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Clinical Public Health and Epidemiology Directorate
Injury Prevention Division**

**Epidemiological Investigation of the Rehabilitation Physical
Readiness Training Program Baseline Survey, April – July 2016**

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14. ABSTRACT In an attempt to improve medical readiness and effectively recondition injured Soldiers, an Army Airborne Division implemented a reconditioning physical readiness training (RPRT) program. This report summarizes findings from the baseline survey conducted in support of the RPRT program. The primary objectives of this investigation are (1) to establish baseline injury incidence among participants and (2) to identify risk factors for injury. An electronic survey was used to capture baseline demographic, lifestyle, physical training (PT), fitness, and injury data for a reconditioning investigation. These analyses consisted of 5,785 (5,187 men, 598 women) U.S. Army Soldiers. Overall, 36% of Soldiers sustained an injury (35% of men and 42% of women) within the previous 12 months. Independent risk factors identified among men in this investigation suggest that maintaining a healthy weight (BMI < 25.0), performing ≤ 75 minutes/week of calisthenics and > 30 minutes/week of sprint/interval training during unit PT, running > 4 miles/week during personal PT and greater cardiorespiratory fitness (as measured by APFT 2-mile run times) may reduce odds of injury. Older age was the only risk factor among men that was not modifiable. Among women, independent risk factors identified suggest that maintaining a healthy weight (BMI < 25.0), performing agility training during personal PT and greater cardiorespiratory fitness (as determined by APFT 2-mile run times) may reduce odds of injury.					
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EPIDEMIOLOGICAL INVESTIGATION OF THE REHABILITATION PHYSICAL
READINESS TRAINING PROGRAM BASELINE SURVEY
APRIL – JULY 2016

1. SUMMARY

1.1 Purpose

In attempt to improve medical readiness and effectively recondition injured Soldiers, an Airborne Division implemented a reconditioning physical readiness training (RPRT) program. The U.S. Army Public Health Center (APHC) agreed to evaluate the RPRT program. This report summarizes findings from the baseline survey conducted in support of the RPRT program. The primary objectives of this investigation are to (1) establish baseline injury incidence among all participants and (2) identify risk factors for injury.

1.2 Methods

A baseline survey was distributed among U.S. Army Airborne Division Soldiers. Soldiers in participating units who completed the survey were included in this investigation, regardless of whether they were injured or treated in RPRT. This survey inquired about personal characteristics, physical training (PT), fitness, and injury over the previous 12 months. Responses were received from April to July 2016. Only participants who provided responses to the injury question/s, reported ≤ 600 minutes/week of unit PT, and ≤ 840 minutes/week of personal PT were included in the analyses. Descriptive statistics were calculated for all variables of interest. Risk factors for injury were analyzed using univariate and multivariable logistic regression. Unadjusted odds ratios (ORs) and adjusted odds ratios (aORs) as well as their 95% confidence intervals (CI) were calculated. The APHC public health review board approved this project as public health practice.

1.3 Results

These analyses consisted of 5,785 (5,187 men, 598 women) U.S. Army Service members. Overall, 36% of Soldiers sustained an injury (35% of men and 42% of women) within the previous 12 months. The majority of men were < 25 years old (53%), junior enlisted (60%), and nonsmokers (76%). The majority of women were < 25 years old (54%), junior enlisted (63%), and nonsmokers (87%). Men held a higher percentage of strenuous jobs (56%), requiring moderately heavy to very heavy lifting activities, than women (25%).

The most common injury types were sprains/strains (38%), tears (13%), and fractures/breaks (8%). Running during PT (31%) and marching with load (14%) were most frequently associated with injury. Overuse activity (41%), falling (20%), and single overexertion/over-extension/twisting effort (14%) were the most common causes of injury. The most commonly injured body areas among men were the knee (21%), lower back (15%), and ankle (13%). Among women, the most common injuries were the hip (19%), knee (16%), and lower back (14%). A medical professional was consulted by 89% of women and 85% of men who were

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injured. With regard to PT, men performed significantly more ($p < 0.05$) unit running, calisthenics, resistance, sprint/interval training, road marching miles, personal PT running, and sprint/interval training than women. Meanwhile, women performed significantly more ($p < 0.05$) aerobic (non-running) training than men.

On average, men did more push-up and sit-up repetitions and had faster 2-mile run times than women. Bivariate analyses were used to evaluate associations between each potential risk factor and injury. For men, greater odds of injury were associated with being ≥ 25 years of age, obese, holding a job that required no or light lifting activities, performing ≤ 30 minutes/week of unit sprint/interval training, running ≤ 4 miles/week during personal PT, and slower Army Physical Fitness Test (APFT) run times. Conversely, performing up to 75 minutes/week of calisthenics during unit PT resulted in lower odds of injury. Among women, performing no agility training during personal PT and slow APFT run times were associated with injury.

1.4 Conclusions and Recommendations

Overall, 36% of participants reported an injury in the previous 12 months, with women reporting a greater percentage of injuries (42%) than men (35%). The results suggest that men may benefit from adjusting modifiable risk factors including increasing cardiorespiratory fitness, obtaining/maintaining a healthy body mass index (BMI), moderate running during personal PT, performing occasional sprint/interval training, and low-moderate calisthenics training. Women may benefit from performing agility training and achieving and/or maintaining high cardiorespiratory fitness

2. REFERENCES AND TERMS

See Appendix A for a listing of references and the glossary for the listing of abbreviations and acronyms used within this report.

3. AUTHORITY

The authority for this investigation is Army Regulation 40-5 paragraph 2-19a, in which the APHC is tasked 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

In an attempt to improve medical readiness and effectively recondition injured Soldiers, an Airborne Division implemented a RPRT program. The APHC agreed to evaluate the RPRT. This report summarizes findings from the baseline survey conducted in support of the RPRT program. The primary objectives of this investigation are to (1) establish baseline injury incidence among all participants and (2) identify risk factors for injury. The APHC conducted this epidemiological investigation.

5. METHODS

5.1 Survey Design and Administration

The APHC designed the survey, with feedback and review from the Chief Physical Therapist at an Army Community Hospital. The APHC entered survey questions into the Verint® Systems Enterprise Edition survey software tool, which generated a link to the survey. The Chief Physical Therapist sent out the survey electronically during the spring and summer of 2016. Responses were received April through July 2016. Appendix B includes an example of the survey.

5.2 APHC Human Protections Review

Prior to the administration of the survey, the APHC public health review board reviewed and approved this project as public health practice.

5.3 Data Collection and Analysis

5.3.1 Data Collection

An electronic survey was used to capture baseline demographic, lifestyle, PT, APFT, and injury data for a reconditioning program evaluation among an Army Airborne Division between April and July of 2016. This was deemed an adequate data collection method, as prior studies have documented close correlations between actual and self-reported APFT scores, weight, and height (references 1 and 2). Only participants who provided responses to injury question(s), reported ≤ 600 minutes/week of unit PT, and reported ≤ 840 minutes/week of personal PT were included in the current analyses. These exclusions were used to censor responses in excess of plausible amounts of exercise.

The APFT measures muscular endurance and cardiorespiratory fitness of Soldiers. All Soldiers are required to complete this test bi-annually. The test consists of three events: a 2-minute maximal effort push-up event, a 2-minute maximal effort sit-up event, and a timed 2-mile run.

Soldiers who smoked more than 100 cigarettes in their lifetime and smoked at least one cigarette in the last 30 days were classified as smokers. All other participants, who had not smoked cigarettes in the last 30 days, were classified as nonsmokers. Smokeless tobacco users were classified as those who used smokeless tobacco in the last 30 days. Soldiers who did not use smokeless tobacco in the last 30 days were nonusers. BMI was calculated by converting self-reported height, in inches, and weight, in pounds, to meters (m) and kilograms (kg) respectively ($BMI = kg/m^2$). These values were categorized according to the Centers for Disease Control and Prevention classifications for “underweight,” “normal,” “overweight,” and “obese.” Underweight and normal weight categories were combined.

An injury was defined as any physical damage to the body, especially if medical attention was needed. This investigation limited injuries to physical injuries being caused by (1) a single incident or accident or (2) overuse of a body area that occurred within 12 months prior to

completing the survey. Soldiers who reported at least one injury were asked details about the injury that most limited their physical abilities. Injury questions included—

- Date of injury;
- Primary body area impacted;
- Injury type;
- Activity associated with injury;
- Mechanism of injury;
- Impact of injury on physical activity;
- Whether the participant was seen by a medical provider for injury; and
- Number of limited duty days, if applicable.

5.3.2 Data Analysis

Data were analyzed on all Soldiers who provided responses to the injury question(s), reported ≤ 600 minutes/week of unit PT, and reported ≤ 840 minutes/week of personal PT ($n=5,785$, 89%). Statistical Analysis System (SAS®), Version 9.4 was used to conduct statistical analyses. The following variables were investigated as potential risk factors for injury: age, gender, BMI, rank, PT (unit and personal), fitness (measured by APFT run times, sit-ups, and push-ups), tobacco use, and lifting activities. Descriptive statistics were calculated for all variables including the outcome of interest (injury). Means and standard deviations were calculated for all APFT events, while frequencies and percentages were calculated for categorical variables. T-tests were used to determine whether there were statistically significant differences in the mean APFT scores between men and women, while chi-squared tests were used to identify if there were differences by gender for all other (categorical) variables. Chi-squared tests were also used to evaluate associations between each of the potential risk factors and injury. Univariate logistic regression analyses were used to calculate ORs and 95% CIs. Multivariate logistic regression was used to calculate aORs and 95% CIs. Two multivariate logistic regression models, one for unit PT and the other for personal PT, were used to identify risk factors for injury. Variables that were associated with injury (having a p-value ≤ 0.05) were included in the univariate and multivariate logistic regression analyses. All statistical tests were two-sided and p-values of ≤ 0.05 were considered statistically significant.

6. RESULTS

6.1 Demographics

The current analyses consisted of 5,785 (5,187 men, 598 women) U.S. Army Soldiers assigned to Infantry Brigades on an airborne installation. Overall, 36% of Soldiers sustained an injury (35% of men and 42% of women) within the prior 12 months. Table 1 displays demographic variables, tobacco use, PT, and injury, stratified by gender. The majority of men were < 25 years old (53%), junior enlisted (60%), overweight (51%), and nonsmokers (76%). The majority of women were < 25 years old (54%), junior enlisted (63%), underweight/normal (58%), and nonsmokers (87%). Men held jobs that were more strenuous (56%), requiring moderately heavy to very heavy lifting activities, than women (25%). With regard to PT, men reported more

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unit running, calisthenics, resistance, sprint/interval training, road marching miles, personal PT running, and sprint/interval training than women ($p < 0.05$). Women reported more aerobic (non-running) training than men ($p < 0.05$).

