



Blast Exposure, Traumatic Brain Injury, and Self-Reported Symptomology Among Active Duty Enlisted Marines:

An Examination of Post-Deployment Health Assessment Records, 2005-2012

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EXECUTIVE SUMMARY

Since the beginning of the Global War on Terrorism in 2001, more than 2 million service members have deployed. Traumatic brain injury (TBI) has been labeled the signature injury of recent conflicts and poses a significant burden on the Military Health System. Although TBIs have various etiologies, deployment-related TBIs are often caused by exposure to overpressure from explosive blasts such as those caused by improvised explosive devices (IEDs) and rocket-propelled grenades. Because of the threat posed by both blast overpressure exposure and subsequent TBIs, developing a thorough understanding of risk factors for injury is of paramount importance. One important yet understudied risk factor that may be associated with the likelihood of being exposed to a blast, sustaining a TBI, and experiencing TBI-related symptoms is Military Occupational Specialty (MOS).

The purpose of this technical report is to provide a comprehensive overview of deployment exposures and self-reported symptomology reported by active duty enlisted Marines on the Post-Deployment Health Assessment (PDHA), particularly as they relate to blast exposure and TBI. Based on analyses of 181,423 active duty enlisted Marines who completed the PDHA between 2005 and 2012, this report provides a comprehensive summary of (1) the number of Marines exposed to potentially TBI-inducing events, (2) probable concussions sustained during deployment as a function of both exposures and MOS, and (3) the symptoms Marines reported experiencing during their deployment. Results are presented for all Marines together as well as for each MOS individually.

Approximately 21% of respondents experienced at least one qualifying event that may have put them at risk for a TBI during deployment. Blast exposure was most common (12.33%), followed by falls (7.72%), “other” events (5.19%), motor vehicle crashes (3.14%), and bullet or fragment wounds above the shoulders (0.30%). Of Marines with a qualifying exposure, approximately 26% sustained a probable concussion, nearly two thirds of which were associated with blast. Furthermore, blast-associated concussions occurred most frequently among Marines working in tank and assault amphibious vehicles; infantry; engineer, construction, facilities, and equipment; military police; and motor transport MOSs. In contrast, impact-associated concussions (e.g., due to motor vehicle crashes, falls, bullet/fragment wounds above the shoulders) occurred most frequently among Marines working in supply, logistics, administration, avionics, and motor transport MOSs. Nearly half of respondents (45.50%) reported experiencing at least one symptom during deployment. In general, 10–20% of active duty enlisted Marines reported back pain, headaches, fatigue, joint pain, muscle aches, and/or ringing in the ears; fewer than 10% of Marines reported fevers, vomiting, skin diseases, numbness, weakness, cough, dizziness, memory issues, red eyes, difficulty breathing, chest pain, or dim vision during deployment.

This report is the first of its kind in that it provides a population-level overview of deployment exposures, concussion screens, and self-reported symptomology for each individual Marine Corps MOS. Along with findings reported elsewhere (Belding et al., 2019; Belding et al., manuscript submitted for publication; Englert et al., 2018), results from this research suggest that exposure to overpressure presents a threat to warfighter health and well-being; results further suggest that such effects are likely to be magnified when warfighters are exposed to both chronic, low-level overpressure (e.g., from firing heavy caliber weapons in training) and acute, high-level overpressure (e.g., such as that generated by IEDs during deployment). Drawing on these findings, we offer several recommendations for policy, clinical practice, and future research.

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Abbreviations

CBRN	Chemical, Biological, Radiological, and Nuclear
DoD	Department of Defense
ECFE	Engineer, Construction, Facilities, and Equipment
EOD	Explosive Ordnance Disposal
HIPAA	Health Insurance Portability and Accountability Act of 1996
IED	improvised explosive device
MAGTF	Marine Air-Ground Task Force
MCCS	Marine Corps Community Services
MOS	Military Occupational Specialty
PDHA	Post-Deployment Health Assessment
PTSD	posttraumatic stress disorder
RPG	rocket-propelled grenade
SIGINT/EW	Signals Intelligence/Ground Electronic Warfare
TAAV	Tank and Assault Amphibious Vehicle
TBI	traumatic brain injury

Background

Since the beginning of the Global War on Terrorism in 2001, an estimated 2.77 million service members have served on 5.4 million deployments at home and abroad (Wenger, O'Connell, & Cottrell, 2018). It is well established that the rigors of deployment, including operational, physical, environmental, and emotional exposures affect service member health, performance, readiness, and well-being (Buckman, Sundin, Greene, Fear, Dandeker, Greenberg, & Wessely, 2011; Eisen et al., 2012; Jankosky et al., 2011; Riviere, Merrill, Thomas, Wilk, & Bliese, 2012; Smith, Wong, Smith, Boyko, Gackstetter, & Ryan, 2009). Deployment-related exposures and their sequelae can differ depending on the service member's occupation and/or mission during deployment. Unfortunately, it is challenging to conduct real-time surveillance of these exposures within austere operational environments. Knowledge that can be leveraged to inform mitigation and response efforts is needed, but is currently limited.

In order to develop a more accurate understanding of deployment exposures, the Department of Defense (DoD) mandated surveillance of service member health throughout the deployment cycle via Deployment Health Assessments. In particular, the Post-Deployment Health Assessment (PDHA; DD Form 2796) is a self-report survey completed by service members within 30 days of their return from deployment. It assesses demographic information, environmental exposures, health behaviors, and various physical and mental health symptoms experienced during the deployment. Although the PDHA is an invaluable resource for examining the incidence and prevalence of specific deployment exposures and how specific exposures may impact immediate and long-term service member health and performance, findings from this population-level surveillance effort are not often publicly disseminated. Additionally, research that harnesses these data to better understand risk factors for injury or illness is scarce.

While it is beyond the scope of any one document to describe how deployment exposures reported on the PDHA impact specific health outcomes, the goal of this technical report is to summarize one research effort aimed at understanding the effects of deployment exposures on service member health, including traumatic brain injuries (TBIs). TBIs, in particular, were chosen as an injury of interest due to the significant burden they place on the Military Health System. With approximately 400,000 TBI diagnoses since 2000 (Defense and Veterans Brain Injury Center, 2019) and estimated annual treatment costs totaling between \$591 and \$910 million (2007 dollars; Eibner, Ringel, Kilmer, Pacula, & Diaz, 2008), TBI has been called the signature injury of recent military conflicts (Farmer et al., 2016). These injuries range in severity from mild (i.e., concussion) to severe, and the severity of the TBI is positively correlated with morbidity and mortality (Bruns & Hauser, 2003).

Although TBIs have various etiologies, deployment-related TBIs are often caused by exposure to overpressure from explosive blasts such as those caused by improvised explosive devices (IEDs) and rocket-propelled grenades (RPGs; Elder, Mitsis, Ahlers, & Cristian, 2010). Overpressure exposure can result in injury to service members through five mechanisms (e.g., Kluger, Nimrod, Biderman, Mayo, & Sorkin, 2006; Wolf, Bebart, Bonnett, Pons, & Cantrill, 2009). Primary blast injury results from the pressure wave itself. Secondary blast injury is the result of debris or shrapnel propelled through the air. Tertiary blast injury can occur when the

human body is physically displaced, which may include collision with other structures such as the ground or vehicles. Quaternary blast injury results from the thermal effect of the blast, including burns. Quinary blast injuries result from the inhalation of environmental contaminants, such as bacteria (e.g., Kluger et al., 2006; Wolf et al., 2009). These mechanisms, both individually and in combination, can result in injury that warrants evacuation from theater for medical treatment, though not all service members exposed to blast are injured to the point of medical evacuation.

Even in the absence of subsequent injuries, primary blast exposure alone can present a serious threat to service member health and well-being. For example, recent research suggests that primary blast exposure can result in unique pathological characteristics such as diffuse axonal injury and astroglial scarring (Agoston et al., 2017; Cernak & Noble-Haeusslein, 2009; MacDonald et al., 2011; Shively et al., 2016), which are not typically seen among service members with TBIs resulting from only a direct impact to the head (e.g., motor vehicle crashes). Such findings highlight the need to expand our knowledge of the similarities and differences between blast-associated and impact-associated TBIs. It is reasonable to suspect that blast-associated TBIs, which can also involve penetrating head trauma and/or a direct impact to the head following the physical displacement of the body (i.e., secondary and/or tertiary blast injury), may result in more severe injuries and symptomology than TBIs from impact alone. Although little research has examined differences in outcomes as a function of mechanisms of injury, there is some evidence of differences in immediate and chronic neurological outcomes of individuals who experience an impact versus blast-related TBI (Englert et al., 2018; MacDonald et al., 2014).

Because of the threat posed by both blast overpressure exposure and corresponding TBIs, developing a thorough understanding of risk factors for injury is of paramount importance. One important risk factor that may be associated with the likelihood of being exposed to a blast, sustaining a TBI, and experiencing TBI-related symptoms is Military Occupational Specialty (MOS). Although each individual's duties and exposures are unique, it is reasonable to assume that service members within the same MOS may share similar characteristics and encounter similar exposures in training and operational environments. For example, whereas artillerymen are frequently exposed to low-level blasts from regularly firing heavy caliber weapons, food service personnel are likely infrequently exposed to low-level blasts. Unfortunately, limited research has examined whether service members in different MOSs report different exposures, injuries, or symptoms, and only one line of research has examined these potential differences using PDHA data (cf. Belding et al., 2019). Additional examinations of population-level data by MOS are required to characterize the occupations within which service members who may be at greatest risk for the exposures and outcomes of interest.

Taken together, there is a need to leverage routinely collected PDHA data in order to understand the nature of exposures and injuries sustained during deployment. The purpose of this report is to present a descriptive summary based on self-report data provided by active duty enlisted Marines on the PDHA between 2005 and 2012. Specifically, this report provides a summary of the following for both Marines overall and separately for each MOS:

1. The number of exposures that may cause service members to sustain a TBI during deployment. Data presented include the number of Marines who reported experiencing any event that could prompt a TBI, as well as the number reporting specific types of events (i.e., blasts, motor vehicle crashes, falls, and bullet or fragment wounds above the shoulders).
2. Among those with a relevant exposure during deployment, the number of probable concussions sustained during deployment. Data presented include the number of Marines who sustained a probable concussion regardless of mechanism of injury, as well as the number with a probable concussion due to blast and due to impact.
3. The number of self-reported symptoms experienced by Marines during deployment. Data presented include the number of Marines who reported any symptom, any neurological symptom, any musculoskeletal symptom, any immunological symptom, as well as each individual symptom.

For each of these topics, we present data for all Marines together and for each MOS individually. When multiple MOSs are presented simultaneously, we rank them by the proportion of Marines who reported each exposure or health outcome. Together, these data provide a comprehensive review of the blast and impact exposures and associated outcomes throughout deployment.

This report is organized in a way that allows readers to review specific data depending on their interests and needs. Military leadership, health care providers, researchers, and funding sponsors can use this report to identify populations that may require further study and refine specific research questions relating to the effects of deployment exposures, probable concussion, mechanism of injury (e.g., impact vs. blast), and self-reported symptomology. Although this is a purely descriptive report that is not intended to evaluate complex models of risk, it provides an overview of the types of exposures and symptoms Marines are likely to experience in deployed environments. For results based on inferential analyses, please see Belding et al., 2019; Belding et al., manuscript submitted for publication; Englert et al., 2018. This information can be leveraged in future research to identify risk factors for sustaining a TBI during deployment, as well as how different types of TBI may contribute to acute and chronic symptomology that may detract from service member performance and readiness.

Method

Data Source

All PDHA records completed by active duty, enlisted Marines from the inception of the PDHA in 2003 to January 2017 were obtained. The PDHA is a DoD-mandated self-report questionnaire that must be completed within 30 days after return from deployment (US Department of the Navy [DON], 2014). It collects data on demographic factors and exposures during deployment that could result in injury, and screens for relevant medical conditions (e.g., TBI, posttraumatic stress disorder [PTSD]) and symptomology. Three different versions of the PDHA (launched in 2003, 2008, and 2012, respectively) have been used to monitor the health of service members during deployment. Because the 2012 version did not assess MOS, which was one of the focal risk factors under investigation, the analyses reported herein were based on data from the 2003 and 2008 versions of the PDHA only.

Participants

The sample consisted of active duty, enlisted Marines who completed the 2003 or 2008 version of the PDHA, representing deployments between January 2005 and December 2012. Due to administration and recordkeeping procedures, it was impossible to use PHDA data to determine whether respondents who completed multiple PDHAs did so with reference to the same or different deployments. Therefore, only the first PDHA record for each Marine was retained. When multiple records were completed on the same day as the first, they were consolidated into a single record. During this consolidation procedure, the appearance of a single affirmative response on any record indicating an exposure or injury was retained, even if the other records completed on the same day indicated a negative response.

Materials

Items assessed by the PDHA include Marines' MOS during deployment, potential TBI-inducing exposures, TBI screens, and symptomology experienced during deployment. However, the wording of the questions used to assess these variables differed between the 2003 and 2008 versions. We summarize each in turn.

MOS. On both the 2003 and 2008 versions of the PDHA, Marines reported their MOS by providing a text response to a prompt assessing their "*occupational specialty during this deployment.*" These data were coded into occupational categories (see below).

Potential TBI-inducing events (2008 version only). The 2008 version of the PDHA assessed exposures that could cause a TBI, while the 2003 version did not. The wording of this item was, "*During this deployment, did you experience any of the following events? (Mark all that apply). (1) Blast or explosion (IED, RPG, land mine, grenade, etc.), (2) Vehicular accident/crash (any vehicle, including aircraft), (3) Fragment wound or bullet wound above your shoulders, (4) Fall, (5) Other event (for example, a sports injury to your head). Describe.*" Marines indicated whether they had experienced each of these five events separately. For some analyses, Marines were grouped into those with blast exposure or those with a non-blast

exposure (including affirmative responses to items 2–5). When Marines reported both a blast and an impact exposure, they were included in the blast group.

TBI screens (2008 version only). If Marines reported experiencing at least one potentially TBI-inducing event, they were screened for a TBI. The wording of this item was as follows, “*Did any of the following happen to you, or were you told happened to you, IMMEDIATELY after any of the event(s) you just noted in question 9.a.? (Mark all that apply). (1) Lost consciousness or got “knocked out,” (2) Felt dazed, confused, or “saw stars,” (3) Didn’t remember the event, (4) Had a concussion, (5) Had a head injury.*” Marines who reported yes on at least one of the first four options were coded as having probable concussion. Option 5 was not considered indicative of a TBI because the question lacked specificity (e.g., someone may have had a minor head laceration rather than a loss or alteration of consciousness). Because service members with severe TBIs are frequently medically evacuated from theater (and thus are less likely to complete the PDHA), positive screens were presumed to indicate those with a probable mild TBI (Luse, Slosek, & Rennix, 2016).

Symptomology. Both the 2003 and 2008 versions of the PDHA assessed self-reported symptomology experienced during deployment; however, they did so in substantially different ways. In addition to relatively minor differences in the wording of some symptoms (see Table 1), the 2003 version assessed whether Marines experienced the symptom while the 2008 version assessed whether they sought care for the symptom. Specifically, the 2003 version of the PDHA asked, “*Do you have any of these symptoms now or did you develop them anytime during this deployment?*” Response options included “No”, “Yes during”, and “Yes now”. Marines who indicated either of the yes options were coded as experiencing the symptom. The 2008 version asked, “*For any of the following symptoms, please indicate whether you went to see a healthcare provider (physician, PA, medic, corpsman, etc.), were placed on quarters (Qtrs) or given light/limited duty (Profile), and whether you are still bothered by the symptom now.*” Marines indicated whether or not they were seen in sick call, were placed on quarters or profile, and were still bothered for each symptom individually. Those who reported “Yes” to any of the three questions for each symptom were coded as experiencing that symptom. Only symptoms that were assessed on both the 2003 and 2008 versions of the PDHA were retained for this report. Symptoms were then categorized as either neurological, musculoskeletal, or immunological on the basis of consultations with subject matter experts. A full list of the wording of the symptoms and their categorization into the three groups is provided in Table 1.

Table 1. List of symptom wording across the 2003 and 2008 versions of the PDHA

	2003 PDHA	2008 PDHA
Neurological Symptoms	Headaches	Bad headaches
	Dimming of vision, like the lights were going out	Dimming of vision, like the lights were going out
	Dizziness, fainting, light headedness	Dizzy, light headed, passed out
	Still feeling tired after sleeping	Problems sleeping or still feeling tired after sleeping

	Difficulty remembering	Forgetful or trouble remembering things
	Vomiting	Vomiting
	Ring of the ears	Ring in the ears
	Numbness or tingling in hands or feet	Numbness or tingling in hands or feet
Musculoskeletal Symptoms	Swollen, stiff, or painful joints Muscle aches Back pain	Swollen, stiff, or painful joints Muscle aches Back pain
Immunological Symptoms	Difficulty breathing Chronic cough Fever Weakness Redness of eyes with tearing Chest pain or pressure Skin diseases or rashes	Trouble breathing Cough lasting more than 3 weeks Fever Generally feeling weak Watery, red eyes Chest pain or pressure Skin diseases or rashes

Procedures

MOS coding. MOS was reported using an open-ended text field. There were 5,341 unique responses from the first PDHA record of all 181,423 Marines in the study sample. Three members of the research team coded each unique response into occupational categories representing groupings listed in the Marine Corps MOS Manual (DON, 2015) using a progressive coding scheme. When one coder could not identify the MOS, the next coder attempted to identify the response. Responses that could not be classified into a category were classified into one of three categories: multiple (i.e., a response corresponding to more than one category, such as “Logistics and martial arts instructor”), missing (i.e., the Marine wrote something that could not be coded, such as “0000”), or unknown (i.e., the coders were unable to identify the appropriate category). Overall, 81.67% of Marines were successfully grouped into an occupational category, 17.50% did not provide an occupational specialty (missing), 0.22% provided more than one specialty (multiple), and 0.61% provided an unknown specialty. Relevant information from the Marine Corps MOS Manual and examples of each Marine-listed MOS within a category are provided in the relevant appendix section for each occupational category.

To assess interrater reliability, a fourth coder also examined a small, randomly selected subset of responses ($n = 200$). Responses were identical on 77% of judgments. Of the 46 disagreements, 33 were coded as “unknown” by one of the coders, which highlights the variety of subject matter expertise required to code these open-ended text fields. When responses that were unable to be categorized by at least one coder were excluded from calculations, the coders agreed on 95.62% of judgments.

Statistical Analyses

Frequencies of deployment exposures (2008 data only), TBI screens (2008 data only), and self-reported symptomology (2003 and 2008 data) were calculated. Frequencies of deployment exposures are presented for any qualifying event that could prompt a TBI (i.e., blast exposure, motor vehicle crash, fall, and bullet or fragment wound above the shoulder). Frequencies of probable concussions are reported for all mechanisms of injury, for those who reported blast exposure, and for those who reported a non-blast (i.e., impact) exposure. Frequencies for symptom reporting are presented in several ways, including experiencing or seeking care for at least one symptom of any type, at least one neurological symptom, at least one musculoskeletal symptom, at least one immunological symptom, and each symptom individually. When data are presented for multiple MOSs simultaneously, MOSs are ranked by the proportion of Marines within that MOS who endorsed the exposure or symptom rather than by sample size to account for differences in the sizes of occupations within the Marine Corps.

Due to HIPAA regulations, we are unable to report frequencies of reported exposures or symptoms of less than 30. We indicate frequencies of less than 30 with gray bars or shadowing and “N/A” where appropriate, rather than omitting the data, to prevent misinterpretation that the exposure or symptom was entirely absent. Additionally, sample sizes in all figures reflect the number of reportable responses. Because Marines may have skipped questions when responding to the survey, sample sizes change from one item to the next and are reported based on the number of responses for each item.

Inferential statistics are not included in this report. For additional results from inferential analyses, the reader is referred to Belding et al. (2019) for a discussion of how high (vs. low) occupational risk for low-level blast is associated with increased likelihood for probable concussion following high-level blast exposure. Additionally, readers can review Belding et al. (manuscript submitted for publication) for a discussion of the combined effects of occupational risk for low-level blast, high-level blast exposure, probable concussion, and symptom type (i.e., neurological, musculoskeletal, and immunological) on number of symptoms reported during deployment. Readers can also review Englert et al. (2018) for a direct comparison of the likelihood of reporting each individual symptom across Marines with blast-association concussions, impact-associated concussions, and no reported exposures.

Results

A total of 324,701 records from active duty enlisted Marines were obtained across the 2003 and 2008 versions of the PDHA, representing deployments from January 2005 through December 2012. During this timeframe, most Marines ($N = 150,177$; 82.78%) provided only one record, though some had more ($N = 31,246$; 17.22%; $\max = 9$, $M = 1.18$, $SD = 0.42$). After consolidation of multiple records as described in the Methods section, final analyses were based on the PHDRA records of $N = 181,423$ active duty enlisted Marines.

Deployment Exposures

Approximately 21% of active duty enlisted Marines experienced at least one qualifying event that may have put them at risk for a TBI during deployment (see Table 2). Blast exposures were most common (12.33%), followed by falls (7.72%), “other” events (5.19%), motor vehicle crashes (3.14%), and lastly bullet or fragment wounds above the shoulders (0.30%). Examination of the open-ended text field for those listing an “other” event suggests that these responses may not be specific to TBI-inducing events (e.g., “ankle sprain”). Deployment exposures differed across MOSs. Table 3 provides the top five MOSs reporting any exposure, as well as each specific exposure individually; Appendix A provides further information on the proportion of Marines with each exposure, in descending order across MOSs.

Table 2. Deployment Exposures¹

	Reported Exposure		Did Not Report Exposure		Total
	<i>n</i>	%	<i>n</i>	%	
<i>Any Exposure</i>	22,769	21.49	83,207	78.51	105,976
Blast	13,008	12.33	92,453	87.67	105,461
Fall	8,078	7.72	96,501	92.28	104,579
Motor vehicle crash	3,284	3.14	101,424	96.86	104,708
Bullet or fragment wound above the shoulders	312	0.30	104,277	99.70	104,589
Other	5,367	5.19	98,042	94.81	103,409

Table 3. Top 5 MOSs Reporting Qualifying Exposures²

Any Exposure	Blast	Motor Vehicle Crash	Fall
1. Combat Camera	1. Combat Camera	1. Motor Transport	1. Infantry
2. Ammunition & Explosive	2. Ammunition & Explosive	2. Military Police	2. Motor Transport
		3. Infantry	3. Military Police

¹ The *ns* and percentages within columns may not sum to the total because Marines may have reported more than one exposure.

² We do not present the top five MOSs reporting bullet or fragment wounds above the shoulders because only one MOS (Infantry) achieved thresholds required for release per HIPAA regulations.

Ordnance Disposal	Ordnance Disposal	4. Engineer, Construction, Facilities, & Equipment	4. Engineer, Construction, Facilities, & Equipment
3. Infantry	3. Infantry	5. Tank & Assault Amphibious Vehicle	5. Ammunition & Explosive Ordnance Disposal
4. Military Police	4. Military Police		
5. Motor Transport	5. Engineer, Construction, Facilities, & Equipment		

Probable Concussion

Of the 22,769 Marines who experienced a qualifying event that may have put them at risk for sustaining a concussion, 22,181 (97.42%) Marines completed a concussion screen. Approximately 26% ($n = 5,863$) of these Marines sustained a probable concussion during deployment; 66.00% of these concussions were blast associated, while the remaining 34.00% were impact associated. There were clear differences in the proportion of Marines with blast-versus impact-associated concussions across MOSs (see Table 4). Appendix B provides the proportion of Marines who screened positive for concussion (i.e., any concussion, blast-associated concussion, and impact-associated concussion) by MOS, in descending order.

Table 4. Top Five MOSs With Probable Concussions

Any Concussion	Blast-Associated Concussions	Impact-Associated Concussions
1. Tank & Assault Amphibious Vehicles	1. Tank & Assault Amphibious Vehicles	1. Supply
2. Motor Transport	2. Infantry	2. Logistics
3. Infantry	3. Engineer, Construction, Facilities, & Equipment	3. Manpower & Administration
4. Engineer, Construction, Facilities, & Equipment	4. Military Police	4. Avionics
5. Military Police	5. Motor Transport	5. Motor Transport

Self-Reported Symptoms

Fewer than half of respondents (45.50%; $n = 76,503$) reported experiencing or seeking care for any symptom during deployment. More Marines sought care for at least one neurological symptom ($n = 53,327$; 32.16%) than for musculoskeletal ($n = 45,106$; 27.41%) or immunological symptoms ($n = 44,286$; 26.68%).³ The frequencies of self-reporting each individual symptom are reported in descending order in Table 5. In general, between 10–20% of active duty enlisted Marines reported back pain, headaches, fatigue, joint pain, muscle aches,

³ When the number of symptoms reported is examined rather than the reporting of at least one symptom, musculoskeletal symptom reporting exceeded neurological symptom reporting. Additional information about the number of symptoms reported is available in Belding et al. (manuscript submitted for publication) and is not discussed further in this technical report.

and/or ringing in the ears; fewer than 10% of these Marines reported fevers, vomiting, skin diseases, numbness, weakness, cough, dizziness, memory issues, red eyes, difficulty breathing, chest pain, or dim vision during deployment.

Table 5. Self-Reported Symptomology During Deployment

	Reported Symptom		Did Not Report Symptom		Total <i>n</i>
	<i>n</i>	%	<i>n</i>	%	
Back pain	30,026	18.62	131,203	81.38	161,229
Headache	26,542	16.34	135,931	83.66	162,473
Fatigue	25,159	15.62	135,863	84.38	161,022
Joint pain	24,157	14.97	137,258	85.03	161,415
Muscle aches	23,430	14.47	138,492	85.53	161,922
Ringing in the ears	16,985	10.50	144,715	89.50	161,700
Fever	13,546	8.27	150,199	91.73	163,745
Vomiting	12,689	7.82	149,616	92.18	162,305
Skin disease	12,465	7.72	149,091	92.28	161,556
Numbness	12,044	7.45	149,538	92.55	161,582
Weakness	10,998	6.78	151,251	93.22	162,249
Cough	10,670	6.55	152,149	93.45	162,819
Dizziness	9,219	5.69	152,751	94.31	161,970
Memory	8,893	5.52	152,354	94.48	161,247
Red eyes	6,884	4.25	154,944	95.75	161,828
Breathing	6,895	4.24	155,549	95.76	162,444
Chest pain	6,288	3.89	155,484	96.11	161,772
Dim vision	2,590	1.60	158,872	98.40	161,462

Table 6 provides a visual map of the MOSs in which more than 10% of active duty enlisted Marines reported experiencing each symptom during deployment. Specifically, more than 10% of active duty enlisted Marines in each of the included 41 occupational categories reported experiencing headaches, fatigue, back pain, joint issues, and muscle aches. Additional information about individual symptoms that Marines reported experiencing during deployment by MOS is available in Appendix C in descending order. Additional information about deployment exposures, concussion screens, and symptomology self-reported by Marines within specific MOS categories is available in Appendix D.

Table 6. Visual Map of Symptom Reporting Within Individual MOSS

MOS Category	Neurological							Musculoskeletal				Immunological						
	Headache	Fatigue	Ringine in the Ears	Vomiting	Numbness	Dizziness	Memory Problems	Dim Vision	Back Pain	Joint Issues	Muscle Ache	Fever	Skin Disease	Weakness	Cough	Red Eyes	Difficulty Breathing	Chest Pain
Air Control and Support	X	X							X	X	X							
Aircraft Maintenance	X	X							X	X	X	X						
Airfield Services	X	X							X	X	X							
Ammo EOD	X	X							X	X	X							
Aviation Logistics	X	X							X	X	X							
Aviation Ordnance	X	X							X	X	X							
Avionics	X	X							X	X	X	X						
CBRN Defense	X	X							X	X	X	X						
Combat Camera	X	X							X	X	X	X						
Communications	X	X							X	X	X	X			X			
Distribution Management	X	X							X	X	X							
ECPE	X	X							X	X	X							
Electronics Maintenance	X	X							X	X	X							
Field Artillery	X	X							X	X	X							
Financial Management	X	X							X	X	X							
Food Service	X	X							X	X	X							
Ground Electronics Maintenance	X	X							X	X	X							
Ground Ordnance Maintenance	X	X							X	X	X							
Infantry	X	X							X	X	X							
Intelligence	X	X							X	X	X	X						
Legal Services									X									
Linguist																		
Logistics	X	X							X	X	X							
MAGTF	X	X							X	X	X	X			X			
Manpower and Administration	X	X							X	X	X							
MCCS																		
Meteorology and Oceanography	X	X							X	X	X							
Military Police	X	X							X	X	X							
Miscellaneous	X	X							X	X	X							
Motor Transport	X	X							X	X	X							
Music	X	X							X	X	X							
Navigation Officer and Enlisted Flight Crew																		
Public Affairs	X	X							X	X	X	X			X			
SIGINT/EW	X	X							X	X	X							
Supply	X	X							X	X	X							
TAAV	X	X							X	X	X							
Training																		
Utilities	X	X							X	X	X							
Missing																		
Multiple	X	X					X		X	X	X	X		X	X			
Unknown	X	X							X	X	X	X	X	X	X			

“x” indicates that more than 10% of active duty enlisted Marines reported experiencing the symptom during deployment. Gray shadowing indicates symptoms that cannot be reported due to HIPAA regulations ($n \leq 30$).

Discussion

Summary

The purpose of this technical report is to provide a comprehensive overview of deployment exposures and self-reported symptomology reported on the PDHA by active duty enlisted Marines, particularly as they relate to blast exposure and TBI. This report summarizes deployment exposures, concussion screens, and self-reported symptomology across the sample as a whole, as well as for each individual MOS category. Results of this effort demonstrate that 21.49% of active duty enlisted Marines who completed the 2003 or 2008 version of the PDHA reported an exposure that put them at risk for sustaining a concussion. Of those exposed, approximately 26.43% sustained a probable concussion, with approximately two thirds of these concussions occurring among Marines with a blast exposure. Thus, consistent with previous research and estimates, these results demonstrate that the most common cause of deployment-related TBIs is blast exposure. Additionally, more than 10% of Marines reported experiencing headaches, fatigue, back pain, joint issues, muscle aches, and ringing in the ears during deployment. The frequency of reported exposures, concussion screens, and symptomology differed across MOSs; these results are fully reported in the appendices. Drawing on these findings, we offer several recommendations for military policy, clinical practice, and future research.

Recommendations

Policy recommendations. Continued support for studies of blast exposure is warranted. Development of equipment for precisely obtaining and recording an individual service member's blast exposure will help medical personnel and researchers to more precisely characterize the magnitude of overpressure to which the service member has been exposed. This, in turn, will facilitate more stringent evaluations of the cumulative effects of overpressure exposure on service member health as well as the mechanisms by which overpressure affects specific aspects of health. Large, well-designed longitudinal studies of blast exposure are needed to identify risk patterns and sequelae over time. However, such studies will take time and will not yield essential answers and strategies for mitigation of threats to service members in the immediate future.

In the interim, epidemiological research, which leverages archival data, can provide insight into actionable items in a much shorter time frame. These investigations can utilize existing archival data to answer important questions regarding the health and career outcomes of the service members who are most likely to have been exposed to blast. However, the utility of any work using archival data hinges on those data being collected in a systematic and reliable fashion using validated instruments and from a well-defined sampling frame. Future improvements to ongoing population-level surveillance efforts (e.g., physical health assessment) should include assessments of overpressure exposure (e.g., the number of acute, high-level blasts experienced in the past year) and associated symptomology.

This report provides useful information that can be leveraged by military leaders to inform staffing and training decisions (e.g., where to embed additional medical providers). Providers embedded within units with high prevalence of TBI-related symptomology or risk for blast exposure may benefit from supplementary training on screening and management of TBI and related symptoms. For example, additional targeted training on the screening and treatment of concussion could be provided to corpsmen and medical officers, respectively.

Clinical recommendations. Regular screening of service members who work in occupations that are frequently exposed to overpressure (meaning high-level blast and/or low-level blast) should be conducted to identify persistent symptoms typically associated with TBI (such as headaches and dizziness). In particular, regular screening during periods of high operational tempo should be conducted when possible, especially for those who work in occupations suspected to be at higher risk for high-level blast exposure. This level of screening should occur even in the absence of an acute event like a high-level blast, as well as when the patient has had an exposure that was not accompanied by a known loss or alteration of consciousness. The data included in this report suggest that these service members may experience subclinical injuries during deployment that may be able to be treated symptomatically.

Second, when service members report tinnitus or other auditory issues, medical providers should conduct additional screening for TBI-related symptoms regardless of whether the patient reports a high-level blast exposure (such as an IED) during deployment. Due to the demonstrated associations between blast exposure and TBI (e.g., Taber, Warden, & Hurley, 2006), and between blast exposure and tinnitus (e.g., Mao et al., 2012), it is reasonable to suspect that service members who report tinnitus may also have had exposure to overpressure, which may be associated with subsequent TBI-related symptomology. The high frequency of self-reported headaches and tinnitus reported on the PDHA lends credence to the idea that comorbidity may be the norm rather than the exception for deployed service members, particularly for those working in occupations marked by greater overpressure exposure.

Third, when service members are diagnosed with a concussion, those who work in occupations with repeated exposure to low-level blast (e.g., Infantry, Artillery) may benefit from a delayed return to duty compared to those with less exposure (e.g., Manpower and Administration, Food Service). Based on the findings in the present report, in conjunction with those in additional publications based on our analysis of PDHA data (e.g., Belding et al., 2019), we suggest that repetitive exposure to low-level blast may prime service members for subsequent injury and may be analogous to having a prior history of concussion. Additional care should be taken to reduce the likelihood that a service member will be exposed to additional overpressure exposure in close temporal proximity to an index blast exposure during deployment, insofar as the mission permits this.

Research recommendations. DoD collects a wealth of data on service members' health and well-being, but these data may routinely not be scrutinized at the population level to identify risk factors. Despite a plethora of data available for analysis and clear indications that blast exposure is associated with injury, relatively little population-level epidemiological research is

being conducted. Replication of these analyses with PDHA and Post-Deployment Health Reassessment data from the other branches of service (e.g., Army) would help to replicate findings among service members with similar training, operational responsibilities, and deployment exposures. Furthermore, existing efforts using self-report data should be bolstered with official medical diagnosis data that are available in service members' medical records. The sequelae of blast exposure also could and should be investigated using data from the Millennium Cohort Study, DoD's largest prospective longitudinal study. The Millennium Cohort Study began collecting data on blast exposure in 2011, but these data have not been analyzed to date. A combination of all of these recommended efforts could validate the findings herein and potentially demonstrate that self-reported symptoms are also associated with official diagnoses of injury.

Researchers can use the base rate statistics included in this technical report to identify populations of interest for ongoing and future studies of overpressure exposure. Those wishing to study acute blast exposure, for instance, may find it useful to collect data from Marines working in the MOSs that reported the highest frequency of acute blast exposure during deployment (e.g., Combat Camera, Ammunition and Explosive Ordnance Disposal, Infantry, Military Police, and Engineering, Construction, Facilities, and Equipment; see Appendix A). The finding that there was very little overlap in the MOSs most likely to screen positive for blast- versus impact-associated concussions suggests that researchers studying different mechanisms of TBI may wish to recruit potential participants from different military populations.

Limitations

Although the PDHA is a mandated survey that must be completed by all service members returning from deployment, it is self-administered and may be subject to sampling and response biases. Nonetheless, PDHA data were chosen for analysis for several reasons. First, the PDHA is one of the few large-scale surveys that assesses blast exposure, one of the focal variables in our research. Because the PDHA is a DoD-mandated survey that must be completed within 30 days of return from deployment, it provides both an opportunity and requirement for service members to report exposures and symptoms, and it results in a large sample size. Accordingly, PDHA data are less likely to be affected by biases that may affect other sources of data (e.g., barriers to care, such as operational tempo, that may limit records of official diagnoses of injury; small sample sizes). Additionally, the PDHA's inclusion of self-reported symptomology is particularly beneficial for studies of blast exposure because no data to date have conclusively shown that repetitive, low-level blast exposure (sometimes referred to as "subclinical blast exposure") is associated with clinical diagnoses of injury despite evidence that it has the potential to affect warfighter performance (Carr, Dell, Yanagi, Hassan, & LoPresti, 2017).

This report only includes descriptive analyses of PDHA data from Marines deployed between 2005 and 2012. It is beyond the scope of this document to articulate potential risk factors beyond military occupation for any of the deployment exposures, probable concussions, or self-reported symptoms. Because these data only represent reports from active duty enlisted Marines, they may not be generalizable to other branches of service. It should also be noted that previous research has shown that injured service members who are medically evacuated are

typically assigned to recovery platoons and thus may be less likely to complete the PDHA. For example, those who do not complete the PDHA compared with those who do are more likely to be diagnosed with a TBI and/or PTSD (Luse et al., 2016). As a result, the data presented herein can be presumed to represent conservative estimates of the deployment exposures, concussions, and symptomology experienced by active duty enlisted Marines during deployment.

Conclusion

These data provide an overview of self-reported symptomology and the potentially TBI-inducing exposures to which active duty enlisted Marines are exposed during deployment. Consistent with previous findings, our results show that between one in four and one in five Marines who were healthy enough to complete their deployment sustained a probable concussion (Tanielian & Jaycox, 2008). These data also provide an overview of the symptoms for which Marines reported seeking care during deployment. This report is the first of its kind to provide an overview of population-level exposures, concussion screens, and self-reported symptomology for each MOS individually. Along with findings reported in additional reports (Belding et al., 2019; Belding et al., manuscript submitted for publication; Englert et al., 2018), results from this research effort suggest that exposure to overpressure presents a threat to warfighter health and well-being, but such effects are likely magnified when warfighters are exposed to both chronic, low-level overpressure (e.g., from firing heavy caliber weapons in training) and acute, high-level blast (e.g., such as that generated by IEDs during deployment).

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Appendix A: Deployment Exposures

Any Qualifying Event Exposure by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Exposure	Proportion of Marines
Combat Camera	184	69	37.50%
Ammo EOD	942	277	29.41%
Infantry	23,280	6,738	28.94%
Military Police	1,821	518	28.45%
Motor Transport	8,221	2,326	28.29%
ECFE	5,265	1,441	27.37%
Public Affairs	181	46	25.41%
TAAV	1,481	311	21.00%
Miscellaneous	1,388	274	19.74%
Ground Ordnance Maintenance	2,044	397	19.42%
Field Artillery	2,729	521	19.09%
MAGTF	246	44	17.89%
SIGINT/EW	1,382	236	17.08%
Utilities	1,555	251	16.14%
Communications	7,523	1,206	16.03%
Ground Electronics Maintenance	1,816	282	15.53%
Aviation Ordnance	1,239	191	15.42%
Avionics	2,474	375	15.16%
Intelligence	1,585	238	15.02%
Aircraft Maintenance	6,344	952	15.01%
Logistics	2,205	326	14.78%
Manpower and Administration	2,005	288	14.36%
Supply	2,915	413	14.17%
Financial Management	304	43	14.14%
Airfield Services	897	124	13.82%
Air Control and Support	654	89	13.61%
Aviation Logistics	950	129	13.58%
Food Service	898	116	12.92%
CBRN Defense	461	57	12.36%
Electronics Maintenance	458	45	9.83%
Missing	21,598	4,290	19.86%
Multiple	≤ 30	≤ 30	N/A
Unknown	291	48	16.49%
Distribution Management	218	≤ 30	N/A
Legal Services	97	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MCCS	59	≤ 30	N/A
Meteorology and Oceanography	112	≤ 30	N/A
Music	≤ 30	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	80	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Blast Exposure by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Exposure	Proportion of Marines
Combat Camera	184	48	26.09%
Ammo EOD	937	194	20.70%
Infantry	23,191	4,750	20.48%
Military Police	1,814	328	18.08%
ECFE	5,232	900	17.20%
Motor Transport	8,178	1,201	14.69%
TAAV	1,477	179	12.12%
Field Artillery	2,721	316	11.61%
Ground Ordnance Maintenance	2,033	200	9.84%
Miscellaneous	1,386	124	8.95%
SIGINT/EW	1,379	116	8.41%
Communications	7,493	580	7.74%
Aviation Ordnance	1,237	90	7.28%
Utilities	1,550	108	6.97%
Intelligence	1,577	99	6.28%
Food Service	890	54	6.07%
Ground Electronics Maintenance	1,809	105	5.80%
Aviation Logistics	949	54	5.69%
Avionics	2,473	139	5.62%
Aircraft Maintenance	6,319	354	5.60%
Air Control and Support	651	34	5.22%
Logistics	2,195	113	5.15%
Supply	2,904	128	4.41%
Manpower and Administration	1,998	84	4.20%
Airfield Services	893	34	3.81%
Missing	21,423	2,522	11.77%
Multiple	≤ 30	≤ 30	N/A
Unknown	289	≤ 30	N/A
CBRN Defense	458	≤ 30	N/A
Distribution Management	217	≤ 30	N/A
Electronics Maintenance	457	≤ 30	N/A
Financial Management	301	≤ 30	N/A
Legal Services	97	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MAGTF	246	≤ 30	N/A
MCCS	59	≤ 30	N/A
Meteorology and Oceanography	111	≤ 30	N/A
Music	≤ 30	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	79	≤ 30	N/A
Public Affairs	180	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Motor Vehicle Crash Exposure by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Exposure	Proportion of Marines
Motor Transport	8,115	477	5.88%
Military Police	1,800	84	4.67%
Infantry	22,951	1,050	4.57%
ECFE	5,188	233	4.49%
TAAV	1,468	64	4.36%
Ammo EOD	933	37	3.97%
Ground Ordnance Maintenance	2,024	61	3.01%
Miscellaneous	1,380	40	2.90%
Field Artillery	2,707	61	2.25%
Communications	7,475	142	1.90%
Logistics	2,181	35	1.60%
Aircraft Maintenance	6,310	83	1.33%
Supply	2,893	34	1.18%
Missing	21,180	666	3.14%
Multiple	≤ 30	≤ 30	N/A
Unknown	290	≤ 30	N/A
Air Control and Support	648	≤ 30	N/A
Airfield Services	892	≤ 30	N/A
Aviation Logistics	947	≤ 30	N/A
Aviation Ordnance	1,235	≤ 30	N/A
Avionics	2,466	≤ 30	N/A
CBRN Defense	457	≤ 30	N/A
Combat Camera	181	≤ 30	N/A
Distribution Management	216	≤ 30	N/A
Electronics Maintenance	456	≤ 30	N/A
Financial Management	301	≤ 30	N/A
Food Service	885	≤ 30	N/A
Ground Electronics Maintenance	1,805	≤ 30	N/A
Intelligence	1,574	≤ 30	N/A
Legal Services	97	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MAGTF	244	≤ 30	N/A
Manpower and Administration	1,993	≤ 30	N/A
MCCS	58	≤ 30	N/A
Meteorology and Oceanography	111	≤ 30	N/A
Music	≤ 30	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	78	≤ 30	N/A
Public Affairs	180	≤ 30	N/A
SIGINT/EW	1,374	≤ 30	N/A
Training	≤ 30	≤ 30	N/A
Utilities	1,541	≤ 30	N/A

Fall Exposure by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Exposure	Proportion of Marines
Infantry	22,934	2,615	11.40%
Motor Transport	8,101	816	10.07%
Military Police	1,801	176	9.77%
ECFE	5,188	424	8.17%
Ammo EOD	930	69	7.42%
TAAV	1,467	104	7.09%
Ground Ordnance Maintenance	2,022	140	6.92%
Miscellaneous	1,377	89	6.46%
Field Artillery	2,707	166	6.13%
Utilities	1,541	86	5.58%
Communications	7,473	416	5.57%
Supply	2,894	161	5.56%
Avionics	2,461	135	5.49%
Manpower and Administration	1,989	106	5.33%
Aircraft Maintenance	6,301	329	5.22%
Aviation Ordnance	1,229	64	5.21%
Food Service	888	46	5.18%
Ground Electronics Maintenance	1,798	88	4.89%
SIGINT/EW	1,372	65	4.74%
Logistics	2,183	99	4.54%
Airfield Services	889	38	4.27%
Aviation Logistics	946	40	4.23%
Intelligence	1,574	64	4.07%
Missing	21,131	1,547	7.32%
Multiple	≤ 30	≤ 30	N/A
Unknown	290	≤ 30	N/A
Air Control and Support	646	≤ 30	N/A
CBRN Defense	456	≤ 30	N/A
Combat Camera	181	≤ 30	N/A
Distribution Management	215	≤ 30	N/A
Electronics Maintenance	454	≤ 30	N/A
Financial Management	300	≤ 30	N/A
Legal Services	97	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MAGTF	244	≤ 30	N/A
MCCS	57	≤ 30	N/A
Meteorology and Oceanography	112	≤ 30	N/A
Music	≤ 30	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	78	≤ 30	N/A
Public Affairs	179	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Bullet/Fragment Wound Above the Shoulders Exposure by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Exposure	Proportion of Marines
Infantry	22,930	161	.70%
Missing	21,111	54	.26%
Multiple	≤ 30	≤ 30	N/A
Unknown	288	≤ 30	N/A
Air Control and Support	648	≤ 30	N/A
Aircraft Maintenance	6,304	≤ 30	N/A
Airfield Services	890	≤ 30	N/A
Ammo EOD	930	≤ 30	N/A
Aviation Logistics	947	≤ 30	N/A
Aviation Ordnance	1,234	≤ 30	N/A
Avionics	2,467	≤ 30	N/A
CBRN Defense	456	≤ 30	N/A
Combat Camera	182	≤ 30	N/A
Communications	7,477	≤ 30	N/A
Distribution Management	216	≤ 30	N/A
ECFE	5,187	≤ 30	N/A
Electronics Maintenance	457	≤ 30	N/A
Field Artillery	2,706	≤ 30	N/A
Financial Management	298	≤ 30	N/A
Food Service	888	≤ 30	N/A
Ground Electronics Maintenance	1,801	≤ 30	N/A
Ground Ordnance Maintenance	2,023	≤ 30	N/A
Intelligence	1,572	≤ 30	N/A
Legal Services	97	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
Logistics	2,182	≤ 30	N/A
MAGTF	244	≤ 30	N/A
Manpower and Administration	1,993	≤ 30	N/A
MCCS	58	≤ 30	N/A
Meteorology and Oceanography	111	≤ 30	N/A
Military Police	1,798	≤ 30	N/A
Miscellaneous	1,380	≤ 30	N/A
Motor Transport	8,101	≤ 30	N/A
Music	≤ 30	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	78	≤ 30	N/A
Public Affairs	180	≤ 30	N/A
SIGINT/EW	1,372	≤ 30	N/A
Supply	2,899	≤ 30	N/A
TAAV	1,467	≤ 30	N/A
Training	≤ 30	≤ 30	N/A
Utilities	1,543	≤ 30	N/A

Appendix B: Probable Concussions

Any Probable Concussion by MOS

MOS Category	# of Marines with Qualifying Exposure	Marines with Qualifying Exposure Screening Positive for Concussion	
	(n)	(n)	(%)
TAAV	305	109	35.74
Motor Transport	2,282	703	30.81
Infantry	6,621	2,021	30.52
ECFE	1,406	415	29.52
Military Police	513	138	26.90
Field Artillery	517	134	25.92
Ground Ordnance Maintenance	387	96	24.81
Intelligence	232	53	22.84
Utilities	242	54	22.31
Communications	1,183	262	22.15
Ammo EOD	270	56	20.74
Logistics	318	65	20.44
Supply	402	82	20.40
Miscellaneous	270	55	20.37
Manpower and Administration	280	53	18.93
SIGINT/EW	226	42	18.58
Ground Electronics Maintenance	270	49	18.15
Aircraft Maintenance	924	128	13.85
Avionics	368	50	13.59
Missing	4,084	1,107	27.11
Multiple	≤30	≤30	N/A
Unknown	46	≤30	N/A
Air Control and Support	87	≤30	N/A
Airfield Services	122	≤30	N/A
Aviation Logistics	128	≤30	N/A
Aviation Ordnance	186	≤30	N/A
CBRN Defense	55	≤30	N/A
Combat Camera	68	≤30	N/A
Distribution Management	≤30	≤30	N/A
Electronics Maintenance	45	≤30	N/A
Financial Management	42	≤30	N/A
Food Service	108	≤30	N/A
Legal Services	≤30	≤30	N/A
Linguist	≤30	≤30	N/A
MAGTF	44	≤30	N/A
MCCS	≤30	≤30	N/A
Meteorology and Oceanography	≤30	≤30	N/A
Music	≤30	≤30	N/A
Navigation Officer & Enlisted Flight Crew	≤30	≤30	N/A
Public Affairs	45	≤30	N/A
Training	≤30	≤30	N/A

Probable Blast-Associated Concussions by MOS

MOS Category	# of Marines with Qualifying Exposure (n)	Marines with Qualifying Exposure Screening Positive for Concussion (n)	(%)
TAAV	302	75	24.83%
Infantry	6,566	1,596	24.31%
ECFE	1,387	291	20.98%
Military Police	509	95	18.66%
Motor Transport	2,247	411	18.29%
Field Artillery	514	83	16.15%
Ammo EOD	252	39	15.48%
Ground Ordnance Maintenance	381	54	14.17%
Communications	1,172	130	11.09%
Missing	4,000	755	18.88%
Multiple	≤ 30	≤ 30	N/A
Unknown	≤ 30	≤ 30	N/A
Air Control and Support	74	≤ 30	N/A
Aircraft Maintenance	891	≤ 30	N/A
Airfield Services	101	≤ 30	N/A
Aviation Logistics	105	≤ 30	N/A
Aviation Ordnance	157	≤ 30	N/A
Avionics	363	≤ 30	N/A
CBRN Defense	31	≤ 30	N/A
Combat Camera	31	≤ 30	N/A
Distribution Management	≤ 30	≤ 30	N/A
Electronics Maintenance	≤ 30	≤ 30	N/A
Financial Management	≤ 30	≤ 30	N/A
Food Service	83	≤ 30	N/A
Ground Electronics Maintenance	218	≤ 30	N/A
Intelligence	177	≤ 30	N/A
Legal Services	≤ 30	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
Logistics	291	≤ 30	N/A
MAGTF	≤ 30	≤ 30	N/A
Manpower and Administration	262	≤ 30	N/A
MCCS	≤ 30	≤ 30	N/A
Meteorology and Oceanography	≤ 30	≤ 30	N/A
Miscellaneous	214	≤ 30	N/A
Music	≤ 30	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	≤ 30	≤ 30	N/A
Public Affairs	≤ 30	≤ 30	N/A
SIGINT/EW	183	≤ 30	N/A
Supply	373	≤ 30	N/A
Training	≤ 30	≤ 30	N/A
Utilities	187	≤ 30	N/A

Probable Impact-Associated Concussions by MOS

MOS Category	# of Marines with Qualifying Exposure (n)	Marines with Qualifying Exposure Screening Positive for Concussion (n)	(%)
Supply	373	56	15.01%
Logistics	291	42	14.43%
Manpower and Administration	262	37	14.12%
Avionics	363	46	12.67%
Motor Transport	2,247	278	12.37%
Aircraft Maintenance	891	108	12.12%
Communications	1,172	129	11.01%
TAAV	302	33	10.93%
Ground Ordnance Maintenance	381	39	10.24%
Field Artillery	514	48	9.34%
ECFE	1,387	117	8.44%
Military Police	509	42	8.25%
Infantry	6,566	405	6.17%
Missing	4,000	316	7.90%
Multiple	≤ 30	≤ 30	N/A
Unknown	≤ 30	≤ 30	N/A
Air Control and Support	74	≤ 30	N/A
Airfield Services	101	≤ 30	N/A
Ammo EOD	252	≤ 30	N/A
Aviation Logistics	105	≤ 30	N/A
Aviation Ordnance	157	≤ 30	N/A
CBRN Defense	31	≤ 30	N/A
Combat Camera	31	≤ 30	N/A
Distribution Management	≤ 30	≤ 30	N/A
Electronics Maintenance	≤ 30	≤ 30	N/A
Financial Management	≤ 30	≤ 30	N/A
Food Service	83	≤ 30	N/A
Ground Electronics Maintenance	218	≤ 30	N/A
Intelligence	177	≤ 30	N/A
Legal Services	≤ 30	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MAGTF	≤ 30	≤ 30	N/A
MCCS	≤ 30	≤ 30	N/A
Meteorology and Oceanography	≤ 30	≤ 30	N/A
Miscellaneous	214	≤ 30	N/A
Music	≤ 30	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	≤ 30	≤ 30	N/A
Public Affairs	≤ 30	≤ 30	N/A
SIGINT/EW	183	≤ 30	N/A
Training	≤ 30	≤ 30	N/A
Utilities	187	≤ 30	N/A

Appendix C: Symptom Reporting

At Least One Symptom by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Combat Camera	277	160	57.76%
Public Affairs	240	137	57.08%
Music	135	76	56.30%
Legal Services	147	82	55.78%
MAGTF	414	229	55.31%
MCCS	136	75	55.15%
Meteorology and Oceanography	243	133	54.73%
Miscellaneous	2,751	1,451	52.74%
Military Police	3,363	1,701	50.58%
Intelligence	2,574	1,293	50.23%
Avionics	4,231	2,095	49.52%
Motor Transport	13,947	6,895	49.44%
Manpower and Administration	3,274	1,606	49.05%
Aircraft Maintenance	10,776	5,286	49.05%
Ammo EOD	1,574	761	48.35%
Airfield Services	1,696	819	48.29%
Distribution Management	351	168	47.86%
Ground Electronics Maintenance	2,941	1,398	47.53%
Electronics Maintenance	796	377	47.36%
ECFE	8,927	4,225	47.33%
Air Control and Support	1,406	659	46.87%
Aviation Ordnance	2,168	1,014	46.77%
Ground Ordnance Maintenance	3,302	1,543	46.73%
Supply	4,855	2,268	46.71%
Utilities	2,782	1,299	46.69%
CBRN Defense	755	352	46.62%
Food Service	1,659	770	46.41%
TAAV	2,350	1,085	46.17%
Infantry	39,426	18,184	46.12%
Logistics	3,515	1,598	45.46%
Communications	12,578	5,553	44.15%
Aviation Logistics	1,385	597	43.10%
SIGINT/EW	1,972	832	42.19%
Financial Management	423	176	41.61%
Field Artillery	4,393	1,755	39.95%
Navigation Officer & Enlisted Flight Crew	165	56	33.94%
Missing	24,717	8,939	36.17%
Multiple	395	248	62.78%
Unknown	1,068	599	56.09%
Linguist	≤ 30	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

At Least One Neurological Symptom by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Music	134	58	43.28%
Combat Camera	268	113	42.16%
Public Affairs	231	92	39.83%
MCCS	135	52	38.52%
MAGTF	405	152	37.53%
Military Police	3,329	1,244	37.37%
Meteorology and Oceanography	241	89	36.93%
Legal Services	145	53	36.55%
Infantry	39,041	13,819	35.40%
Intelligence	2,537	897	35.36%
Miscellaneous	2,711	955	35.23%
Motor Transport	13,829	4,868	35.20%
Avionics	4,154	1,422	34.23%
Distribution Management	347	118	34.01%
Manpower and Administration	3,233	1,091	33.75%
ECFE	8,836	2,978	33.70%
Aircraft Maintenance	10,587	3,563	33.65%
Ground Ordnance Maintenance	3,256	1,087	33.38%
TAAV	2,325	775	33.33%
Ammo EOD	1,556	517	33.23%
Food Service	1,647	543	32.97%
Airfield Services	1,672	544	32.54%
Utilities	2,744	892	32.51%
Aviation Ordnance	2,138	672	31.43%
Supply	4,814	1,513	31.43%
CBRN Defense	745	234	31.41%
Electronics Maintenance	784	242	30.87%
Air Control and Support	1,387	427	30.79%
Logistics	3,477	1,051	30.23%
Ground Electronics Maintenance	2,883	871	30.21%
Communications	12,452	3,742	30.05%
Aviation Logistics	1,371	391	28.52%
Financial Management	418	119	28.47%
SIGINT/EW	1,936	527	27.22%
Field Artillery	4,344	1,179	27.14%
Navigation Officer & Enlisted Flight Crew	162	31	19.14%
Missing	24,089	5,767	23.94%
Multiple	392	192	48.98%
Unknown	1,057	439	41.53%
Linguist	≤ 30	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

At Least One Musculoskeletal Symptom by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Music	132	51	38.64%
MCCS	130	48	36.92%
Legal Services	145	52	35.86%
Miscellaneous	2,685	956	35.61%
Meteorology and Oceanography	242	83	34.30%
Military Police	3,285	1,095	33.33%
MAGTF	405	131	32.35%
Motor Transport	13,731	4,402	32.06%
Combat Camera	268	83	30.97%
Public Affairs	233	71	30.47%
TAAV	2,319	696	30.01%
Ammo EOD	1,544	461	29.86%
Ground Ordnance Maintenance	3,232	956	29.58%
Infantry	38,702	11,411	29.48%
ECFE	8,777	2,578	29.37%
Distribution Management	348	101	29.02%
Utilities	2,733	780	28.54%
Supply	4,782	1,350	28.23%
Airfield Services	1,673	464	27.73%
Avionics	4,103	1,137	27.71%
Electronics Maintenance	781	216	27.66%
Air Control and Support	1,376	378	27.47%
Manpower and Administration	3,201	872	27.24%
Aircraft Maintenance	10,495	2,849	27.15%
Ground Electronics Maintenance	2,860	771	26.96%
Intelligence	2,510	669	26.65%
Aviation Ordnance	2,126	565	26.58%
CBRN Defense	740	196	26.49%
Food Service	1,644	435	26.46%
Logistics	3,449	869	25.20%
Communications	12,369	3,036	24.55%
Field Artillery	4,325	1,025	23.70%
Aviation Logistics	1,365	317	23.22%
Financial Management	417	93	22.30%
SIGINT/EW	1,916	397	20.72%
Missing	23,906	4,945	20.69%
Multiple	386	171	44.30%
Unknown	1,047	363	34.67%
Linguist	≤ 30	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	162	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

At Least One Immunological Symptom by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Music	133	56	42.11%
Combat Camera	270	106	39.26%
Public Affairs	239	91	38.08%
MAGTF	406	154	37.93%
Legal Services	146	52	35.62%
MCCS	133	46	34.59%
Avionics	4,169	1,376	33.01%
Intelligence	2,537	817	32.20%
Meteorology and Oceanography	240	76	31.67%
Aircraft Maintenance	10,612	3,326	31.34%
Miscellaneous	2,714	847	31.21%
Aviation Ordnance	2,137	661	30.93%
Electronics Maintenance	787	243	30.88%
Manpower and Administration	3,245	1,000	30.82%
Distribution Management	346	106	30.64%
Air Control and Support	1,390	419	30.14%
Ground Electronics Maintenance	2,905	873	30.05%
Utilities	2,750	817	29.71%
CBRN Defense	741	220	29.69%
Military Police	3,321	986	29.69%
Airfield Services	1,682	496	29.49%
Supply	4,818	1,418	29.43%
Motor Transport	13,824	4,057	29.35%
Aviation Logistics	1,376	398	28.92%
Logistics	3,487	980	28.10%
Food Service	1,645	462	28.09%
ECFE	8,842	2,463	27.86%
Ground Ordnance Maintenance	3,263	890	27.28%
Communications	12,469	3,289	26.38%
SIGINT/EW	1,927	500	25.95%
Ammo EOD	1,555	399	25.66%
Financial Management	418	107	25.60%
Infantry	38,961	9,863	25.32%
TAAV	2,328	571	24.53%
Navigation Officer & Enlisted Flight Crew	164	37	22.56%
Field Artillery	4,350	947	21.77%
Missing	24,184	4,540	18.77%
Multiple	389	166	42.67%
Unknown	1,056	425	40.25%
Linguist	≤ 30	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Headache by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Music	133	37	27.82%
Meteorology and Oceanography	232	53	22.84%
MAGTF	396	87	21.97%
Public Affairs	229	49	21.40%
Combat Camera	259	54	20.85%
Military Police	3,237	656	20.27%
Motor Transport	13,566	2,649	19.53%
Intelligence	2,472	481	19.46%
Manpower and Administration	3,162	600	18.98%
Avionics	4,031	762	18.90%
Miscellaneous	2,656	500	18.83%
Food Service	1,623	301	18.55%
ECFE	8,682	1,585	18.26%
Utilities	2,691	485	18.02%
Supply	4,731	836	17.67%
Electronics Maintenance	770	134	17.40%
Airfield Services	1,645	286	17.39%
TAAV	2,295	395	17.21%
Distribution Management	338	58	17.16%
Infantry	38,321	6,517	17.01%
Ground Electronics Maintenance	2,816	476	16.90%
Aircraft Maintenance	10,317	1,725	16.72%
Air Control and Support	1,363	226	16.58%
Aviation Ordnance	2,097	341	16.26%
Ground Ordnance Maintenance	3,201	520	16.24%
Ammo EOD	1,518	246	16.21%
Logistics	3,408	551	16.17%
Communications	12,236	1,977	16.16%
CBRN Defense	727	114	15.68%
Aviation Logistics	1,353	211	15.59%
SIGINT/EW	1,876	255	13.59%
Financial Management	414	54	13.04%
Field Artillery	4,278	532	12.44%
Missing	23,543	2,316	9.84%
Multiple	377	120	31.83%
Unknown	1,022	278	27.20%
Legal Services	141	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MCCS	129	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	160	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Fatigue by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Music	130	39	30.00%
Public Affairs	224	50	22.32%
Distribution Management	339	73	21.53%
Avionics	4,008	789	19.69%
MAGTF	392	77	19.64%
Military Police	3,204	607	18.95%
Intelligence	2,443	456	18.67%
Aircraft Maintenance	10,212	1,903	18.63%
Motor Transport	13,410	2,462	18.36%
Miscellaneous	2,607	469	17.99%
Manpower and Administration	3,138	553	17.62%
Ground Ordnance Maintenance	3,169	558	17.61%
Meteorology and Oceanography	235	41	17.45%
Aviation Ordnance	2,057	355	17.26%
TAAV	2,286	385	16.84%
ECFE	8,585	1,434	16.70%
Utilities	2,671	446	16.70%
Airfield Services	1,641	272	16.58%
Ammo EOD	1,496	248	16.58%
CBRN Defense	718	119	16.57%
Supply	4,684	767	16.37%
Ground Electronics Maintenance	2,783	443	15.92%
Aviation Logistics	1,334	212	15.89%
Air Control and Support	1,349	208	15.42%
Infantry	38,043	5,845	15.36%
Logistics	3,370	516	15.31%
Combat Camera	259	39	15.06%
Electronics Maintenance	759	114	15.02%
Food Service	1,616	235	14.54%
Communications	12,154	1,730	14.23%
Financial Management	408	55	13.48%
Field Artillery	4,260	532	12.49%
SIGINT/EW	1,866	221	11.84%
Missing	23,333	2,504	10.73%
Multiple	369	95	25.75%
Unknown	1,010	235	23.27%
Legal Services	144	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MCCS	129	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	159	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Ringling in the Ears by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Infantry	38,095	5,900	15.49%
TAAV	2,291	343	14.97%
Military Police	3,216	465	14.46%
Motor Transport	13,525	1,677	12.40%
Combat Camera	263	32	12.17%
ECFE	8,644	1,050	12.15%
Ground Ordnance Maintenance	3,179	354	11.14%
MAGTF	397	44	11.08%
Ammo EOD	1,508	163	10.81%
Miscellaneous	2,630	278	10.57%
Field Artillery	4,268	435	10.19%
Utilities	2,688	266	9.90%
Airfield Services	1,636	137	8.37%
Aviation Ordnance	2,079	170	8.18%
Avionics	3,997	327	8.18%
Air Control and Support	1,354	109	8.05%
Aircraft Maintenance	10,229	820	8.02%
Intelligence	2,463	181	7.35%
Communications	12,214	893	7.31%
CBRN Defense	728	52	7.14%
Logistics	3,401	242	7.12%
Electronics Maintenance	766	52	6.79%
Supply	4,720	316	6.69%
Food Service	1,623	102	6.28%
Ground Electronics Maintenance	2,817	177	6.28%
Manpower and Administration	3,162	194	6.14%
SIGINT/EW	1,874	108	5.76%
Aviation Logistics	1,349	73	5.41%
Missing	23,393	1,730	7.40%
Multiple	377	60	15.92%
Unknown	1,016	125	12.30%
Distribution Management	340	≤ 30	N/A
Financial Management	407	≤ 30	N/A
Legal Services	141	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MCCS	128	≤ 30	N/A
Meteorology and Oceanography	236	≤ 30	N/A
Music	131	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	159	≤ 30	N/A
Public Affairs	227	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Vomiting by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Combat Camera	262	36	13.74%
Infantry	38,374	4,685	12.21%
MAGTF	399	48	12.03%
Intelligence	2,477	221	8.92%
Food Service	1,625	133	8.18%
TAAV	2,291	169	7.38%
Military Police	3,251	238	7.32%
SIGINT/EW	1,888	138	7.31%
Aviation Ordnance	2,094	147	7.02%
Communications	12,245	816	6.66%
Ammo EOD	1,519	100	6.58%
Utilities	2,695	175	6.49%
Avionics	4,021	257	6.39%
Aircraft Maintenance	10,295	654	6.35%
Ground Ordnance Maintenance	3,191	202	6.33%
CBRN Defense	731	45	6.16%
Motor Transport	13,575	835	6.15%
Field Artillery	4,278	262	6.12%
ECFE	8,688	521	6.00%
Miscellaneous	2,654	157	5.92%
Manpower and Administration	3,162	186	5.88%
Ground Electronics Maintenance	2,824	162	5.74%
Supply	4,719	271	5.74%
Logistics	3,408	189	5.55%
Aviation Logistics	1,352	70	5.18%
Airfield Services	1,646	80	4.86%
Air Control and Support	1,360	60	4.41%
Missing	23,296	1,595	6.85%
Multiple	378	≤ 30	N/A
Unknown	1,032	57	5.52%
Distribution Management	345	≤ 30	N/A
Electronics Maintenance	771	≤ 30	N/A
Financial Management	409	≤ 30	N/A
Legal Services	142	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MCCS	126	≤ 30	N/A
Meteorology and Oceanography	235	≤ 30	N/A
Music	131	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	158	≤ 30	N/A
Public Affairs	230	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Numbness by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Miscellaneous	2,628	288	10.96%
Military Police	3,234	334	10.33%
Distribution Management	342	34	9.94%
Infantry	38,116	3,475	9.12%
Motor Transport	13,540	1,218	9.00%
ECFE	8,669	756	8.72%
Ground Ordnance Maintenance	3,185	273	8.57%
TAAV	2,282	190	8.33%
Airfield Services	1,640	128	7.80%
Utilities	2,674	205	7.67%
Food Service	1,621	121	7.46%
Air Control and Support	1,355	99	7.31%
Ammo EOD	1,505	110	7.31%
Manpower and Administration	3,150	228	7.24%
Supply	4,708	338	7.18%
Electronics Maintenance	773	55	7.12%
CBRN Defense	731	50	6.84%
Intelligence	2,457	165	6.72%
Logistics	3,390	227	6.70%
Avionics	4,000	259	6.48%
Aircraft Maintenance	10,253	644	6.28%
Ground Electronics Maintenance	2,799	172	6.15%
Field Artillery	4,260	257	6.03%
Communications	12,212	704	5.76%
Aviation Ordnance	2,074	114	5.50%
Aviation Logistics	1,347	72	5.35%
SIGINT/EW	1,866	84	4.50%
Missing	23,262	1,114	4.79%
Multiple	373	51	13.67%
Unknown	1,027	116	11.30%
Combat Camera	261	≤ 30	N/A
Financial Management	408	≤ 30	N/A
Legal Services	144	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MAGTF	395	≤ 30	N/A
MCCS	127	≤ 30	N/A
Meteorology and Oceanography	233	≤ 30	N/A
Music	130	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	156	≤ 30	N/A
Public Affairs	226	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Dizziness by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Motor Transport	13,557	976	7.20%
TAAV	2,293	163	7.11%
Military Police	3,248	228	7.02%
Infantry	38,242	2,541	6.64%
Manpower and Administration	3,164	209	6.61%
ECFE	8,683	567	6.53%
Utilities	2,689	175	6.51%
Supply	4,722	304	6.44%
Intelligence	2,469	150	6.08%
Ammo EOD	1,520	90	5.92%
Ground Ordnance Maintenance	3,185	184	5.78%
Avionics	4,017	230	5.73%
Miscellaneous	2,644	140	5.30%
Communications	12,223	621	5.08%
Aircraft Maintenance	10,286	519	5.05%
Food Service	1,620	80	4.94%
Logistics	3,402	164	4.82%
Ground Electronics Maintenance	2,805	132	4.71%
Aviation Ordnance	2,085	98	4.70%
Aviation Logistics	1,353	62	4.58%
Airfield Services	1,646	75	4.56%
CBRN Defense	730	33	4.52%
Air Control and Support	1,356	61	4.50%
Electronics Maintenance	774	32	4.13%
Field Artillery	4,273	170	3.98%
SIGINT/EW	1,871	71	3.79%
Missing	23,242	875	3.76%
Multiple	381	41	10.76%
Unknown	1,030	80	7.77%
Combat Camera	259	≤ 30	N/A
Distribution Management	342	≤ 30	N/A
Financial Management	408	≤ 30	N/A
Legal Services	144	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MAGTF	396	≤ 30	N/A
MCCS	130	≤ 30	N/A
Meteorology and Oceanography	236	≤ 30	N/A
Music	131	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	160	≤ 30	N/A
Public Affairs	226	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Memory Problems by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
MAGTF	396	31	7.83%
Motor Transport	13,484	980	7.27%
Ground Ordnance Maintenance	3,177	220	6.92%
ECFE	8,626	558	6.47%
Miscellaneous	2,621	168	6.41%
Utilities	2,675	169	6.32%
Infantry	38,029	2,393	6.29%
TAAV	2,291	143	6.24%
Ammo EOD	1,510	93	6.16%
Avionics	4,005	235	5.87%
Manpower and Administration	3,140	184	5.86%
Military Police	3,242	190	5.86%
Supply	4,710	259	5.50%
Logistics	3,391	179	5.28%
Ground Electronics Maintenance	2,804	146	5.21%
Intelligence	2,456	127	5.17%
Electronics Maintenance	766	39	5.09%
Food Service	1,611	82	5.09%
Aviation Ordnance	2,079	100	4.81%
Communications	12,190	579	4.75%
Aircraft Maintenance	10,232	456	4.46%
Field Artillery	4,263	186	4.36%
Air Control and Support	1,349	57	4.23%
Aviation Logistics	1,346	57	4.23%
Airfield Services	1,637	59	3.60%
SIGINT/EW	1,856	62	3.34%
Missing	23,192	893	3.85%
Multiple	373	38	10.19%
Unknown	1,022	80	7.83%
CBRN Defense	720	≤ 30	N/A
Combat Camera	261	≤ 30	N/A
Distribution Management	341	≤ 30	N/A
Financial Management	404	≤ 30	N/A
Legal Services	145	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MCCS	127	≤ 30	N/A
Meteorology and Oceanography	234	≤ 30	N/A
Music	130	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	160	≤ 30	N/A
Public Affairs	224	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Dim Vision by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Military Police	3,237	81	2.50%
Motor Transport	13,544	311	2.30%
ECFE	8,655	171	1.98%
Utilities	2,682	53	1.98%
Miscellaneous	2,626	51	1.94%
Infantry	38,129	736	1.93%
Supply	4,705	86	1.83%
TAAV	2,287	37	1.62%
Ground Ordnance Maintenance	3,175	50	1.57%
Intelligence	2,464	38	1.54%
Logistics	3,396	48	1.41%
Communications	12,207	159	1.30%
Field Artillery	4,263	52	1.22%
Manpower and Administration	3,142	38	1.21%
Aircraft Maintenance	10,244	122	1.19%
Avionics	3,996	38	0.95%
Missing	23,136	263	1.14%
Multiple	381	≤ 30	N/A
Unknown	1,028	≤ 30	N/A
Air Control and Support	1,354	≤ 30	N/A
Airfield Services	1,640	≤ 30	N/A
Ammo EOD	1,514	≤ 30	N/A
Aviation Logistics	1,350	≤ 30	N/A
Aviation Ordnance	2,080	≤ 30	N/A
CBRN Defense	729	≤ 30	N/A
Combat Camera	258	≤ 30	N/A
Distribution Management	340	≤ 30	N/A
Electronics Maintenance	770	≤ 30	N/A
Financial Management	407	≤ 30	N/A
Food Service	1,610	≤ 30	N/A
Ground Electronics Maintenance	2,805	≤ 30	N/A
Legal Services	143	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MAGTF	396	≤ 30	N/A
MCCS	128	≤ 30	N/A
Meteorology and Oceanography	234	≤ 30	N/A
Music	131	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	159	≤ 30	N/A
Public Affairs	226	≤ 30	N/A
SIGINT/EW	1,863	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Back Pain by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Music	127	37	29.13%
Miscellaneous	2,616	619	23.66%
Military Police	3,182	752	23.63%
MAGTF	393	90	22.90%
Motor Transport	13,433	3,024	22.51%
Infantry	37,897	8,355	22.05%
Legal Services	144	31	21.53%
TAAV	2,287	486	21.25%
ECFE	8,608	1,790	20.79%
Meteorology and Oceanography	235	48	20.43%
Combat Camera	260	52	20.00%
Ammo EOD	1,504	297	19.75%
Ground Ordnance Maintenance	3,180	624	19.62%
Air Control and Support	1,332	260	19.52%
Distribution Management	340	63	18.53%
Utilities	2,678	482	18.00%
Supply	4,675	840	17.97%
Food Service	1,618	289	17.86%
Airfield Services	1,648	292	17.72%
Manpower and Administration	3,139	551	17.55%
Public Affairs	228	40	17.54%
Electronics Maintenance	769	134	17.43%
Intelligence	2,451	419	17.10%
Aircraft Maintenance	10,274	1,748	17.01%
Aviation Ordnance	2,070	350	16.91%
Avionics	4,019	671	16.70%
Ground Electronics Maintenance	2,808	468	16.67%
Field Artillery	4,240	690	16.27%
CBRN Defense	726	116	15.98%
Logistics	3,378	534	15.81%
Communications	12,165	1,912	15.72%
Financial Management	411	60	14.60%
Aviation Logistics	1,345	188	13.98%
SIGINT/EW	1,872	224	11.97%
Missing	23,493	3,068	13.06%
Multiple	367	116	31.61%
Unknown	1,005	259	25.77%
Linguist	≤ 30	≤ 30	N/A
MCCS	124	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	159	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Joint Issues by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Meteorology and Oceanography	237	52	21.94%
Miscellaneous	2,614	514	19.66%
Military Police	3,208	591	18.42%
Motor Transport	13,457	2,400	17.83%
TAAV	2,284	401	17.56%
Infantry	38,014	6,427	16.91%
Distribution Management	337	56	16.62%
ECFE	8,603	1,401	16.29%
Ground Ordnance Maintenance	3,167	512	16.17%
Ammo EOD	1,505	237	15.75%
Ground Electronics Maintenance	2,797	432	15.45%
MAGTF	395	61	15.44%
Combat Camera	261	40	15.33%
Utilities	2,688	409	15.22%
CBRN Defense	725	109	15.03%
Public Affairs	228	34	14.91%
Aircraft Maintenance	10,244	1,501	14.65%
Supply	4,724	672	14.23%
Airfield Services	1,652	233	14.10%
Intelligence	2,467	346	14.03%
Air Control and Support	1,345	187	13.90%
Avionics	3,973	548	13.79%
Manpower and Administration	3,149	434	13.78%
Aviation Ordnance	2,080	281	13.51%
Logistics	3,388	457	13.49%
Electronics Maintenance	766	102	13.32%
Food Service	1,624	216	13.30%
Communications	12,181	1,537	12.62%
Field Artillery	4,270	537	12.58%
Aviation Logistics	1,346	167	12.41%
SIGINT/EW	1,876	206	10.98%
Financial Management	409	43	10.51%
Missing	23,424	2,662	11.36%
Multiple	378	87	23.02%
Unknown	1,013	174	17.18%
Legal Services	144	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MCCS	125	≤ 30	N/A
Music	130	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	158	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Muscle Ache by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Music	131	39	29.77%
Meteorology and Oceanography	233	50	21.46%
MAGTF	397	79	19.90%
Military Police	3,221	610	18.94%
Miscellaneous	2,625	486	18.51%
Public Affairs	232	42	18.10%
Motor Transport	13,516	2,255	16.68%
Infantry	38,131	6,314	16.56%
ECFE	8,651	1,373	15.87%
TAAV	2,288	359	15.69%
Avionics	4,019	622	15.48%
Supply	4,715	721	15.29%
Ground Ordnance Maintenance	3,189	486	15.24%
Manpower and Administration	3,156	480	15.21%
Distribution Management	343	52	15.16%
Ammo EOD	1,512	225	14.88%
Utilities	2,690	400	14.87%
Airfield Services	1,652	244	14.77%
CBRN Defense	724	106	14.64%
Aviation Ordnance	2,094	305	14.57%
Combat Camera	257	37	14.40%
Electronics Maintenance	772	111	14.38%
Aircraft Maintenance	10,296	1,473	14.31%
Air Control and Support	1,348	192	14.24%
Intelligence	2,470	350	14.17%
Ground Electronics Maintenance	2,811	385	13.70%
Food Service	1,629	214	13.14%
Aviation Logistics	1,352	176	13.02%
Communications	12,216	1,539	12.60%
Logistics	3,407	429	12.59%
Field Artillery	4,270	486	11.38%
Financial Management	414	43	10.39%
SIGINT/EW	1,868	169	9.05%
Missing	23,434	2,186	9.33%
Multiple	378	100	26.46%
Unknown	1,025	221	21.56%
Legal Services	141	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MCCS	126	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	160	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Fever by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Public Affairs	235	42	17.87%
MAGTF	400	62	15.50%
Combat Camera	264	33	12.50%
Intelligence	2,501	280	11.20%
Avionics	4,062	425	10.46%
Aircraft Maintenance	10,417	1,059	10.17%
Manpower and Administration	3,197	323	10.10%
Aviation Ordnance	2,107	208	9.87%
Aviation Logistics	1,357	131	9.65%
Food Service	1,626	156	9.59%
Ground Electronics Maintenance	2,848	271	9.52%
Miscellaneous	2,660	250	9.40%
Military Police	3,268	294	9.00%
Supply	4,757	426	8.96%
Utilities	2,713	233	8.59%
SIGINT/EW	1,904	163	8.56%
Electronics Maintenance	773	66	8.54%
Infantry	38,573	3,286	8.52%
Logistics	3,443	288	8.36%
Communications	12,339	1,005	8.14%
Ammo EOD	1,537	123	8.00%
Air Control and Support	1,368	108	7.89%
Motor Transport	13,659	1,073	7.86%
CBRN Defense	732	57	7.79%
Airfield Services	1,654	128	7.74%
Ground Ordnance Maintenance	3,221	243	7.54%
ECFE	8,751	650	7.43%
TAAV	2,298	151	6.57%
Field Artillery	4,313	247	5.73%
Missing	23,766	1,463	6.16%
Multiple	379	50	13.19%
Unknown	1,039	120	11.55%
Distribution Management	343	≤ 30	N/A
Financial Management	413	≤ 30	N/A
Legal Services	144	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MCCS	128	≤ 30	N/A
Meteorology and Oceanography	235	≤ 30	N/A
Music	131	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	162	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Skin Disease by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
TAAV	2,287	217	9.49%
Miscellaneous	2,633	248	9.42%
Ground Electronics Maintenance	2,813	263	9.35%
MAGTF	396	37	9.34%
Avionics	4,007	374	9.33%
Aircraft Maintenance	10,255	907	8.84%
Intelligence	2,465	218	8.84%
Ground Ordnance Maintenance	3,177	273	8.59%
Air Control and Support	1,358	116	8.54%
Motor Transport	13,536	1,144	8.45%
Manpower and Administration	3,148	258	8.20%
ECFE	8,657	705	8.14%
Financial Management	408	33	8.09%
Supply	4,711	381	8.09%
Utilities	2,683	217	8.09%
Aviation Ordnance	2,080	166	7.98%
Airfield Services	1,644	130	7.91%
Aviation Logistics	1,345	106	7.88%
Ammo EOD	1,507	118	7.83%
CBRN Defense	730	56	7.67%
Electronics Maintenance	771	59	7.65%
Infantry	38,091	2,880	7.56%
Logistics	3,392	256	7.55%
SIGINT/EW	1,856	138	7.44%
Military Police	3,230	236	7.31%
Food Service	1,616	116	7.18%
Communications	12,204	857	7.02%
Field Artillery	4,272	267	6.25%
Missing	23,232	1,360	5.85%
Multiple	374	33	8.82%
Unknown	1,030	114	11.07%
Combat Camera	260	≤ 30	N/A
Distribution Management	341	≤ 30	N/A
Legal Services	143	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MCCS	127	≤ 30	N/A
Meteorology and Oceanography	236	≤ 30	N/A
Music	129	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	158	≤ 30	N/A
Public Affairs	226	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Weakness by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
MAGTF	398	39	9.80%
Avionics	4,013	329	8.20%
Military Police	3,252	266	8.18%
Motor Transport	13,586	1,102	8.11%
Supply	4,728	380	8.04%
Aviation Ordnance	2,092	166	7.93%
Intelligence	2,469	195	7.90%
Food Service	1,620	127	7.84%
Aircraft Maintenance	10,330	800	7.74%
Utilities	2,693	207	7.69%
Manpower and Administration	3,164	237	7.49%
Ground Ordnance Maintenance	3,190	236	7.40%
Infantry	38,274	2,781	7.27%
Miscellaneous	2,643	186	7.04%
Aviation Logistics	1,349	94	6.97%
ECFE	8,693	601	6.91%
Ground Electronics Maintenance	2,816	187	6.64%
Ammo EOD	1,519	100	6.58%
Logistics	3,410	222	6.51%
Electronics Maintenance	767	49	6.39%
Communications	12,252	754	6.15%
Airfield Services	1,648	99	6.01%
TAAV	2,288	135	5.90%
Air Control and Support	1,363	78	5.72%
CBRN Defense	726	41	5.65%
SIGINT/EW	1,876	101	5.38%
Field Artillery	4,271	196	4.59%
Missing	23,355	983	4.21%
Multiple	378	47	12.43%
Unknown	1,030	111	10.78%
Combat Camera	261	≤ 30	N/A
Distribution Management	340	≤ 30	N/A
Financial Management	408	≤ 30	N/A
Legal Services	142	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MCCS	126	≤ 30	N/A
Meteorology and Oceanography	233	≤ 30	N/A
Music	131	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	159	≤ 30	N/A
Public Affairs	228	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Cough by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Public Affairs	228	32	14.04%
Combat Camera	261	31	11.88%
MAGTF	399	43	10.78%
Avionics	4,044	375	9.27%
Miscellaneous	2,649	235	8.87%
Intelligence	2,470	215	8.70%
Military Police	3,255	270	8.29%
Aviation Ordnance	2,096	169	8.06%
Manpower and Administration	3,167	248	7.83%
Aviation Logistics	1,354	106	7.83%
Aircraft Maintenance	10,352	807	7.80%
Logistics	3,421	263	7.69%
Food Service	1,623	123	7.58%
CBRN Defense	727	55	7.57%
Utilities	2,698	204	7.56%
Airfield Services	1,651	118	7.15%
Motor Transport	13,614	972	7.14%
Ground Electronics Maintenance	2,832	202	7.13%
Supply	4,734	334	7.06%
Ground Ordnance Maintenance	3,209	217	6.76%
Electronics Maintenance	771	52	6.74%
ECFE	8,705	577	6.63%
Air Control and Support	1,356	87	6.42%
Communications	12,274	771	6.28%
Infantry	38,388	2,331	6.07%
Ammo EOD	1,522	88	5.78%
TAAV	2,301	131	5.69%
SIGINT/EW	1,881	99	5.26%
Field Artillery	4,287	186	4.34%
Missing	23,563	1,062	4.51%
Multiple	381	48	12.60%
Unknown	1,029	113	10.98%
Distribution Management	341	≤ 30	N/A
Financial Management	411	≤ 30	N/A
Legal Services	143	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MCCS	126	≤ 30	N/A
Meteorology and Oceanography	235	≤ 30	N/A
Music	132	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	161	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Red Eyes by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Miscellaneous	2,642	156	5.90%
Military Police	3,238	188	5.81%
Electronics Maintenance	768	43	5.60%
Supply	4,710	257	5.46%
ECFE	8,666	458	5.29%
Manpower and Administration	3,158	163	5.16%
Motor Transport	13,559	700	5.16%
Intelligence	2,465	127	5.15%
Ground Electronics Maintenance	2,816	144	5.11%
Air Control and Support	1,353	68	5.03%
Aviation Ordnance	2,080	100	4.81%
Utilities	2,685	127	4.73%
Avionics	4,010	188	4.69%
Aviation Logistics	1,349	62	4.60%
Aircraft Maintenance	10,276	471	4.58%
Ammo EOD	1,515	68	4.49%
TAAV	2,289	102	4.46%
Logistics	3,404	151	4.44%
Ground Ordnance Maintenance	3,187	138	4.33%
Airfield Services	1,645	70	4.26%
Communications	12,226	479	3.92%
Infantry	38,205	1,457	3.81%
Food Service	1,619	57	3.52%
Field Artillery	4,269	129	3.02%
SIGINT/EW	1,868	56	3.00%
Missing	23,225	689	2.97%
Multiple	378	≤ 30	N/A
Unknown	1,026	66	6.43%
CBRN Defense	729	≤ 30	N/A
Combat Camera	261	≤ 30	N/A
Distribution Management	342	≤ 30	N/A
Financial Management	411	≤ 30	N/A
Legal Services	143	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MAGTF	401	≤ 30	N/A
MCCS	128	≤ 30	N/A
Meteorology and Oceanography	235	≤ 30	N/A
Music	131	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	159	≤ 30	N/A
Public Affairs	229	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Difficulty Breathing by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Miscellaneous	2,647	158	5.97%
Electronics Maintenance	773	45	5.82%
Manpower and Administration	3,168	171	5.40%
Military Police	3,257	174	5.34%
Avionics	4,018	205	5.10%
Logistics	3,411	174	5.10%
Intelligence	2,472	124	5.02%
Utilities	2,694	132	4.90%
Aviation Logistics	1,352	66	4.88%
Motor Transport	13,606	664	4.88%
Airfield Services	1,657	76	4.59%
Supply	4,722	216	4.57%
Aviation Ordnance	2,095	95	4.53%
Air Control and Support	1,357	61	4.50%
Ground Electronics Maintenance	2,825	126	4.46%
Food Service	1,620	72	4.44%
CBRN Defense	729	32	4.39%
Ground Ordnance Maintenance	3,198	140	4.38%
ECFE	8,694	377	4.34%
Aircraft Maintenance	10,302	443	4.30%
Ammo EOD	1,525	65	4.26%
Infantry	38,301	1,571	4.10%
Communications	12,253	470	3.84%
Field Artillery	4,279	129	3.01%
SIGINT/EW	1,871	54	2.89%
TAAV	2,293	66	2.88%
Missing	23,453	773	3.30%
Multiple	377	≤ 30	N/A
Unknown	1,027	53	5.16%
Combat Camera	263	≤ 30	N/A
Distribution Management	340	≤ 30	N/A
Financial Management	411	≤ 30	N/A
Legal Services	142	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MAGTF	397	≤ 30	N/A
MCCS	131	≤ 30	N/A
Meteorology and Oceanography	235	≤ 30	N/A
Music	131	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	161	≤ 30	N/A
Public Affairs	229	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Chest Pain by MOS

