



Understanding Vulnerability to Late-Life Suicide

Olivia J. Ding¹ · Gary J. Kennedy^{1,2}

Accepted: 25 May 2021

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2021

Abstract

Purpose of Review We review recent evidence on suicide among older adults, examine risk factors contributing to vulnerability to late-life suicide, and summarize possible interventions.

Recent Findings We found a steadily increasing rate of late-life suicide in the USA in the past decade. Evidence supporting the integration of depression care managers into primary care for risk reduction is among the strongest to date. Pharmacologic and neuromodulation studies should be considered in geriatric depression complicated by suicidality. Broad societal campaigns about suicide education, as well as active outreach to psychiatric patients after discharge or a suicidal crisis, prevent suicidal behavior. Growing research supports an integrative multidisciplinary approach.

Summary Suicide is a complex and multifaceted behavior with numerous casual points for intervention. Access to deadly means, presence of depression, disease, disability, and social disconnection are factors that increase vulnerability. Quality geriatric care, regular screening in primary and emergency care settings, and a multidisciplinary approach are necessary to mitigate risk factors. The COVID-19 pandemic amplifies need for a more aggressive approach.

Keywords Suicidal ideation · Suicide and self-harm · Geriatric

Introduction

Although crude death rates have declined over the last five decades, having peaked in the 1950s, a slow and steady rise in suicides occurred in the last 10 years (CDC fatal injury reports). The actual number of deaths by suicide in late life is expected to rise with increasing percentage of older Americans (expected to reach 22% of the population by 2050). Despite its prevalence, late-life suicide receives little attention from media to healthcare initiatives to funding agencies [1•]. Ageist views tend to consider depression and thoughts of death as a normal feature of the aging process. Accumulation of physical illnesses, disabilities, life events, and losses is seen as the explanation for so-called rational suicide to opt out of this end-stage of life [2]. A systemic

review of “rational suicide” identified depression, self-determination, mental competence, and ageism in both physicians’ and population’s perspectives [3•]. Geriatricians are increasingly encountering older adults expressing suicidal wishes in the absence of overt mental illness, which is expected to grow [4] more so in the aftermath of the COVID-19 pandemic [5]. In this review, we provide an update on suicide rates and related vulnerabilities. We summarize notable prior literature and highlight more specific findings from the past 3 years. Finally, we end with a review of population-based approaches for reducing its risk.

Suicide Rates Among Older Adults

Table 1 shows suicide rates among adults ages 65 and older from 2009 to 2019. In the most recent decade, the highest rate was 16.67 per 100,000 seniors in 2019, reflecting a nearly stepwise annual increase, and a 60% increase as compared with 10.4 per 100,000 seniors 20 years prior. The nation’s 65-and-older population has grown rapidly since 2010, by over a third (34.2% or 13,787,044) during the past decade and by 3.2% (1,688,924) from 2018 to 2019. In 2019, older adults made up 16.5% of the American population but they

This article is part of the Topical Collection on *Geriatric Disorders*

✉ Gary J. Kennedy
gkennedy@montefiore.org

¹ Department of Psychiatry and Behavioral Science, Bronx, NY, USA

² Division of Geriatric Psychiatry, Montefiore Medical Center, Albert Einstein College of Medicine, Bronx, NY, USA

Table 1 WISQARS injury mortality report suicide injury deaths and rates per 100,00 all races, both sexes ages 65–85+

Year	Suicide injury deaths	Crude rates per 100,000
2010	5994	14.88
2011	6321	15.29
2012	6648	15.41
2013	7215	16.17
2014	7702	16.69
2015	7912	16.60
2016	8204	16.67
2017	8568	16.88
2018	9102	17.38
2019	9173	16.97

accounted for more than 19.4% of suicides. Approximately 71% of late-life suicides in the USA are the result of firearm use. Suicide attempts in this age group are usually fatal in the first attempt due to the lethality of means, existing fragility and lack of desire or opportunity for rescue [6]. While the crude suicidal death rate was 16.67 per 100,000 seniors in 2019 including all races, ethnicities and genders, the highest death rate was observed in white males ages 85 and above, at 54.41 per 100,000. Suicide rates among white males grow from late adolescence and see an abrupt increase from age 65, in contrast to elderly women, whose rates remain constant from 65. The prevalence of late-life suicide among white males, a group least likely to seek treatment for depression, has been the case since the early 2000s [7] (Fig. 1).

Systemic reviews suggest that older adults who died by suicide are different from younger suicide victims. Older victims had less evidence of maladaptive personalities and the majority did not meet the threshold for psychiatric diagnosis. The only significant association was with a relatively small number of older suicide victims who had obsessive-compulsive and avoidant personality disorders, which researchers suggest may account for more difficult transitions into later-life changes. They also noted that older suicide victims were more diverse in both risk factors and experiences compared with early-life suicide victims [8]. A cross-sectional case-control study comparing the personalities of 200 late- and early-onset elderly suicide attempters using the Five Factor Model echoed similar findings where older attempters scored higher on orderliness and conscientiousness. In contrast, younger attempters displayed higher neuroticism, borderline traits, lower extraversion, and higher antisocial traits [6]. Gujral's 2020 [9] study examined whether late-onset (versus early-onset) suicidal behavior is associated with worse cognition. They found that both attempter groups displayed worse executive functioning than non-suicidal depressed older adults. Late-onset attempters additionally displayed poorer global cognition and processing speed than non-

suicidal depressed older adults and poorer memory than early-onset attempters.