Table 1. Distribution of characteristics of Infantry Soldiers – Demographics, Tobacco Use, and Physical Training (N=5,785)

		Men (89.66% (n=5,187))		Women (10.34% (n= 598))	
Category	Variable	Level of Variable	% (n ¹)	Level of Variable	% (n ¹)
Demographics	Age	<25	53.33 (2766)	<25	54.01 (323)
		25 – 35	37.61 (1951)	25 – 35	35.62 (213)
		> 35	9.06 (470)	> 35	10.37 (62)
	BMI ²	Underweight/Normal	37.40 (1937)	Underweight/Normal	57.55 (343)
		Overweight	50.99 (2641)	Overweight	37.08 (221)
		Obese	11.60 (601)	Obese	5.37 (32)
	Rank ²	E1 – E4	59.59 (3087)	E1 – E4	63.38 (379)
		E5 – E9	28.69 (1486)	E5 – E9	23.91 (143)
Officers/Warrant Officers		11.72 (607)	Officers/Warrant Officers	12.71 (76)	
Tobacco Use	Cigarette Use ²	Non-smoker	76.08 (3851)	Non-smoker	86.50 (506)
		Smoker	23.92 (1211)	Smoker	13.50 (79)
	Smokeless Tobacco Use ²	Non User	79.78 (4138)	Non User	98.66 (590)
		User	20.22 (1049)	User	1.34 (8)
Lifting	Lifting activities required by job ²	No Lifting	6.06 (313)	No Lifting	15.49 (92)
		Light	11.88 (614)	Light	29.80 (177)
		Medium	26.19 (1354)	Medium	29.29 (174)
		Moderately Heavy	27.90 (1442)	Moderately Heavy	16.33 (97)
		Heavy	16.02 (828)	Heavy	6.40 (38)
		Very Heavy	11.96 (618)	Very Heavy	2.69 (16)
Unit PT	Miles of unit running ²	None	3.68 (172)	None	12.82 (60)
		≤ 6.0 miles per week	24.76 (1159)	≤ 6.0 miles per week	25.21 (118)
		6.1 – 9.0 miles per week	27.63 (1293)	6.1 – 9.0 miles per week	18.80 (88)
		9.1 – 12.0 miles per week	27.39 (1282)	9.1 – 12.0 miles per week	24.15 (113)
		> 12.0 miles per week	16.54 (774)	> 12.0 miles per week	19.02 (89)
		Duration of unit calisthenics ²	None	20.36 (951)	None
	≤ 40.0 minutes per week		31.57 (1475)	≤ 30.0 minutes per week	24.41 (114)
	40.1 – 75.0 minutes per week		23.16 (1082)	30.1 – 60.0 minutes per week	19.06 (89)
	> 75.0 minutes per week		24.91 (1164)	> 60.0 minutes per week	22.70 (106)
	Duration of unit resistance training ²	None	27.76 (1297)	None	35.97 (168)
		≤ 30.0 minutes per week	25.24 (1179)	≤ 30.0 minutes per week	23.98 (112)
		30.1 – 60.0 minutes per week	21.43 (1001)	30.1 – 60.0 minutes per week	22.06 (103)
		> 60.0 minutes per week	25.58 (1195)	> 60.0 minutes per week	17.99 (84)
	Duration of unit agility training	None	28.15 (1315)	None	30.84 (144)
		≤ 25.0 minutes per week	22.90 (1070)	≤ 21.0 minutes per week	19.27 (90)
		25.1 – 51.0 minutes per week	21.81 (1019)	21.1 – 48.0 minutes per week	20.13 (94)
		> 51.0 minutes per week	27.14 (1268)	> 48.0 minutes per week	29.76 (139)
	Duration of unit sprint/interval training ²	None	8.18 (382)	None	18.84 (88)
		≤ 30.0 minutes per week	32.30 (1509)	≤ 30.0 minutes per week	31.05 (145)
		30.1 – 60.0 minutes per week	32.17 (1503)	30.1 – 60.0 minutes per week	26.98 (126)
		> 60.0 minutes per week	27.35 (1278)	> 60.0 minutes per week	23.13 (108)
	Road marching total distance per month ²	None	4.94 (231)	None	13.92 (65)
		< 10 miles	40.84 (1908)	< 10 miles	37.26 (174)
		≥ 10 miles	54.22 (2533)	≥ 10 miles	48.82 (228)

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Category	Variable	Men (89.66% (n=5,187))		Women (10.34% (n= 598))	
		Level of Variable	% (n ¹)	Level of Variable	% (n ¹)
Personal PT	Miles of personal running ²	None	16.49 (685)	None	20.83 (95)
		≤ 4.0 miles per week	30.21 (1255)	≤ 4.0 miles per week	29.39 (134)
		4.1 – 6.0 miles per week	15.70 (652)	4.1 – 6.0 miles per week	16.23 (74)
		6.1 – 10.0 miles per week	19.07 (792)	6.1 – 10.0 miles per week	15.13 (69)
		> 10.0 miles per week	18.54 (770)	> 10.0 miles per week	18.42 (84)
	Duration of personal calisthenics	None	42.01 (1745)	None	44.30 (202)
		≤ 23.0 minutes per week	18.46 (767)	≤ 25.0 minutes per week	19.96 (91)
		23.1 – 60.0 minutes per week	22.60 (939)	25.1 – 60.0 minutes per week	20.18 (92)
		> 60.0 minutes per week	16.92 (703)	> 60.0 minutes per week	15.57 (71)
	Duration of personal resistance training	None	27.64 (1148)	None	33.33 (152)
		≤ 40.0 minutes per week	22.73 (944)	≤ 36.0 minutes per week	21.71 (99)
		40.1 – 135.0 minutes per week	26.38 (1096)	36.1 – 100.0 minutes per week	22.15 (101)
		> 135.0 minutes per week	23.25 (966)	> 100.0 minutes per week	22.81 (104)
	Duration of personal agility training	None	49.95 (2075)	None	53.07 (242)
		≤ 18.0 minutes per week	15.31 (636)	≤ 15.0 minutes per week	14.69 (67)
		18.1 – 40.0 minutes per week	14.90 (619)	15.1 – 46.0 minutes per week	16.23 (74)
		> 40.0 minutes per week	19.84 (824)	> 46.0 minutes per week	16.01 (73)
	Duration of personal sprint/interval training ²	None	33.34 (1385)	None	33.77 (154)
		≤ 20.0 minutes per week	19.76 (821)	≤ 23.0 minutes per week	21.49 (98)
		20.1 – 50.0 minutes per week	22.20 (922)	23.1 – 60.0 minutes per week	27.41 (125)
		> 50.0 minutes per week	24.70 (1026)	> 60.0 minutes per week	17.32 (79)
	Duration of personal aerobic training ²	None	39.87 (1656)	None	30.04 (137)
		≤ 30.0 minutes per week	23.25 (966)	≤ 40.0 minutes per week	23.25 (106)
		30.1 – 70.0 minutes per week	17.09 (710)	40.1 – 90.0 minutes per week	24.56 (112)
		> 70.0 minutes per week	19.79 (822)	> 90.0 minutes per week	22.15 (101)
Injury	Injured ²	Yes	34.78 (1804)	Yes	42.14 (252)
		No	65.22 (3383)	No	57.86 (346)
Legend: PT = physical training Notes: ¹ Not everyone answered all of the questions on the survey. ² A statistically significant difference was identified between men and women (p<0.05), using a chi-squared test.					

6.2 Army Physical Fitness Test Performance

Table 2 displays APFT scores for men and women. On average, men did more push-up and sit-up repetitions and had faster 2-mile run times than women.

Table 2. APFT Scores of Infantry Soldiers by Quartiles (25% Groups) (N=5,785)

Variable	Men (n=5,187) ¹			Women (n=598) ¹		
	Level of Variable	% (n)	Mean ± SD	Level of Variable	% (n)	Mean ± SD
Push-ups (reps)²	10 – 55 (Q1)	29.13 (1466)	63.58 ± 12.72	6 – 30 (Q1)	29.93 (170)	38.22 ± 12.56
	56 – 64 (Q2)	22.05 (1110)		31 – 39 (Q2)	21.30 (121)	
	65 – 72 (Q3)	24.58 (1237)		40 – 45 (Q3)	24.30 (138)	
	73 – 130 (Q4)	24.24 (1220)		46 – 106 (Q4)	24.47 (139)	
Sit-ups (reps)²	2 – 60 (Q1)	25.94 (1302)	68.30 ± 11.07	26 – 56 (Q1)	28.62 (160)	64.60 ± 12.48
	61 – 68 (Q2)	25.56 (1283)		57 – 65 (Q2)	25.94 (145)	
	69 – 76 (Q3)	23.96 (1203)		66 – 73 (Q3)	20.93 (117)	
	77 – 129 (Q4)	24.54 (1232)		74 – 109 (Q4)	24.51 (137)	
2-mile Run (min:min)²	8.50 – 13.77 (Q1)	24.57 (1183)	14.91 ± 2.12	11.90 – 16.33 (Q1)	24.61 (126)	18.07 ± 3.38
	13.78 – 14.65 (Q2)	25.09 (1208)		16.34 – 17.57 (Q2)	25.20 (129)	
	14.66 – 15.60 (Q3)	25.14 (1210)		17.58 – 18.83 (Q3)	25.39 (130)	
	15.61 – 36.50 (Q4)	25.20 (1213)		18.84 – 37.40 (Q4)	24.80 (127)	
Legend: SD = Standard Deviation Q = quartile Notes: ¹ Not everyone provided APFT scores. ² APFT means between men and women were significantly different (p ≤ 0.0001), using a t-test.						

6.3 Characteristics of Reported Injury

Table 3 displays the characteristics of injury among the population stratified by gender. The most common injury types were sprains/strains, tears, and fractures/breaks. Running and marching with load were the activities most frequently associated with injury. Overuse activity, falling, and single overexertion/over-extension/twisting effort were the most common causes of injury. The most common primary body areas injured among men were the knee, lower back and ankle, while hip, knee, and lower back were most common among women. A medical professional was consulted by 89% of women and 85% of men for their injury.

