



HEALTHY KIDS COLORADO SURVEY

Brief Report: Adolescent Suicide Risk and Protective Factors

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Introduction

Suicide represents one of the most common causes of death among adolescents. Colorado has one of the highest suicide rates in the nation among both adults and adolescents.^{1,2} The rate among those ages 10 to 19 years old is 7.75 / 100,000, higher than the national average of 4.33 / 100,000¹ and representing 50 to 60 deaths per year in Colorado.²

The current report presents weighted estimates of risk indicators for suicide, including suicide attempts, planning and thinking about suicide, and feeling sad or hopeless for more than two weeks. Other risk and protective factors associated with these indicators are also presented. Results can be used to inform prevention programming for adolescent suicide.

Background

The data for this report come from the Healthy Kids Colorado Survey (HKCS). The HKCS is a voluntary survey that collects self-reported health information from Colorado middle and high school students, grades 6-12. A unified version of the survey was launched in 2013 that addresses multiple needs for youth health data and provides both state- and region-level results. The unified HKCS was administered in fall 2013 and will be repeated in odd-numbered years, with the next administration in fall 2015.

The HKCS is supported by the Colorado Department of Public Health and Environment, Colorado Department of Education, and Colorado Department of Human Services. The University of Colorado Anschutz Medical Campus implements the HKCS. The survey includes the Centers for Disease Control and Prevention's Youth Risk Behavior Surveillance System (YRBSS) and collects anonymous student information on multiple health topics, as well as student attitudes and perceptions that address prevention and risk and protective behaviors. Topics include weight, nutrition, physical activity, suicide, bullying, mental health, tobacco, alcohol, marijuana, drugs, sexual health (high school only), other health topics and youth engagement in school and their community. The HKCS results represent Colorado's middle and high school populations both statewide and for 21 Health Indicators Regions.

Schools, local public health agencies, community partners, researchers, state agencies, foundations and students use the HKCS results to assess the status of youth health and behaviors. The primary use is to identify health priorities in order to better implement school- and community-based strategies to improve and maintain the health of youth across Colorado.

Methods

Surveys were completed by students from a random sample of selected schools and randomly selected classrooms with those schools. A total of 224 randomly selected schools and more than 40,000 randomly students participated in the 2013 HKCS.

The current report focuses on four risk indicators for suicide and suicide attempts among Colorado high school students: a suicide attempt in the past 12 months, seriously thinking about suicide, making a plan for suicide in the past 12 months, and feeling so sad or hopeless almost every day for two weeks or more in a row that the student stopped doing usual activities. Results are weighted to represent the whole population as well categories of sex, grade, and health statistics region. Significant differences were tested using a Rao-Scott chi-square test and value of $p < .05$.

Demographic Differences in Risk Factors for Suicide

Table 1 illustrates demographic differences on three suicide risk factors: a suicide attempt in the past 12 months, making a suicide plan in the past 12 months, and in the past 12 months feeling so sad or hopeless almost every day for two weeks or more in a row that the student stopped doing some usual activities. Females had higher rates than males on all three indicators. Although males are more likely to die by suicide as compared to females at any age,^{2,3} females are more likely to have suicide attempts resulting in hospitalization and are hospitalized at 50% higher rates than males in Colorado.³

Table 1. Risk factors for suicide by demographic characteristics for high school students, 2013

