

# Health Care Experiences Prior to Suicide and Self-inflicted Injury, Active Component, U.S. Armed Forces, 2001-2010

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Suicide is a leading cause of deaths of U.S. service members. Medical care providers may play a role in suicide prevention. We summarized the outpatient experiences of service members prior to suicide or self-inflicted injury and compared them with service members without suicidal behavior. During 2001-2010, 45 percent of individuals who completed suicide and 75 percent of those who injured themselves had outpatient encounters within 30 days prior to suicide/self-harm. Primary care was the most frequently visited clinical service prior to suicide/self-harm. As compared to their counterparts, service members with suicidal behavior had especially excessive outpatient visit rates within, but not prior to, 60 days of their deaths/injuries. The finding suggests that there may be one or more “triggering” events that lead to care-seeking. These results may help identify individuals that should be screened for suicide risk.

Suicide is the third leading cause of deaths of U.S. service members after traffic accidents and war.<sup>1</sup> Since the beginning of combat operations in Iraq and Afghanistan, the number of suicides among U.S. military members has increased. The estimated suicide rate among U.S. Army soldiers nearly doubled from 2004 to 2008 (10.8 to 20.2 per 100,000);<sup>2,3</sup> the rate is higher than the adjusted suicide rate among civilians.

In civilian studies, a significant proportion of individuals who died by suicide were seen in health care clinics in close proximity to their suicides; an estimated 45 percent of individuals with completed suicides had encounters with health care providers within one month prior to their deaths.<sup>4</sup> Gillmore and Chan highlight the potentially important roles that medical care providers may play in suicide prevention;<sup>5</sup> such interventions are enabled by increased awareness of suicide risk factors and knowledge of common demographics among individuals who die by suicide. In the same vein, Sudak et al. suggest that standardized curricula designed by suicide

experts and provided to resident physicians might reduce morbidity and mortality.<sup>6</sup>

Several studies among civilians have indicated that suicide decedents were more frequent users of medical care than age- and sex-matched controls. During the year prior to their deaths, suicide cases were more likely than controls to have contact with mental health specialists or emergency departments.<sup>7-9</sup> Powers et al. found that compared to controls, suicide decedents visited general practitioners more frequently during one year prior, but not one month prior to suicide.<sup>10</sup>

The numbers, natures, and timing of health care encounters among individuals who later die by suicide have not been examined in the U.S. military population. This report summarizes the outpatient experiences of service members prior to suicide or self-inflicted injury and compares them to those of service members without suicidal behavior. To this end, the report evaluates frequencies and rates of visits to outpatient clinics and the timing of these visits in relationship to eventual suicide or self-inflicted injury.

## METHODS

The surveillance period was January 2001 to December 2010. The surveillance population was comprised of all individuals who served in an active component of the Army, Navy, Air Force or Marine Corps any time during the surveillance period. Death and medical records maintained in the Defense Medical Surveillance System and the DoD Medical Mortality Registry were used to identify three retrospective cohorts. (For the remainder of this report, these cohorts are referred to as the “suicide/self-harm” cohorts.):

*Suicide cohort:* Service members who died by suicide were identified from death records maintained by the Office of the Armed Forces Medical Examiner.

*Self-inflicted injury cohort:* Service members who were affected by self-inflicted injuries were identified from a) records of hospitalizations and ambulatory visits with “external cause of injury” codes (E-codes) indicative of self-inflicted injury or poisoning (ICD-9-CM: E950-E958) in any diagnostic position; and b) records of injury-related hospitalizations with NATO Standard Agreement (STANAG) “general class of trauma” codes indicative of injuries that were “intentionally self-inflicted.” For each affected service member, only the first self-inflicted injury-specific encounter was used for analyses regardless of the number of such encounters during the surveillance period.

*Likely self-harm cohort:* Patrick and colleagues reported that the combination of injury/poisoning and mental disorder diagnoses on hospital discharge records was a strong indicator of “self-harm.”<sup>11</sup> In turn, for this analysis, the “likely self-harm” cohort was comprised of service members who were hospitalized for an injury or poisoning (with no indication of intentional self-harm) and had a mental disorder diagnosis (ICD-9-CM: 290-319) during the

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same hospitalization. Injury/poisoning-related hospitalizations caused by accidents (ICD-9-CM: E800-E848, E850-E869) or “adverse effects of drugs properly administered” (ICD-9-CM: E930-E949) were not considered likely self-harm-defining events.

