

Suicide

Definition: Suicide deaths are those resulting from an intentional injury, poisoning, or suffocation in which there is evidence that a self-inflicted act led to the person's death. Suicide deaths from 1980–1998 include all death records with an ICD-9 code including E950-E959. Suicide deaths from 1999–2011 include records with ICD-10 codes of X60-X84 or Y87.0.

Summary

In 2011, 992 Washington State residents died by suicide (the [age-adjusted rate](#) was 14 per 100,000 people). Suicide is the eighth leading cause of death among all Washington residents and the second leading cause among youth ages 15–24. The highest rates of suicide occur among men 75 years old or older, although the largest number of deaths occurs among men 45–64 years old.

Evidence-based suicide prevention strategies that target high-risk individuals include restricting access to lethal means such as firearms or poison, use of cognitive behavioral therapy, and providing immediate and continuing care to those who have attempted suicide following discharge from an emergency department or hospital. Interventions that combine multiple prevention strategies, such as those used by the U.S. Air Force, show promise.

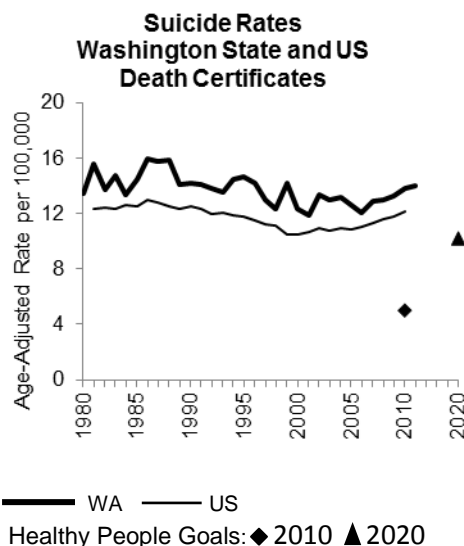
Time Trends

From 1980 to 1987, suicide rates held steady at about 15 per 100,000 Washington residents per year. Rates declined from 1987 through 2006 and have held steady between 12 per 100,000 and 14 per 100,000 people per year since 2006.

During 2009–2011, 50% of suicide deaths were caused by firearms, 21% by suffocation, 20% by poisoning, and 9% from other causes. From 1980 to 1988, firearm suicide rates held steady at about 9 per 100,000 Washington residents per year. Rates declined from 1988 through 2007 and have held steady at about 7 per 100,000 since 2007. Suffocation suicide rates have increased slightly from 2 per 100,000 residents per year in 1980 to 3 per 100,000 per year in 2011.

From 1980 to 1986, poisoning suicide rates increased. Rates declined from 1987 through 1997 and have held steady at about 3 per 100,000 since 1997.

In 2010, the most recent year for which national data are available, the U.S. age-adjusted suicide rate was 12 per 100,000 people, lower than the Washington rate of 14 per 100,000. In 2010, age-adjusted suicide rates in Washington were the same as in the western region (14 per 100,000), which are higher than in other U.S. regions (Northeast – 9 per 100,000; Midwest – 12 per 100,000; and South – 13 per 100,000).¹



2010 and 2020 Goals

The national *Healthy People 2010* goal was to reduce the age-adjusted rate of suicide to 5 per 100,000 people. In 2010 the age-adjusted suicide rate in Washington was 14 per 100,000; we did not meet this goal.

The national *Healthy People 2020* goal is to reduce the age-adjusted rate of suicide to 10 per 100,000. If current trends continue, Washington's age-adjusted suicide rate is unlikely to meet the *Healthy People 2020* goal.