	attempt % (95% CI)	suicide plan % (95% CI)	feel sad/hopeless % (95% CI)
U.S.⁴	8.0 (7.2-8.9)	13.6 (12.3-15.0)	27.1 (19.5-36.4) ^p
Colorado	6.6 (6.0-7.1)	12.0 (11.3-12.7)	24.3 (23.5-25.2)
Sex			
Male	4.1* (3.5-54.6)	8.9* (8.2-9.6)	16.6* (15.8-17.4)
Female	9.1 (8.4-9.8)	15.2 (14.3-16.1)	32.3 (30.9-33.6)
Race/ethnicity			
White	5.2 (4.8-5.6)	11.1 (10.5-11.8)	21.4 (20.5-22.4)
Hispanic	7.8* (6.8-8.7)	11.9 (10.8-13.0)	28.2* (27.1-29.4)
American Indian/Alaskan Native	14.5* (10.1-18.9)	16.8 (11.9-21.7)	28.3 (22.9-33.8)
Asian	4.7 (3.4-6.1)	11.2 (9.6-12.8)	25.8* (23.5-28.2)
Black/African American	9.3* (7.7-11.0)	13.9 (10.1-17.6)	25.6 (21.9-29.2)
Native Hawaiian/other Asian Pacific Islander	8.0 (1.9-14.2)	17.6 (10.0-25.2)	26.4 (16.2-36.6)
other	12.9* (11.2-14.7)	19.8* (17.0-21.6)	31.0* (29.2-32.7)
Grade			
9 th	7.6 (6.7-8.4)	12.2 (11.2-13.2)	23.9 (22.5-25.3)
10 th	7.3 (6.5-8.1)	12.3 (11.4-13.3)	25.7 (24.3-27.1)
11 th	5.5* (4.8-6.2)	11.9 (10.9-12.9)	25.0 (23.6-26.5)
12 th	5.3* (4.3-6.2)	11.4 (10.0-12.7)	22.1 (22.1-22.8)
Sexual orientation^a			
heterosexual	4.5*(4.2-4.9)	10.0* (9.5-10.6)	21.4* (20.6-22.2)
lesbian, gay, or bisexual	22.1 (19.8-24.4)	32.4 (29.7-35.1)	49.1 (46.2-52.0)

^a “not sure” responses are omitted

^b Indicates the median and range for all states reporting this estimate (not the national YRBS estimate)

* Indicates a significant difference by sex, race/ethnicity (compared to Whites), grade (compared to 9th grade) or sexual orientation

American Indian/Alaskan Native, Black/African American, and multiple races/ethnicities (“other”) had significantly higher suicide risk rates than White students. Compared to 9th graders, 11th and 12th graders were significantly less likely to have attempted suicide in the past year.

Compared to self-identified heterosexual students, students who self-identified as lesbian, gay or bisexual had almost five times the rate of suicide attempts in the past year and more than double the rate of feeling sad or hopeless almost every day for two weeks or more in a row.

Regional Variations

Suicide attempt rates among Colorado high school students varied across Health Indicators Regions, with a roughly two-fold difference between the lowest 20 percent and the highest 20 percent (Figure 1; see appendix for list of counties in each health statistics regions with regional estimates). Similar patterns were seen for rates of seriously considering suicide (Figure 2). The highest rates of both indicators were in Regions 7, 13, and 14. Two other Regions, 15 and 20, were high for one but not both indicators.

Figure 1. Prevalence (% in quintiles) of self-reported suicide attempt in the past 12 months among high school students, by Health Indicators Region, 2013

