Suicide risk in long-term care facilities: A systematic review

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Abstract

Objective—Suicide risk is highest in later life, however, little is known about the risk of suicide among older adults in long-term care facilities (e.g., nursing homes, assisted living facilities). The goal of this paper is to review and synthesize the descriptive and analytic epidemiology of suicide in long-term care settings over the past 25 years.

Methods—Four databases (PubMed, CINAHL Plus, Web of Knowledge, and EBSCOHost) were searched for empirical studies of suicide risk in nursing homes, assisted living, and other residential facilities from 1985 to 2013. Of the 4,073 unique research articles identified, 36 were selected for inclusion in this review.

Results—Of the included reports, 20 were cross-sectional, 10 were longitudinal, three qualitative, and five were intervention studies. Most studies indicate that suicidal thoughts (active and passive) are common among residents (prevalence in the past month: 5 – 33%), although completed suicide is rare. Correlates of suicidal thoughts among long-term care residents include depression, social isolation, loneliness, and functional decline. Most studies examined only individual-level correlates of suicide, although there is suggestive evidence that organizational characteristics (e.g., bed size, staffing) may also be relevant.

Conclusions—Existing research on suicide risk in long-term care facilities is limited, but suggests that this is an important issue for clinicians and medical directors to be aware of and address. Research is needed on suicide risk in assisted living and other non-nursing home residential settings, as well as the potential role of organizational characteristics on emotional well-being for residents.

Keywords
assisted living; nursing homes; long-term care; suicide; self-harm
INTRODUCTION

It is increasingly recognized that suicide in later life is an important public health problem. Suicide is among the top 10 leading causes of death in the US (U.S. DHHS, 2012), and suicide risk increases substantially after age 65, particularly for men (CDC, 2010). In recent years suicide risk has been rising for middle-aged (aged 35 – 64) adults (CDC, 2010; Caine et al., 2011), suggesting the emergence of a cohort effect that may persist as this group ages. Prevention strategies that promote well-being across settings and over the lifespan are needed. The 2012 Surgeon General National Strategy for Suicide Prevention specifically identifies healthcare organizations, aging services networks, and other programs that offer support to older adults as settings for suicide prevention efforts (U.S. DHHS, 2012).

However, the suicide risk in long-term care (LTC) facilities (i.e., assisted living, nursing homes, continuing care communities) is largely unknown. In the US, currently 1.5 million adults live in nursing homes (Jones et al., 2009), and another 1 million living in assisted living/residential care facilities (Park-Lee et al., 2011). It is estimated that 14% of Americans aged 65 and older will need some sort of long-term care services as they age, and in 2005 alone long-term care services cost $207 billion (Komisar and Thompson, 2007). In 2010 the Substance Abuse and Mental Health Services Administration (SAMHSA) released a toolkit for promoting emotional health and preventing suicide in senior living facilities (SAMHSA, 2010). Residents of LTC facilities may be socially isolated and have mental and physical health limitations, which are established risk factors for suicide (Reiss & Tischler, 2008; Juurlink et al., 2004; Conwell et al., 2011; Duberstein et al., 2004a, Duberstein et al., 2004b). It is possible that concerns about the transition to a LTC facility may itself be a risk factor for self-harm (Loebel et al., 1991). However, LTC facilities also offers facilitated contact with peers, greater monitoring of daily activities, more contact with health and mental health professionals, and presumably less access to lethal means of suicide. In sum, neither the quantity of suicidal behavior, nor the factors that influence suicide risk in these settings, is well understood.

Preventing suicide in later life requires understanding the context of long-term care facilities and determining whether they are appropriate “points of engagement” for older adults (Caine et al., 2011). For instance, suicide prevention strategies that are effective in community or primary care settings may not be applicable to long-term care and senior living facilities. There is also the need to develop interventions that reflect the needs of future residents of LTC facilities (e.g., baby boomers) in order to promote well-being in these settings.

In this paper we review the empirical research on suicide risk in long-term care facilities over the past 25 years, synthesize the descriptive and analytic epidemiology of suicide in these settings, and provide suggestions for future prevention and intervention efforts.
METHODS

Search Strategy

Four databases were searched between 5 June 2013 and 30 June 2013. The databases included PubMed, CINAHL Plus, Web of Knowledge, and EBSCOHost Academic Search Complete. Searches used various combinations of the following terms: “suicide,” “suicidal ideation,” “attempted suicide,” “assisted suicide,” “suicide risk,” “self-injurious behavior,” “self-inflicted injuries,” “self-destructive behavior,” “accidents,” “patient compliance,” “treatment compliance,” “medication adherence” or “treatment refusal” and “homes for the aged,” “nursing homes,” “nursing home patients,” “assisted living facilities,” “skilled nursing facilities,” “intermediate care facilities,” or “retirement communities.” Three limits were applied to each search: publication date from 1/1/1985 to 4/31/2013, English language, and human subjects. The reference lists of previous systematic reviews, meta-analyses, and selected studies were screened.

Selection Criteria

Only peer-reviewed original empirical articles were considered for inclusion. Additionally, studies were included if they 1) sampled a population of older adults, 2) were within the nursing home, long-term care, assisted living, and/or skilled nursing settings, and 3) examined suicidal behavior, self-injurious behavior, self-destructive behavior, and/or treatment refusal/compliance. The criterion of “older adults” was determined by examining the age distribution of the study population of the abstracted studies, and to be inclusive we considered all reports with a mean sample age >50 years old. For multiple publications from the same study, only those presenting novel results or analyses were included.

