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Public Health Report No. S.0049809.1, Surveillance of Suicidal Behavior, January through December 2017

Table of Contents

Page

1 SUMMARY 1

1.1 Purpose 1
1.2 Results 1
1.3 Conclusion 2

2 REFERENCES 2

3 AUTHORITY 2

4 METHODS 2

5 RESULTS 2

5.1 Suicide Cases 2
5.2 Suicide Attempt Cases 3
5.3 Suicidal Ideation Cases 4
5.4 Tables and Figures 6

6 DISCUSSION 18

7 CONCLUSION 19

8 POINT OF CONTACT 20

APPENDICES

A REFERENCES A-1
B METHODS B-1
C SUPPLEMENTAL TABLES AND FIGURES C-1
GLOSSARY Glossary-1

FIGURES

Figure 1. Overall Crude Rates by Suicidal Behavior among U.S. Army Active Duty Soldiers, 2008–2017 13

Page

Figure 2. Crude Sex-specific Suicide Rates among U.S. Army Active Duty Soldiers, 2008–2017 13
Figure 3. Crude Age-specific Suicide Rates among U.S. Army Active Duty Soldiers, 2008–2017 14
Figure 4. Crude Rank-specific Suicide Rates among U.S. Army Active Duty Soldiers, 2008–2017 14
Figure 5. Crude Sex-specific Suicide Attempt Rates among U.S. Army Active Duty Soldiers, 2008–2017 15
Figure 6. Crude Age-specific Suicide Attempt Rates among U.S. Army Active Duty Soldiers, 2008–2017 15
Figure 7. Crude Rank-specific Suicide Attempt Rates among U.S. Army Active Duty Soldiers, 2008–2017 16
Figure 8. Crude Sex-specific Suicidal Ideation Rates among U.S. Army Active Duty Soldiers, 2008–2017 16
Figure 9. Crude Age-specific Suicidal Ideation Rates among U.S. Army Active Duty Soldiers, 2008–2017 17
Figure 10. Crude Rank-specific Suicide Ideation Rates among U.S. Army Active Duty Soldiers, 2008–2017 17
Figure C-1. Counts and Rates of Suicide by Year, 2001–2016 .... C-11
Figure C-2. Administrative Data Sources in the Army Behavioral Health Integrated Data Environment C-15

TABLES

Table 1. Demographic and Military Characteristics for U.S. Army Active Duty Soldiers by Suicidal Behavior, 2016–2017 6
Table 2. Event Characteristics for U.S. Army Active Duty Soldiers by Suicidal Behavior, 2016–2017 7
Table 3. Personal and Legal/Administrative History for U.S. Army Active Duty Soldiers by Suicidal Behavior, 2016–2017 8
Table 4. Behavioral Health Indicators in U.S. Army Active Duty Soldiers by Suicidal Behavior, 2016–2017 9
Table 5. Non-behavioral Health Indicators in U.S. Army Active Duty Soldiers by Suicidal Behavior, 2016–2017 11
Table 6. Substance-related Testing, Screening, and Treatment History in U.S. Army Active Duty Soldiers by Suicidal Behavior Cases, 2016–2017 12
Table C-1. Crude Rates for Each Suicidal Behavior by Year, among U.S. Army Active Soldiers, 2008–2017 (supplemental data for Figure 1) C-1

Page

Table C-2. Crude Sex-specific Suicide rates, among U.S. Army Active Soldiers, 2008–2017 (supplemental data for Figure 2) ... C-2
Table C-3. Crude Age-specific Suicide Rates among U.S. Army Active Soldiers, 2008–2017 (supplemental data for Figure 3) ... C-3
Table C-4. Crude Rank-specific Suicide Rates among U.S. Army Active Soldiers, 2008–2017 (supplemental data for Figure 4) ... C-4
Table C-5. Crude Sex-specific Suicide Attempt Rates among U.S. Army Active Soldiers, 2008–2017 (supplemental data for Figure 5) ... C-5
Table C-6. Crude Age-specific Suicide Attempt Rates among U.S. Army Active Soldiers, 2008–2017 (supplemental data for Figure 6) ... C-6
Table C-7. Crude Rank-specific Suicide Attempt Rates among U.S. Army Active Soldiers, 2008–2017 (supplemental data for Figure 7) ... C-7
Table C-8. Crude Sex-specific Suicidal Ideation Rates among U.S. Army Active Soldiers, 2008–2017 (supplemental data for Figure 8) ... C-8
Table C-9. Crude Age-specific Suicideal Ideation Rates among U.S. Army Active Soldiers, 2008–2017 (supplemental data for Figure 9) ... C-9
Table C-10. Crude Rank-specific Suicidal Ideation Rate among U.S. Army Active Soldiers, 2008–2017 (supplemental data for Figure 10) ... C-10
Table C-11. Categorizing Behavioral Health, Chronic Pain and Traumatic Brain Injury Medical Encounters and Diagnoses ... C-12

PUBLIC HEALTH REPORT
SURVEILLANCE OF SUICIDAL BEHAVIOR: JANUARY–DECEMBER 2017
PHR NO. S.0049809.1

1 SUMMARY

1.1 Purpose

The U.S. Army Public Health Center (APHC), Division of Behavioral and Social Health Outcomes Practice generates this annual publication to report the frequency and rate of suicidal behavior among U.S. Army Active Duty Soldiers during a calendar year using data from the Army Behavioral Health Integrated Data Environment (ABHIDE). This report includes the demographic and military characteristics and major life events of suicidal behavior cases. Findings contained in this report are used by military leaders, scientists, public health practitioners, and clinicians to determine where to focus prevention and research efforts to mitigate adverse outcomes.

1.2 Results

During the 2017 calendar year, 3,977 Army Active Duty Soldiers engaged in a suicidal behavior; 116 Soldiers died by suicide, 459 had a documented suicide attempt, and 3,402 had a reported suicidal ideation. The most recent and/or serious event was captured for each Soldier. The rates of suicides, suicide attempts, and suicidal ideations were 25, 98, and 724 per 100,000 Soldiers, respectively. Over the last decade, statistically significant trends were not observed in the rates of suicides and suicide attempts; however, there was a statistically significant increasing trend in suicidal ideation rates during this period.

The majority of suicidal behavior cases in 2017 occurred in the United States among junior enlisted white males between ages 17 and 34. Soldiers who were ever deployed in support of Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), and Operation New Dawn (OND) made up a larger proportion of suicide cases (54%) compared to attempt (29%) and ideation cases (30%). Gunshot wounds and drug/alcohol overdose were the primary methods for dying by suicide and attempting suicide, respectively. The principal stressors found among suicide and attempt cases were relationship and work-related problems. At least 40% of suicidal behavior cases made contact with the behavioral healthcare system within 30 days prior to the event. The majority of suicidal behavior cases were diagnosed with at least one BH condition during service; the most prevalent diagnoses were adjustment and mood disorders.

Across all suicidal behavior, Soldiers who were 17–24 years old had the highest rate compared to Soldiers over age 24. Female Soldiers had higher rates of suicide attempt and suicidal ideation than males. While similar rates of suicide were observed between Soldiers in the E1–E4 and E5–E9 ranks, Soldiers who were in the E1–E4 ranks had a higher rates of attempt and ideation compared to Soldiers who were senior enlisted Soldiers or Officers.

Public Health Report No. S.0049809.1, Surveillance of Suicidal Behavior, January through December 2017

1.3 Conclusion

Based on these findings, preventive measures may need to be developed for each suicidal behavior by targeting slightly different demographic groups. For instance, prevention strategies targeting suicide cases continue to be essential in a state-side garrison environment for males, 17–24-year-old and enlisted Soldiers. However, Soldiers who are junior enlisted, female, or 17–24 years old remain a population to focus prevention efforts for suicide attempts and suicidal ideations. Behavioral health care continues to be an important factor when examining suicidal behavior in the Army population, and more rigorous studies must be conducted to evaluate this relationship and its impact on suicide prevention efforts in the Army. Primary care plays a key role in the screening, diagnosis, and treatment of TBI, pain, and substance use/misuse. Ensuring continuum of care so Soldiers are referred to the most appropriate services proves to be crucial.

2 REFERENCES

See Appendix A for a listing of references used in this report.

3 AUTHORITY

Army Regulation 40-5 (*Preventive Medicine*, 25 May 2007), Section 2-19.

4 METHODS

See Appendix B for the methods used to generate this report.

5 RESULTS

5.1 Suicide Cases

5.1.1 Demographics/Military Characteristics (Table 1):

In 2017, 116 Soldiers died by suicide translating to a rate of 25 per 100,000 Army Active Duty Soldiers (95% CI: 20.2–29.2) (Figure 1). Most cases were male (95%), 17–34 years old (79%), white (66%), married (54%), junior enlisted (53%), and had a history of OEF, OIF, or OND deployment (54%). Soldiers who were 17–24 years old had the highest rate of suicide at 31 suicides per 100,000 Soldiers (95% CI: 22.6–38.9) compared to those over age 24 (Figure 3). However, rates of suicide between Soldiers in E1–E4 (29/100,000 Soldiers, 95% CI: 22.0–36.8) and E5–E9 (30/100,000 Soldiers, 95% CI: 21.6–38.2) ranks were similar (Figure 4).

5.1.2 Event Characteristics (Table 2):

Ninety percent of suicides occurred in the United States. The most common method of suicide was gunshot wound (67%) followed by hanging/asphyxiation (28%). Thirty-six percent of Soldiers communicated their suicidal intentions prior to the act.

5.1.3 Personal and Legal/Administrative History (Table 3):

Among Soldiers with Department of Defense Suicide Event Reports (DoDSERs) (n=105) who had personal (n=80) and legal/administrative (n=28) problems within 1 year prior to the suicide, the most frequent personal problems were relationship (49%) and work-related stress (30%). Civil legal problems (10%) were the principal legal/administrative issue.

5.1.4 BH Indicators (Table 4):

At least 84% of suicide cases had an outpatient and/or inpatient BH encounter during their military career; of those, 39% had a BH encounter within 30 days preceding the event. More than half were diagnosed with a BH disorder. Primary diagnoses were adjustment (39%) and mood (33%) disorders.

5.1.5 Other Medical Indicators (Table 5):

Twenty-one percent of cases had been diagnosed with a traumatic brain injury (TBI) during their military career. In the year preceding the suicide, 11% had a medical encounter for chronic pain.

5.1.6 Drug Testing and Alcohol and Substance Abuse Program (ASAP) Screening (Table 6):

Of cases with drug testing data (n=113) during their military career, few (4%) had at least one positive drug test. In the year preceding the suicide, 10% (n=12) of these cases were screened for intake into the ASAP; of these, 75% (n=9) were enrolled into the program.

5.2 Suicide Attempt Cases

5.2.1 Demographics/Military Characteristics (Table 1):

The number of suicide attempt cases reported in 2017 was 459 resulting in a rate of 98 per 100,000 Army Active Duty Soldiers (95% CI: 88.8–106.7) (Figure 1). The majority of cases were male (75%), 17–24 years old (66%), white (51%), single (54%), junior enslited (75%), and had no history of an OEF, OIF, or OND deployment (71%). Female Soldiers had a higher rate of suicide attempt at 165 per 100,000 Soldiers (95% CI: 134.8–195.0) compared to males (Figure 5). Soldiers who were 17–24 years old (169/100,000 Soldiers, 95% CI: 148.7–186.6) or in E1–E4 ranks (166/100,000 Soldiers, 95% CI: 148.3–183.4) had the highest suicide attempt rate compared to Soldiers who were over age 24 or in E5–E9 or O1–O9 ranks, respectively (Figures 6 and 7).

5.2.2 Event Characteristics (Table 2):

The majority of attempts occurred in the United States (89%) by overdose (49%). As a result, up to 46% of attempts involved some type of drug or alcohol. Approximately 25% of cases communicated suicidal intentions prior to their attempt.

5.2.3 Personal and Legal/Administrative History (Table 3):

The majority of attempts had personal issues (n=336) which occurred within 1 year prior to the event. Relationship problems (44%), work stress (34%), and being a victim of abuse (34%) were the most frequent. Legal/administrative issues (n=149) were primarily related to Article 15 (16%) or administrative separation (13%).

5.2.4 BH Indicators (Table 4):

At least 78% of suicide attempt cases made contact with the behavioral healthcare system during their military career, and more than half (58%) made contact within 30 days preceding the event. Two-thirds (64%) were diagnosed with a BH disorder before their event, and the most frequent diagnoses were adjustment (47%) and mood (39%) disorders.

5.2.5 Other Medical Indicators (Table 5):

Ten percent of cases had been diagnosed with a TBI during service. In the year preceding their suicide attempt, 9% of cases sought treatment for chronic pain, and 3% sought treatment within 30 days of their attempt. In the year before their event, 7% received a chronic pain diagnosis.

5.2.6 Drug Testing and ASAP Screening (Table 6):

Of suicide attempt cases with drug testing data (n=404), 6% tested positive for illicit drug use during their military career. Positive drug tests were primarily for cannabis (58%), amphetamines (27%), and cocaine (23%). In the year before their attempt, 15% (n=69) were screened for intake into the ASAP program; 83% (n=57) of those were enrolled into the program.

