Published in final edited form as:

Int J Geriatr Psychiatry. 2019 July ; 34(7): 1058–1069. doi:10.1002/gps.5109.

Deliberate Self-Harm in Older Adults: A National Analysis of U.S. Emergency Department Visits and Follow-Up Care

Timothy Schmutte, Psy.D.¹, Mark Olfson, M.D., M.P.H.², Ming Xie, M.S.³, and Steven C. Marcus, Ph.D.⁴

¹Yale University, Department of Psychiatry, Program for Recovery and Community Health

²Columbia University, Department of Psychiatry and the New York State Psychiatric Institute

³University of Pennsylvania, Department of Psychiatry

⁴University of Pennsylvania, School of Social Policy & Practice

Abstract

Objective: To examine mental health care received by older adults following emergency department visits for deliberate self-harm.

Methods: This retrospective cohort analysis examined 2015 Medicare claims for adults 65 years of age with emergency department (ED) visits for deliberate self-harm (N=16,495). We estimated adjusted risk ratios (ARR) for discharge disposition, ED coding of mental disorder, and 30-day follow-up mental health outpatient care.

Results: Most patients (76.9%) were hospitalized with lower likelihoods observed for African American patients (ARR=0.86, 99% CI=0.79-0.94) and patients with either one medical comorbidity (ARR=0.91, 99% CI=0.83-0.99) or 2-3 comorbidities (ARR=0.93, 99% CI=0.88-0.99). Hospitalization was associated with recent depression (ARR=1.09, 99% CI=1.03-1.16) and recent psychiatric inpatient care (ARR=1.13, 99% CI=1.04-1.22). Among patients discharged to the community (n=3,818), 56.4% received an ED mental disorder diagnosis. Predictors of an ED mental disorder diagnosis included younger age (65-69 years; ARR=1.53, 99% CI=1.31-1.78), recent mental health care in ED (ARR=1.50, 99% CI=1.29-1.74) or outpatient (ARR=1.62, 99% CI=1.44-1.82) settings, recent diagnosis of mental disorder (ARR=1.61, 99% CI=1.43-1.80) and other/unknown lethality methods of self-harm (ARR=1.24, 99% CI=1.01-1.52). Among community discharged patients, 39.0% received 30-day follow-up outpatient mental health care, which was most strongly predicted by an ED diagnosis of mental disorder (ARR=2.65, 99% CI=2.25-3.12) and prior outpatient mental health care (ARR=2.62, 99% CI=2.28-3.00).

Correspondence: Timothy Schmutte, Yale Program for Recovery and Community Health, Erector Square, Building One, 319 Peck Street, New Haven, CT, 06513, USA. timothy.schmutte@yale.edu.

Potential Conflicts of Interest: Dr. Marcus has received grant support from Ortho-McNeil Janssen and has served as a consultant to AstraZeneca. The other authors report no financial relationships with commercial interests.

Role of the sponsors: The supporters had no role in the design, analysis, interpretation, or publication of this study.

Data Availability Statement

The data that support the findings of this study are available from the Centers for Medicare and Medicaid Services (CMS). Restrictions apply to the availability of these data, which were used under license for this study.

Conclusion: Most older adult Medicare beneficiaries who present to EDs with self-harm are hospitalized. Of those who are discharged to the community, many are not diagnosed with mental disorder in the ED or receive timely follow-up mental health care.

Keywords

self-harm; suicide attempts; older adults; emergency department

INTRODUCTION

Emergency departments have the potential to play a pivotal role in suicide prevention through mental health management of suicide attempts and self-harm events. Approximately half a million patients present annually to U.S. emergency departments (EDs) for treatment of deliberate self-harm,¹ which includes intentional self-injury and self-poisoning irrespective of suicidal intent. Deliberate self-harm substantially increases the risk of future of suicide death.^{2,3}

Suicide risk increases substantially after age 65⁴ and the geriatric population is growing rapidly.⁵ In the U.S. there have been recent increases in the ED visits for deliberate self-harm,⁶ suicide ideation,⁷ and mental and substance use disorders among aging adults.⁸ As compared to younger adults, suicide prevention in older adults tends to be more challenging because self-harm behavior is more immediately lethal and has fewer warning signs.⁹

Prior research suggests that a large majority of self-harm events in older adults are suicide attempts,^{10–12} rather than non-suicidal self-injury which is more prevalent in younger persons.^{13–15} In the U.S., the prevalence of ED visits for self-harm peaks in early adulthood then decreases with age.¹⁶ On the other hand, case fatality rates for self-harm increase with age and are highest in older adults.^{17,18} Geriatric self-harm is associated with greater suicidal intent than in younger persons^{11,12} as older adults tend to formulate a more lethal suicide plan, to use more lethal means, and to be in poorer physical health and more isolated, making self-harm behavior more fatal.¹⁹

Research underscores the importance of assessment of and treatment initiation for mental health problems in the emergency management of older adults with self-harm. Nearly all (90%–92%) of adults treated in EDs for self-harm are diagnosable with a mental illness at the time of self-injury when standardized assessments are employed.^{20,21} However, mental disorders are not coded in 25%–45% of standard ED visits for self-harm.^{22–24} Concerns about the underidentification of mental health problems extend to problems in linkage to timely follow-up outpatient mental health treatment. In U.S. studies of youth and adults younger than 65 years, 47.1%–58.8% of discharged patients did not receive any outpatient care within 30-days after an ED visit for self-harm.^{25–29}

Post mortem studies in the U.S. reveal similar findings with 90% of older adults who die from suicide had diagnosable mental disorders at the time of death,^{30,31} but that most were not receiving mental health care.^{31,32} Analysis of suicide deaths and recent health care use in 8 U.S. states revealed that 1 in 3 geriatric suicide decedents had an ED visit within 30-days prior to death, yet fewer than 10% were diagnosed with a mental or substance use disorder

during the visit.³² Because of the strong connections between mental disorders, self-harm, and suicide, the current recommendations are for all ED patients seen for self-harm to receive a mental health evaluation and referral to follow-up outpatient care before emergency department discharge.^{33,34}

National data from other countries exist for emergency care and self-harm outcomes in older adults.^{11,12,35–38} However, no national study has focused on the mental health care received after self-harm in the U.S. geriatric population. Prior national U.S. studies focused on youth and working-age adults discharged back to the community following ED visits for self-harm have observed low rates of identified mental illness in the ED and receipt of timely outpatient mental health treatment.^{25–29} To help fill this knowledge gap, we present a national analysis of Medicare claims data focusing on older adults who presented for emergency care after a self-harm event. We describe patient characteristics associated with discharge disposition for ED visits among geriatric self-harm patients. Among patients discharged back to the community, we evaluate predictors of ED diagnosis of mental disorders and 30-day follow-up outpatient mental health care. The goal of our paper was to inform emergency department practices related to the treatment of self-harm and adequate follow-up treatment for patients discharged back to the community.