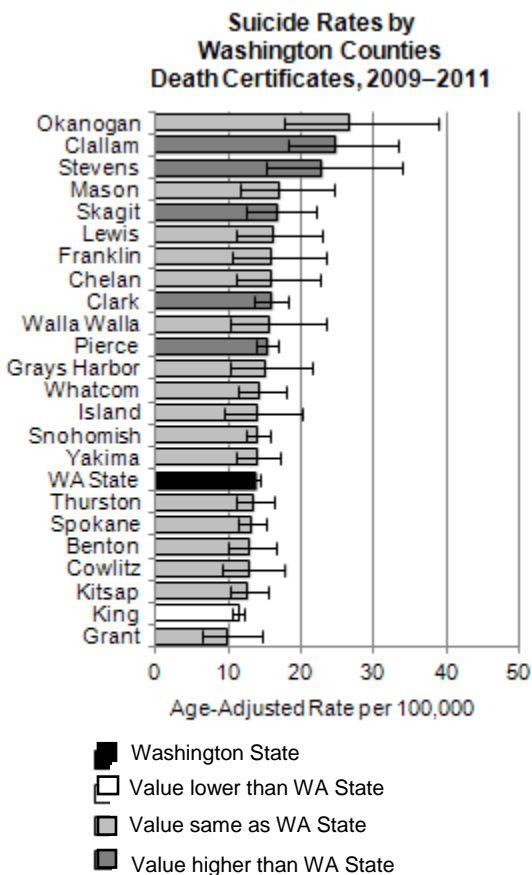
The national 2020 target for youth is to reduce the rate of suicide attempts that require medical attention by adolescents in grades 9–12 from 1.9 per

100 in 2009 to 1.7 per 100. Comparable Washington data are not available.

Geographic Variation

For 2009–2011 combined, Clallam, Stevens, Clark and Pierce counties had age-adjusted suicide death rates higher than the overall state rate. King County was the only county with a suicide death rate lower than the overall state rate.

For 2009–2011 combined, the suicide death rate was higher in isolated rural areas (19 per 100,000) than in urban areas (13 per 100,000) (See [Technical Notes](#)). Community differences in suicide rates might be explained by lack of access to healthcare services, residential instability, unemployment, other factors that limit economic opportunity, or higher levels of mental illness, substance misuse, family dysfunction and violence victimization.²

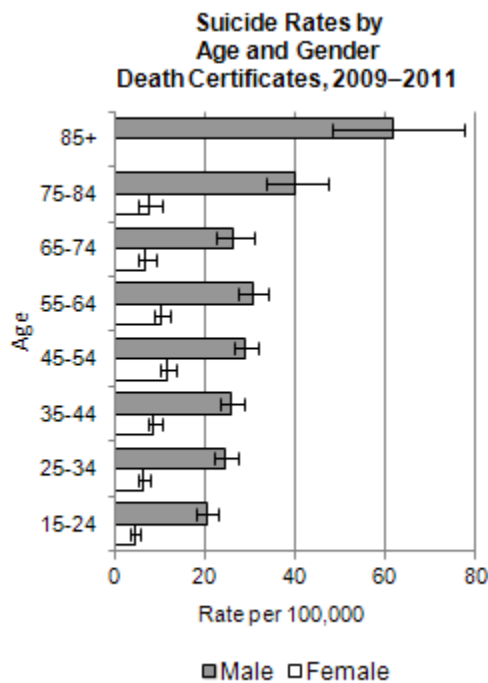


The county chart does not include 16 counties in which [fewer than 20](#) Washington residents died of suicide during 2009–2011. Death rates for

these counties fluctuate widely even when combining three years of data.

