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Epidemiology and Disease Surveillance Portfolio
Injury Prevention Program

Survey of Injuries and Injury Risk Factors in the 2nd Brigade Combat
Team, 3rd Infantry Division, November 2014 – January 2015

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Survey of Injuries and Injury Risk Factors in the 2nd Brigade Combat Team, 3rd
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1 Summary

1.1 Purpose

The original goals of this project were to: (1) develop an evidence-based injury prevention program using a mixed methods approach that gathered input from brigade and battalion Commanders, other unit leaders, and Soldiers to be used in the program design and (2) implement the program in two infantry battalions, and (3) evaluate the effects of the program on injuries, physical fitness, physical training activities, and leadership support.

Due to multiple field deployments in the 2nd Brigade, the timing of project elements was delayed and ultimately the injury prevention program could not be completed as planned. Therefore, the revised focus was to assess injuries and potential injury risk factors, a potential barrier to unit readiness, in order to guide future injury prevention strategies in the 2nd Brigade.

1.2 Methods

The effort involved a partnership between the Fort Stewart Winn Army Community Hospital (Department of Rehabilitative Services and Department of Preventive Medicine), 3rd Infantry Division Division of Health Promotion, and the U.S. Army Public Health Center (APHC), formerly the U.S. Army Public Health Command (USAPHC) Injury Prevention Program. The APHC Injury Prevention Program, with its partners, developed an electronic survey that was administered to members of battalions 1-30BN and 3-15BN in the 2nd Infantry Brigade Combat Team, 3rd Infantry Division (2BCT, 3ID) (formerly the 4th Infantry Brigade Combat Team, 3ID). The survey collected information on injuries, Soldier physical fitness, unit and personal physical training programs, health behaviors, and perceptions of leadership and medical support related to injury. Survey responses were received for 50 days from November 2014 through January 2015, and a briefing of survey results was provided to Fort Stewart Preventive Medicine, Division health promotion, and Brigade physical therapy staff. Descriptive statistics were produced and potential risk factors for injury were analyzed using univariate and multivariable logistic regression. Review and approval for this project was obtained from the APHC Public Health Review Board (PHRB).

1.3 Results

A total of 831 members out of 1,395 Soldiers in 1-30BN and 3-15BN completed the survey (60 percent response rate). Almost all (99 percent) respondents were male, 64 percent were age 18 to 25, 67 percent held ranks of E1-E4, and 82 percent held Combat Arms occupations.

Ninety-three percent of respondents indicated that they attended unit physical training (PT); of those, 38 percent said that their unit PT was based on Traditional Army PT (running, push-ups, sit-ups) and thirty percent rated the unit PT as somewhat hard. On average, respondents from 3-15BN reported unit PT workouts of equal or greater frequency and for longer durations than respondents from 1-30BN. For unit PT, respondents reported distance running three times per week on average, and participation in sprint/interval training, calisthenics, agility drills, and resistance training twice per week. Road marching was reported an average of four times per month. For personal PT, respondents reported participation approximately twice per week for all activity types. Eighty-three percent of respondents reported participating in personal PT,

with 27 percent of them indicating that their personal PT program was based on Traditional Army PT. Thirty-five percent of them indicated that a goal of their personal PT program was to gain muscle mass. Again, respondents from 3-15BN reported average personal PT frequencies and durations that were equal to or greater than those reported by respondents from 1-30BN.

Thirty percent of respondents indicated current tobacco use, 29 percent indicated current smokeless tobacco use, and 11 percent indicated current e-cigarette or personal vaporizer use. Twenty-three percent indicated dietary supplement use, mostly vitamins (76 percent), citing the primary reason as promoting general health (73 percent).

When asked about leadership support related to injury prevention, 75 percent of respondents said that leadership encouraged safe PT, 76 percent indicated that leadership provided recommendations for reducing injuries at least occasionally, 67 percent indicated that leadership provided information about unit injuries at least occasionally, and 35 percent said they believe that their current unit has a higher than normal rate of injury. Sixty-three percent were aware of an Army Wellness Center (AWC) on their installation, and 43 percent were aware that their unit had an assigned Master Fitness Trainer.

Over one-third (37 percent, 310 respondents) reported having at least one injury in the 6 months prior to survey administration. Common injury types were sprains and strains (40 percent) and tears (15 percent). Frequently injured body parts were the knee (23 percent), lower back (17 percent), and ankle (12 percent). Leading mechanisms were overuse/repetitive activities (46 percent), single overexertion/twisting efforts (17 percent), and falls (16 percent). Leading activities associated with injury were running for physical training (27 percent), marching with a load (22 percent), and weightlifting for physical training (10 percent). Factors significantly associated with injuries among all respondents included age, rank, BMI, being a former smokeless tobacco user, frequency of reported injury status updates from leadership, and perception of unit injury rates.

Responses to leadership questions indicated that 75 percent agree or strongly agree that their PT leader strives to increase fitness while minimizing injuries; 41 percent disagree or strongly disagree that their unit has a higher than average injury rate; 76 percent agree or strongly agree that their PT leader describes common causes of injury and ways to reduce injury; and 67 percent report that their PT leader routinely or occasionally provides the status of unit injuries.

Risk factor analyses were further stratified by survey question topics: self-assessed fitness, unit PT practices, personal PT practices, and leadership evaluation.

1.4 Conclusions and Recommendations

Over one-third of 1-30BN and 3-15BN Soldiers reported having at least one injury in the 6 months prior to survey administration. Most injuries were to the lower extremities, the leading injury type was sprains and strains, the most frequently reported injury mechanism was overuse/repetitive activity, and the leading activity resulting in injury was running for physical training.

Exercises performed during unit and personal PT should be examined. For unit PT, the frequency of running, duration of agility drills, and frequency of sprint/interval training were associated with injury; for personal PT, weekly running mileage and the frequency of resistance training participation were associated with injury. An optimal cardiovascular training program would both increase aerobic capacity and minimize injury risk through a balance of aerobic endurance and

cross-training exercises. Weight loss programs may reduce excess body fat which may in turn decrease injury rates.

This is one of the first investigations to measure the effects of unit leadership on injuries. Results showed that certain leadership efforts, such as providing recommendations to reduce injury, were associated with injuries independent of other factors. Additional investigations are needed to further explore the role and effect of leadership on injury prevention.

Establishment of surveillance and/or routine review of Soldier injury, illness, and health behavior data is recommended for monitoring of physical training program effects and collection of data necessary to inform future injury prevention priorities and planning.

2 References

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

3 Authority

The authority for APHC involvement in the evaluation of the program is Army Regulation (AR) 40-5, paragraph 2-19a (Department of the Army (DA) 2007), which tasks the APHC to provide “support of Army preventive medicine activities through consultations, program evaluations...in the areas of disease and injury prevention and control...health surveillance and epidemiology...”

4 Background

At Fort Stewart, as in other Army populations, injuries are the leading cause of medical encounters leading to limited duty days and impacting the readiness of military units (APHC (Prov) 2016; Marshall et al. 2014; Patient Administration Systems and Biostatistics Activity 2016). While numerous investigations of injuries and injury risk factors have been conducted in the Basic Combat Training environment (Knapik et al. 2006), less is known about injuries and injury risk factors in operational units.

As noted by Jones et al. (2010), a systematic approach to reducing injuries in military populations begins with a review of surveillance data and investigation of risk factors and causes of injury. Survey data provide a summary of factors that affect or are associated with injury that is not available in medical records or administrative data, such as unit and personal physical activities and causes of injuries.

This survey was phase 1 of a larger injury prevention program project, in which the goals included:

- Developing an evidence-based injury prevention program using a mixed methods approach that gathered input from 2nd Brigade and Battalion Commanders, other unit leaders, and Soldiers to be used in the program design;
- Implementing the program in two infantry battalions of 2nd Brigade; and
- Evaluating the effects of the program on injuries, physical fitness, physical training activities, and leadership support.

Due to multiple deployments of the 2nd Brigade, the timing of project elements was delayed and ultimately the injury prevention program could not be completed as planned. Therefore, the revised

focus was to assess injuries and potential injury risk factors, a barrier to unit readiness, in order to guide future injury prevention strategies in the 2nd Brigade.

5 Methods

5.1 Survey Design and Administration

The APHC Injury Prevention Program designed the survey with input from and review by project team members from the Fort Stewart Medical Department Activity (MEDDAC). Survey questions captured information on injury risk factors, injuries, and knowledge and behaviors, such as leadership support that were the intended targets of the injury prevention program.

The APHC entered survey questions into the Verint[®] Systems Enterprise Edition survey software tool, which generated a link to the survey. MEDDAC project team members worked with 2nd Brigade, 3ID staff to distribute the survey link by email to Soldiers in 1-30 BN and 3-15 BN on 24 November 2014. The survey remained open for responses until 19 February 2015, but the last response was received on 12 January 2015. Therefore, responses were collected for a total of 50 days. The survey is included in Appendix B.

5.2 Human Protections Review

Prior to the administration of the survey, the APHC PHRB reviewed and approved this project as public health practice (PHRB Project No. 14-312).

5.3 Data Collection and Analysis

5.3.1 Data Collection

The survey collected the following information:

- Demographics: gender, age, rank, component, occupation, battalion, and company
- Personal characteristics: height and weight (to calculate body mass index (BMI)), occupation, battalion, and company
- Self-assessed fitness: endurance, sprint speed, strength, flexibility, body fat
- Most recent Army Physical Fitness Test (APFT) performance: push-up repetitions, sit-up repetitions, and 2-mile run time
- Activities related to unit PT in the last 6 months
- Activities related to personal PT in the last 6 months
- Occupational demands for lifting and aerobic activities
- Health behaviors: tobacco use, dietary supplement use
- Unit leadership support
- Recent injuries: types of injury, associated activities and mechanisms, and number of limited duty days for respondents' two most physically limiting injuries in the past 6 months

Injury was defined as a physical injury caused either by (1) a single incident or accident (examples include tripping and twisting ankle while marching, falling from a ladder, getting hit by/bumping into an object, injuries due to heat or cold, or injuries resulting from an automobile crash) or by (2) overuse of a body area (examples include running long distances or repeatedly

lifting/pulling/moving objects for job tasks or physical training) that resulted in physical damage to the body and limited physical abilities. The APFT includes push-up, sit-up, and 2-mile run time events and is completed bi-annually according to Army regulations (Field Manual 7-22, Army Physical Readiness Training (DA 2012)).

Population data for 3-15BN was obtained from 2nd Brigade staff in September 2014, and for 1-30BN in July 2015. For both 1-30BN and 3-15BN, unit strength values were provided for each company. The population data was used to quantify the total population of Soldiers in the battalions of interest and to provide company-specific results.

5.3.2 Data Analysis

Data were exported from the survey software and analyzed with the Statistical Program for Social Sciences (SPSS[®]), Version 19.0. Data were cleaned in SPSS, which involved removing entries that had been misclassified as injuries from the analysis and re-categorizing “Other” write-in responses into appropriate response groupings, as needed. Descriptive statistics of survey responses were calculated for demographics, personal characteristics, physical fitness and occupational demands, leadership and medical support, health behaviors, and injury history.

After the survey was administered, age and rank were grouped into accepted categories (≤ 25 , 26-34, ≥ 35 ; E1-E4, E5-E9, O1-O5) and occupations were grouped as Combat Arms, Combat Services, or Combat Services Support. BMI has been established as an effective measure of body fatness on a population basis (Deurenberg et al. 1991). For this analysis, each respondent’s BMI was calculated from self-reported height and weight data, and categorized according to the Centers for Disease Control and Prevention (CDC) (2015) classifications for underweight (BMI < 18.5), normal (18.5-24.9), overweight (25.0-29.9), and obese (≥ 30). The “overweight” category was further split into “low overweight” and “high overweight” categories with cut points consistent with the highest allowable BMI for male Army Soldiers (27.5), according to AR 600-9, The Army Body Composition Program (DA 2013).

Current cigarette smokers, current smokeless tobacco users, and current e-cigarette users were defined as those Soldiers who reported using these products in the past 30 days. Former users of tobacco products were those who reported use within their lifetime, but have quit and have not used in the past 30 days. Those who did not report current or former use were considered non-users. APFT variables were grouped into approximately equal groups (tertiles, quartiles, quintiles, etc.). Durations of unit PT activities were grouped by half hours and durations of personal PT activities were grouped by quarter hours. Total weekly running mileage for both unit and personal PT was calculated based on average reported frequency and distance of running. Using similar responses to three road marching questions, additional variables were calculated for miles per month marched, average weight carried per mile, and average pound-miles per month.

In preparation for multivariable risk factor analysis, the occurrence of at least one injury during the 6 months prior to the survey was coded as a binary variable to identify Soldiers with one or more injury. Potential risk factors for injuries included in the analysis were demographics (i.e., age, gender, and rank), personal characteristics (BMI, occupation, battalion, and company), physical fitness (APFT performance and self-assessed endurance/strength/flexibility), and leadership support for injury prevention (unit PT leaders not encouraging safe PT or not informing the unit of the status of unit injuries).

Risk ratios comparing the proportion injured to a reference parameter, 95 percent confidence intervals (CIs), and the Mantel-Haenszel chi-square significance (two-tailed p-values) are reported for each potential categorical risk factor. For variables with multiple categories, the reference parameter was usually chosen as the category with the lowest injury rate, to identify whether there were any comparatively high injury proportions. However, if the category with the lowest injury rate had a small sample size, the category with the next highest injury percentage was chosen.

Univariate risk ratios and 95 percent CIs are reported for each risk factor variable. Variables were entered into a backward-stepping multivariable logistic regression analysis if they were found to be significant in univariate logistic regression assessments of injury risk ($p \leq 0.10$). If there were discrepancies in the univariate regression results between the significance of the overall variable and the significance of individual categories, the multivariable analysis was conducted both with and without that variable included and the final model with the best fit (as measured by the Cox & Snell R-squared statistic) was used. Odds ratios and 95 percent CIs for variables remaining in the final multivariable models ($p \leq 0.05$) are reported.

Separate risk factor analyses were performed for variables related to self-assessed fitness, unit PT programs, personal PT programs, and leadership support perceptions. For each analysis, the following stepwise approach was used: Variables related to self-assessed fitness, unit PT programs, personal PT programs, or leadership support perceptions were entered into a backward-stepping multivariable logistic regression model. All variables with a $p \leq 0.10$ were entered into a second backward-stepping regression along with demographic variables that were significant in the univariate model. Variables remaining in the second model were entered into a third and final model that also included the fitness and health behaviors variables (e.g., smoking, APFT performance) that were significant in the univariate analysis. Finally, all variables that remained in any of the stratified models were entered into one overall backward-stepping logistic regression analysis to identify significant factors associated with injury among participants of both unit PT and personal PT.

6 Results

There were 831 Soldiers from 1-30BN and 3-15BN who completed this survey (337 from 1-30BN; 494 from 3-15BN). Based on the July 2015 1-30BN roster of 659 Soldiers, the response rate for 1-30BN was 51 percent. Based on rosters indicating 736 Soldiers in 3-15BN during September 2014, the 3-15BN response rate was 67 percent. The overall response rate for both battalions was 60 percent. Table 1 displays the response rates for all companies surveyed.

Table 1. Response rates for each company surveyed (n=831 survey respondents)

Company	Respondents (% of total)	Population	Response rate
1-30 A	81 (10%)	110	74%
1-30 B	73 (9%)	110	66%
1-30 C	58 (7%)	117	50%
1-30 D	12 (1%)	85	14%
1-30 HHC	113 (14%)	167	68%
All 1-30	337 (41%)	659	51%
3-15 A	74 (9%)	132	56%
3-15 B	99 (12%)	126	79%
3-15 C	124 (15%)	127	98%
3-15 D	75(9%)	84	89%
3-15 HHC	122(15%)	267	46%
All 3-15	494 (59%)	736	67%
All respondents	831 (100%)	1,395	60%

6.1 Demographics

The demographic information of survey respondents is shown in Table 2. Of the 831 respondents, 99 percent were male, 64 percent were 25 years of age or younger, 67 percent were ranked E1-E4, and 82 percent held Combat Arms military occupation specialties. Nearly all Soldiers (n=830, 99.8%) were Active Duty; one was a National Guard reservist (data not shown).

Table 2. Demographics (n=831 survey respondents)

Variable	Category	Count (% of total)
Gender	Female	6 (1%)
	Male	825 (99%)
Age (years) Mean age: 25±5	18-25	474 (57%)
	26-39	297 (36%)
	40-54	60 (7%)
Rank	E1-E4	553 (67%)
	E5-E9	200 (24%)
	O1-O5	78 (9%)
Occupation	Combat Arms	681 (82%)
	Combat Services	41 (5%)
	Combat Services Support	108 (13%)

6.2 Physical Fitness and Occupational Demands

6.2.1 Army Physical Fitness Test (APFT) Performance

Self-reported performance during respondents' most recent APFT are shown in Table 3, reported by gender. Values not included in the reported totals and means: 34 men who did not report push-up repetitions, 30 men and 1 woman who did not report sit-up repetitions, 49 men and 1 woman who did not report run times, and 19 men who reported nonsensical run times.

Table 3. Army Physical Fitness Test performance by gender (n=831 survey respondents)

Variable	Category	n (%)	Mean ± SD
Push-ups (Men), n=791	≤ 55	183 (23%)	66.0 ± 13.1
	56 – 65	206 (26%)	
	66 – 74	174 (22%)	
	≥ 75	228 (29%)	
Push-ups (Women), n=6	≤ 27	2 (33%)	42.0 ± 20.7
	28 – 56	2 (33%)	
	≥ 57	2 (33%)	
Sit-ups (Men), n=795	≤ 61	186 (23%)	69.9 ± 11.7
	62 – 68	186 (23%)	
	69 – 78	225 (28%)	
	≥ 79	198 (25%)	
Sit-ups (Women), n=5	≤ 61	1 (20%)	66.0 ± 8.8
	62 - 69	2 (40%)	
	≥ 70	2 (40%)	
2-Mile Run (minutes, Men), n=757	≤ 13.49	170 (23%)	14.54 ± 1.73
	13.50 – 14.42	208 (28%)	
	14.43 – 15.22	190 (25%)	
	≥ 15.23	189 (25%)	
2-Mile Run (minutes, Women), n=5	≤ 14.61	1 (20%)	16.14 ± 2.48
	14.62 – 17.59	2 (40%)	
	≥ 17.60	2 (40%)	

6.2.2 Body Mass Index

Based on reported height and weight, respondents' BMI was calculated and categorized into accepted categories established by the CDC (Table 4). Thirty-six percent had a BMI in the "normal" range, while 1 percent were underweight and 10 percent were obese. Ten respondents reported nonsensical values for height and/or weight, so BMI was not calculated for those respondents.

Table 4. Distribution of Body Mass Index by category (n=831 survey respondents)

Variable	CDC Categories	Respondents (% of total)
BMI	<18.5 (underweight)	8 (1%)
	18.5-24.9 (normal)	295 (36%)
	25.0-27.5 (low overweight)	280 (34%)
	27.6-29.9 (high overweight)	154 (19%)
	≥ 30 (obese)	84 (10%)
	Not able to calculate	10 (1%)

6.2.3 Permanent Profiles

Among the survey respondents, 6 percent (n= 53) were on permanent profile and had been for an average of 2-3 years; 19 percent of these respondents reported that their permanent profile rendered them unable to perform their military duties as assigned, shown in Table 5. Those reporting a permanent profile were older than those not reporting one (average age of 29 instead of 25 for those not reporting a profile, data not shown). As seen in Table 6, 91 percent of those on profile were restricted from running for physical training, with 38 percent restricted from sit-ups and 33 percent from push-ups (respondents could select all that applied).

Table 5. Impact of permanent profile (n=53 Soldiers on permanent profile)

Survey Question	Responses	n (% of permanent profiles)
Does your permanent profile limit your physical training or job duties?	No	18 (34%)
	Little impact	12 (23%)
	Some impact	10 (19%)
	Significant impact	3 (6%)
	Unable to perform military duties as assigned	10 (19%)

Table 6. Restricted APFT events among Soldiers with permanent profiles (n=53 Soldiers on permanent profile)*

Survey question	Responses	n (% of permanent profiles)
From which PT events are you restricted?	Push-ups	14 (33%)
	Sit-ups	16 (38%)
	Run	38 (91%)

Note: *Respondents were instructed to select all that applied.

6.2.4 Army Alternative PT Programs

Eight percent (n=66) of survey respondents reported participation in alternate PT programs; of these, 70 percent were for Profile PT, as shown in Table 7.

Table 7. Percent of Soldiers on profile participating in Alternate PT program types (n=66 Soldiers in alternative PT programs)

Survey question	Responses	n (% of Soldiers in alternative PT)
In which alternate PT program do you participate?	Profile PT	46 (70%)
	Weight control PT	14 (21%)
	Pregnancy PT	1 (2%)
	Other	5 (7%)

6.2.5 Self-assessed Fitness

Respondents were asked to assess their own level of fitness in terms of endurance, sprint speed, strength, flexibility, and body fat, compared to others of the same age and gender. As Tables 8 and 9 show, most respondents assessed themselves as average or better than their peers across all of these metrics. For self-assessed sprint speed, those most likely to rate themselves as worse than average were older (≤ 35).

Table 8. Distribution (%) of levels of self-assessed fitness for endurance, sprint speed, strength, and flexibility among Soldiers (n=831 survey respondents)

Self-assessment	Endurance	Sprint Speed	Strength	Flexibility
Much greater than average	75 (9%)	72 (9%)	79 (10%)	43 (5%)
Greater than average	323 (39%)	284 (34%)	261 (31%)	165 (20%)
Average	346 (42%)	387 (47%)	406 (49%)	388 (47%)
Slightly less than average	68 (8%)	66 (8%)	75 (9%)	179 (22%)
Far less than average	19 (2%)	22 (3%)	10 (1%)	56 (7%)

Table 9. Self-assessed body fat (n=831 survey respondents)

Self-assessment	Body fat
Far less than average	129 (16%)
Slightly less than average	202 (24%)
Average	414 (50%)
Greater than average	76 (9%)
Much greater than average	10 (1%)

6.2.6 Occupational Physical Demands

When asked how much lifting was required to complete their job functions, 33 percent of respondents reported moderately heavy lifting, defined as “frequently lifting 40 pounds and occasionally lifting up to 80 pounds,” and this is shown in Table 10. Table 11 shows the reported occupational aerobic activity requirements, with 58 percent citing moderate aerobic demands defined as usual strenuous activity.

Table 10. Occupational lifting demands (n=831 survey respondents)

Survey question	Responses	n (%)
How much lifting is required to do your job?	No lifting or always <10 lbs	25 (3%)
	Light (frequently 10 lbs, up to 20 lbs)	69 (8%)
	Medium (frequently 25 lbs, up to 50 lbs)	203 (24%)
	Moderately heavy (frequently 40 lbs, up to 80 lbs)	272 (33%)
	Heavy (frequently 50 lbs, up to 100 lbs)	155 (19%)
	Very heavy (frequently >50 lbs, up to >100 lbs)	107 (13%)

Table 11. Occupational aerobic demands (n=831 survey respondents)

Survey question	Responses	n (%)
How much aerobic activity is required to do your job?	None (sedentary)	32 (4%)
	Light (occasional strenuous activity)	191 (23%)
	Moderate (usual strenuous activity)	482 (58%)
	High (many high energy activities)	126 (15%)

6.3 Physical Training (PT)

Survey respondents were asked about the availability and their use of a variety of fitness equipment and amenities for PT activities. The results are listed in Table 12. The pull-up bar, free weights, and the running area were the most frequently used; racquetball/squash courts and

baseball/softball fields were the most infrequently used; and outdoor bicycles were the most frequently reported unavailable equipment.

