Financial costs to the U.S. Army for suicides by newly enlisted Soldiers

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Abstract

Objective

To estimate the financial burden to the U.S. Army of suicide by enlisted Soldiers during their first year of service.

Methods

This analysis included new Army enlisted Soldiers who started initial entry training from October 2012 through September 2016 and subsequently died by suicide within their first year of service. Outpatient and inpatient direct medical, direct nonmedical, recruiting, and training costs to the Army were calculated.

Results

During the 48-month observational study period, 29 Soldiers died by suicide within their respective first year of service. The described financial costs accrued by the U.S. Army as a result of these deaths was $152,271—with an average of $6,091 per healthcare utilizer. Recruiting and training costs were $1,115,860 for all suicide cases.

Conclusion

Average direct cost per healthcare utilizer increased during a Soldier's first year of service. This may be associated with the transition through different phases of training and to the first operational duty station.

Public Health Implications

Results obtained through this cost-of-illness analysis may serve as baseline metrics to inform future cost-effectiveness studies.
INTRODUCTION

The Army suicide rate surpassed the civilian suicide rate in the United States for the first time in 2008 (Bachynski et al., 2012) and has continued to be higher ever since (Watkins et al., 2018). Because of this, the Army has invested heavily in research (Hoge et al., 2005; Kessler et al., 2005; Kessler et al., 2013; Nock et al., 2008; Nock et al., 2013; Nweke et al., 2015; Ribeiro et al., 2016; Schoenbaum et al., 2014; Ursano et al., 2014), including a $50 million project in 2009 (Jo, 2014; Kessler et al., 2013; Ursano et al., 2014), to better understand risk and protective factors associated with death by suicide. The Army G-1 (Personnel) Suicide Prevention Program provides a variety of tools and prevention initiatives. At the strategic level, the year-round Strengthening Readiness and Resilience Campaign focuses on enhancing unit cohesion, sustaining personal readiness, and cultivating positive relationships. At the tactical level, the Commander’s Risk Reduction Toolkit tracks over 40 risk factors to assess both Soldier and unit health. Several training/education activities, such as Master Resiliency Training, Ask Care Escort – Suicide Intervention, and Engage, have been implemented. In 2019, the Army launched a suicide prevention pilot program among selected Army National Guard and Army Reserve Soldiers units and at three installations. Aspects of the program that demonstrate success in reducing suicide rates will be replicated across the Army as a means to reduce suicide enterprisewide.

While the Army has implemented the aforementioned and other programs to address suicide, a literature review did not reveal cost-effectiveness information. This may be attributable—at least in part—to a lack of publicly available data on the financial costs associated with suicide in the Army; such data are integral for analyzing cost-effectiveness. Cost-of-illness (COI) analysis can be used to estimate financial burden and helps leaders “formulate and prioritize healthcare policies and interventions, and allocate resources based on budget constraints to ensure policy efficiency.” (Jo, 2014) Traditionally, direct cost is a core measurement in COI studies. Direct costs include direct medical costs (e.g., expenditures for diagnosis, treatment, and rehabilitation) and related direct nonmedical costs (e.g., transportation, household expenditures, relocation, property losses, and any kind of informal care). With COI estimates, a cost-effectiveness study can compare the costs and outcomes of interventions with those achieved under the current standard of care.

In 2019, behavioral health illnesses were the second-highest ranking disease category by numbers of medical encounters and highest-ranking disease category by number of hospital bed days among Regular Army Soldiers (Defense Health and Agency, 2020). However, while cost metrics are readily available for other top disease categories, such as injuries among Soldiers (Bulzacchelli et al., 2017; Department of the Army, 2014; Hauschild
et al., 2018; Lopez, 2002; Ruscio et al., 2010), no information is publicly available on financial costs associated with behavioral health.