For members of each suicide/self-harm cohort, all of their ambulatory visits (in U.S. military medical facilities and from purchased care providers) within two years prior to their cohort-defining events were grouped by the timing of the visits in relation to the events: 0-30 days, 31-60 days, 61-90 days, 91-180 days, 181-360 days, and 361-720 days preceding the events.

To detect patterns of outpatient care potentially related to suicide risk, the outpatient experiences of each suicide/self-harm cohort were compared against those of matched referent cohorts. For this purpose, referent cohort members were individually matched to suicide/self-harm cohort members on gender, age group (within 1 year), service branch, and length of service (within 6 months); in addition, referent cohort members had no record of suicidal behavior and were in service in the active component on the day of the cohort-defining event of their index cohort member.

Outcomes of interest during analyses were a) the rates of cohort members who received outpatient care from various clinical services (e.g., primary care) or medical specialty clinics (e.g., psychiatry) at various times prior to their cohort-defining events; and b) differences between each suicide/self-harm and its referent cohort regarding rates of ambulatory visits, by clinical service/medical specialty type, during various time intervals prior to their respective cohort-defining events. The clinical services/medical specialties of outpatient clinics in U.S. military medical facilities were documented with Medical Expense and Reporting System (MEPRS) codes. Because the natures of clinics in non-military facilities were not specified in available records, outpatient visits in non-military facilities were characterized as “non-military facility” visits. Only one outpatient visit per clinical service/medical specialty type per day was counted for each individual.

“Excess incidence” rates of outpatient visits by each suicide/self-harm cohort were estimated by subtracting the rates of visits – to each clinic type during each period of interest – in each referent cohort from the corresponding rates in the respective suicide/self-harm cohort. Relatively high or increasing “excess incidence” rates of outpatient visits to specific clinical services/medical specialty clinics, especially during periods just prior to suicide/self-harm events, were considered potential indicators of high or increasing suicide, self-inflicted injury, or self-harm risk.

## RESULTS

During 2001-2010, 1,939 service members completed suicide; 19,955 were diagnosed with self-inflicted injuries; and 3,463 were hospitalized for injuries/poisonings that were “likely self-harm” related (i.e., diagnoses of an injury/poisoning and mental disorder during the same hospitalization) (Table 1).

Compared to self-inflicted injury and likely self-harm cohort members, suicide victims were much more often males and older than 29 years. The ratio of completed suicides to self-inflicted injuries plus likely

self-harm cases sharply increased with increasing age. Approximately two-thirds of service members in each suicide/self-harm cohort were in the Army or Marine Corps (Table 1).

### Outpatient clinic visits prior to suicidal behavior among suicide/self-harm cohorts

Of those who died from suicide, 45 percent had an outpatient visit within 30 days prior to their deaths; in contrast, approximately three-fourths of those in the self-inflicted injury (73%) and likely self-harm (76%) cohorts had outpatient encounters within 30 days prior to their cohort-defining events (Table 2).

Among all three suicide/self-harm cohorts, “primary care” was the most frequently visited clinical service/medical specialty during the month prior to their cohort-defining events. The proportions of suicide cases who visited mental health (4.4%), psychiatry (2.9%) and psychology (2.0%) specialty clinics within one month of their deaths were only one-third to one-fifth of the respective proportions among members of the self-inflicted injury and likely self-harm cohorts (Table 2).

**TABLE 1.** Demographic and military characteristics of service members in suicide/self-harm cohorts, active component, U.S. Armed Forces, 2001-2010

	Suicide		Self-inflicted injury <sup>a</sup>		Likely self-harm <sup>b</sup>	
	No.	%	No.	%	No.	%
Total	1,939		19,955		3,463	
Service						
Army	864	44.6	10,995	55.1	1,747	50.5
Navy	380	19.6	3,856	19.3	585	16.9
Air Force	389	15.8	2,894	14.5	566	16.3
Marine Corps	306	20.1	2,210	11.1	565	16.3
Sex						
Female	79	4.1	5,373	26.9	799	23.1
Male	1,860	95.9	14,581	73.1	2,664	76.9
Age						
<20	174	9.0	4,369	21.9	564	16.3
20-24	787	40.6	10,160	50.9	1,544	44.6
25-29	433	22.4	3,251	16.3	682	19.7
30-34	215	11.1	1,197	6.0	293	8.5
35-39	188	9.7	630	3.2	220	6.4
40+	140	7.2	347	1.7	160	4.6

<sup>a</sup>Inpatient or outpatient diagnosis of an intentionally self-inflicted injury or poisoning  
<sup>b</sup>Hospitalization for injury or poisoning with a concurrent mental health diagnosis