Table 12. Use and availability of fitness equipment and amenities (n=831 survey respondents)

Equipment/Amenity	Used	Not available
Pull-up bar	84%	3%
Free weights	83%	4%
Running area	83%	3%
Kettlebells	73%	4%
Universal weight training equipment	69%	8%
Track	63%	7%
Ropes to climb or swing	62%	6%
Treadmill	60%	8%
Swimming facility	60%	4%
Tires to flip	59%	7%
Sled to drag/push	52%	14%
Stationary bicycles	51%	8%
Basketball court	50%	4%
Bands and chains for weight training	48%	13%
Stairmasters	38%	12%
Nautilus	35%	25%
Racquetball/squash court	35%	8%
Soccer field	29%	19%
Baseball/softball field	28%	16%
Outdoor bicycles	25%	47%
Tennis court	25%	34%

Note: Remaining results from PT questions are presented for unit PT and personal PT separately.

6.3.1 Unit PT

Among the 1-30BN and 3-15BN respondents, 93 percent (n=774) said that they participate in unit PT. Of those who participate, 81 percent said they participate 5 days each week, 10 percent participate fewer than 5 days each week, and 9 percent participate more often. Respondents were asked to rate the difficulty of their unit PT program as easy, moderate, somewhat hard, hard, or challenging, and the results are shown in Table 13. Many variations in difficulty ratings are present among the 10 companies surveyed; 1-30D had the highest percentage of “Challenging” ratings (58 percent) and 3-15HHC had the highest percentage of “Easy” ratings (10 percent). Sixty-five percent of participants indicated that new Soldiers are given time to adapt to unit PT.

Table 13. Unit PT difficulty ratings by company (n=774 Soldiers participating in Unit PT)

Responses	All	1-30 A	1-30 B	1-30 C	1-30 D	1-30 HHC	3-15 A	3-15 B	3-15 C	3-15 D	3-15 HHC
Challenging	136 (16%)	11 (16%)	12 (17%)	10 (17%)	7 (58%)	16 (15%)	5 (7%)	14 (15%)	30 (25%)	14 (20%)	17 (16%)
Hard	195 (24%)	12 (17%)	20 (28%)	15 (26%)	3 (25%)	19 (18%)	27 (39%)	18 (20%)	32 (27%)	27 (39%)	22 (20%)
Somewhat Hard	248 (30%)	30 (43%)	26 (37%)	21 (36%)	1 (8%)	38 (36%)	21 (30%)	34 (37%)	26 (22%)	16 (23%)	35 (32%)
Moderate	167 (20%)	15 (22%)	11 (15%)	12 (21%)	1 (8%)	31 (29%)	14 (20%)	21 (23%)	26 (22%)	13 (19%)	23 (21%)
Easy	28 (3%)	1 (0%)	2 (3%)	0 (0%)	0 (0%)	2 (2%)	3 (4%)	5 (5%)	4 (3%)	0 (0%)	11 (10%)

When asked what overarching program their unit PT was primarily based on, 38 percent of respondents said Traditional Army PT, followed by 19 percent who indicated cross-training. 1-30HHC was the only company where respondents suggested that different programs were used (extreme conditioning and a combination of programs, both 33 percent). “Combination of programs” responses included running/CrossFit[®], PRT/CrossFit, PRT/traditional, and traditional/weight-training. Table 14 shows the responses for each company. Traditional Army PT was defined as “Running, Push-ups, Sit-ups,” but no specific definition was given for cross-training.

Table 14. Unit PT program influences by company (n=774 Soldiers participating in Unit PT)

Company	Greatest influence	Second greatest influence
All respondents	Traditional Army PT (38%)	Cross-training (19%)
1-30 A	Traditional Army PT (52%)	Cross-training (20%)
1-30 B	Traditional Army PT (36%)	Cross-training (19%)
1-30 C	Traditional Army PT (38%)	Cross-training (29%)
1-30 D	Extreme Conditioning (33%) Combination of programs (33%)	Traditional Army PT (17%) Cross-training (17%)
1-30 HHC	Traditional Army PT (31%)	Physical Readiness Training (PRT) (24%)
All 1-30	Traditional Army PT (38%)	Cross-training (19%)
3-15 A	Traditional Army PT (47%)	Cross-training (16%)
3-15 B	Traditional Army PT (31%)	Cross-training (21%)
3-15 C	Traditional Army PT (50%)	Cross-training (16%)
3-15 D	Traditional Army PT (37%)	Cross-training (19%)
3-15 HHC	Traditional Army PT (26%)	Cross-training (20%)
All 3-15	Traditional Army PT (38%)	Cross-training (19%)

Respondents were asked to report the average number of times they participated in a variety of PT activities with their unit, shown in Table 15, and the average duration of each activity in which they participated, seen in Table 16. Frequencies were rounded to the nearest integer. Sprints were defined as short bursts of speed that cannot be sustained for more than a few minutes; intervals were defined as short periods of high speed running mixed with periods of jogging or walking; calisthenics were defined as jumping jacks, windmills, mountain climbers, and so forth; cross-training type exercises were defined as circuit training and combinations of exercises to work various parts of the body; agility drills were defined as drills requiring lateral movements, typically using cones or ladders, obstacle course, and so forth; and resistance training was defined as weight lifting using free weights, dumbbells, kettlebells, hammer-strength machines, and so forth.

For running, the duration was expressed as the average number of miles run during each session. For all other activities, duration was measured in minutes spent during a typical session. If a respondent answered zero for frequency and/or duration, the response was removed from this descriptive analysis in order to focus on only those who participated in each activity; however, if a non-zero value was reported for either frequency or duration with no value reported for the other, the non-zero response was included in the calculation of average. Therefore, while the total number of participants in each activity is noted, the number of participants reporting frequencies and durations of the same activity may not be equal. For the calculation of averages, a response of “<1 time per week” frequency was estimated as 0.5 times per week and “>7 times per week” was estimated as eight times per week. Running was participated in the most frequently, about three times per week on average. For all activities, 3-15BN had longer average reported durations than 1-30BN.

Similar questions were asked about road marching participation. Table 17 shows the average frequency, distance, and load carriage for each company. Average unit responses ranged from 3.6-6.8 road marches per month for 6.4-8.0 miles per session, carrying loads of 37-48 pounds each time. For all metrics, 3-15BN had higher reported values than 1-30BN, on average.

Table 15. Average frequency of unit PT activity participation by company (times per week, past 6 months)*

Company	Distance Running n=758	Sprint/Interval Training n=739	Calisthenics n=671	Cross-training n=700	Agility drills n=632	Resistance training n=652
All respondents	3 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1
1-30 A	3 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1
1-30 B	2 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1
1-30 C	3 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1
1-30 D	2 ± 1	2 ± 1	2 ± 1	2 ± 1	1 ± 1	2 ± 1
1-30 HHC	2 ± 1	1 ± 1	2 ± 1	2 ± 1	1 ± 1	2 ± 1
All 1-30	2 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1
3-15 A	3 ± 1	1 ± 1	2 ± 1	1 ± 1	1 ± 1	2 ± 1
3-15 B	3 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1
3-15 C	3 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1
3-15 D	3 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1	1 ± 1
3-15 HHC	2 ± 1	1 ± 1	2 ± 1	2 ± 1	1 ± 1	2 ± 1
All 3-15	3 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1	2 ± 1

Note: * n=774 Soldiers participating in unit PT

Table 16. Average duration of unit PT activity participation by company (past 6 months)*

Company	Running distance per session (miles) n=762	Sprint/Interval (minutes per session) n=754	Calisthenics (minutes per session) n=691	Cross-training (minutes per session) n=719	Agility drills (minutes per session) n=660	Resistance training (minutes per session) n=675
All respondents	4.0 ± 1.2	43 ± 25	40 ± 25	47 ± 25	39 ± 25	45 ± 25
1-30 A	3.6 ± 1.2	36 ± 20	31 ± 19	38 ± 18	32 ± 17	34 ± 18
1-30 B	3.8 ± 1.0	38 ± 23	39 ± 25	46 ± 23	41 ± 23	46 ± 27
1-30 C	3.8 ± 1.3	41 ± 22	42 ± 23	47 ± 23	42 ± 23	45 ± 22
1-30 D	3.4 ± 1.3	35 ± 20	21 ± 13	54 ± 27	17 ± 15	36 ± 18
1-30 HHC	3.6 ± 0.9	39 ± 19	37 ± 20	41 ± 20	34 ± 22	42 ± 22
All 1-30	3.7 ± 1.1	38 ± 21	36 ± 22	43 ± 21	36 ± 22	42 ± 23
3-15 A	3.8 ± 1.2	46 ± 25	43 ± 26	47 ± 26	41 ± 28	51 ± 26
3-15 B	4.0 ± 1.0	39 ± 21	35 ± 24	44 ± 23	36 ± 23	40 ± 21
3-15 C	4.7 ± 1.0	54 ± 30	49 ± 30	57 ± 28	48 ± 30	54 ± 27
3-15 D	4.4 ± 1.4	48 ± 26	45 ± 24	56 ± 31	44 ± 26	46 ± 26
3-15 HHC	4.0 ± 1.4	42 ± 25	42 ± 27	47 ± 24	39 ± 24	46 ± 27
All 3-15	4.2 ± 1.3	46 ± 26	43 ± 27	50 ± 27	42 ± 27	48 ± 26

Note: * n=774 Soldiers participating in unit PT

Table 17. Average road marching frequency, distance, and load carriage by company (past 6 months)*

Company	Average frequency per month (n=737)	Average distance per session (miles) (n=740)	Average load per session (lbs) (n=741)
All respondents	4 ± 4	7.5 ± 3.5	44 ± 12
1-30 A	3 ± 2	7.4 ± 4.2	39 ± 11
1-30 B	3 ± 3	7.3 ± 3.2	45 ± 9
1-30 C	4 ± 3	7.0 ± 3.9	40 ± 11
1-30 D	6 ± 6	7.3 ± 5.5	37 ± 4
1-30 HHC	3 ± 2	6.5 ± 3.4	39 ± 9
All 1-30	3 ± 3	7.0 ± 3.7	40 ± 10
3-15 A	4 ± 4	8.1 ± 3.1	44 ± 13
3-15 B	5 ± 3	7.8 ± 3.1	44 ± 12
3-15 C	5 ± 4	7.9 ± 3.1	48 ± 12
3-15 D	4 ± 3	6.4 ± 2.4	44 ± 12
3-15 HHC	4 ± 4	8.4 ± 3.9	47 ± 16
All 3-15	4 ± 4	7.8 ± 3.2	46 ± 13

Note: * n=774 Soldiers participating in unit PT

Based on the responses to the road marching questions, the average weight per mile and the average pound-miles per month (Table 18) were also calculated for each company.

Table 18. Road marching: Average pound- miles per month by company (past 6 months)*

Company	Average pound-miles per month (n=737)
All respondents	1717 ± 2276
1-30 A	988 ± 851
1-30 B	1418 ± 1601
1-30 C	1460 ± 2346
1-30 D	2853 ± 4896
1-30 HHC	931 ± 840
All 1-30	1225 ± 1727
3-15 A	1890 ± 1898
3-15 B	2377 ± 2779
3-15 C	2303 ± 2594
3-15 D	1547 ± 1885
3-15 HHC	1943 ± 2972
All 3-15	2057 ± 2535

Note: * n=774 Soldiers participating in unit PT

6.3.2 Personal Physical Training (PT)

When asked whether they participated in personal PT, 83 percent of respondents (n=688) replied that they did. Similar to the unit PT programs, Traditional Army PT (27 percent) and cross-training (26 percent) influenced the most respondents' personal training programs, shown in Table 19. "Combination of programs" responses were further specified by the respondent and included cardio/weights, CrossFit/resistance, and modified CrossFit. "Other" responses included weight-training, aerobics, gym, and upper body. Because so many "other" responses were identified as weightlifting/resistance training, it is included in Table 19 as its own additional category.

Table 19. Personal PT program influences*

Survey question	Responses	n (%)
What program is your personal PT program based on?	Traditional Army PT	183 (27%)
	Cross-training	177 (26%)
	Extreme conditioning	111 (16%)
	Combination of programs	78 (11%)
	Weightlifting/Resistance training	74 (11%)
	Physical Readiness Training (PRT)	39 (6%)
	Other	26 (4%)

Note: *n=688 Soldiers participating in personal PT

Respondents were asked to report the primary goal of their personal PT programs. Thirty-five percent said their goal was to gain muscle mass, shown in Table 20.

Table 20. Goals of personal PT programs*

Survey question	Responses	n (%)
What is the goal of your personal PT program?	Gain muscle mass	244 (35%)
	Increase aerobic capacity and gain muscle mass	188 (27%)
	Lose weight	125 (18%)
	Maintain current fitness levels	81 (12%)
	Unit PT is not challenging enough to maintain fitness levels	27 (4%)
	Increase aerobic capacity	24 (4%)

Note: *n=688 Soldiers participating in personal PT

For personal PT, 1-30BN and 3-15BN personnel were asked to report their average frequency and duration of participation for a variety of PT activities. These results are reported by Battalion in Tables 21 and 22. Personal PT activity durations for those in 3-15BN were equal to or longer than those in 1-30BN.

Table 21. Average frequency of personal PT activity participation by Battalion (times per week, past 6 months)*

Battalion	Running sessions per week n=621	Sprint/Interval Training sessions per week n=512	Calisthenics sessions per week n=477	Cross-training sessions per week n=502	Agility drills sessions per week n=392	Resistance training sessions per week n=525	Other aerobic activity sessions per week n=486
Overall	2 ± 2	2 ± 1	2 ± 2	2 ± 2	2 ± 2	2 ± 2	2 ± 2
1-30	2 ± 1	2 ± 1	2 ± 2	2 ± 2	2 ± 2	2 ± 2	2 ± 2
3-15	2 ± 2	2 ± 1	2 ± 2	2 ± 2	2 ± 2	3 ± 2	2 ± 2

Note: * n=688 Soldiers participating in personal PT

Table 22. Average duration of personal PT activity participation by Battalion (past 6 months)*

Battalion	Running distance per session (miles) n=618	Sprint/Interval minutes per session n=500	Calisthenics minutes per session n=430	Cross-training minutes per session n=462	Agility drills minutes per session n=359	Resistance training minutes per session n=427	Other aerobic activity minutes per session n=427
Overall	3.4 ± 1.6	20 ± 24	24 ± 24	26 ± 26	24 ± 25	31 ± 29	25 ± 24
1-30	3.1 ± 1.5	20 ± 23	23 ± 22	26 ± 24	23 ± 24	30 ± 28	23 ± 21
3-15	3.6 ± 1.6	20 ± 24	25 ± 25	26 ± 27	25 ± 27	31 ± 29	26 ± 26

Note: * n=688 Soldiers participating in personal PT

6.4 Health Behaviors

6.4.1 Tobacco Use

When asked about their tobacco use habits, 30 percent (n=253) of respondents indicated that they were current cigarette smokers, 29 percent (n=241) were current smokeless tobacco users, and 11 percent (n=92) were current e-cigarette or vaporizer users. Of the respondents who reported current use, the number of days using the product in the last 30 days, the predominant duration having smoked the product, and the average amount of product used daily are reported in Table 23.

Table 23. Tobacco use

Tobacco Products	Days using the product in the past 30 days	Years smoking product	Average amount of product used daily
Cigarettes (n=253)	21-30 (62%)	0-5 (47%)	1-5 cigarettes (51%)
Smokeless tobacco (n=241)	21-30 (51%)	0-5 (71%)	1.15 cans 1.00 pouches 0.44 plugs
E-cigarettes or vaporizers (n=92)	1-10 (61%)	0-1 (90%)	-

Among respondents who have smoked more than 100 cigarettes in their life (46 percent, n=381), the average age they started smoking was 12 years. Of those who reported smoking cigarettes in the 30 days prior to survey completion, 47 percent are also smokeless tobacco users and 21 percent use e-cigarettes or personal vaporizers. The average respondent who is a current cigarette smoker has smoked eight cigarettes daily on 22 of the last 30 days and has smoked cigarettes for 6.8 years. Those who quit smoking (15 percent, n=128) did so an average of 3.1 years ago.

Of those respondents who reported using smokeless tobacco in the past 30 days (29 percent, n=241), 49 percent were also current cigarette smokers and 12 percent use e-cigarettes or personal vaporizers. The average current smokeless tobacco user has been using tobacco for 4.8 years, reported using tobacco 20 out of the past 30 days, and uses an average of 1.15 cans,

1 pouch, or 0.44 plugs each day. Forty-eight percent of respondents (n= 398) reported having ever used smokeless tobacco; the average respondent who has quit using smokeless tobacco quit 2.4 years ago.

Thirty percent (n=251) of respondents reported having ever used e-cigarettes or personal vaporizers, and 11 percent (n=92) reported having smoked e-cigarettes or personal vaporizers in the past 30 days. The average current e-cigarette/vaporizer user has been using e-cigarettes for less than 9 months and smoked them on an average of 12 days in the past 30 days. Among those who have quit smoking e-cigarettes, the average respondent did so 1.1 years ago.

6.4.2 Dietary Supplement Use

When asked about their dietary supplement use, 23 percent (n=188) of respondents reported current use. As shown in Table 24, three-fourths of those who use dietary supplements reported vitamin use, followed by nearly two-thirds who use performance/muscle enhancement supplements (respondents were asked to select all that apply). “Other” responses include protein, mass gainer, and fish oil. Reported reasons for taking dietary supplements are shown in Table 25, with promoting general health (73 percent) and greater muscle strength (61 percent) leading the responses.

Table 24. Dietary supplement use (n=188, selected all that apply)

Survey question	Responses	n (%)
What dietary supplements do you take?	Vitamins	143 (76%)
	Performance/muscle enhancement supplements	113 (60%)
	Nutrition enhancement supplements	74 (39%)
	Healthy joint supplements	64 (34%)
	Weight loss supplements	41 (22%)
	Other	6 (3%)

Table 25. Reasons for taking dietary supplements (n=188, selected all that apply)

Survey question	Responses	n (%)
For what reasons do you take dietary supplements?	Promote general health	138 (73%)
	Greater muscle strength	114 (61%)
	Give more energy	95 (51%)
	Performance enhancement	74 (39%)
	Healthy joints	73 (39%)
	Increased endurance	58 (31%)
	Weight loss	55 (29%)
	Other	5 (3%)
	Not sure	3 (2%)

6.5 Leadership and Medical Support

Respondents were asked whether their leadership encourages PT in a safe way that strives to increase fitness but reduce or minimize injuries; responses by company are listed in Table 26. Most respondents (75 percent) said that they agree or strongly agree. Respondents from 1-30BN had more positive responses than respondents from 3-15BN.

Results of respondents' assessment of whether they believe their current unit has a higher than normal rate of PT-related injuries are shown in Table 27. Thirty-five percent of respondents indicated that they agree or strongly agree that their unit has a high rate of injury, while 33 percent disagree or strongly disagree and 32 percent are unsure. More personnel in 3-15BN gave "Agree" or "Strongly agree" responses than 1-30BN personnel.

Table 26. Your unit leadership encourages PT in a safe way that strives to increase fitness but reduce or minimize injuries (by company, n=831)

Company	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
All respondents	352 (42%)	276 (33%)	132 (16%)	47 (6%)	24 (3%)
1-30 A	43 (53%)	20 (25%)	14 (17%)	3 (4%)	1 (1%)
1-30 B	33 (45%)	26 (36%)	12 (16%)	0 (0%)	2 (3%)
1-30 C	32 (55%)	22 (38%)	3 (5%)	1 (2%)	0 (0%)
1-30 D	7 (58%)	3 (25%)	1 (8%)	1 (8%)	0 (0%)
1-30 HHC	52 (46%)	33 (29%)	23 (20%)	3 (3%)	2 (2%)
All 1-30	167 (50%)	104 (31%)	53 (16%)	8 (2%)	5 (2%)
3-15 A	26 (35%)	27 (36%)	14 (19%)	4 (5%)	3 (4%)
3-15 B	30 (30%)	38 (38%)	19 (19%)	8 (8%)	4 (4%)
3-15 C	59 (46%)	36 (29%)	15 (12%)	11 (9%)	3 (2%)
3-15 D	31 (41%)	27 (36%)	10 (13%)	6 (8%)	1 (1%)
3-15 HHC	39 (32%)	44 (36%)	21 (17%)	10 (8%)	8 (7%)
All 3-15	185 (37%)	172 (35%)	79 (16%)	39 (8%)	19 (4%)

Table 27. Your current unit has a higher than normal rate of PT-related injuries (by company, n=831)

Company	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure
All respondents	106 (13%)	184 (22%)	266 (32%)	76 (9%)	199 (24%)
1-30 A	9 (11%)	16 (20%)	29 (36%)	10 (12%)	17 (21%)
1-30 B	7 (10%)	14 (19%)	25 (34%)	12 (16%)	15 (21%)
1-30 C	12 (21%)	7 (12%)	33 (38%)	5 (9%)	12 (21%)
1-30 D	1 (8%)	6 (50%)	4 (33%)	1 (8%)	0 (0%)
1-30 HHC	8 (7%)	22 (20%)	44 (39%)	7 (6%)	32 (28%)
All 1-30	37 (11%)	65 (19%)	124 (37%)	35 (10%)	76 (23%)
3-15 A	7 (9%)	19 (26%)	20 (27%)	2 (3%)	26 (35%)
3-15 B	12 (12%)	29 (29%)	30 (30%)	2 (2%)	17 (17%)
3-15 C	14 (11%)	27 (22%)	34 (27%)	16 (13%)	33 (27%)
3-15 D	12 (16%)	16 (21%)	32 (43%)	5 (7%)	10 (13%)
3-15 HHC	24 (20%)	28 (23%)	26 (21%)	7 (6%)	37 (30%)
All 3-15	69 (14%)	119 (24%)	142 (29%)	41 (8%)	123 (25%)

Respondents were asked how often their unit or PT leader described common causes of training injuries and provided recommendations to reduce injuries and these results are displayed in

Table 28. Most respondents (74 percent) responded that their leadership does this at least occasionally. Respondents from 1-30BN reported this more frequently than those from 3-15BN.

Table 28. Does your unit or PT leader describe common causes of training injury and provide recommendations to reduce injuries? (by company, n=831)

Company	Routinely	Occasionally	Rarely	Never
All respondents	313 (38%)	312 (38%)	123 (15%)	83 (10%)
1-30 A	37 (46%)	32 (40%)	5 (6%)	7 (9%)
1-30 B	25 (34%)	39 (53%)	5 (7%)	4 (5%)
1-30 C	31 (58%)	22 (38%)	3 (5%)	2 (3%)
1-30 D	7 (58%)	5 (42%)	0 (0%)	0 (0%)
1-30 HHC	43 (38%)	43 (38%)	22 (19%)	5 (4%)
All 1-30	143 (42%)	141 (42%)	35 (10%)	18 (5%)
3-15 A	20 (27%)	32 (43%)	16 (22%)	6 (8%)
3-15 B	28 (28%)	38 (38%)	21 (21%)	12 (12%)
3-15 C	50 (40%)	42 (34%)	13 (10%)	19 (15%)
3-15 D	38 (51%)	24 (32%)	10 (13%)	3 (4%)
3-15 HHC	34 (28%)	35 (29%)	28 (23%)	25 (20%)
All 3-15	170 (34%)	171 (35%)	88 (18%)	65 (13%)

Soldiers were also asked how frequently their unit or PT leader provided information about the status of unit injuries and causes and these results are shown in Table 29. Sixty-seven percent of respondents indicated that their leadership provided information routinely or occasionally, and this was more frequent in 1-30BN than 3-15BN.