Estimates of the total cost of suicide in nonmilitary populations vary widely (McDaid et al., 2016), from $400,000 to $4,000,000 (in 2014 U.S. Dollars) per suicide. This may be due to differences in study populations, healthcare systems, cost measures, and/or other factors. The overall cost of suicide within the Army is not published in the literature. Two previous studies, which provided cost estimates focused on the contribution of specific diagnoses to suicide-related costs among a subpopulation of service members who deployed to Operation Enduring Freedom/Operation Iraqi Freedom in 2008, were limited in scope and do not provide an assessment of Army-wide financial costs associated with suicide deaths (Eibner et al., 2008; Kilmer et al., 2011). Thus, a COI study to provide a foundation for cost-effectiveness evaluations of suicide prevention initiatives in the Army is necessary.

The first year of Army enlisted service is of particular interest due to the costs associated with recruiting, training, and ensuring the health of first-year enlisted Soldiers. This first year has also been identified as a period of special concern for suicidal behavior. Ursano et al.; (2015) found that among Soldiers who attempted suicide from 2004 to 2009, 98% were enlisted, and risk for suicide attempt was elevated in the first year of Army service. Risk was highest at the second month and declined substantially as time in service continued (Ursano et al., 2015). Research from 2004 to 2009 also found that 98% of Soldiers who died by suicide had at least one healthcare encounter in the 52 weeks prior to death, and 49% had a healthcare encounter in the 4 weeks prior to death (Ribeiro et al., 2017). These two proportions were significantly higher among Soldiers who died by suicide than in a matched control group (Ribeiro et al., 2017), suggesting that the financial costs to the Army among the suicide population could be greater. However, none of these studies focus on the number of healthcare encounters and associated costs—specifically for newly enlisted Soldiers. Knowledge of the financial costs associated with suicides among new Soldiers during the first year of Army enlisted service could aid decision-making about suicide prevention and intervention strategies.

This study aims to (1) characterize Soldiers who reported to initial entry training (IET) and died by suicide during their first year of service; (2) quantify and compare direct medical and direct nonmedical costs; and (3) quantify recruiting and training costs.

**METHODS**

**Study population**

The study population included all enlisted Regular Army, Army National Guard and Army Reserve Soldiers who started IET from October 01, 2012, through September 30, 2016, as
recorded by the Army Training Requirements and Resource System (Table 1), and who
died by suicide within their first year of service. Enlisted Soldiers with a documented
history of prior military service or other military grades (e.g., officers, warrant officers, and
cadets) were excluded.

**TABLE 1.** Data sources used to estimate the economic burden of suicides during the first
year of Army enlisted service

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATRRS</td>
<td>Army Training Requirements and Resource System</td>
<td>Army central registry for training requirements</td>
</tr>
<tr>
<td>DMDC</td>
<td>Defense Manpower Data Center</td>
<td>Military personnel records</td>
</tr>
<tr>
<td>RECMOD</td>
<td>Reception Battalion's Reception Module</td>
<td>New Army Soldiers’ first assignment</td>
</tr>
<tr>
<td>DEERS</td>
<td>Defense Enrollment Eligibility Reporting System</td>
<td>Eligibility and enrollment</td>
</tr>
<tr>
<td>DoDSER</td>
<td>Department of Defense Suicide Event Report</td>
<td>Department of Defense events</td>
</tr>
<tr>
<td>CAPER</td>
<td>Comprehensive Ambulatory / Professional Encounter Record</td>
<td>Outpatient records of in-patients</td>
</tr>
<tr>
<td>TED-NI</td>
<td>TRICARE Encounter Data Non-Institutional</td>
<td>Outpatient records of non-inpatient</td>
</tr>
<tr>
<td>SIDR</td>
<td>Standard Inpatient Data Record</td>
<td>Inpatient records of in-patients</td>
</tr>
<tr>
<td>TED-I</td>
<td>TRICARE Encounter Data Institutional</td>
<td>Inpatient records of out-patients</td>
</tr>
<tr>
<td>AMCOS</td>
<td>Army Military-Civilian Cost System</td>
<td>Itemized pay table per service member</td>
</tr>
</tbody>
</table>

* DEERS, CAPER, TED-NI, SIDR, and TED-I are independent databases stored in the Military Health System Data Repository (MDR).