METHOD

Data Sources

The self-harm cohort was extracted from 2015 national Medicare administrative data from the Centers for Medicare and Medicaid Services. Data were derived from the Medicare Provider Analysis and Review (MedPAR) and Outpatient files. The MedPAR file includes all claims for ED visits that resulted in inpatient stays. The Outpatient files contains all claims submitted as non-admission (outpatient) services. Both files include demographic information, date of service, discharge status, as well as diagnoses, procedures, and provider codes. In October 2015, the *International Classification of Disease, Tenth Revision* (ICD-10) was implemented, therefore both ICD-9 and ICD-10 codes appear in 2015 claims.

The study was approved by the human subjects' review by the Yale University institutional review board.

Sample Selection

Emergency visits were selected for a diagnosis of intentional self-harm (ICD-9 codes E950–959; ICD-10 codes X71–X83; T36*X2A–T65*X2A; T71*2A; T14.91) in any position on the claim. Because a primary focus of the analysis was patients who were discharged from the ED to the community, patients were excluded if they died in the ED (n= 202), left against medical advice (n=118), or were discharged to another healthcare facility (n=209) or institutional residential setting (n=192). Similarly, because a focus of the analysis was follow-up outpatient care, patients were excluded if they received services in an institutional residential setting such as prisons, skilled nursing/assisted living facilities, group homes, hospices, and residential care facilities. Individual patients could contribute more than one self-harm ED visit (i.e., treatment episode) to the analysis.

Independent Variables

Patient-level independent variables from the Medicare files included patient age at ED discharge (categorized as 65–69, 70–74, 75–79, or 80+ years), sex, and race/ethnicity. Based on claims during the 30 days prior to the index ED visit, past 30-day health care was classified for the presence of outpatient visits, inpatient episodes, ED visits, or any health care contact in which a mental disorder (ICD-9 codes 290–319, ICD-10 codes F01-F05, F10-F48) was diagnosed. Episodes were also classified for any claim for deliberate self-harm during the 30 days before the index ED visit. ED treatment episodes were further classified by at least one claim 30 days before the ED visit with a diagnosis of a depressive disorder, bipolar disorder, anxiety disorder, adjustment disorder, schizophrenia and related disorders, personality disorder, substance use disorders, cognitive disorders (i.e., dementia, mild cognitive impairment, or delirium), and sleep disorders (see Appendix for list of ICD-9 and ICD-10 diagnosis codes). Mental disorder codes in the ED was defined by the presence of a diagnosis of a mental disorder (ICD-9 codes 290–319, ICD-10 codes F01-F05, F10-F48) in any position on the claim during the ED visit. Because general medical illness is associated with heightened risk for suicidal behavior,^{39,40} claims data were also classified by medical comorbidity severity using the Elixhauser Comorbidity Scale.⁴¹ The number of comorbid medical conditions were recoded ordinally (zero, 1, 2–3, 4–5, and 6 or more illnesses). Chronic pain was also classified in line with prior research using administrative data⁴² (see Appendix for list of ICD-9 and ICD-10 diagnoses codes). The index deliberate self-harm event was classified based on method into high, low, or unknown lethality.¹⁸ High lethality methods included use of firearms, drowning, suffocation, fall, fire, and motor vehicle, whereas low lethality methods included cutting and poisoning. Unspecified or poorly specified codes were classified as “other/unknown.” Separate categories were also created for poisoning, the most common self-harm method in older adults,⁴³ versus “other” methods. In the analysis of follow-up outpatient mental health care, mental disorder groups were based on mental diagnoses given at the ED visit. To facilitate cross-study analyses and to be consistent with prior U.S. studies^{25–29} of demographic, clinical, and service use factors related to ED visits for self-harm, the same independent variables were used to examine each of the outcome variables.

Outcomes

The three outcome variables were: 1) discharge disposition (inpatient care vs community discharge), 2) a mental disorder (ICD-9 codes 290–319, ICD-10 codes F01-F05, F10-F48) coded during the ED visit (present vs absent), and 3) use of follow-up outpatient mental health care within 30 days of ED discharge back to the community (present vs absent). Follow-up outpatient mental health care was defined as any Medicare-reimbursed outpatient service containing a mental health diagnosis during the 30 days after ED discharge.

Analytic Plan

The percentages of self-harm patients seen in EDs who were hospitalized or discharged to the community were determined overall and stratified by patient-level characteristics. For each of these characteristics, unadjusted risk ratios were calculated using the SAS GENMOD procedure with the log-link function. Corresponding adjusted models controlled

for patient age, gender, and race/ethnicity. Because approximately 1.5% of patients contributed more than one treatment episode, the observations are non-independent. Accordingly, generalized estimating equations were used to adjust the confidence intervals to accommodate clustering of observations with the individual subject as a random effects variable. Similar sets of analyses were performed for patients with ED visits who were discharged to the community. In these analyses, mental health diagnoses coded during the ED visits and outpatient mental health care within 30 days of the ED visit were the dependent variables. To compensate for the large number of comparisons, results are presented as adjusted risk ratios (ARR) with associated 99% confidence intervals with significance set at $p < .01$.

RESULTS

Discharge Disposition

In total, 16,495 treatment episodes met all eligibility criteria. Among these episodes, 76.9% ($n=12,677$) resulted in hospitalization and 23.1% ($n=3,818$) were discharged to the community (Table 1). Multivariate analyses revealed patients who were African American ($p < .0001$) and those with only one medical comorbidity ($p < .0001$) or 2–3 comorbidities ($p = .003$) were less likely to be hospitalized. Conversely, admitted patients were significantly more likely to have a recent diagnosis of depression ($p < .0001$) and recent inpatient psychiatric care ($p < .0001$).

Mental Health Codes During ED Visit

In patients who were discharged to the community, 56.4% of the treatment episodes included a mental health diagnosis in the ED (Table 2). In the adjusted analyses, receiving an ED code of a mental disorder was significantly related to younger age (65–69 years, $p < .0001$; 70–74 years, $p = .0009$), recent diagnosis of any mental disorder except for personality disorder (p 's $< .001$), recent mental health visits in ED ($p < .0001$) or outpatient settings ($p < .0001$), and other/unknown lethality of self-harm methods ($p = .006$).

Outpatient Mental Health Care

Overall, 74.6% of community discharged patients had some kind of health care encounter within 30 days of the ED discharge. Approximately 4 in 10 (39.0%) of these treatment episodes were an outpatient visit containing a mental health diagnosis. (Table 3). In the adjusted analyses, the only variable that was inversely associated with outpatient mental health care was male gender ($p < .0001$). Multiple characteristics were associated with higher likelihoods of receiving timely follow-up outpatient mental health care, including age of 65–69 years ($p < .0001$) and 70–74 years ($p = .0004$) as well as prior diagnosis of all mental disorders (p 's $< .0001$) and chronic pain, cognitive impairment, and sleep disturbances (p 's $< .0001$). Recent healthcare visits in outpatient, inpatient, or ED settings for mental or medical reasons and all levels of medical comorbidity during the ED visits also predicted 30-day follow-up mental health visit (p 's $< .0001$). Overall, recent outpatient mental health care and having a mental disorder coded during the index ED visit were most strongly associated with timely follow-up mental health visits ($p < .0001$).