MOS Category	# of Marines in MOS	# of Marines Reporting Symptom	Proportion of Marines
Manpower and Administration	3,164	156	4.93%
Motor Transport	13,562	637	4.70%
Military Police	3,242	150	4.63%
Aviation Ordnance	2,088	96	4.60%
Miscellaneous	2,636	121	4.59%
Airfield Services	1,644	75	4.56%
Utilities	2,680	118	4.40%
Supply	4,713	203	4.31%
Intelligence	2,462	105	4.26%
Logistics	3,395	139	4.09%
Food Service	1,616	66	4.08%
Avionics	4,012	163	4.06%
Infantry	38,174	1,539	4.03%
Communications	12,223	490	4.01%
ECFE	8,670	348	4.01%
Air Control and Support	1,359	53	3.90%
Ground Ordnance Maintenance	3,188	122	3.83%
Ground Electronics Maintenance	2,814	104	3.70%
TAAV	2,291	82	3.58%
Aircraft Maintenance	10,272	366	3.56%
Aviation Logistics	1,347	46	3.41%
Ammo EOD	1,520	51	3.36%
Field Artillery	4,266	121	2.84%
SIGINT/EW	1,865	38	2.04%
Missing	23,197	632	2.72%
Multiple	380	32	8.42%
Unknown	1,028	70	6.81%
CBRN Defense	728	≤ 30	N/A
Combat Camera	260	≤ 30	N/A
Distribution Management	341	≤ 30	N/A
Electronics Maintenance	773	≤ 30	N/A
Financial Management	410	≤ 30	N/A
Legal Services	142	≤ 30	N/A
Linguist	≤ 30	≤ 30	N/A
MAGTF	398	≤ 30	N/A
MCCS	128	≤ 30	N/A
Meteorology and Oceanography	236	≤ 30	N/A
Music	131	≤ 30	N/A
Navigation Officer & Enlisted Flight Crew	161	≤ 30	N/A
Public Affairs	228	≤ 30	N/A
Training	≤ 30	≤ 30	N/A

Appendix D: Results by MOS Category

Air Control and Support ($n = 1,468$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Air Control and Support occupations within Occupational Field 72:

The Air Control, Air Traffic Control, Air Support, And Antiair Warfare OccFld includes the operation and management of the air command and control functions associated with the Marine Aircraft Wing. Qualifications required include manual dexterity for man-machine interface, highly developed visual/auditory skills, the ability to communicate effectively with radios, and the leadership and skills to work effectively as a member of a command and control team. The duties involve skills and procedures that are initially acquired through formal schools and further developed by individual and team training. Air Control, Air Traffic Control, Air Support And Antiair Warfare Marines will be required to learn the emplacement, cabling orientation and operation of air command, control, traffic control, and antiair warfare defense systems and equipment. Entry-Level Assignments Include LAAD Gunner, Air Command and Control Operator, Air Traffic Controller, and Air Support Operations Operator. A wide variety of FMF billets are available in the OccFld in the active and reserve forces at group, squadron/battalion, or battery level. Numerous Non-FMF assignments also exist at the Marine Corps Systems Command, Marine Corps Air Stations worldwide, as instructors at MOS-producing schools. Marines will participate in routine air command and control functions while training for a designated MOS within the OccFld (p. 937).

Examples of Self-Reported Air Control and Support MOSs

The five most frequent Air Control and Support military occupational specialties during deployment that were self-reported on the PDHA were 7212 ($n = 495$), 7257 ($n = 357$), 7242 ($n = 264$), 7234 ($n = 158$), and 7236 ($n = 55$).

Results

Active duty enlisted Marines working in Air Control and Support MOSs during deployment infrequently reported blast exposure (5%; Figure 2.1). When exposed to a qualifying event that could prompt a concussion, positive concussion screens were rare in general ($n \leq 30$; Figures 2.2 and 2.3). Of Marines working in Air Control and Support, 47% reported experiencing at least one symptom during deployment, with 31%, 27%, and 30% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 2.4). Back pain was the most commonly reported symptom in this MOS category (20%), followed by headache (17%), fatigue (15%), joint issues (14%), and muscle ache (14%). The remaining symptoms were reported by fewer than 10% of Marines working in Air Control and Support MOSs (Figure 2.5).

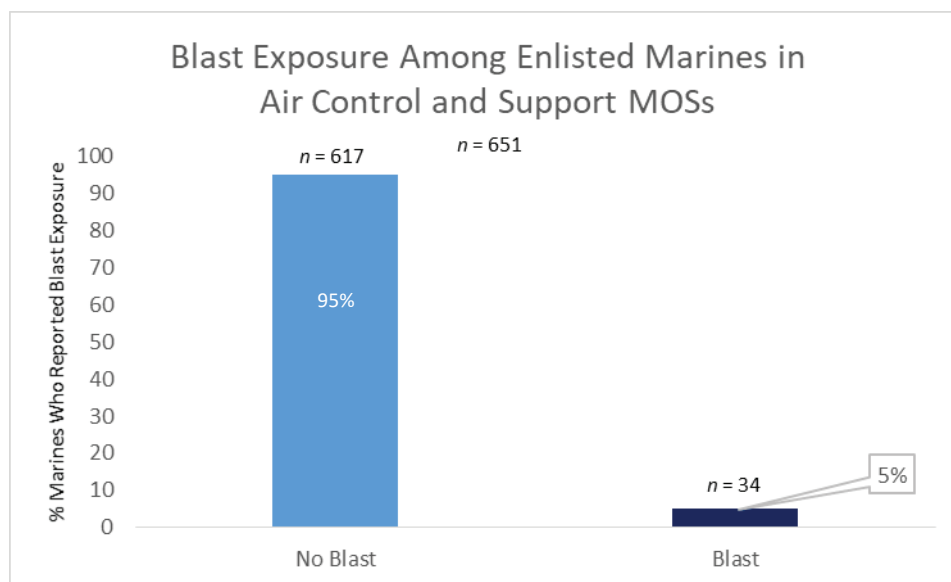


Figure 1.1

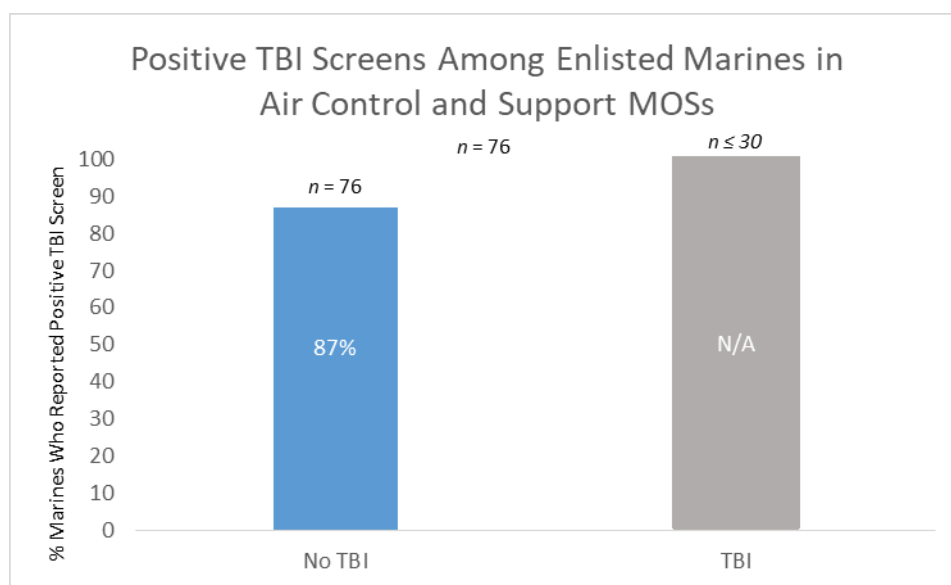


Figure 1.2

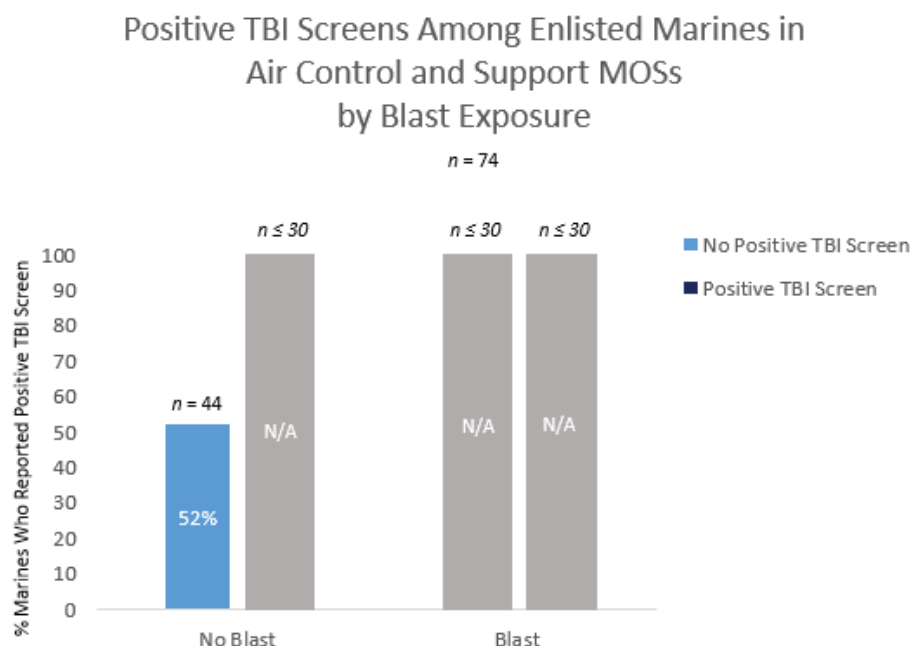


Figure 1.3

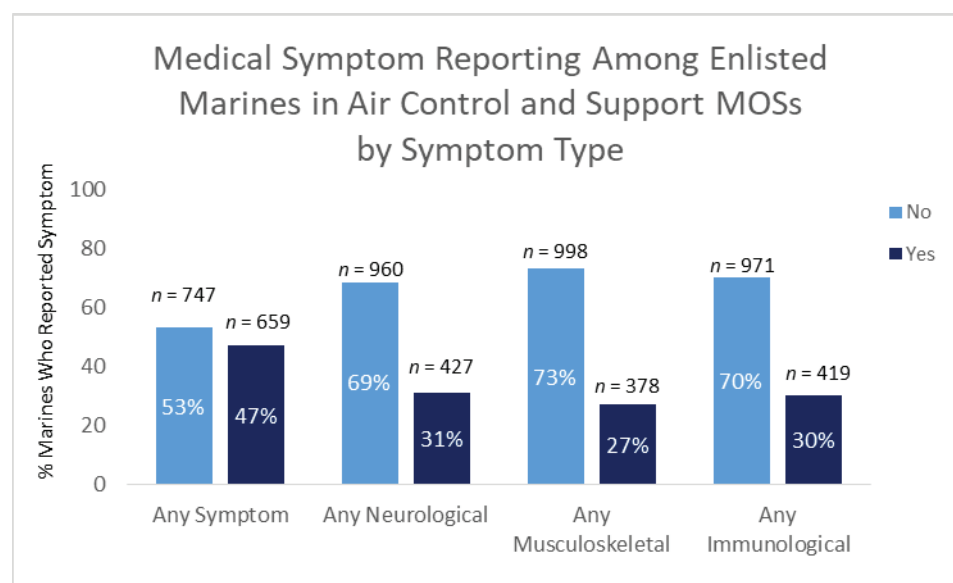


Figure 1.4

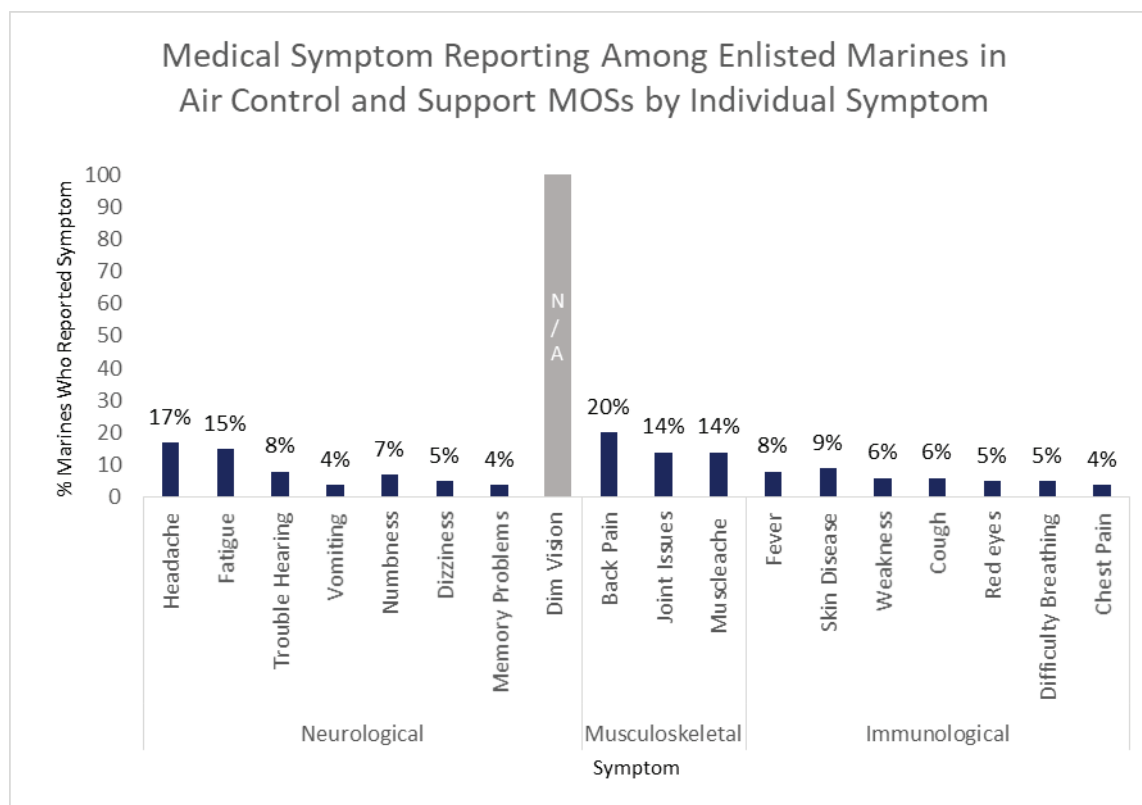


Figure 1.5

Aircraft Maintenance ($n = 11,298$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Aircraft Maintenance occupations within Occupational Field 60, 61, and 62:

The Aircraft Maintenance OccFlds includes direct and indirect support of the total airframes and power plant package of all aviation aircraft weapons systems. While there is similarity in the skills required to provide this support, the systems being supported are diverse. The following examples are provided: direct support-repair and servicing at the organizational maintenance activity which is normally accomplished on aircraft, e.g., preflight and servicing of aircraft and their systems; indirect support-repair of components at the intermediate maintenance activity which is normally accomplished off aircraft, e.g., hydraulic actuators, servos, and accumulators, aircraft engines, and transmissions. Marines entering these fields receive MOS 6000, Basic Aircraft Maintenance Marine, and then progress through specific hard skill MOSs. After completion of formal training, Marines are qualified to maintain airframes and aircraft components. The opportunity to participate in a formal apprenticeship program leading to receipt of a Department of Labor Certification of Apprenticeship Completion maybe available in some MOSs within OccFlds 60/61/62. As the Marine progresses, repair and administrative requirements for multiple systems take on an equal importance until the Marine is placed in a management/supervisory position. Billets for both repair and administration are varied and extend from the squadron level to staff positions at the wing, force commander, and Headquarters U.S. Marine Corps level (p. 832).

Examples of Self-Reported Aircraft Maintenance MOSs

The five most frequent Aircraft Maintenance military occupational specialties during deployment that were self-reported on the PDHA were 6046 ($n = 793$), 6048 ($n = 690$), 6153 ($n = 578$), 6114 ($n = 572$), and 6154 ($n = 559$).

Results

Active duty enlisted Marines working in Aircraft Maintenance MOSs during deployment infrequently reported blast exposure (6%; Figure 3.1). When exposed to a qualifying event that could prompt a concussion, 14% screened positive for concussion (Figure 3.2); impact-associated concussions occurred often (12%) and blast-associated TBIs were rare ($n \leq 30$; Figure 3.3). Of Marines in Aircraft Maintenance MOSs, 49% reported experiencing at least one symptom during deployment, with 34%, 27%, and 31% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 3.4). Fatigue was the most commonly reported symptom in this MOS category (19%), followed by headache (17%), back pain (17%), joint issues (15%), muscle ache (14%), and fever (10%). The remaining symptoms were reported by fewer than 10% of Marines working in Aircraft Maintenance MOSs (Figure 3.5).

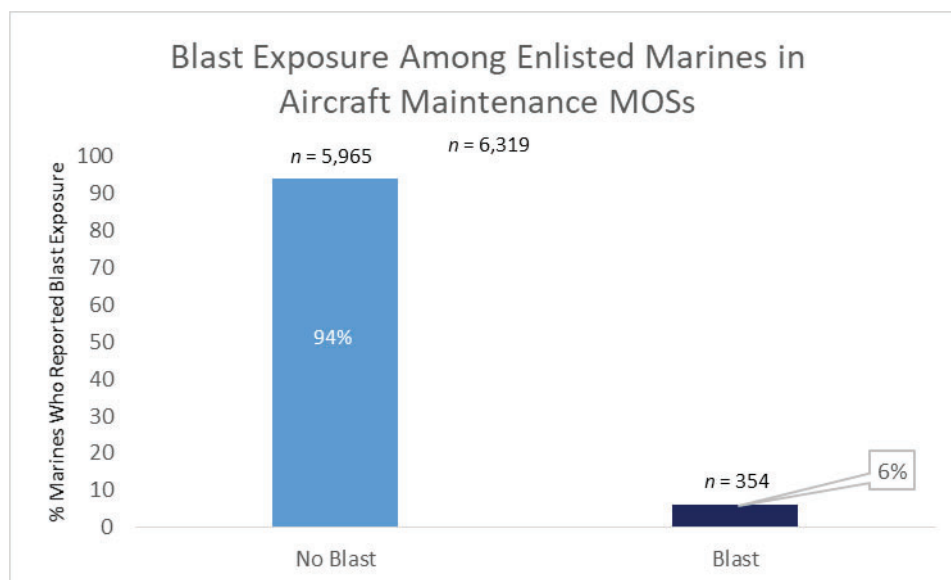


Figure 2.1

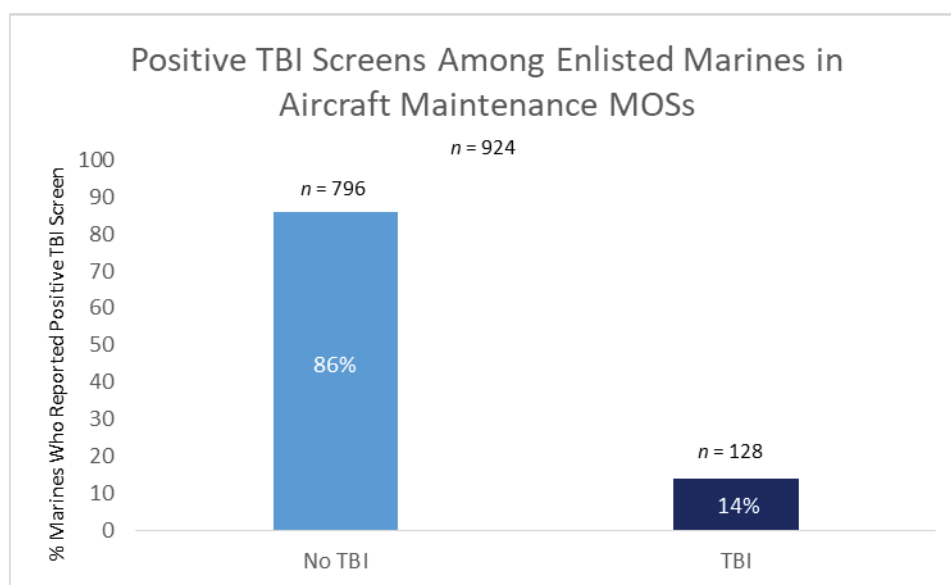


Figure 2.2

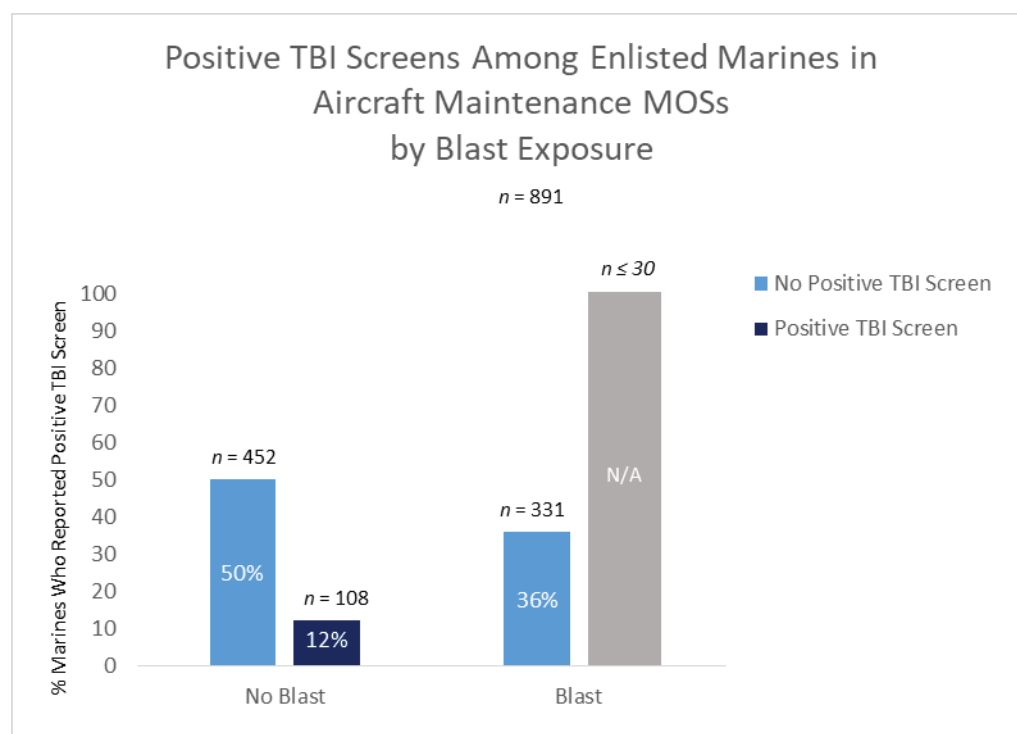


Figure 2.3

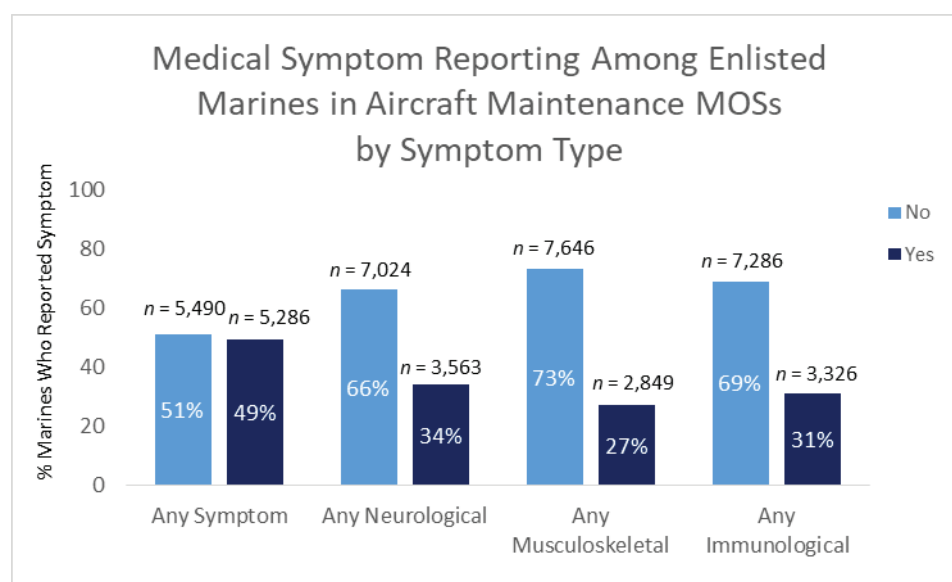


Figure 2.4

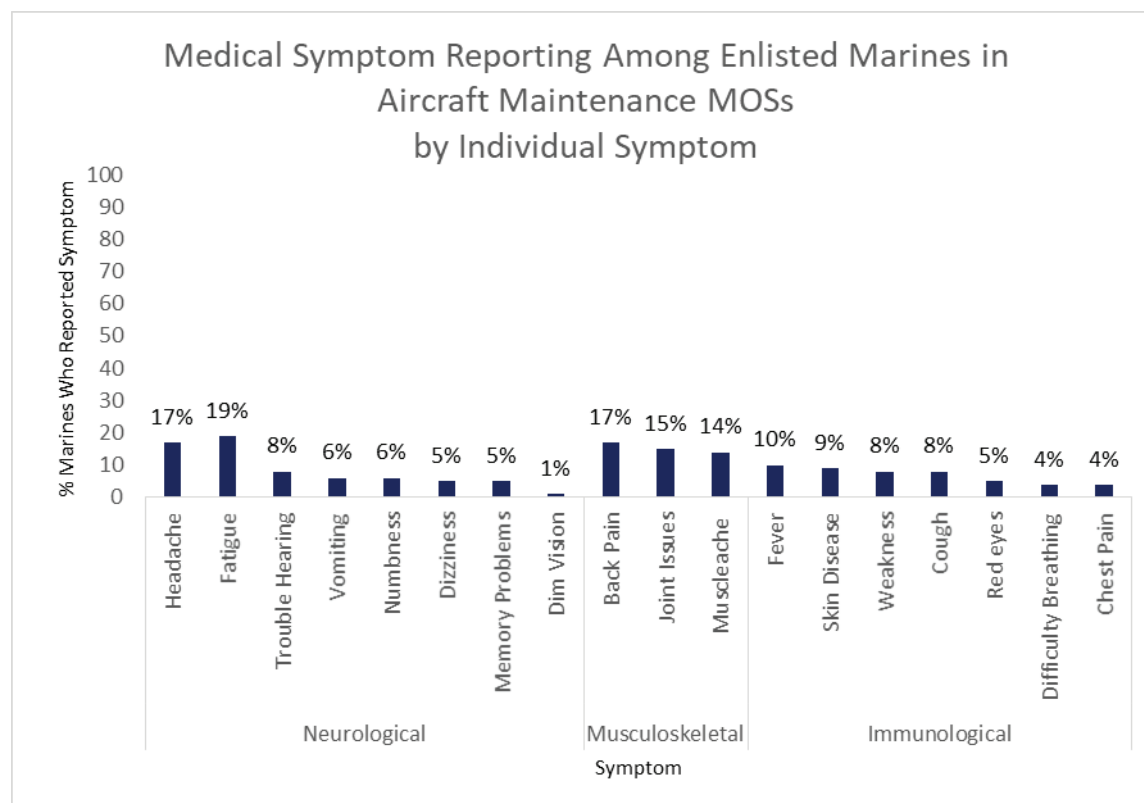


Figure 2.5

Airfield Services ($n = 1,750$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Airfield Services occupations within Occupational Field 70:

Marines entering this OccFld will receive MOS 7000, Basic Airfield Services Marine. Formal schooling is provided to Marines entering the 7000 OccFld. The Airfield Services OccFld includes the performance of Expeditionary Airfield (EAF) Systems Technician (MOS 7011), Aviation Operations Specialist (MOS 7041), and Aircraft Rescue Fire Fighting (ARFF) Specialist (MOS 7051). In addition to the required basic technical skills of the particular specialty, Airfield Services Marines must have the ability to work closely with others and must have the aptitude to learn all facets of equipment, clerical, and administrative procedures unique to the MOS to which assigned (p. 928).

Examples of Self-Reported Airfield Services MOSs

The five most frequent Airfield Services military occupational specialties during deployment that were self-reported on the PDHA were 7051 ($n = 685$), 7041 ($n = 578$), 7011 ($n = 382$), 7051 Aircraft Rescue and Fire Fighting ($n = 7$), and aircraft recovery ($n = 7$).

Results

Active duty enlisted Marines working in Airfield Services MOSs during deployment infrequently reported blast exposure (4%; Figure 4.1). When exposed to a qualifying event that could prompt a concussion, positive concussion screens were rare in general ($n \leq 30$; Figures 4.2 and 4.3). Of Marines working in Airfield Services, 48% reported experiencing at least one symptom during deployment, with 32%, 28%, and 29% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 4.4). Back pain was the most commonly reported symptom in this MOS category (18%), followed by headache (17%), fatigue (17%), muscle ache (15%), and joint issues (14%). The remaining symptoms were reported by fewer than 10% of Marines working in Airfield Service MOSs (Figure 4.5).

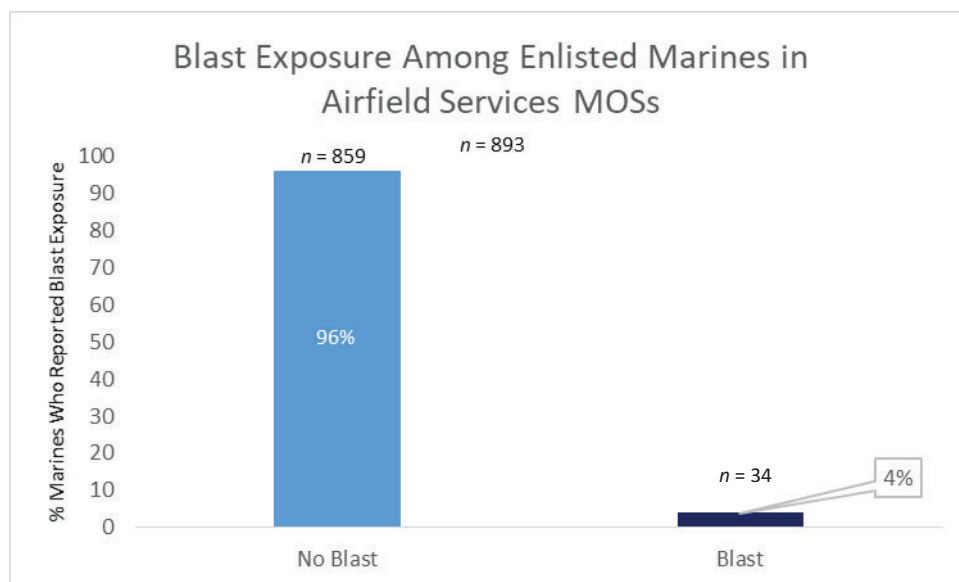


Figure 3.1

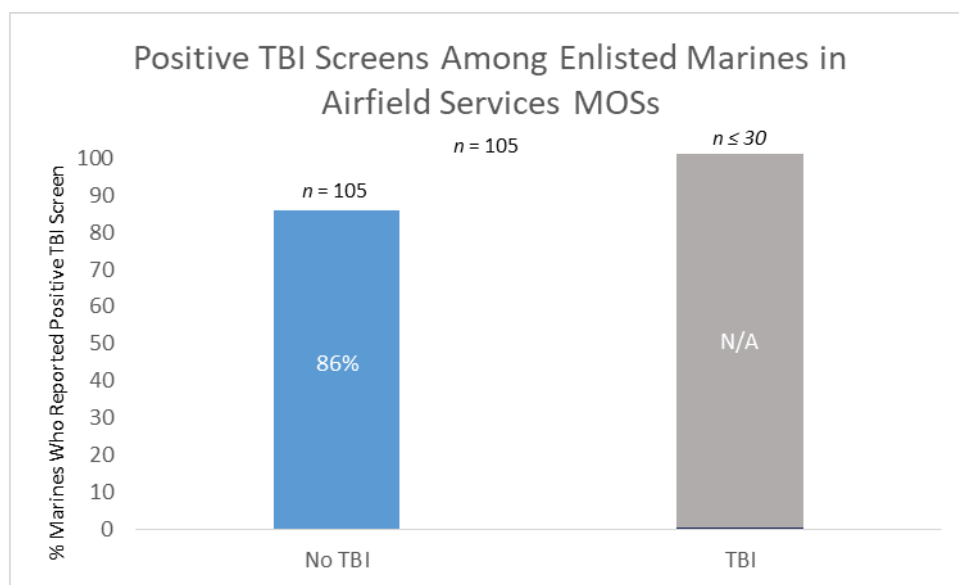


Figure 3.2

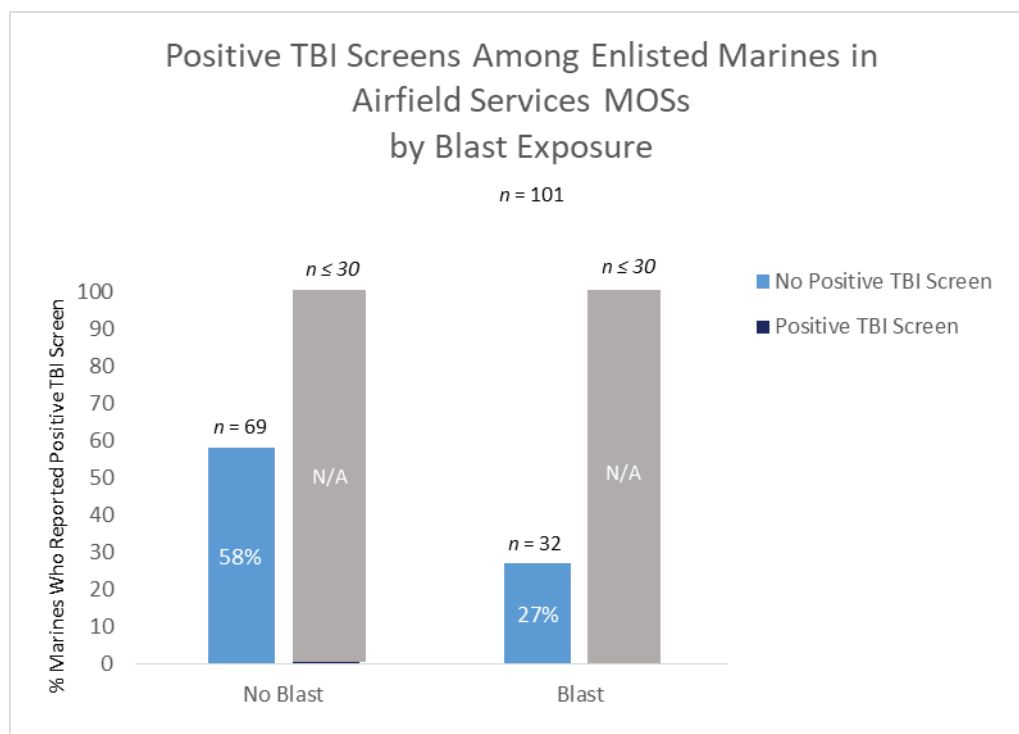


Figure 3.3

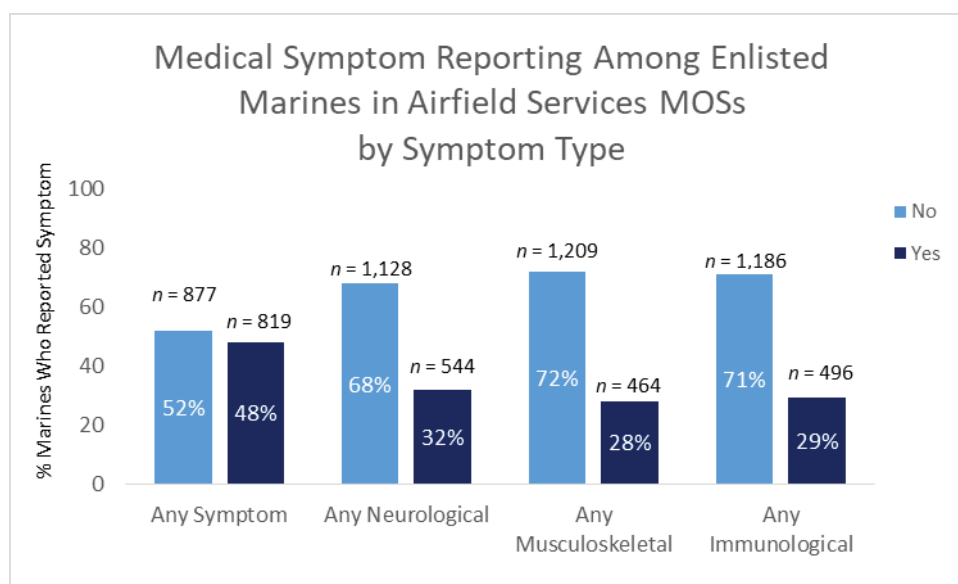


Figure 3.4

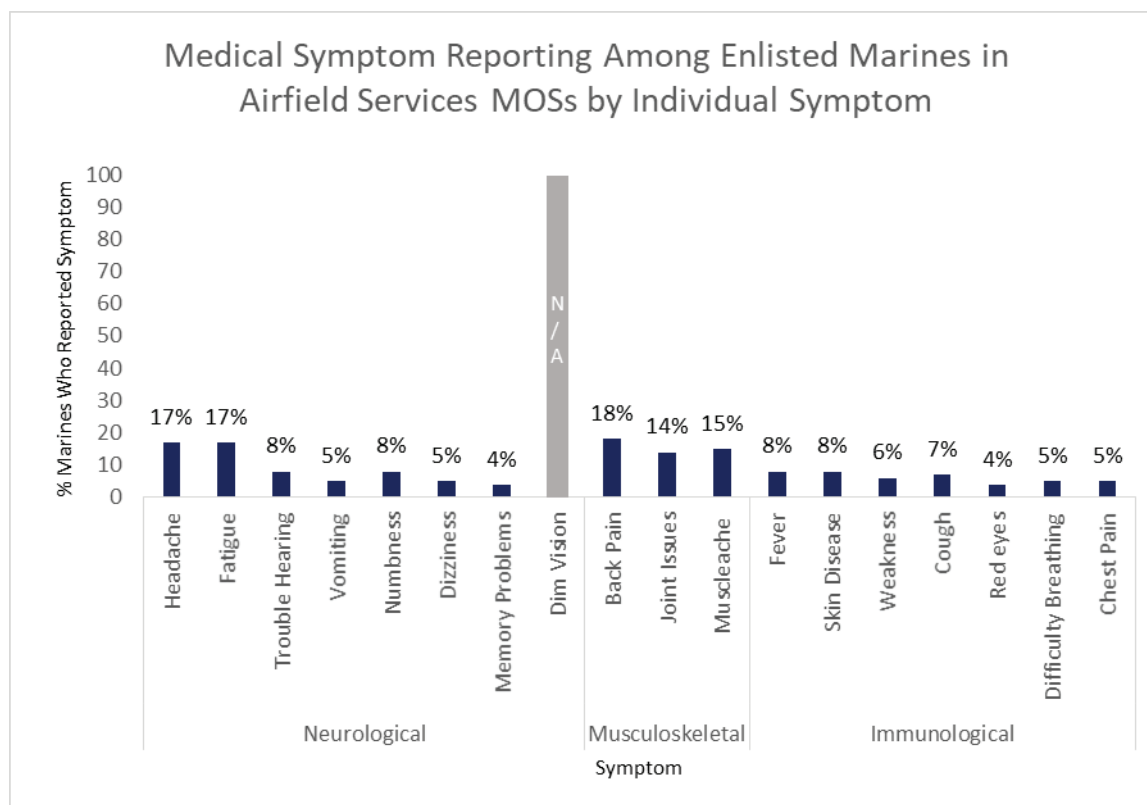


Figure 3.5

Ammunition and Explosive Ordnance Disposal (EOD; $n = 1,646$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Ammunition and EOD occupations within Occupational Field 23:

The Ammunition and EOD OccFld includes planning, operations, and management related to a very hazardous group of materiel. These MOSs require personnel who are mature, mentally sound, and have evidenced a willingness and capability to perform their assigned duties in a reliable manner. The duties MOSs in this field are as follows: the ammunition technician handles, transports, and stores all type of ammunition, explosives, missiles, inspects materiel to determine serviceability and need for repair or destruction; the EOD technician provides the commander with the capability to neutralize hazards associated with conventional explosive ordnance, weapons of mass destruction (WMD) and improvised explosive devices (IED); and conducts ordnance technical intelligence and dynamic explosive entry (p. 533).

Examples of Self-Reported Ammunition EOD MOSs

The five most frequent Ammunition and EOD military occupational specialties during deployment that were self-reported on the PDHA were 2311 ($n = 1,115$), 2336 ($n = 440$), EOD ($n = 8$), 2336/EOD ($n = 7$), and Ammo Tech ($n = 4$).

Results

Active duty enlisted Marines working in Ammunition and EOD MOSs during deployment frequently reported blast exposure (21%; Figure 5.1). When exposed to a qualifying event that could prompt a concussion, 21% screened positive for concussion (Figure 5.2). Impact-associated concussions were rare ($n \leq 30$); blast was the primary mechanism of injury for those with positive concussion screens (15%; Figure 5.3). Of Marines in Ammunition and Explosive Ordnance Disposal MOSs, 48% reported experiencing at least one symptom during deployment, with 33%, 30%, and 26% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 5.4). Back pain was the most commonly reported symptom in this MOS category (20%), followed by fatigue (17%), headache (16%), joint issues (16%), muscle ache (15%), and ringing in the ears (11%). The remaining symptoms were reported by fewer than 10% of Marines working in Ammunition and Explosive Ordnance Disposal MOSs (Figure 5.5).

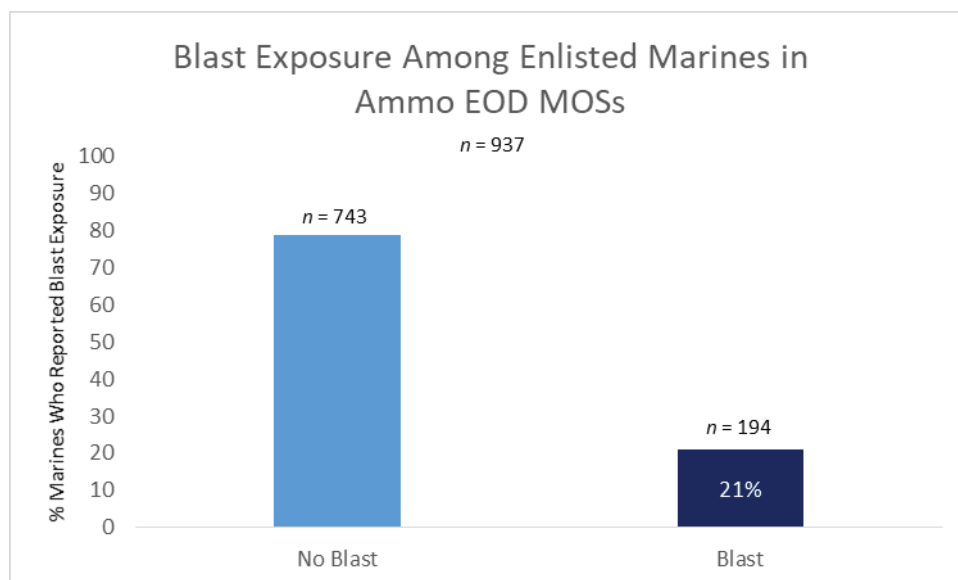


Figure 4.1

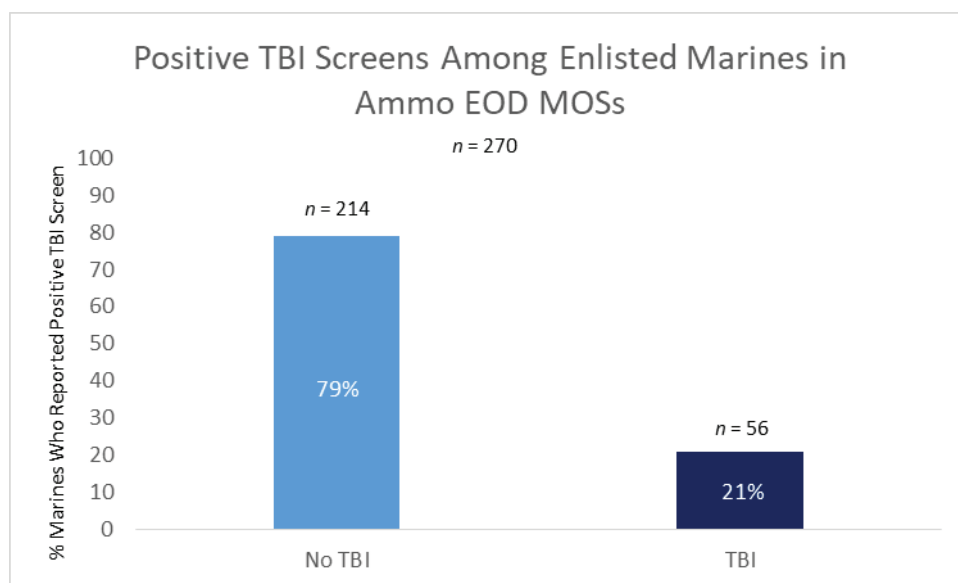


Figure 4.2

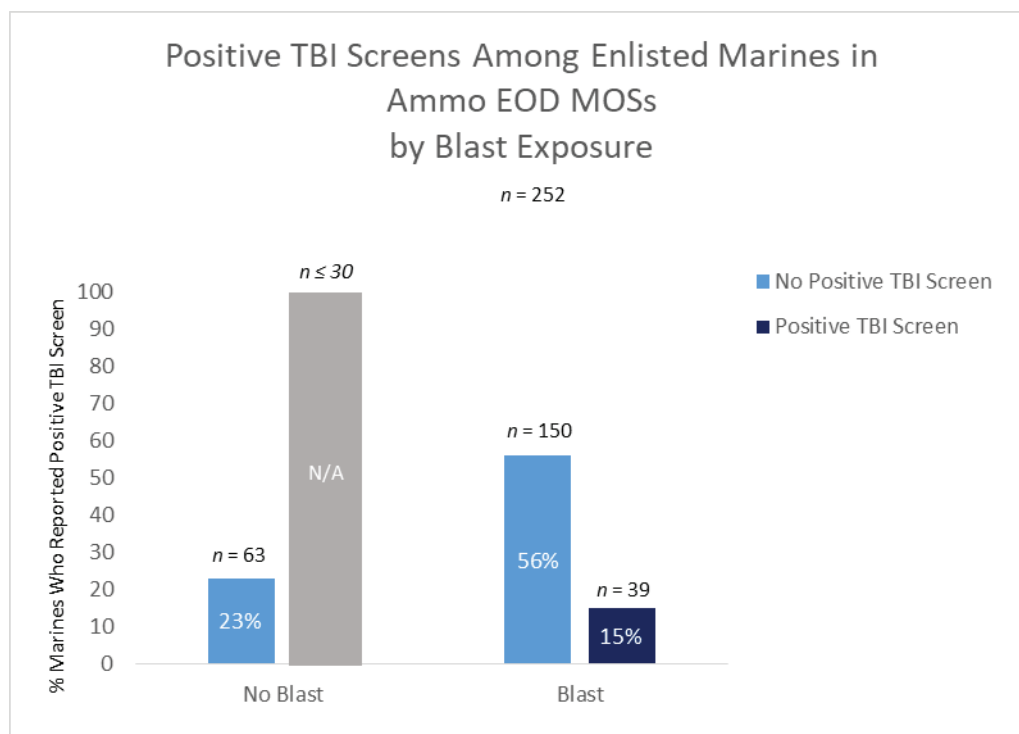


Figure 4.3

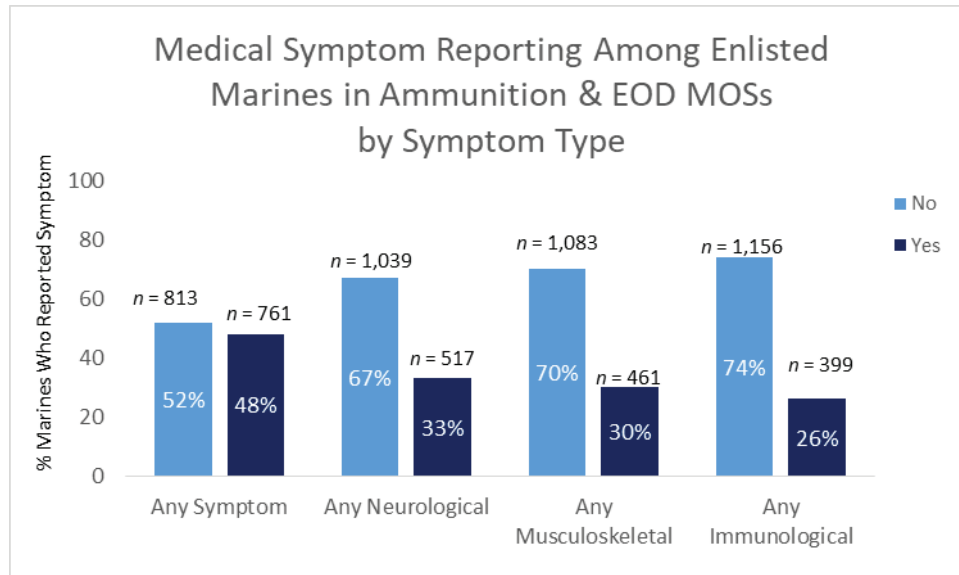


Figure 4.4

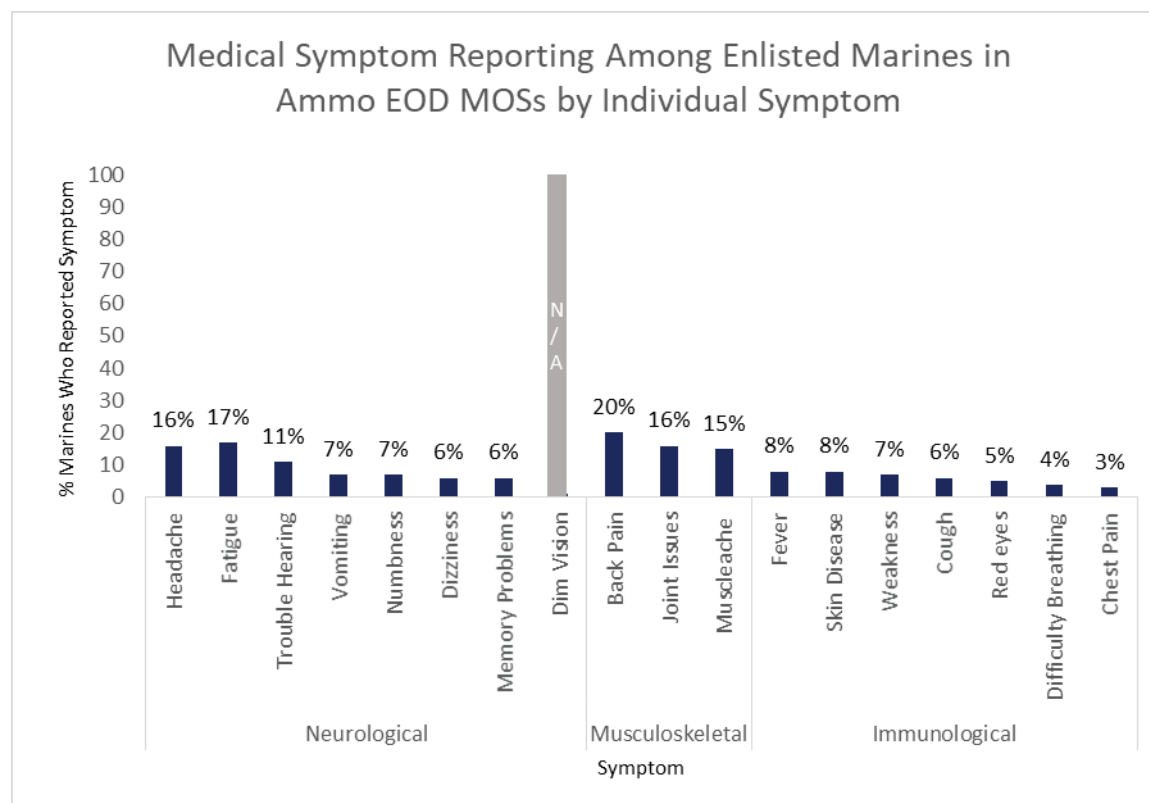


Figure 4.5

Aviation Logistics (*n* = 1,427)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Aviation Logistics occupations within Occupational Field 66:

The Aviation Logistics OccFld includes personnel in the areas of aviation supply, aviation information systems, and aviation logistics planning. Qualifications required include operating various information technology systems; understanding and utilizing related publications, possessing distinct communicative and writing skills, and the ability to work independently and closely with additional logistical functional areas. The duties involve administration and operational procedures, office and warehouse management procedures; preparation and use of military publications and the preparation of accounting documents. Formal schooling is provided to Marines entering the Aviation Supply Specialist and Aviation Information Systems Specialist MOSs. Types of entry-level jobs include work as Aviation Supply Logistics and AIS. There are a wide variety of billets available in the OccFld ranging from duty at all level of the Marine Aircraft Wing/Marine Aviation Logistics Squadron to various Non-FMF billets such as HMX-1 and instructor duty. Aviation Logisticians are primarily aviation supply, aviation maintenance, aviation ordnance, and avionics personnel on higher headquarters staffs that coordinate/conduct aviation logistics planning in support of OPLANS/CONPLANS. In addition to a thorough understanding of their primary MOS, these personnel are involved with the Marine Aviation Logistics Support Program (MALSP), the Marine Corps Planning Process, the Joint Operations Planning and Execution System (JOPES), Maritime Prepositioning Force (MPF) operations, and employment of the aviation logistics ship (TAVB). The Aviation Logistics OccFld has been expanded to include principal responsibility in the management and execution of CNO and CMC-directed strategies for continuous process improvement (p. 915).

Examples of Self-Reported Aviation Logistics MOSs

The five most frequent Aviation Logistics military occupational specialties during deployment that were self-reported on the PDHA were 6672 (*n* = 1,075), 6694 (*n* = 282), Aviation Supply (*n* = 9), Aviation Supply Specialist (*n* = 4), and aviation supply (*n* = 3).

Results

Active duty enlisted Marines working in Aviation Logistics MOSs during deployment infrequently reported blast exposure (6%; Figure 6.1). When exposed to a qualifying event that could prompt a concussion, positive concussion screens were rare in general (*n* ≤ 30; Figures 6.2 and 6.3). Of Marines working in Aviation Logistics, 43% reported experiencing at least one symptom during deployment, with 28%, 23%, and 29% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 6.4). Headache was the most commonly reported symptom in this MOS category (16%), followed by fatigue (16%), back pain (14%), muscle ache (13%), joint issues (12%), and fever (10%). The remaining symptoms were reported by fewer than 10% of Marines working in Aviation Logistics MOSs (Figure 6.5).

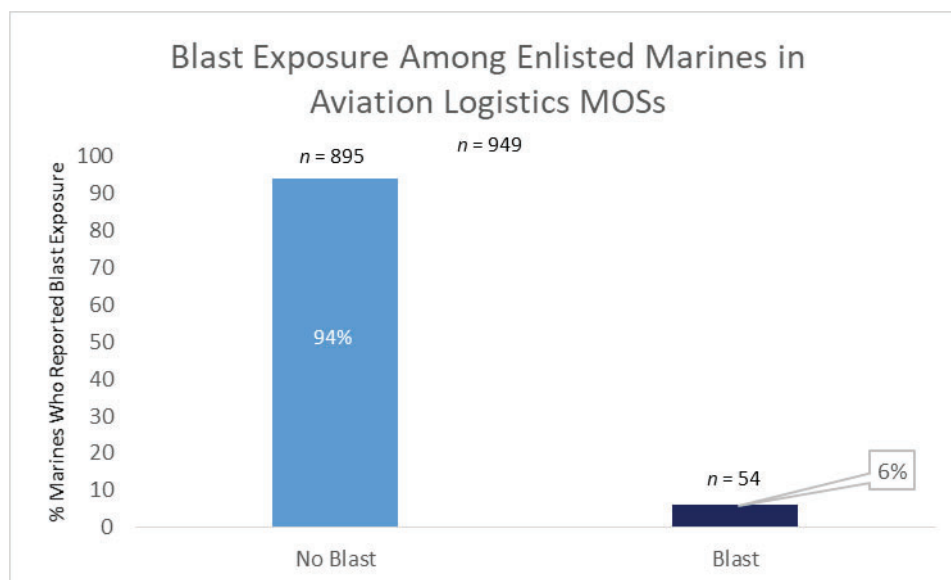


Figure 5.1

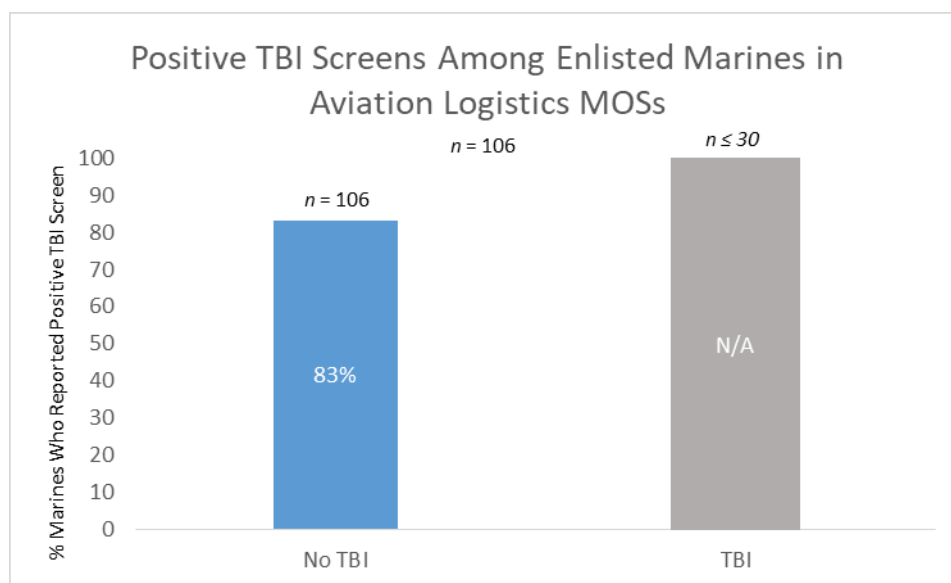


Figure 5.2

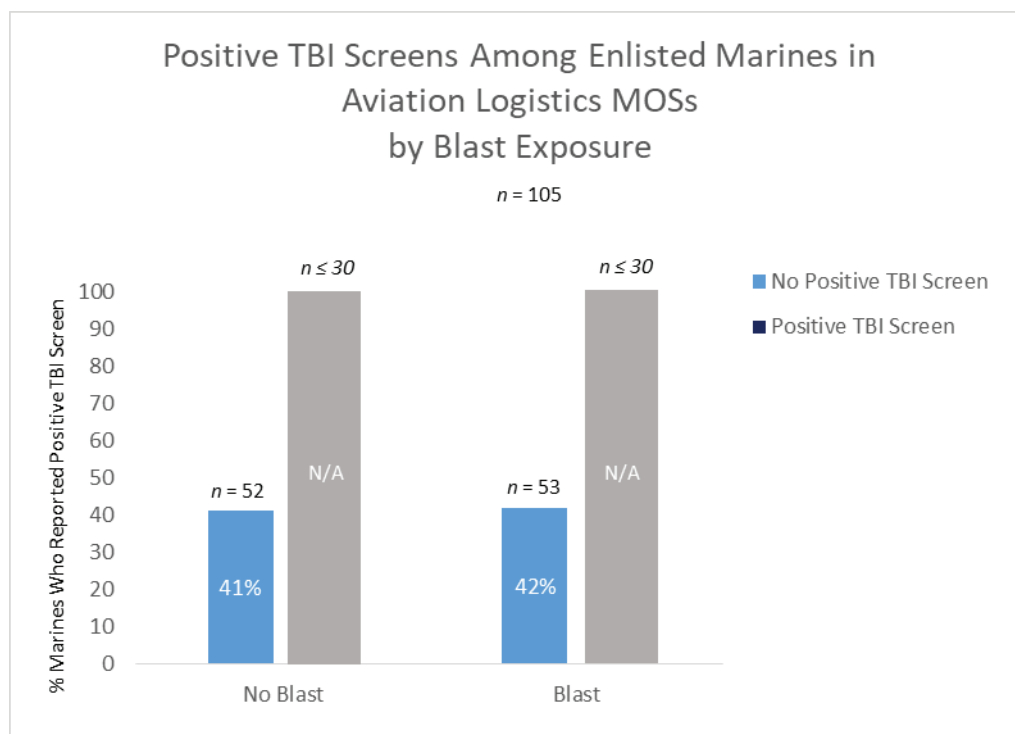


Figure 5.3

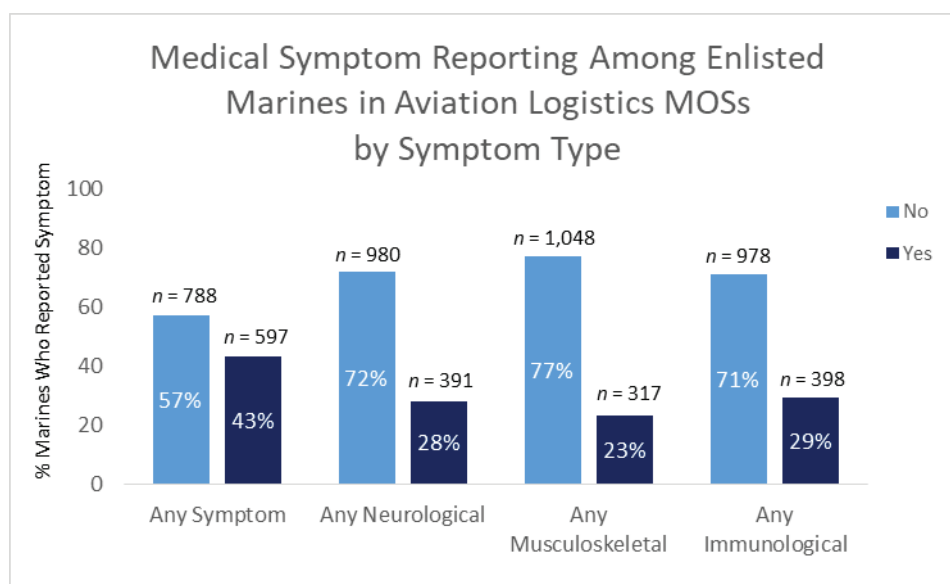


Figure 5.4

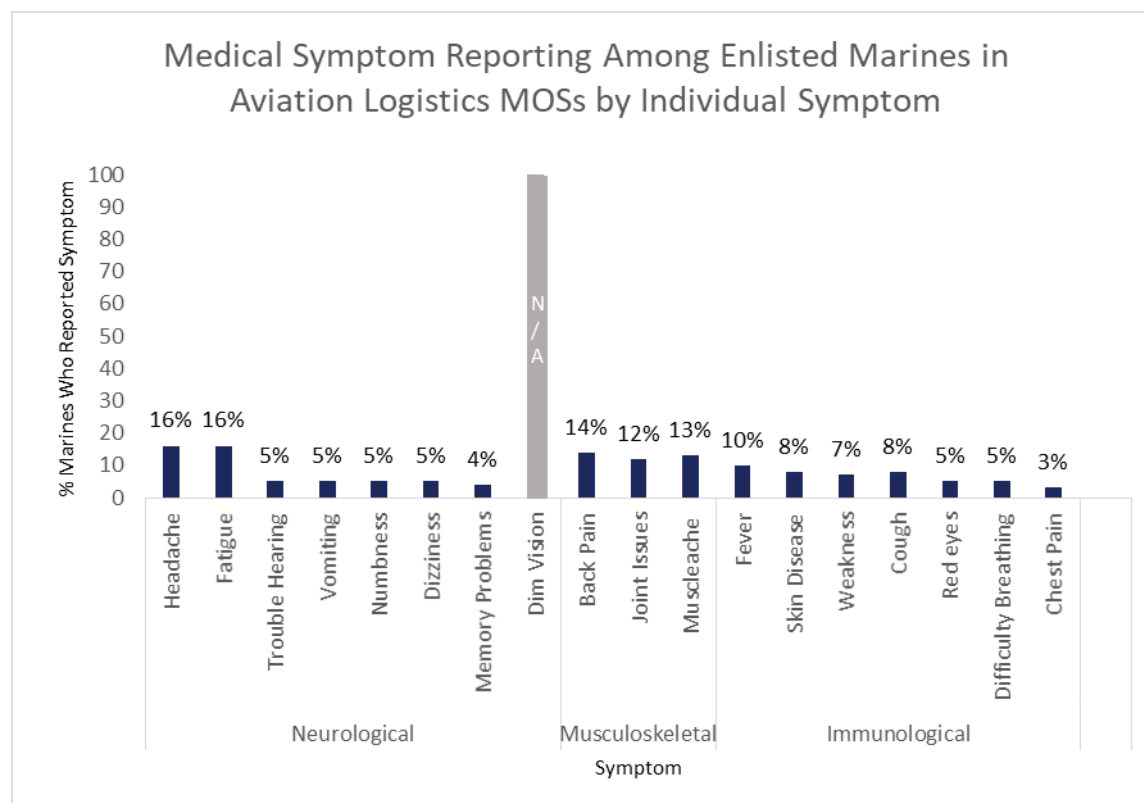


Figure 5.5

Aviation Ordnance (*n* = 2,274)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Aviation Ordnance occupations within Occupational Field 65:

Aviation ordnance MOSs handle aviation Class V (A) ammunition issues from safety to procurement, storage, buildup, delivery, and subsequent aircraft loading and downloading. The OccFld includes organizational and intermediate maintenance of aircraft weapons systems, guns, gun pods, bomb racks, missile launchers, and aviation ordnance support equipment. Aviation ordnance Marines are qualified and certified under current directives. Formal schooling is provided to Marines entering the OccFld. A wide variety of billet assignments are available as shown in the figure later in this entry. Marines entering this OccFld receive MOS 6500, Basic Aviation Ordnance Marine, and attend Aviation Ordnanceman, Class AO A1 School at Pensacola, FL with follow-on training at one of several CNATT AO(C) Courses dependent upon anticipated fleet assignment. Upon completion of AO(C) Course, they will participate in routine aviation ordnance functions and attend specialized schools while training for a designated MOS within the OccFld (p. 902).

Examples of Self-Reported Aviation Ordnance MOSs

The five most frequent Aviation Ordnance military occupational specialties during deployment that were self-reported on the PDHA were 6531 (*n* = 1,227), 6541 (*n* = 800), 6591 (*n* = 112), Aviation Ordnance (*n* = 11), and Aviation Ordnance Technician (*n* = 11).

Results

Active duty enlisted Marines working in Aviation Ordnance MOSs during deployment infrequently reported blast exposure (7%; Figure 7.1). When exposed to a qualifying event that could prompt a concussion, positive concussion screens were rare in general (*n* ≤ 30; Figures 7.2 and 7.3). Of Marines working in Aviation Ordnance, 47% reported experiencing at least one symptom during deployment, with 31%, 27%, and 31% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 7.4). Back pain was the most commonly reported symptom in this MOS category (17%), followed by fatigue (17%), headache (16%), muscle ache (15%), joint issues (14%), and fever (10%). The remaining symptoms were reported by fewer than 10% of Marines working in Aviation Ordnance MOSs (Figure 7.5).