5.3 Suicidal Ideation Cases

5.3.1 Demographics/Military Characteristics (Table 1):

There were an estimated 3,402 suicidal ideation cases in 2017, which translates to a rate of 724 per 100,000 Army Active Duty Soldiers (95% CI: 700.0–748.7) (Figure 1). There was a signicantly increasing trend in the rate of suicidal ideation (β=49.13, p value=0.01) from 2008–2017. The majority of cases were male (76%), aged 17–24 (62%), white (51%), single (53%) and junior enlisted (74%). Over two-thirds (70%) had no history of an OEF, OIF, or OND deployment. Female Soldiers (1150/100,000 Soldiers, 95% CI: 1070.4–1229.6) had a higher rate of suicidal ideation compared to males (Figure 8). Soldiers who were 17–24 years old (1170/100,000 Soldiers, 95% CI: 1119.4–1219.6) or in E1–E4 ranks (1215/100,000 Soldiers, 95% CI: 1167.9–1262.8) had the highest rate of suicidal ideation compared to Soldiers over 24 years, or in E5–E9, O1–O9 or W1–W5 ranks, respectively (Figures 9 and 10).

Public Health Report No. S.0049809.1, Surveillance of Suicidal Behavior, January through December 2017

5.3.1 BH Indicators (Table 4):

One-third (31%) of suicidal ideation cases had an inpatient BH encounter during their military career. The majority had an outpatient BH encounter since accession (86%), and 71% had a BH encounter in the 30 days preceding the event. Approximately three-fourths (74%) of cases were diagnosed with a BH disorder before their event. The primary diagnoses were adjustment (58%), mood (44%), and anxiety disorders (31%).

5.3.2 Other Medical Indicators (Table 5):

Eleven percent of cases had ever been diagnosed with a TBI. In the year preceding their suicidal ideation, 13% of cases had a medical encounter for chronic pain, and 10% received a chronic pain diagnosis.

5.3.3 Drug Testing and ASAP Screening (Table 6):

Of ideation cases with drug testing data (n=3,029), 8% had a positive drug test at some time during their military career. Positive drug tests were primarily for cannabis (62%), cocaine (21%) and amphetamines (14%). In the year before their event, 13% (n=447) were screened for intake into the ASAP program; 84% (n=375) of those were enrolled into the program.

5.4 Tables and Figures

Table 1. Demographic and Military Characteristics for U.S. Army Active Duty Soldiers by Suicidal Behavior, 2016–2017

	Suicidal Behavior n (%)							
	Suicide[a]			Suicide Attempt[b]			Suicidal Ideation[b]	
	2016 (n=130)	2017 (n=116)		2016 (n=524)	2017 (n=459)		2016 (n=2276)	2017 (n=3402)
SEX								
Male	120 (92)	110 (95)		386 (74)	344 (75)		1779 (78)	2600 (76)
Female	10 (8)	6 (5)		138 (26)	115 (25)		497 (22)	802 (24)
AGE (yr)								
17–24	53 (41)	55 (47)		332 (63)	302 (66)		1224 (54)	2093 (62)[c]
25–34	53 (41)	37 (32)		151 (29)	120 (26)		742 (33)	955 (28)
35–59	24 (18)	24 (21)		41 (8)	37 (8)		310 (14)	354 (10)
Mean (±std)	28 (±7.5)	28 (±7.4)		25 (±6.0)	25 (±6.3)		26 (±7.0)	25 (±6.6)
RACE-ETHNICITY								
White	88 (68)	76 (66)		259 (50)	232 (51)		1231 (54)	1743 (51)
Black	19 (15)	14 (12)		139 (27)	113 (25)		587 (26)	915 (27)
Hispanic	15 (12)	19 (16)		85 (16)	72 (16)		303 (13)	498 (15)
Asian/Pacific Islander	5 (4)	7 (6)		36 (7)	31 (7)		138 (6)	199 (6)
American Indian	3 (2)	0 (0)		4 (1)	10 (2)		17 (1)	47 (1)
MARITAL STATUS[c]								
Single	48 (37)	42 (36)		276 (53)	249 (54)		1058 (46)	1819 (53)
Married	66 (51)	63 (54)		226 (43)	180 (39)		1104 (49)	1423 (42)
Divorced	14 (11)	10 (9)		22 (4)	29 (6)		110 (5)	150 (4)
Other	2 (2)	1 (1)		0 (0)	0 (0)		4 (0)	10 (<1)
RANK[d]								
E1–E4	61 (47)	61 (53)		402 (77)	344 (75)		1539 (68)	2521 (74)
E5–E9	47 (36)	50 (43)		103 (20)	102 (22)		635 (28)	753 (22)
W1–W5	4 (3)	2 (2)		3 (1)	4 (1)		12 (1)	25 (1)
O1–O3	13 (10)	3 (3)		11 (2)	7 (2)		70 (3)	79 (2)
O4–O9	5 (4)	0 (0)		5 (1)	2 (<1)		20 (1)	24 (1)
DEPLOYED[e]								
No	66 (51)	53 (46)		323 (62)	327 (71)		1329 (58)	2371 (70)
Yes	64 (49)	63 (54)		201 (38)	132 (29)		947 (42)	1031 (30)

Legend: E – Enlisted, O – Officer, W – Warrant Officer
Notes: [a]Included those confirmed or pending confirmation by the Armed Forces Medical Examiner System (AFMES). [b]Suicide attempt and suicidal ideation cases are from DoDSERs, which are completed only for cases serious enough to warrant hospitalization or evacuation. [c]Included widowed and legally separated. Marital status was unknown for one suicide attempt case in 2017. [d]No cases reported for Cadets. [e]Refers to the number of OEF, OIF or OND deployments during service.

Table 2. Event Characteristics for U.S. Army Active Duty Soldiers by Suicidal Behavior, 2016–2017

	Suicidal Behavior n (%)				
	Suicide[a]			Suicide Attempt[b]	
	2016 (n=130)	2017 (n=116)[c]		2016 (n=524)	2017 (n=459)
LOCATION OF DEATH[d]					
USA	119 (92)	104 (90)		444 (85)	402 (89)
In Theater	1 (1)	4 (3)		31 (6)	12 (3)
Other[e]	10 (8)	8 (7)		47 (9)	39 (9)
METHOD OF DEATH[d]					
Gunshot wound	86 (66)	78 (67)		22 (4)	24 (5)
Hanging/asphyxiation	32 (25)	33 (28)		70 (13)	61 (13)
Drug/alcohol overdose	3 (2)	3 (3)		260 (50)	223 (49)
Cutting	0	0		64 (12)	76 (17)
Other[f]	7 (5)	2 (2)		106 (20)	72 (16)
Unknown	2 (2)	0 (0)		2 (<1)	2 (<1)
SUBSTANCE INVOLVEMENT[b]					
Event Involved Alcohol	23 (18)	15 (14)		145 (28)	132 (29)
Event Involved Drugs	10 (8)	5 (5)		260 (50)	212 (46)
OTHER EVENT CHARACTERISTICS[b]					
Communicated Prior to Event	24 (19)	38 (36)		137 (26)	113 (25)

Notes: [a]Included those confirmed or pending confirmation by AFMES. [b]Obtained from DoDSERs, which are available only for cases serious enough to warrant hospitalization or evacuation. [c]Substance involvement and other event characteristics data were not available for 11 cases. [d]Obtained from the Defense Casualty Information Processing System. [e]Primarily Europe or Korea. [f]Includes carbon monoxide and other poisoning, jumping from heights or in front of vehicles, vehicle crashes, or drowning.

Table 3. Personal and Legal/Administrative History[a] for U.S. Army Active Duty Soldiers by Suicidal Behavior, 2016–2017

	Suicidal Behavior n (%)				
	Suicide[b]			Suicide Attempt[c]	
	2016 (n=130)	2017 (n=116)[d]		2016 (n=524)	2017 (n=459)
LEGAL/ADMINISTRATIVE HISTORY[e]	(n=33)	(n=28)		(n=167)	(n=149)
Article 15	14 (11)	9 (9)		87 (17)	74 (16)
Civil Legal Problems	12 (9)	11 (10)		39 (7)	24 (5)
Administrative Separation[f]	9 (7)	9 (9)		67 (13)	61 (13)
Absent Without Leave	4 (3)	5 (5)		15 (3)	13 (3)
Nonselection[g]	6 (5)	5 (5)		24 (5)	15 (3)
Courts Martial	2 (2)	4 (4)		8 (2)	6 (1)
MEDICAL BOARD[h]					
Yes	7 (5)	8 (8)		54 (10)	50 (11)
PERSONAL HISTORY[e]	(n=93)	(n=80)		(n=408)	(n=336)
Relationship Problem	66 (51)	51 (49)		266 (51)	199 (44)
Work Stress	29 (22)	31 (30)		188 (36)	157 (34)
Physical Health Problem	28 (22)	26 (25)		100 (19)	61 (13)
Victim of Abuse					
Previous Year	4 (3)	4 (4)		58 (11)	64 (14)
Ever	18 (14)	16 (15)		167 (32)	157 (34)
Emotional Abuse	11 (9)	15 (14)		94 (18)	113 (25)
Physical Abuse	9 (7)	7 (7)		97 (19)	87 (19)
Sexual Abuse	9 (7)	3 (3)		101 (19)	81 (18)
Perpetrator of Abuse	13 (10)	14 (13)		34 (6)	22 (5)
Spouse/Family/Friend Death	7 (5)	7 (7)		81 (15)	68 (15)
Financial Stress	5 (4)	15 (14)		39 (7)	37 (8)
Spouse/Family Health Problem	1 (1)	6 (6)		35 (7)	26 (6)
Spousal/Family/Friend Suicide					
Previous Year	1 (1)	3 (3)		26 (5)	35 (8)
Ever	8 (6)	11 (10)		77 (15)	77 (17)
Family Advocacy Program	7 (5)	9 (9)		32 (6)	24 (5)

Notes: [a]Personal and legal/administrative history within 1 year before suicide, except as noted. Data were obtained from DoDSER. [b]Included those confirmed or pending confirmation by AFMES. [c]Obtained from DoDSERs, which are available only for cases serious enough to warrant hospitalization or evacuation. [d]Data were not available for 11 cases. [e]Not mutually exclusive. [f]Considered for separation from the Army on the basis of conduct or inability to meet standards of duty performance and discipline. [g]Not selected for advanced schooling, promotion, or command. [h]Medical evaluation board to determine fitness for continued duty.

Table 4. Behavioral Health Indicators among U.S. Army Active Duty Soldiers by Suicidal Behavior, 2016–2017

	Suicidal Behavior n (%)					
	Suicide[a]		Suicide Attempt[b]		Suicidal Ideation[b]	
	2016 (n=130)	2017 (n=116)	2016 (n=524)[c]	2017 (n=459)[c]	2016 (n=2276)	2017 (n=3402)
BH MEDICAL ENCOUNTERS[d]						
Inpatient	30 (23)	27 (23)	141 (27)	139 (31)	714 (31)	1067 (31)
Outpatient	99 (76)	97 (84)	421 (82)	346 (78)	2011 (88)	2937 (86)
30 Days Before Event	46 (35)	45 (39)	309 (60)	256 (58)	1645 (72)	2415 (71)
BH DIAGNOSIS[d,e]						
Any BH Diagnosis						
Prevalence[f] Before Event	71 (55)	68 (59)	346 (67)	285 (64)	1778 (78)	2506 (74)
Incidence in Year Before Event	39 (30)	37 (32)	260 (50)	211 (48)	1351 (59)	1982 (58)
More Than One BH Diagnosis						
Prevalence[f] Before Event	44 (34)	47 (41)	241 (47)	204 (46)	1302 (57)	1730 (51)
Incidence in Year Before Event	22 (17)	16 (14)	145 (28)	122 (27)	698 (31)	1063 (31)
Any Mood Disorder						
Prevalence[f] Before Event	40 (31)	38 (33)	200 (39)	174 (39)	1140 (50)	1510 (44)
Incidence in Year Before Event	20 (15)	16 (14)	127 (25)	108 (24)	663 (29)	1011 (30)
~Major Depression						
Prevalence[f] Before Event	29 (22)	31 (27)	165 (32)	153 (34)	912 (40)	1291 (38)
Incidence in Year Before Event	21 (16)	18 (16)	136 (26)	113 (25)	713 (31)	999 (29)
~Other Depressive Disorders						
Prevalence[f] Before Event	23 (18)	18 (16)	99 (19)	65 (15)	600 (26)	501 (15)
Incidence in Year Before Event	5 (4)	4 (3)	40 (8)	17 (4)	180 (8)	155 (5)
~Bipolar Disorder						
Prevalence[f] Before Event	6 (5)	4 (3)	15 (3)	9 (2)	84 (4)	105 (3)
Incidence in Year Before Event	4 (3)	0 (0)	12 (2)	9 (2)	59 (3)	88 (3)
Posttraumatic Stress Disorder						
Prevalence[f] Before Event	17 (13)	16 (14)	79 (15)	58 (13)	483 (21)	573 (17)
Incidence in Year Before Event	7 (5)	5 (4)	52 (10)	38 (9)	261 (11)	375 (11)
Other Anxiety Disorder[g]						
Prevalence[f] Before Event	31 (24)	29 (25)	143 (28)	114 (26)	798 (35)	1068 (31)
Incidence in Year Before Event	17 (13)	8 (7)	80 (16)	63 (14)	413 (18)	588 (17)
Adjustment Disorder						
Prevalence[f] Before Event	51 (39)	45 (39)	277 (54)	209 (47)	1388 (61)	1980 (58)
Incidence in Year Before Event	21 (16)	14 (12)	144 (28)	112 (25)	712 (31)	1142 (34)