**TABLE 2.** Numbers and proportions of service members in suicide/self-harm cohorts who visited outpatient clinics during the 30 days prior to their cohort-defining events, among clinics visited by at least 1% of suicide completers, active component, U.S. Armed Forces, 2001-2010

Outpatient clinic type	Suicide		Self-inflicted injury <sup>a</sup>		Likely self-harm <sup>b</sup>	
	No.	%	No.	%	No.	%
Any outpatient clinic	876	45.2	14,637	73.4	2,626	75.8
Primary care	318	16.5	5,796	29.2	1,015	29.5
Family practice	187	9.7	2,495	12.6	468	13.6
Non-military facility	157	8.2	2,650	13.3	811	23.6
Emergency medical	135	7.0	2,911	14.6	405	11.8
Optometry	102	5.3	1,647	8.3	276	8.0
Substance abuse	90	4.7	2,181	11.0	350	10.2
Physical therapy	89	4.6	1,443	7.3	430	12.5
Hearing conservation	89	4.6	1,319	6.6	223	6.5
Mental health	85	4.4	2,948	14.8	535	15.5
Immunizations	72	3.7	1,133	5.7	182	5.3
Social work	57	3.0	1,180	5.9	210	6.1
Psychiatry	55	2.9	3,035	15.3	459	13.3
Flight medicine	52	2.7	398	2.0	109	3.2
Community health	48	2.5	751	3.8	123	3.6
Psychology	38	2.0	1,565	7.9	239	6.9
Orthopedic	37	1.9	655	3.3	190	5.5
Medical examination	24	1.2	629	3.2	98	2.8
Occupational health	23	1.2	896	4.5	164	4.8
General surgery	23	1.2	247	1.2	98	2.8
Internal medicine	22	1.1	569	2.9	110	3.2
Audiology	22	1.1	290	1.5	50	1.5
Immediate care	21	1.1	629	3.2	73	2.1
Neurology	18	0.9	203	1.0	54	1.6

<sup>a</sup>Inpatient or outpatient diagnosis of an intentionally self-inflicted injury or poisoning

<sup>b</sup>Hospitalization for injury or poisoning with a concurrent mental health diagnosis

### Outpatient clinic types with excessive visits

During the 30 days prior to their deaths, suicide cases (compared to their referent) had higher rates of visits to approximately three-fourths (77%) of the 64 clinical services/medical specialties visited overall. The clinic types for which visit rates were most excessive among suicide cases compared to referent cohort members were “non-military facilities” (i.e., outsourced care), family practice, substance abuse, and emergency medical (Figure 1a).

During the 30 days prior to their injuries, the self-inflicted injury cohort (compared to their referent) had higher rates of visits to 89 of 96 (88%) clinical services/medical specialties visited overall. Among self-inflicted injury cohort members, outpatient visit rates were most excessive to psychiatry, mental health, non-military facility, substance abuse and emergency medical clinics (Figure 1b).

During the 30 days prior to their hospitalizations, the likely self-harm cohort (compared to their referent) had higher rates of visits to 71 of 74 (96%) clinical services/medical specialties visited overall. Among likely self-harm cohort members, outpatient visit rates were most excessive to non-military facilities, psychiatry, mental health, primary care, substance abuse and physical therapy clinics (Figure 1c).

Of note, among members of all three suicide/self-harm cohorts together, the most frequent primary diagnoses during visits to non-military facilities were musculoskeletal disorders (e.g., back pain) (19.3%), “signs, symptoms and ill-defined conditions” (16.8%), injuries (15.1%) and mental disorders (9.3%) (data not shown).

