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## Suicide Crisis

July 12, 2019 – Volume 29, Issue 2

### Can the rising rate be stemmed?

By Christina L. Lyons



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#### Introduction

More than 47,000 Americans died by suicide in 2017, twice as many as by homicide, according to the latest federal count, and another 1.4 million attempted to take their lives. The nation's suicide rate has been rising since 2000 among nearly every age group, particularly adolescents, young adults and middle-aged men. Researchers cite a variety of theories for the increase, including undiagnosed or untreated mental health problems, fallout from the opioid crisis, economic pressures, easy access to guns and increased use of social media by the young. New drug and psychological therapies offer some hope of effective treatment for those at risk of suicide, but experts say health care providers, suicide counselors, family members and others need better ways to spot signs of suicide risk. Some researchers are looking to artificial intelligence and machine learning as potential tools. Meanwhile, a new treatment based on the old party drug ketamine is being tested as a rapid-acting treatment for severe depression.



Renee Conlogue Foreman, of Gray, Maine, holds a preschool graduation photo of her son, Royce, who died by suicide in April while at college. The nation's suicide rate has been rising since 2000 and is now the highest since the 1940s. (Getty Images/Portland Press Herald/Derek Davis)

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## Overview

Seventeen-year-old Nick Bales had many friends, played sports and was making straight A's in his senior year at Arapahoe High School in Centennial, Colo. "He seemed to have it all," said his mother. Then on Sept. 29 he killed himself. <sup>1</sup>

Bales had struggled with depression and anxiety since the sixth grade and had tried various therapies and medications. Outwardly, he showed improvement, and his parents thought he was doing better. But his distress continued. <sup>2</sup>

Three days after Bales took his life, one of his classmates also died by suicide. School administrators canceled classes for the day as the town grieved, and mental health workers rushed to help other students.



Nick Bales, a popular and successful high school senior from Centennial, Colo., who had struggled with depression and anxiety since the sixth grade, took his life last September. Within days, a fellow student killed himself, an example of what researchers call a copycat suicide. Mental health experts and researchers are working to create reliable ways to identify individuals at high risk of suicide. (Courtesy Bales Family)

"It's just heartbreaking," said 18-year-old Joe Roberts, a senior at nearby Heritage High School. <sup>3</sup>

Communities, mental health experts, researchers and lawmakers are scrambling to understand why the U.S. suicide rate has been soaring. In 2017 it reached its highest level since the 1940s — 14 per 100,000 population — according to the latest federal data. After falling to a record low in 2000, the rate has been rising across nearly every state, gender, race and age. <sup>4</sup> The increase has occurred even as the global suicide rate has fallen 38 percent from its peak in 1994 and despite increased research into causes and treatments, expanded prevention efforts and repeated calls for action. <sup>5</sup>

Researchers cite many theories for the rising suicide rate, from mental health problems to the opioid crisis, economic pressures, easy access to guns and increased use of social media by the young. Experts agree that early detection of dangerous psychological distress is key to reducing suicides, but how to do that is difficult.

"This increasing [suicide] rate is really exasperating," says David Jobes, a psychology professor and the director of the Suicide Prevention Laboratory at the Catholic University of America in Washington, D.C. "Those of us in the field who were encouraged in the 1990s are really discouraged now, because we thought we were making headway."

Programs

► Jul. 09, 1948 Mental Health

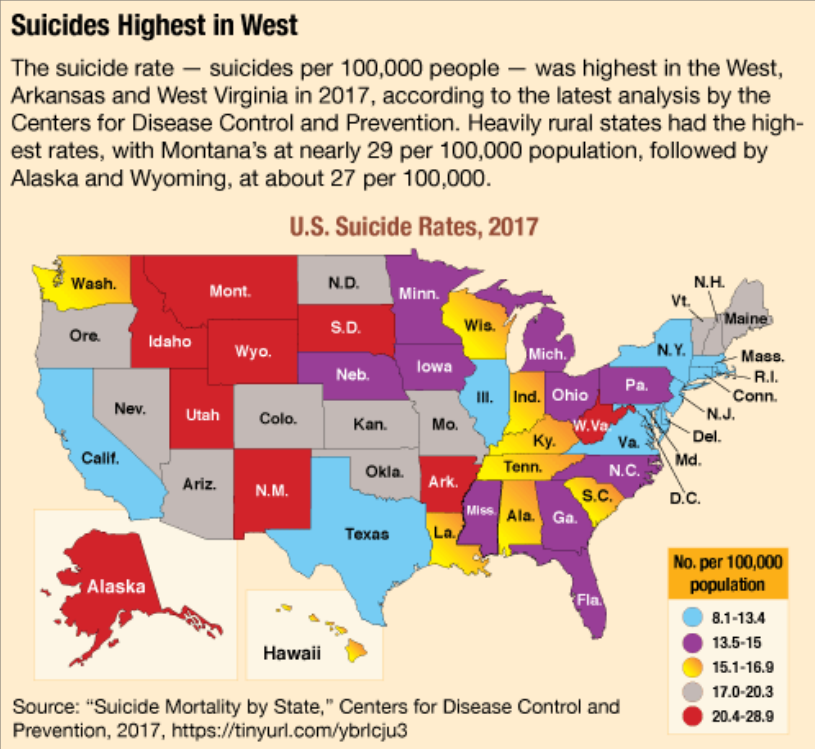
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#### Long Description

The 2017 suicide rate was 33 percent greater than the rate in 1999 and ranked as the 10th leading cause of death. More than 47,000 Americans ages 10 or older died by suicide in 2017, more than twice as many as by homicide. Another 1.4 million attempted suicide, and about 10 million Americans each year report having suicidal thoughts.<sup>6</sup>

The 10 states with the highest suicide rates in 2017 were largely in the rural West, but the rates have risen in nearly every state over the past 20 years.<sup>7</sup> Baby Boomers — people born between 1946 and 1964 — have had the highest rate of any age group since at least the 1990s, but experts also have been alarmed by rising suicide rates among adolescents and young adults. Suicides among those ages 15 to 24 reached the highest level in 2017 — 14.6 per 100,000 — since the government began collecting data on youth suicide in 1960.<sup>8</sup>

"I don't think it is an exaggeration ... to say that we have a mental health crisis among adolescents in the U.S.," said San Diego State University psychologist Jean Twenge, who studies generational differences in emotional health.<sup>9</sup>

Middle-aged white men accounted for more than 70 percent of suicides in 2017, and accidental deaths — which many researchers say may include suicides — as well as opioid-related suicides have doubled in the past 17 years.<sup>10</sup>

And certain occupations — such as construction, law enforcement, food preparation, arts and media — report high rates of suicide compared with other jobs. Suicide rates among military veterans are about 150 percent higher than among civilians.<sup>11</sup>

"It's startling and of tremendous concern that the rates are going up really to such a high rate across the board," said Dr. Robert Dicker, associate director of child and adolescent psychiatry at Zucker Hillside Hospital in New York City.<sup>12</sup>

Suicides cost the U.S. economy an estimated \$93.5 billion a year, primarily due to lost productivity, according to the most recent data available.<sup>13</sup>

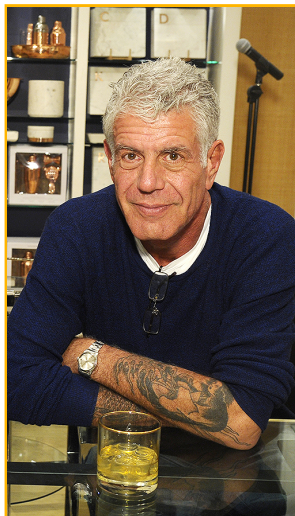
Experts say more federal spending is needed to better pinpoint risk factors for suicide. "There are very few facts in suicide research," says Stacey Freedenthal, an associate professor at the University of Denver Graduate School of Social Work who specializes in suicide prevention. "There's more hypotheses and theories and correlations."

"We must mobilize a nationwide public health effort," said Colleen Creighton, executive director of the American Association of Suicidology, an advocacy group in Washington focused on suicide prevention research and training. She called for a "billion-dollar war on suicide."<sup>14</sup>

Funding for suicide research through the National Institutes of Health rose from \$46 million in fiscal 2015 to \$96 million in fiscal 2018. It was budgeted at about \$117 million in fiscal 2019, but some

suicide experts say that is not enough. <sup>15</sup>

“Any other disease that comes close to killing as many Americans as suicide does, like HIV and heart disease, gets marquee recognition as a public health menace and major federal research funding,” said Dr. Richard A. Friedman, a professor of clinical psychiatry at Weill Cornell Medical College in New York City. <sup>16</sup>



Celebrity chef and travel documentarian Anthony Bourdain took his life in June 2018. Hours after his death, calls to some national crisis centers spiked by as much as 500 percent. (Getty Images/Owen Hoffmann/Patrick McMullan)

Researchers say mental health conditions — such as schizophrenia, bipolar disorder, manic behavior, substance abuse, poor impulse control or anger management problems — can be a factor in suicide. But more than 54 percent of those who died by suicide in 2015 had not been previously diagnosed with a mental disorder, according to the Centers for Disease Control and Prevention (CDC). Many researchers point to studies from as early as the 1950s that indicated at least 90 percent of suicide victims have a mental disorder. <sup>17</sup>

Depression was a factor in about half of suicide attempts, according to the CDC. However, only 2 percent to 4 percent of those diagnosed with depression will die by suicide, according to the National Institute of Mental Health (NIMH) in Bethesda, Md. <sup>18</sup>

“People tend to think of suicide as the purview of severely depressed people, [but] that’s not the case,” says Amy Barnhorst, vice chair for community mental health in the psychiatry department at the University of California, Davis. “Severe depression is one pathway, but it’s not the only one.” Emotional challenges, such as losing a job or a significant relationship, also can be a factor, she says.