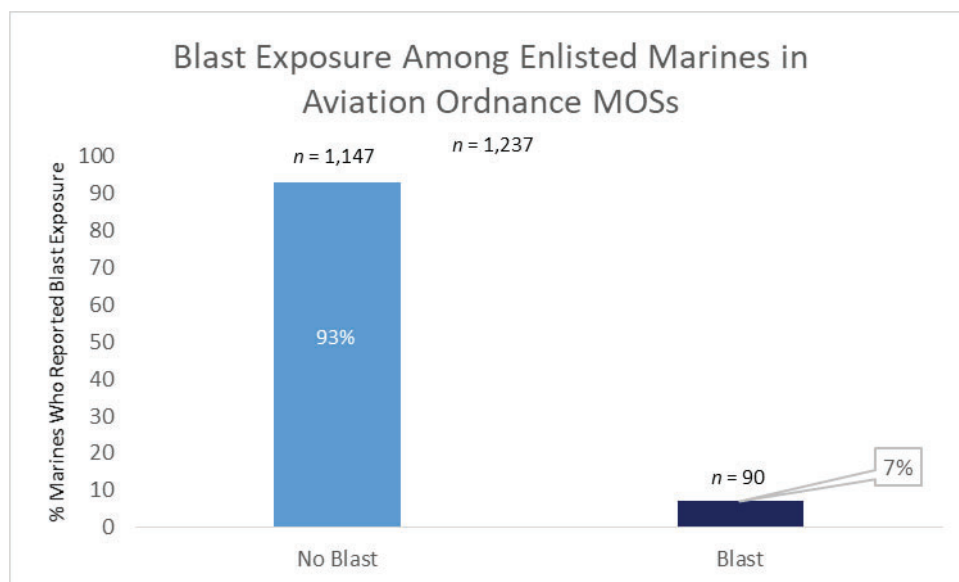


Figure 6.1

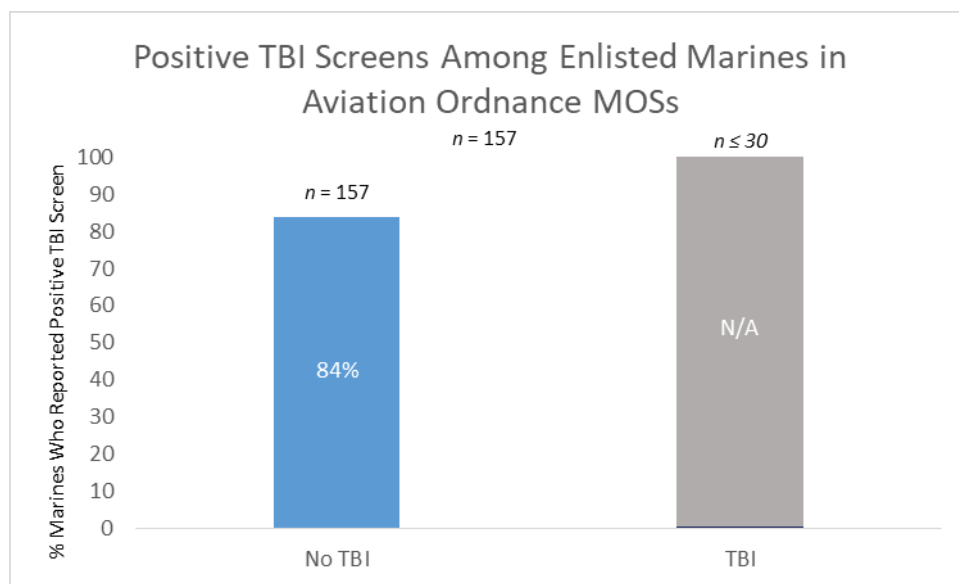


Figure 6.2

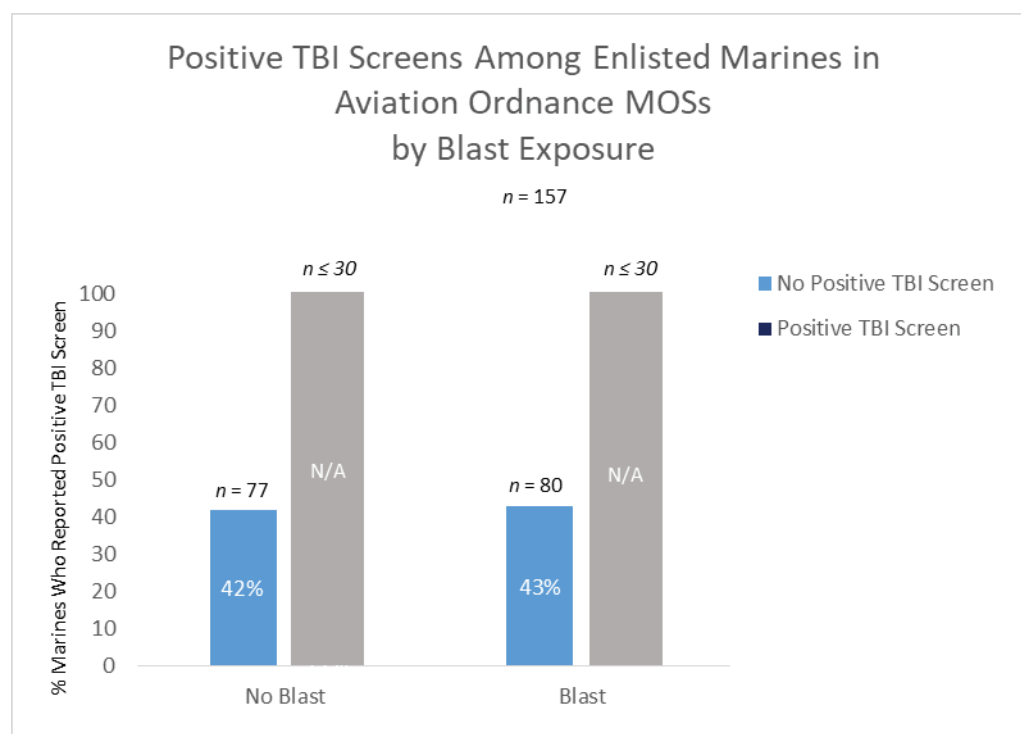


Figure 6.3

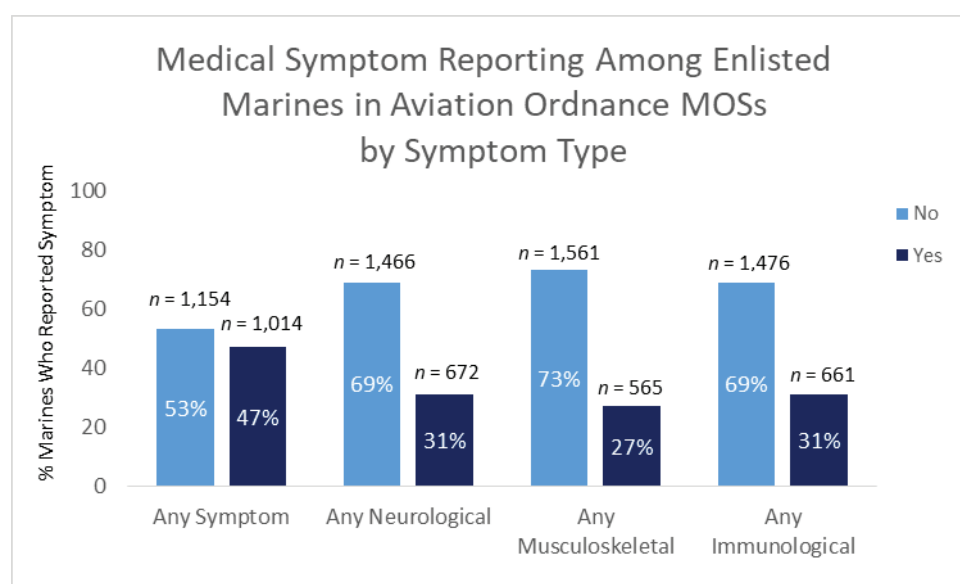


Figure 6.4

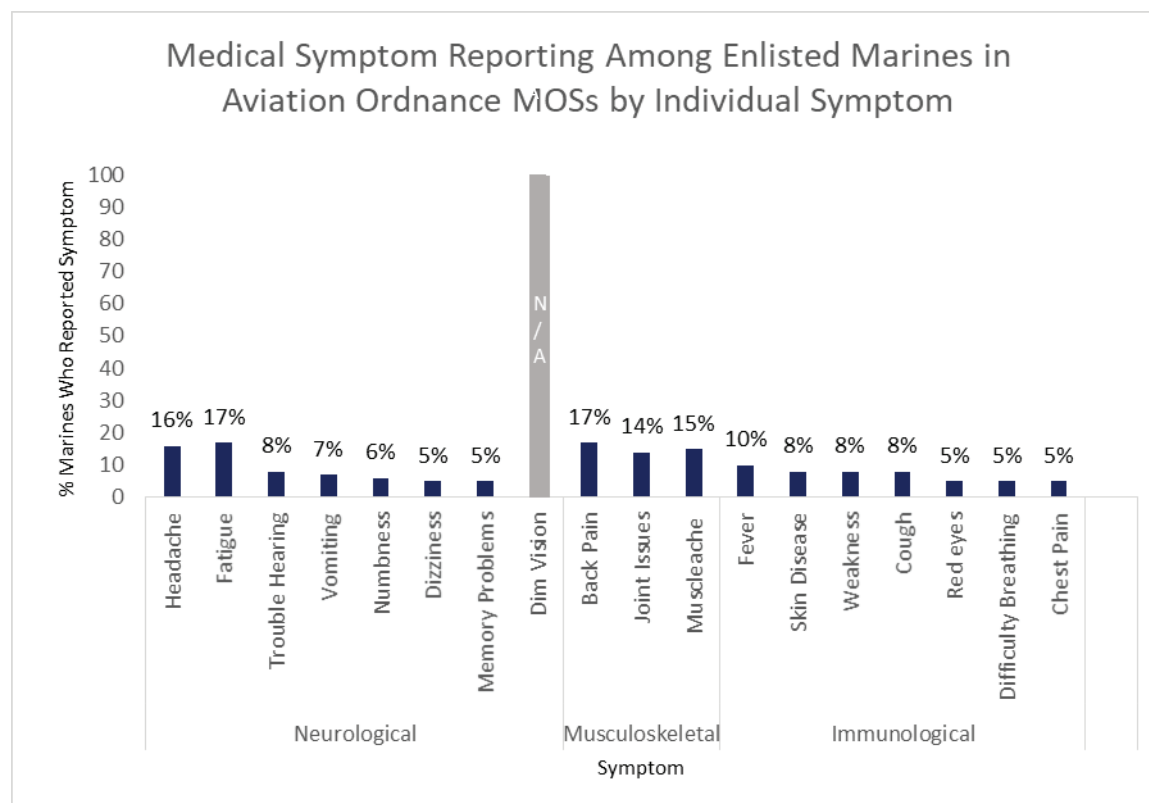


Figure 6.5

Avionics (*n* = 4,439)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summaries of Avionics occupations within Occupational Fields 63 and 64:

Occupational Field 63:

The Avionics OccFld includes direct and indirect support of all aviation weapon systems. While there is a large similarity in the skills required to provide this support, the systems being supported are diverse. The following examples are provided: direct support repair accomplished at the organizational maintenance activity (OMA) which is normally accomplished on aircraft, e.g., replacement of the radar antenna on the aircraft; indirect support-repair accomplished at the intermediate maintenance activity (IMA) which is normally accomplished off aircraft, e.g., radar system module repair, and repair/calibration of the radar support equipment. Marines entering the OccFld receive MOS 6300, Basic Avionics Marine, and then progress through specific hard skill MOSs and ultimately are assigned MOS 6391, Avionics Chief. Qualifications initially include technical proficiency in the repair of one or more electronic systems after completion of formal training. As the Marine is promoted, repair and administrative requirements for multiple systems take on an equal importance until the Marine is ultimately placed in a supervisory position. Billets for both repair and administration are varied and extend from the squadron level to staff positions at the Wing and force commander, and Headquarters U.S. Marine Corps level (p. 882).

Occupational Field 64:

The Avionics OccFld includes direct and indirect support of all aviation weapon systems. While there is a large similarity in the skills required to provide this support, the systems being supported are diverse. The following examples are provided: direct support repair accomplished at the organizational maintenance activity (OMA) which is normally accomplished on aircraft, e.g., replacement of the radar antenna on the aircraft; indirect support-repair accomplished at the intermediate maintenance activity (IMA) which is normally accomplished off aircraft, e.g., radar system module repair, and repair/calibration of the radar support equipment. Marines entering the OccFld receive MOS 6400, Basic Avionics Marine, and then progress through specific hard skill MOSs and ultimately are assigned MOS 6391, Avionics Maintenance Chief. Qualifications initially include technical proficiency in the repair of one or more electronic systems after completion of formal training. As the Marine is promoted, repair and administrative requirements for multiple systems take on an equal importance until the Marine is ultimately placed in a supervisory position. Billets for both repair and administration are varied and extend from the squadron level to staff positions at the Wing and force commander, and Headquarters U.S. Marine Corps level (p. 895).

Examples of Self-Reported Avionics MOSs

The five most frequent Avionics military occupational specialties during deployment that were self-reported on the PDHA were 6323 (*n* = 503), 6324 (*n* = 503), 6492 (*n* = 240), 6322 (*n* = 235), and 6337 (*n* = 183).

Results

Active duty enlisted Marines working in Avionics MOSs during deployment infrequently reported blast exposure (6%; Figure 8.1). When exposed to a qualifying event that could prompt a concussion, 14% screened positive for concussion (Figure 8.2). Impact-associated concussions occurred frequently (13%) and blast-associated TBIs were rare ($n \leq 30$; Figure 8.3). Of Marines in Avionics MOSs, 49% reported experiencing at least one symptom during deployment, with 34%, 28%, and 33% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 8.4). Fatigue was the most commonly reported symptom in this MOS category (20%), followed by headache (19%), back pain (17%), muscle ache (16%), joint issues (14%), and fever (11%). The remaining symptoms were reported by fewer than 10% of Marines working in Avionics MOSs (Figure 8.5).

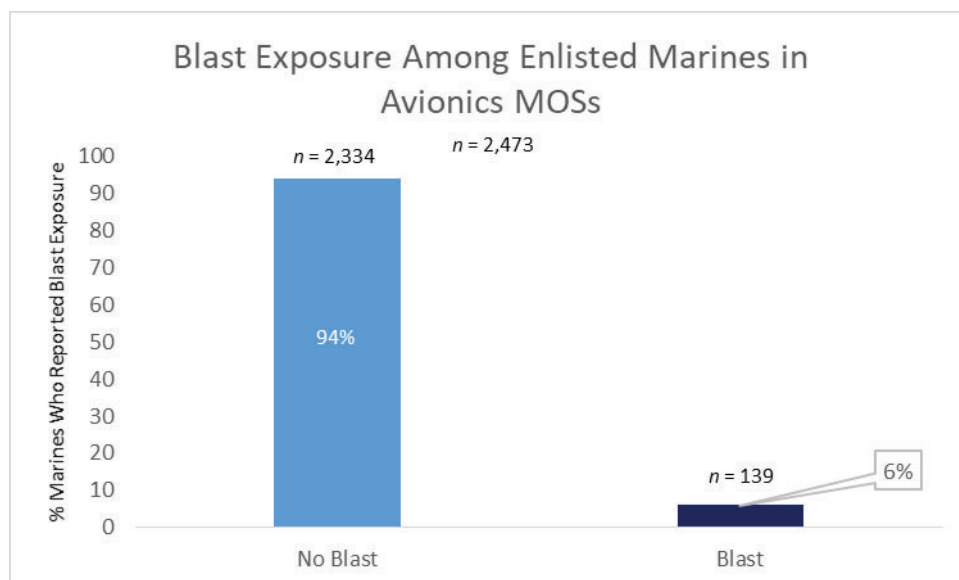


Figure 7.1

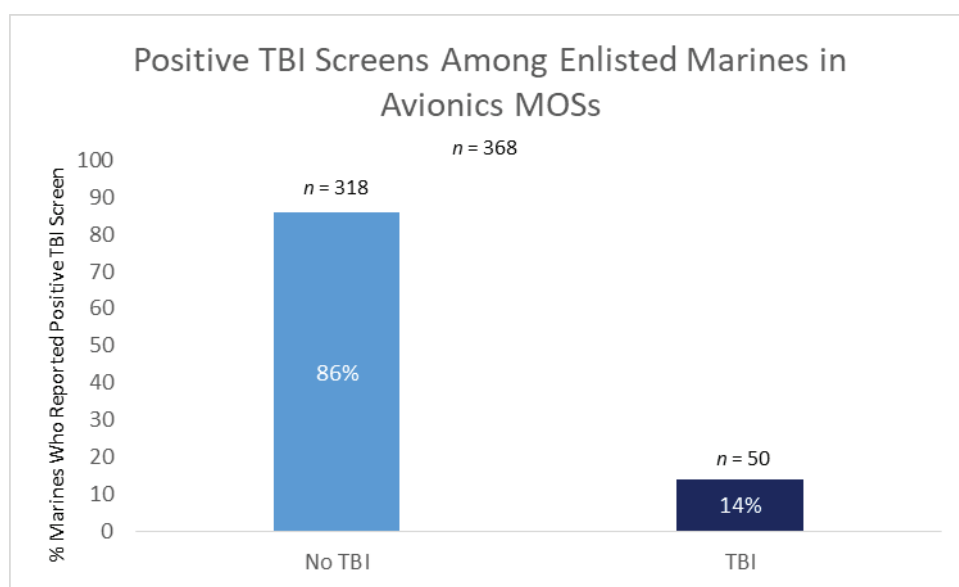


Figure 7.2

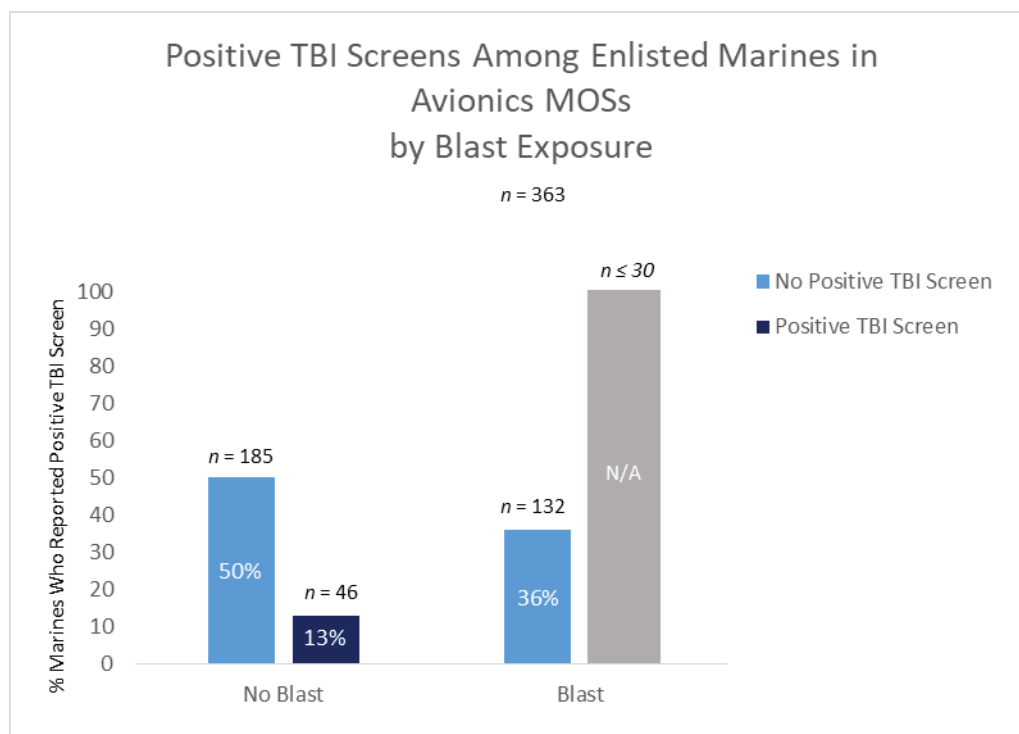


Figure 7.3

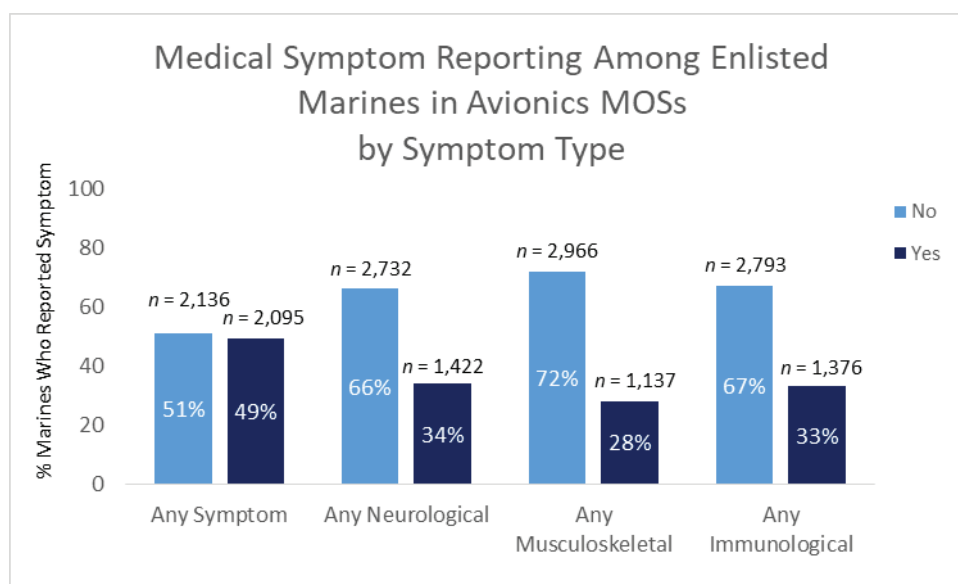


Figure 7.4

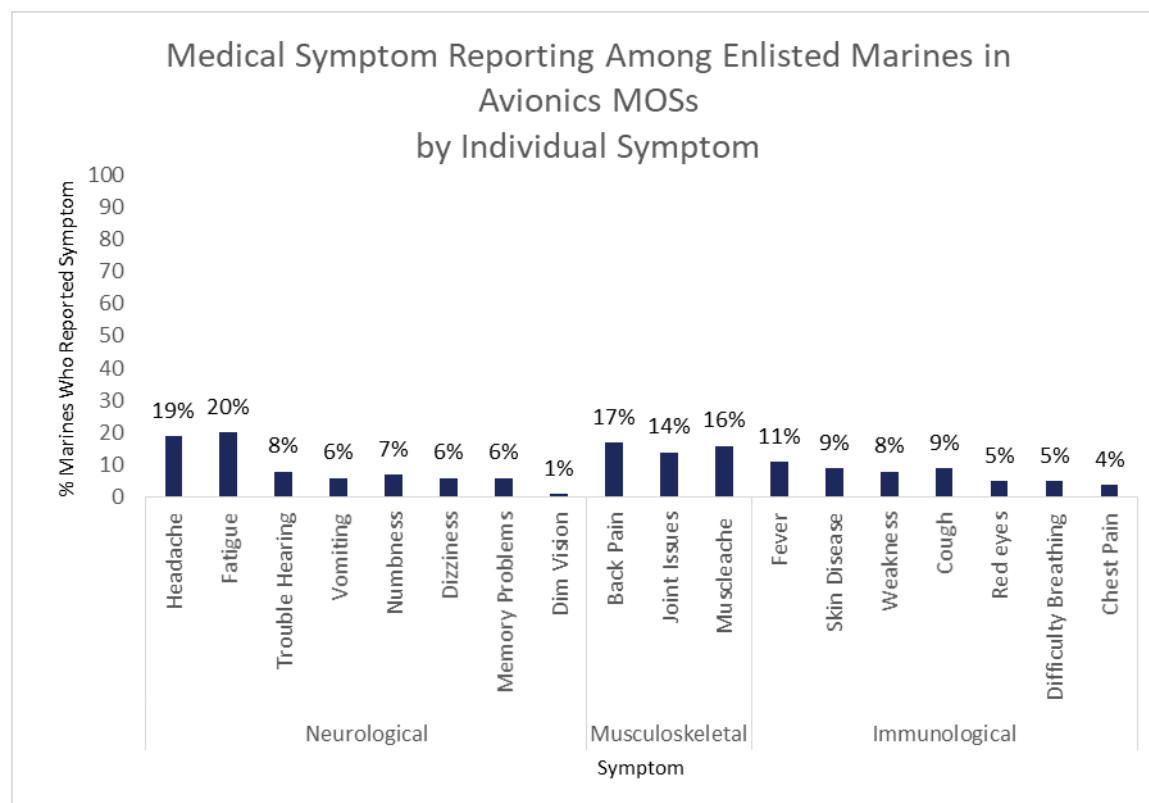


Figure 7.5

Chemical, Biological, Radiological, and Nuclear (CBRN) Defense ($n = 791$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of CBRN Defense occupations within Occupational Field 57:

The Chemical, Biological, Radiological, Nuclear (CBRN) Defense Field includes the detection, identification, warning, reporting, protection, avoidance and decontamination procedures associated with CBRN hazard and contamination on the battlefield. CBRN Defense Specialists' duties involve operational and technical skills, along with logistical and administrative requirements. CBRN Defenses Specialists will be required to learn Chemical and Biological (CB) Warfare Agents' characteristics, physiological symptoms and effects, treatment, detection and identification. They must know the procedures necessary for mitigating the effects of nuclear explosions and detection of radiological hazards. CBRN Defense Specialists will learn how to conduct CBRN hazard prediction, disseminate this information utilizing the CBRN Warning and Report System, and ensure their command effectively executes contamination avoidance procedures. CBRN Defense Specialists must possess the necessary knowledge to be able to employ and supervise unit level decontamination, monitor survey and reconnaissance operations. CBRN Defense Specialist must be able to effectively instruct CBRN defense individual and unit survival measures to their unit personnel, and provide more in-depth training to their unit's CBRN defense team members. Additionally, CBRN Defense Specialists must be familiar with the proper employment, operation, serviceability, maintenance, calibration, storage, supply, and accountability procedures for all CBRN defense equipment and materials down to the battalion/squadron level. Formal schooling is provided at the entry level. Billets available in the OccFld are at the battalion, select squadron, regiment and Marine Aircraft Group (MAG) level; as a member of a CBRN defense platoon in the Division or Marine Logistics Group; as a member of a CBRN defense section in a Marine/aircraft Wing; on staffs involving the development of doctrine and acquisition of new equipment; as a member of an equipment assessment unit assigned to a Marine Corps Base; as a member of the Chemical Biological Incident Response Force (CBIRF); and as an instructor at a Marine Corps or other service school. Marines entering this OccFld will initially receive MOS 5700, Basic CBRN Defense Marine (p. 768).

Examples of Self-Reported CBRN Defense MOSs

The five most frequent CBRN Defense military occupational specialties during deployment that were self-reported on the PDHA were 5711 ($n = 754$), CBRN ($n = 3$), 5711 (CBRN Defense) ($n = 2$), CBRN Defense specialist ($n = 2$), and Nuclear Biological Chemical Defense Specialist ($n = 1$).

Results

Among, active duty enlisted Marines working in CBRN Defense MOSs during deployment, blast exposure was rare ($n \leq 30$; Figure 9.1). When exposed to a qualifying event that could prompt a concussion, positive concussion screens were rare in general ($n \leq 30$; Figures 9.2 and 9.3). Of Marines working in CBRN Defense, 47% reported experiencing at least one symptom during deployment, with 31%, 26%, and 30% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure

9.4). Fatigue was the most commonly reported symptom in this MOS category (17%), followed by headache (16%), back pain (16%), joint issues (15%), and muscle ache (15%). The remaining symptoms were reported by fewer than 10% of Marines working in CBRN Defense MOSs (Figure 9.5).

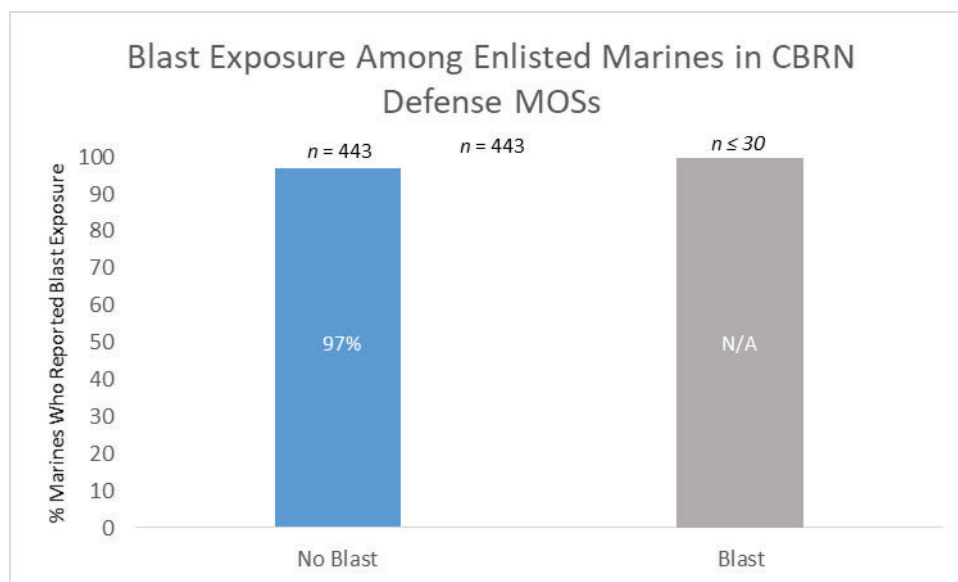


Figure 8.1

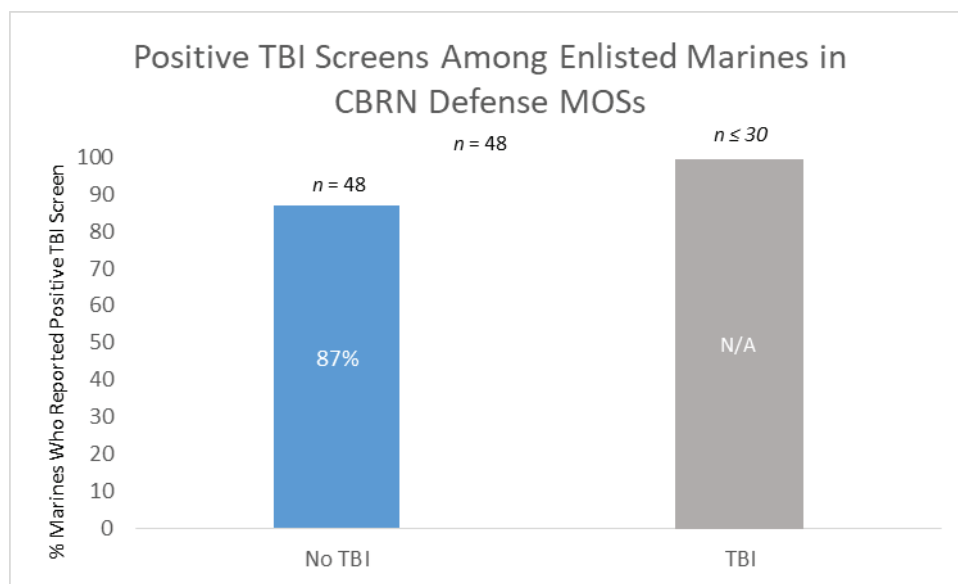


Figure 8.2

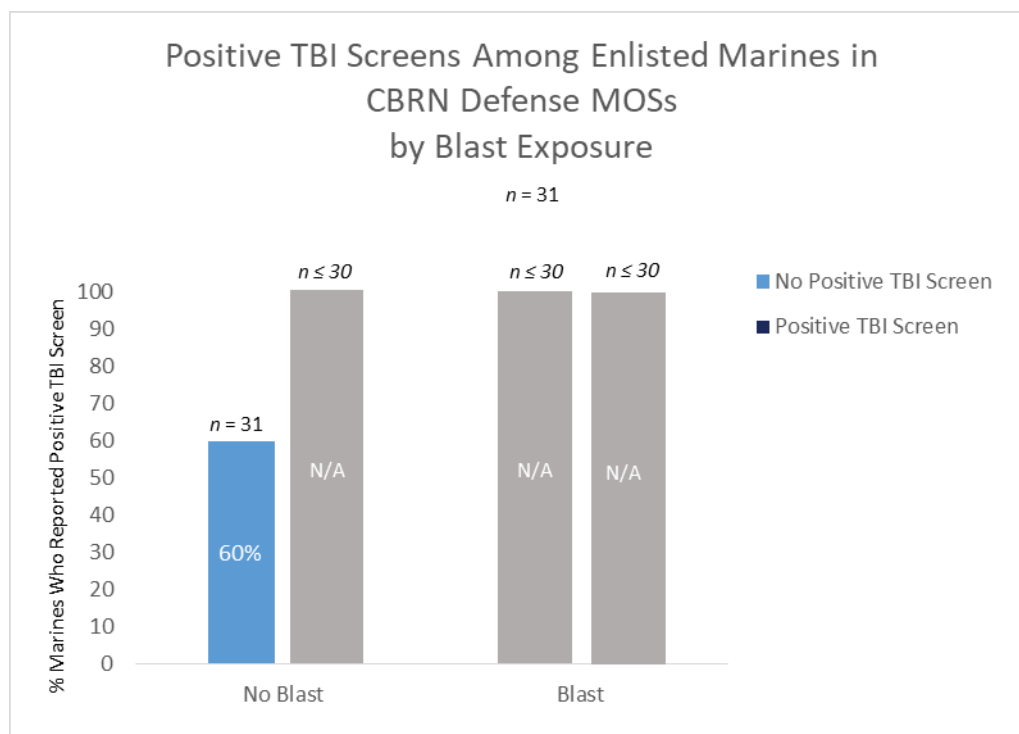


Figure 8.3

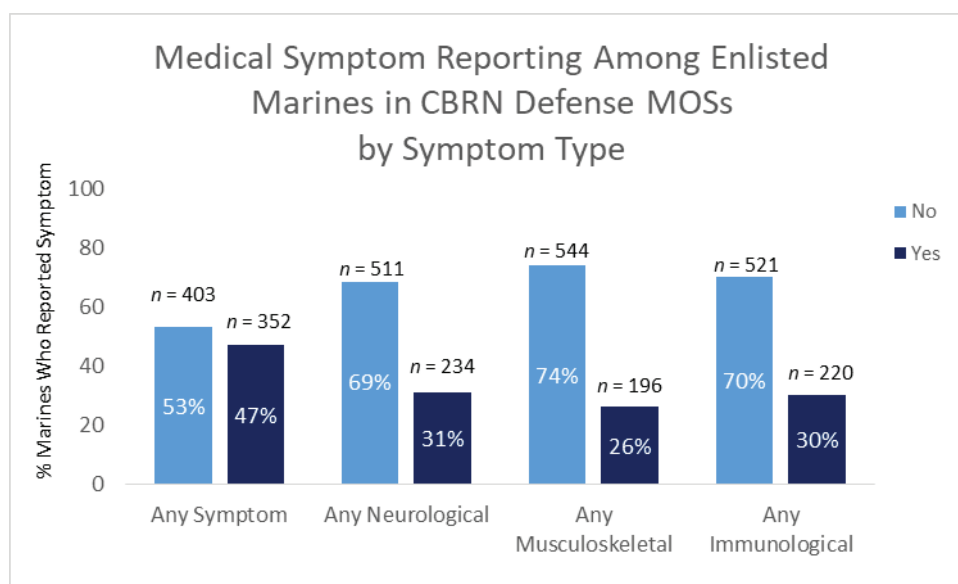


Figure 8.4

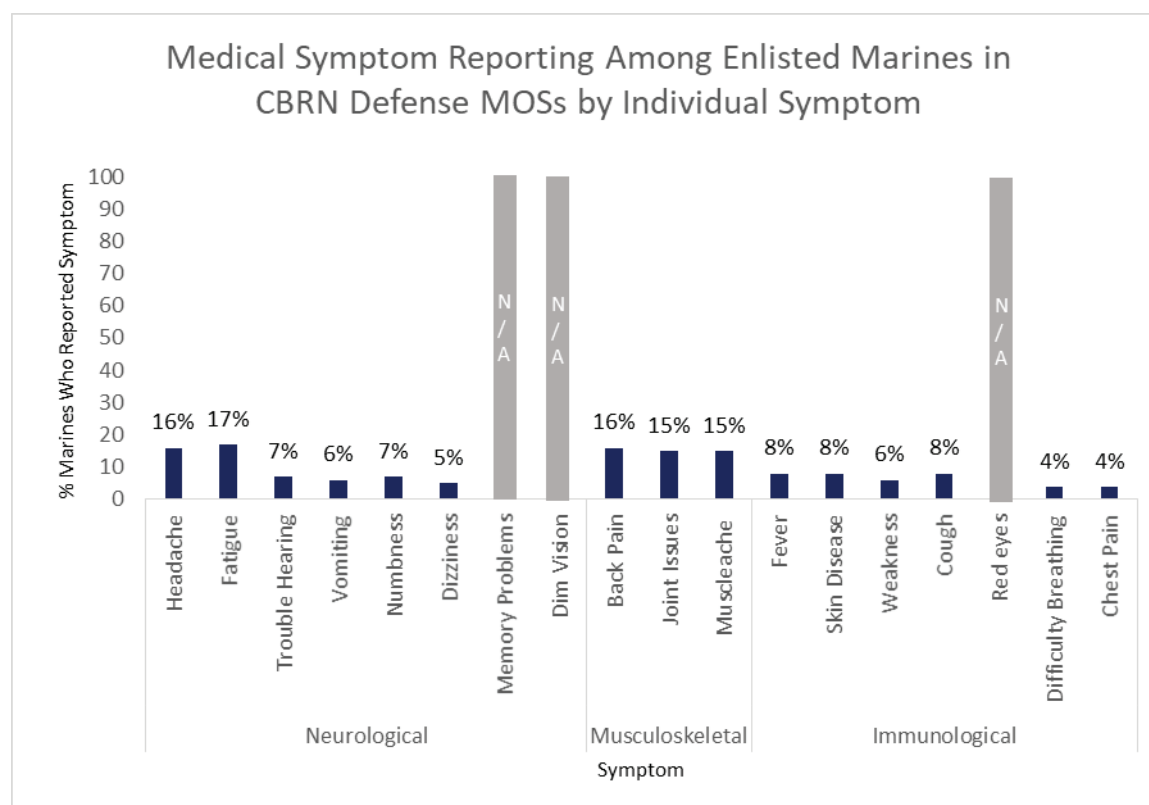


Figure 8.5

Combat Camera (*n* = 287)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Combat Camera occupations within Occupational Field 46:

The Combat Camera OccFld includes the operation and management of combat camera (ComCam) in the areas of imagery acquisition (photography, videography and imagery manipulation), imagery management (imagery editing, transmission and archival) and all aspects of imagery production product development, production printing and reproduction). Qualification requirements vary by MOS, but include basic administrative, computer, and mechanical skills, as well as knowledge or experience with mathematics, production techniques, and the ability to communicate and work closely with others. The duties involve administrative, technical, and managerial skills. Combat Camera Marines will be required to learn administrative, accounting, filing, managerial and reporting procedures peculiar to the OccFld, and those technical aspects necessary for the individual MOSs. Marines are entry-level jobs include work as a Photographer, Videographer, and Combat Camera Production Specialist. The opportunity to participate in a formal apprenticeship program leading to receipt of a Department of Labor Certificate of apprenticeship completion may be available in some MOSs in OccFld 46. There are a wide variety of billets available in the OccFld, ranging from duty with the Operating Forces to the opportunity to serve in the White House Communications Agency. Marines entering this OccFld will receive MOS 4600 (Basic Combat Camera Marine) until successfully completing a MOS-granting course at the Defense Information School (DINFOS), Ft Meade, MD. Personnel entering through lateral movement must complete the appropriate formal school or MOJT prior to being awarded MOS 4612, 4641, or 4671 (p. 740).

Examples of Self-Reported Combat Camera MOSs

The five most frequent Combat Camera military occupational specialties during deployment that were self-reported on the PDHA were 4641 (*n* = 98), 4671 (*n* = 98), 4612 (*n* = 48), 4691 (*n* = 22), and 4611 (*n* = 6).

Results

Active duty enlisted Marines working in Combat Camera MOSs during deployment frequently reported blast exposure (26%; Figure 10.1). However, when exposed to a qualifying event that could prompt a concussion, positive concussion screens were rare in general (*n* ≤ 30; Figures 10.2 and 10.3). Of Marines working in Combat Camera, 58% reported experiencing at least one symptom during deployment, with 42%, 31%, and 39% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 10.4). Because HIPAA regulations prohibit the release of medical data for groups smaller than 30 individuals, many of the symptoms were not reported by enough Marines in this MOS to be reported here. The symptoms reported by at least 30 Marines (and thus more than 10% of Marines in this MOS) were as follows: headache (21%), back pain (20%), fatigue (15%), joint issues (15%), muscle ache (14%), vomiting (14%), fever (13%), ringing in the ears (12%), skin disease (12%), and cough (12%). Symptoms reported by fewer than 30 Marines in this MOS and thus rare included numbness, dizziness, memory problems, dim vision, weakness, red eyes, difficulty breathing, and chest pain (Figure 10.5).

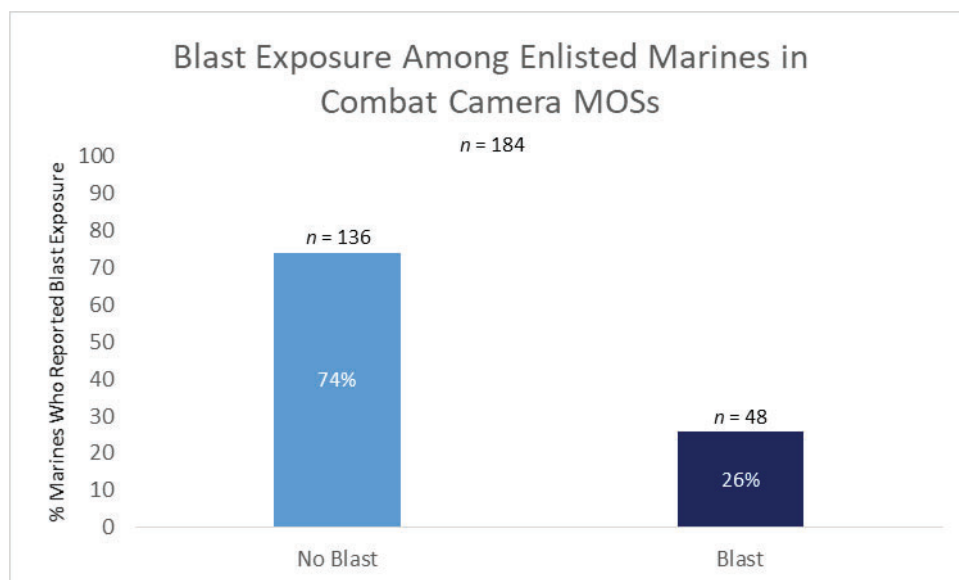


Figure 9.1

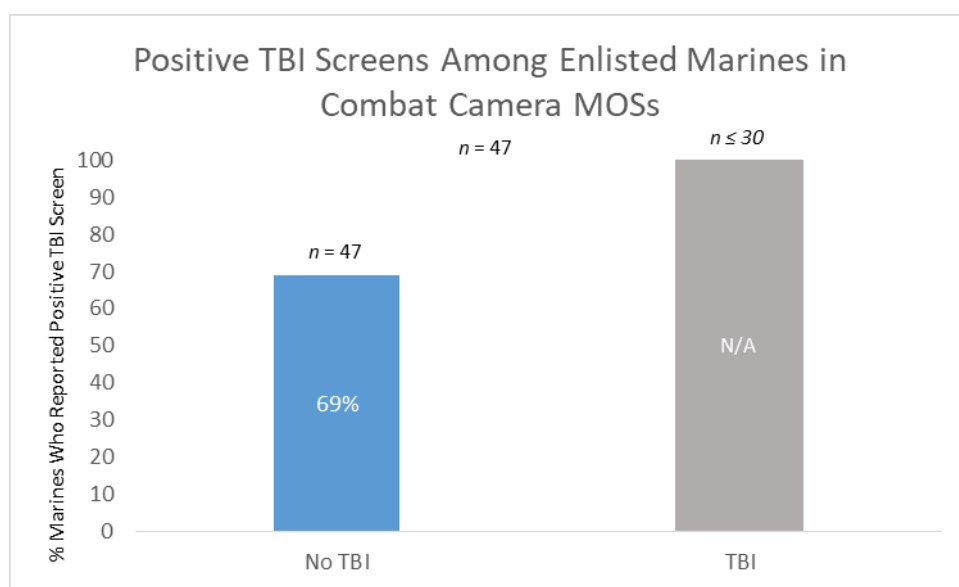


Figure 9.2

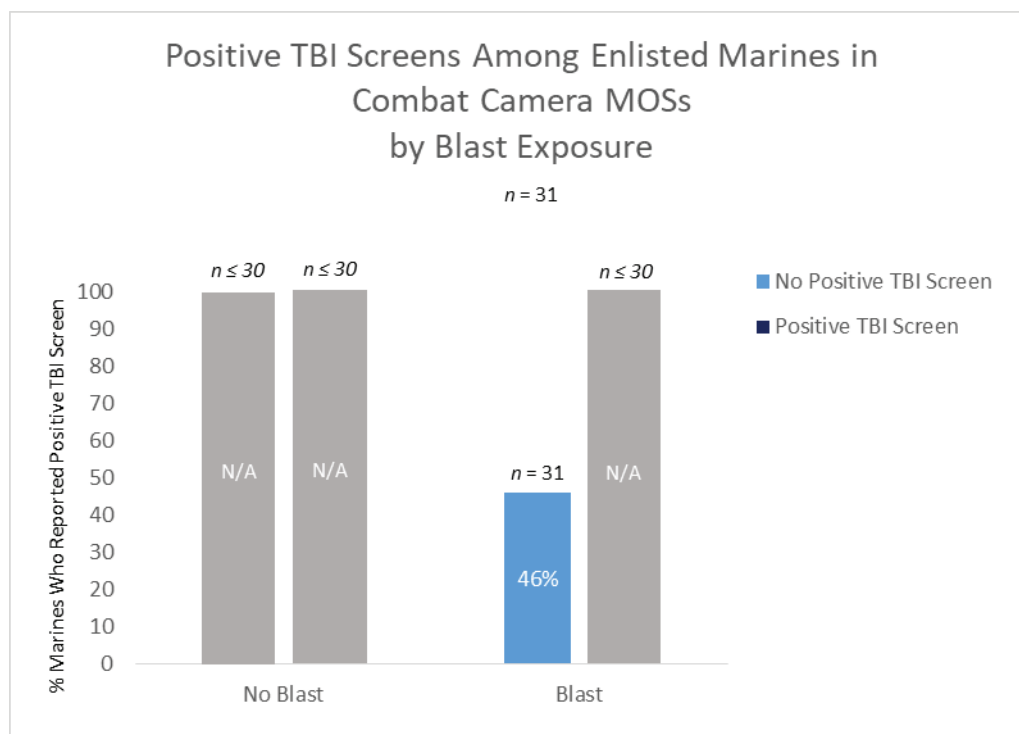


Figure 9.3

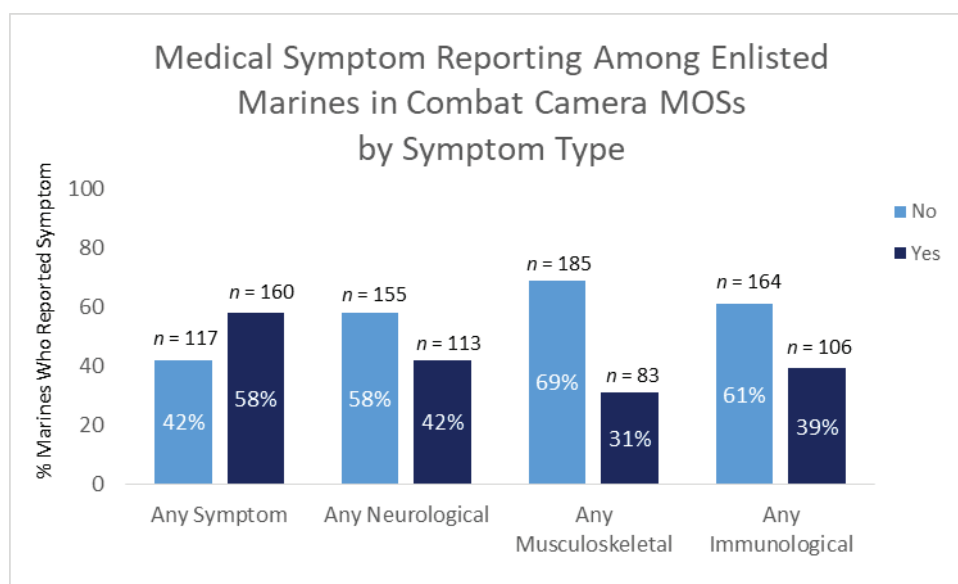


Figure 9.4

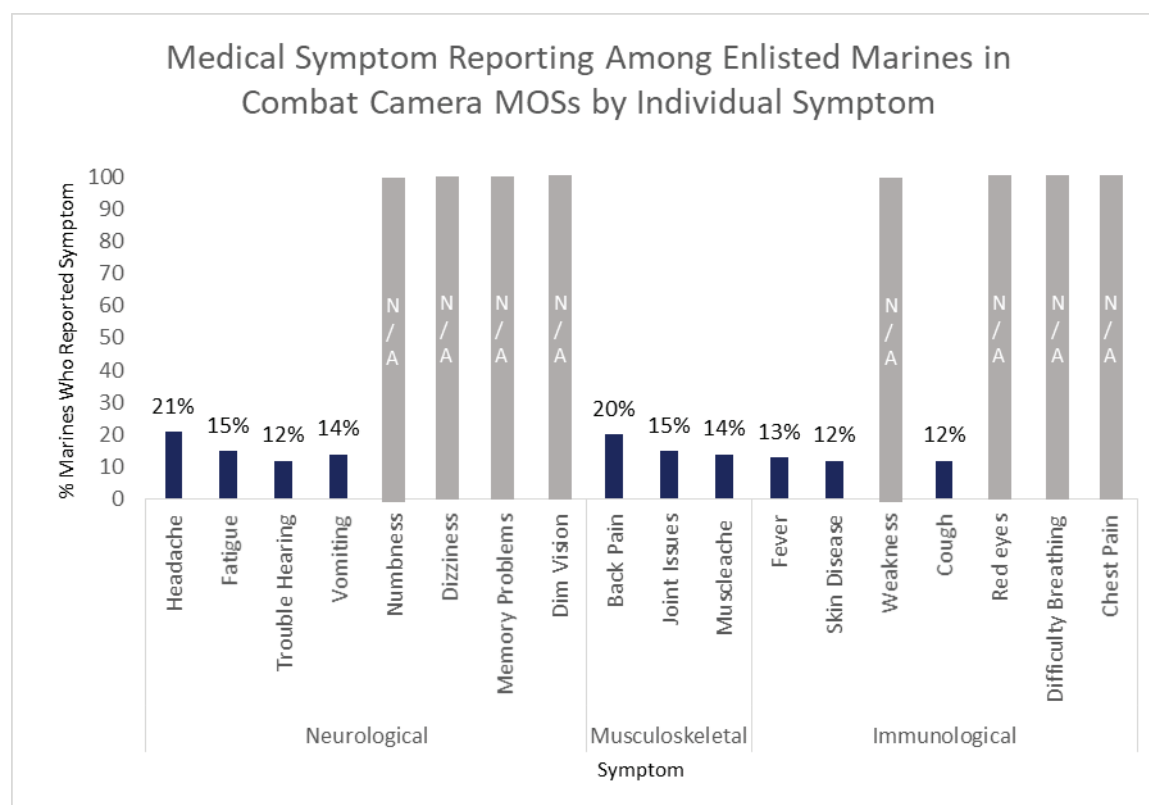


Figure 9.5

Communications (*n* = 13,121)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Communications occupations within Occupational Field 06:

The Communications Occupational Field includes the design, installation, interconnection, and operation of communication networks and information systems used to transmit information and data. Marines in this field operate and perform preventive maintenance on both hardware and software systems; including telephone, switching, radio, cryptographic, and Cyber Network systems, which are essential links in the overall functions of communication. They must have basic to advanced manual and language skills and must be able to master precise communication and computer procedures, as well as interact on a daily basis with users to solve communication systems challenges. Attention to detail and the ability to work closely with others are essential requirements. Eligibility for a security clearance is a requirement for communication systems specialties. Marines entering Communications Systems are assigned MOS 0600, Basic Communications Systems Marine. They will participate in various communication systems functions while training for a designated MOS within the OccFld. Entry-level jobs include work as a Field Radio Operator, Tactical Switching Operator, Digital Multichannel Wideband Transmission Equipment Operator, Satellite Communications Operator, Cyber Network Operator, and Cyber Security Technician and Information Security Technicians. The opportunity to participate in a formal apprenticeship program leading to receipt of a Department of Labor Certificate of Apprenticeship Completion may be available in some MOSs within OccFld 0600. More detail information on tasks and training objectives can be found in reference (i), the Communications Training and Readiness Manual for OccFld 06 (p. 429).

Examples of Self-Reported Communications MOSs

The five most frequent Communications military occupational specialties during deployment that were self-reported on the PDHA were 0621 (*n* = 5,832), 0651 (*n* = 1,630), 0612 (*n* = 1,612), 0656 (*n* = 878), and 0629 (*n* = 597).

Results

Active duty enlisted Marines working in Communications MOSs during deployment infrequently reported blast exposure (8%; Figure 11.1). When exposed to a qualifying event that could prompt a concussion, 22% screened positive for concussion (Figure 11.2). Both impact-associated and blast-associated concussions occurred often (11% and 11%, respectively; Figure 11.3). Of Marines working in Communications MOSs, 44% reported experiencing at least one symptom during deployment, with 30%, 24%, and 26% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 11.4). Back pain was the most commonly reported symptom in this MOS category (16%), followed by headache (16%), fatigue (14%), joint issues (13%), and muscle ache (13%). The remaining symptoms were reported by fewer than 10% of Marines working in Communications MOSs (Figure 11.5).

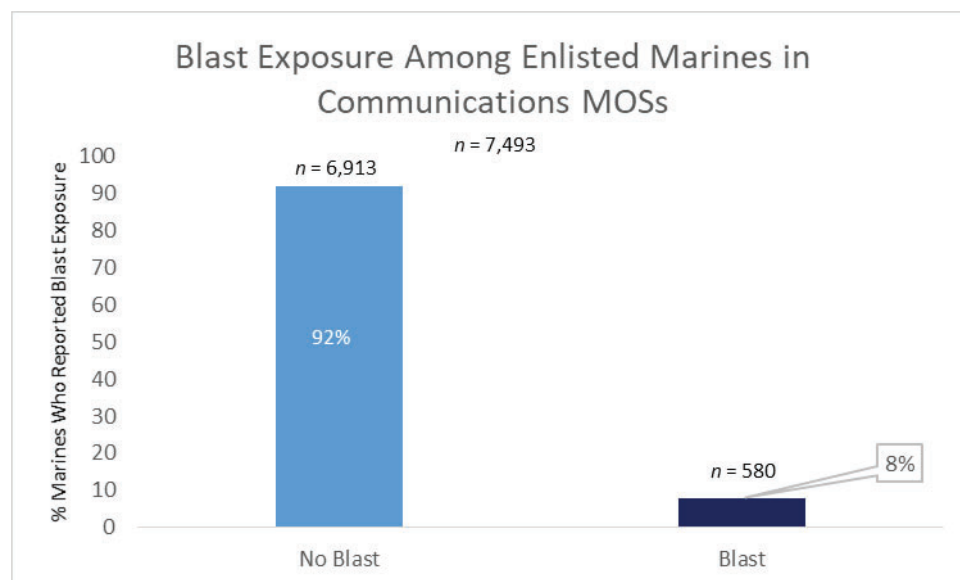


Figure 10.1

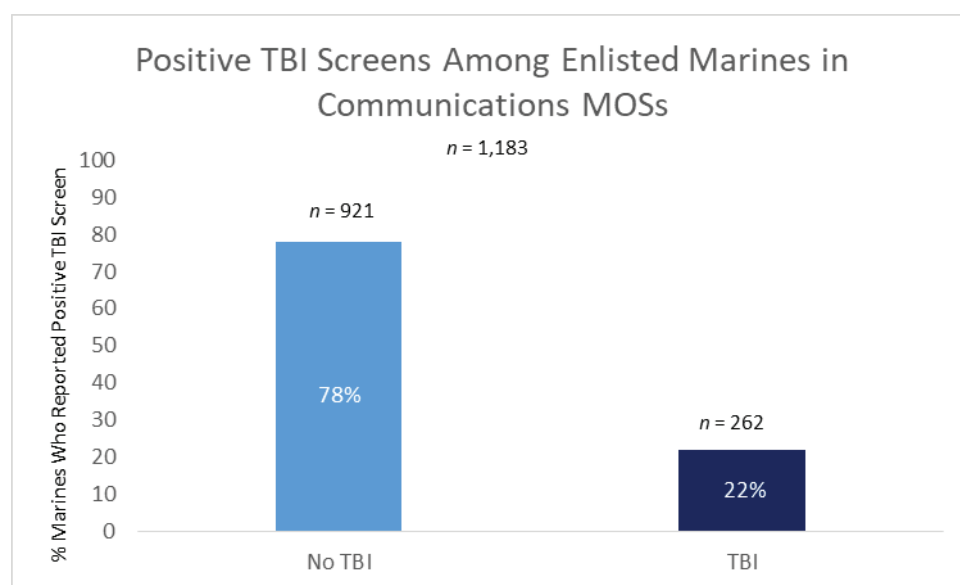


Figure 10.2

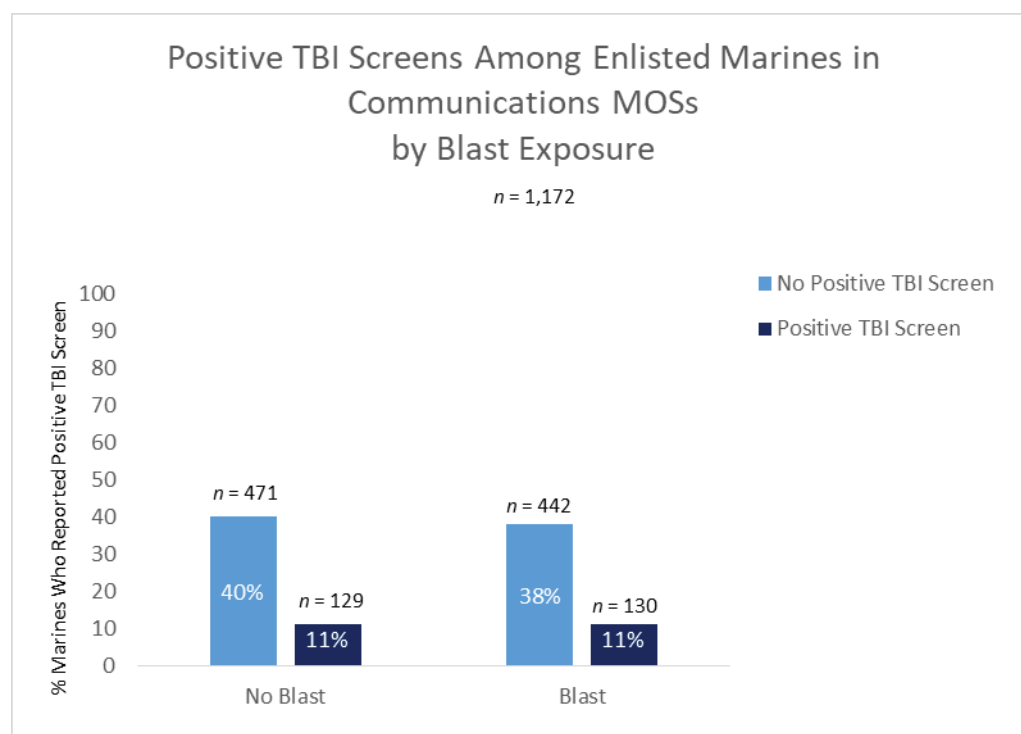


Figure 10.3

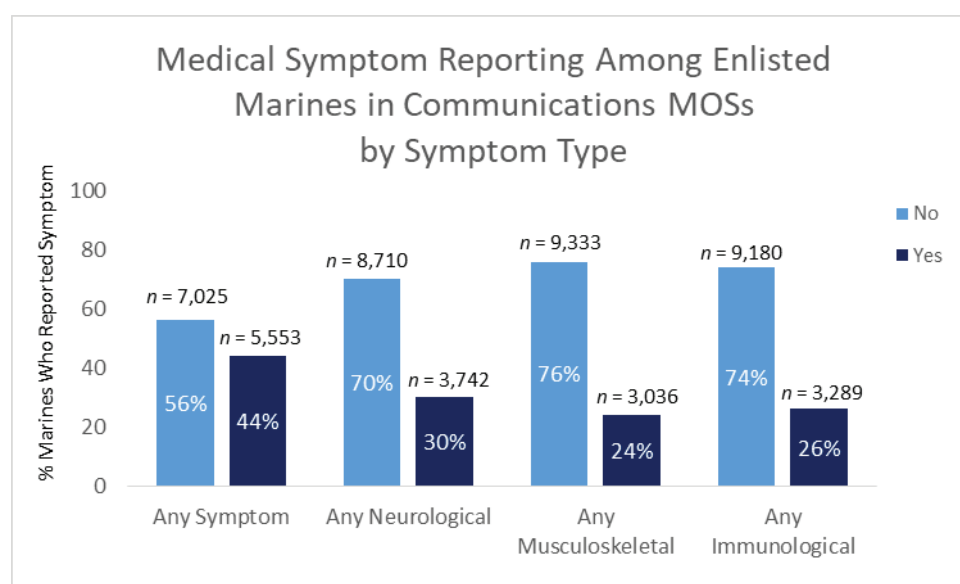


Figure 10.4

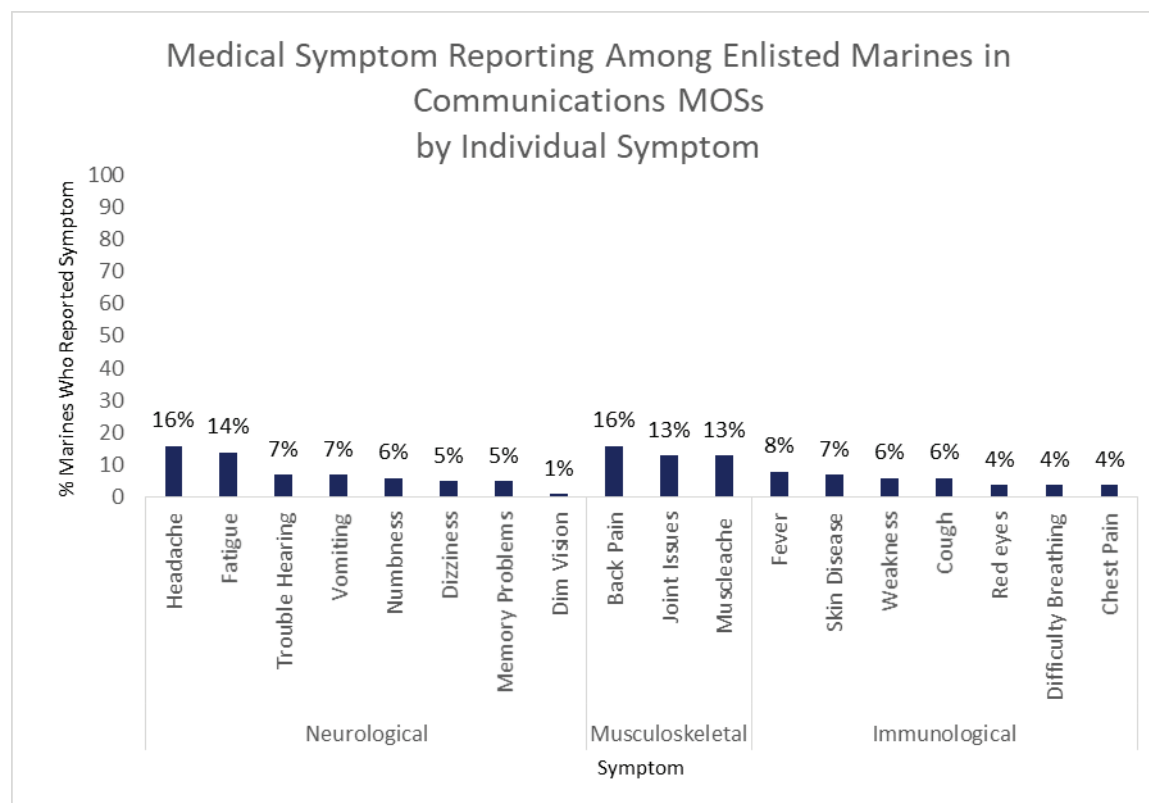


Figure 10.5

Distribution Management (*n* = 370)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Distribution Management occupations within Occupational Field 31.

The Distribution Management OccFld includes the procurement/acquisition of DoD or commercial transportation resources for the movement of personnel, equipment, supplies and personal property via air, bus, rail, truck, and water. Qualifications include familiarity with transport equipment and related limitations, commercial and DoD transportation systems, transportation procurement procedures and preparation of procurement and tracking documents. This includes a comprehensive understanding of commercial carrier tariffs, United States/foreign government rules and regulations applicable to the movement of personnel and material in domestic and foreign transport (p. 682).

Examples of Self-Reported Distribution Management MOSs

The five most frequent Distribution Management military occupational specialties during deployment that were self-reported on the PDHA were 3112 (*n* = 334), 3135 (*n* = 5), 3151 (*n* = 4), 3112 TMO (*n* = 3), and 3133 (*n* = 3).

Results

Active duty enlisted Marines working in Distribution Management MOSs during deployment rarely reported blast exposure and rarely screened positive for concussion (*ns* ≤ 30; Figures 12.1, 12.2, and 12.3). Of Marines working in Distribution Management MOSs, 48% reported experiencing at least one symptom during deployment, with 34%, 29%, and 31% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 12.4). Because HIPAA regulations prohibit the release of medical data for groups smaller than 30 individuals, many of the symptoms were not reported by enough Marines in this MOS to be reported here. Of the symptoms reported by enough Marines to be included here, fatigue was the most commonly reported symptom in this MOS category (22%), followed by back pain (19%), joint issues (17%), headache (17%), muscle ache (15%), and numbness (10%; Figure 12.5).

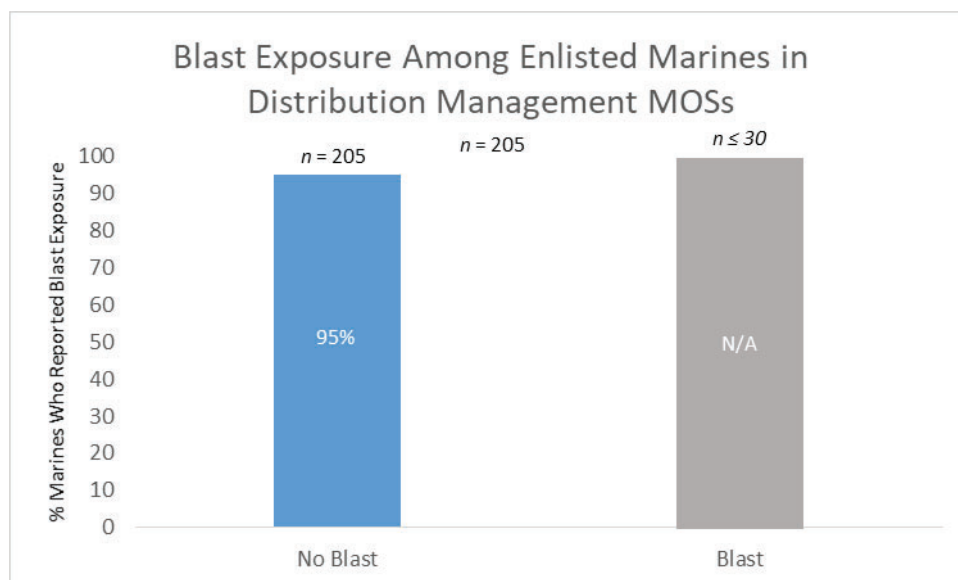


Figure 11.1

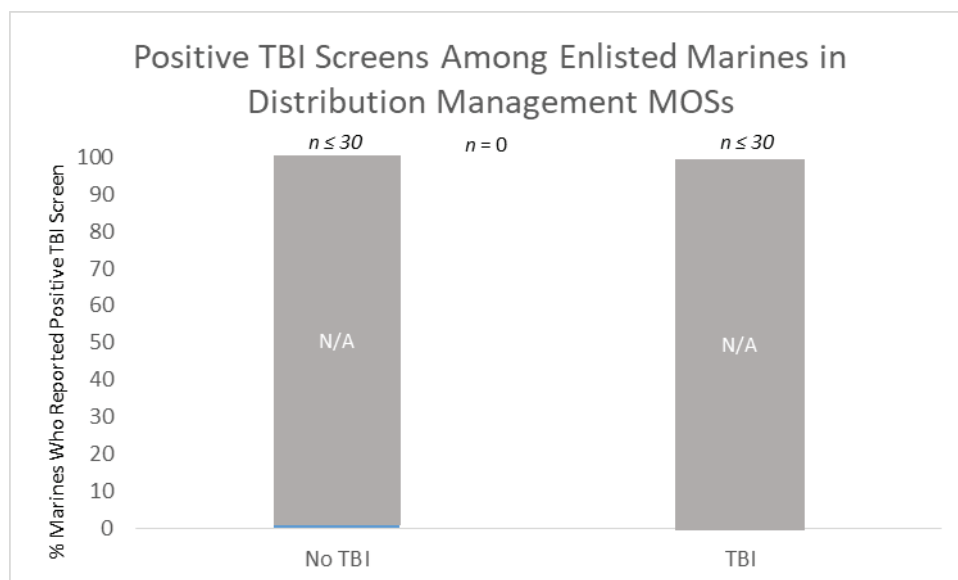


Figure 11.2

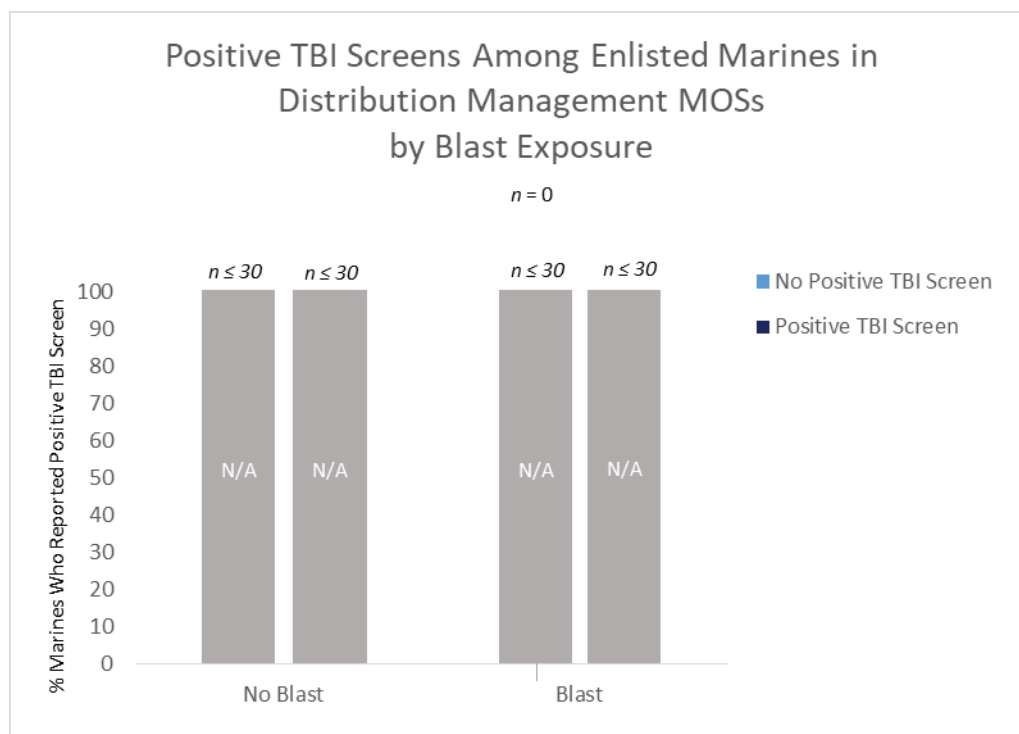


Figure 11.3

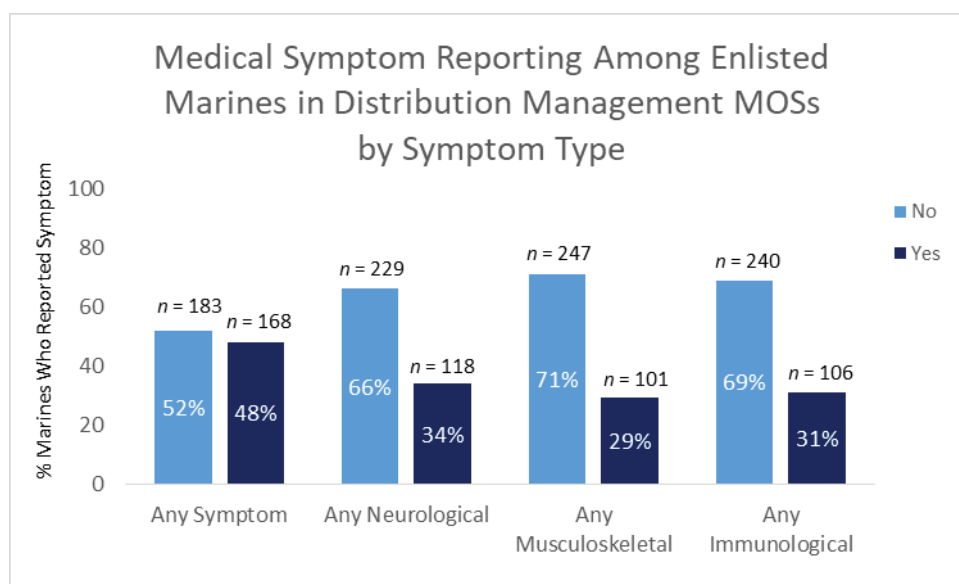


Figure 11.4

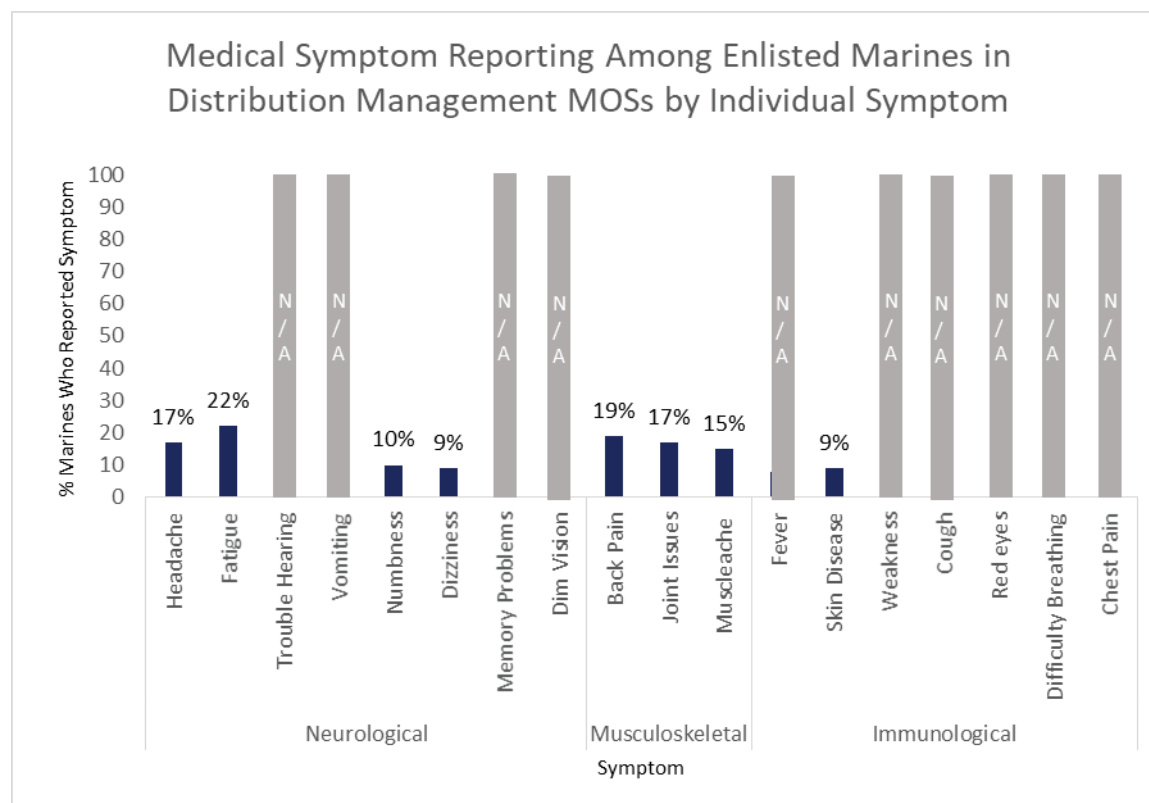


Figure 11.5

Engineer, Construction, Facilities, and Equipment (ECFE; $n = 9,242$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of ECFE occupations within Occupational Field 13:

The Engineer, Construction, Facilities, and Equipment OccFld comprises Marines whose duties include metalworking and welding; repair, maintenance, and operation of engineer heavy equipment such as cranes and bulldozers; construction and repair of military structures and facilities; clearing and emplacing obstacles such as minefields; construction of standard and nonstandard bridging; and emplacing and detonating explosives for construction and demolition projects. Also, some Marines in the field work with the storage and distribution of bulk fuel products. Marines entering the field receive MOS 1300, Basic Engineer, Construction, and Equipment Marine. The Basic Engineer may be assigned a variety of MOSs and may be sent to a variety of formal schools. The MOSs that is initially available is Metal Workers, Engineer Equipment Mechanics, Engineer Equipment Operators, Combat Engineers, Engineer Assistants, and Bulk Fuel Specialists. The opportunity to participate in a formal apprenticeship program leading to receipt of a Department of Labor Certificate of Apprenticeship Completion may be available in some MOSs within OccFld 13. There are a variety of challenging and interesting billets available in OccFld 13, ranging from inspector-instructor duty, to duty with operating forces (in division, Marine Logistics Group, or Marine Air Wing) or the supporting establishment (p. 489).