Suicide Screening

The majority of suicide decedents encounter primary or emergency care settings in the year prior, rather than a professional in mental health. According to a review of forty studies, 45% of suicide victims visited their primary care provider in the month before suicide, while only 20% saw mental health professional in the same period [10].

Unfortunately, the level of suicide screening and subsequent mental health evaluation is less among older adults. Of those discharged from the emergency department with a positive suicide screen, less than half (42%) of older adults received a mental health evaluation during their visit compared with 66% of younger adults who met the same criteria. Similarly, fewer older, than younger patients with current suicidal ideation following an attempt received referral to mental health treatment (34 vs 60%) [11]. Similar findings were supported by medical records from a military veterans' clinic, where patients older than 50 were less likely to have evidence of (1) screening for impulsivity and firearms access (2) engagement in safety planning and (3) referrals for mental health services including psychiatric hospitalization [12].

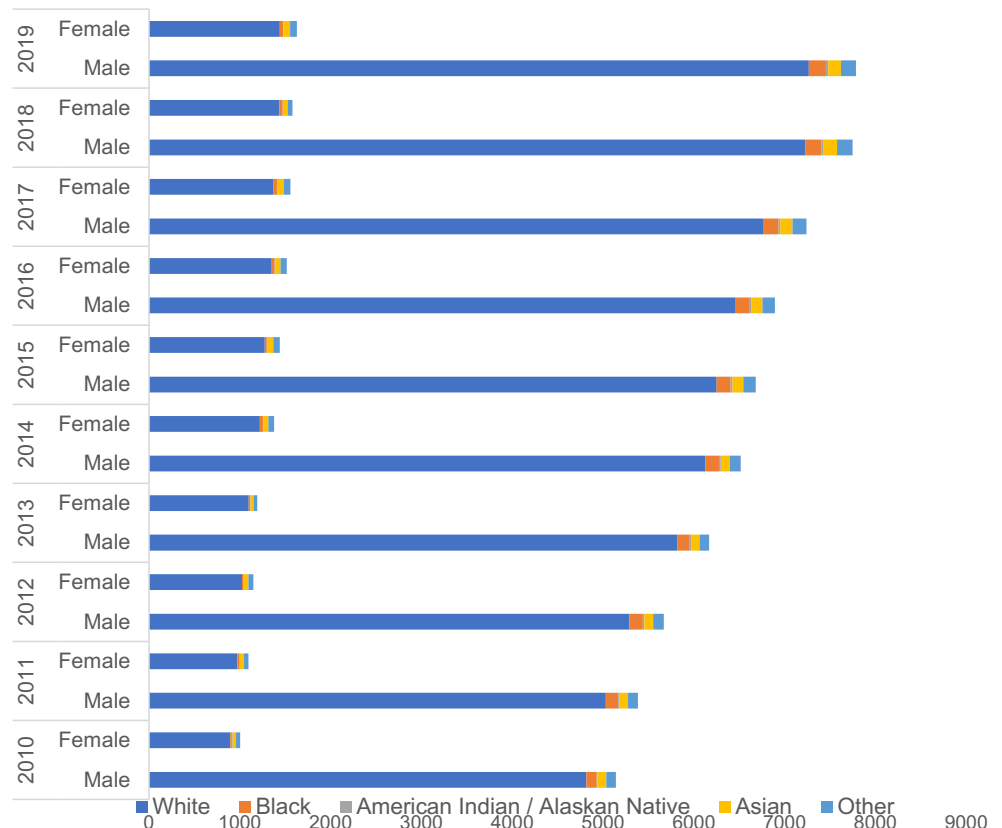
Risk Factors

Pain, cancer, and chronic illness account for an elevated risk for suicide. As the number of comorbid diseases mount, relative risk of suicide is thought to increase substantially. In Choi's 2019 review [13], physical health problems were recorded as a suicide precipitant for 50% of the older decedents. Compared with those without, those with physical health problems as a precipitant were older and twice as likely to have had depressed mood. They were also more likely to have disclosed suicide intent, left a suicide note, and used a firearm. Coroner, medical examiner, and law enforcement reports found pain (29%) and cancer (28%) mentioned most frequently, dementia-related functional decline, fear of becoming a burden to loved ones, refusal of nursing homes, and loss of independence also named. Even a recent diagnosis of mild cognitive impairment with its threat of progression to dementia has been associated with attempted suicide [14•].

A number of small-sample cross-sectional studies have specifically looked at neurocognitive impairments as diathesis to late-life suicide, suggesting that executive dysfunction, altered decision-making, impaired control of intrusive thoughts, and reduced social emotion recognition underlie decreased problem-solving ability, which may lead to suicidal ideation [10].

Alessi's 2019 two-part study measured motivations for attempting suicide based on self-report with the Reasons for

Figure 1 White Males Predominate in Late Life Suicides in the United States. <https://webappa.cdc.gov/sasweb/ncipc/mortrate.html>. Accessed 1 Apr 2021



Attempting Suicide Questionnaire (RASQ), followed by a semi-qualitative assessment. Measures of personality for both studies included assessments of impulsivity, the Five-Factor Personality Domains, interpersonal dysfunction, and borderline traits. In study 1, escape/self-punishment motives on the RASQ were associated with multiple attempts and borderline pathology, while interpersonal motives were less frequently endorsed and associated with poorly planned attempts. In study 2, experiences of defeat (powerlessness, poor coping to threats to autonomy/status) were more frequently endorsed by men and associated with disagreeableness. Study 1 revealed that attempters high in dysfunctional psychopathology were more likely to report self-oriented escape motives for suicide, while study 2 identified a putative pathway to suicide in men involving antagonism and the experience of defeat [15].

