippi	175	1,942,936	9.0	11.4
Missouri	333	3,447,032	9.7	12.4
Montana	88	600,163	14.7	18.3
Nebraska	106	1,121,646	9.5	10.9
Nevada	137	981,907	14.0	21.1
New Hampshire	72	695,586	10.4	11.6
New Jersey	202	4,549,678	4.4	6.5
New Mexico	170	1,201,079	14.2	17.3
New York	549	10,522,603	5.2	6.9
North Carolina	389	4,548,361	8.6	11.1
North Dakota	54	443,788	12.2	11.5
Ohio	457	7,062,866	6.5	9.0
Oklahoma	251	2,236,556	11.2	13.6
Oregon	212	2,018,430	10.5	14.8
Pennsylvania	579	7,036,794	8.2	10.8
Rhode Island	40	562,882	7.1	7.8
South Carolina	211	2,432,074	8.7	11.3
South Dakota	83	518,812	16.0	16.1
Tennessee	284	3,313,003	8.6	12.3
Texas	1126	13,233,108	8.5	10.7
Utah	227	1,770,905	8.1	15.4
Vermont	29	362,490	12.8	11.4
Virginia	381	4,110,737	8.0	10.9
Washington	326	3554757	9.3	12.1
West Virginia	112	1,153,522	9.2	12.7
Wisconsin	296	3,403,537	9.7	10.7
Wyoming	49	355,170	8.7	17.1
Total	13597	167,377,960	13.8	10.6

Note.

* Population estimates are aggregated for multi-year reports to produce rates

** Standard population is 1940, all races, both sexes.

Data Source: NCHS Vital Statistics System for numbers of deaths. Bureau of Census for population estimates.

Table D. Suicide rates among 10- to 24-year old youth and age adjusted suicide rates: California counties, 1996-1998.

County Name	Number of youth suicides	Youth population**	Youth suicide rate	Age-adjusted suicide rate***
ALAMEDA	39	814,231	4.8	8.6
ALPINE*	0	641	0.0	19.0
AMADOR*	2	17,739	11.3	12.8
BUTTE*	10	129,008	7.8	15.7
CALAVERAS*	2	18,247	11.0	18.5
COLUSA*	0	11,990	0.0	9.1
CONTRA COSTA	28	493,901	5.7	9.1
DEL NORTE*	0	16,149	0.0	10.7
EL DORADO*	11	79,530	13.8	16.3
FRESNO	50	508,867	9.8	9.9
GLENN*	0	16,346	0.0	14.5
HUMBOLDT*	8	76,483	10.5	17.0
IMPERIAL*	3	103,007	2.9	5.7
INYO*	1	8,547	11.7	15.9
KERN	26	403,645	6.4	10.8
KINGS*	2	79,188	2.5	8.2
LAKE*	0	25,947	0.0	20.4
LASSEN*	1	21,302	4.7	11.6
LOS ANGELES	331	5,903,396	5.6	8.5
MADERA*	4	75,098	5.3	8.0
MARIN*	6	101,345	5.9	10.5
MARIPOSA*	0	7,379	0.0	13.0
MENDOCINO*	7	46,838	15.0	20.4
MERCED*	5	134,258	3.7	8.6
MODOC*	0	5,234	0.0	16.5
MONO*	0	5,354	0.0	11.1
MONTEREY*	19	226,409	8.4	10.9
NAPA*	6	63,834	9.4	10.4
NEVADA*	2	42,255	4.7	11.5
ORANGE	87	1,696,433	5.1	8.1
PLACER*	6	119,826	5.0	12.4
PLUMAS*	1	9,868	10.1	13.4
RIVERSIDE	62	877,815	7.1	11.0
SACRAMENTO	49	668,923	7.3	11.6
SAN BENITO*	0	30,964	0.0	6.2
SAN BERNARDINO	78	1,058,427	7.4	10.1
SAN DIEGO	126	1,733,098	7.3	11.4
SAN FRANCISCO	21	362,781	5.8	11.8
SAN JOAQUIN	22	349,664	6.3	10.0
SAN LUIS OBISPO*	8	151,475	5.3	12.1
SAN MATEO	20	362,091	5.5	9.3
SANTA BARBARA*	13	256,768	5.1	10.7
SANTA CLARA	58	960,719	6.0	7.7
SANTA CRUZ*	14	150,905	9.3	10.2
SHASTA*	12	92,775	12.9	21.1
SIERRA*	0	1,509	0.0	23.1
SISKIYOU*	3	23,933	12.5	21.4
SOLANO	23	226,531	10.2	11.4
SONOMA	37	233,855	15.8	15.1
STANISLAUS*	18	268,493	6.7	10.5
SUTTER*	2	46,666	4.3	14.1
TEHAMA*	1	30,607	3.3	10.8
TRINITY*	0	6,804	0.0	9.0
TULARE*	17	242,930	7.0	7.4
TUOLUMNE*	1	26,718	3.7	10.2
VENTURA	24	453,468	5.3	9.9
YOLO*	11	118,720	9.3	11.5
YUBA*	2	38,717	5.2	16.1
CALIFORNIA	1,279	20,037,651	6.4	9.8

* Rates based on 20 or fewer deaths may be unstable. Use with caution.

** Population estimates are aggregated for multi-year reports to produce rates

*** Standard population is 1940, all races, both sexes.