Glenn R. Sullivan, an associate professor of psychology at the Virginia Military Institute in Lexington, Va., says social isolation is another risk factor. “There’s a lot of lonely people out there,” he says. “If you are having suicidal thoughts and there’s no one there to intervene, you can ... soon have a suicidal crisis.”

More than half of all suicides involve the use of a firearm, leading some psychologists, gun control advocates and suicide prevention groups to urge limiting access to firearms. “If you truly want to continue to reduce gun deaths in this country, you have to talk about ... the tools for preventing gun suicide,” said John Feinblatt, president of Everytown for Gun Safety, a gun control advocacy group in New York City. <sup>19</sup>

Fifteen states and the District of Columbia have passed “red flag” laws, which allow law enforcement officers, families or (in D.C.) mental health practitioners to petition a court to confiscate the guns of individuals deemed at risk of harming themselves or others. <sup>20</sup>

Other researchers and health care providers warn that anxiety and depression have increased as exposure to social media and smartphones has grown among young children and teens. But they disagree on whether increased screen time leads to suicidal thoughts.

Since the late 1980s, drug companies have produced antidepressants, mood stabilizers and antipsychotic drugs, in part to treat suicidal thoughts and behaviors. The number of Americans taking such medications for five years or more tripled between 2000 and 2017 — to 15.5 million. <sup>21</sup>

## Suicide Rate on the Rise

The suicide rate — the number of suicide deaths per 100,000 people — has been rising in the United States since 2000, when it fell to a historic low of 10.4. The rate reached 14.5 per 100,000 in 2017, the highest since the early 1940s. Suicides peaked during the Great Depression, at 21.9 per 100,000 people in 1932.



\* Data through 2007 is age-adjusted to make comparisons fairer between groups with different age distributions, such as population clusters with higher percentages of elderly people versus those with younger populations.

Source: National Center for Health Statistics, Centers for Disease Control and Prevention

### Long Description

The drugs reduce depression and anxiety in some patients, but many people have difficulty stopping them without symptoms returning. For other patients, the drugs do not work. A new nasal-spray version of the anesthetic ketamine, a popular party drug in the 1990s, shows promise for patients who have not responded to antidepressants, but several mental health experts say they doubt it can reverse the rising suicide rate. (See [Short Feature](#).)

“We’d like to believe there’s a magic pill and everything will be fine. But it just isn’t true,” says Dr. Julie Zito, a professor of pharmacy and psychiatry at the University of Maryland.

New research suggests that certain psychological therapies that focus on changing patients’ thinking patterns and behavior — such as the Collaborative Assessment and Management of Suicidality (CAMS) or dialectical behavior therapy (DBT) — can treat patients with suicidal thoughts or behaviors. But few psychologists are trained in those therapies, and insurance companies rarely cover them. <sup>22</sup>

Others, especially those who distrust or cannot afford drugs or psychotherapy, are seeking help and advice from groups and websites organized by people who have survived suicide attempts. (See [Short Feature](#).)

Health care providers and researchers say early identification of those at risk and early treatment are the keys to lowering suicide rates. To that end, experts in artificial intelligence and machine analytics are raising hopes that computerized tools that sift through massive amounts of health data could help identify potentially suicidal patients. The Department of Veterans Affairs (VA) is using such a tool to address rising suicide rates among veterans.

As the federal government, communities, researchers and health care providers seek ways to reverse the rising U.S. suicide rate, these are some questions being debated:

### Could tougher gun control laws reduce the suicide rate?

About two-thirds of the nearly 40,000 gun-related deaths in 2017 were suicides, with white men accounting for the highest percentage of such suicides. <sup>23</sup> And firearms account for more than half of all suicide deaths, even though they are used in less than 6 percent of suicide attempts. That is because firearms are the deadliest method of suicide: 82.5 percent of attempts using a firearm are fatal. <sup>24</sup>

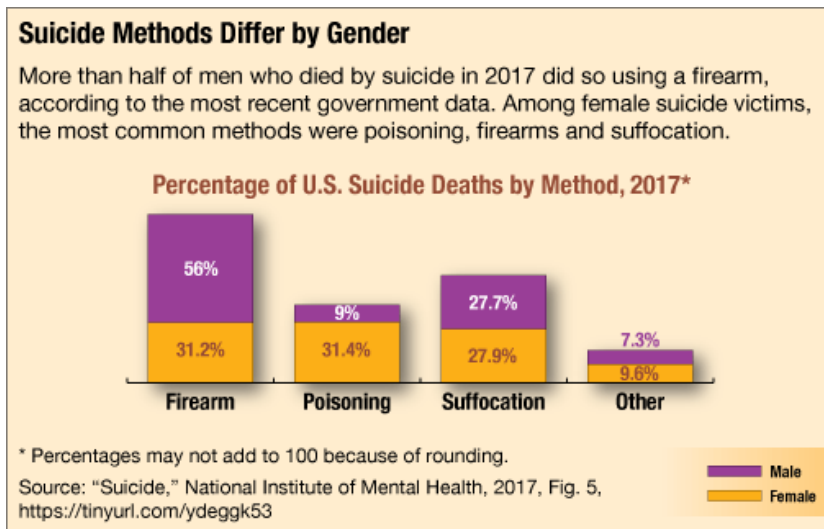
However, experts disagree on whether easy access to guns is to blame for America’s rising suicide rate. “Guns represent an opportunity we as a nation can leverage in a concerted effort to substantially lower the national suicide rate,” Michael D. Anestis, a University of Southern Mississippi associate professor of psychology, wrote in *Guns and Suicide: An American Epidemic*. <sup>25</sup>

But Sullivan, at the Virginia Military Institute, says guns are not the only problem. “There can’t possibly be a single explanation for a phenomenon so widespread and complex as suicide,” he says.

Researchers at the RAND Corp., a Santa Monica, Calif.-based think tank, said it seems logical that because guns are the most lethal form of suicide, “when guns are less available, fewer suicide attempts will result in fatality.” But studies have not clearly proved that, according to the RAND researchers. <sup>26</sup>

Some researchers point out that suicide rates have fallen in countries that have restricted access to certain poisons or drugs typically used in suicides. For example, deaths in England and Wales

attributed to overdoses of paracetamol (the British equivalent of Tylenol) fell 43 percent in 11 years after a 1998 law restricted packaging size.<sup>27</sup> And suicide rates in Sri Lanka decreased significantly after the government restricted the importation and sales of toxic pesticides commonly used in self-poisonings.<sup>28</sup>



#### Long Description

"It appears if you take away the [methods that suicidal individuals] were focused on, they can get off that trajectory, and you can save a life," says Jane L. Pearson, special adviser to the director of suicide research at NIMH. Pearson says researchers have found that many suicide attempts are impulsive acts, and people whose attempts fail do not usually try again. For every suicide death, about 25 attempts fail, according to the CDC.

"If the method you use doesn't kill you, it doesn't mean you will just go out" and find another method, says Paul S. Nestadt, an assistant professor of psychiatry and behavioral sciences at Johns Hopkins University in Baltimore. He cited a University of California, Berkeley, study showing that only about 6 percent of people stopped from jumping off the Golden Gate Bridge in San Francisco between 1937 and 1971 ever tried to attempt suicide again.<sup>29</sup>

Researchers also disagree on which type of gun control laws would help reduce suicides. Some experts believe background checks for gun purchasers would work if they look for previous mental health issues. But a 2018 Harvard University study found that 87 percent of suicide victims could have passed a background check on the day of their death.<sup>30</sup>

Nestadt says certain gun control actions have coincided with falling suicide rates. For instance, he says, in the decade after the District of Columbia barred the purchase or sale of handguns by civilians in 1976, suicides by firearms dropped 23 percent.<sup>31</sup>

A study led by Anestis on the correlation between passage of state gun control laws and changes in suicide rates found that legislation focused on "preventing gun ownership rather than regulating use and storage" of existing guns, did the most to lower suicide rates.<sup>32</sup>

Among proposed gun control measures, red flag laws appear to have the greatest public support, but studies of their effectiveness in reducing suicides have produced mixed results. A University of Indianapolis study said firearms-related suicides fell 7.5 percent in Indiana in the decade after the Legislature passed a red flag law in 2005.<sup>33</sup>

And a study led by Duke University psychiatry professor Dr. Jeffrey Swanson on whether Connecticut's 1999 red flag law helped police avert suicides found that such gun removal laws could be "at least modestly effective in preventing suicide." Between 1999 and 2013, the researchers said, 61 percent of the 762 people whose guns were confiscated for a year were considered a suicide risk. Of those, 21 later did kill themselves, six with a gun.<sup>34</sup>

But David B. Kopel, research director of the Independent Institute in Denver, Colo., a gun-rights advocacy center, pointed out to the U.S. Senate Judiciary Committee in March that the Connecticut law did not prevent all suicides. Of those who died by suicide after their guns were confiscated, he said, 10 were completed by hanging or strangulation. The theory that depriving suicidal people of firearms will make it less likely that they will die by suicide is incorrect, he said. "Several other methods of suicide — namely hanging, carbon monoxide exhaust or drowning — are nearly as likely as firearms to result in death."<sup>35</sup>

John R. Lott Jr., a gun-rights advocate and the founder of the Crime Prevention Research Center in Swarthmore, Pa., and Carlisle E. Moody, a professor of criminology and economics at the College of

William & Mary in Williamsburg, Va., conducted their own research and concluded that red flag laws in California, Connecticut, Indiana and Washington state had “no significant effect” on suicide. <sup>36</sup>

Dr. Paul S. Appelbaum, a professor of psychiatry and law at Columbia University, says the laws represent “an innovative approach” to identifying people at risk of violence.