Another study examining motivation for suicide by Bickford 2019 emphasized “perceived stress” as a significant risk factor. He suggested screening for perceived stress using the Perceived Stress Scale as part of suicidal prevention efforts [16].

Both active suicidal ideation and ambivalence about living are associated with suicide attempt within 6 months. Clinicians should be mindful that differentiating between active suicidal ideation and ambivalence about living are both presentations that warrant follow-up [8].

Given the multitude of physical, psychological, and sociodemographic factors that contribute to suicidal ideation, an individual factor may have little predictive value. However, mitigating social isolation has been suggested to reduce population attributable risk of suicide by 27% [17].

Late-Life Depression Older adults are less likely than younger adults to recognize depression symptoms as an illness and less likely to alert their primary care provider. [18]. In primary care settings, 6% meet criteria for major depressive disorder. Another 6% meet criteria for minor depression or dysthymia (persistent depressive disorder), and an additional 10% meet criteria for subsyndromal depression (short duration or insufficient symptoms), scoring above the recovery threshold of the Hamilton Depression Rating Scale (HAM-D). As a result, clinically significant depressive symptoms which may represent partial remission or the beginning of a major disorder can be easily missed [19].

Depression predisposes both young and old to somatic illnesses and the relationship is reciprocal. Studies suggest that white matter changes on MRI and executive dysfunction may underlie geriatric depression and predict poor antidepressant response [18]. Depression may then predispose and precipitate vascular events [20]. In Mikami’s 2014 study, low-dose escitalopram provided to persons free of depression symptoms and anxiety within 90 days of an embolic stroke halved the

incidence of depression, reduced the emergence of anxiety and was well-tolerated [21].

That geriatric depression is mediated by inflammation is a provocative theory. Plasma studies suggest that peripheral inflammatory markers are elevated in late life depression and associated with severity of both mood and cognitive symptoms. A recent prospective study found that inflammation predicted new onset depression in men more so than women. Participants ($n = 10,357$) with no evidence of depression at baseline (based on the nine-item Patient Health Questionnaire (PHQ-9), lifetime diagnoses, and current antidepressant medication) were evaluated for depression 5 years later. Multivariate logistic regression predicted the onset of depression based on C-reactive protein and white blood cell count. Based on both markers, inflammation was predictive of new cases of depression 5 years later, even after adjusting for sociodemographic, physical health, health behavior, and baseline depression symptoms. Inflammatory markers were predictive of depression in men, but not in women. Additional predictors for the onset of depression were younger age, loneliness, smoking (in men), cancer, and less alcohol consumption (in women). These gender differences in the etiology of depressive disorders within the community suggest a greater role of physical factors in men [22].

Unfortunately, studies targeting inflammation in geriatric depression have not been promising to date. Taking 100 mg of daily aspirin compared with placebo was not preventative [23].

Comorbid Psychiatric Conditions

Anxiety disorders, often comorbid with depression, are involved in one of every six older adult suicides. A cohort study from the Veterans Affairs National Patient Care Database and the Centers for Disease Control and Prevention's National Death Index found that psychiatric disorders strongly associated with suicide include bipolar disorder, depression, substance use disorders (both alcohol and drugs), schizophrenia, anxiety disorders, and post-traumatic stress disorder (PTSD). PTSD was linked to suicide risk in both military and civilians. Treatment approaches include increased access care, sustained engagement, care coordination, reinforcement of family, and peer relations and limiting access to lethal means. A meta-analysis of interventions following self-harm in late life found that cognitive behavioral therapy was the most effective therapy [24].

Screening for the Wish for Death

The wish to die in older patients admitted to rehabilitation can be validly assessed with two novel instruments, with a high concordance rate of 90.1%. The Categories of Attitudes toward Death Occurrence (CADO) allows for passive death wishes to

be distinguished from wishes to actively hasten death. Associations were observed between the Schedule of Attitudes Toward Hastening Death (SAHD) and advanced age, depressive symptoms, lower quality of life, and lower cognitive function [25].

However existing scales for depression and suicidal ideation are not sufficiently reliable or clinically useful in predicting the small subgroup of suicide ideators whose death by suicide is imminent. An ecological momentary assessment method found that suicidal ideation fluctuates from moment to moment. In a sample of participating inpatients, who attempted suicide in the past year, there were dramatic fluctuations in the intensity of suicidal ideation. "All participants had ideas of suicide which varied in intensity by a full standard deviation on most days. Many had one standard deviation fluctuations several hours apart within the same day" [8]. This highlights the need to monitor fluctuations and not dismiss the possibility of sudden increases in suicidal urges, even when the current risk appears low. Additionally, suicidal ideation is considered a better predictor of lifetime risk for suicide than imminent risk, so assessments should include describing the characteristics and impact of prior SI as well as current.

