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INTENTIONAL VIOLENCE (S BONNE AND M CRANDALL, SECTION EDITOR)

Suicide in American Cities

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Abstract

Purpose of Review Suicide rates have risen over the past two decades in the United States of America (USA). Rates are higher in rural settings, but more total suicides occur in urban areas. Understanding risk and protective factors prevalent in urban areas is essential in reducing the individual and public health impact of suicide.

Recent Findings Lower rates of suicide in urban settings derive less from underlying differences in mental distress than from variation in access to care and to highly lethal means of suicide. Culturally appropriate interventions incorporating intersectional perspectives are needed to prevent and reduce suicide among people of color, particularly Native American and Black youth, and among lesbian, gay, bisexual, and transgender (LGBT) populations.

Summary The Zero Suicide Initiative aims to coordinate multi-level suicide prevention interventions across sites of healthcare, and may be particularly well-suited to urban areas, where sources of care are more densely available and healthcare contacts may be more frequent.

Keywords Suicide · Urban · Inequity · Suicide prevention · Firearms · Lethal means reduction

Introduction

Suicide is a society-wide problem that represents a major public health challenge in the United States of America (USA). Suicide has been a growing cause of death across the nation over the last two decades. In 2019, 47,511 people died by suicide in the USA [1•], representing an increase in suicide deaths from 10.4 per 100,000 people in 2000 to 13.9 per 100,000 in 2019. This alarming rise in suicide deaths has positioned suicide as the tenth leading cause of death overall and the second leading cause of death for people aged 10–34 years [1•].

The recent rise in suicide has been most prominent among older white men living in rural areas [2••, 3, 4, 5••, 6], and the most prominent images in the public narrative reflect this trend [7]. However, because more than 80% of the US population now lives in urban areas [8], 3 in 4 suicide deaths occur in cities (Fig. 1 and 2), and these populations deserve focused attention.

Suicide is not inevitable. Each death has the potential to be prevented, but effective suicide prevention is not one size fits all. General principles of risk assessment, lethal means reduction, substance abuse treatment, and mental health intervention apply broadly, but focused strategies that are culturally and situationally appropriate strategies are needed across the landscape.

Epidemiology

The impact of suicide in the USA is broad. Each suicide touches an average of 135 survivors who knew or were related to the person who died [9]. Apart from grief, families and friends wrestle with guilt and stigma that can lead to distorted social interactions [10]. In 2019, 1.4 million people attempted suicide in the USA, representing significant societal, emotional, financial strain [1•]. From a financial

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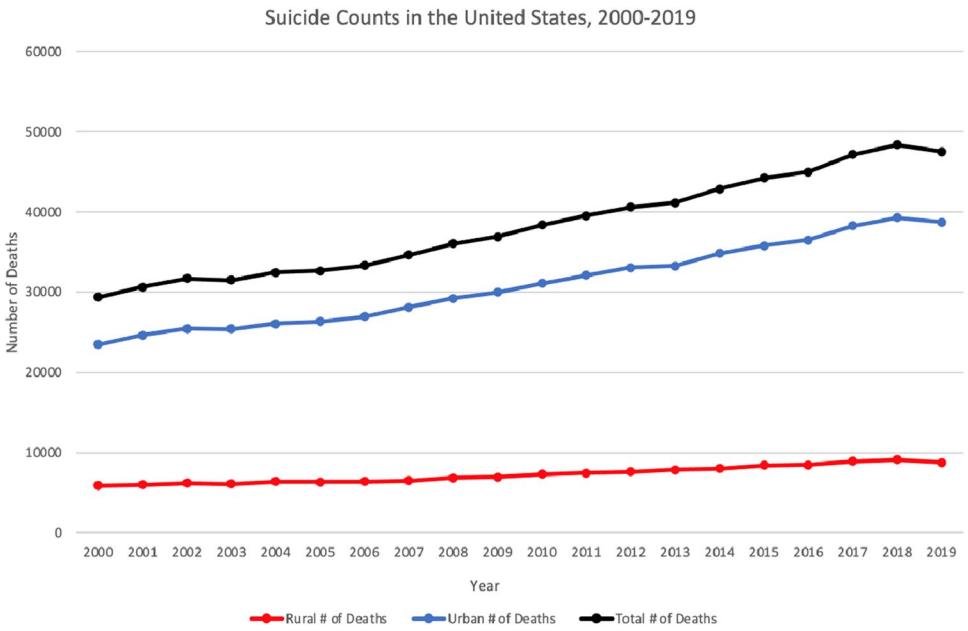