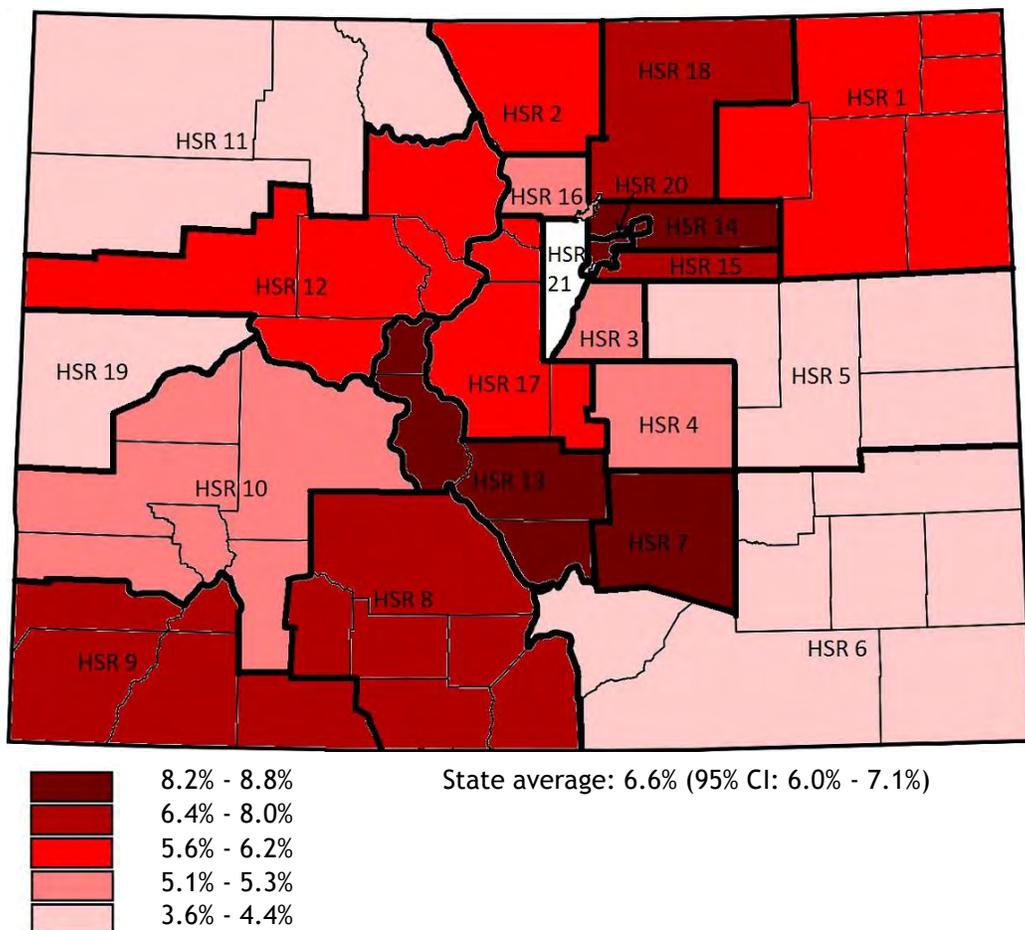
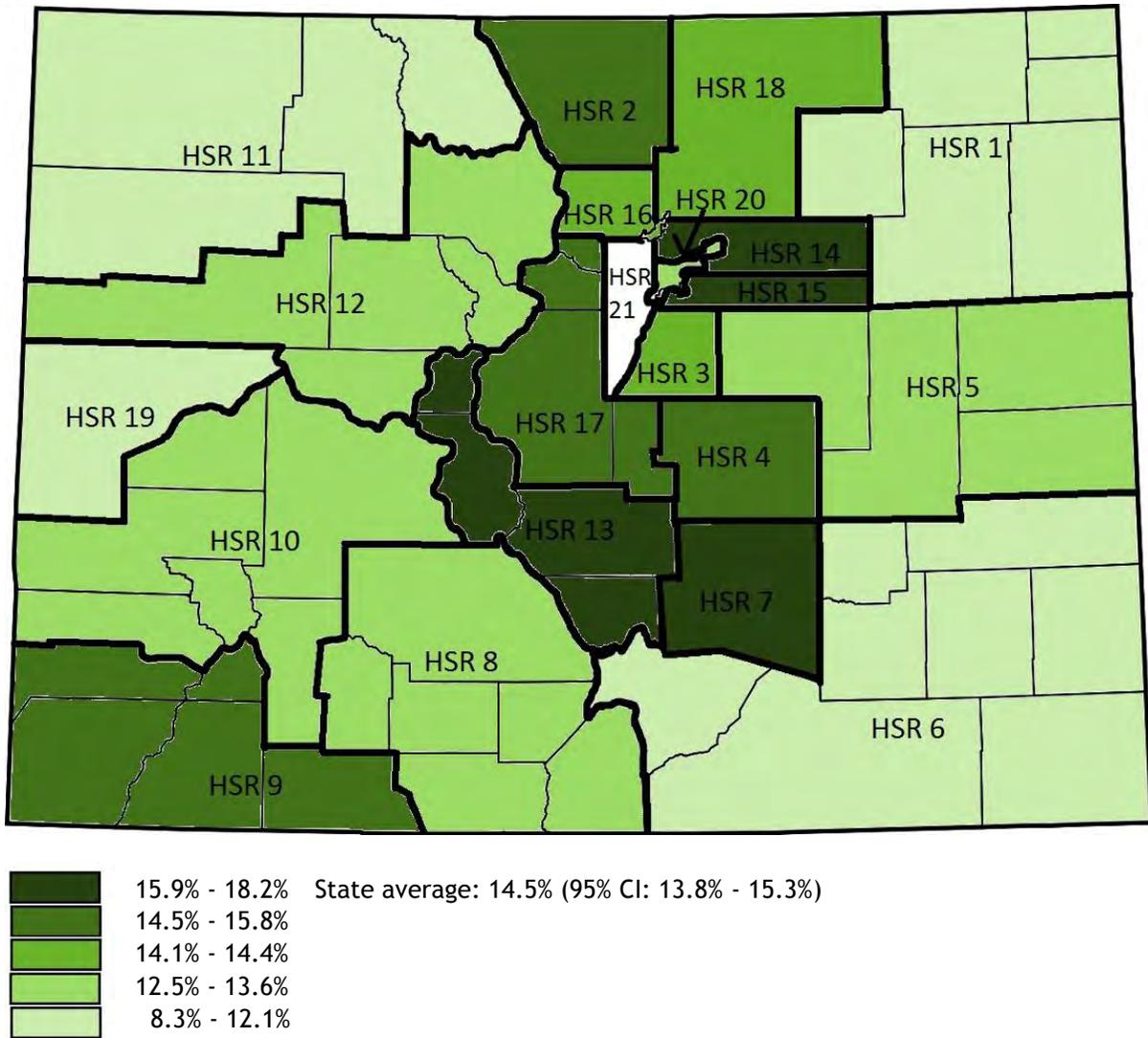