Table 29. Does your unit or PT leader provide information about the status of unit injuries and causes? (by company, n=831)

Company	Routinely	Occasionally	Rarely	Never
All respondents	241 (29%)	314 (38%)	140 (17%)	136 (16%)
1-30 A	33 (41%)	26 (32%)	10 (12%)	12 (15%)
1-30 B	17 (23%)	41 (56%)	9 (12%)	6 (8%)
1-30 C	25 (43%)	25 (43%)	9 (12%)	6 (8%)
1-30 D	4 (33%)	5 (42%)	2 (17%)	1 (8%)
1-30 HHC	30 (27%)	45 (40%)	25 (22%)	13 (12%)
All 1-30	109 (32%)	142 (42%)	51 (15%)	35 (10%)
3-15 A	18 (24%)	26 (35%)	15 (20%)	15 (20%)
3-15 B	20 (20%)	37 (37%)	20 (20%)	22 (22%)

Company	Routinely	Occasionally	Rarely	Never
3-15 C	41 (33%)	44 (35%)	15 (12%)	24 (19%)
3-15 D	30 (40%)	30 (40%)	12 (16%)	3 (4%)
3-15 HHC	23 (19%)	35 (29%)	27 (22%)	37 (30%)
All 3-15	132 (27%)	172 (35%)	89 (18%)	101 (20%)

The leadership responses summarized in Tables 26-30 were all significantly correlated with 2-mile run times ($p < 0.05$), and those with slower run times were more likely to report negative assessments of their unit PT leadership (data not shown).

When asked whether they were aware of an AWC on their installation, 63 percent of respondents ($n=525$) said they were aware (2 percent were unaware and 35 percent were unsure). Of those aware of the AWC, 30 percent had been evaluated there.

Respondents were also asked whether their unit has an assigned Master Fitness Trainer (MFT). The results are listed in Table 30 by company.

Table 30. Awareness of assigned Master Fitness Trainer (MFT) ($n=831$ survey respondents)

Company	Yes	No	Not Sure
All respondents	356 (43%)	74 (9%)	401 (48%)
1-30 A	30 (37%)	6 (7%)	45 (56%)
1-30 B	35 (34%)	10 (14%)	38 (52%)
1-30 C	22 (38%)	7 (12%)	29 (50%)
1-30 D	3 (25%)	1 (8%)	8 (67%)
1-30 HHC	79 (70%)	5 (4%)	29 (26%)
All 1-30	159 (47%)	29 (9%)	149 (44%)
3-15 A	21 (28%)	12 (16%)	41 (55%)
3-15 B	25 (25%)	9 (9%)	65 (65%)
3-15 C	66 (53%)	7 (6%)	51 (41%)
3-15 D	39 (52%)	7 (9%)	29 (39%)
3-15 HHC	46 (38%)	10 (8%)	66 (54%)
All 3-15	197 (40%)	45 (9%)	252 (51%)

6.6 Injury History

6.6.1 Overall

Over one-third (37 percent, 310 respondents) reported having at least one injury in the 6 months prior to survey administration. Respondents indicated that 25 percent (n=101) of the first- and second-most limiting injuries reported on the survey were not seen by a medical professional. Table 31 shows the percent injured within each demographic and personal characteristic category. Injury rates were higher among males (37 percent), those over 35 years of age (55 percent), those ranked E6-E9 or officers (47 percent each), those in Combat Services occupations (46 percent), and members of 1-30D (50 percent).

Table 31. Percent injured (Past 6 Months, n=831 survey respondents)

Variable	Categories	Percent Injured (one or more injuries) in past 6 months
Total		310 (37%)
Gender	Male	308 (37%)
	Female	2 (33%)
Age	18-25	179 (34%)
	26-35	105 (42%)
	>35	26 (55%)
Rank	E1-E5	229 (35%)
	E6-E9	44 (47%)
	Officer	37 (47%)
Occupation	Combat Arms	255 (37%)
	Combat Services	19 (46%)
	Combat Services Support	35 (32%)
Unit	1-30 A	33 (41%)
	1-30 B	28 (38%)
	1-30 C	19 (33%)
	1-30 D	6 (50%)
	1-30 HHC	46 (41%)
	3-15 A	28 (38%)
	3-15 B	35 (35%)
	3-15 C	41 (33%)
	3-15 D	19 (25%)
	3-15 HHC	55 (45%)

Considering injury counts, respondents were asked how many injuries they experienced in the past 6 months (0, 1, 2, or 3 or more). Assuming that all responses of “three or more injuries” (n=34) represented exactly three injuries, a total of 446 injuries were reported in this survey. Table 32 shows the frequency of injured Soldiers by Company. Additional information was collected about each respondent’s first- and second-most physically limiting injuries (n=412).

Table 32. Distribution (%) of 1, 2, or 3 or more injuries among 1-30BN and 3-15BN (past 6 months, n=831 survey respondents)

Company	One injury (n=208)	Two injuries (n=68)	Three or more injuries (n=34)
Overall	208 (67%)	68 (22%)	34 (11%)
1-30 A	25 (76%)	6 (18%)	2 (6%)
1-30 B	24 (89%)	3 (11%)	1 (4%)
1-30 C	13 (68%)	5 (26%)	1 (5%)
1-30 D	4 (67%)	1 (17%)	1 (17%)
1-30 HHC	29 (63%)	12 (26%)	5 (11%)
All 1-30	95 (72%)	27 (20%)	10 (8%)
3-15 A	20 (71%)	4 (14%)	4 (14%)
3-15 B	25 (71%)	5 (14%)	5 (14%)
3-15 C	26 (63%)	10 (24%)	5 (15%)
3-15 D	14 (74%)	4 (21%)	1 (5%)
3-15 HHC	28 (51%)	18 (33%)	9 (16%)
All 3-15	113 (63%)	41 (23%)	24 (13%)

6.6.2 Body Areas

See Table 33 for the most commonly injured body areas among survey respondents, as reported for the first- and second-most physically limiting injury. The knee was the mostly frequently reported injured body area (23 percent), followed by the lower back (17 percent) and the ankle (12 percent). “Other” body areas included the jaw and eye.

Table 33. Injured body areas (n=412 Injuries)

Injury Type	Total Injuries n (%)
Knee	94 (23%)
Back (lower)	72 (17%)
Ankle	50 (12%)
Shoulders	41 (10%)
Foot	34 (8%)
Hand	21 (5%)
Lower leg (shin/calf)	14 (3%)
Hip	11 (3%)
Neck	9 (2%)
Wrist	9 (2%)
Heat/cold injury – no specific body area	9 (2%)
Upper leg (thigh/hamstring)	7 (2%)
Head	6 (1%)
Back (upper)	6 (1%)
Chest/ribs	6 (1%)
Elbow	5 (1%)
Groin	4 (1%)
Abdomen	3 (1%)
Spine	3 (1%)
Upper arm (bicep/tricep)	2 (0%)
Lower arm	1 (0%)
Other/unspecified	5 (1%)
Total	412

6.6.3 Injury Types

Reported injury types for the first- and second-most physically limiting injuries are presented in Table 34. Sprains and strains were the most common injury type (40 percent), followed by tears (15 percent) and fractures (6 percent). Sprains and strains also accounted for the highest number

of temporary profiles (34 percent of all profiles), and tears led to the most reported limited duty days (29 percent of limited duty days). “Other” responses included iliotibial (IT) band, thinning/worn cartilage, acromioclavicular (AC) separation, and lateral hip impingement. Many sprain/strains (48 percent), tears (44 percent), and fractures (36 percent) were associated with overuse/repetitive activity.

Table 34. Distribution (%) of injury types and limited duty days (n=412 injuries)

Injury Type	Total Injuries n (%)	Total Injuries resulting in Temporary Profile (% total profiles)	Total Limited Duty Days (% total days)	Average Limited Duty Days per Injury Type
Sprain/Strain	164 (40%)	80 (34%)	1464 (16%)	18
Tear	61 (15%)	43 (19%)	2635 (29%)	61
Fracture/Break	25 (6%)	22 (10%)	1609 (18%)	73
Nerve injury	19 (5%)	8 (3%)	415 (5%)	52
Blunt Force/Trauma	15 (4%)	12 (5%)	282 (3%)	24
Spinal injury	15 (4%)	8 (3%)	229 (3%)	29
Unspecified pain	14 (3%)	7 (3%)	322 (4%)	46
Bruise/Contusion	13 (3%)	3 (1%)	50 (<1%)	17
Arthritis	10 (2%)	4 (2%)	149 (2%)	37
Heat injury	8 (2%)	3 (1%)	34 (<1%)	11
Cut/Laceration	7 (2%)	4 (2%)	233 (3%)	58
Other/unspecified Overuse	6 (1%)	5 (2%)	64 (<1%)	13
Fasciitis	6 (1%)	5 (2%)	344 (4%)	69
Dislocation	5 (1%)	1 (<1%)	35 (<1%)	35
Abrasion	5 (1%)	3 (1%)	34 (<1%)	11
Blister	4 (<1%)	1 (<1%)	30 (<1%)	30
Bursitis	3 (<1%)	2 (<1%)	270 (3%)	135
Tendinitis	3 (<1%)	3 (1%)	58 (<1%)	19
Spasms	3 (<1%)	1 (<1%)	90 (1%)	90
Cold injury	2 (<1%)	2 (<1%)	5 (<1%)	3
Unknown	9 (2%)	4 (2%)	179 (2%)	45
Other	15 (4%)	11 (5%)	664 (7%)	60
Total	412 (100%)	232 (100%)	8985 (100%)	39

6.6.4 Mechanisms of Injuries

Reported mechanisms of injuries are shown in Table 35, as reported for the first- and second-most physically limiting injury. Overuse/repetitive activity was reported as the mechanism resulting in the most injuries, temporary profiles, and associated limited duty days (46 percent of all injuries, 45 percent of all temporary profiles, and 44 percent of all limited duty days). Injuries from “falling onto an object/surface/ground” were predominantly due to falls from a level surface (60 percent); “contact (hit by/against an object/surface)” responses were further specified as involving a football, tree, car door, barbell, and the ground. “Other” injury mechanisms included pothole, a car accident, and uneven road.

Table 35. Distribution (%) of injury mechanisms and limited duty days (n=412 Injuries)

Injury Cause	Total Injuries n (%)	Total Injuries Resulting in Temporary Profile (% total profiles)	Total Limited Duty Days (% total days)	Average Limited Duty Days per Injury Type
Overuse/repetitive activity	189 (46%)	105 (45%)	3918 (44%)	37
Single overexertion/twisting effort	70 (17%)	39 (17%)	1403 (16%)	36
Falling onto an object/surface/ground	67 (16%)	37 (16%)	1332 (15%)	36
Contact (hit by/against an object/surface)	27 (7%)	19 (8%)	784 (9%)	41
Direct contact by a person	13 (3%)	9 (4%)	444 (5%)	49
Heat injury	8 (2%)	3 (1%)	34 (<1%)	11
Cut or puncture by a sharp tool, object, or instrument	5 (1%)	2 (<1%)	14 (<1%)	7
Insect bite	2 (<1%)	1 (<1%)	60 (<1%)	60
Cold injury	2 (<1%)	2 (<1%)	5 (<1%)	3
Unknown	5 (1%)	1 (<1%)	180 (2%)	180
Other	24 (6%)	14 (<1%)	811 (9%)	58
Total	412 (100%)	232 (100%)	8985 (100%)	39

6.6.5 Activities Associated with Injuries

Activities associated with the first- and second-most physically limiting injuries among survey respondents are listed in Table 36. Running for physical training was the most common activity associated with injuries (27 percent), followed by marching with a load (22 percent) and weight

training (10 percent). Running was also associated with the most temporary profiles (32 percent of all profiles) and the most resulting limited duty days (28 percent of all limited duty days). Examples of specified “Other physical training” responses were obstacle course, airborne operation, push-ups, and sit-ups. Some “Sports/recreation” responses were specified as basketball, football, cycling, and Ultimate Frisbee. “Riding, driving, or moving in/around a motor vehicle” responses were predominantly referring to riding in a civilian vehicle (55 percent). “Other” responses included a fall, bounding to cover, and piloting a water-jet pack. Many injuries during running (61 percent), marching with a load (62 percent), and weightlifting (58 percent) were associated with overuse/repetitive activities.

Table 36. Distribution (%) of injury activities and limited duty days (n=412 injuries)

Injury Activity	Total Injuries n (%)	Total Injuries Resulting in Temporary Profile (% total profiles)	Total Limited Duty Days (% total days)	Average Limited Duty Days per Injury Type
Physical training (running)	113 (27%)	74 (32%)	2514 (28%)	31
Marching – with load	93 (22%)	48 (21%)	1795 (20%)	33
Physical training (weight lifting)	43 (10%)	19 (8%)	678 (8%)	36
Lifting or moving heavy objects	35 (8%)	18 (8%)	957 (11%)	49
Other physical training	31 (8%)	17 (8%)	482 (5%)	28
Sports/recreation	20 (5%)	14 (6%)	378 (4%)	27
Walking or hiking	13 (3%)	5 (2%)	204 (2%)	41
Riding, driving, or moving in/around a motorized vehicle	11 (3%)	8 (3%)	489 (5%)	61
Stepping/climbing	8 (2%)	4 (2%)	154 (2%)	39
Combatives training	7 (1%)	3 (1%)	290 (3%)	97
Marching – no load	3 (<1%)	1 (<1%)	45 (<1%)	45
Repairing or maintaining equipment	3 (<1%)	1 (<1%)	14 (<1%)	14
Other	23 (6%)	17 (7%)	777 (9%)	46
Unknown	9 (2%)	3 (1%)	208 (2%)	-
Total	412 (100%)	232 (100%)	8985 (100%)	39

6.6.6 Impact of Injuries

When asked what impact each injury had on respondents’ physical activity or job duties, the most common response was “Some impact” (32 percent), shown in Table 37. Of the 236 injured Soldiers on profile, 177 (75 percent) indicated that they knew what alternative exercises can be performed while on profile. Fourteen percent indicated that they were unaware of appropriate exercises and 11 percent said that they could still perform unit PT while on profile.

Table 37. Self-assessed impact of injury (n=236 Injuries)

Survey question	Responses	n (%)
What impact does your injury have on your physical activity or job duties?	No impact	90 (22%)
	Little impact	97 (24%)
	Some impact	133 (32%)
	Significant impact	63 (15%)
	Unable to perform military duties as assigned	23 (6%)
	Other	6 (1%)

6.7 Factors Associated with Injury

6.7.1 Injury Rate Ratios: All Variables

Comparisons of cumulative injury incidence rates (past 6 months) across variable categories (Table 38) suggested that the following factors were associated with injury ($p \leq 0.10$):

- *Demographic and personal characteristics*: older age, higher rank, low or high BMI;
- *Health behaviors*: being a former smokeless tobacco user;
- *Self-assessed fitness*: lower self-assessed endurance, any response other than “greater than average” self-assessed sprint speed; “slightly less than average” self-assessed strength; “greater than average,” “slightly less than average,” or “far less than average” self-assessed flexibility;
- *Most recent APFT performance*: not reporting APFT push-up repetitions, 61-68 APFT sit-ups or not reporting sit-up repetitions, slower 2-mile run times or not reporting run time;
- *Unit PT perceptions and participation*: participation in any unit PT, assessment of PT as “hard” or “challenging,” having a program that is based on a combination of programs, running one or four times per week, conducting sprint or interval training fewer than three times per week, participating in sprint or interval training for 30 minutes or less during each session, participating in calisthenics two or more times per week or not participating in calisthenics, participating in calisthenics for 1-30 minutes per session, not reporting average frequency or duration of cross-training participation, not participating in agility drills, conducting agility drills for thirty or fewer minutes per session, conducting resistance training for 31-60 minutes per session, participating in road marching three times per month, road marching for one to 6 miles per session;
- *Personal PT perceptions and participation*: having the goal to lose weight; basing PT on a combination of programs or “other” programs; running zero times, once, or twice per week;

running for 2 or fewer miles per session; having a weekly running mileage total of 4 or fewer miles per week; conducting sprint or interval training fewer than once per week; not participating in calisthenics; not participating in cross-training exercises or participating twice per week; participating in agility drills fewer than once per week or participating twice per week; not participating in resistance training or participating more than four times per week; participating in resistance training for 31 or more minutes per session or not reporting average duration of resistance training sessions; not participating in other aerobic activities or participating four or more times per week;

- *Physical job requirements*: having a job that requires no lifting or light lifting; and
- *Unit leadership support*: the perception that new Soldiers are not given enough time to adapt to PT, the perception that leadership does not encourage safe PT, the perception that leadership rarely or never provides recommendations to reduce injuries, the perception that leadership rarely or never provides the status of unit injuries, and the perception that the respondents' current unit has a higher than average injury rate.

All respondents who reported participation in unit and personal PT were included in the calculations of percent injured and rate ratios, even if they did not report participation in that specific activity type, in order to capture the effects of non-participation on injury likelihood. If frequency of an activity was reported but duration was not, duration was recorded as "missing"; the converse was also handled the same way.

Table 38. Comparison of cumulative injury incidence by level of demographic, health behavior, fitness, unit PT, personal PT, and leadership support factors for 1-30BN and 3-15BN Soldiers

Variable category			Total n	% injured (past 6 months)	Rate Ratio (95% CI)	p-value
Demographics	Age	≤25	474	34%	1.00	
		26-34	297	40%	1.19(0.98-1.43)	0.08
		≥35	60	52%	1.53(1.16-2.02)	<0.01
	Gender	Male	825	37%	1.00	
		Female	6	33%	0.89(0.29-2.78)	0.84
	Rank	E1-E4	553	35%	1.00	
		E5-E9	200	39%	1.09(0.88-1.34)	0.44
		O1-O5	78	47%	1.34(1.03-1.73)	0.04
Battalion	1-30	337	39%	1.09(0.91-1.30)	0.36	
	3-15	494	36%	1.00		
Personal characteristics	BMI	≤18.4	8	63%	1.84(1.05-3.23)	0.09
		18.5-24.9	295	34%	1.00	
		25-27.5	280	33%	0.97(0.77-1.22)	0.79
		27.6-29.9	154	40%	1.19(0.93-1.53)	0.18
		≥30	84	56%	1.65(1.29-2.12)	<0.01
		Not able to calculate	10	40%	1.18(0.54-2.56)	0.69
	Occupation group	Combat Arms	681	37%	1.16(0.87-1.54)	0.32
		Combat Services	41	46%	1.43(0.93-2.19)	0.12
		Combat Services Support	108	32%	1.00	
		Not answered	1	100%	n/a	n/a

Variable category			Total n	% injured (past 6 months)	Rate Ratio (95% CI)	p-value
Health behaviors	Cigarette smoking status	Current smoker	252	38%	1.06(0.89-1.30)	0.57
		Former smoker	128	41%	1.13(0.89-1.44)	0.33
		Never smoked	451	36%	1.00	
	Smokeless tobacco status	Current user	240	37%	1.06(0.86-1.31)	0.58
		Former user	157	46%	1.33(1.07-1.65)	0.01
		Never used	434	35%	1.00	
	E-cigarette status	Current smoker	92	41%	1.13(0.86-1.47)	0.39
		Former smoker	160	38%	1.02(0.82-1.29)	0.84
		Never smoked	579	37%	1.00	
Health behaviors	Dietary supplement use	Yes	188	41%	1.13(0.93-1.38)	0.24
		No	643	36%	1.00	
Self-assessed fitness	Endurance	Much greater than average	75	28%	1.00	
		Greater than average	323	37%	1.32(0.89-1.94)	0.15
		Average	346	36%	1.28(0.87-1.89)	0.20
		Slightly less than average	68	50%	1.79(1.16-2.76)	<0.01
		Far less than average	19	63%	2.26(1.37-3.72)	<0.01
	Sprint speed	Much greater than average	72	40%	1.35(0.96-1.88)	0.09
		Greater than average	284	30%	1.00	
		Average	387	39%	1.31(1.06-1.63)	0.01
		Slightly less than average	66	47%	1.57(1.15-2.14)	<0.01
		Far less than average	22	59%	1.97(1.34-2.92)	<0.01

Variable category			Total n	% injured (past 6 months)	Rate Ratio (95% CI)	p-value	
Self-assessed fitness	Strength	Much greater than average	79	42%	1.21(0.89-1.65)	0.24	
		Greater than average	261	35%	1.00		
		Average	406	36%	1.05(0.85-1.30)	0.65	
		Slightly less than average	75	47%	1.35(1.01-1.82)	0.05	
		Far less than average	10	50%	1.45(0.76-2.76)	0.32	
	Flexibility	Much greater than average	43	23%	1.00		
		Greater than average	165	39%	1.69(0.95-3.01)	0.05	
		Average	388	34%	1.44(0.82-2.52)	0.17	
		Slightly less than average	179	44%	1.87(1.06-3.31)	0.01	
		Far less than average	56	48%	2.07(1.13-3.80)	0.01	
	Body fat	Much greater than average	10	30%	0.94(0.35-2.52)	0.91	
		Greater than average	76	41%	1.28(0.89-1.86)	0.19	
		Average	414	37%	1.17(0.88-1.55)	0.26	
		Slightly less than average	202	40%	1.26(0.93-1.71)	0.13	
		Far less than average	129	32%	1.00		
	Most recent APFT performance	Pushup repetitions	≤54	148	38%	1.14(0.86-1.50)	0.37
			55-64	212	38%	1.15(0.89-1.47)	0.29
			67-74	209	37%	1.12(0.87-1.44)	0.38
			≥75	228	33%	1.00	
Not reported			34	56%	1.68(1.18-2.38)	0.01	

Variable category			Total n	% injured (past 6 months)	Rate Ratio (95% CI)	p-value
Most recent APFT performance	Sit-up repetitions	≤60	180	38%	1.21(0.92-1.59)	0.17
		61-68	197	44%	1.41(1.09-1.81)	<0.01
		69-77	206	36%	1.14(0.87-1.49)	0.35
		≥78	221	31%	1.00	
		Not reported	27	48%	1.54(1.00-2.39)	0.08
	2-mile run time	≥15.24	190	47%	1.60(1.21-2.12)	<0.01
		14.43-15.23	193	34%	1.15(0.85-1.56)	0.36
		13.50-14.42	208	37%	1.25(0.93-1.68)	0.13
		≤13.49	171	29%	1.00	
		Not reported	69	43%	1.49(1.04-2.12)	0.03
Unit Physical Training	Unit PT participation	Yes	774	35%	1.00	
		No	57	68%	1.95(1.60-2.39)	<0.01
	Frequency of PT participation (times/week)	≤4	82	38%	1.17(0.75-1.82)	0.48
		5	624	35%	1.08(0.75-1.55)	0.67
		≥6	68	33%	1.00	
	Difficulty of Unit PT program	Easy	28	39%	1.37(0.81-2.97)	0.26
		Moderate	167	29%	1.00	
		Somewhat hard	248	32%	1.12(0.83-1.51)	0.45
		Hard	195	41%	1.43(1.07-1.91)	0.02
	What program is your Unit PT based on?	Challenging	136	38%	1.33(0.97-1.83)	0.08
		Traditional Army PT	315	32%	1.05(0.78-1.40)	0.75
		Physical Readiness Training	108	36%	1.19(0.84-1.68)	0.33
		Cross-training	155	30%	1.00	
		Extreme Conditioning	85	40%	1.32(0.93-1.88)	0.13
		Combination of programs	105	46%	1.51(1.10-2.07)	0.01
Other	6	50%	1.65(0.72-3.80)	0.31		

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Variable category		Total n	% injured (past 6 months)	Rate Ratio (95% CI)	p-value	
Unit Physical Training	Frequency of distance running during Unit PT (times/week)	0	12	42%	1.84(0.80-4.24)	0.18
		<1	22	23%	1.00(0.40-2.51)	0.99
		1	83	37%	1.65(0.93-2.92)	0.07
		2	233	36%	1.61(0.95-2.73)	0.06
		3	300	33%	1.44(0.85-2.44)	0.15
		4	67	49%	2.18(1.25-3.79)	<0.01
		≥5	53	23%	1.00	
	Average running distance during Unit PT (miles/session)	0	12	42%	1.31(0.65-2.62)	0.48
		1.0-3.0	259	37%	1.15(0.90-1.47)	0.25
		3.5-4.0	255	36%	1.13(0.89-1.45)	0.32
		≥5.0	248	32%	1.00	
	Total weekly mileage run during Unit PT	0	12	42%	1.28(0.63-2.57)	0.52
		0.5-8	305	36%	1.12(0.87-1.44)	0.39
		9-12	263	35%	1.06(0.81-1.38)	0.66
		≥13	190	33%	1.00	
		missing	4	50%	1.53(0.56-4.17)	0.47
	Frequency of sprint/interval training (times/week)	0	20	60%	3.00(1.55-5.80)	<0.01
		<1	95	35%	1.73(0.94-3.23)	0.07
		1	272	35%	1.77(0.99-3.14)	0.03
		2	241	35%	1.76(0.99-3.15)	0.04
		3	81	32%	1.61(0.85-3.04)	0.13
		≥4	50	20%	1.00	
		<i>missing</i>	15	60%	3.00(1.50-5.99)	<0.01
	Average sprint/interval training duration (minutes/session)	0	20	60%	2.22(1.41-3.52)	<0.01
		1-30	318	37%	1.39(1.00-1.91)	0.04
		31-60	310	34%	1.27(0.91-1.76)	0.14
		≥61	126	27%	1.00	