A Separate Psychiatric Phenomenon

The idea that suicide is a separate phenomenon from traditionally associated mood disorders has gained attention. A recent retrospective analysis concluded that most older adults in the USA who die from suicide did not have a known mental health condition. The study was completed in 2019 using the National Violent Death Reporting System, 2003–2016 ($n = 26,884$) for suicide deaths for adults aged ≥ 65 years. ORs compared sociodemographic and clinical characteristics, cause of death, and precipitating circumstances based on coroner/medical examiner and law enforcement reports. Older male (69.1%) and female (50.2%) suicide decedents did not have a known mental illness. A physical health problem was the most prevalent precipitating circumstance but was more common among older adults without known mental illness. Past suicide attempt, disclosure of suicidal intent, depressed mood, and substance use were more common among those with a known mental illness. More than three fourths of suicide decedents did not disclose their suicidal intent. Most suicide deaths involved firearms, which were disproportionately used by decedents without known mental illness (81.6% of male and 44.6% of female decedents) compared with those with known mental illness (70.5% of male and 30.0% of female decedents) [26]. Disconnection between prior mental illness and suicide completion perhaps warrants the consideration of suicide as a separate psychiatric illness with its distinct symptoms and pathological processes.

Table 2 The 5 D’s framework—dynamic interactions between determinants of suicide risk late life [27]

Characteristic	Description	Interventions to potentially mitigate risk
Deadly means	The presence of a firearm in the home. Lethality of intent and implementation are higher among older adults than those who die by suicide at younger ages (CDC). In the U.S., 75% of older people who die by suicide used a firearm	Firearm legislation strength is inversely associated with firearm suicide rates [33]. Restricting access for those at risk is critical. Suicide prevention training and vigilance working with distressed individuals may help in firearm retail settings. Screening in both primary care and mental health settings is needed to identify those at risk. When found to be at high-risk, utilizing social supports to remove access to weapons is helpful. Other means restrictions actions include increasing expired medication disposal efforts, building bridge barriers [28••]
Depression	Depression occurring in older patients is often undetected or inadequately treated. Major and minor affective disorders have been found through psychological autopsy studies in up to 87% of older people who die by suicide [12]	Evidence supporting the integration of depression care managers into primary care for screening, diagnosis and treatment is among the strongest to date. Treat with medication, start low, go slow, but treat to target. SSRIs/SNRIs remain first line for late-life depression. Psychotherapy, exercise therapy, and electroconvulsive therapy may also be effective. [29, 31, 32]
Disease and disability	Disability in older people is frequently associated with disease and vice versa. Functional disability, as well as several specific physical illnesses have demonstrated associations with suicidal behavior in older adults	Adherence to medication, nutritional programs, physical therapy, and exercise programs are key. Quality interdisciplinary geriatric care, promotion of home-based and virtual care may increase access. Treatments that prioritize and maximize the quality of life [48]. Psychoeducation and support groups for patients and caregivers [49]. Minimize polypharmacy
Disconnectedness	Social disconnectedness is the lack of structural, functional, and emotional supports that people want and need from each other	Detecting those at risk for social isolation and connecting them with employment, community activities, support groups, individual or group skills training [1••]. Utilizing technology to maximize connection with internet-based supports, family, and friend networks, as well as healthcare providers [50,51]. Screen and treat for sensory deficits, an independent predictor of social isolation [44]
Development	Factors in one’s development may contribute to vulnerability to the “D’s” encountered later in life. Growing up in an unsafe neighborhood might increase chances of possessing firearms. Lack of social and structural support increases risk and consequences of disease and disability. Attachment style is established early in development based on experiences of safe, trusted relationships with others. These early life developments contribute to an older adult’s suicide risk	Continuity of care, using a longitudinal lifespan approach to identify individual risk and protective factors for suicide in late life. Carstensen’s Socioemotional Selectivity Theory: [52] as people age, there is an associated decrease in attachment anxiety, whereas persisting attachment anxiety is related to low levels of well-being and high levels of distress. Bolstering social support moderates this risk

Opportunities to Reduce Suicide Risk

The challenge of tackling suicide lies in its complex and multi-determined nature; however, it also presents opportunities to intervene at multiple points in the causal web. Conwell and Lutz [27] recently suggested the 5D'S framework as a practical way of looking at the risk factors for late-life depression, summarized in Table 2. Similar strategies were suggested by Moutier in 2020 [28••]; though some strategies were targeted toward suicide prevention during COVID-19, they have broad applicability.

Pharmacotherapy and Other Somatic Interventions

A range of somatic therapies promise to reduce the risk of suicide among older adults seeking behavioral health care. These include antidepressants alone and augmentation with antipsychotics, lithium [10], and electroconvulsive therapy [29]. However, pharmacotherapy is not without risk [30]. Evidence that transcranial magnetic, direct current stimulation, or ketamine is effective among older patients has yet to emerge. The larger limitation with these interventions is that so many people who die by suicide in old age did not seek and were not identified as needing care.

Nonpharmacological Interventions

The SEEDS study, a trial of 121 patients with late-life depression, compared the antidepressant effectiveness of sertraline (S) and sertraline plus exercise (S + EX) and showed greater improvements in depression in the (S + EX group) [31]. Findings from a recent meta-analysis of randomized controlled trials directly compared the effectiveness of three major exercise types (aerobic, resistance, and mind-body exercise) in clinically depressed adults aged 65 and older. Symptoms of depression improved at 3 months follow-up compared with baseline regardless of the type of exercise. No statistical difference was found between the types of exercise. Clinically depressed older adults, indeed all adults, should be encouraged to select their preferred exercise type for physical and mental benefits [32].

Lethal Means Restriction

Broadly reducing availability and access to firearms has lowered firearm suicide rates in other countries but does not appear feasible in the USA. Firearm legislation strength is inversely associated with firearm suicide rates [33, 42]. Gun safety is critical to restricting access for those at risk. Screening in both primary care and mental health settings is needed to identify those at risk. When found to be at high-risk, utilizing social supports to remove access to weapons is helpful. Most suicides involve guns purchased years earlier.