DISCUSSION

This is the first national study focused on mental health care following self-harm in the U.S. geriatric population. Among Medicare beneficiaries aged 65 years or more, roughly one-fourth (23.1%) of older adult visits that presented to an ED for deliberate self-harm were discharged to the community. Among those who were discharged, roughly half (56.4%) received a mental health diagnosis in the ED and 4 in 10 (39.0%) received any outpatient mental health care within 30 days. These findings raise concerns over the assessment of mental health and follow-up treatment in the routine emergency care of geriatric patients following episodes of deliberate self-harm. Compared to younger age groups for whom deliberate self-harm includes a larger percentage of non-suicidal self-injury, deliberate self-harm in older adults involves greater suicidal intent and more closely resembles attempted suicide.^{10–12}

The present findings are consistent with prior U.S. research demonstrating that females account for slightly more than half of ED visits for geriatric self-harm and that a minority of ED patients aged 65 years treated for self-harm are discharged back to the community.^{23,43} In this study, the percent of ED visits containing codes for mental disorders among patients discharged to the community (56.4%) is comparable to figures from similar national U.S. analyses focused on adults aged 21–64 years (47.5%–57.3%).^{26–28} The rate of 30-day follow-up mental health (39.0%) is lower than the percentage observed for self-harm Medicaid patients aged 21–64 years discharged to the community from the ED (52.4%–52.9%) but similar to those for privately insured adults (41.2%).^{26–28} Limited data are available on mental health care following geriatric self-harm. One Australian study of adults aged 65+ years treated for self-harm in EDs observed that 79.6% received unspecified follow-up mental health care within 12 months.¹¹

In the present study, the rate of hospital admission (76.9%) was significantly higher than the base rate of hospitalization for all ED visits in the U.S. by adults 65 years and older (33.6%).⁴⁴ It was also substantially higher than the corresponding percentage of inpatient admissions in a national sample of Medicaid and privately insured adults aged 21–64 years treated for self-harm in EDs (37.5%–53.1%).^{27,28} This suggests that emergency departments may be reacting to the greater acute risk of suicide in older adults with self-harm compared to younger adults or that self-harm in older adults necessitates hospitalization more often because of physical frailty.⁴⁵

In the present study, hospital admission was significantly related to known suicide risk factors following self-harm including a depressive disorder and recent inpatient psychiatric care^{46,47} but unrelated to others, such as bipolar disorder,⁴⁸ substance use,^{23,49} or use of highly lethal methods.^{10,50} African American self-harm patients were less likely to be hospitalized, a finding observed in other analyses using the U.S. National Trauma Data Bank for self-harm visits.⁵¹ Clinical and non-clinical patient factors as well as ED practices and regional service characteristics have been shown to influence ED disposition decisions.^{51–53}

Increased likelihoods of diagnosis of mental illness during index ED visits for self-harm were observed for patients with recent mental health visits in outpatient and ED settings.

Taken together, these results suggest that knowledge of recent health care in which a mental disorder was diagnosed may have a nonspecific effect of alerting ED clinicians of the presence of a mental illness. Surprisingly, major risk factors for late-life suicide (e.g., male gender and high lethality method)⁵⁴ did not increase the likelihood of recognition having a of mental disorder coded during the ED visit for self-harm. This claims-based analysis cannot shed light on the reasons for the is low level of attention to the mental health status of high suicide risk adults, but it is possible that the acute physical health threats posed self-harm methods diverts clinical attention of some ED staff away from mental health aspects of care. Clinical decisions of some ED clinicians may also be influenced by limited training in assessment of mental health and suicide risk,^{55,56} negative attitudes toward patients who self-harm,⁵⁷ or the diagnostic complexity associated with older ED patients.⁵⁸ The lack of significant associations between individual patient characteristics, including medical comorbidity, suggests that the provision of emergency mental health assessments is dictated less by the clinical characteristics of individual patients than by staffing patterns or established ED evaluation protocols. These results are consistent with results from the Emergency Department Safety Assessment and Follow-up Evaluation (ED-SAFE) study which revealed meaningful age-related disparities in the use of suicide screening, safety counseling, and mental health assessment of geriatric ED patients with suicide risk.^{59–61}

The largest predictors of 30-day outpatient mental health follow-up care were receipt of recent outpatient mental health care prior to the ED visit for self-harm (ARR=2.62, 99% CI=2.28–3.00) and having a mental health diagnosis coded during the ED self-harm visit (ARR=2.65, 99% CI=2.25–3.12). This suggests that a sizable proportion of the follow-up mental health visits simply represented continuation of ongoing mental health care rather than ED-driven referrals for new outpatient mental health services. Prior U.S. research shows that roughly 50% of younger ED patients discharged to the community following self-harm proceed to follow up on referrals to outpatient mental health services.^{26,28,62} One factor that may partially explain the lower rate of follow-up care in this sample is U.S. older adults, in general, report significantly lower levels than younger adults of perceived need for and receipt of any mental health care,^{63,64} including among those with recent suicide plans and attempts.⁶⁵ Moreover, the only variable associated with lower likelihood of follow-up mental health care was male gender (ARR=0.82, 99% CI=0.71–0.94), which is consistent with research demonstrating lower help-seeking behavior in men.^{66,67} Because active contact and mental health care following self-harm events reduce repeated self-harm^{68,69} and suicide mortality,^{10,11} guidelines in the management of self-harm emphasize the importance of rapid referral and outreach to ensure receipt of mental health care.^{33,34,70–72}

This study has several potential limitations. First, data were not available concerning several clinically important factors, such as patients' reactions to surviving self-harm,⁷³ self-harm intent,²³ or the extent to which patients were offered referrals for outpatient mental health care, all of which may influence hospital admission, recognition of mental disorders, or use of follow-up outpatient mental health care. Without more detailed information on whether the self-harm occurred with or without a suicidal intent, it is impossible to exclude the possibility that some discharged patients were at relatively low risk, although deliberate self-harm is a main risk factor for fatal and non-fatal suicide attempts,^{2,3} particularly among older adults.¹⁰ Second, concerns exist over the validity and completeness of ICD codes to

measure self-harm.^{74–76} Third, diagnoses were based on clinician judgment and were not subject to standardized or structured assessments. Fourth, the mental status and medication regimens of patients were unknown. Fifth, it is likely that the data under-represent the actual rate follow-up visits that addressed patient mental health as some visits may have been paid out-of-pocket or with private insurance.⁷⁷ Sixth, the present analyses are restricted to a 30-day look-back period, which may have reduced the sensitivity of the measures of recent mental disorders, recent health care, and medical comorbidities.

These limitations notwithstanding, the results suggest that approximately 1 in 2 Medicare beneficiaries 65 years of age and older who are discharged to the community from EDs after an episode of self-harm have a mental disorder coded during their treatment episode, yet only 4 in 10 receive timely follow-up outpatient mental health care. These findings highlight the need for strategies to promote identification of mental health disorders during self-harm visits, to enhance ED physicians' training in geriatric mental health and suicide prevention, and to create effective approaches to timely transitions to outpatient mental health care. It is especially troubling that ED diagnoses of mental disorders was significantly lower in patients discharged back to the community who are generally at especially high risk of suicide, such as those who have used dangerous self-harm methods.¹⁰ Improved focus on policies and procedures that promote emergency department mental health assessments and timely transitions to outpatient mental health care are needed. Triage scales,⁷⁸ educational efforts to improve the attitudes and practices of emergency department staff toward self-harm patients,⁷⁹ and systematic efforts to manage service transitions⁸⁰ and active outreach^{81,82} represent promising approaches to improve mental health assessments and effective referrals of these high-risk patients.