Examples of Self-Reported ECFE MOSs

The five most frequent ECFE military occupational specialties during deployment that were self-reported on the PDHA were 1371 ($n = 3,898$), 1345 ($n = 1,835$), 1391 ($n = 1,345$), 1341 ($n = 1,190$), and 1316 ($n = 306$).

Results

Active duty enlisted Marines working in ECFE MOSs during deployment commonly reported blast exposure (17%; Figure 13.1). When exposed to a qualifying event that could prompt a concussion, more than one quarter (29%) screened positive (Figure 13.2). Impact-associated concussions occurred infrequently (8%), but blast-associated concussions were frequent (21%; Figure 13.3). Of Marines working in ECFE MOSs, 47% reported experiencing at least one symptom during deployment, with 34%, 29%, and 28% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 13.4). Back pain was the most commonly reported symptom in this MOS category (21%), followed by headache (18%), fatigue (17%), joint issues (16%), muscle ache (16%), and ringing in the ears (12%). The remaining symptoms were reported by fewer than 10% of Marines working in ECFE MOSs (Figure 13.5).

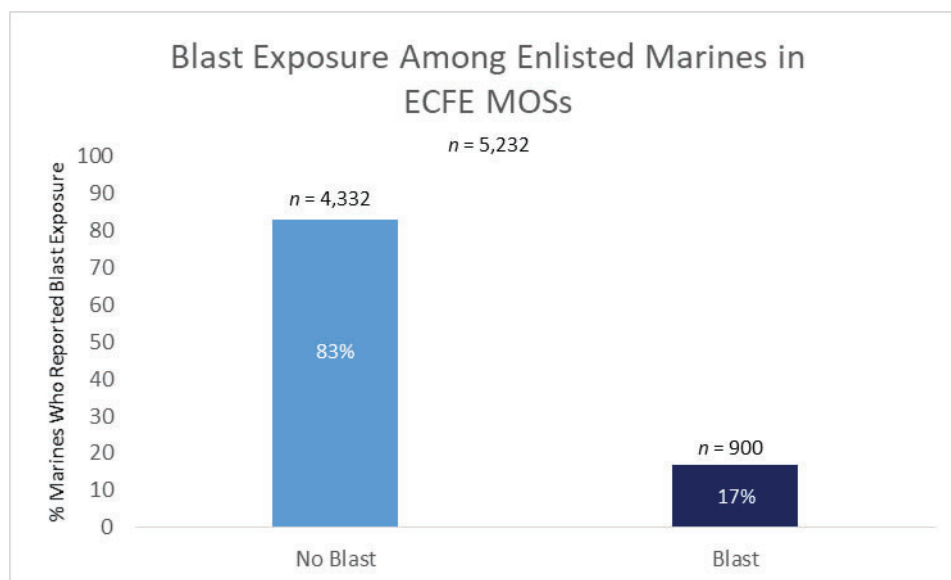


Figure 12.1

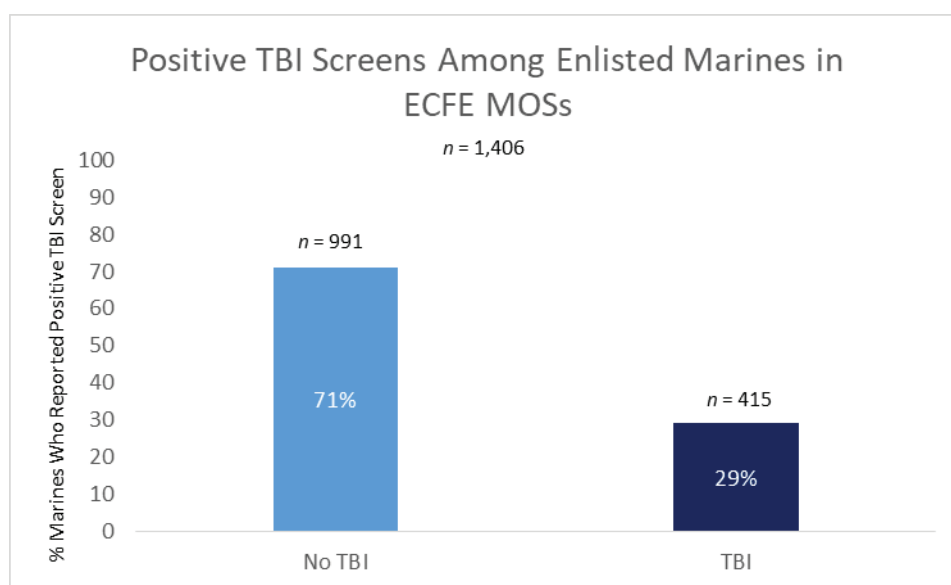


Figure 12.2

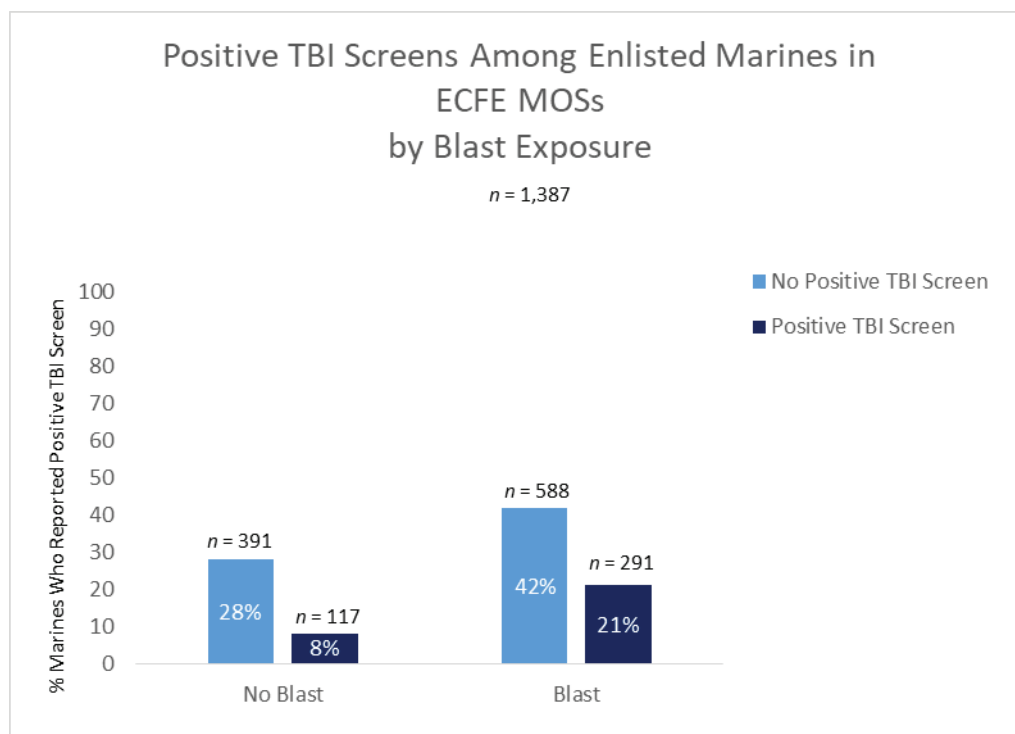


Figure 12.3

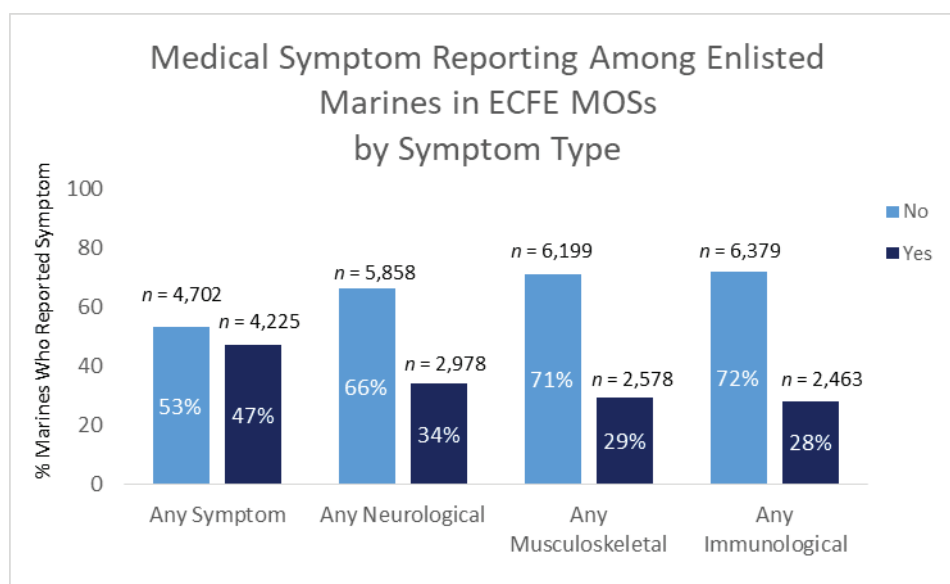


Figure 12.4

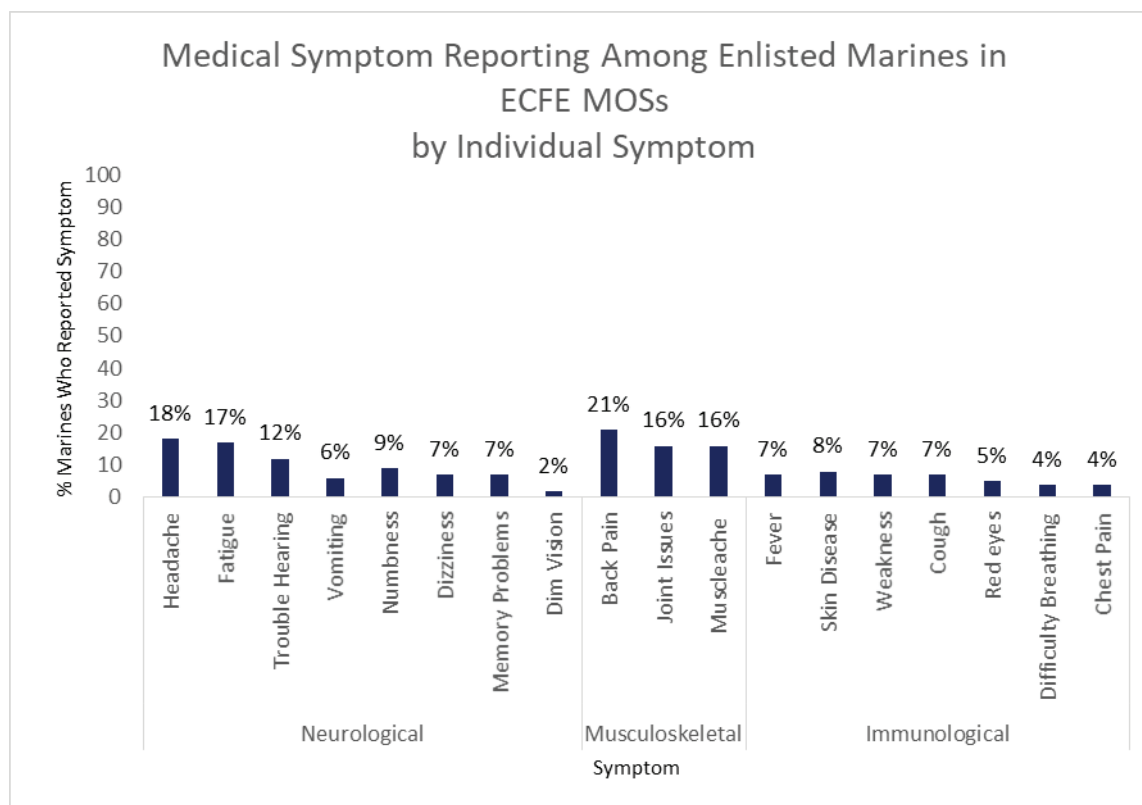


Figure 12.5

Electronics Maintenance ($n = 853$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Electronics Maintenance occupations within Occupational Field 59:

The Aviation Command and Control Electronics Maintenance Occupational Field plans, installs, operates, maintains, and repairs electronic equipment organic to the Marine Air Command and Control System (MACCS). The MACCS equipment is ground based and includes various types of communications transmission systems, information technology systems, radar systems, cryptographic devices, meteorological equipment, and miscellaneous non-communication systems. The MACCS equipment facilitates the control of friendly aircraft and surface-to-air weapons for anti-air warfare and provides air surveillance, continuous all-weather radar and non-radar services, airspace management, and weather forecasting in support of the Aviation Combat Element of the Marine Air-Ground Task Force. Qualifications to work in this field include manual dexterity, normal color vision, be eligible to hold a secret security clearance, the ability to understand highly technical material, and to comprehend complex mathematical and logic principles. Marines in the 5900 Occupational Field have the opportunity to participate in formal apprenticeship programs leading to a Department of Labor Certificate of Apprenticeship; refer to reference (bs) for specific information concerning the United Services Military Apprenticeship Program (USMAP). Marines entering this occupational field will receive formal courses of instruction in Basic Electronics followed by detailed instruction in data, communication, or radar systems. After completion of formal training, an MOS will be assigned which designates a specific job in the electronics maintenance field. Marines in this field will serve within the Marine Aircraft Wing (p. 808).

Examples of Self-Reported Electronics Maintenance MOSs

The five most frequent Electronics Maintenance military occupational specialties during deployment that were self-reported on the PDHA were 5939 ($n = 149$), 5954 ($n = 115$), 5953 ($n = 104$), 5974 ($n = 102$), and 5952 ($n = 98$).

Results

Among, active duty enlisted Marines working in Electronics Maintenance MOSs during deployment, blast exposure was rare ($n \leq 30$; Figure 14.1). When exposed to a qualifying event that could prompt a concussion, positive concussion screens were rare in general ($n \leq 30$; Figures 14.2 and 14.3). Of Marines working in Electronics Maintenance, 47% reported experiencing at least one symptom during deployment, with 31%, 28%, and 31% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 14.4). Back pain was the most commonly reported symptom in this MOS category (17%), followed by headache (17%), fatigue (15%), muscle ache (14%), and joint issues (13%). The remaining symptoms were reported by fewer than 10% of Marines working in Electronics Maintenance MOSs (Figure 14.5).

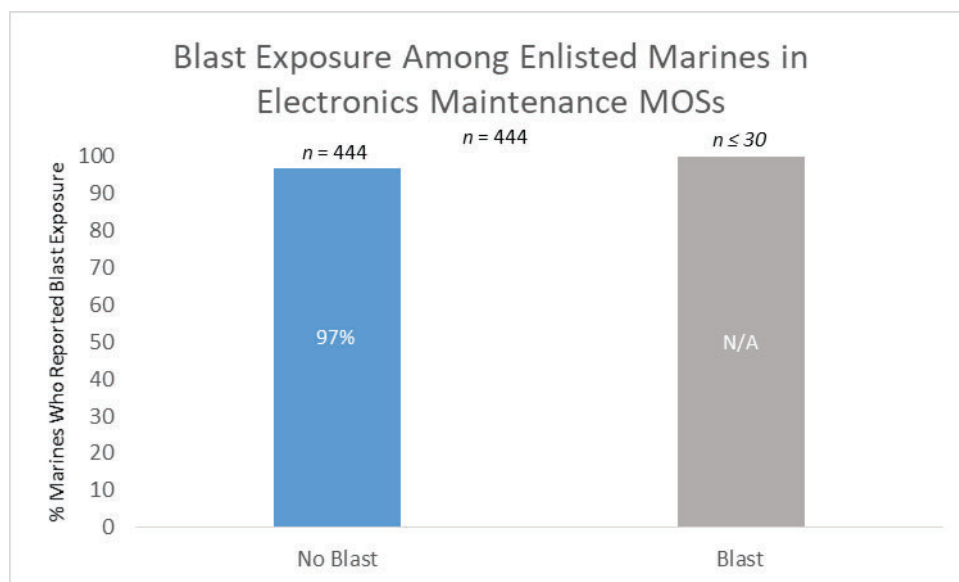


Figure 13.1

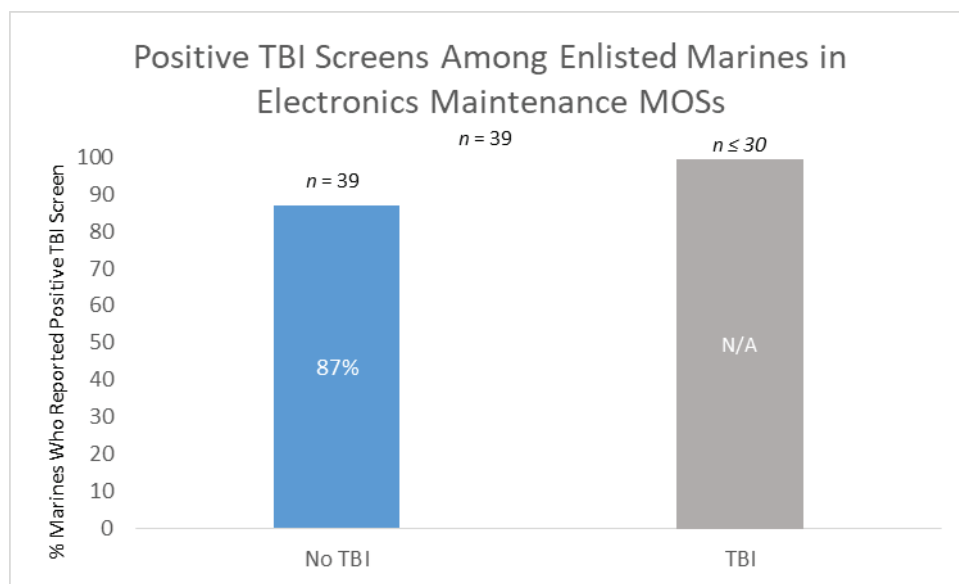


Figure 13.2

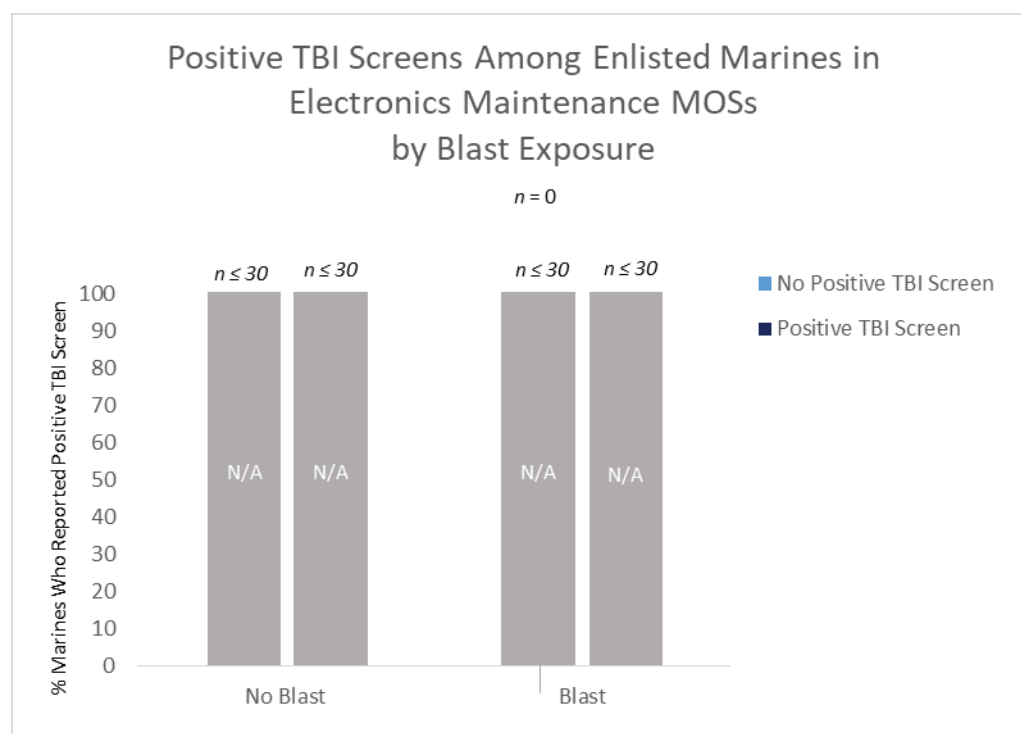


Figure 13.3

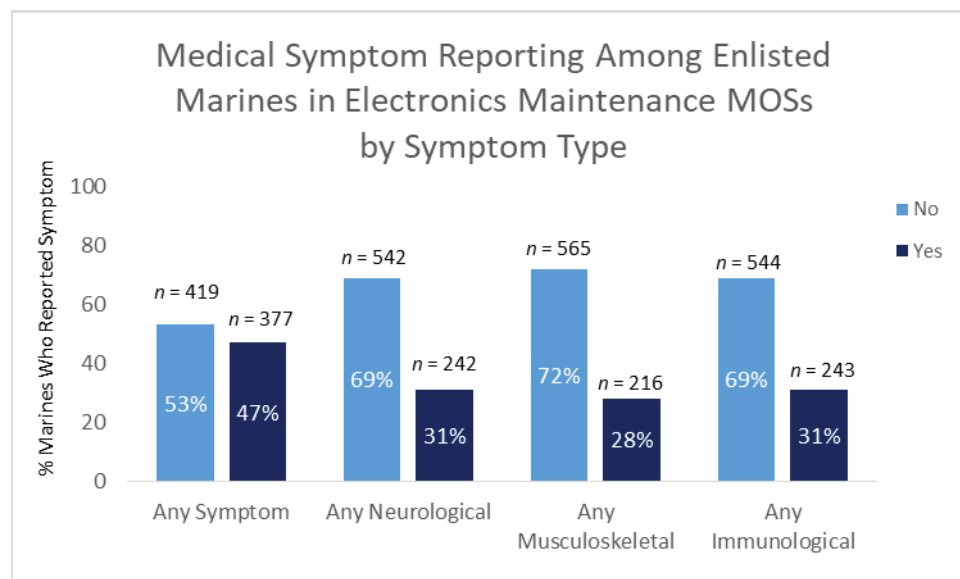


Figure 13.4

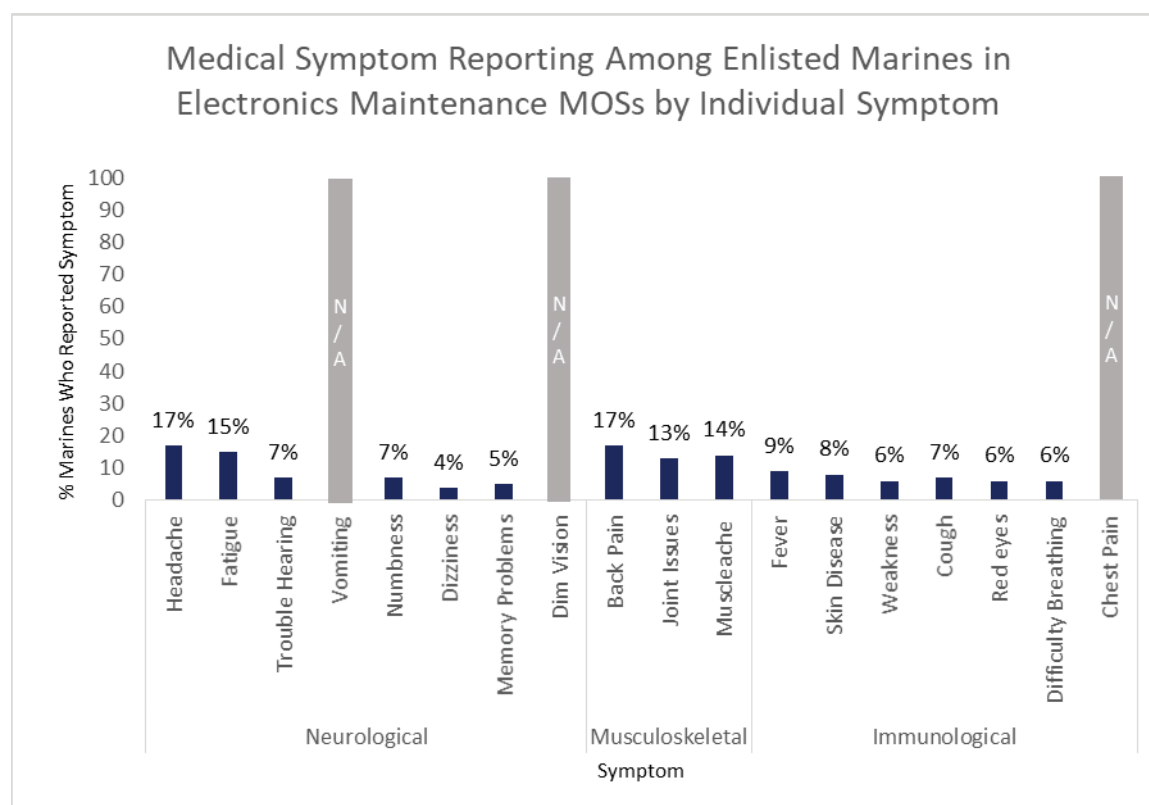


Figure 13.5

Field Artillery (*n* = 4,587)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Field Artillery occupations within Occupational Field 08:

The Field Artillery OccFld is divided among three functional areas: firing battery, field artillery operations, and field artillery observation/liaison. Qualifications include ability and learned skills to operate and maintain artillery equipment; basic technical and mathematical skills for computing, communicating, and executing fire commands; ability and attitudes supporting life and close work with others in a field environment; and performing duties involving hard technical skills as well as administrative and managerial skills. The duties that must be learned vary by functional area. Firing battery includes moving, emplacing, loading, firing, protecting, and maintaining field artillery cannon weapons systems. Field artillery operations involve moving, emplacing, operating, protecting, and maintaining equipment which acquires targets; provides, relates, and evaluates gun and target survey information, meteorological data, weapon system performance; and integrating these factors into orders and communicating these orders to the firing battery. Field artillery observation and liaison include checking and analyzing combat plans and communicating appropriate advice, planning and operating information to coordinate the fires of field artillery and naval guns with infantry and armor combat maneuvers; observing and reporting targets and other battlefield information; and adjusting observed fires on targets. Types of entry-level jobs include work as Field Artillery Cannoneer, Radar Operator, Fire Control Man, Sensor Support Marine, and as a Fire Support Man, spotting fires of artillery and naval gunfire. Formal schooling or field skills training is provided to Marines entering the OccFld. Because field artillery is the primary supporting arm for Marine Infantry and Armor, most of its billets are in FMF ground organizations. The Marine Artilleryman finds most assignment opportunities similar to the wide variety of billets available to those in other combat and combat support fields at all staff levels of the division and in various free billets. Marines entering this OccFld receive MOS 0800, Basic Field Artillery Man, and under instruction and close supervision, perform routine duties incident to the firing, operation, and maintenance of field artillery pieces and related equipment. These Marines are trained for one of the MOSs in the field artillery OccFld and participate in routine functioning and tactical employment of the unit to which attached (p. 454).

Examples of Self-Reported Field Artillery MOSs

The five most frequent Field Artillery military occupational specialties during deployment that were self-reported on the PDHA were 0811 (*n* = 2,555), 0861 (*n* = 724), 0844 (*n* = 719), 0842 (*n* = 213), and 0848 (*n* = 150).

Results

Active duty enlisted Marines working in Field Artillery MOSs during deployment often reported blast exposure (12%; Figure 15.1). When exposed to a qualifying event that could prompt a concussion, approximately one quarter (26%) screened positive (Figure 15.2). Impact-associated concussions occurred infrequently (9%), while blast-associated concussions occurred often (16%; Figure 15.3). Of

Marines working in Field Artillery MOSs, 40% reported experiencing at least one symptom during deployment, with 27%, 24%, and 22% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 15.4). Back pain was the most commonly reported symptom in this MOS category (16%), followed by fatigue (13%), joint issues (13%), headache (12%), muscle ache (11%), and ringing in the ears (10%). The remaining symptoms were reported by fewer than 10% of Marines working in Field Artillery MOSs (Figure 15.5).

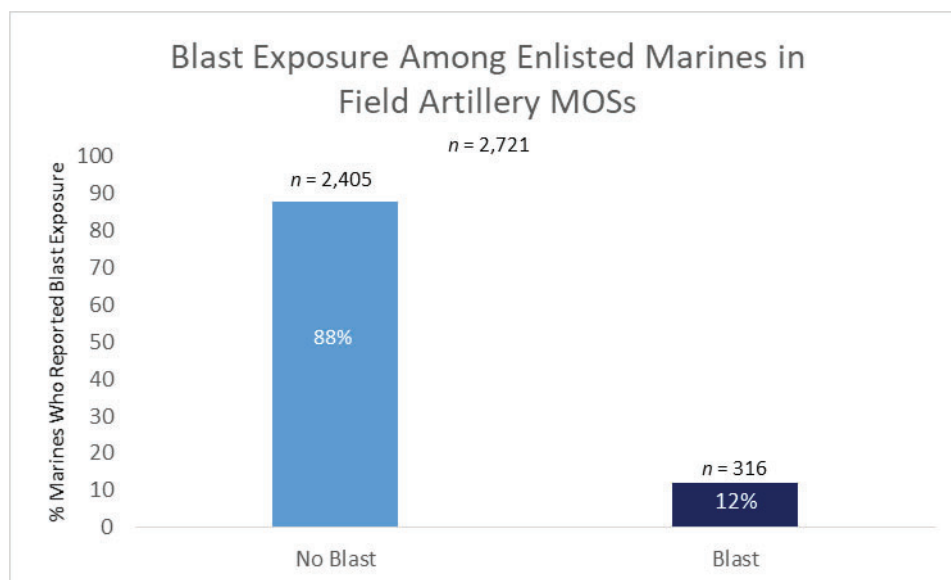


Figure 14.1

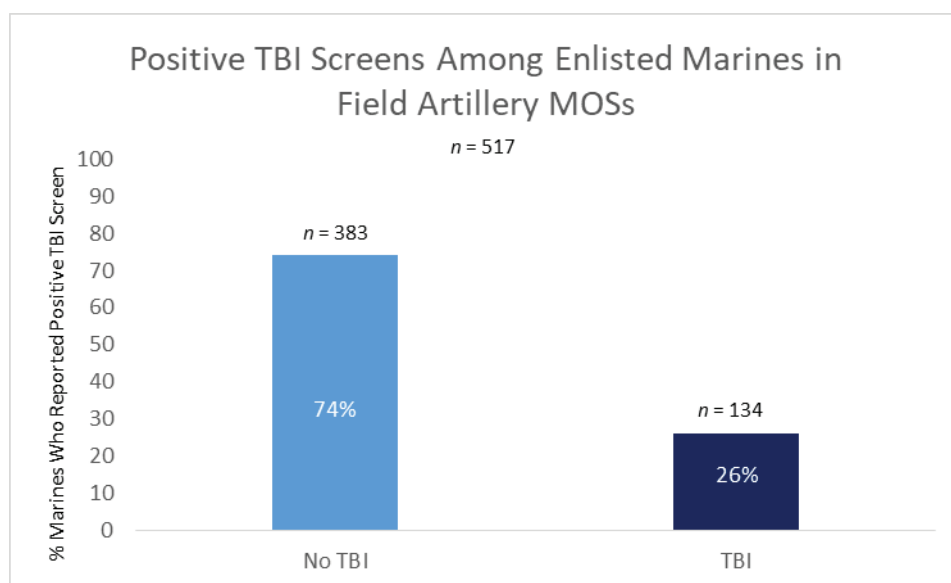


Figure 14.2

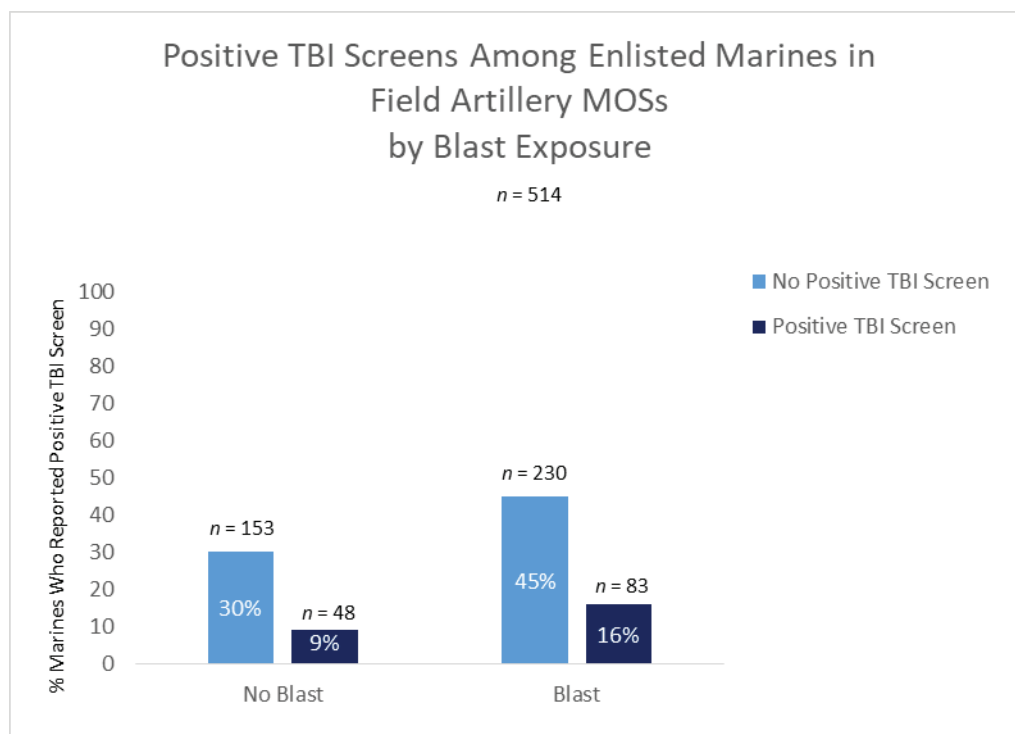


Figure 14.3

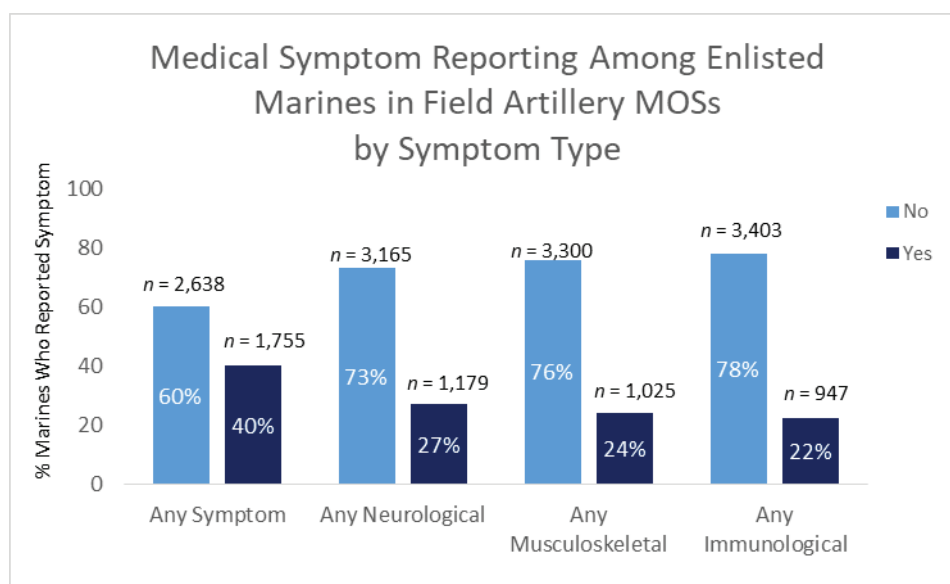


Figure 14.4

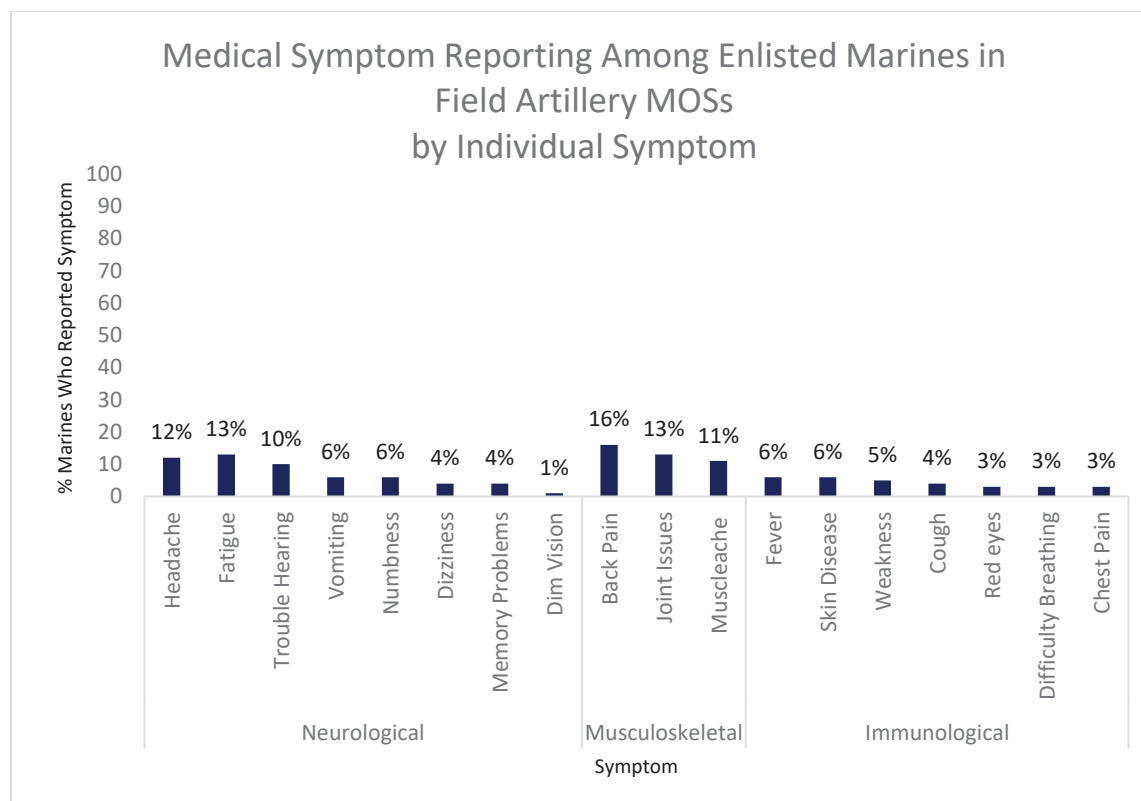


Figure 14.5

Financial Management (*n* = 451)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Financial Management occupations within Occupational Field 34:

The Financial Management OccFld encompasses the functions of finance, accounting, and budget which are developed to ensure the continuing quality of the financial management process and to safeguard all public funds. Personnel serving in the OccFld assist and support the commander in the execution of the responsibilities, both command and legal, that relate to financial administration. Qualifications required include skills involving the disbursement of public funds, budget development and execution, managerial accounting, reporting, resource evaluation and analysis, and auditing. Formal schooling is provided to Marines entering the OccFld as Finance Technicians and Financial Management Resource Analysts. Types of entry-level jobs available include work in finance, managerial accounting, and comptroller offices in the operating forces and the post and station activities. They perform routine duties incident to the preparation of financial records, travel vouchers, processing of public vouchers for payment and the maintenance of internal controls. The appropriate command shall initiate MOS reclassification for any Marine in the OccFld who receives NJP or is convicted by court-martial or civilian court for any offense involving larceny; theft; fraud, falsifying financial records; misuse of the Government Travel charge Card (GTCC); or misuse of public funds. Any Financial Management MOS will be voided only by the authority of CMC (p. 695).

Examples of Self-Reported Financial Management MOSs

The five most frequent Financial Management military occupational specialties during deployment that were self-reported on the PDHA were 3432 (*n* = 314), 3451 (*n* = 114), 3432 Disbursing Technician (*n* = 2), Disbursing (*n* = 2), and Disbursing Clerk (*n* = 1).

Results

Active duty enlisted Marines working in Financial Management MOSs during deployment rarely reported blast exposure and rarely screened positive for concussion (*ns* ≤ 30; Figures 16.1, 16.2, and 16.3). Of Marines working in Financial Management, 42% reported experiencing at least one symptom during deployment, with 28%, 22%, and 26% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 16.4). Because HIPAA regulations prohibit the release of medical data for groups smaller than 30 individuals, many of the symptoms were not reported by enough Marines in this MOS to be reported here. The symptoms reported by at least 30 Marines and more than 10% of Marines in this MOS were back pain (15%), fatigue (14%), headache (13%), joint issues (11%), and muscle ache (10%; Figure 16.5).

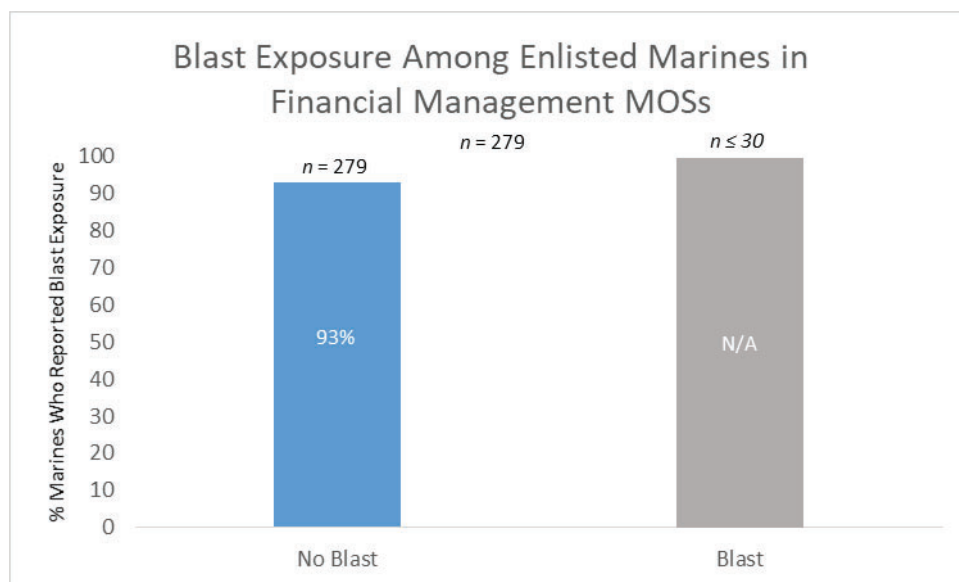


Figure 15.1

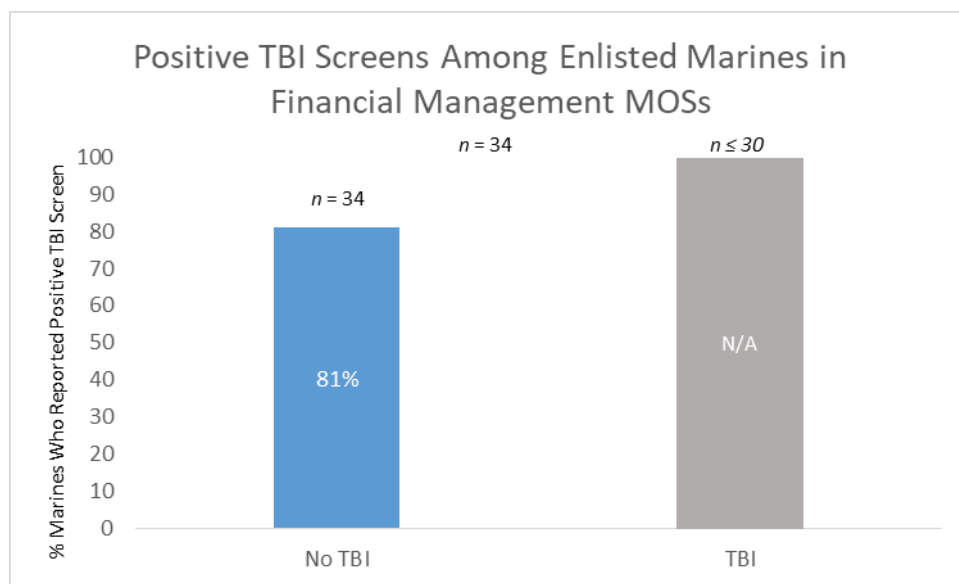


Figure 15.2

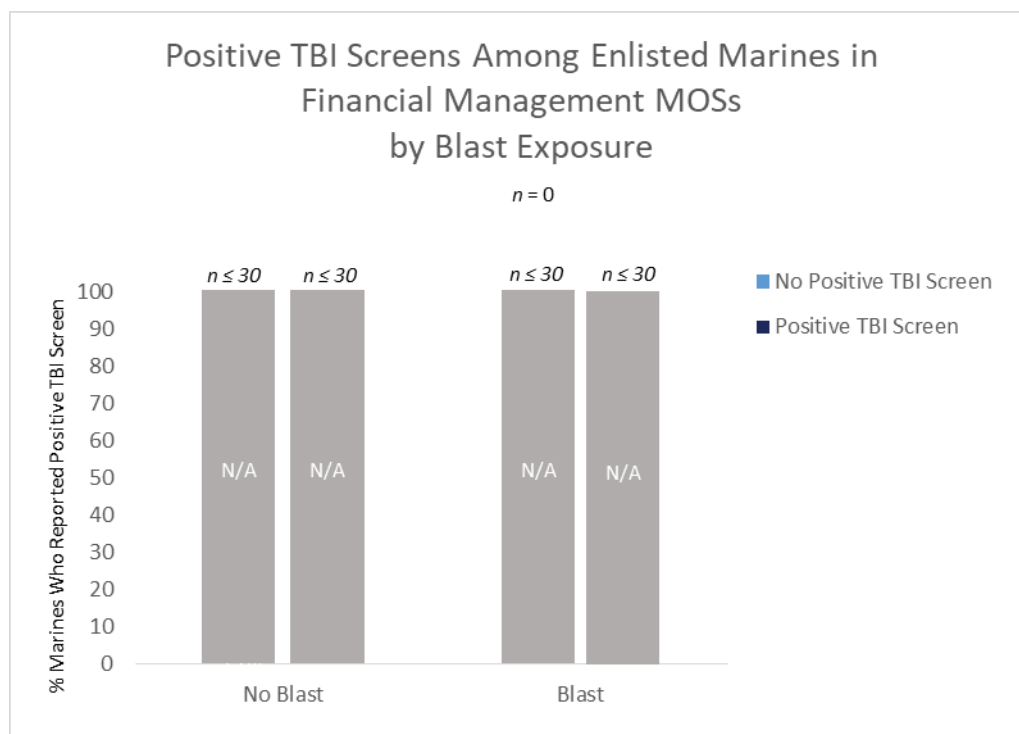


Figure 15.3

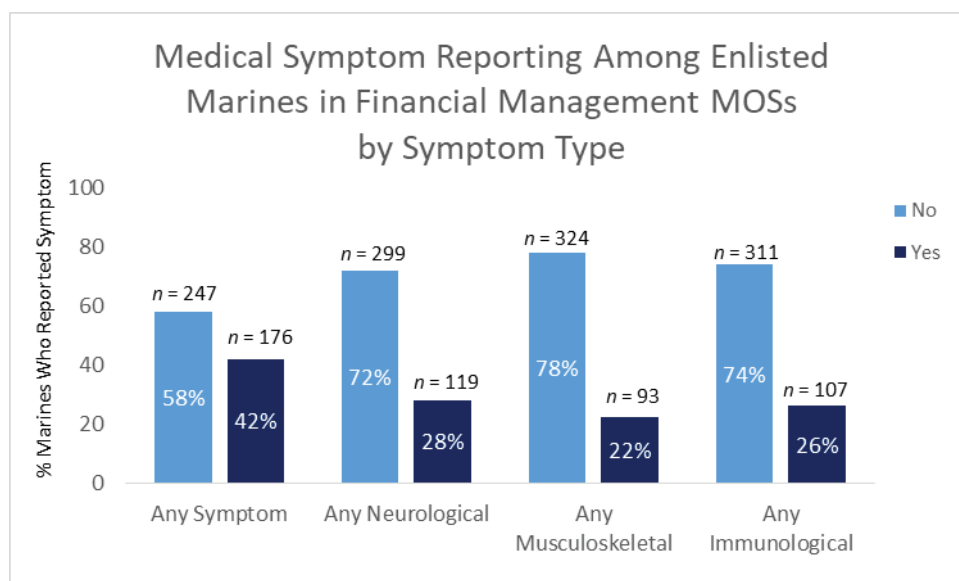


Figure 15.4

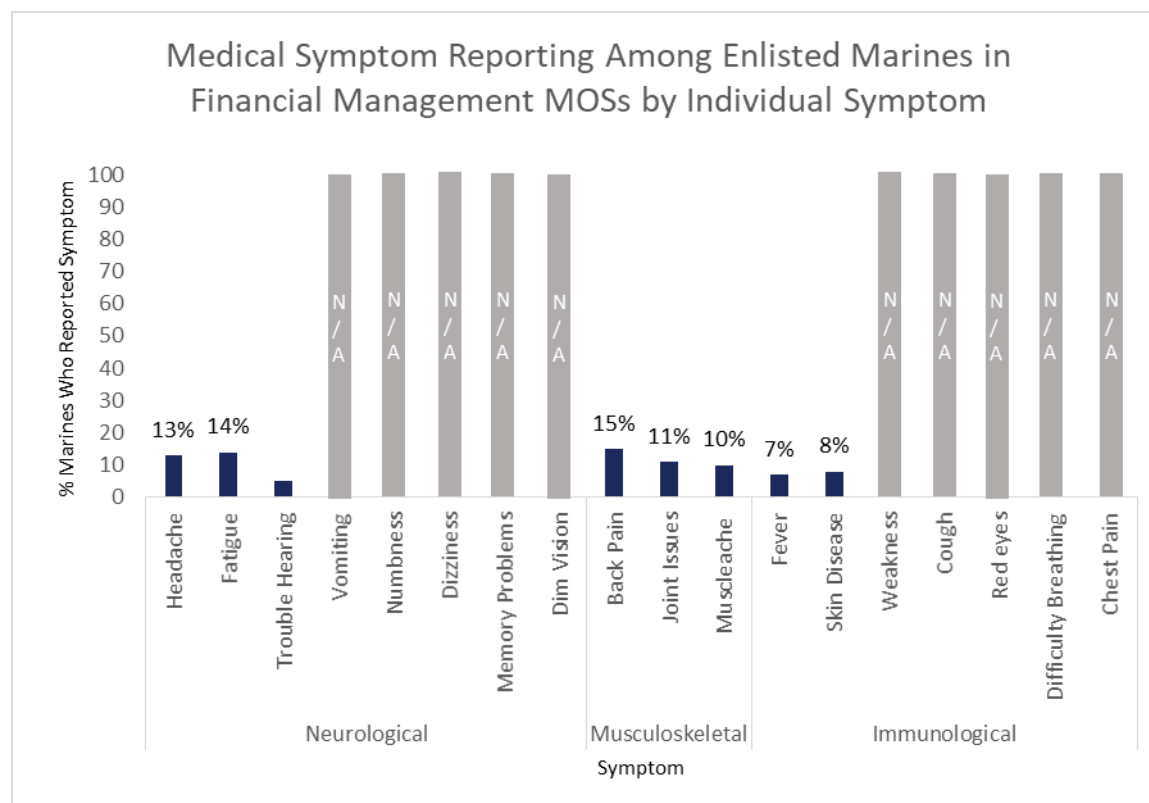


Figure 15.5

Food Service ($n = 1,700$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Food Service occupations within Occupational Field 33:

The Food Service OccFld includes the acquisition of food, supplies, and equipment; menu and recipe planning; meal preparation and serving; sanitation; operation and management of facilities and personnel; training; and accounting and reporting functions for garrison and field operation. Qualifications required include basic skills in math and reading, ability to follow recipes, and the ability to work closely with others. The duties involve technical, administrative, and managerial skills. Food service personnel will be required to learn garrison and field food preparation and serving procedures, recipe conversion, preparation and use of food service administrative forms, quality assurance surveillance procedures for food processing, mess hall operations, and storage facilities, and methods of cooking food and preparing desserts and beverages by using recipes/formulas. Formal schooling is provided to Marines entering the food service field. Types of entry-level jobs available include work as a Food Service Specialist, and Baker. The opportunity to participate in a formal apprenticeship program leading to receipt of a Department of Labor Certificate of Apprenticeship Completion may be available within OccFld 33. Specific information concerning this program can be obtained from local education offices. Billets available in the OccFld range from duty with operating forces and supporting establishment. Marines entering this OccFld will receive MOS 3300, Basic Food Service Marine. They will participate in routine food service functions while training for MOS 3381, Food Service Specialist (p. 688).

Examples of Self-Reported Food Service MOSs

The five most frequent Food Service military occupational specialties during deployment that were self-reported on the PDHA were 3381 ($n = 1,622$), 3381 Food Service ($n = 6$), Food Service ($n = 6$), Food Service Specialist ($n = 6$), and 3381 Food Service Specialist ($n = 4$).

Results

Active duty enlisted Marines working in Food Service MOSs during deployment infrequently reported blast exposure (6%; Figure 17.1). However, when exposed to a qualifying event that could prompt a concussion, positive concussion screens were rare in general ($n \leq 30$; Figures 17.2 and 17.3). Of Marines working in Food Service, 46% reported experiencing at least one symptom during deployment, with 33%, 26%, and 28% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 17.4). Headache was the most commonly reported symptom in this MOS category (19%), followed by back pain (18%), fatigue (15%), joint issues (13%), muscle ache (13%), and fever (10%). The remaining symptoms were reported by fewer than 10% of Marines working in Food Service MOSs (Figure 17.5).

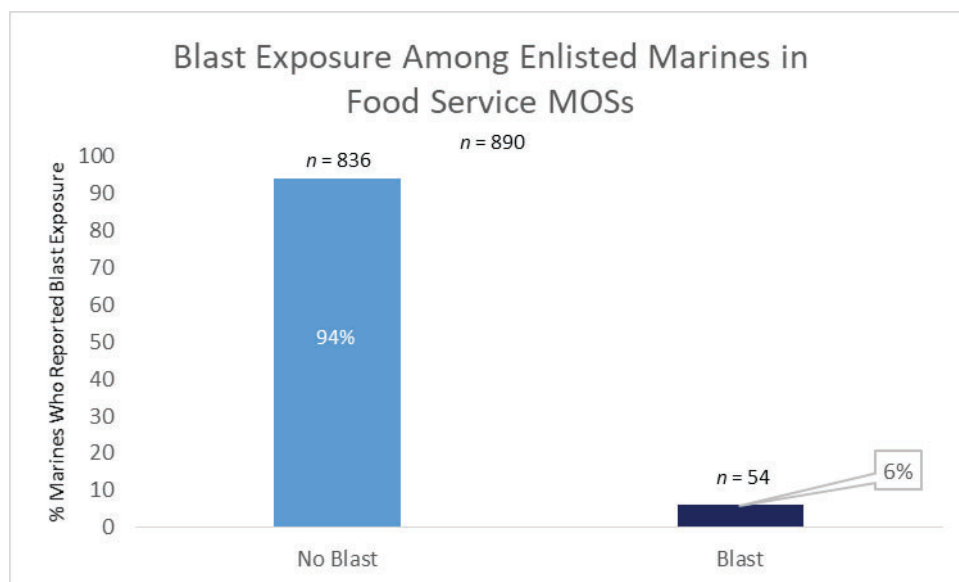


Figure 16.1

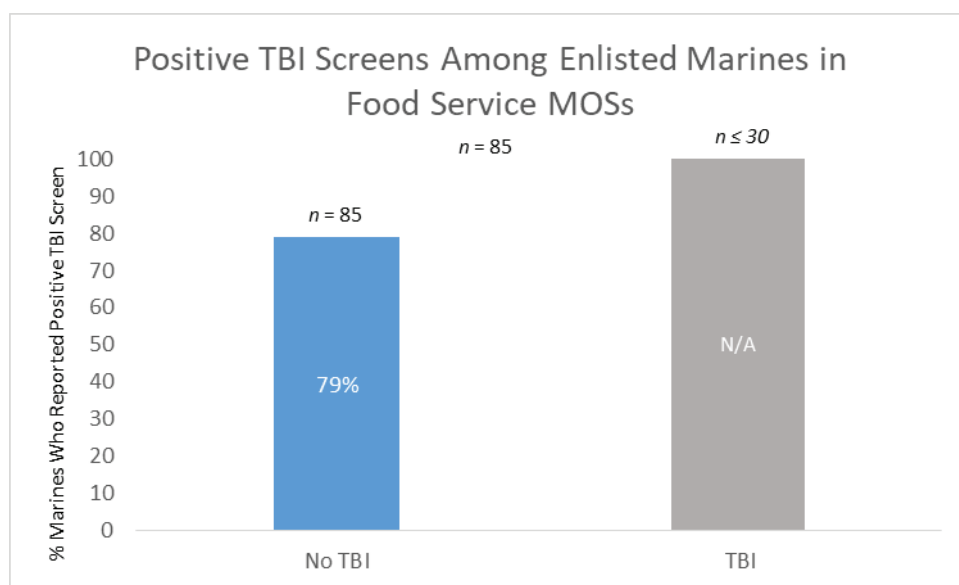


Figure 16.2

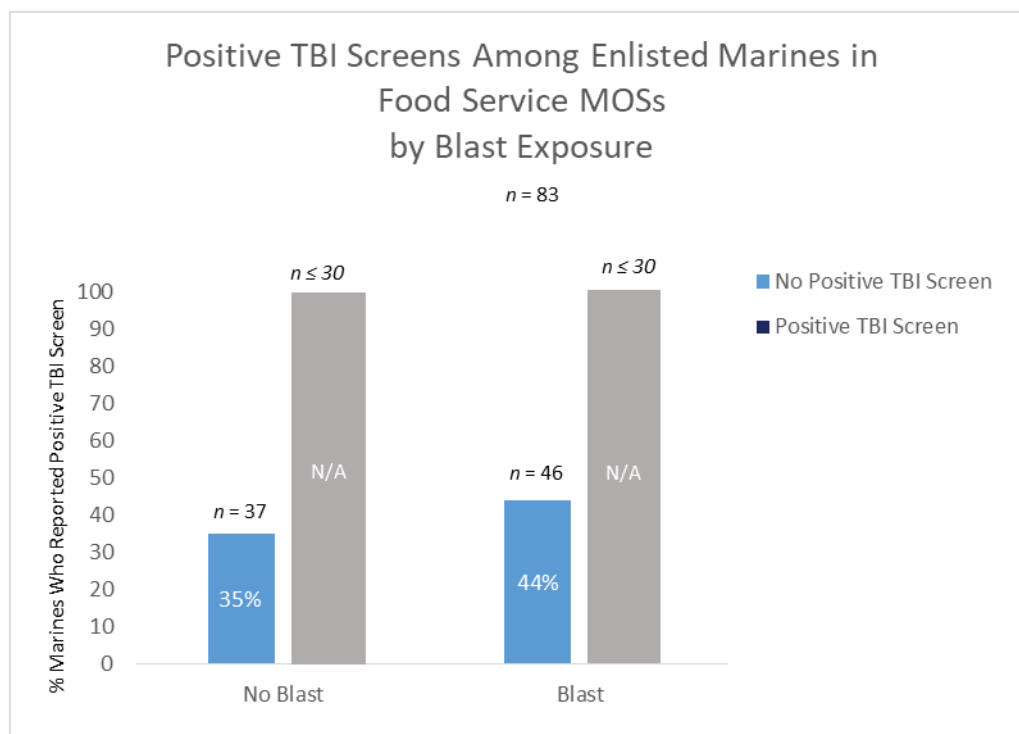


Figure 16.3

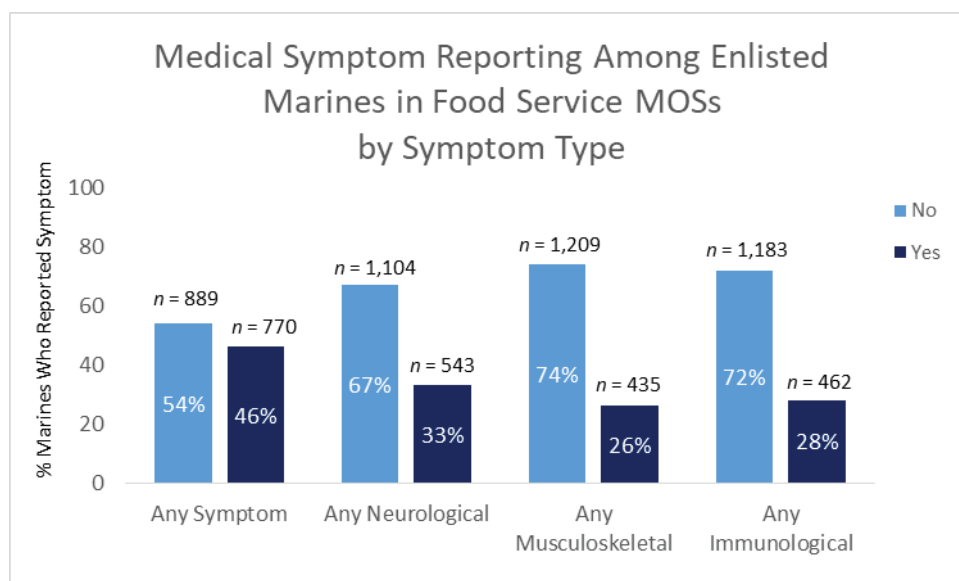


Figure 16.4

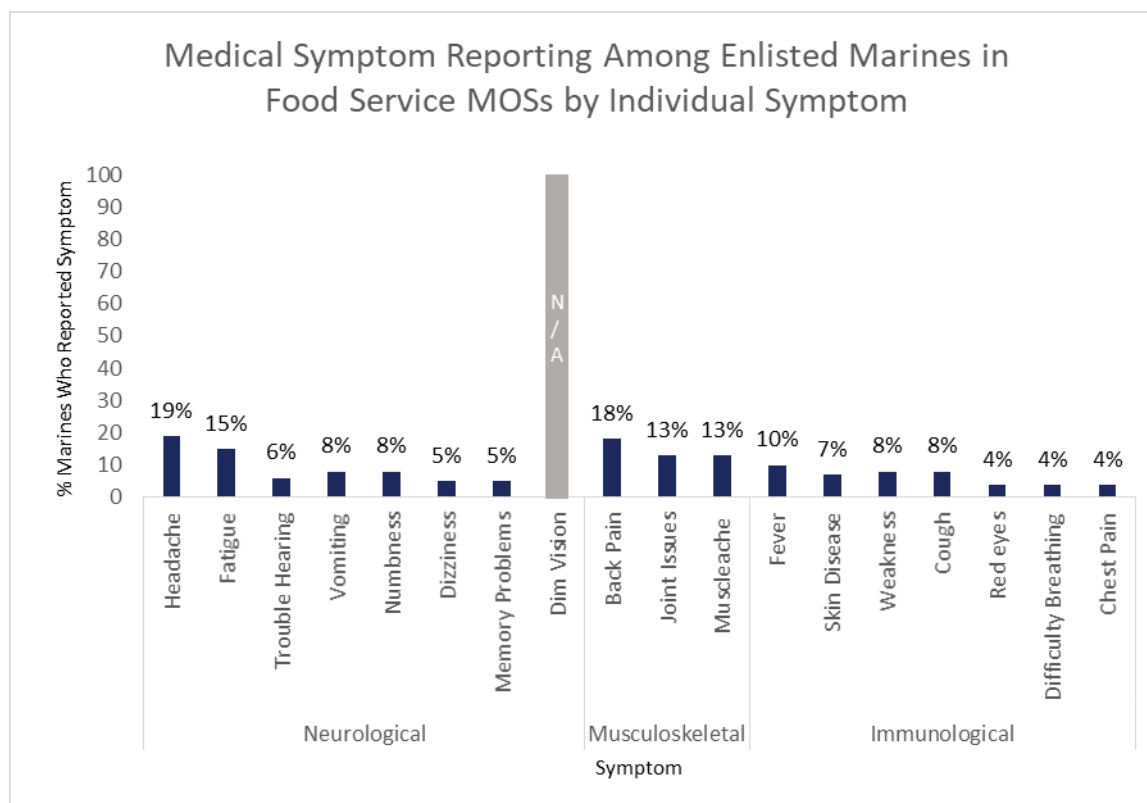


Figure 16.5

Ground Electronics Maintenance ($n = 3,102$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Ground Electronics Maintenance occupations within Occupational Field 28:

The Ground Electronics Maintenance Occupational Field includes the installation; inspection and classification; servicing, adjustment, and tuning; repair; modification; recovery and evacuation; overhauling and rebuilding; and testing and calibration of electronic equipment and systems used by Marine Corps Ground Forces. The equipment includes various types of communications transmission systems, information technology systems, intelligence processing systems, tactical sensor systems, cryptographic devices, artillery electronics systems, digital fire control systems, unmanned aerial vehicle electronics, miscellaneous non-communication systems, electronic jamming systems, and a wide range of test equipment and calibration devices. Qualifications to work in this field include manual dexterity, normal color vision, be eligible to hold a secret security clearance, the ability to understand highly technical material, and to comprehend complex mathematical and logic principles. Types of entry-level jobs available include work as a Ground Electronics Transmission Systems Maintainer, Ground Electronics Telecommunications and Information Technology Systems Maintainer, Calibration Technician, Artillery Electronics Technician, and Technical Controllers. Formal schooling is provided to all Marines entering this field. In general, entry-level training consists of basic electronics, electronic systems fundamentals, and an equipment-oriented phase at either a Marine Corps school or other service school. Career progression training will involve either related supervisory/technical level training or lateral move to another MOS within the field. Skill progression, skill enhancement and skill sustainment training is provided via on the job and through distributed learning and formal schooling. Billets for Ground Electronics Maintenance Personnel are found throughout the Marine Corps, but are concentrated within units having specific electronic or service support missions. Marines in this field may serve within division or wing units, MLG, MHG or supporting establishments. Instructor billets are found at the formal schools. Marines entering this field will be assigned MOS 2800, Basic Ground Electronics Maintenance Marine (p. 645).

Examples of Self-Reported Ground Electronics Maintenance MOSs

The five most frequent Ground Electronics Maintenance military occupational specialties during deployment that were self-reported on the PDHA were 2844 ($n = 835$), 2847 ($n = 562$), 2862 ($n = 397$), 2846 ($n = 388$), and 2841 ($n = 175$).

Results

Active duty enlisted Marines working in Ground Electronics Maintenance MOSs during deployment infrequently reported blast exposure (6%; Figure 18.1.). When exposed to a qualifying event that could prompt a concussion, 18% screened positive for concussion and blast-associated TBIs were rare ($n \leq 30$; Figures 18.2 and 18.3). Of Marines in Ground Electronics Maintenance MOSs, 47% reported experiencing at least one symptom during deployment, with 30%, 27%, and 30% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 18.4). Back pain was the most commonly reported symptom in this MOS category (17%), followed by headache (17%), fatigue (16%),

joint issues (15%), muscle ache (14%), and fever (10%). The remaining symptoms were reported by fewer than 10% of Marines working in Ground Electronics Maintenance MOSs (Figure 18.5).

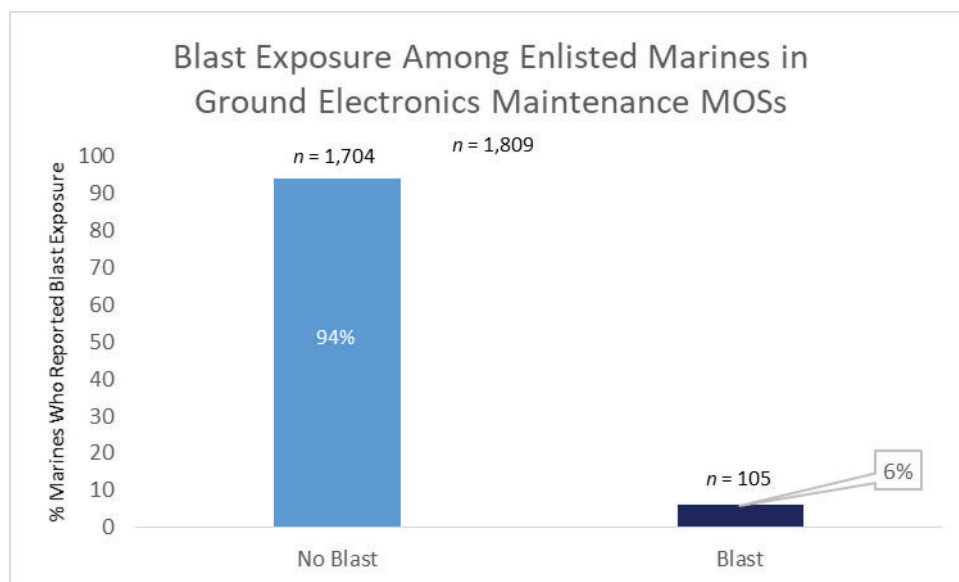


Figure 17.1

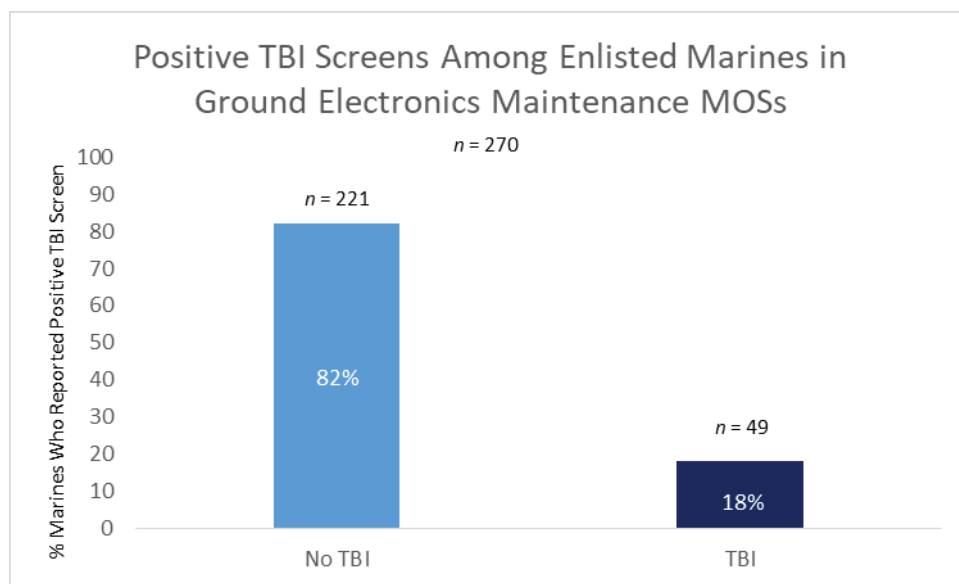


Figure 17.2

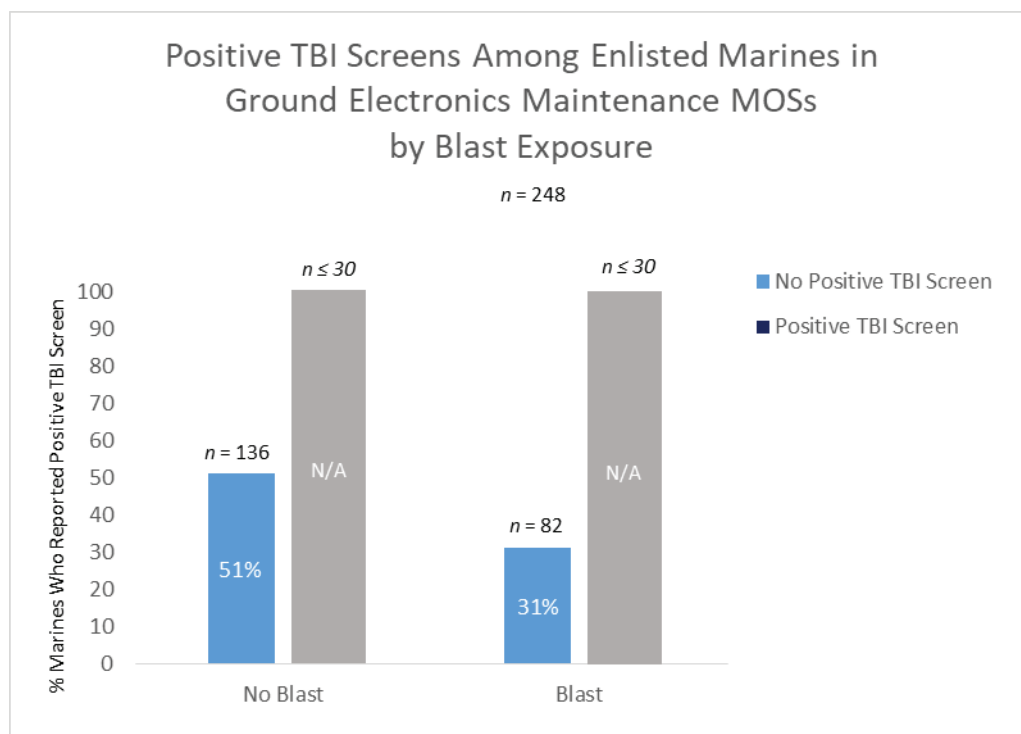


Figure 17.3

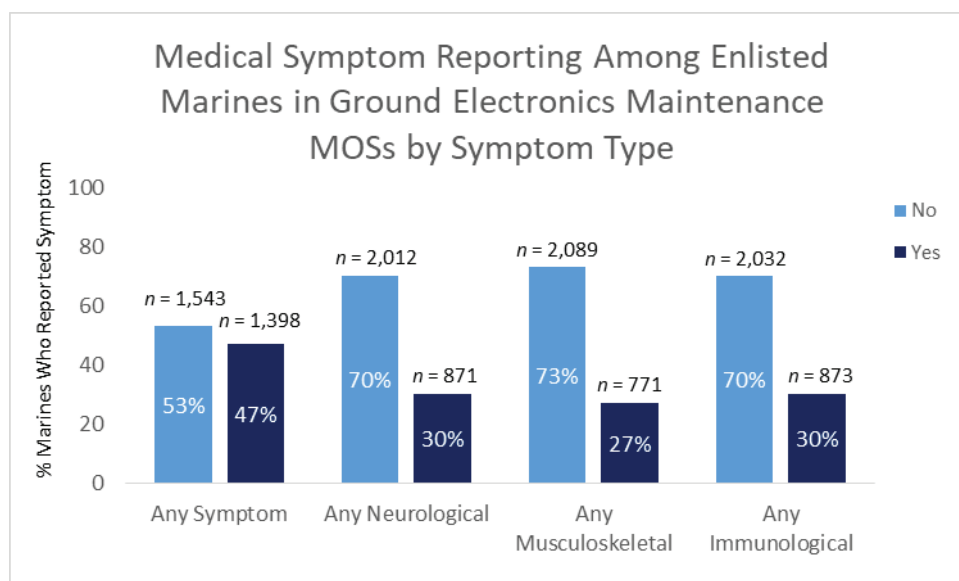


Figure 17.4

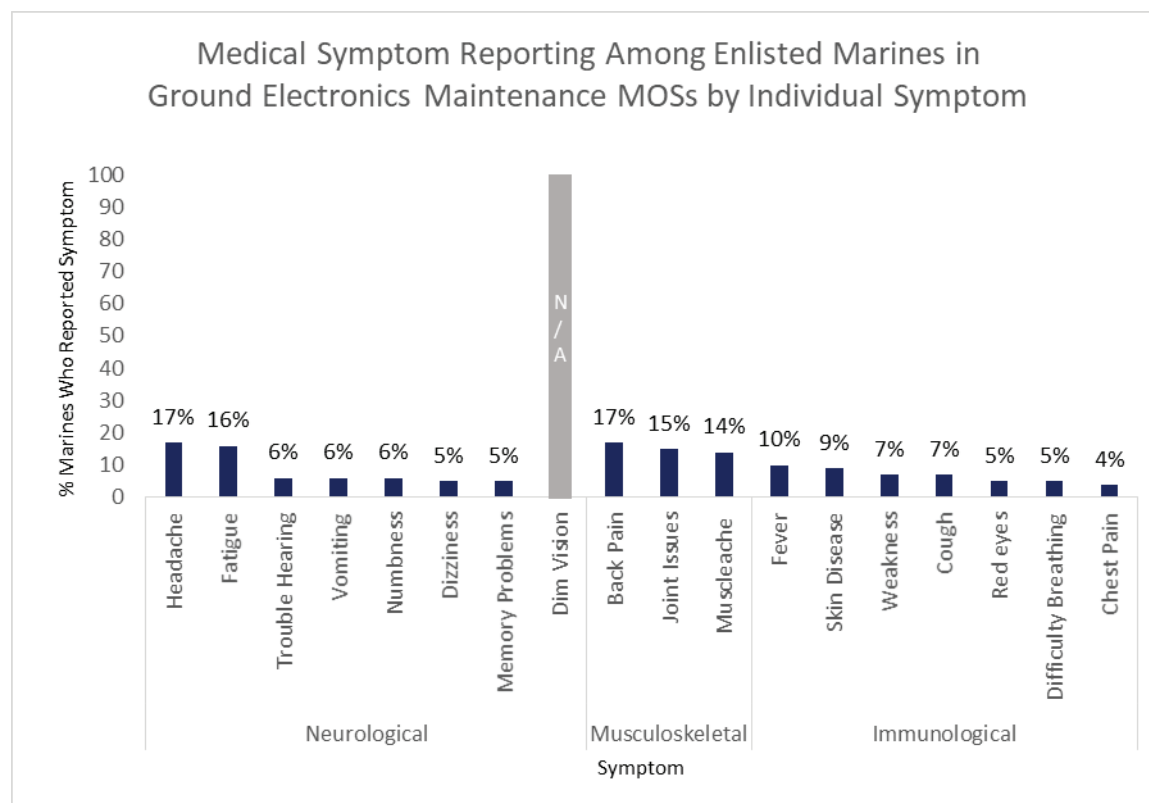


Figure 17.5

Ground Ordnance Maintenance (n = 3,428)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Ground Ordnance Maintenance occupations within Occupational Field 21:

The Ground Ordnance Maintenance OccFld ensures the MARFOR that serviceable ordnance materials are available. Duties include the inspection, repair, and maintenance of most weapon and optical systems possessed by Marine Corps units. Qualifications required include basic ordnance administration and knowledge; the capability to technically inspect/analyze an ordnance item and repair/fabricate the same, and to understand and implement repair shop/armory operational procedures. The requirement also exists to impart technical knowledge to organizational personnel, crews, and supervisors for proper preventive maintenance, inspections, and application. Ground Ordnance Maintenance Personnel will be required to learn Ground Ordnance Maintenance administrative procedures, repair analysis, technical inspection procedures, repair procedures, testing of ordnance equipment, and quality control methodology. Types of entry/level jobs available include Armorer, Artillery Repairer; Assault Amphibious Vehicle/Tank/Light Armored Vehicle/Optical/Laser/Small Missile Repairer/Machinist. Marines entering this OccFld will receive MOS 2100, Basic Ground Ordnance Maintenance Marine. Additionally, they must be familiar with associated warranties and contract logistics support options for ground ordnance equipment and components, as well as is able to execute processes and procedures as part of that sustainment plan (p. 515).