Age and Gender

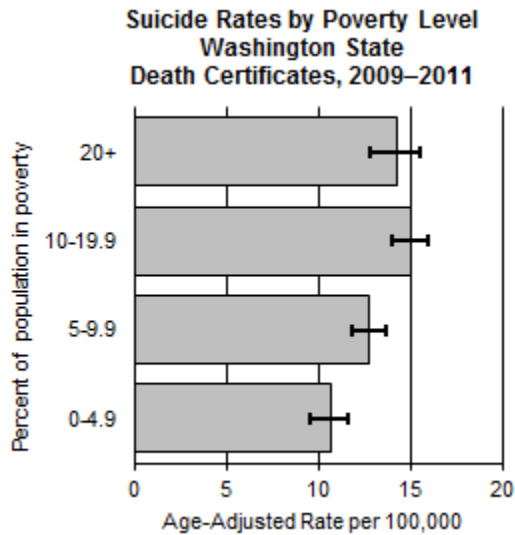
During 2009–2011, males in Washington accounted for 80% of suicide deaths. Men ages 75 and older had the highest suicide rates per population while men ages 45–64 had the highest number of suicides. Washington residents younger than age 15 and women age 85 or older had fewer than 20 deaths over the three-year period. Suicide death rates for these two groups fluctuate widely even when combining three years of data, and so the figure does not include these groups.



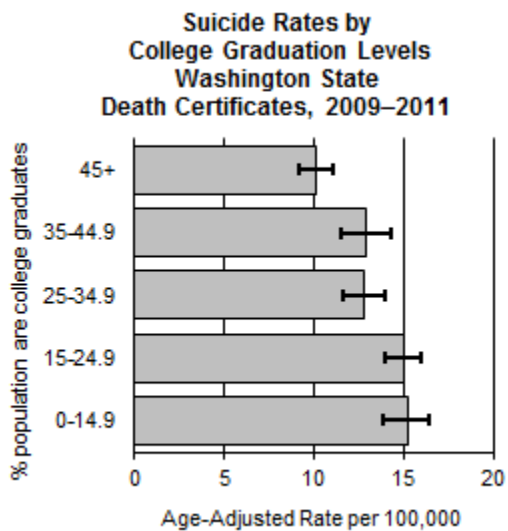
Economic Factors and Education

Poverty and unemployment are linked with higher levels of suicidal thoughts and attempts.^{3,4} One study found that unemployment was a stronger predictor of suicidal thoughts and attempts than either poverty or educational attainment.⁴ In a recent national study, the relationship between suicide and poverty was strongest for those with a mental disorder, suggesting that socioeconomic distresses may have stronger effects for those who are more susceptible to life's stressors.⁵

In Washington, suicide rates in 2009–2011 were higher in census tracts where 10% or more of the population lived in poverty compared to census tracts where less than 10% lived in poverty.

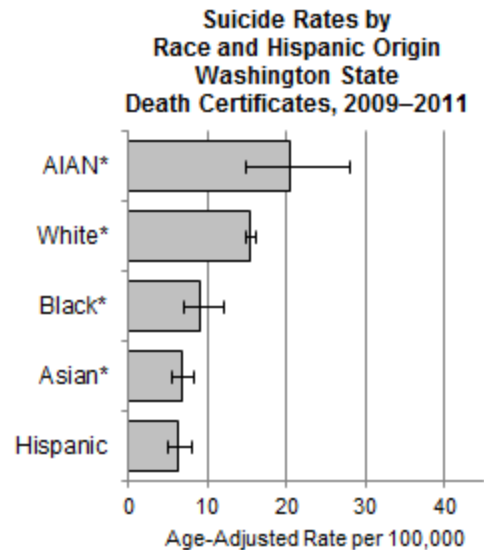


In 2009–2011, age-adjusted suicide rates increased as the percent of census tracts residents with a college education or more decreased. Rates in census tracts where less than 25% of adults ages 25 and older completed college were about 50% higher than rates in tracts with 45% or more of adults completing college. This pattern is consistent with national data showing that suicide rates increase as educational attainment decreases.⁶



Race and Hispanic Origin

In Washington in 2009–2011 combined, age-adjusted suicide rates were highest for American Indians and Alaska Natives and whites. This is similar to patterns seen elsewhere in the United States.⁷ Nationally, the highest suicide rates among American Indians and Alaska Natives are for adolescents and young adults, while rates among whites are highest in older age groups,¹ suggesting that different risk factors might contribute to suicide in these groups.



* Non-Hispanic, single race only
AIAN: American Indian/Alaska Native
Native Hawaiian/Other Pacific Islander not included due to unreliable rates due to small numbers.