Figure 2. Prevalence (% in quintiles) of seriously considering suicide in the past 12 month among high school students, by Health Indicators Region, 2013



The geographic variation of suicide risk indicators differed from the locations of reported suicide deaths of all ages. During 2008-2012, the highest age-adjusted suicide death rates were recorded in Health Indicators Regions 11, 13, 17 and 19. The difference between a suicide attempt and suicide death is influenced by the lethality of the method of attempt.⁵

Associated Risk Factors

Investigations of suicide deaths for adults and for adolescents have revealed potential precipitating factors or associated risk factors. A common factor is the presence of one or more substances in the body at the time of death. Other circumstances associated with suicide deaths include depressed mood, mental health problems, relationship problems, and substance use problems.³

We examined these and other related risk factors for their association risk indicators for suicide. The associations presented in Table 2 are adjusted for demographic characteristics (sex, race/ethnicity, and grade in school).

Current use of alcohol, tobacco, or marijuana were all significantly associated with each risk indicator for suicide. Table 2 presents the strength of the association between risk behaviors and indicators in the form of odds ratios (ORs). When an odds ratio is greater than 1.0 it indicates that the risk behavior and suicide risk indicator are positively associated; the greater the odds ratio the greater the association. Odds ratios in Table 2 range from 2.0 for the relationship between current (past 30 day) alcohol use and feeling sad or hopeless, to 5.7 for the relationship between current (past 30 day) cigarette use and a past-year suicide attempt. Other associated risk behaviors included aggressive behaviors, bullying victimization, victimization from a dating partner, self-harm, and skipping school. Due to the cross-sectional nature of the data, it is not possible to determine which behavior precedes the other, and the relationship is likely to be bidirectional among many of these risk behaviors and suicidality.