### Excess visits by time period

In general, in each suicide/self-harm cohort (compared to their respective

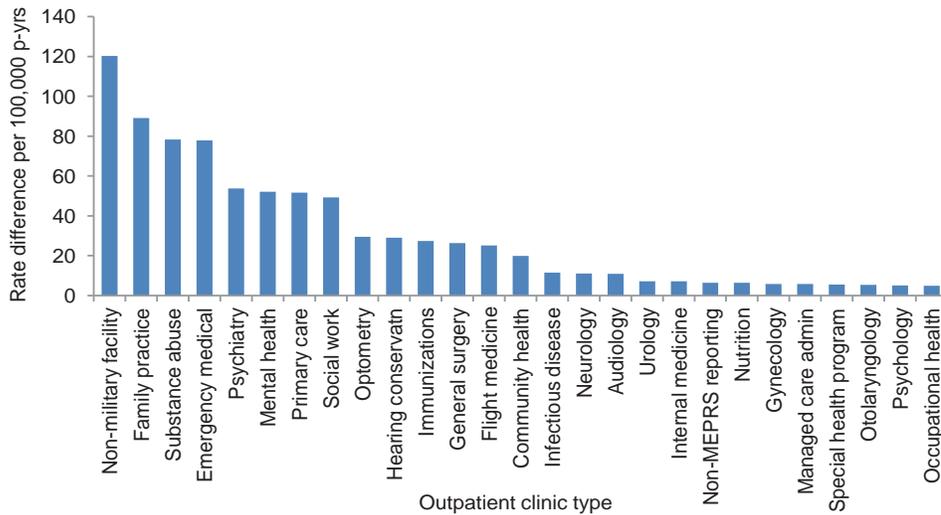
referents), outpatient visit rates were most excessive within the 60 days prior to their cohort-defining events. Moreover, the magnitudes of differences in rates to many clinical services and medical specialty types sharply increased during the 0-60 day period, compared to more remote periods, prior to cohort-defining events. In contrast to the general finding, suicide cases had relatively high rates of visits to primary care clinics within 30 days – but relatively low rates of primary care clinic visits within 30-60 days – prior to their deaths (Figures 2a-c).

### EDITORIAL COMMENT

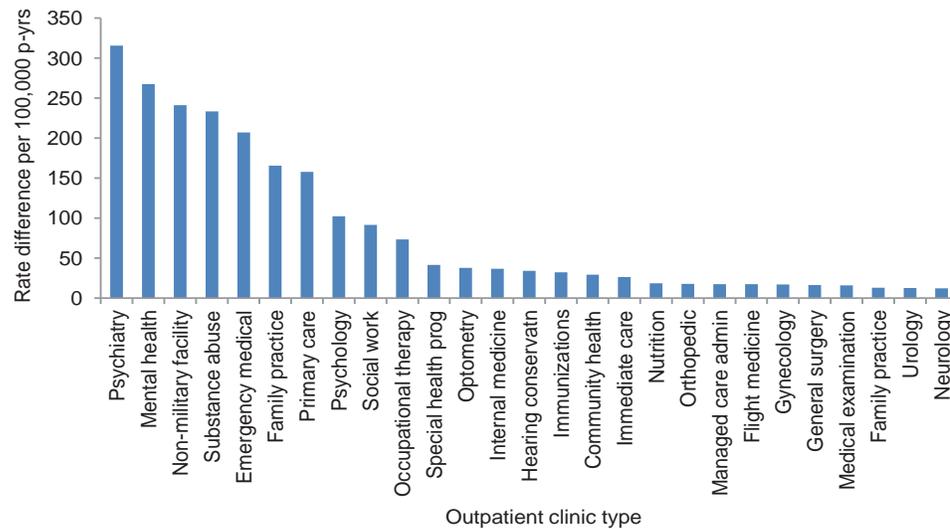
This report documents that U.S. service members who die by suicide or engage in other self-harm behaviors are very similar to their counterparts in terms of health care use prior to, but not within, 60 days or so of their deaths/injuries. The finding suggests that there may be one or more “triggering” events during which thoughts of self-harm intensify and lead to increased health care usage in many clinical service settings. A few hypotheses shed light on these findings. Distressed service members may seek health care services in the hope that clinicians might recognize or help ameliorate the distress. In this analysis, service members with suicidal behavior as compared to their referent cohorts had higher rates of visits to most clinic types, including family practice and primary care; many service members seek help for psychosocial problems in primary care settings, perhaps because they are less stigmatizing than behavioral health settings. It is also possible that service members with significant health problems experience feelings of hopelessness and contemplate ending their lives. Another possibility is that service members seek medications in health care clinics for the purpose of self-poisoning.