Other Measures of Impact and Burden

Nonfatal suicide attempts. The 2008–2009 National Survey on Drug Use and Health estimated that every year 36,000 Washington residents ages 18 or older made a suicide attempt, 68,000 made a suicide plan, and 230,000 had suicidal thoughts.²

In 2011, there were 3,604 [hospitalizations](#) in Washington for nonfatal suicide attempts, a rate of 53 per 100,000 people. Females had a higher rate of hospitalization for suicide attempts (66 per 100,000) than males (40 per 100,000).

The number of patients treated and released for nonfatal suicide attempts in emergency departments (not hospitalized) is much higher than the number hospitalized. Additionally, many people who have made suicide attempts do not seek medical care. Nationally, the 2010 rate for nonfatal suicide attempts treated in hospital emergency departments

was 153 per 100,000 people.⁸ This rate is almost 13 times higher than the national rate for suicide deaths. Although comparable Washington data are not available, patterns in Washington are likely similar.

Physician assisted suicide. From 2009–2011, 213 terminally ill adults died from a lethal ingestion of medication prescribed by their doctors. These deaths are not classified as suicides—they are classified as the chronic condition that led to the assisted suicide.

Youth suicide. In Washington, suicide is the second leading cause of death among youth 15–24 years old and caused 25% of the deaths in this age group in 2011.

In the 2010 [Healthy Youth Survey](#), 18% ($\pm 1\%$) of Washington 10th graders reported they had considered attempting suicide in the past year, 12% ($\pm 1\%$) reported having a plan for their suicide attempt, and 7% ($\pm 1\%$) reported attempting suicide.

Depression is associated with youth suicide. In 2010, about 30% ($\pm 1\%$) of Washington 10th graders reported that at some point in the past year, they had been so sad or hopeless almost every day for two weeks or more in a row that they stopped doing their usual activities. This is similar to the 29% ($\pm 2\%$) of 10th graders in the nation reporting feeling sad or hopeless.⁹ About 39% ($\pm 1\%$) of 10th graders in Washington reported having no adults to turn to when they were depressed, and 38% ($\pm 3\%$) of these youth reported they would be very unlikely to seek help if they were feeling depressed or suicidal.

Emotional and economic costs. Family members and friends of those who have killed themselves experience significant emotional pain. Those who have attempted suicide experience not only emotional but often physical pain.

The estimated economic burden of suicide including deaths and serious attempts in the United States in 2005 was \$41 billion. This figure includes medical expenses of \$2 billion and work-related losses of \$39 billion.¹⁰ It does not include quality of life costs. These figures likely underestimate the true costs because suicide deaths are not always reported as such (see [Technical Notes](#)), and data about suicide attempts are underreported.

Risk and Protective Factors

The U.S. Department of Health and Human Services included a comprehensive list of suicide risk and protective factors in the National Strategy for Suicide Prevention.¹¹

Risks associated with suicide and suicidal behaviors include:

- Previous suicide attempt(s).
- Mental disorders, particularly depression.
- Substance abuse.
- Impulsive or aggressive tendencies.
- Family history of suicide.
- Personal losses (relational, social, work or financial).
- Physical illness or chronic pain.
- High-conflict or violent relationships.
- Few available sources of supportive relationships.
- Barriers to healthcare (e.g. lack of access to providers or medication, concern about how providers will respond to suicidal patients).
- Easy access to lethal means of suicide.
- Media reports of suicide that do not follow the National Suicide Prevention Lifeline guidelines established to prevent “copycat” suicides.

Protective factors for suicide include:

- Easy access to physical and mental health services.
- Restricted access to lethal means of suicide.
- Safe and supportive school and community environments.
- Sources of continued care after psychiatric hospitalization.
- Connectedness to individuals, family, community and social institutions.
- Supportive relationships with healthcare providers.
- Coping and problem-solving skills.
- Reasons for living (e.g. children in the home).
- Moral objections to suicide.