Data Extraction

Three independent reviewers (BM, AR, and ML) evaluated and selected articles by title for full-text abstraction. Abstracted data included: year, first author, location, study design, sample characteristics, measures, outcome, and summary of the main findings. Of articles selected for full-text abstraction, those investigating suicide risk factors (e.g. depression, substance abuse) without examining suicidal behavior were excluded. Reports on assisted suicide, euthanasia, or end-of-life decision-making were excluded.

RESULTS

Selection of Studies

A total of 4,073 unique research articles were retrieved from search (see Flowchart). After screening titles based on our inclusion criteria, 578 articles were selected for full-text abstraction. From the 578 articles abstracted, 36 articles were retained for analysis. The 36 articles selected for analysis encompassed 20 cross-sectional reports, 10 cohort studies, three qualitative studies, and five intervention studies.

First, we note that these 36 reports used a wide range of terminology to describe suicidal behavior. Often these terms mapped on to established concepts or defined behaviors such as “passive” (i.e., having suicidal thoughts but little intent to carry them out or refusing efforts
to maintain life) and “active” (i.e., seriously thinking about or planning to commit suicide) suicidal thoughts (Beck, Kovacs and Weissman, 1979). Several studies distinguished between “direct” (i.e., cutting oneself, ingesting toxic substances) and “indirect” (i.e., refusing food or medication) self-destructive behavior (e.g., Draper et al. 2002a), while many others combined these into a single measure of suicide attempts. However, in other cases terms were more global (e.g., Osgood and Brant (1990) refer to “indirect life-threatening behavior,” defined as “repetitive acts by individuals directed toward themselves, which result in physical harm or tissue damage and which could bring about a premature end of life,” (emphasis added) and gives examples that range from refusing food or hydration to ingesting foreign substances or self-mutilation, and distinguished this from “overt” suicidal behavior, which was defined as a “willful taking (or attempt to take) one’s own life” (Osgood, Brant and Lipman, 1998 – 1989; Osgood and Brant, 1990)).

For clarity, throughout the text we use the term “suicide risk” to refer to the probability of completed suicide as articulated by Beck and colleagues (Beck, Kovacs and Weissman, 1979), which encompasses both suicidal thoughts and history of attempts, and report the specific component of suicide risk assessed by each study in the tables. Finally, we have organized these studies according to the primary outcome examined: completed suicide (Table 1), suicidal thoughts or attempts (Table 2), and interventions aimed at addressing suicide risk in LTC (Table 3). Many reports examined multiple aspects of suicide risk in a single study, and in these cases we categorized them according to the most serious outcome assessed (i.e., studies that examined both suicidal thoughts and completed suicide are shown in Table 1).

Quantifying suicide risk in long-term care settings

Completed suicide—Table 1 summarizes the findings from studies evaluating the epidemiology and risk factors for completed suicide in LTC settings. Seven studies estimated the prevalence of completed suicide in LTC settings. In a study of 463 LTC facilities housing 30,269 residents, Osgood et al. (1989) estimated the overall prevalence of suicidal behavior (i.e., suicidal thoughts, attempts, and completed suicide) among residents was 1%, with 80% of these cases involving indirect life-threatening behavior as defined above (Osgood et al., 1988-89). A follow-up study showed 19% of LTC facilities had at least one instance of suicidal behavior (Osgood and Brant, 1990). Studies from European samples report similar prevalence estimates of completed suicide among residents (1% in Finland (Suominen et al., 2003) and 3% in Spain (Magagna et al., 2012-13)).

Six studies estimated the incidence for completed suicide in LTC settings, with substantial variability across the reports. For example, Abrams et al. (1988) estimated that the cumulative incidence of suicide was substantially lower in LTC facilities compared to the general population (19.74 per 100,000 vs. 98.56 per 100,000) (Abrams et al., 1988). In an analysis of 12 LTC facilities from 1981 – 1997 Menghini and Evans (2000) estimated the incidence of completed suicide to be 35 per 100,000 person-years (Menghini and Evans, 2000). Using data from Italy, Scocco et al. estimated the one-year incidence of completed suicide was higher in LTC facilities compared to the general population (18.6 per 100,000 vs. 8.9 per 100,000) (Scocco et al., 2006). While they did not estimate cumulative incidence,
Mezuk et al. reported that the relative risk of suicide in New York City from 1990 to 2005 decreased amongst community dwelling adults (RR = 0.97, P < 0.001), but did not change for LTC residents (RR = 1.05, P < 0.17) (Mezuk et al., 2008).

**Methods of suicide in LTC settings**—The most common methods of suicide in LTC settings included hanging (5 studies), jumping (3 studies), drug overdose (2 studies), firearm (2 studies), wrist slashing, asphyxiation, refusing to eat or drink, medication refusal, drowning, and self-poisoning (Abrams et al., 1988; Osgood et al., 1989; Menghini and Evans, 2000; Suominen et al., 2003; Scocco et al., 2006; Seyfried et al., 2011). When compared to methods of suicide in the community, cases in LTC facilities were less likely to involve firearms and 2.6 times more likely to involve fall (Mezuk et al., 2008).

