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Injuries and Injury Risk Factors in the 23rd Quartermaster Brigade, Fort Lee, Virginia

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14. ABSTRACT

In March 2017, Kenner Army Health Center requested assistance from the Army Public Health Center (APHC) Injury Prevention Division (INP) in describing injuries and injury risk factors among Trainees in-processing with the 262nd Battalion of the 23rd Quartermaster Brigade. **Purpose:** To 1) describe injuries sustained during basic combat training among Trainees in-processing with the 262nd Battalion, 23rd Quartermaster Brigade and 2) examine risk factors for injury among in-processing Trainees. **Methods:** Surveys were administered to Trainees in-processing with the 262nd Battalion of the 23rd Quartermaster Brigade for Advanced Individual Training (AIT) courses with start dates between 31 July and 12 December 2017. The survey included questions on personal and health characteristics, unit PT during Basic Combat Training (BCT), and injury during BCT. Administrative records were obtained for all Trainees in-processing with the 262nd Battalion of the 23rd Quartermaster Brigade from the Army Training Requirements and Resources System (ATRRS). Medical encounter data were obtained from the Defense Medical Surveillance System (DMSS), a data system maintained by the Armed Forces Health Surveillance Branch (AFHSB). Descriptive statistics (frequencies, distributions, means, standard deviations (SD)) were calculated for personal and health characteristics, physical training, and injuries. To investigate potential factors associated with injury during AIT, injury odds ratios and 95% confidence intervals (95% CI) were calculated for men and women separately. **Results:** Of the 2,146 Trainees who in-processed with the 262nd Battalion in the timeframe, 1,869 completed surveys (87%). Sixty-six percent were enrolled in the Petroleum Supply Specialist course. Seventy-four percent (n=1,385) of those surveyed were men, half were under 20 years old, 77% completed BCT at Fort Jackson in South Carolina, fifty-three percent of in-processing Trainees were rank of E1, and approximately two-thirds of the Trainees were in the "normal" BMI range. Of all Trainees who completed a survey, 15% (n=282) indicated they had been injured during BCT (12% men, 26% women). Half of all BCT injuries occurred to the lower extremities and 24% of injuries were for pain. There were 1,078 injuries experienced by 244 Trainees that completed AIT in the 262nd Quartermaster Battalion between 31 July 2017 and 12 March 2018. The majority of injuries were to the lower extremity (73%) and spine and back (14%) and 85% were categorized as "tissue damage, other." When examined in a multivariable logistic regression model, the following were found to be associated with injury during Petroleum Supply Specialist AIT among men: older age, BCT site. **Conclusions:** Trainees who in-processed with the 262nd Quartermaster Battalion from 31 July 2017 to 04 December 2017 were similar to other AIT populations but had an overall lower injury rate compared with other AIT Trainee populations. Medical encounters for injury during AIT were similar to those seen in other AIT populations. Older age (≥ 30 years old) was identified as a risk factor for injury during Petroleum Supply Specialist AIT among men in the 262nd Quartermaster Battalion, after controlling for other significant risk factors. AIT leadership are recommended to continue to utilize FM 7-22 to create physical training regimens for Trainees.

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1. SUMMARY

1.1 Purpose

The purpose of this report is to—

- Describe injuries sustained during basic combat training among Trainees in-processing with the 262nd Battalion, 23rd Quartermaster Brigade (QM BDE) start dates between 31 July and 12 December 2017, and
- Describe and assess risk factors for injury sustained during Advance Individual Training (AIT) among in-processing Trainees.

1.2 Results and Findings

There were 2,146 Trainees who in-processed with the 262nd Battalion from 31 July 2017 to 12 March 2018. Of these personnel, 1,869 completed the surveys (87%). The greatest proportion (66%) were enrolled in the Petroleum Supply Specialist course, followed by Paralegal Specialist (11%), and Water Treatment Specialist (10%) courses.

Seventy-four percent (n=1,385) of those surveyed were men, half were under 20 years old, 77% completed Basic Combat Training (BCT) at Fort Jackson in South Carolina, 53% of in-processing Trainees were a rank of E1 (Private), and approximately two-thirds of the Trainees had a "normal" BMI (18.5 – 24.9 kg/m^2). Eighty-nine percent of Trainees who completed the survey had not smoked more than 100 cigarettes in their lifetime.

Of the Trainees who completed a survey, 15% (n=282) indicated they had been injured during BCT (12% of men, 26% of women). Among the most recent injuries sustained during BCT, half occurred to the lower extremities and 24% were for pain.

There were 1,078 injury-related medical encounters documented among 244 Trainees that completed AIT in the 262nd Quartermaster Battalion between 31 July 2017 and 12 March 2018. The majority of injuries were to the lower extremity (73%) and spine and back (14%) and 85% were categorized as "tissue damage, other" (i.e. Traumatic damage to non-MSK tissues not

otherwise described that causes inflammation (e.g., fluid accumulation), pain, tissue dysfunction, and/or limits physical ability) (U.S. Army Public Health Center 2017b).

Investigation of risk factors for women was not conducted, given the likelihood of unstable estimates for many characteristics. The following associations were found among men in Petroleum Supply Specialist AIT after conducting multivariable logistic regression which included age and BCT installation:

- Among Petroleum Supply Specialists, men age 30 years or older had 2.6 times higher odds of injury during AIT than men who were between 25 and 29.9 years old (OR (95% CI): 2.56 (1.16-6.06), p = 0.02).
- Among Petroleum Supply Specialists, men who completed BCT at Ft Leonard Wood had 0.49 times lower odds of injury during AIT then men who completed BCT at Fort Jackson (OR (95% CI): 0.49 (0.28-0.86), p = 0.01).

1.3 Conclusions and Recommendations

Trainees who in-processed with the 262nd Quartermaster Battalion from 31 July 2017 to 04 December 2017 were similar to other AIT populations, but had an overall lower injury rate. In the current study, self-reported injuries during BCT were similar to other BCT, AIT, and operational units. Medical encounters for injury during AIT were similar to other AIT populations. Older age (≥ 30 years old) was identified as a risk factor for injury during Petroleum Supply Specialist AIT among men in the 262nd Quartermaster Battalion, after controlling for other significant risk factors. AIT leadership should continue to utilize FM 7-22 to create physical training regimens for Trainees.

2. REFERENCES

Appendix A lists the references cited in this report.

3. AUTHORITY

Under Army Regulation (AR) 40-5, Section 2-19, the U.S. Army Public Health Center (APHC) is responsible for providing support for Army preventive medicine activities, including review and interpretation of surveillance data and identification and characterization of health problems as a foundation for injury prevention planning and policy efforts.

4. BACKGROUND

Kenner Army Health Clinic (KAHC) has executed the U.S. Army Medical Command (MEDCOM) Injury Operational Order (OPORD) 15-74 (Improving Readiness through Reduction of Unintentional Injuries) since 2015. In March 2017, the KAHC OPORD Team Lead requested assistance from the APHC Injury Prevention Division (INP) in describing injuries and injury risk factors among Trainees in-processing with 262nd Battalion of the 23rd QM BDE to help reduce injuries at Fort Lee. The 262nd Battalion trains and provides support to Soldiers in Four AIT Training Departments: Petroleum and Water Department, Aerial Delivery Field Services Department, Joint Mortuary Affairs Center, and Paralegal (U.S. Army Quartermaster Corps and Quartermaster School 2019b). Injuries sustained during basic combat training (BCT) often remain untreated prior to BCT graduation and are present upon arrival to the advanced individual training (AIT) site, which adversely affects AIT course completion and success (Grier et al. 2010). The 23rd QM BDE leadership focused on identifying injured Trainees during in-processing and understanding injury risk factors among incoming Trainees.
APHC INP agreed to provide survey management and analytic support for a period of 6 months to—

- Describe injuries sustained during basic combat training among Trainees in-processing with the 262nd Battalion, 23rd QM BDE, and
- Examine risk factors for injury among in-processing Trainees.

The Memorandum of Understanding (APHC-17-CPHE-117) was signed in July 2017. APHC INP briefed the 262nd Battalion, 23rd QM BDE leadership on 18 May 2018 for the survey results (Appendix B) and on 06 November 2018 for the medical records (Appendix C).

5. METHODS

The population of interest was all Trainees who in-processed in the following 262nd Battalion courses (i.e. Military Occupational Specialties (MOS)) [course number in parentheses]: Paralegal Specialist (512-27D10), Petroleum Supply Specialist (821-92F10), Petroleum Laboratory Specialist (491-92L10), Parachute Rigger (860-92R10), Shower and Laundry Specialist (840-92S10), Water Treatment Specialist (720-92W10), and Mortuary Affairs Specialist (492-92M10). The length of training differed by course type and ranged from 44–84 days (Table 1).

Table 1. Length of training (days) by MOS course when completed in accordance with standard timelines.

MOS (Course Number)	Number of phases	Length of training
Paralegal Specialist (512-27D10)	1	73 days
Petroleum Supply Specialist (821-92F10)	2	73 days
Petroleum Laboratory Specialist (491-92L10)	3	74 days
Parachute Rigger (860-92R10)	3	81 days
Shower and Laundry Specialist (840-92S10)	1	44 days
Water Treatment Specialist (720-92W10)	1	84 days
Mortuary Affairs Specialist (492-92M10)	2	52 days

Trainees reported to Ft Lee, VA and were in-processed no later than the Friday before their class start date between 31 July and 12 December 2017 (U.S. Army Quartermaster Corps and Quartermaster School 2019a). In-processing ensures that each Soldier has processed properly and completely before being released to the activity for clearance and movement to the gaining unit (Department of the Army 2018).

5.1 Survey Data Collection

Paper surveys were distributed and collected by 262nd S1 and/or S3 personnel to Trainees on the second day of in-processing with the 262nd Battalion of the 23rd QM BDE for AIT courses with start dates between 31 July and 12 December 2017. The survey included questions on personal and health characteristics, unit PT during BCT, and injury during BCT. Appendix D contains the survey.

Data collected via survey that were included in this analysis were:

- Demographics included sex, age, rank (e.g., E1 or E2), height, and weight at the time of in-processing for AIT.
- Risk factors data collected included:
    - Body mass index (BMI) categories calculated by height and weight, defined as: underweight (≤ 18.5 kg/m^2); normal weight (18.5-24.9 kg/m^2); low overweight (25.0-27.5 kg/m^2); high overweight (27.6-29.9 kg/m^2); and obese (30.0 kg/m^2 and above) (Centers for Disease Control and Prevention 2016, Department of the Army 2013) .
    - Smokers during BCT are those who smoked at least 100 cigarettes in their lifetime and smoked at least one cigarette in the previous 30 days prior to BCT, which is consistent with the definition used by the CDC (Jamal et al. 2015).

Additional tobacco use questions included: how many days cigarettes were smoked in the past 30 days, number of cigarettes smoked in the past 30 days, if smokeless tobacco had ever been used prior to BCT (if so, how many days it was used), if electronic cigarettes (e-cigarettes) had ever been used prior to BCT (if so, how many days it was used).

- Unit physical fitness training, including the average weekly frequency and duration for the following: sprint training, agility drill training, and resistance training; as well as distance running frequency and mileage.
- Army Physical Fitness Test (APFT) variables, including timed 2-minute push-up and sit-up repetitions and 2-mile run time. Prior to in-processing for AIT, Trainees reported scores from their most recent APFT. High correlations have been found between actual and self-reported APFT performance as well as actual and self-reported height and weight in Army operational units (Martin et al. 2016, Jones et al. 2007).
- Injury variables, including number of injuries during BCT.
- For the most recent injury sustained during BCT, data were collected on type of injury, body part injured, mechanism of injury, activity associated with the injury, if a medical provider was seen, and total days of limited-duty for injuries that resulted in a profile.

Within the various topics investigated, response totals for each question may not be applicable since the associated questions were not always answered.

5.2 Administrative Data

Administrative records were obtained for all Trainees who in-processed with the 262nd Battalion of the 23rd QM BDE, 31 July through 12 December 2017, from the Army Training Requirements and Resources System (ATRRS), regardless of survey completion. ATRRS was queried to determine the proportion of Trainees with medical holds by course during AIT. ATRRS data included demographics and AIT course enrollment data.

Data collected via ATRRS included:

- Demographic data on sex, age, branch, and rank.
- AIT course enrollment included input status and output status. The input status indicates the type of student that is enrolling in the class, which includes three types of students: new input, retrainee in (from another course of instruction), and recycle in (from another class of the same course of instruction). The output date is when the Trainee left the class and the output status and output reason description indicate why the Trainee left

the class. Output statuses include graduate (successfully completed class), hold (including reason for hold), retrainee out (to another course of instruction), recycle out (to another class of the same course of instruction), other non-successful completion, or discharged from service.

Overall, 2,146 Trainees in-processed with the 262nd Battalion between 31 July and 04 December 2017. Ninety-five percent (n=2,031) were new to AIT, 4% (n=86) were retrainees in from another AIT course of instruction, and 1% (n=29) were recycles in from another class of the same AIT course of instruction. Between August 2017 and January 2018, 10 Trainees (0.5%) were put on medical hold and 26 Trainees (1.2%) were discharged from service. No further assessment of these outcomes was performed due to small numbers.

5.3 Medical Data

Medical encounter data were obtained from the Defense Medical Surveillance System (DMSS), which is a data system maintained by the Armed Forces Health Surveillance Branch (AFHSB) containing all records of inpatient and outpatient medical encounters at military treatment facilities or paid for by the military health system (Rubertone and Brundage 2002). Medical encounter data included race, visit dates, and International Classification of Diseases 10th Revision Clinical Modification (ICD-10-CM) diagnosis codes for all outpatient and hospitalized injury medical encounters from March 2017 (4 months prior to the first surveyed AIT class' start date) through March 2018 (date last surveyed AIT class graduated). This timeframe was chosen to overlap with Trainees' time in BCT (assuming Trainees came directly from BCT to AIT).

Injury-related medical encounters were identified if ICD-10-CM codes associated with both overuse and traumatic injuries, consistent with the APHC definition of injury (U.S. Army Public Health Center 2017b), were found in the primary (first) diagnosis position. A 60-day incidence rule was applied to the primary diagnosis, i.e. there were at least 60 days between listed codes for new injuries, using the primary diagnosis code per medical encounter out to the 6th digit when available. ICD-10-CM injury activity and cause codes were identified in diagnoses 1-4; there were no activity or cause codes in diagnoses 5-9.

The 23rd QM BDE is a Training and Doctrine Command (TRADOC) unit; therefore, activity and cause codes were compared to those in medical encounters for injury among TRADOC Soldiers and all U.S. Army Active Component (AC) Soldiers in CY2017. TRADOC Soldiers' and all U.S. Army Soldiers' medical encounters for injury in CY2017 were requested from DMSS as part of routine surveillance activities. TRADOC Soldiers were identified using Unit Identification Codes provided by TRADOC.

5.4 Statistical Analyses

5.4.1 Survey

Descriptive statistics (i.e., frequencies, distributions, means, standard deviations) were calculated for personal and health characteristics, BCT physical training, and injuries. Significant differences in average APFT performance between men and women were assessed by *t* test. Significant differences in average APFT performance among men by BCT site were assessed by ANOVA. Average limited duty days for injury were calculated by injury type and injured body area. Percentage of injury medical encounters with an activity or cause code were compared to that of injury medical encounters among all TRADOC Soldiers and all Army AC Soldiers in 2017.

5.4.2 Medical Data

To investigate potential factors associated with injury during AIT, injury odds ratios and 95% confidence intervals (CI) were calculated for men stratified by MOS. Data collected from surveys and ATRRS were included as potential risk factors for injury during AIT. Factors associated with injury at an overall p-value ≤ 0.25 in simple logistic regression were included in multivariable analyses. Multivariable logistic regression was used to assess factors associated with injury risk during AIT for men. Adjusted odds ratios (aOR) and 95% CI were presented for each potential risk factor. Investigation of risk factors for women was not conducted, given the likelihood of unstable estimates for many characteristics due to small numbers. The Statistical Package for the Social Sciences (SPSS®), Version 21, was used for statistical analysis.