Table 2. Relationship between risk indicators and suicide attempts, planning, and poor mental health, adjusted for demographic characteristics

	attempt OR (95% CI)	suicide plan OR (95% CI)	feel sad OR (95% CI)
Bullied			
Bullied for sexual orientation, past year	7.4 (5.9-9.3)	5.5 (4.6-6.6)	4.5 (3.9-5.3)
Bullied for race/ethnicity, past year	4.5 (3.6-5.5)	3.2 (2.7-3.7)	2.8 (2.5-3.3)
Bullied electronically, past year	6.5 (5.7-7.5)	4.9 (4.3-5.5)	4.7 (4.3-5.2)
Bullied at school, past year	4.8 (4.2-5.5)	4.0 (3.5-4.5)	3.9 (3.5-4.3)
Fighting, Dating Violence, Weapon Carrying			
Physical fight, past year	4.1 (3.3-5.2)	2.8 (2.3-3.3)	2.0 (1.8-2.3)
Physically hurt by date, past year	6.3 (4.9-8.0)	4.7 (4.0-5.6)	3.7 (3.8-4.3)
Carried a weapon, past 30 days	2.5 (2.0-3.1)	2.1 (1.8-2.5)	1.4 (1.2-1.6)
Substance Use			
Cigarette smoking, past month	5.7 (4.6-7.0)	3.8 (3.3-4.5)	2.9 (2.5-3.3)
Marijuana use, past month	3.5 (3.0-4.2)	2.5 (2.2-2.9)	2.1 (1.8-2.4)
Alcohol use, past month	2.9 (2.2-3.7)	2.4 (2.1-2.6)	2.0 (1.8-2.2)
Skipped School			
Skipped school, past 4 weeks	2.5 (1.9-3.3)	2.0 (1.7-2.3)	2.1 (1.8-2.4)
Self-harm			
Purposefully hurt self, past year	24.8 (21.2-30.4)	13.9 (12.0-16.0)	8.6 (7.6-9.8)

OR = odds ratios, adjusted for sex, race/ethnicity, and grade.

All associations are statistically significant, $p < .001$.

Protective Factors

Many protective factors are associated with indicators of suicidality. Table 3 presents a selection of protective factors queried in the HKCS including grades in school, connection to school and teachers, perceived availability of and participation in extracurricular activities, presence of a parent or other adult to help with personal problems, sleep, and physical activity. Nearly all of these factors were associated with significantly lower risk of indicators of suicidality, as indicated by an odds ratio less than 1.0. For example, those students who reported they could ask a parent for help with a personal problem were 24% as likely to have attempted suicide compared to those who said they could not ask a parent for help. As noted with risk factors, due to the cross-sectional nature of the data, it is not possible to determine which behavior precedes the other. Nonetheless, enhancing these factors, such as helping youth develop relationships with caring adults, may help protect youth against suicide risk.

Table 3. Relationship between protective factors and suicide attempts, planning and poor mental health, adjusted for demographic characteristics