**Suicidal thoughts and suicide attempts**—The prevalence of suicidal thoughts and attempts in LTC settings is generally high, particularly compared to the general population. In Table 2 we distinguish between lifetime prevalence (report of suicidal thoughts or a suicide attempt at any point in time) and point prevalence (report of suicidal thoughts or a suicide attempt contemporaneous with the time of interview, generally within the past 14 – 30 days). In their study of 172 LTC residents, Scocco et al. estimated that one-half had a lifetime history of suicidal behavior, with 33% expressing suicidal thoughts, plans, and/or attempts within the past month (Scocco et al., 2009) and a cumulative incidence of attempted suicide of 29.7 per 100,000 (Scocco et al., 2006). In a study of 610 LTC residents, Draper et al. (2002a) reported the point prevalence of indirect suicidal behavior (e.g., refusal to eat or take medication) was 61%, and the point prevalence of direct suicidal behavior (e.g., self-cutting, ingestion of toxic substances) was 14% (Draper et al., 2002a).

In an analysis of new LTC residents, Ron (2002) reported that the prevalence of suicidal thoughts was highest in the first seven months since entering as measured by the Scale for Suicidal Ideation (Ron, 2002). Haight (1995) reported 12% of newly relocated LTC residents had suicidal thoughts as measured by the Beck Suicide Ideation Scale (Haight, 1995). Malfent et al. (2010) estimated the lifetime, one-year, and one-month prevalence of active suicidal thoughts among LTC residents as 35%, 11%, and 7%, respectively (Malfent et al., 2010). Finally, in a small study comparing suicide risk between LTC residents and psychiatric inpatients, the point prevalence of suicidal thoughts as assessed by the Beck Scale for Suicidal Ideation was comparable between the groups (approximately 2.5% in both groups) (Uncapher et al., 1998).

**Correlates of suicide risk in long-term care settings**—Individual-level risk factors for completed suicide in LTC generally mirror those of suicide in the general population: male gender; (Osgood and Brant, 1990); history of depression, substance abuse, loss of spouse within the past year, previous history of suicidal behavior, intact cognition, and impaired mobility (Menghini and Evans, 2000; Suominen et al., 2003; Magagna et al., 2012; Seyfried et al., 2011); deterioration of overall health status, low mood, impaired sleep, functional impairment (Shaw, 2000; Magagna et al., 2012); and pain (Suominen et al., 2003). Findings are similar for suicidal thoughts and attempts, including lack of a confidant, depressed mood, feelings of helplessness, lower life satisfaction, lower well-being (Haight, 1995; Uncapher et al., 1998; Ron, 2004; Heisel et al., 2005; Scocco et al., 2009; Malfent et
as well as health problems, functional impairment, and pain (Haight, 1995; Jorm et al., 1995). Meeks and Tennyson (2003) also reported suicidal thoughts were positively correlated with the number of medications prescribed (Meeks and Tennyson, 2003). For recently relocated LTC residents, suicidal thoughts were associated with history of family conflict and dysfunction (Haight and Hendrix, 1998).

Although it is hypothesized that organizational characteristics of LTC facilities (e.g., staffing, size, organizational culture) may be associated with depression and risk of suicide among residents (Osgood, 1992), there is little empirical evidence about this question. In her seminal study of suicidal behavior in LTC facilities, Osgood reported that staff turnover and facility size were positively correlated with the frequency of attempted suicide, completed suicide, and indirect life-threatening behavior; lower per diem costs and type of facility ownership (public, private, religious, other) were also positively correlated with completed suicide (Osgood, 1992). More recently, Scocco et al. (2006) reported unexpectedly that the presence of a mental health professional within LTC facilities had no influence on suicidal behavior (Scocco et al., 2006). Low et al. (2004) reported that facility design features for patients with frailty and dementia, as well as more intense facility security, were positively associated with depressive symptoms and suicidal behavior (Low et al., 2004).

There is very little known about whether anticipating placement in a LTC facility may act as a risk factor for suicide. A small (n=60) study of suicide cases in LTC reported that 44% of individuals were highly distressed by anticipation of moving into a LTC facility (Loebel et al., 1991). Individuals who were married were more likely to report LTC placement as a reason for suicide as compared to unmarried persons (Loebel et al., 1991), potentially because their spouse may not have been able to accompany them. In a study of new LTC admissions, Morriss et al. (1994) reported the prevalence of suicidal behavior was 6% at the time of admission, 2.3% at two weeks following admission, and 2.9% at two months following admission (Morriss et al., 1994).

**Efforts aimed at preventing suicide in long-term care settings**—Assessment and evaluation of preventative interventions for suicide in LTC settings remains limited (Table 3). Three studies focused on interventions for healthcare providers and geriatric caregivers, while only two were directed to LTC residents themselves. An efficacy study of the “Preventing Suicide and Depression” curriculum presented to LTC staff improved knowledge about this topic 20% from pre- to post-test (Walker and Osgood, 2000-01). Ziervogel et al. (2005) reported similar results in a training session about knowledge and attitudes towards depression and suicide for caregivers (Ziervogel et al., 2005). In a study evaluating knowledge and ability to recognize risk factors for completed suicide and indirect suicidal behavior among clinical psychologists who work with older adults, providers were generally able to identify clinical risk factors (e.g., history of suicide attempt, suicidal ideation, depression, hopelessness, social isolation, self-harm), but failed to recognize many others, such as bereavement, male gender, presence of medical illness, marital status, and ethnicity (Brown et al., 2004). Concerning interventions for LTC residents, a randomized controlled trial of “life review” as compared to a friendly visit amongst 52 LTC residents significantly lowered depressive symptoms at 8-week, 1-year, and 2-year follow-up, but had no significant impact on levels of hopelessness or suicidal ideation (Haight et al., 2000).
Finally, a small (n=9) study assessing the feasibility of telepsychiatric services for LTC residents that were referred for psychiatric evaluation showed 89% of residents would benefit from the program (Yeung et al., 2009).