6. RESULTS

6.1 Personal Characteristics of Surveyed Trainees

Of the 2,146 Trainees who in-processed with the 262nd Battalion during the survey period (Table 2), 1,869 completed surveys (87%). The greatest proportion of Trainees was enrolled in the Petroleum Supply Specialist course (66%), followed by Paralegal Specialist (11%), and Water Treatment Specialist (10%) courses. The Mortuary Affairs Specialist course was transferred to another unit halfway through data collection, resulting in small numbers (n=21), and will not be included in further analyses.

- The majority of Trainees who completed the in-processing survey were men (74%), under 20 year olds (50%), had rank of E1 (53%), in the "normal" BMI range (63%), and completed BCT at Fort Jackson, South Carolina (77%).

Table 2. Personal characteristics of Trainees in-processed and surveyed with the 262nd Battalion between 31 July and 12 December 2017 (n=1,869)

Characteristic	Characteristic levels	Men (n=1,385)		Women (n=474)		Total (n=1,869)	
		n	(%)	n	(%)	n	(%)
Course*	Petroleum Supply Specialist (92F)	923	(66.6)	295	(62.2)	1,218	(65.5)
	Paralegal Specialist (27D)	139	(10.0)	63	(13.3)	202	(10.9)
	Water Treatment Specialist (92W)	137	(9.9)	56	(11.8)	193	(10.4)
	Parachute Rigger (92R)	86	(6.2)	18	(3.8)	104	(5.6)
	Shower and Laundry Specialist (92S)	67	(4.8)	31	(6.5)	98	(5.3)
	Petroleum Laboratory Specialist (92L)	33	(2.4)	11	(2.3)	44	(2.4)
Age groups (years) (Mean: 21.1 ± 3.8 years)	< 20	625	(46.3)	276	(59.2)	901	(49.6)
	20-24.9	483	(35.8)	135	(29.0)	618	(34.0)
	25.0-29.9	162	(12.0)	41	(8.8)	203	(11.2)
	≥ 30	81	(6.0)	14	(3.0)	95	(5.2)
BCT Installation	Ft Jackson, SC	1,004	(72.9)	413	(87.3)	1,417	(76.6)
	Ft Leonard Wood, MO	172	(12.5)	33	(7.0)	205	(11.1)
	Ft Sill, OK	104	(7.5)	24	(5.1)	128	(6.9)
	Ft Benning, GA	98	(7.1)	3	(0.6)	101	(5.5)
Rank	E1	784	(56.9)	196	(41.4)	980	(52.9)
	E2	314	(22.8)	156	(33.0)	470	(25.4)
	E3	195	(14.2)	95	(20.1)	290	(15.7)
	E4	85	(6.2)	26	(5.5)	111	(6.0)
BMI (kg/m^2) (Mean: 24.1 ± 2.8 kg/m^2)	Underweight (≤ 18.5 kg/m^2)	7	(0.5)	8	(1.8)	15	(0.8)
	Normal (18.5 – 24.9 kg/m^2)	793	(59.8)	312	(70.7)	1,105	(62.5)
	Low Overweight (25.0 – 27.4 kg/m^2)	344	(25.9)	112	(25.4)	456	(25.8)
	High Overweight (27.5 – 29.9 kg/m^2)	138	(10.4)	8	(1.8)	146	(8.3)
	Obese (≥ 30.0 kg/m^2)	45	(3.4)	1	(0.2)	46	(2.6)

Notes:
* MOS number included in parentheses

6.2 Physical Fitness

6.2.1 Army Physical Fitness Test Performance

Men performed an average of 55 ± 13 push-ups and women performed an average of 31 ± 11 push-ups (*t* test $p < 0.05$) during BCT (Tables 3 and 4). Men performed an average of 63 ± 10 sit-ups and women performed an average of 60 ± 11 sit-ups (*t* test $p < 0.05$). Men performed the 2-mile run in an average of 14.42 ± 1.28 minutes and fractions of a minute and women averaged 17.24 ± 1.59 minutes and fractions of a minute (*t* test $p < 0.05$).

Table 3. Summary of average BCT APFT performance for male trainees in-processed with the 262nd Battalion between 31 July and 12 December 2017 (n=1,385)

APFT Performance Mean ± SD	Age Group			Overall	ANOVA p-value
	17-21 years	22-26 years	≥ 27 years		
Push-up repetitions	54.6 ± 12.3	56.3 ± 13.8	54.8 ± 14.4	55.0 ± 13.0	0.14
Sit-up repetitions	63.4 ± 9.9	61.5 ± 10.3	58.4 ± 11.2	62.5 ± 10.3	< 0.01
2-mile run time (minutes and fraction of a minute)	14.32 ± 1.21	14.48 ± 1.43	14.90 ± 1.29	14.42 ± 1.28	< 0.01

Table 4. Summary of average BCT APFT performance for female trainees in-processed with the 262nd Battalion between 31 July and 12 December 2017 (n=474)

APFT Performance Mean ± SD	Age Group			Overall	ANOVA p-value
	17-21 years	22-26 years	≥ 27 years		
Push-up repetitions	31.6 ± 10.5	28.9 ± 14.1	32.1 ± 11.4	31.3 ± 11.4	0.14
Sit-up repetitions	61.1 ± 10.7	57.3 ± 11.1	55.9 ± 12.7	60.2 ± 11.0	< 0.01
2-mile run time (minutes and fraction of a minute)	17.12 ± 1.52	17.60 ± 1.80	17.69 ± 1.56	17.24 ± 1.59	0.01

Table 5 examines differences in average APFT performance during BCT by BCT installation among men. Average APFT performance did not significantly differ by BCT installation among men.

Table 5. APFT performance during AIT by BCT installations among men (n=1,371)

	BCT Installation				ANOVA p-value
	Ft Benning Avg ± SD (n=97)	Ft Jackson Avg ± SD (n=1,000)	Ft Leonard Wood Avg ± SD (n=171)	Ft Sill Avg ± SD (n=103)	
APFT Push-ups (reps)	54 ± 13	55 ± 13	56 ± 13	55 ± 13	0.69
APFT Sit-ups (reps)	64 ± 11	62 ± 10	63 ± 10	64 ± 12	0.09
APFT 2-mile run time (min)	14.31 ± 1.29	14.40 ± 1.28	14.48 ± 1.28	14.53 ± 1.30	0.57

Refer to Appendix E for details on PT activities during BCT as reported on the in-processing survey.

6.3 Tobacco Use

Seven percent of Trainees who completed the survey had smoked at least at 100 cigarettes in their lifetime and one percent reported smoking within 30 days prior to the start of BCT (8% of men, 4% of women).

- Among 145 Trainees who reported smoking cigarettes within 30 days prior to BCT, 54% smoked between 19 and 30 days prior to BCT (52% men, 62% women) (Table 6). Eighty-four percent of Trainees who smoked within 30 days prior to BCT had smoked an average of 1–10 cigarettes per day.
- Thirteen percent of Trainees reported using smokeless tobacco in their lifetime (16% men, 4% women). Among those who reported using smokeless tobacco within 30 days prior to BCT, about half of the Trainees used it between 1–14 days during the 30 days prior to BCT.
- Fourteen percent of Trainees reported using e-cigarettes in their lifetime (15% men, 8% women). Among those who reported using e-cigarettes tobacco within 30 days prior to BCT, about half of the Trainees used it between 1–18 days during the 30 days prior to BCT.

Table 6. Cigarette, smokeless tobacco, and e-cigarettes use prior to BCT

Variable	Categories	Men		Women		Total	
		n	(%)	n	(%)	n	(%)
Ever Smoke >100 Cigarettes in Lifetime?	Yes	180	(13.2)	29	(6.2)	209	(11.4)
	No	1,186	(86.8)	440	(93.8)	1,626	(88.6)
Smoker within 30 Days Prior to BCT	Yes	124	(9)	21	(4.4)	145	(7.8)
	No	1,261	(91)	453	(95.6)	1,714	(92.2)
If Smoked in 30 Days Prior to BCT: How Many Days Did You Smoke Cigarettes?	1-18	59	(47.6)	8	(38.1)	67	(46.2)
	19-30	65	(52.4)	13	(61.9)	78	(53.8)
If Smoked in 30 Days Prior to BCT: How Many Cigarettes per day?	1-10	104	(83.9)	18	(85.7)	122	(84.1)
	11-20	20	(16.1)	3	(14.3)	23	(15.9)
Ever Used Smokeless Tobacco Prior to BCT	Yes	219	(16.2)	20	(4.3)	239	(13.2)
	No	1,131	(83.8)	444	(95.7)	1,575	(86.8)
If Used Smokeless: How Many Days Did You Use Smokeless Tobacco?	1-14	52	(49.5)	5	(100)	57	(51.8)
	15-30	53	(50.5)	0	(-)	53	(48.2)
Ever Used E-Cigarettes Prior to BCT	Yes	209	(15.4)	37	(7.9)	246	(13.5)
	No	1,147	(84.6)	430	(92.1)	1,577	(86.5)
If Used E-Cigarettes: How Many Days Did You Use Smokeless Tobacco?	1-18	40	(46)	9	(56.3)	49	(47.6)
	19-30	47	(54)	7	(43.8)	54	(52.4)

6.4 Injuries during BCT

Of all the Trainees who completed a survey, 15% (n=282) indicated they had been injured during BCT (12% men, 26% women). Of those who reported they were injured, 78% only had one injury (78% men, 77% women) (Table 7). Among the most recent self-reported injuries during BCT:

- Ninety-five percent of injured Trainees had new injuries; 5% reported the most recent injury was a re-injury.
- Half of all injuries occurred to the lower extremities (49% men, 53% women).
- Twenty-four percent of injuries were identified as pain (32% men, 14% women), 22% were sprains (21% men, 23% women), and 17% were strains (13% men, 23% women).
- Almost half of injuries (46%) were associated with running (47% men, 44% women), followed by 21% associated with marching with a load (15% men, 31% women), and 10% associated with other physical training (e.g., push-ups, pull-ups, etc.) (13% men, 7% women).
- Overuse/repetitive use caused 43% of injuries (39% men, 49% women), followed by 22% falling onto an object/surface/the ground (20% men, 26% women), and 14% single overexertion/over-extension/twisting effort (14% men and women, respectively).

Table 7. Description of the most recent self-reported injuries during BCT by Trainees in-processed with the 262nd Battalion (n=282[a])

Variable	Categories	Men		Women		Total	
		n	(%)	n		n	(%)
Number of injuries	1	118	(78.1)	93	(76.9)	211	(77.6)
	2	26	(17.2)	23	(19)	49	(18)
	≥ 3	7	(4.6)	5	(4.1)	12	(4.4)
New injury	New	146	(94.8)	111	(94.9)	257	(94.8)
	Re-injury	8	(5.2)	6	(5.1)	14	(5.2)
Body area injured	Lower extremities	73	(49)	58	(53.2)	131	(50.8)
	Upper extremities	58	(38.9)	37	(33.9)	95	(36.8)
	Torso	11	(7.4)	11	(10.1)	22	(8.5)
	Head and neck	7	(4.7)	3	(2.8)	10	(3.9)
Type of injury	Pain	32	(31.7)	10	(14.1)	42	(24.4)
	Sprain (ligament or joint)	21	(20.8)	16	(22.5)	37	(21.5)
	Strain (tendon or muscle)	13	(12.9)	16	(22.5)	29	(16.9)
	Broken/fractured bone	11	(10.9)	9	(12.7)	20	(11.6)
	Bruise (contusion)	3	(3)	4	(5.6)	7	(4.1)
	Tendonitis or bursitis	3	(3)	2	(2.8)	5	(2.9)
	Blister	3	(3)	2	(2.8)	5	(2.9)
	Dislocation (joint)	2	(2)	0	(-)	2	(1.2)
	Nerve injury	2	(2)	0	(-)	2	(1.2)
	Traumatic brain injury (e.g. concussion)	2	(2)	0	(-)	2	(1.2)
	Burn	1	(1)	0	(-)	1	(0.6)
	Tear	2	(2)	3	(4.2)	5	(2.9)
	Other[b]	6	(5.9)	9	(12.7)	15	(8.7)

Variable	Categories	Men		Women		Total	
		n	(%)	n		n	(%)
Activity associated with injury	Running	67	(46.5)	48	(44.4)	115	(45.6)
	Marching – with load	21	(14.6)	33	(30.6)	54	(21.4)
	Other physical training[c]	18	(12.5)	8	(7.4)	26	(10.3)
	Combatives training	10	(6.9)	3	(2.8)	13	(5.2)
	Field exercise	4	(2.8)	5	(4.6)	9	(3.6)
	Lifting or moving heavy objects (not weight training)	4	(2.8)	3	(2.8)	7	(2.8)
	Weight lifting	5	(3.5)	1	(0.9)	6	(2.4)
	Climbing (e.g. a ladder, into a vehicle)	2	(1.4)	2	(1.9)	4	(1.6)
	Walking or hiking	3	(2.1)	0	(-)	3	(1.2)
	Sports/recreation	0	(-)	3	(2.8)	3	(1.2)
	Marching – no load	0	(-)	1	(0.9)	1	(0.4)
	Other[d]	10	(6.9)	1	(0.9)	11	(4.4)
Mechanism of injury	Overuse/repetitive use	54	(38.6)	52	(49.1)	106	(43.1)
	Falling onto an object/surface/the ground	28	(20)	27	(25.5)	55	(22.4)
	Single overexertion/over-extension/twisting effort	19	(13.6)	15	(14.2)	34	(13.8)
	Contacting (hit by/against) an object/surface	20	(14.3)	5	(4.7)	25	(10.2)
	Directly contacting a person	4	(2.9)	1	(0.9)	5	(2)
	Exposure to temperature (hot or cold)	3	(2.1)	0	(-)	3	(1.2)
	Insect bite	1	(0.7)	0	(-)	1	(0.4)
	Cutting or puncture by a sharp tool, object or instrument	0	(-)	1	(0.9)	1	(0.4)
	Other[e]	11	(7.9)	5	(4.7)	16	(6.5)

Notes:

[a] Includes Trainees with missing data in subsequent variables

[b] Other type of injury includes: plantar fasciitis, growth plate movement

[c] Other physical training includes: agility drills, pull-ups, push-ups

[d] Other activity includes: corrective training, land navigation

[e] Other mechanism of injury includes: chemical reaction, sitting, pressure

Overall, there were 172 self-reported injury-related encounters that resulted in a profile and injury type was reported (n=110 were missing injury types), which accounted for 1,710 total limited duty days (Table 8a).

- The most frequently reported injury type was pain, accounting for 42 (24%) total injuries, but the highest number of limited duty days was among broken/fractured bones (n=859, 50%). Other injury types with high limited duty days were pain (13%) and strains (9%).
- Among the 26 Trainees who reported sprains that resulted in limited duty days, the average length of limited duty was 6 days ± 4 days. Among the 25 Trainees who reported pain that resulted in limited duty days, the average length of limited duty was 9 days ± 12 days. Among the 20 Trainees who reported strains that resulted in limited duty days, the average length of limited duty 8 days ± 8 days. Broken/fractured bones resulted in the highest average length of limited duty days (45 days ± 69 days).

Overall, there were 179 self-reported injury-related encounters that resulted in a profile and body area was reported, which accounted for 2,377 total limited duty days (Table 8b).

- Lower extremity was the most commonly reported injured body area with 131 (51%) individuals reporting this body area, and accounted for 1,353 (57%) total limited duty days. Upper extremity was the second most commonly reported injured body area, with 95 (37%) individuals and 800 (34%) total limited duty days, followed by torso with 22 (9%) individuals and 194 (8%) total limited duty days.
- Among the 95 Trainees who experienced lower extremity injury that resulted in limited duty days, the average length of limited duty was 14 days ± 34 days. Among the 61 Trainees who experienced upper extremity injury that resulted in limited duty days, the average length of limited duty was 13 days ± 26 days.