Table 3. Characteristics of injury among Infantry Soldiers (N = 2,056)

Variable	Men (n=1,804)		Women (n=252)	
	Level of Variable	% (n ¹)	Level of Variable	% (n ¹)
Injury type	Sprain or strain	39.08 (705)	Sprain or strain	33.73 (85)
	Tear (muscle/ligaments/meniscus/cartilage)	13.08 (236)	Tear (muscle/ligaments/meniscus/cartilage)	14.29 (36)
	Fracture/break	8.04 (145)	Fracture/break	9.52 (24)
	Bruise/contusion	3.82 (69)	Unspecified pain	4.37 (11)
	Spinal injury (e.g., bulging or slipped disk)	3.60 (65)	Bursitis	3.57 (9)
	Nerve injury	3.55 (64)	Fasciitis (e.g., plantar fasciitis)	2.78 (7)
	Fasciitis (e.g., plantar fasciitis)	2.83 (51)	Nerve injury	2.38 (6)
	Dislocation	2.83 (51)	Bruiser/contusion	2.38 (6)
	Blunt force trauma	2.72 (49)	Dislocation	1.98 (5)
	Arthritis	1.72 (31)	Spinal injury (e.g., bulging or slipped disk)	1.98 (5)
	Unspecified pain	1.61 (29)	Cut/laceration	1.19 (3)
	Cut/laceration	1.61 (29)	Blunt force trauma	0.79 (2)
	Heat injury	1.11 (20)	Abrasion	0.40 (1)
	Bursitis	0.94 (17)	Heat injury	0.40 (1)
	Abrasion	0.72 (13)	Arthritis	0.40 (1)
	Blister	0.44 (8)	Cold injury	0.40 (1)
	Cold injury	0.17 (3)	Blister	-
	Other	12.14 (219)	Other	19.44 (49)
Primary Body Area	Knee	20.57 (371)	Hip	18.65 (47)
	Back (lower)	14.86 (268)	Knee	15.48 (39)
	Ankle	13.03 (235)	Back (lower)	13.89 (35)
	Shoulders	10.25 (185)	Ankle	13.10 (33)
	Foot	7.76 (140)	Foot	8.73 (22)
	Lower leg (shin/calf)	6.10 (110)	Lower leg (shin/calf)	4.76 (12)
	Hip	3.77 (68)	Shoulders	4.37 (11)
	Hand	3.71 (67)	Hand	3.57 (9)
	Upper leg (thigh/hamstring)	2.83 (51)	abdomen	2.38 (6)
	Head	2.77 (50)	Back (upper)	2.38 (6)
	Wrist	2.49 (45)	Wrist	1.98 (5)
	Chest/ribs	1.94 (35)	Chest/ribs	1.59 (4)
	Back (upper)	1.88 (34)	Upper leg (thigh/hamstring)	1.59 (4)
	Abdomen	1.50 (27)	Neck	1.59 (4)
	Neck	1.50 (27)	Pelvic region	1.59 (4)
	Heat/Cold Injury - Non-specific body region	1.05 (19)	Head	1.19 (3)
	Pelvic region	0.94 (17)	Upper Arm (bicep/tricep)	0.40 (1)
	Elbow	0.83 (15)	Lower Arm (forearm)	0.40 (1)
	Upper Arm (bicep/tricep)	0.55 (10)	Elbow	0.40 (1)
	Spine	0.50 (9)	Heat/Cold Injury - Non-specific body region	0.40 (1)
	Lower Arm (forearm)	0.22 (4)	Spine	-

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Variable	Men (n=1,804)		Women (n=252)	
	Level of Variable	% (n ¹)	Level of Variable	% (n ¹)
Activity	PT (running)	29.61 (533)	PT (running)	38.55 (96)
	Marching - with load	13.67 (246)	Marching - with load	16.06 (40)
	PT (weight training)	8.56 (154)	Lifting or moving heavy objects (not weight training)	6.02 (15)
	Sports/recreation	7.94 (143)	Other PT	6.02 (15)
	Lifting or moving heavy objects (not weight training)	7.56 (136)	Walking or hiking	4.42 (11)
	Other PT	5.33 (96)	Air assault training/operations	4.02 (10)
	Air assault training/operations	4.89 (88)	Obstacle course	4.02 (10)
	Riding, driving, or moving in/around a motorized vehicle	3.11 (56)	Riding, driving, or moving in/around a motorized vehicle	2.81 (7)
	Walking or hiking	2.11 (38)	Sports/recreation	2.81 (7)
	Obstacle course	1.89 (34)	PT (weight training)	1.20 (3)
	Combative training	1.67 (30)	Combative training	1.20 (3)
	Stepping/climbing	1.44 (26)	Repairing or maintaining equipment	0.80 (2)
	Repairing or maintaining equipment	1.06 (19)	Stepping/climbing	0.80 (2)
	Rough-housing or fighting	0.67 (12)	Gunshot, missile, or blast	-
	Gunshot, missile, or blast	0.56 (10)	Rough-housing or fighting	-
	Marching - no load	0.33 (6)	Marching - no load	-
	Other	9.61 (173)	Other	11.24 (28)
Mechanism	Overuse/repetitive activity	39.49 (710)	Overuse/repetitive activity	47.22 (119)
	Falling onto an object/surface/the ground	20.30 (365)	Falling onto an object/surface/the ground	14.68 (37)
	Single overexertion/over-extension/twisting effort	14.24 (256)	Single overexertion/over-extension/twisting effort	11.51 (29)
	Contact (hit by/against) an object/surface	8.90 (160)	Contact (hit by/against) an object/surface	3.97 (10)
	Direct contact by a person	2.89 (52)	Direct contact by a person	1.59 (4)
	Cut or puncture by a sharp tool, object or instrument	0.95 (17)	Impact from a blast	1.19 (3)
	Heat injury	0.89 (16)	Heat injury	0.40 (1)
	Impact from a blast	0.28 (5)	Cut or puncture by a sharp tool, object or instrument	0.40 (1)
	Insect bite	0.22 (4)	Cold injury	0.40 (1)
	Cold injury	0.17 (3)	Burn (by fires, hot substance or object, or steam)	-
	Burn (by fires, hot substance or object, or steam)	-	Insect bite	-
	Other	11.68 (210)	Other	18.65 (47)
Seen by Medical Professional	Yes	84.86 (1524)	Yes	89.29 (225)
	No	15.14 (272)	No	10.71 (27)
Note:				
¹ Not everyone answered all of the questions on the survey.				

6.4 Injury Related Limited Duty Days

Table 4 displays the distribution of limited duty days according to the characteristic of injury, including the type of injury, affected body part, related activity, and mechanism of injury. The average number of limited duty days per injury was calculated for each specific injury characteristic. The most common injury characteristics (Table 3) also made up the highest percentage of limited duty days (Table 4). For injury type, tears and fractures/breaks averaged the most limited duty days per injury. For body area, any injury affecting the pelvic area or spine resulted in a large number of average limited duty days per injury. For activity, an injury from a gunshot, missile, or blast, resulted in a large number of limited duty days per injury. For mechanism, any injury resulting in a cut or puncture resulted in a large number of limited duty days per injury.

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Table 4. Distribution (%) of Primary Injury Characteristics and Limited Duty Days (n=2,056 injuries)

Characteristic of Injury	Number of Injuries % (n ¹)	Injuries Resulting in Temporary Profile % (n ²)	Total Limited Duty Days % (n ³)	Average Number of Limited Duty Days per Injury
<i>Injury Type</i>				
Sprain or strain	38.42 (790)	34.43 (480)	19.90 (12,441)	25.92
Tear (muscle/ligaments/meniscus/cartilage)	13.23 (272)	15.49 (216)	25.56 (15,974)	73.95
Fracture/break	8.22 (169)	10.98 (153)	15.94 (9,963)	65.12
Bruise/contusion	3.65 (75)	3.08 (43)	1.74 (1,085)	25.23
Spinal injury (e.g., bulging or slipped disk)	3.40 (70)	3.30 (46)	3.55 (2,222)	48.30
Nerve injury	3.40 (70)	2.94 (41)	4.13 (2,580)	62.93
Fasciitis (e.g., plantar fasciitis)	2.82 (58)	2.87 (40)	3.67 (2,297)	57.43
Dislocation	2.72 (56)	3.30 (46)	3.54 (2,215)	48.15
Blunt force trauma	2.48 (51)	2.37 (33)	2.22 (1,385)	41.97
Arthritis	1.95 (40)	2.08 (29)	1.63 (1,016)	35.03
Unspecified pain	1.56 (32)	1.15 (16)	0.60 (374)	23.38
Cut/laceration	1.56 (32)	1.15 (16)	1.04 (651)	40.69
Heat injury	1.26 (26)	1.43 (20)	0.84 (525)	26.25
Bursitis	1.02 (21)	1.08 (15)	0.34 (213)	14.20
Abrasion	0.68 (14)	0.36 (5)	0.06 (40)	8.00
Blister	0.39 (8)	0.07 (1)	0.02 (14)	14.00
Cold injury	0.19 (4)	0.14 (2)	0.07 (44)	22.00
Other	13.04 (268)	13.77 (192)	15.15 (9,468)	49.31
<i>Primary Body Part Affected</i>				
Knee	19.94 (410)	21.81 (304)	21.21 (13,258)	43.61
Back (lower)	14.74 (303)	12.41 (173)	10.64 (6,652)	38.45
Ankle	13.04 (268)	12.98 (181)	11.06 (6,916)	38.21
Shoulders	9.53 (196)	8.90 (124)	11.08 (6,924)	55.84
Foot	7.88 (162)	8.75 (122)	10.09 (6,310)	51.72
Lower leg (shin/calf)	5.93 (122)	6.38 (89)	5.53 (3,455)	38.82
Hip	5.59 (115)	5.95 (83)	6.98 (4,363)	52.57
Hand	3.70 (76)	3.37 (47)	2.85 (1,780)	37.87
Upper leg (thigh/hamstring)	2.68 (55)	2.80 (39)	2.83 (1,768)	45.33
Head	2.58 (53)	2.65 (37)	2.83 (1,766)	47.73
Wrist	2.43 (50)	2.15 (30)	2.11 (1,316)	43.87
Chest/ribs	1.95 (40)	1.43 (20)	0.86 (536)	26.80
Back (upper)	1.90 (39)	2.08 (29)	3.17 (1,984)	68.41
Abdomen	1.61 (33)	2.08 (29)	2.59 (1,622)	55.93
Neck	1.51 (31)	1.36 (19)	0.81 (507)	26.68
Pelvic Region	1.02 (21)	0.93 (13)	1.73 (1,080)	83.08
Heat/Cold Injury - Non-specific body region	0.97 (20)	0.93 (13)	0.32 (203)	15.62
Elbow	0.78 (16)	0.50 (7)	0.42 (264)	37.71
Upper Arm (bicep/triceps)	0.54 (11)	0.50 (7)	0.34 (212)	30.29
Spine	0.44 (9)	0.50 (7)	0.94 (585)	83.57
Lower Arm (forearm)	0.24 (5)	0.22 (3)	0.31 (194)	64.67