[Intervention Strategies](#)

The *National Strategy for Suicide Prevention* emphasizes that everyone has a role in preventing suicide and creating a healthier nation.¹¹ The

National Strategy is organized into four interconnected strategic directions: healthy and empowered individuals, families and communities; clinical and preventive services; treatment and support services; and surveillance, research and evaluation. Because the strategic directions are interrelated, an activity in a specific strategic direction might overlap with activities in other directions. This organization represents a change from the 2001 *National Strategy*, which focused on three areas: increase awareness, improve interventions, and develop research aimed at reducing suicide.¹²

Evidence of program effectiveness for preventing or reducing suicide is limited. The following types of interventions have shown some success or have been recommended because they address known risk factors for suicide.

Healthy and empowered individuals, families and communities. This strategic direction seeks to create supportive environments that will promote health for all and reduce the risk of suicidal behavior. The *National Strategy* recommends integrating suicide prevention into programs focused on other health-related issues that share the same risk and protective factors. For example, it recommends integrating suicide prevention into programs that seek to prevent or treat mental illness, substance abuse, trauma and violence prevention.

To prevent suicide, the *National Strategy* recommends increasing community awareness that mental and substance abuse disorders can respond to treatment and that recovery is possible. Safe and positive messages addressing mental illness, substance abuse and suicide can help reduce stigma associated with these issues and promote help-seeking behavior.¹¹ Since no single message works for everyone, the *National Strategy* recommends that awareness campaigns be tailored to different audiences. An example is the *Toolkit on Suicide Prevention for Senior Living Communities*.¹³

Clinical and community preventive services. This strategic direction supports clinical services in conducting suicide risk assessment and preventive screening, and connecting those at risk to available sources of care in the community. It also encourages a wide range of community partners to have a role in delivering prevention programs, and notes that

coordination between clinical and community preventive services is needed.

Healthcare providers can play an important role in the early identification and treatment of people who are suicidal. Many of those who die by suicide come into contact with their primary care providers in the weeks before their death, and they are twice as likely to visit a primary care practitioner as a mental health clinician.¹⁴ Educating providers to improve detection and treatment of depression was shown to be effective in reducing suicide if it occurred along with nurse case management and integration between primary care providers and specialists.¹⁵ The *National Strategy* recommends that healthcare providers be aware of community resources for treating substance abuse, depression and other mental illness. To support the education of providers, the 2012 Washington State legislature required mental health professionals to receive suicide assessment, treatment and management training every six years.

An example of an evidence-based suicide prevention program that primary care providers can use is PROSPECT,^{16,17} which provides guidelines for treatment and care management for community-dwelling adults ages 60 and older who have been diagnosed with depression.

The *National Strategy* recommends reducing the availability of lethal means, such as firearms, to reduce suicide as an evidence-based strategy to reduce suicides by those methods.^{18,19}

Identifying and training community members or professionals, "natural helpers" known as gatekeepers, who have contact with people at risk for suicide has been shown to improve knowledge, skills and attitudes about suicide prevention among the gatekeepers.²⁰ Since gatekeeper training often occurs within broader suicide prevention programs, the effect of this training by itself on reducing suicide rates has not been studied.

In the high school setting, two programs that can be used in schools with diverse population have been shown to reduce suicide risk factors and increase protective factors.^{21,22} CARE (Care, Assess, Respond, Empower) targets high-risk youth, assesses their suicide risk, and provides a motivational counseling session and social support intervention. CAST (Coping and Support Training) delivers life-skills training and social support to youth at high risk for suicide.