Variable category		Total n	% injured (past 6 months)	Rate Ratio (95% CI)	p-value	
Unit Physical Training	Frequency of calisthenics (times/week)	0	81	38%	1.45(0.99-2.12)	0.06
		<1	100	36%	1.36(0.94-1.97)	0.11
		1	155	26%	1.00	
		2	159	35%	1.33(0.95-1.86)	0.09
		3	107	38%	1.45(1.02-2.07)	0.04
		≥4	150	38%	1.43(1.03-2.00)	0.03
		missing	22	41%	1.55(0.88-2.73)	0.16
	Average calisthenics duration (minutes/session)	0	82	39%	1.33(0.89-1.99)	0.16
		1-30	321	39%	1.32(0.95-1.83)	0.08
		31-60	264	32%	1.09(0.77-1.54)	0.63
		≥61	106	29%	1.00	
		missing	1	0%	n/a	n/a
	Frequency of cross-training (times/week)	0	49	39%	1.23(0.82-1.86)	0.33
		<1	73	33%	1.05(0.71-1.54)	0.82
		1	191	31%	1.00	
		2	212	36%	1.16(0.88-1.52)	0.30
		3	131	36%	1.12(0.82-1.53)	0.49
		≥4	93	34%	1.10(0.77-1.56)	0.61
		missing	25	52%	1.66(1.08-2.55)	0.04
	Average cross-training duration (minutes/session)	0	50	40%	1.20(0.79-1.81)	0.40
		1-30	239	35%	1.05(0.79-1.41)	0.72
		31-60	339	34%	1.03(0.78-1.35)	0.85
		≥61	141	33%	1.00	
		missing	5	80%	2.42(1.47-3.98)	0.03
	Frequency of agility drills (times/week)	0	110	44%	1.40(1.04-1.89)	0.03
		<1	138	33%	1.05(0.76-1.44)	0.77
		1	196	31%	1.00	
		2	151	33%	1.06(0.78-1.45)	0.69
3		73	36%	1.14(0.79-1.66)	0.48	
≥4		74	39%	1.26(0.89-1.79)	0.21	
missing		32	38%	1.21(0.74-1.97)	0.47	

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Variable category		Total n	% injured (past 6 months)	Rate Ratio (95% CI)	p-value	
Unit Physical Training	Average agility drills duration (minutes/session)	0	110	44%	1.58(1.09-2.30)	0.01
		1-30	320	38%	1.37(0.97-1.91)	0.07
		31-60	235	31%	1.11(0.77-1.60)	0.57
		≥61	105	28%	1.00	
		missing	4	50%	1.81(0.65-5.06)	0.33
	Frequency of resistance training (times/week)	0	92	39%	1.26(0.89-1.76)	0.20
		<1	125	34%	1.08(0.77-1.50)	0.66
		1	170	31%	1.00	
		2	173	37%	1.19(0.88-1.60)	0.26
		3	96	35%	1.14(0.80-1.61)	0.48
		≥4	88	39%	1.24(0.88-1.75)	0.23
		missing	30	27%	0.86(0.45-1.61)	0.62
	Average resistance training duration (minutes/session)	0	92	39%	1.33(0.92-1.93)	0.13
		1-30	253	32%	1.09(0.79-1.50)	0.59
		31-60	289	39%	1.32(0.98-1.79)	0.06
		≥61	133	29%	1.00	
		missing	7	43%	1.46(0.60-3.58)	0.45
	Frequency of road marching (times/month)	0	33	33%	1.09(0.60-1.96)	0.78
		1	75	31%	1.00	
		2	77	39%	1.27(0.82-1.97)	0.29
		3	78	48%	1.57(1.04-2.37)	0.03
		4	289	32%	1.04(0.71-1.52)	0.85
		5	64	41%	1.33(0.84-2.08)	0.22
		≥6	154	32%	1.04(0.69-1.57)	0.86
		missing	4	50%	1.63(0.58-4.60)	0.42
	Average road marching distance (miles/session)	0	33	33%	1.11(0.65-1.89)	0.70
		1-6	393	37%	1.25(0.96-1.61)	0.08
		7-8	167	35%	1.16(0.85-1.57)	0.35
≥8.5		180	30%	1.00		
missing		1	100%	n/a	n/a	

Variable category			Total n	% injured (past 6 months)	Rate Ratio (95% CI)	p-value
Unit Physical Training	Total road marching distance (miles/month)	0	33	33%	1.05(0.62-1.78)	0.85
		1-15	142	39%	1.22(0.91-1.64)	0.18
		16-23	165	38%	1.19(0.89-1.58)	0.24
		24-39	230	33%	1.06(0.80-1.39)	0.69
		≥40	199	32%	1.00	
		missing	5	60%	1.90(0.90-3.99)	0.18
	Average weight carried during road march (lbs/session)	0	33	33%	1.06(0.63-1.77)	0.83
		1-39	273	32%	1.00	
		40-49	250	36%	1.16(0.91-1.47)	0.24
		≥50	218	38%	1.21(0.95-1.54)	0.13
	Average road march pound-miles per month (lbs-miles/month)	0	33	33%	1.00(0.60-1.67)	0.99
		1-750	249	36%	1.08(0.85-1.38)	0.53
		751-1472	243	35%	1.06(0.83-1.35)	0.66
		≥1473	245	33%	1.00	
		missing	4	50%	1.49(0.55-4.04)	0.49
Personal Physical Training	Personal PT participation	Yes	688	37%	1.00	
		No	143	38%	1.04(0.83-1.31)	0.75
	What is the goal of your personal PT program?	Lose weight	124	49%	1.55(1.20-2.02)	<0.01
		Gain muscle mass	244	31%	1.00	
		Increase aerobic capacity	24	42%	1.34(0.80-2.23)	0.29
		Increase aerobic capacity and gain muscle mass	188	38%	1.21(0.93-1.58)	0.15
		Maintain current fitness levels	81	37%	1.19(0.85-1.67)	0.33
		Unit PT is not challenging	27	30%	0.95(0.52-1.75)	0.87

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Variable category			Total n	% injured (past 6 months)	Rate Ratio (95% CI)	p-value
Personal Physical Training	What program is your personal PT based on?	Traditional Army PT	183	37%	1.28(0.91-1.83)	0.14
		Physical Readiness Training	39	41%	1.42(0.88-2.29)	0.16
		Cross-training	177	35%	1.22(0.85-1.73)	0.28
		Extreme Conditioning	111	29%	1.00	
		Combination of programs	78	46%	1.60(1.10-2.34)	0.01
		Weight lifting or resistance training	74	36%	1.27(0.83-1.93)	0.28
		<i>Other</i>	26	54%	1.87(1.18-2.96)	0.02
	Frequency of distance running during personal PT (times/week)	0	60	48%	1.86(1.23-2.82)	<0.01
		<1	53	34%	1.31(0.80-2.14)	0.29
		1	102	40%	1.55(1.04-2.31)	0.03
		2	186	41%	1.60(1.11-2.29)	<0.01
		3	172	35%	1.35(0.92-1.97)	0.12
		≥4	108	23%	1.00	
		missing	7	29%	1.10(0.33-3.71)	0.88
	Average running distance during personal PT (miles/session)	0	67	46%	1.57(1.09-2.26)	0.02
		1.0-2.0	229	44%	1.48(1.10-1.99)	<0.01
		2.5-4.0	250	33%	1.13(0.82-1.54)	0.45
		≥4.5	139	29%	1.00	
		missing	3	0%	n/a	n/a
	Total weekly mileage run during personal PT (miles/week)	0	60	48%	1.70(1.21-2.39)	<0.01
		<1-4.0	217	45%	1.59(1.22-2.07)	<0.01
		4.5-9.0	197	35%	1.21(0.91-1.62)	0.19
		≥10.0	204	28%	1.00	
		missing	10	20%	0.70(0.20-2.48)	0.56
	Frequency of sprint/interval training (times/week)	0	137	46%	1.64(1.15-2.34)	<0.01
		<1	83	43%	1.55(1.05-2.29)	0.03
		1	159	33%	1.19(0.82-1.73)	0.36
		2	163	35%	1.25(0.86-1.80)	0.23
		≥3	107	28%	1.00	
		missing	39	41%	1.46(0.90-2.37)	0.14

Variable category		Total n	% injured (past 6 months)	Rate Ratio (95% CI)	p-value	
Personal Physical Training	Average duration of sprint/interval training (minutes/session)	0	176	45%	1.32(1.05-1.65)	0.02
		1-15	299	34%	1.00	
		≥16	201	35%	1.04(0.81-1.32)	0.78
		missing	12	25%	0.73(0.27-1.98)	0.51
	Frequency of calisthenics (times/week)	0	174	43%	1.34(0.99-1.81)	0.06
		<1	88	35%	1.11(0.76-1.62)	0.60
		1	132	32%	1.00	
		2	119	34%	1.06(0.74-1.51)	0.76
		3	71	38%	1.20(0.81-1.76)	0.37
		≥4	67	42%	1.31(0.90-1.92)	0.17
		missing	37	35%	1.10(0.67-1.83)	0.70
	Average duration of calisthenics (minutes/session)	0	211	41%	1.30(0.91-1.87)	0.14
		1-15	224	33%	1.04(0.72-1.52)	0.82
		16-30	79	32%	1.00	
		≥31	127	38%	1.19(0.81-1.77)	0.37
		missing	47	45%	1.41(0.90-2.22)	0.14
	Frequency of cross-training (times/week)	0	153	46%	1.94(1.30-2.90)	<0.01
		<1	60	35%	1.46(0.89-2.42)	0.14
		1	117	31%	1.29(0.82-2.03)	0.27
		2	162	43%	1.81(1.21-2.71)	<0.01
		3	71	34%	1.41(0.87-2.30)	0.17
		≥4	92	24%	1.00	
		missing	33	33%	1.39(0.76-2.55)	0.30
	Average duration of cross-training (minutes/session)	0	186	45%	1.39(1.08-1.79)	<0.01
		1-15	227	32%	1.00	
		16-30	75	36%	1.14(0.79-1.62)	0.49
		≥31	160	37%	1.16(0.88-1.54)	0.29
missing		40	38%	1.18(0.76-1.84)	0.47	
Frequency of agility drills (times/week)	0	235	43%	1.63(1.10-2.40)	<0.01	
	<1	78	41%	1.57(1.00-2.45)	0.05	
	1	127	31%	1.17(0.75-1.83)	0.48	
	2	103	38%	1.45(0.93-2.24)	0.09	
	≥3	84	26%	1.00		
	missing	61	38%	1.44(0.89-2.33)	0.14	

Variable category		Total n	% injured (past 6 months)	Rate Ratio (95% CI)	p-value	
Personal Physical Training	Average duration of agility drills (minutes/session)	0	296	42%	1.32(1.03-1.69)	0.03
		1-15	187	32%	1.00	
		16-30	63	32%	1.01(0.66-1.53)	0.98
		≥31	109	36%	1.13(0.82-1.58)	0.46
		missing	33	42%	1.35(0.86-2.11)	0.22
	Frequency of resistance training (times/week)	0	124	48%	1.75(1.21-2.51)	<0.01
		<1	61	33%	1.18(0.73-1.91)	0.50
		1	101	28%	1.00	
		2	106	35%	1.26(0.84-1.89)	0.27
		3	89	29%	1.05(0.67-1.66)	0.82
		≥4	168	41%	1.48(1.03-2.13)	0.03
	Average duration of resistance training (minutes/session)	missing	39	38%	1.39(0.84-2.30)	0.22
		0	163	46%	1.64(1.24-2.17)	<0.01
		1-15	192	28%	1.00	
		16-30	66	33%	1.19(0.79-1.79)	0.42
		≥31	189	38%	1.34(1.00-1.79)	0.05
	Frequency of other aerobic activities (times/week)	missing	78	42%	1.50(1.07-2.12)	0.02
		0	162	41%	1.29(0.95-1.76)	0.10
		<1	73	33%	1.03(0.68-1.55)	0.91
		1	139	34%	1.06(0.75-1.48)	0.76
2		131	32%	1.00		
3		70	39%	1.20(0.82-1.77)	0.36	
≥4		73	44%	1.37(0.95-1.96)	0.09	
Average duration of other aerobic activities (minutes/session)	missing	41	39%	1.22(0.77-1.92)	0.41	
	0	203	41%	1.35(0.90-2.02)	0.13	
	1-15	215	33%	1.09(0.72-1.65)	0.68	
	16-30	66	30%	1.00		
	≥31	146	40%	1.31(0.86-1.99)	0.19	
Physical job requirements	Amount of lifting required for job	missing	58	40%	1.31(0.81-2.12)	0.28
		None/Light	94	50%	1.54(1.16-2.04)	<0.01
		Medium	203	33%	1.00	
		Moderate	272	35%	1.09(0.84-1.40)	0.53
		Heavy	155	37%	1.13(0.85-1.51)	0.40
		Very Heavy	107	41%	1.27(0.94-1.71)	0.13

Variable category			Total n	% injured (past 6 months)	Rate Ratio (95% CI)	p-value
Physical job requirements	Amount of aerobic activity required for job	None/Light	223	36%	1.00	
		Moderate	482	37%	1.01(0.82-1.25)	0.92
		High	126	41%	1.14(0.87-1.49)	0.36
Unit leadership support	Are new Soldiers given time to adapt to Unit PT?	Yes	502	30%	1.00	
		No	272	43%	1.42(1.18-1.72)	<0.01
	Leadership encourages safe PT	Strongly agree	352	32%	1.00	
		Agree	276	36%	1.12(0.90-1.39)	0.32
		Neither agree nor disagree	132	45%	1.38(1.08-1.76)	0.01
		Disagree	47	53%	1.64(1.21-2.23)	<0.01
	Leadership provides recommendations to reduce injury	Strongly disagree	24	50%	1.54(1.01-2.37)	0.08
		Routinely	313	29%	1.00	
		Occasionally	312	37%	1.27(1.01-1.58)	0.04
		Rarely	123	44%	1.49(1.15-1.94)	<0.01
	Leadership provides status of unit injuries	Never	83	58%	1.97(1.53-2.53)	<0.01
		Routinely	241	28%	1.00	
		Occasionally	314	34%	1.21(0.94-1.56)	0.14
		Rarely	140	49%	1.75(1.34-2.27)	<0.01
	Your unit has a higher than average injury rate	Never	136	49%	1.72(1.32-2.24)	<0.01
		Strongly agree	106	43%	1.50(0.99-2.27)	0.05
Agree		184	48%	1.65(1.13-2.42)	<0.01	
Disagree		266	30%	1.03(0.69-1.53)	0.90	
Strongly disagree		76	29%	1.00		
	Not sure	199	38%	1.30(0.88-1.93)	0.18	

Legend

CI = Confidence Interval

Note:

Significant categories ($p \leq 0.10$) are in bold and italics.

6.7.2 Univariate Logistic Regression Results

Univariate logistic regression models were used to inform multivariate regression modeling. Variables associated with injury in these models ($p \leq 0.10$) were subsequently entered into multivariable models. Variables associated with injury in univariate logistic regression models did not differ from variables identified in the rate ratio comparisons above.

The following tables present univariate logistic regression results used to inform multivariate regression modeling. The following variables were associated with injury in univariate logistic regression models (Variable $p \leq 0.10$, Table 39):

- *Demographic and personal characteristics*: older age, high and low BMI;
- *Health behaviors*: being a former smokeless tobacco user;
- *Self-assessed fitness*: poor self-assessed endurance, self-assessed sprint speed of anything other than “greater than average,” self-assessed flexibility that is “greater than average,” “slightly less than average,” or “far less than average”;
- *Most recent APFT performance*: 61-68 APFT sit-ups or not reporting sit-up repetitions, slower or not reported run times;
- *Unit PT perceptions and participation*: having a unit PT program based on a combination of programs, running one, two, or four times per week, conducting sprint or interval training fewer than three times per week, participating in sprint or interval training for thirty or fewer minutes per session, spending thirty or fewer minutes per session on agility drills;
- *Personal PT perceptions and participation*: having the goal to lose weight; conducting distance running zero, one, or two times per week; running 2 or fewer miles per session; running 4 or fewer miles per week; participating in sprint or interval training less than once per week; not participating in cross-training or participating twice per week; conducting agility drills less than once per week or twice per week, not participating in resistance training or participating four or more times per week; and conducting resistance training for 31 or more minutes per session;
- *Physical job requirements*: having a job that requires little or no lifting;
- *Unit leadership support*: the perception that leadership does not allow new Soldiers time to adapt to unit PT, the perception that leadership does not encourage safe PT, the perception that leadership infrequently provides recommendations to reduce injury, the perception that leadership infrequently provides the status of unit injuries, and the belief that respondents’ current unit has a higher than average rate of injury.

Other factors were seen to be significantly associated with injury, even though the overall variable was not found to be a significant predictor (i.e., variable p -value > 0.10 but category p -value ≤ 0.10): *Demographic or personal characteristics*: officer rank; *Self-assessed fitness*: “slightly less than average” self-assessed strength; *Most recent APFT scores*: not reported APFT push-up repetitions; *Unit PT perceptions and participation*: “hard” or “challenging” reported difficulty of unit PT program, not participating in calisthenics or participating two or more times per week, participating in calisthenics for 1-30 minutes per session, not reporting an average weekly frequency of cross-training participation, not participating in agility drills, conducting resistance training for 31-60 minutes per session, road marching three times per month, road marching one to 6 miles per session; *Personal PT perceptions and participation*: basing personal PT on a combination of programs, not including calisthenics, spending zero minutes on cross-training, spending zero minutes on agility drills, and not participating in other aerobic activities or participating four or more times per week.

Table 39. Univariate logistic regression results: potential injury risk factors for 1-30BN and 3-15BN Soldiers

Variable category			Total n	% injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
Demographics	Age	≤25	474	34%	1.00		0.01
		26-34	297	40%	1.31(0.97-1.77)	0.08	
		≥35	60	52%	2.10(1.22-3.60)	<0.01	
	Gender	Male	825	37%	1.00		0.84
		Female	6	33%	0.84(0.15-4.61)	0.84	
	Rank	E1-E4	553	35%	1.00		0.12
		E5-E9	200	39%	1.14(0.82-1.59)	0.44	
		O1-O5	78	47%	1.64(1.02-2.65)	0.04	
Battalion	1-30	337	39%	1.14(0.86-1.52)	0.36	0.84	
	3-15	494	36%	1.00			
Personal characteristics	BMI	≤18.4	8	63%	1.97(1.21-3.21)	0.04	<0.01
		18.5-24.9	295	34%	1.00		
		25-27.5	280	33%	0.95(0.68-1.35)	0.79	
		27.6-29.9	154	40%	1.31(0.88-1.97)	0.18	
		≥30	84	56%	2.48(1.51-4.06)	<0.01	
		Not able to calculate	10	40%	1.30(0.36-4.71)	0.69	
Personal characteristics	Occupation group	Combat Arms	681	37%	1.25(0.81-1.92)	0.31	0.47
		Combat Services	41	46%	1.80(0.86-3.75)	0.12	
		Combat Services Support	108	32%	1.00		
		Not answered	1	100%	n/a	>0.99	
Health behaviors	Cigarette Smoking Status	Current smoker	252	38%	1.10(0.80-1.51)	0.57	0.60
		Former smoker	128	41%	1.22(0.82-1.82)	0.33	
		Never smoked	451	36%	1.00		
	Smokeless tobacco status	Current user	240	37%	1.10(0.79-1.52)	0.58	0.04
		Former user	157	46%	1.60(1.11-2.32)	0.01	
		Never used	434	35%	1.00		
	E-cigarette status	Current smoker	92	41%	1.22(0.78-1.91)	0.39	0.69
Former smoker		160	38%	1.04(0.72-1.49)	0.84		
Never smoked		579	37%	1.00			

Variable category			Total n	% injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
Health behaviors	Dietary supplement use	Yes	188	41%	1.22(0.88-1.70)	0.24	0.24
		No	643	36%	1.00		
Self-assessed fitness	Endurance	Much greater than average	75	28%	1.00		0.01
		Greater than average	323	37%	1.50(0.86-2.49)	0.15	
		Average	346	36%	1.44(0.83-2.49)	0.20	
		<i>Slightly less than average</i>	68	50%	<i>2.57(1.29-5.14)</i>	<0.01	
		<i>Far less than average</i>	19	63%	<i>4.41(1.53-12.72)</i>	<0.01	
Self-assessed fitness	Sprint speed	<i>Much greater than average</i>	72	40%	<i>1.58(0.93-2.70)</i>	0.09	<0.01
		Greater than average	284	30%	1.00		
		Average	387	39%	<i>1.51(1.09-2.10)</i>	0.01	
		<i>Slightly less than average</i>	66	47%	<i>2.07(1.20-3.58)</i>	<0.01	
		<i>Far less than average</i>	22	59%	<i>3.38(1.39-8.21)</i>	<0.01	
	Strength	Much greater than average	79	42%	1.36(0.82-2.28)	0.24	0.27
		Greater than average	261	35%	1.00		
		Average	406	36%	1.08(0.78-1.49)	0.65	
		<i>Slightly less than average</i>	75	47%	<i>1.66(0.99-2.80)</i>	0.06	
		Far less than average	10	50%	1.90(0.54-6.74)	0.32	

Variable category			Total n	% injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
Self-assessed fitness	Flexibility	Much greater than average	43	23%	1.00		0.02
		Greater than average	165	39%	2.15(0.99-4.65)	0.05	
		Average	388	34%	1.66(0.80-3.48)	0.17	
		Slightly less than average	179	44%	2.55(1.18-5.49)	0.02	
		Far less than average	56	48%	3.07(1.27-7.41)	0.01	
	Body fat	Much greater than average	10	30%	0.92(0.23-3.74)	0.91	0.56
		Greater than average	76	41%	1.48(0.82-2.66)	0.19	
		Average	414	37%	1.27(0.84-1.94)	0.26	
		Slightly less than average	202	40%	1.44(0.90-2.29)	0.13	
		Far less than average	129	32%	1.00		
Most recent APFT performance	Pushup repetitions	≤54	148	38%	1.22(0.79-1.87)	0.37	0.17
		55-64	212	38%	1.24(0.84-1.83)	0.29	
		67-74	209	37%	1.19(0.80-1.76)	0.38	
		≥75	228	33%	1.00		
		Not reported	34	56%	2.53(1.22-5.26)	0.01	
	Sit-up repetitions	≤60	180	38%	1.34(0.88-2.02)	0.17	0.08
		61-68	197	44%	1.71(1.14-2.55)	<0.01	
		69-77	206	36%	1.24(0.83-1.85)	0.30	
		≥78	221	31%	1.00		
		Not reported	27	48%	2.05(0.91-4.58)	0.08	
	2-mile run time	≥15.24	190	47%	2.13(1.38-3.30)	<0.01	<0.01
		14.43-15.23	193	34%	1.23(0.79-1.92)	0.36	
		13.50-14.42	208	37%	1.39(0.90-2.15)	0.13	
≤13.49		171	29%	1.00			
Not reported		69	43%	1.86(1.04-3.32)	0.04		
Unit Physical Training	Unit PT participation	Yes	774	35%	1.00		<0.01
		No	57	68%	4.02(2.26-7.17)	<0.01	