Targeted initiatives like gun violence restraining orders, smart gun technology, and gun safety education campaigns potentially reduce access to already purchased firearms by suicidal individuals but are too new to have evidence of effectiveness [34]. Suicide prevention training and vigilance working with distressed individuals may help in firearm retail settings. Other means restrictions actions include increasing expired medication disposal efforts, building bridge barriers [28••].

Access to Treatment for Mental Illness and Substance Use

Increasing the availability of virtual mental health and substance use treatment is a strategy to increase access. Especially beneficial to elderly patients with mobility problems, home-based tele-treatment has been shown to be feasible and well accepted in the areas of inpatient and nursing home consultation, cognitive testing, dementia diagnosis and treatment, depression in integrated and collaborative care models, and psychotherapy [35, 39, 43, 50, 51]. The PROSPECT and IMPACT studies demonstrated that a greater percentage of depressed patients receiving collaborative care (medication, psychotherapy or both) experienced a decline in suicidal ideation than depressed patients receiving routine care.

Addressing Disease and Disability

Suicide is associated with functional disability and specific conditions such as cancer, neurologic disorders, chronic obstructive pulmonary disease (COPD), liver disease, arthritis/arthrosis, and pain [10]. The significant contribution of disease and disability on suicide risk highlights the importance of comprehensive, quality geriatric medical care. Several cross-sectional studies indicate an association between clinical frailty and gut microbiota composition (lower levels of butyrate-producing bacteria). Findings suggest that the causal link between microbiota and physical fitness is still uncertain due to a lack of targeted studies and the influence of covariates, including diet, exercise, multimorbidity, and polypharmacy, on both microbiota and physical function in older age. However, the relationship between microbiota and physical function remains a very promising area of research for the future [36].

Ageism and Stigma

Ageism has a negative impact on older people's health and wellbeing. Anti-stigma education and pro-help-seeking messaging may be effectively delivered through creative partnerships with media, community organizations, and entertainment platforms. Performing arts may be an intervention to lessen age stereotypes among both the young and old. A study comparing pre- and post-programming attitudes toward aging

indicated a successful increase in positive age stereotypes and decrease in negative age stereotypes after a performance art program [37]. The scale utilized in this study, “Expectations Regarding Aging” met minimum requirements for psychometric validation (i.e., internal consistency, adequate content and structural validity) for assessing the “stereotypes” dimension of ageism, but not for the other two ageism dimensions “prejudice and discrimination,” highlighting the need to develop and validate a scale that more broadly captures the multidimensional nature of ageism [38]. Similar community-level campaigns were tested in Nuremberg compared with Würzburg Germany, which resulted in a decline in suicide attempts after year one and even more in year two in Nuremberg. However, reductions were most noticeable in the use of lethal means and among persons less than 70 years of age [39].

Increasing Social Connectedness

A substantial body of evidence indicates that loneliness and social isolation increase suicide risk. Quality of perceived social support is linked to health status [10]. Data suggest that those who died by suicide were less likely to be married, have children, or be involved in religious practice. Association between low social integration and suicide remained significant after controlling for psychiatric disorders and employment status. In addition to poor social integration and sense of belonging, the death of close relatives is a highly disruptive loss that constitutes a major risk factor for suicide. Mogensen reported the highest suicide risk during the 6 months following the loss of a close relative (40). The highest odds ratios for suicide were found in persons aged 45 and older who had lost a partner within the last month. Interestingly, loss of a spouse was associated with lower levels of belongingness in men, but not in women. The differential link between bereavement and sense of belongingness between men and women may be due to the different psychosocial function of marriage or lower ability for men to maintain social ties compared with women.

Detecting high-risk patient populations with recent suicide attempts and those likely to be socially disconnected is a start. Connecting them with community activities, support groups and individual and group skills training may be effective. Provide training to maximize elderly use of technology to connect with health care providers, internet communities and existing social supports, like family and friends. Van Orden suggests creating “a Connections Plan,” for the depressed elderly, similar in concept a Safety Plan in Emergency Settings. They propose its widespread use in outpatient clinics and long-term care settings, as well as in early sessions of psychotherapy [1••].

For patients presenting with a prior suicide attempt, studies demonstrate a 50–60% reduction of subsequent attempts by providing a series of caring messages in the form of postcards, letters, emails, or telephone messages after discharge [28••].

Within healthcare settings, the systemic use of virtual check-ins has a strong suicide risk-reducing effect.

Clinicians should also address sensory impairment that could hamper the safety planning process (e.g., vision/hearing) and employ frequent repetition and memory aids to address age-related cognitive changes and cognitive impairment when present [41•]. Animal studies demonstrate that hearing loss and social isolation independently target the serotonergic system with vast implications for psychiatric disorders [42••].

Other

At the legislative level, striving for mental health parity and promoting integration into primary care are priorities. Providing fiscal safety nets may also help, as studies suggest that economic downturns have deleterious effects on population suicide rates. Communities may also promote social cohesion through social media, influencing policy, and other campaigns.

Conclusions

A far greater percentage of older patients see their primary care providers rather than mental health professionals prior to suicide completion. Training primary care physicians in depression recognition and treatment prevents suicide. Training healthcare providers and informal support systems to assess suicide risk and in evidence-based intervention plans/guidelines is needed. Evidence supporting the integration of depression care managers into primary care is convincing.