However, he says, “Overall, I think the contribution they will make to reducing the suicide rate as a whole will be relatively small because most people who are suicidal will probably not do anything that calls attention to themselves in such a way that police are summoned to intervene.”

### Does social media increase the risk for suicide?

San Diego State University's Twenge, author of *iGen*, a book about the first generation of Americans to spend their teen years using social media, believes the increasing use of social media is creating mental health problems for adolescents.

Twenge led a study analyzing data from two surveys on U.S. adolescents and youth behavior, along with CDC data on suicide deaths since 1999. The data showed that between 2010 and 2015, the number of adolescents reporting severe depression rose 33 percent, and the number of suicides increased 31 percent. Girls — particularly those who spent more time online than their peers — were most likely to report depressive or suicidal symptoms. The researchers concluded that the increased time that adolescents spent on screen activities may account for increases in depression and suicide. <sup>37</sup>

In another study, Twenge and several colleagues reported that 13.2 percent of 18- to 25-year-olds reported serious psychological distress in 2017, up 71 percent from 2008. Meanwhile, major depressive episodes among 12- to 17-year-olds in 2017 were up 52 percent from 2005. And one of every five teenage girls had experienced major depression in the previous year.

Twenge's team attributed such distress to less in-person social interaction among adolescents than among youths in prior generations, largely due to the growing prevalence of time spent on smartphones and social media. <sup>38</sup>

But other researchers question Twenge's conclusion that screen time directly leads to — or is the primary cause of — depression or suicide.

Oxford University psychology researchers Amy Orben and Andrew K. Przybylski believe the correlation between digital technology use and adolescents' mental health is overstated. Studies like Twenge's are based on analyses of large data sets that can be subject to researchers' bias, they said. Analyzing the same data sets Twenge used for *iGen*, the researchers concluded that screen use had a “tiny” effect on teens' mental health when compared with a range of other potential correlating factors. <sup>39</sup>

“Using technology is about as associated with well-being as eating potatoes,” Przybylski said. Bullying had a four times greater effect on mental health, said Orben and Przybylski. <sup>40</sup>

In May, the two researchers evaluated whether the amount of time adolescents spend on social media affects their mood. Again, they found that screen time had a “tiny — arguably trivial” — effect on mood. <sup>41</sup>

“It's not time spent that is associated with positive or negative outcomes, but how people use social media,” says Christopher Ferguson, a psychology professor at Stetson University in Florida. In a 2017 study, Ferguson found that moderate use of screens did not increase behavioral or mental health problems among children, and excessive screen time only marginally correlated with such problems. In another study, he and two other researchers concluded that time spent online did not result in depression or suicidal thoughts among young adults. <sup>42</sup>

Mike Brooks, director of the Austin Psychology and Assessment Center in Austin, Texas, and author of *Tech Generation: Raising Balanced Kids in a Hyper-Connected World*, says, “My pet theory is that when we see association between screen use and negative health outcomes, it may be that it's because they are up until 1 a.m., and their sleep is taking a hit, and then their mood.”

A study led by a University of Colorado, Boulder, integrative physiology professor found a link between digital media use and reduced sleep, and a study led by a Stanford psychiatry professor found that sleep problems could provide early clues to suicidal thoughts in certain young adults. <sup>43</sup>

Brooks and Ferguson agree, however, with Twenge's theory that digital media use can lead to social isolation if it replaces in-person interaction. “There's a good reason to be concerned, but alarmism is problematic,” Brooks says.

Sara Konrath, an associate professor of philanthropic studies at Indiana University, says smartphones and social media can reduce loneliness among young people because they feel surrounded by others. A 2015 study by two German researchers found that browsing Facebook triggers positive emotions more often than negative ones. <sup>44</sup>

However, a study led by University of Michigan psychology professor Ethan Kross found that the more time people spent on Facebook, the worse they felt psychologically. And a British study found that, among social media sites, Instagram and



Ian Russell's daughter, Molly, took her life at age 14 after viewing disturbing material on Instagram. In June, Russell spoke at a conference in London to urge social media companies to better control online material that promotes suicide and other forms of self harm. (Getty Images/Helen Williams)

Snapchat were the most detrimental to the mental health of young people (ages 14 to 24), based on their responses to questions about anxiety, depression, loneliness, sleep, body image and cyberbullying. <sup>45</sup>

Many observers raise alarms about the availability online of information about how to take one's life. Ian Russell, whose 14-year-old daughter, Molly, killed herself in 2017, holds Instagram partly responsible. After her suicide, the family found material in her Instagram account about depression and suicidal methods. Instagram said it "does not allow content that promotes or glorifies self-harm or suicide" and has said it would remove such content. <sup>46</sup>

Many worry that cyberbullying can lead to suicidal thoughts, particularly among girls. The suicide rate among girls ages 10 to 14 grew 12.7 percent between 2007 and 2016, compared with 7.1 percent among boys in the same age group, according to one study. <sup>47</sup>

"Girls are more often ... cyberbullied [than boys] on social media," said Joan Luby, a psychiatrist at Washington University School of Medicine in St. Louis, and "they tend to have much more negative psychological effects to that cyberbullying." <sup>48</sup>

But Daniel J. Reidenberg, executive director of Suicide Awareness Voices of Education, a nonprofit suicide prevention and public education group in Bloomington, Minn., says people share their suicidal thoughts online far more frequently now than in the past, and in such cases, friends often can provide help. <sup>49</sup>

In January, after Chicago rapper CupcakKe tweeted that she was suicidal, her followers immediately messaged her and alerted authorities, who took her to the hospital where she began treatment for depression. <sup>50</sup>

### Can "big data" help reduce suicide rates?

The Department of Veterans Affairs is using a computer algorithm that sifts through voluminous health data to detect common warning signs and flag veterans who are at risk of suicide. VA health care providers then reach out directly to those individuals, and the veterans decide whether to seek help.

"[V]eterans at highest risk of suicide are also at very high risk of some other things," such as accidents, overdoses and opioid addiction, said Aaron Eagan, the department's deputy director for innovation. <sup>51</sup>

Within a year of implementing the so-called REACH Vet program in April 2017, the VA had contacted more than 30,000 veterans. Those participating in the program were admitted to mental health inpatient units less often, showed up more often for doctor appointments and visited the VA more frequently than other vets, the department reported. <sup>52</sup>

Many researchers, health care providers and others believe similar data analytics can help alert nonmilitary doctors about at-risk patients. Health care providers typically assess suicide risk by asking patients such questions as whether they are depressed, have considered harming themselves or have a suicide plan. However, one-third of suicide attempts and deaths occur among patients who have not reported suicidal thoughts. <sup>53</sup>





At a May 2016 event in Washington, D.C., aimed at preventing veteran suicide, veterans, their families and survivors of veterans who have died by suicide reach out to one another and to touch the Spartan sword, made from melted-down steel from the World Trade Center. (Getty Images/The Washington Post/Michael S. Williamson)

Researchers believe that health professionals could prevent a suicide if they knew more about a patient's risk. A 2014 study found that 83 percent of those who killed themselves had visited a doctor's office within the previous year, but about half of them did not have a mental health diagnosis.<sup>54</sup>

Data analytics could help track streams of information and alert doctors when a patient may need a thorough assessment, says Gregory E. Simon, a senior investigator for Kaiser Permanente Washington Health Research Institute in Seattle and a psychiatrist at Kaiser. He equates it to a warning light on a car's sideview mirror that illuminates when another car pulls into the driver's blind spot. "The purpose is to deliver information to our health care providers that people are at risk, then let [the providers] do what they do better."

Facebook also uses artificial intelligence to scan postings for live videos of suicide or phrases or words that suggest suicidal thoughts. Within a year of starting the program in 2017, Facebook had found 3,500 posts or videos containing content that led the company to contact emergency responders.<sup>55</sup>

Nevertheless, many medical care providers, researchers and others are uncertain whether such tools can help. People at risk of suicide often are socially isolated and unlikely to visit a doctor, so they might not generate enough health records for algorithms to evaluate, says Barnhorst at the University of California, Davis. "I don't know where the predictive analytics [data] would come from," she says. "There's not a lot of output from these people."

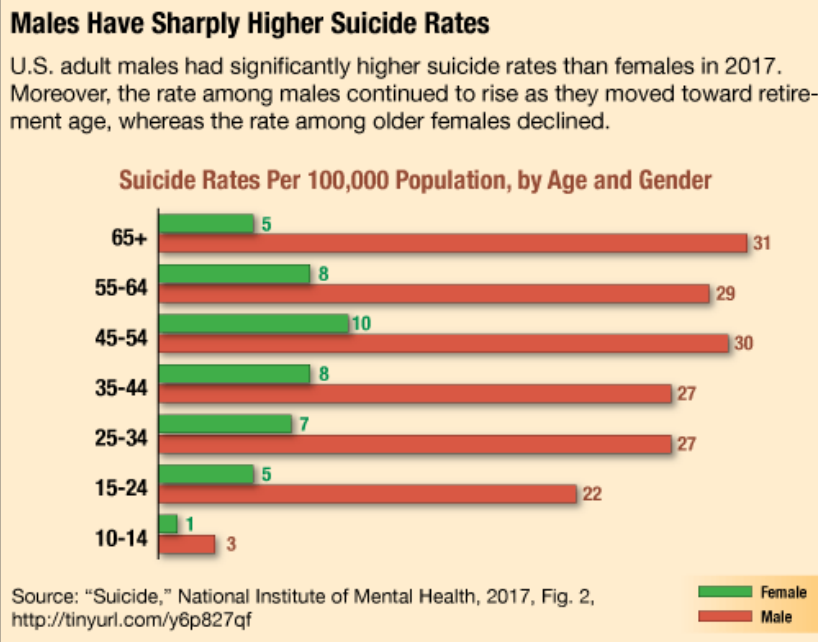
The NIMH's Pearson is similarly cautious. "We have ways of helping people by using existing data to find someone at risk," she says. But more research is needed to ensure that artificial intelligence tools do not miss whole groups of people. "There may be racial/ethnic minorities or sexual minorities who are not hitting the health care system very often for a number of reasons," she says. "How do they fare in predictive analytics? That's a really important question."