Suicide cases were found to have higher rates of outpatient visits during the month prior to suicide than similar groups of service members who did not complete suicide. The most frequented clinic type was primary care. Some of these visits may

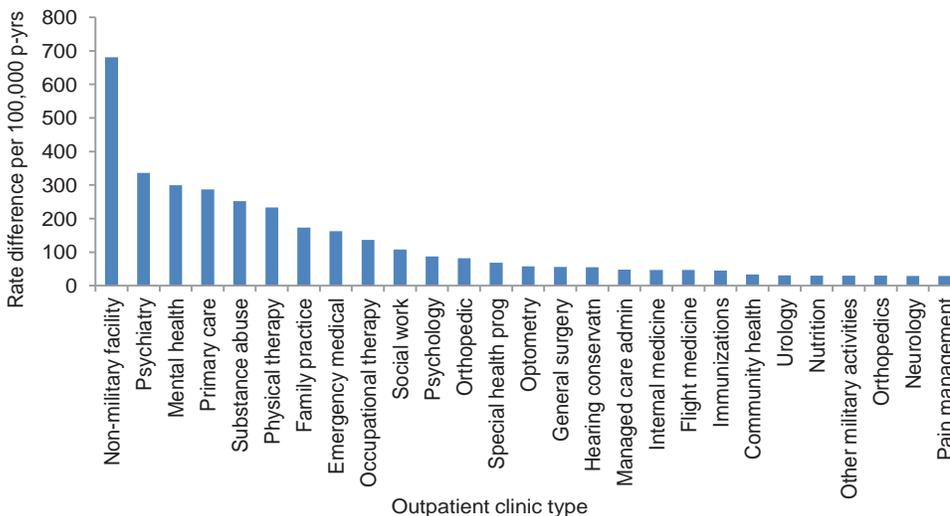
**FIGURE 1A.** Rate difference (“excess incidence”) in outpatient clinic visits among suicide cases vs. referents, during the 30 days prior to suicide



**FIGURE 1B.** Rate difference (“excess incidence”) in outpatient clinic visits among service members with self-inflicted injury vs. referents, during the 30 days prior to injury



**FIGURE 1C.** Rate difference (“excess incidence”) in outpatient clinic visits among service members with “likely self-harm” vs. referents, during the 30 days prior to self-harm



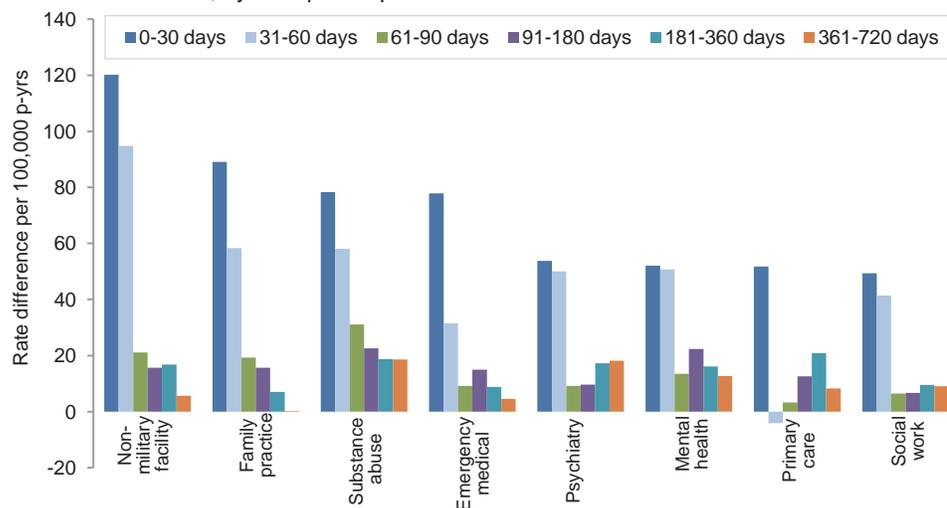
represent a final call for help by individuals who have made specific plans to end their lives. The excess visits might also represent the somatization of distress and related problems such as sleep deprivation. However, the majority (55%) of suicide completers did not present to any outpatient clinic during the 30 days prior to suicide. Overall, the frequency of health care visits among service member suicide decedents mirrors that among civilians.<sup>4</sup>

Interestingly, approximately three-quarters of individuals with medical records of self-inflicted injury or likely self-harm visited an outpatient clinic during the month prior to their injury event. As compared with suicide completers, higher proportions of service members with self-inflicted injury and self-harm-related medical visits sought care in mental health and psychiatry clinics. These service members may represent a group of suicide contemplators who use less lethal forms of self-harm and may also reflect qualitative differences between service members who complete suicide and those who engage in self-harm. For example, certain psychiatric problems may be accompanied by parasuicidal behaviors. These suppositions, however, should be considered provisional and await empirical validation.