DISCUSSION

The primary finding from this review is that although completed suicide is rare, both passive and active suicidal thoughts are common among residents of LTC facilities. The main correlates of suicidal behavior in these settings are the same as those in the community: depression, social isolation, loneliness, health problems and functional decline. Finally, only a handful of intervention studies have examined promoting mental health for older adults in these settings, and the effectiveness of these programs is largely unknown.

This review highlights the limitations of extant research. Most of the studies here involved small samples that have unknown generalizability. Only a handful of studies included comparisons to older adults living in the general community, which means it is unresolved whether suicide risk is elevated in these settings among and beyond what is expected among older adults living in the general community. Almost all reports were cross-sectional in nature and enrolled a mix of both new and established residents. Inconsistent terminology regarding aspects of suicidality (i.e., lack of distinction between thoughts and attempts) and the broad range of outcome measures makes comparisons across studies difficult. These issues also limit our ability to understand the source of the substantial variability across studies as to the prevalence of suicide risk, including the possibility that suicide risk in LTC may have changed over the past 25 years as LTC systems (i.e., emergence of assisted living facilities and home health care) have changed. We also note that there is very limited research on either the LTC transition process or periods of risk among LTC residents, or whether organizational characteristics of these settings (e.g., size, staffing, services) are associated with suicide risk.

Future directions for research

One reason for the lack of information on suicide risk in LTC facilities is that prior to 2010 universal screening for suicidal ideation in these facilities had not been widely adopted nor recommended as an approach to prevent suicide (U.S. DHHS, 2004; O’Riley et al., 2013). With the revised Minimum Data Set (MDS) 3.0, (Saliba and Bucahanan, 2008), Medicare- and Medicaid-certified LTC facilities will be required to administer the Patient Health Questionnaire (PHQ-9) (Spitzer et al., 1999), a brief assessment for mental disorders including an item specifically regarding presence of thoughts of self-harm. The full MDS 3.0 assessment is administered to all residents at admission, discharge, and periodically during nursing home stays. Data from the revised MDS assessments may therefore provide valuable information about suicidality among LTC residents and periods of greatest risk. The inclusion of the PHQ-9 questions in the MDS 3.0 also implies the need for LTC facilities to have systems of treatment or referral in place to manage suicide risk for those who respond affirmatively to thoughts of self-harm.

The release of the National Survey of Residential Care Facilities demonstrates both the rapid growth in non-nursing home LTC alternatives, as well as the wide range of variability in
assisted living and other residential care facilities (Caffrey et al., 2012). Strong trends indicate that assisted living facilities are displacing the market for nursing homes in LTC, particularly for older adults with fewer functional limitations (Grabowski et al., 2012), but the oversight and regulation of these facilities varies substantially by state (Polzer 2011; Stevenson and Grabowski, 2010). The characteristics of both the residents and the services offered by these facilities differs substantially from those in nursing homes (Grabowski et al., 2012; Park-Lee et al., 2011), and this demonstrates the need to conduct research on suicide risk and promoting well-being in these settings specifically.

Organizational-level characteristics

While preliminary work suggests that organizational-level characteristics such as facility size, auspices, per diem cost, and staff turnover rate may be associated with suicide risk in LTC facilities (Osgood, 1992), these data are over three decades old and little is known about whether or how organizational-level characteristics of today’s senior living facilities are associated with suicide risk. To better understand the relationship between organizational-level characteristics and suicide risk in LTC facilities three areas need to be developed. First, a clear theoretical framework for organizational-level interventions must be developed that identifies the essential components of effective interventions. Second, objective data of organizational-level characteristics associated with suicide risk in LTC facilities need to be collected; MDS 3.0 will fill some of this gap for nursing homes, but assisted living facilities, daycares, etc. also need to be assessed. Third, health services research needs to identify best practices of organizational-level interventions (e.g., staff training, provision of mental health services) (U.S. DHHS, 2012).

Long-term care facilities may serve as an opportunity for organizational-level interventions for suicide prevention. For example, in 1996 the Air Force implemented an institutionalizing community-wide prevention program endorsed by the senior ranks (Knox et al., 2003). This program led to institutional policy changes regarding the availability of resources as well as radical changes in social norms to decrease stigma around help-seeking behaviors for all members of the community (Knox et al., 2003). Like the Air Force, LTC facilities may be appropriate settings for this type of organizational change.

Summary

Over the past 30 years, a small but growing body of research has shown that both passive and active suicidal thoughts, direct and indirect self-harm, as well as several risk factors for completed suicide, are prevalent among residents of LTC facilities. Additional inquiry regarding factors that contribute to, as well as those that may ameliorate, this burden is warranted.