Variable category			Total n	% injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
Unit Physical Training	Frequency of PT participation (times/week)	≤4	82	38%	1.27(0.65-2.50)	0.49	0.78
		5	624	35%	1.12(0.66-1.92)	0.67	
		≥6	68	33%	1.00		
	Difficulty of Unit PT program	Easy	28	39%	1.60(0.70-3.68)	0.26	0.11
		Moderate	167	29%	1.00		
		Somewhat hard	248	32%	1.18(0.77-1.81)	0.45	
		Hard	195	41%	1.73(1.11-2.68)	0.02	
	What program is your Unit PT based on?	Challenging	136	38%	1.54(0.95-2.48)	0.08	0.08
		Traditional Army PT	315	32%	1.07(0.71-1.62)	0.75	
		Physical Readiness Training	108	36%	1.30(0.77-2.19)	0.33	
		Cross-training	155	30%	1.00		
		Extreme Conditioning	85	40%	1.53(0.88-2.66)	0.13	
		Combination of programs	105	46%	1.94(1.16-3.24)	0.01	
	Frequency of distance running during Unit PT (times/week)	0	12	42%	2.14(0.59-7.75)	0.25	0.07
		<1	22	23%	1.01(0.31-3.29)	0.99	
		1	83	37%	2.04(0.93-4.45)	0.08	
		2	233	36%	1.96(0.98-3.94)	0.06	
		3	300	33%	1.66(0.83-3.30)	0.15	
		4	67	49%	3.32(1.49-7.40)	<0.01	
		≥5	53	23%	1.00		
		missing	4	50%	6.83(0.57-82.02)	0.13	
Average running distance during Unit PT (miles/session)	0	12	42%	1.53(0.47-4.96)	0.48	0.62	
	1.0-3.0	259	37%	1.24(0.86-1.79)	0.25		
	3.5-4.0	255	36%	1.21(0.83-1.75)	0.32		
	≥5.0	248	32%	1.00			
Total weekly mileage run during Unit PT	0	12	42%	1.48(0.45-4.83)	0.52	0.85	
	0.5-8	305	36%	1.18(0.81-1.73)	0.39		
	9-12	263	35%	1.09(0.74-1.62)	0.66		
	≥13	190	33%	1.00			
	missing	4	50%	2.07(0.28-15.00)	0.47		

Variable category		Total n	% injured	Odds Ratio (95% CI)	Category p-values	Variable p-value	
Unit Physical Training	Frequency of sprint/interval training (times/week)	0	20	60%	6.00(1.94-18.60)	<0.01	0.03
		<1	95	35%	2.13(0.95-4.79)	0.07	
		1	272	35%	2.18(1.05-4.56)	0.04	
		2	241	35%	2.18(1.04-4.58)	0.04	
		3	81	32%	1.89(0.82-4.36)	0.14	
		≥4	50	20%	1.00		
		<i>missing</i>	15	60%	6.00(1.73-20.81)	<0.01	
	Average sprint/interval training duration (minutes/session)	0	20	60%	4.06(1.53-10.79)	<0.01	0.02
		1-30	318	37%	1.62(1.03-2.55)	0.04	
		31-60	310	34%	1.41(0.89-2.22)	0.15	
		≥61	126	27%	1.00		
	Frequency of calisthenics (times/week)	0	81	38%	1.72(0.97-3.06)	0.06	0.34
		<1	100	36%	1.56(0.91-2.69)	0.11	
		1	155	26%	1.00		
		2	159	35%	1.51(0.93-2.45)	0.09	
		3	107	38%	1.73(1.02-2.93)	0.04	
		≥4	150	38%	1.70(1.05-2.77)	0.03	
		<i>missing</i>	22	41%	1.93(0.77-4.84)	0.16	
	Average calisthenics duration (minutes/session)	0	82	39%	1.55(0.84-2.85)	0.16	0.27
		1-30	321	39%	1.52(0.95-2.45)	0.08	
		31-60	264	32%	1.13(0.69-1.85)	0.63	
		≥61	106	29%	1.00		
		<i>missing</i>	1	0%	n/a	>0.99	
	Frequency of cross-training (times/week)	0	49	39%	1.38(0.72-2.65)	0.33	0.58
		<1	73	33%	1.07(0.60-1.90)	0.82	
		1	191	31%	1.00		
		2	212	36%	1.25(0.82-1.89)	0.30	
		3	131	36%	1.18(0.74-1.89)	0.49	
≥4		93	34%	1.15(0.68-1.94)	0.61		
<i>missing</i>		25	52%	2.37(1.02-5.49)	0.05		

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Variable category		Total n	% injured	Odds Ratio (95% CI)	Category p-values	Variable p-value	
Unit Physical Training	Average cross-training duration (minutes/session)	0	50	40%	1.33(0.69-2.59)	0.40	0.40
		1-30	239	35%	1.08(0.70-1.68)	0.72	
		31-60	339	34%	1.04(0.69-1.58)	0.85	
		≥61	141	33%	1.00		
		missing	5	80%	8.00(0.87-73.59)	0.07	
	Frequency of agility drills (times/week)	0	110	44%	1.71(1.06-2.78)	0.03	0.41
		<1	138	33%	1.07(0.67-1.71)	0.77	
		1	196	31%	1.00		
		2	151	33%	1.10(0.70-1.73)	0.69	
		3	73	36%	1.22(0.70-2.16)	0.48	
		≥4	74	39%	1.43(0.82-2.49)	0.21	
		missing	32	38%	1.33(0.61-2.89)	0.47	
	Average agility drills duration (minutes/session)	0	110	44%	2.03(1.15-3.59)	0.02	0.06
		1-30	320	38%	1.57(0.97-2.55)	0.07	
		31-60	235	31%	1.16(0.70-1.93)	0.57	
		≥61	105	28%	1.00		
		missing	4	50%	2.62(0.35-19.48)	0.35	
	Frequency of resistance training (times/week)	0	92	39%	1.42(0.84-2.41)	0.20	0.73
		<1	125	34%	1.12(0.68-1.83)	0.66	
		1	170	31%	1.00		
2		173	37%	1.30(0.83-2.03)	0.26		
3		96	35%	1.21(0.71-2.06)	0.48		
≥4		88	39%	1.39(0.81-2.38)	0.23		
missing		30	27%	0.80(0.34-1.92)	0.62		
Average resistance training duration (minutes/session)	0	92	39%	1.55(0.88-2.72)	0.13	0.24	
	1-30	253	32%	1.14(0.72-1.79)	0.59		
	31-60	289	39%	1.53(0.98-2.37)	0.06		
	≥61	133	29%	1.00			
	missing	7	43%	1.81(0.39-8.46)	0.45		

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Variable category		Total n	% injured	Odds Ratio (95% CI)	Category p-values	Variable p-value	
Unit Physical Training	Frequency of road marching (times/month)	0	33	33%	1.13(0.47-2.71)	0.78	0.15
		1	75	31%	1.00		
		2	77	39%	1.44(0.74-2.82)	0.28	
		3	78	48%	2.15(1.11-4.16)	0.02	
		4	289	32%	1.06(0.61-1.83)	0.85	
		5	64	41%	1.55(0.77-3.12)	0.22	
		≥6	154	32%	1.06(0.58-1.92)	0.86	
		missing	4	50%	2.26(0.30-17.05)	0.43	
	Average road marching distance (miles/session)	0	33	33%	1.17(0.53-2.57)	0.70	0.56
		1-6	393	37%	1.39(0.96-2.04)	0.09	
		7-8	167	35%	1.24(0.79-1.95)	0.35	
		≥8.5	180	30%	1.00		
		missing	1	100%	n/a	n/a	
	Total road marching distance (miles/month)	0	33	33%	1.08(0.49-2.36)	0.85	0.57
		1-15	142	39%	1.37(0.87-2.14)	0.18	
		16-23	165	38%	1.30(0.84-2.01)	0.24	
		24-39	230	33%	1.09(0.72-1.63)	0.69	
		≥40	199	32%	1.00		
		missing	5	60%	3.24(0.53-19.87)	0.20	
	Average weight carried during road march (lbs/session)	0	33	33%	1.09(0.51-2.34)	0.83	0.45
		1-39	273	32%	1.00		
		40-49	250	36%	1.24(0.87-1.79)	0.24	
		≥50	218	38%	1.34(0.92-1.94)	0.13	
	Average road march pound-miles per month (lbs-miles/month)	0	33	33%	0.99(0.46-2.15)	0.99	0.93
		1-750	249	36%	1.13(0.78-1.63)	0.53	
		751-1472	243	35%	1.09(0.75-1.58)	0.66	
		≥1473	245	33%	1.00		
		missing	4	50%	1.99(0.28-14.37)	0.50	

Variable category		Total n	% injured	Odds Ratio (95% CI)	Category p-values	Variable p-value	
Personal Physical Training	Personal PT participation	Yes	688	37%	1.00		0.75
		No	143	38%	1.06(0.73-1.54)	0.75	
	What is the goal of your personal PT program?	Lose weight	124	49%	2.23(0.91-5.47)	0.08	0.05
		Gain muscle mass	244	31%	1.00		
		Increase aerobic capacity	24	42%	1.70(0.53-5.40)	0.37	
		Increase aerobic capacity and gain muscle mass	188	38%	1.44(0.60-3.47)	0.41	
		Maintain current fitness levels	81	37%	1.40(0.55-3.58)	0.49	
		Unit PT is not challenging	27	30%	1.07(0.45-2.56)	0.87	
	What program is your personal PT based on?	Traditional Army PT	183	37%	1.46(0.88-2.43)	0.15	0.15
		Physical Readiness Training	39	41%	1.72(0.80-3.67)	0.16	
		Cross-training	177	35%	1.33(0.80-2.23)	0.28	
		Extreme Conditioning	111	29%	1.00		
		Combination of programs	78	46%	2.12(1.16-3.88)	0.02	
		Weight lifting or resistance training	74	36%	1.42(0.76-2.65)	0.27	
		<i>Other</i>	26	54%	2.88(1.20-6.90)	0.02	
	Frequency of distance running during personal PT (times/week)	0	60	48%	2.67(1.38-5.20)	<0.01	0.07
		<1	53	34%	1.47(0.72-3.00)	0.29	
		1	102	40%	1.92(1.07-3.45)	0.03	
		2	186	41%	2.02(1.20-3.40)	<0.01	
		3	172	35%	1.53(0.90-2.61)	0.12	
≥4		108	23%	1.00			
missing		7	29%	1.10(0.33-3.71)	0.88		
Average running distance during personal PT (miles/session)	0	67	46%	2.06(1.13-3.76)	0.02	0.02	
	1.0-2.0	229	44%	1.85(1.18-2.90)	<0.01		
	2.5-4.0	250	33%	1.19(0.76-1.86)	0.45		
	≥4.5	139	29%	1.00			
	missing	3	0%	n/a	n/a		

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Variable category		Total n	% injured	Odds Ratio (95% CI)	Category p-values	Variable p-value	
Personal Physical Training	Total weekly mileage run during personal PT (miles/week)	0	60	48%	1.78(1.18-2.69)	<0.01	<0.01
		<1-4.0	217	45%	2.07(1.38-3.11)	<0.01	
		4.5-9.0	197	35%	1.33(0.87-2.03)	0.19	
		≥10.0	204	28%	1.00		
		missing	10	20%	0.63(0.13-3.05)	0.57	
	Frequency of sprinting/interval training (times/week)	0	137	46%	2.19(1.27-3.75)	<0.01	0.05
		<1	83	43%	1.97(1.07-3.60)	0.03	
		1	159	33%	1.28(0.75-2.19)	0.36	
		2	163	35%	1.38(0.81-2.35)	0.23	
		≥3	107	28%	1.00		
		missing	39	41%	1.79(0.83-3.84)	0.14	
	Average duration of sprint/interval training (minutes/session)	0	176	45%	1.57(1.07-2.30)	0.02	0.08
		1-15	299	34%	1.00		
		≥16	201	35%	1.06(0.73-1.54)	0.78	
		missing	12	25%	0.64(0.17-2.43)	0.52	
	Frequency of calisthenics (times/week)	0	211	43%	1.59(0.99-2.55)	0.06	0.52
		<1	88	35%	1.17(0.66-2.06)	0.60	
		1	132	32%	1.00		
		2	119	34%	1.09(0.64-1.84)	0.78	
		3	71	38%	1.32(0.72-2.40)	0.37	
		≥4	67	42%	1.54(0.84-2.83)	0.17	
		missing	37	35%	1.16(0.54-2.50)	0.70	
	Average duration of calisthenics (minutes/session)	0	211	41%	1.52(0.88-2.62)	0.14	0.26
		1-15	224	33%	1.07(0.62-1.85)	0.82	
16-30		79	32%	1.00			
≥31		127	38%	1.31(0.72-2.38)	0.37		
missing		47	45%	1.75(0.83-3.68)	0.14		
Frequency of cross-training (times/week)	0	153	46%	2.76(1.55-4.90)	<0.01	<0.01	
	<1	60	35%	1.71(0.84-3.50)	0.14		
	1	117	31%	1.41(0.76-2.63)	0.27		
	2	162	43%	2.42(1.37-4.29)	<0.01		
	3	71	34%	1.63(0.82-3.23)	0.17		
	≥4	92	24%	1.00			
	missing	33	33%	1.59(0.67-3.79)	0.29		

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Variable category		Total n	% injured	Odds Ratio (95% CI)	Category p-values	Variable p-value	
Personal Physical Training	Average duration of cross-training (minutes/session)	0	186	45%	1.70(1.14-2.54)	0.01	0.15
		1-15	227	32%	1.00		
		16-30	75	36%	1.21(0.70-2.10)	0.49	
		≥31	160	37%	1.26(0.82-1.93)	0.29	
		missing	40	38%	1.29(0.64-2.60)	0.47	
	Frequency of agility drills (times/week)	0	235	43%	2.09(1.20-3.62)	0.01	0.08
		<1	78	41%	1.96(1.01-3.81)	0.05	
		1	127	31%	1.25(0.68-2.31)	0.48	
		2	103	38%	1.72(0.92-3.22)	0.09	
		≥3	84	26%	1.00		
		missing	61	38%	1.71(0.84-3.47)	0.14	
	Average duration of agility drills (minutes/session)	0	296	42%	1.54(1.05-2.27)	0.03	0.18
		1-15	187	32%	1.00		
		16-30	63	32%	1.01(0.55-1.86)	0.98	
		≥31	109	36%	1.21(0.73-1.99)	0.46	
		missing	33	42%	1.60(0.75-3.41)	0.22	
	Frequency of resistance training (times/week)	0	124	48%	2.44(1.40-4.28)	<0.01	0.02
		<1	61	33%	1.27(0.64-2.54)	0.49	
		1	101	28%	1.00		
		2	106	35%	1.40(0.77-2.53)	0.27	
		3	89	29%	1.08(0.57-2.02)	0.82	
		≥4	168	41%	1.82(1.07-3.10)	0.03	
		missing	39	38%	1.63(0.75-3.50)	0.22	
	Average duration of resistance training (minutes/session)	0	163	46%	2.18(1.40-3.38)	<0.01	0.01
1-15		192	28%	1.00			
16-30		66	33%	1.28(0.70-2.33)	0.42		
≥31		189	38%	1.54(1.00-2.37)	0.05		
missing		78	42%	1.87(1.08-3.24)	0.03		
Frequency of other aerobic activities (times/week)	0	162	41%	1.49(0.92-2.42)	0.10	0.51	
	<1	73	33%	1.06(0.57-1.95)	0.85		
	1	139	34%	1.08(0.65-1.80)	0.76		
	2	131	32%	1.00			
	3	70	39%	1.33(0.73-2.44)	0.36		
	≥4	73	44%	1.65(0.92-2.98)	0.10		
	missing	41	39%	1.36(0.66-2.81)	0.41		

Variable category		Total n	% injured	Odds Ratio (95% CI)	Category p-values	Variable p-value	
Personal Physical Training	Average duration of other aerobic activities (minutes/session)	0	203	41%	1.59(0.88-2.88)	0.13	0.32
		1-15	215	33%	1.13(0.62-2.06)	0.68	
		16-30	66	30%	1.00		
		≥31	146	40%	1.52(0.82-2.82)	0.19	
		missing	58	40%	1.51(0.72-3.18)	0.28	
Physical job requirements	Amount of lifting required for job	None/Light	94	50%	2.08(1.26-3.42)	<0.01	0.05
		Medium	203	33%	1.00		
		Moderate	272	35%	1.13(0.77-1.66)	0.53	
		Heavy	155	37%	1.21(0.78-1.87)	0.40	
		Very Heavy	107	41%	1.45(0.89-2.35)	0.13	
	Amount of aerobic activity required for job	None/Light	223	36%	1.00		0.60
		Moderate	482	37%	1.02(0.73-1.42)	0.92	
High		126	41%	1.23(0.79-1.93)	0.36		
Unit leadership support	Are new Soldiers given time to adapt to Unit PT?	Yes	502	30%	1.00		<0.01
		No	272	43%	1.75(1.29-2.37)	<0.01	
	Leadership encourages safe PT	Strongly agree	352	32%	1.00		0.10
		Agree	276	36%	1.19(0.85-1.65)	0.32	
		Neither agree nor disagree	132	45%	1.69(1.12-2.54)	0.01	
		Disagree	47	53%	2.37(1.28-4.39)	<0.01	
		Strongly disagree	24	50%	2.09(0.91-4.79)	0.08	
	Leadership provides recommendations to reduce injury	Routinely	313	29%	1.00		<0.01
		Occasionally	312	37%	1.42(1.02-1.99)	0.04	
		Rarely	123	44%	1.88(1.22-2.89)	<0.01	
		Never	83	58%	3.29(2.00-5.43)	<0.01	
	Leadership provides status of unit injuries	Routinely	241	28%	1.00		<0.01
		Occasionally	314	34%	1.32(0.91-1.89)	0.14	
Rarely		140	49%	2.47(1.60-3.82)	<0.01		
Never		136	49%	2.40(1.55-3.72)	<0.01		

Variable category		Total n	% injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
Your unit has a higher than average injury rate	Strongly agree	106	43%	1.88(1.01-3.52)	0.05	<0.01
	Agree	184	48%	2.25(1.27-3.99)	<0.01	
	Disagree	266	30%	1.04(0.59-1.82)	0.90	
	Strongly disagree	76	29%	1.00		
	Not sure	199	38%	1.30(0.88-1.93)	0.18	

Legend:

CI = Confidence Interval

Notes:

Significant variables (p≤0.10) are in bold. Significant categories (p≤0.10) are in bold and italics.

6.7.3 Multivariable Logistic Regression – Self-Assessed Fitness

The first multivariable model assessed the association of self-assessed fitness with injury, adjusting for demographics and fitness and health variables that were statistically significantly associated with injury in univariate models. In the first step, statistically significant self-assessed fitness variables were regressed against injury risk (Table 40). Those variables remaining in the multivariable backward-stepping logistic regression model were then regressed with statistically significant demographics variables (Table 41), and finally with statistically significant fitness and health behavior variables (Table 42). Variables included in the final model as significantly associated with injury are average or below average self-assessed sprint speed, obese BMI, and former smokeless tobacco use.

At every stage, variables with significant univariate categories were also included if the Cox & Snell R-squared goodness of fit was the same or better with them included. For example, self-assessed strength was not found to be significantly associated with injury incidence overall in the univariate regression analysis, but one category (the “slightly less than average” response) was significantly associated with increased injury. The same Cox & Snell R-squared value for the first multivariable model was obtained with and without self-assessed strength included (0.028), this variable was removed from the backward stepping model.

Table 40. Multivariable association of self-assessed fitness with injury (n=831)

Variable Category		Total n	% injured	Odds Ratio (95% CI)	Category p-value	Variable p-value
Self-assessed sprint speed	Much greater than average	72	40%	1.95(1.10-3.45)	0.02	0.02
	Greater than average	284	30%	1.00		
	Average	387	39%	1.47(1.05-2.05)	0.02	
	Slightly less than average	66	47%	1.82(1.04-3.20)	0.04	
	Far less than average	22	59%	2.73(1.08-6.87)	0.03	

Variable Category		Total n	% injured	Odds Ratio (95% CI)	Category p-value	Variable p-value
Self-assessed flexibility	Much greater than average	43	23%	1.00		0.06
	<i>Greater than average</i>	165	39%	2.51(1.10-5.73)	0.03	
	Average	388	34%	1.87(0.85-4.15)	0.12	
	<i>Slightly less than average</i>	179	44%	2.69(1.17-6.22)	0.02	
	<i>Far less than average</i>	56	48%	2.82(1.09-7.31)	0.03	

Notes:

Variables with $p \leq 0.10$ are shown. Significant variables ($p \leq 0.05$) are in bold. Significant categories ($p \leq 0.05$) are in bold and italics. Variables entered: Self-assessed endurance, Self-assessed sprint speed, Self-assessed strength, Self-assessed flexibility

When age and rank were included with the significant variables from the first model, the same Cox & Snell R-squared value was observed with and without rank included (0.036), since that variable was removed from the backward stepping model (Table 41).

Table 41. Multivariable association of self-assessed fitness with injury, adjusting for selected demographic variables (n=831)

Variable Category		Total n	% Injured	Odds Ratio (95% CI)	Category p-value	Variable p-value
Self-assessed sprint speed	<i>Much greater than average</i>	72	40%	1.95(1.10-3.45)	0.02	0.04
	Greater than average	284	30%	1.00		
	<i>Average</i>	387	39%	1.40(1.00-1.96)	0.05	
	Slightly less than average	66	47%	1.72(0.98-3.03)	0.06	
	<i>Far less than average</i>	22	59%	2.54(1.00-6.44)	0.05	
Age	≤ 25	474	34%	1.00		0.05
	26-34	297	40%	1.28(0.94-1.73)	0.12	
	≥ 35	60	52%	1.89(1.09-3.30)	0.02	

Variable Category		Total n	% injured	Odds Ratio (95% CI)	Category p-value	Variable p-value
Self-assessed flexibility	Much greater than average	43	23%	1.00		0.07
	<i>Greater than average</i>	165	39%	2.57(1.12-5.90)	0.03	
	Average	388	34%	1.99(0.89-4.43)	0.09	
	<i>Slightly less than average</i>	179	44%	2.79(1.20-6.47)	0.02	
	<i>Far less than average</i>	56	48%	3.00(1.15-7.85)	0.03	

Notes:

Variables with $p \leq 0.10$ are shown. Significant variables ($p \leq 0.05$) are in bold. Significant categories ($p \leq 0.05$) are in bold and italics. Variables entered into the backward stepping logistic regression model: Self-assessed sprint speed, Self-assessed flexibility, and Age.

The final model (Table 42) indicated that measures of self-assessed fitness had an overall borderline statistical significance ($p \leq 0.10$) with injury when controlling for other key factors (BMI, smokeless tobacco status). The Cox & Snell R-squared value for this model was 0.050, regardless of whether APFT push-up repetitions were included because this variable was removed from the model when included.

Soldiers reporting “average” and “slightly less than average” self-assessed sprint speed had approximately 1.5 to 2 times greater odds of injury compared to the “greater than average” assessment ($p \leq 0.05$). Soldiers reporting self-assessed flexibility “greater than average” or “slightly less than average” had odds of injury that were twice as high as those reporting “much greater than average” ($p \leq 0.05$). In this model, those with BMI in the obese category had more than twice the odds of injury, and previous smokeless tobacco users had a 1.5 times greater odds of injury, compared to Soldiers who never used smokeless tobacco.