Ongoing treatment for associated mental disorders remains critical. Meta-analyses find that antidepressants prevent suicide attempts, but individual randomized controlled trials appear to be underpowered.

Cognitive-behavioral therapy and dialectical behavior therapy prevent suicidal behavior. Exercise and nutrition interventions may be beneficial; given few adverse effects is worthwhile to pursue as a treatment adjunct. Clinically depressed older adults should be encouraged to self-select their preferred exercise type to achieve therapeutic benefit (no one type of exercise significantly outperformed another). Electroconvulsive therapy is generally safe in geriatric patients, with transient neurocognitive side effects.

In contrast to their younger counterparts, a significant portion of older suicide completers do not have mental illness. Recent evidence describes different personality traits in old vs. young suicide attempters, which may warrant development of screening tools specific to suicide. CADO and SAHD are 2 novel scales with promise.

Targeting the vulnerability factors to suicide using the 5D’s framework should be standard practice (Table 2). Providers

should consider implementing a “Connections Plan” as a form of safety planning for individuals at risk for social disconnection.

Means restriction, including of firearms, prevents suicide but is sporadically employed in the USA, even though firearms are used in >70% of late-life suicides. Restricting firearm access by at-risk individuals warrants wider use; specific strategies are an ongoing area of research as well as controversy.

Active follow-up of patients after discharge or a suicide-related crisis should be routine and may reduce subsequent attempts; providers should advocate to maximize virtual communications and access to telemedicine. Suicide rate reduction requires evaluating newer approaches, such as electronic health record-derived algorithms, Internet-based screening methods, and passive monitoring of dangerous fluctuation of acute suicide. The aftermath of the pandemic may well usher in a surge in deaths of despair [44] due to social isolation, reduced access to care both mental and physical, complicated by onset of COVID-19 related cognitive impairment. However, in 2020, COVID-19 rose to be the third leading cause of death, suicides fell by 5% from 2019 [45] but drug overdose deaths rose by 4.8% from 2019 [46], although age-specific data were not reported. It remains to be seen if the use of telemedicine and technology can repair the longer-term damage done to older adults who survived the pandemic [35, 47].

References

Papers of particular interest, published recently, have been highlighted as:

- Of importance
- Of major importance

1. •• Van Orden KA, Bower E, Lutz J, Silva C, Gallegos AM, Podgorski CA, Santos EJ, Conwell Y. Strategies to Promote Social Connections Among Older Adults During 'Social Distancing' Restrictions. *Am J Geriatr Psychiatry*. 2020. <https://doi.org/10.1016/j.jagp.2020.05.004>. **This is one of several references that address the threat of suicide among older adults during the COVID-19 pandemic. Because life-life suicide is overwhelming related to firearm possession among white males rather than identified mental illness, social interventions may be currently the most effective means of risk reduction.**
2. de Leo D. Ageism and suicide prevention. *Lancet Psychiatry*. 2018;5(3):192–3. [https://doi.org/10.1016/S2215-0366\(17\)30472-8](https://doi.org/10.1016/S2215-0366(17)30472-8).
3. • Gramaglia C, Calati R, Zeppego P. Rational suicide in late life: a systematic review of the literature. *Medicina (Kaunas)*. 2019. 55(10):656. <https://doi.org/10.3390/medicina55100656> **This is a review of the controversial yet persistent debate over the rationality of suicide among older persons and its implications.**
4. Balasubramaniam M. Rational suicide in elderly adults: a clinician's perspective. *J Am Geriatr Soc*. 2018;66(5):998–1001. <https://doi.org/10.1111/jgs.15263>.
5. Zalsman G, Stanley B, Szanto K, Clarke DE, Carli V, Mehlum L. Suicide in the time of COVID-19: review and recommendations. *Arch Suicide Res*. 2020;24(4):477–82.
6. Szucs A, Szanto K, Wright A, Dombrovski A. Personality of late- and early-onset elderly suicide attempters. *Int J Geriatr Psychiatry*. 2020;35(4):384–95.
7. Kennedy GJ. Reducing the risk of suicide in late life, in *Geriatric Depression 2015* The Guilford Press, pps 152–173.
8. Harmer B, Lee S, Duong TVH, Saadabadi A. Suicidal Ideation. 2020 Nov 23. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021.
9. Gujral S, Butters M, Dombrovski A, Szanto K. Cognition and late-life suicide: cognitive profiles among depressed suicidal subgroups as a function of medical seriousness and onset of suicidal behavior. *American journal of geriatric psychiatry poster s119-s120* April 01 2020.
10. Conejero I, Olié E, Courtet P, Calati R. Suicide in older adults: current perspectives. *Clin Interv Aging*. 2018;13:691–9. Published 2018 Apr 20. <https://doi.org/10.2147/CIA.S130670>.
11. Arias SA, Boudreaux ED, Segal DL, Miller I, Camargo CA, Betz ME. Disparities in treatment of older adults with suicide risk in the emergency department. *J Am Geriatr Soc*. 2017;65:2272–7.
12. Simons K, Van Orden K, Conner KR, Bagge C. Age differences in suicide risk screening and management prior to suicide attempts. *Am J Geriatr Psychiatry*. 2019;27:604–8.
13. Choi NG, DiNitto DM, Marti CN, Kaplan MS. Older suicide decedents: intent disclosure, mental and physical health, and suicide means. *Am J Prev Med*. 2017;53:772–80.
14. • Günak, MM, Barnes DE, Yaffe K et al. Risk of Suicide Attempt in Patients With Recent Diagnosis of Mild Cognitive Impairment or Dementia *JAMA Psychiatry*. 2021;78(6):659–666. <https://doi.org/10.1001/jamapsychiatry.2021.0150> **This reference is noteworthy for identifying increased risk of suicide following the diagnosis of mild cognitive impairment and supports the hypothesis that fear of becoming a burden on others (“burdensomeness”) is one of the motivators for suicide in old age. The clinical implications are obvious.**
15. Alessi M, Szanto K, Dombrovski A. Motivations for attempting suicide in mid- and late-life. *Int Psychogeriatr*. 2019;31(1):109–21. <https://doi.org/10.1017/S1041610218000571>.
16. Bickford D, Morin RT, Nelson JC, Mackin RS. Determinants of suicide-related ideation in late life depression: associations with perceived stress. *Clin Gerontol*. 2020;43(1):37–45. <https://doi.org/10.1080/07317115.2019.1666442>.
17. Beautrais AL, Fergusson DM. Media reporting of suicide in New Zealand: “more matter less art” (hamlet, Shakespeare). *N Z Med J*. 2012;125(1362):5–10.
18. Alexopoulos GS. Mechanisms and treatment of late-life depression. *Transl Psychiatry*. 2019;9(1):188. <https://doi.org/10.1038/s41398-019-0514-6>.
19. Kok RM, Reynolds CF 3rd. Management of Depression in older adults: a review. *JAMA*. 2017;317(20):2114–22. <https://doi.org/10.1001/jama.2017.5706>.
20. Wouts L, Voshaar RCO, Baitelar JK BMA, BWJH P, ATF B. Cardiac disease, depressive symptoms, and incident stroke in an elderly population. *Arch Gen Psychiatry*. 2008;65(5):596–602.
21. Mikami K, Jorge RE, Moser DJ, Arndt S, Jang M, Solodkin A, et al. Prevention of post-stroke generalized anxiety disorder, using escitalopram or problem-solving therapy. *J Neuropsychiatr Clin Neurosci*. 2014;26(4):323–8. <https://doi.org/10.1176/appi.neuropsych.11020047>.
22. Ernst M, Brähler E, Otten D, Werner AM, Tibubos AN, Reiner I, et al. Inflammation predicts new onset depression in men, but not in women within a prospective, respective community cohort. *Sci Report*. 2021;11(1):2271. <https://doi.org/10.1038/s41598-021-81927-9>.