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REFERENCES


Figure 1.
### Table 1

<table>
<thead>
<tr>
<th>Year</th>
<th>First author</th>
<th>Location</th>
<th>Study design</th>
<th>Sample size and composition</th>
<th>Sample characteristics</th>
<th>Outcome</th>
<th>Outcome measure</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988</td>
<td>Abrams</td>
<td>USA</td>
<td>Retrospective cohort</td>
<td>632 suicide cases</td>
<td>Age 70 and older</td>
<td>Completed suicide</td>
<td>OCME records</td>
<td>Cumulative incidence in LTC: 19.74/100,000. Cumulative incidence in general population: 98.96/100,000. Methods of suicide in LTC included jumping, hanging, and drug overdose.</td>
</tr>
<tr>
<td>1989</td>
<td>Osgood</td>
<td>USA</td>
<td>Cross-sectional</td>
<td>463 LTC facilities housing 30,269 residents</td>
<td>Mean age: 68, 74% White; Gender proportions unspecified</td>
<td>Completed suicide, attempted suicide, ILTB among LTC residents</td>
<td>Self-report questionnaire completed by LTC facility administrators</td>
<td>Point prevalence of any kind of suicidal behavior: 1% (80% were ILTB). Prevalence of death after suicidal behavior: 0.2%. Commonly used methods included wrist-slashing, firearms, asphyxiation, refusing to eat or drink and refusing to take medications.</td>
</tr>
<tr>
<td>1990</td>
<td>Osgood</td>
<td>USA</td>
<td>Cross-sectional</td>
<td>463 LTC facilities housing 30,269 residents</td>
<td>Mean age: 68, 74% White</td>
<td>Completed suicide, attempted suicide, ILTB among LTC residents</td>
<td>Self-report questionnaire completed by LTC facility administrators</td>
<td>19% of LTC facilities reported at least one instance of suicidal behavior. Cumulative incidence of completed suicide in LTC: 94.9/100,000. Men had higher risk of completed suicide relative to women.</td>
</tr>
<tr>
<td>1991</td>
<td>Loebel</td>
<td>USA</td>
<td>Retrospective cohort</td>
<td>57 suicide cases</td>
<td>Mean age: 74, 43 Male: 14 Female</td>
<td>Completed suicide and reasons for suicide</td>
<td>Suicide notes and informant interview</td>
<td>44% of individuals who gave reasons for their suicide were motivated by anticipated LTC placement. Married persons more frequently cited LTC placement as a reason for suicide than unmarried persons.</td>
</tr>
<tr>
<td>1992</td>
<td>Osgood</td>
<td>USA</td>
<td>Cross-sectional</td>
<td>463 LTC facilities housing 30,269 residents</td>
<td>Mean age: 68, 74% White</td>
<td>Completed suicide, attempted suicide, ILTB among LTC residents</td>
<td>Self-report questionnaire completed by LTC facility administrators</td>
<td>Staff turnover and facility size were positively correlated with any type of resident suicidal behavior. Per-diem costs and religious facility ownership positively correlated with death from suicidal behavior.</td>
</tr>
<tr>
<td>2000</td>
<td>Menghini</td>
<td>USA</td>
<td>Retrospective cohort</td>
<td>12 LTC facilities</td>
<td>Median age: 79, 75% Male</td>
<td>Completed and attempted suicide</td>
<td>Medical and death records</td>
<td>Cumulative incidence of suicide in LTC: 35/100,000. Common methods: drowning, hanging, jumping, and overdose. Risk factors: depression, history of substance abuse, loss of spouse within the past year, history of suicidal behavior, intact cognition, and impaired mobility. All residents who completed suicide had life-threatening illnesses.</td>
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<tr>
<td>2000</td>
<td>Shaw</td>
<td>USA</td>
<td>Cross-sectional</td>
<td>19 LTC facilities housing 3,383 residents</td>
<td>63% Proprietary facilities, 37% Non-profit facilities</td>
<td>Suicide risk assessment and completed suicide</td>
<td>Self-report questionnaire completed by LTC facility administrators</td>
<td>Prevalence of suicide risk: 1,418/100,000 residents. No completed suicides reported. Resident factors positively associated with suicide risk included female gender, length of stay, deterioration of overall health status, deterioration of mood, appetite, sleep and functioning, medication refusal.</td>
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<tr>
<td>2003</td>
<td>Draper</td>
<td>Australia</td>
<td>Longitudinal cohort</td>
<td>647 LTC residents</td>
<td>Mean age: 82, 73% Female</td>
<td>All-cause mortality, passive SDB and</td>
<td>HBS, EBAS-DEP, HDRS</td>
<td>50% of residents were alive at followup. No suicide mortality over the 3-month period.</td>
</tr>
<tr>
<td>Year</td>
<td>First author</td>
<td>Location</td>
<td>Study design</td>
<td>Sample size and composition</td>
<td>Sample characteristics</td>
<td>Outcome</td>
<td>Outcome measure</td>
<td>Main findings</td>
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<tr>
<td>2003</td>
<td>Suominen</td>
<td>Finland</td>
<td>Retrospective cohort</td>
<td>1397 suicide cases</td>
<td>Mean age: 76 75% Male</td>
<td>Completed suicide</td>
<td>Psychological autopsy</td>
<td>1-year cumulative incidence of suicide in LTC: 1%. Most common method: hanging. Risk factors for suicide: LTC admission within past year, pain, previous suicide attempt, and history of psychiatric disorders. Cumulative incidence of completed suicide in LTC: 18.6/100,000. Cumulative incidence in community: 8.9/100,000. Cumulative incidence of attempted suicide in LTC: 29.7/100,000. Common methods: hanging and jumping. No significant difference in suicidal behavior of LTC facilities with and without mental health professionals. Suicide cases in LTC were older but did not differ from community cases in terms of race or sex. Common method in LTC: fall. Significant decrease in the relative rate of suicide in community-dwelling adults but no change in LTC over 15 year period.</td>
</tr>
<tr>
<td>2006</td>
<td>Scocco</td>
<td>Italy</td>
<td>Retrospective cohort</td>
<td>289 LTC facilities housing 26,875 residents</td>
<td>Mean age: 82</td>
<td>Attempted and completed suicide</td>
<td>Interview completed by LTC managers</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>Mezuk</td>
<td>USA</td>
<td>Retrospective cohort</td>
<td>1771 suicide cases from LTC and community settings</td>
<td>Age: 50+ Male: 70% White: 72% Black: 9% Hispanic: 10%</td>
<td>Completed suicide</td>
<td>OCME records</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>Seyfried</td>
<td>USA</td>
<td>Retrospective cohort</td>
<td>294,952 Veterans Affairs patients with dementia</td>
<td>Age range: 60 - 90+ 97% Male 47% White</td>
<td>Completed suicide</td>
<td>National Death Index</td>
<td></td>
</tr>
</tbody>
</table>