Table 8a. Injury type and limited duty days for self-reported injury during BCT (n=172)

Injury Type	Self-reported injury during BCT		Total injuries resulting in temporary profiles	Total Limited Duty Days		Average Limited Duty Dates per Injury Type ± SD
	n	(%)	n	n	(%)	
Pain	42	(24.4)	25	222	(13.0)	9 ± 12
Sprain (ligament or joint)	37	(21.5)	26	145	(8.5)	6 ± 4
Strain (tendon or muscle)	29	(16.9)	20	155	(9.1)	8 ± 8
Broken/fractured bone	20	(11.6)	19	859	(50.2)	45 ± 69
Bruise (contusion)	7	(4.1)	5	39	(2.3)	8 ± 7
Tendonitis or bursitis	5	(2.9)	3	34	(2)	11 ± 4
Blister	5	(2.9)	2	8	(0.5)	4 ± 3
Tear	5	(2.9)	5	42	(2.5)	8 ± 5
Dislocation (joint)	2	(1.2)	0	-	-	-
Nerve injury	2	(1.2)	1	7	(0.4)	7 ± 0
Traumatic brain injury (e.g., concussion)	2	(1.2)	2	5	(0.3)	3 ± 1
Burn	1	(0.6)	1	4	(0.2)	4 ± 0
Other	15	(8.7)	11	190	(11.1)	17 ± 26
Total	**172**	**(100)**	**120**	**1,710**	**(100)**	14 ± 32

Table 8b. Injured body area and limited duty days for self-reported injury during BCT (n=258)

Body Area	Self-reported injury during BCT		Total injuries resulting in temporary profiles	Total Limited Duty Days		Average Limited Duty Dates per Injury Type ± SD
	n	(%)	n	n	(%)	
Lower extremities	131	(50.8)	95	1,353	(56.9)	14 ± 34
Upper extremities	95	(36.8)	61	800	(33.7)	13 ± 26
Torso	22	(8.5)	16	194	(8.2)	12 ± 10
Head and neck	10	(3.9)	3	30	(1.3)	10 ± 13
Total	**258**	**(100)**	**175**	**2,377**	**(100)**	14 ± 30

6.5 Injury Medical Encounters during AIT

There were 1,078 injury-related medical encounters among 244 Trainees who completed AIT in the 262nd Quartermaster Battalion between 31 July 2017 and 12 March 2018 (Table 9).

- The majority of injuries were to the lower extremity (73%) and spine and back (14%).
- Eight-five percent of injuries were categorized as "tissue damage other," which is defined as musculoskeletal tissue damage that includes diagnoses such as pain, lumbago, bursitis (ICD 10-CM M codes) and injuries such as lacerations of muscle, fascia, and tendons (ICD 10-CM S codes).
- Nine percent (n=96) of injury medical encounters included activity codes. Of those, running was the leading activity associated with injury (79%), followed by walking, marching, and hiking (5%), and push-ups, pull-ups, sit-ups (3%).
- Only 1% (n=14) of injury medical encounters included cause codes. Of those, overexertion and falls were the leading causes of injury (36% each), followed by natural/environmental (7%).

Table 9. Injury-related medical encounters among Trainees in 262nd Battalion AIT courses (n=1,078)

Variable	Categories	Total	
		n	(%)
Body Area	Lower extremity	784	(72.7)
	Spine & back	152	(14.1)
	Upper extremity	115	(10.7)
	Other	21	(1.9)
	Head & neck	3	(0.3)
	Torso	3	(0.3)
Injury Category	Tissue Damage Other	919	(85.3)
	Sprain/joint damage	70	(6.5)
	Strain/tear	41	(3.8)
	Fracture	31	(2.9)
	Reaction to foreign substance	5	(0.5)
	Dislocation	4	(0.4)
	Poisoning	4	(0.4)
	Nerve	1	(0.1)
	Asphyxiation	1	(0.1)
	Neglect/abuse	1	(0.1)
	Trauma	1	(0.1)
Activity associated with injury	Running	76	(79.2)
	Walking, marching and hiking	5	(5.2)

Variable	Categories	Total	
		n	(%)
	Push-ups, pull-ups, sit-ups	3	(3.1)
	American flag or touch football	2	(2.1)
	Basketball	1	(1.0)
	Free weights	1	(1.0)
	Obstacle course	1	(1.0)
	Sleeping	1	(1.0)
	Other specified	6	(6.3)
	Missing	982	-
Mechanism of injury	Overexertion	5	(35.7)
	Fall	5	(35.7)
	Poisoning	2	(14.3)
	Natural/environmental	1	(7.1)
	Motor vehicle traffic	1	(7.1)
	Unspecified	26	-
	Missing	1,038	-

- A higher proportion of injuries among 262nd BN Trainees was associated with running compared to TRADOC and all U.S. Army Trainees in CY2017 (see Figure 1). Eighty-eight percent (n=84) of activity codes among 262nd QM BN Trainees were associated with cumulative mechanical injuries.
- Overexertion and falls were similar in proportion among, but not between, 262nd QM BN Trainees, TRADOC Soldiers, and all U.S. Army Soldiers (see Figure 2). Fifty percent (n=7) of cause codes among 262nd QM BN Trainees were associated with cumulative mechanical injuries.

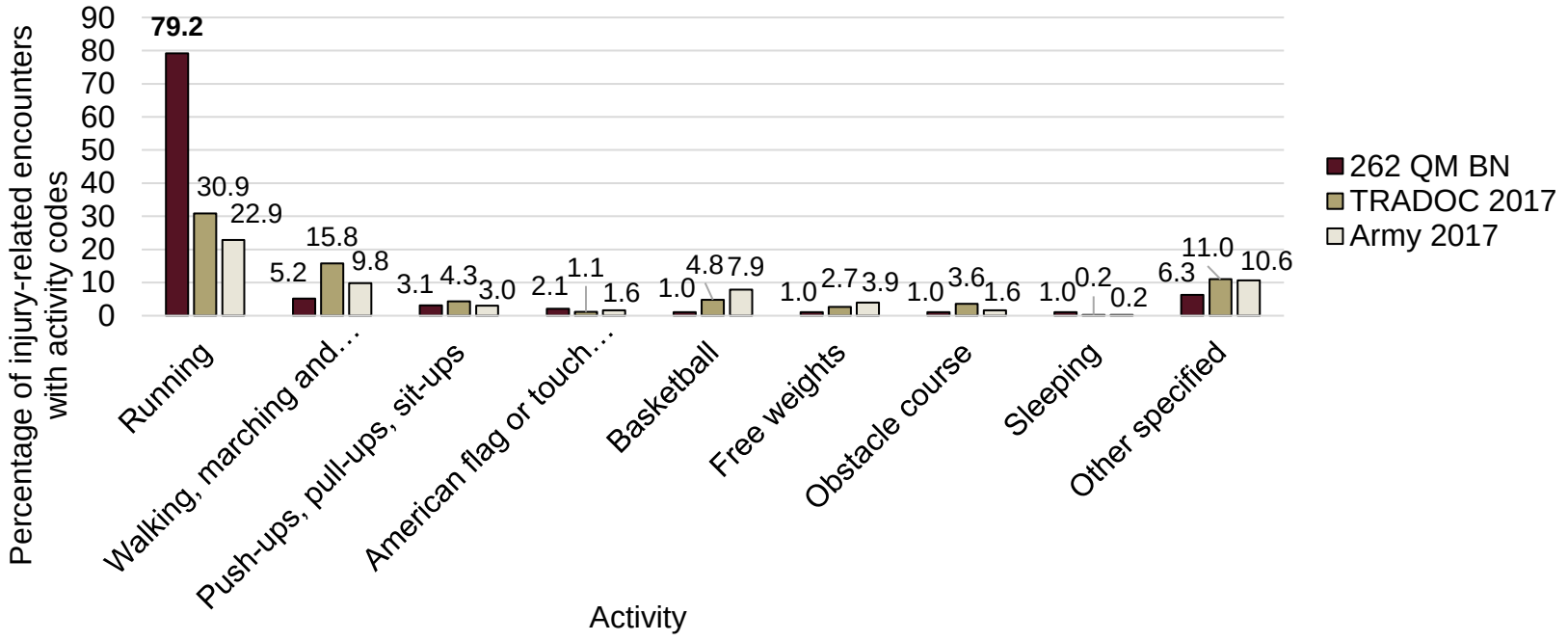

Figure 1. Injury activity codes* among Trainees in 262nd BN 23rd QM BDE from 31 July 2017 to 12 March 2018, compared to TRADOC and all Army Trainees in CY2017. (n=96)

*Obtained from DX2-4 (no activity codes in DX1)

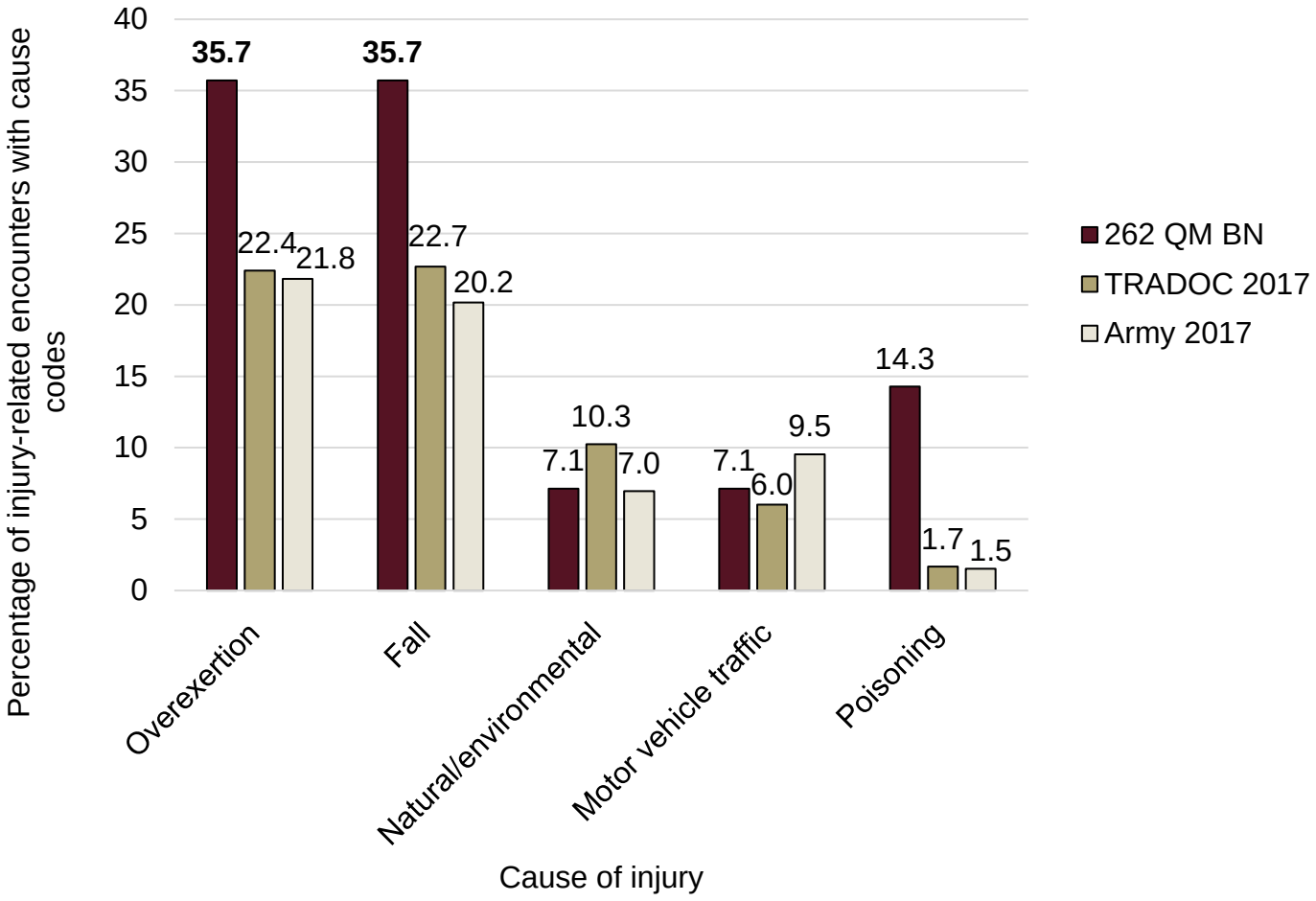

Figure 2. Injury cause codes* among Trainees in 262nd BN 23rd QM BDE from 31 July 2017 to 12 March 2018, compared to TRADOC and all Army Soldiers in CY2017. (n=14)

*Obtained from DX1-4

6.6 Factors associated with Injury during Petroleum Supply Specialist AIT

To assess risk factors for injury among men during AIT, univariate and multivariable logistic regressions stratified by MOS were conducted. There are significant differences in training length and training activities between MOS's, therefore the MOS with the most robust data was chosen for risk factor analysis. Investigation of risk factors for women was not conducted, given the likelihood of unstable estimates for many characteristics due to small numbers of women.

Table 10 represents the results of a univariate analysis of potential factors associated with injury among men during Petroleum Supply Specialists AIT. These results include:

- Among Petroleum Supply Specialists, men age 30 years or older had 2.3 times higher odds of injury during AIT than men who were between 25 and 29.9 years old (OR (95% CI): 2.28 (1.09-4.78), p = 0.03).
- Among Petroleum Supply Specialists, men who completed BCT at Ft Leonard Wood had 0.50 times lower odds of injury during AIT then men who completed BCT at Fort Jackson (OR (95% CI): 0.50 (0.29-0.86), p = 0.01).

Table 10. Univariate logistic regression results for injury during Petroleum Supply Specialist AIT among men in the 262nd Quartermaster Battalion, 31 July 2017 to 12 March 2018 (n=982)

Characteristic	Characteristic Level	n (% injured)	Odds Ratio (95% CI)	p-value	Overall p-value
Age	< 20 years	131 (46.6)	1.37 (0.76-2.46)	0.29	**0.13**
	20 – 24.9 years	184 (42.4)	1.16 (0.66-2.02)	0.61	
	25 – 29.9 years	72 (38.9)	1.00		
	≥ 30 years	49 (59.2)	2.28 (1.09-4.78)	0.03	
BMI	Underweight/Normal ≤ 18.5 – 24.9 kg/m^2	217 (47.9)	1.00		0.32
	Low Overweight 25.0 – 27.4 kg/m^2	112 (39.3)	0.70 (0.44-1.12)	0.14	
	High Overweight/Obese ≥ 27.5 kg/m^2	65 (46.2)	0.93 (0.53-1.62)	0.80	
BCT Installation	Ft Benning, GA	27 (51.9)	1.10 (0.50-2.43)	0.81	**0.06**
	Ft Jackson, SC	273 (49.5)	1.00		
	Ft Leonard Wood, MO	73 (32.9)	0.50 (0.29-0.86)	0.01	

Characteristic	Characteristic Level	n (% injured)	Odds Ratio (95% CI)	p-value	Overall p-value
	Ft Sill, OK	38 (39.5)	0.67 (0.33-1.33)	0.25	
Cigarette use before QM AIT	No	390 (44.1)	1.00		0.30
	Yes	46 (52.2)	1.38 (0.75-2.55)	0.30	
Lifetime smokeless tobacco use	No	337 (45.7)	1.00		0.79
	Yes	61 (47.5)	1.08 (0.62-1.86)	0.79	
Lifetime e-cigarette use	No	340 (45.3)	1.00		0.82
	Yes	64 (46.9)	1.07 (0.62-1.82)	0.82	
APFT Push-up repetitions (tertiles)	≤ 48	155 (42.6)	0.88 (0.54-1.42)	0.60	0.66
	49 – 60	138 (47.8)	1.09 (0.66-1.78)	0.74	
	≥ 61	118 (45.8)	1.00		
APFT Sit-up repetitions (tertiles)	≤ 58	170 (45.3)	1.19 (0.74-1.92)	0.47	0.42
	59 – 66	121 (49.6)	1.41 (0.85-2.36)	0.19	
	≥ 67	117 (41.0)	1.00		
APFT 2-mile run time (tertiles)	≤ 13.83	110 (47.3)	1.00		0.93
	13.84 - 15.00	121 (45.5)	0.93 (0.55-1.56)	0.78	
	≥ 15.01	180 (45.0)	0.91 (0.57-1.47)	0.71	

Notes:
Bolded text indicates p ≤ 0.25

Variables shown to be associated (p ≤ 0.25) in univariate analyses were included in the multivariable analysis to determine factors associated with injury during Petroleum Supply Specialist AIT. Table 11 represents the results of a multivariable analysis assessing the factors associated with injury during Petroleum Supply Specialist AIT among men in this unit. The variables included in this analysis included: age and BCT installation. The sample size for the multivariable analysis is smaller than for the univariate analysis because it is restricted to the population with data on BCT installation. These results include:

- Among Petroleum Supply Specialists, men age 30 years or older had 2.6 times higher odds of injury during AIT than men who were between 25 and 29.9 years old (OR (95% CI): 2.56 (1.16-6.06), p = 0.02).