Examples of Self-Reported Ground Ordnance Maintenance MOSs

The five most frequent Ground Ordnance Maintenance military occupational specialties during deployment that were self-reported on the PDHA were 2111 (n = 1,114), 2147 (n = 534), 2171 (n = 447), 2141 (n = 440), and 2146 (n = 397).

Results

Active duty enlisted Marines working in Ground Ordnance Maintenance MOSs during deployment frequently reported blast exposure (10%; Figure 19.1). When exposed to a qualifying event that could prompt a concussion, one quarter (25%) screened positive (Figure 19.2). Both impact-associated and blast-associated concussions occurred often (10% and 14%, respectively; Figure 19.3). Of Marines working in Ground Ordnance Maintenance MOSs, 47% reported experiencing at least one symptom during deployment, with 33%, 30%, and 27% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 19.4). Back pain was the most commonly reported symptom in this MOS category (20%), followed by fatigue (18%), headache (16%), joint issues (16%), muscle ache (15%), and ringing in the ears (11%). The remaining symptoms were reported by fewer than 10% of Marines working in Ground Ordnance Maintenance MOSs (Figure 19.5).

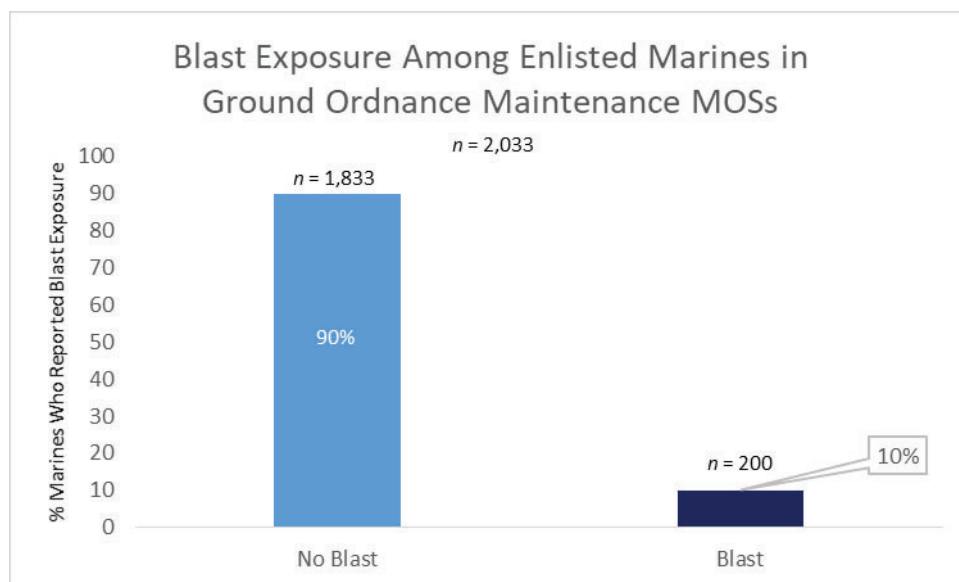


Figure 18.1

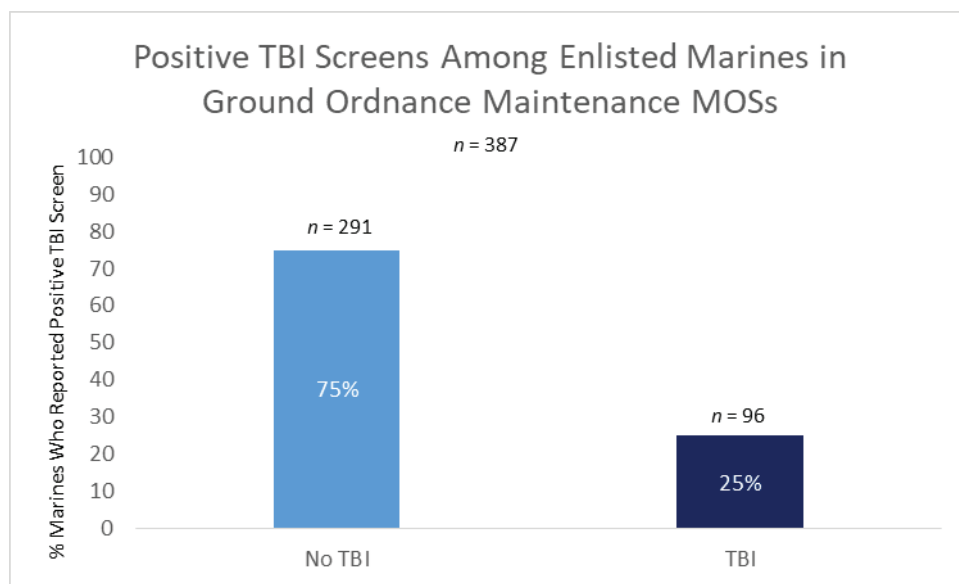


Figure 18.2

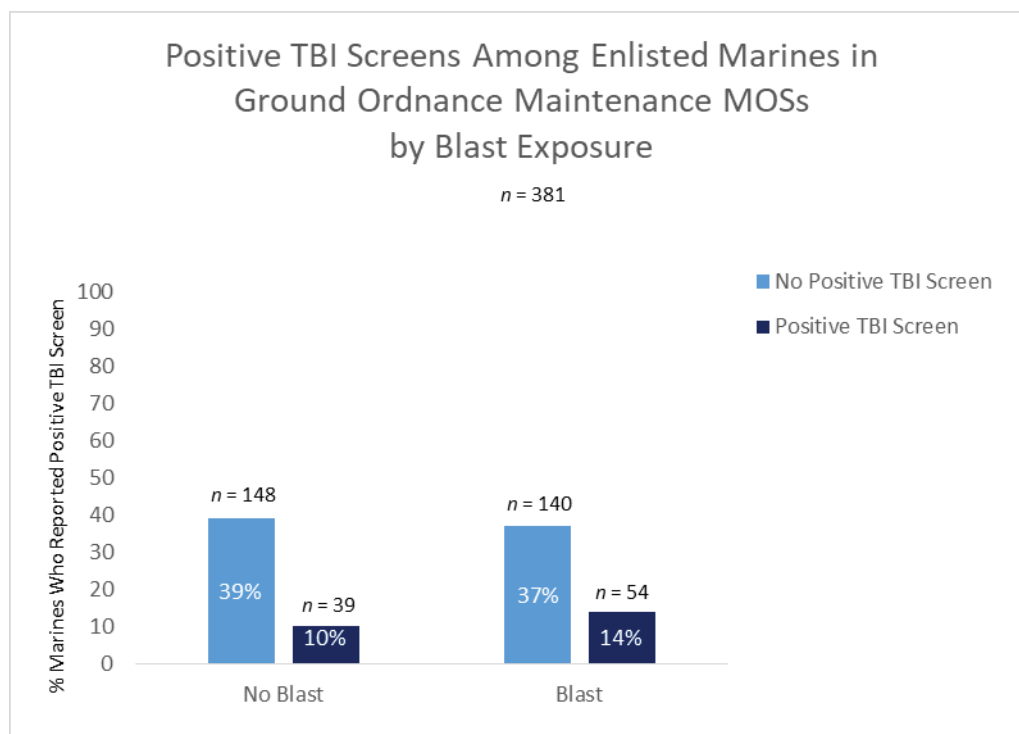


Figure 18.3

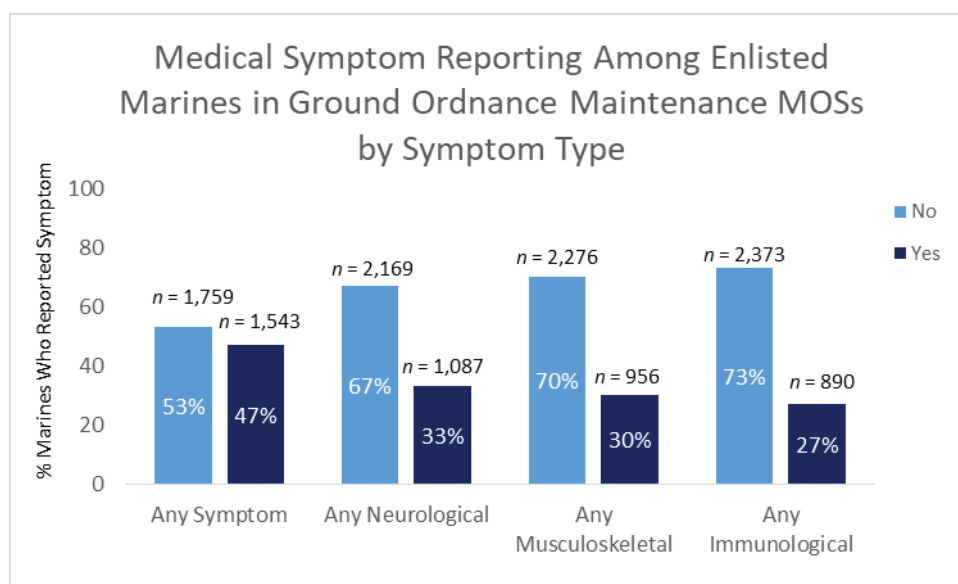


Figure 18.4

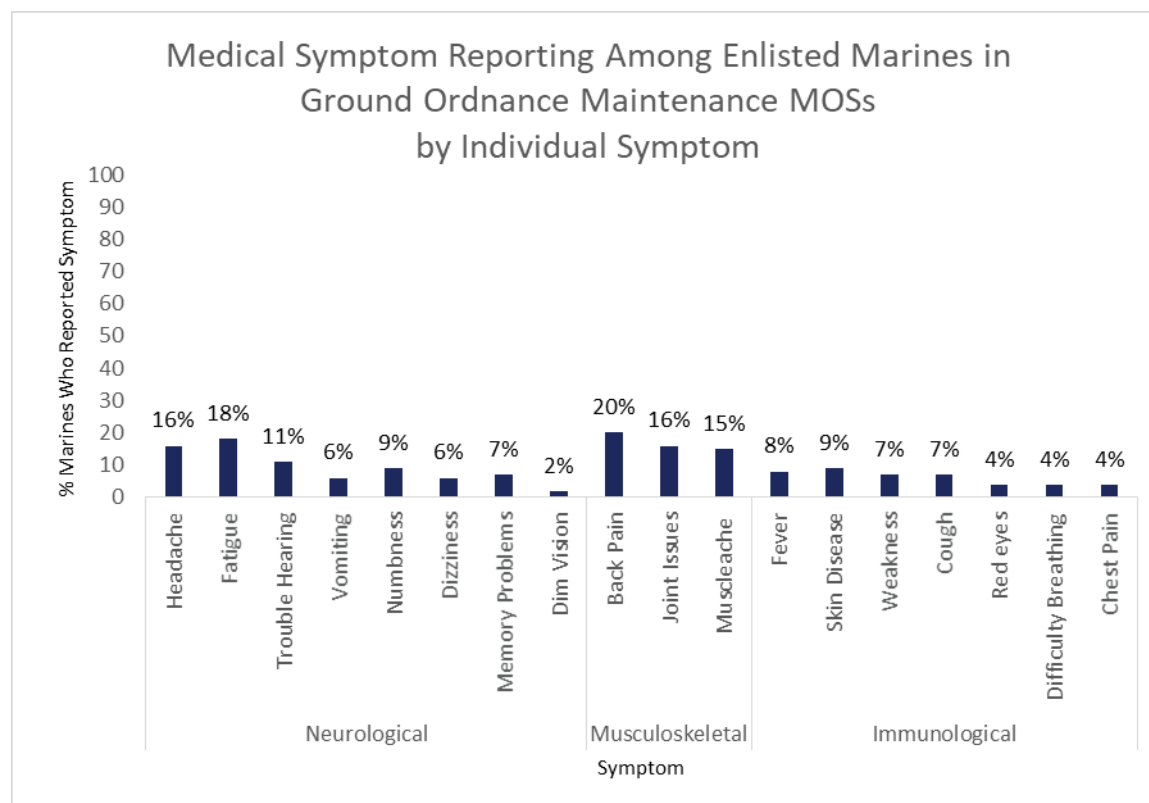


Figure 18.5

Infantry (*n* = 41,431)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Infantry occupations within Occupational Field 03:

In addition to the Infantry Officer, Marine Gunner and Infantry Unit Leader, the 03 occupational field is comprised of the following specialties: Rifleman, LAV Crewman, Sniper, Reconnaissance Man, Machine Gunner, Mortarman, Assaultman, and Anti-Tank Assaultman. Regardless of specialty, Infantrymen are primarily employed in units from the team to regimental level to locate, close with and destroy the enemy in all environments and weather conditions, day and night. Excluding LAR Units, Infantrymen are principally trained to operate on foot. However, infantry units are capable of embarking aboard and fighting from helicopters, assault amphibian tractors, motorized vehicles and small boats. As a principal component of a Marine Air-Ground Task Force's Ground Combat Element, infantry units must be comprised of Marines who are trained to direct supporting arms fires and act in concert with other combat arms units. All Infantrymen must be masters of field craft and proficient in the use and operation of small arms, demolitions, rockets and mortars (p. 360).

Examples of Self-Reported Infantry MOSs

The five most frequent Infantry military occupational specialties during deployment that were self-reported on the PDHA were 0311 (*n* = 22,243), 0331 (*n* = 4,536), 0341 (*n* = 4,495), 0351 (*n* = 2,827), and 0369 (*n* = 1,953).

Results

Active duty enlisted Marines working in Infantry MOSs during deployment frequently reported blast exposure (20%; Figure 20.1). When exposed to a qualifying event that could prompt a concussion, 30% screened positive (Figure 20.2). Impact-associated concussions were infrequent (6%), while blast-associated concussions occurred frequently (24%; Figure 20.3). Of Marines working in Infantry MOSs, 46% reported experiencing at least one symptom during deployment, with 35%, 29%, and 25% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 20.4). Back pain was the most commonly reported symptom in this MOS category (22%), followed by joint issues (17%), muscle ache (17%), headache (17%), ringing in the ears (16%), fatigue (15%), and vomiting (12%). The remaining symptoms were reported by fewer than 10% of Marines working in Infantry MOSs (Figure 20.5).

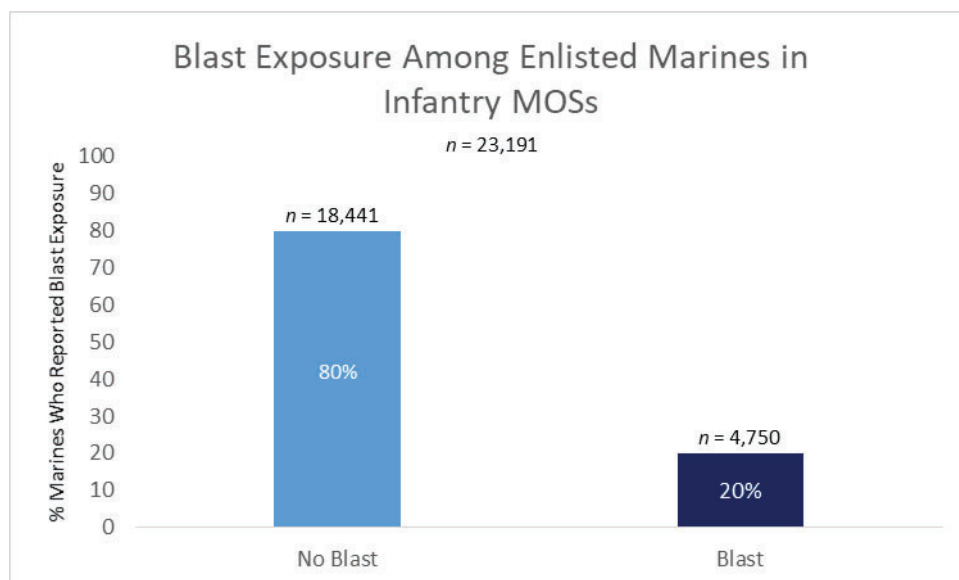


Figure 19.1

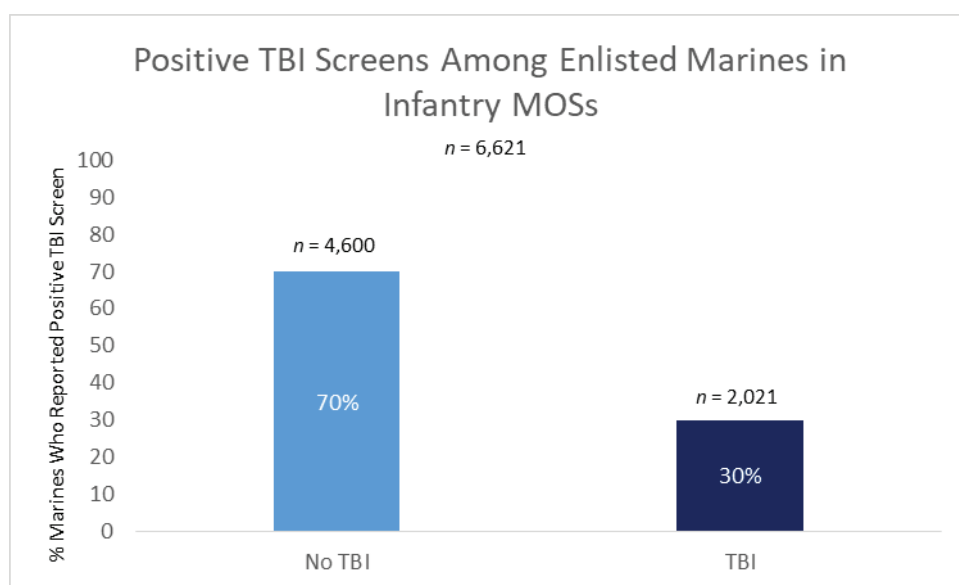


Figure 19.2

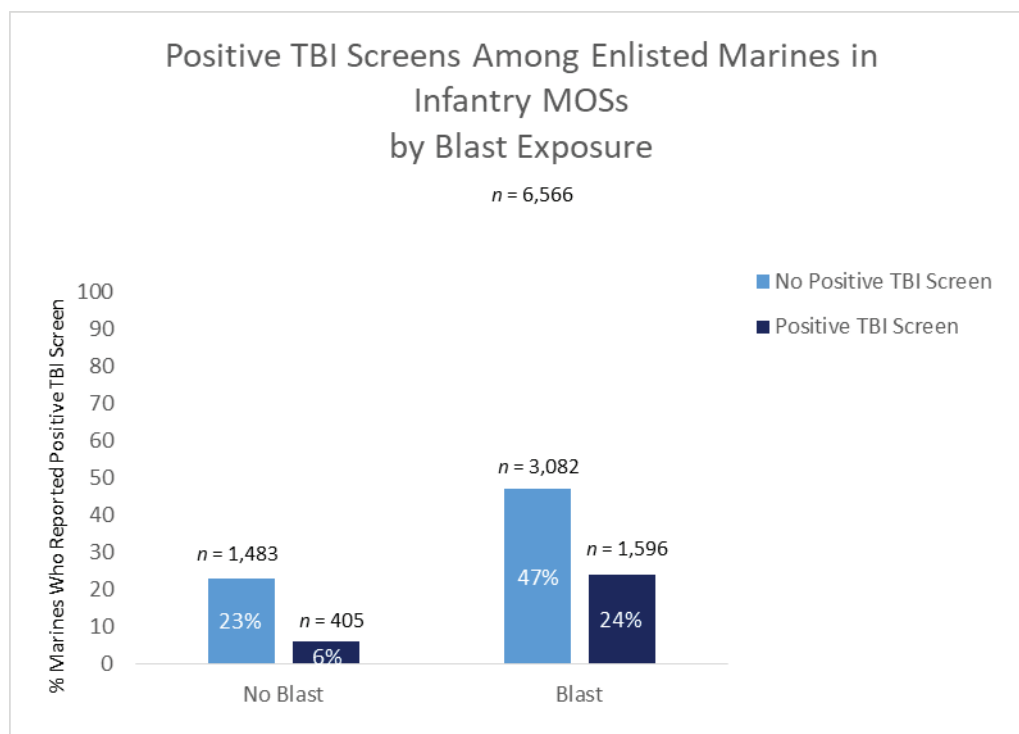


Figure 19.3

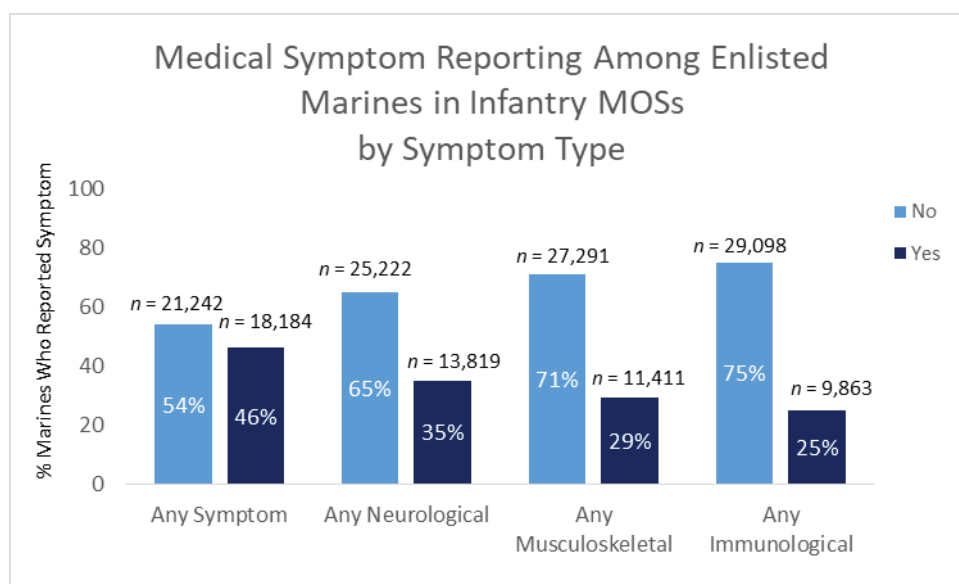


Figure 19.4

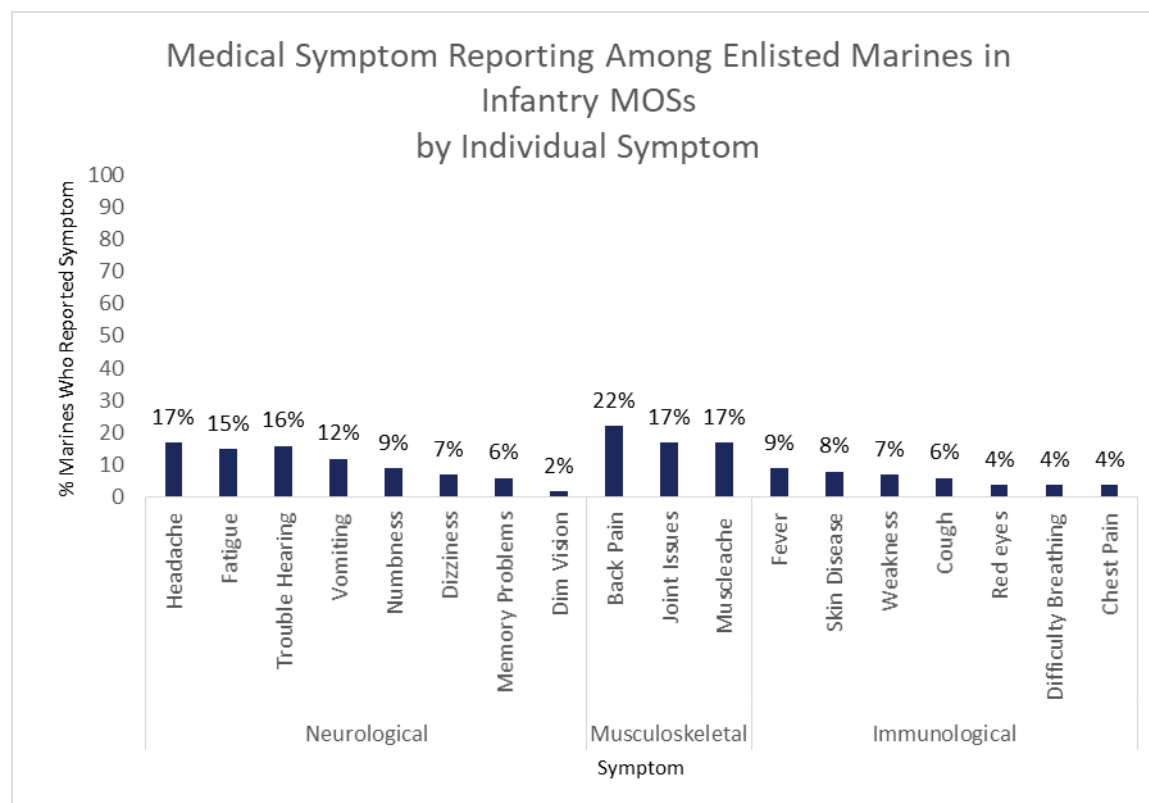


Figure 19.5

Intelligence (*n* = 2,679)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Intelligence occupations within Occupational Field 02:

The Intelligence OccFld conducts the collection, processing, and dissemination of intelligence. The specialties within the Intelligence OccFld are analysis, counterintelligence, imagery interpretation, geographic intelligence and human intelligence. Basic qualification requirements include clerical, communication, and computer skills. Intelligence Specialists are required to learn and master a variety of analytical and technical skills. Formal schooling is mandatory for assignment of an intelligence MOS. Entry-level Marines enter the field in MOS 0231, (Intelligence Specialist) or MOS 0261 (Geographic Intelligence Specialist). Entry into MOS 0211, Counterintelligence/Human Source (CI/HUMINT) Specialist or MOS 0241, Imagery Interpreter is accomplished by lateral move. Duty assignments vary widely from all levels of the Operating Forces to Joint Staffs, to Unified/Commands. Intelligence Marines also have the opportunity to serve in billets such as drill instructor, recruiter, and Marine Security Guard duty. Marines entering the OccFld will receive MOS 0200, Basic Intelligence Marine, while participating in on-the-job training (if required) and/or attending formal school. All Marines assigned an intelligence MOS must submit a Single Scope Background Investigation (SSBI) prior to attending formal school. Intelligence MOS Marines must have an adjudicated SSBI to qualify for assignment of one of the primary intelligence MOSs. Intelligence MOS Marines are required to have a Defense Language Aptitude Battery (DLAB) test score on file in their official military personnel file (OMPF). Intelligence MOS Marines that score above 100 on the DLAB may be designated to attend formal language training. There is no minimum DLAB score required before being assigned as 02XX PMOS. DoD has stated a career goal for professional linguists of achieving Interagency Language Roundtable General Proficiency (Level-3) in those modalities (listening, reading, and/or speaking) required to perform their primary function. Linguists are encouraged to take advantage of language training events in order to achieve this goal. Intelligence MOSs are assigned and voided only by the Commandant of the Marine Corps (MM) in coordination with the OccFld specialist's recommendations (p. 335).

Examples of Self-Reported Intelligence MOSs

The five most frequent Intelligence military occupational specialties during deployment that were self-reported on the PDHA were 0231 (*n* = 1,713), 0211 (*n* = 420), 0241 (*n* = 256), 0261 (*n* = 161), and 0291 (*n* = 15).

Results

Active duty enlisted Marines working in Intelligence MOSs during deployment infrequently reported blast exposure (6%; Figure 21.1). However, when exposed to a qualifying event that could prompt a concussion, 23% screened positive for concussion, but both impact-TBIs and blast-TBIs were rare (*n* ≤ 30; Figures 21.2 and 21.3). Of Marines working in Intelligence, 50% reported experiencing at least one symptom during deployment, with 35%, 27%, and 32% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 21.4). Headache was the most commonly reported

symptom in this MOS category (20%), followed by fatigue (19%), back pain (17%), joint issues (14%), muscle ache (14%), and fever (11%). The remaining symptoms were reported by fewer than 10% of Marines working in Intelligence MOSs (Figure 21.5).

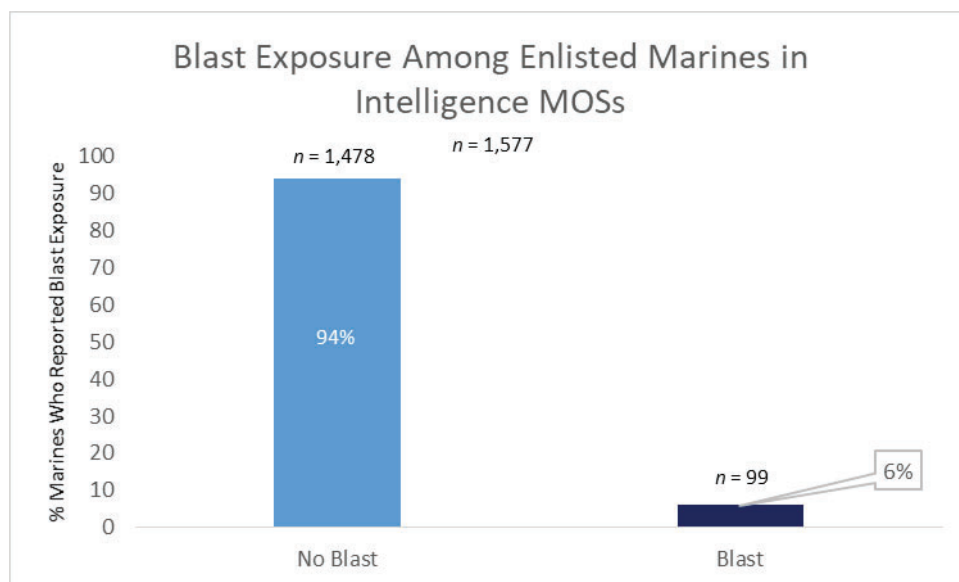


Figure 20.1

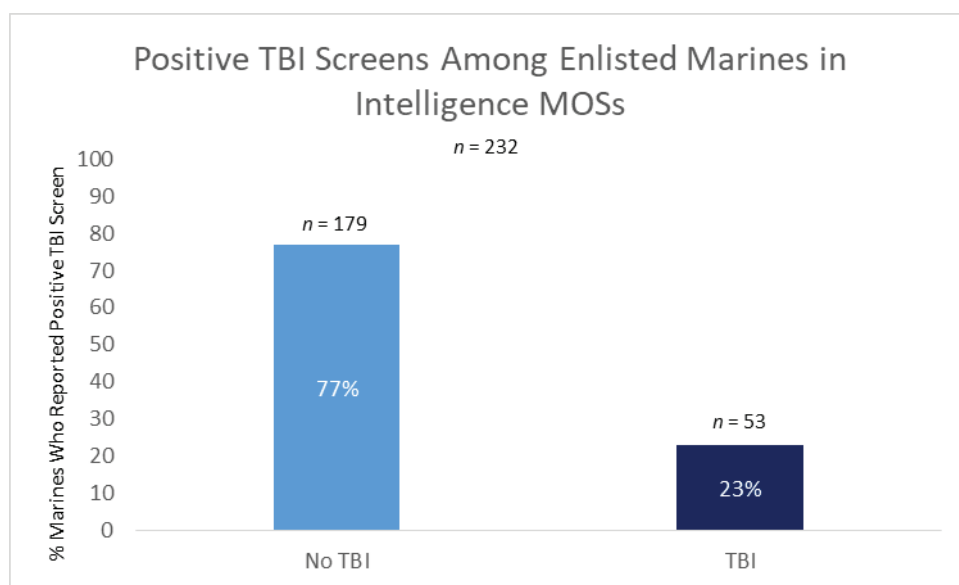


Figure 20.2

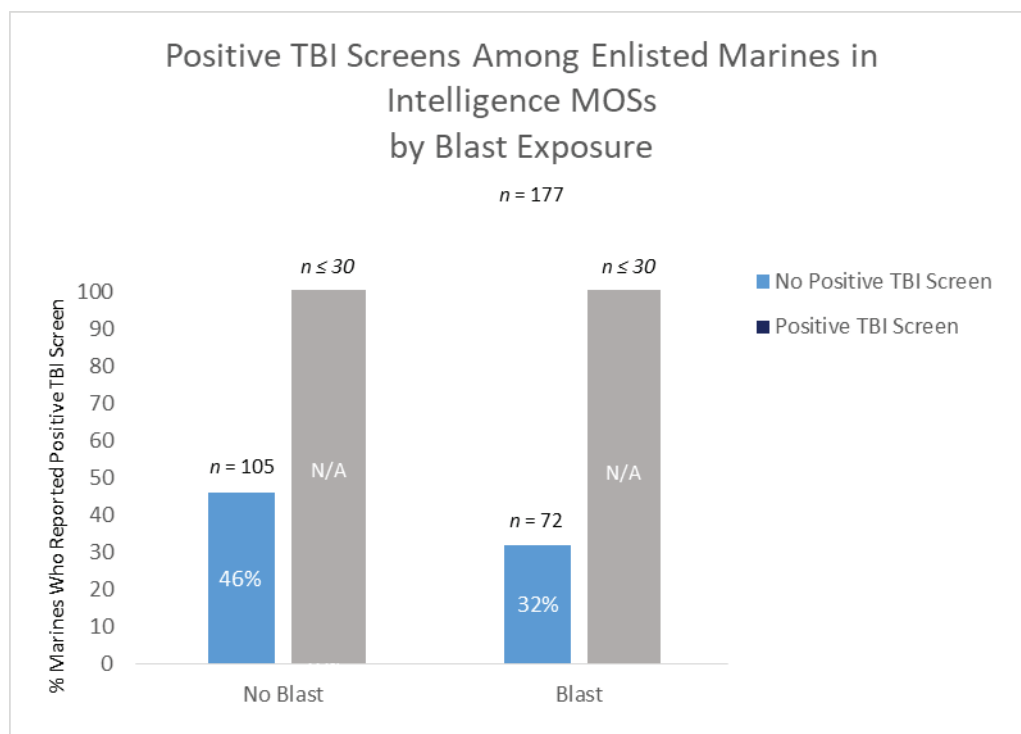


Figure 20.3

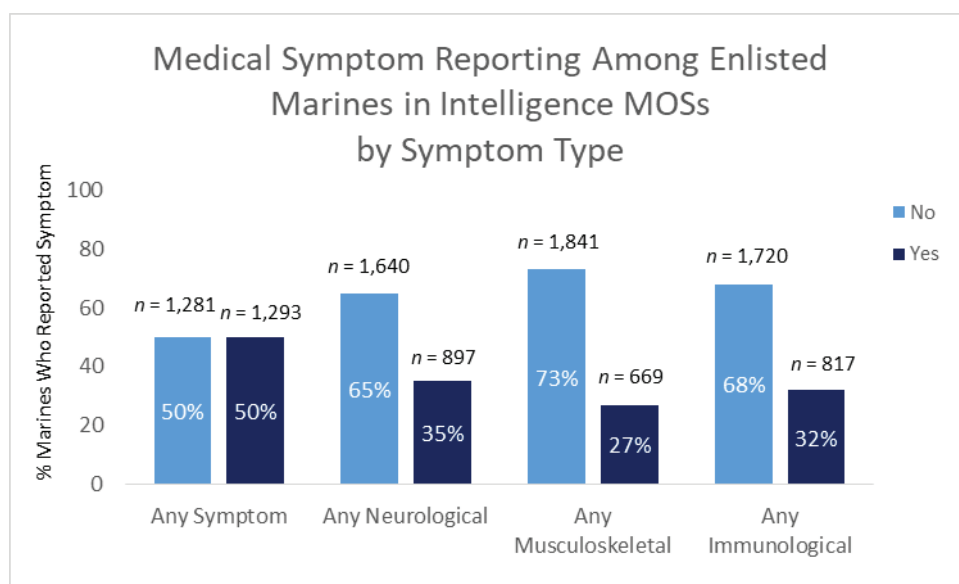


Figure 20.4

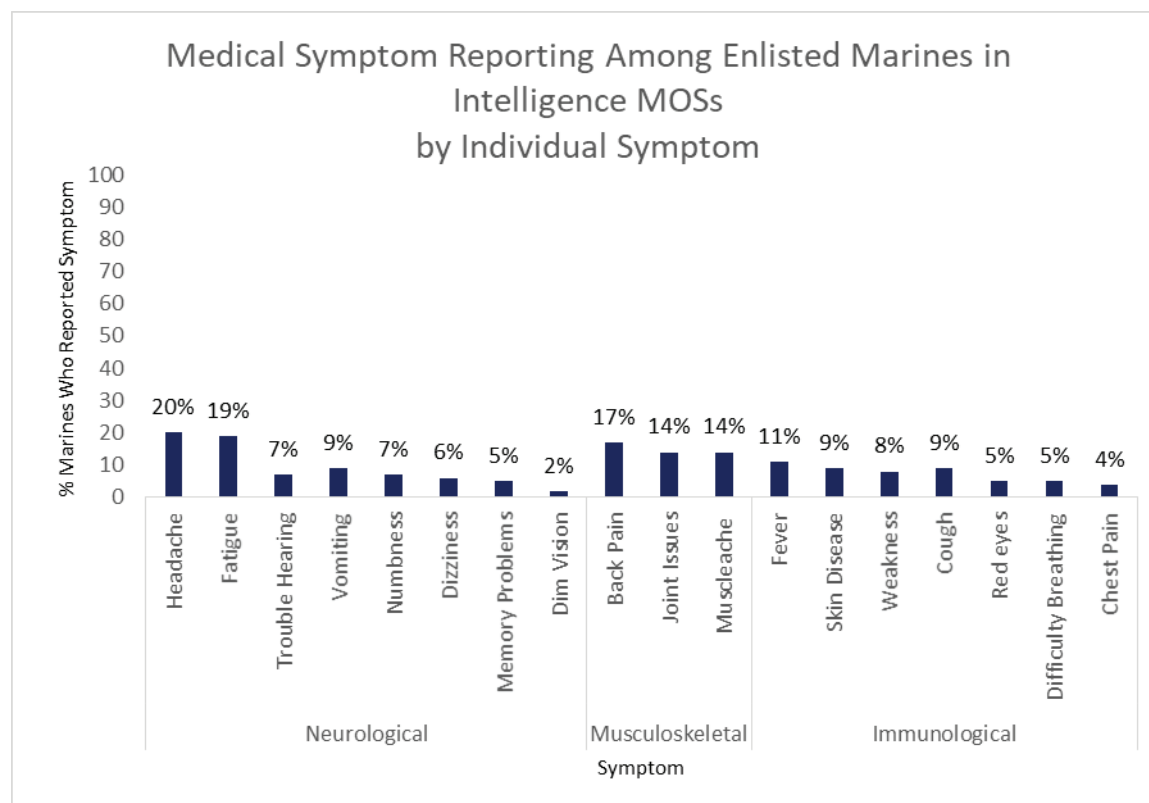


Figure 20.5

Legal Services (*n* = 149)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Legal Services occupations within Occupational Field 44:

The Legal Services OccFld consists of MOS 4421. Legal Services Specialist/Reporter. Personnel in this MOS provide services required in the operational, managerial, legal, administrative, typing, clerical and courts-martial reporting/transcribing areas necessary for the proper functioning of a legal services support section (LSSS), legal services support team (LSST), Office of the Staff Judge Advocate (OSJA), or other agencies/commands in support of a Marine Judge Advocate. Marines entering the OccFld receive MOS 4400, Basic Legal Services Marine. Formal schooling is provided to all Marines entering the OccFld. The appropriate command shall initiate action to void the MOS of any Marine in OccFld 44 who receives NJP or is convicted by a court-martial or civilian court for any offense involving drugs. Also, action shall be initiated to void the OccFld 44 MOS if convicted by courts-martial or civilian court for any offense involving controlled substances or for any offense involving moral turpitude as defined in reference (bg), Manual for Courts Martial, United States, current edition (p. 731).

Examples of Self-Reported Legal Services MOSs

The five most frequent Legal Services military occupational specialties during deployment that were self-reported on the PDHA were 4421 (*n* = 132), 4429 (*n* = 6), Legal Clerk (*n* = 1), Legal Services Support Specialist (*n* = 1), and 4421 Legal Services (*n* = 1).

Results

Active duty enlisted Marines working in Legal Services MOSs during deployment rarely reported blast exposure and rarely screened positive for concussion (*ns* ≤ 30; Figures 22.1, 22.2, and 22.3). Of Marines working in Legal Services, 56% reported experiencing at least one symptom during deployment, with 37%, 36%, and 36% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 22.4). Because HIPAA regulations prohibit the release of medical data for groups smaller than 30 individuals, many of the symptoms were not reported by enough Marines in this MOS to be reported here. The only symptom reported by a sufficient number of Marines was back pain (22%; Figure 22.5).

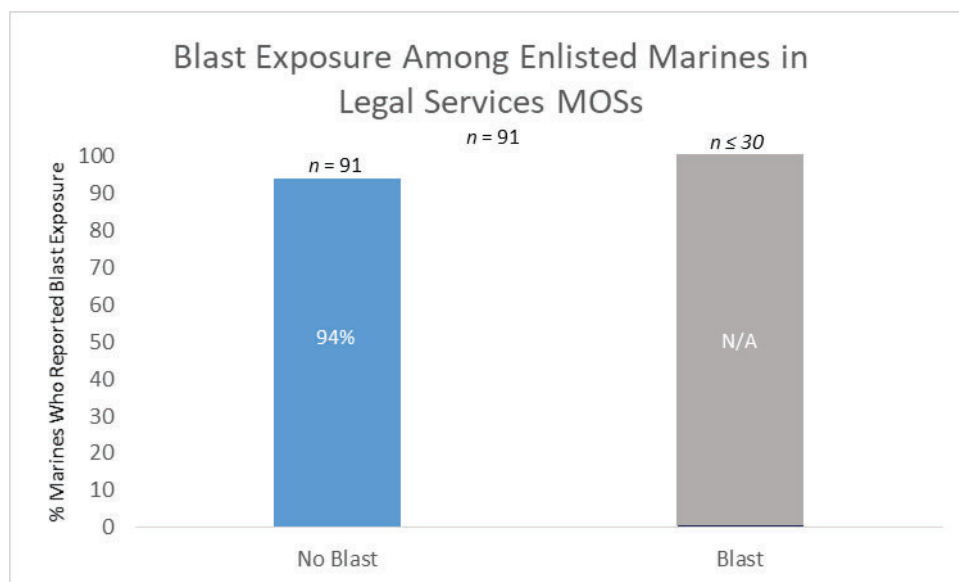


Figure 21.1

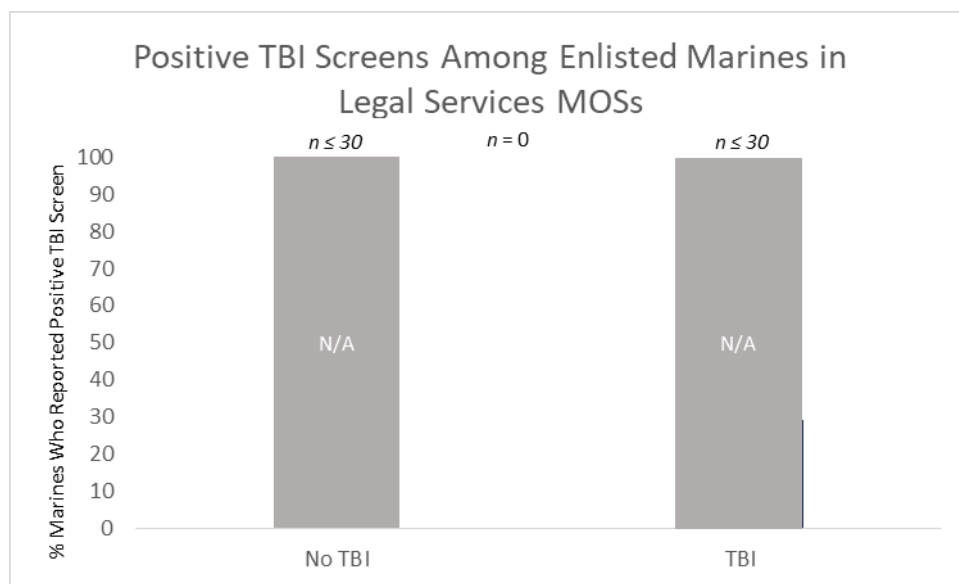


Figure 21.2

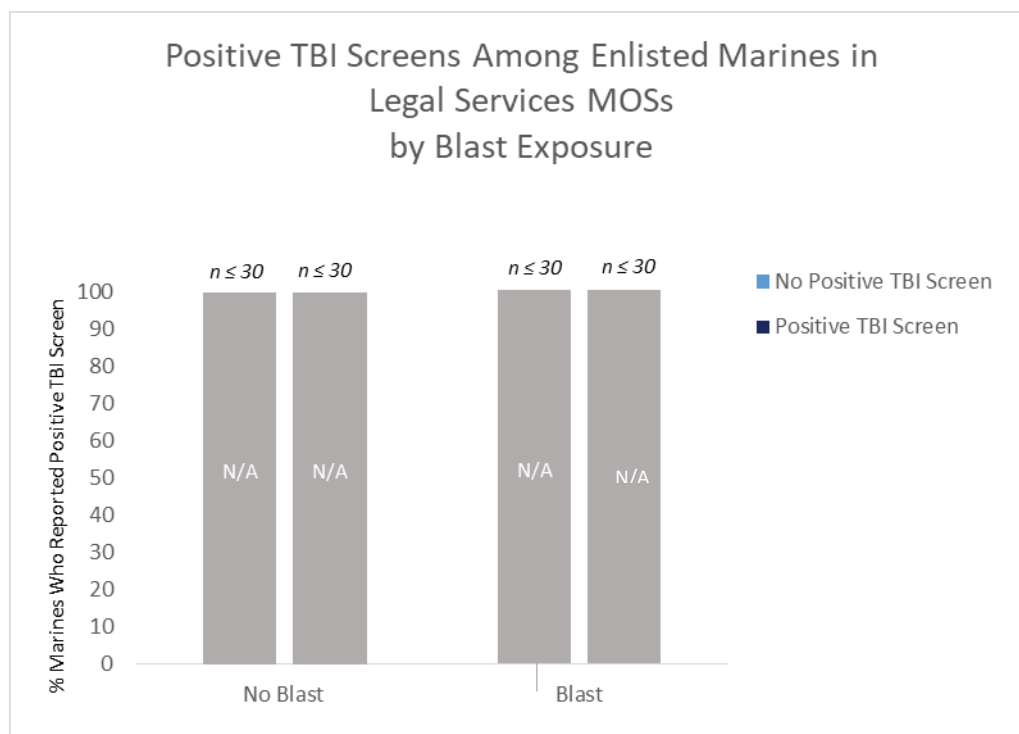


Figure 21.3

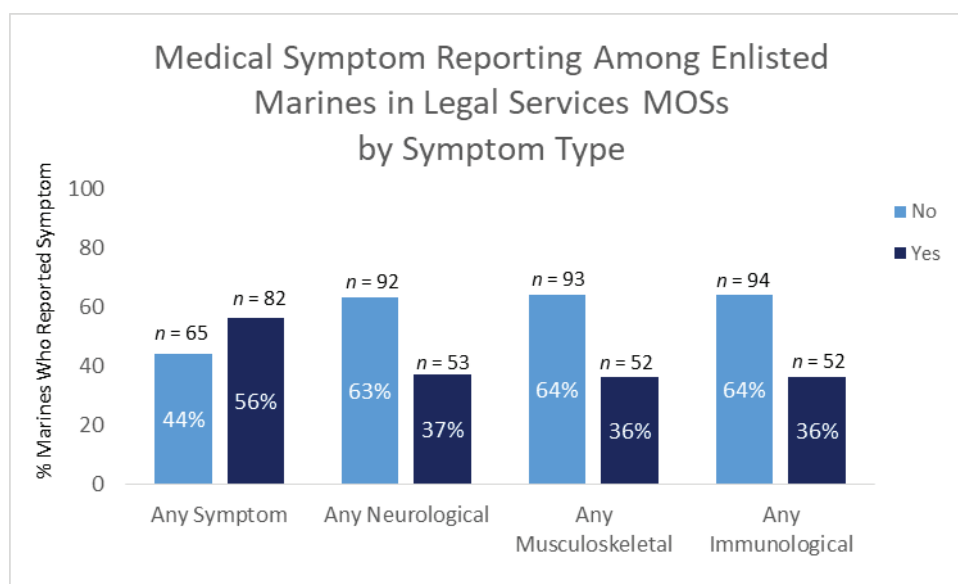


Figure 21.4

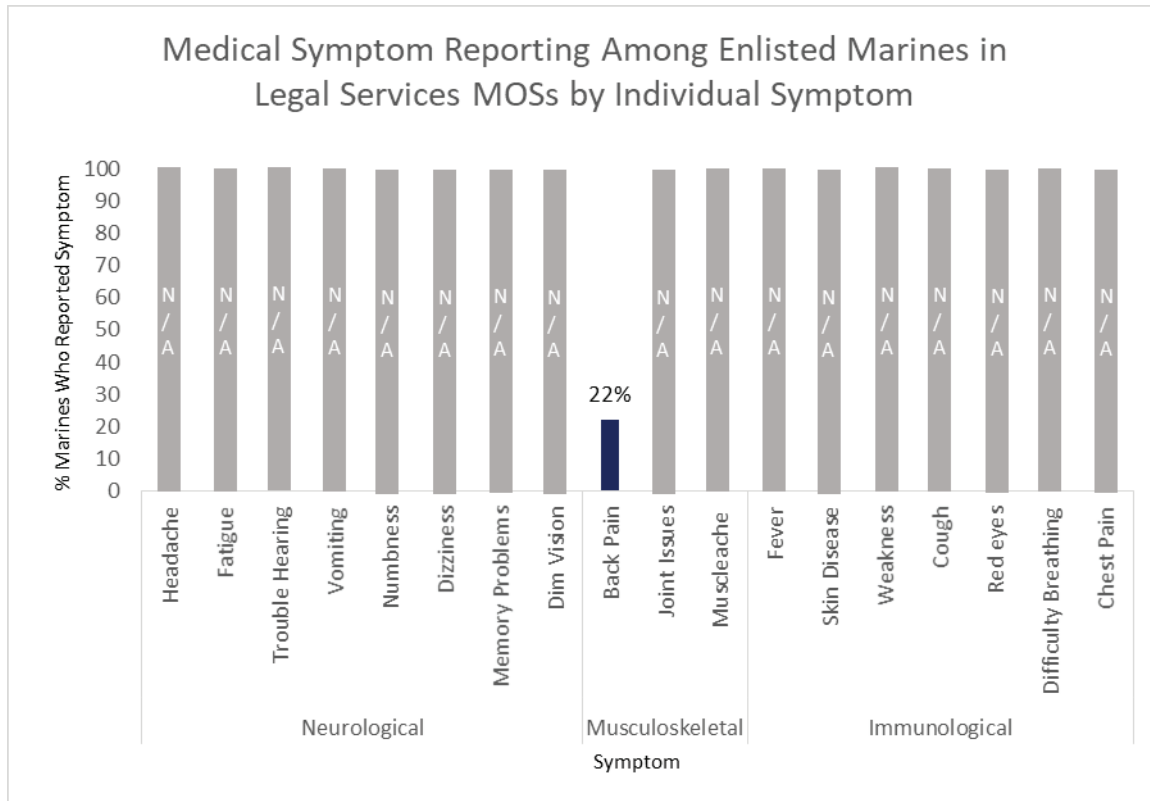


Figure 21.5

Linguist ($n = 12$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Linguist occupations within Occupational Field 27:

The Linguist OccFld contains EMOSs broken down to identify specific foreign language skills. Qualifications require that Marines attend a formal language school or designated language dialect course or obtain and maintain a minimum proficiency of Level 2 with two modalities (listening, reading, or speaking) on the Defense Language Proficiency Test (DLPT). The DLPT is the current Department of Defense standard to determine foreign language proficiency and maintain quality control. Duties may involve direct supervision and participation in language translation/interpretation activities in support of the full range of military operational and intelligence matters encountered during contingencies, operations, and exercises. Formal schooling is provided to those Marines entering this OccFld as a part of the comprehensive training program for designated MOSs within the 26XX OccFld. However, required foreign language skills may be obtained through any combination of formal or informal training. These EMOSs will be assigned and voided by the CMC (MM) only (p. 570).

Examples of Self-Reported Linguist MOSs

The five most frequent Linguist military occupational specialties during deployment that were self-reported on the PDHA were 2799 ($n = 5$), 2712 ($n = 3$), 2718 ($n = 1$), 2761 ($n = 1$), 2763 ($n = 1$), and 2767 ($n = 1$).

Results

Due to an incredibly small sample size ($n = 12$), we are unable to report data for active duty enlisted Marines in deployment-related Linguist occupations (Figures 23.1–23.5).

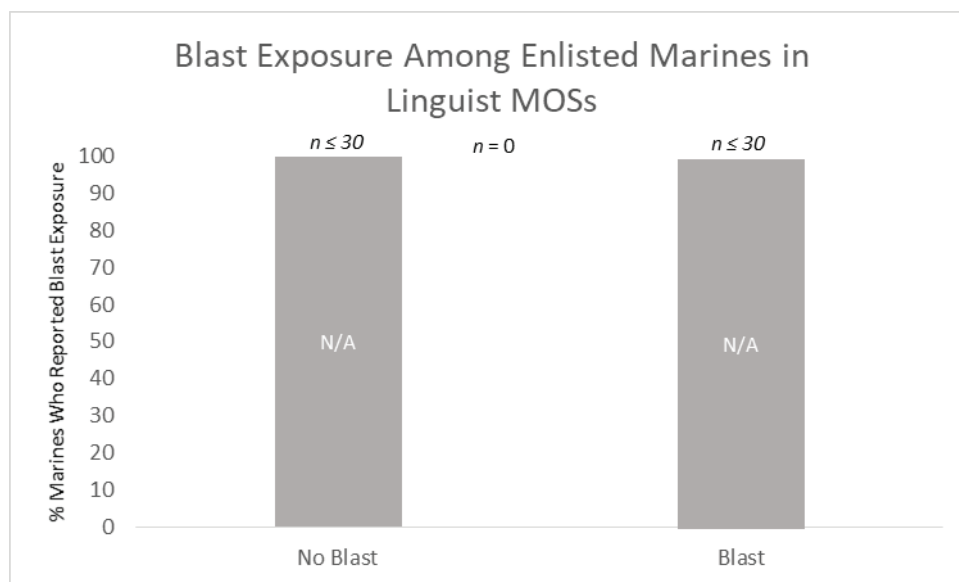


Figure 22.1

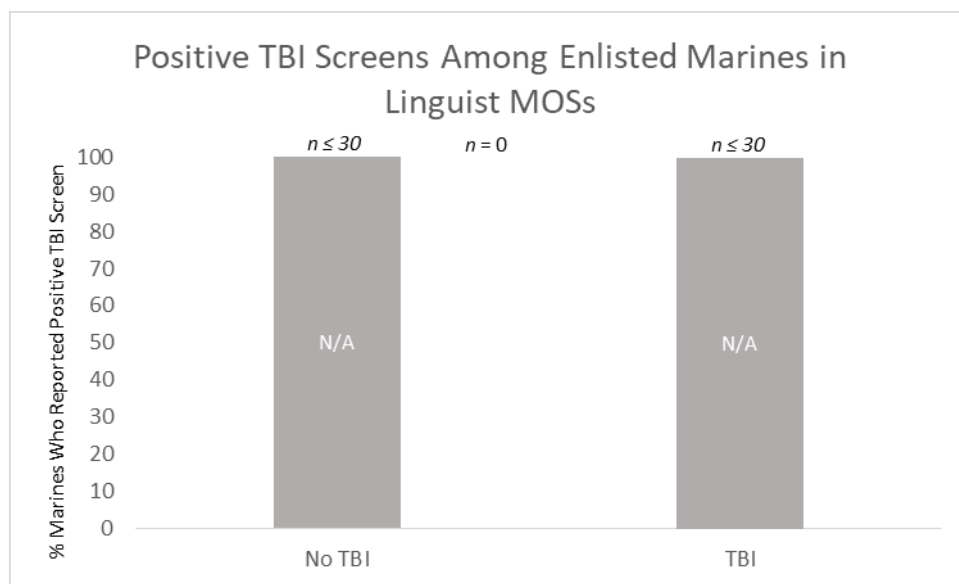


Figure 22.2

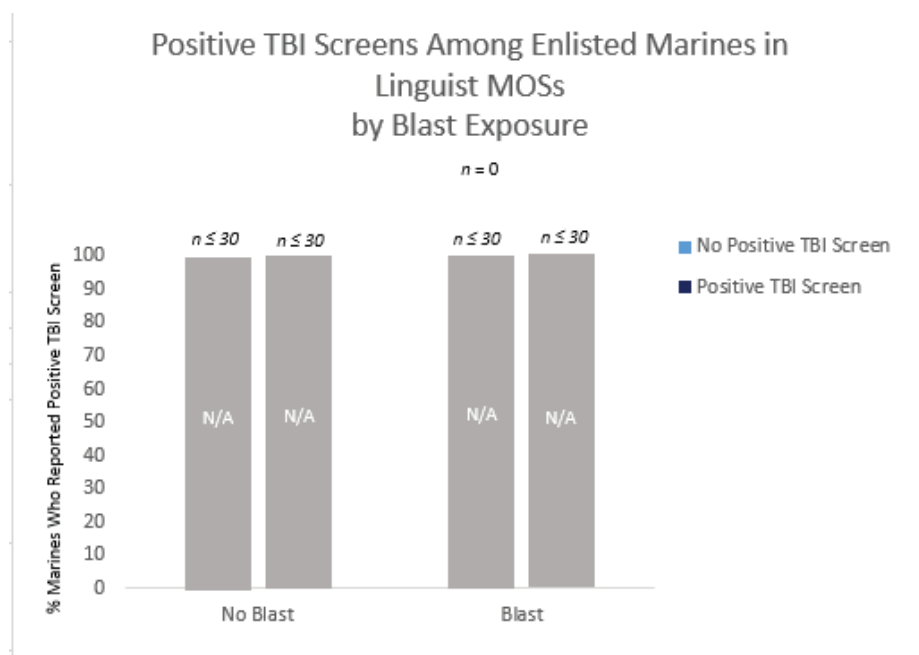


Figure 22.3

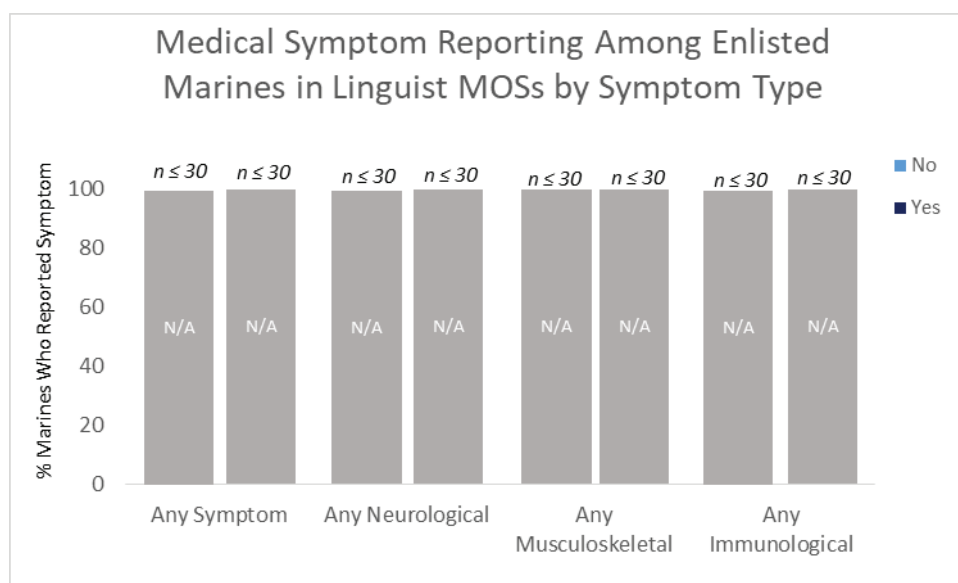


Figure 22.4

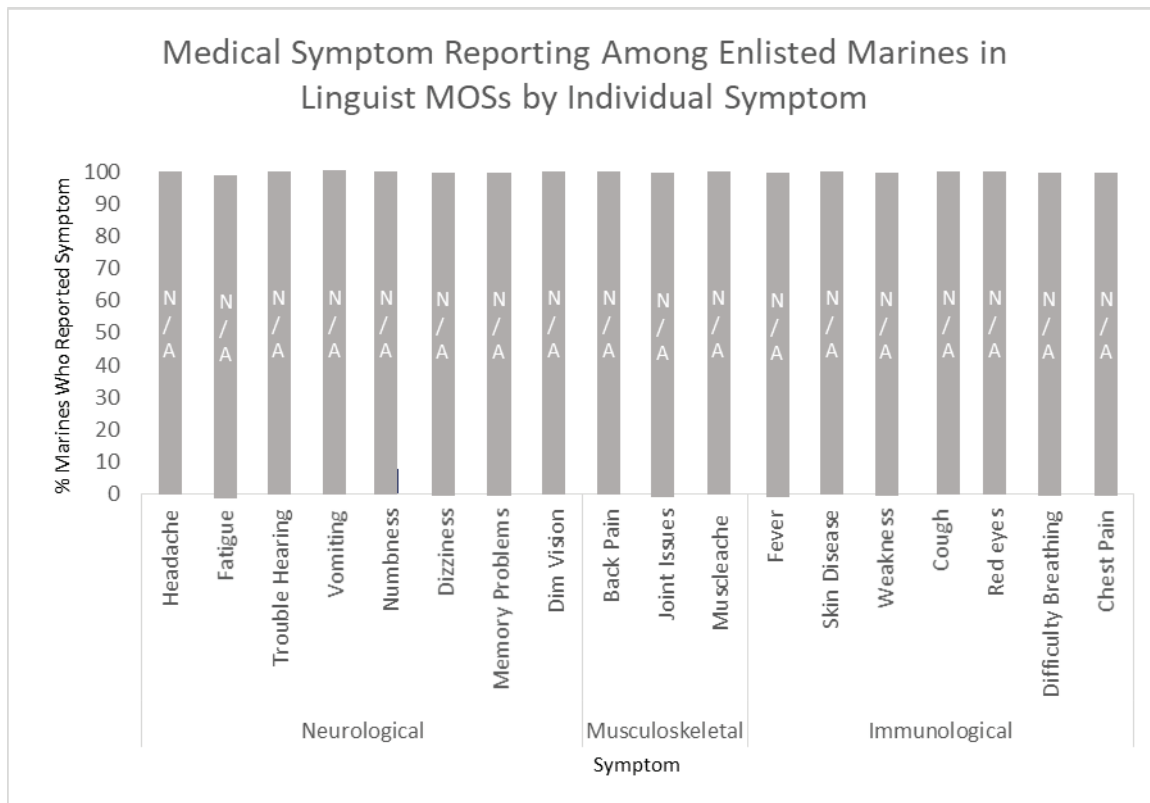


Figure 22.5

Logistics (*n* = 3,653)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Logistics occupations within Occupational Field 04:

Logistics is the science of planning and carrying out the movement and maintenance of forces. It includes the design, development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of material; the movement, evacuation, and hospitalization of personnel; the acquisition or construction, maintenance, operation, and disposition of facilities; and the acquisition or furnishings of services. Logistics functions are performed by a wide variety of MOSs in various occupational fields. Enlisted specialties within occupational field 04 provide advice, guidance, logistics/combat service support, embarkation, landing support, and air delivery (p. 390).

Examples of Self-Reported Logistics MOSs

The five most frequent Logistics military occupational specialties during deployment that were self-reported on the PDHA were 0431 (*n* = 1,182), 0411 (*n* = 953), 0481 (*n* = 951), 0491 (*n* = 222), and 0451 (*n* = 159).

Results

Active duty enlisted Marines working in Logistics MOSs during deployment infrequently reported blast exposure (5%; Figure 24.1). When exposed to a qualifying event that could prompt a concussion, 20% screened positive for concussion (Figure 24.2). Impact-associated concussions occurred infrequently (1%) and blast-associated concussions were rare (*n* ≤ 30; Figure 24.3). Of Marines in Logistics MOSs, 45% reported experiencing at least one symptom during deployment, with 30%, 25%, and 28% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 24.4). Back pain was the most commonly reported symptom in this MOS category (16%), followed by headache (16%), fatigue (15%), joint issues (14%), and muscle ache (13%). The remaining symptoms were reported by fewer than 10% of Marines working in Logistics MOSs (Figure 24.5).

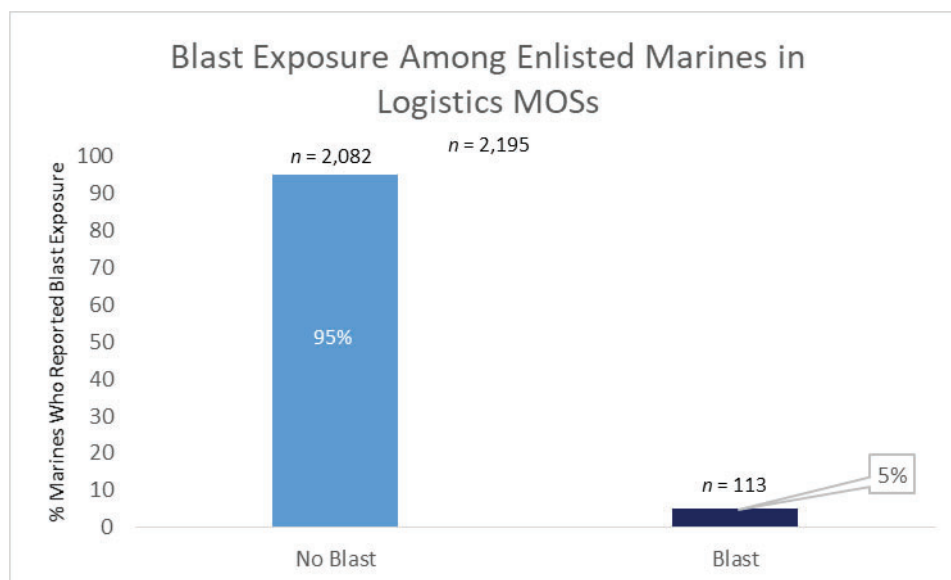


Figure 23.1

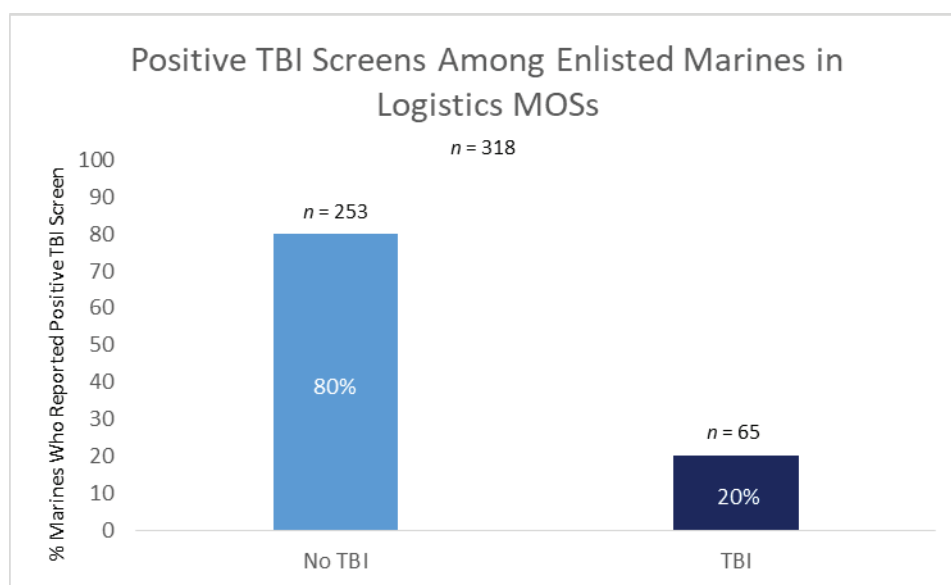


Figure 23.2

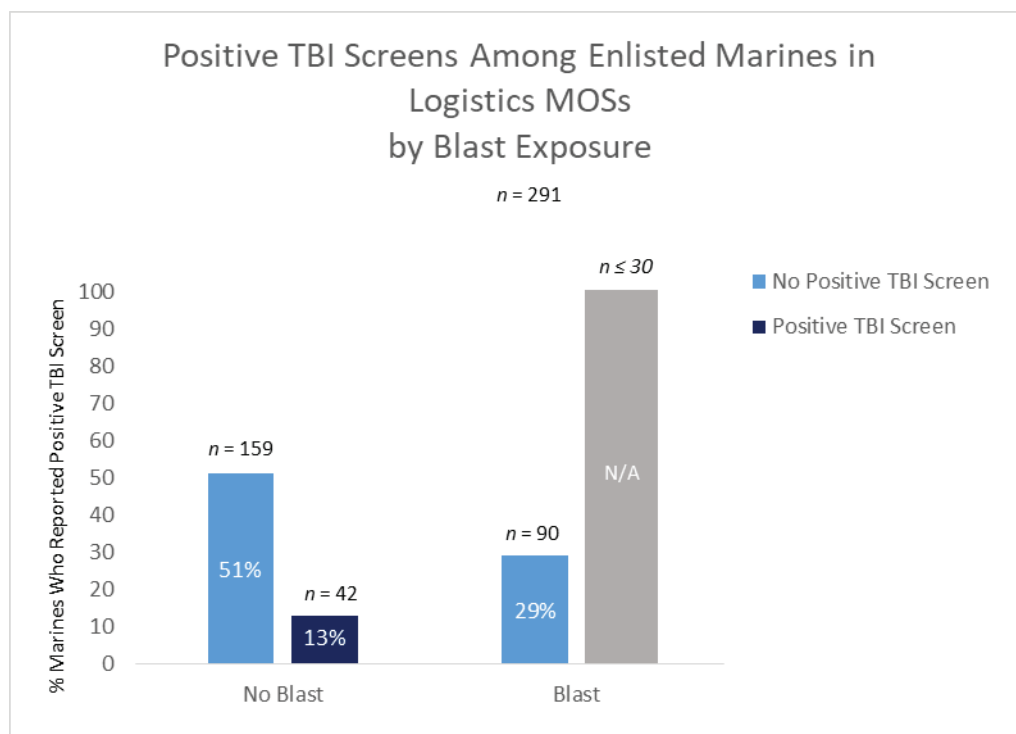


Figure 23.3

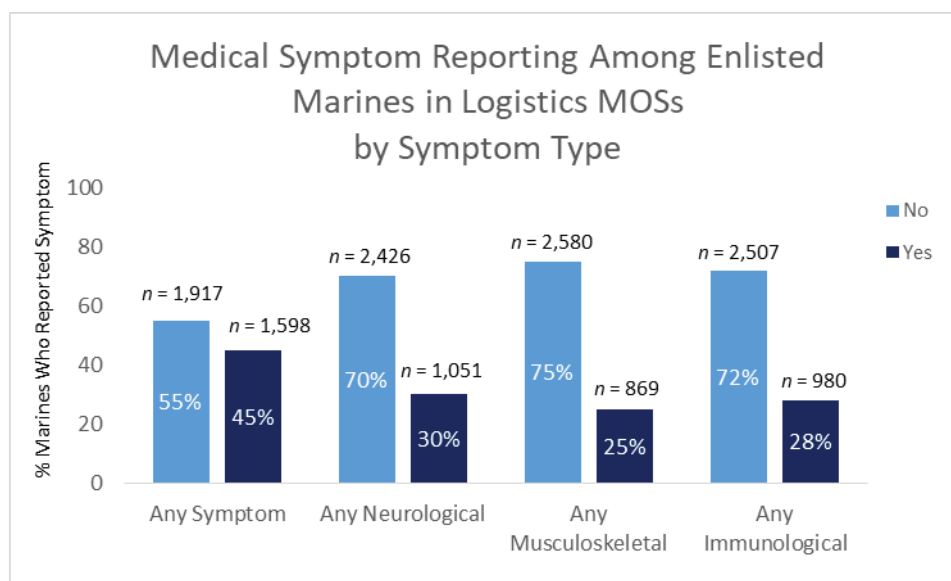


Figure 23.4

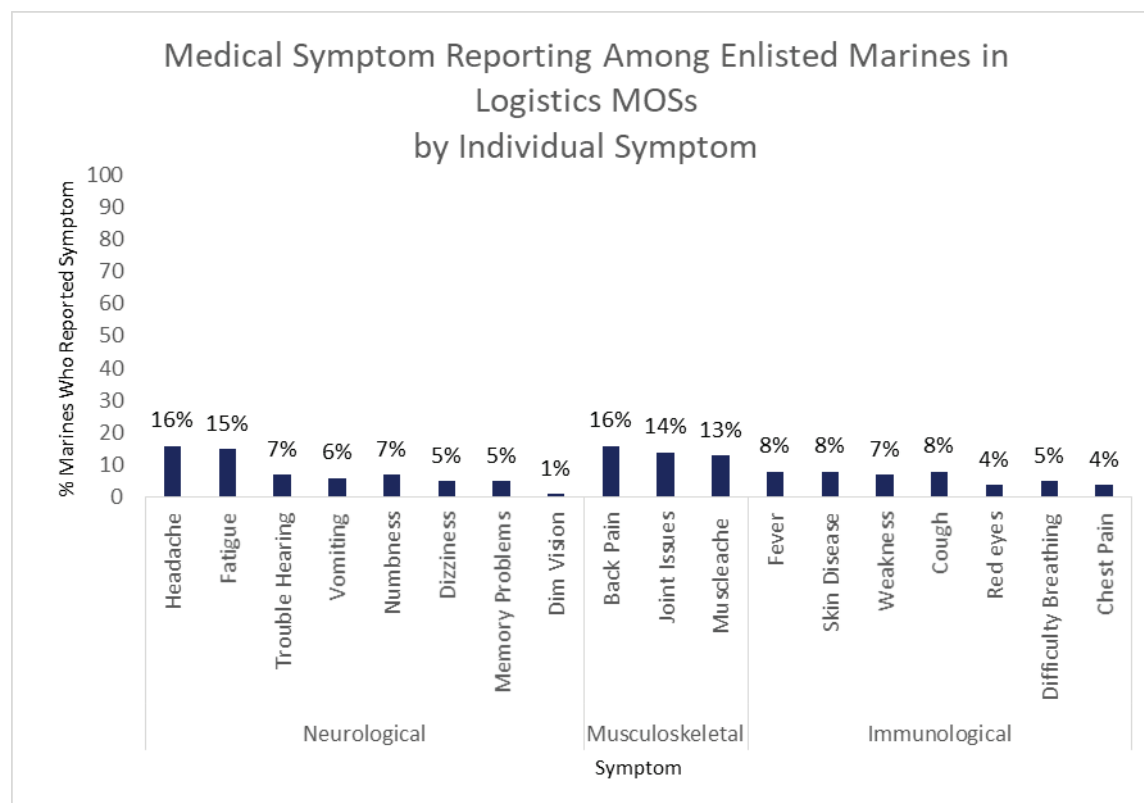


Figure 23.5

Manpower and Administration (*n* = 3,394)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Manpower and Administration occupations within Occupational Field 01:

The Manpower Administration and Retention OccFld include the operation and management of administrative and clerical functions in the areas of general administration, personnel administration, operational administration and postal service. Qualifications required include basic clerical skills, and communication abilities. The duties involve administrative, managerial, and technical skills. Administrative Specialist are required to learn clerical and administrative procedures and processes, office management, personal computer skills (personnel and pay database retrieval and word processing), preparation and use of military publications and correspondence, preparation of orders and directives, and the use of filing systems and record keeping. Formal schooling is provided to Marines entering this OccFld. Types of entry-level jobs available include work as an Administrative Specialist and Postal Clerk. There are a wide variety of billets available in this OccFld assignment ranging from duty at the staff level in the operational, garrison, and joint duty assignments to the opportunity to serve on independent duty in support of the Selected Marine Corps Reserve. Marines entering this OccFld will receive MOS 0100 and will participate in routine personnel and administrative functions while training for 0111 MOS within the OccFld. The mission essential task list is used by formal schools and unit commanders to determine proficiency, evaluate individual training, and maintain quality control (p. 323).