LTC: Long-term care; ILTB: Indirect life-threatening behavior; NH: Nursing Home; HBS: Harmful Behaviors Scale; EBAS-DEP: Even Briefer Assessment Scale for Depression; HDRS: Hamilton Depression Rating Scale; OCME: Office of the Chief Medical Examiner; SDB: self-destructive behavior
### Table 2

Studies of suicidal thoughts and suicide attempts in long-term care settings

<table>
<thead>
<tr>
<th>Year</th>
<th>First author</th>
<th>Location</th>
<th>Study design</th>
<th>Sample size and composition</th>
<th>Sample characteristics</th>
<th>Outcome</th>
<th>Outcome measure</th>
<th>Point Prevalence*</th>
<th>Risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>Haight</td>
<td>USA</td>
<td>Cross-sectional</td>
<td>N=99 Recently-relocated LTC residents</td>
<td>Mean age: 79 95% White 75% Female</td>
<td>Suicidal thoughts, hopelessness, depression</td>
<td>BSIS</td>
<td>Suicidal thoughts: 12%</td>
<td>Lack of a confidant, depressed mood, hopelessness, older age, lower life-satisfaction, lower well-being, arthritis</td>
</tr>
<tr>
<td>1995</td>
<td>Jorm</td>
<td>Australia</td>
<td>Cross-sectional</td>
<td>N=923 (100 in LTC) Community-based sample</td>
<td>Age 70+</td>
<td>Wish to die</td>
<td>CIE</td>
<td>“Wish to die”: 2%</td>
<td>Poor self-rated health, presence of disability, pain, hearing or vision impairment, living in a LTC</td>
</tr>
<tr>
<td>1998</td>
<td>Haight</td>
<td>USA</td>
<td>Qualitative</td>
<td>N=12 Recently-relocated LTC residents</td>
<td>Mean age: 80 100% White 100% Female</td>
<td>Suicidal thoughts</td>
<td>BSIS</td>
<td>Not applicable</td>
<td>History of family conflict and dysfunction, social isolation, pessimism, regretful memories, non-religiousness, past suicidal experience, depression, hopelessness.</td>
</tr>
<tr>
<td>1998</td>
<td>Uncapher</td>
<td>USA</td>
<td>Cross-sectional</td>
<td>N=60 LTC residents &amp; Psychiatric inpatients</td>
<td>LTC residents: 100% male Mean age: 76 83% White 67% Married</td>
<td>Depression, hopelessness, suicidal thoughts</td>
<td>GDS, GHS, BSS</td>
<td>Suicidal thoughts among LTC residents: 2.5% Suicidal thoughts among inpatients: 2.6%</td>
<td>Depression, hopelessness, and low social support</td>
</tr>
<tr>
<td>2002a</td>
<td>Draper</td>
<td>Australia</td>
<td>Cross-sectional</td>
<td>N=610 LTC residents</td>
<td>Mean age: 84 75% Female</td>
<td>Suicidal thoughts, direct and indirect SDB</td>
<td>HBS, EBAS-DEP, HDRS</td>
<td>Indirect SDB: 61% Direct SDB: 14%</td>
<td>Younger age, dementia, functional limitations, and higher HDRS score</td>
</tr>
<tr>
<td>2002b</td>
<td>Draper</td>
<td>Australia</td>
<td>Cross-sectional</td>
<td>N=647 LTC residents</td>
<td>Mean age: 82 73% Female</td>
<td>Latent classes of SDB</td>
<td>HBS, EBAS-DEP, HDRS</td>
<td>Four SDB classes: Aggressive (35%) Food refusal (27%) Behavioral (5%) Non-symptomatic (33%)</td>
<td>Food refusal class associated with cognitive impairment</td>
</tr>
<tr>
<td>2002</td>
<td>Ron</td>
<td>Israel</td>
<td>Cross-sectional</td>
<td>N=83 LTC residents</td>
<td>Mean age: 87 66% Female</td>
<td>Depression, hopelessness, suicidal thoughts</td>
<td>BDI, BHS, BSIS</td>
<td>Not reported</td>
<td>Suicidal thoughts In LTC&lt;2 mths: 3.2% In LTC 3–6 mths: 3.7% In LTC 7–12 mths: 3.1% In LTC &gt;12 mths: 2.7%</td>
</tr>
<tr>
<td>Year</td>
<td>First author</td>
<td>Location</td>
<td>Study design</td>
<td>Sample size and composition</td>
<td>Sample characteristics</td>
<td>Outcome</td>
<td>Outcome measure</td>
<td>Point Prevalence*</td>
<td>Risk factors</td>
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<tr>
<td>2003</td>
<td>Meeks</td>
<td>USA</td>
<td>Cross-sectional</td>
<td>N=39 LTC residents</td>
<td>Mean age: 84 100% Female</td>
<td>Depression, hopelessness, suicidal thoughts</td>
<td>BSS, GHS, GDS</td>
<td>Suicidal thoughts: 5%</td>
<td>Greater number of medications</td>
</tr>
<tr>
<td>2004</td>
<td>Chow</td>
<td>Hong Kong</td>
<td>Cross-sectional</td>
<td>245 LTC residents</td>
<td>Mean age: 81 63% Female</td>
<td>Suicidal ideation</td>