Dr. Todd Essig, a psychologist and psychoanalyst at the William Alanson White Institute, a New York City mental health treatment center, calls predictive analytics "extremely useful" in helping identify potential suicide victims. However, it cannot ensure that people will get the treatment they need. "If predictive analytics led to a program where people who are at higher risk had their guns [confiscated], that would reduce the suicide rate," he says.

Columbia University's Appelbaum says people have tried to predict suicides based on various risk factors "for a long time, and it has been extremely difficult." "The variables associated with suicide are common in the population and uncommonly lead to suicidal outcomes," he says. For example, depression is a strong predictor of suicide, but most people with depression do not attempt suicide.

He and other researchers say years of research show that scientists still do not know exactly how to predict suicide.<sup>56</sup> A meta-analysis of 50 years of research, published in 2016, concluded that scientists have not gotten any better at predicting suicide attempts, saying "prediction was only slightly better than chance."<sup>57</sup>

Other researchers acknowledge that the science of prediction is not perfect but say it could help health care providers do their job better. "It will miss a huge percentage of people. It's not going to solve all of our problems," Ursula Whiteside, a clinical psychologist at the University of Washington in Seattle, says. "But it is helpful to clinicians."



#### [Long Description](#)

Other researchers are raising privacy concerns about the use of predictive analytics in suicide prevention tools. Mason Marks, a visiting fellow at Yale Law School's Information Society Project, said that while health care privacy laws govern how medical providers can use patient medical records, artificial-intelligence-based suicide prediction using social media information and data is unregulated and could pose safety and ethical concerns.

"The risks include stigmatization of people with mental illness, the transfer of sensitive health data to third-parties ... unnecessary involuntary confinement, violent confrontations with police, exacerbation of mental health conditions, and ... increases in suicide risk," he said. <sup>58</sup>

Companies and lawmakers will have to examine policy and legal frameworks, he added.

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## Background

### Research Emerges

In ancient societies, philosophers, religious leaders and governments reacted to suicide in a variety of ways, ranging from glorification to religious condemnation. Colonists in early America viewed suicide as a sin and a crime until juries began to see it as a symptom of disease. Courts stopped ruling it a crime by the end of the 1800s.

Also in the 19th century, researchers began studying whether economic and sociological changes — increased industrialization and loosened family and community ties — led to mental illness and suicide. Physicians began sending suicidal patients to asylums for treatment with sedatives or stimulants. <sup>59</sup>

Scientists gave suicide only sporadic attention, however, until French sociologist Émile Durkheim concluded in his 1897 book, *Le Suicide*, that people who were more socially integrated were less likely to kill themselves. He also found suicide more common among men than women and soldiers than civilians. <sup>60</sup>

Durkheim's book prompted other scientists to analyze mental illness more closely. In 1925, psychiatrists Karl and William Menninger opened a clinic outside Topeka, Kan., to treat the mentally ill. In his 1930 book, *The Human Mind*, Karl contended that psychiatry could help such patients. Eight years later, his *Man Against Himself* suggested that the suicidal impulse was a misdirection of the survival instinct. <sup>61</sup>

During the Great Depression, the suicide rate in the United States reached a 20th-century peak — 21.9 suicides per 100,000 — in 1932. <sup>62</sup> It would fall to 11.4 per 100,000 by 1957, climb erratically during the 1960s through the 1970s, reaching 13.7 in 1977 and fall to an all-time low of 10.4 in 2000. (See Graphic.)

After World War II, clinical psychologist Edwin Shneidman propelled suicide research when he began investigating a cache of Los Angeles death records filled with hundreds of suicide notes.

In 1958, Shneidman and psychologist Norman L. Farberow along with Dr. Robert E. Litman used a federal grant to open the first suicide prevention facility in a condemned building of the Los Angeles County General Hospital. Staff offered in-person and phone counseling to individuals experiencing

depression and suicidal thoughts. Most famously, the center conducted the first psychological autopsies — interviews with family, friends, doctors and other associates of suicide victims to confirm the cause of death.<sup>63</sup>

The National Center for Health Statistics reported that in 1964 an average of 56 Americans killed themselves every day, accounting for 1 percent of deaths that year. But the center also said suicide statistics likely were “grossly understated” because family and friends often prevented coroners from reporting suicides on death certificates.<sup>64</sup>

The National Institute of Mental Health began a campaign in the 1960s to reduce mental illness and suicide. The institute in 1966 hired Shneidman to create a suicide prevention program, which led to a jump in the number of U.S. suicide prevention centers — from 15 to more than 100 within a few years.<sup>65</sup>

## Suicide and Health

In the 1980s and '90s, suicide became a leading health concern in the United States and the world. By 1990, U.S. rates had reached 12.4 per 100,000 for all age groups, but for ages 15 to 24, the rate rose from 8.8 to 13.2 per 100,000.<sup>66</sup>

Experts speculated that family disintegration due to rising divorce rates, drug abuse, dwindling job and educational opportunities and the availability of guns could be partly to blame. Firearms continued to be the most common method of suicide.<sup>67</sup>

Studies in the 1980s by David P. Phillips, a sociologist at the University of California, San Diego, found that suicides rose significantly after well-publicized cases, with the rise greatest among teenagers.<sup>68</sup> And researchers found correlations between fictionalized suicide attempts in television movies and increased suicide attempts among teens.<sup>69</sup>

As the suicide rate among adolescents and young adults rose, the Department of Health and Human Services created a task force on youth suicide in 1985.<sup>70</sup> In 1987, a group of families affected by suicide joined with scientists to establish the American Foundation for Suicide Prevention to fund research and education about suicide. More grassroots organizations followed.<sup>71</sup>

Researchers and communities grew increasingly concerned about suicide clusters — multiple suicides occurring in the same geographical area in a short span of time. In March 1987, for example, four teenagers in Bergenfield, N.J., killed themselves by locking themselves in a garage and running a car engine. Within a week, at least two other young people attempted suicide in the same manner.

“The news coverage of teenage suicides can portray the victims as martyrs of sorts,” said Dr. David Shaffer, a child psychiatry professor at Columbia University and the director of the suicide research unit at the New York State Psychiatric Institute. “The more sentimentalized it is, the more legitimate — even heroic — it may seem to some teenagers.”<sup>72</sup>

Drug treatments for depression were introduced in the late 1980s, beginning with the 1987 approval of Prozac by the U.S. Food and Drug Administration (FDA). The drug aimed to ease depression by raising the levels of a chemical called serotonin in the brain.<sup>73</sup>

In 1989, suicide experts, other researchers, public health officials and news outlets met to discuss ways to prevent suicide contagion. They developed recommendations for discussions with the media and suggested that news outlets avoid providing details of suicide methods.<sup>74</sup>

In the early 1990s, University of Washington psychologist Marsha Linehan developed one of the three evidence-based interventions and treatments that have been shown to be effective in reducing suicidality. Her program, called dialectical behavior therapy, teaches patients how to manage painful emotions and decrease conflict in relationships.<sup>75</sup> The other two treatments are cognitive behavior therapy, which encourages patients to challenge distorted viewpoints and change destructive patterns of behavior, and CAMS developed by Catholic University's Jobes. Therapists using CAMS talk in detail with patients about their thoughts of hopelessness and suicide and help them build a treatment plan.<sup>76</sup>

Although suicide rates fell in the 1990s, researchers and health officials remained concerned about finding an effective treatment for suicidal behavior — particularly after the highly publicized suicide of Kurt Cobain, lead singer for the rock band Nirvana, on April 5, 1994. A Catholic University study determined that Cobain's suicide was not followed by copycat suicides but did spark more calls to suicide crisis hotlines — likely due to how the media covered the story and community outreach efforts encouraging people at risk to seek help.<sup>77</sup>

## “Call to Action”

In 1996, the World Health Organization urged member nations to address rising suicide rates in their countries. Most alarmingly, the number of suicides in the United States had nearly tripled among adolescents and young adults since 1952. Suicide was the third leading cause of death among those ages 15 to 24 and the fourth leading cause among those ages 10 to 14.

Suicide remained a public health problem among many other groups as well, including white men over age 65, Native Americans and Alaskan Natives.<sup>78</sup>

In 1998, Shneidman's *The Suicidal Mind* outlined common features of individuals who killed themselves, including feelings of hopelessness and deep, enduring psychological pain. He said victims often experienced lifelong emotional struggles and left signs they planned to kill themselves.

"We must look to previous episodes of disturbance, dark times in that life ... a penchant for constriction and dichotomous thinking, a tendency to throw in the towel," he wrote.<sup>79</sup>

Even as the overall suicide rate declined, the rate among young people ages 15-19 had increased 14 percent between 1980 and 1996, and among those ages 10-14 years it increased 100 percent.