Fig. 1 Suicide counts in the USA, 2000–2019. Both suicide counts and rates have increased over the past 20 years in the USA in both rural and urban settings. While age-adjusted rates of suicide are higher in rural than in urban settings, overall suicide numbers are higher in urban than in rural settings

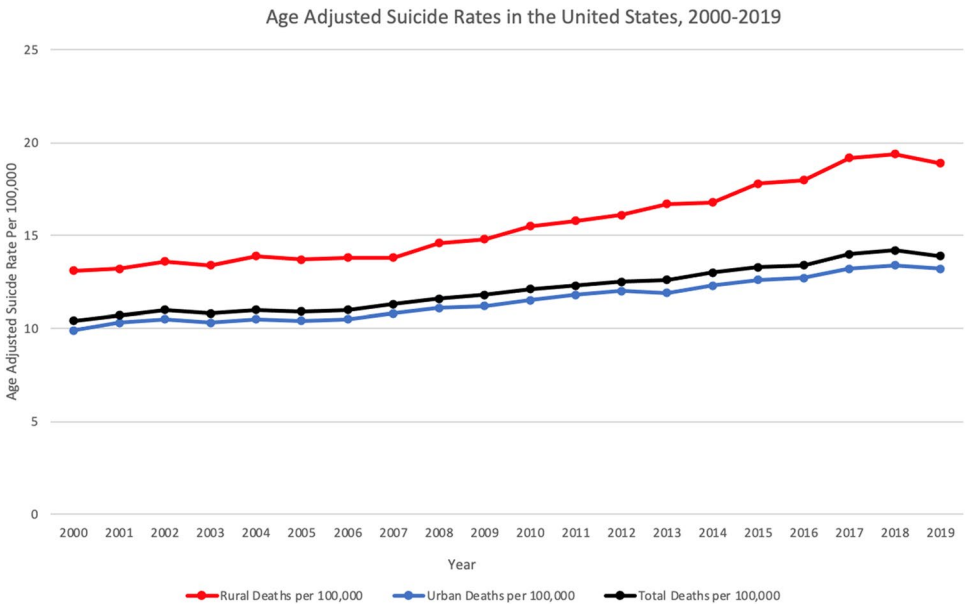

Fig. 2 Age-adjusted suicide rates in the USA, 2000–2019

perspective alone, it is estimated that suicides result in the loss of over 70 billion dollars per year in the USA [1•].

The risk of suicide is not equally distributed, however. Men are three times more likely to die from suicide than women [1•], although women are more likely to attempt suicide [11]. This disparity relates in part to differences in means of suicide: men are more likely to attempt suicide with highly lethal means, such as firearms. While risk of suicide increases with age, adolescents and young adults are by no means immune; 41% of suicides in 2019 occurred in people aged 20–44 years, and 6% occurred in people less than 20 years old. Suicide is most common among white people and Native Americans, with lower rates in Asian Americans, Black and African Americans, and Hispanic and Latinx populations. Geography is a key predictor of suicide, with the highest rates in the west and south and lowest rates in the northeast (Table 1) [1•].

Rural/Urban Distinctions in Suicide Patterns and Mortality

Suicide rates in rural settings are consistently higher than those in urban settings [2••, 3, 4, 5••, 6, 13••], not only in the USA but also internationally, from Portugal [14], to

Table 1 Counts and column percentages of suicide in the USA by geography and other variables, 2019 [12]