<td>GDS-SF</td>
<td>Suicidal thoughts: 27%</td>
<td>Not applicable</td>
</tr>
<tr>
<td>2004</td>
<td>Ron</td>
<td>Israel</td>
<td>Cross-sectional</td>
<td>N=318 (91 in LTC Community-based sample)</td>
<td>Mean age: 71 Female: 65%</td>
<td>Depression, hopelessness, suicidal ideation</td>
<td>BDI, BHS, BSSI</td>
<td>Lifetime prevalence of suicide attempt among LTC residents: 5.4% Comm. residents: 13%</td>
<td>Older age, education, hopelessness, and depressive symptoms</td>
</tr>
<tr>
<td>2005</td>
<td>Heisel</td>
<td>USA</td>
<td>Cross-sectional</td>
<td>N=105 (53 in LTC Clinical sample)</td>
<td>Mean age: 82 77% Female</td>
<td>Depression and suicidal ideation</td>
<td>GDS, GDS-SF, GSIS, BSSI</td>
<td>Suicidal thoughts: 5%</td>
<td>Depressive symptoms</td>
</tr>
<tr>
<td>2009</td>
<td>Scocco</td>
<td>Italy</td>
<td>Cross-sectional</td>
<td>N=172 LTC residents</td>
<td>Mean age: 83 69% Female</td>
<td>Passive and active suicidal thoughts, plans, and attempts</td>
<td>5 questions on suicidal behavior</td>
<td>Past month suicidal thoughts/plans/attempts: 33% Lifetime prevalence of thoughts/plans/attempts: 50%</td>
<td>Male gender and older age</td>
</tr>
<tr>
<td>2010</td>
<td>Malfent</td>
<td>Austria</td>
<td>Cross-sectional</td>
<td>N=129 LTC residents</td>
<td>Mean age: 80 83% Female</td>
<td>Passive death wishes, active and passive suicidal thoughts, attempted suicide</td>
<td>GDS, SWLS</td>
<td>Past month suicidal thoughts: 7% Past year suicidal thoughts: 11% Lifetime prevalence of suicidal thoughts: 35%</td>
<td>Depression symptoms, current psychotherapeutic treatment, external locus of control, low self-efficacy and low life satisfaction</td>
</tr>
<tr>
<td>2012</td>
<td>Tsai</td>
<td>China</td>
<td>Qualitative</td>
<td>N=36 LTC residents</td>
<td>Mean age: 81 100% Male</td>
<td>Reasons for living following suicidal ideation</td>
<td>Semi-structured interview</td>
<td>Not applicable</td>
<td>Common reasons for living included fear of death, improvement in health, self-dignity, concerns for family</td>
</tr>
<tr>
<td>1994</td>
<td>Morriss</td>
<td>USA</td>
<td>Longitudinal cohort</td>
<td>N=431 Newly-admitted LTC residents</td>
<td>Not specified</td>
<td>SDB</td>
<td>PGDRS</td>
<td>SDB at admission: 6% SDB 2 weeks after admission: 2.3% SDB 2 months after admission: 2.9%</td>
<td>Increase in SDB associated with dementia, delirium, ADL limitations</td>
</tr>
<tr>
<td>2004</td>
<td>Low</td>
<td>Australia</td>
<td>Cross-sectional</td>
<td>N=647 LTC residents</td>
<td>Mean age: 82 73% Female</td>
<td>SDB</td>
<td>HBS</td>
<td>Not reported</td>
<td>Number of design features for frailty and dementia and more intense facility security associated with higher HBS score</td>
</tr>
<tr>
<td>2011</td>
<td>Davis-Berman</td>
<td>USA</td>
<td>Qualitative</td>
<td>N=18 LTC or AL residents</td>
<td>Mean age: 85 69% Female</td>
<td>Beliefs and thoughts about death and residents’</td>
<td>Semi-structured interviews</td>
<td>Not applicable</td>
<td>Themes identified: acceptance of death, ideas about afterlife,</td>
</tr>
<tr>
<td>Year</td>
<td>First author</td>
<td>Location</td>
<td>Study design</td>
<td>Sample size and composition</td>
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<tr>
<td>2012</td>
<td>Magagna</td>
<td>Spain</td>
<td>Cross-sectional</td>
<td>N=110 LTC residents</td>
<td>Mean age: 80 68% Female</td>
<td>Suicidal behavior</td>
<td>GDS, PSRS</td>
<td>Suicidal behavior: 38%</td>
<td>Impact of living situation, and suicide. Level of care did not impact themes. Death anxiety and fear decreased with age. Talk of suicide may arise in response to seeing other residents decline and die.</td>
</tr>
<tr>
<td>2012</td>
<td>Wongpakaran</td>
<td>Thailand</td>
<td>Cross-sectional</td>
<td>N=81 LTC residents</td>
<td>Mean age: 77 56% Female</td>
<td>Suicide risk</td>
<td>MINI, GDS, CSDD, CSI</td>
<td>Lifetime prevalence suicide attempt: 6% Low suicide risk: 23% Mod suicide risk: 9% High suicide risk: 1%</td>
<td>Not reported</td>
</tr>
</tbody>
</table>