In 1999, U.S. Surgeon General Davidatcher issued a "Call to Action to Prevent Suicide," asking the nation to address suicide "as a significant public health problem and put into place national strategies to prevent the loss of life and the suffering suicide causes." In 2001, he urged public information campaigns and community-based suicide prevention programs in every state.<sup>80</sup>

The rising number of children and adolescents experiencing depression and other mental health issues prompted some pediatricians in 2002 to begin prescribing antidepressants to such patients, even though the FDA had not approved them as treatments for young people. Providing prescriptions outside of FDA guidelines, called off-label, is a legal and common practice among doctors when they consider a drug medically appropriate. News outlets soon began reporting cases of adolescents killing themselves — or attempting to do so — while taking such medications.<sup>81</sup>



Jane Clementi's son Tyler killed himself in September 2010 after his roommate at Rutgers University in New Jersey surreptitiously filmed him with another man and streamed the video. Parents and health care researchers worry that cyberbullying may be contributing to high youth suicide rates. (AFP/Getty Images/Jewel Samad)

In the fall of 2004, the FDA warned that taking antidepressants could produce suicidal thoughts and behaviors in children and adolescents. The agency began requiring drug manufacturers to add a warning on antidepressant labels about the increased risk to children.<sup>82</sup>

The warning stirred controversy, however, and many medical providers pushed back. In 2005, the American Medical Association adopted a resolution saying the drugs had not been shown to raise the risk of "completed suicide," so children dealing with serious depression should not be denied such medications if the drugs could save their lives.<sup>83</sup>

That same year, Florida State University psychology professor Thomas E. Joiner theorized in *Why People Die by Suicide* that individuals would not kill themselves without both the desire and ability to do so, and that those who want to die feel socially alienated and believe they are a burden to other people.<sup>84</sup>

In 2007, the FDA expanded the warning on antidepressants to include adults ages 18 to 24.<sup>85</sup> Many health care providers continued to object to the warning and to the claims that antidepressants

could lead to suicidal behavior, arguing that no one could know whether suicidal symptoms that develop during treatment are due to the medication or to the underlying illness.<sup>86</sup>

Meanwhile, after bottoming out at 10.4 suicides per 100,000 people in 2000, U.S. suicide rates began to climb, to 12.4 per 100,000 by 2010, with the greatest increase among adults, ages 35 to 64.<sup>87</sup>

In the 2010s, as the use of digital devices and social media among young people grew, parents and health care officials began to worry that cyberbullying might be contributing to youth suicide rates. In one nationally publicized case, Rutgers University freshman Tyler Clementi, 18, killed himself by jumping from the George Washington Bridge linking New York City and New Jersey in September 2010 after his roommate used a webcam to record Clementi kissing another man and then invited people to watch the streaming video.<sup>88</sup>

That same year, the U.S. Department of Health and Human Services and the Pentagon announced they were forming the National Action Alliance for Suicide Prevention, a public-private partnership to try to stem the rise in suicides.

The surgeon general's office in 2012 again called for a heightened national focus on suicide, setting a goal of reducing the overall rate by 20 percent by 2025. The office said the largest number of suicides were occurring among middle-aged Americans, "sapping the workforce we need to grow our economy."

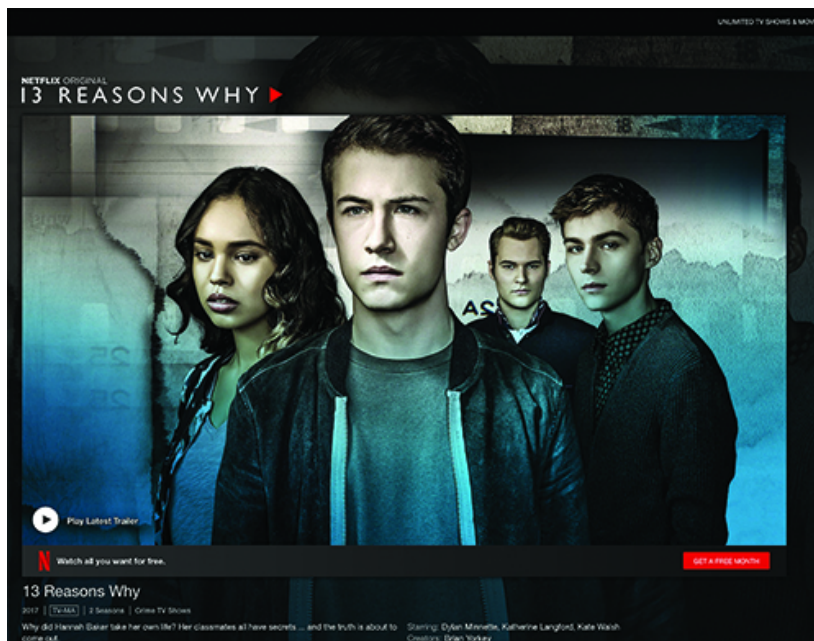
The office also encouraged health care and community groups to aim for an ideal of "zero suicides," thereby urging all health care providers to help identify and treat patients potentially at risk.<sup>89</sup>

Focusing on the zero suicide ideal, the National Action Alliance for Suicide Prevention and the Suicide Prevention Resource Center began a nationwide effort to provide suicide prevention training for nurses and doctors in all health care systems.

In May 2013, the CDC reported that Baby Boomers had higher suicide rates than earlier generations, even as youths. And in the wake of the wars in Afghanistan and Iraq, suicides among veterans were climbing. By 2016 veterans accounted for 14 percent of adult suicides even though they comprised only 8 percent of the U.S. population.<sup>90</sup>

Researchers in Denmark found in 2016 that antidepressants could double the risk of suicidal behavior or violence in adults who exhibit no signs of a mental disorder. Other studies showed that youths whose sexual identity or orientation differs from the majority in their communities are two to seven times more likely than heterosexual youths to die by suicide.<sup>91</sup>

In March 2017, Netflix began airing "13 Reasons Why," a show about a high school student who kills herself and leaves behind 13 audio recordings explaining why. Executive producer Selena Gomez said she wanted to help struggling teens, but researchers at the Nationwide Children's Hospital in Columbus, Ohio, found that in the nine months immediately following the show's release about 195 more suicide deaths among 10- to 17-year-olds occurred across the country than were expected.<sup>92</sup>



Attempted suicides among adolescents surged after Netflix aired the show "13 Reasons Why" in March 2017 about a teen suicide. Some researchers said the show, which aimed to help teens struggling with suicidal thoughts, glorified suicide. (SAGE Publishing Inc/Screenshot)

A Northwestern University survey commissioned by Netflix found almost three-quarters of adolescent viewers said the show made them feel "more comfortable processing tough topics," said

Netflix.<sup>93</sup>

In January 2018, following reports that an average of 20 veterans a day died by suicide, President Trump issued an executive order stating that veterans must be automatically enrolled in VA mental health care for a year after leaving the service. Meanwhile, suicides among active-duty military members also were rising, with 321 members dying by suicide in 2018.<sup>94</sup>

However, a Government Accountability Office (GAO) study later found that anti-suicide messages posted on social media by the VA dropped by more than two-thirds from fiscal 2017 to fiscal 2018, and no public outreach messages were aired on national television or radio for more than a year. Of the \$6.2 million set aside for suicide prevention media advertisements in fiscal 2018, the VA only used \$57,000, according to the GAO, largely due to “leadership turnover and reorganization.”<sup>95</sup>

“At a time when 20 veterans a day still die by suicide, VA should be doing everything in its power to inform the public about the resources available to veterans in crisis,” said Rep. Tim Walz, D-Minn., ranking member of the House Veterans’ Affairs Committee. “Unfortunately, VA has failed to do that, despite claiming the elimination of veteran suicide as its highest clinical priority.”<sup>96</sup>

In June of that year, fashion designer Kate Spade and celebrity chef Anthony Bourdain took their lives, highlighting the worsening crisis. In the hours after Bourdain’s death, the National Suicide Prevention Lifeline reported spikes of up to 500 percent in calls to its crisis centers. In August, Trump signed into law a bill mandating a study on the effectiveness of the lifeline (1-800-273-TALK) and the feasibility of creating an easier-to-remember three-digit dialing code like 911.<sup>97</sup>

Trump signed a fiscal 2019 spending bill in September that included a total increase of \$4.8 million in the budgets for the lifeline, grants for the National Strategy for Suicide Prevention and for NIMH research on suicide prevention. Advocates for suicide prevention had pushed for a \$150 million increase.<sup>98</sup>

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## Current Situation

### Government Efforts

The Trump administration is boosting efforts to address the sustained high rate of suicides among veterans. Recent statistics indicate that between 2005 and 2016, the suicide rate among veterans increased 25.9 percent.<sup>99</sup>

A new federal task force, begun by the administration earlier this year, is working to better coordinate suicide research among the departments of Defense, Veterans Affairs and Homeland Security. Such research is examining potential risk factors, such as homelessness, traumatic brain injury, post-traumatic stress syndrome and mental health disorders.

Among other things, the task force will seek ways to better reach veterans who are not accessing the VA health care system, since about 70 percent of veteran suicide victims had little or no contact with the system.

The administration is proposing raising the amount earmarked for suicide prevention outreach in 2020 to \$222 million — a \$15.6 million increase from 2019.<sup>100</sup>

Meanwhile, gun control groups, suicide prevention advocates and others across the country continue advocating passage of more state red flag laws. The National Rifle Association, which had opposed such legislation, recently reversed its stance and said Congress should give states funding to adopt such laws.<sup>101</sup>

The Senate held a hearing in March on red flag laws, just days after the suicides of three survivors of recent mass school shootings — two teenagers from Parkland, Fla., the scene of a 2018 Valentine’s Day school massacre, and the father of one of 20 children killed in the December 2012 shooting at Sandy Hook Elementary School in Newtown, Conn.<sup>102</sup>

Separate bills introduced by Sen. Dianne Feinstein and Rep. Salud Carbajal, both California Democrats, would allow states to use federal funds to administer red flag laws. Both measures are awaiting action.<sup>103</sup>

The Democratic-controlled House in February 2019 passed a universal background check law for firearms purchases, a measure applauded by some suicide prevention groups. But experts say the measure has little chance of making it through the Republican-controlled Senate.