	Suicidal Behavior n (%)							
	Suicide[a]			Suicide Attempt[b]			Suicidal Ideation[b]	
	2016 (n=130)	2017 (n=116)		2016 (n=524)[c]	2017 (n=459)[c]		2016 (n=2276)	2017 (n=3402)
Substance Use Disorder								
Prevalence[f] Before Event	31 (24)	29 (25)		122 (24)	106 (24)		590 (26)	826 (24)
Incidence in Year Before Event	12 (9)	13 (11)		76 (15)	65 (15)		307 (13)	512 (15)
Personality Disorder[h]								
Prevalence[f] Before Event	8 (6)	9 (8)		41 (8)	25 (6)		127 (6)	176 (5)
Incidence in Year Before Event	3 (2)	3 (3)		35 (7)	22 (5)		87 (4)	139 (4)
Psychosis								
Prevalence[f] Before Event	2 (2)	2 (2)		6 (1)	6 (1)		66 (3)	80 (2)
Incidence in Year Before Event	2 (2)	2 (2)		5 (1)	4 (1)		51 (2)	65 (2)
Previous Suicide Attempt/Self Harm[i]								
Prevalence[f] Before Event	14 (11)	15 (13)		79 (15)	67 (15)		223 (10)	388 (11)
Incidence in Year Before Event	9 (7)	10 (9)		68 (13)	52 (12)		176 (8)	342 (10)
Previous Suicidal Ideation[j]								
Prevalence[f] Before Event	20 (15)	17 (15)		139 (27)	111 (25)		766 (34)	1198 (35)
Incidence in Year Before Event	12 (9)	11 (9)		116 (23)	92 (21)		661 (29)	1046 (31)
SLEEP DISORDERS[k]								
Medical Encounters								
1 year before event	30 (23)	23 (20)		173 (34)	133 (30)		855 (38)	1281 (38)
30 days before event	13 (10)	8 (7)		78 (15)	52 (12)		370 (16)	619 (18)
Diagnoses								
1 year before event	26 (20)	18 (16)		142 (28)	112 (25)		696 (31)	1077 (32)

Legend: BH – behavioral health, Clinical Modification, ICD-10 – International Classification of Diseases, 10th revision, Clinical Modification, PTSD – post-traumatic stress disorder

Notes: [a]Included those confirmed or pending confirmation by AFMES. [b]Obtained from the DoDSERs, which are available only for cases serious enough to warrant hospitalization or evacuation. [c]BH data were not available for 11 cases in 2016, and 15 cases in 2017. [d]Not mutually exclusive. [e]Diagnosed for one or more of the following: mood, PTSD, other anxiety disorders, adjustment disorder, substance use disorders, personality disorders, or psychosis. [f]Ever diagnosed during time in service. [g]Included panic disorder, generalized anxiety disorder, or obsessive-compulsive disorder. [h]Included borderline or antisocial personality disorders. [i]Based on ICD-10 X-,T-, and Z-codes for self-inflicted injuries. [j]Based on an ICD-10 R-code for suicidal ideation. [k]ICD-10 codes indicating sleep problems include F51, G47, and Z72.820.

Table 5. Non-behavioral Health Indicators among U.S. Army Active Duty Soldiers by Suicidal Behavior, 2016–2017

	Suicidal Behavior n (%)							
	Suicide[a]			Suicide Attempt[b]			Suicidal Ideation[b]	
	2016 (n=130)	2017 (n=116)		2016 (n=524)[c]	2017 (n=459)[c]		2016 (n=2276)	2017 (n=3402)
TRAUMATIC BRAIN INJURY[d]								
Medical Encounters								
1 year before event	5 (4)	12 (10)		43 (8)	30 (7)		206 (9)	249 (7)
30 days before event	4 (3)	6 (5)		16 (3)	13 (3)		75 (3)	96 (3)
Diagnoses								
Any Diagnosis	19 (15)	24 (21)		71 (14)	45 (10)		331 (15)	365 (11)
First within 1 year before event	3 (2)	6 (5)		29 (6)	25 (6)		110 (5)	143 (4)
CHRONIC PAIN[e]								
Medical Encounters								
1 year before event	11 (8)	13 (11)		49 (10)	38 (9)		271 (12)	446 (13)
30 days before event	4 (3)	3 (3)		15 (3)	14 (3)		85 (4)	139 (4)
Diagnoses								
1 year before event	10 (8)	10 (9)		38 (7)	29 (7)		205 (9)	332 (10)

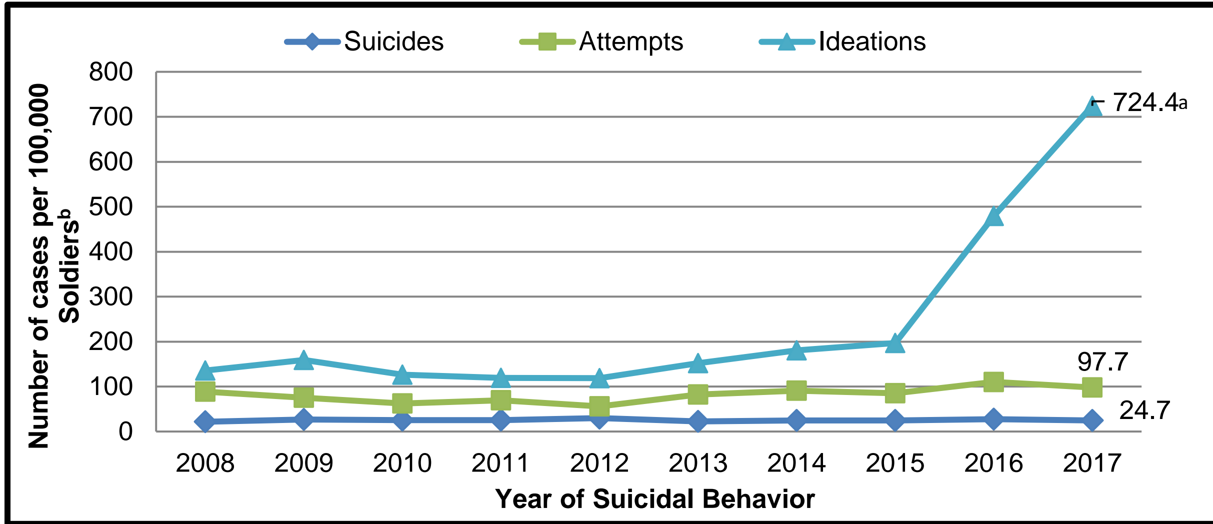
Legend: ICD-10 – International Classification of Diseases, 10th revision, Clinical Modification
Notes: [a]Included those confirmed or pending confirmation by AFMES. [b]Obtained from the DoDSERs, which are available only for cases serious enough to warrant hospitalization or evacuation. [c]Medical claims data (TBI, chronic pain, sleep) were not available for 11 cases in 2016, and 15 cases in 2017. [d]Based on ICD-10 codes for traumatic brain injuries provided by the Defense and Veterans Brain Injury Center: F07.81, S04.02-S04.04, S06.0-S06.6, S06.8-S06.9, S02.0-S02.1, S02.8-S02.9, S07.1, Z87.820, DOD0102, DOD0103, DOD0104, and DOD0105. [e]ICD-10 codes indicating chronic pain provided by the American Academy of Professional Coders: G89.21, G89.22, G89.28, G89.29, G89.3, and G89.4.

Table 6. Substance-related Testing, Screening, and Treatment History among U.S. Army Active Duty Soldiers by Suicidal Behavior Cases, 2016–2017

	Suicidal Behavior n (%)							
	Suicide[a]			Suicide Attempt[b]			Suicidal Ideation[b]	
	2016 (n=130)	2017 (n=116)		2016 (n=524)	2017 (n=459)		2016 (n=2276)	2017 (n=3402)
DRUG TEST HISTORY[c]	(n=122)[d]	(n=113)[d]		(n=455)[d]	(n=404)[d]		(n=2064)[d]	(n=3029)[d]
Positive Drug Test	5 (4)	4 (4)		28 (6)	26 (6)		125 (6)	215 (8)
More than One	1 (20)	1 (25)		11 (39)	9 (35)		40 (32)	55 (26)
1 Year Before Event	4 (80)	3 (75)		26 (93)	21 (81)		91 (73)	182 (85)
Amphetamines	0 (0)	2 (50)		7 (25)	7 (27)		12 (10)	31 (14)
Cannabis	4 (80)	1 (25)		16 (57)	15 (58)		66 (53)	134 (62)
Cocaine	0 (0)	1 (25)		6 (21)	6 (23)		33 (26)	45 (21)
Oxycodone/Oxymorphone	0 (0)	0 (0)		2 (7)	3 (12)		10 (8)	12 (6)
Opiates	1 (20)	0 (0)		0 (0)	1 (4)		7 (6)	17 (8)
Heroin	0 (0)	0 (0)		0 (0)	0 (0)		3 (2)	5 (2)
Steroids	0 (0)	0 (0)		0 (0)	0 (0)		1 (1)	3 (1)
Barbiturates	0 (0)	0 (0)		0 (0)	0 (0)		1 (1)	0 (0)
Unknown	1 (20)	0 (0)		4 (14)	5 (19)		18 (14)	18 (8)
ALCOHOL MISUSE[e]	(n=73)[f]	(n=71)[f]		(n=263)[f]	(n=243)[f]		(n=1259)[f]	(n=1743)[f]
Unhealthy Drinking[g]	8 (11)	5 (7)		25 (10)	21 (9)		112 (9)	132 (8)
Probable Alcohol Disorder[h]	2 (3)	0 (0)		7 (3)	3 (1)		16 (1)	20 (1)
Referred to ASAP	7 (7)	3 (3)		18 (5)	8 (2)		41 (3)	58 (2)
Received Alcohol-Related Education	48 (49)	39 (38)		122 (33)	111 (32)		647 (39)	829 (33)
ASAP INTAKE SCREENING[c,i]								
Screened for Intake	16 (12)	12 (10)		73 (14)	69 (15)		310 (14)	447 (13)
Enrolled for Treatment	14 (88)	9 (75)		58 (79)	57 (83)		254 (82)	375 (84)

Legend: ASAP – Army Substance Abuse Program, PHA – Periodic Health Assessment, AUDIT-C – Alcohol Use Disorders Identification Test-Consumption, three-question screening tool on a 5-point likert scale (i.e., a=0, e=4) with scores range from
0–12.

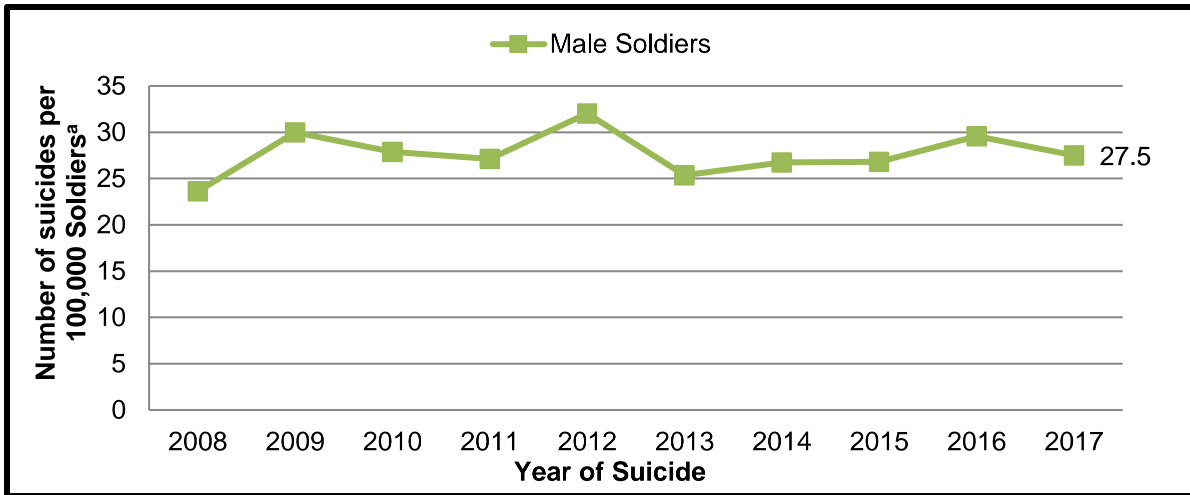
Notes: [a]Included those confirmed or pending confirmation by AFMES. [b]Obtained from the DoDSER, which are available only for cases serious enough to warrant hospitalization or evacuation. [c]Obtained from the Drug and Alcohol Management Information System. [d]Total number of cases drug tested within 1 year before the suicide event. [e]Based on scores from the most recent PHA in the 15 months before suicide. [f]Total number of individuals completed assessement. [g]A score of 5 or more for men and 4 or more for women on the AUDIT-C. [h]A score of 8 and above on the AUDIT-C. [i]ASAP screening and enrollment in the year before the event.