Treatment and support services. This strategic direction focuses on individuals at high risk for suicide who require mental health treatment

combined with strategies that directly address suicide risk. The *National Strategy* recommends that specific psychotherapy treatments for underlying mental health conditions be combined with strategies that directly address suicide risk, such as crisis safety planning. For those high-risk patients with underlying mental health conditions, dialectical behavior therapy and cognitive behavior therapy for suicide prevention can reduce suicidal behaviors among these patients.²³ For patients who have attempted suicide, immediate and continuing care after discharge from an emergency department or hospital—referred to as continuity of care—are critical to reducing risk of another attempt. For example, proactive follow-up after discharge from emergency departments reduced completed suicides in one multi-country study.²⁴

Certified crisis centers can serve as an effective option for continuity of care. In the U.S., the National Suicide Prevention Lifeline serves as a central switchboard connecting callers to their local crisis centers. One study found that crisis call hotlines were effective in reducing emotional distress among crisis callers and intent to commit suicide among suicidal callers.²⁵ The quality of services provided varies across centers; however, standards for suicide risk assessment might help ensure that all callers receive quality service.²⁶

The *National Strategy* recommends comprehensive, system-wide changes which make suicide prevention a core goal. These changes often require changing the organizational culture around suicide prevention by reinforcing the idea that suicide can be prevented. The U.S. Air Force Suicide Prevention Program combines policy changes, such as having commanders encourage early help-seeking behaviors among their staff, increasing confidentiality for patients seen by mental health providers and setting up trauma stress response teams to help personnel deal with emotions after experiencing traumatic events. It also includes suicide prevention education for all its members. This approach, which was fully implemented in 1997, reduced suicide rates by one-third and sustained the reduction from 1997 to 2008.²⁷

In the United Kingdom, integration of suicide prevention into delivery of mental health services has reduced suicide rates among patients. Providing 24-hour crisis care was associated with the greatest reduction in suicide

rates followed by local policies on patients with dual diagnosis, for example mental health illness and alcohol dependency, and multidisciplinary review after suicide.²⁸

Surveillance, research and evaluation. The *National Strategy* recommends improving national surveillance systems that could provide information for prevention planning. Examples include systems that collect emergency department data or the National Violent Death Reporting System, neither of which are currently available in Washington. The *National Strategy* supports additional research to understand suicidal behavior as well as barriers for seeking and obtaining help and support. Emerging interventions—both suicide prevention programs and clinical treatment—need to be evaluated in diverse populations to assure the interventions are feasible and effective.

Data Sources (For additional detail, see [Appendix B.](#))

Washington State Death Certificate Data: Washington State Department of Health, Vital Registration System Annual Statistical Files, Deaths 1980–2011, released September 2012.

Washington Hospitalization Data: Dataset compiled by the Washington State Department of Health Center for Health Statistics from the Washington Comprehensive Hospitalization Abstract System, Oregon Hospital Discharge data, July 2012.

Washington State population counts: 2000 and 2010 U.S. Census and 2001–2009 intercensal and 2011 post-censal estimates, Washington State Office of Financial Management, Forecasting Division (OFM), released January 25, 2013; 1990 U.S. Census and 1991–1999 OFM intercensal estimates, Vista Partnership and Krupski Consulting, released October 2007; 1980 U.S. Census and 1981–1989 OFM intercensal estimates.

National data: National Center for Injury Prevention and Control, National Centers for Health Statistics. Available on the Web-based Injury Statistics Query and Reporting System website at <http://www.cdc.gov/injury/wisqars/>.

For More Information

Department of Health Injury and Violence Prevention Program, (360) 236-2855.
<http://www.doh.wa.gov/YouandYourFamily/InjuryandViolencePrevention.aspx>

Suicide Prevention Resource Center. <http://www.sprc.org>
U.S. Centers for Disease Control and Prevention Division of Violence Prevention: Suicide Prevention Fact Sheet
<http://www.cdc.gov/ncipc/factsheets/suifacts.htm>

Youth Suicide Prevention Program, <http://www.yspp.org>

Technical Notes

This chapter uses death certificates to estimate suicide deaths. Several studies have estimates that death certificates likely underestimate the 'actual' number of suicides by about 20%.^{29,30,31}

The Rural-Urban Commuting Area (RUCA) system was used to classify urban and isolated rural areas. The RUCA system uses U.S. Census Bureau definitions of urbanized areas and commuting relationships to define areas. Urban areas are those with at least 50,000 people and the primary commuting flow to the core area is more than 30% of commuting trips. Isolated rural areas are those with no town greater than 2,500 people where the primary commuting flow is local. For more information, see the Department of Health "[Guidelines for Using Rural-Urban Classification Systems for Public Health Assessment](#)."