Table 42. Multivariable association of self-assessed fitness with injury, adjusting for selected demographic and fitness/health behaviors variables, FINAL STRATIFICATION MODEL (n=831)

Variable Category		Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
BMI	≤ 18.4	8	63%	3.33(0.76-14.51)	0.11	0.04
	18.5-24.9	295	34%	1.00		
	25-27.5	280	33%	0.92(0.65-1.31)	0.64	
	27.6-29.9	154	40%	1.20(0.79-1.80)	0.40	
	≥ 30	84	56%	2.02(1.21-3.88)	<0.01	
	Not able to calculate	10	40%	1.61(1.10-2.36)	>0.99	

Variable Category		Total n	% injured	Odds Ratio (95% CI)	Category p-value	Variable p-value
Smokeless tobacco status	Current user	240	37%	1.03(0.73-1.44)	0.87	0.04
	<i>Former user</i>	<i>157</i>	<i>46%</i>	<i>1.61(1.10-2.36)</i>	<i>0.02</i>	
	Never used	434	35%	1.00		
Self-assessed sprint speed	Much greater than average	72	40%	1.59(0.93-2.75)	0.09	0.06
	Greater than average	284	30%	1.00		
	<i>Average</i>	<i>387</i>	<i>39%</i>	<i>1.54(1.10-2.14)</i>	<i>0.03</i>	
	<i>Slightly less than average</i>	<i>66</i>	<i>47%</i>	<i>1.80(1.02-3.17)</i>	<i>0.04</i>	
	<i>Far less than average</i>	<i>22</i>	<i>59%</i>	<i>2.20(1.04-6.68)</i>	<i>0.04</i>	
Self-assessed flexibility	Much greater than average	43	23%	1.00		0.10
	<i>Greater than average</i>	<i>165</i>	<i>39%</i>	<i>2.34(1.02-5.40)</i>	<i>0.05</i>	
	Average	388	34%	1.70(0.76-3.81)	0.20	
	<i>Slightly less than average</i>	<i>179</i>	<i>44%</i>	<i>2.38(1.02-5.55)</i>	<i>0.05</i>	
	Far less than average	56	48%	2.55(0.97-6.72)	0.06	

Notes:

Variables with $p \leq 0.10$ are shown. Significant variables ($p \leq 0.05$) are in bold. Significant categories ($p \leq 0.05$) are in bold and italics. Variables entered into the backward stepping logistic regression model: Self-assessed sprint speed, Self-assessed flexibility, Age, BMI, APFT pushup repetitions, APFT sit-up repetitions, APFT 2-mile run time, and Smokeless tobacco status.

6.7.4 Multivariable Logistic Regression – Unit Physical Training (PT)

The next multivariable model assessed the association of unit physical training perceptions and activities with injury, adjusting for demographics and fitness and health variables that were statistically significantly associated with injury in univariate models. Unit PT participation was not included as a variable in this analysis; rather, it was used to select for data used in this analysis (i.e., persons reporting they had participated in unit PT). Potentially significant variables, which had significant categories but not overall significance in the univariate analysis (such as difficulty of unit PT, total weekly mileage run, frequency of sprint/interval training, frequency of calisthenics, frequency of agility drills, and frequency of road marching) were also considered. The best Cox & Snell R-squared value was observed when all potential variables with any significant univariate categories were included (0.072, Table 43), compared to when none were included (0.058).

Table 43. Multivariable association of unit PT participation with injury (n=774)

Variable Category		Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
Difficulty of Unit PT program	Easy	28	39%	1.51(0.61-3.73)	0.37	0.05
	Moderate	167	29%	1.00		
	Somewhat hard	248	32%	1.26(0.80-2.00)	0.32	
	Hard	195	41%	1.88(1.17-3.03)	<0.01	
	Challenging	136	38%	1.89(1.12-3.18)	0.02	
Frequency of distance running (times/week)	0	12	42%	1.39(0.31-6.29)	0.67	0.03
	<1	22	23%	0.66(0.18-2.42)	0.54	
	1	83	37%	1.41(0.60-3.31)	0.43	
	2	233	36%	1.64(0.76-3.55)	0.21	
	3	300	33%	1.29(0.61-2.72)	0.51	
	4	67	49%	3.31(1.41-7.76)	<0.01	
	≥5	53	23%	1.00		
missing	4	50%	4.39(0.41-46.95)	0.22		
Frequency of sprint/interval training (times/week)	0	20	60%	7.09(1.81-27.77)	<0.01	0.04
	<1	95	35%	2.53(1.00-6.41)	0.05	
	1	272	35%	2.75(1.18-6.42)	0.02	
	2	241	35%	2.46(1.08-5.65)	0.03	
	3	81	32%	2.10(0.84-5.22)	0.11	
	≥4	50	20%	1.00		
	missing	15	60%	8.53(2.11-34.45)	<0.01	
Average resistance training duration (minutes/session)	0	92	39%	1.00(0.45-2.21)	>0.99	0.03
	1-30	253	32%	0.67(0.33-1.36)	0.27	
	31-60	289	39%	1.43(0.76-2.69)	0.27	
	≥61	133	29%	1.00		
	missing	7	43%	0.21(0.01-3.14)	0.26	
Average agility drills duration (minutes/session)	0	110	44%	n/a	n/a	0.07
	1-30	320	38%	2.29(1.02-5.12)	0.04	
	31-60	235	31%	1.28(0.60-2.75)	0.53	
	≥61	105	28%	1.00		
	missing	4	50%	3.97(0.16-98.21)	0.40	

Notes:

Variables with p≤0.10 are shown. Significant variables (p≤0.05) are in bold. Significant categories (p≤0.05) are in bold and italics. Variables entered into the backward stepping logistic regression model: Difficulty of unit PT program, What program is your Unit PT based on?, Frequency of distance running, Frequency of sprint/interval training (unit PT only), Average sprint/interval training duration (unit PT only), Frequency of calisthenics (unit PT only), Average calisthenics duration (unit PT only), Frequency of cross-training (unit PT only), Average cross-training duration (unit PT only), Frequency of agility drills (unit PT

only), Average agility drills duration (unit PT only), Average resistance training duration (unit PT only), Frequency of road marching, Average road marching distance.

When age was included with the above significant variables, the Cox & Snell R-squared value was the same with or without rank (0.071, Table 44). (Note: because only those respondents who participated in unit PT were included, the “Total n” and “% injured” values for the demographic variables represented in this model differ from what is reported in Tables 38 and 39.)

The final model for this stratification (Table 45) identified the following variables that were statistically significantly associated with injury risk: difficulty of unit PT, frequency of distance running, average duration of agility drills, age, and APFT run time. Self-assessed difficulty of unit PT as “hard” or “challenging” was associated with about twice the odds of injury, those reporting average running frequencies of four times per week had almost four times the odds of injury, conducting agility drills for thirty or fewer minutes per session was associated with about twice the odds of injury, those aged 35 years and over had twice the odds of injury compared to those younger than 25, and those with the slowest APFT 2-mile run times had twice the odds of injury compared to those with the fastest times. The results suggested that those who did not conduct sprint/interval training, or failed to report a sprint/interval training frequency, had increased odds of injury, but this was not statistically significantly associated injury ($p=0.06$). The Cox & Snell R-squared value for the model was the same (0.082) when the variable for APFT push-up repetitions was included and when it was not, because the variable did not remain in the model when it was included.

Table 44. Multivariable association of unit PT participation with injury, adjusting for selected demographic variables (n=774)

Variable Category		Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
Difficulty of Unit PT program	Easy	28	39%	1.51(0.62-3.69)	0.36	0.04
	Moderate	167	29%	1.00		
	Somewhat hard	248	32%	1.29(0.82-2.02)	0.27	
	Hard	195	41%	1.97(1.24-3.13)	<0.01	
	Challenging	136	38%	1.78(1.08-2.96)	0.03	
Frequency of distance running (times/week)	0	12	42%	1.00(0.22-4.50)	>0.99	0.03
	<1	22	23%	0.69(0.19-2.47)	0.57	
	1	83	37%	1.57(0.68-3.64)	0.29	
	2	233	36%	1.66(0.78-3.53)	0.19	
	3	300	33%	1.40(0.67-2.91)	0.37	
	4	67	49%	3.52(1.53-8.14)	<0.01	
	≥5	53	23%	1.00		
missing	4	50%	2.69(0.27-27.10)	0.40		
Average agility drills duration (minutes/session)	0	110	44%	2.34(1.26-4.32)	<0.01	0.03
	1-30	320	38%	1.84(1.10-3.06)	0.02	
	31-60	235	31%	1.26(0.74-2.15)	0.40	
	≥61	105	28%	1.00		
	missing	4	50%	1.79(0.20-15.92)	0.60	
Age	≤25	441	31%	1.00		<0.01
	26-34	281	39%	1.40(1.01-1.95)	0.05	
	≥35	52	50%	2.39(1.30-4.41)	<0.01	
Frequency of sprint/interval training (times/week)	0	20	60%	5.46(1.52-19.62)	<0.01	0.07
	<1	95	35%	1.77(0.74-4.23)	0.20	
	1	272	35%	1.95(0.88-4.30)	0.10	
	2	241	35%	1.81(0.83-3.96)	0.14	
	3	81	32%	1.72(0.72-4.13)	0.22	
	≥4	50	20%	1.00		
	missing	15	60%	6.22(1.66-23.27)	<0.01	

Notes:

Variables with p≤0.10 are shown. Significant variables (p≤0.05) are in bold. Significant categories (p≤0.05) are in bold and italics. Variables entered: Difficulty of unit PT program, Frequency of sprint/interval training (unit PT only), Frequency of distance running (unit PT only), Average duration of agility drills (unit PT only), Average duration of resistance training (unit PT only), and Age.

Table 45. Multivariable association of unit PT participation with injury, adjusting for selected demographic and fitness/health behaviors variables, FINAL STRATIFICATION MODEL (n=774)

Variable Category		Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
Difficulty of Unit PT program	Easy	28	39%	1.72(0.69-4.33)	0.25	0.05
	Moderate	167	29%	1.00		
	Somewhat hard	248	32%	1.24(0.79-1.96)	0.35	
	Hard	195	41%	1.93(1.21-3.09)	<0.01	
	Challenging	136	38%	1.69(1.01-2.81)	0.05	
Frequency of distance running (times/week)	0	12	42%	0.90(0.20-4.18)	0.90	0.01
	<1	22	23%	0.59(0.16-2.17)	0.43	
	1	83	37%	1.57(0.67-3.66)	0.30	
	2	233	36%	1.79(0.83-3.86)	0.14	
	3	300	33%	1.43(0.68-2.99)	0.35	
	4	67	49%	3.88(1.65-9.09)	<0.01	
	≥5	53	23%	1.00		
	missing	4	50%	2.48(0.23-26.35)	0.45	
Average agility drills duration (minutes/session)	0	110	44%	2.37(1.28-4.42)	<0.01	0.02
	1-30	320	38%	1.91(1.14-3.20)	0.01	
	31-60	235	31%	1.27(0.74-2.18)	0.39	
	≥61	105	28%	1.00		
	missing	4	50%	1.46(0.16-13.78)	0.74	
Age	≤25	441	31%	1.00		0.05
	26-34	281	39%	1.30(0.92-1.82)	0.13	
	≥35	52	50%	2.05(1.09-3.84)	0.03	
APFT run time	≥15.24	190	47%	2.04(1.24-3.35)	<0.01	0.05
	14.43-15.23	193	34%	1.15(0.70-1.90)	0.59	
	13.50-14.42	208	37%	1.46(0.90-2.36)	0.12	
	≤13.49	171	29%	1.00		
	Not reported	69	43%	1.43(0.68-3.00)	0.34	
Frequency of sprint/interval training (times/week)	0	20	60%	5.62(1.53-20.66)	<0.01	0.06
	<1	95	35%	1.69(0.71-4.07)	0.24	
	1	272	35%	1.84(0.83-4.11)	0.13	
	2	241	35%	1.70(0.77-3.76)	0.19	
	3	81	32%	1.64(0.68-3.96)	0.28	
	≥4	50	20%	1.00		
	missing	15	60%	6.37(1.69-23.99)	<0.01	

Notes:

Variables with $p \leq 0.10$ are shown. Significant variables ($p \leq 0.05$) are in bold. Significant categories ($p \leq 0.05$) are in bold and italics. Variables entered: Difficulty of unit PT program, Frequency of sprint/interval training (unit PT only), Frequency of distance running (unit PT only), Average duration of agility drills (unit PT only), Age, BMI, APFT push-up repetitions, APFT sit-up repetitions, APFT 2-mile run time, and Smokeless tobacco status.

6.7.5 Multivariable Logistic Regression – Personal Physical Training (PT)

The third multivariable model assessed the association of personal physical training characteristics with injury, adjusting for demographics and fitness and health variables that were statistically significantly associated with injury in univariate models. Personal PT participation was not included as a variable in this analysis; rather, it was used to select for data used in this analysis (i.e., persons reporting they had participated in personal PT). The Cox & Snell R-squared value was higher (0.079, compared to 0.071) when those variables which were not significant ($p > 0.10$) at univariate but had significant categories associated with injuries were included (what program is your personal PT based on?, frequency of calisthenics, average duration of cross-training, average duration of agility drills, and frequency of other aerobic activities).

Table 46. Multivariable association of personal PT participation with injury (n=688)

Variable Category		Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
What is the goal of your personal PT program?	<i>Lose weight</i>	124	49%	2.26(1.42-3.62)	<0.01	0.03
	Gain muscle mass	244	31%	1.00		
	Increase aerobic capacity	24	42%	2.01(0.82-4.96)	0.13	
	Increase aerobic capacity and gain muscle mass	188	38%	1.44(0.94-2.20)	0.09	
	Maintain current fitness levels	81	37%	1.50(0.86-2.61)	0.16	
	Unit PT is not challenging	27	30%	1.05(0.43-2.57)	0.91	
Total weekly mileage run (miles/week)	0	60	48%	2.14(1.12-4.08)	<0.01	<0.01
	<1-4.0	217	45%	2.15(1.39-3.31)	<0.01	
	4.5-9.0	197	35%	1.32(0.85-2.05)	0.22	
	≥ 10.0	204	28%	1.00		
	missing	10	20%	0.72(0.14-3.76)	0.70	

Variable Category		Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
Frequency of resistance training (times/week)	0	124	48%	2.37(1.19-4.71)	0.01	0.03
	<1	61	33%	1.31(0.60-2.90)	0.50	
	1	101	28%	1.00		
	2	106	35%	1.35(0.69-2.64)	0.38	
	3	89	29%	1.04(0.52-2.11)	0.91	
	≥4	168	41%	2.40(1.27-4.56)	<0.01	
	missing	39	38%	1.90(0.73-4.92)	0.19	
Frequency of cross-training (times/week)	0	153	46%	1.89(0.98-3.63)	0.06	0.10
	<1	60	35%	1.85(0.81-4.21)	0.14	
	1	117	31%	1.87(0.92-3.80)	0.09	
	2	162	43%	2.72(1.48-5.01)	<0.01	
	3	71	34%	1.94(0.94-4.02)	0.08	
	≥4	92	24%	1.00		
	missing	33	33%	1.56(0.56-4.35)	0.40	

Notes:

Variables with $p \leq 0.10$ are shown. Significant variables ($p \leq 0.05$) are in bold. Significant categories ($p \leq 0.05$) are in bold and italics. Variables entered: What is the goal of your personal PT program?, What program is your personal PT based on: Frequency of distance running, Average running distance, Total weekly mileage run, Frequency of sprint/interval training, Average sprint/interval training duration, Frequency of calisthenics, Frequency of cross-training, Average cross-training duration, Frequency of agility drills, Average agility drills duration, Frequency of resistance training, Average resistance training duration, and Frequency of other aerobic activities.

Age was included in the next model (Table 47) along with the remaining variables identified in Table 46. The Cox & Snell R-squared value was higher when the rank variable was included (0.082, compared to 0.074). (Note: because only those respondents who participated in personal PT were included, the “Total n” and “% Injured” values for the demographic variables represented in this model differ from what is reported in Tables 38 and 39.)

Table 47. Multivariable association of personal PT participation with injury, adjusting for selected demographic variables (n=688)

Variable Category		Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-values
What is the goal of your personal PT program?	<i>Lose weight</i>	124	49%	2.10(1.31-3.38)	<0.01	0.06
	Gain muscle mass	244	31%	1.00		
	Increase aerobic capacity	24	42%	1.95(0.79-4.83)	0.15	
	Increase aerobic capacity and gain muscle mass	188	38%	1.35(0.88-2.06)	0.17	
	Maintain current fitness levels	81	37%	1.42(0.81-2.49)	0.22	
	Unit PT is not challenging	27	30%	0.97(0.39-2.37)	0.94	
Total weekly mileage run (miles/week)	0	60	48%	2.11(1.13-3.96)	0.02	<0.01
	<1-4.0	217	45%	2.37(1.55-3.62)	<0.01	
	4.5-9.0	197	35%	1.40(0.90-2.17)	0.13	
	≥10.0	204	28%	1.00		
	missing	10	20%	0.82(0.16-4.22)	0.82	
Frequency of resistance training (times/week)	0	124	48%	2.37(1.32-4.26)	<0.01	0.01
	<1	61	33%	1.29(0.63-2.62)	0.49	
	1	101	28%	1.00		
	2	106	35%	1.53(0.83-2.83)	0.18	
	3	89	29%	1.04(0.54-2.00)	0.92	
	≥4	168	41%	2.25(1.28-3.96)	<0.01	
	missing	39	38%	1.59(0.70-3.62)	0.27	
Age	≤25	379	34%	1.00		0.02
	26-34	259	39%	1.13(0.80-1.61)	0.50	
	≥35	50	54%	2.47(1.32-4.64)	<0.01	

Notes:

Variables with p≤0.10 are shown. Significant variables (p≤0.05) are in bold. Significant categories (p≤0.05) are in bold and italics. Variables entered into the backward stepping logistic regression model: What is the goal of your personal PT program?, Total weekly mileage run, Frequency of cross-training, Frequency of resistance training, and Age.

The final model (Table 48) added fitness and health behavior variables that were significantly associated with injury in univariate models. The final model identified the following variables that were statistically significantly associated with injury: Total weekly mileage run, Frequency of resistance training, Age, and APFT 2-mile run time. Those who participated in distance running for

4 or fewer miles per week had about twice the odds of injury, not participating in resistance training or participating four times per week lead to more than twice the odds of injury compared to participating once, and being older than 34 years of age was associated with more than twice the odds of injury compared to being younger than 25 years old. The cause of injury among those who reported resistance training ≥ 4 times per week was predominantly overuse/repetitive activity (51%). Having an obese BMI (≥ 30) was associated with almost twice the odds of injury.

Table 48. Multivariable association of personal PT participation with injury, adjusting for selected demographic and fitness/health behaviors variables, FINAL STRATIFICATION MODEL (n=688)

Variable Category	Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value	
Total weekly mileage run (miles/week)	0	60	48%	1.89(1.02-3.53)	0.04	<0.01
	<1-4.0	217	45%	2.29(1.50-3.50)	<0.01	
	4.5-9.0	197	35%	1.35(0.87-2.09)	0.18	
	≥ 10.0	204	28%	1.00		
	missing	10	20%	0.70(0.14-3.60)	0.67	
Frequency of resistance training (times/week)	0	124	48%	2.30(1.28-4.12)	<0.01	0.03
	<1	61	33%	1.21(0.59-2.46)	0.60	
	1	101	28%	1.00		
	2	106	35%	1.48(0.80-2.73)	0.21	
	3	89	29%	1.02(0.53-1.97)	0.95	
	≥ 4	168	41%	2.01(1.15-3.52)	0.01	
	missing	39	38%	1.64(0.72-3.74)	0.24	
Age	≤ 25	379	34%	1.00		0.02
	26-34	259	39%	1.20(0.84-1.71)	0.33	
	≥ 35	50	54%	2.45(1.30-4.62)	<0.01	
BMI	≤ 18.4	7	71%	3.82(0.69-21.06)	0.12	0.05
	18.5-24.9	237	34%	1.00		
	25-27.5	239	32%	0.82(0.55-1.24)	0.35	
	27.6-29.9	128	41%	1.27(0.79-2.03)	0.32	
	≥ 30	71	54%	1.81(1.02-3.21)	0.04	
	Not able to calculate	6	33%	0.78(0.14-4.51)	0.78	
APFT Push-up repetitions	≤ 54	109	38%	1.08(0.60-1.95)	0.80	0.10
	55-64	167	38%	1.20(0.73-1.99)	0.47	
	65-74	180	38%	1.12(0.69-1.81)	0.64	
	≥ 75	202	33%	1.00		
	<i>Not reported</i>	30	53%	4.45(1.54-12.90)	<0.01	

Notes:

Variables with $p \leq 0.10$ are shown. Significant variables ($p \leq 0.05$) are in bold. Significant categories ($p \leq 0.05$) are in bold and italics. Variables entered: What is the goal of your personal PT program?, Total weekly mileage run, Frequency of resistance training, Age, BMI, APFT pushup repetitions, APFT sit-up repetitions, APFT 2-mile run time, and Smokeless tobacco status.

6.7.5 Multivariable Logistic Regression – Leadership Injury Focus

The fourth multivariable model assessed the association of leadership-driven injury prevention measures with injury, adjusting for demographics and fitness and health variables that were statistically significantly associated with injury in univariate models. All leadership support questions were considered for the multivariate model (Table 49), as they were all significant in the univariate regression analysis. The Cox & Snell goodness-of-fit R-squared value for this model is 0.056.

Table 49. Multivariable association of leadership support with injury (n=831)

Variable Category		Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
Leadership provides status of unit injuries	Routinely	241	28%	1.00		0.04
	Occasionally	314	34%	1.29(0.78-2.13)	0.32	
	<i>Rarely</i>	140	49%	2.28(1.23-4.21)	<0.01	
	Never	136	49%	1.35(0.66-2.73)	0.41	
Your unit has a higher than average injury rate	Strongly agree	106	43%	1.83(0.95-3.55)	0.07	0.02
	Agree	184	48%	1.65(0.89-3.07)	0.11	
	Disagree	266	30%	0.95(0.53-1.72)	0.87	
	Strongly disagree	76	29%	1.00		
	Not sure	199	38%	1.11(0.60-2.05)	0.75	
Leadership provides recommendations to reduce injury	Routinely	313	29%	1.00		0.06
	Occasionally	312	37%	1.09(0.68-1.74)	0.72	
	Rarely	123	44%	1.18(0.63-2.23)	0.60	
	<i>Never</i>	83	58%	2.57(1.22-5.41)	0.01	

Notes:

Significant variables ($p \leq 0.05$) are in bold. Significant categories ($p \leq 0.05$) are in bold and italics. Variables entered: Are new Soldiers given time to adapt to Unit PT?, Leadership encourages safe PT, Leadership provides recommendations to reduce injury, Leadership provides status of unit injuries, Your unit has a higher than average injury rate.

When age was included (Table 50), age and the perception of one's unit having a higher than average injury rate were significantly associated with injury.

Table 50. Multivariable association of leadership support with injury, adjusting for selected demographic variables (n=831)

Variable Category	Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value	
Your unit has a higher than average injury rate	<i>Strongly agree</i>	106	43%	<i>1.92(1.01-3.66)</i>	0.05	0.01
	<i>Agree</i>	184	48%	<i>1.81(1.00-3.31)</i>	0.05	
	Disagree	266	30%	1.01(0.57-1.80)	0.97	
	Strongly disagree	76	29%	1.00		
	Not sure	199	38%	1.23(0.67-2.24)	0.50	
Age	≤25	474	34%	1.00		0.01
	26-34	297	40%	1.24(0.91-1.69)	0.18	
	≥35	60	52%	<i>2.25(1.28-3.96)</i>	<0.01	
Leadership provides recommendations to reduce injury	Routinely	313	29%	1.00		0.08
	Occasionally	312	37%	1.08(0.69-1.71)	0.74	
	Rarely	123	44%	1.13(0.62-2.06)	0.69	
	<i>Never</i>	83	58%	<i>2.32(1.14-4.73)</i>	0.02	
Leadership provides status of unit injuries	Routinely	241	28%	1.00		0.07
	Occasionally	314	34%	1.23(0.76-2.00)	0.41	
	<i>Rarely</i>	140	49%	<i>2.10(1.16-3.79)</i>	0.01	
	Never	136	49%	1.40(0.72-2.71)	0.34	

Notes:

Significant variables (p≤0.05) are in bold. Significant categories (p≤0.05) are in bold and italics. Variables entered into the backward stepping logistic regression model: Leadership provides recommendations to reduce injury, Leadership provides status of unit injuries, Your unit has a higher than average injury rate, and Age.