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Characteristic of Injury	Number of Injuries % (n ¹)	Injuries Resulting in Temporary Profile % (n ²)	Total Limited Duty Days % (n ³)	Average Number of Limited Duty Days per Injury
Activity Associated with Injury				
PT (running)	30.59 (629)	32.07 (440)	30.16 (18,849)	42.17
Marching - with load	13.91 (286)	14.13(197)	12.13 (7,580)	38.48
PT (weight training)	7.64 (157)	6.17 (86)	6.23 (3,849)	45.30
Sports/recreation	7.34 (151)	6.31 (88)	5.56 (3,474)	39.48
Lifting or moving heavy objects (not weight training)	7.30 (150)	7.46 (104)	7.77 (4,855)	46.68
Other PT	5.40 (111)	5.52 (77)	5.56 (3,474)	45.10
Air assault training/operations	4.77 (98)	5.02 (70)	5.75 (1,590)	51.34
Riding, driving, or moving in/around a motorized vehicle	3.06 (63)	3.23 (45)	2.54 (1,191)	35.33
Walking or hiking	2.38 (49)	1.94 (27)	1.91 (978)	44.11
Obstacle course	2.14 (44)	2.15 (30)	1.56 (833)	32.60
Combative training	1.61 (33)	1.58 (22)	1.33 (837)	37.86
Stepping/climbing	1.36 (28)	1.65 (23)	1.34 (839)	36.39
Repairing or maintaining equipment	1.02 (21)	1.00 (14)	1.34 (429)	59.93
Rough-housing or fighting	0.58 (12)	0.72 (10)	0.69 (429)	42.90
Gunshot, missile, or blast	0.49 (10)	0.65 (9)	1.15 (716)	79.56
Marching - with no load	0.29(6)	0.14 (2)	0.03 (20)	65.41
Other	10.12 (208)	10.26 (143)	14.96 (9,353)	42.17
Mechanism of Injury				
Overuse/repetitive activity	40.32 (829)	38.02 (530)	35.74 (22,338)	42.15
Falling onto an object/surface/the ground	19.55 (402)	21.45 (299)	22.80 (14,251)	47.66
Single overexertion/over-extension/twisting effort	13.86 (285)	13.13 (183)	12.14 (7,587)	41.46
Contact (hit by/against) an object/surface	8.27 (170)	8.54 (119)	7.23 (4,521)	37.99
Direct contact by a person	2.72 (56)	3.30 (46)	3.08 (1,923)	41.80
Cut or puncture by a sharp tool, object or instrument	0.88 (18)	0.72 (10)	1.28 (798)	79.80
Heat injury	0.83 (17)	0.79 (11)	0.17 (108)	9.82
Impact from a blast	0.39 (8)	0.50 (7)	0.54 (335)	47.86
Insect bite	0.19 (4)	0.29 (4)	0.14 (88)	22.00
Cold injury	0.19 (4)	0.22 (3)	0.04 (28)	9.33
Burn (by fires, hot substance or object, or steam)	0.00 (0)	0.00 (0)	0.00 (0)	0.00
Other	12.79 (263)	13.06 (182)	16.85 (10,530)	57.86
Notes: n ¹ = 2,056 primary injuries n ² = 1,394 injuries resulting in a temporary profile n ³ = 62,507 total limited duty days				

6.5 Bivariate Analyses – Men

Bivariate analyses were used to investigate associations between each of the potential risk factors and injury among men. All variables, except tobacco use (cigarette use and smokeless tobacco use), road marching, running miles during unit PT, and duration of aerobic training during personal PT were significantly associated ($p \leq 0.05$) with injury (Table 5).

Table 5. Identification of potential risk factors for injury among male Infantry Soldiers (N=5,187)

Category	Variable	Level of Variable	n ¹	Reported Injury (%)	p-value ²
Demographics	Age	<25	2766	29.14	<0.0001
		25 – 35	1951	39.31	
		> 35	470	49.15	
	BMI	Underweight/Normal	1937	28.86	<0.0001
		Overweight	2641	35.44	
		Obese	601	51.08	
	Rank	E1 – E4	3087	32.75	<0.0001
		E5 – E9	1486	39.70	
		Officers/ Warrant Officers	607	32.95	
Tobacco Use	Cigarette Use	Non-smoker	3851	34.33	0.4189
		Smoker	1211	35.59	
	Smokeless Tobacco Use	Non User	4138	34.49	0.3773
		User	1049	35.94	
Lifting	Lifting activities required by job	No Lifting	313	49.52	<0.0001
		Light	614	43.49	
		Medium	1354	33.01	
		Moderately Heavy	1442	31.28	
		Heavy	828	31.76	
		Very Heavy	618	33.98	
Unit PT	Miles of unit running	None	172	40.12	0.1317
		≤ 6.0 miles per week	1159	33.48	
		6.1 – 9.0 miles per week	1293	31.40	
		9.1 – 12.0 miles per week	1282	31.44	
		> 12.0 miles per week	774	33.98	
	Duration of unit calisthenics	None	951	35.33	0.0040
		≤ 40.0 minutes per week	1475	31.46	
		40.1 – 75.0 minutes per week	1082	29.30	
		> 75.0 minutes per week	1164	35.31	
	Duration of unit resistance training	None	1297	36.08	0.0051
		≤ 30.0 minutes per week	1179	32.65	
		30.1 – 60.0 minutes per week	1001	32.37	
		> 60.0 minutes per week	1195	29.37	
	Duration of unit agility training	None	1315	36.35	0.0003
		≤ 25.0 minutes per week	1070	34.58	
		25.1 – 51.0 minutes per week	1019	29.05	
		> 51.0 minutes per week	1268	30.28	

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Category	Variable	Level of Variable	n ¹	Reported Injury (%)	p-value ²	
	Duration of unit sprint/interval training	None	382	37.96	0.0006	
		≤ 30.0 minutes per week	1509	35.45		
		30.1 – 60.0 minutes per week	1503	31.40		
		> 60.0 minutes per week	1278	29.42		
	Road marching total distance per month	None	231	35.50	0.3123	
		< 10 miles	1908	33.54		
		≥ 10 miles	2533	31.82		
	Personal PT	Miles of personal running	None	685	40.29	0.0033
			≤ 4.0 miles per week	1255	35.54	
4.1 – 6.0 miles per week			652	33.90		
6.1 – 10.0 miles per week			792	34.34		
> 10.0 miles per week			770	30.52		
Duration of personal calisthenics		None	1745	37.25	0.0139	
		≤ 23.0 minutes per week	767	32.86		
		23.1 – 60.0 minutes per week	939	31.52		
		> 60.0 minutes per week	703	35.85		
Duration of personal resistance training		None	1148	37.54	0.0424	
		≤ 40.0 minutes per week	944	32.31		
		40.1 – 135.0 minutes per week	1096	33.30		
		> 135.0 minutes per week	966	36.13		
Duration of personal agility training		None	2075	38.12	0.0001	
		≤ 18.0 minutes per week	636	33.96		
		18.1 – 40.0 minutes per week	619	31.02		
		> 40.0 minutes per week	824	30.46		
Duration of personal sprint/interval training		None	1385	39.13	0.0002	
		≤ 20.0 minutes per week	821	35.32		
		20.1 – 50.0 minutes per week	922	31.34		
		> 50.0 minutes per week	1026	32.07		
Duration of personal aerobic training		None	1656	36.90	0.0961	
		≤ 30.0 minutes per week	966	32.71		
		30.1 – 70.0 minutes per week	710	32.82		
		> 70.0 minutes per week	822	35.28		
APFT	Push-ups (reps)	10 – 55 (Q1)	1466	40.18	<0.0001	
		56 – 64 (Q2)	1110	31.80		
		65 – 72 (Q3)	1237	33.71		
		73 – 130 (Q4)	1220	31.56		
	Sit-ups (reps)	2 – 60 (Q1)	1302	40.40	<0.0001	
		61 – 68 (Q2)	1283	34.53		
		69 – 76 (Q3)	1203	31.75		
		77 – 129 (Q4)	1232	31.98		
	2-mile Run (mm.mm)	8.50 – 13.77 (Q1)	1183	25.11	<0.0001	
		13.78 – 14.65 (Q2)	1208	30.30		
		14.66 – 15.60 (Q3)	1210	34.05		
		15.61 – 36.50 (Q4)	1213	46.99		
Notes:						
¹ Not everyone answered all of the questions on the survey.						
² Wald chi-squared p-values reported. Variables with p ≤0.05 are indicated in BOLD.						

6.6 Bivariate Analyses – Women

Bivariate analyses were used to investigate associations between each of the potential risk factors and injury among women. BMI, cigarette use, duration of agility and aerobic training during personal PT, and APFT 2-mile run time were significantly associated ($p \leq 0.05$) with injury (Table 6).