- Among Petroleum Supply Specialists, men who completed BCT at Ft Leonard Wood had 0.49 times lower odds of injury during AIT then men who completed BCT at Fort Jackson (OR (95% CI): 0.49 (0.28-0.86), p = 0.01).

Table 11. Multivariable logistic regression results for injury during Petroleum Supply Specialist AIT among men in the 262nd Quartermaster Battalion, 31 July 2017 to 12 March 2018 (n=411)

Characteristic	Characteristic Level	aOdds Ratio (95% CI)	p-value	Overall p-value
Age	< 20 years	1.25 (0.68-2.30)	0.48	0.06
	20 – 24.9 years	1.02 (0.56-1.83)	0.96	
	25 – 29.9 years	1.00		
	≥ 30 years	2.56 (1.16-6.06)	**0.02**	
BCT Installation	Ft Benning, GA	1.10 (0.50-2.45)	0.81	0.06
	Ft Jackson, SC	1.00		
	Ft Leonard Wood, MO	0.49 (0.28-0.86)	**0.01**	
	Ft Sill, OK	0.64 (0.32-1.30)	0.22	

Notes:
Bolded text indicates p ≤ 0.05
Variables included in the analysis: age, BCT installation

7. DISCUSSION

7.1 Survey Findings

Most Trainees who in-processed with the 262nd Quartermaster Battalion from 31 July 2017 to 04 December 2017 were men, under 20 years old, in the normal BMI range, and had a rank of E1, similar to other Army BCT and AIT populations (Grier et al. 2010, Knapik et al. 2012, Dada et al. 2017, Knapik, Canham-Chervak, Hauret, et al. 2001).

APFT performance of Trainees in the current investigation was also similar to prior studies of other Army BCT and AIT populations (Dada et al. 2017, U.S. Army Public Health Center 2017a, Grier et al. 2011, Knapik, Canham-Chervak, Hoedebecke, et al. 2001). As seen previously within the APFT, men had higher average push-up and sit-up repetitions and faster average 2-mile run times compared to women in the same unit (Dada et al. 2017). The most recent APFT the Trainees entering AIT completed was likely their test to graduate from BCT; therefore, these

scores are expected to be slightly higher than scores reported during BCT. For example, Dada et al. (2017) reported mean APFT scores for a BCT population that are slightly lower among men and women compared to the surveyed population. The APHC (2017a) reported final APFT performance for men and women graduating from one-station unit training (OSUT), with scores similar to those in this investigation. Average APFT scores in the current study were also similar to those among surveyed AIT Trainees at the Ordnance School (Grier et al. 2011).

Prior studies of BCT populations have not included questions on frequency and duration of unit physical training regimens. Reported resistance training participation during BCT unit physical training was lower than in operational units (U.S. Army Public Health Center (Provisional) 2014).

In BCT and AIT, Trainees are not allowed to smoke, though there may be some lingering effects from smoking prior to BCT that increases injury risk (Henderson et al. 2000). Trainees in the current study reported lower levels of smoking cigarettes than in other AIT populations (Grier et al. 2011). Grier et al. (2011) determined that approximately 30% of Trainees smoked tobacco within 30 days prior BCT among Ordnance School AIT Trainees, whereas the current study only found 8% smoked tobacco in the same time period. The proportion of Trainees who reported ever using smokeless tobacco prior to BCT was similar to that reported by Grier et al. (2011) (about 14%)(Grier et al. 2011).

7.2 Injuries during BCT

Self-reported injuries during BCT in the current study were similar to those seen in other BCT (Knapik et al. 2013) and operational units (U.S. Army Public Health Center (Provisional) 2014).

The leading body area injured was lower extremities, which is consistent with studies conducted in similar populations. Fort Leonard Wood Trainees also experienced a majority of injuries in the lower extremities (85%) (Knapik et al. 2013). The rate of injury for lower extremities was 84% among men and 87% among women (Knapik et al. 2013). In the same study, the lower extremities were also the leading injured body areas among Military Police OSUT (82%) and Engineering OSUT Trainees (84%) (Knapik et al. 2013). A study of BCT Trainees at Fort Jackson also determined these were the majority of injuries (Knapik, Canham-Chervak, Hoedebecke, et al. 2001). Approximately half of injuries before (48%) and after (51%) a physical training program in a light infantry brigade occurred in the lower extremities (U.S. Army Public Health Center (Provisional) 2014). Similar to studies of infantry units, lower extremity injuries also accounted for the highest number of total limited-duty days (Canham-Chervak et al. 2019, Malish, Arnett, and Place 2014).

The leading injury types experienced during BCT were pain, sprains, strains, and broken/fractured bones, which were similar to other investigations of injuries among BCT

(Knapik et al. 2013) and operational units (U.S. Army Public Health Center (Provisional) 2014). The leading types of injury reported by three BCT battalions at Fort Leonard Wood were joint pain (20%), muscle strain/tear (19%), and tendonitis (16%) (Knapik et al. 2013). More specifically, leading injuries among men in the three BCT battalions were muscle strain/tear (20%), sprains (18%), and joint pain (17%), while among women were joint pain (24%), muscle strain/tear (19%), and tendonitis (15%) (Knapik et al. 2013). In the Fort Leonard Wood study, 25% of injuries among Military Police OSUT Trainees were joint pain, followed by tendonitis (15%), and sprains (14%); among Engineering OSUT Trainees, the leading injuries were joint pain (36%), blister (20%), and muscle strain/tear (14%) (Knapik et al. 2013). An investigation of a physical training program in a light infantry brigade determined that sprains/strains (52%), broken/fractured bones (10%), and pain (9%) were the leading types of injury before and during the program (U.S. Army Public Health Center (Provisional) 2014). Regarding limited duty, overuse injuries (including sprains and strains) accounts for the greatest total number of limited duty days in these Quartermaster MOS's as well as among infantry, engineer, and artillery Soldiers (Canham-Chervak et al. 2019, Reynolds et al. 2009).

Running is also consistently associated with injury across Army populations (U.S. Army Public Health Center (Provisional) 2014, Knapik et al. 2013, Canham-Chervak et al. 2019). Knapik et al. (2013) collected data on three BCT battalions at Fort Leonard Wood, Missouri, and found that approximately one quarter of injuries were due to physical training and road marching, respectively. The leading activities associated with injury in a surveyed light infantry brigade were running (22%), walking/hiking/marching (14%), and lifting/moving heavy objects (9%) (U.S. Army Public Health Center (Provisional) 2014). A separate investigation of 874 injured Soldiers in an infantry brigade found that the most common activities associated with injury were running (32%), lifting or moving heavy objects (13%), and walking, hiking, or road marching (11%) (Canham-Chervak et al. 2019).

7.3 Injuries during AIT

Medical encounters for injury during AIT were lower than those previously reported in other AIT populations (Henderson et al. 2000). As seen by Jones et al. (2008), the change in season and colder weather during the winter months may have also affected the incidence of injury among Trainees, resulting in lower injury rates than seen in other AIT Army populations.

The leading body area injured during AIT was also the lower extremities, similar to other AIT populations. An investigation of injuries among Combat Medic AIT Trainees at Fort Sam Houston determined that the leading injured body parts among men were the foot (17.1%), knee (13.8%), and ankle (13.0%) (Henderson et al. 2000). Female Combat Medic AIT Trainees suffered a majority of injuries to the lower extremities as well, with 22.0% of injuries to the foot, 21.0% knee, and 14.7% groin/thigh (Henderson et al. 2000).

Tissue damage was the leading type of injury among AIT Trainees in the current investigation, which included ICD-10-CM diagnosis codes for pain, lumbago, bursitis, and lacerations of muscle, fascia, and tendons. A study of Combat Medic AIT Trainees found that 46.3% of injuries among men and 59.7% among women were overuse injuries (e.g., shin splints, bursitis, fasciitis, tendinitis, retropatellar pain, and nonspecific musculoskeletal pain) (Henderson et al. 2000). Similarly to injuries in the Quartermaster Battalion, the next most frequent injuries were traumatic sprains/strains (34.1% among men, 13.7% among women) (Henderson et al. 2000).

Though only a small proportion of injury-related medical encounters included activity and cause codes, running was the activity associated with the majority of activity-coded injuries. Running has consistently been seen as the leading activity associated with injury in a variety of military populations (Canham-Chervak et al. 2019, Smith and Cashman 2002, Knapik et al. 2007). Though the proportions differ, running was also the leading activity associated with activity-coded injuries among TRADOC Soldiers and All Army Soldiers in 2017. Overexertion and falls are also typically the leading mechanisms of injuries among cause-coded injury-related medical encounters (Canham-Chervak et al. 2019, Canham-Chervak et al. 2016, Marshall S et al. 2013). Similarly, overexertion and falls were the leading mechanisms of injuries among cause-coded injury-related medical encounters in TRADOC Soldiers and All Army Soldiers in 2017.

7.4 Risk Factors for Injury during Petroleum Supply Specialist AIT

Older age (≥ 30 years old) was identified as a risk factor for injury during Petroleum Supply Specialist AIT among men in the 262nd Quartermaster Battalion, after controlling for other significant risk factors. Older age has previously been associated with injury in BCT (Jones et al. 1993) and AIT (Henderson et al. 2000) populations. Jones et al. (1993) estimated that Trainees 24 years or older had 4.3 times higher odds of lower extremity musculoskeletal injury during BCT than Trainees younger than 24 years old. Trainees older than 25 years in the Combat Medic AIT at Fort Sam Houston had 3.5 times higher odds of injury than Trainees younger than 20 years old (Henderson et al. 2000).

Men in the Petroleum Supply Specialist course who completed BCT at Fort Leonard Wood had lower odds of injury compared to those who trained at Fort Jackson. A study of Trainees attending AIT at Aberdeen Proving Ground, Maryland from January 2000 to December 2006, found that men who completed BCT at Fort Knox, Fort Leonard Wood, and Fort Benning had significantly higher injury rates compared to Fort Jackson (Grier et al. 2010). As suggested by Grier et al. (2010), differences in environmental factors (e.g., terrain, distance from barracks to training sites, weather, etc.) may explain the differences in risk of injury by BCT site.

Previous studies have found that low physical fitness (as measured by APFT performance) has a significant association with injury during AIT and in other Army populations (Grier et al. 2011, U.S. Army Public Health Center (Provisional) 2014, Jones and Hauschild 2015). However, physical performance during BCT did not have a significant statistical effect on risk of injury during AIT in the population under study. The reason is not clear, but may be related to the physical demands of these particular MOS's and frequency of physical training during AIT, which was not measured in this investigation.

Unlike previous studies, there was no significant association between injury and tobacco use in the population under study (Grier et al. 2011, Jones and Hauschild 2015, Altarac et al. 2000). The proportion of Trainees reporting ever smoking tobacco (11%) was lower than seen in other AIT and Army populations (Grier et al. 2011, Anderson et al. 2017). In an investigation of injuries in the Army Ordnance School, 43% of Trainees reported using cigarettes occasionally or frequently prior to BCT, and frequent cigarette use was found to be associated with time-loss injury in Ordnance School (Grier et al. 2011). A review of risk factors for injury among Army populations estimated that male cigarette smokers may have 1.2 to 2.8 times higher risk of injury than non-smokers (Jones and Hauschild 2015). One study of BCT Trainees found that 35% of men reported smoking cigarettes and that smoking was associated with increased risk of overuse injury (Altarac et al. 2000). A previous study of Combat Medic AIT Trainees did not find an association between cigarette use and injury among men (Henderson et al. 2000).

7.5 Limitations

One limitation was unit size and timeframe, which did not provide sufficient information for the assessment of injury risk factors among women or risk factors for administrative outcomes of interest (e.g., holds, recycles). Also, surveys were only administered upon entry to AIT; therefore, data on unit physical training, personal physical training, APFT results, and tobacco use during AIT were not collected. These characteristics have previously been shown to be associated with risk of injury, but could not be included in the regressions for the current study. Multivariable regression included characteristics that were only available for the surveyed population; therefore, the population included in the regression analysis was smaller than the entire in-processed trainee population. There are also significant differences in training length and training activities between MOS's, therefore the logistic regression was stratified by MOS. However, the Petroleum Supply Specialist course was the only course with sufficient data for risk factor analysis. ATRRS data were also too small to be included in descriptive results or risk factor analysis. This represents one of the challenges of pulling from a centralized system, like ATRRS, that is designed for administrative purposes only. Additionally, only 9% of injury medical encounters included activity codes and only 1% included cause codes in the population under investigation. These are elements of a minimum basic database for injury surveillance recommended by the World Health Organization and would improve effective injury prevention

planning (Canham-Chervak et al. 2019). Current military medical coding guidance directs that new-onset injuries be assigned an injury mechanism code in the electronic health record (Coding Guidance Subgroup 2017).

8. CONCLUSIONS AND RECOMMENDATIONS

Trainees who in-processed with the 262nd Quartermaster Battalion from 31 July 2017 to 04 December 2017 were similar to other AIT populations, but had an overall lower injury rate. Self-reported injuries during BCT in the current study were similar to those seen in other BCT, AIT, and operational units. Medical encounters for injury during AIT were similar to those seen in other AIT populations. Older age (≥ 30 years old) was identified as a risk factor for injury during Petroleum Supply Specialist AIT among men in the 262nd Quartermaster Battalion, after controlling for other significant risk factors. AIT leadership are recommended to continue to utilize FM 7-22 to create physical training regimens for Trainees.

9. POINT OF CONTACT

The APHC Injury Prevention Division 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 author(s) listed at the front of this report.