	attempt OR (95% CI)	seriously plan OR (95% CI)	feel sad OR (95% CI)
Grades mostly A's and B's past year	0.33 (0.25-0.44)**	0.50 (0.42-0.61)**	0.51 (0.44-0.60)**
School work is often/always meaningful	0.63 (0.52-0.77)**	0.63 (0.54-0.74)**	0.64 (0.57-0.71)**
School work will be important later in life	0.60 (0.46-0.79)**	0.64 (0.54-0.75)**	0.64 (0.57-0.73)**
Teachers care and encourage (agree/strongly agree)	0.41 (0.32-0.51)**	0.44 (0.38-0.51)**	0.43 (0.38-0.48)**
Participation on sports teams	0.71 (0.52-0.96)*	0.71 (0.62-0.81)**	0.58 (0.54-0.63)**
Chances to get involved in sports, clubs, or school activities	0.67 (0.46-1.00)*	0.81 (0.57-1.14)	0.65 (0.58-0.73)**
Could ask parent for help with personal problem	0.24 (0.20-0.29)**	0.26 (0.22-0.30)**	0.29 (0.26-0.33)**
Have someone to go to for help with serious problem	0.27 (0.22-0.33)**	0.30 (0.26-0.34)**	0.35 (0.31-0.40)**
Sleep at least 8 hours on school nights	0.62 (0.49-0.79)**	0.56 (0.47-0.66)**	0.48 (0.42-0.55)**
Physically active for > 60 minutes per day on 7 of the past 7 days	0.73 (0.62-0.85)	0.70 (0.62-0.79)	0.66 (0.61-0.73)

Note: OR's adjusted for sex, race/ethnicity, and grade.

* significant at $p < .05$ **significant at $p < .001$.

Summary

Suicide is one of the major causes of adolescent mortality. Understanding risk factors and indicators of risk is critical for preventing suicide deaths. Substantial numbers of Colorado adolescents reported one or more suicide risk indicators in 2013, and these risks were associated with factors that may increase or reduce the risk. The results have important implications for public health programming.

Funding Acknowledgment

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References

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Appendix

Health Statistic Regions	Suicide attempt in past 12 months (Figure 1)		Seriously considered suicide in past 12 months (Figure 2)	
	Rate	95% CI	Rate	95% CI
1: Yuma, Washington, Morgan, Logan, Sedgwick, Phillips	6.2	1.3-11.2	12.1	8.7-15.6
2: Larimer	5.6	3.0-8.2	15.8	13.6-17.9
3: Douglas	5.3	4.6-5.9	14.1	12.7-15.5
4: El Paso	5.3	3.8-6.8	14.5	10.4-18.5
5: Elbert, Lincoln, Kit Carson, Cheyenne	4.0	3.0-5.0	12.9	11.2-14.5
6: Crowley, Kiowa, Bent, Prowers, Otero, Huerfano, Las Animas, Baca	4.1	2.6-5.6	11.9	8.6-15.1
7: Pueblo	8.8	7.6-10.0	18.2	15.9-20.5
8: Saguache, Mineral, Rio Grande, Alamosa, Conejos, Costilla	7.5	5.1-9.8	13.6	11.0-16.1
9: Dolores, Montezuma, San Juan, La Plata, Archuleta	6.4	5.6-7.2	15.8	14.2-17.5
10: Montrose, San Miguel, Ouray, Hinsdale, Delta, Gunnison	5.1	2.7-7.5	13.6	10.8-16.3
11: Moffat, Rio Blanco, Routt, Jackson	3.6	2.7-4.6	8.3	7.8-8.8
12: Garfield, Eagle, Pitkin, Summit, Grand	5.6	3.8-7.4	12.5	10.4-14.6
13: Lake, Chaffee, Fremont, Custer	8.0	7.6-8.5	16.1	14.3-17.8
14: Adams	8.8	7.8-9.7	16.6	15.9-17.4
15: Arapahoe	8.0	5.9-10.1	15.9	13.6-18.1
16: Boulder, Broomfield	5.3	3.9-6.6	14.0	12.0-15.9
17: Gilpin, Clear Creek, Park, Teller	5.9	4.6-7.2	15.1	13.0-17.2
18: Weld	7.3	4.8-9.9	14.4	11.0-17.8
19: Mesa	4.4	2.3-6.6	10.5	8.5-12.5
20: Denver	8.2	6.1-10.3	13.0	10.3-15.8
21: Jefferson	No data available		No data available	
State estimate	6.6	6.0-7.1	14.5	13.8-15.3