Both chambers have bipartisan measures pending that would fund research on the impact of technology and media on children and teens, including whether they lead to bullying and depression.<sup>104</sup>

Many state legislatures are considering bills to require that health care providers be trained in suicide prevention. Washington and Kentucky adopted such legislation in 2012 and 2013, and other states are expected to follow.<sup>105</sup>



Elina Asensio, 13, holds a photo of her best friend, Emma Benavides, who died in an apparent murder-suicide at the hands of Emma's mother Cristi in a Denver suburb in 2017. Gun control advocates support "red flag" laws that allow authorities to confiscate guns of people who may be at risk of self-harm or violence. (Getty Images/The Denver Post/Joe Amon)

On May 8, Arizona's Republican governor signed legislation requiring all school faculty to be trained in suicide prevention. In Grand Junction, Colo., all school employees must receive training in suicide prevention, and the school district also has begun training some students, in sixth grade or higher, on how to detect signs that another student may be considering suicide.<sup>106</sup>

### In the Courts

Many colleges and universities are debating whether they could be held accountable for student suicides after a 2018 ruling by the Supreme Judicial Court of Massachusetts. The court said that even though the Massachusetts Institute of Technology could not be sued for the 2009 suicide of a 25-year-old graduate student, college officials could be held responsible for not preventing student suicides — even among students living off campus — "[i]f it was within the university's knowledge and power to do so."<sup>107</sup>

Such liability lawsuits are pending against several other institutions, including the University of Pennsylvania, Washington and Lee University in Lexington, Va., and the University of South Carolina.<sup>108</sup>

Three students and a mental health group are suing Stanford University in federal court for requiring that students take a leave of absence if they have a "psychiatric, psychological or medical condition" that "jeopardizes the life or safety" of themselves or others or that significantly disrupts campus activities. Some Stanford students say the policy is discriminatory, deprives students of peer-support networks and forces them to pay housing termination fees and other unexpected costs. Other students, however, have said they benefited from taking a leave of absence to get needed mental health care.<sup>109</sup>

Parents also are trying to hold school administrators accountable for conditions that could lead to suicidal behavior in their children. For example, the mother of a fourth grade special education student at a Chicago elementary school is suing school officials for allegedly bullying her son before he tried to kill himself on Feb. 18.<sup>110</sup>

Meanwhile, a federal judge in Northern California ruled on March 5 that United Behavioral Health, a division of UnitedHealth Group, improperly denied claims for mental health and substance addiction treatment for more than 50,000 patients in violation of the federal Mental Health Parity and Addiction Equity Act of 2008. The law requires that insurers provide the same coverage for mental health and addiction treatment that they provide for other health conditions. UnitedHealth said it will appeal the ruling.

"We look forward to demonstrating in the next phase of this case how our members received appropriate care," the company said.<sup>111</sup>

### Research and Predictions

Researchers are continuing to study the causes, treatment and effects of suicidal behavior.

Kaiser Permanente's Simon is working with about 20,000 patients — the largest randomized sample ever used in such a study — to compare three suicide intervention programs: mental health care alone; medical care plus a Web- and phone-based program to coach patients on how to manage difficult emotions; and medical care supplemented by phone or email support. Results of the study are expected in early 2020, according to Simon.

One University of Washington researcher studied suicidal patients in an emergency room virtually, using an avatar and other online tools, to assess the effectiveness of Jobses' Collaborative Assessment and Management of Suicidality therapy. The researcher found that the CAMS protocol helped some patients. Three clinical trials are studying whether the approach reduces suicide attempts. <sup>112</sup>

Other studies are examining:

- Workers at risk: Researchers around the country, along with suicidologist Julie Cerel at the University of Kentucky, are examining how suicide affects workers in various occupations, such as law enforcement, construction and the food industry.
- Copycat suicides: Johns Hopkins University's Nestadt is studying suicide and the copycat effect among Maryland high school students. He says his preliminary research has pinpointed about 28 suicide clusters — each including at least two suicides — among school-age children between 2007 and 2018.
- Predictive analytics: The VA and the Energy Department are analyzing medical data collected from more than 22 million veterans to identify patients at risk of suicide. <sup>113</sup> Researchers at Massachusetts General Hospital and Boston Children's Hospital also are researching the effectiveness of using data analytics to predict suicide attempts. <sup>114</sup>
- Social media: People who have lost loved ones to suicide can donate their social media data to OurDataHelps, a project of Qntfy, a data analytics company in Arlington, Va., to help researchers determine ways to predict suicide. <sup>115</sup>
- Brain imaging: Researchers at Carnegie Mellon University and the University of Pittsburgh are using brain imaging in hopes of identifying individuals with suicidal thoughts based on their brain activity patterns. <sup>116</sup>
- Effects of suicide: Cerel also is studying how a suicide affects family, friends, co-workers and others. She recently found that each suicide affects about 135 other people — far more than the six psychologist Shneidman once estimated. <sup>117</sup>

“By getting a better estimate of those affected, there will be a day when health care and mental health care are better-funded systems that can truly help people,” Cerel says.

Meanwhile, scientists are analyzing why — despite the rising suicide rate in the United States — the 2018 global suicide rate fell to its lowest level in two decades.

Ali Mokdad, a professor of health metrics sciences at the University of Washington in Seattle, said rates have dropped — especially among young people and women — in China and India because increased urbanization has given women more liberty to work. William Pridemore, dean and a professor at the School of Criminal Justice at the University at Albany in New York, said declining suicide rates in Russia — particularly among middle-aged men — could be the result of an improved quality of life. <sup>118</sup>

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## Outlook

### More Research

Researchers, lawmakers, suicide prevention groups and companies are looking for new ways to contribute to the suicide prevention effort. And advertisers may increasingly pressure social media platforms to take responsibility for content posted by users.

In March, after reports of Instagram posts containing depictions of self-harm and suicide, the World Federation of Advertisers told members to “think carefully about where they place advertising” and acknowledge their moral responsibility in deciding where to run ads. <sup>119</sup>

Many mental health providers say further research will help refine the use of predictive analytics to prevent suicides. But Essig, at the William Alanson White Institute, says “this technological fetish [of] looking to machines to solve problems” could detract from the treatment of suicidal patients and will ultimately fail unless health care providers use technology to help focus on human relationships. Then, he says, “things will get better.”

Barnhorst at the University of California, Davis, says that even if technology helps identify suicide risks, the health care community will remain limited in its ability to aid those experiencing a suicidal crisis. “We’re not magicians. And antidepressants are not a cure-all,” she says. “There’s a lot of other stuff going on for people that we cannot fix,” such as relationship problems, unemployment, family disintegration, rising college costs and more.

Jobses, of Catholic University, says the nation’s suicide rate will drop only with better public education about effective therapies. The 30 percent to 40 percent of individuals at risk of suicide who seek treatment “should get treatment that works,” he says, “but they don’t necessarily get that.” He urges training more medical providers in suicide prevention, and starting a public education campaign to inform patients about available treatments.

“We have different tools for different needs,” and proving that different therapies work for different people “could save thousands of dollars,” he says.



However, he continues, “we need so much more,” such as a national mental health service corps — a government-led initiative in which medical school graduates can get loan forgiveness if they participate in suicide prevention and intervention programs. Otherwise, he says, “we’ll never have enough clinicians to treat 10.6 million Americans” with suicidal thoughts.

Pearson, at the NIMH, says it would help to “get a better picture on how to reduce access to lethal means and make communities aware” of people at risk.

Nestadt, at Johns Hopkins, who will soon begin studying suicides among Native Americans and possible links between opioids and suicides in Maryland, says that with so many studies underway across the country, he is upbeat about the country’s ability to address the rising suicide rate.

“We are recognizing the problem more and more, so we know how to address it,” he says. “We are recognizing the role of guns, ... the role of opioids, and we are seeing that there are things that have worked.”

And, as a clinician, he says, “every day, I see people who got better.”

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**Pro/Con**

Can computerized risk-assessment tools reduce the suicide rate?