Variable	Urban Count (%)	Rural Count (%)	Combined Count (%)
Total	38,718	8793	47,511
Region			
Northeast	5406 (14.0%)	803 (9.1%)	6209 (13.1%)
South	15,148 (39.1%)	3568 (40.6%)	18,716 (39.4%)
Midwest	7492 (19.3%)	2691 (30.6%)	10,183 (21.4%)
West	10,672 (27.6%)	1731 (19.7%)	12,403 (26.1%)
Age groups (years)			
< 20 years	2198 (5.7%)	558 (6.3%)	2756 (5.8%)
20–44 years	15,764 (40.7%)	3564 (40.5%)	19,328 (40.7%)
45–64 years	13,490 (34.8%)	2760 (31.4%)	16,250 (34.2%)
65+ years	7263 (18.8%)	1910 (21.7%)	9173 (19.3%)
Sex			
Male	30,073 (77.7%)	7183 (81.7%)	37,256 (78.4%)
Female	8645 (22.3%)	1610 (18.3%)	10,255 (21.6%)
Race			
White	33,836 (87.4%)	8099 (92.1%)	41,935 (88.3%)
Black	3027 (7.8%)	282 (3.2%)	3309 (7.0%)
American Indian/Alaskan Native	339 (0.9%)	319 (3.6%)	658 (1.4%)
Asian/Pacific Islander	1516 (3.9%)	93 (1.1%)	1609 (3.4%)
Ethnicity			
Hispanic	3931 (10.2%)	400 (4.5%)	4331 (9.1%)
Non-Hispanic	34,679 (89.6%)	8369 (95.2%)	43,048 (90.6%)
Mechanism of injury			
Cut/pierce	778 (2.0%)	143 (1.6%)	921 (1.9%)
Drowning	456 (1.2%)	50 (0.6%)	506 (1.1%)
Fall	1104 (2.9%)	79 (0.9%)	1183 (2.5%)
Fire/flame	151 (0.4%)	36 (0.4%)	187 (0.4%)
Firearm	18,672 (48.2%)	5269 (59.9%)	23,941 (50.4%)
Poisoning	5322 (13.7%)	803 (9.1%)	6125 (12.9%)
Suffocation	11,276 (29.1%)	2287 (26.0%)	13,563 (28.5%)

China [15, 16], Austria [17], Australia [18], Germany [19], and Sweden [20], among many others. Rates of suicide have risen more quickly in the rural USA than in urban areas, widening this gap (Figures 1 and 2) [13••].

Differences in suicide rates between rural and urban areas are not fully explained but are undoubtedly multifactorial. Underlying rates of mental and emotional distress appear similar, as do rates of suicidal ideation [21]. The bulk of the disparity in suicide deaths appears to result not from the underlying distress that may lead to a suicide attempt, but from the type of attempt and care available afterward [22]. Most suicide deliberations are transient, with 75% lasting less than an hour. Moreover, 90% of those who survive a nonfatal suicide attempt do not go on to die by suicide, making what happens during and after a suicide attempt critical. Means of suicide is an important factor in determining outcomes. Firearms are involved in less than 5% of suicide attempts but more than half of suicide deaths, because 90% of suicide attempts using a firearm result in death [23]. Therefore, access to firearms is crucial to evaluating suicide risk. The presence of a firearm in the home increases an individual's risk of suicide nearly 5-fold [24, 25]. Firearm ownership is more than twice as common in rural areas, where 46% of the population reports owning at least one firearm, compared to 19% in urban centers [26].

Firearms, which have the highest case fatality rate of all suicide methods, are more frequently used in suicidal acts in rural counties, while jumping from heights and drug poisoning (which carry lower risk of death) are more common in urban counties [23, 27]. In fact, the rural male risk for firearm suicide may entirely explain the difference in rural versus urban and male versus female suicide rates, as non-firearm suicide shows no such disparities [27]. In cities, the relationship between suicide risk and firearm ownership [28] varies across the population. Both firearm availability and socioeconomic disadvantage are significantly associated

with increased suicide risk among young white males in urban settings. Among young Black males in the same settings, firearm availability is the major risk factor for suicide [29].