* Outpatient appointment duration in CAPER was used to estimate the outpatient appointment duration in TED-NI.

* AMCOS provided itemized personnel, recruiting and training costs. The AMCOS personnel cost table was used to estimate
direct nonmedical cost; the AMCOS recruiting and training cost table was used to estimate recruiting and training cost.

The Department of Defense Suicide Event Report (DoDSER) was used to determine a
Soldier’s suicide status (Table 1). DoDSER is a standardized surveillance system that
records all suicide deaths in the Army (Department of Defense, 2012, 2017; Department of
the Army, 2015a, 2015b).

**Study timeframe and time periods for analysis**
The overall study timeframe ranged from October 1, 2012, to September 30, 2017. This included the enrollment period (2012–2016) and the 1-year follow-up period. Because IET training cycles were staggered throughout the year, the 1-year follow-up period was defined as “the first IET start date (Day 0) +365 days” to ensure all Soldiers’ follow-up periods aligned at Day 0.

In general, the first year of Army enlisted service involves IET and time at the first operational duty station. IET includes basic and advanced training courses. The length of IET varies by military occupational specialty. Time at the first duty station includes a transition phase and an integration phase. To determine the financial costs associated with recruiting, training, direct medical and nonmedical for Soldiers during the first year, the analysis was stratified to identify cost by phase: (1) first quarter (months 0–3): basic training, (2) second quarter (months 4–6): advanced training, (3) third quarter (months 7–9): transition to first duty station, and (4) fourth quarter (months 10–12): duty station integration.

Demographic characteristics

Four administrative data sources were used to ensure the completeness and validity of baseline demographic information: the Defense Manpower Data Center, the Reception Battalion's Reception Module, the Defense Enrollment Eligibility Reporting System, and Army Training Requirements and Resource System (Table 1).

Medical encounter data

The Military Health System Data Repository provided records of inpatient and outpatient medical appointments (Table 1). Medical records corresponding to healthcare encounters occurring outside the study period were not included. All inpatient records for the same day were considered as one medical encounter. The same rule was applied to outpatient records.

Cost calculations

Direct medical costs

Direct medical costs represent the cost of care paid by the Department of Defense (DoD). For inpatient and outpatient medical encounters that occurred at military treatment facilities, the full costs included clinician and professional salaries, evaluation and management, procedure, surgical, intensive care unit, laboratory, radiology, pharmacy, support, labor, and ancillary costs. All cost items were extracted from the Medical Expense and Performance Reporting System, the standard cost accounting...
system for the Military Health System. Each cost item was determined based on the reimbursable amount to a hospital and to a physician for each Current Procedural Terminology code used. The reimbursable amount to a hospital is a locality-adjusted fixed amount to include services, clinical intensity, and resource utilization, as derived from the Centers for Medicare and Medicaid Services Healthcare Common Procedure Coding System. The reimbursable amount to a physician was calculated from locality-adjusted Relative Value Units, as defined in Medicare, to include a physician’s work (e.g., time and subject matter expertise), practice expense (e.g., labor, equipment, and supplies), and liability expense (e.g., malpractice insurance). For inpatient and outpatient medical encounters at civilian treatment facilities, the amount covered by TRICARE was paid by DoDA. (TRICARE is a military healthcare program that allows service members and other eligible beneficiaries to utilize civilian healthcare facilities.) Amounts paid by other health insurance to civilian treatment facilities, amounts paid out of pocket by patients, and amounts paid due to interest were not considered.