CONCLUSION

Deliberate self-harm in older adults is closely related to suicide and emergency departments are a key setting in terms of their potential for suicide prevention for identifying and intervening with high risk individuals. Given the low percentage of mental health diagnoses coded during emergency treatment for self-harm and timely follow-up mental health treatment among patients discharged to the community, innovations are needed in effective care delivery that improve thorough psychosocial evaluation and successful transitions to community-based care of older adults in the ED to improve the emergency care of older adults presenting to hospitals with self-harm.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Funding/Support: This research was supported by grant R01MH107452–02S1 from the National Institute of Mental Health.

REFERENCES

1. Ambulatory and Hospital Care Statistics Branch, National Center for Health Statistics, Centers for Disease Control and Prevention: National Hospital Ambulatory Medical Care Survey: 2015. Emergency Department Summary Tables, Table 15: Injury-related emergency department visits, by intent: United States, 2015 Available at https://www.cdc.gov/nchs/data/nhamcs/web_tables/2015_ed_web_tables.pdf. Accessed October 26, 2017.
2. Beghi M, Rosenbaum JF, Cerri C, Cornaggia CM. Risk factors for fatal and nonfatal repetition of suicide attempts: a literature review. *Neuropsychiatr. Dis. Treat* 2013;9:1725. [PubMed: 24235836]
3. Franklin JC, Ribeiro JD, Fox KR, et al. Risk factors for suicidal thoughts and behaviors: A meta-analysis of 50 years of research. *Psychol. Bull* 2016;143(2):187–232. [PubMed: 27841450]
4. Centers for Disease Control and Prevention. (2017). Health, United States, 2016. Table 30: Death rates by suicide, by sex, race, Hispanic origin, and age, United States, selected years 1950–2015. Available at <https://www.cdc.gov/nchs/data/abus/abus15.pdf>. Accessed May 15, 2018.
5. Administration on Aging, U.S. Department of Health and Human Services. A Profile of Older Americans: 2016 Rockville, MD.
6. Olfson M, Wang S, Blanco C. National trends in hospital-treated self-harm events among middle-aged adults. *Gen. Hosp. Psychiatry* 2015;37(6):613–619. [PubMed: 26380873]
7. Owens P, Fingar K, Heslin K, Mutter R, Booth C. Emergency Department Visits Related to Suicidal Ideation: 2006–2013. HCUP Statistical Brief #220. 2017.
8. Weiss A, Barrett M, Heslin K, Stocks C. Trends in Emergency Department Visits Involving Mental and Substance Use Disorders, 2006–2013. HCUP Statistical Brief #216. 2016.
9. Van Orden KA, Conwell Y. Issues in research on aging and suicide. *Aging & mental health*. 2016;20(2):240–251. [PubMed: 26179380]
10. Bostwick JM, Pabbati C, Geske JR, McKean AJ. Suicide attempt as a risk factor for completed suicide: even more lethal than we knew. *Am. J. Psychiatry* 2016;173(11):1094–1100. [PubMed: 27523496]
11. Cheung G, Foster G, de Beer W, et al. Predictors for repeat self-harm and suicide among older people within 12 months of a self-harm presentation. *Int. Psychogeriatr*. 2017;29(8):1237–1245. [PubMed: 28349860]
12. Hawton K, Harriss L. How Often Does Deliberate Self-Harm Occur Relative to Each Suicide? A Study of Variations by Gender and Age. *Suicide Life Threat. Behav* 2008;38(6):650–660. [PubMed: 19152296]
13. Klonsky E Non-suicidal self-injury in United States adults: prevalence, sociodemographics, topography and functions. *Psychol. Med* 2011;41(9):1981–1986. [PubMed: 21208494]
14. Swannell SV, Martin GE, Page A, Hasking P, St John NJ. Prevalence of nonsuicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-regression. *Suicide and Life Threat. Behav* 2014;44(3):273–303.
15. Segal DL, Connella A, Miller T, Coolidge FL. Deliberate self-harm among younger and older adults. *Death Stud* 2016;40(7):440–444. [PubMed: 27050389]
16. Canner J, Giuliano K, Selvarajah S, Hammond E, Schneider E. Emergency department visits for attempted suicide and self harm in the USA: 2006–2013. *Epidemiol Psychiatr Sci*. 2016:1–9.
17. Mathews EM, Woodward CJ, Musso MW, Jones GN. Suicide attempts presenting to trauma centers: trends across age groups using the National Trauma Data Bank. *Am. J. Emerg. Med* 2016;34(8):1620–1624. [PubMed: 27321943]
18. Spicer RS, Miller TR. Suicide acts in 8 states: incidence and case fatality rates by demographics and method. *Am. J. Public Health* 2000;90(12):1885. [PubMed: 11111261]
19. Conwell Y, Van Orden K, Caine ED. Suicide in older adults. *Psychiatr. Clin. North Am* 2011;34(2):451–468. [PubMed: 21536168]
20. Beautrais A, Joyce P, Mulder R, Fergusson D, Deavoll B, Nightingale S. Prevalence and comorbidity of mental disorders in persons making serious suicide attempts: a case-control study. *Am. J. Psychiatry* 1996;153(8):1009–1014. [PubMed: 8678168]