Suicidal acts may also be more likely to lead to fatality in rural than urban settings due to differential availability of acute care for injuries sustained during a suicide attempt and availability of mental health care afterward. People who attempt suicide in urban settings are more often hospitalized following the attempt [23]. As a corollary to this (and in an effort to guide further screening efforts), easier access to mental health and primary care providers may provide a means for screening patients at high risk for suicide, since 20% of suicide victims contacted mental health providers within a month of death and 45% contacted primary care providers [30]. In fact, one of the highest predictors of death from suicide is recent contact with healthcare for suicide-related behaviors. Identifying at-risk patients for simple interventions has the potential to reduce suicide deaths. Because urban settings have a higher density of mental health and primary care providers, they provide a promising environment for such efforts.

The built environment contributes to suicide in urban areas. For example, subway-related suicide is a specifically urban phenomenon, with higher risks associated with faster trains, more media reporting of subway suicide, and increased numbers of passengers [31]. Subway-related suicide is also more common at stations that are more frequently used as meeting points for drug users [31, 32]. Higher levels of air pollution, more common in urban settings, have also been linked to higher rates of suicide [33].

Risk Factors

Patient-Specific Factors

While key risk factors for suicide are known, these factors have not significantly improved prediction of who will die by suicide in the last 50 years. Currently, the accuracy of suicide prediction is no better than a coinflip [34]. Individual characteristics including older age, male gender, and presence of chronic illness are associated with a higher suicide risk [2, 35]. Risk for suicide is particularly elevated in patients with cancer [35] and epilepsy [36], patients with substance use history [37, 38], homelessness [37], and history of physical [39] or sexual trauma [40].

Risk of suicide is prominent among cancer patients, with distinct risk factors including diagnosis of lung or pancreatic cancer or metastatic disease [35]. Among cancer patients, any marital status at cancer diagnosis other than "married" is associated with a higher risk of suicide, with divorced status associated with the highest risk [35]. Hispanic ethnicity has been associated with a decreased risk for suicide among patients with cancer [35].

Linked to many of these findings, social isolation is associated with an increased risk for suicide [3, 41]. Loneliness, feelings of alienation, and an absence of belongingness were similarly associated with higher risks for suicide [41]. On the other hand, dense social networks are protective against suicide [41]. Both living alone and being divorced or separated (particularly for men) have been associated with increased risk for suicide, particularly when the surrounding community does not share these attributes, resulting in a perception of difference and isolation [41]. These findings extend to correctional facilities—isolation and segregation cells increase risk for suicide among people in correctional facilities while family contacts protect against it [41]. Unemployment may increase suicide risk both by decreasing social interaction and by increasing economic stress and hopelessness.

Individuals who own a firearm or live with someone who does have a 3- to 5-fold increased risk of death by suicide [24, 25, 42]. A case-control analysis that matched suicide decedents to controls by sex, race, age, and neighborhood of residence identified that decedents were more likely to have lived alone, taken prescribed psychotropic medications, been arrested, abused drugs or alcohol, and not graduated from high school. When all these features were controlled, however, the presence of a firearm in the house remained significantly associated with increased risk of suicide [24]. This association is present at the population (state, region, country) level - states and regions in the USA with higher rates of suicide by firearm [43, 44] and international studies have shown that increased firearm ownership rates are associated with increased rates of suicide by firearm [45, 46]. Moreover, the institution of child access prevention laws has decreased the incidence of youth suicide death by firearm, particularly among males [47].

External Factors

Unemployment rates are linked with suicide rates [35, 48]. County-level poverty rates are associated with increased suicide rates in children and adolescents [49•]. Socioeconomic status (as measured at the county level) increases suicide risk in cancer patients, with higher rates in counties with greater than 5% unemployment rates, greater than 5% of families below the poverty line, and 20% or less of the population having attained a high school education [35]. Moreover, these risks are additive—socioeconomic disadvantage leads to a higher risk of suicide among males, older patients, and African Americans [35, 50].