### Direct nonmedical costs

Direct nonmedical costs represent the monetary value lost to the Army when a Soldier is away for healthcare appointments. The Army Military-Civilian Cost System (AMCOS) cost model documentation provided the hourly compensation per pay grade for Regular Army, Army National Guard, and Army Reserve Soldiers (Table 2). Personnel costs included annual average costs of military base pay, special pay, basic allowances for housing and subsistence, amortized reenlistment bonus, annualized permanent change of station, all separation incentives, Medicare-eligible retiree health care, retired pay accrual, morale, welfare and recreation, and other benefits to include clothing allowance, Federal Insurance Contribution Act, death gratuities, apprehension of deserters, unemployment compensations, and survivor benefits. The direct nonmedical costs were calculated by multiplying a new Soldier’s hourly compensation by the number of hours for outpatient appointments or hospitalizations.

**TABLE 2. Annual Personnel Cost, Recruiting and Training Cost by Pay Plan and Pay Grade / Rank, 2018**

<table>
<thead>
<tr>
<th>Pay Grade – Ranka</th>
<th>The Army Military-Civilian Cost System (AMCOS) Pay Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual cost in target year 2018</td>
</tr>
<tr>
<td></td>
<td>Personnel costb,c</td>
</tr>
<tr>
<td>Regular enlistedc</td>
<td>National guard enlisted</td>
</tr>
<tr>
<td>E1 – Private</td>
<td>$71,089</td>
</tr>
</tbody>
</table>
Pay Grade – Rank | The Army Military-Civilian Cost System (AMCOS) Pay Plan
| Annual cost in target year 2018 | Recruiting cost
| Personnel cost | Regular enlisted | National guard enlisted | Reserve enlisted | Regular enlisted |
| E2 – Private | $75,437 | $17,314 | $13,784 | $38,695 |
| E3 – Private First Class | $80,891 | $17,107 | $13,925 | $35,115 |

a Information for pay grade on or above E4 is not included in the table because all Soldiers who died by suicide in this study were in the E1–E3 pay grades.
b Personnel costs included but not limited to annual average costs of military base pay, special pays, basic allowance for housing and subsistence, amortized enlistment bonus, annualized permanent change of station, all separation incentives, Medicare-eligible retiree health care, retired pay accrual, morale, welfare and recreation, and other benefits to include clothing allowance, Federal Insurance Contribution Act (FICA), death gratuities, apprehension of deserters, unemployment compensation, and survivor benefits.
c Hourly personnel costs were estimated using the civilian standard of 2087 h/year (AMCOS, 2018).
d Recruiting and training costs included annual average costs of recruitment, basic combat training, and initial skill training.
e Regular enlisted represents the “Active Enlisted Pay Plan” designated for enlisted Regular Army Soldiers in the AMCOS system.

Recruiting and training costs: cost of losing a new Soldier or cost to replace a new Soldier

Recruiting and training costs included annual average costs of recruitment, basic combat training, and initial skill training. The AMCOS recruiting and training cost table was used to estimate monetary losses to the Army that are not recouped when a Soldier dies by suicide. These were calculated as the number of suicide cases in a pay grade multiplied by the recruiting and training costs at that pay grade (Table 2). This calculation was performed for each pay grade and summed across all pay grades.

RESULTS

Among 407,401 new Army Soldiers who started IET during the study period, 29 died by suicide (<0.01%). Most new Soldiers were male (80%), 17–24 years of age (87%), in the Regular Army (58%), and in E1–E2 (Private Rank) pay grades (74%). Among the Soldiers who died by suicide, 86% were male, 83% 17–24 years of age, 79% in the Regular Army, and 97% Private in rank. One Soldier died in the first quarter, 6 died in the second quarter, 8 died in the third quarter, and 14 died in the last quarter.
Direct cost and healthcare utilization of suicide population

Twenty-five of the twenty-nine Soldiers (86%) who died by suicide utilized health care, totaling 342 medical encounters. Most (*n* = 337) were outpatient encounters; five were inpatient medical encounters, by four Soldiers (Table 3).