Notes: [a]Significant trend, β=49.13; p=0.01.

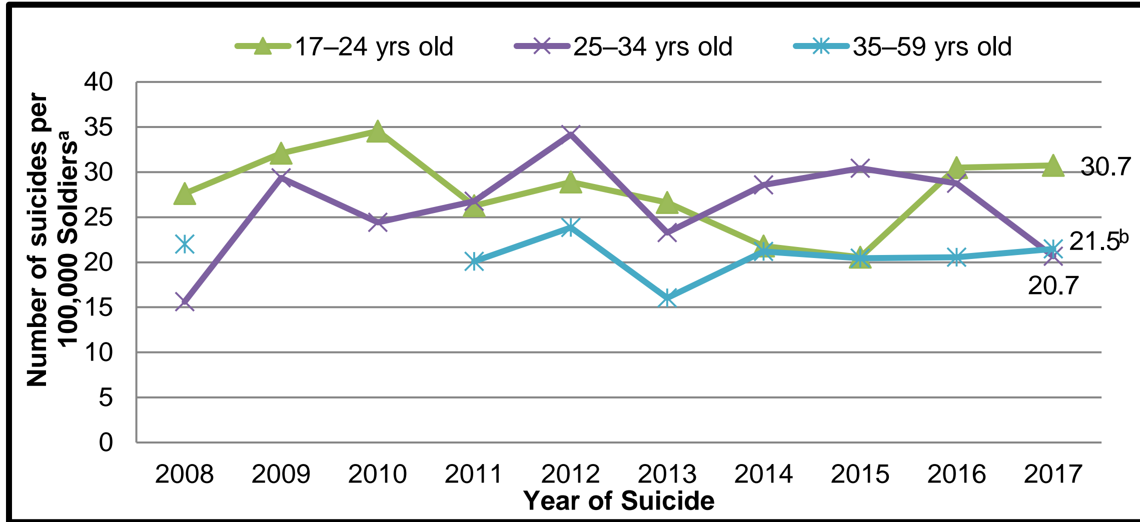
[b]Rates include only Army Active Duty cases aged 17–59 with identifiable demographic factors. Army Active Duty population counts used to calculate rates were provided by AFMES.

Figure 1. Overall Crude Rates by Suicidal Behavior among U.S. Army Active Duty Soldiers, 2008–2017



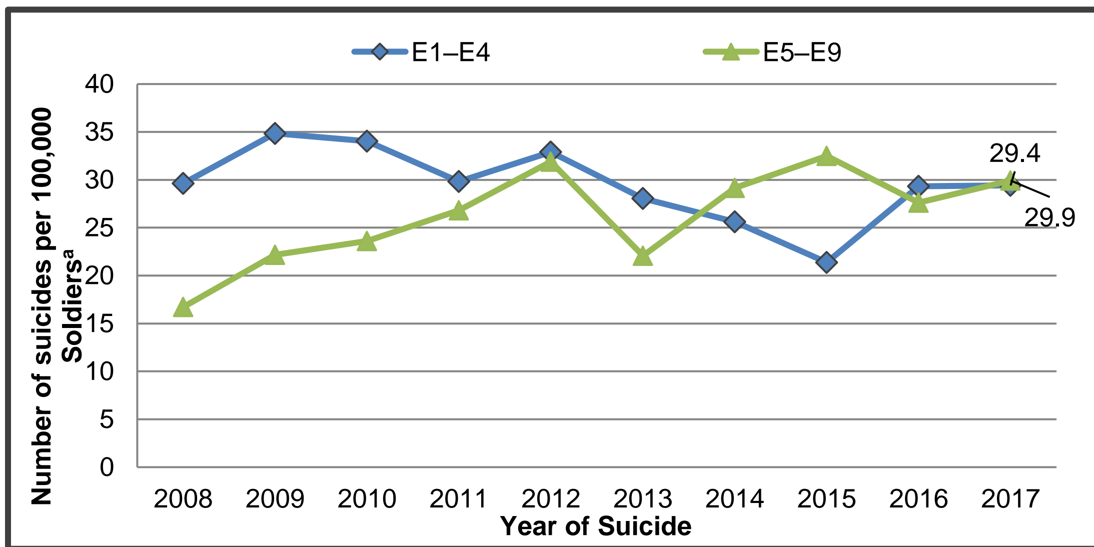
Notes: [a]Rates include only Army Active Duty cases aged 17–59 with identifiable demographic factors. Army Active Duty population counts used to calculate rates were provided by AFMES. Unstable rates (n <20) are not reported. Specifically, fewer than 20 female Soldiers died by suicide in any year, so rates could not be calculated for that group.

Figure 2. Crude Sex-specific Suicide Rates among U.S. Army Active Duty Soldiers, 2008–2017



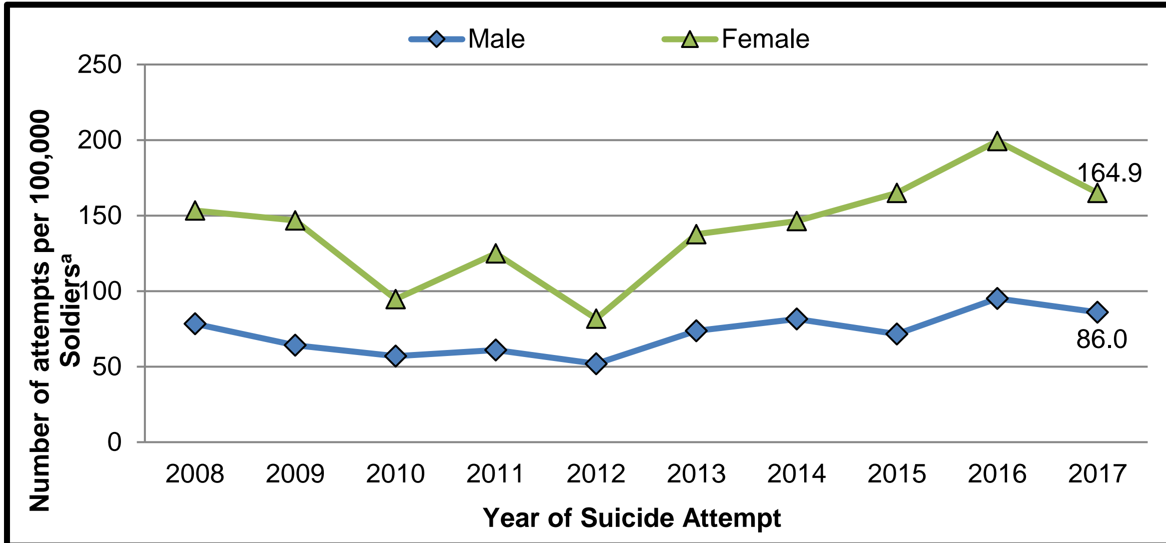
Notes: [a]Rates include only Army Active Duty cases aged 17–59 with identifiable demographic factors. Army Active Duty population counts used to calculate rates were provided by AFMES. [b]Unstable rates (n <20) are not reported. Specifically, for some years, fewer than 20 Soldiers between 35-59 years of age died by suicide, so rates could not be calculated for those years.

Figure 3. Crude Age-specific Suicide Rates among U.S. Army Active Duty Soldiers, 2008–2017



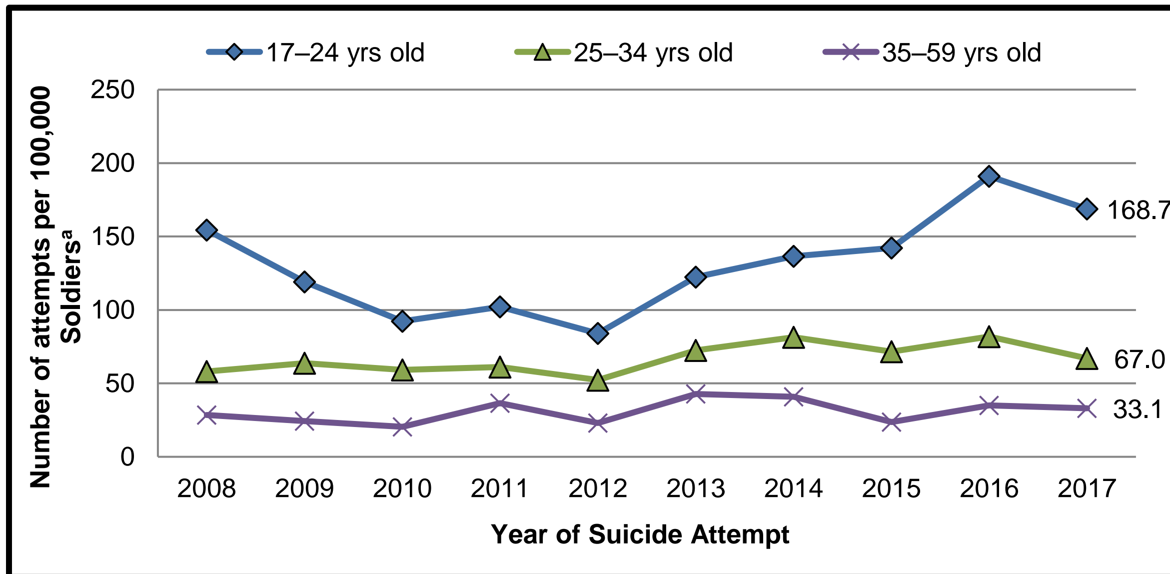
Notes: [a]Rates include only Army Active Duty cases aged 17–59 with identifiable demographic factors. Army Active Duty population counts used to calculate rates were provided by AFMES. Unstable rates (n < 20) are not reported. Specifically, fewer than 20 Officers or Warrant Officers died by suicide in any year, so rates could not be calculated for those groups.

Figure 4. Crude Rank-specific Suicide Rates among U.S. Army Active Duty Soldiers, 2008–2017



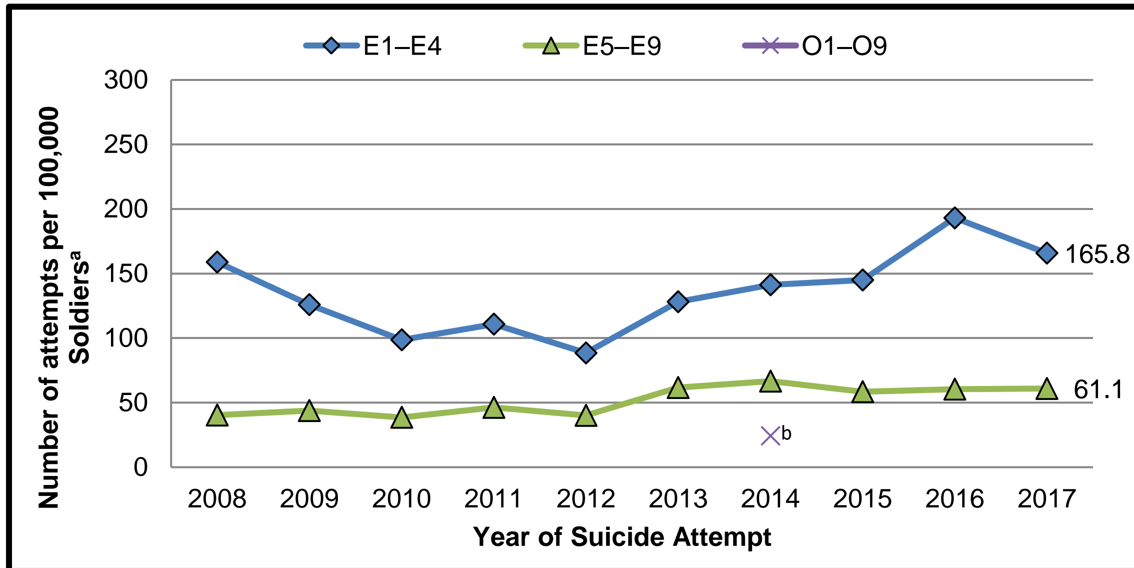
Notes: [a]Rates include only Army Active Duty cases aged 17–59 with identifiable demographic factors. Army Active Duty population counts used to calculate rates were provided by AFMES.