The Impact of Inequity on Suicide Risk

While suicide results from an individual mental health crisis, numerous social, cultural, and economic factors contribute to mental illness and to resulting suicidality and suicide. For members of marginalized groups, minority stress can be a key contributor to elevated levels of mental distress including suicide risk. In this model, developed by Meyer to understand elevated rates of mental illness in lesbian, gay, and bisexual populations, it is not the marginalized identity that causes distress, but rather the accumulated effects of prejudice and discrimination [51]. Indeed, lesbian, gay, and bisexual people have 2.5 times the risk of suicide than heterosexual individuals [52]. Along with focused, culturally competent care and outreach, decreasing societal stresses can lower suicide risk. For example, legalization of same-sex marriage has been associated with decreased mental distress and suicide among lesbian, gay, bisexual, and transgender (LGBT) individuals in the USA and elsewhere [53, 54]. Individuals with intersectional identities exposed to multiple axes of discrimination are at further increased risk [55]. For example, while disabled and LGBT youth both have high rates of suicide, this risk is compounded for individuals who are both disabled and LGBT [56]. Baiden et al. studied risk among LGBT youth of color and identified lower rates of reported suicidal ideation but higher risk of suicide attempt in these groups [57]. These phenomena are highly situational, and risk can be attenuated or eliminated by peer and family acceptance [58].

As research and practice in healthcare so often embodies systemic racism and inequity, most studies of suicide have focused on white populations, and most interventions have been validated among white people [59], with relatively few available interventions that are culturally appropriate to populations of color [60]. This undoubtedly leads to unequal care and missed opportunities to prevent suicide deaths.

For example, Native Americans and Alaska Natives die from suicide at double the rate of the overall US population [61]. Wexler and Gone summarize the ways that suicide prevention initiatives designed for and tested on non-Native populations may miss the mark. They theorize that suicide in Native communities may be best understood as a consequence of "social disorganization, culture loss, and a collective suffering" rather than an individual mental illness, and argue that for suicide prevention to be culturally responsive, it must extend beyond individual mental healthcare to address community concerns [62].

As shown in Table 1, Black and African American individuals have lower rates of suicide compared to white and Native American populations, but rates of suicide have been rising among Black youth [63], with Black children under 13 having double the risk of suicide of white children. However, Black children are less likely to be diagnosed with depression when they are symptomatic and less likely to receive treatment [64–66]. Risk factors for suicide among Black youth include bullying, socioeconomic challenges, experiences of racial discrimination, and experiences of discrimination on the basis of sexual orientation and gender identity [67, 68••]. Additionally, despite having similar risks for suicide, some of the disparity in suicide reporting may be because Black and Hispanic individuals appear to be at higher risk for having apparent suicide events misclassified as the cause of death [69]. Novel initiatives to develop tailored interventions have shown promise in engaging this at-risk population [67, 70]. Across the urban-rural landscape, risks are not equal: suicide rates among non-Hispanic African Americans are consistently higher in urban than rural areas, in contrast to national averages [2••].

Suicide Prevention in Urban Areas

Zero Suicide Initiative

The mobilization and integration of primary health and emergency health settings with behavioral health systems is a crucial step in suicide prevention under the auspices of the National Action Alliance for Suicide Prevention's Zero Suicide (ZS) Initiative [71] (Fig. 3). ZS integrates three major components of suicide prevention through the Assess, Intervene, and Monitor for Suicide Prevention (AIM-SP) model [71]. Because of the density of primary care, emergency department, and behavioral health services, urban settings are particularly well-suited to implementing the ZS Initiatives, whereas individual providers might struggle to provide effective services in isolation. For example, emergency departments and trauma units may have a unique opportunity to identify and assess suicide risk among patients who are admitted for self-injurious behaviors [72].

The ZS model utilizes the Columbia Suicide Severity Rating Scale (C-SSRS) to identify the presence and severity of suicide risk [71, 73••]. The C-SSRS measures four constructs of suicidality: severity of ideation, intensity of ideation, suicidal behaviors, and lethality of attempt behavior [74]. This highly structured clinical interview can be implemented in a variety of health settings and requires minimal additional training. Providers can use C-SSRS responses to triage intervention services at the point of care and in follow-ups with behavioral health services. C-SSRS interviews can be conducted as a part of a Suicide Assessment Five-step Evaluation and Triage (SAFE-T), which incorporates the American Psychiatric Association Practice Guidelines for assessing suicide risk. The SAFE-T process utilizes a five-step model for assessing, evaluating, and triaging suicide risk that includes: first, identification of risk factors (noting those that can be modified to reduce risk); second,