<p><b>Pro</b></p>  <p><b>Philip Resnik</b> Professor, Department of Linguistics and Institute for Advanced Computer Studies</p>	<p><b>Con</b></p>  <p><b>Dr. Paul S. Appelbaum</b> Dollard Professor of Psychiatry, Medicine and Law, Columbia University College of Physicians &amp; Surgeons. Written for <i>CQ Researcher</i>, July 2019</p>
<p>University of Maryland</p> <p>Written for <i>CQ Researcher</i>, July 2019</p>	<p>It’s time to get realistic about how best to prevent suicide, and computerized risk-assessment tools are likely not the answer.</p>
<p>Preventing suicide is difficult, and conventional research on suicide prevention has failed to make progress. One recent analysis of the medical literature shows no improvement in identifying predictive suicide risk factors over the past 50 years; another found that, unlike other major mortalities such as tuberculosis, the rate of death by suicide has essentially not changed in a century.</p> <p>Suicidal thoughts and behaviors do not generally take place in the lab where researchers can study them. In addition, a majority of people who die by suicide will not share their suicidal thoughts with a doctor, even when they see one and are asked directly.</p> <p>Increasingly, though, another source of information can provide the predictive signal we need to identify suicide risk: people’s everyday language. During the long gaps between clinical encounters, many people create a rich window into their daily thoughts, feelings and lives through their use of social media.</p> <p>In recent years, a growing community of technologists has been developing methods to analyze what people say online, and to predict whether they may be at risk of suicide and the severity of that risk. Techniques of this kind have been developed to target settings where people have already chosen to reach out for support (such as <a href="#">ReachOut.com</a> or Reddit’s <a href="#">r/SuicideWatch</a> forum) and to address the challenging problem of screening, when no explicit indicator of risk has been identified.</p> <p>This predictive technology is not perfect, but already it can be as good or better than what doctors can do. Using a wide range of subtle, language-based cues, predictive models have been shown to distinguish users who would go on to attempt suicide with a success rate many times better than clinicians’ ability to identify the risk.</p>	<p>Despite decades of studies aimed at assessing suicide risk, predictive accuracy has not increased over the last half-century. None of the existing tools, some of which are widely used, has demonstrated a strong ability to identify people who are likely to attempt suicide. Indeed, most people identified as high risk never try to end their lives, and most who do are classified as low risk.</p> <p>Why is suicide prediction so difficult? Although suicide is a tragedy, especially when a young person is involved, it is uncommon. Only about 14 in every 100,000 people take their lives. Attempts to predict rare events, especially when the variables being used are common in the population, inevitably result in low specificity, with many people wrongly identified as high risk. Moreover, the variables have low sensitivity, resulting in many people who should be identified as high risk being missed entirely.</p> <p>That’s exactly the situation with suicide prediction. Many predictors have been identified, but they are much more common than suicide itself. At any point in time, about 7 percent of Americans experience major depression, one of the strongest correlates of suicide. Roughly 6 percent have alcohol-use disorders, another oft-cited predictor. Male sex, advanced age, social isolation — the list of suicide correlates is almost endless. But many more people fall into these risk groups than will ever end their own lives.</p> <p>Hence, although many people intuitively believe that someone — especially mental health professionals — should be able to tell when a person is planning suicide, the task is impossible to perform with acceptable accuracy. Even studies that have started with samples of people known to have committed suicide have failed to identify algorithms that would have predicted their behavior.</p> <p>What’s the answer? Reducing the suicide rate is much more likely to be accomplished by using population-based approaches to identify and treat serious mental disorders — such as depression and substance abuse — than by</p>

So, reducing the suicide rate is now a question of how to use this emerging technology appropriately and effectively and how to create a practical, ethical framework for large-scale, opt-in participation by individuals who are or might be at risk. In addition, the intervention ecosystem needs to be redesigned so that, once a much larger number of people are identified as being at risk, they can get the help they need.

focusing resources on those people we believe, usually mistakenly, to be at high risk. In addition, reducing the easy availability of the means of suicide — in the United States, usually a gun — would save lives. Resources would be better spent on such approaches than on the latest high-tech tool that purports to predict what likely will remain unpredictable.

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## Chronology

<b>1890s–1960s</b>	Research on suicide begins, and first suicide prevention centers open.
<b>1897</b>	French sociologist Émile Durkheim's book <i>Le Suicide</i> suggests social issues such as social isolation can lead to suicide.
<b>1925</b>	The Menninger Clinic, founded in Topeka, Kan., gains international attention for its treatment of the mentally ill.
<b>1958</b>	Psychologists Edwin Shneidman and Norman Farberow and psychiatrist Robert E. Litman open nation's first suicide prevention center, in Los Angeles.
<b>1964</b>	An average of 56 people kill themselves daily in the United States, according to the National Institute of Mental Health (NIMH).
<b>1966</b>	NIMH hires Shneidman to create comprehensive national suicide prevention program.
<b>1970s–1990s</b>	Grassroots organizations form to advocate for suicide prevention; researchers develop therapies to treat patients at risk of suicide.
<b>1974</b>	A sociologist at the University of California, San Diego, David P. Phillips, begins to study whether news reports of suicides can increase risk of more suicides.
<b>1980</b>	Centers for Disease Control and Prevention (CDC) reports that the suicide rate for older teens and young adults has risen 40 percent since 1970 and that firearms are the most common means of suicide.
<b>1987</b>	Families affected by suicide join with scientists to create the American Foundation for Suicide Prevention to fund research and education.... Food and Drug Administration (FDA) approves Prozac to treat depression.
<b>1989</b>	Researchers, public health officials and news media representatives meet to discuss how the media can report on suicides without fostering "suicide contagion," or copycat suicides.
<b>1993</b>	University of Washington psychologist Marsha Linehan develops dialectical behavior therapy to help suicidal patients manage their emotions.
<b>1996</b>	World Health Organization urges member nations to address suicide.... CDC reports that suicide is the ninth leading cause of death in United States.
<b>1999</b>	U.S. Surgeon General David Satcher declares suicide a serious public health threat.
<b>2000s to Present</b>	Elected officials respond to surging suicide rates.
<b>2002</b>	Physicians begin prescribing antidepressants for children and adolescents off-label, or without FDA approval.
<b>2004</b>	FDA requires warning labels on antidepressants, alerting consumers that children and teens taking the drugs might experience suicidal thoughts.
<b>2005</b>	Florida State University psychologist Thomas E. Joiner's <i>Why People Die by Suicide</i> says many people take their lives because they feel socially isolated and view themselves as a burden.
<b>2010</b>	Federal health officials announce goal to reduce suicide rate... In a case that highlighted the role of social media and bullying in rising suicide rates, Rutgers University student Tyler Clementi kills himself

	after his roommate secretly records him kissing another man and invites people on Twitter to watch the video.
2012	Surgeon General Regina M. Benjamin announces that suicide is among the top five causes of death for adults under age 46, announces goal to reduce suicide rate 20 percent by 2025 and encourages communities and health care providers to aim for “zero suicides.”
2013	CDC reports Baby Boomers have highest suicide rate of any age group.
2017	U.S. suicide is at highest level in nearly 30 years.... After the Department of Veterans Affairs reports that military veterans accounted for 14 percent of all suicide deaths among U.S. adults in 2016, the department begins using large health datasets to help identify veterans at risk of suicide.
2018	President Trump orders departments of Defense, Homeland Security and Veterans Affairs to improve veterans' access to suicide prevention resources.... Fashion designer Kate Spade and CNN celebrity chef and travel documentarian Anthony Bourdain die by suicide.... Massachusetts Supreme Court rules colleges may be held liable for student suicides.
2019	FDA approves nasal-spray containing an active ingredient of ketamine, an anesthetic, to treat certain patients with depression.... U.S. Senate weighs whether to help fund state “red flag” laws that allow temporary confiscation of guns from people deemed at risk of dying by suicide or violence.... Researchers say the 2017 Netflix show “13 Reasons Why” caused a sharp rise in suicides among 10- to 17-year-olds in the month after its release.

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## Short Features

### Version of Party Drug Ketamine Approved, With Caution, for Depression

*The powerful anesthetic could reduce suicidal ideation.*

A component of the 1980s “club drug” ketamine, dubbed Special K, is inspiring hope among some doctors and researchers that it could treat severe depression — and might even help prevent some suicides. However, several experts are cautious, warning that the drug’s potential for preventing suicide is not yet proven.

“This is the first truly novel mechanism [for treating depression] that has been presented in over 50 years,” said Dr. Gerard Sanacora, a Yale University psychiatry professor and director of the Yale Depression Research Program. He was referring to the U.S. Food and Drug Administration (FDA) approval in March of Spravato, a nasal spray containing esketamine, an active ingredient of ketamine. “But this is not a medicine for everybody.”<sup>1</sup>

Many experts hope the medicine will treat certain patients with severe depression, an illness that could lead some people to suicide. But researchers say there is no conclusive evidence that Spravato will reduce suicidal behavior. Gregory E. Simon, a psychiatrist at Kaiser Permanente Washington and a senior investigator at Kaiser Permanente Washington Health Research Institute in Seattle, Wash., says that while studies have shown the product can effectively reduce “symptoms of depression and suicidal ideation ... one should not assume if a medicine reduces suicidal thoughts it will reduce suicide attempts.”

The FDA approved Spravato, developed by Johnson & Johnson subsidiary Janssen Pharmaceuticals, only for patients suffering from “treatment-resistant depression,” meaning they have not responded to at least two other antidepressant medications. Up to 20 percent of the 16 million Americans who suffer from depression do not get relief from traditional antidepressants.<sup>2</sup>

The company continues to study whether Spravato can help patients specifically at risk of suicide.<sup>3</sup>

Because Spravato is intended to treat a serious or potentially life-threatening condition, the FDA considered it as a breakthrough drug, allowing it to be considered for final approval via an expedited process. The last phase of testing included four randomized controlled trials in which patients receiving esketamine experienced “statistically significantly greater improvement in depressive symptoms” than those who received a placebo. The side effects, which could last up to two hours after treatment, included sedation, elevated blood pressure and disassociation (patients not knowing who or where they were). As a result, the spray must be administered in a doctor’s office and a patient must remain there for two hours under observation.



Lauren Pestikas, who has struggled with depression and has repeatedly tried to end her life, found that treatment with the drug ketamine made her feel better. In 2019 the Federal Drug Administration approved a nasal spray containing an active ingredient of ketamine, originally developed as an anesthetic, as a treatment for depression. (AP Photo/Teresa Crawford)

Two FDA advisory panels decided the benefits outweighed the risks and the side effects.<sup>4</sup>

However, Dr. Julie Zito, a professor emerita of pharmacy and psychiatry at the University of Maryland in Baltimore, is one of two FDA advisory panel members who opposed recommending that the FDA approve the drug. (Fourteen members voted for approval.) Zito says she remains concerned that the trials did not show enough benefit for patients and that patients could experience side effects after leaving a doctor's office.

"This is a mind drug," she says. "How can you tell me I'm going to walk out and have a very severe disassociate episode and that it's not the drug?"