Figure 5. Crude Sex-specific Suicide Attempt Rates among U.S. Army Active Duty Soldiers, 2008–2017



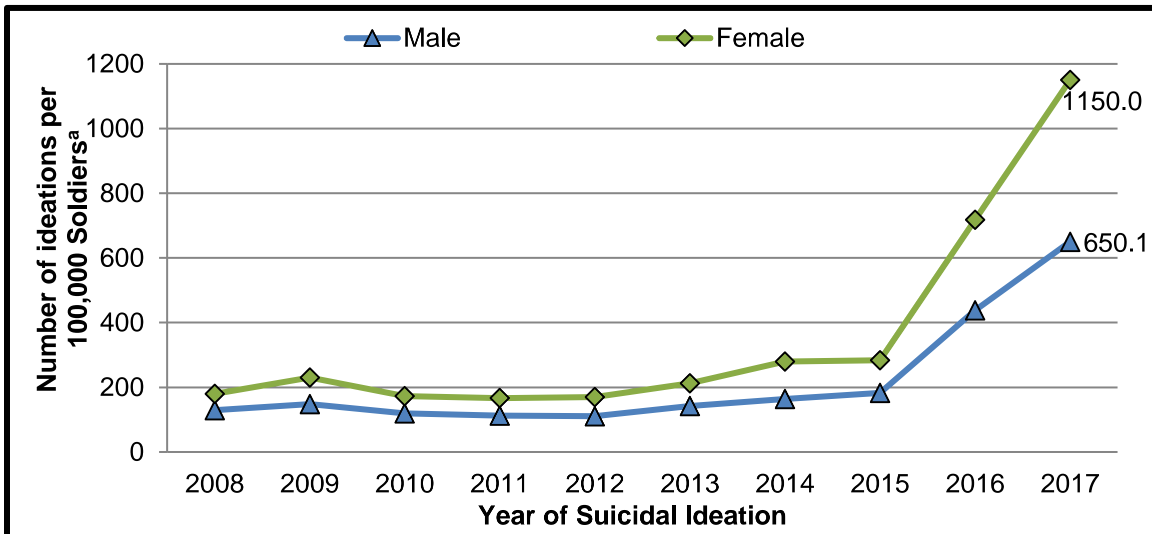
Notes: [a]Rates include only Army Active Duty cases aged 17–59 with identifiable demographic factors. Army Active Duty population counts used to calculate rates were provided by AFMES.

Figure 6. Crude Age-specific Suicide Attempt Rates among U.S. Army Active Duty Soldiers, 2008–2017



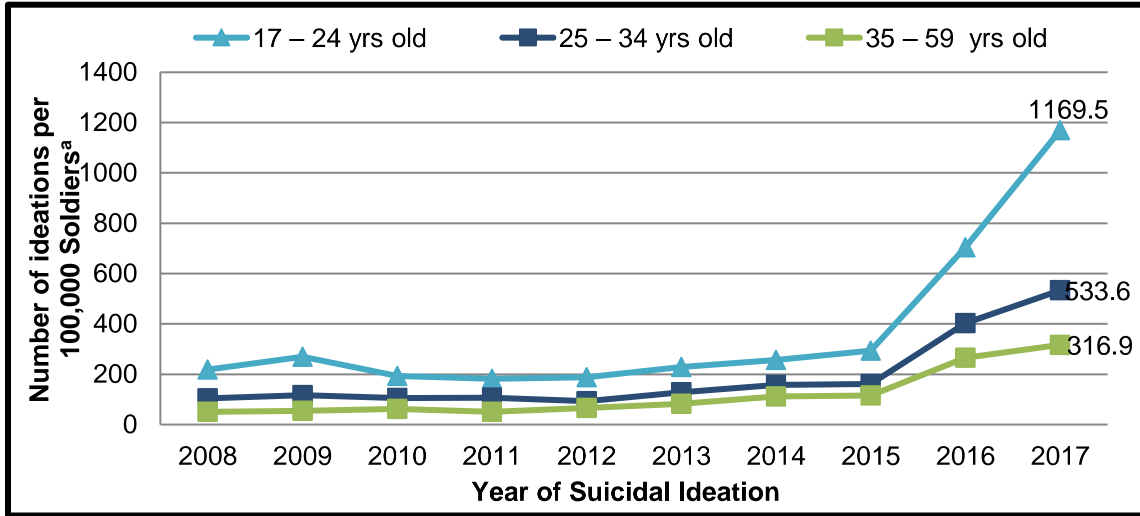
Notes: [a]Rates include only Army Active Duty cases aged 17–59 with identifiable demographic factors. Army Active Duty population counts used to calculate rates were provided by AFMES. [b]Unstable rates (n < 20) are not reported. Specifically, there were fewer than 20 suicide attempts by Officers or Warrant Officers in all but 1 year, so rates could not be calculated.

Figure 7. Crude Rank-specific Suicide Attempt Rates among U.S. Army Active Duty Soldiers, 2008–2017



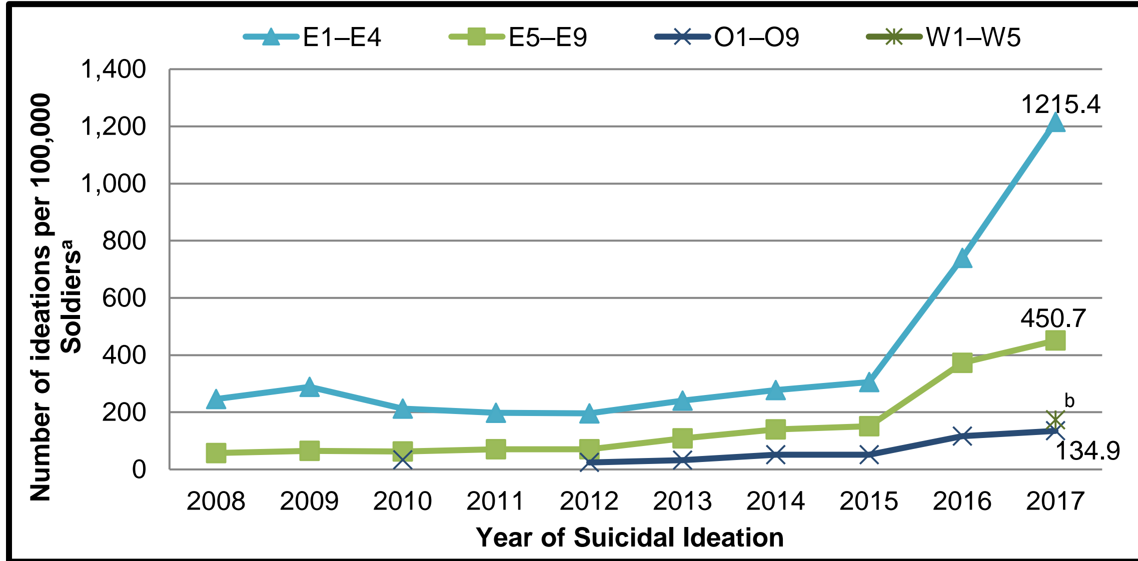
Notes: [a]Rates include only Army Active Duty cases aged 17–59 with identifiable demographic factors. Army Active Duty population counts used to calculate rates were provided by AFMES.

Figure 8. Crude Sex-specific Suicidal Ideation Rates among U.S. Army Active Duty Soldiers, 2008–2017



Notes: [a]Rates include only Army Active Duty cases aged 17–59 with identifiable demographic factors. Army Active Duty population counts used to calculate rates were provided by AFMES.

Figure 9. Crude Age-specific Suicidal Ideation Rates among U.S. Army Active Duty Soldiers, 2008–2017



Notes: [a]Rates include only Army Active Duty cases aged 17–59 with identifiable demographic factors. Army Active Duty population counts used to calculate rates were provided by AFMES. [b]Unstable rates (n < 20) are not reported. Specifically, in all but one year there were fewer than 20 cases of suicidal ideation by Warrant Officers, and all 6 years there were fewer than 20 cases by Officers, so rates could not be calculated for those groups for those years.

Figure 10. Crude Rank-specific Suicidal Ideation Rates among U.S. Army Active Duty Soldiers, 2008–2017

6 DISCUSSION

During the 2017 calendar year, 3,977 Active Duty Soldiers engaged in suicidal behavior; 116 died by suicide, 459 attempted suicide, and 3,402 had a reported suicidal ideation. There was a significantly increasing trend in suicidal ideation rates from 2008–2017, with the highest rates occurring after 2015. This increase may be due to recent policy changes implemented in 2016 to identify additional unreported cases using medical encounters and decreasing the number of required fields on the DoDSER.

There were notable differences in the characteristics of Soldiers who died by suicide when compared to Soldiers who had a suicide attempt or suicidal ideation. Male Soldiers under 25 years old had higher rates of suicide. Meanwhile, Soldiers who were junior enlisted, female, or 17–24 years old had a higher rate of suicide attempt and suicidal ideation than their counterparts. Given the differences observed particularly by sex, it is evident that preventive measures should be developed by suicidal behavior, as demographics may vary by suicidal behavior type.

Forty percent of suicides and 60% of suicide attempts made contact with the behavioral healthcare system within 30 days of the event. Taking these findings into consideration, it may be worth identifying the types of BH services received within 30–60 days prior to the event. Furthermore, over 70% of suicide and suicide attempt cases had personal problems within the previous year. The most frequent were relationship and work-related problems, which are consistent with reports in prior studies.[1] A preliminary assessement conducted to examine if BH services were sought to manage and cope with these psychosocial circumstances could determine if Soldiers are being matched appropriately to specialized BH services.

During the initial appointment at BH clinics, Soldiers typically complete a battery of screening instruments measuring an array of social and BH outcomes including suicidal behavior. These data, housed in the Behavioral Health Data Portal can provide case-specific contextual information. Embedded Behavioral Health continues to be a vital initiative in tackling barriers to accessing and reducing stigma associated with seeking BH care. Moreover, this would help to ensure a continuum of care extending beyond the healthcare system to community-based programs such as support groups and Chaplain services.

Twenty-one percent of suicide, 10% of attempt, and 11% of ideation cases had ever been diagnosed with TBI during their military career. Fortunately, strides are being made to increase awareness of TBI and its health implications. In addition to creating mandatory TBI training[2], the Army recently funded the development of a device which will assess TBI on the battlefield[3] in an effort to promote early detection and diagnosis. Twelve percent of suicidal behavior cases received chronic pain diagnoses. Chronic pain is a “complex experience affecting thoughts, moods, and behaviors and can lead to isolation, immobility, and drug dependence.”[4] Given the link between these medical indicators and suicidal behaviors, the Army Medicine’s Patient Centered Medical Home model[5] is likely to be beneficial as it provides integrated and coordinated comprehensive care.

7 CONCLUSION

Based on these findings, preventive measures may need to be developed for each suicidal behavior by targeting slightly different demographic groups. For instance, prevention strategies targeting suicide cases continue to be essential in a state-side garrison environment for males, 17–24-year-olds and enlisted Soldiers. However, Soldiers who are junior enlisted, female, or 17–24 years old remain a population to focus prevention efforts for suicide attempts and suicidal ideations. Behavioral healthcare continues to be an important factor when examining suicidal behavior in the Army population, and more rigorous studies must be conducted to evaluate this relationship and its impact on suicide prevention efforts in the Army. Primary care plays a key role in the screening, diagnosis, and treatment of TBI, pain, and substance use/misuse. Furthermore, coordinating a continuum of care so Soldiers are referred to the most appropriate services proves to be crucial.

Public Health Report No. S.0049809.1, Surveillance of Suicidal Behavior, January through December 2017

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APPENDIX A

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Public Health Report No. S.0049809.1, Surveillance of Suicidal Behavior, January through December 2017

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APPENDIX B

METHODS

B-1 POPULATION AND DEFINITIONS

This surveillance report includes estimated counts and proportions of suicides, suicide attempts, and suicidal ideations among U.S. Army Active Duty Soldiers aged 17–64 during calendar year 2017 using information stored in the ABHIDE. National Guard and Reserve Soldiers were excluded because population data for these Soldiers were not separated by activation status. As a result, rates that included only activated National Guard and Reserve Soldiers could not be generated. This report: (1) describes the population of Soldiers who experienced suicidal behavior in 2017, (2) calculates crude stratified rates, and (3) tests for trends over time. Suicide was defined as "self-inflicted death with evidence (either explicit or implicit) of intent to die.."[6] Suicide attempt was defined as "a self-inflicted, potentially injurious behavior with a non-fatal outcome for which there is evidence (either explicit or implicit) of intent to die.."[6] Suicidal ideation was defined as "any self-reported thoughts of engaging in suicide-related behaviors.."[6]

B-2 DATA SOURCES

The ABHIDE is a comprehensive database containing information on Soldiers who exhibited a suicidal behavior while serving in the U.S. Army.[7] The ABHIDE includes data from multiple data sources: Armed Forces Medical Examiner System (AFMES), Defense Manpower Data Center (DMDC), Military Health System Data Repository (MDR), DoDSER, Defense Casualty Information Processing System (DCIPS), Drug and Alcohol Management Information System (DAMIS), and Periodic Health Assessment (PHA). See Appendix C, Figure C-2 for a complete list of data sources included in the ABHIDE.

AFMES provides the Department of Defense (DOD) and other Federal agencies with comprehensive forensic investigative services including medical mortality surveillance and forensic pathology, and as a result, this was the primary source for identifying suicide cases.[8] The DoDSER system is the principal suicide surveillance tool used to collect and report the contextual factors present among Service members who engaged in suicide-related behavior[6] and was primarily used to identify suicide attempt and suicidal ideation cases. DMDC is a data repository that receives and maintains demographic, military, and deployment information on all military personnel, essentially creating an archive of information throughout a Soldier's military career.[9] MDR is the centralized data repository that captures and archives health care data worldwide;[10] this database was used to extract medical encounters related to BH, chronic pain, and TBIs. DCIPS is a system that interfaces with DMDC by retrieving personnel data and provides casualty statistics[11] serving as a supplemental source for information pertaining to the person and suicide. DAMIS is the Army's historical repository of all ASAP-related information,[12] housing data on positive drug test, and screenings for and referrals to ASAP. The PHA is a preventive screening tool designed to improve the reporting and visibility of Individual Medical Readiness and is required for all Soldiers. These data were used to identify Soldiers who screened positive for alcohol-use disorder.