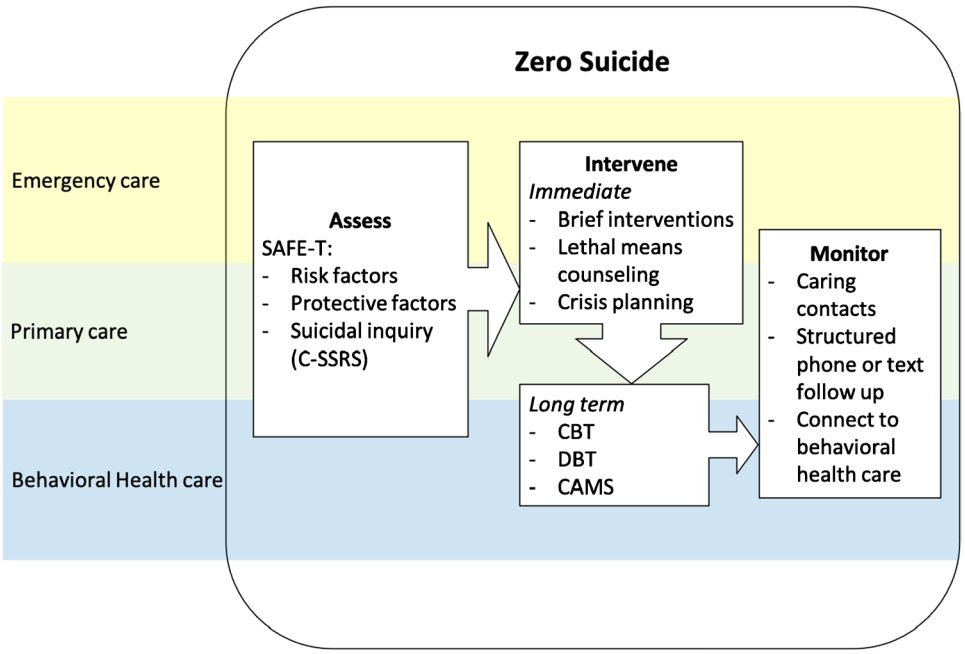

Fig. 3 Schematic for integrating urban health settings using the Zero Suicide framework. The Zero Suicide Initiative aims to reduce suicide mortality by leveraging multiple interventions across the spectrum of healthcare settings. Suicide Assessment Five-Step Evaluation and Triage (SAFE-T), Columbia-Suicide Severity Rating Scale (C-SSRS), Cognitive Behavioral Therapy (CBT), Dialectical Behavioral Therapy (DBT), Collaborative Assessment and Management of Suicidality Care (CAMS)

identification of protective factors (noting those that can be enhanced); third, conducting a suicidal inquiry that assesses suicidal thoughts, plans, behavior and intent (as through the C-SSRS); four, determining the level of risk and appropriate intervention to address and reduce risk; and five, documentation of risk, intervention, and means of follow-up [71, 75].

Interventions to Reduce Suicide Risk

These settings may also be appropriate for the provision of brief suicide interventions such as Safety Planning Interventions (SPI), counseling on restricted access to lethal means, and provision of crisis numbers [76•, 77]. These services can be implemented in emergency settings with appropriate training and have been demonstrated to contribute to significant reductions in risk for repeated suicide attempts [76•, 77]. SPIs are brief suicide risk interventions (20–45 min to complete) that are intended to reduce the imminent risk of suicide by helping at-risk patients develop a 5-step safety plan to consult when in crisis, as well as brief lethal means counseling [78]. Providers conduct SPIs by counseling patients to: first, identify warning signs, second, identify internal coping strategies (i.e., ways to distract from the suicidal crisis), third, identify social situations and people that can distract from the crisis, fourth, identify interpersonal supports that the patient can use for support, and fifth, identify professionals, emergency services, and emergency numbers that can help (e.g., the suicide prevention lifeline number) [78]. Finally, the clinician provides the client with psychoeducation and a plan for restricting access to lethal means and making their environment safe [78].