TABLE 3. Total Direct Costs Among Enlisted Soldiers Who Started Initial Entry Training Between October 01, 2012, and September 30, 2016, And Subsequently Died by Suicide During Their First Year Of Army Service

<table>
<thead>
<tr>
<th></th>
<th>Direct Costs</th>
<th>Suicide Population (N = 29)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Outpatient</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>Costa ($)^{a}</td>
<td>$152,271</td>
<td>$73,377</td>
</tr>
<tr>
<td>Avg. cost / utilizerd</td>
<td>$6,091</td>
<td>$2,935</td>
</tr>
</tbody>
</table>

Encounters and utilizers – (n)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Medical encounters</td>
<td>342</td>
<td>337</td>
</tr>
<tr>
<td>Healthcare utilizers</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

By time in service

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<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>First quarter (0–3 months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthcare utilizers (n)</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Total cost ($)</td>
<td>$18,127</td>
<td>$18,127</td>
</tr>
<tr>
<td>Avg. Cost / utilizer ($)</td>
<td>$824</td>
<td>$824</td>
</tr>
</tbody>
</table>

Second quarter (4–6 months)

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<tr>
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</thead>
<tbody>
<tr>
<td>Healthcare utilizers (n)</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Total cost ($)</td>
<td>$34,033</td>
<td>$22,025</td>
</tr>
<tr>
<td>Avg. Cost / utilizer ($)</td>
<td>$1,891</td>
<td>$1,224</td>
</tr>
</tbody>
</table>

Third quarter (7–9 months)
<table>
<thead>
<tr>
<th>Direct Costs</th>
<th>Suicide Population (N = 29)</th>
<th>( T_i )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Outpatient</td>
<td>Total</td>
</tr>
<tr>
<td>Healthcare utilizers (n)</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Total cost ($)</td>
<td>$69,677</td>
<td>$15,149</td>
</tr>
<tr>
<td>Avg. cost / utilizer ($)</td>
<td>$6,334</td>
<td>$1,377</td>
</tr>
</tbody>
</table>

Fourth quarter (10–12 months)

| Healthcare utilizers (n) | 10 | 10 | - | - | 2 |
| Total cost ($) | $30,169 | $17,811 | $16,667 | $1,143 | $ |
| Avg. cost / utilizer ($) | $3,017 | $1,781 | $1,667 | $114 | $ |

\[ ^a \text{All costs were adjusted from the original dollar amount in a given calendar year to its equivalent dollar amount in 2018.} \]
\[ ^b \text{For inpatient and outpatient medical encounters that took place at military treatment facilities, the full cost of each encounter was used to calculate the direct medical cost. For inpatient and outpatient medical encounters that occurred at civilian treatment facilities, the amount paid by TRICARE was used to calculate the direct medical cost.} \]
\[ ^c \text{Direct nonmedical cost used a Soldier's hourly compensation to estimate monetary value lost to the Army for a medical appointment.} \]
\[ ^d \text{Average cost per healthcare utilizer is defined as the per person cost to the Army for each Soldier that used the Army healthcare system.} \]

Overall, the direct costs, both medical and nonmedical, incurred by the suicide cases amounted to $152,271, of which $73,377 was from outpatient encounters and $78,894 was from inpatient encounters. The direct medical costs for outpatient ($67,610) and inpatient ($68,678) encounters were comparable. However, the direct nonmedical costs for outpatient encounters ($5,767) were about half the inpatient costs ($10,216; Table 3), reflecting the differences in the amount of time Soldiers were away from their duties.

Total direct costs and the average cost per healthcare utilizer increased progressively during Soldiers’ first three quarters of service (Table 3). Total direct costs were highest during the third quarter ($69,677), with one Soldier accounting for $54,526 (78%) of inpatient medical costs during that period. Total direct costs in the fourth quarter were less than half ($30,169) those in the third quarter (Table 3).

**Recruiting and training costs**

For the 29 Soldiers who died, $1,115,860 of recruiting and training costs were considered lost to the Army. The amount was not prorated based on number of months a Soldier was
in service and did not account for training completion status prior to death.