Table 6. Identification of potential risk factors for injury among female Infantry Soldiers (N=598)

Category	Variable	Level of Variable	n ¹	Reported Injury (%)	p-value ²
Demographics	Age	<25	323	38.39	0.0879
		25 – 35	213	45.07	
		> 35	62	51.61	
	BMI	Underweight/Normal	343	38.48	0.0388
		Overweight	221	45.25	
		Obese	32	59.38	
	Rank	E1 – E4	379	41.95	0.9281
		E5 – E9	143	43.36	
		Officers/Warrant Officers	76	40.79	
Tobacco Use	Cigarette Use	Non Smoker	506	40.12	0.0099
		Smoker	79	55.70	
	Smokeless Tobacco Use	Non User	590	42.20	1.0000 ³
		User	8	37.50	
Lifting	Lifting activities required by job	No Lifting	92	48.91	0.3618
		Light	177	43.50	
		Medium	174	39.66	
		Moderately Heavy	97	36.08	
		Heavy	38	50.00	
		Very Heavy	16	31.25	
Unit PT	Miles of unit running	None	60	43.33	0.4651
		≤ 6.0 miles per week	118	39.83	
		6.1 – 9.0 miles per week	88	50.00	
		9.1 – 12.0 miles per week	113	39.82	
		>12.0 miles per week	89	48.31	
	Duration of unit calisthenics	None	158	44.30	0.7733
		≤ 30.0 minutes per week	114	39.47	
		30.1 – 60.0 minutes per week	89	43.82	
		> 60.0 minutes per week	106	46.23	
	Duration of unit resistance training	None	168	48.21	0.4068
		≤ 30.0 minutes per week	112	39.29	
		30.1 – 60.0 minutes per week	103	39.81	
		> 60.0 minutes per week	84	44.05	
	Duration of unit agility training	None	144	47.92	0.4943
		≤ 21.0 minutes per week	90	37.78	
		21.1 – 48.0 minutes per week	94	43.62	
		> 48.0 minutes per week	139	42.45	
	Duration of unit sprint/interval training	None	88	45.45	0.9314
		≤ 30.0 minutes per week	145	41.38	
		30.1 – 60.0 minutes per week	126	43.65	
		> 60.0 minutes per week	108	44.44	
	Road marching total distance per month	None	65	53.85	0.1887
		< 10 miles	174	42.53	
		≥ 10 miles	228	41.23	
Personal PT	Miles of personal running	None	95	46.32	0.0516
		≤ 4.0 minutes per week	134	50.00	
		4.1 – 6.0 minutes per week	74	40.54	
		6.1 – 10.0 minutes per week	69	28.99	
		> 10.0 minutes per week	84	38.10	
	Duration of personal calisthenics	None	202	48.02	0.1617
		≤ 25.0 minutes per week	91	36.26	
		25.1 – 60.0 minutes per week	92	40.22	
		> 60.0 minutes per week	71	36.62	

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Category	Variable	Level of Variable	n ¹	Reported Injury (%)	p-value ²
	Duration of personal resistance training	None	152	42.76	0.2898
		≤ 36.0 minutes per week	99	34.34	
		36.1 – 100.0 minutes per week	101	44.55	
		> 100.0 minutes per week	104	47.12	
	Duration of personal agility training	None	242	49.17	0.0133
		≤ 15.0 minutes per week	67	29.85	
		15.1 – 46.0 minutes per week	74	37.84	
		> 46.0 minutes per week	73	35.62	
	Duration of personal sprint/interval training	None	154	48.70	0.2670
		≤ 23.0 minutes per week	98	38.78	
		23.1 – 60.0 minutes per week	125	38.40	
		> 60.0 minutes per week	79	40.51	
	Duration of personal aerobic training	None	137	47.45	0.0194
		≤ 40.0 minutes per week	106	35.85	
		40.1 – 90.0 minutes per week	112	33.93	
		> 90.0 minutes per week	101	51.49	
APFT	Push-ups (reps)	6 – 30 (Q1)	170	46.47	0.3738
		31 – 39 (Q2)	121	41.32	
		40 – 45 (Q3)	138	43.48	
		46 – 106 (Q4)	139	36.69	
	Sit-ups (reps)	26 – 56 (Q1)	160	48.13	0.2753
		57 – 65 (Q2)	145	39.31	
		66 – 73 (Q3)	117	37.61	
		74 – 109 (Q4)	137	40.88	
	2-mile Run (min:min)	11.90 – 16.33 (Q1)	126	31.75	0.0003
		16.34 – 17.57 (Q2)	129	39.53	
		17.58 – 18.83 (Q3)	130	37.69	
		18.84 – 37.40 (Q4)	127	57.48	
Notes:					
¹ Not everyone answered all of the questions on the survey.					
² Wald chi-squared p-values reported. Variables with p ≤0.05 are indicated in BOLD.					
³ Fisher's Exact Test p-values were reported where appropriate.					

6.7 Injury Risk Factors for Men – Unit Physical Training Unadjusted and Adjusted Odds Ratios

Unadjusted and adjusted odds ratios were calculated for all demographic, tobacco use, lifting, APFT, and unit PT variables that were associated with injury in the bivariate analyses among male Soldiers. Greater odds of injury were associated with being ≥ 25 years of age, obese, holding a job that required no or light lifting activities, performing ≤ 30 minutes of sprint/interval training during unit PT, and slower APFT run times (Table 7). Meanwhile, performing up to 75 minutes of calisthenics/week during unit PT resulted in lower odds of injury.

Table 7. Unadjusted and adjusted odds ratios for variables associated with injury among male Infantry Soldiers – Unit Physical Training (N=5,187)

Category	Variable	Level of Variable	n ¹	Reported Injury (%)	Unadjusted Odds Ratio (95% CI) ²	Adjusted Odds Ratios (95% CI) ³
Demographics	Age	<25	2766	29.14	Ref	Ref
		25 – 35	1951	39.31	1.58 (1.39-1.78)	1.46 (1.24-1.72)
		> 35	470	49.15	2.35 (1.93-2.87)	1.92 (1.43-2.58)
	BMI	Underweight/ Normal	1937	28.86	Ref	Ref
		Overweight	2641	35.44	1.35 (1.19-1.54)	1.04 (0.90-1.20)
		Obese	601	51.08	2.57 (2.13-3.11)	1.53 (1.20-1.94)
	Rank	E1 – E4	3087	32.75	Ref	Ref
		E5 – E9	1486	39.70	1.35 (1.19-1.54)	0.97 (0.80-1.17)
		Officers/Warrant Officers	607	32.95	1.01 (0.84-1.21)	0.84 (0.66-1.06)
Lifting	Lifting activities required by job	No Lifting	313	49.52	1.91 (1.45-2.52)	1.79 (1.28-2.51)
		Light	614	43.49	1.50 (1.19-1.88)	1.38 (1.05-1.82)
		Medium	1354	33.01	0.96 (0.78-1.17)	0.96 (0.76-1.21)
		Moderately Heavy	1442	31.28	0.88 (0.72-1.08)	0.95 (0.75-1.19)
		Heavy	828	31.76	0.90 (0.73-1.13)	1.03 (0.80-1.33)
		Very Heavy	618	33.98	Ref	Ref
Unit PT	Duration of unit calisthenics	None	951	35.33	1.00 (0.84-1.20)	0.94 (0.76-1.16)
		≤ 40.0 minutes per week	1475	31.46	0.84 (0.71-0.99)	0.82 (0.68-1.00)
		40.1 – 75.0 minutes per week	1082	29.30	0.76 (0.64-0.91)	0.79 (0.65-0.96)
		> 75.0 minutes per week	1164	35.31	Ref	Ref
	Duration of unit resistance training	None	1297	36.08	1.36 (1.15-1.61)	1.09 (0.89-1.34)
		≤ 30.0 minutes per week	1179	32.65	1.17 (0.98-1.39)	0.97 (0.79-1.20)
		30.1 – 60.0 minutes per week	1001	32.37	1.15 (0.96-1.38)	1.09 (0.89-1.33)
		> 60.0 minutes per week	1195	29.37	Ref	Ref
	Duration of unit agility training	None	1315	36.35	1.32 (1.12-1.55)	1.18 (0.96-1.45)
		≤ 25.0 minutes per week	1070	34.58	1.22 (1.02-1.45)	1.14 (0.93-1.41)
		25.1 – 51.0 minutes per week	1019	29.05	0.94 (0.79-1.13)	0.97 (0.79-1.18)
		> 51.0 minutes per week	1268	30.28	Ref	Ref

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Category	Variable	Level of Variable	n ¹	Reported Injury (%)	Unadjusted Odds Ratio (95% CI) ²	Adjusted Odds Ratios (95% CI) ³
	Duration of unit sprint/interval training	None	382	37.96	1.47 (1.16-1.86)	1.03 (0.76-1.38)
		≤ 30.0 minutes per week	1509	35.45	1.32 (1.12-1.55)	1.23 (1.02-1.48)
		30.1 – 60.0 minutes per week	1503	31.40	1.10 (0.93-1.29)	1.13 (0.95-1.35)
		> 60.0 minutes per week	1278	29.42	Ref	Ref
APFT	Push-ups (reps)	10 – 55 (Q1)	1466	40.18	1.46 (1.24-1.71)	1.15 (0.92-1.44)
		56 – 64 (Q2)	1110	31.80	1.01 (0.85-1.20)	0.93 (0.75-1.15)
		65 – 72 (Q3)	1237	33.71	1.10 (0.93-1.31)	1.04 (0.85-1.27)
		73 – 130 (Q4)	1220	31.56	Ref	Ref
	Sit-ups (reps)	2 – 60 (Q1)	1302	40.40	1.44 (1.23-1.70)	0.88 (0.70-1.11)
		61 – 68 (Q2)	1283	34.53	1.12 (0.95-1.32)	0.87 (0.71-1.07)
		69 – 76 (Q3)	1203	31.75	0.99 (0.83-1.17)	0.85 (0.70-1.03)
		77 – 129 (Q4)	1232	31.98	Ref	Ref
	2-mile Run (mm.mm)	8.50 – 13.77 (Q1)	1183	25.11	Ref	Ref
		13.78 – 14.65 (Q2)	1208	30.30	1.30 (1.08-1.55)	1.28 (1.05-1.57)
		14.66 – 15.60 (Q3)	1210	34.05	1.54 (1.29-1.84)	1.40 (1.14-1.73)
		15.61 – 36.50 (Q4)	1213	46.99	2.64 (2.22-3.14)	2.27 (1.81-2.83)
Notes: ¹ Not everyone answered all of the questions on the survey. ² Logistic regression used to calculate crude/unadjusted odds ratios (ORs). ³ Multivariate logistic regression was used to calculate adjusted odds ratios (aORs). Bolded odds ratios are significant (p<0.05)						

6.8 Injury Risk Factors for Men – Personal Physical Training Unadjusted and Adjusted Odds Ratios

Unadjusted and adjusted odds ratios were calculated for all demographic, tobacco use, lifting, APFT, and personal PT variables that were associated with injury in the bivariate analyses among male Soldiers. Greater odds of injury were associated with being ≥ 25 years of age, obese, holding a job that required no or light lifting activities, running ≤ 4 miles/week, and slower APFT run times (Table 8).