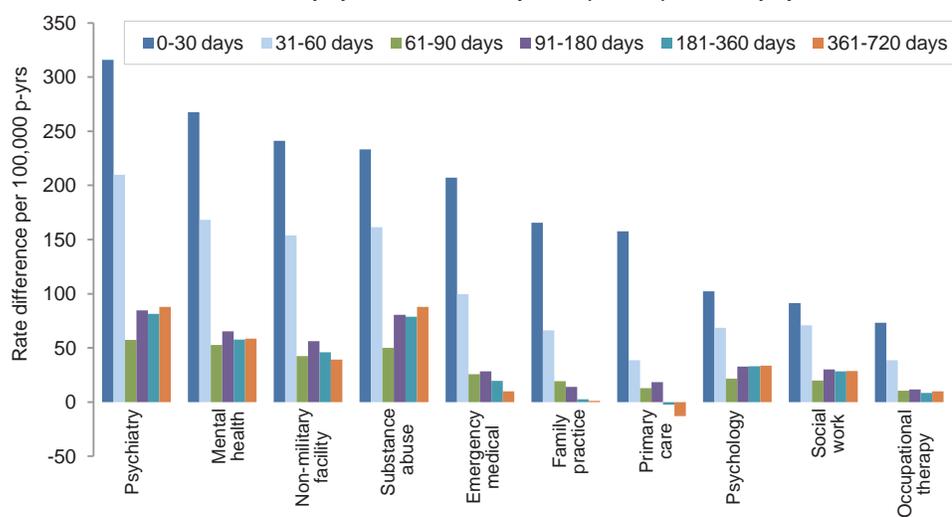
There are some limitations to this analysis that should be noted. The causal codes used to identify the self-inflicted injury cohort specified that the injuries were intentionally inflicted; however, it is unclear whether the intent was suicide or self-harm without intent to die (e.g., skin cutting). In addition, the validity of the criteria used to define the self-inflicted injury and self-harm cohorts are unknown. The completeness and accuracy of reporting of relevant “external causes of injury” (ICD-9-CM E-codes) by medical providers is unknown.

Overall, the finding that the outpatient records of individuals who complete suicide or harm themselves are most distinguishable from those of other service members during the 0-60 day window prior to the suicide/self-harm event indicates that there may be a particular window of opportunity to intervene and potentially prevent service member suicides. It may also be possible to

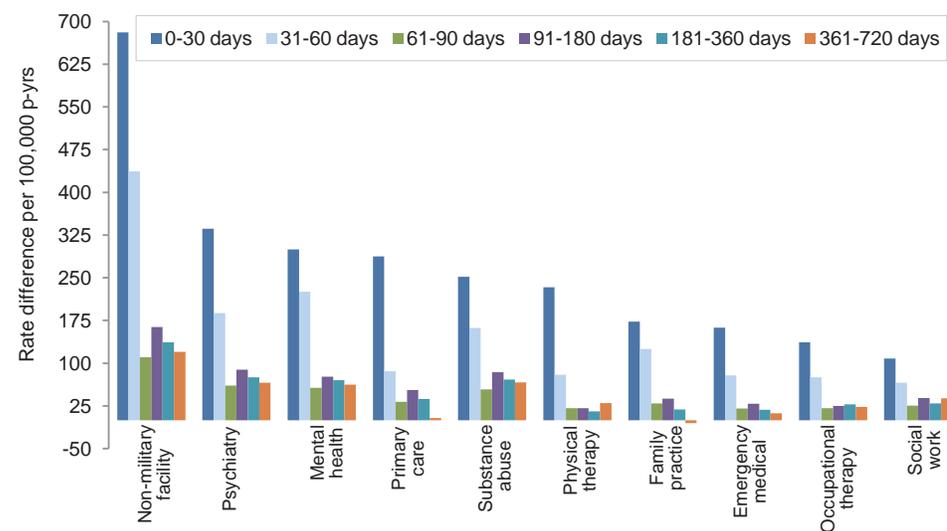
**FIGURE 2A.** Rate difference (“excess incidence”) in outpatient clinic visits among suicide cases vs. referents, by time period prior to suicide



**FIGURE 2B.** Rate difference (“excess incidence”) in outpatient clinic visits among service members with self-inflicted injury vs. referents, by time period prior to injury



**FIGURE 2C.** Rate difference (“excess incidence”) in outpatient clinic visits among service members with “likely self-harm” vs. referents, by time period prior to self-harm



combine diagnoses thought to be predictive of suicide (see article on page 7) and the results of this report to identify individuals that should be screened for suicide risk. Suicide risk screening for high-risk patients could help to identify patients that would benefit from additional care. Moreover, interventions that specifically target post-hospitalized patients such as “caring letters” may help to prevent suicide.<sup>12,13</sup>

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