DISCUSSION

The World Health Organization emphasizes the importance of economic considerations when developing a suicide prevention strategy. As stated by Madsen et al. (2018), “a modern public health strategy aimed at suicide prevention needs a much greater focus on cost-effectiveness in the prioritization of interventions.” (Madsen et al., (2018)) To that end, the COI estimates provided by this analysis could serve as baseline metrics for use by public health practitioners, policy makers, and senior leaders when selecting and evaluating current and future prevention and intervention initiatives within the Army.

For the 25 newly enlisted Soldiers who died by suicide after utilizing health care, the average direct costs per healthcare utilizer were higher in the last two quarters of service than in the first two. The lower costs in the first quarter may be because there were no hospitalizations. This could also reflect the transition from IET to first duty station, when Soldiers may have more time to seek health care. Additional analysis of the types of providers seen and the number of encounters may provide further understanding of this finding. Information on the number of encounters with a specialist compared to the number of encounters with a generalist may also shed some light on the scope of the care provided. Furthermore, future analysis of diagnoses related to behavioral health conditions (e.g., adjustment disorder, mood disorder, anxiety disorder, sleep disorder, and substance use disorder) and psychosocial circumstances (e.g., life or family circumstances, partner relationship problems, and occupational problems) during the first year of enlisted service could provide insights on healthcare utilization and costs associated with behavioral health and other medical encounters.

Each year, the Army spends tremendous resources in recruiting and training new Soldiers. Rigorous basic training followed by courses specific to military occupational specialties prepare new Soldiers to be ready and resilient. The loss of 29 Soldiers within their first year of service equates to the loss of over $1 million in recruiting and training costs. To ensure recruits are prepared for this challenging year, awareness of baseline stressors may help the Army target prevention interventions. As part of a whole-person assessment, the Army must continue to consider how to obtain more accurate and complete information about risk factors from prospective recruits prior to enlistment and during the initial phases of IET. In addition to data on commonly recognized factors associated with suicide (e.g., past or current mental health problems, other comorbid health conditions, previous suicide attempts; Bryan et al., 2016; Nock et al., 2008, 2013), understanding how social determinants of health (e.g., poverty, crime, crowding, malnutrition, and discrimination) and personal determinants of health (e.g., grief,
interpersonal disputes, and loneliness) can impact new recruits may also be of value (Weissman et al., 2020). A better understanding of these risk factors may help direct prevention efforts. A retrospective analysis expanding the study period from 1 year through the first enlistment contract period (e.g., 3 years) or a prospective study following a cohort of new Soldiers throughout their entire service period could provide additional insights on how various interventions and determinants of health impact the return on investment of recruiting and training costs associated with suicide.

The Army continues to dedicate significant resources to understanding the multifaceted factors and systems that influence suicidal behavior. COI data should be considered along with return on investment and cost-effectiveness of available interventions when funding prevention programs. This information, collectively, should be used to inform the development and implementation of interventions.

This study has several limitations. Costs are likely underestimated because the study focused on measurable costs (e.g., medical appointments) and did not include costs such as spiritual health services (e.g., Chaplain) provided by the Army. Additionally, this study focused on new Soldiers and did not include Soldiers who died by suicide after their first year of service. Therefore, these estimates should not be considered to represent the full financial cost of suicide to the Army. However, the first year of service includes several important transition periods: transition from civilian to military life, from basic to advanced training, from training to first duty station, and finally integration into the duty station. Understanding the direct costs associated with each of these four phases may inform more comprehensive cost-effectiveness analyses of suicide prevention strategies. Lastly, recruiting and training costs were calculated based on Regular Army cost estimates and on the assumption that costs were similar across components. While this could lead to an overestimate of recruiting and training costs of Army National Guard and Army Reserve, 23 (79%) new Soldiers who died by suicide were Regular Army, so the effects would be negligible.