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Endnotes

¹ U.S. Centers for Disease Control and Prevention. *Fatal injury data, 2010*. Web-based Injury Statistics Query and Reporting System. Atlanta, GA: U.S. Centers for Disease Control and Prevention; 2012. http://www.cdc.gov/injury/wisqars/fatal_injury_reports.html. Accessed September 27, 2012.

² Crosby AE, Han B, Ortega LAG, Parks SE, Gfroerer J. Suicidal thoughts and behaviors among adults aged ≥ 18 Years – United States, 2008-2009. *MMWR Morb Mortal Wkly Rep*. 2011;60(13):1-22.

³ Bolton JM, Belik SL, Enns MW, Cox BJ, Sareen J. Exploring the correlates of suicide attempts among individuals with major depressive disorder: findings from the national epidemiologic survey on alcohol and related conditions. *J Clin Psychiatry*. 2008;69:1139-1149.

⁴ Borges G, Angst J, Nock MK, Ruscio AM, Kessler RC. Risk factors for the incidence and persistence of suicide-related outcomes: A 10-year follow-up study using the National Comorbidity Surveys. *J Affect Disord*. 2008;105(1-3):25-33.

⁵ Pan Y-J, Stewart R, Chang C-K. Socioeconomic disadvantage, mental disorders and risk of 12-month suicide ideation and attempt in the National Comorbidity Survey Replication. *Soc Psychiatry Psychiatr Epidemiol*. 2012; epub.

⁶ Borges G, Angst J, Nock MK, Ruscio AM, Walters EE, Kessler RC. Risk factors for twelve-month suicide attempts in the National Comorbidity Survey Replication (NCS-R). *Psychol Med*. 2006;36(12):1747-1757.

⁷ U.S. Centers for Disease Control and Prevention. CDC Health Disparities and Inequalities Report—United States, 2011. *MMWR Morb Mortal Wkly Rep*. 2011;60(suppl).

⁸ U.S. Centers for Disease Control and Prevention, National Centers for Injury Prevention and Control. *Web-based Injury Statistics Query and Reporting System (WISQARS)*. Atlanta, GA: U.S. Centers for Disease Control and Prevention; 2012. www.cdc.gov/ncipc/wisqars. Accessed November 5, 2012.

⁹ U.S. Centers for Disease Control and Prevention. *High School Youth Risk Behavior Survey Data, 1991-2011*. Atlanta, GA: U.S. Centers for Disease Control and Prevention; 2012. <http://apps.nccd.cdc.gov/youthonline>. Accessed November 5, 2012.

¹⁰ U.S. Centers for Disease Control and Prevention. *Cost of Injury Reports; 2005*. Atlanta, GA: U.S. Centers for Disease Control and Prevention; 2012. <http://wisqars.cdc.gov:8080/costT/>.

¹¹ U.S. Department of Health and Human Services, Office of the Surgeon General and National Action Alliance for Suicide Prevention. *National strategy for suicide prevention: Goals and objectives for action*. Washington, DC: U.S. Department of Health and Human Services; 2012. www.samhsa.gov/NSSP. Accessed September 27, 2012.

¹² U.S. Department of Health and Human Services. *National strategy for suicide prevention: Goals and objectives for action*. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service; 2001.

¹³ Substance Abuse and Mental Health Services Administration. *Toolkit on Suicide Prevention for Senior Living Communities*; Rockville, MD: Substance Abuse and Mental Health Services Administration (SAMHSA); 2010. <http://content.govdelivery.com/bulletins/gd/USSAMHSA-6e9b8>. Accessed June 2012.