21. Haw C, Hawton K, Houston K, Townsend E. Psychiatric and personality disorders in deliberate self-harm patients. *Br. J. Psychiatry* 2001;178(1):48–54. [PubMed: 11136210]
22. Doshi A, Boudreaux ED, Wang N, Pelletier AJ, Camargo CA Jr. National study of US emergency department visits for attempted suicide and self-inflicted injury, 1997–2001. *Ann. Emerg. Med* 2005;46(4):369–375. [PubMed: 16183394]
23. Choi NG, DiNitto DM, Marti CN, Choi BY. Nonsuicidal self-injury and suicide attempts among ED patients older than 50 years: comparison of risk factors and ED visit outcomes. *Am. J. Emerg. Med* 2016;34(6):1016–1021. [PubMed: 26976771]
24. Ting SA, Sullivan AF, Boudreaux ED, Miller I, Camargo CA Jr. Trends in US emergency department visits for attempted suicide and self-inflicted injury, 1993–2008. *Gen. Hosp. Psychiatry* 2012;34(5):557–565. [PubMed: 22554432]
25. Olfson M, Gameroff MJ, Marcus SC, Greenberg T, Shaffer D. Emergency treatment of young people following deliberate self-harm. *Arch. Gen. Psychiatry* 2005;62(10):1122–1128. [PubMed: 16203957]
26. Olfson M, Marcus SC, Bridge JA. Emergency treatment of deliberate self-harm. *Arch. Gen. Psychiatry* 2012;69(1):80–88. [PubMed: 21893643]
27. Olfson M, Marcus SC, Bridge JA. Emergency department recognition of mental disorders and short-term outcome of deliberate self-harm. *Am. J. Psychiatry* 2013;170(12):1442–1450. [PubMed: 23897218]
28. Marcus SC, Bridge JA, Olfson M. Payment source and emergency management of deliberate self-harm. *Am. J. Public Health* 2012;102(6):1145–1153. [PubMed: 22515853]
29. Bridge JA, Marcus SC, Olfson M. Outpatient care of young people after emergency treatment of deliberate self-harm. *J. Am. Acad. Child Adolesc. Psychiatry* 2012;51(2):213–222. e211. [PubMed: 22265367]
30. Conwell Y, Lyness JM, Duberstein P, et al. Completed suicide among older patients in primary care practices: a controlled study. *J. Am. Geriatr. Soc* 2000;48(1):23–29. [PubMed: 10642017]
31. Waern M, Runeson BS, Allebeck P, et al. Mental disorder in elderly suicides: a case-control study. *Am. J. Psychiatry* 2002;159(3):450–455. [PubMed: 11870010]
32. Ahmedani BK, Simon GE, Stewart C, et al. Health care contacts in the year before suicide death. *J. Gen. Intern. Med* 2014;29(6):870–877.
33. National Institute for Clinical Excellence (NICE). Self-harm: short-term management and prevention of recurrence. London: NICE 2004.
34. Office of the Surgeon General National Action Alliance for Suicide Prevention. (2012). National Strategy for Suicide Prevention: goals and objectives for action: a report of the US Surgeon General and of the National Action Alliance for Suicide Prevention.
35. Hawton K, Harriss L. Deliberate self-harm in people aged 60 years and over: characteristics and outcome of a 20-year cohort. *Int. J. Geriatr. Psychiatry* 2006;21(6):572–581. [PubMed: 16645937]
36. Lawrence D, Almeida O, Hulse G, Jablensky A, Holman Ca J. Suicide and attempted suicide among older adults in Western Australia. *Psychol. Med* 2000;30(4):813–821. [PubMed: 11037089]
37. Fedyszyn IE, Erlangsen A, Hjorthøj C, Madsen T, Nordentoft M. Repeated Suicide Attempts and Suicide Among Individuals With a First Emergency Department Contact for Attempted Suicide: A Prospective, Nationwide, Danish Register-Based Study. *J. Clin. Psychiatry* 2016;77(6):832–840. [PubMed: 27232826]
38. Murphy E, Kapur N, Webb R, et al. Risk factors for repetition and suicide following self-harm in older adults: multicentre cohort study. *Br. J. Psychiatry* 2012;200(5):399–404. [PubMed: 22157801]
39. Fässberg MM, Cheung G, Canetto SS, et al. A systematic review of physical illness, functional disability, and suicidal behaviour among older adults. *Aging Ment Health*. 2016;20(2):166–194. [PubMed: 26381843]
40. Juurlink DN, Herrmann N, Szalai JP, Kopp A, Redelmeier DA. Medical illness and the risk of suicide in the elderly. *Arch. Intern. Med* 2004;164(11):1179–1184. [PubMed: 15197042]
41. Elixhauser A, Steiner C, Harris DR, Coffey RM. Comorbidity measures for use with administrative data. *Med. Care* 1998;36(1):8–27. [PubMed: 9431328]

42. Tonelli M, Wiebe N, Fortin M, et al. Methods for identifying 30 chronic conditions: application to administrative data. *BMC Med. Inform. Decis. Mak* 2015;15(1):31. [PubMed: 25886580]
43. Carter MW, Reymann MR. ED use by older adults attempting suicide. *Am. J. Emerg. Med* 2014;32(6):535–540. [PubMed: 24630804]
44. Sun R, Karaca Z, Wong HS Trends in Hospital Emergency Department Visits by Age and Payer, 2006–2015 HCUP Statistical Brief #238. 3 2018 Agency for Healthcare Research and Quality, Rockville, MD Available at www.hcup-us.ahrq.gov/reports/statbriefs/sb238-Emergency-Department-Age-Payer-2006-2015.pdf. Accessed January 13, 2019.
45. Vermeiren S, Vella-Azzopardi R, Beckwée D, et al. Frailty and the prediction of negative health outcomes: a meta-analysis. *J. Am. Med. Dir. Assoc* 2016;17(12):1163 e1161-1163. e1117.
46. Olfson M, Wall M, Wang S, Crystal S, Gerhard T, Blanco C. Suicide Following Deliberate Self-Harm. *Am. J. Psychiatry*. 2017;appi. ajp. 2017.16111288.
47. Olfson M, Wall M, Wang S, et al. Short-term suicide risk after psychiatric hospital discharge. *JAMA psychiatry*. 2016;73(11):1119–1126. [PubMed: 27654151]
48. Runeson B, Haglund A, Lichtenstein P, Tidemalm D. Suicide risk after nonfatal self-harm: a national cohort study, 2000–2008. *J. Clin. Psychiatry* 2016;77(2):240–246. [PubMed: 26301588]
49. Choi NG, DiNitto DM, Marti CN, Choi BY. Associations of mental health and substance use disorders with presenting problems and outcomes in older adults' emergency department visits. *Acad. Emerg. Med* 2015;22(11):1316–1326. [PubMed: 26473592]
50. Centers for Disease Control and Prevention. (2015). National Centers for Injury Prevention and Control, Web-based Injury Statistics Query and Reporting System (WISQARS). Retrieved from <http://www.cdc.gov/injury/wisqars/index.html>.
51. Hanuscin C, Zahmatkesh G, Shirazi A, Pan D, Teklehaimanot S, Bazargan-Hejazi S. Socio-Demographic and Mental Health Profile of Admitted Cases of Self-Inflicted Harm in the US Population. *Int. J. Environ. Res. Public Health* 2018;15(1):77.
52. Suominen K, Lönnqvist J. Determinants of psychiatric hospitalization after attempted suicide. *Gen. Hosp. Psychiatry* 2006;28(5):424–430. [PubMed: 16950379]
53. Kroll DS, Karno J, Mullen B, Shah SB, Pallin DJ, Gitlin DF. Clinical severity alone does not determine disposition decisions for patients in the emergency department with suicide risk. *Psychosomatics*. 2018;59(4):388–393. [PubMed: 29336787]
54. Tidemalm D, Beckman K, Dahlin M, et al. Age-specific suicide mortality following non-fatal self-harm: national cohort study in Sweden. *Psychol. Med* 2015;45(8):1699–1707. [PubMed: 25425148]
55. Betz ME, Boudreaux ED. Managing suicidal patients in the emergency department. *Ann. Emerg. Med* 2016;67(2):276–282. [PubMed: 26443554]
56. Betz ME, Wintersteen M, Boudreaux ED, et al. Reducing suicide risk: challenges and opportunities in the emergency department. *Ann. Emerg. Med* 2016;68(6):758–765. [PubMed: 27451339]
57. Saunders KE, Hawton K, Fortune S, Farrell S. Attitudes and knowledge of clinical staff regarding people who self-harm: a systematic review. *J. Affect. Disord* 2012;139(3):205–216. [PubMed: 21925740]
58. Samaras N, Chevalley T, Samaras D, Gold G. Older patients in the emergency department: a review. *Ann. Emerg. Med* 2010;56(3):261–269. [PubMed: 20619500]
59. 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(10):2272–2277. [PubMed: 28752539]
60. Betz ME, Arias SA, Segal DL, Miller I, Camargo CA, Boudreaux ED. Screening for suicidal thoughts and behaviors in older adults in the emergency department. *J. Am. Geriatr. Soc* 2016;64(10).
61. Betz ME, Kautzman M, Segal DL, et al. Frequency of lethal means assessment among emergency department patients with a positive suicide risk screen. *Psychiatry Res.* 2018;260:30–35. [PubMed: 29169036]
62. Lizardi D, Stanley B. Treatment engagement: a neglected aspect in the psychiatric care of suicidal patients. *Psychiatr. Serv* 2010;61(12):1183–1191. [PubMed: 21123401]