This study has several notable strengths. First, it is part of a larger study that includes data from every enlisted Soldier across all three Army components who started IET from October 2012 to September 2016 ($N = 407,401$). Second, because all suicide deaths in the Army are required to be reported via the standardized DoDSER surveillance system, there is minimal selection bias in case identification. Third, because of the use of 10 U.S. Army administrative data sources (Table 1), the completeness of information in the analysis is high (e.g., <0.1% of demographic information was missing for the entire 407,401 new Soldier population). Additionally, the use of multiple data sources and the ability to identify new Soldiers without prior military service increased the generalizability of our findings. Lastly, the comprehensiveness of the data available to characterize costs differed
from previous studies in the civilian population (Corso et al., 2007; Florence et al., 2015; Shepard et al., 2016; Stensland et al., 2010).

Of interest for future studies are factors not measured by this study, such as other direct nonmedical costs (e.g., transportation to and from medical or behavioral health appointments) and indirect costs (e.g., productivity losses due to injuries or pain), and a Soldier’s experiences prior to joining the Army (e.g., preenlistment behavioral health history and socioeconomic status). A holistic assessment of Soldiers’ experiences before and during Army service could further explain the COI during the first year of service. This would also allow the Army to target preventive and treatment efforts to those at greater risk.

Finally, findings from this COI study allow the Army to explore whether suicide prevention strategies should be specific to each component (Regular Army, Army National Guard, and Army Reserve). For example, among 407,401 new Army Soldiers who started IET during the study period, 58% of Soldiers were in the Regular Army. In comparison, 79% of the 29 new Army Soldiers who died by suicide during the first year of service were in the Regular Army. How the costs of suicide across three Army components contributes to the cost-effectiveness of a single overarching or three component-specific Army suicide prevention strategies has yet to be evaluated. This study provides a first step toward prioritizing such efforts.

**PUBLIC HEALTH IMPLICATIONS**

Based on publicly available information, cost-effectiveness of the Army's suicide prevention initiatives has not been comprehensively evaluated. This COI study provides a foundation for future evaluations. This study also takes an initial step toward understanding the financial costs to the U.S. Army of suicidal behavior among new Soldiers. In addition, it is important to understand the COI for Soldiers who attempt suicide or experience suicidal ideation. A comprehensive knowledge of COI for all suicidal behavior could help inform Army's suicide prevention messaging and target upstream warning signs.

Despite the importance of COI information on cost-effectiveness studies, cost alone should not influence the decision-making process. When determining funding levels, resourcing needs, and resource allocation for suicide prevention programs, the following items should be considered alongside the COI: balancing the needs and rights of individual (e.g., personal and social determinants of health) with those of the Army (e.g., mission readiness), the impact of policies and prevention efforts on retention, and the cost-effectiveness of available interventions.
While this study focuses on financial costs of suicide to the Army, significant emotional effects on individuals, to include unit commanders, peers, chaplains, clinicians, and prevention program staff cannot be overlooked. Bereaved individuals, especially those closest to the individual who died by suicide, are vulnerable to physical, psychological, and psychosomatic difficulties. Bereavement from a suicide may be more intense compared to death from an illness or accident. Survivor's guilt is rooted in the belief that one could have intervened and prevented the suicide. Psychological symptoms of a survivor may include nightmares, increased stress, depression, anxiety, anger, and guilt. Survivors may also find stigma makes it more difficult to talk about suicide. Reluctance to seek help could increase survivors' risk for suicide.

As stated by the current Chief of Staff of the Army, “people are the Army's number one priority”. Therefore, it is crucial to set new Soldiers up for success—starting with recruiting, training, and integration into military life. This study is a stepping stone to identify cost-effective suicide prevention strategies. The development and implementation of such strategies will support how the Army promotes the success and care of its People, the Total Army Family.

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HUMAN PARTICIPANT PROTECTION

The Public Health Review Board of the U.S. Army Public Health Center approved this study as Public Health Practice under number 17-550.

DISCLAIMERS

The views expressed in this publication are those of the authors and do not necessarily reflect the official policy or position of the Department of the Army, the Department of Defense, or the U.S. Government.
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