23. Berk M, Woods RL, Nelson MR, Shah RC, Reid CM, Storey E, et al. Effect of Aspirin vs Placebo on the Prevention of Depression in Older People: A Randomized Clinical Trial. *JAMA Psychiatry*. 2020;77(10):1012–20. <https://doi.org/10.1001/jamapsychiatry.2020.1214>.
24. Zeppegno P, Gattoni E, Mastrangelo M, Gramaglia C, Sarchiapone M. Psychosocial suicide prevention interventions in the elderly: a mini-review of the literature. *Front Psychol*. 2019;9:2713. <https://doi.org/10.3389/fpsyg.2018.02713>.
25. Dürst AV, Spencer B, Büla C, Fustinoni S, Mazzocato C, Rochat E, et al. Wish to die in older patients: development and validation of two assessment instruments. *J Am Geriatr Soc*. 2020;68:1202–9.
26. Schmutte TJ, Wilkinson ST. Suicide in older adults with and without known mental illness: results from the national violent death reporting system, 2003–2016. *Am J Prev Med*. 2020;58(4):584–90.
27. Conwell Y, Lutz J. Lifespan development and suicide in later life. *Int Psychogeriatr*. 2021;33(2):117–9. <https://doi.org/10.1017/S1041610220003695> **Conwell and Lutz provide a concise summary of the biomedical and psychosocial determinants of suicide as well as describing practical measures for risk reduction.**
28. Moutier C. Suicide Prevention in the COVID-19 Era: Transforming Threat Into Opportunity. *JAMA Psychiatry*. 2021;78(4):433–438. <https://doi.org/10.1001/jamapsychiatry.2020.3746> **Moutier notes, and subsequent reports extend findings that suicide did not increase during the first year of the pandemic. Yet the crisis does present an opportunity for broad reaching interventions to reduce suicide as the prevalence of morbidity associated with surviving COVID-19 increases.**
29. Lisanby SH, McClintock SM, Alexopoulos G, Bailine SH, Bernhardt E, Briggs MC, et al. And the CORE/PRIDE work group. Neurocognitive effects of combined electroconvulsive therapy and venlafaxine in geriatric depression: phase 1 of the PRIDE study. *Am J Geriatr Psychiatry*. 2020;28(3):304–16.
30. Lindblad AJ, Clarke J-A, Shan LS. Antidepressants in the elderly. *Canadian Family Physician*. 2019;65(5):340.
31. Murri MB, Ekkekakis P, Menchetti M, Neviani F, Trevisani F, Tedeschi S, et al. Physical exercise for late-life depression: effects on symptom dimensions and time course. *J Affect Disord*. 2018;230:65–70. <https://doi.org/10.1016/j.jad.2018.01.004>.
32. Miller KJ, Gonçalves-Bradley DC, Areerob P, Hennessy D, Mesagno C, Grace F. Comparative effectiveness of three exercise types to treat clinical depression in older adults: a systematic review and network meta-analysis of randomised controlled trials. *Ageing Res Rev*. 2020 Mar;58:100999. <https://doi.org/10.1016/j.arr.2019.100999>.
33. Anestis MD, Houtsma C, Daruwala SE, Butterworth SE. Firearm legislation and statewide suicide rates: the moderating role of household firearm ownership levels. *Behav Sci Law*. 2019;37(3):270–80. <https://doi.org/10.1002/bsl.2408>.
34. Mann JJ, Michel CA. Prevention of firearm suicide in the United States: what works and what is possible. *Am J Psychiatry*. 2016;173(10):969–79. <https://doi.org/10.1176/appi.ajp.2016.16010069>.
35. Gentry MT, Lapid MI, Rummans TA. Geriatric Telepsychiatry: systematic review and policy considerations. *Am J Geriatr Psychiatry*. 2019 Feb;27(2):109–27. <https://doi.org/10.1016/j.jagp.2018.10.009>.
36. Ticinesi A, Nouvenne A, Cerundolo N, Catania P, Prati B, Tana C, et al. Gut microbiota, muscle mass and function in aging: a focus on physical frailty and sarcopenia. *Nutrients*. 2019;11(7):1633. <https://doi.org/10.3390/nu11071633>.