During the advisory panel's Feb. 12 meeting, Jaskaran Singh, the senior director of clinical research for Janssen Pharmaceuticals, said such side effects are short-lived because the drug is rapidly absorbed and metabolized.<sup>5</sup>

Zito is also concerned about the safety of the drug. Ketamine is a powerful anesthetic that became a popular party drug during the 1980s and '90s for its hallucinatory effects. Abuse of the drug led to severe side effects, such as disrupted learning and memory processing. In 1999, the U.S. Drug Enforcement Administration banned nonmedical uses of ketamine and classified it in the same category as addictive substances such as morphine and oxycodone.<sup>6</sup>

Zito points out that six deaths — three by suicide — occurred among those receiving esketamine during the trials, which involved more than 1,000 patients overall. The deaths were all among patients receiving the esketamine rather than a placebo, and the suicides occurred within four, 12 and 20 days of the last dose. One patient drove his motorcycle into a tree 26 hours after his last dose.<sup>7</sup> "You have to explain to me how those are unrelated," she says.

Psychiatrist Dr. David Hough, who led the esketamine trials for Janssen, said suicide is, for complex reasons, "far too common" among patients with treatment-resistant depression. Investigators closely examined each of the suicide deaths that occurred during the trials, he said, and determined that they were "not related to the underlying medication."<sup>8</sup>

Dr. Todd Essig, a psychologist and psychoanalyst at the William Alanson White Institute, a training institution for mental health professionals in New York, said Spravato is not "magic," but he said he hopes it can help many patients suffering from long-term depression, based on the success he has seen with infusions of pure ketamine, which have been available for decades. A patient who has battled depression for 25 years has now "started to get her life back together" after beginning a ketamine-infusion trial last year, Essig said, and many other ketamine users have shared similar success stories.<sup>9</sup>

Until the approval of Spravato, neither ketamine nor its derivatives had been approved as a treatment for depression. However, since the late 1990s, researchers have found that ketamine infusions work quickly to treat depression. Traditional antidepressants, which alter the activity of the neurotransmitter serotonin, take four to six weeks to work. But ketamine triggers rapid production of the neurotransmitter glutamate — and the effects can be felt within hours, according to researchers. Although the drug stays in the body only for a short time, its initial effects can last for three to 14 days.<sup>10</sup>

Patients obtaining ketamine infusions also reported strange sensations initially, such as seeing colors and patterns, but soon felt a strong sense of optimism. In recent years, hundreds of clinics nationwide have offered intravenous doses of ketamine to treat depression, and dozens of studies have shown positive results.<sup>[11]</sup>

However, some researchers have raised alarms about such off-label use of the drug, meaning doctors have prescribed it outside of FDA guidelines — a legal and common practice among doctors when they consider a drug medically appropriate. A task force of the American Psychiatric Association in 2017 called for further research into how ketamine works and what guidelines should apply to its use.<sup>[12]</sup>

John Mann, a Columbia University professor of translational neuroscience, which focuses on translating science into new therapies, has led research on the use of pure ketamine. He said the recent approval of Spravato “is very good news for depressed patients, but we have more to learn about it,” such as the best dosage levels, best follow-up treatments and whether better drugs can be developed that do not create the negative side effects.<sup>[13]</sup>

— **Christina L. Lyons**

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## Suicide Survivors Help Peers, Researchers

*“We need to be involved in every conversation about us.”*

Dese'Rae Stage began suffering from depression and self-injury as a high school freshman. Antidepressants made her feel worse. Then she lost a friend to suicide.

Years later, conflict with her girlfriend prompted Stage to begin considering ending her own life. In the summer of 2005, after continued clashes with her girlfriend, Stage attempted suicide. But the girlfriend called the police, and emergency help arrived in time.

In 2010, Stage launched a website, [LiveThroughThis.org](http://LiveThroughThis.org), where she shared her story and asked other survivors of attempted suicide to share theirs. She has since collected more than 100 stories, and web traffic has steadily grown, reaching about 100,000 visitors last year, she says.

“LiveThroughThis is lifting up a marginalized community — one that’s never been given a voice ... and [has had] stereotypes heaped on it,” Stage says.

The so-called lived experience community also could help researchers, says Julie Cerel, a suicidologist at University of Kentucky’s College of Social Work, who has worked with Stage and

volunteers through the website. "It is incredibly important to hear the voices of people who have attempted suicide and survived in order to better understand how to prevent future suicides," she says.

Typically, about 1.18 million Americans survive suicide attempts each year, a number that increased to 1.4 million in 2017, according to the American Association of Suicidology, an advocacy group in Washington focused on suicide prevention.<sup>14</sup> Health care experts say many survivors could help others struggling with suicidal thoughts but who won't tell a medical professional due to the stigma, cost of treatment or fear of being involuntarily hospitalized.

Suicide survivors are, in varying degrees, "disconnected from health care," because so many have had a negative experience with doctors, says David A. Jobes, director of the Suicide Prevention Laboratory at The Catholic University of America in Washington, D.C. He says he hopes "the peer support movement may capture someone who would never see a person like me."

Moreover, "People with lived experience have intimate knowledge of suicidality that those without it just don't," says Stage. "A lot of folks who've never had these experiences come at them from a fear-driven place and immediately want to escalate, sometimes without understanding that a thought or a feeling just needs validation and an ear."

Ursula Whiteside, a clinical psychologist with the University of Washington in Seattle, operates [nowmattersnow.org](http://nowmattersnow.org), a website that provides free suicide prevention resources along with stories from individuals who have recovered from suicidal thoughts after receiving treatment called dialectical behavior therapy, or DBT. Developed by University of Washington psychologist Marsha Linehan, DBT focuses on changing a patient's behaviors and patterns of thinking through individual and group therapy sessions.



Ursula Whiteside, a clinical psychologist with the University of Washington and who has had suicidal thoughts, runs the website [nowmattersnow.org](http://nowmattersnow.org), which provides free resources to those struggling with suicidal thoughts. (Courtesy nowmattersnow)

Although studies have found that DBT works, few therapists are trained in how to use it, Whiteside says.<sup>15</sup> Plus, she says, the therapy costs \$200 for an individual session (\$100 for a group session) and typically involves weekly or twice-weekly sessions for six to 12 months. The total cost can be too high for many people and typically is not covered by insurance, says Whiteside, who has experienced suicidal thoughts herself.

Recently, she says, she surveyed the more than 138,000 individuals who visited [nowmattersnow.org](http://nowmattersnow.org) between March 2015 and December 2017. Among the 3,670 visitors who answered the survey, those who said they had had intense suicidal thoughts reported they experienced "significant reductions" in the intensity of such thoughts and emotions after reviewing the site — sometimes within minutes.<sup>16</sup>

While the results show only a correlation between using the site and feeling better, Whiteside is studying why users feel better. "It could just be a distraction" that allows the suicidal impulse to pass, she says. Or website visitors may find help just when they need it, she says, during the acute periods when people make decisions they would not otherwise make.

Amy Barnhorst, vice chair of community health at the University of California, Davis, department of psychiatry, says people do not make long-range plans about suicide. The idea surfaces during "a dark time they dip into, sometimes a couple times in a lifetime, sometimes a couple times in a month." It is unlikely that someone "will be there to intervene" at such times, she says. However, online networks and crisis hotlines, often staffed by suicide survivors, are available around the clock.

Survivors also are participating in studies to help pinpoint common risk factors and successful treatments. For instance, survivors will work with patients in hospital emergency departments as part of a study Jobs is overseeing, in which mental health care providers will talk with patients about their thoughts of hopelessness and help develop a treatment plan for them.

Stage has been working with other researchers analyzing risk factors and treatments for suicidal thoughts or behaviors, including a recent study analyzing the experience of suicide survivors whose gender or sexual identity differed from most of those in the surrounding community. The study found common traits, such as internalized self-hate, hidden identities and lack of peer support. <sup>17</sup>

Stage says she is encouraged that scientists and others are seeking input from suicide survivors. "However, researchers, clinicians and the medical community have a long way to go," she adds, and "we need to be involved in every conversation about us."

— **Christina L. Lyons**

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## The Next Step

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## Contacts

### American Association of Suicidology

5221 Wisconsin Ave., N.W., Washington, DC 20015  
202-237-2280

[www.suicidology.org](http://www.suicidology.org)

Advocacy group focused on suicide prevention research and training.

### Harvard Injury Control Research Center

677 Huntington Ave., Boston, MA 02115  
617-495-1000

[www.hsph.harvard.edu/hicrc/firearms-research/](http://www.hsph.harvard.edu/hicrc/firearms-research/)

Research group at Harvard University's School of Public Health that studies the relationship between firearms and suicide.

### Live Through This

<https://livethroughthis.org>.

Grassroots organization that provides peer support for people who have attempted suicide.

### National Action Alliance for Suicide Prevention

1025 Thomas Jefferson St., N.W., Suite 700W, Washington, DC, 20007

[theactionalliance.org](http://theactionalliance.org)

Public-private partnership that works with health care professionals and communities to implement the U.S. surgeon general's 2012 strategy for reducing the nation's suicide rate.

### National Institute of Mental Health

6001 Executive Blvd., Room 6200, Bethesda, MD 20892  
866-615-6464

[www.nimh.nih.gov/index.shtml](http://www.nimh.nih.gov/index.shtml)

Federal group that researches suicide and suicide prevention.

### National Suicide Prevention Lifeline

800-273-8255

[suicidepreventionlifeline.org](http://suicidepreventionlifeline.org)

National network of crisis centers that offer counseling and educational materials for callers who are considering suicide or are concerned loved ones may attempt suicide.

### Suicide Prevention Resource Center

43 Foundry Ave., Waltham, MA 02453  
877-438-7772

[www.sprc.org](http://www.sprc.org)

Federally supported center that provides suicide prevention training and resources.

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#### Document APA Citation

Lyons, C. L. (2019, July 12). Suicide crisis. *CQ researcher*, 29, 1-60. Retrieved from <http://library.cqpress.com/>

**Document ID:** cqresre2019071200

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