63. US Department of Health Human Services, Substance Abuse and Mental Health Services Administration. 2015 National Survey on Drug Use and Health (NSDUH).
64. Choi NG, DiNitto DM, Marti CN. Relationship between the types of insurance coverage and outpatient mental health treatment use among older adults. *J. Appl. Gerontol* 2016;35(12):1343–1362. [PubMed: 25800462]
65. Choi NG, DiNitto DM, Marti CN. Mental health treatment use and perceived treatment need among suicide planners and attempters in the United States: between and within group differences. *BMC Res. Notes* 2015;8(1):305. [PubMed: 26179170]
66. Magaard JL, Seeralan T, Schulz H, Brütt AL. Factors associated with help-seeking behaviour among individuals with major depression: A systematic review. *PLoS One*. 2017;12(5):e0176730. [PubMed: 28493904]
67. Yousaf O, Grunfeld EA, Hunter MS. A systematic review of the factors associated with delays in medical and psychological help-seeking among men. *Health Psychol. Rev* 2015;9(2):264–276. [PubMed: 26209212]
68. Hetrick SE, Robinson J, Spittal MJ, Carter G. Effective psychological and psychosocial approaches to reduce repetition of self-harm: a systematic review, meta-analysis and meta-regression. *BMJ open* 2016;6(9):e011024.
69. Inagaki M, Kawashima Y, Kawanishi C, et al. Interventions to prevent repeat suicidal behavior in patients admitted to an emergency department for a suicide attempt: a meta-analysis. *J. Affect. Disord* 2015;175:66–78. [PubMed: 25594513]
70. Zero Suicide in Health and Behavioral Healthcare. <http://zerosuicide.sprc.org/>. Accessed August 3, 2017.
71. National Action Alliance for Suicide Prevention: Research Prioritization Task Force. (2014). A prioritized research agenda for suicide prevention: An action plan to save lives. Rockville, MD: National Institute of Mental Health and the Research Prioritization Task Force.
72. Carter G, Page A, Large M, et al. Royal Australian and New Zealand College of Psychiatrists clinical practice guideline for the management of deliberate self-harm. *Aust. N. Z. J. Psychiatry* 2016;50(10):939–1000. [PubMed: 27650687]
73. Bhaskaran J, Wang Y, Roos L, Sareen J, Skakum K, Bolton JM. Method of suicide attempt and reaction to survival as predictors of repeat suicide attempts: a longitudinal analysis. *J. Clin. Psychiatry* 2014.
74. Randall JR, Roos LL, Lix LM, Katz LY, Bolton JM. Emergency department and inpatient coding for self-harm and suicide attempts: Validation using clinician assessment data. *Int. J. Methods Psychiatr. Res* 2017;26(3).
75. Bethell J, Rhodes AE. Identifying deliberate self-harm in emergency department data. *Health Rep.* 2009;20(2):35. [PubMed: 19728584]
76. Walkup JT, Townsend L, Crystal S, Olfson M. A systematic review of validated methods for identifying suicide or suicidal ideation using administrative or claims data. *Pharmacoepidemiol. Drug Saf* 2012;21(S1):174–182. [PubMed: 22262604]
77. Stagnitti MN National Health Care Expenses in the U.S. Civilian Noninstitutionalized Population, Distributions by Type of Service and Source of Payment, 2013 Statistical Brief #491. 7 2016. Agency for Healthcare Research and Quality, Rockville, MD http://www.meps.ahrq.gov/mepsweb/data_files/publications/st491/stat491.shtml.
78. La Vonne AD, Zun LS, Burke T. Comparison of Canadian triage acuity scale to Australian Emergency Mental Health Scale triage system for psychiatric patients. *Int. Emerg. Nurs* 2015;23(2):138–143. [PubMed: 25082415]
79. Betz ME, Arias SA, Miller M, et al. Change in emergency department providers' beliefs and practices after use of new protocols for suicidal patients. *Psychiatr. Serv* 2015;66(6):625–631. [PubMed: 25726978]
80. Atzema CL, MacLagan LC. The Transition of Care Between Emergency Department and Primary Care: A Scoping Study. *Acad. Emerg. Med* 2017;24(2):201–215. [PubMed: 27797435]
81. Currier GW, Fisher SG, Caine ED. Mobile crisis team intervention to enhance linkage of discharged suicidal emergency department patients to outpatient psychiatric services: a randomized controlled trial. *Acad. Emerg. Med* 2010;17(1):36–43. [PubMed: 20015106]

82. Arora S, Burner E, Terp S, et al. Improving attendance at post-emergency department follow-up via automated text message appointment reminders: A randomized controlled trial. *Acad. Emerg. Med* 2015;22(1):31–37. [PubMed: 25388481]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Key Points: 1) The older adult population is a rapidly growing and high suicide risk group. 2) Emergency departments are critical settings in suicide prevention by identifying individuals at risk and facilitating timely intervention to inpatient and outpatient care. 3) The present study identified concerns regarding recognition of mental disorders and timely outpatient mental health care following emergency treatment of self-harm in U.S. older adults ≥ 65 years of age.