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Date: 2019.12.12 09:45:20 -05'00'

MICHELLE CANHAM-CHERVAK, PhD MPH
Program Manager
Injury Prevention Program

Appendix A

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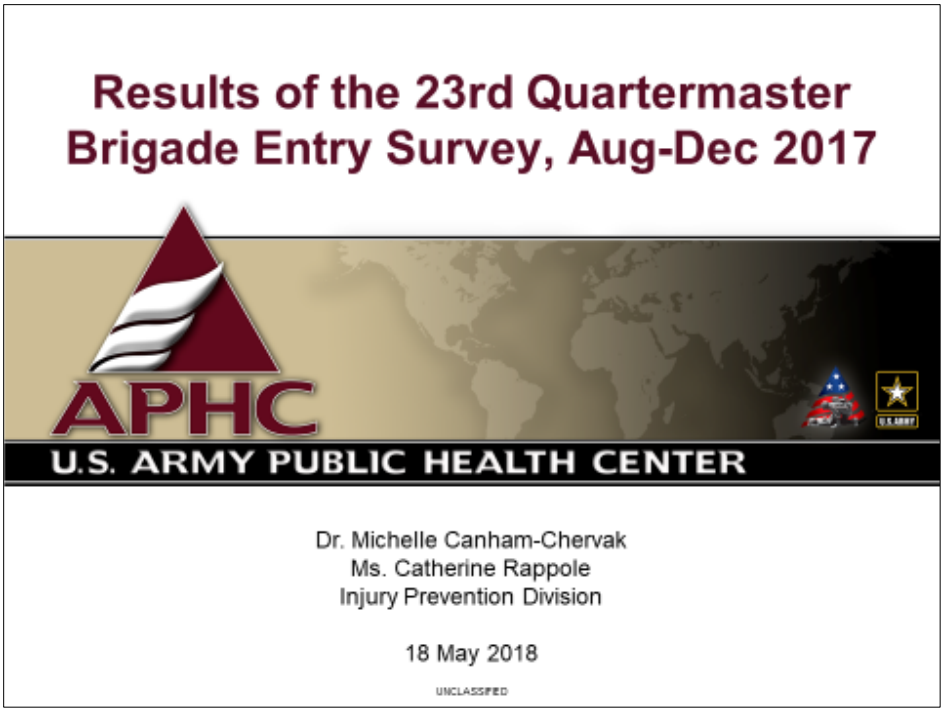
Appendix B

Survey Results Brief



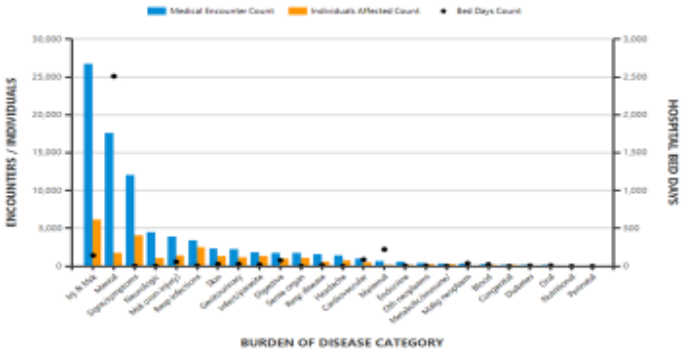
Background

Available in Public Health 360: https://pasba.army.mil/MEDCOM360/

MORBIDITY BURDEN SUMMARY
BY DISEASE CATEGORY, ACTIVE DUTY

PH360 PUBLIC HEALTH

Fort Lee // Calendar year **2016**



Data source: Defense Medical Surveillance System, 2016; Prepared by Army Public Health Center, Injury Prevention Division

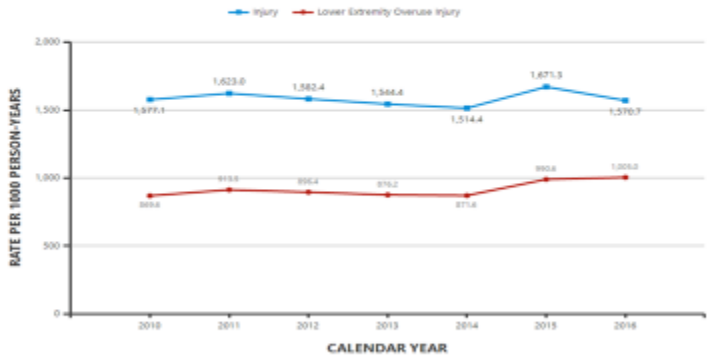
Background

Available in Public Health 360: https://pasba.army.mil/MEDCOM360/

INJURY AND OVERUSE INJURY RATES
BY YEAR, ACTIVE DUTY

PH360 PUBLIC HEALTH

Fort Lee // Calendar years **2010 - 2016**



Data source: Defense Medical Surveillance System, 2016; Prepared by Army Public Health Center, Injury Prevention Division

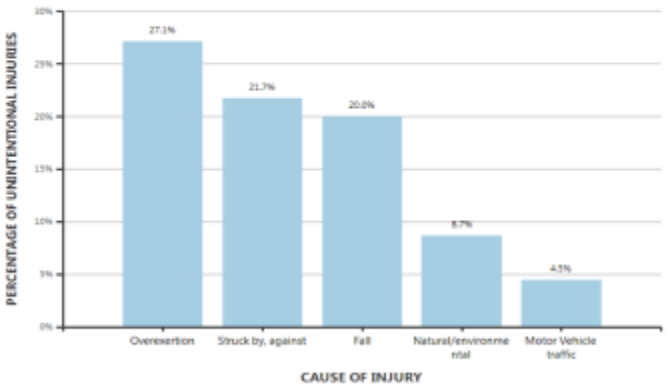
Background

Available in Public Health 360: https://pasba.army.mil/MEDCOM360/

TOP FIVE CAUSES OF UNINTENTIONAL INJURY RATES
ACTIVE DUTY OUTPATIENTS

PH 360 PUBLIC HEALTH

Fort Lee // Calendar year **2015**



Data source: Defense Medical Surveillance System, 2015; Prepared by Army Public Health Center, Injury Prevention Division

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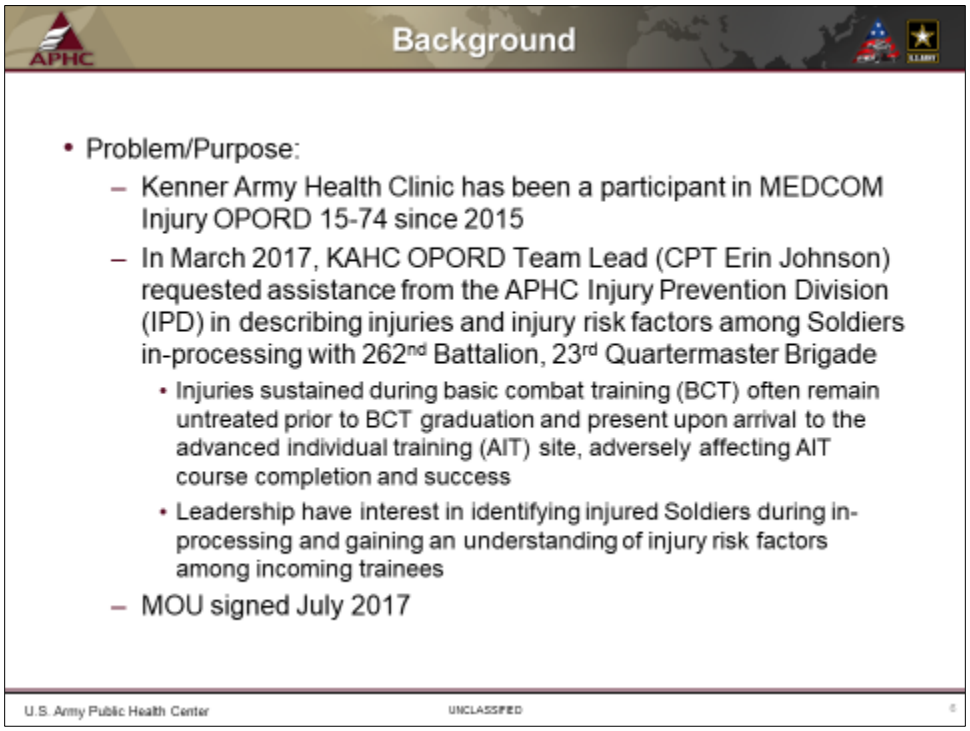
Background
Quarterly Injury Rates with Control Limits – Ft. Lee, 2013-2017
Available in the Army's Strategic Management System (SMS). https://www.sms.army.mil/cms/
FT. LEE**All Injury Count (Selected Quarter)
Actual Value: 3,092
FT. LEE**Person Time (Selected Quarter)
Actual Value: 1,861.35
Current Rate:
1,661.16
Jul - Sep 2017
Rate of first injury visits per 1,000 Soldier-years
2,000
1,750
1,500
1,250
Oct-Dec 2012
Oct - Dec 2013
Oct - Dec 2014
Oct - Dec 2015
Oct - Dec 2016
Series Color
Hierarchy Node
FT. LEE**Injury Rate Per 1000
FT. LEE**Historical (2007-2013) Mean
FT. LEE**Warning indication
FT. LEE**Improvement indication
Data source: Defense Medical Surveillance System, 2016; Prepared by Army Public Health Center, Injury Prevention Division
U.S. Army Public Health Center
UNCLASSIFIED


APHC
Background
• Problem/Purpose:
– Kenner Army Health Clinic has been a participant in MEDCOM Injury OPORD 15-74 since 2015
– In March 2017, KAHC OPORD Team Lead (CPT Erin Johnson) requested assistance from the APHC Injury Prevention Division (IPD) in describing injuries and injury risk factors among Soldiers in-processing with 262nd Battalion, 23rd Quartermaster Brigade
• Injuries sustained during basic combat training (BCT) often remain untreated prior to BCT graduation and present upon arrival to the advanced individual training (AIT) site, adversely affecting AIT course completion and success
• Leadership have interest in identifying injured Soldiers during in-processing and gaining an understanding of injury risk factors among incoming trainees
– MOU signed July 2017
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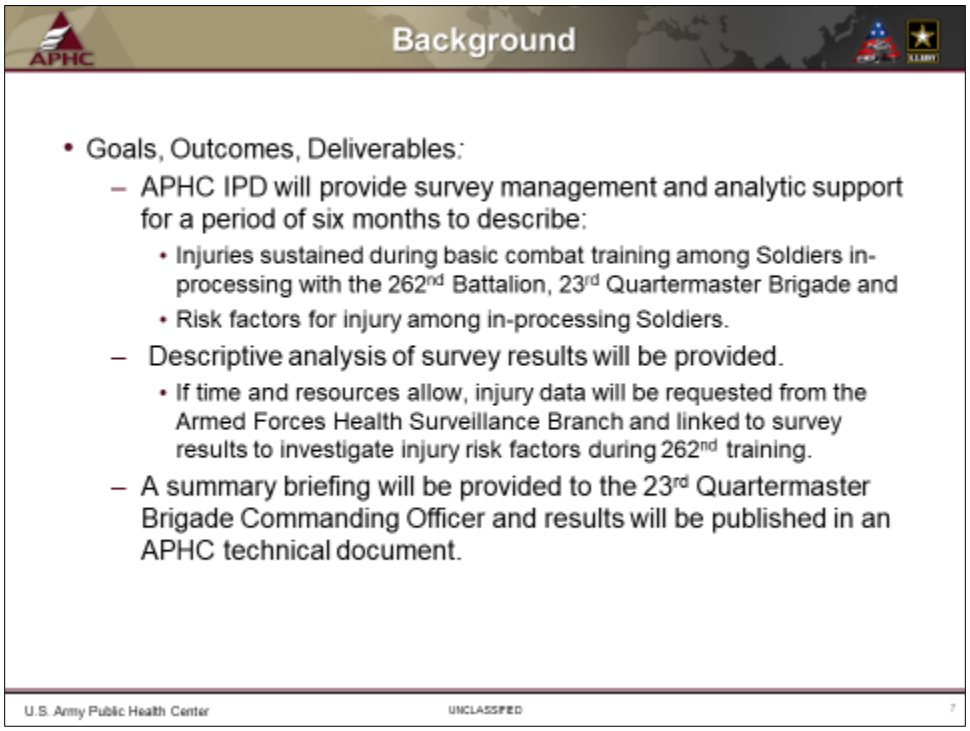
APHC
Background
• Goals, Outcomes, Deliverables:
– APHC IPD will provide survey management and analytic support for a period of six months to describe:
• Injuries sustained during basic combat training among Soldiers in-processing with the 262nd Battalion, 23rd Quartermaster Brigade and
• Risk factors for injury among in-processing Soldiers.
– Descriptive analysis of survey results will be provided.
• If time and resources allow, injury data will be requested from the Armed Forces Health Surveillance Branch and linked to survey results to investigate injury risk factors during 262nd training.
– A summary briefing will be provided to the 23rd Quartermaster Brigade Commanding Officer and results will be published in an APHC technical document.
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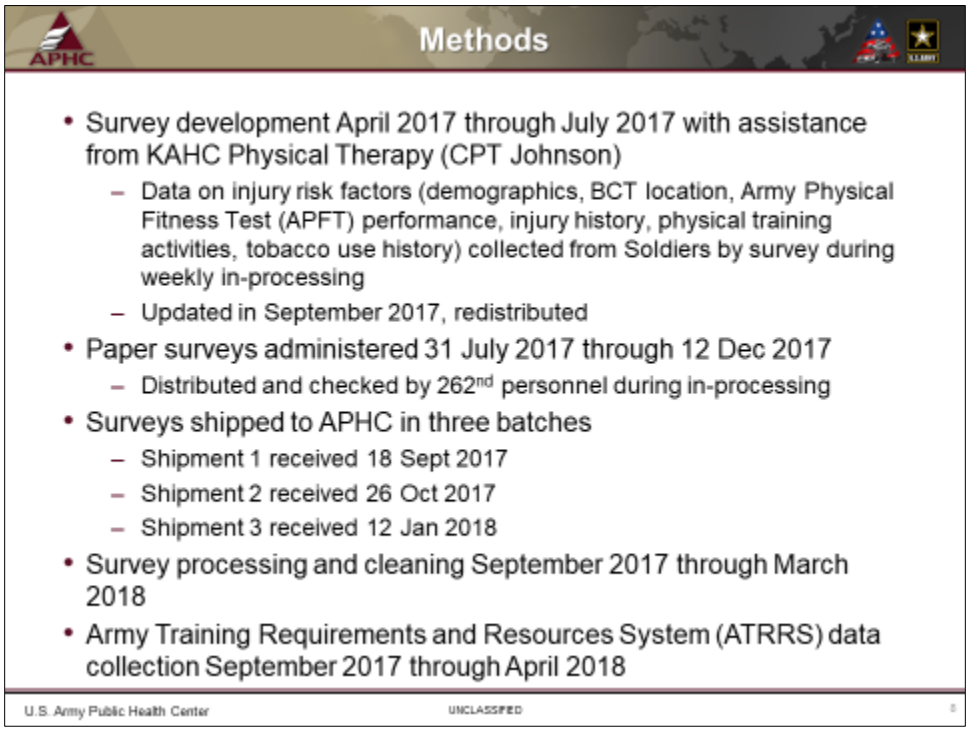
APHC
Methods
• Survey development April 2017 through July 2017 with assistance from KAHC Physical Therapy (CPT Johnson)
– Data on injury risk factors (demographics, BCT location, Army Physical Fitness Test (APFT) performance, injury history, physical training activities, tobacco use history) collected from Soldiers by survey during weekly in-processing
– Updated in September 2017, redistributed
• Paper surveys administered 31 July 2017 through 12 Dec 2017
– Distributed and checked by 262nd personnel during in-processing
• Surveys shipped to APHC in three batches
– Shipment 1 received 18 Sept 2017
– Shipment 2 received 26 Oct 2017
– Shipment 3 received 12 Jan 2018
• Survey processing and cleaning September 2017 through March 2018
• Army Training Requirements and Resources System (ATRRS) data collection September 2017 through April 2018
U.S. Army Public Health Center
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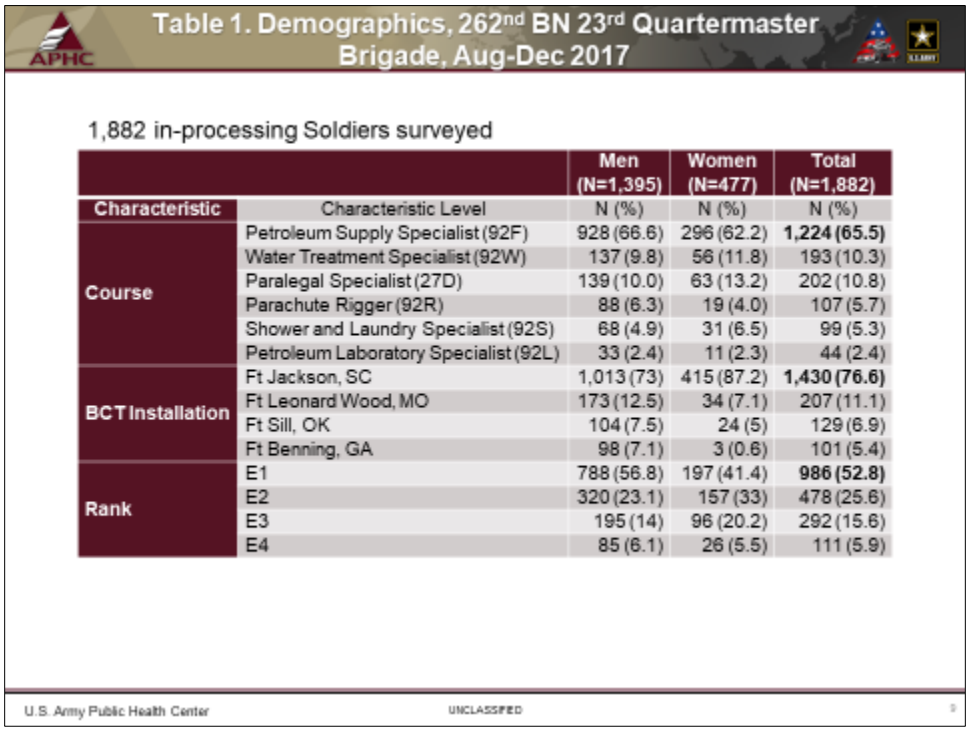