Examples of Self-Reported Manpower and Administration MOSs

The five most frequent Manpower and Administration military occupational specialties during deployment that were self-reported on the PDHA were 0151 (*n* = 1,096), 0111 (*n* = 698), 0121 (*n* = 517), 0161 (*n* = 409), and 0193 (*n* = 386).

Results

Active duty enlisted Marines working in Manpower and Administration MOSs during deployment infrequently reported blast exposure (4%). When exposed to a qualifying event that could prompt a concussion, 19% screened positive for concussion. Impact-associated TBIs were infrequent (1%) and blast-associated TBIs were rare (*n* ≤ 30). Of Marines in Manpower and Administration MOSs, 49% reported experiencing at least one symptom during deployment, with 34%, 27%, and 31% reporting neurological, musculoskeletal, and immunological symptoms, respectively. Headache was the most common symptom reported (19%), followed by fatigue (18%), back pain (18%), muscle ache (15%), joint issues (14%), and fever (10%). The remaining symptoms were reported by fewer than 10% of Marines working in Manpower and Administration MOSs.

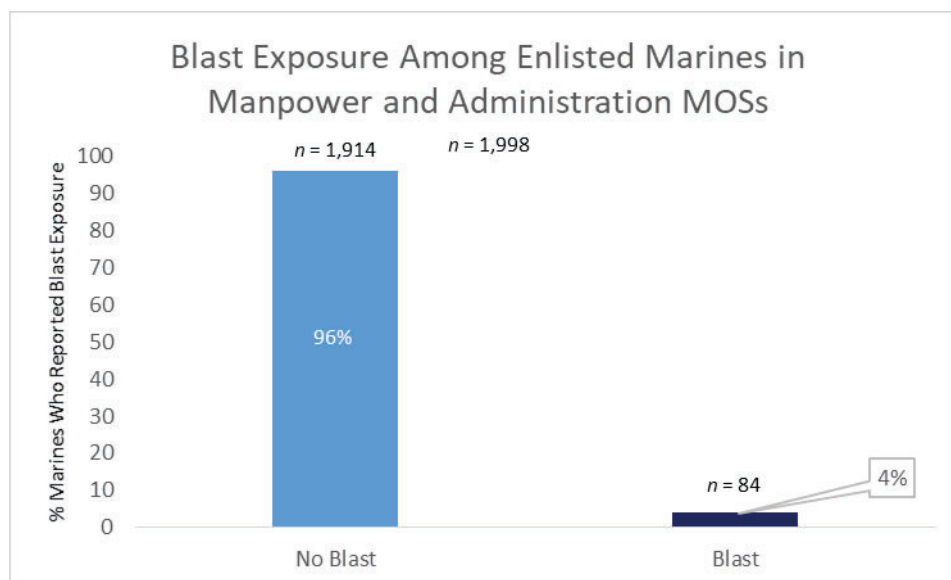


Figure 24.1

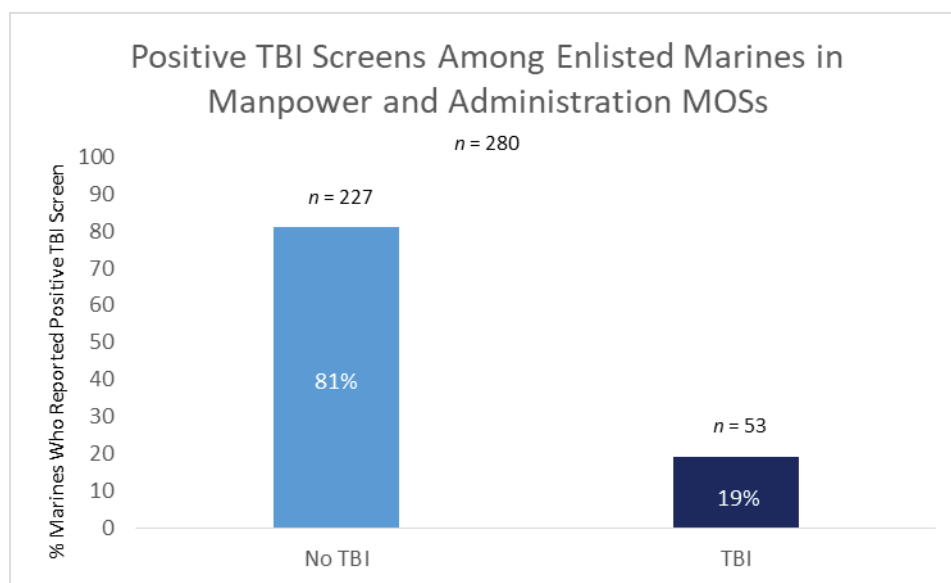


Figure 24.2

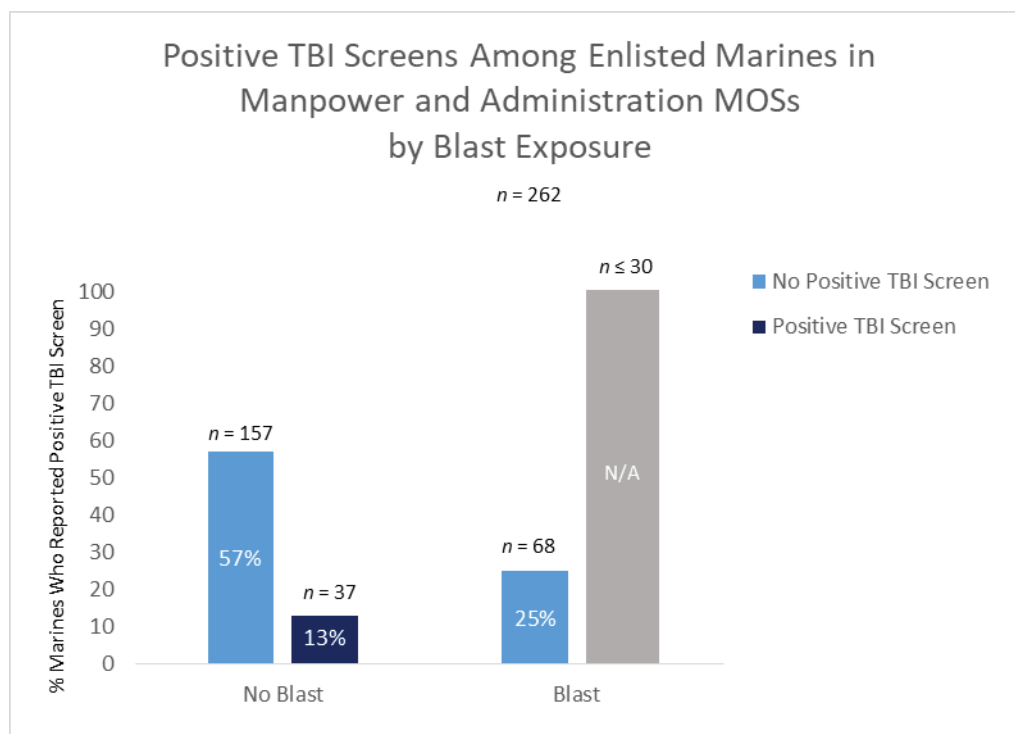


Figure 24.3

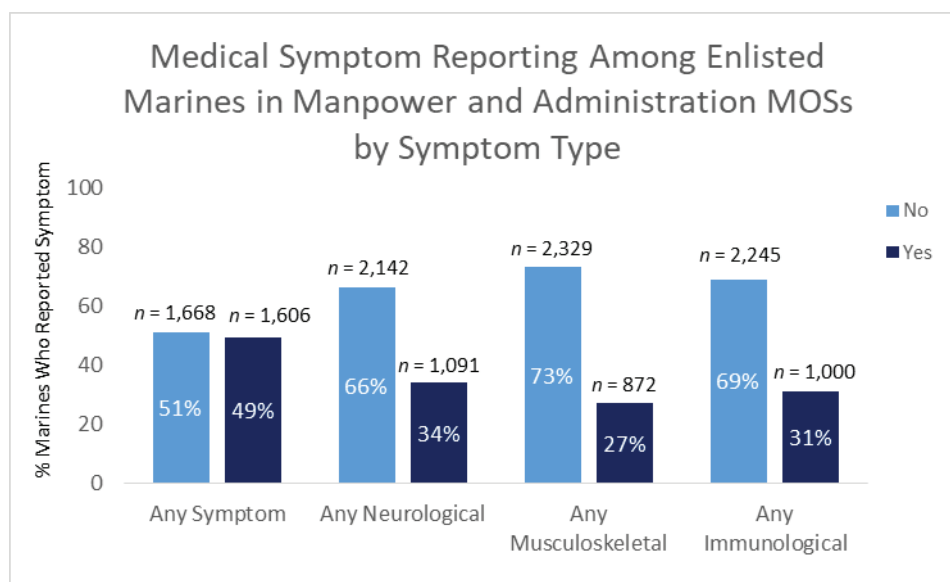


Figure 24.4

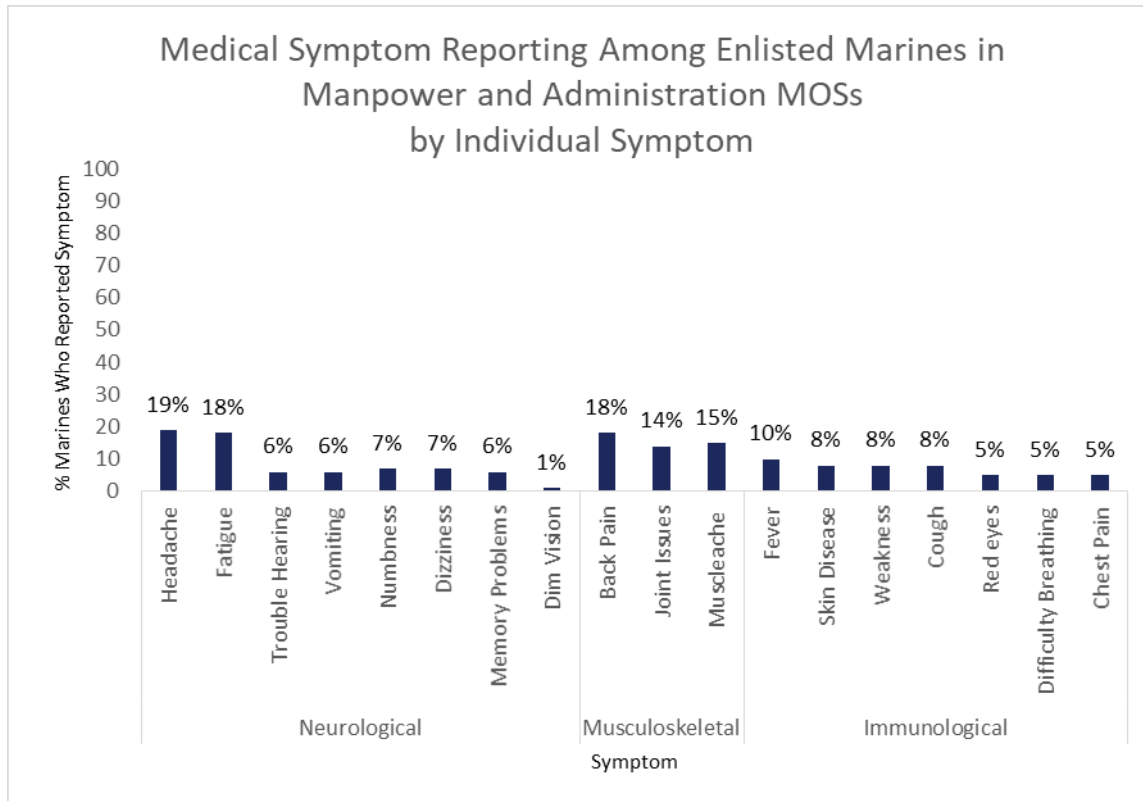


Figure 24.5

Marine Air-Ground Task Force (MAGTF; $n = 426$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Marine Air-Ground Task Force occupations within Occupational Field 05:

MAGTF Plans OccFld encompasses the development of plans, policies, and functions pertaining to Global Force Management (GFM) of assigned, apportioned, or allocated forces, and the management of Time Phased Force Deployment Data (TPFDD) in support of Combatant Commanders OPLAN/CONPLAN and MAGTF operations roles consist of advising Joint and MAGTF Staff Plans Officers on Joint and Marine Corps Force Deployment Planning and Execution (FDP&E) matters in the deliberate, and crisis action planning environments, developing and sourcing of global force requirements and the refinement of forces and movement data for plan mobilization, deployment, employment, sustainment, and redeployment of forces. Formal schooling encompasses Joint and Marine Corps Planning Fundamentals, the Marine Corps Planning Process (MCPPE), Global Force Management Software Applications, Joint Operational Planning and Execution Systems (JOPES) Software Applications, and Marine Corps Planning Systems training. The enlisted personnel in this OccFld provide analysis, technical automated system, and advisory support to Staff Plans Officers in the areas of force deployment planning and execution, orders development, global force management, plans analysis, report retrieval, force disposition, phasing data, doctrine, and electronic conferencing. Enlisted Plans Specialists are assigned to the S-3 at the Major Subordinate Element (MSE) level and the G-3 Plans/G-5 staffs at the Major Subordinate Command (MSC) level to support the various aspects of force deployment planning and execution. MAGTF Planners are to be readily available to support and/or augment Service component force, Joint Task Force (JTF), JOPES cells, and Unified Combatant Commander (UCC), Joint Force Deployment Contingency and Crisis Action Planning Staffs as necessary. Psychological Operations Noncommissioned Officers perform various duties incident to planning psychological operations; preparing, producing, distribution and disseminating psychological operations material; and conducting psychological operations to the unit level. Civil Affairs Noncommissioned Officers perform civil-military assessments in the operational area and coordinate with a wide variety of civilian populations, organizations, and agencies. Information Operations Specialist coordinates and synchronizes the employment of its five core capabilities; Psychological Operations, Military Deception, Operation Security, Electronic Warfare, and Computer Network Operations, in support of the combatant commander's objectives or to prevent the adversary from achieving his desired objectives (p. 419).

Examples of Self-Reported MAGTF MOSs

The five most frequent MAGTF military occupational specialties during deployment that were self-reported on the PDHA were 0511 ($n = 210$), 0531 ($n = 182$), 0530 ($n = 7$), 0521 ($n = 5$), and MAGTF Planner ($n = 3$).

Results

Among, active duty enlisted Marines working in MAGTF MOSs during deployment, blast exposure was rare ($n \leq 30$; Figure 25.1). When exposed to a qualifying event that could prompt a concussion, positive concussion screens were rare in general ($n \leq 30$; Figures 25.2 and 25.3). Of Marines working in MAGTF MOSs, 55% reported experiencing at least one symptom during deployment, with 37%, 32%, and 38% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 25.4). Because HIPAA regulations prohibit the release of medical data for groups smaller than 30 individuals and Marines working in MAGTF MOSs were relatively rare ($n = 426$), many of the symptoms were not reported by enough Marines in this MOS to be reported here. However, the most commonly reported symptom in this MOS category was back pain (23%), followed by headache (22%), fatigue (20%), muscle ache (20%), fever (16%), joint issues (15%), vomiting (12%), ringing in the ears (11%), cough (11%), and weakness (10%; Figure 25.5).

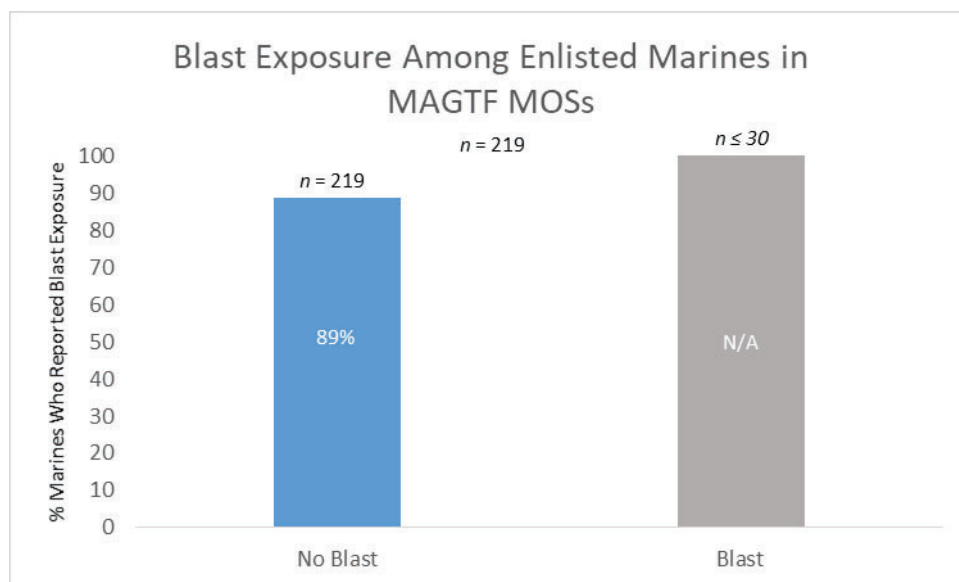


Figure 25.1

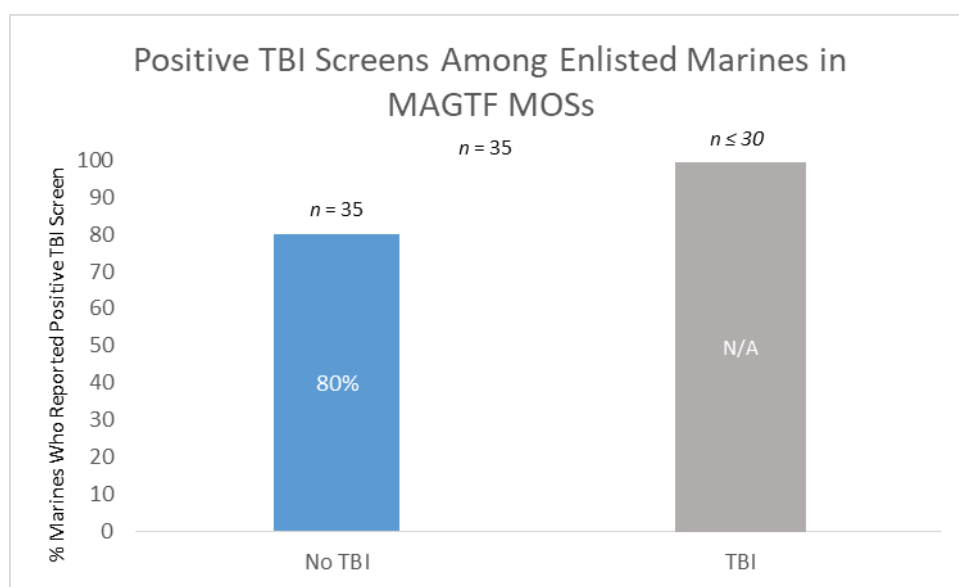


Figure 25.2

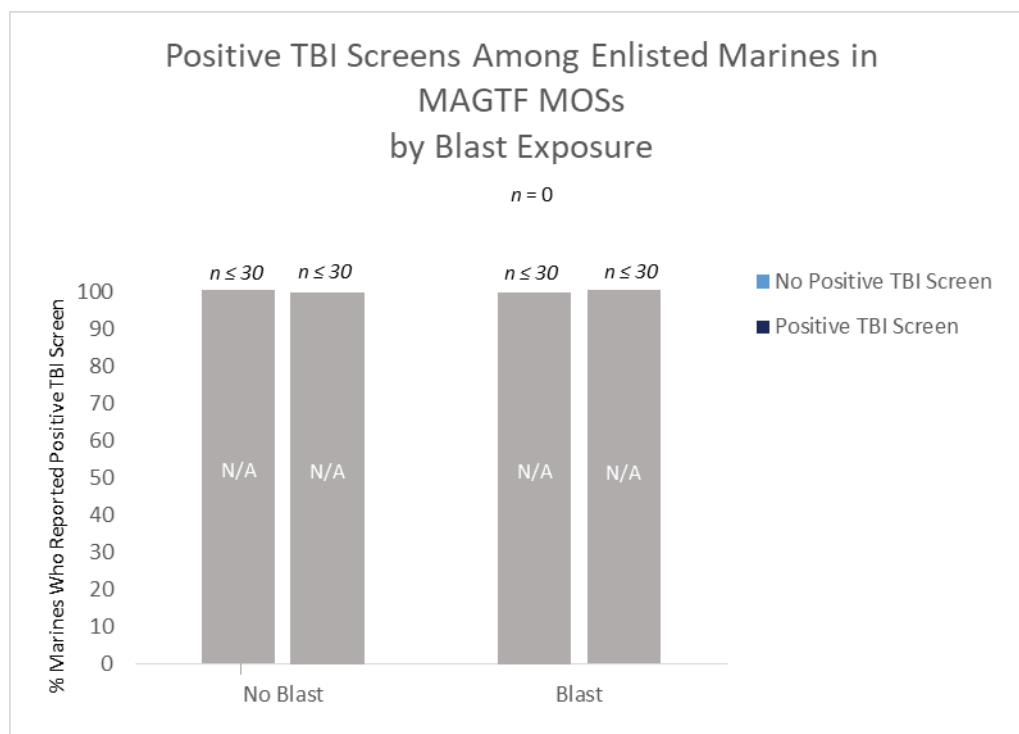


Figure 25.3

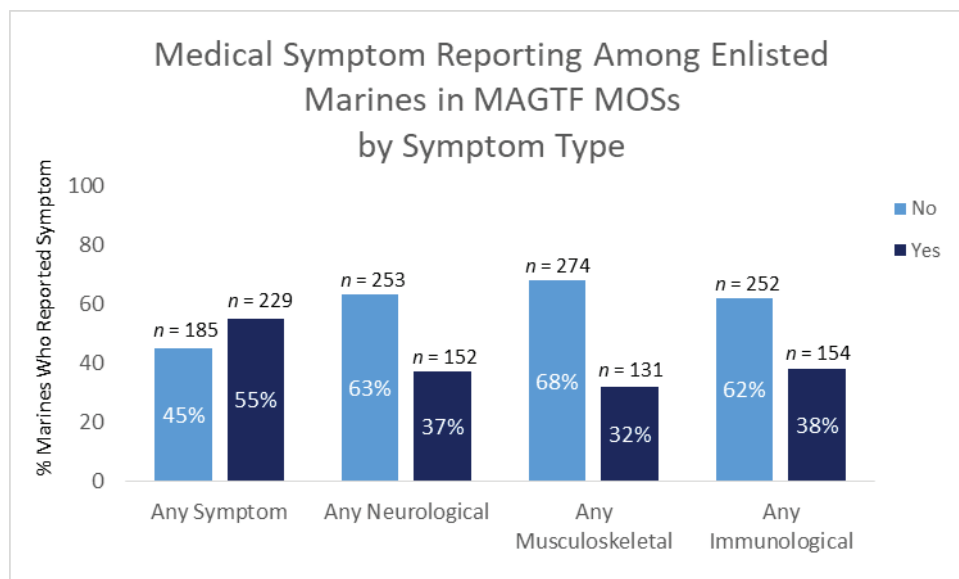


Figure 25.4

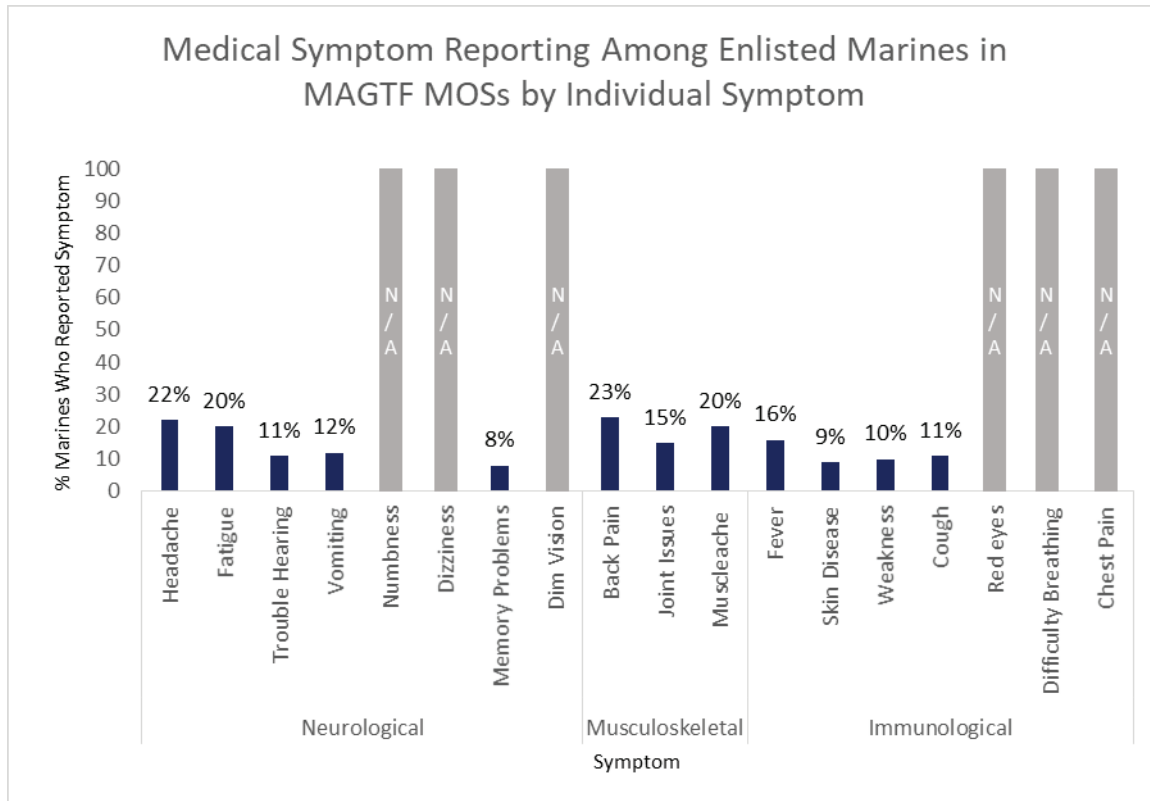


Figure 25.5

Marine Corps Community Services (MCCS; $n = 139$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of MCCS occupations within Occupational Field 41:

The Marine Corps Community Services OccFld includes the operations, management, and supervision of Marine Corps exchanges and clubs. The functional areas include contracting, expeditionary operations, financial management, basic management, and business operation. Qualifications include the knowledge and understanding of retail business, financial management, inventory and cost controls, hospitality business, and general correspondence. This is a lateral move MOS with the grade structure starting at Sergeant. The duties involve a combination of technical skills in addition to administrative skills. Training for the MOS is provided through MOJT and formal schools. Types of initial assignments available for MOS 4133 include Assistant Store Manager and Assistant Club Manager in a retail store or club. Marines entering this OccFld receive MOS 4100, Basic Marine Corps Community Services Marine. They participate in routine exchange or club administrative and operational duties while training. The skill enhancement courses located in the Marine Corps Community Services Career Structure Chart can be located in the MCCS Training Catalog that is updated annually (p. 718).

Examples of Self-Reported MCCS MOSs

The five most frequent MCCS military occupational specialties during deployment that were self-reported on the PDHA were 4133 ($n = 122$), px ($n = 3$), MOS 4133 ($n = 2$), Tactical Field Exchange Manager ($n = 1$), and 4133 - Exchange Chief ($n = 1$).

Results

Active duty enlisted Marines working in MCCS MOSs during deployment rarely reported blast exposure and rarely completed screens for concussion ($n \leq 30$; Figures 26.1–26.3). Of Marines working in MCCS, 55% reported experiencing at least one symptom during deployment, with 38%, 37%, and 35% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 26.4). Because HIPAA regulations prohibit the release of medical data for groups smaller than 30 individuals, many of the symptoms were not reported by enough Marines in this MOS to be reported here. The only symptom reported by a sufficient number of Marines was back pain (24%; Figure 26.5).

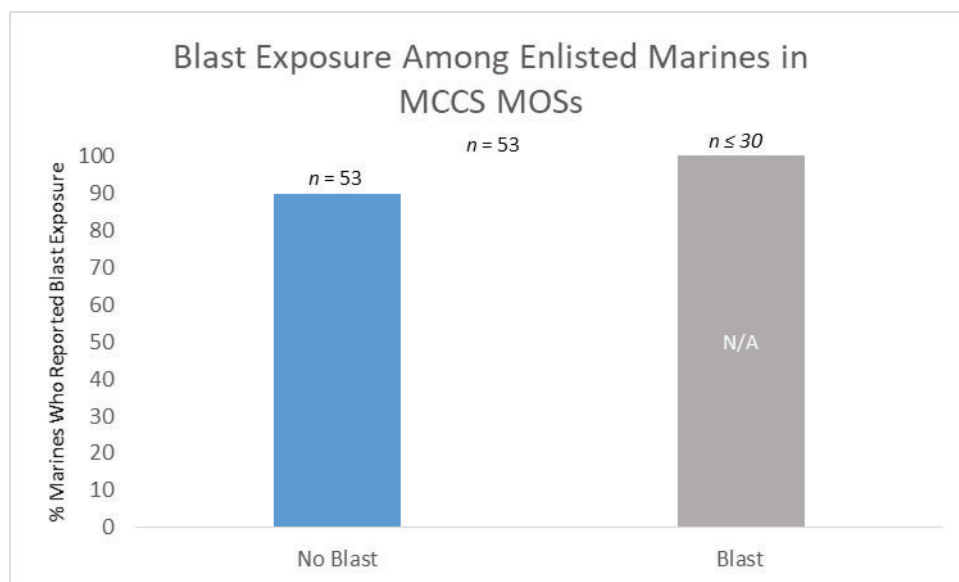


Figure 26.1

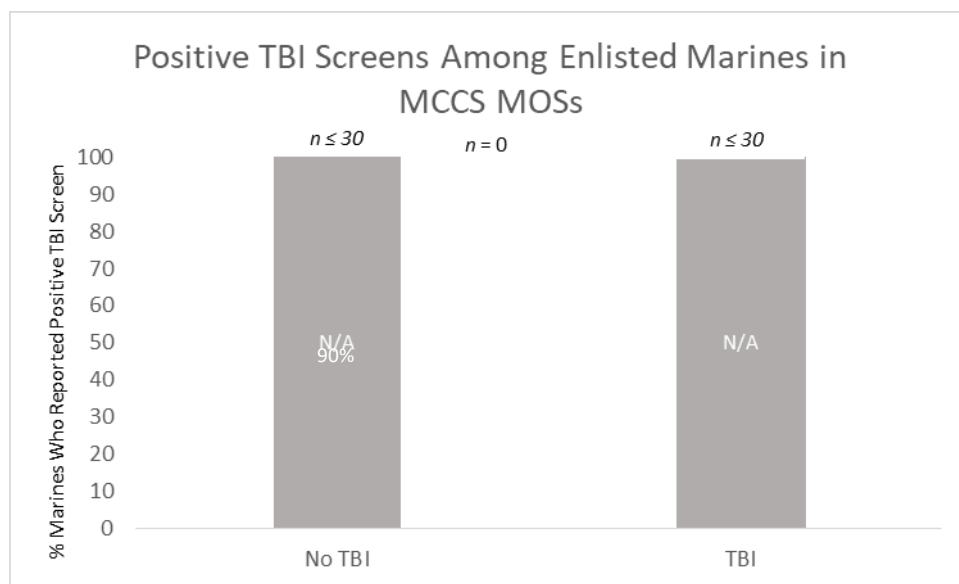


Figure 26.2

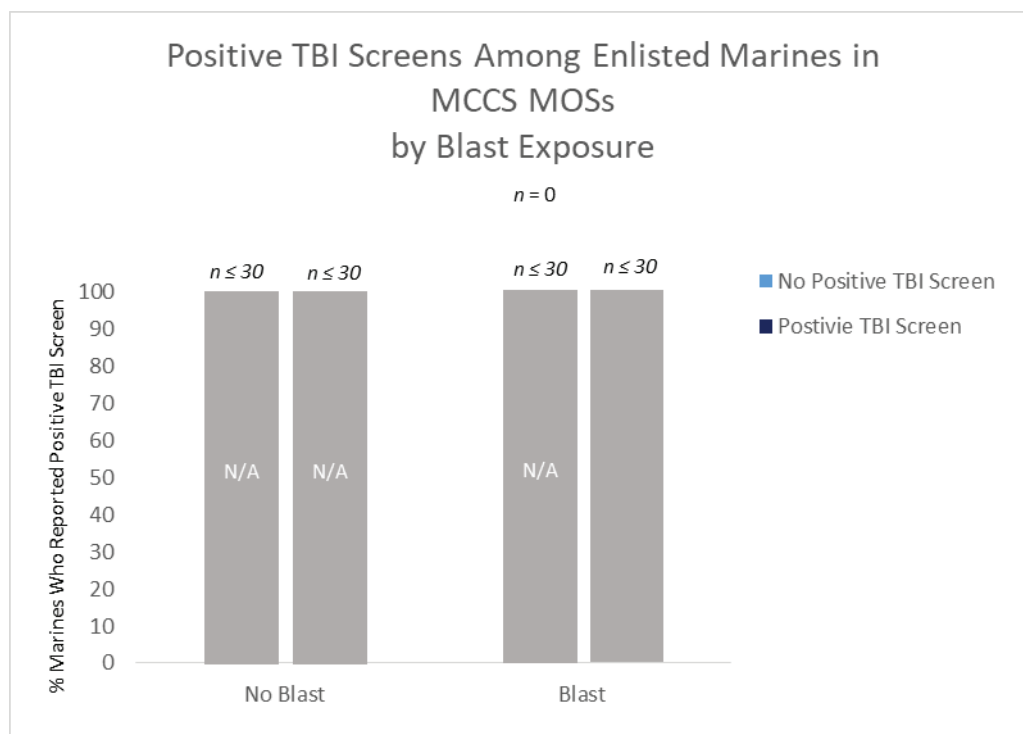


Figure 26.3

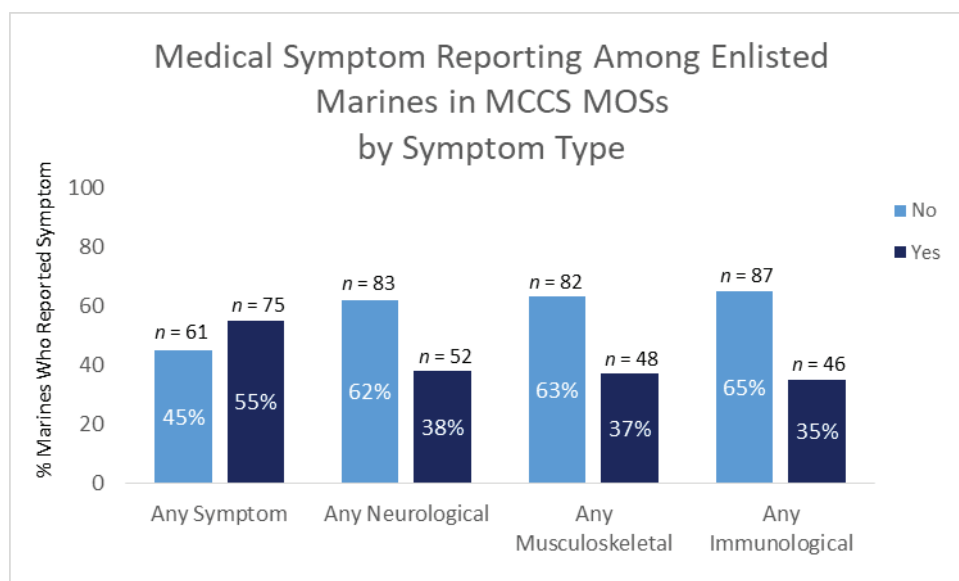


Figure 26.4

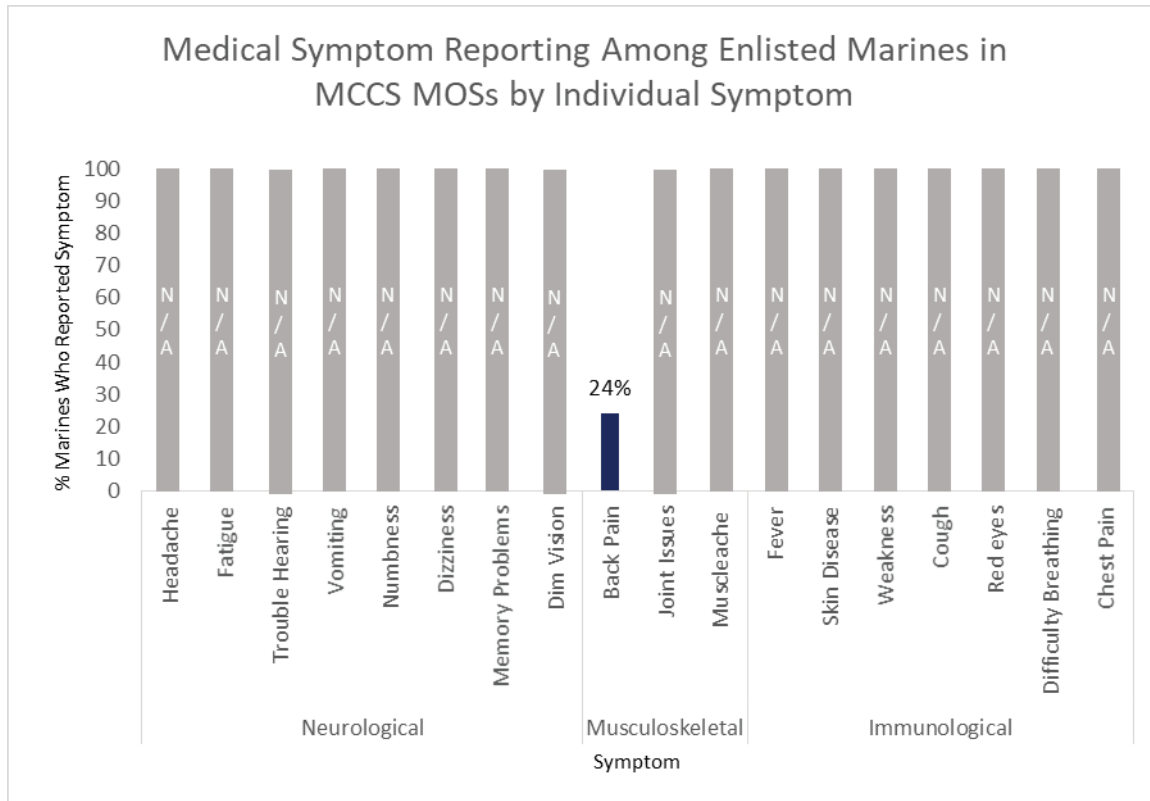


Figure 26.5

Meteorology and Oceanography (*n* = 256)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Meteorology and Oceanography occupations within Occupational Field 23:

The METOC Service OccFld is responsible for collecting, assessing and disseminating METOC intelligence relevant to friendly and enemy force strengths and vulnerabilities for the planning and execution of operations necessary to characterize the battle space. This includes atmospheric, space, climatic and hydrologic intelligence for use in the production of Tactical Decision Aids (TDA) and METOC effects matrices. The METOC OccFld is comprised of MOS 6842, METOC Forecaster, and MOS 6852, METOC Impacts Analyst, and is progressive in nature. Marines entering the 6800 OccFld will complete formal training and receive MOS 6842. As their skill enhancing training progresses, they become eligible to attend further formal MOS instruction. Billets include assignment to MEF, MAW, MARDIV, MLG, MEU, Intel Battalion, Marine Air Control Squadron, Marine Corps Air Station, TECOM, CBIRF, NMOPDC, and instructor at MARDET Keesler AFB, MS (p. 924).

Examples of Self-Reported Meteorology and Oceanography MOSs

The five most frequent Meteorology and Oceanography military occupational specialties during deployment that were self-reported on the PDHA were 6842 (*n* = 145), 6821 (*n* = 82), 6821 Weather Observer (*n* = 3), METOC observer (*n* = 2), and Weather Forecaster (*n* = 2).

Results

Active duty enlisted Marines working in Meteorology and Oceanography MOSs during deployment rarely reported blast exposure and rarely completed screens for concussion (*n* ≤ 30; Figures 27.1–27.3). Of Marines working in Meteorology and Oceanography, 55% reported experiencing at least one symptom during deployment, with 37%, 34%, and 32% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 27.4). Because HIPAA regulations prohibit the release of medical data for groups smaller than 30 individuals, many of the symptoms were not reported by enough Marines in this MOS to be reported here. The only symptoms reported by a sufficient number of Marines were headache (23%), joint issues (22%), muscle ache (22%), back pain (20%), and fatigue (17%; Figure 27.5).

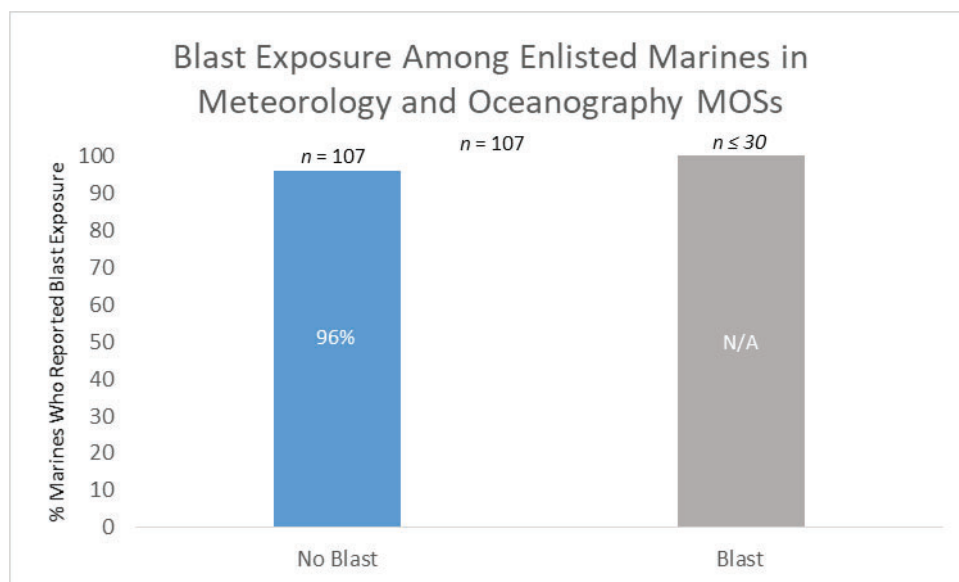


Figure 27.1

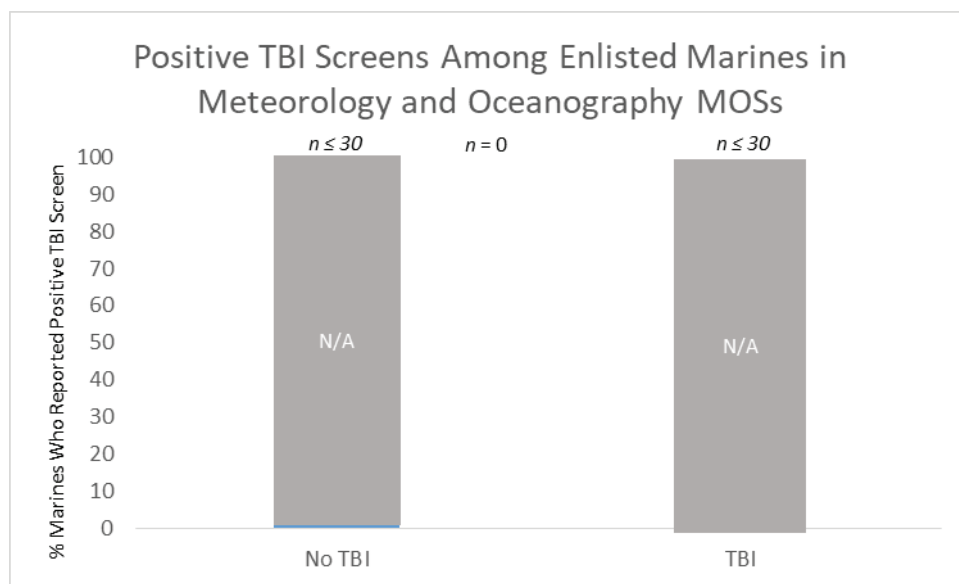


Figure 27.2

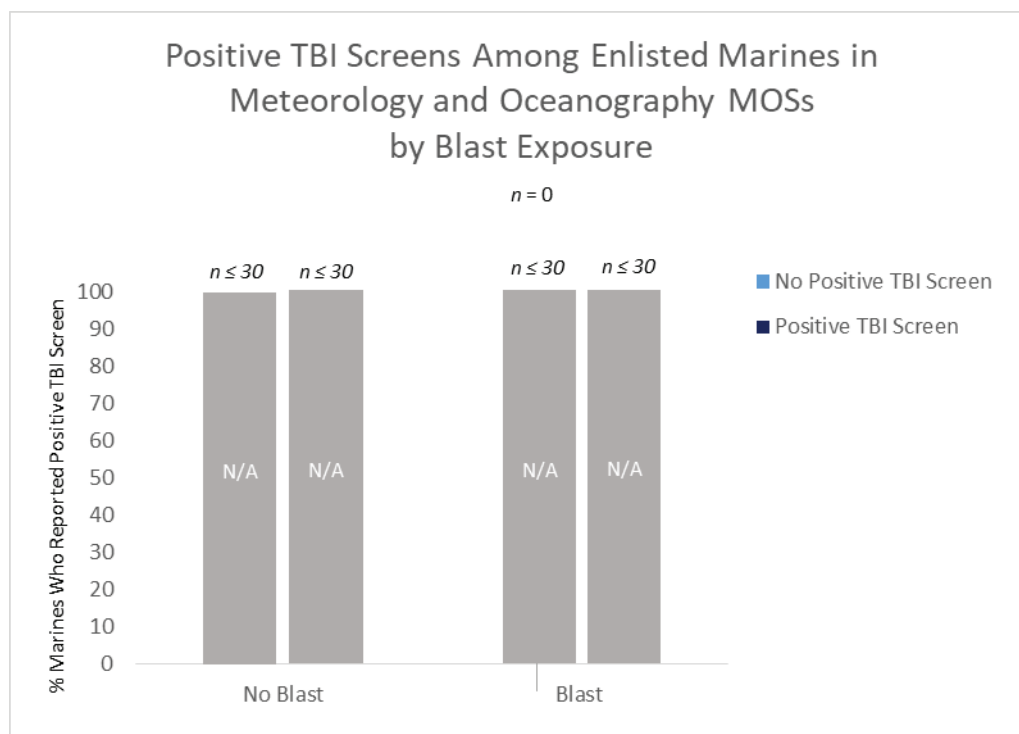


Figure 27.3

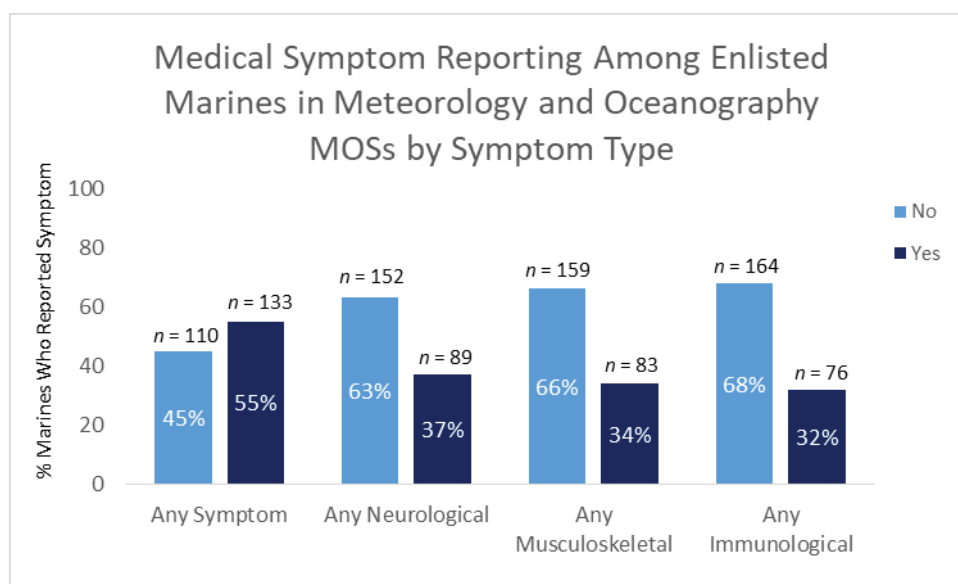


Figure 27.4

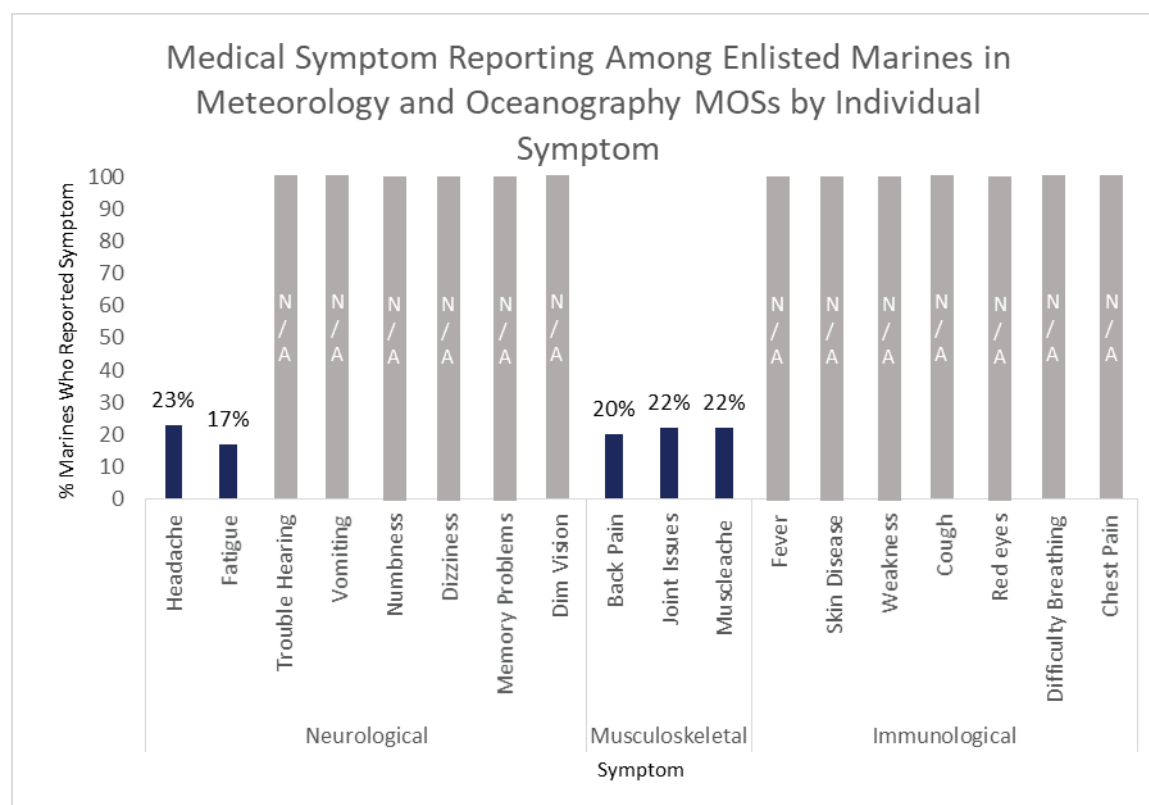


Figure 27.5

Military Police (*n* = 3,466)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Military Police occupations within Occupational Field 58:

The Military Police and Corrections OccFld provides the commander continuous support by enforcing the law; preventing and suppressing crime; assessing command physical security posture; preserving military control; quelling disturbances; investigating offenses; apprehending offenders; protecting property and personnel; registering and controlling privately owned vehicles and weapons; investigating traffic accidents; controlling traffic; antiterrorism; handling and safeguarding prisoners of war, refugees, or evacuees; conducting small unit offensive and defensive combat operations; guarding military prisoners; returning absentees/deserters to military control; and supervising brig operations and correctional custody units. Entry-level specialties available include Military Police and Correctional Specialists (p. 774).

Examples of Self-Reported Military Police MOSs

The five most frequent Military Police military occupational specialties during deployment that were self-reported on the PDHA were 5811 (*n* = 2,744), 5812 (*n* = 277), 5831 (*n* = 98), Military Police (*n* = 91), and 5821 (*n* = 69).

Results

Active duty enlisted Marines working in Military Police MOSs during deployment often reported blast exposure (18%; Figure 28.1). When exposed to a qualifying event that could prompt a concussion, 27% screened positive (Figure 28.2). Impact-associated concussions occurred infrequently (8%), while blast-associated concussions occurred often (19%; Figure 28.3). Of Marines working in Military Police MOSs, 51% reported experiencing at least one symptom during deployment, with 37%, 33%, and 30% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 28.4). Back pain was the most commonly reported symptom in this MOS category (24%), followed by headache (20%), fatigue (19%), muscle ache (19%), joint issues (18%), ringing in the ears (15%), and numbness (10%). The remaining symptoms were reported by fewer than 10% of Marines working in Military Police MOSs (Figure 28.5).

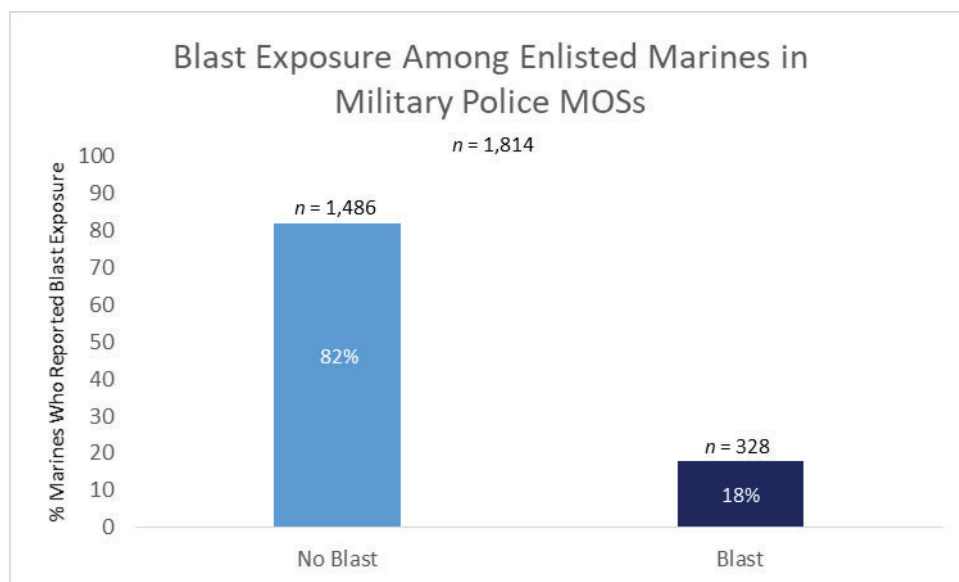


Figure 28.1

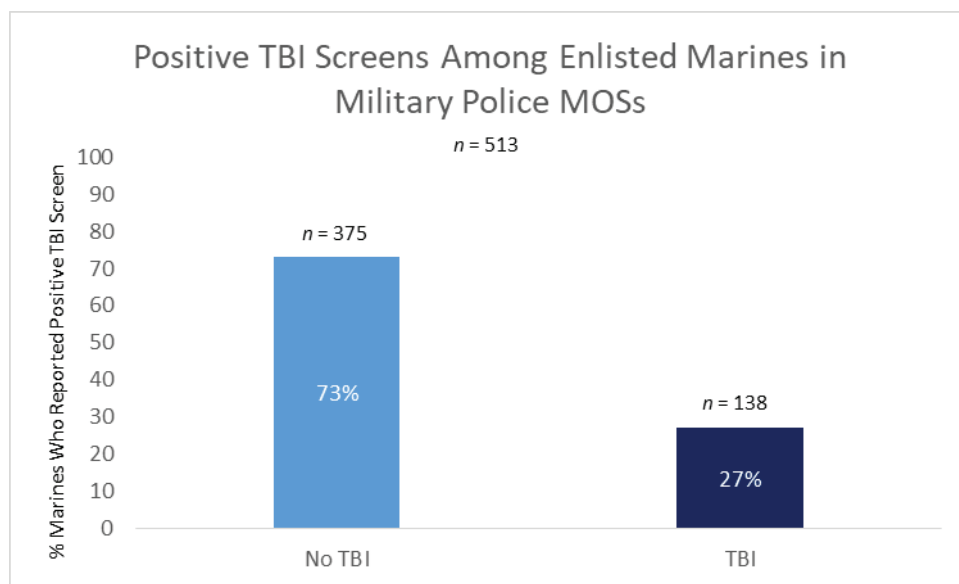


Figure 28.2

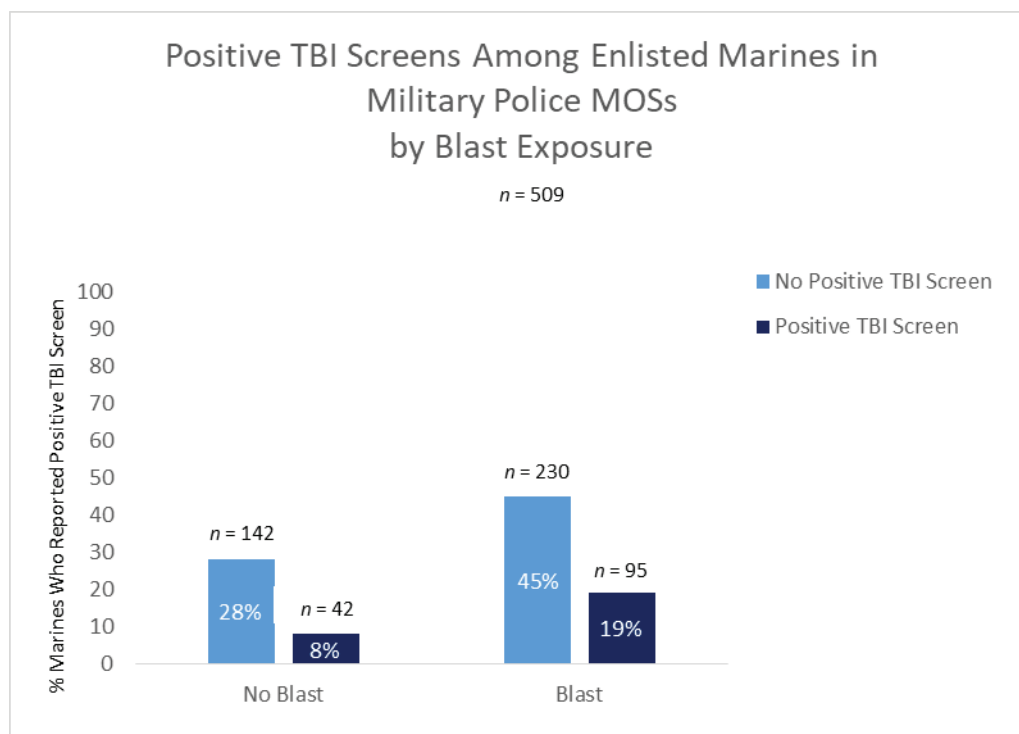


Figure 28.3

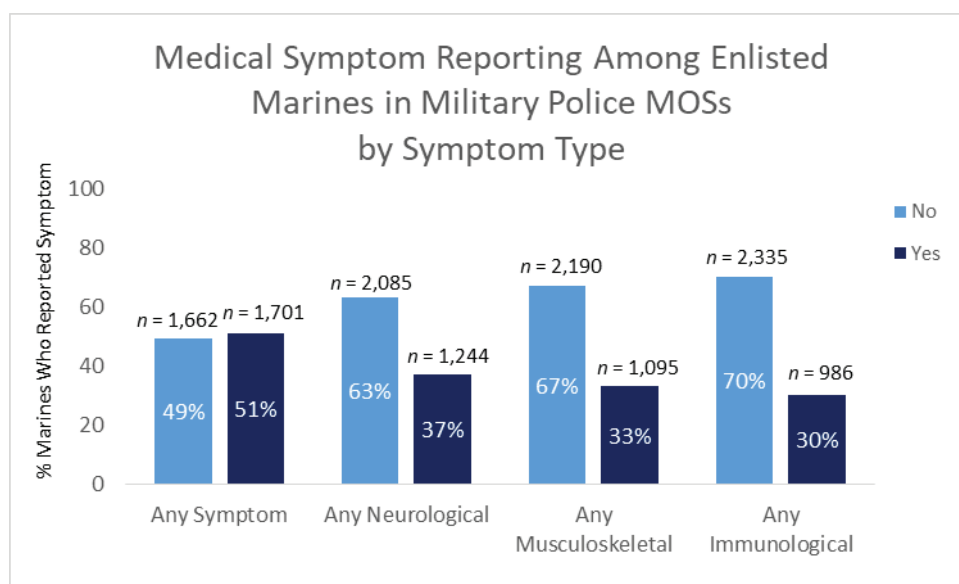


Figure 28.4

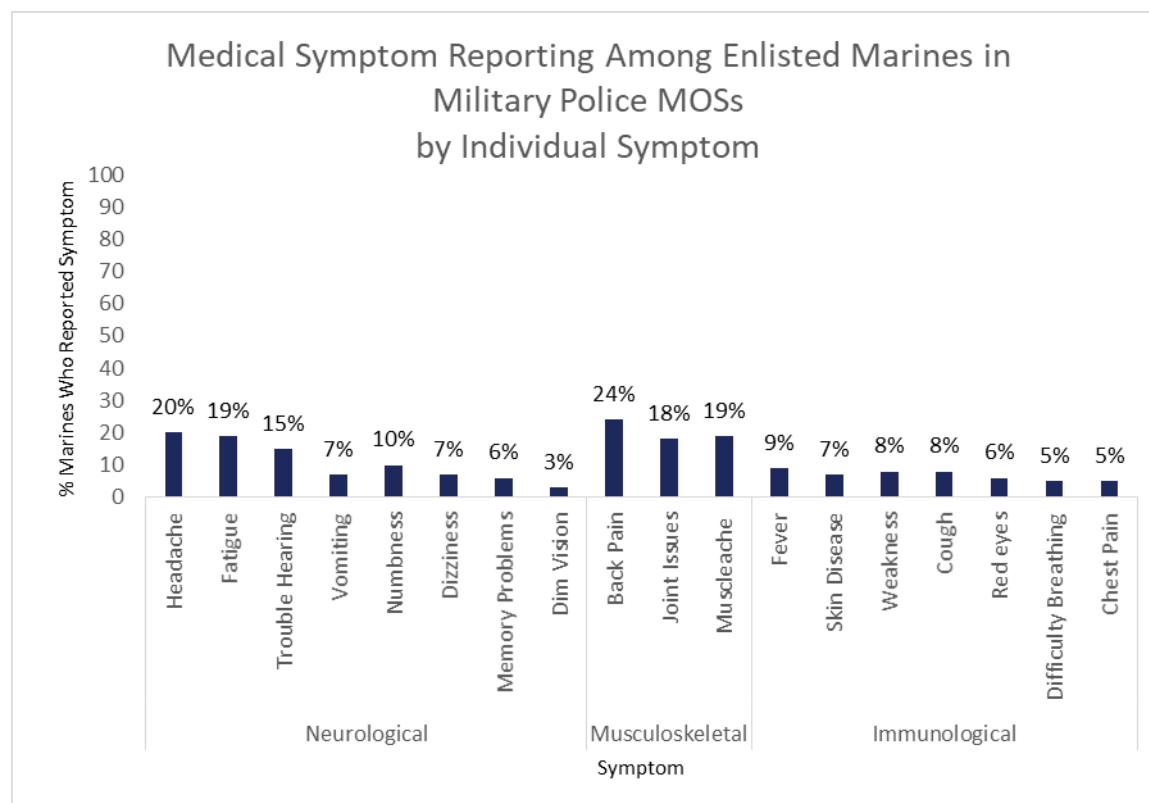


Figure 28.5

Miscellaneous ($n = 2,833$)

Occupational Requirements

This category represented all MOSs in the 8000 series, but the Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) does not include an overall summary for these occupations within Occupational Fields 80, 81, 82, 84, 86, 87, and 89. It does, however, provide a list of occupations that fall under this category, which include but are not limited to: MOS 8000 (General Service Marine Basic MOS), MOS 8011 (Basic Marine with Enlistment Guarantee), MOS 8060 (Acquisition Specialist), MOS 8412 (Career Recruiter), and MOS 8911 (Billet Designator - Barracks and Grounds Marine) (pp. 958–992).

Examples of Self-Reported Miscellaneous MOSs

The five most frequent Miscellaneous military occupational specialties during deployment that were self-reported on the PDHA were 8152 ($n = 639$), 9916 ($n = 631$), 8999 ($n = 608$), 9999 ($n = 245$), and 8014 ($n = 198$).

Results

Active duty enlisted Marines working in Miscellaneous MOSs during deployment infrequently reported blast exposure (9%; Figure 29.1). When exposed to a qualifying event that could prompt a concussion, 20% screened positive (Figure 29.2). Both impact-associated and blast-associated concussions occurred often (10% for both; Figure 29.3). Of Marines working in Miscellaneous MOSs, 53% reported experiencing at least one symptom during deployment, with 35%, 36%, and 31% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 29.4). Back pain was the most commonly reported symptom in this MOS category (24%), followed by joint issues (20%), muscle ache (19%), headache (19%), fatigue (18%), ringing in the ears (11%), and numbness (11%). The remaining symptoms were reported by fewer than 10% of Marines working in Miscellaneous MOSs (Figure 29.5).

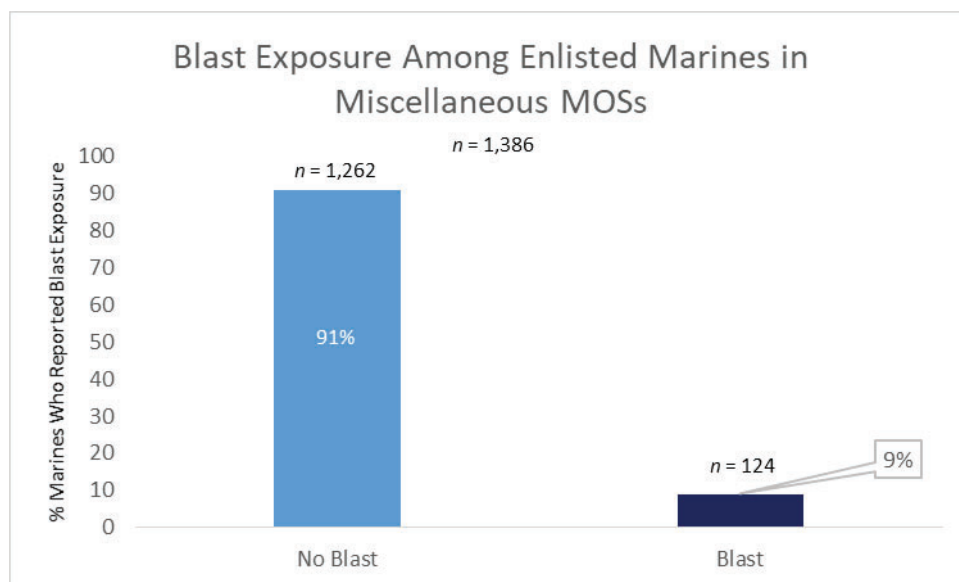


Figure 29.1

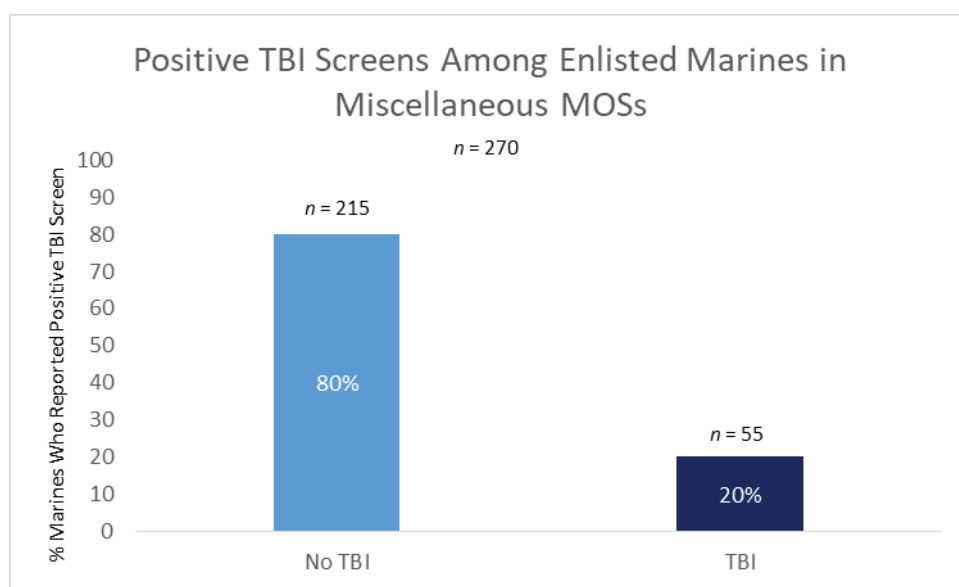


Figure 29.2

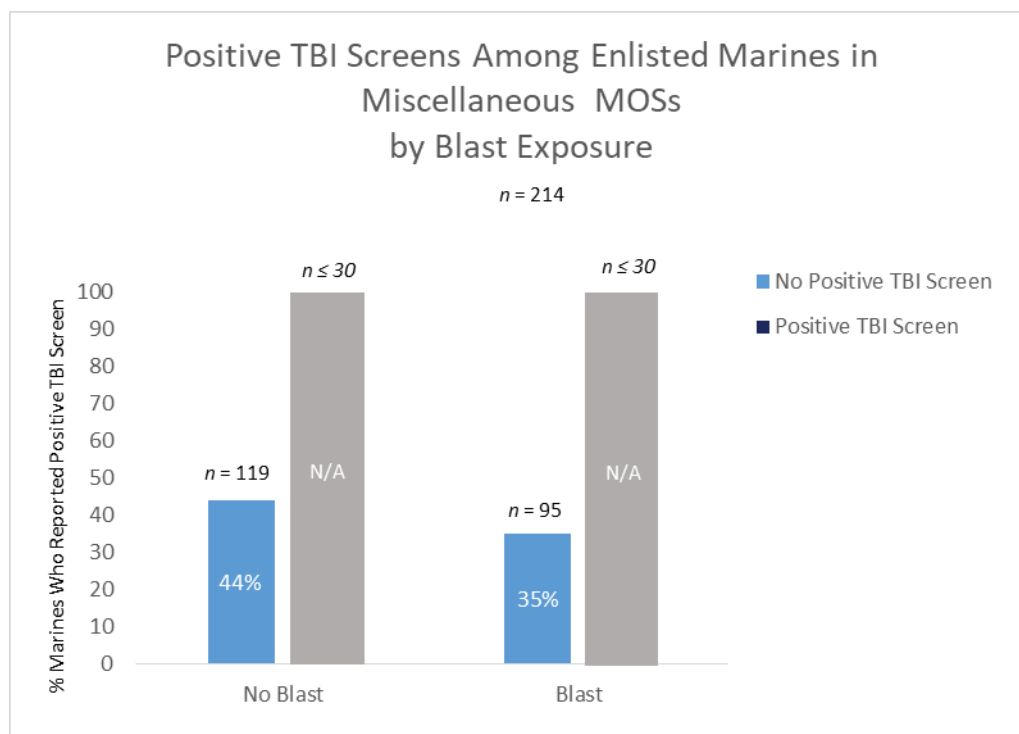


Figure 29.3

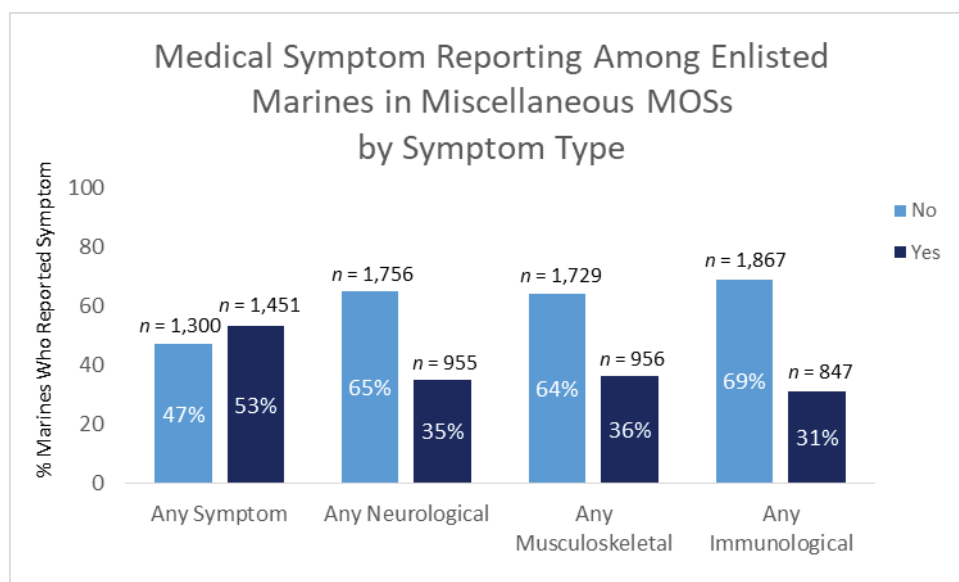


Figure 29.4

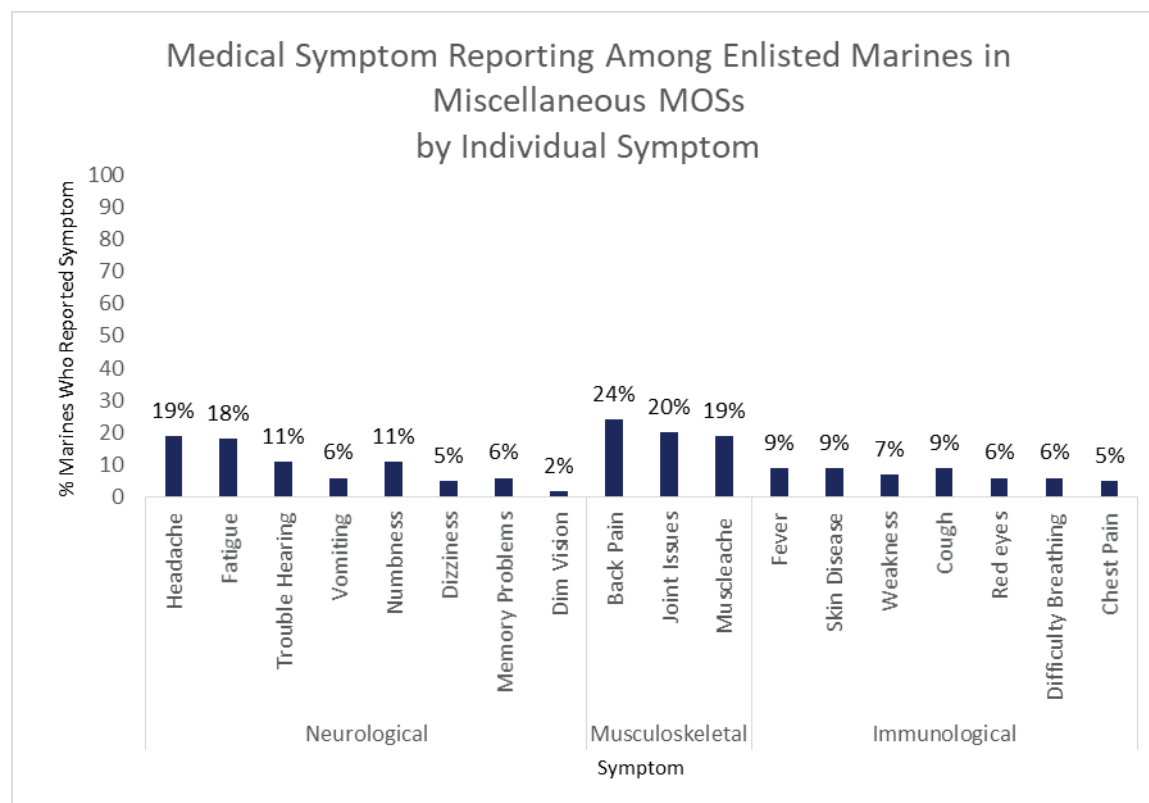


Figure 29.5

Missing (*n* = 31,753)

Occupational Requirements

In this category, occupations were coded as “Missing” if the Marine wrote something on the PDHA that could not be tracked back to a given rate, and therefore the Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) does not include an overall summary of Missing occupations.