¹⁴ Luoma JB, Martin CE, Pearson JL. Contact with mental health and primary care providers before suicide: a review of the evidence. *Am J Psychiatry*. 2002;159:909-916.

¹⁵ Gilbody S, Whitty P, Grimshaw J, et al. Educational and organizational interventions to improve the management of depression in primary care: a systematic review. *JAMA*. 2003;289:3145-3151.

¹⁶ Alexopoulos GS, Reynolds CF, Bruce ML, et al. Reducing suicidal ideation and depression in older primary care patients: 24-month outcomes of the PROSPECT study. *Am J Psychiatry*. 2009;166(8):882-890.

¹⁷ Bruce M, Ten Have T, Reynolds CF, et al. Reducing suicidal ideation and depressive symptoms in depressed older primary care patients: A randomized control trial. *JAMA*. 2004;291(9):1081-1091.

¹⁸ van der Feltz-Cornelis CM, Sarchiapone M, Postuvan V, et al. Best practice elements of multilevel suicide prevention strategies: a review of systematic reviews. *Crisis*. 2011;32(6):319-33.

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- ¹⁹ Mann JJ, Apter A, Bertolote J, et al. Suicide prevention strategies: a systematic review. *JAMA*. 2005;294(16):2064-2074.
- ²⁰ Issac M, Elias B, Katz LY, et al. Gatekeeper Training as a Preventative Intervention for Suicide: A Systematic Review. *Can J Psychiatry*. 2009;54(4):260-268.
- ²¹ Eggert LL, Thompson EA, Herting JR, Nicholas LJ. Reducing suicide potential among high-risk youth: Tests of a school-based prevention program. *Suicide Life Threat Behav*. 1995;25:276-296.
- ²² Thompson EA, Eggert LL, Randell BP, Pike KC. Evaluation of indicated suicide risk prevention approaches for potential high school dropouts. *Am J Public Health*. 2001;91(5):742-752.
- ²³ Wasserman D, Rihmer Z, Rujescu D, et al. The European Psychiatric Association (EPA) guidance on suicide treatment and prevention. *Eur Psychiatry*. 2012;27(2):129-141.
- ²⁴ Fleischmann A, Bertolote JM, Wasserman D, et al. Effectiveness of brief intervention and contact for suicide attempters: a randomized controlled trial in five countries. *Bull World Health Organ*. 2008;86:703-709.
- ²⁵ Gould MS, Kalafat J, Manfakh JLH, Kleinman M. An evaluation of crisis hotline outcomes part 2: suicidal callers. *Suicide Life Threat Behav*. 2007;37(3):338-352.
- ²⁶ Joiner T, Kalafat J, Draper J, et al. Establishing standards for the assessment of suicide risk among callers to the national suicide prevention lifeline. *Suicide Life Threat Behav*. 2007;37(3):353-365.
- ²⁷ Knox KL, Pflanz S, Talcott GW, et al. The U.S. Air Force Suicide Prevention Program: Implications for Public Health Policy. *Am J Public Health*. 2010;100:2457-2463.
- ²⁸ While D, Bickley H, Roscoe A, et al. Implementation of mental health service recommendations in England and Wales and suicide rates, 1997-2006: a cross-sectional and before-and-after observational study. *Lancet*. 2012;379(9820):1005-1012.
- ²⁹ Carr JR, Hoge CW, Gardner J, Potter R. Suicide surveillance in the U.S. Military--reporting and classification biases in rate calculations. *Suicide Life Threat Behav*. 2004;34(3):233-241.
- ³⁰ Sampson HH, Ruddy GN. Under-reporting of suicide in South Yorkshire (West): a retrospective study of suicide and open verdicts returned by HM Coroner, 1992-1997. *J Clin Forensic Med*. 1999;6(2):72-76.
- ³¹ Huusko R, Hirvonen J. The problem of determining the manner of death as suicide or accident in borderline cases. *Z Rechtsmed*. 1988;100(2-3):207-213.