Table 1. Demographics, 262nd BN 23rd Quartermaster Brigade, Aug-Dec 2017

1,882 in-processing Soldiers surveyed

		Men (N=1,395)	Women (N=477)	Total (N=1,882)
Characteristic	Characteristic Level	N (%)	N (%)	N (%)
Course	Petroleum Supply Specialist (92F)	928 (66.6)	296 (62.2)	**1,224 (65.5)**
	Water Treatment Specialist (92W)	137 (9.8)	56 (11.8)	193 (10.3)
	Paralegal Specialist (27D)	139 (10.0)	63 (13.2)	202 (10.8)
	Parachute Rigger (92R)	88 (6.3)	19 (4.0)	107 (5.7)
	Shower and Laundry Specialist (92S)	68 (4.9)	31 (6.5)	99 (5.3)
	Petroleum Laboratory Specialist (92L)	33 (2.4)	11 (2.3)	44 (2.4)
BCT Installation	Ft Jackson, SC	1,013 (73)	415 (87.2)	**1,430 (76.6)**
	Ft Leonard Wood, MO	173 (12.5)	34 (7.1)	207 (11.1)
	Ft Sill, OK	104 (7.5)	24 (5)	129 (6.9)
	Ft Benning, GA	98 (7.1)	3 (0.6)	101 (5.4)
Rank	E1	788 (56.8)	197 (41.4)	**986 (52.8)**
	E2	320 (23.1)	157 (33)	478 (25.6)
	E3	195 (14)	96 (20.2)	292 (15.6)
	E4	85 (6.1)	26 (5.5)	111 (5.9)

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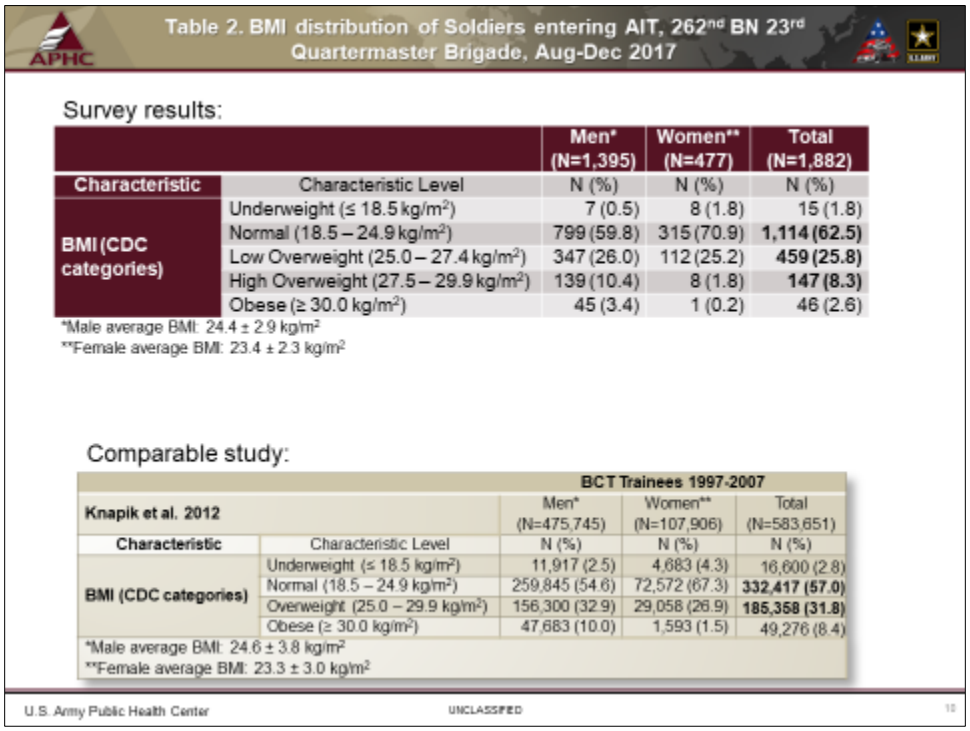

Table 2. BMI distribution of Soldiers entering AIT, 262nd BN 23rd Quartermaster Brigade, Aug-Dec 2017

Survey results:

		Men* (N=1,395)	Women** (N=477)	Total (N=1,882)
Characteristic	Characteristic Level	N (%)	N (%)	N (%)
BMI (CDC categories)	Underweight (≤ 18.5 kg/m²)	7 (0.5)	8 (1.8)	15 (1.8)
	Normal (18.5 – 24.9 kg/m²)	799 (59.8)	315 (70.9)	**1,114 (62.5)**
	Low Overweight (25.0 – 27.4 kg/m²)	347 (26.0)	112 (25.2)	**459 (25.8)**
	High Overweight (27.5 – 29.9 kg/m²)	139 (10.4)	8 (1.8)	**147 (8.3)**
	Obese (≥ 30.0 kg/m²)	45 (3.4)	1 (0.2)	46 (2.6)

*Male average BMI: 24.4 ± 2.9 kg/m²
**Female average BMI: 23.4 ± 2.3 kg/m²

Comparable study:

		BCT Trainees 1997-2007		
Knapik et al. 2012		Men* (N=475,745)	Women** (N=107,906)	Total (N=583,651)
Characteristic	Characteristic Level	N (%)	N (%)	N (%)
BMI (CDC categories)	Underweight (≤ 18.5 kg/m²)	11,917 (2.5)	4,683 (4.3)	16,600 (2.8)
	Normal (18.5 – 24.9 kg/m²)	259,845 (54.6)	72,572 (67.3)	**332,417 (57.0)**
	Overweight (25.0 – 29.9 kg/m²)	156,300 (32.9)	29,058 (26.9)	**185,358 (31.8)**
	Obese (≥ 30.0 kg/m²)	47,683 (10.0)	1,593 (1.5)	49,276 (8.4)

*Male average BMI: 24.6 ± 3.8 kg/m²
**Female average BMI: 23.3 ± 3.0 kg/m²

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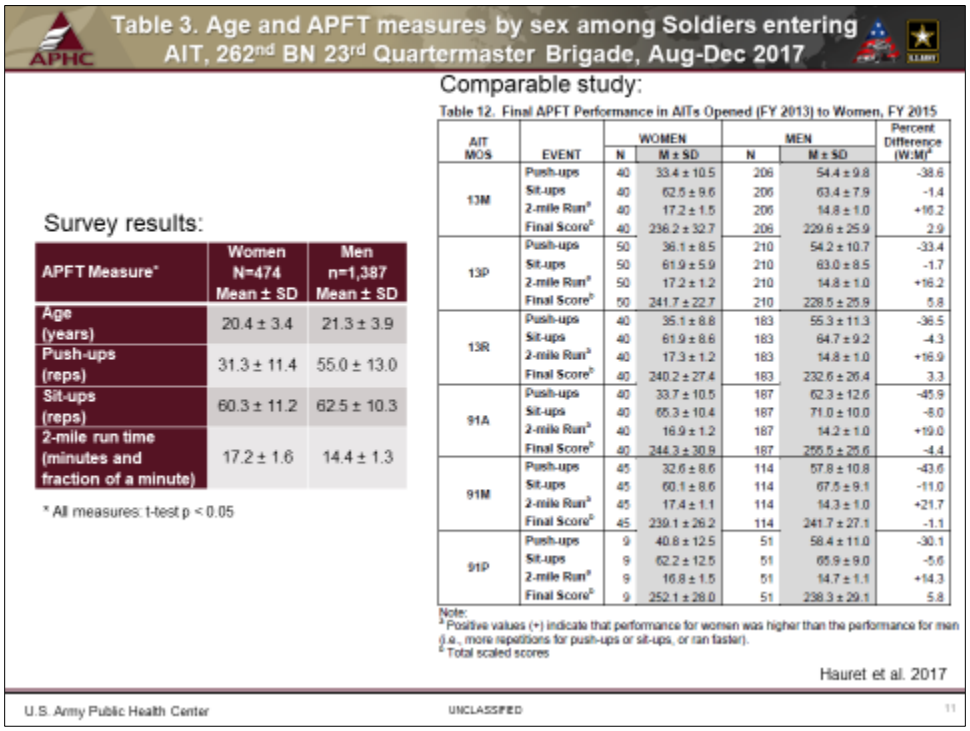

Table 3. Age and APFT measures by sex among Soldiers entering AIT, 262nd BN 23rd Quartermaster Brigade, Aug-Dec 2017

Survey results:

APFT Measure*	Women N=474 Mean ± SD	Men n=1,387 Mean ± SD
Age (years)	20.4 ± 3.4	21.3 ± 3.9
Push-ups (reps)	31.3 ± 11.4	55.0 ± 13.0
Sit-ups (reps)	60.3 ± 11.2	62.5 ± 10.3
2-mile run time (minutes and fraction of a minute)	17.2 ± 1.6	14.4 ± 1.3

* All measures: t-test $p < 0.05$

Comparable study:

Table 12. Final APFT Performance in AITs Opened (FY 2013) to Women, FY 2015

AIT MOS	EVENT	WOMEN N	WOMEN M ± SD	MEN N	MEN M ± SD	Percent Difference (W:M)[a]
13M	Push-ups	40	33.4 ± 10.5	206	54.4 ± 9.8	-38.6
	Sit-ups	40	62.5 ± 9.6	206	63.4 ± 7.9	-1.4
	2-mile Run[a]	40	17.2 ± 1.5	206	14.8 ± 1.0	+16.2
	Final Score[b]	40	236.2 ± 32.7	206	229.6 ± 25.9	2.9
13P	Push-ups	50	36.1 ± 8.5	210	54.2 ± 10.7	-33.4
	Sit-ups	50	61.9 ± 5.9	210	63.0 ± 8.5	-1.7
	2-mile Run[a]	50	17.2 ± 1.2	210	14.8 ± 1.0	+16.2
	Final Score[b]	50	241.7 ± 22.7	210	228.5 ± 25.9	5.8
13R	Push-ups	40	35.1 ± 8.8	183	55.3 ± 11.3	-36.5
	Sit-ups	40	61.9 ± 8.6	183	64.7 ± 9.2	-4.3
	2-mile Run[a]	40	17.3 ± 1.2	183	14.8 ± 1.0	+16.9
	Final Score[b]	40	240.2 ± 27.4	183	232.6 ± 26.4	3.3
91A	Push-ups	40	33.7 ± 10.5	187	62.3 ± 12.6	-45.9
	Sit-ups	40	65.3 ± 10.4	187	71.0 ± 10.0	-8.0
	2-mile Run[a]	40	16.9 ± 1.2	187	14.2 ± 1.0	+19.0
	Final Score[b]	40	244.3 ± 30.9	187	255.5 ± 25.6	-4.4
91M	Push-ups	45	32.6 ± 8.6	114	57.8 ± 10.8	-43.6
	Sit-ups	45	60.1 ± 8.6	114	67.5 ± 9.1	-11.0
	2-mile Run[a]	45	17.4 ± 1.1	114	14.3 ± 1.0	+21.7
	Final Score[b]	45	239.1 ± 26.2	114	241.7 ± 27.1	-1.1
91P	Push-ups	9	40.8 ± 12.5	51	58.4 ± 11.0	-30.1
	Sit-ups	9	62.2 ± 12.5	51	65.9 ± 9.0	-5.6
	2-mile Run[a]	9	16.8 ± 1.5	51	14.7 ± 1.1	+14.3
	Final Score[b]	9	252.1 ± 28.0	51	238.3 ± 29.1	5.8

Note:
[a] Positive values (+) indicate that performance for women was higher than the performance for men (i.e., more repetitions for push-ups or sit-ups, or ran faster).
[b] Total scaled scores

Hauret et al. 2017

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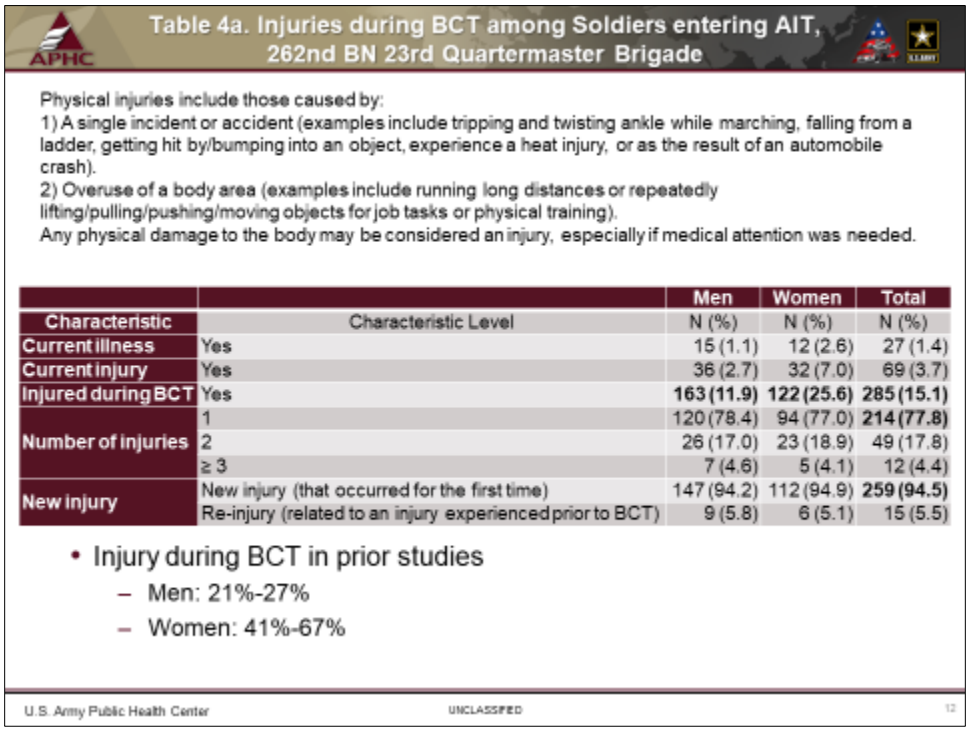

Table 4a. Injuries during BCT among Soldiers entering AIT, 262nd BN 23rd Quartermaster Brigade

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.