In the final model (Table 51), respondents' perception of high unit injury rates was significantly associated with almost twice the odds of injury compared to those who did not have that perception. Rarely having leadership update Soldiers about the current status of unit injuries was associated with twice the odds of injury compared to those who reported that their leadership routinely provided this information. Leadership never providing recommendations to reduce injuries and former smokeless tobacco use were associated with injuries at the p≤0.10 level, but were not significantly associated with injury. Also, age over 34 years and obese or underweight BMI were observed to be significantly associated with injuries.

Table 51. Multivariable association of leadership support with injury, adjusting for selected demographic and fitness/health behaviors variables, FINAL STRATIFICATION MODEL (n=831)

Variable Category		Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
Leadership provides status of unit injuries	Routinely	241	28%	1.00		0.05
	Occasionally	314	34%	1.23(0.74-2.04)	0.42	
	<i>Rarely</i>	140	49%	<i>2.19(1.18-4.07)</i>	0.01	
	Never	136	49%	1.29(0.65-2.57)	0.46	
Your unit has a higher than average injury rate	<i>Strongly agree</i>	106	43%	<i>1.91(0.99-3.69)</i>	0.05	0.01
	Agree	184	48%	1.80(0.97-3.33)	0.06	
	Disagree	266	30%	0.97(0.54-1.75)	0.92	
	Strongly disagree	76	29%	1.00		
	Not sure	199	38%	1.16(0.62-2.14)	0.65	
Age	≤25	474	34%	1.00		0.01
	26-34	297	40%	1.20(0.86-1.69)	0.29	
	≥35	60	52%	<i>2.41(1.33-4.39)</i>	<0.01	
BMI	≤18.4	8	63%	<i>5.39(1.15-25.34)</i>	0.03	0.03
	18.5-24.9	295	34%	1.00		
	25-27.5	280	33%	1.00(0.69-1.46)	0.99	
	27.6-29.9	154	40%	1.34(0.86-2.07)	0.19	
	≥30	84	56%	<i>2.02(1.18-3.46)</i>	0.01	
	Not able to calculate	10	40%	1.65(0.43-6.36)	0.46	
APFT Sit-up repetitions	≤60	180	38%	1.04(0.61-1.78)	0.88	0.05
	61-68	197	44%	1.49(0.92-2.42)	0.11	
	69-77	206	36%	1.12(0.70-1.78)	0.64	
	≥78	221	31%	1.00		
	<i>Not reported</i>	27	48%	<i>0.19(0.04-0.86)</i>	0.03	
Smokeless tobacco status	Current user	240	37%	1.09(0.76-1.53)	0.66	0.06
	<i>Former user</i>	157	46%	<i>1.61(1.08-2.40)</i>	0.02	
	Never used	434	35%	1.00		
Leadership provides recommendations to reduce injury	Routinely	313	29%	1.00		0.08
	Occasionally	312	37%	1.02(0.63-1.63)	0.95	
	Rarely	123	44%	1.15(0.62-2.13)	0.67	
	<i>Never</i>	83	58%	<i>2.35(1.13-4.87)</i>	0.02	

Notes:

Significant variables (p≤0.05) are in bold. Significant categories (p≤0.05) are in bold and italics.

Variables entered into the backward stepping logistic regression model: Leadership provides recommendations to reduce injury, Leadership provides status of unit injuries, Your unit has a higher than

average injury rate, Age, BMI, APFT pushup repetitions, APFT sit-up repetitions, APFT 2-mile run time, and Smokeless tobacco status.

6.7.6 Multivariable Logistic Regression – All Variables

The last overall multivariable logistic regression analysis included all variables appearing in any of the previous models. Soldiers who reported participation in both unit PT and personal PT are included (n=646, Table 52). This analysis identified the following variables as significantly associated with injury occurrence: self-assessed sprint speed much greater than average, self-assessed flexibility anything other than much greater than average, personal PT running distances 0.5-4.0 miles per session, rating unit PT as hard or challenging, leadership reportedly never providing recommendations to reduce injuries, and age greater than 34. Conducting distance running between 2 and 4 times per week for unit PT, cross-training for personal PT zero or two times per week for personal PT, and leadership reportedly rarely providing the status of unit injuries were all marginally associated with injury. Respondents' assessment of high unit injury rates was also marginally associated with injury, although no specific category was significant. Self-assessed sprint speed that is "slightly less than average," or "much greater than average" remained in the model at the p≤0.10 level, but the variable was not significantly associated with injury incidence. The Cox & Snell R-squared goodness-of-fit was 0.157. (Note: because only those respondents who participated in both unit PT and personal PT were included, the "Total n" and "% Injured" values represented in this model differ from what is reported in previous tables.)

Table 52. Multivariable association of self-assessed fitness, unit PT participation, personal PT participation, and leadership support with injury, adjusting for selected demographic and fitness/health behaviors variables, FINAL OVERALL MODEL (n=646)

Variable Category		Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
Self-assessed sprint speed	<i>Much greater than average</i>	62	40%	2.89(1.44-5.81)	<0.01	0.03
	Greater than average	231	29%	1.00		
	Average	299	35%	1.14(0.75-1.73)	0.56	
	Slightly less than average	49	51%	1.90(0.92-3.95)	0.08	
	Far less than average	5	40%	1.17(0.15-9.36)	0.88	
Self-assessed flexibility	Much greater than average	38	21%	1.00		0.04
	<i>Greater than average</i>	133	42%	4.80(1.73-13.34)	<0.01	
	<i>Average</i>	314	32%	3.69(1.38-9.86)	<0.01	

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Variable Category	Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value	
	<i>Slightly less than average</i>	133	36%	4.88(1.72-13.84)	<0.01	
	<i>Far less than average</i>	28	46%	4.22(1.16-15.32)	0.03	
Difficulty of unit PT program	Easy	21	43%	2.58(0.85-7.88)	0.10	0.04
	Moderate	143	29%	1.00		
	Somewhat hard	204	32%	1.38(0.82-2.31)	0.23	
	Hard	160	40%	2.09(1.21-3.61)	<0.01	
	Challenging	118	39%	2.01(1.12-3.58)	0.02	
Total weekly mileage run for personal PT (miles/week)	0	48	40%	1.16(0.52-2.58)	0.71	0.03
	<1-4.0	202	44%	2.22(1.36-3.64)	<0.01	
	4.5-9.0	190	33%	1.35(0.83-2.19)	0.23	
	≥10.0	197	27%	1.00		
	missing	9	22%	1.44(0.24-8.54)	0.69	
Leadership provides recommendations to reduce injury	Routinely	274	27%	1.00		0.04
	Occasionally	234	37%	1.12(0.64-1.94)	0.70	
	Rarely	82	44%	1.43(0.66-3.08)	0.37	
	Never	56	54%	3.77(1.46-9.73)	<0.01	
Age	≤25	354	31%	1.00		<0.01
	26-34	248	38%	1.25(0.85-1.84)	0.26	
	≥35	44	55%	4.31(2.05-9.06)	<0.01	
Frequency of distance running during Unit PT (times/week)	0	12	42%	1.69(0.27-10.43)	0.58	0.09
	<1	22	23%	1.94(0.39-9.59)	0.42	
	1	83	37%	2.48(0.92-6.66)	0.07	
	2	233	36%	2.55(1.07-6.11)	0.04	
	3	300	33%	2.45(1.04-5.78)	0.04	
	4	67	49%	5.60(2.04-15.41)	<0.01	
	≥5	53	23%	1.00		
missing	4	50%	1.08(0.07-15.76)	0.96		
Frequency of cross-training during personal PT (times/week)	0	132	46%	2.30(1.16-4.59)	0.02	0.09
	<1	55	35%	1.56(0.68-3.60)	0.30	
	1	113	31%	1.18(0.57-2.45)	0.65	
	2	157	43%	2.20(1.13-4.26)	0.02	
	3	67	34%	1.94(0.88-4.27)	0.10	
	≥4	89	24%	1.00		
missing	33	33%	1.25(0.47-3.30)	0.66		
Leadership provides	Routinely	212	25%	1.00		0.06

Variable Category		Total n	% Injured	Odds Ratio (95% CI)	Category p-values	Variable p-value
status of unit injuries	Occasionally	245	34%	1.53(0.85-2.76)	0.16	
	<i>Rarely</i>	104	51%	2.20(1.05-4.61)	0.04	
	Never	85	42%	0.92(0.34-2.18)	0.85	
Your unit has a higher than average injury rate	Strongly agree	88	40%	1.65(0.77-3.52)	0.20	0.06
	Agree	126	44%	1.25(0.61-2.56)	0.54	
	Disagree	218	28%	0.72(0.37-1.40)	0.34	
	Strongly disagree	67	30%	1.00		
	Not sure	147	37%	1.08(0.54-2.17)	0.84	

Notes:

Significant variables ($p \leq 0.05$) are in bold. Significant categories ($p \leq 0.05$) are in bold and italics. Variables entered into the backward stepping logistic regression model: Self-assessed sprint speed, Self-assessed flexibility, Difficulty of unit PT program, Frequency of distance running (unit PT), Frequency of sprint/interval training (unit PT), Average agility drills duration (unit PT), Average resistance training duration (unit PT), What is the goal of your personal PT program?, Total weekly mileage run (personal PT), Frequency of cross-training (personal PT), Frequency of resistance training (personal PT), Leadership provides recommendations to reduce injury, Leadership provides status of unit injuries, Your unit has a higher than average injury rate, Age, BMI, APFT push-up repetitions, APFT sit-up repetitions, APFT 2-mile run time, and Smokeless tobacco status.

7 Discussion

The results of this survey provide a detailed assessment of unit and personal physical activities, injuries, and factors associated with injury in this infantry Brigade, which was predominately male (99%) and young in age (64% age 18 to 25 years). As a result of original program goals, the survey also provided a unique opportunity to assess the leadership activities related to injury prevention.

7.1 Physical Training, Injuries, Injury Types, and Activities Associated with Injury

Respondents reported distance running during unit PT three times per week on average; participation in sprint/interval training, calisthenics, agility drills, and resistance training twice per week; and road marching an average of four times per month. For personal PT, respondents reported participation approximately twice per week for all activity types. Eight percent of respondents reported participating in alternative PT and 6 percent reported being on permanent profile.

Over one third of all respondents (37 percent, $n=310$) reported having at least one injury in the past 6 months. Of these injuries reported via survey, respondents indicated that 25 percent of them were not seen by a medical professional. Sprains and strains were the most common self-reported injury among Soldiers in the two infantry battalions surveyed (40 percent) and led to the most temporary profiles (34 percent), but tears accounted for the most limited duty days (29 percent).

Sprains and strains and the knee and lower back have represented a higher proportion of injuries in the military overall (Marshall et al. 2014; Ruscio et al. 2010) and in other specific military populations (Jones et al. 1993; Ruscio et al. 2010; Sell et al. 2010; USAPHC 2014). Sprains and strains to the lower extremities among military personnel have been attributed to physical training and sports (Lauder et al. 2000; Ruscio et al. 2010; Sell et al. 2010). Likewise, overuse/repetitive activity mechanisms led to the most injuries (46 percent), temporary profiles (45 percent), and limited duty days (44 percent) in this survey population.

Running during physical training was the leading activity associated with injuries, accounting for 27 percent of reported injuries, 32 percent of temporary profiles, and 28 percent of total limited duty days reported by this population. Marching with a load accounted for 22 percent of the injuries reported. This injury rate and the injury types were similar to those observed in other military studies (Knapik et al. 2012; Knapik and Reynolds 2015; Orr et al. 2014; Roy et al. 2012), and specifically operational units (USACHPPM 2006; USACHPPM 2008; USAPHC 2014).

7.2 Factors Associated with Injuries

7.2.1 Demographics

Being 35 years of age or older was shown to be significantly associated with injury in the overall multivariable model and in models looking specifically at unit PT, personal PT, and leadership factors. These results are consistent with findings from a study among 380 Army hospital employees, which identified age greater than or equal to 40 years as a significant risk factor for injury among Active Duty Soldiers (APHC (Prov) 2016). Other injury studies have also identified older age as associated with injury ((APHC (Prov) 2015; Grier et al. 2010; Heir and Eide 1997; Jones et al. 1993; Knapik et al. 2011). However, most of these investigations concluded a lower age for significantly increased risk of injury than the present investigation: those over 19 years were seen to be at risk among Chemical Brigade Soldiers (APHC (Prov) 2015), those over 24 years were reported to be at a higher injury risk among Infantry trainees (Jones et al. 1993), those over 22 years among enlisted men (Heir and Eide 1997), and those over thirty years in Soldiers in advanced individual training in Ordnance School (Grier et al. 2010) and in FBI trainees (Knapik et al. 2011).

7.2.2 Fitness

Classification as obese (BMI \geq 30) was significantly associated with injury in the final regression models for self-assessed fitness and leadership support. BMI also remained in the final model for personal PT variables, but was not significantly associated with injury when considered with those variables. Being underweight (BMI \leq 18.4) was also associated with injury in the leadership model. Obesity was reportedly associated with injury in another study of 1,250 Army Soldiers in a light infantry brigade (USAPHC 2014), and both underweight and obese subjects have been shown to be at a higher risk of injury in previous military studies (Heir and Eide 1997; Jones et al. 1993). Higher BMI has also been associated with lower aerobic capacity, lower anaerobic capacity, and less strength (Bohnker et al. 2005; Crawford et al. 2011). Not reporting APFT sit-up repetitions was associated with injury in the leadership model, and not reporting APFT push-up repetitions remained in the personal PT final model at the $p \leq 0.10$ level. As 56% of those without reported push-up scores and 48% of those without reported sit-up scores were injured, this association is likely because those without reported scores were currently on profile due to injury. APFT 2-mile run time was significantly associated with injury when considered

with the unit PT and personal PT variables, with run times greater than 15.24 minutes being significant in the unit PT model ($p \leq 0.05$). Poor APFT run time performance, a measure of aerobic endurance, has often been associated with higher injury risk (Jones and Hauschild 2015).

7.2.3 Tobacco use

Former smokeless tobacco use was associated with injury in the self-assessed fitness model and was marginally significant in the leadership support model. Many previous studies have reported tobacco use to be a risk factor for injury among military populations, although these studies considered cigarette use (Altarac et al. 2000; Grier et al. 2010; Knapik et al. 2001; Munnoch and Bridger 2007). Another study of 1490 Chemical Brigade Soldiers observed a similarly increased injury risk for former cigarette smokers (APHC (Prov) 2015). However, these studies reported greater injury risk among current users, not former, and Grier et al. (2010) found no association between smokeless tobacco use and injury, so this is a unique result. The relationship between tobacco use and injury may be due to an inhibited ability to heal damaged tissues (Amoroso et al. 1996). Those users who are Soldiers engaging in physically demanding tasks in accordance with physical training requirements and/or occupational tasks (such as the most common military injuries reported by respondents in this survey: running, playing sports, or lifting heavy objects) may have reduced ability to repair damaged tissues, contributing to higher injury rates in this military population.

7.2.4 Self-assessed fitness

Self-assessed sprint speed that is average or below average remained in the self-assessed health model, although the variable was not significantly associated with injury ($p \leq 0.10$); likewise, slightly less than average or much greater than average self-assessed sprint speed remained in the overall regression model ($p \leq 0.10$), but was also not statistically significantly associated with injury. This variable was significantly associated with injury when considered with all other variables in the overall model. Respondents who evaluated their own flexibility as greater than average or less than average were observed to have significantly increased odds of injury in the self-assessed fitness stratification and the overall model. The implication of these results is that those who were not confident or were too confident about their sprint speed and flexibility (regardless of their actual sprint speed and flexibility) were more likely to be injured. A previous consideration of self-assessed health among 1250 members of a light infantry brigade saw no significant differences in injury odds among the various self-assessments of personal sprint speed and flexibility (USAPHC 2014). Objective measures of flexibility have shown greater injury risk among those with higher and lower flexibility (Canham-Chervak et al. 2000; Jones et al. 1993).

7.2.5 Unit PT Programs

When asked to rate the difficulty of their unit PT as easy, moderate, somewhat hard, hard, or challenging, those who responded “hard” or “challenging” were observed to have higher injury odds in the unit PT stratification. This subjective assessment may or may not have been influenced by the respondents’ negative experiences with their own injuries. Rating unit PT as hard or challenging was significantly associated with injury in the overall regression model. Not conducting sprint/interval training for unit PT and not reporting a frequency for sprint/interval training during unit PT remained in the unit PT model, but was not significantly associated with injury ($p \leq 0.10$). Participation in sprint training during personal PT has been previously reported as a protective factor for injury among members of a deployed infantry brigade, and those who participated had higher levels of overall fitness and incorporated more varied activities into their

personal PT program (Canham-Chervak et al. 2015). Cross-training has been shown to improve muscular and aerobic endurance in military populations without affecting injury rates (Canham-Chervak et al. 2015; Grier et al. 2015).

Running four times per week during unit PT was observed to be significantly associated with injury in the unit PT stratification, and participating in distance running for unit PT between two and four times per week remained in the overall model but was not significantly associated with injury. Distance running has also been shown to be a risk factor in other military studies (Grier et al. 2016; USAPHC 2014). Commonly occurring running-related musculoskeletal injuries include medial tibial stress syndrome, Achilles tendinopathy, and plantar fasciitis (Lopes et al. 2012). While a systematic review of running-related injuries concluded that high running volume increases injury risk, the authors did not conclude that running frequency had an effect on injury incidence (Nielsen et al. 2012).

Conducting agility drills for thirty or fewer minutes per session during unit PT was found to be associated with a higher rate of injury compared to sessions that are at least an hour long. These results can be compared to those of another investigation with 1,250 members of a light infantry brigade which found that those who participated in agility drills 1-4 times per week were at a lower risk of injury (USAPHC 2014).

7.2.6 Personal PT Programs

Focus groups in military populations have indicated that personal PT is often required because unit PT is often not sufficient to obtain “optimal activity.” In these cases, personal PT conducted off-duty becomes necessary to fulfill physical duty requirements (USAPHC 2013).

Running fewer than 4 miles per week during personal PT was observed to be associated with a higher rate of injury in the personal PT model. These results can be compared to the findings of a survey among 1,250 members of a light infantry brigade, where running 5-9 miles per week was found to be a risk factor for injury (USAPHC 2014). However, these observations are contradictory to other results which indicate that injury odds increase with greater running distances (Koplan et al. 1982; Marti et al. 1988; Samet et al. 1982). It is possible that some of the respondents who reported shorter distances of running during personal PT were unable to do more because of an injury, and therefore were not injured due to a choice to run less during personal PT.

The frequency of cross-training during personal PT remained as a variable in the overall model. However, this variable was only marginally associated with injury ($p < 0.10$).

Not participating in resistance training during personal PT, or participating more than four times per week, was significantly associated with injury in the personal PT model. Those who reported non-participation may have done so due to their injury. It has been suggested that participation in resistance training may be associated with increased injury rates (Colado and Garcia-Massó 2009; Grier et al. 2015; Kolber et al. 2010). However, previous military studies of 1,250 light infantry brigade Soldiers (USAPHC 2014) and 1,490 Soldiers in a Chemical Brigade (APHC (Prov) 2015) did not observe a significant difference in injury occurrence based on resistance training frequency. Grier et al. (2013) found that men in a Brigade Combat Team who resistance trained were at a lower risk of injury. The current findings that resistance training specifically zero or four times per week is associated with increased risk of injury has not been previously reported.

7.2.7 Leadership support

In a 2010 systematic review, leadership support was suggested as a critical component of successful injury prevention programs (Bullock et al. 2010). A 2002 effort involved a systematic process of participatory economics to incorporate leadership into the implementation of an injury prevention program and found that support from the highest levels were necessary in order to obtain the resources and policies necessary for injury prevention (Berg Rice et al. 2002). The 2010 implementation of Physical Readiness Training found that leadership enforcement of injury prevention techniques introduced as part of this program, such as gradual progressive overload, were associated with reduction in injuries; a similar program at basic combat training sites in 2004 that did not have proper oversight did not see the same reduction in injuries (Scott et al. 2012).

In this investigation, respondents' belief that their unit had a higher than average injury rate was significantly associated with higher injury rates, in the leadership regression models and marginally associated overall. However, this association does not necessarily imply causation, as those who were injured may have had a negative perception about their unit injury rates that may not reflect reality. Furthermore, those with lower fitness levels (slower APFT run times) were more likely to give an unfavorable rating to their leadership, indicating that those respondents may be unfairly associating perceived difficulty of unit PT with poor leadership. Units with leadership that rarely provided updates about the status of injuries were found to have higher injury incidence in the leadership support model and marginally in the overall model. Units with leadership that never provided recommendations for injury reduction had higher injury incidence in the overall model and marginally in leadership model. The effects of the specific leadership factors addressed in the present survey on military injury rates have not been previously considered.

7.3 Limitations

Limitations of this study included the self-reported and cross-sectional nature of the survey data. Because both potential risk factors and injuries were assessed at the same time, it cannot be determined which occurred first; therefore, causal relationships between potential risk factors and injuries cannot be asserted. However, the survey allowed for the collection of detailed information specific to 3ID-2BCT interests and needs, much of which are not readily available from existing data sources.

8 Conclusions and Recommendations

8.1 Conclusions

Thirty-seven percent of respondents reported at least one injury in the 6 months preceding survey administration. The most commonly reported injuries were sprains and strains to lower extremities resulting from physical training, consistent with previous investigations of injuries in the military. Leading modifiable factors associated with injury include the frequency or duration of certain exercise types during unit and personal physical training.

8.2 Recommendations

Exercises performed during unit and personal PT should be examined. Those who participate in sprint and interval training for shorter durations, those who run shorter distances during personal PT, and those who do not participate in calisthenics or participate for long durations during personal PT experienced higher injury incidence. An optimal cardiovascular training program would both increase aerobic capacity and minimize injury risk through a balance of aerobic endurance and mobility exercises.

Establishment of surveillance and/or routine review of Soldier injury and physical training data would enable ongoing monitoring of program effects and form the basis for future data-driven prioritization of injury prevention activities.

9 Point of Contact

The APHC IPP is the point of contact for this project, e-mail usarmy.apg.medcom-phc.mbx.injuryprevention@mail.mil, or phone number 410-436-4655, DSN 584-4655. Specific questions may be directed to authors listed at the front of this report.

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Appendix A

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Appendix B

Survey Questions

Note: Survey was administered electronically; length does not represent actual page length of survey and question numbers represent internal numbering system of Verint software. Skip patterns are indicated.

Fort Stewart survey_FINAL [English (United States)]

Demographics

1. Background Details

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4. What is your height (feet'inches")?
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5. What is your gender?

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- Female

6. What is your component?

- Active duty
- Reserve
- National Guard
- Other (Please Specify) _____

7. What is your military occupational specialty (MOS), AOC or Functional Area? (e.g., 11B)

Please Specify _____

8. What is your rank?

- O1
- O2
- O3
- O4
- O5
- O6
- O7
- O8
- O9
- O10
- E1
- E2
- E3
- E4
- E5
- E6
- E7

- E8
- E9
- W1
- W2
- W3
- W4
- W5
- Other

(End of Page 1)

9. What is your current batallion?

- 1-30 IN BN
- 3-15 IN BN

(End of Page 2)

This Page is Conditionally Shown if: (9 = 1-30 IN BN)

10. What is your current company (1-30 IN BN)?

- A Company
- B Company
- C Company
- D Company
- HHC

(End of Page 3)

This Page is Conditionally Shown if: (9 = 3-15 IN BN)

11. What is your current company (3-15 IN BN)?

- A Company
- B Company
- C Company
- D Company
- HHC

(End of Page 4)

12. Are you currently on permanent profile?

- Yes
- No

(End of Page 5)

This Page is Conditionally Shown if: (12 = Yes)

13. How long have you been on permanent profile? (If not applicable, please enter '0'.)

Years _____

Months _____

Days _____

14. Does your permanent profile limit your physical training or job duties?

- No
- Little impact

- Some impact
- Significant impact
- Unable to perform military duties as assigned

(End of Page 6)

15. Were you tape tested at your last weigh in?

- Yes
- No

16. Do you participate in any Army alternative PT programs (e.g. Profile, Weight Control, Pregnancy, etc.)?

- Yes
- No

(End of Page 7)

This Page is Conditionally Shown if: (16 = Yes)

17. Which Army alternative PT program do you participate in?

- Profile PT
- Weight Control PT
- Pregnancy PT
- Other (Please Specify) _____

(End of Page 8)

18. Please rate your fitness levels compared to others your age and gender:

Please use the sliding bar to select the best response.