Table 8. Unadjusted and adjusted odds ratios for variables associated with injury among male Infantry Soldiers – Personal Physical Training (N=5,187)

Category	Variable	Level of Variable	n ¹	Reported Injury (%)	Unadjusted Odds Ratios (95% CI) ²	Adjusted Odds Ratios (95% CI) ³
Demographics	Age	<25	2766	29.14	Ref	Ref
		25 – 35	1951	39.31	1.58 (1.39-1.78)	1.45 (1.22-1.72)
		> 35	470	49.15	2.35 (1.93-2.87)	1.88 (1.38-2.55)
	BMI	Normal/ Underweight	1937	28.86	Ref	Ref
		Overweight	2641	35.44	1.35 (1.19-1.54)	1.08 (0.92-1.27)
		Obese	601	51.08	2.57 (2.13-3.11)	1.49 (1.16-1.91)
	Rank	E1 – E4	3087	32.75	Ref	Ref
		E5 – E9	1486	39.70	1.35 (1.19-1.54)	0.91 (0.75-1.11)
		Officers/Warrant Officers	607	32.95	1.01 (0.84-1.21)	0.79 (0.62-1.01)
Lifting	Lifting activities required by job	No Lifting	313	49.52	1.91 (1.45-2.52)	2.34 (1.65-3.32)
		Light	614	43.49	1.50 (1.19-1.88)	1.61 (1.21-2.14)
		Medium	1354	33.01	0.96 (0.78-1.17)	1.05 (0.82-1.33)
		Moderately Heavy	1442	31.28	0.88 (0.72-1.08)	1.02 (0.80-1.30)
		Heavy	828	31.76	0.90 (0.73-1.13)	1.13 (0.87-1.47)
		Very Heavy	618	33.98	Ref	Ref
Personal PT	Miles of personal running	None	685	40.29	1.54 (1.24-1.91)	1.32 (1.01-1.72)
		≤ 4.0 miles per week	1255	35.54	1.26 (1.04-1.52)	1.26 (1.02-1.56)
		4.1 – 6.0 miles per week	652	33.90	1.17 (0.93-1.46)	1.18 (0.92-1.49)
		6.1 – 10.0 miles per week	792	34.34	1.19 (0.96-1.47)	1.14 (0.91-1.43)
		> 10.0 miles per week	770	30.52	Ref	Ref
	Duration of personal calisthenics	None	1745	37.25	1.06 (0.89-1.28)	0.96 (0.77-1.20)
		≤ 23.0 minutes per week	767	32.86	0.88 (0.71-1.09)	0.88 (0.67-1.15)
		23.1 – 60.0 minutes per week	939	31.52	0.82 (0.67-1.01)	0.86 (0.68-1.09)
		> 60.0 minutes per week	703	35.85	Ref	Ref
	Duration of personal resistance training	None	1148	37.54	1.06 (0.89-1.27)	0.91 (0.74-1.11)
		≤ 40.0 minutes per week	944	32.31	0.84 (0.70-1.02)	0.86 (0.68-1.09)
		40.1 – 135.0 minutes per week	1096	33.30	0.88 (0.74-1.06)	0.96 (0.78-1.17)
		> 135.0 minutes per week	966	36.13	Ref	Ref

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Category	Variable	Level of Variable	n ¹	Reported Injury (%)	Unadjusted Odds Ratio (95% CI) ²	Adjusted Odds Ratios (95% CI) ³
	Duration of personal agility training	None	2075	38.12	1.41 (1.18-1.67)	1.15 (0.92-1.45)
		≤ 18.0 minutes per week	636	33.96	1.17 (0.94-1.47)	1.05 (0.79-1.39)
		18.1 – 40.0 minutes per week	619	31.02	1.03 (0.82-1.29)	1.09 (0.84-1.42)
		> 40.0 minutes per week	824	30.46	Ref	Ref
	Duration of personal sprint/interval training	None	1385	39.13	1.36 (1.15-1.61)	1.13 (0.91-1.41)
		≤ 20.0 minutes per week	821	35.32	1.16 (0.95-1.41)	1.16 (0.91-1.47)
		20.1 – 50.0 minutes per week	922	31.34	0.97 (0.80-1.17)	0.95 (0.77-1.17)
		> 50.0 minutes per week	1026	32.07	Ref	Ref
APFT	Push-ups (reps)	10 – 55 (Q1)	1466	40.18	1.46 (1.24-1.71)	1.02 (0.81-1.30)
		56 – 64 (Q2)	1110	31.80	1.01 (0.85-1.20)	0.89 (0.71-1.12)
		65 – 72 (Q3)	1237	33.71	1.10 (0.93-1.31)	1.03 (0.84-1.26)
		73 – 130 (Q4)	1220	31.56	Ref	Ref
	Sit-ups (reps)	2 – 60 (Q1)	1302	40.40	1.44 (1.23-1.70)	0.96 (0.75-1.22)
		61 – 68 (Q2)	1283	34.53	1.12 (0.95-1.32)	0.97 (0.78-1.21)
		69 – 76 (Q3)	1203	31.75	0.99 (0.83-1.17)	0.92 (0.75-1.13)
		77 – 129 (Q4)	1232	31.98	Ref	Ref
	2-mile Run (mm.mm)	8.50 – 13.77 (Q1)	1183	25.11	Ref	Ref
		13.78 – 14.65 (Q2)	1208	30.30	1.30 (1.08-1.55)	1.17 (0.95-1.44)
		14.66 – 15.60 (Q3)	1210	34.05	1.54 (1.29-1.84)	1.33 (1.08-1.65)
		15.61 – 36.50 (Q4)	1213	46.99	2.64 (2.22-3.14)	2.17 (1.72-2.75)
Notes:						
¹ Not everyone answered all of the questions on the survey.						
² Logistic regression used to calculate crude/unadjusted odds ratios (ORs).						
³ Multivariate logistic regression was used to calculate adjusted odds ratios (aORs).						
Bolded odds ratios are significant (p<0.05)						

6.9 Injury Risk Factors for Women – Personal Physical Training Unadjusted and Adjusted Odds Ratios

Unadjusted and adjusted odds ratios were calculated for all demographic, tobacco use, lifting, APFT, and personal PT variables that were associated with injury in the bivariate analyses among female Soldiers. Greater odds of injury were associated with slow APFT run times and performing no agility training during personal PT (Table 9).

Table 9. Unadjusted and adjusted odds ratios for variables associated with injury among female Infantry Soldiers – Personal Physical Training (N=598)

Category	Variable	Level of Variable	n ¹	Reported Injury (%)	Unadjusted Odds Ratios (95% CI) ²	Adjusted Odds Ratios (95% CI) ³
Demographics	BMI	Underweight/Normal	343	38.48	Ref	Ref
		Overweight	221	45.25	1.32 (0.94-1.86)	0.83 (0.51-1.36)
		Obese	32	59.38	2.34 (1.12-4.89)	1.72 (0.48-6.18)
Tobacco Use	Cigarette Use	Non Smoker	506	40.12	Ref	Ref
		Smoker	79	55.70	1.88 (1.16-3.03)	1.82 (0.93-3.57)
Personal PT	Duration of personal agility training	None	242	49.17	1.75 (1.02-3.01)	2.09 (1.10-3.96)
		≤ 15.0 minutes per week	67	29.85	0.77 (0.38-1.56)	0.90 (0.38-2.14)
		15.1 – 46.0 minutes per week	74	37.84	1.10 (0.56-2.15)	1.31 (0.61-2.85)
		> 46.0 minutes per week	73	35.62	Ref	Ref
	Duration of personal aerobic training	None	137	47.45	0.85 (0.51-1.42)	0.84 (0.44-1.61)
		≤ 40.0 minutes per week	106	35.85	0.53 (0.30-0.92)	0.74 (0.36-1.48)
		40.1 – 90.0 minutes per week	112	33.93	0.48 (0.28-0.84)	0.63 (0.33-1.21)
APFT	2-mile Run (min:min)	> 90.0 minutes per week	101	51.49	Ref	Ref
		11.90 – 16.33 (Q1)	126	31.75	Ref	Ref
		16.34 – 17.57 (Q2)	129	39.53	1.41 (0.84-2.35)	0.86 (0.45-1.63)
		17.58 – 18.83 (Q3)	130	37.69	1.30 (0.78-2.18)	1.44 (0.78-2.69)
		18.84 – 37.40 (Q4)	127	57.48	2.91 (1.74-4.86)	2.54 (1.32-4.89)

Legend:
PT = physical training
Notes:
¹Not everyone answered all of the questions on the survey.
²Logistic regression used to calculate crude/unadjusted odds ratios (ORs).
³Multivariate logistic regression was used to calculate adjusted odds ratios (aORs).
Bolded odds ratios are significant (p<0.05)

7. DISCUSSION

This analysis established injury incidence and evaluated risk factors associated with injury among male and female U.S. Army Soldiers in Airborne Infantry units. Overall, 36% of Soldiers sustained an injury (35% of men and 42% of women) within the prior 12 months. Risk factors among men included older age (≥ 25 years), obesity, and holding a job that required no or light lifting activities. Additionally, those who performed low amounts of sprint/interval training during unit PT had greater odds of injury compared to those performing high amounts sprint/interval training during unit PT. Those who ran less during personal PT had increased odds of injury compared to those who ran the most during personal PT. Slower APFT run times were also a risk factor for injury. Moreover, performing low-moderate amounts of calisthenics during unit PT were protective against injury in men. Women who performed no agility training during personal PT and had slow APFT run times had greater odds of injury than those who performed agility training and had faster run times.

7.1 Older Age and Injury

Consistent with prior research of military populations (references 3–7), older age (≥ 25 years) was associated with greater odds (45 – 91%) of injury among men in the current analysis. On the contrary, two studies reported that as age increased there was a decrease in the risk of

musculoskeletal injury (reference 8) and hospitalization (reference 9) among U.S. Army Soldiers. Of these two studies, one assessed musculoskeletal injuries only (reference 8), while the other evaluated risk factors associated with more severe injuries (reference 9). Injuries requiring hospitalization can be associated with performing more strenuous tasks (reference 9), which tend to be more common among younger individuals and those with lower rank. Since older age was associated with greater odds of injury, modified or adapted exercise programs may be beneficial in reducing injury risk among older Soldiers.