While SPIs have been demonstrated to reduce suicide risk, especially in the short-term period immediately following a suicidal crisis, long-term psychosocial follow-up services can be offered via behavioral health providers following the identification and assessment of patients at risk for suicide [79]. These interventions include specific therapeutic models focused on suicide risk reduction such as Cognitive Behavioral Therapy (CBT) and Dialectical Behavioral Therapy (DBT). Systematic reviews of these therapies have demonstrated reduced rates of repeated self-harm among adults receiving CBT and DBT [80]. Additionally, Collaborative Assessment and Management of Suicidality Care (CAMS) is a psychotherapy that utilizes "therapeutic assessment" through the completion of a Suicide Status Form (SSF) that assesses six core constructs of suicide risk (i.e., psychological pain, stress, agitation, hopelessness, self-hate, and overall risk) and provides tools for treatment-planning, tracking, and clinical outcomes [81]. Because of the structured nature of the SSF, strong assessment component, and flexible therapeutic framework, CAMS has proven not only to be one of the most effective treatments of suicide risk, but also easily extendable to multiple domains and settings [82]. Furthermore, recent research has indicated that virtual provision of CAMS (V-CAMS) care may be easily implemented to provide clinical decision support tools using a novel digital environment and avatar system. However, additional research is still needed to support the efficacy of V-CAMS [83].

Lethal means reduction is an essential intervention to preventing suicidal impulses from resulting in death. Because firearms are the most lethal means, reducing or delaying access to firearms for a person in crisis can be lifesaving.

Promising interventions range from individual counseling [84] and secure storage of firearms [85] to temporarily separating at-risk individuals from their firearms, either voluntarily [86] or through an extreme-risk protection order (ERPO) [87]. Policies that introduce delay into the purchasing process for firearms can also prevent suicide, including waiting periods and licensing laws [88].

Follow-up for Individuals at Risk

In addition to risk assessment and brief intervention, emergency departments and primary healthcare settings can implement structured follow-ups by telephone or via text message that can act as "caring contacts" and encourage engagement with behavioral follow-up services. Early research on patients thought to be at high risk for suicide indicates that even in the absence of therapeutic treatment for suicide, patients who receive brief contact notes through the mail (or occasionally by phone) are at lower risk for eventual death by suicide [89]. Follow-up research has indicated that caring contacts could be extended to include reminders to engage with behavioral health services and could be implemented widely and inexpensively following a suicidal event through post-acute services. These interventions in military personnel may reduce suicidal ideation and attempts and encourage treatment-seeking following discharge from an emergency department [90–92]. Overall, the inclusion of SPI with a telephone follow-up contact following emergency department visit for a suicidal event significantly reduces the odds of engaging in suicidal behavior at 6-month follow-up and leads to a two times greater odds of attending a mental health treatment session following discharge [93]. Because of the efficacy of well-integrated strategies for providing brief suicide risk assessments, SPIs, and behavioral health interventions, the ZS Initiatives are well-positioned to capitalize on the unique advantages of the presence of multiple service providers present in urban environments.

Conclusions

Suicide is a complex health, cultural, economic, and societal challenge with far-reaching implications. Urban areas may provide fertile ground for many of the most promising avenues for investigation into methods for meaningful reduction in suicide rates. The density of emergency departments, primary care, and mental health providers, and the potential for the creation of an integrated network to cohesively identify patients at risk for suicide death and to determine interventions that may reduce the risk, makes the urban setting very attractive for further investigation into this area.

Much of the existing research on suicide epidemiology focuses on suicide in general or on rising rates in rural areas. Risk and protective dynamics may vary not only between rural and urban areas but also among urban populations at risk. Urban areas may present key opportunities for understanding the intersectional impacts of inequity, access to care, access to lethal means, and mental distress on suicide risk. Future research must be attuned to population-specific needs and risk factors and should develop effective interventions tailored to urban settings. Additional research is needed to better evaluate the efficacy of current interventions (including caring contacts, development of integrated mental health follow-up, CBT, and DBT) in preventing suicide. With a comprehensive understanding of the contributors to suicide, we can hope to realize the potential of preventing suicide death.

Declarations

Conflict of Interest no conflicts of interest exist for this study

Human and Animal Rights This article does not contain any studies with human or animal subjects performed by any of the authors.

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