Public Health Report No. S.0049809.1, Surveillance of Suicidal Behavior, January through December 2017

B-3 METRICS

Suicidal Behavior:
Suicide cases (including confirmed and pending cases) and annual population data were extracted from AFMES. DoDSERs for suicide cases are completed by BH professionals within 60 days of AFMES confirmation. Pending cases are those that are under investigation. Suicide attempt and suicidal ideation cases were identified by DoDSERs, which are completed only for cases serious enough to warrant hospitalization or evacuation. DoDSERs for suicide attempt and ideation cases are completed by BH professionals within 30 days of the event. Suicidal ideation cases were also identified by isolating inpatient medical encounters with ICD-9 ('V6284') or ICD-10 code ('R45851') in any diagnosis positions (Dx1–Dx8) using MDR. The Army's DoDSER Program Manager enters unreported ideation cases from MDR into the DoDSER system. Information on personal and legal/administrative history and other variables obtained from the DoDSER is not available for pending/probable cases under investigation.

Personal and Event Characteristics:
Demographic (i.e., sex, age, race, marital status) and *military* (i.e., rank and deployments) characteristics were obtained from the following sources in this order (most to least complete): (1) DMDC, (2) AFMES and/or (3) DoDSERs. Each variable was categorized accordingly: sex (i.e., Male and Female), age (i.e., 17–24, 25–34, 35–64), race-ethnicity (i.e., White, Black, Hispanic, Asian/Pacific Islander, and American Indian), marital status (i.e., Single, Married, Divorced, and Other), rank (i.e., E1–E4, E5–E9, W1–W5, O1–O3, O4–O9), and deployed (i.e., yes/no). The race-ethnicity category "American Indian" included Alaska Natives and Native Americans. The "Other" category for marital status included widowed and legally separated. Deployments were defined as lifetime deployments in support of OEF, OIF, and OND while serving in any military branch. Deployments in support of earlier conflicts or other operations were not available.

Event characteristics included location (i.e., USA, In Theater, Other, and Unknown), method of event (i.e., Gunshot wound, Hanging/asphyxiation, Drug/alcohol overdose, Cutting, Other, and Unknown), substance involvement (i.e., drugs or alcohol), and communication prior to event. Communication prior to the event was defined as communicating potential for self-harm verbally, through writing, or text message to a supervior, Chaplain, mental health staff, friend, or spouse. Location and method of suicide and suicide attempts were obtained from DCIPS and DoDSER, respectively. All other event characteristics were obtained from DoDSER. Event characteristics were only collected for suicides and suicide attempts.

Personal and Legal/Administrative History:
Major life events and stressors of interest that occurred within one year of the suicidal behavior event and reported on DoDSERs were grouped into the following major nonmutually exclusive themes: Legal/administrative history and Personal history. *Legal/administrative history* included Article 15, civil legal problems, administrative separation, absent without leave, nonselection, court martial, and medical board. Administrative separation is based on misconduct or inability to meet standard of duty. Soldiers who were not selected for advanced schooling, promotion, or command were placed in the "nonselection" category. Soldiers on medical board were being evaluated to determine fitness for continued duty.

Personal history encompassed relationship problems, work stress, physical health problems, victim or perpetrator of abuse, financial stress, and death, suicide and/or health problems of spouse, family member, or friend. Indication of work problems included workplace hazing, job problems, poor performance, and coworker conflicts. Abuse included emotional, physical, or sexual harassment or assault. Lifetime histories for being a victim of abuse or death of a family member or friend were collected due to the potential negative impact on Soldiers' quality of life. Information on the use of Family Advocacy Program (FAP) services was also collected. FAP is a program dedicated to the prevention, reporting, investigation, and treatment of spousal and child abuse.[13] Personal and legal/administrative issues were only collected for suicides and suicide attempts.

Behavioral Health and Other Health Conditions:
Medical encounters and diagnoses for BH conditions, TBI, and chronic pain were based on medical claims that occurred during a Soldier's time in service and obtained from the MDR. Inpatient and outpatient medical encounters with an ICD-9/10 code of interest in any diagnosis position Dx1–Dx8 or Dx1–Dx4, respectively, were isolated. See Appendix C, Table C-11 for the list of health conditions of interest and respective ICD-9/10 code(s). A diagnoses was defined as an inpatient encounter with an ICD-9/10 code in any diagnosis position Dx1–Dx8 or an outpatient encounter with a ICD-10 code in the first diagnosis position (Dx1). A diagnosis was also defined as two outpatient encounters with ICD-9/10 codes for the same condition in the second through fourth diagnosis positions (Dx2–Dx4) dated within one year but not on the same day. These definitions were based on the Healthcare Effectiveness Data and Information Set guidelines from the National Committee for Quality Assurance for major depressive disorders and was applied to all BH conditions.[14]

Substance-related Screening, Use and Treatment:
Substance-related indicators included drug testing, alcohol misuse, and the ASAP. Information on whether a Soldier had a positive drug test, the type of drug found (e.g., cocaine, marijuana, or heroin), and/or referral to ASAP were extracted from DAMIS. Soldiers with hazardous drinking behaviors were identified using the AUDIT-C administered on the PHA dated within 15 months of the suicidal behavior. The AUDIT-C is a self-report screening tool that evaluates hazardous drinking behaviors or alcohol-use disorders using three questions: (1) how often alcohol is consumed, (2) number of drinks consumed on each occasion, and (3) how often six or more drinks are consumed per occassion. The responses are on a 5-point Likert scale (i.e., a=0, e=4) with scores ranging from 0–12. Men with scores over 5 and women with scores over 4 were considered positive for hazardous drinking behaviors or unhealthy drinking behavior.

B-4 DATA ANALYSIS

Descriptive statistics (e.g., counts, proportions, and means) were calculated for each variable by suicidal behavior in 2016 and 2017. Annual crude rates were calculated from 2008–2017 by dividing the number of Soldiers with suicidal behavior (i.e., suicides, suicide attempts, or suicidal ideations) by the total population averaged across 12 months for U.S. Army Active Duty Soldiers aged 17–59 then multiplying by 100,000. Stratified crude rates were calculated by sex, rank, and age by dividing the number of events by the total population of Soldiers within the respective category. The most serious and/or recent event was counted for Soldiers who had

more than one suicidal event. Rates account for differences in the total number of Soldiers across years and/or categories, which allows for more appropriate comparisons. Linear regression was used to assess trends in suicidal behavior rates over a 10-year span (2008–2017). Beta estimates and p values, and crude rates (number of events/100,000 Soldiers) and 95% confidence intervals were reported. Positive or negative beta estimates indicate increasing or decreasing trend, respectively. Beta estimates with p values <0.05 were statistically significant.

Direct standardization was applied to compare suicide rates between the U.S. Army and U.S. general populations—controlling for the higher prevalence of young and male Soldiers in the U.S. Army. Suicide rates from 2001–2016 were adjusted for age and sex using the 2015 U.S. Army distribution as the standard population. This population was used as the standard population because it reflects the drawdown of U.S. Army Active Duty Soldiers and is the year in which all military occupations were opened to women. The adjusted rates are rates that may have existed if both populations had the same age and gender distribution. Adjusted suicide rates for the U.S. general population are based on data from the Centers for Disease Control and Prevention.[15,16] All data management and analytical procedures were performed using SAS® 9.4 and Microsoft® Excel®.

B-5 LIMITATIONS

The BH provider who completes the DoDSER may not be familiar with the case resulting in missing fields/entries. To increase completeness, medical providers who were familiar with the suicide case or Soldiers who had a suicide attempt and/or ideation were interviewed to ascertain relevant information. Suicide attempt and suicidal ideation cases were only captured if the Soldier was hospitalized or evacuated, which may result in underestimated counts. This report only included Active Duty Soldiers; however, there will be a subsequent report that describes the characteristics of U.S. Army National Guard and Reserve Soldiers who engaged in suicidal behavior during calendar year 2017. Although the most recent and/or serious event was captured for each Soldier, information on the history of suicidal events was also ascertained and reported. However, estimating and reporting the frequency of prior suicidal events for each Soldier may offer futher insight into what opportunities exist to intervene before a subsequent and/or more serious suicidal event occurs. Population data were not available by race/ethnicity, so race-specific rates were not calculated. Race stratified rates will be calculated and reported in the next report using an alternate data source.

APPENDIX C

SUPPLEMENTAL TABLES AND FIGURES

Table C-1. Crude Rates for Each Suicidal Behavior by Year,[a–c] among U.S. Army Active Duty Soldiers, 2008–2017 (supplemental data for Figure 1)

	Suicide Cases			Suicide Attempt Cases			Suicidal Ideation Cases	
	Rate	95% CI		Rate	95% CI		Rate	95% CI
Year of Death								
2008	21.7	17.8 – 25.7		88.6	80.6 – 96.5		135.9	126.0 – 145.8
2009	26.7	22.4 – 31.0		75.3	68.0 – 82.5		159.1	148.5 – 169.6
2010	25.4	21.2 – 29.5		62.1	55.6 – 68.6		126.5	117.2 – 135.8
2011	25.0	20.9 – 29.1		69.6	62.7 – 76.4		119.4	110.4 – 128.4
2012	29.9	25.3 – 34.4		55.9	49.7 – 62.2		118.8	109.7 – 127.9
2013	22.7	18.6 – 26.7		82.4	74.7 – 90.1		151.7	141.3 – 162.2
2014	24.6	20.3 – 28.9		90.5	82.3 – 98.8		180.5	168.8 – 192.1
2015	24.4	20.1 – 28.8		84.9	76.7 – 93.0		197.0	184.6 – 209.4
2016	27.4	22.7 – 32.1		110.3	100.9 – 119.8		479.4	459.5 – 498.9
2017	24.7	20.2 – 29.2		97.7	88.8 – 106.7		724.4	700.0 – 748.7

Notes: [a]Rates include only Army Active cases aged 17–59 with identifiable demographic factors. [b]Army Active population counts used to calculate rates were provided by AFMES. [c]Unstable rates (n <20) were not calculated for female Soldiers.

Table C-2. Crude Sex-specific Suicide Rates,[a–c] among U.S. Army Active Duty Soldiers, 2008–2017 (supplemental data for Figure 2)

	Overall			Male			Female	
	Rate	95% CI		Rate	95% CI		Rate	95% CI
Year of Death								
2008	21.7	17.8 – 25.7		23.6	19.2 – 28.0		—	—
2009	26.7	22.4 – 31.0		30.0	25.1 – 34.9		—	—
2010	25.4	21.2 – 29.5		27.9	23.2 – 32.6		—	—
2011	25.0	20.9 – 29.1		27.1	22.5 – 31.7		—	—
2012	29.9	25.3 – 34.4		32.0	27.0 – 37.1		—	—
2013	22.7	18.6 – 26.7		25.4	20.8 – 30.0		—	—
2014	24.6	20.3 – 28.9		26.7	21.9 – 31.5		—	—
2015	24.4	20.1 – 28.8		26.8	21.9 – 31.7		—	—
2016	27.4	22.7 – 32.1		29.6	24.3 – 34.9		—	—
2017	24.7	20.2 – 29.2		27.5	22.4 – 32.6		—	—

Notes: [a]Rates include only Army Active cases aged 17–59 with identifiable demographic factors. [b]Army Active population counts used to calculate rates were provided by AFMES. [c]Unstable rates (n <20) were not calculated for female Soldiers.

Table C-3. Crude Age-Specific Suicide Rates[a–c] among U.S. Army Active Duty Soldiers, 2008–2017 (supplemental data for Figure 3)

	17 – 24 yrs old			25 – 34 yrs old			35 – 59 yrs old	
	Rate	95% CI		Rate	95% CI		Rate	95% CI
Year of Death								
2008	27.6	20.4 – 34.8		15.6	10.2 – 21.0		22.0	13.7 – 30.3
2009	32.1	24.3 – 39.8		29.3	22.2 – 36.5		—	—
2010	34.5	26.5 – 42.6		24.4	18.0 – 30.8		—	—
2011	26.3	19.1 – 33.4		26.8	20.2 – 33.4		20.1	12.5 – 27.7
2012	28.9	21.2 – 36.6		34.2	26.6 – 41.7		23.9	15.6 – 32.1
2013	26.6	19.2 – 34.1		23.3	16.9 – 29.7		16.0	9.2 – 22.9
2014	21.8	15.0 – 28.7		28.6	21.3 – 35.9		21.2	13.2 – 29.2
2015	20.6	13.8 – 27.3		30.4	22.7 – 38.2		20.5	12.4 – 28.5
2016	30.5	22.3 – 38.7		28.7	21.0 – 36.5		20.5	12.3 – 28.8
2017	30.7	22.6 – 38.9		20.7	14.0 – 27.3		21.5	12.9 – 30.1

Notes: [a]Rates include only Army Active cases aged 17–59 with identifiable demographic factors. [b]Army Active population counts used to calculate rates were provided by AFMES. [c]Unstable rates (n <20) were not calculated for Soldiers 35–59 years old.