Examples of Self-Reported Missing MOSs

The five most frequent Missing military occupational specialties during deployment that were self-reported on the PDHA were NULL (*n* = 347), MOS (*n* = 263), 0000 (*n* = 34), 03 (*n* = 27), and 0 (*n* = 20).

Results

Active duty enlisted Marines working in Missing MOSs during deployment often reported blast exposure (12%; Figure 30.1). When exposed to a qualifying event that could prompt a concussion, 27% screened positive (Figure 30.2). Impact-associated concussions occurred infrequently (8%), while blast-associated concussions occurred often (19%; Figure 30.3). Of Marines working in Missing MOSs, 36% reported experiencing at least one symptom during deployment, with 24%, 21%, and 19% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 30.4). Back pain was the most commonly reported symptom in this MOS category (13%), followed by joint issues (11%), fatigue (11%), and headache (10%). The remaining symptoms were reported by fewer than 10% of Marines working in Missing MOSs (Figure 30.5).

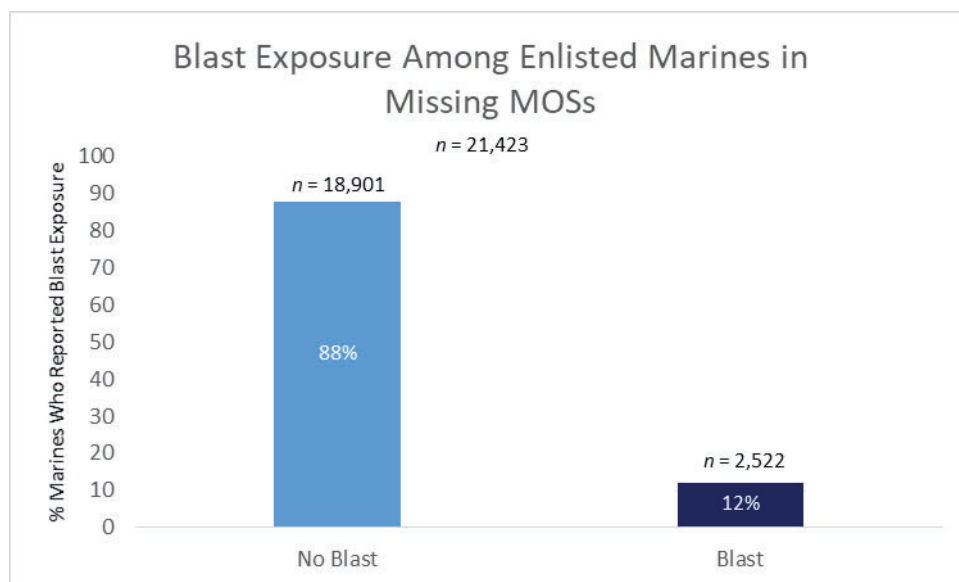


Figure 30.1

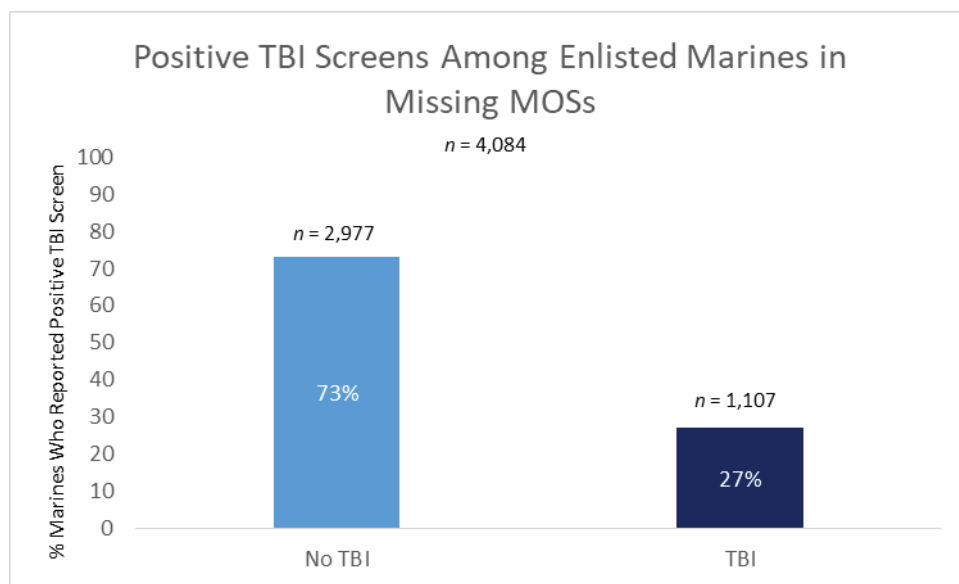


Figure 30.2

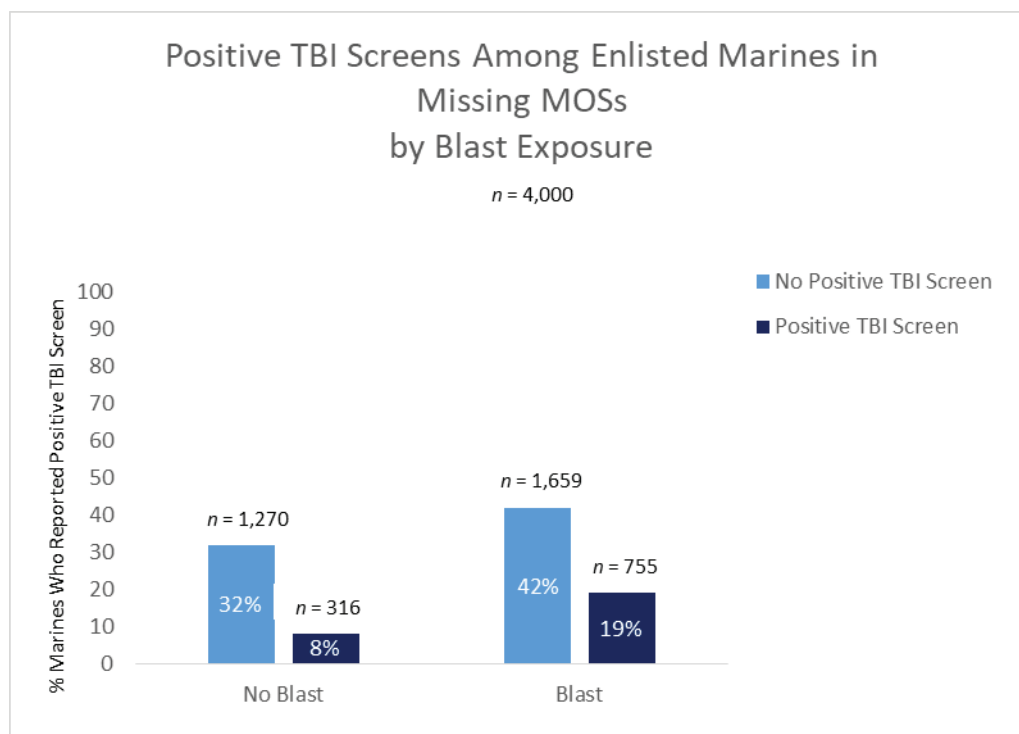


Figure 30.3

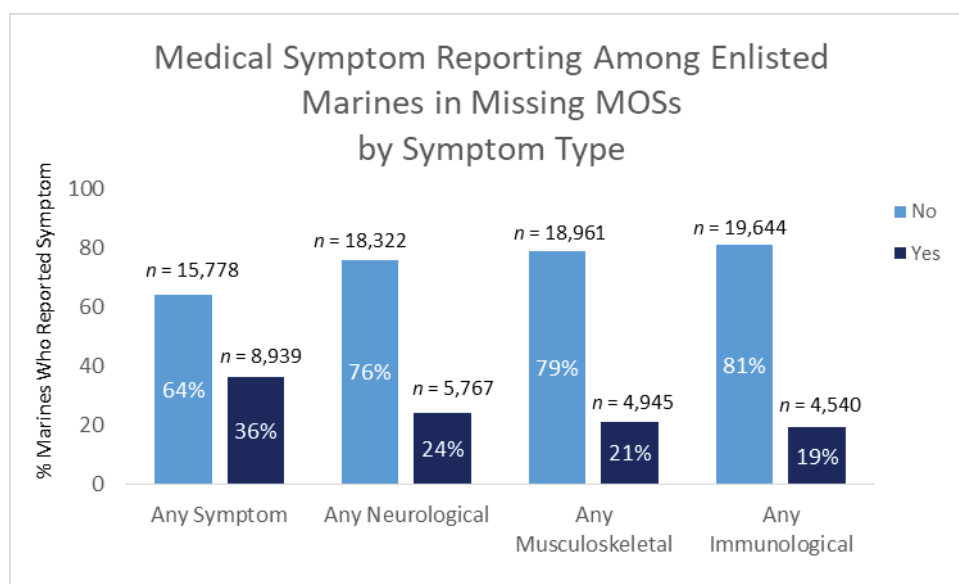


Figure 30.4

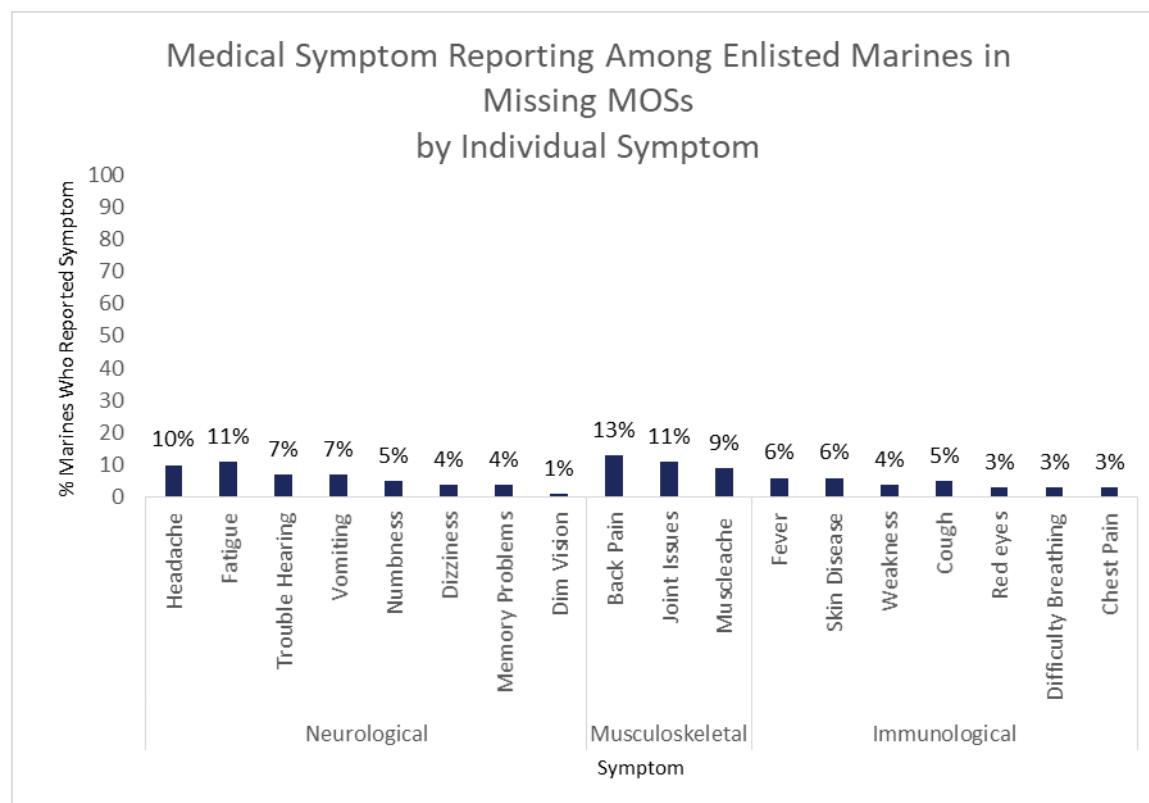


Figure 30.5

Motor Transport (*n* = 14,432)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Motor Transport occupations within Occupational Field 35:

The Motor Transport Occupational Field (OccFld) includes the operation, employment, maneuver, and maintenance functions for motor transport tactical wheeled vehicles in support of combat and garrison operations. Qualifications required include operation and maintenance skills of automotive vehicles. The duties require highly technical skills supplemented by administrative and managerial skills. Motor Transport Marines will be required to learn vehicle operation and maintenance procedures, personnel and operational management techniques, preparation of orders and directives and record keeping procedures. Formal schooling and standardized training is provided to Marines entering this Occupational Field. Types of entry-level jobs available include work as Tactical Wheeled Vehicle Operator and Field/Intermediate Maintenance Technician. There is a wide variety of billets available in the OccFld ranging from duty at all staff levels of MAGTF to the opportunity to serve in smaller organizations/units. Marines entering this OccFld will receive MOS 3500, Basic Motor Transport Marine. After entry into OccFld 35, and assignment of MOS 3500, personnel will specialize in either operations or maintenance and assigned either PMOS 3531 or 3521 respectively (p. 702).

Examples of Self-Reported Motor Transport MOSs

The five most frequent Motor Transport military occupational specialties during deployment that were self-reported on the PDHA were 3531 (*n* = 6,417), 3521 (*n* = 4,121), 3533 (*n* = 1,697), 3537 (*n* = 648), and 3529 (*n* = 462).

Results

Active duty enlisted Marines working in Motor Transport MOSs during deployment frequently reported blast exposure (15%; Figure 31.1). When exposed to a qualifying event that could prompt a concussion, 31% screened positive (Figure 31.2). Both impact-associated and blast-associated concussions occurred often (12% and 18%, respectively; Figure 31.3). Of Marines working in Motor Transport MOSs, 49% reported experiencing at least one symptom during deployment, with 35%, 32%, and 29% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 31.4). Back pain was the most commonly reported symptom in this MOS category (23%), followed by headache (20%), fatigue (18%), joint issues (18%), muscle ache (17%), and ringing in the ears (12%). The remaining symptoms were reported by fewer than 10% of Marines working in Motor Transport MOSs (Figure 31.5).

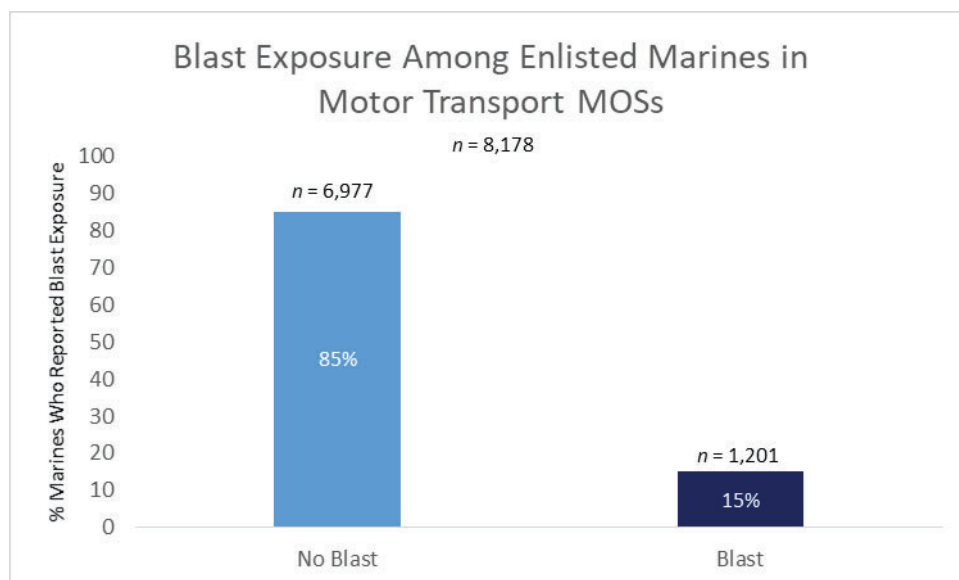


Figure 31.1

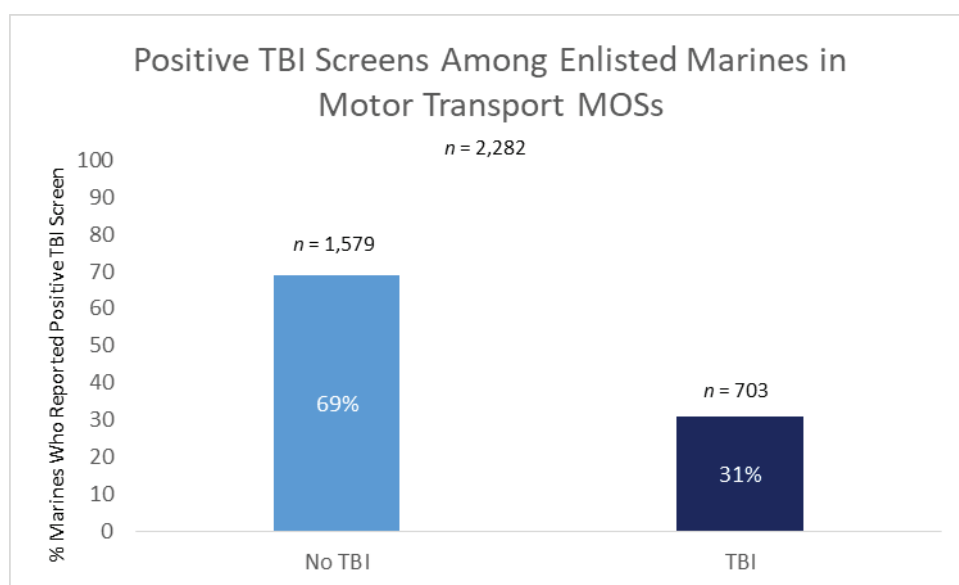


Figure 31.2

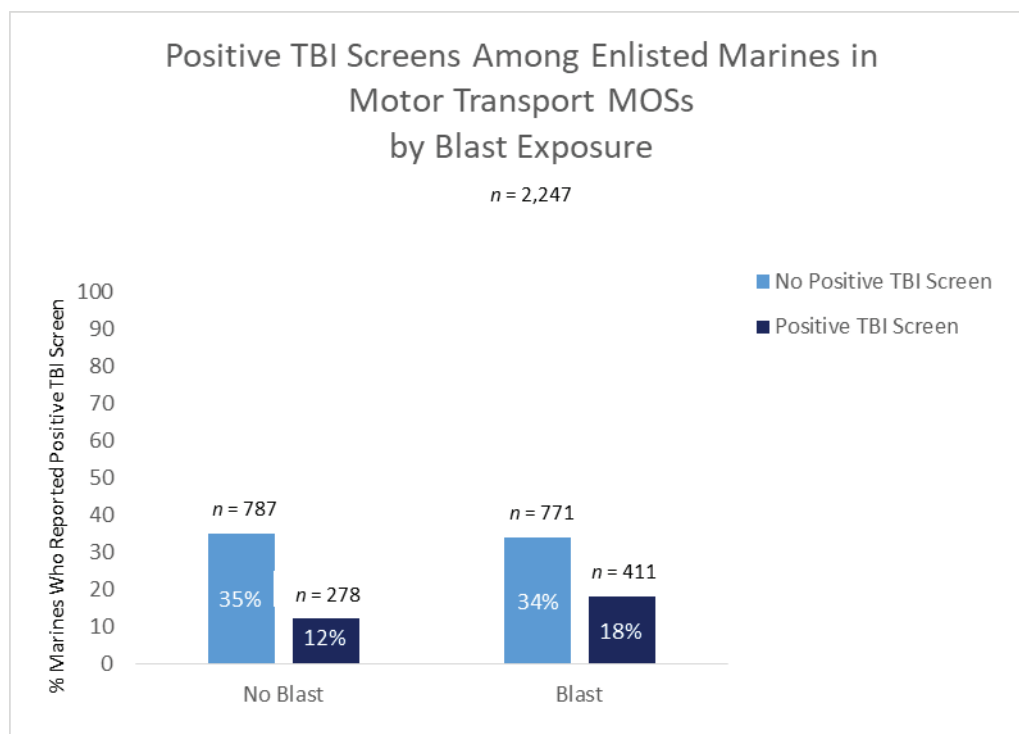


Figure 31.3

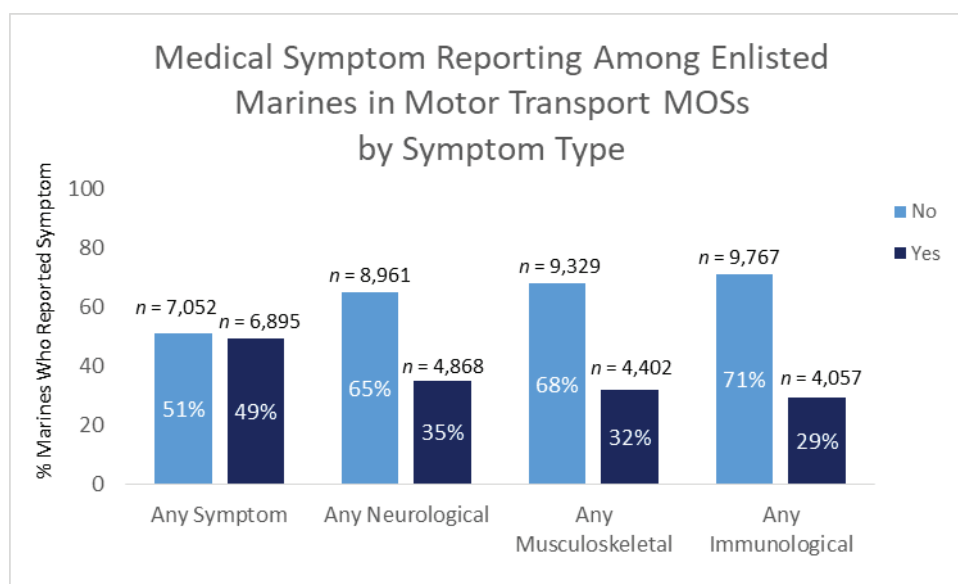


Figure 31.4

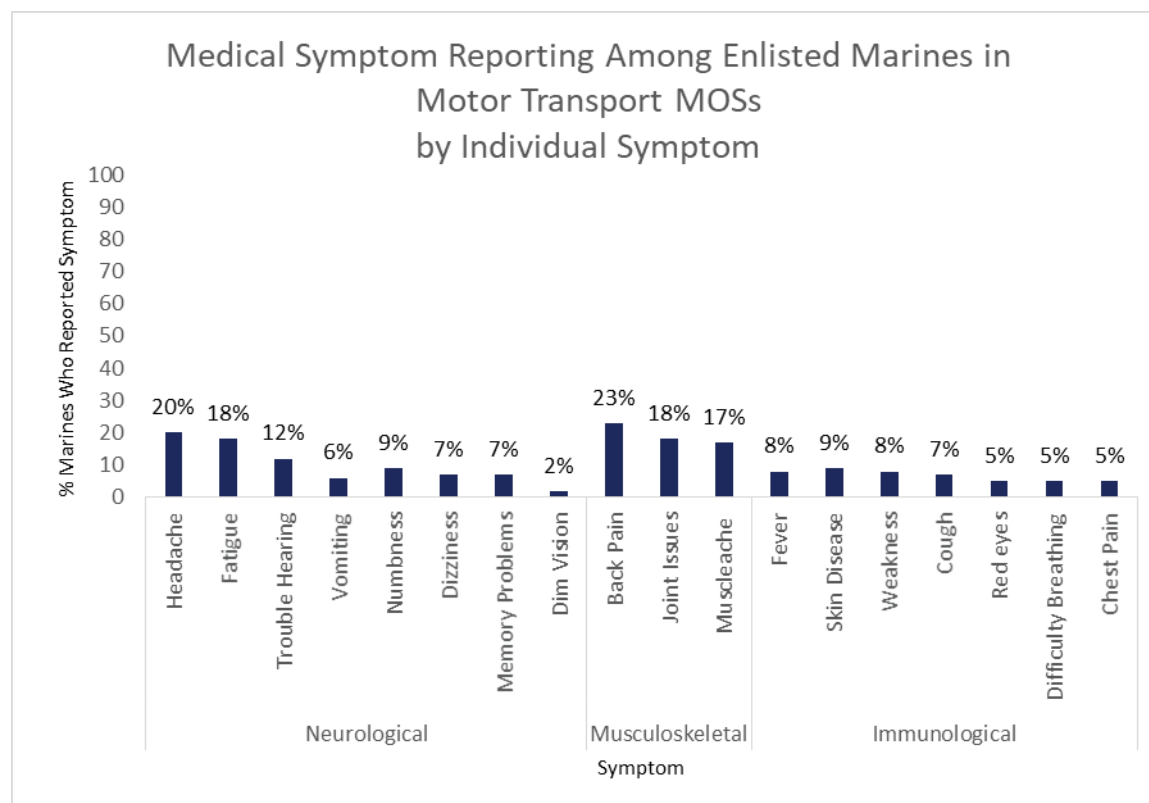


Figure 31.5

Multiple ($n = 402$)

Occupational Requirements

In this category, occupations were coded as “Multiple” if the Marine wrote something on the PDHA that could correspond to multiple rates. The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) does not include an overall summary of multiple occupations.

Examples of Self-Reported Multiple MOSs

The five most frequent military occupational specialties during deployment that could be classified in multiple categories that were self-reported on the PDHA were Mechanic ($n = 29$), 0311/8152 ($n = 24$), 0311/8621 ($n = 8$), 0811/MP ($n = 7$), and 1371/5811 ($n = 5$).

Results

Due in part to a small sample size ($n = 402$), data for Marines working in occupations that could be classified in multiple categories cannot be released due to HIPAA regulations. Active duty enlisted Marines working in these occupations during deployment rarely reported blast exposure and rarely screened positive for concussion ($ns \leq 30$; Figures 32.1–32.3). Of Marines working in occupations that could be classified in multiple categories, 63% reported experiencing at least one symptom, with 49%, 44%, and 43% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 32.4). The most commonly reported symptom in this MOS category was headache (32%), followed by back pain (32%), muscle ache (27%), fatigue (26%), joint issues (23%), ringing in the ears (16%), numbness (14%), fever (13%), cough (13%), weakness (12%), dizziness (11%), and memory problems (10%; Figure 32.5).

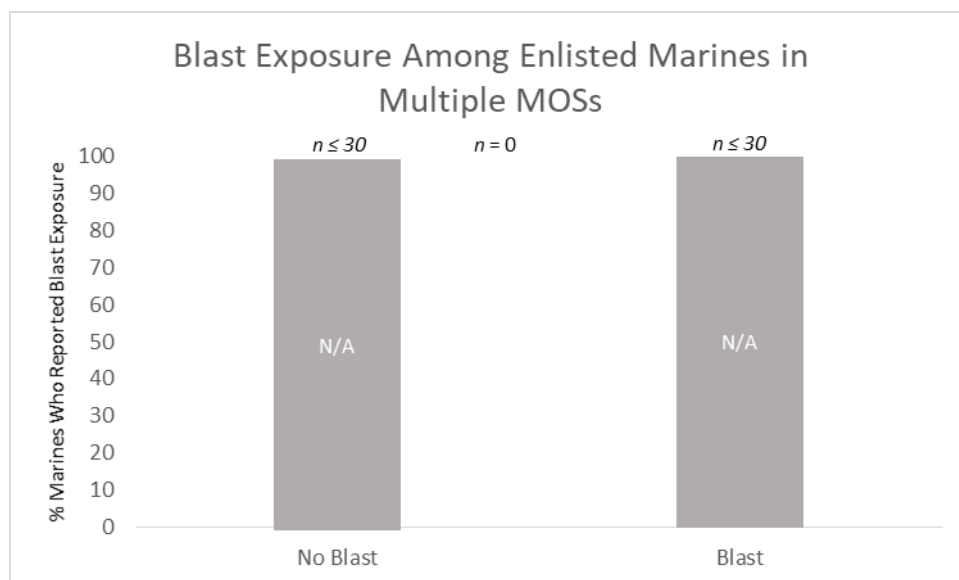


Figure 32.1

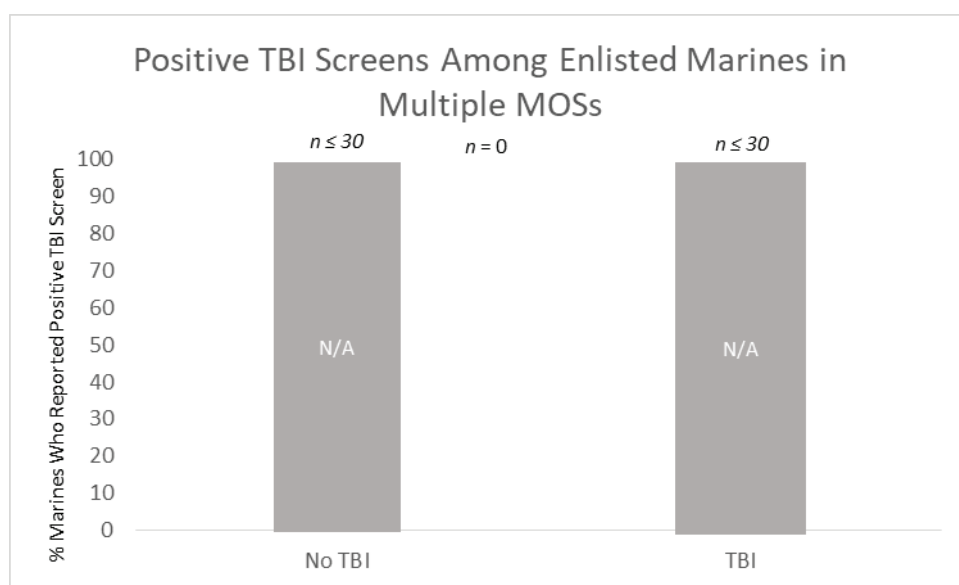


Figure 32.2

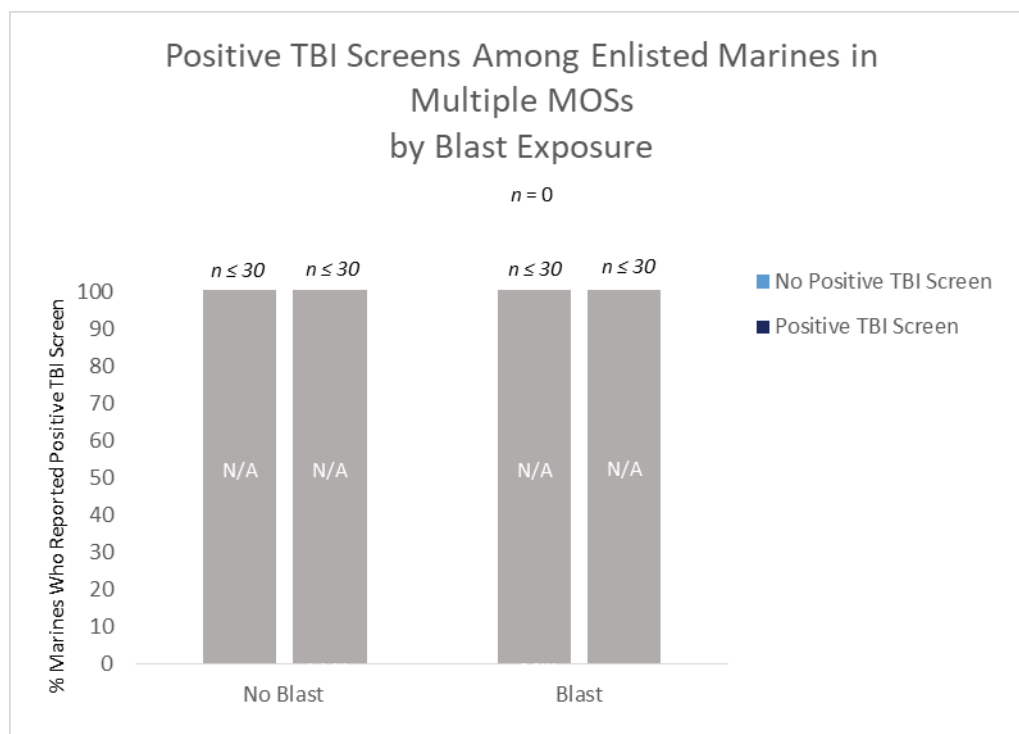


Figure 32.3

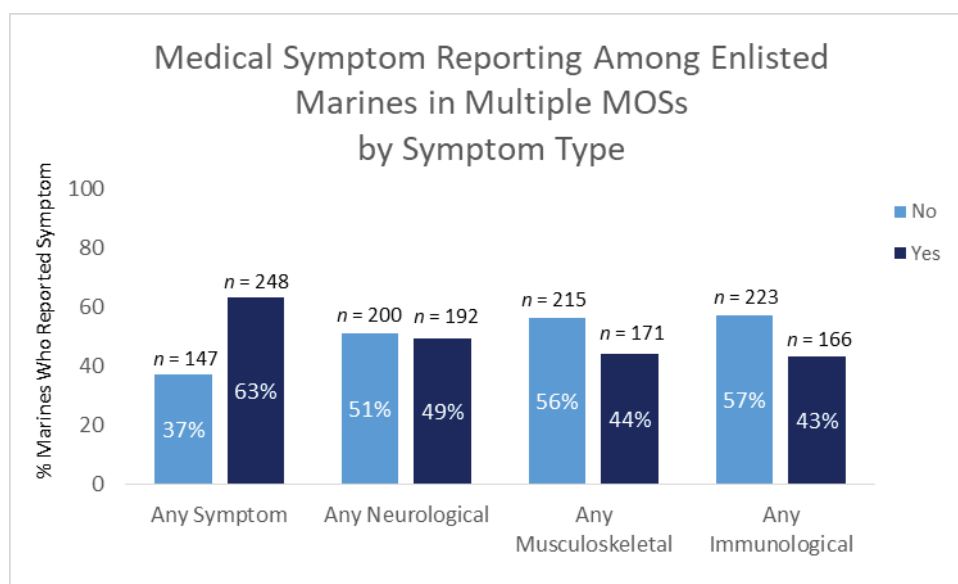


Figure 32.4

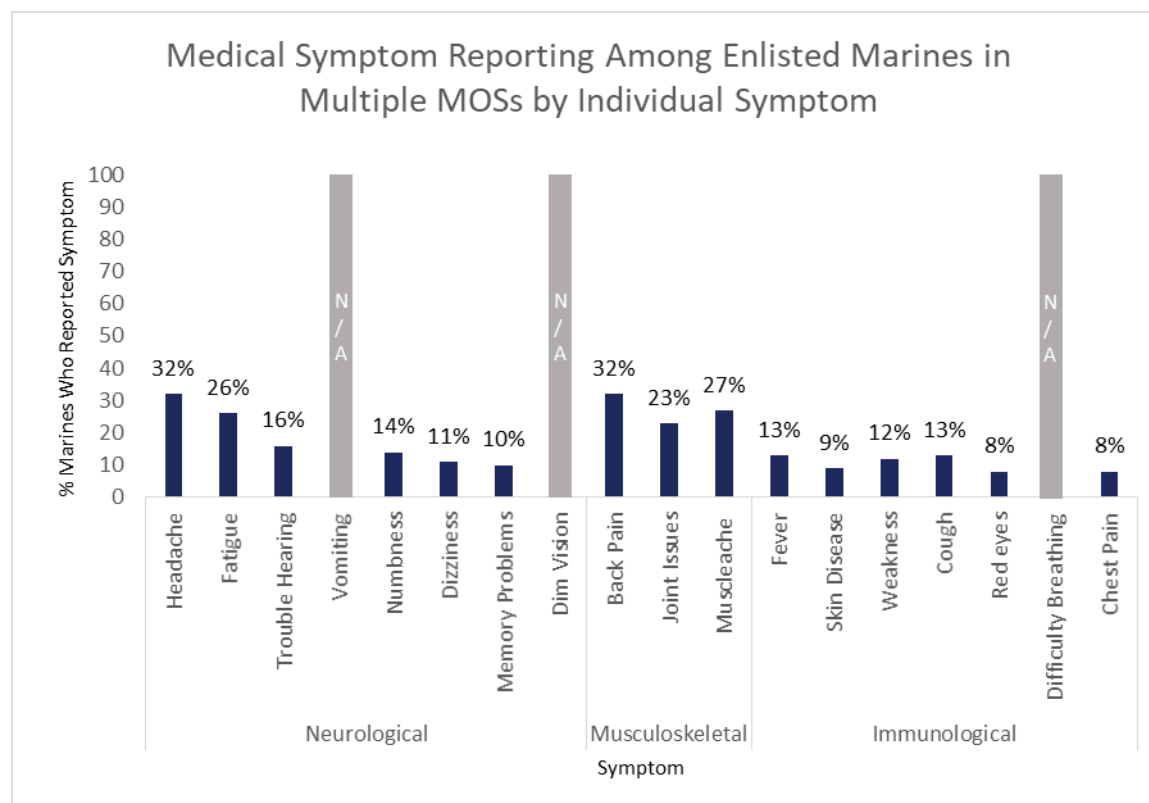


Figure 32.5

Music (*n* = 135)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Music occupations within Occupational Field 55:

Marines in the Music OccFld provide music to support military ceremonies, official functions, community relations, personnel procurement programs, and troop "esprit de corps." In combat, musical units continue musical functions and augment security on a temporary basis during periods of heightened combat intensity when use of the band in its primary role is impractical. Marines entering this OccFld will receive MOS 5500, Basic Musician. All OccFld 5500 MOSs are assigned and voided by authority of the CMC (MM). Marines enlisting under the Musician Enlisted Option Program (MEOP) may be required to attend the Music Basic Course at the School of Music after having completed recruit training and Marine Combat Training (MCT). Assignment to a Marine Corps Band follows successful completion of the Basic Course. Career Marine Musicians may return to the School of Music for advanced technical training or complete the Instrument Repair Course provided through a civilian school. The opportunity to participate in a formal apprenticeship program leading to receipt of Department of Labor Certification of Apprenticeship may be available in some MOSs within OccFld 55 (p. 751).

Examples of Self-Reported Music MOSs

The five most frequent Music military occupational specialties during deployment that were self-reported on the PDHA were 5524 (*n* = 122), 5521 (*n* = 4), 5519 (*n* = 2), 5537 (*n* = 2), and 5517 (*n* = 1).

Results

Active duty enlisted Marines working in Music MOSs during deployment rarely reported blast exposure and rarely screened positive for concussion (*ns* ≤ 30; Figures 33.1–33.3). Of Marines working in Music MOSs, 56% reported experiencing at least one symptom during deployment, with 43%, 39%, and 42% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 33.4). Because HIPAA regulations prohibit the release of medical data for groups smaller than 30 individuals, many of the symptoms were not reported by enough Marines in this MOS to be reported here. The only symptoms reported by a sufficient number of Marines were fatigue (30%), muscle ache (30%), back pain (29%), and headache (28%; Figure 33.5).

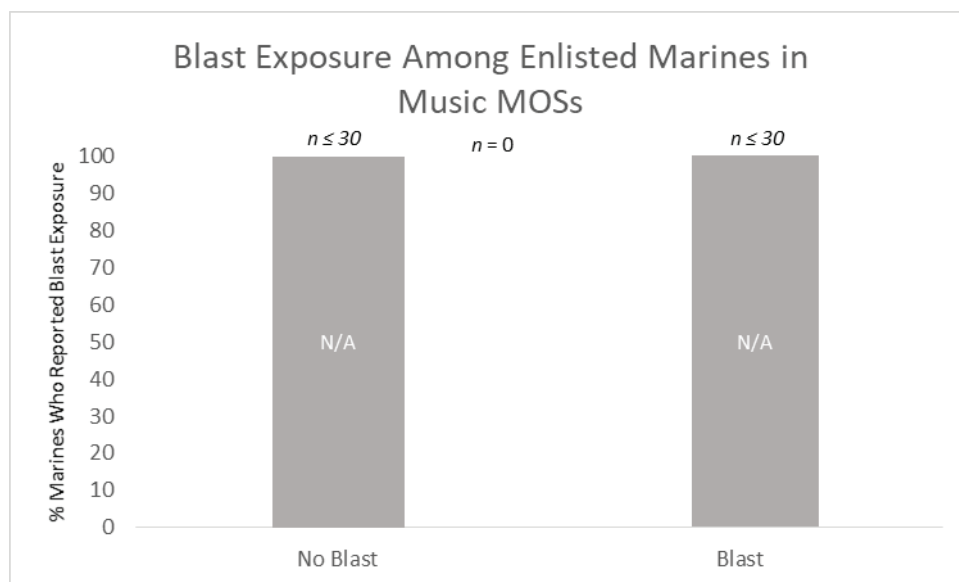


Figure 33.1

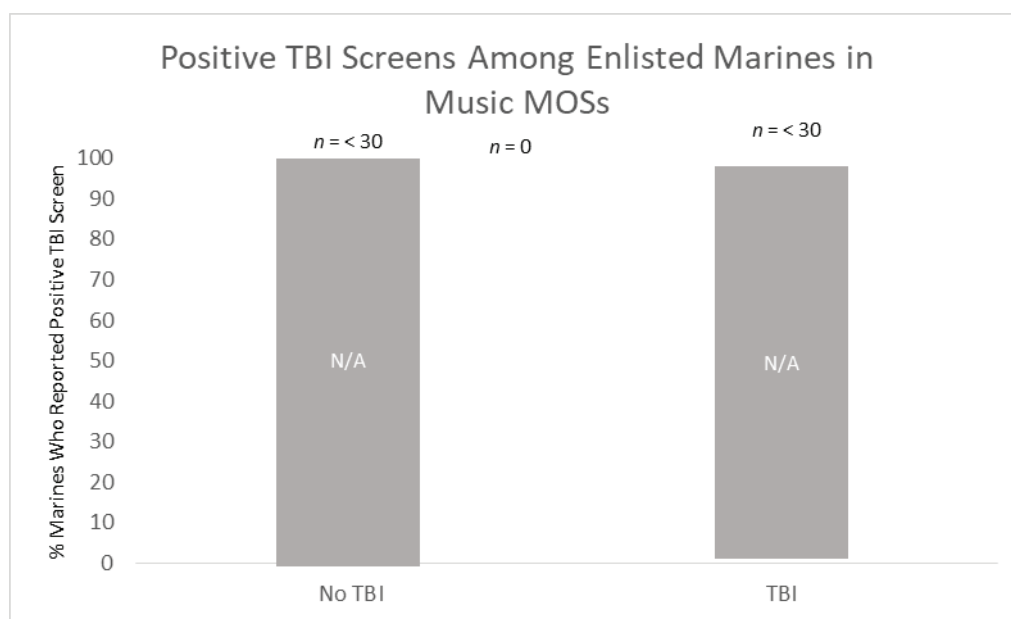


Figure 33.2

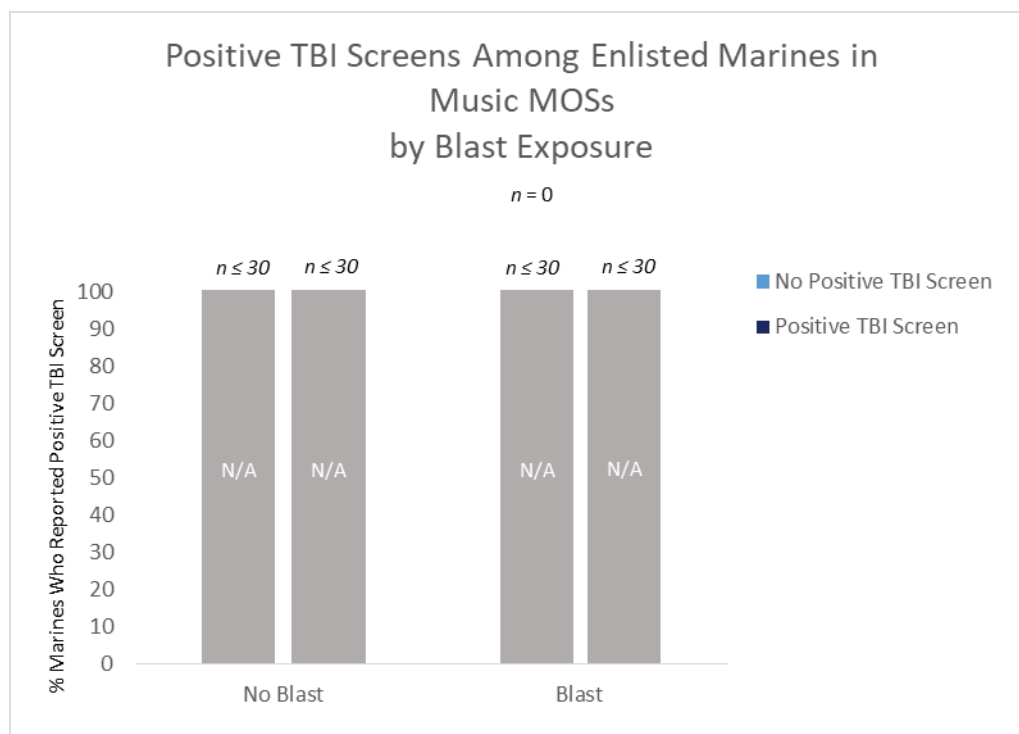


Figure 33.3

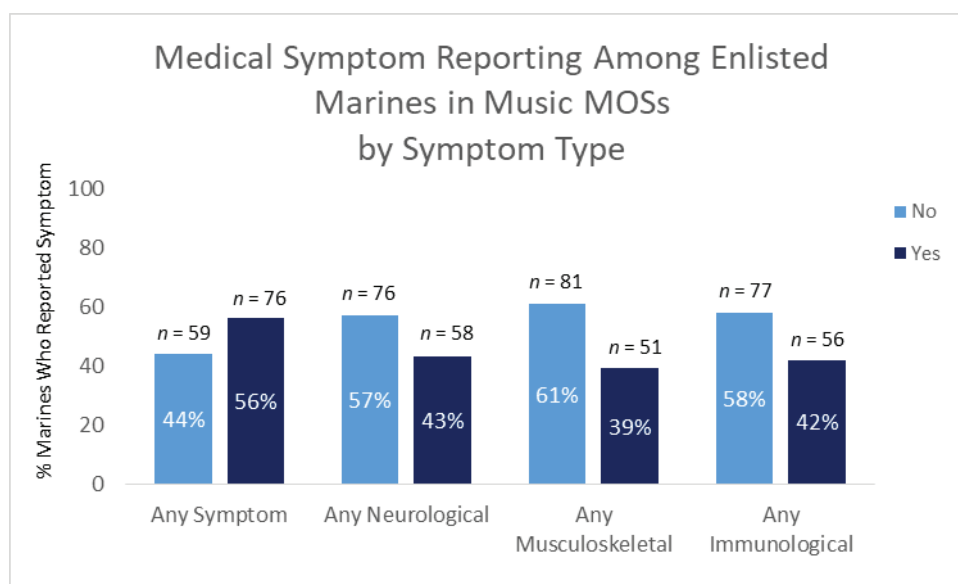


Figure 33. 4

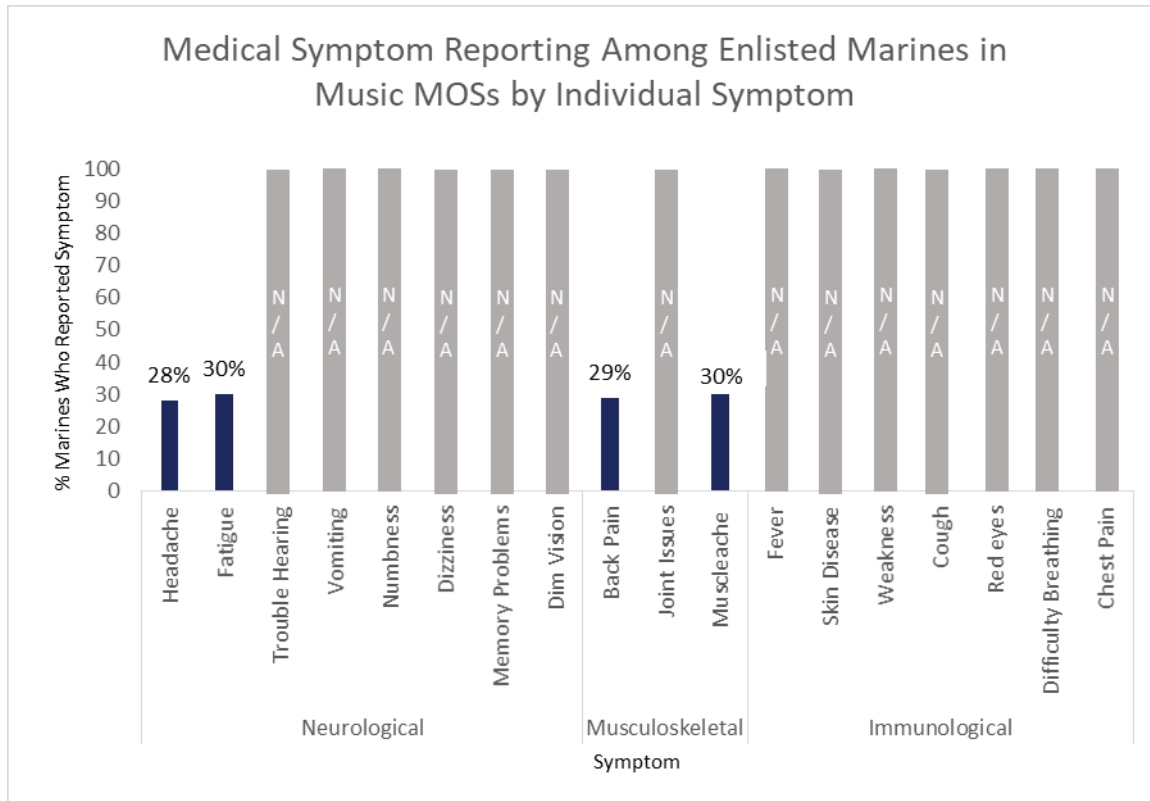


Figure 33.5

Navigation Officer and Enlisted Flight Crew ($n = 173$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Navigation Officer and Enlisted Flight Crew occupations within Occupational Field 73:

The Enlisted Flight Crews in this OccFld assist in the planning and execution of tactical in-flight refueling and assault support missions, perform navigational duties, and operate and maintain the various communications and loading equipment in transport aircraft (p. 951).

Examples of Self-Reported Navigation Officer and Enlisted Flight Crew MOSs

The five most frequent Navigation Officer and Enlisted Flight Crew military occupational specialties during deployment that were self-reported on the PDHA were 7372 ($n = 12$), 7316 ($n = 6$), UAV Operator ($n = 4$), 7314 UAV Operator ($n = 2$), and 7314/Internal Operator ($n = 2$).

Results

Active duty enlisted Marines working in Navigation Officer and Enlisted Flight Crew MOSs during deployment rarely reported blast exposure and rarely screened positive for concussion ($ns \leq 30$; Figures 34.1–34.3). Of Marines working in Navigation Officer and Enlisted Flight Crew MOSs, 34% reported experiencing at least one symptom during deployment, with 19% and 23% reporting neurological and immunological symptoms, respectively; musculoskeletal symptoms were reported among fewer than 30 Marines and thus cannot be reported (Figure 34.4). Because HIPAA regulations prohibit the release of medical data for groups smaller than 30 individuals, none of the symptoms were reported by enough Marines in this MOS to be reported here (Figure 34.5).

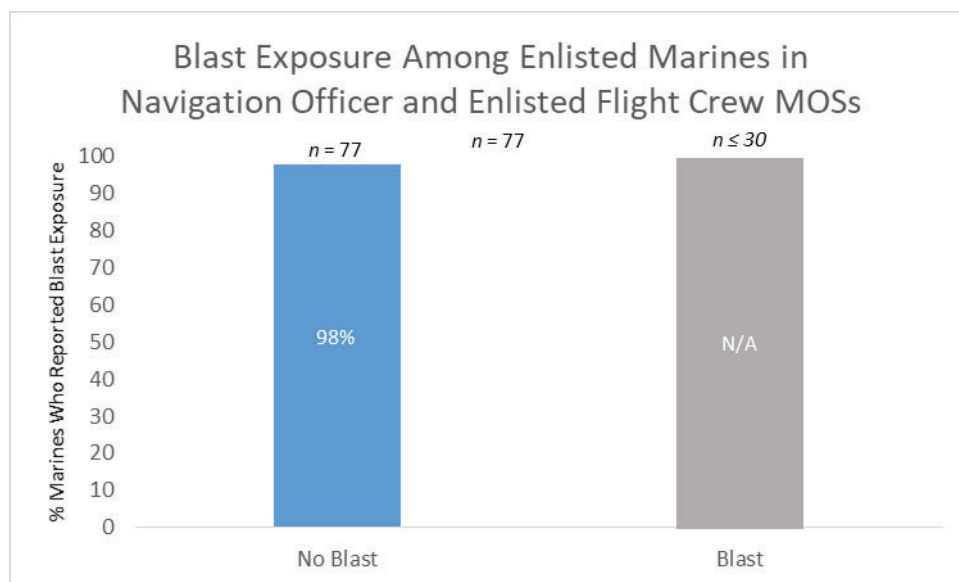


Figure 34.1

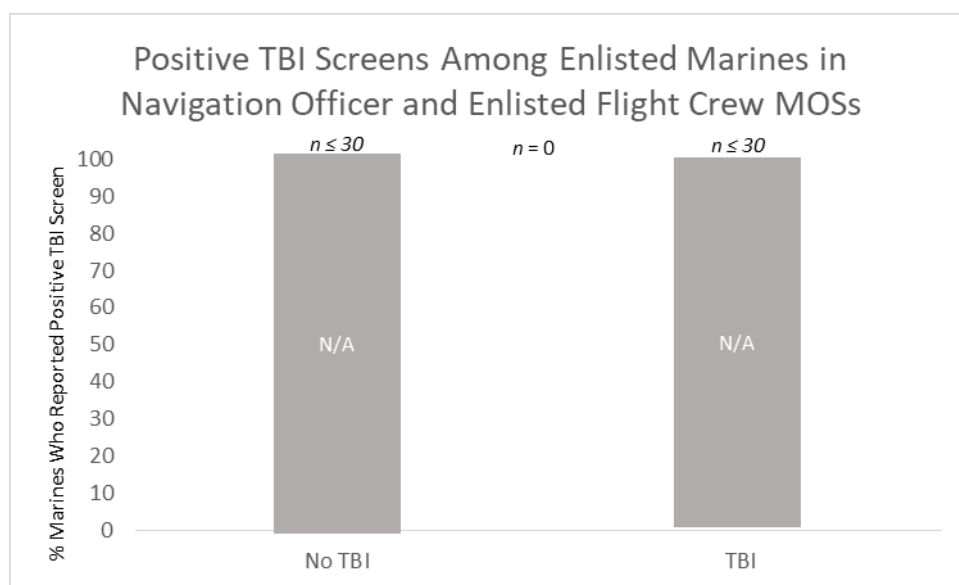


Figure 34.2

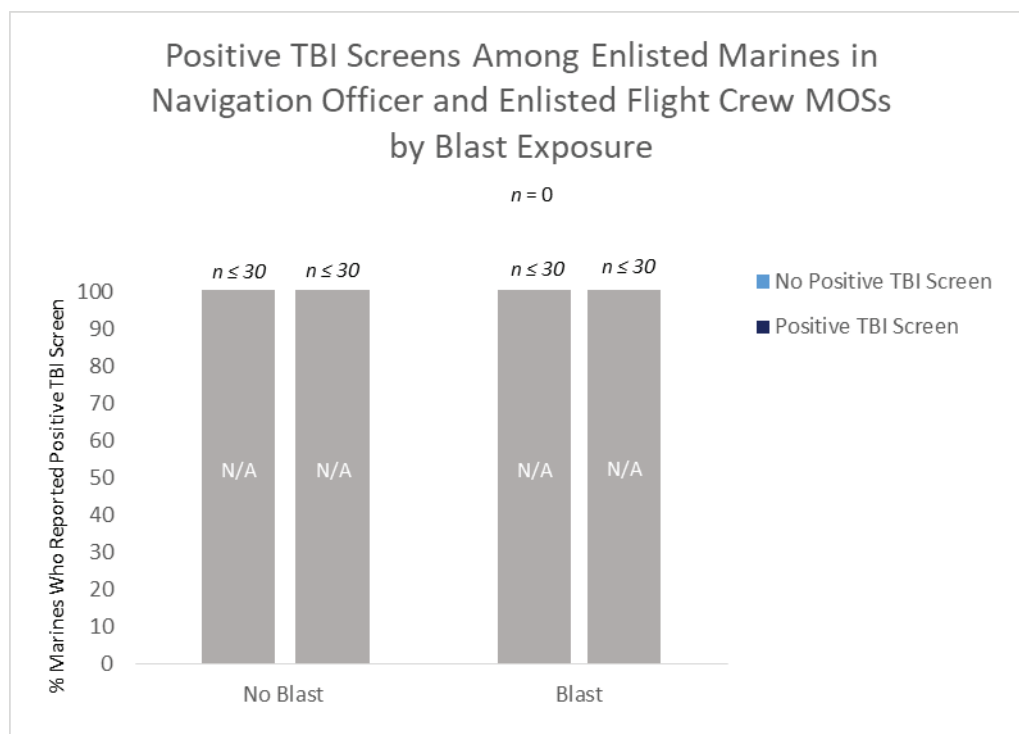


Figure 34.3

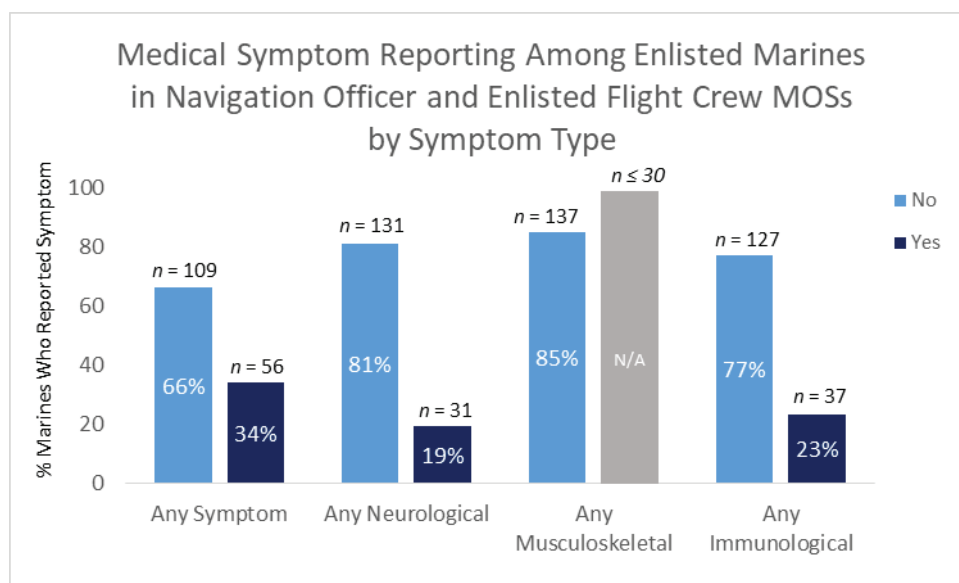


Figure 34.4

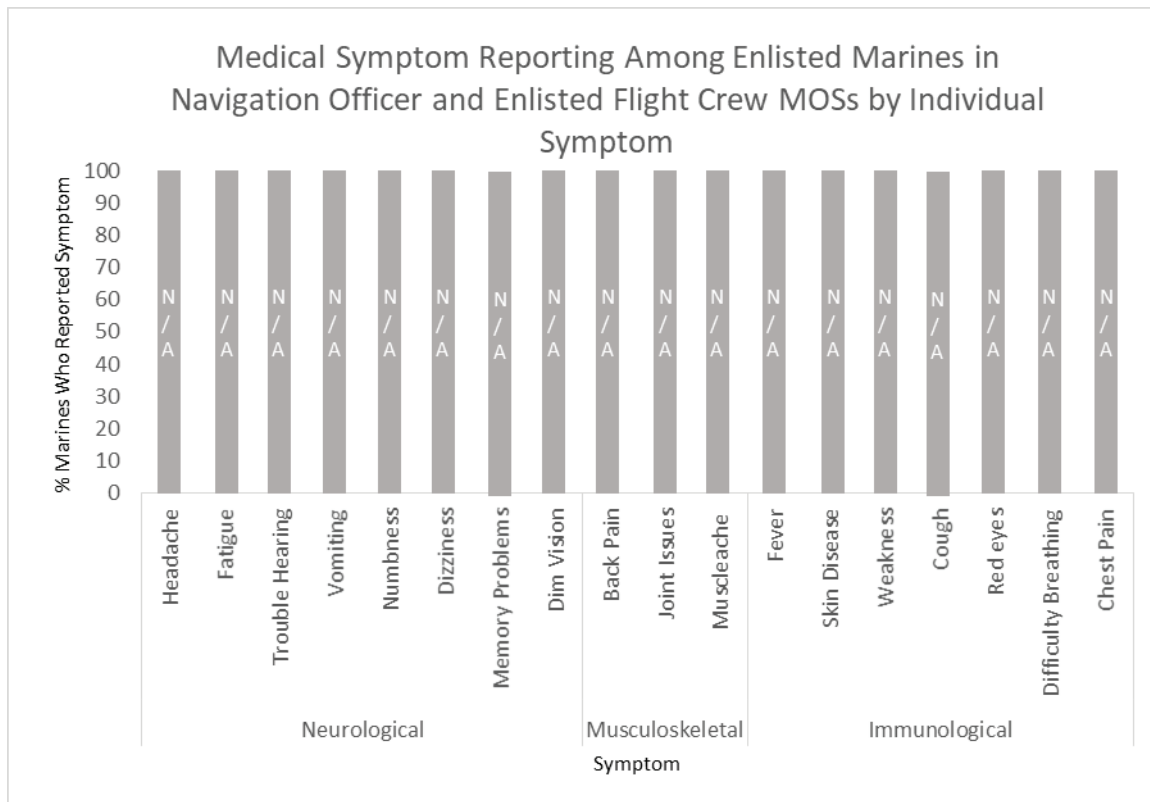


Figure 34.5

Public Affairs (*n* = 258)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Public Affairs occupations within Occupational Field 43:

Marine Corps Public Affairs (PA) is a unique capability that enables effective communication with key publics in order to build understanding, credibility, trust, and mutually beneficial relationships that contribute to the achievement of operational and Service objectives. PA uses a rigorous, sophisticated approach to planning and implementing Marine Corps communication strategies that is comprehensive, integrated, and synchronized with our plans, policies, programs, and operations. PA collects and analyzes data related to key public's awareness, attitudes, opinions and beliefs of our organization and operations in order to develop a deep and accurate understanding of the information environment and effectively assess the impact our actions have within that environment. Using information gathered through research, PA analyzes and frames problems and opportunities and informs decisions regarding stakeholders, goals, objectives, action and communication strategies, and tactics. As the lead communication counsel on a commander's staff, PA integrates and synchronizes communication with operational plans and campaigns and aligns and nests a commander's communication strategy within national strategic objectives. In implementing communication plans, PA conducts communication activities tailored to specific publics. PA leaders identify specific communication tasks, allocate required resources, establish and execute a detailed engagement schedule, and coordinate with internal and external elements of the command to achieve a commander's communication end state. PA Marines develop professional, transmedia, digital communication products in support of strategies and tactics; and disseminate those products through designated channels to initiate and maintain a dialogue with key publics in order to achieve communication objectives. Throughout, PA constantly frames the message to ensure the context of our communication is accurate, factual, and relevant. Finally, PA evaluates the effectiveness of the planning, implementation, and, ultimately, impact of a commander's communication strategy. PA leaders develop metrics to evaluate the impact of communication strategies on the intended public's knowledge, attitudes, opinions, beliefs and behaviors and assess the achievement of communication objectives (p. 722).

Examples of Self-Reported Public Affairs MOSs

The five most frequent Public Affairs military occupational specialties during deployment that were self-reported on the PDHA were 4341 (*n* = 236), Combat Correspondent (*n* = 4), 4341 Combat Correspondent (*n* = 4), PAO (*n* = 1), and Public Affairs (*n* = 1).

Results

Active duty enlisted Marines working in Public Affairs MOSs during deployment rarely reported blast exposure and rarely screened positive for concussion (*ns* ≤ 30; Figures 35.1–35.3). Of Marines working in Public Affairs MOSs, 57% reported experiencing at least one symptom during deployment, with 40%, 30%, and 38% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 35.4). Because HIPAA regulations prohibit the release of medical data for groups smaller than 30

individuals, many of the symptoms were not reported by enough Marines in this MOS to be reported here. The only symptoms reported by a sufficient number of Marines were fatigue (22%), headache (21%), back pain (18%), muscle ache (18%), fever (18%), joint issues (15%), and cough (14%; Figure 35.5).

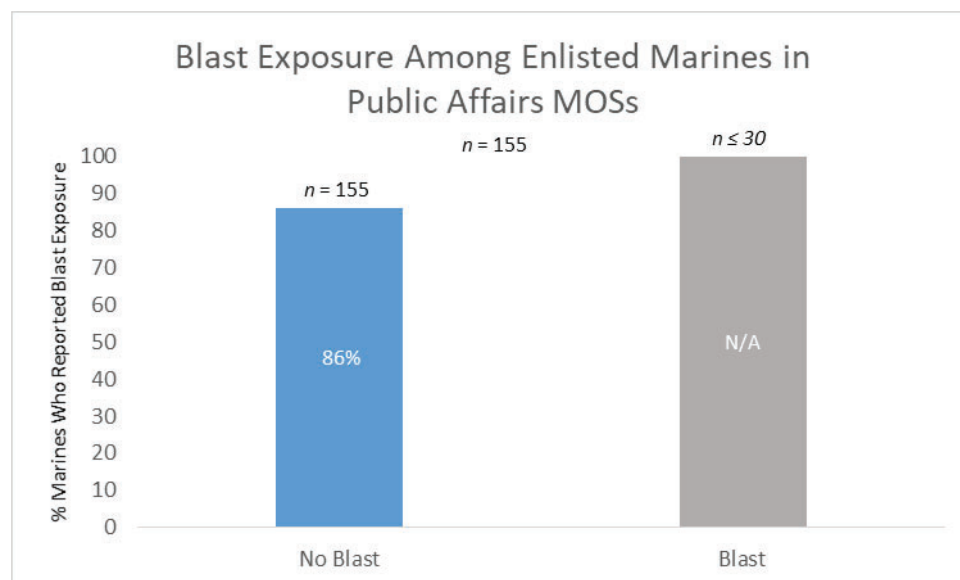


Figure 35.1

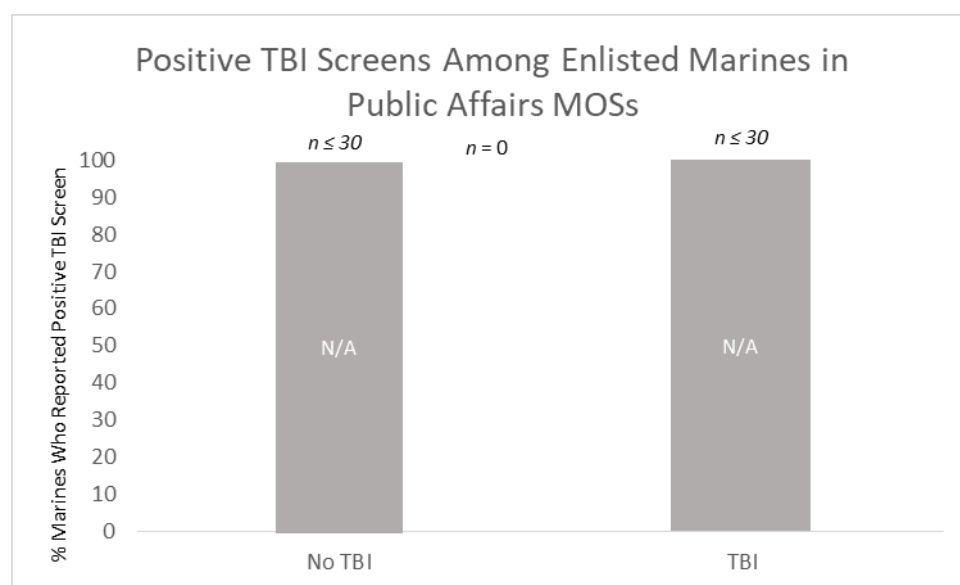


Figure 35.2

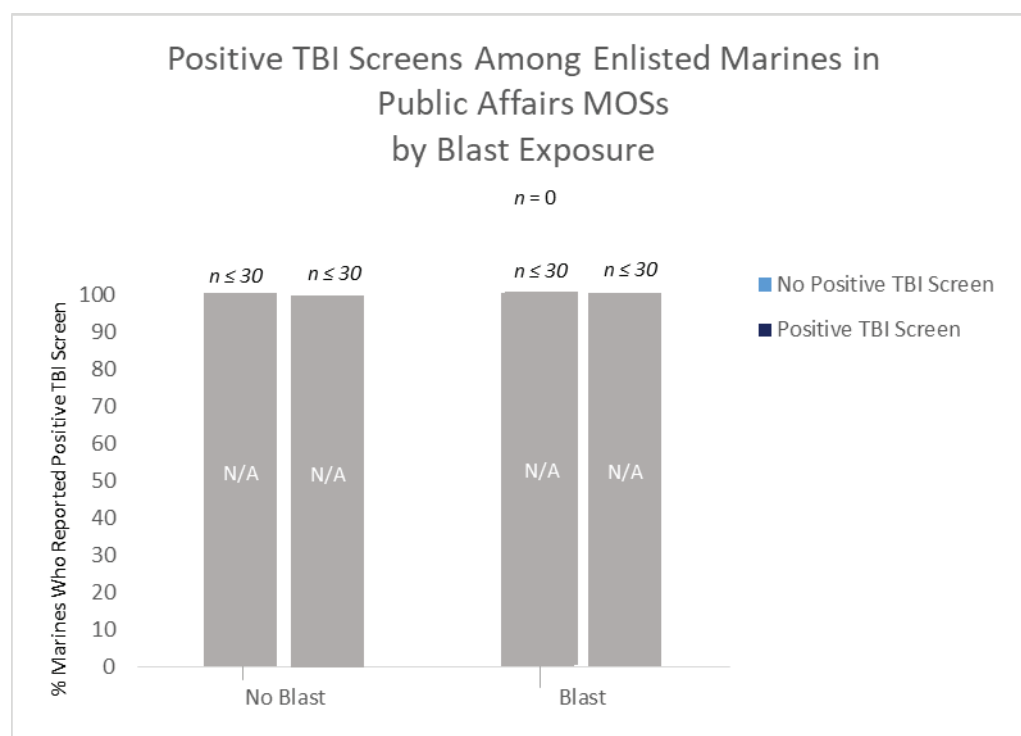


Figure 35.3

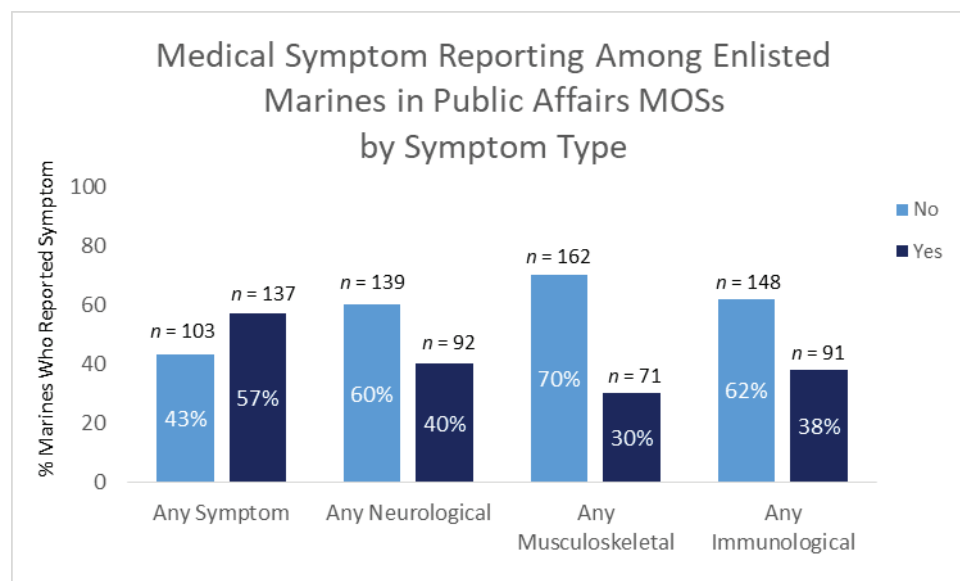


Figure 35.4

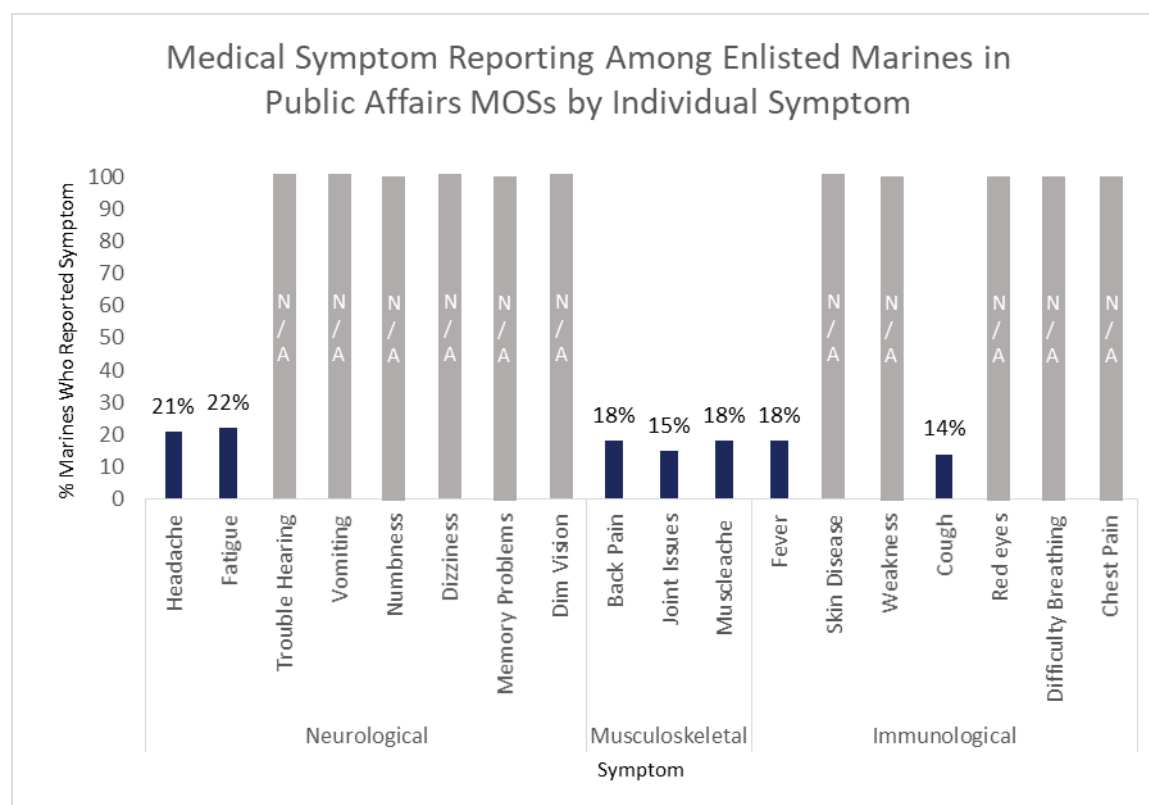


Figure 35.5

Signals Intelligence/Ground Electronics Warfare (SIGINT/EW) ($n = 2,101$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Signals Intelligence/Ground Electronic Warfare occupations within Occupational Field 26:

The Signals Intelligence/Ground Electronic Warfare (SIGINT/EW) OccFld includes the employment of Signals Intelligence (SIGINT), Electronic Warfare (EW), Computer Network Operations (CNO), and Special Intelligence Communications (SPINTCOM) capabilities. Marines in this field collect process and analyze data to produce and disseminate intelligence. Marines in the SIGINT/EW field will be required to set up and operate collection and communications electronic equipment, prepare intelligence reports, conduct preventive maintenance on assigned equipment, and assist in the operational control and management of SIGINT/EW personnel, equipment, and facilities. Entry-level jobs include Special Communications Signals Intercept Collection Operator, Electronic Intelligence (ELINT) Intercept Operator, Special Intelligence System Administrator/Communicator, or Cryptologic Linguist. Marines can also enter the SIGINT field at the grade of Corporal or Sergeant. Sergeants requesting latmove into the 26 OccFld must have no more than 1 year time in grade. Duty assignments include Marine Special Operations Command, Marine Cryptologic Support Battalion, Radio Battalions, Intelligence Battalions, the Air Wing VMAQs, the Special Security Communications Teams (SSCTS), and the staff sections of the Marine divisions and wings (p. 542).