Table 1

Percent of Patients Hospitalized in 16,495 Emergency Department Visits for Deliberate Self-harm in Older Adult Medicare Beneficiaries, Stratified by Discharge Status and Patient Characteristics

Characteristics	Admitted Patient Visits, % (n=12,204)	Discharged Patient Visits, % (n=3,687)	Hospitalized (%)	Unadjusted Risk Ratio (99% CI)	Adjusted Risk Ratio (99% CI)
Total (n=16,495)			76.9		
Age (years)					
65-69 (n=6,375)	38.4	39.3	76.4	1.02(0.96,1.08)	1.02(0.96,1.09)
70-74 (n=3,968)	24.6	22.3	78.6	1.04(0.98,1.12)	1.05(0.97,1.12)
75-79 (n=2,530)	15.5	14.9	77.6	1.03(0.96,1.11)	1.03(0.96,1.11)
80 + (n=3,622)	21.5	23.5	75.2	-- --	-- --
Sex					
Male (n=6,872)	40.7	45.0	75.0	0.96(0.92,1.00)	0.96(0.92,1.01)
Female (n=9,623)	59.3	55.0	78.2	-- --	-- --
Race/Ethnicity					
African American (n=1,390)	7.4	11.9	67.3	0.86(0.79,0.94)	0.86(0.79,0.94)
Hispanic (n=272)	1.6	1.9	73.9	0.95(0.79,1.14)	0.94(0.79,1.14)
White (n=14,166)	87.4	81.0	78.2	-- --	-- --
Other (n=667)	3.7	5.2	69.7	0.89(0.79,1.01)	0.89(0.79,1.01)
Any recent mental disorder (n=5,855) ^{a,b}	36.7	31.5	79.4	1.05(1.00,1.10)	1.04(0.97,1.10)
Depression (n=3,074)	20.2	13.5	83.3	1.10(1.04,1.17)	1.09(1.03,1.16)
Bipolar (n=835)	5.5	3.5	84.1	1.10(0.99,1.21)	1.09(0.98,1.20)
Anxiety (n=2,479)	15.8	12.5	80.7	1.06(0.99,1.13)	1.04(0.98,1.11)
Psychosis (n=789)	4.8	4.8	76.8	1.00(0.90,1.11)	1.00(0.90,1.11)
Adjustment (n=430)	2.7	2.4	78.8	1.03(0.89,1.18)	1.02(0.89,1.17)
Personality (n=166)	1.1	0.9	80.1	1.04(0.83,1.31)	1.03(0.83,1.29)
Substance Use (n=1,838)	11.4	10.4	78.2	1.02(0.95,1.10)	1.02(0.95,1.10)
Recent health care ^a					
Outpatient mental health (n=5,348)	33.1	30.28	78.4	1.03(0.98,1.08)	1.02(0.97,1.07)
Inpatient mental health (n=1,555)	10.6	5.7	86.0	1.13(1.05,1.22)	1.13(1.04,1.22)
Emergency department (medical) (n=3,226)	19.1	20.9	75.3	0.97(0.92,1.03)	0.98(0.92,1.03)
Emergency department (mental) (n=1,731)	10.3	11.0	75.7	0.98(0.91,1.06)	0.98(0.91,1.06)
Any chronic pain					
Yes (n=3,798)	22.6	24.3	75.6	0.97(0.92,1.03)	0.97(0.92,1.02)
Any cognitive impairment ^a					
Yes (n=802)	5.0	4.6	78.3	1.02(0.92,1.13)	1.02(0.92,1.13)
Any sleep disturbance					
Yes (n=951)	5.8	5.6	77.7	1.01(0.92,1.12)	1.00(0.91,1.11)

Characteristics	Admitted Patient Visits, % (n=12,204)	Discharged Patient Visits, % (n=3,687)	Hospitalized (%)	Unadjusted Risk Ratio (99% CI)	Adjusted Risk Ratio (99% CI)
Number of Elixhauser comorbidities					
0 (n=7,181)	44.7	38.8	79.4	-- --	-- --
1 (n=2,370)	13.3	17.9	71.1	0.90(0.83,0.83)	0.89(0.79,1.01)
2-3 (n=3,536)	20.7	23.9	74.1	0.93(0.87,0.99)	0.93(0.88,0.99)
4-5 (n=2,000)	12.2	11.8	77.4	1.00(0.92,1.09)	0.98(0.90,1.05)
6 or more (n=1,408)	8.9	7.5	79.7	1.04(0.94,1.16)	1.01(0.92,1.10)
Recent self-harm ^a					
Yes (n=361)	2.1	2.4	74.5	0.97(0.83,1.14)	0.97(0.83,1.14)
Lethality of current self-harm method ^c					
Low lethality (n=14,429)	90.6	90.3	76.9	-- --	-- --
High lethality (n=572)	3.7	2.9	80.9	1.05(0.93,1.19)	1.07(0.94,1.20)
Other/Unknown (n=994)	5.8	6.9	73.6	0.96(0.87,1.06)	0.96(0.87,1.07)
Current self-harm method					
Poisoning (n=13,760)	83.9	81.8	77.3	1.03(0.97,1.10)	1.03(0.97,1.10)
Other (n=2,735)	16.1	18.2	74.6	-- --	-- --

Adjusted models controlled for age, sex, and race/ethnicity.

^aBased on 30 days before the emergency department visit.

^bFor mental disorder variables, the reference group consists of treatment episodes without the disorder.

^cHigh lethality methods include firearms, drowning, suffocation, fall, fire, and motor vehicle; low lethality methods include cutting and poisoning; unknown includes unspecified or poorly specified.

Values in bold indicate significant risks ratios at p < .01.

Table 2

Percent of Patients Receiving Mental Health Code During Emergency Department Visit for Deliberate Self-Harm Among Older Adult Medicare Beneficiaries Discharged to the Community (N=3,818), Stratified by Patient Characteristics

Characteristics	Code for Mental Disorder (%)	Unadjusted Risk Ratio (99% CI)	Adjusted Risk Ratio (99% CI)
Total (n=3,818)	56.4		
Age (years)			
65-69 (n=1,502)	47.2	1.52(1.30,1.77)	1.53(1.31,1.78)
70-74 (n=850)	22.0	1.25(1.05,1.49)	1.26(1.05,1.50)
75-79 (n=568)	12.2	1.03(0.84,1.27)	1.04(0.84,1.27)
80 + (n=898)	18.6	-- --	-- --
Sex			
Male (n=1,717)	43.8	0.95(0.85,1.06)	0.94(0.84,1.27)
Female (n=2,101)	56.2	-- --	-- --
Race/Ethnicity			
African American (n=454)	58.2	1.03(0.87,1.23)	1.01(0.84,1.19)
Hispanic (n=71)	60.6	1.08(0.72,1.60)	1.08(0.73,1.61)
White (n=3,091)	56.2	-- --	-- --
Other (n=202)	55.4	0.99(0.77,1.27)	0.97(0.75,1.25)
Any recent mental disorder (n=1,204) ^b	78.2	1.68(1.50,1.88)	1.61(1.43,1.80)
Depression (n=515)	78.6	1.48(1.29,1.71)	1.40(1.22,1.62)
Bipolar (n=133)	86.5	1.56(1.22,2.00)	1.40(1.09,1.80)
Anxiety (n=478)	77.2	1.44(1.24,1.67)	1.37(1.18,1.60)
Psychosis (n=183)	83.6	1.52(1.22,1.88)	1.44(1.16,1.79)
Adjustment (n=91)	81.3	1.46(1.07,1.97)	1.38(1.01,1.87)
Personality (n=33)	87.9	1.56(0.97,2.53)	1.48(0.91,2.40)
Substance Use (n=399)	83.2	1.56(1.34,1.82)	1.42(1.21,1.66)
Recent healthcare ^a			
Outpatient mental health (n=1,156)	79.1	1.70(1.52,1.90)	1.62(1.44,1.82)
Inpatient mental health (n=218)	70.2	1.26(1.02,1.57)	1.20(0.96,1.49)
Emergency department (medical) (n=798)	62.9	1.15(1.01,1.31)	1.13(0.99,1.29)
Emergency department (mental) (n=420)	84.8	1.60(1.38,1.86)	1.50(1.29,1.74)
Any chronic pain ^a			
Yes (n=928)	61.7	1.12(0.99,1.28)	1.09(0.96,1.24)
Any cognitive impairment ^a			
Yes (n=174)	66.7	1.19(0.93,1.52)	1.26(0.98,1.61)
Any sleep disturbance			
Yes (n=212)	68.9	1.23(0.99,1.54)	1.19(0.96,1.49)