Table C-4. Crude Rank-specific Suicide Rates[a–c] among U.S. Army Active Duty Soldiers, 2008–2017 (supplemental data for Figure 4)

	E1 – E4			E5 – E9	
	Rate	95% CI		Rate	95% CI
Year of Death					
2008	29.6	22.7 – 36.5		16.7	11.1 – 22.3
2009	34.9	27.5 – 42.2		22.2	15.8 – 28.6
2010	34.0	26.9 – 41.2		23.6	17.0 – 30.2
2011	29.8	23.2 – 36.4		26.8	19.7 – 33.9
2012	32.9	25.7 – 40.1		31.9	24.1 – 39.6
2013	28.0	21.2 – 34.9		22.1	15.5 – 28.6
2014	25.6	18.9 – 32.3		29.2	21.5 – 36.8
2015	21.4	15.1 – 27.6		32.5	24.2 – 40.8
2016	29.3	22.0 – 36.7		27.6	19.7 – 35.5
2017	29.4	22.0 – 36.8		29.9	21.6 – 38.2

Notes: [a]Sample include Army Active cases aged 17–59 with identifiable demographic factors. [b]Army Active population counts provided by AFMES. [c]Unstable rates (n < 20) were not calculated for Officers or Warrant Officers.

Table C-5. Crude Sex-specific Suicide Attempt Rates[a,b] among U.S. Army Active Duty Soldiers, 2008–2017 (supplemental data for Figure 5)

	Overall			Male			Female	
	Rate	95% CI		Rate	95% CI		Rate	95% CI
Year of Attempt								
2008	88.6	80.6 – 96.5		78.4	70.3 – 86.5		153.3	124.7 – 181.8
2009	75.3	68.0 – 82.5		64.1	56.9 – 71.3		146.8	119.2 – 174.3
2010	62.1	55.6 – 68.6		57.0	50.3 – 63.7		94.7	72.9 – 116.6
2011	69.6	62.7 – 76.4		60.9	54.0 – 67.8		124.8	99.9 – 149.8
2012	55.9	49.7 – 62.2		51.9	45.5 – 58.4		81.7	61.2 – 102.2
2013	82.4	74.7 – 90.1		73.7	65.9 – 81.5		137.7	110.7 – 164.6
2014	90.5	82.3 – 98.8		81.5	73.1 – 90.0		146.3	118.2 – 174.4
2015	84.9	76.7 – 93.0		71.6	63.6 – 79.7		164.9	134.8 – 195.1
2016	110.3	100.9 – 119.8		95.1	85.6 – 104.6		199.3	166.1 – 232.6
2017	97.7	88.8 – 106.7		86.0	76.9 – 95.1		164.9	134.8 – 195.0

Notes: [a]Rates include only Army Active cases aged 17–59 with identifiable demographic factors. [b]Army Active population counts used to calculate rates were provided by AFMES.

Table C-6. Crude Age-specific Suicide Attempt Rates[a,b] among U.S. Army Active Duty Soldiers, 2008–2017 (supplemental data for Figure 6)

	17 – 24 yrs old			25 – 34 yrs old			35 – 59 yrs old	
	Rate	95% CI		Rate	95% CI		Rate	95% CI
Year of Attempt								
2008	154.5	137.6 – 171.5		58.0	47.6 – 68.5		28.5	19.1 – 38.0
2009	119.1	104.2 – 134.0		63.7	53.1 – 74.3		24.3	15.8 – 32.9
2010	92.3	79.1 – 105.5		59.3	49.3 – 69.3		20.5	12.7 – 28.2
2011	102.0	88.0 – 116.1		61.2	51.2 – 71.2		36.5	26.3 – 46.7
2012	84.0	70.8 – 97.1		52.3	43.0 – 61.6		23.1	15.0 – 31.2
2013	122.3	106.3 – 138.3		72.6	61.3 – 83.9		42.8	31.6 – 54.0
2014	136.5	119.3 – 153.6		81.4	69.1 – 93.7		40.8	29.7 – 51.9
2015	143.1	124.5 – 159.8		71.7	59.8 – 83.6		23.7	15.1 – 32.4
2016	191.0	170.5 – 211.6		81.9	68.8 – 95.0		35.1	24.4 – 45.8
2017	167.6	148.7 – 186.6		66.5	54.5 – 78.4		32.2	21.7 – 42.8

Notes: [a]Rates include only Army Active cases aged 17–59 with identifiable demographic factors. [b]Army Active population counts used to calculate rates were provided by AFMES.

Table C-7. Crude Rank-specific Suicide Attempt Rates[a–c] among U.S. Army Active Duty Soldiers, 2008–2017 (supplemental data for Figure 7)

	E1 – E4		E5 – E9		O1 – O9		W1 – W5	
	Rate	95% CI	Rate	95% CI	Rate	95% CI	Rate	95% CI
Year of Attempt								
2008	158.9	143.0 – 174.9	40.3	31.6 – 49.0	—	—	—	—
2009	125.8	111.9 – 139.7	43.9	34.9 – 52.9	—	—	—	—
2010	98.7	86.5 – 110.8	38.5	30.1 – 47.0	—	—	—	—
2011	110.8	98.1 – 123.6	46.3	37.0 – 55.6	—	—	—	—
2012	88.6	76.8 – 100.3	40.2	31.5 – 48.9	—	—	—	—
2013	128.1	113.6 – 142.7	61.7	50.8 – 72.6	—	—	—	—
2014	141.3	125.5 – 157.1	66.7	55.1 – 78.2	24.4	13.7– 35.1	—	—
2015	144.9	129.5 – 162.2	58.4	47.3 – 69.5	—	—	—	—
2016	193.2	176.3 – 212.1	60.5	48.8 – 72.2	—	—	—	—
2017	165.8	148.3 – 183.4	61.1	49.2 – 72.9	—	—	—	—

Notes: [a]Rates include only Army Active cases aged 17–59 with identifiable demographic factors. [b]Population counts used to calculate rates were provided by AFMES. [c]Unstable rates (n < 20) were not calculated for Officers or Warrant Officers.

Table C-8. Crude Sex-specific Suicidal Ideation Rates[a,b] among U.S. Army Active Duty Soldiers, 2008–2017 (supplemental data for Figure 8)

	Overall			Male			Female	
	Rate	95% CI		Rate	95% CI		Rate	95% CI
Year of Ideation								
2008	135.9	126.0 – 145.8		129.1	118.9 – 139.7		179.5	148.6 – 210.3
2009	159.1	148.5 – 169.6		148.0	137.1 – 158.9		230.3	195.7 – 264.8
2010	126.5	117.2 – 135.8		119.3	109.6 – 129.0		172.4	142.8 – 201.9
2011	119.4	110.4 – 128.4		112.1	102.7 – 121.4		166.5	137.6 – 195.3
2012	118.8	109.7 – 127.9		110.7	101.3 – 120.2		170.0	140.5 – 199.6
2013	151.7	141.3 – 162.2		142.2	131.3 – 153.1		212.0	178.5 – 245.5
2014	180.5	168.8 – 192.1		164.4	152.5 – 176.4		280.0	241.1 – 318.9
2015	197.0	184.6 – 209.4		182.6	169.7 – 195.5		284.0	244.4 – 323.6
2016	479.4	459.5 – 498.9		438.5	418.1 – 458.8		717.9	654.8 – 781.0
2017	724.4	700.0 – 748.7		650.1	625.1 – 675.1		1150.0	1070.4 – 1229.6

Notes: [a]Rates include only Army Active cases aged 17–59 with identifiable demographic factors. [b]Army Active population counts used to calculate rates were provided by AFMES.

Table C-9. Crude Age-specific Suicidal Ideation Rates[a,b] among U.S. Army Active Duty Soldiers, 2008–2017 (supplemental data for Figure 9)

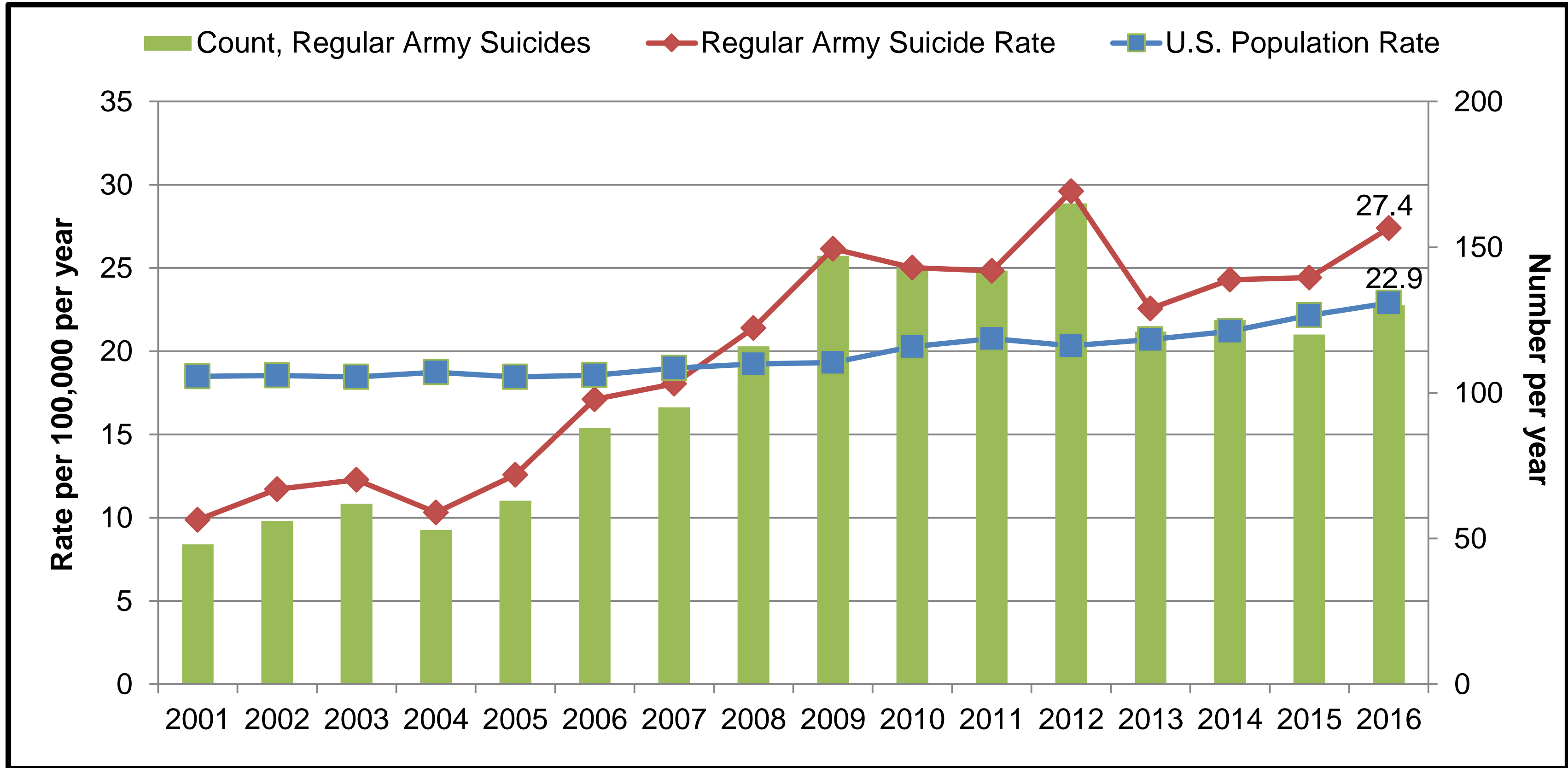
	17–24 yrs old			25–34 yrs old			35–59 yrs old	
	Rate	95% CI		Rate	95% CI		Rate	95% CI
Year of Ideation								
2008	218.4	198.3 – 238.6		103.4	89.5 – 117.3		50.5	38.0 – 63.1
2009	269.2	246.8 – 291.6		116.5	102.2 – 130.8		54.1	41.3 – 66.9
2010	192.5	173.4 – 211.6		105.1	91.8 – 118.4		62.1	48.7 – 75.6
2011	181.9	163.1 – 200.6		106.2	93.0 – 119.4		50.6	38.6 – 62.7
2012	188.3	168.6 – 208.0		93.0	80.5 – 105.4		66.3	52.6 – 80.1
2013	228.3	206.5 – 250.2		128.8	113.7 – 143.8		82.5	66.9 – 98.0
2014	256.1	232.7 – 279.6		157.0	139.9 – 174.1		112.2	93.8 – 130.6
2015	293.4	268.1 – 318.8		161.4	143.5 – 179.3		115.4	96.3 – 134.4
2016	704.3	664.8 – 743.8		402.4	373.5 – 431.4		265.4	235.9 – 294.9
2017	1169.5	1119.4 – 1219.6		533.6	499.8 – 567.4		316.9	283.9 – 349.9

Notes: [a]Rates include only Army Active cases aged 17–59 with identifiable demographic factors. [b]Army Active population counts used to calculate rates were provided by AFMES.