Examples of Self-Reported SIGINT/EW Warfare MOSs

The five most frequent SIGINT/EW military occupational specialties during deployment that were self-reported on the PDHA were 2621 ($n = 750$), 2651 ($n = 430$), 2671 ($n = 253$), 2631 ($n = 180$), and 2676 ($n = 144$).

Results

Active duty enlisted Marines working in SIGINT/EW MOSs during deployment infrequently reported blast exposure (8%; Figure 36.1). When exposed to a qualifying event that could prompt a concussion, 19% screened positive for concussion (Figure 36.2), though both impact-associated and blast-associated concussions were rare ($n \leq 30$; Figure 36.3). Of Marines working in SIGINT/EW MOSs, 42% reported experiencing at least one symptom during deployment, with 27%, 21%, and 26% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 36.4). Headache was the most commonly reported symptom in this MOS category (14%), followed by fatigue (12%), back pain (12%), and joint issues (11%). The remaining symptoms were reported by fewer than 10% of Marines working in SIGINT/EW MOSs (Figure 36.5).

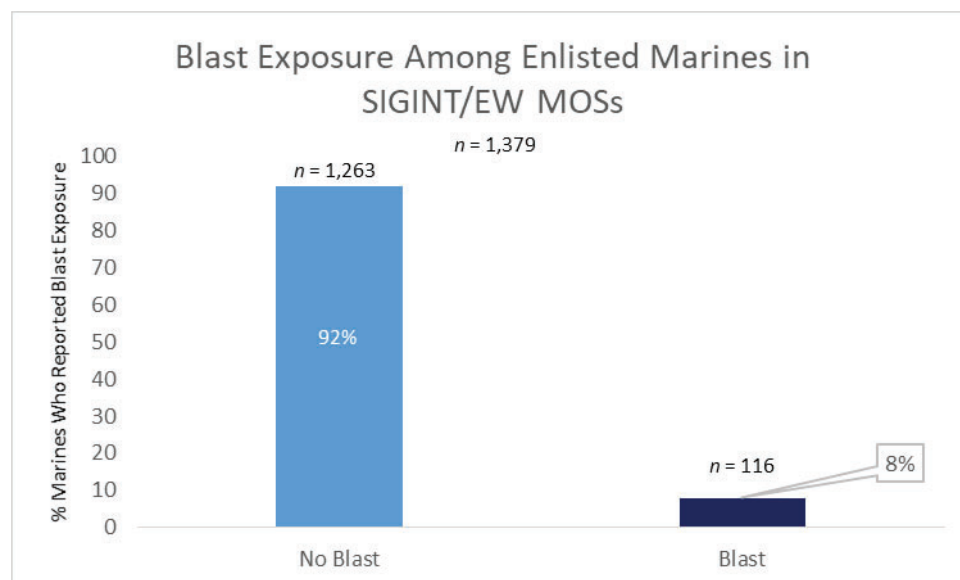


Figure 36.1

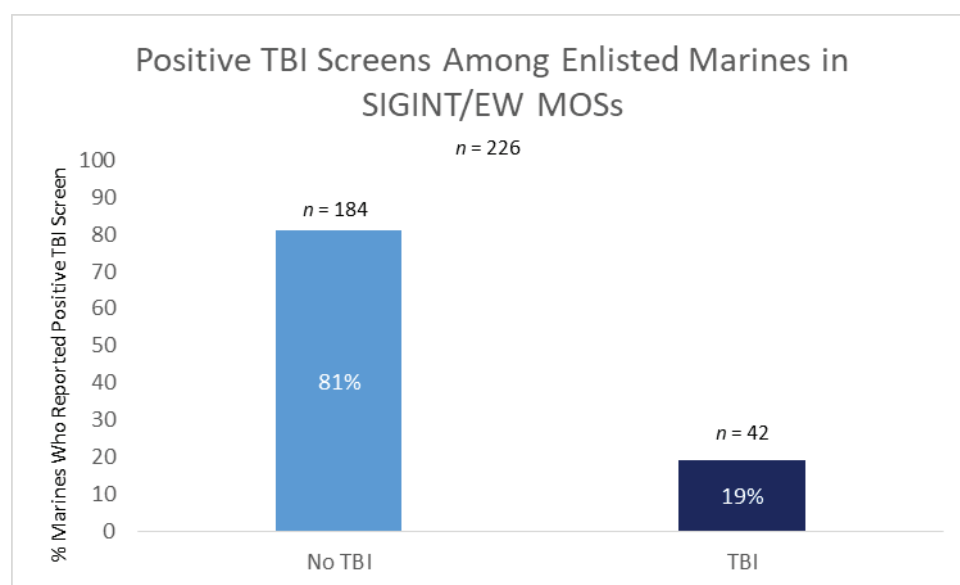


Figure 36.2

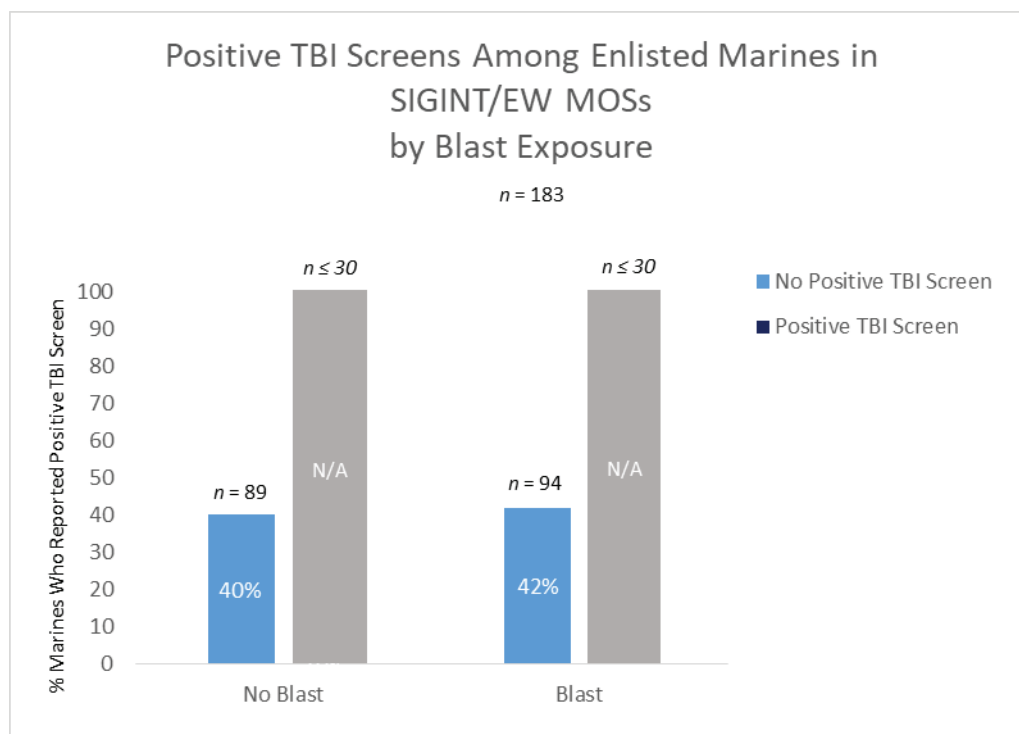


Figure 36.3

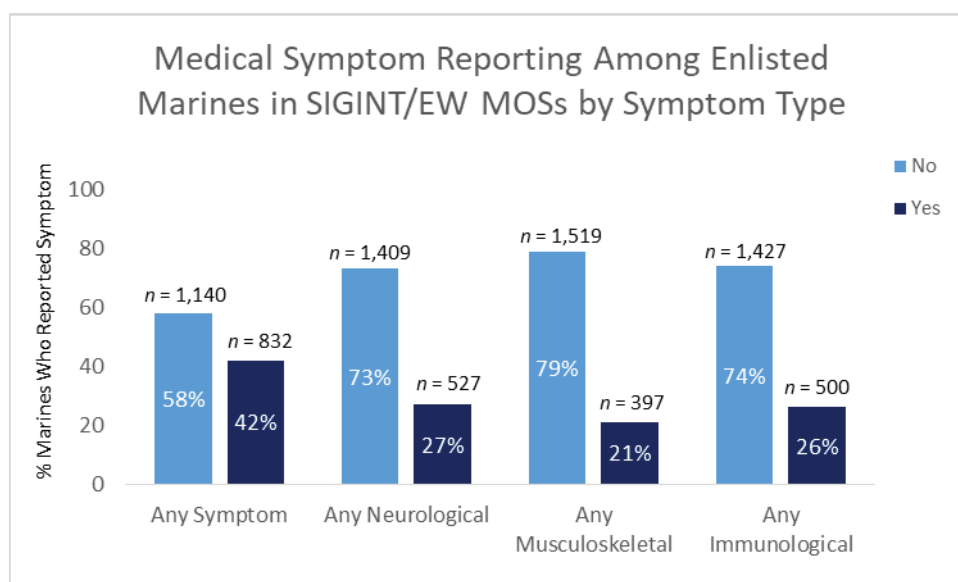


Figure 36.4

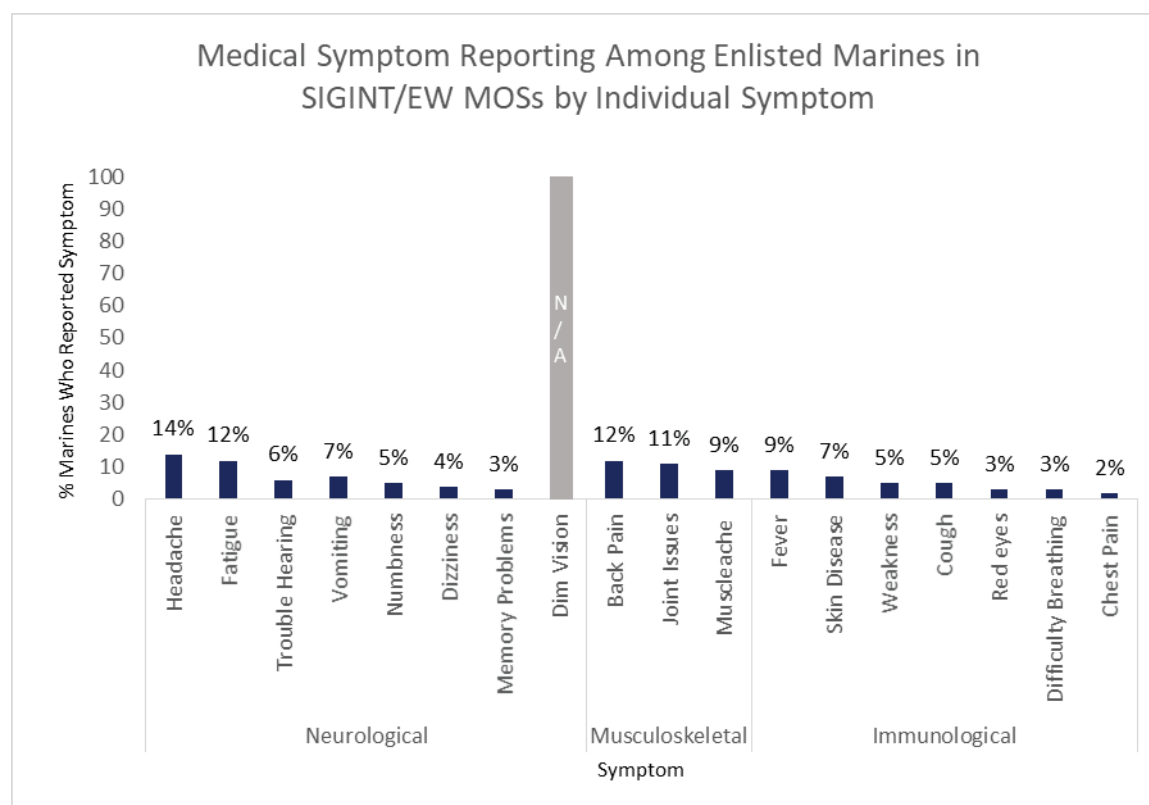


Figure 36.5

Supply (*n* = 5,044)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Supply occupations within Occupational Field 30:

The Supply Administration and Operations OccFld includes personnel in the areas of ground supply administration and operations, warehousing, preservation and packaging, hazardous materials storage operations handling, fiscal accounting and purchasing, and contracting procedures pursuant to the Federal Acquisition Regulations. Duties involve administrative procedures, familiarization with all state, Federal, and Department of Defense regulations, and the use of material handling equipment in the movement and storage of supplies and equipment. In all MOSs within the OccFld, technical skills are required regarding military and commercial specifications on supplies and equipment being procured, stored, and maintained. These skills and duties must be performed in garrison, contingency and combat environs. These Marines are required to have an operational understanding of various multimedia, data scanning, and retrieval devices; office and warehouse management procedures; automated information services data entry and external systems interface procedures; asset accounting functions; financial budget formulation; management and analysis; and the proper handling, storage, and disposal of hazardous material. Formal schooling is provided to Marines entering the OccFld. Types of entry-level jobs include work as automated information services supply stock control clerk (retail and wholesale), warehouse clerk, packaging specialist, fiscal clerk, contract specialist and personal computer operator (p. 670).

Examples of Self-Reported Supply MOSs

The five most frequent Supply military occupational specialties during deployment that were self-reported on the PDHA were 3043 (*n* = 2,475), 3051 (*n* = 2,042), 3052 (*n* = 216), 3044 (*n* = 55), and 3011 (*n* = 42).

Results

Active duty enlisted Marines working in Supply MOSs during deployment infrequently reported blast exposure (4%; Figure 37.1). When exposed to a qualifying event that could prompt a concussion, 20% screened positive (Figure 37.2). Impact-associated concussions occurred often (14%), but blast-associated concussions were rare (*n* ≤ 30; Figure 37.3). Of Marines working in Supply MOSs, 47% reported experiencing at least one symptom during deployment, with 31%, 28%, and 29% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 37.4). Headache was the most commonly reported symptom in this MOS category (18%), followed by back pain (18%), fatigue (16%), muscle ache (15%), and joint issues (14%). The remaining symptoms were reported by fewer than 10% of Marines working in Supply MOSs (Figure 37.5).

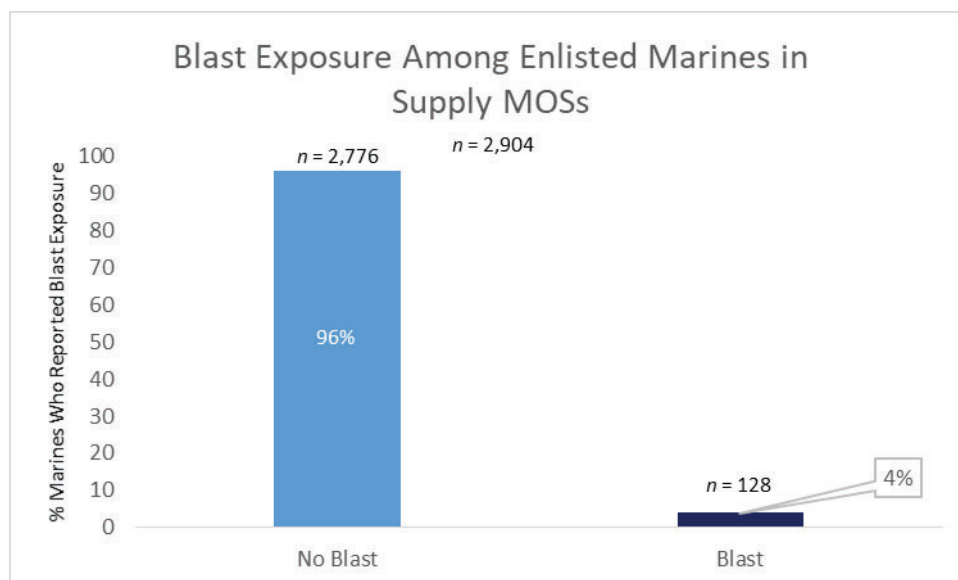


Figure 37.1

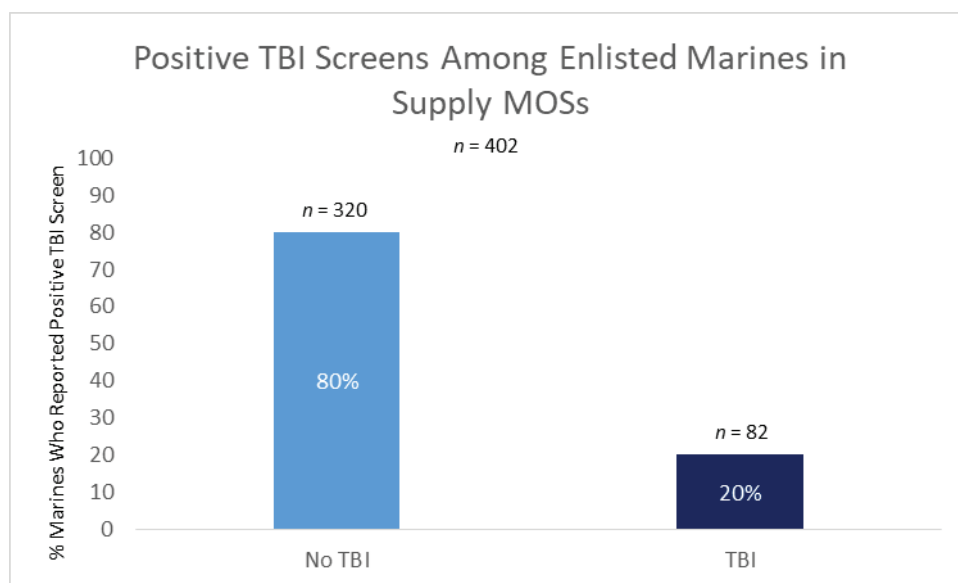


Figure 37.2

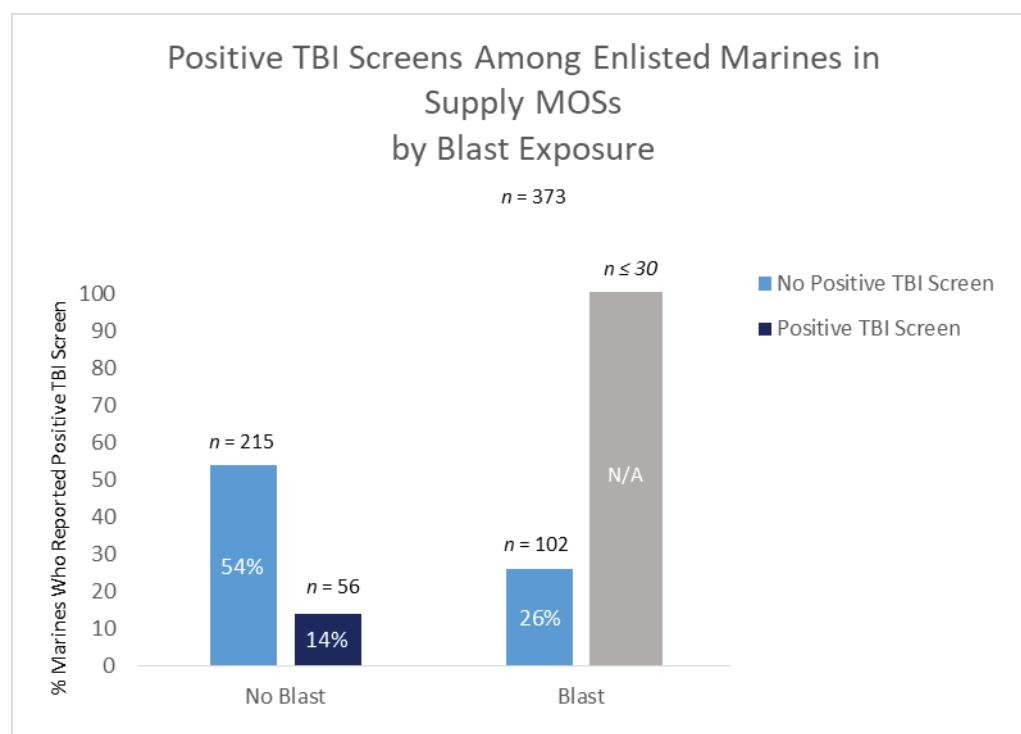


Figure 37.3

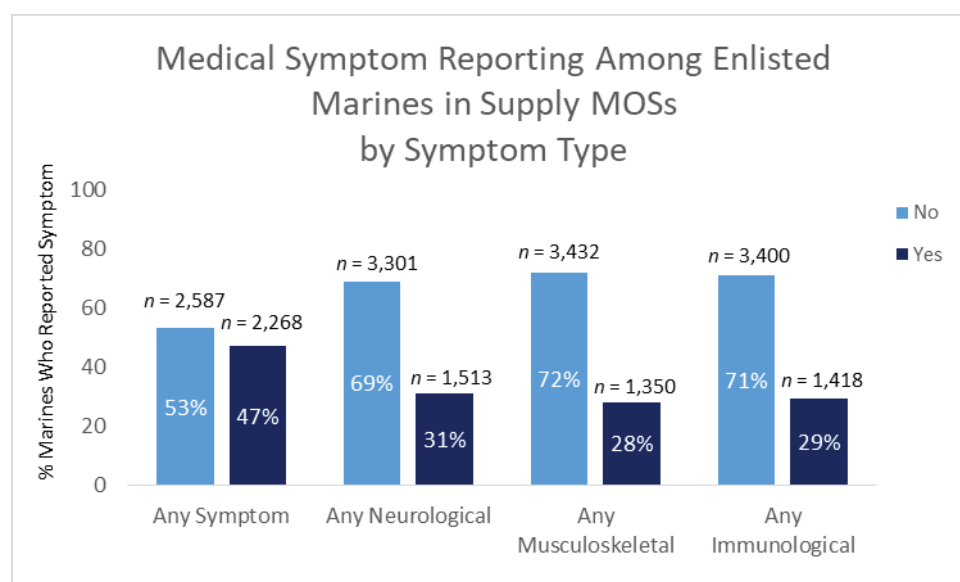


Figure 37.4

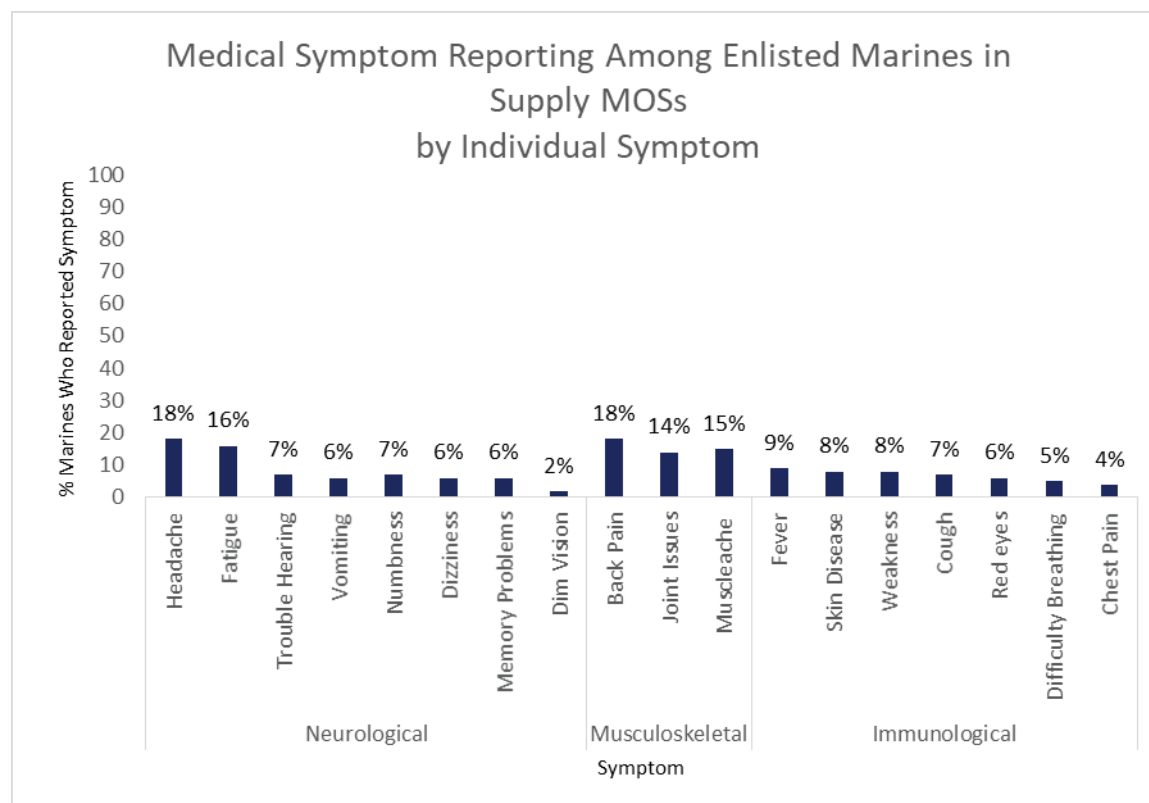


Figure 37.5

Tank and Assault Amphibious Vehicle (TAAV; $n = 2,455$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of TAAV occupations within Occupational Field 18:

The Tank and Assault Amphibious Vehicle OccFld includes operation, employment, maneuver, and maintenance of tracked vehicles in the combined arms environment during both amphibious assaults and subsequent land operations ashore. Qualifications required include basic mechanical aptitude and the ability to perform harmoniously with others in the confined area inside combat vehicles. The duties involved are incident to the operation, employment, maneuver, and maintenance of tanks and assault amphibious vehicles. Formal schooling is provided to Marines at both the entry level and at the appropriate time in career development. Marines entering this OccFld receive MOS 1800, Basic Tank and Assault Amphibious Vehicle Crewman. After entry into OccFld 18 and assignment of a basic 1800 MOS, personnel specialize in either the M1A1 tank or the assault amphibious vehicle are assigned MOS 1812, or 1833 respectively (p. 507).

Examples of Self-Reported TAAV MOSs

The five most frequent TAAV military occupational specialties during deployment that were self-reported on the PDHA were 1833 ($n = 1,810$), 1812 ($n = 610$), 1812/Tankcrewman ($n = 6$), Tank Crewman ($n = 3$), and AAV ($n = 2$).

Results

Active duty enlisted Marines working in TAAV MOSs during deployment often reported blast exposure (12%; Figure 38.1). When exposed to a qualifying event that could prompt a concussion, more than one third (36%) screened positive (Figure 38.2). Impact-associated concussions occurred often (11%), while blast-associated concussions occurred frequently (25%; Figure 38.3). Of Marines working in TAAV MOSs, 46% reported experiencing at least one symptom during deployment, with 33%, 30%, and 24% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 38.4). Back pain was the most commonly reported symptom in this MOS category (21%), followed by joint issues (18%), headache (17%), fatigue (17%), muscle ache (16%), ringing in the ears (15%), and skin disease (10%). The remaining symptoms were reported by fewer than 10% of Marines working in TAAV MOSs (Figure 38.5).

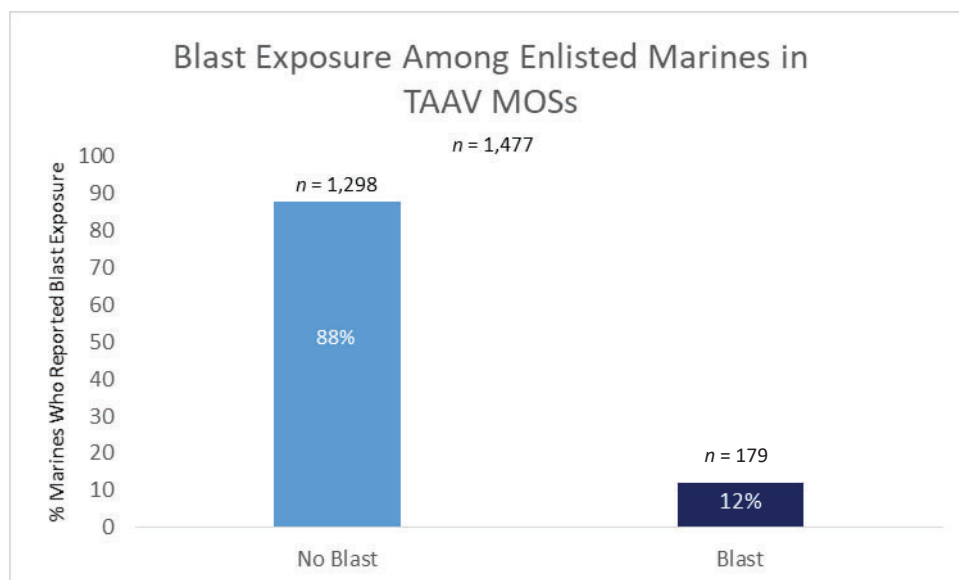


Figure 38.1

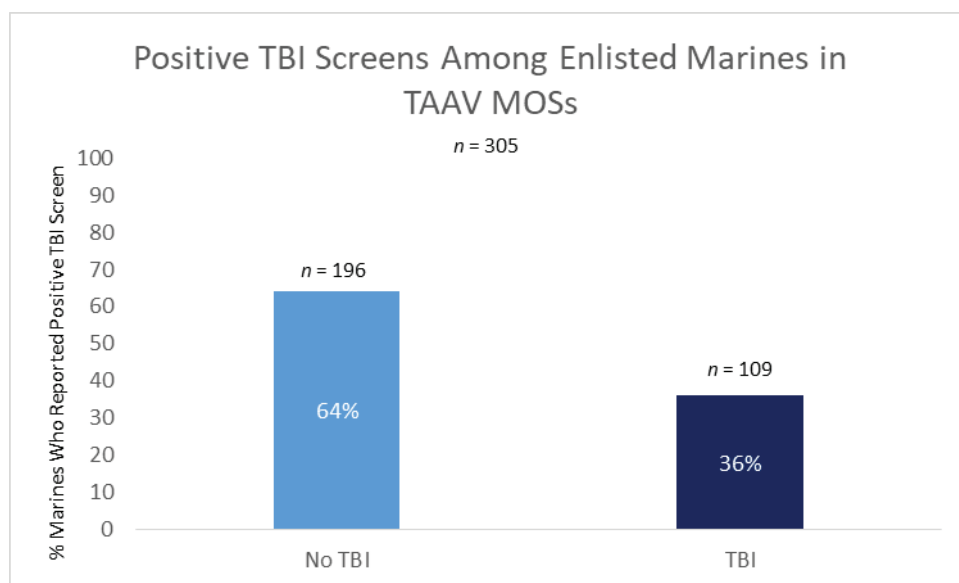


Figure 38.2

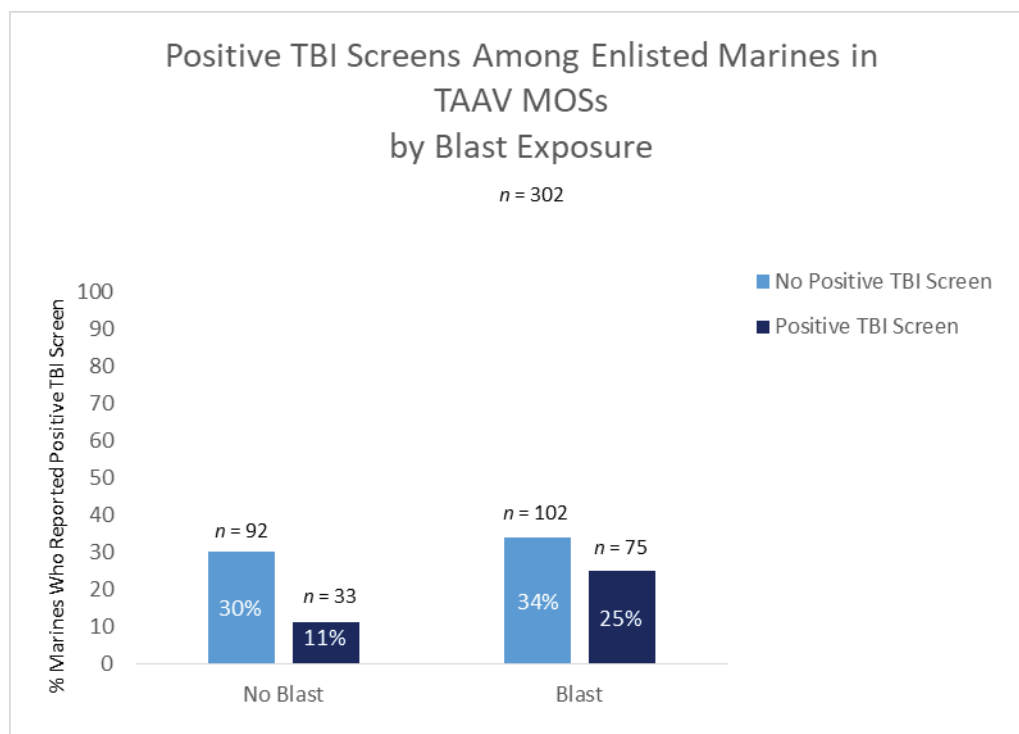


Figure 38.3

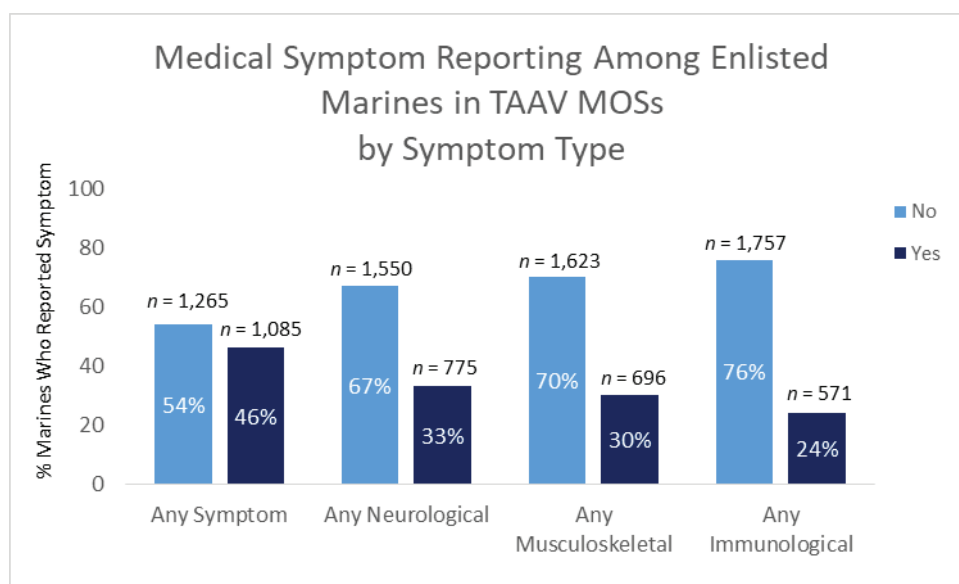


Figure 38.4

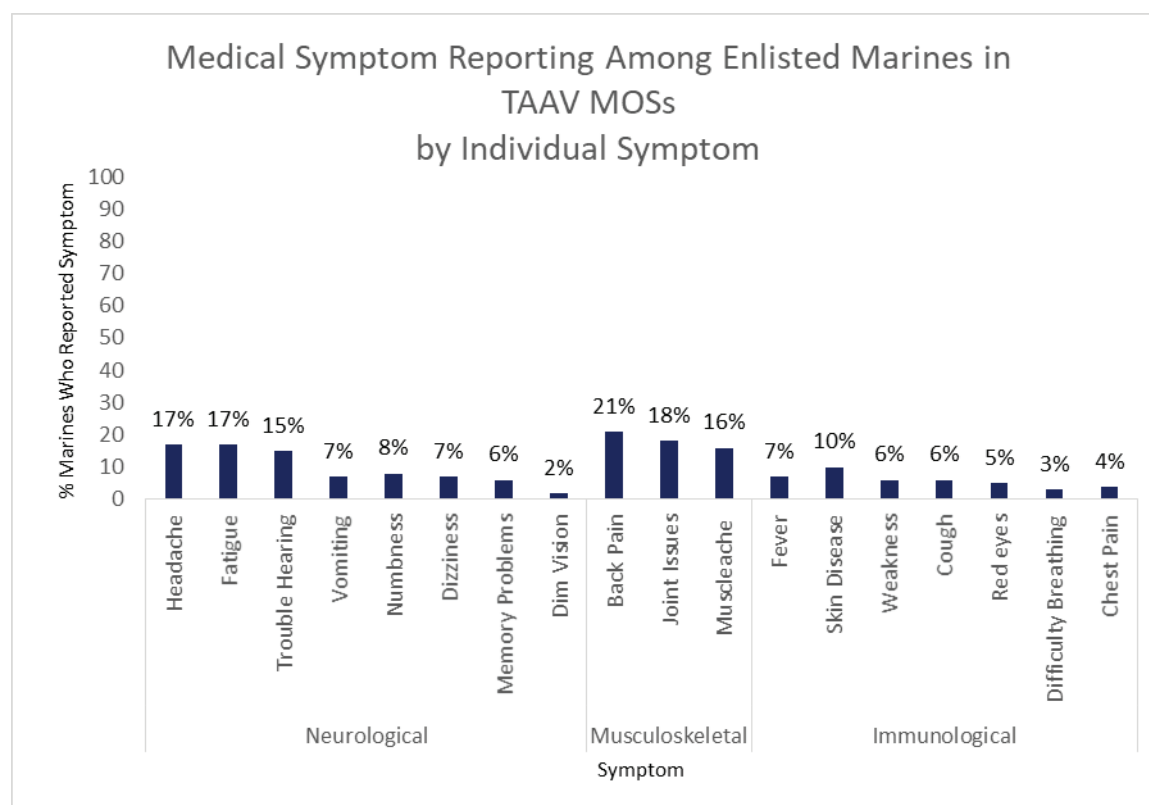


Figure 38.5

Training ($n = 17$)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Training occupations within Occupational Field 09:

Occupational Field 09, Training, comprises MOSs used to identify Marines who possess skill sets to conduct vital training, particularly to entry-level Marines, as required by various high visibility Marine Corps programs. First exposure to Marine Corps training is provided by the Drill Instructor. Next contact is with the marksmanship coaches and instructors overseen by a Range Officer, Swim Instructors, Martial Arts Instructors, and then Marine Combat Instructors. In the operating forces, training continues with the addition of Small Weapons Instructors and Martial Arts Instructor-Trainers. These MOSs are sponsored by the Training and Education Command (p. 470).

Examples of Self-Reported Training MOSs

The five most frequent Training military occupational specialties during deployment that were self-reported on the PDHA were 0931 ($n = 4$), Trainer ($n = 3$), 0916 ($n = 2$), Marine Corps Martial Arts Instructor ($n = 1$), and Training NCO ($n = 1$).

Results

Due to an incredibly small sample size ($n = 17$), we are unable to report data for active duty enlisted Marines in deployment-related Training occupations (Figures 39.1–39.5).

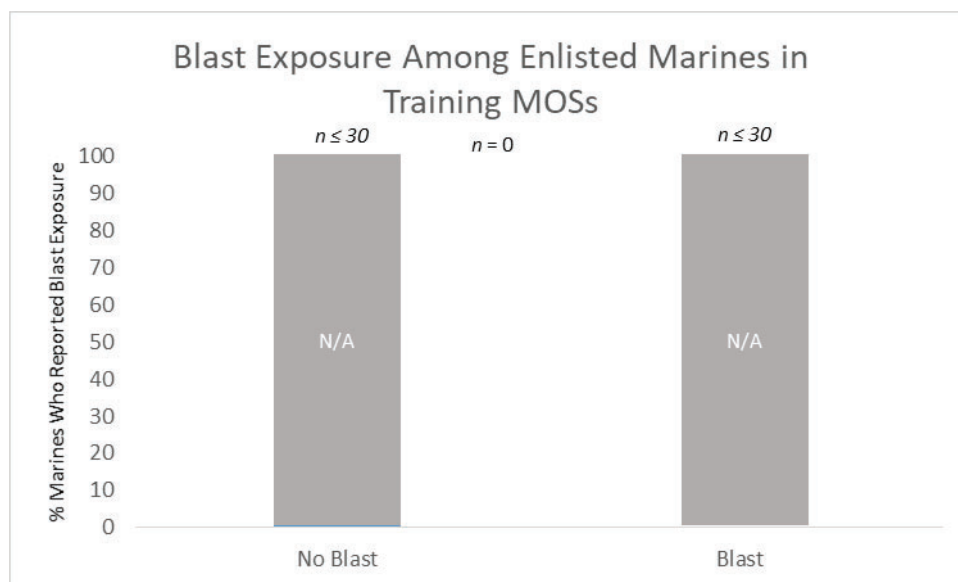


Figure 39.1

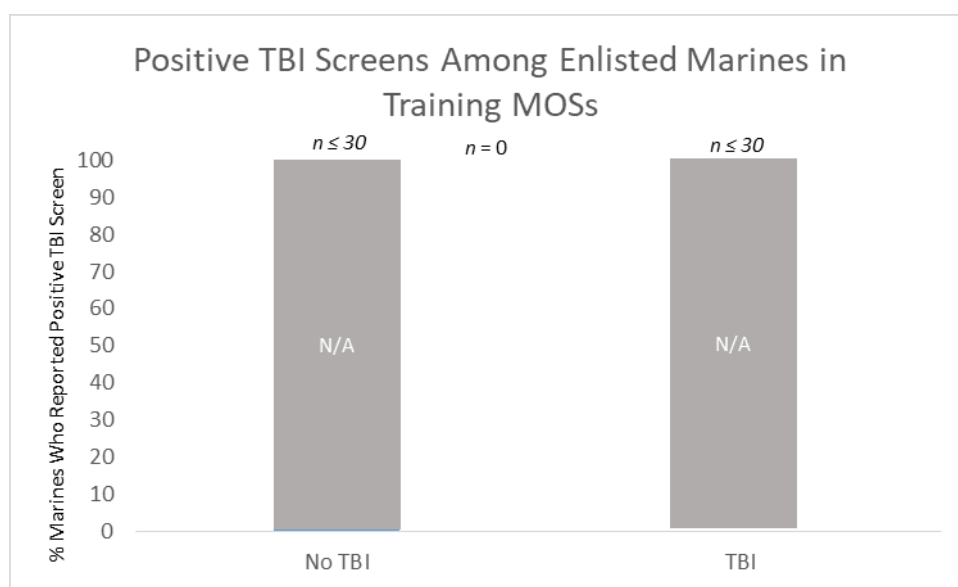


Figure 39.2

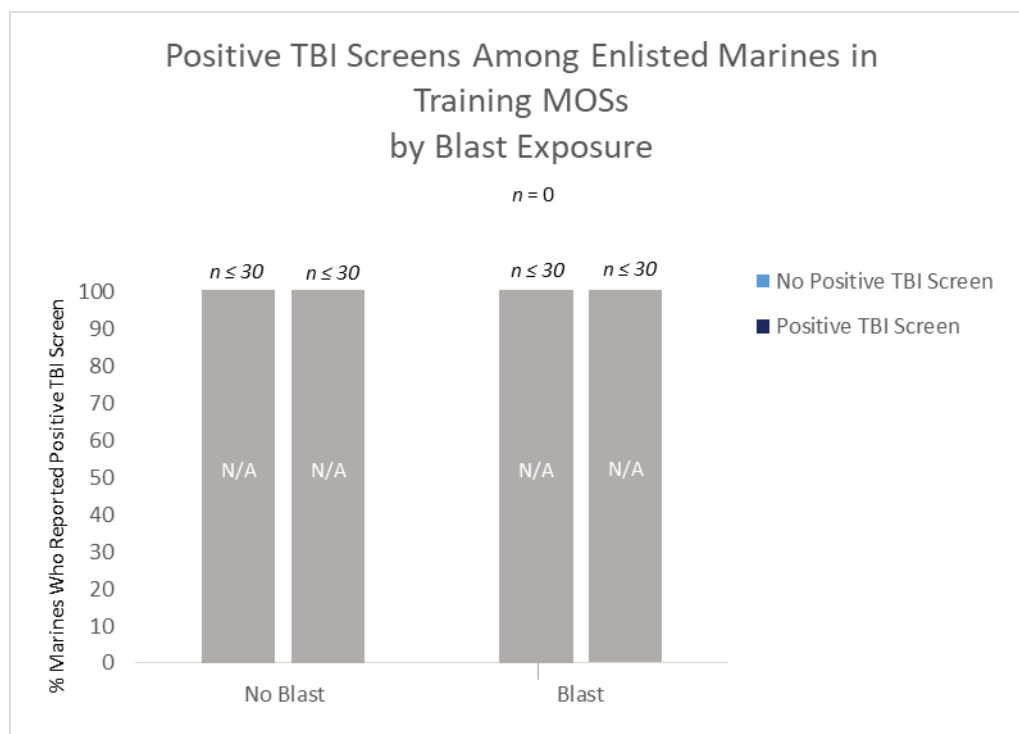


Figure 39.3

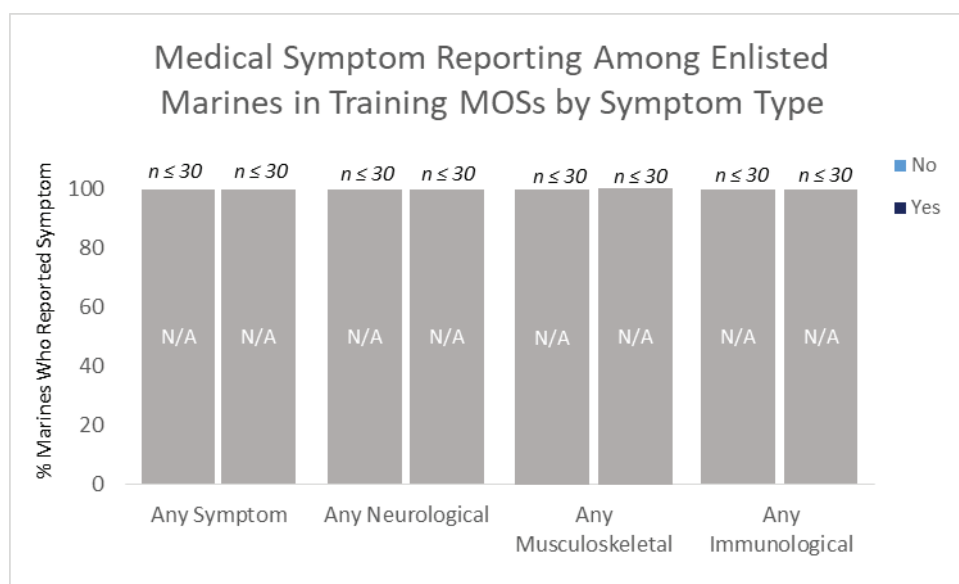


Figure 39.4

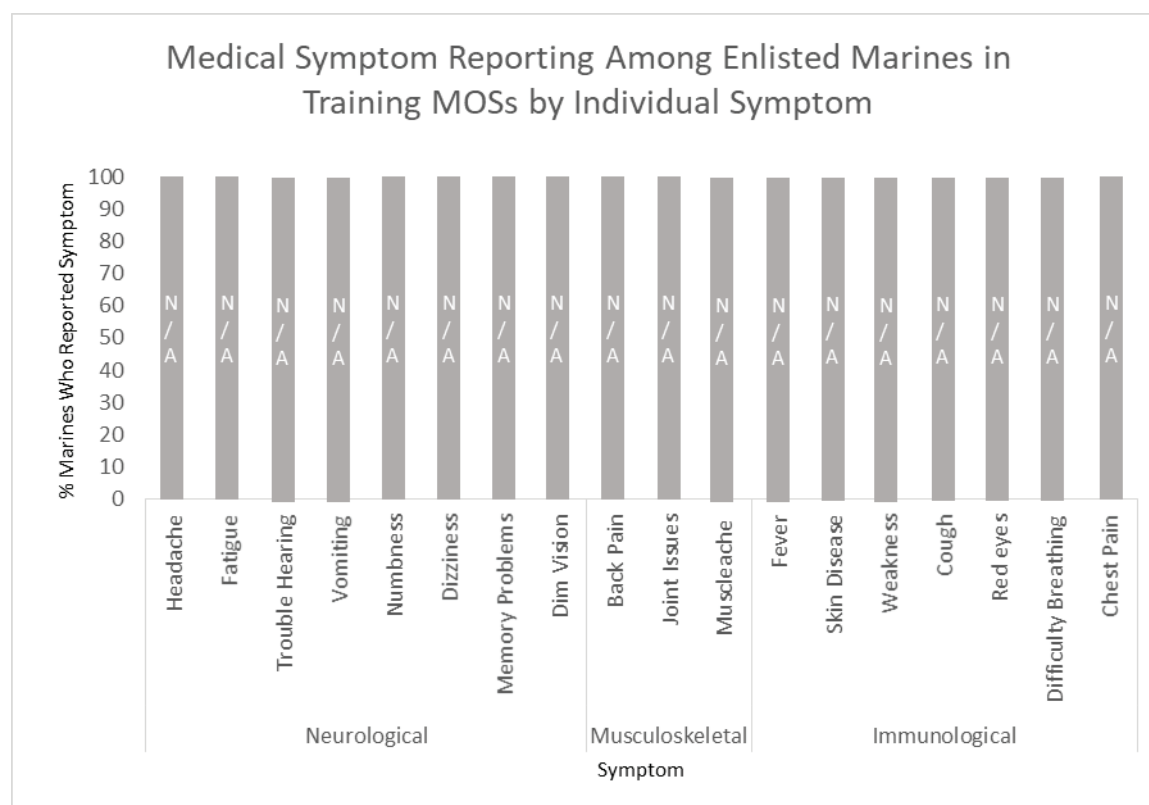


Figure 39.5

Unknown (*n* = 1,100)

Occupational Requirements

In this category, occupations were coded as “unknown” if our team of coders was unable to identify the corresponding rate based on what the Marine wrote on the PDHA. The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) does not include an overall summary of Unknown occupations.

Examples of Self-Reported Unknown MOSs

The five most frequent Unknown military occupational specialties during deployment that were self-reported on the PDHA were 4821 (*n* = 108), Security (*n* = 91), TFMP (*n* = 16), 990 (*n* = 12), and Gunner (*n* = 11).

Results

Among active duty enlisted Marines working in Unknown MOSs during deployment, blast exposure and positive concussion screens were rare (*n* ≤ 30; Figures 40.1–40.3). Of Marines working in Unknown MOSs, 56% reported experiencing at least one symptom during deployment, with 41%, 35%, and 40% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 40.4). Headache was the most commonly reported symptom in this MOS category (27%), followed by back pain (26%), fatigue (23%), muscle ache (22%), joint issues (17%), ringing in the ears (12%), fever (12%), numbness (11%), skin disease (11%), weakness (11%), and cough (11%). The remaining symptoms were reported by fewer than 10% of Marines working in Unknown MOSs (Figure 40.5).

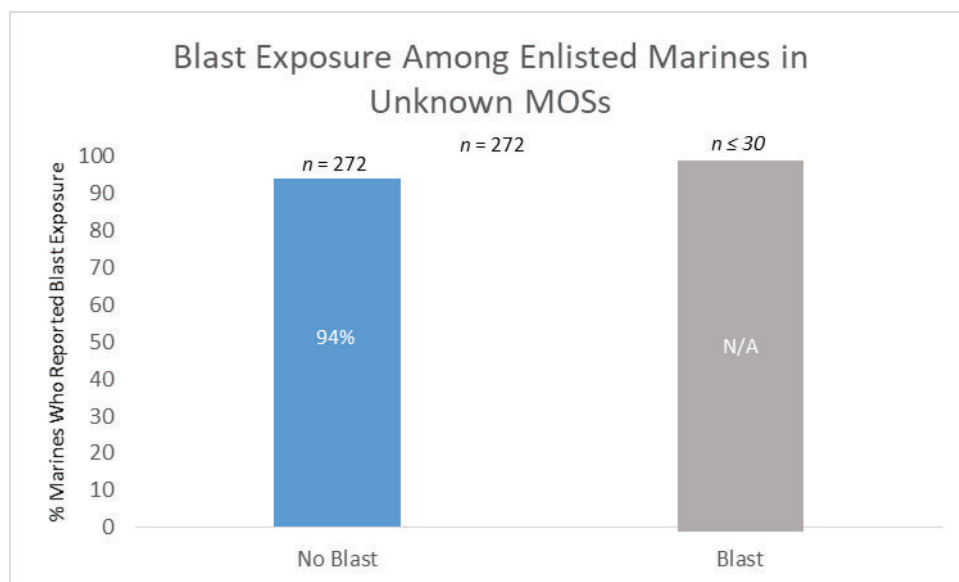


Figure 40.1

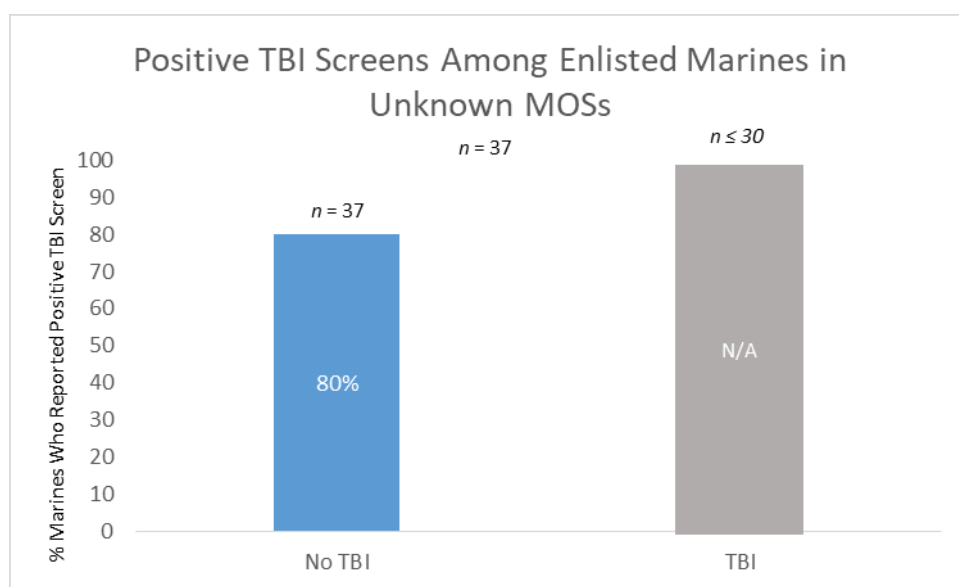


Figure 40.2

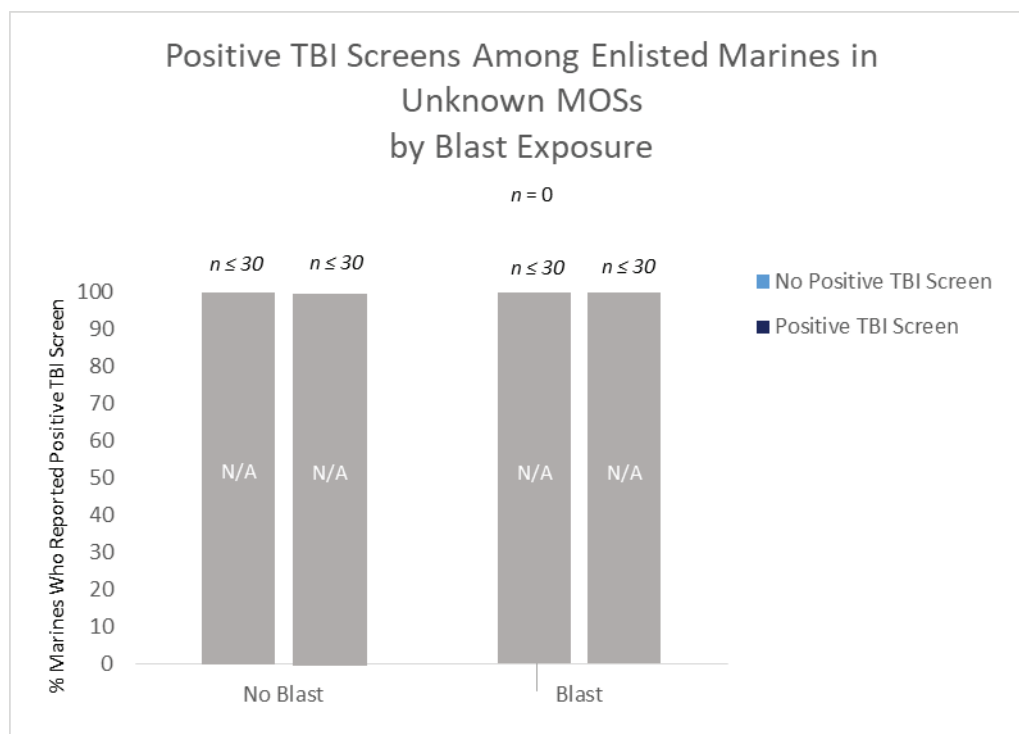


Figure 40.3

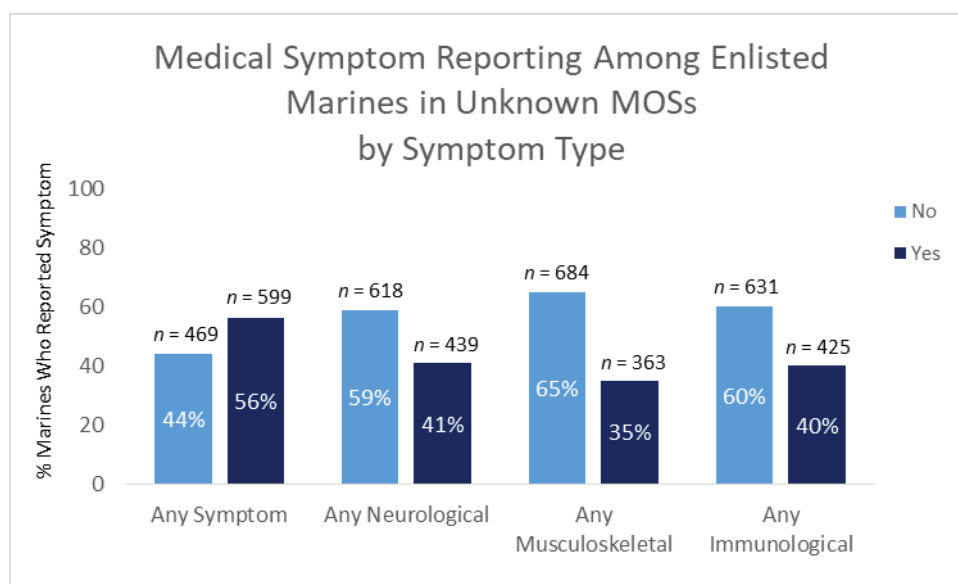


Figure 40.4

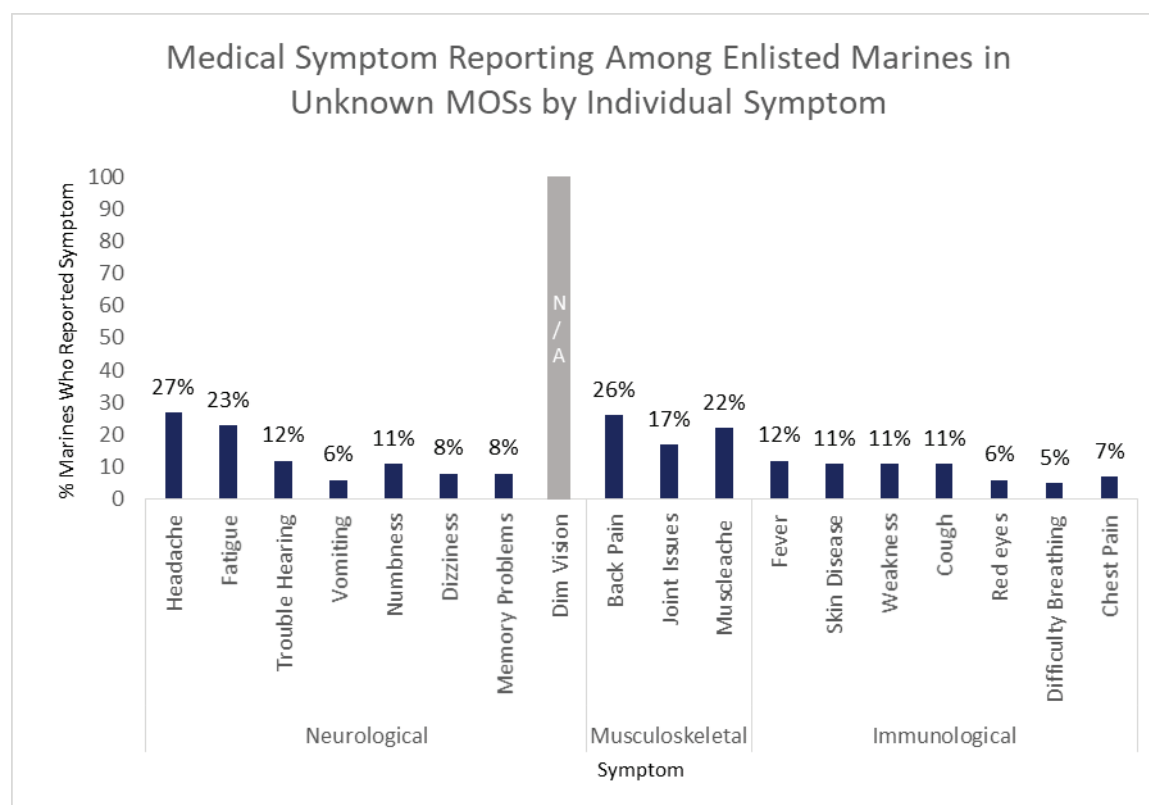


Figure 40.5

Utilities (*n* = 2,881)

Occupational Requirements

The Marine Corps Military Occupational Specialties Manual (NAVMC 1200.1A CH 1) provides the following summary of Utilities occupations within Occupational Field 11:

A utility is a provided service such as water, light, power environmental control and refrigeration. The Utilities OccFld is responsible for planning and providing strategic and tactical utilities support to all levels of all elements of the various MAGTFs, to include posts and stations, in any climate or place. This functional support includes planning establishment, operation, maintenance, and repair of electric power generation sites along with the inherent underground, above ground overhead and tactical electric power distribution systems; water purification, storage and distribution sites; shower and laundry facilities; and heating, ventilation, air conditioning and refrigeration sites. In addition to maintaining and repairing their own equipment at the organizational and intermediate levels, Marines in this OccFld troubleshoot and repair water pumps on equipment used by other OccFlds; the air conditioning systems on all ground equipment; and the electrical systems on engineer and general supply equipment. Cantonment is supported with field sanitation, sewage, and waste disposal; and Humanitarian Assistance and Civil Military Operations are supported with plumbing, HVAC, and interior wiring installation and repair (p. 478).

Examples of Self-Reported Utilities MOSs

The five most frequent Utilities military occupational specialties during deployment that were self-reported on the PDHA were 1142 (*n* = 893), 1141 (*n* = 693), 1171 (*n* = 635), 1161 (*n* = 394), and 1169 (*n* = 132).

Results

Active duty enlisted Marines working in Utilities MOSs during deployment infrequently reported blast exposure (7%; Figure 41.1). When exposed to a qualifying event that could prompt a concussion, 22% screened positive for concussion (Figure 41.2), though impact-associated and blast-associated concussions were rare ($n \leq 30$; Figure 41.3). Of Marines in Utilities MOSs, 47% reported experiencing at least one symptom during deployment, with 32%, 28%, and 30% reporting neurological, musculoskeletal, and immunological symptoms, respectively (Figure 41.4). Back pain was the most commonly reported symptom in this MOS category (18%), followed by headache (18%), fatigue (17%), joint issues (15%), muscle ache (15%), and ringing in the ears (10%). The remaining symptoms were reported by fewer than 10% of Marines working in Utilities MOSs (Figure 41.5).

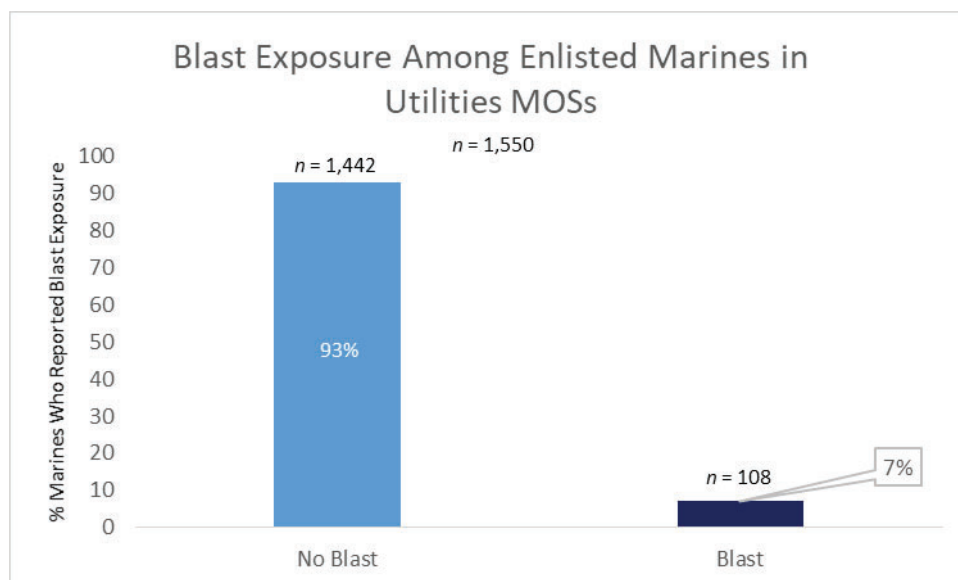


Figure 41.1

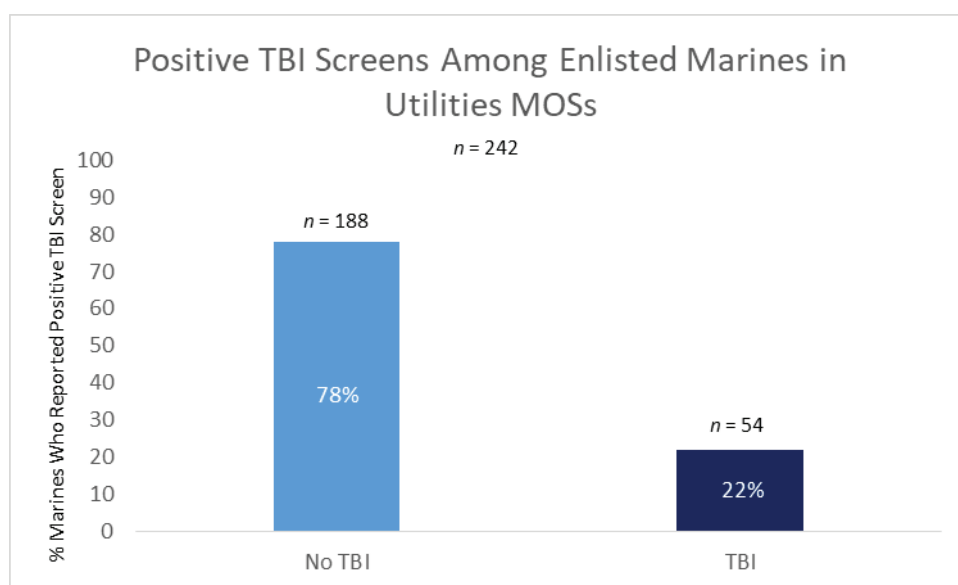


Figure 41.2

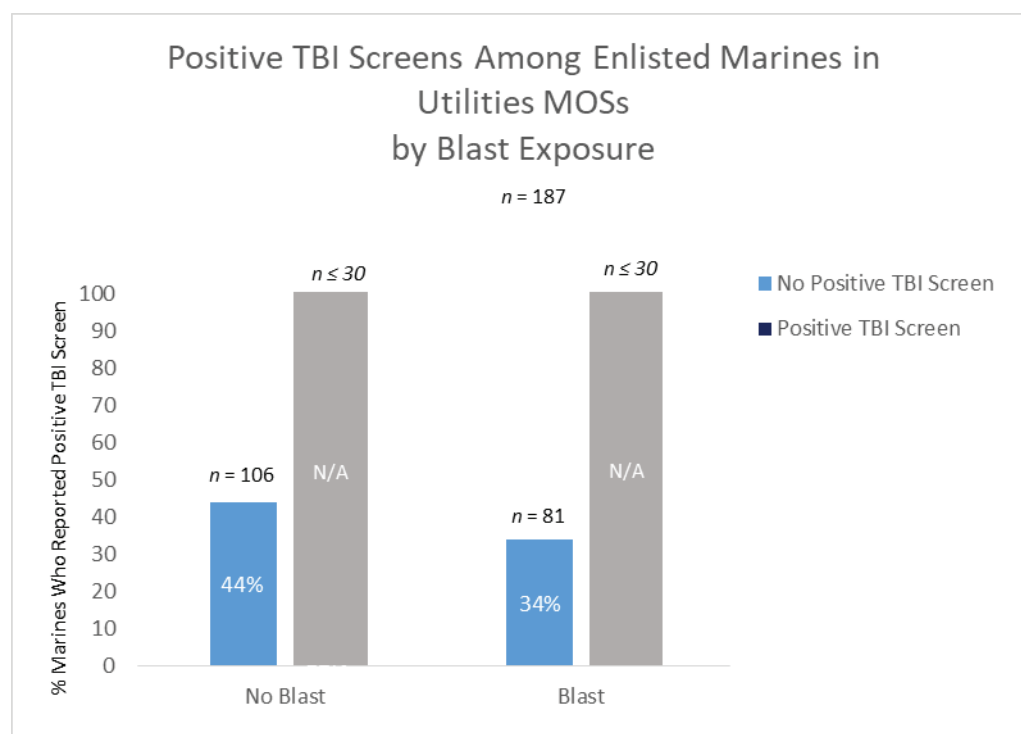


Figure 41.3

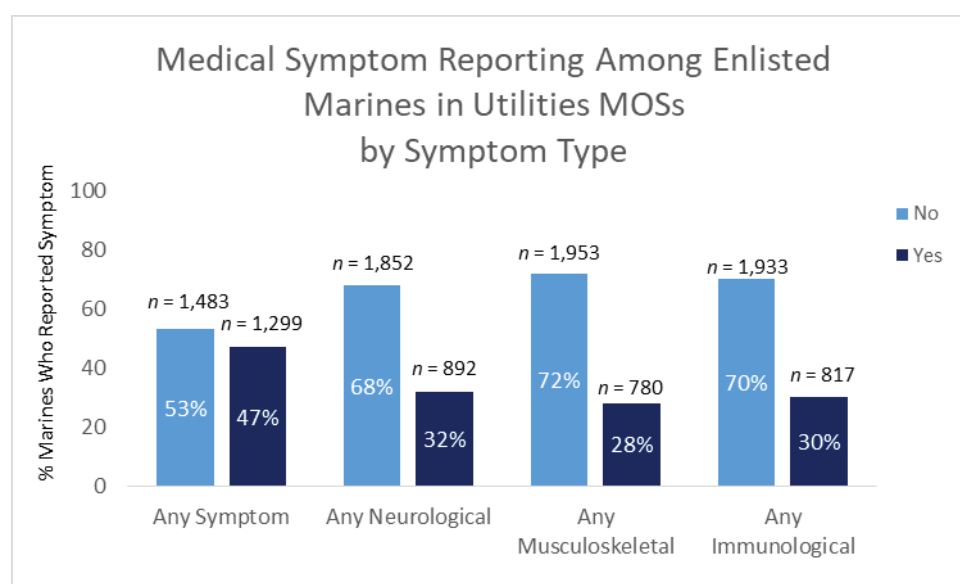


Figure 41.4

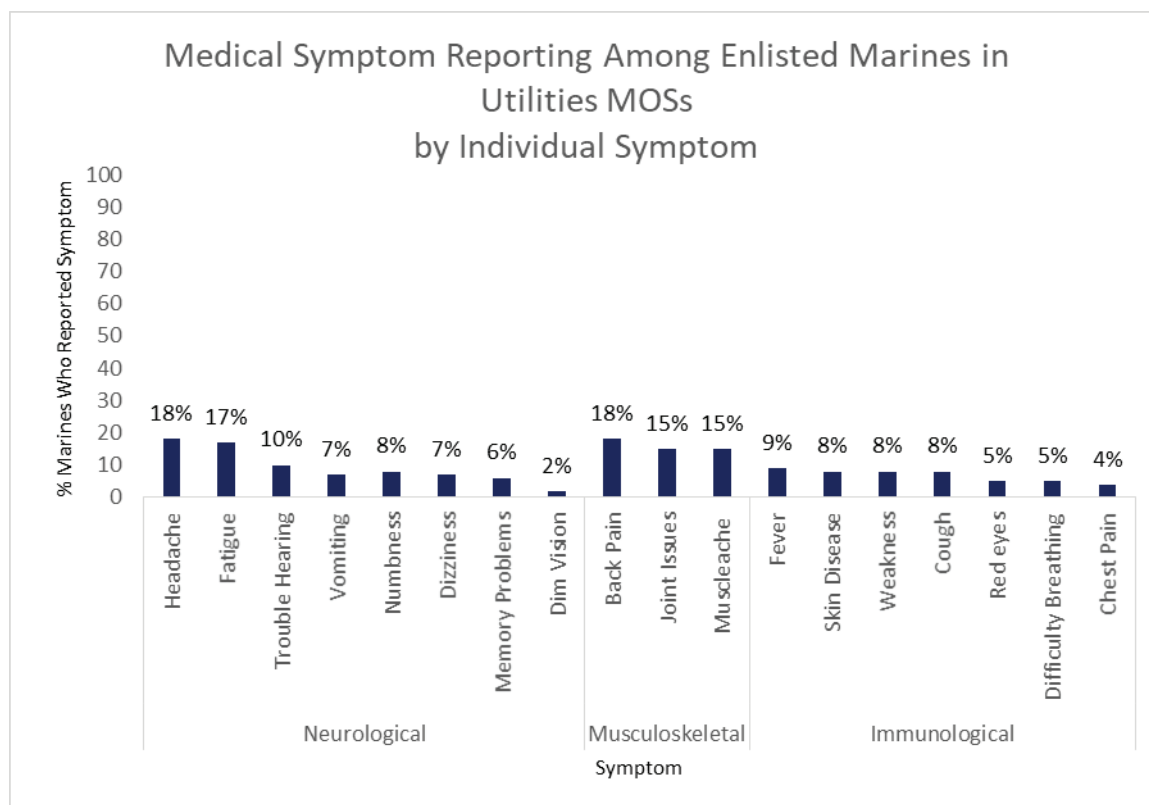


Figure 41.5

REPORT DOCUMENTATION PAGE					<i>Form Approved</i> OMB No. 0704-0188	
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14. ABSTRACT Executive Summary Since the beginning of the Global War on Terror in 2001, more than 2 million service members have deployed. Traumatic brain injury (TBI) has been labeled the signature injury of recent conflicts and poses a significant burden on the Military Health System (MHS). Although TBIs have various etiologies, deployment-related TBIs are often caused by exposure to overpressure from explosive blasts such as those caused by improvised explosive devices (IEDs) and rocket-propelled grenades (RPGs). Because of the threat posed by both blast overpressure exposure and subsequent TBIs, developing a thorough understanding of risk factors for injury is of paramount importance. One important yet understudied risk factor that may be associated with the likelihood of being exposed to a blast, sustaining a TBI, and experiencing TBI-related symptoms is one's Military Occupational Specialty (MOS). The purpose of this technical report is to provide a comprehensive overview of deployment exposures and self-reported symptomatology reported by active duty enlisted Marines on the Post-Deployment Health Assessment (PDHA), particularly as they relate to blast exposure and TBI. Based on analyses of 181,423 active duty enlisted Marines who completed the PDHA between 2005 and 2012, this report provides a comprehensive summary of: (1) the number of Marines exposed to potentially TBI-inducing events, (2) probable concussions sustained during deployment as a function of both exposures and MOS, and (3) the symptoms Marines reported experiencing during their deployment. Results are presented for all Marines together as well as for each MOS individually. Approximately 21% of respondents experienced at least once qualifying event that may have put them at risk for a TBI during deployment. Blast exposure was most common (12.33%), followed by falls (7.72%), "other" events (5.19%), motor vehicle crashes (3.14%), and bullet or fragment wounds above the shoulders (0.30%). Of Marines with a qualifying exposure, approximately 26% sustained a probable concussion, nearly two thirds of which were associated with blast. Furthermore, blast-associated concussions occurred most frequently among Marines working in tank and amphibian assault vehicles; infantry; engineer, construction, facilities, and equipment; military police; and motor transportation MOSs. In contrast, impact-associated concussions (e.g., due to motor vehicle crashes, falls, bullet/fragment wounds above the shoulders) occurred most frequently among Marines working in supply, logistics, administration, avionics, and motor transportation MOSs. Nearly half of respondents (45.50%) reported experiencing at least one symptom during deployment. In general, 10-20% of active duty enlisted Marines reported back pain, headaches, fatigue, joint pain, muscle aches, and/or ringing in the ears; fewer than 10% of Marines reported fevers, vomiting, skin diseases, numbness, weakness, cough, dizziness, memory issues, red eyes, difficulty breathing, chest pain, or dim vision during deployment. This report is the first of its kind in that it provides a population-level overview of deployment exposures, concussion screens, and self-reported symptomatology for each individual Marine Corps MOS. Along with findings reported elsewhere (Belding et al., in press; Belding et al., under review; Englert et al., in preparation), results from this research suggest that exposure to overpressure presents a threat to warfighter health and wellbeing; results further suggest that such effects are likely to be magnified when warfighters are exposed to both chronic, low-level overpressure (e.g., from firing heavy caliber weapons in training) and acute, high-level overpressure (e.g., such as that generated by IEDs during deployment). Drawing on these findings, we offer several recommendations for policy, clinical practice, and future research.						
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