37. Ermer AE, York K, Mauro K. Addressing ageism using intergenerational performing arts interventions. *Gerontol Geriatr Educ*. 2020;1:1–8. <https://doi.org/10.1080/02701960.2020.1737046>.
38. Ayalon L, Dolberg P, Mikulionienė S, Perek-Białas J, Rapolienė G, Stypinska J, et al. A systematic review of existing ageism scales. *Ageing Res Rev*. 2019;54:100919. <https://doi.org/10.1016/j.arr.2019.100919>.
39. Hegerl U, Dietrich AJ, Seville JL, et al. The alliance against depression: 2-year evaluation of a community-based intervention to reduce suicidality. *Psychol Med*. 2006;36:12251233.
39. Mogensen H, Möller J, Hultin H, Mittendorfer-Rutz E. Death of a close relative and the risk of suicide in Sweden—a large scale register-based case-crossover study. *PLoS One*. 2016;11(10):e0164274. <https://doi.org/10.1371/journal.pone.0164274>.
41. Conti EC, Jahn DR, Simons KV, LPC E, Jacobs ML, Vinson L, et al. Safety planning to manage suicide risk with older adults: case examples and recommendations. *Clin Gerontol*. 2020;43(1):104–9. <https://doi.org/10.1080/07317115.2019.1611685> **The authors described pragmatic steps to reduce late-life suicide.**
42. Mann JJ, Michel CA, Auerbach RP. Improving suicide prevention through evidence-based strategies: a systematic review. *Am J Psychiatry*. 2021;appiajp202020060864. <https://doi.org/10.1176/appi.ajp.2020.20060864>. Online ahead of print. PMID: 33596680 **Although not focused on suicide in old age, this reference is an up-to-date review of data rather than merely opinion or case examples.**
43. Keesom SM, Hurley LM. Silence, solitude, and serotonin: neural mechanisms linking hearing loss and social isolation. *Brain Sci*. 2020;10(6):367. <https://doi.org/10.3390/brainsci10060367>.
44. Case A, Deaton A. Mortality and morbidity in the 21st century. *Brook Pap Econ Act*. 2017;2017:397–476.
45. Ahmad FB, Anderson RN. The leading causes of death in the US for 2020. *JAMA*. 2021;325(18):1829–1830. <https://doi.org/10.1001/jama.2021.5469>.
46. Miniño AM, Hedegaard H. Drug poisoning mortality, by state and by race and ethnicity: United States, 2019. *NCHS Health E-Stats*. 2021. <https://doi.org/10.15620/cdc:103967>.
47. Brown S, Schuman DL. Suicide in the Time of COVID-19: A Perfect Storm. *J Rural Health*. 2021;37(1):211–4.
48. Arai H, Ouchi Y, Yokode M, Ito H, Uematsu H, Eto F, et al. Toward the realization of a better aged society: messages from gerontology and geriatrics. *Geriatr Gerontol Int*. 2012;12(1):16–22. <https://doi.org/10.1111/j.1447-0594.2011.00776.x>.
49. Hendrix CC, Matters D, Griffin T, Batchelder H, Kramer P, Prewitt JR, et al. Academic-Practice Partnership for Caregiver Training and Support: The Duke Elder Family/Caregiver Training (DEFT) Center. *N C Med J*. 2020. 81(4):221–7. <https://doi.org/10.18043/ncm.81.4.221>.
50. Nicol GE, Piccirillo JF, Mulsant BH, Lenze EJ. Action at a distance: geriatric research during a pandemic. *J Am Geriatr Soc*. 2020;68(5):922–5. <https://doi.org/10.1111/jgs.16443>.
51. Oesterle TS, Kolla B, Risma CJ, Breiting SA, Rakocevic DB, Loukianova LL, et al. Substance Use Disorders and Telehealth in the COVID-19 Pandemic Era: A New Outlook. *Mayo Clin Proc*. 2020. 95(12):2709–18. <https://doi.org/10.1016/j.mayocp.2020.10.011>.
52. Carstensen LL, Isaacowitz DM, Charles ST. Taking time seriously. A theory of socioemotional selectivity. *Am Psychol*. 1999 Mar;54(3):165–81. <https://doi.org/10.1037//0003-066x.54.3.165>.