Characteristics	Code for Mental Disorder (%)	Unadjusted Risk Ratio (99% CI)	Adjusted Risk Ratio (99% CI)
Number of Elixhauser comorbidities			
0 (n=1,482)	54.0	-- --	-- --
1 (n=685)	56.3	1.04(0.89,1.22)	1.07(0.91,1.25)
2-3 (n=914)	56.7	1.05(0.91,1.21)	1.07(0.92,1.24)
4-5 (n=451)	58.3	1.08(0.90,1.30)	1.08(0.90,1.29)
6 or more (n=286)	65.7	1.21(0.99,1.50)	1.20(0.98,1.48)
Recent self-harm ^a			
Yes (n=92)	59.8	1.06(0.74,1.51)	1.01(0.70,1.44)
Lethality of current self-harm method ^c			
Low lethality (n=3,447)	56.1	-- --	-- --
High lethality (n=109)	38.5	0.69(0.46,1.02)	0.72(0.48,1.07)
Other/Unknown (n=262)	67.9	1.21(0.99,1.48)	1.24(1.01,1.52)
Current self-harm method			
Poisoning (n=3,124)	55.6	0.92(0.80,1.06)	0.91(0.78,1.04)
Other (n=694)	60.1	-- --	-- --

Adjusted models controlled for age, sex, and race/ethnicity.

^aBased on 30 days before the emergency department visit

^bFor mental disorder variables, the reference group consists of treatment episodes without the disorder.

^cHigh lethality methods include firearms, drowning, suffocation, fall, fire, and motor vehicle; low lethality methods include cutting and poisoning; unknown includes unspecified or poorly specified.

Values in bold indicate significant risks ratios at p < .01.

Table 3

Percent of Patients Receiving Outpatient Mental Health Follow-Up Care Within 30 Days of Emergency Department Visits for Deliberate Self-Harm Among Older Adult Medicare Beneficiaries Discharged to the Community (N=3,818), Stratified by Patient Characteristics

Characteristics	Outpatient Follow-Up Care (%)	Unadjusted Risk Ratio (99% CI)	Adjusted Risk Ratio (99% CI)
Total (n=3,818)	39.0		
Age (years)			
65-69 (n=1,502)	46.2	1.53(1.27,1.84)	1.56(1.30,1.88)
70-74 (n=850)	38.5	1.27(1.03,1.57)	1.29(1.04,1.59)
75-79 (n=568)	34.7	1.15(0.90,1.46)	1.16(0.91,1.47)
80 + (n=898)	30.2	-- --	-- --
Sex			
Male (n=1,717)	35.0	0.82(0.72,0.95)	0.82(0.71,0.94)
Female (n=2,101)	42.3	-- --	-- --
Race/Ethnicity			
African American (n=454)	35.7	0.89(0.72,1.11)	0.88(0.71,1.09)
Hispanic (n=71)	36.6	0.91(0.55,1.53)	0.92(0.56,1.55)
White (n=3,091)	39.9	-- --	-- --
Other (n=202)	34.2	0.86(0.62,1.18)	0.84(0.61,1.16)
Any recent mental disorder (n=1,204) ^b	68.5	2.70(2.36,3.08)	2.59(2.26,2.97)
Depression (n=515)	73.6	2.19(1.88,2.55)	2.05(1.75,2.39)
Bipolar (n=133)	82.7	2.21(1.71,2.85)	1.96(1.51,2.55)
Anxiety (n=478)	70.5	2.04(1.74,2.40)	1.91(1.62,2.44)
Psychosis (n=183)	71.6	1.92(1.51,2.42)	1.86(1.47,2.35)
Adjustment (n=91)	71.4	1.87(1.35,2.59)	1.77(1.28,2.46)
Personality (n=33)	87.9	2.28(1.40,3.69)	2.12(1.30,3.45)
Substance Use (n=399)	72.9	2.08(1.76,2.46)	1.98(1.66,2.36)
Recent healthcare ^a			
Outpatient mental health (n=1,156)	69.8	2.72(2.38,3.11)	2.62(2.28,3.00)
Inpatient mental health (n=218)	66.1	1.77(1.41,2.22)	1.67(1.33,2.12)
Emergency department (medical) (n=798)	54.3	1.55(1.34,1.79)	1.54(1.33,1.78)
Emergency department (mental) (n=420)	72.4	2.07(1.77,2.45)	2.00(1.68,2.37)
Mental disorder coded on ED visit for DSH ^c			
Yes (n=2,155)	54.0	2.75(2.34,3.23)	2.65(2.25,3.12)
Any chronic pain ^a			
Yes (n=928)	49.1	1.37(1.20,1.59)	1.31(1.14,1.52)
Any cognitive impairment ^a			

Characteristics	Outpatient Follow-Up Care (%)	Unadjusted Risk Ratio (99% CI)	Adjusted Risk Ratio (99% CI)
Yes (n=174)	63.2	1.67(1.29,2.16)	1.74(1.35,2.26)
Any sleep disturbance			
Yes (n=212)	53.8	1.41(1.10,1.81)	1.35(1.04,1.74)
Number of Elixhauser comorbidities			
0 (n=1,482)	29.2	-- --	-- --
1 (n=685)	38.1	1.30(1.06,1.60)	1.32(1.07,1.62)
2-3 (n=914)	44.0	1.50(1.26,1.80)	1.52(1.27,1.82)
4-5 (n=451)	51.2	1.75(1.42,2.16)	1.74(1.41,2.44)
6 or more (n=286)	56.6	1.94(1.53,2.46)	1.92(1.52,2.45)
Recent self-harm ^a			
Yes (n=92)	56.5	1.46(1.02,2.11)	1.44(1.00,2.07)
Lethality of current self-harm method ^c			
Low lethality (n=3,447)	38.7	-- --	-- --
High lethality (n=109)	32.1	0.83(0.53,1.29)	0.89(0.58,1.40)
Other/Unknown (n=262)	45.4	1.17(0.92,1.50)	1.21(0.95,1.56)
Current self-harm method			
Poisoning (n=3,124)	38.3	0.91(0.77,1.07)	0.87(0.73,1.03)
Other (n=694)	42.2	-- --	-- --

Adjusted models controlled for age, sex, and race/ethnicity.

^aBased on 30 days before the emergency department visit

^bFor mental disorder variables, the reference group consists of treatment episodes without the disorder.

^cAny mental diagnosis recognized during index emergency department visit for deliberate self-harm

^dHigh lethality methods include firearms, drowning, suffocation, fall, fire, and motor vehicle; low lethality methods include cutting and poisoning; unknown includes unspecified or poorly specified.

Values in bold indicate significant risks ratios at p .01.