Endurance: Far less than average; Slightly less than average; Average; Greater than average; Much greater than average

Sprint speed: Far less than average; Slightly less than average; Average; Greater than average; Much greater than average

Strength: Far less than average; Slightly less than average; Average; Greater than average; Much greater than average

Flexibility: Far less than average; Slightly less than average; Average; Greater than average; Much greater than average

Body Fat: Far less than average; Slightly less than average; Average; Greater than average; Much greater than average

(End of Page 9)

19. If you were asked to walk briskly up a slight incline of 100 yards (the length of a football field), what would your exertion level be?

Far less than average; Slightly less than average; Average; Greater than average; Much greater than average

(End of Page 10)

Army Physical Fitness Test (APFT)

20. What was the approximate date of your most recent APFT?

Approximate Date (mm/dd/yyyy) _____

21. What were the raw scores on your most recent APFT (If not applicable, please enter "0".)

Push-ups (repetitions) _____

Sit-ups (repetition) _____

2-mile run time (min:sec) _____

Other event (Please Specify) _____

(End of Page 11)

22. Are you on permanent profile that restricts you from participating in any of the APFT events?

Yes

No

(End of Page 12)

This Page is Conditionally Shown if: (62 = Yes)

23. From which event(s) are you restricted? (Select all that apply)

Push-ups

Sit-ups

Run

(End of Page 13)

Injury History (last 6 months)

The following questions are about physical injuries that you may have experienced. Physical injuries include those caused by:

1) A single incident or accident (examples include tripping and twisting ankle while marching, falling from a ladder, getting hit by/bumping into an object, experience a heat injury, or as the result of an automobile crash).

2) Overuse of a body area (examples include running long distances or repeatedly lifting/pulling/pushing/moving objects for job tasks or physical training).

Any physical damage to the body may be considered an injury, especially if medical attention was needed.

24. How many injuries have you experienced in the last 6 months?

None

1

2

3 or more

Destination: Page 37 (Set in 24 (None))

(End of Page 14)

If you reported more than 1 injury, please first answer the questions pertaining to the injury that MOST limited your physical abilities in the last 6 months (injury #1). You will then be asked the same questions for your 2nd most physically limiting injury (injury #2). Even if you reported 3 or more injuries, you will only be asked questions on the 2 most physically limiting injuries.

25. Estimate the approximate date of the injury #1 (past 6 months).

- December 2014
- November 2014
- October 2014
- September 2014
- August 2014
- July 2014
- June 2014

26. What was the primary body area injured?

- Head
- Neck
- Shoulders
- Upper Arm (bicep/tricep)
- Lower Arm (forearm)
- Elbow
- Wrist
- Hand
- Chest/ribs
- Abdomen
- Back (lower)
- Back (upper)
- Spine
- Hip
- Upper leg (Thigh/Hamstring)
- Lower leg (Shin/Calf)
- Knee
- Ankle
- Foot
- Heat/Cold Injury - Non-specific body area
- Other (Please Specify) _____

27. What was the type of injury #1?

- Abrasion
- Arthritis
- Blister
- Bruise/contusion
- Bursitis
- Cut/laceration
- Dislocation

- Fasciitis (e.g., plantar fasciitis)
- Fracture/Break
- Heat injury
- Cold injury
- Nerve injury
- Sprain or strain
- Tear (muscle/ligaments/meniscus/cartilage)
- Blunt force trauma
- Spinal injury (e.g., bulging or slipped disk)
- Other (Please Specify) _____

28. What activity was associated with injury #1?

- Gunshot, missile, or blast
- Lifting or moving heavy objects
- Physical training (running)
- Physical training (weight lifting)
- Other physical training (Please Specify) _____
- Repairing or maintaining equipment
- Riding, driving, or moving in/around a motorized vehicle
- Rough-housing or fighting
- Combatives training
- Sports/recreation
- Stepping/climbing
- Walking or hiking
- Marching - with load
- Marching - no load
- Other (Please Specify) _____

(End of Page 15)

This Page is Conditionally Shown if: (28 = Sports/recreation)

29. Please specify the sport causing injury #1:

- Football
- Basketball
- Soccer
- Volleyball
- Softball/baseball
- Running (e.g., road racing/marathons)
- Other (Please Specify) _____

(End of Page 16)

This Page is Conditionally Shown if: (28 = Riding, driving, or moving in/around a motorized vehicle)

30. While injured in or on a motorized vehicle, you were:

- Driving a military vehicle
- Riding in a military vehicle
- Driving a civilian vehicle
- Riding in a civilian vehicle
- Getting into a vehicle
- Getting out of a vehicle

(End of Page 17)

31. What was the cause associated with injury #1?

- Falling onto an object/surface/the ground
- Contact (hit by/against) an object/surface (Please Specify Object) _____
- Cut or puncture by a sharp tool, object or instrument
- Direct contact by a person
- Impact from a blast
- Overuse/repetitive activity
- Single overexertion/over-extension/twisting effort
- Burn (by fire, hot substance or object, or steam)
- Heat injury
- Cold injury
- Animal bite
- Insect bite
- Other (Please Specify) _____

(End of Page 18)

This Page is Conditionally Shown if: (31 = Falling onto an object/surface/the ground)

32. Injury #1 was caused by a fall from:

- Motor vehicle
- Aircraft
- Raised surface or platform 6ft or higher (not from a motor vehicle or aircraft)
- Raised surface or platform less than 6 ft high (not from a motor vehicle or aircraft)
- Level surface such as floor or ground (e.g., slipped, tripped)
- Other (Please Specify) _____

(End of Page 19)

33. Have you been seen by a medical professional for injury #1?

- Yes
- No

(End of Page 20)

This Page is Conditionally Shown if: (162 = Yes)

34. Which type of medical professional did you see for injury #1? (Select all that apply)

- Medic
- Physician's Assistant (PA)
- Nurse
- Physician (Doctor)

- Physical therapist
- Other (Please specify) _____
- Not sure

(End of Page 21)

35. Were you placed on temporary profile for injury #1?

- Yes
- No

(End of Page 22)

This Page is Conditionally Shown if: (35 = Yes)

36. How many days were you placed on temporary profile for injury #1?

Number of Days ____

37. For unit PT, do you know what alternative exercises you can do while on profile?

- Yes
- No
- N/A (I can still perform unit PT with no problems and do not need to perform alternative exercises)

(End of Page 23)

38. What impact does injury #1 currently have on your physical activity or job duties?

- No impact
- Little impact
- Some impact
- Significant impact
- Unable to perform military duties as assigned
- Other (Please Specify) _____

39. When did injury #1 occur?

- During duty hours
- Before or after duty hours

Branch to: Page 37 (24 = 1)

(End of Page 24)

These next questions will ask about injury #2 that you experienced in the past 6 months.

40. Estimate the approximate date of injury #2 (past 6 months).

- December 2014
- November 2014
- October 2014
- September 2014
- August 2014
- July 2014
- June 2014

41. What was the primary body area injured?

- Head
 - Neck
 - Shoulders
 - Upper Arm (bicep/tricep)
 - Lower Arm (forearm)
 - Elbow
 - Wrist
 - Hand
 - Chest/ribs
 - Abdomen
 - Back (lower)
 - Back (upper)
 - Spine
 - Hip
 - Upper Leg (thigh/hamstring)
 - Lower Leg (Shin/calf)
 - Knee
 - Ankle
 - Foot
 - Other (Please Specify) _____
 - Heat/cold injury - Non-specific body area
42. What was the type of injury #2?
- Abrasion
 - Arthritis
 - Blister
 - Bruise
 - Bursitis
 - Cut/laceration
 - Dislocation
 - Fascitis
 - Fracture/Break
 - Heat injury
 - Nerve injury
 - Sprain or strain
 - Tear (muscle/ligaments/meniscus/cartilage)
 - Blunt force trauma
 - Spinal injury (i.e. bulging or slipped disk)
 - Other (Please Specify) _____
43. What activity was associated with injury #2?
- Gunshot, missile, or blast
 - Lifting or moving heavy objects

- Physical training (running)
- Physical training (weight lifting)
- Other physical training (Please Specify) _____
- Repairing or maintaining equipment
- Riding or driving in a motorized vehicle
- Rough-housing or fighting
- Combatives training
- Sports/recreation
- Stepping/climbing
- Walking or Hiking
- Marching - with load
- Marching - No load
- Other (Please Specify) _____

(End of Page 25)

This Page is Conditionally Shown if: (43 = Sports/recreation)

44. Please specify the sport causing the injury #2:

- Football
- Basketball
- Soccer
- Volleyball
- Softball/baseball
- Running (e.g., road racing/marathons)
- Other (Please Specify) _____

(End of Page 26)

This Page is Conditionally Shown if: (43 = Riding or driving in a motorized vehicle)

45. While injured in or on a motorized vehicle, you were:

- Driving a military vehicle
- Riding in a military vehicle
- Driving a civilian vehicle
- Riding in a civilian vehicle
- Getting into a vehicle
- Getting out of a vehicle

(End of Page 27)

46. What was the cause associated with injury #2?

- Falling onto an object/surface/the ground
- Contact (hit by/against) an object/surface (Please Specify Object) _____
- Cut or puncture by a sharp tool, object or instrument
- Direct contact by a person
- Impact from a blast
- Overuse/reptitive activity (List activity) _____

- Single overexertion/over-extension/twisting effort - moved too fast, too much weight
- Burn (by fire, hot substance or object, or steam)
- Heat injury
- Cold injury
- Animal bite
- Insect bite
- Other (Please Specify) _____

(End of Page 28)

This Page is Conditionally Shown if: (46 = Falling onto an object/surface/the ground)

47. Injury #2 was caused by a fall from:

- Motor vehicle
- Aircraft
- Raised surface or platform 6ft or higher (not from a motor vehicle or aircraft)
- Raised surface or platform less than 6 ft high (not from a motor vehicle or aircraft)
- Level surface such as floor or ground (e.g., slipped, tripped)
- Other (Please Specify) _____

(End of Page 29)

48. Have you been seen by a medical professional for injury #2?

- Yes
- No

(End of Page 30)

This Page is Conditionally Shown if: (48 = Yes)

49. Which type of medical professional did you see for injury #2? (Select all that apply)

- Medic
- Physician Assistant (PA)
- Nurse
- Physician (Doctor)
- Physical therapist
- Other (Please Specify) _____
- Not sure

(End of Page 31)

50. Were you placed on temporary profile for injury #2?

- Yes
- No

(End of Page 32)

This Page is Conditionally Shown if: (51 = Yes)

51. How many days were you placed on temporary profile for injury #2?

Number of Days ____

52. For unit PT, do you know what alternative exercises you can do while on profile?

- Yes

No

N/A (I can still perform unit PT with no problems and do not need to perform alternative exercises)

(End of Page 33)

53. What impact does injury #2 currently have on your physical activity or job duties?

No impact

Little impact

Some impact

Significant impact

Unable to perform military duties as assigned

Other (Please Specify) _____

54. When did injury #2 occur?

During duty hours

Before or after duty hours

(End of Page 34)

Physical Demands for Work Performance

55. Select the category below that best describes the lifting activities required to do your job (amount of weight and frequency of lifting):

No Lifting (lifting is always less than 10 pounds)

Light: Frequent or constant lifting of 10 pounds, with occasional lifting up to 20 pounds

Medium: Frequent or constant lifting of 25 pounds, with occasional lifting up to 50 pounds

Moderately Heavy: Frequent or constant lifting of 40 pounds, with occasional lifting up to 80 pounds

Heavy: Frequent or constant lifting of 50 pounds, with occasional lifting up to 100 pounds

Very Heavy: Frequent or constant lifting in excess of 50 pounds, with occasional lifting over 100 pounds

56. Select the category below that best describes the overall amount of aerobic activity (e.g., that increases breathing rate) required to do your job:

None - not physical; activities are sedentary

Light - limited or occasional strenuous high energy activities

Moderate - most days involve strenuous high energy activities

High - every day involves long periods (many hours) of high energy activities

(End of Page 35)

Unit Physical Training (PT)

57. Do you currently participate in unit PT (i.e., road marching, running, calisthenics, or strength training with your unit)?

Yes

No

Destination: Page 42 (Set in 54 (No))
(End of Page 36)

58. How would you rate your unit PT?

- Challenging
- Hard
- Somewhat Hard
- Moderate
- Easy

59. Are new Soldiers to your unit slowly introduced to unit PT, giving them time to adapt?

- Yes
- No

60. What is your unit PT program primarily based on:

- Traditional Army PT (Running, Push-ups, Sit-ups)
- Physical Readiness Training (PRT)
- Cross-training
- Extreme conditioning (e.g., P90X, CrossFit, Insanity)
- Combination of these programs (Please specify) _____
- Other (Please Specify) _____

61. On average, how often do you participate in unit PT each week?

- None
- <1 time per week
- 1 time per week
- 2 times per week
- 3 times per week
- 4 times per week
- 5 times per week
- 6 times per week
- 7 times per week
- More than 7 times per week

(End of Page 37)

62. For distance running (running continuously for 1 mile or greater) with your unit, please select your average DISTANCE (miles per time you ran) and FREQUENCY (number of times per week) during the typical week over the last 6 months.

Please use the sliding bar to select the best response or enter a number directly into the box to the far right.

On average, how many times per week did you perform distance running with your unit in the last 6 months?

Each time you ran with your unit, on average, how many miles did you run?

(End of Page 38)

63. For the below listed exercise activities with your unit, please select your average FREQUENCY (number of times per week) and DURATION (minutes per event) of participation

during the typical week over the last 6 months.

Sprints are short bursts of speed that cannot be sustained for more than a few minutes. Intervals are short periods of high speed running mixed with periods of jogging or walking.

Calisthenics include jumping jacks, windmills, mountain climbers, etc.

Cross-training type exercises include circuit training and combinations of exercises to work various parts of the body.

Agility drills are drills requiring lateral movements, typically using cones or ladders, obstacle course, etc.

Resistance training is weight lifting using free weights, dumbbells, kettlebells, hammer-strength machines, etc.

On average, how many times per week did you perform the activity with your unit in the last 6 months?

On average, how many minutes per event did you perform this activity with your unit in the last 6 months?

Unit Road Marches

64. On average, how many times per month did you perform road marching with your unit in the last 6 months?

Number of times road marching per month _____

65. Each time you road marched with your unit in the last 6 months, how many miles did you road march on average?

Distance in miles _____

66. On average, how heavy was your march load each time you road marched with your unit in the last 6 months?

Weight in pounds _____

(End of Page 39)

Personal Physical Training (PT)

67. Do you perform PT on your own time?

Yes

No

(End of Page 40)

This Page is Conditionally Shown if: (67 = Yes)

68. What is your primary goal of personal PT?

Lose weight

Gain muscle mass

Increase aerobic capacity

Increase aerobic capacity and gain muscle mass

Maintain current fitness levels

Unit PT is not challenging so I need additional PT to maintain my fitness levels

69. What program is your personal physical training program primarily based on:

Traditional Army PT (Running, Push-ups, Sit-ups)

- Physical Readiness Training (PRT)
- Cross-training
- Extreme conditions (e.g., P90X, CrossFit, Insanity)
- Combination of these programs (Please specify) _____
- Other (Please specify) _____

(End of Page 41)

This Page is Conditionally Shown if: (67 = Yes)

70. For Distance running (running continuously for 1 mile or greater) for personal PT, please select your average DISTANCE (miles per time you ran) and FREQUENCY (number of times per week) during the typical week over the last 6 months.

On average, how many times per week did you run for personal PT in the last 6 months
Each time you ran for personal PT, on average, how many miles did you run?

71. For the below listed exercise activities for personal PT, please select your average FREQUENCY (number of times per week) and DURATION (minutes per event) of participation during the typical week over the last 6 months.

Sprints are short bursts of speed that cannot be sustained for more than a few minutes. Intervals are short periods of high speed running mixed with periods of jogging or walking.

Calisthenics include jumping jacks, windmills, mountain climbers, etc.

Cross-training type exercises include circuit training and combinations of exercises to work various parts of the body.

Agility drills are drills requiring lateral movements, typically using cones or ladders, obstacle course, etc.

Aerobic endurance activities include elliptical machines, rowing machine, cycling, stair steppers. DO NOT include running.

Resistance training is weight lifting using free weights, dumbbells, kettlebells, hammer-strength machines, etc.

On average, how many times per week did you perform the activity in the last 6 months?
Each time you ran for personal PT, on average, how many miles did you run?

(End of Page 41)

Exercise Equipment (Unit and Personal PT)

72. Exercise Equipment use and availability

Treadmills: Available – USED this equipment/area; Available – not used; Not Available

Stationary Bicycles: Available – USED this equipment/area; Available – not used; Not Available

Stairmasters: Available – USED this equipment/area; Available – not used; Not Available

Free Weights: Available – USED this equipment/area; Available – not used; Not Available

Kettlebells: Available – USED this equipment/area; Available – not used; Not Available

Tires to Flip: Available – USED this equipment/area; Available – not used; Not Available

Sled to drag or push: Available – USED this equipment/area; Available – not used; Not Available

Ropes to climb or swing: Available – USED this equipment/area; Available – not used; Not Available

Universal Weight Training Equipment: Available – USED this equipment/area; Available – not used; Not Available

Nautilus: Available – USED this equipment/area; Available – not used; Not Available

Pull-up Bar: Available – USED this equipment/area; Available – not used; Not Available

Swimming Facility: Available – USED this equipment/area; Available – not used; Not Available

Basketball Court: Available – USED this equipment/area; Available – not used; Not Available

Tennis Court: Available – USED this equipment/area; Available – not used; Not Available

Racquetball/Squash Court: Available – USED this equipment/area; Available – not used; Not Available

Baseball/Softball Field: Available – USED this equipment/area; Available – not used; Not Available

Soccer Field: Available – USED this equipment/area; Available – not used; Not Available

Track: Available – USED this equipment/area; Available – not used; Not Available

Running area: Available – USED this equipment/area; Available – not used; Not Available

Outdoor Bicycles: Available – USED this equipment/area; Available – not used; Not Available

73. Was there other equipment available that you used or did not use (Please specify)?

(End of Page 43)

Tobacco Use

74. Have you smoked more than 100 cigarettes in your life? (100 cigarettes=5 packs)

Yes

No

75. Have you ever used smokeless tobacco (chewing tobacco, snuff, dip, etc.)?

Yes

No

76. Have you ever used electronic cigarettes or personal vaporizers?

Yes

No

(End of Page 44)

This Page is Conditionally Shown if: (74 = Yes)

77. You indicated that you have smoked cigarettes. About how old were you when you started smoking cigarettes for the first time?

6

7

8

9

10

- 11
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- 46
- 47
- 48
- 49
- > 50

78. Have you smoked cigarettes in the last 30 days?

- I have smoked cigarettes in the last 30 days.

I quit smoking and have not smoked cigarettes in the last 30 days.
(End of Page 45)

This Page is Conditionally Shown if: (78 = I have smoked cigarettes in the last 30 days.)

79. How long have you smoked cigarettes? (If not applicable, please enter '0'.)

Number of years _____

Number of months _____

80. In the past 30 days, how many days did you smoke cigarettes?

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
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- 22
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 30

81. In the past 30 days, how many cigarettes have you smoked on average PER DAY?

Cigarettes per day on average _____

(End of Page 46)

This Page is Conditionally Shown if: (230 = I quit smoking and have not smoked cigarettes in the last 30 days.)

82. How many months or years ago did you quit smoking cigarettes? (If not applicable, please enter '0'.)

Years quit _____

Months quit _____

(End of Page 47)

This Page is Conditionally Shown if: (75 = Yes)

Smokeless Tobacco

83. You indicated that you have used smokeless tobacco. Have you used smokeless tobacco (chewing tobacco, snuff, dip, etc.) in the last 30 days?

I have used smokeless tobacco in the last 30 days.

I quit using smokeless tobacco, and have not used in the last 30 days.

(End of Page 48)

This Page is Conditionally Shown if: (83 = I quit using smokeless tobacco, and have not used in the last 30 days.)

84. How long ago did you quit using smokeless tobacco? (If not applicable, please enter '0'.)

Years quit ____

Months quit ____

(End of Page 49)

This Page is Conditionally Shown if: (83 = I have used smokeless tobacco in the last 30 days.)

85. How long have you been using smokeless tobacco? (If not applicable, please enter '0'.)

Years used ____

Months used ____

86. How many days did you use smokeless tobacco in the last 30 days?

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

- 14
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- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 30

87. How many cans, pouches, or plugs did you use PER DAY on average in the last 30 days? (If not applicable, please enter '0'.)

Number of Cans _____

Number of Pouches _____

Number of Plugs _____

(End of Page 50)

This Page is Conditionally Shown if: (76 = Yes)

Electronic Cigarettes

88. You indicated that you have used electronic cigarettes or personal vaporizers. Have you used electronic cigarettes or personal vaporizers in the last 30 days?

- I have used electronic cigarettes or personal vaporizers in the last 30 days.
- I quit using electronic cigarettes and have not used them in the last 30 days.

(End of Page 51)

This Page is Conditionally Shown if: (88 = I quit using electronic cigarettes and have not used them in the last 30 days.)

89. How long ago did you quit using electronic cigarettes? (If not applicable, please enter '0'.)

Years quit ____

Months quit ____

(End of Page 52)

This Page is Conditionally Shown if: (88 = I have used electronic cigarettes or personal vaporizers in the last 30 days.)

90. How long have you been using electronic cigarettes or personal vaporizers? (If not applicable, please enter '0'.)

Years used ____

Months used ____

91. How many days did you use electronic cigarettes or personal vaporizers in the last 30 days?

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
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- 21
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- 29
- 30

(End of Page 53)

Dietary Supplements and Prescriptions

92. Do you take dietary supplements?

- Yes
- No

(End of Page 54)

This Page is Conditionally Shown if: (92 = Yes)

93. What dietary supplements do you take? (Select all that apply)

- Vitamins/multivitamin
- Weight loss supplements
- Performance/muscle enhancement supplements
- Nutrition enhancement supplements
- Healthy joint supplements
- Other (Please Specify) _____

94. For what reasons do you take dietary supplements? (Select all that apply)

- Promote general health
- Give more energy
- Greater muscle strength
- Performance enhancer
- Healthy joints
- Weight loss
- Increased endurance
- Not sure
- Other (Please Specify) _____

(End of Page 55)

Leadership and Medical Support

95. Does your unit have an assigned Master Fitness Trainer (MAT)?

- Yes
- No
- Not sure

96. Is there an Army Wellness Center (AWC) on your installation?

- Yes
- No
- Not sure

(End of Page 56)

This Page is Conditionally Shown if: (96 = Yes)

97. Have you been evaluated at the Army Wellness Center?

- Yes
- No

(End of Page 57)

Leadership and Medical Support Continued

98. Your unit leadership encourages physical training in a safe way that strives to increase fitness but reduce or minimize injuries.

- Strongly agree
- Agree
- Neither agree or disagree

- Disagree
- Strongly Disagree

99. Does your unit or physical training leader describe common causes of training injury and provide recommendations to reduce injuries?

- Routinely
- Occasionally
- Rarely
- Never

100. Does your unit or physical training leader provide information about status of unit injuries and causes?

- Routinely
- Occasionally
- Rarely
- Never

101. Your current unit has a higher than normal rate of physical training related injuries.

- Strongly agree
- Agree
- Disagree
- Strongly Disagree
- Not Sure

(End of Page 58)

This is the end of the survey, thank you for your participation. Please select the "Submit Survey" button below.

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