7.2 Obesity and Injury

After adjusting for other variables, obesity was associated with greater odds of injury (49%) among men. Several studies among U.S. Army Service members (references 4, 7, and 10) and recruits (reference 4) reported similar findings. Anderson et al. (reference 3) not only recognized obesity as a risk factor for injury, but also identified high-overweight (27.5 – 29.9 BMI) Soldiers as having greater injury risk than Soldiers with a BMI considered normal (18.5 – 24.9 BMI). Similarly, Grier et al. (reference 10) and Reynolds et al. (reference 7) reported that overweight Soldiers had a greater risk of injury than Soldiers with lower BMIs (BMI < 25.0) (references 7 and 10). The findings of the current investigation build upon prior literature, further highlighting the association between obesity and injury. Since obesity is a risk factor for injury, encouraging improvements in fitness and emphasizing the importance of healthy eating habits among obese Soldiers may aid in reducing injuries.

7.3 Lifting Activities and Injury

Men who held positions requiring no or light lifting activities had approximately twice the odds of injury compared to those with jobs that required very heavy lifting. This association was previously documented in the literature among U.S. Army trainees (reference 6) and Service members (references 3, 11 and 12). The association may be attributed to lifting activities decreasing as age and rank increase. In a secondary analysis of the current investigation, the percentage of Soldiers performing no to light lifting activities increased with age from 14% (< 25 years) to 20% (25 – 35 years) to 31% (> 35 years).

7.4 Agility Training and Injury

The current investigation identified no agility training during personal PT a risk factor for injury among women. Similarly, a systematic review recognized agility training, drills, exercises, and conditioning interventions as effective in preventing injury (reference 13). Because of these findings, the Joint Physical Training Injury Prevention Working Group proposed that agility-like exercises be implemented in the military services to reduce PT-related injuries. They attributed this noticeable reduction in injury to (1) neuromuscular learning; (2) agility activities replacing and reducing exposure to running activities; and (3) the prevention of musculoskeletal overuse/stress by the utilization of different muscle groups rather than only one during agility training (reference 13). Considering this, it may be beneficial to place an increased emphasis on incorporating agility exercise into PT programs.

7.5 Cardiorespiratory Fitness, Weekly Running Distance, and Injury

This investigation identified lower cardiorespiratory fitness, measured by 2-mile run times, as a risk factor for injury among men and women. The odds of injury were over 2 times greater among men and women with lower cardiorespiratory fitness. Similarly, previous investigations reported slow run times as being associated with greater risk of injury among U.S. Army trainees (references 6 and 14–16) and Soldiers (references 7, 8, 10, 17, and 18).

A number of studies have established that injury risk increased with greater running exposure (references 6, 13, and 19–21). The current investigation reported that among men, running ≤ 4 miles/week during personal PT had greater odds of injury when compared to running > 10 miles/week. These findings, together with those of others, suggest that running can help Soldiers remain fit, but too much running may increase the risk of incurring an injury (references 6, 13, 19–21). These results suggest that there may be an ideal range of personal PT running whereby physical fitness can be maintained and injuries reduced. Further studies should be conducted to investigate this association, as running is important to maintaining military physical readiness. However, it can also be a factor that detracts from or counteracts physical readiness through higher injury risk with greater running exposure.

7.6 Calisthenics Training and Injury

The odds of injury were approximately 20% lower for men who did up to 75 minutes of calisthenics training per week during unit PT compared to those who did >75 minutes/week. Considering that low muscular endurance has been associated with greater risk of injury (references 15, 17, 18, 22, and 23), it makes sense that some calisthenics training would result in lower odds of injury, as it has been used to increase muscular strength and endurance (references 24–26). However, in this investigation low-moderate calisthenics training resulted in lower odds of injury than high calisthenics training. This finding is partly supported by the findings of Hootman et al. (reference 27), which reported that the majority who were injured in the general population had high fitness levels or participated in calisthenics training. In addition, Almeida et al. (reference 24) stated that in order to prevent injury, only calisthenics known to be safe and effective should be performed using the proper technique. While unit calisthenics training can be beneficial in obtaining and maintaining muscular strength and endurance, too much may increase the odds of injury. Furthermore, it is important that unit calisthenics exercises selected be safe, effective, and performed with the proper technique.

7.7 Sprint/Interval Training and Injury

Men who performed low amounts of sprinting during unit PT generally had greater odds of injury compared to those who performed high amounts of sprinting during unit PT. In support of this finding, Bullock et al. (reference 13) and McArdle et al. (reference 28) identified interval training as an excellent way to train the cardiovascular system while minimizing repetitive strain on the lower extremities (references 13 and 28). Additionally, Bullock et al. (reference 13) recommended replacing some distance runs with interval running as an injury prevention strategy.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusion

Overall, 36% of participants reported an injury in the prior 12 months, with women reporting a greater percentage of injuries (42%) than men (35%). The results suggest that men may benefit from adjusting modifiable risk factors such as increasing cardiorespiratory fitness, obtaining/maintaining a healthy BMI, performing moderate running during personal PT, occasional sprint/interval training, and low-moderate calisthenics training. While women may benefit from performing agility training and achieving and/or maintaining high cardiorespiratory fitness.

8.2 Recommendations

Injuries among male Soldiers may be prevented if they—

- Obtain/maintain a healthy weight (BMI < 25.0). This can be achieved through healthy eating and regular exercise.
- Aim to increase/maintain high cardiorespiratory fitness; to do so personal PT running should exceed 4 miles per week but remain within reasonable limits (< 20 miles a week) to help minimize the risk of a running related injury.
- Perform > 30 minutes/week of unit sprint/interval training. This may be achieved by reducing unit PT running and supplementing it with sprint/interval training.

Injuries among female Soldiers may be prevented if they—

- Aim to increase/maintain high cardiorespiratory fitness, and
- Perform agility training during personal PT.

9. POINT OF CONTACT

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APPENDIX A

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APPENDIX B

EXAMPLE SURVEY QUESTIONS

Note: Survey was administered electronically; length does not represent actual page length of survey. Some questions follow a skip pattern, in which case all possible combinations are present.

Demographics

Background Details

What is your age?

☐ 17 - ☐ 65+

What is your weight (lbs)?

☐ 90 - ☐ 300+

What is your height (feet'inches")?

☐ 4'2" - ☐ 7'2"

What is your gender?

☐ Male

☐ Female

What is your component?

☐ Active duty

☐ Reserve

☐ National Guard

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☐ Other **(Please Specify)** _____

What is your military occupational specialty (MOS)? (e.g., 11B)

Please Specify _____

What is your rank?

☐ O1 - ☐ O10

☐ E1 - ☐ E9

☐ W1 - ☐ W5

☐ Other

What is your current brigade?

☐ 1BCT

☐ 2BCT

☐ 3BCT

☐ 101 CAB

☐ HHB

☐ DIVARTY

☐ 101 SB

What is your current batallion?

☐ HHC

☐ 1-327 IN BN

☐ 2-327 IN BN

☐ 1-506 IN BN

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- ☐ 326 BEB
- ☐ 426 FSB
- ☐ 1-32 CAV
- ☐ REPL

What is your current batallion?

- ☐ HHC
- ☐ 1-502 IN BN
- ☐ 2-502 IN BN
- ☐ 1-26 IN BN
- ☐ 39 BEB
- ☐ 526 FSB
- ☐ 1-75 CAV
- ☐ REPL

What is your current batallion?

- ☐ HHC
- ☐ 1-187 IN BN
- ☐ 3-187 IN BN
- ☐ 2-506 IN BN
- ☐ 21 BEB
- ☐ 626 FSB
- ☐ 1-33 CAV
- ☐ REPL

What is your current batallion?

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- ☐ HHC
- ☐ 1-101 AV
- ☐ 3-101 AV
- ☐ 5-101 AV
- ☐ 6-101 AV
- ☐ 96 ASB
- ☐ 2-17 CAV
- ☐ B/101st AVN CO
- ☐ REPL

What is your current batallion?

- ☐ HHB
- ☐ HHC
- ☐ A CO
- ☐ REPL
- ☐ NG BN
- ☐ USAR BN
- ☐ BAND
- ☐ 253 SR TRIAL
- ☐ 264 FLD TRIAL
- ☐ 11th PS

What is your current batallion?

- ☐ HHB
- ☐ 1-320 FA
- ☐ 2-320 FA

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- ☐ 3-320 FA
- ☐ Fco 426 BSB
- ☐ Fco 526 BSB
- ☐ Fco 626 BSB

What is your current batallion?

- ☐ 101 BTB
- ☐ 101 HR CO
- ☐ 101 FIN
- ☐ 9th AG
- ☐ 58 SIG CO
- ☐ 613 MCT
- ☐ 632 MCT
- ☐ 129 CSSB
- ☐ 372 TRANS
- ☐ 227 GS
- ☐ 584 MAINT
- ☐ 541 TRANS
- ☐ 594 TRANS
- ☐ 74 TRUCK CO

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What is your Company?

Please Specify: _____

Are you currently on permanent profile?

☐ Yes

☐ No

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

Years _____

Months _____

Days _____

Does your permanent profile limit your physical training?

☐ No

☐ Little impact

☐ Some impact

☐ Significant impact

☐ Unable to perform military duties as assigned

Does your permanent profile limit your job duties?

☐ No

☐ Little impact

☐ Some impact

☐ Significant impact

☐ Unable to perform military duties as assigned

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Were you tape tested at your last weigh in?

- ☐ Yes
- ☐ No

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

- ☐ Yes
- ☐ No

Which Army alternative PT program do you participate in?

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

Army Physical Fitness Test (APFT)

What was the approximate date of your most recent APFT?

Approximate Date (mm/dd/yyyy) _____

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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)** _____

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

☐ Yes

☐ No

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

☐ Push-ups

☐ Sit-ups

☐ Run

Injury History (last 12 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 injuries resulting from 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.

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How many injuries have you experienced in the last 12 months?

- ☐ None
- ☐ 1
- ☐ 2
- ☐ 3 or more

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 12 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.