Table C-10. Crude Rank-specific Suicidal Ideation Rates[a–c] among U.S. Army Active Duty Soldiers, 2008–2017 (supplemental data for Figure 10)

	E1 – E4			E5 – E9			O1 – O9			W1 – W5	
	Rate	95% CI		Rate	95% CI		Rate	95% CI		Rate	95% CI
Year of Ideation											
2008	246.5	226.7 – 266.4		57.5	47.1 – 67.9		—	—		—	—
2009	288.4	267.3 – 309.5		65.1	54.1 – 76.1		—	—		—	—
2010	212.4	194.6 – 230.2		62.6	51.8 – 73.4		33.5	20.6 – 46.3		—	—
2011	198.0	180.9 – 215.0		70.7	59.2 – 82.2		—	—		—	—
2012	196.2	178.7 – 213.7		70.2	58.7 – 81.7		24.4	13.7 – 35.1		—	—
2013	240.3	220.3 – 260.3		108.3	93.9 – 122.8		32.7	20.4 – 45.0		—	—
2014	277.1	255.0 – 299.2		140.1	123.3 – 156.8		51.2	35.7 – 66.7		—	—
2015	306.0	282.3 – 329.6		150.9	133.0 – 168.7		51.4	35.7 – 67.1		—	—
2016	739.5	702.6 – 776.5		373.2	344.2 – 402.2		116.0	92.0 – 140.0		—	—
2017	1215.4	1167.9 – 1262.8		450.7	418.5 – 482.9		134.9	108.9 – 161.0		173.7	105.6 – 241.8

Notes: [a]Rates include only Army Active cases aged 17–59 with identifiable demographic factors. [b]Army Active population counts used to calculate rates were provided by AFMES. [c]Unstable rates (n < 20) were not calculated for Officers and Warrant Officers.



Notes: [a]Rates have been direct adjusted by age and gender, using the 2015 US Army distribution as a standard population. [b]US Army suicide rates and counts include Active Duty Army Soldiers, aged 17-59.

Figure C-1. Counts and Rates of Suicide by Year, 2001–2016

Table C-11. Categorizing Behavioral Health, Chronic Pain and Traumatic Brain Injury Medical Encounters and Diagnoses

Broad Category	Diagnosis Category	ICD-9 DX, V-Codes, E-Codes	ICD-10 DX, Z-Codes
Behavioral Health Conditions			
Organic Conditions		290, 293, 294, 310	F01-F04
Substance use	Alcohol	291, 303, 3050	F10
	Drugs	292, 304, 3052-3059	F11-F19
Personality Disorder		301	F21, F60
Psychosis	Schizophrenia	2950-2953, 2955-2959	F20
	Schizophreniform	2954	
	Delusional or Shared	‘297 ‘, 2971, 2973	F22, F24
	Paranoia	2970, 2972, 2978, 2979, 2983, 2984	F22, F23
	Brief Psychotic Disorder	2988	F23
	Psychosis NOS	2989	F29
	Other Psychoses	2908, 2909,'298 ', 2980, 2981, 2982	F28
Mood Disorders	Bipolar	2960, 2964-2968	F30, F31, F340
	Major Depression	2962, 2963	F32 OR F33
	Dysthymia	3004	F341
	Depression NOS	311, 29699	F348 OR F349
	Other Mood	'296 ',2961,2969, V790	F39
Anxiety	Social Phobia	30023	F40
	Phobias	30020, 30022, 30029	
	Anxiety NOS	'300 ', '3000 ', 30000	F41
	Other Anxiety	30009, 30010	
	Panic	30001, 30021	
	GAD	30002	
	OCD	3003	F42
Acute Stress Reaction		308	F430
PTSD		30981	F431
Adjustment Disorder		All 309 (except 309.81)	F432, F438, F439
Dissociative		30012-30015, 3006	F44, F481
Conversion		30011	F44
Somatoform		3007, 3008, 3078	F45
Eating Disorder		3071, 3075	F50
Factitious		30016, 30019	F681
Attention Deficit Disorder		314	F90
Conduct/Emotional Disorder		312, 313	F91
Unspecified Mental Disorder		3009	-

Broad Category	Diagnosis Category	ICD-9 DX, V-Codes, E-Codes	ICD-10 DX, Z-Codes
Psych Factors, Physical Condition		306, 316	-
Other BH conditions		299, 302, 315, 317-319, 3070, 3072, 3073, 3076, 3077	F52 , F66 , F70 , F804 , F808 , F84 , F95, F984, F985, F64-F659, F800-F802, F81-F82, F88-F89, F980-F981, F4321, F1010
BH Screening		-	Z046 , Z0471 , Z0472 , Z134
Partner Relationship Problems		V6100-V6104, V6110	Z630
Family Circumstances Problems		V612, V618, V619	Z62, Z635-Z639
Maltreatment Problems		99580-99585, V6111, V6112, V6121, V6122, V6283	T74, T76, Z69-Z6982
Life Circumstance Problems		V620-V625, V628-V629	Z72810, Z72811, Z73-Z736, Z55-Z559, Z56-Z569, Z60-Z609, Z65-Z659
Mental or Behavioral Problems, Substance Abuse Counseling		'V40 ', V402, V403, V409, V6542	Z714-Z7142, Z715-Z7152
Personal Trauma		9955, V154, V6121	Z914, Z9149 , Z91410, Z6281, Z69010, Z69020, Z6911, Z6981
Suicidal Ideation		V6284	R45851
Suicide Attempt/ Self-harm		E95-E959, E98-E9890	X71-X83, X838XX, T3992X, T1491, T1491X, T1491XA, Z915, T360X2 -T375X2, T378X2, T379X2-T387X2, T38802, T38812, T38892, T38902, T38992, T39012, T39092, T391X2, T392X2, T39312, T39392, T394X2, T398X2, T3992, T400X2-T405X2, T40602, T40692, T407X2, T408X2, T40902, T40992, T410X2, T411X2, T41202, T41292, T413X2, T4142, T415X2, T420X2-T426X2, T4272, T4272X, T428X2, T43012, T43022, T431X2, T43202, T43212, T43222, T43292, T433X2, T434X2, T43502, T43592, T43602, T43612, T43622, T43632, T43692, T438X2, T4392, T440X2-T448X2, T44902, T44992, T450X2-T454X2, T45512, T45522, T45602, T45612, T45622, T45692, T457X2, T458X2, T4592, T460X2,-T468X2, T46902, T46992, T470X2-T478X2, T4792, T480X2, T481X2, T48202, T48992, T483X2- T486X2, T48902, T48992, T490X2- T498X2, T4992, T500X2-T508X2, T50902, T50992, T50A12, T50A22, T50, T50A92, T50B12, T50B92, T50Z14, T50Z92, T510X2-T513X2, T518X2, T5192, T5192X, T520X2-T524X2, T528X2, T5292, T530X2-T537X2, T5392, T540X2-T543X2, T5492, T550X2, T551X2, T560X2-T568X2, T56892, T5692, T570X2-T573X2,

Broad Category	Diagnosis Category	ICD-9 DX, V-Codes, E-Codes	ICD-10 DX, Z-Codes
			T578X2, T5792, T5802, T5802X, T5812, T582X2, T588X2, T5892, T590X2-T597X2, T59812, T59892, T5992, T600X2-T604X2, T608X2, T6092, T6102, T6112, T61772, T61782, T618X2, T6192, T620X2-T622X2, T628X2, T6292, T63002, T63012, T63022, T63032, T63042, T63062, T63072, T63082, T63092, T63112, T63122, T63192, T632X2, T63302, T63312, T63322, T63332, T63392, T63412, T63422, T63432, T63442, T63452, T63462, T63482, T63512, T63592, T63612, T63622, T63632, T63692, T63712, T63792, T63812, T63822, T63832, T63892, T6392, T6402, T6482, T650X2, T651X2, T65212, T65222, T65292, T653X2-T656X2, T65812, T65822, T65832, T65892, T6592, T71112, T71122, T71132, T71152, T71162, T71192, T71222, T71232
Sleep Disorders		29182, 29285, 3074-30748, 327-3278, 7805-78056, 78058, V694, 327-32780, 7805-78056, 78058, V694	F51, G47, Z72820
Traumatic Brain Injury		3102, 800–801.99, 803–804.99, and 850–854.19, 95901, 9501-9503, 9070	F0781, S0402-S0404, S060-S066, S068-S069, S020-S021, S028-S029, S071, Z87820, DOD0102-DOD0105
Chronic Pain		3078, 3372, 3380, 3381, 3382-3384, 7240-7245, 7295, 7231, 7840, 7865, 33821, 33829, 38872, 78096	G8921, G8922, G8928, G8929, G893, G894
V-codes and Z-codes are not diagnostic codes, but are used for coding encounters.			

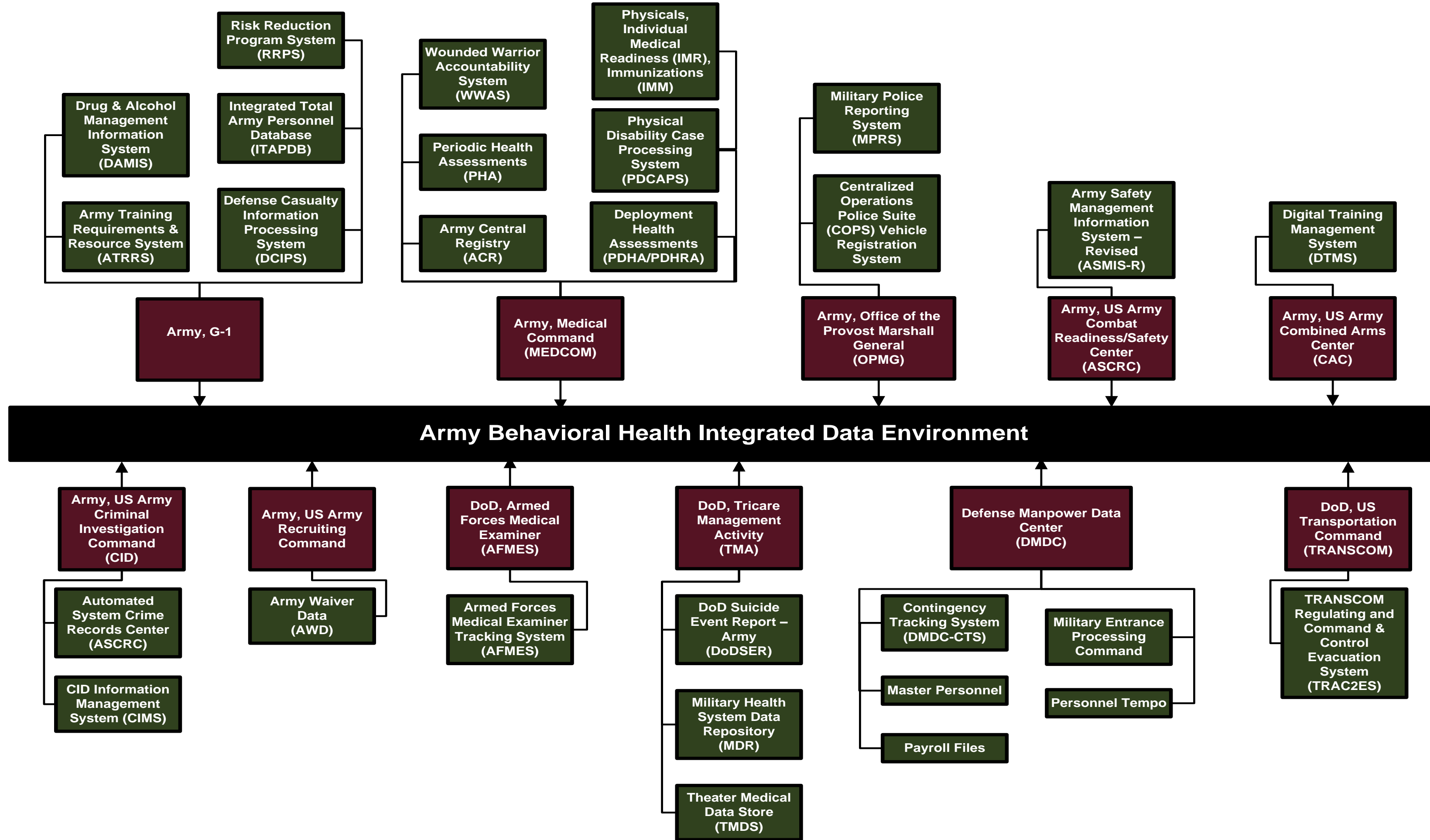


Figure C-2. Administrative Data Sources in the Army Behavioral Health Integrated Data Environment

GLOSSARY

ABHIDE
Army Behavioral Health Integrated Data Environment

AFMES
Armed Forces Medical Examiner System

APHC
U.S. Army Public Health Center

AR
Army Regulation

ASAP
Army Substance Abuse Program

AUDIT-C
Alcohol Use Disorders Identification Test-Consumption

BH
behavioral health

BHDP
Behavioral Health Data Portal

DAMIS
Drug and Alcohol Management Information System

DCIPS
Defense Casualty Information Processing System

DMDC
Defense Manpower Data Center

DOD
Department of Defense

DoDSER
Department of Defense Suicide Event Report

E1–E9
Enlisted rank

FAP
Family Advocacy Program

ICD-9
International Classification of Diseases, Ninth Revision, Clinical Modification

ICD-10
International Classification of Diseases, 10th Revision, Clinical Modification

MPR
Military Health System Data Repository

O1–O9
Officer rank

OEF
Operation Enduring Freedom

OIF
Operation Iraqi Freedom

OND
Operation New Dawn

PHA
Periodic Health Assessment

PTSD
Post-traumatic Stress Disorder

TBI
traumatic brain injury

W1–W5
Warrant Officer rank