LTC: Long-term care; BSIS: Beck Suicide Ideation Scale; BSS: Beck Scale of Suicide Ideation; CIE: Canberra Interview for the Elderly; NH: Nursing Home; PGDRS: Psychogeriatric Dependency Rating Scale; GDS: Geriatric Depression Scale; GHS: Geriatric Hopelessness Scale; HBS: Harmful Behaviors Scale; EBAS-DEP: Even Briefer Assessment Scale for Depression; HDRS: Hamilton Depression Rating Scale; SDB: self-destructive behavior; BDI: Beck Depression Inventory; BHS: Beck Hopelessness Scale; GSIS: Geriatric Suicidal Ideation Scale; SWLS: Satisfaction with Life Scale; PSRS: Plutchik Suicide Risk Scale; MINI: Mini International Neuropsychiatric Interview; CSDD: Cornell Scale for Depression in Dementia; CSI: Core Symptom Index

* Estimates are point prevalence except where noted.
### Table 3

Studies of interventions aimed at reducing suicide risk in long-term care settings

<table>
<thead>
<tr>
<th>Year</th>
<th>First author</th>
<th>Location</th>
<th>Study design</th>
<th>Sample size and composition</th>
<th>Sample characteristics</th>
<th>Outcome</th>
<th>Outcome measure</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Haight</td>
<td>USA</td>
<td>Randomized controlled study of life review vs. friendly visit</td>
<td>52 LTC residents (23 control, 29 intervention)</td>
<td>Mean age: 80 69% Female 80% White</td>
<td>Depression, hopelessness, suicidal ideation</td>
<td>BDI, HS, BSIS</td>
<td>Intervention group had significantly lower depressive symptoms at the 8-week, 1-year, and 2-year follow-ups vs. control group. No significant effects of the intervention on hopelessness or suicidal ideation.</td>
</tr>
<tr>
<td>2000</td>
<td>Walker</td>
<td>USA</td>
<td>Efficacy study of the curriculum “Preventing Suicide and Depression”</td>
<td>57 staff members from 2 LTC facilities</td>
<td>56% African American 84% Female</td>
<td>Knowledge of suicide and prevention techniques, attitudes toward suicide and suicide prevention, and use of prevention practices</td>
<td>Self-report knowledge and attitudes</td>
<td>Knowledge scores increased 20% for pre- vs. post-test. Attitudes for preventing suicide and depression significantly improved. Participants were more likely to perform practices of preventing suicide and depression after training.</td>
</tr>
<tr>
<td>2004</td>
<td>Brown</td>
<td>USA</td>
<td>Cross-sectional survey</td>
<td>681 licensed psychologists working with older adults</td>
<td>Mean age: 54 48% Female</td>
<td>Knowledge about risk factors for completed suicide and ISDB</td>
<td>Self-report questionnaire</td>
<td>Knowledge among caregivers increased at post-intervention and 3-month follow-up. Knowledge improved regarding understanding of biological reasons for depression, pharmacological treatment for depression, inaccurate beliefs and negative image of antidepressants, and the relationship between psychiatric disorder and suicide risk.</td>
</tr>
<tr>
<td>2005</td>
<td>Zierovgel</td>
<td>Germany</td>
<td>Efficacy study of caregiving training session</td>
<td>374 geriatric caregivers</td>
<td>83% Female</td>
<td>Knowledge and attitudes towards depression and suicidality in old age</td>
<td>Self-report questionnaire</td>
<td>Knowledge among caregivers increased at post-intervention and 3-month follow-up. Knowledge improved regarding understanding of biological reasons for depression, pharmacological treatment for depression, inaccurate beliefs and negative image of antidepressants, and the relationship between psychiatric disorder and suicide risk.</td>
</tr>
<tr>
<td>2009</td>
<td>Yeung</td>
<td>USA</td>
<td>Feasibility study</td>
<td>9 LTC residents referred for psychiatric evaluation</td>
<td>Mean age: 77</td>
<td>Feasibility, clinical improvement, and patient/nurse satisfaction</td>
<td>Resident participation level, CGI-I</td>
<td>Telepsychiatric services were feasible for approximately 89% of residents. Reasons for referral included to the service included psychiatric intervention and suicide-risk assessment.</td>
</tr>
</tbody>
</table>

BDI: Beck Depression Inventory; BSIS: Beck’s Suicide Ideation Scale; HS: The Hopelessness Scale; ISDB: indirect self-destructive behavior; CGI-I: Clinical Global Impressions-Improvement Scale.