Estimate the approximate date of your most serious injury #1 (past 12 months).

Specify Date _____

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)

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- ☐ Spine
- ☐ Hip
- ☐ Upper leg (Thigh/Hamstring)
- ☐ Lower leg (Shin/Calf)
- ☐ Knee
- ☐ Ankle
- ☐ Foot
- ☐ Heat/Cold Injury - Non-specific body area
- ☐ Other **(Please Specify)** _____

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)

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- ☐ Blunt force trauma
- ☐ Spinal injury (e.g., bulging or slipped disk)
- ☐ Other **(Please Specify)** _____

What activity was associated with injury #1?

- ☐ Gunshot, missile, or blast
- ☐ Physical training (running)
- ☐ Physical training (weight training)
- ☐ Other physical training **(Please Specify)** _____
- ☐ Air assault Training/operations
- ☐ Lifting or moving heavy objects (not weight training)
- ☐ Repairing or maintaining equipment
- ☐ Riding, driving, or moving in/around a motorized vehicle
- ☐ Rough-housing or fighting
- ☐ Combatives training
- ☐ Obstacle Course
- ☐ Sports/recreation
- ☐ Stepping/climbing
- ☐ Walking or hiking
- ☐ Marching - with load
- ☐ Marching - no load
- ☐ Other **(Please Specify)** _____

Please specify the sport causing injury #1:

- ☐ Football

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

You mentioned you were injured during the Obstacle Course. Please specify what you were doing on the obstacle course that led to an injury

Please Specify:

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

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

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- ☐ Burn (by fire, hot substance or object, or steam)
- ☐ Heat injury
- ☐ Cold injury
- ☐ Animal bite
- ☐ Insect bite
- ☐ Other **(Please Specify)** _____

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)** _____

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

- ☐ Yes
- ☐ No

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

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Were you placed on temporary profile for injury #1?

- ☐ Yes
- ☐ No

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

Number of Days ____

Did you temporarily stop attending regular unit PT due to your injury

- ☐ Yes
- ☐ Yes, and was placed into a profile PT class with other injured Soldiers
- ☐ No, Continued with regular unit PT
- ☐ No, but modified unit PT exercises to accommodate for my injury

How many days before you began regular unit PT again?

Please specify days: _____

How many days did you attend this class before returning to regular unit PT?

Please specify days: _____

What impact does injury #1 currently have on your job duties?

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

What impact does injury #1 currently have on your physical activity?

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

When did injury #1 occur?

- ☐ During duty hours
- ☐ Before or after duty hours

These next questions will ask about injury #2 that you experienced in the past 12 months.

Estimate the approximate date of the injury #2 (past 12 months).

Specify Date _____

What was the primary body area injured?

- ☐ Head
- ☐ Neck
- ☐ Shoulders
- ☐ Upper Arm (bicep/tricep)
- ☐ Lower Arm (forearm)
- ☐ Elbow
- ☐ Wrist
- ☐ Hand

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- ☐ 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

What was the type of injury #2?

- ☐ Abrasion
- ☐ Arthritis
- ☐ Blister
- ☐ Bruise
- ☐ Bursitis
- ☐ Cut/laceration
- ☐ Dislocation
- ☐ Fascitis
- ☐ Fracture/Break
- ☐ Heat injury

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- ☐ Nerve injury
- ☐ Sprain or strain
- ☐ Tear (muscle/ligaments/meniscus/cartilage)
- ☐ Blunt force trauma
- ☐ Spinal injury (i.e. bulging or slipped disk)
- ☐ Other **(Please Specify)** _____

What activity was associated with injury #2?

- ☐ Gunshot, missile, or blast
- ☐ Physical training (running)
- ☐ Physical training (weight training)
- ☐ Other physical training **(Please Specify)** _____
- ☐ Air assault training/operations
- ☐ Lifting or moving heavy objects (Not weight training)
- ☐ Repairing or maintaining equipment
- ☐ Riding or driving in a motorized vehicle
- ☐ Rough-housing or fighting
- ☐ Combatives training
- ☐ Obstacle course
- ☐ Sports/recreation
- ☐ Stepping/climbing
- ☐ Walking or Hiking
- ☐ Marching - with load
- ☐ Marching - No load
- ☐ Other **(Please Specify)** _____

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Please specify the sport causing the injury #2:

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

You mentioned you were injured during the Obstacle Course. Please specify what you were doing on the obstacle course that led to an injury

Please Specify:

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

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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/repetitive 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)** _____

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)** _____

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

- ☐ Yes
- ☐ No

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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

Were you placed on temporary profile for injury #2?

- ☐ Yes
- ☐ No

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

Number of Days ____

Did you temporarily stop attending regular unit PT due to your injury

- ☐ Yes
- ☐ Yes, and was placed into a profile PT class with other injured Soldiers
- ☐ No, Continued with regular unit PT
- ☐ No, but modified unit PT exercises to accommodate for my injury

How many days before you began regular unit PT again?

Please specify days: _____

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How many days did you attend this class before returning to regular unit PT?

Please specify days: _____

What impact does injury #2 currently have on your job duties?

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

What impact does injury #2 currently have on your physical activity?

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

When did injury #2 occur?

- ☐ During duty hours
- ☐ Before or after duty hours

Physical Demands for Work Performance

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

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

Unit Physical Training (PT)

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

- ☐ Yes
- ☐ No

How would you rate your unit PT?

- ☐ Challenging
- ☐ Hard
- ☐ Somewhat Hard
- ☐ Moderate
- ☐ Easy

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

- ☐ Yes
- ☐ No

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, Insanity)
- ☐ Combination of these programs **(Please specify)** _____
- ☐ Other **(Please Specify)** _____

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

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 12 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?

	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	>7 times per week
<u>Unit distance running</u>	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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

Unit distance running _____

At about what pace does your unit usually run when performing unit distance running?

- ☐ No Distance Running
- ☐ 5 minute mile
- ☐ 6 minute mile
- ☐ 7 minute mile
- ☐ 8 minute mile
- ☐ 9 minute mile
- ☐ 10 minute mile
- ☐ 11 minute mile

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- ☐ 12 minute mile
- ☐ Other (Please specify) _____

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 12 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?

	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	>7 times per week
<u>Sprinting/Interval Training</u>	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
<u>Calisthenics</u>	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
<u>Cross-training type of exercises</u>	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
<u>Agility drills</u>	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
<u>Resistance training</u>	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
<u>Obstacle Course</u>	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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On average, how many minutes per event did you perform this activity with your unit?

Sprinting/Interval Training _____

Calisthenics _____

Cross-training type of exercises _____

Agility drills _____

Resistance training _____

Obstacle Course _____

Unit Road Marches

On average, how many times per month did you perform road marching with your unit in the last 12 months?

Number of times road marching per month _____

On average, how many miles did you road march per month in the last 12 months?

Distance in miles _____

On average, how heavy was your march load each time you road marched with your unit in the last 12 months?

Weight in pounds _____

Personal Physical Training (PT)

Do you perform PT on your own time?

- ☐ Yes
- ☐ No

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

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, Insanity)
- ☐ Other Weight or Resistance training
- ☐ Combination of these programs (**Please specify**) _____
- ☐ Other (**Please specify**) _____

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 12 months.

On average, how many times per week did you run for personal PT?

	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	> 7 times per week
<u>Personal PT Distance running</u>	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Each time you ran for personal PT, on average, how many miles did you run?

Personal PT Distance running _____

At about what pace during personal PT do you usually run when performing distance running?

- ☐ No Distance Running
- ☐ 5 minute mile
- ☐ 6 minute mile
- ☐ 7 minute mile
- ☐ 8 minute mile
- ☐ 9 minute mile
- ☐ 10 minute mile
- ☐ 11 minute mile
- ☐ 12 minute mile

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☐ Other (Please specify) _____

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 12 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?

	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	> 7 times per week
<u>Sprinting/Interval Training</u>	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
<u>Calisthenics</u>	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
<u>Cross-training type of exercises</u>	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
<u>Agility drills</u>	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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Other aerobic endurance ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
activities that do NOT
involve running

Resistance training ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Each time performed this activity for personal PT, on average, how many minutes did you perform the activity?

Sprinting/Interval Training _____

Calisthenics _____

Cross-training type of exercises _____

Agility drills _____

Other aerobic endurance _____
activities that do NOT involve _____
running

Resistance training _____

Tobacco Use

Have you ever used tobacco products such as cigarettes, smokeless/chewing tobacco, or e-cigarettes?

☐ Yes

☐ No

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

☐ Yes

☐ No

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

☐ 6 - ☐ > 50

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.

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

Number of years _____

Number of months _____

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

☐ 1 - ☐ 30

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

Cigarettes per day on average _____

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

Years quit _____

Months quit _____

Smokeless Tobacco

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

- ☐ Yes
- ☐ No

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.

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

Years quit ____

Months quit ____

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

Years used ____

Months used ____

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

- ☐ 1 - ☐ 30

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 _____

Electronic Cigarettes

Have you ever used electronic cigarettes or personal vaporizers?

- ☐ Yes
- ☐ No

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.

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

Years quit ____

Months quit ____

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

Years used ____

Months used ____

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

- ☐ 1 - ☐ 30

Dietary Supplements and Prescriptions

Do you take dietary supplements?

- ☐ Yes
- ☐ No

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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)** _____

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)** _____

Leadership and Medical Support

Does your unit have an assigned Master Fitness Trainer (MFT)?

- ☐ Yes
- ☐ No
- ☐ Not sure

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

- ☐ Yes
- ☐ No
- ☐ Not sure

Have you been evaluated at the Army Wellness Center?

- ☐ Yes
- ☐ No

Leadership and Medical Support Continued

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

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

- ☐ Routinely
- ☐ Occasionally
- ☐ Rarely
- ☐ Never

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

- ☐ Routinely
- ☐ Occasionally
- ☐ Rarely
- ☐ Never

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

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

GLOSSARY

ABBREVIATIONS AND ACRONYMS

APFT

Army Physical Fitness Test

APHC

U.S. Army Public Health Center

aOR

adjusted odds ratio

BMI

body mass index

CI

confidence intervals

kg/m²

kilograms per meters squared

MOS

military occupational specialty

OR

odds ratio

RPRT

Reconditioning Physical Readiness Training

PT

physical training

SD

standard deviation