		Men	Women	Total
Characteristic	Characteristic Level	N (%)	N (%)	N (%)
Current illness	Yes	15 (1.1)	12 (2.6)	27 (1.4)
Current injury	Yes	36 (2.7)	32 (7.0)	69 (3.7)
Injured during BCT	Yes	**163 (11.9)**	**122 (25.6)**	**285 (15.1)**
Number of injuries	1	120 (78.4)	94 (77.0)	**214 (77.8)**
	2	26 (17.0)	23 (18.9)	49 (17.8)
	≥ 3	7 (4.6)	5 (4.1)	12 (4.4)
New injury	New injury (that occurred for the first time)	147 (94.2)	112 (94.9)	**259 (94.5)**
	Re-injury (related to an injury experienced prior to BCT)	9 (5.8)	6 (5.1)	15 (5.5)

- Injury during BCT in prior studies
  - Men: 21%-27%
  - Women: 41%-67%

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Table 5a. Injuries during BCT among Soldiers entering AIT, 262nd BN 23rd Quartermaster Brigade

Characteristic	Characteristic Level	N (%)
Body area injured	Lower extremities	**132 (50.6)**
	Upper extremities	97 (34.0)
	Torso	22 (7.4)
	Head and neck	10 (3.8)
Type of injury	Pain	**42 (24.0)**
	Sprain (ligament or joint)	37 (21.1)
	Strain (tendon or muscle)	29 (16.6)
	Broken/fractured bone	22 (12.6)
	Bruise (contusion)	7 (4.0)
	Tendonitis or bursitis	5 (2.9)
	Blister	5 (2.9)
	Tear (muscle/ligaments/meniscus/cartilage)	5 (2.9)
	Nerve injury	3 (1.7)
	Dislocation (joint)	2 (1.1)
	Traumatic brain injury (e.g., concussion)	2 (1.1)
	Burn	1 (0.6)
	Other	15 (8.6)

- Leading body areas injured during BCT in prior studies
  - Lower extremity (e.g. foot, knee, ankle, shin)
- Leading types of injury during BCT in prior studies
  - Overuse, traumatic sprains/strains, pain, stress fractures

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Table 5b. Injuries during BCT among Soldiers entering AIT, 262nd BN 23rd Quartermaster Brigade

Characteristic	Characteristic Level	N (%)
Mechanism of injury	Overuse/repetitive use	**108 (43.4)**
	Falling onto an object/surface/the ground	55 (22.1)
	Single overexertion/over-extension/twisting effort	34 (13.7)
	Contacting (hit by/against) an object/surface	26 (10.4)
	Directly contacting a person	5 (2.0)
	Exposure to temperature (hot or cold)	3 (1.2)
	Cutting or puncture by a sharp tool, object or instrument	1 (0.4)
	Insect bite	1 (0.4)
	Other	16 (6.4)
Activity associated with injury	Running	**115 (45.3)**
	Marching - with load	54 (21.3)
	Physical training (not running, marching, or lifting weights)	27 (10.6)
	Combatives training	13 (5.1)
	Field exercise	10 (3.9)
	Lifting or moving heavy objects (not weight training)	7 (2.8)
	Weight lifting	6 (2.4)
	Climbing (e.g., climbing a ladder, into a vehicle, etc.)	4 (1.6)
	Sports/recreation	3 (1.2)
	Walking or hiking	3 (1.2)
	Marching - no load	1 (0.4)
	Other	11 (4.3)

- Leading activities associated with injury during BCT in prior studies
  - Physical training, road marching

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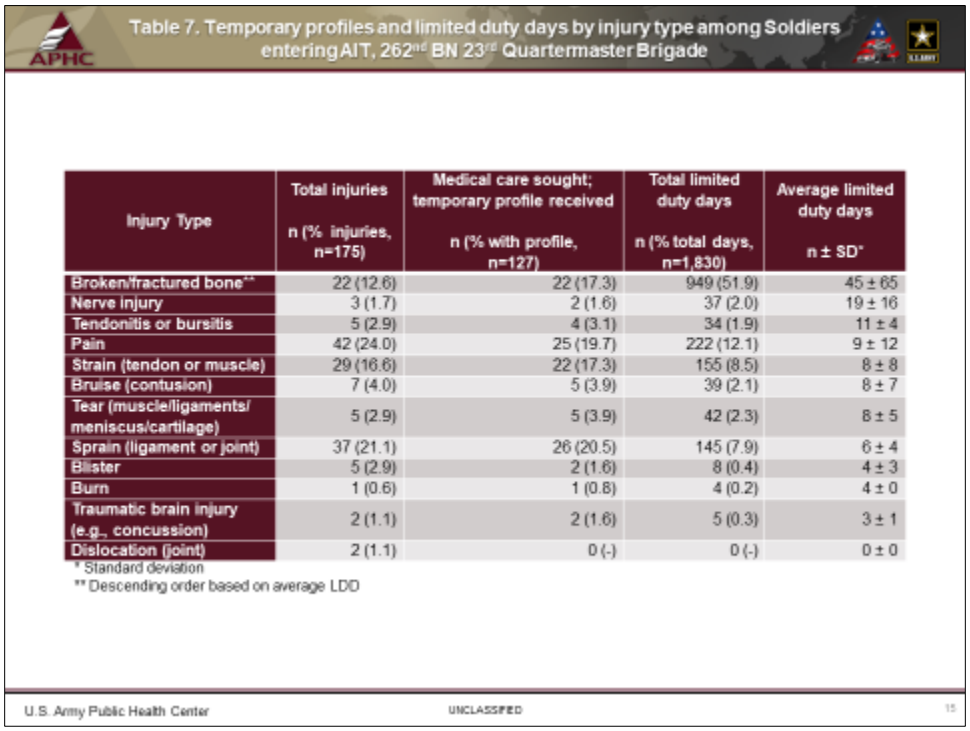

Table 7. Temporary profiles and limited duty days by injury type among Soldiers entering AIT, 262nd BN 23rd Quartermaster Brigade

Injury Type	Total injuries n (% injuries, n=175)	Medical care sought; temporary profile received n (% with profile, n=127)	Total limited duty days n (% total days, n=1,830)	Average limited duty days n ± SD*
Broken/fractured bone**	22 (12.6)	22 (17.3)	949 (51.9)	45 ± 65
Nerve injury	3 (1.7)	2 (1.6)	37 (2.0)	19 ± 16
Tendonitis or bursitis	5 (2.9)	4 (3.1)	34 (1.9)	11 ± 4
Pain	42 (24.0)	25 (19.7)	222 (12.1)	9 ± 12
Strain (tendon or muscle)	29 (16.6)	22 (17.3)	155 (8.5)	8 ± 8
Bruise (contusion)	7 (4.0)	5 (3.9)	39 (2.1)	8 ± 7
Tear (muscle/ligaments/ meniscus/cartilage)	5 (2.9)	5 (3.9)	42 (2.3)	8 ± 5
Sprain (ligament or joint)	37 (21.1)	26 (20.5)	145 (7.9)	6 ± 4
Blister	5 (2.9)	2 (1.6)	8 (0.4)	4 ± 3
Burn	1 (0.6)	1 (0.8)	4 (0.2)	4 ± 0
Traumatic brain injury (e.g., concussion)	2 (1.1)	2 (1.6)	5 (0.3)	3 ± 1
Dislocation (joint)	2 (1.1)	0 (-)	0 (-)	0 ± 0

* Standard deviation
** Descending order based on average LDD

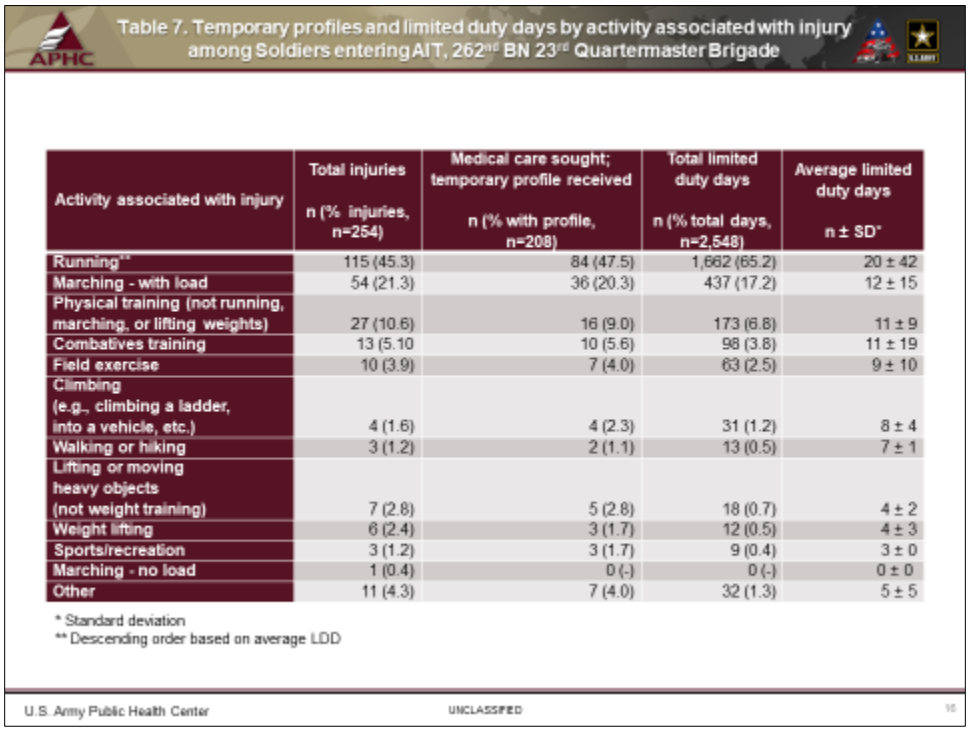

Table 7. Temporary profiles and limited duty days by activity associated with injury among Soldiers entering AIT, 262nd BN 23rd Quartermaster Brigade

Activity associated with injury	Total injuries n (% injuries, n=254)	Medical care sought; temporary profile received n (% with profile, n=208)	Total limited duty days n (% total days, n=2,548)	Average limited duty days n ± SD*
Running**	115 (45.3)	84 (47.5)	1,662 (65.2)	20 ± 42
Marching - with load	54 (21.3)	36 (20.3)	437 (17.2)	12 ± 15
Physical training (not running, marching, or lifting weights)	27 (10.6)	16 (9.0)	173 (6.8)	11 ± 9
Combatives training	13 (5.10	10 (5.6)	98 (3.8)	11 ± 19
Field exercise	10 (3.9)	7 (4.0)	63 (2.5)	9 ± 10
Climbing (e.g., climbing a ladder, into a vehicle, etc.)	4 (1.6)	4 (2.3)	31 (1.2)	8 ± 4
Walking or hiking	3 (1.2)	2 (1.1)	13 (0.5)	7 ± 1
Lifting or moving heavy objects (not weight training)	7 (2.8)	5 (2.8)	18 (0.7)	4 ± 2
Weight lifting	6 (2.4)	3 (1.7)	12 (0.5)	4 ± 3
Sports/recreation	3 (1.2)	3 (1.7)	9 (0.4)	3 ± 0
Marching - no load	1 (0.4)	0 (-)	0 (-)	0 ± 0
Other	11 (4.3)	7 (4.0)	32 (1.3)	5 ± 5

* Standard deviation
** Descending order based on average LDD

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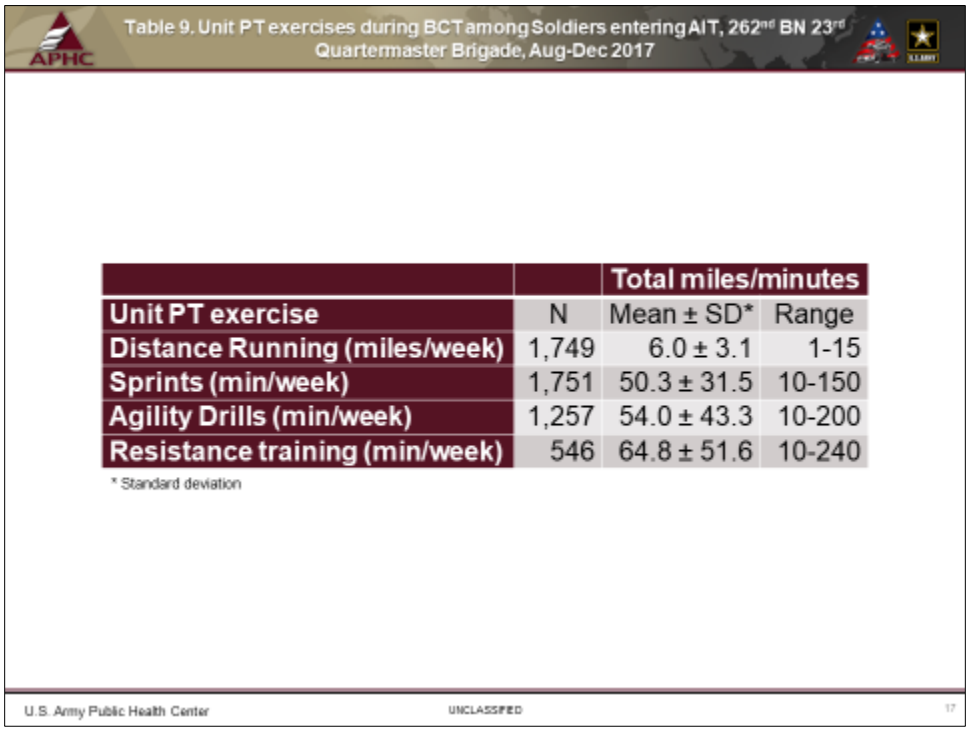
Table 9. Unit PT exercises during BCT among Soldiers entering AIT, 262nd BN 23rd Quartermaster Brigade, Aug-Dec 2017
APHC
Total miles/minutes
Unit PT exercise
N
Mean ± SD*
Range
Distance Running (miles/week)
1,749
6.0 ± 3.1
1-15
Sprints (min/week)
1,751
50.3 ± 31.5
10-150
Agility Drills (min/week)
1,257
54.0 ± 43.3
10-200
Resistance training (min/week)
546
64.8 ± 51.6
10-240
* Standard deviation
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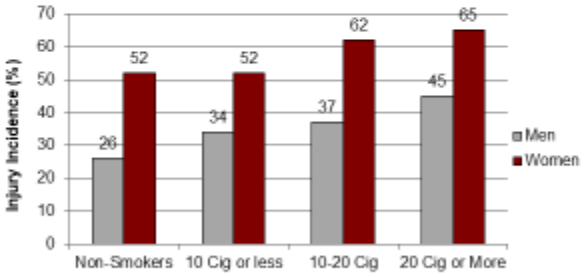
Table 10a. Tobacco use among Soldiers entering AIT, 262nd BN 23rd Quartermaster Brigade, Aug-Dec 2017

Survey results:

Over Lifetime	Men (N=1,395)	Women (N=477)	Total (N=1,882)
Tobacco Variable	N (%)	N (%)	N (%)
Smoked ≥ 100 Cigarettes	184 (13.4)	29 (6.1)	213 (11.5)
Smokeless Tobacco Use	221 (16.3)	20 (4.3)	244 (13.3)
E-cigarette Use	212 (15.5)	37 (7.9)	252 (13.7)

Current smokers n=135 (6.1%)

Comparable study:



Basic Training; n= 4,255 (men=3,757, women=498)

Source: Grier et al Military Medicine 176 (11), 2011.

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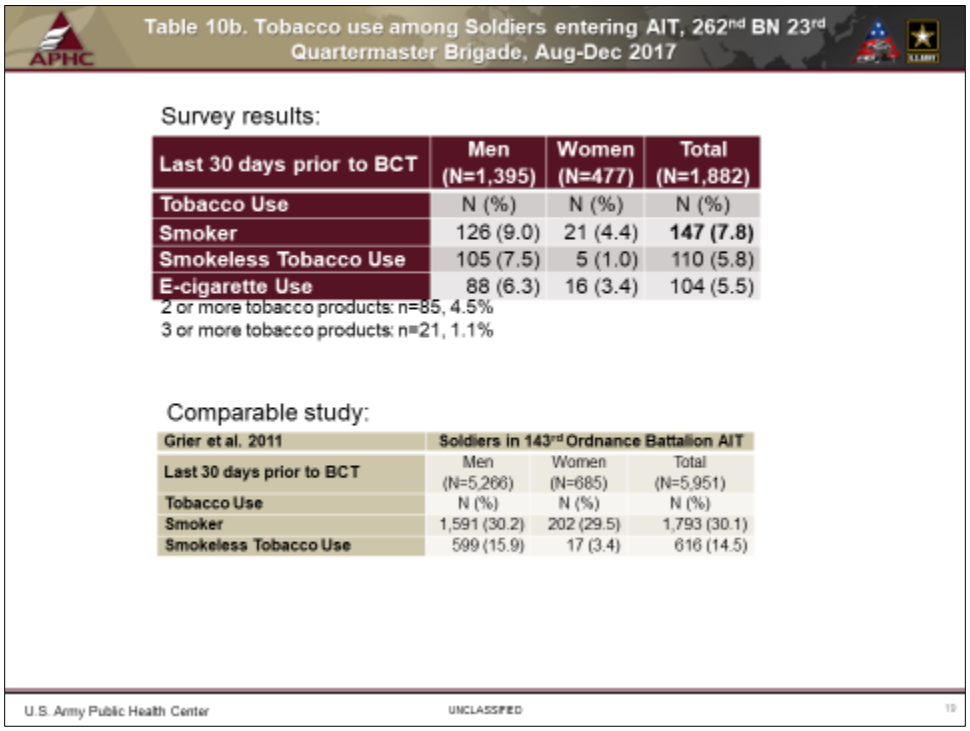

Table 10b. Tobacco use among Soldiers entering AIT, 262nd BN 23rd Quartermaster Brigade, Aug-Dec 2017

Survey results:

Last 30 days prior to BCT	Men (N=1,395)	Women (N=477)	Total (N=1,882)
Tobacco Use	N (%)	N (%)	N (%)
Smoker	126 (9.0)	21 (4.4)	**147 (7.8)**
Smokeless Tobacco Use	105 (7.5)	5 (1.0)	110 (5.8)
E-cigarette Use	88 (6.3)	16 (3.4)	104 (5.5)

2 or more tobacco products: n=85, 4.5%
3 or more tobacco products: n=21, 1.1%

Comparable study:

Grier et al. 2011	Soldiers in 143rd Ordnance Battalion AIT		
Last 30 days prior to BCT	Men (N=5,266)	Women (N=685)	Total (N=5,951)
Tobacco Use	N (%)	N (%)	N (%)
Smoker	1,591 (30.2)	202 (29.5)	1,793 (30.1)
Smokeless Tobacco Use	599 (15.9)	17 (3.4)	616 (14.5)

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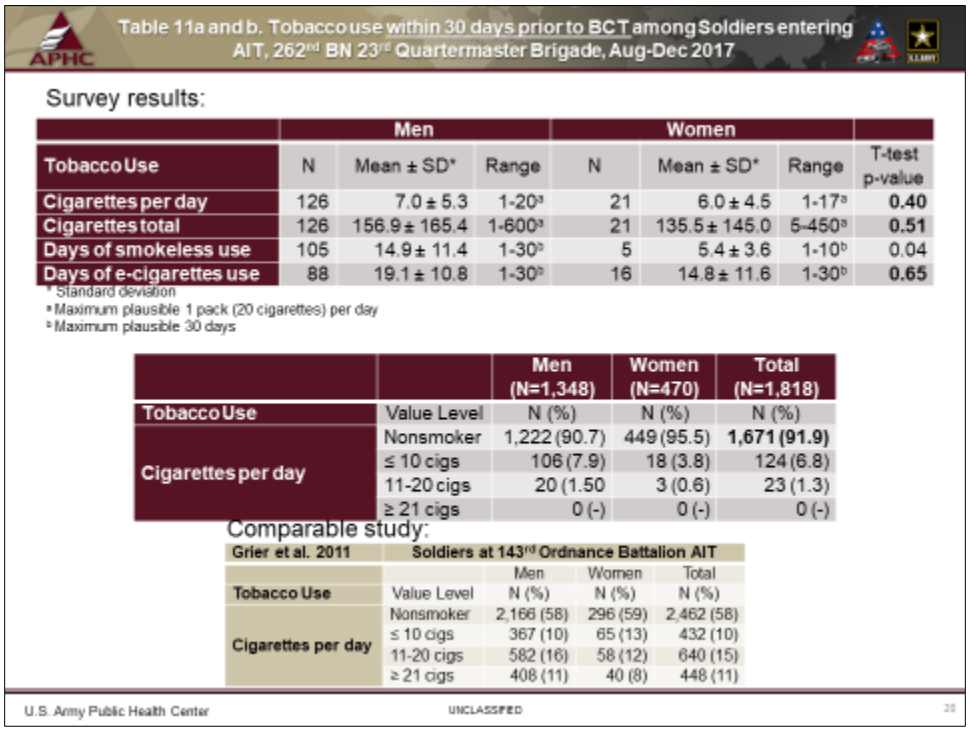

Table 11a and b. Tobacco use within 30 days prior to BCT among Soldiers entering AIT, 262nd BN 23rd Quartermaster Brigade, Aug-Dec 2017

Survey results:

	Men			Women			
Tobacco Use	N	Mean ± SD*	Range	N	Mean ± SD*	Range	T-test p-value
Cigarettes per day	126	7.0 ± 5.3	1-20[a]	21	6.0 ± 4.5	1-17[a]	**0.40**
Cigarettes total	126	156.9 ± 165.4	1-600[a]	21	135.5 ± 145.0	5-450[a]	**0.51**
Days of smokeless use	105	14.9 ± 11.4	1-30[b]	5	5.4 ± 3.6	1-10[b]	0.04
Days of e-cigarettes use	88	19.1 ± 10.8	1-30[b]	16	14.8 ± 11.6	1-30[b]	**0.65**

* Standard deviation
[a] Maximum plausible 1 pack (20 cigarettes) per day
[b] Maximum plausible 30 days

		Men (N=1,348)	Women (N=470)	Total (N=1,818)
Tobacco Use	Value Level	N (%)	N (%)	N (%)
Cigarettes per day	Nonsmoker	1,222 (90.7)	449 (95.5)	**1,671 (91.9)**
	≤ 10 cigs	106 (7.9)	18 (3.8)	124 (6.8)
	11-20 cigs	20 (1.50	3 (0.6)	23 (1.3)
	≥ 21 cigs	0 (-)	0 (-)	0 (-)

Comparable study:

Grier et al. 2011	**Soldiers at 143rd Ordnance Battalion AIT**			
		Men	Women	Total
Tobacco Use	Value Level	N (%)	N (%)	N (%)
Cigarettes per day	Nonsmoker	2,166 (58)	296 (59)	2,462 (58)
	≤ 10 cigs	367 (10)	65 (13)	432 (10)
	11-20 cigs	582 (16)	58 (12)	640 (15)
	≥ 21 cigs	408 (11)	40 (8)	448 (11)

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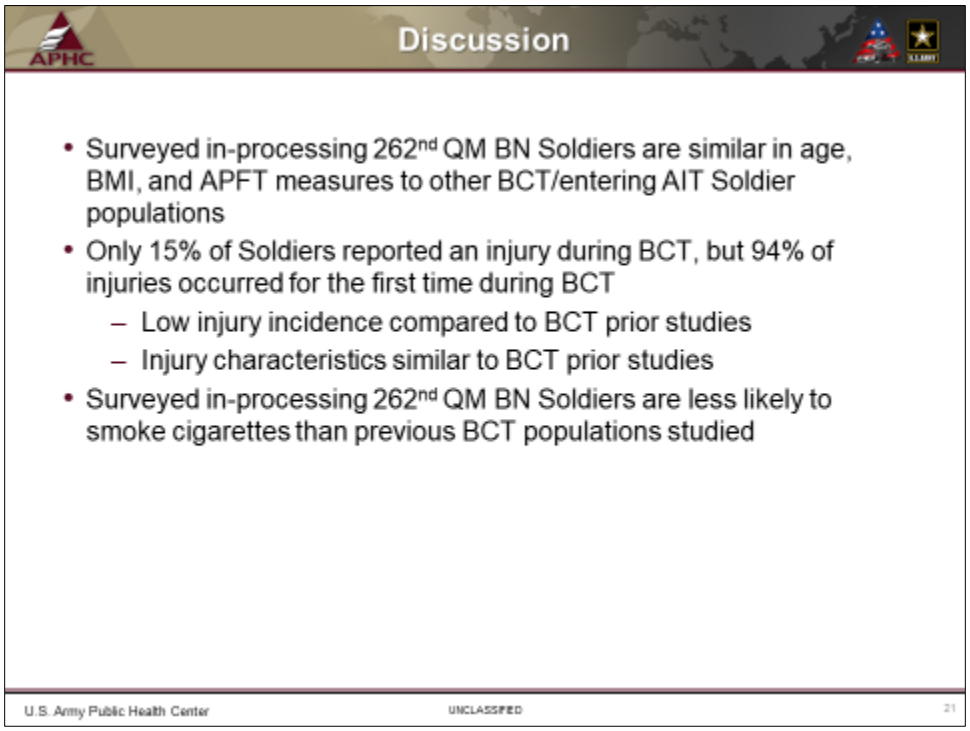
APHC
Discussion
• Surveyed in-processing 262nd QM BN Soldiers are similar in age, BMI, and APFT measures to other BCT/entering AIT Soldier populations
• Only 15% of Soldiers reported an injury during BCT, but 94% of injuries occurred for the first time during BCT
– Low injury incidence compared to BCT prior studies
– Injury characteristics similar to BCT prior studies
• Surveyed in-processing 262nd QM BN Soldiers are less likely to smoke cigarettes than previous BCT populations studied
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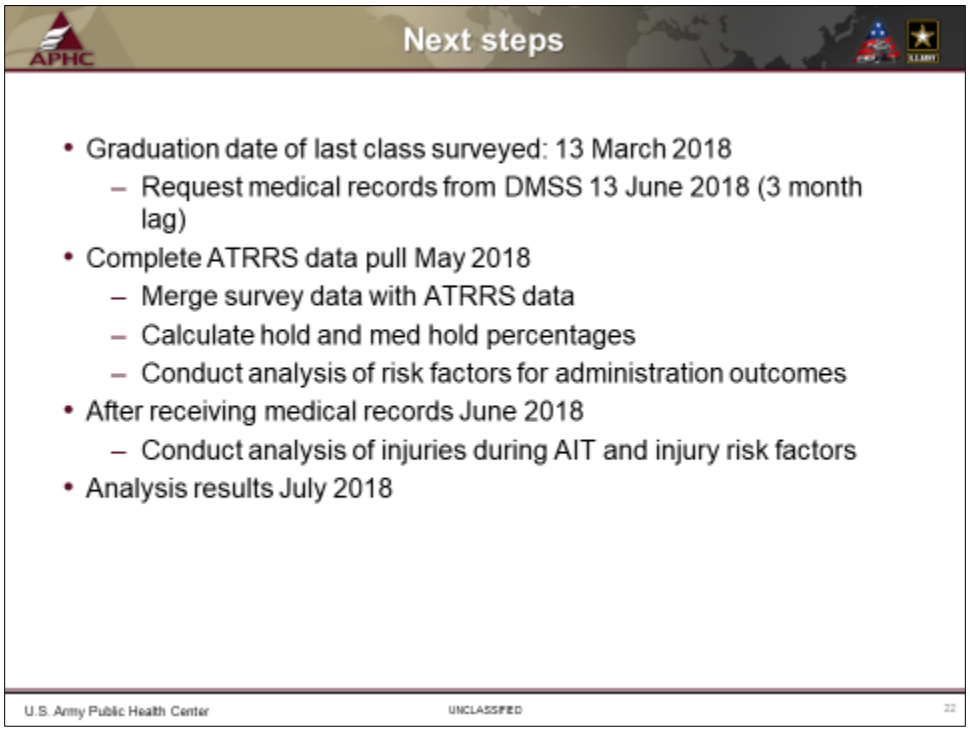
APHC
Next steps
• Graduation date of last class surveyed: 13 March 2018
– Request medical records from DMSS 13 June 2018 (3 month lag)
• Complete ATRRS data pull May 2018
– Merge survey data with ATRRS data
– Calculate hold and med hold percentages
– Conduct analysis of risk factors for administration outcomes
• After receiving medical records June 2018
– Conduct analysis of injuries during AIT and injury risk factors
• Analysis results July 2018
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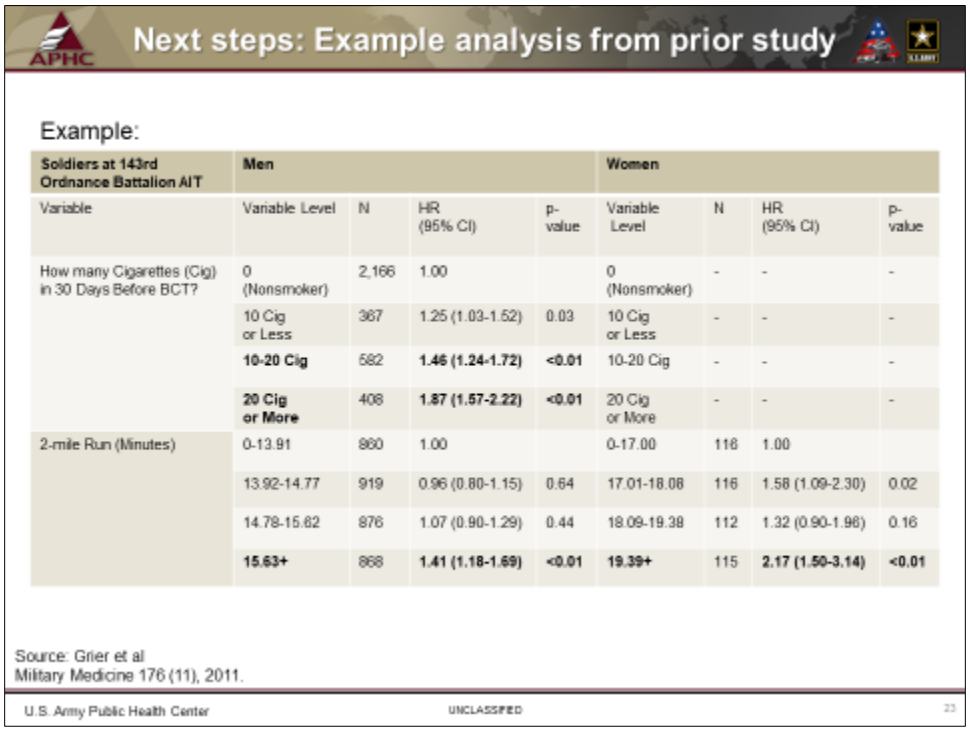

Next steps: Example analysis from prior study

Example:

Soldiers at 143rd Ordnance Battalion AIT	Men				Women			
Variable	Variable Level	N	HR (95% CI)	p-value	Variable Level	N	HR (95% CI)	p-value
How many Cigarettes (Cig) in 30 Days Before BCT?	0 (Nonsmoker)	2,166	1.00		0 (Nonsmoker)	-	-	-
	10 Cig or Less	367	1.25 (1.03-1.52)	0.03	10 Cig or Less	-	-	-
	10-20 Cig	582	**1.46 (1.24-1.72)**	**<0.01**	10-20 Cig	-	-	-
	20 Cig or More	408	**1.87 (1.57-2.22)**	**<0.01**	20 Cig or More	-	-	-
2-mile Run (Minutes)	0-13.91	860	1.00		0-17.00	116	1.00	
	13.92-14.77	919	0.96 (0.80-1.15)	0.64	17.01-18.08	116	1.58 (1.09-2.30)	0.02
	14.78-15.62	876	1.07 (0.90-1.29)	0.44	18.09-19.38	112	1.32 (0.90-1.96)	0.16
	15.63+	868	**1.41 (1.18-1.69)**	**<0.01**	**19.39+**	115	**2.17 (1.50-3.14)**	**<0.01**

Source: Grier et al
Military Medicine 176 (11), 2011.

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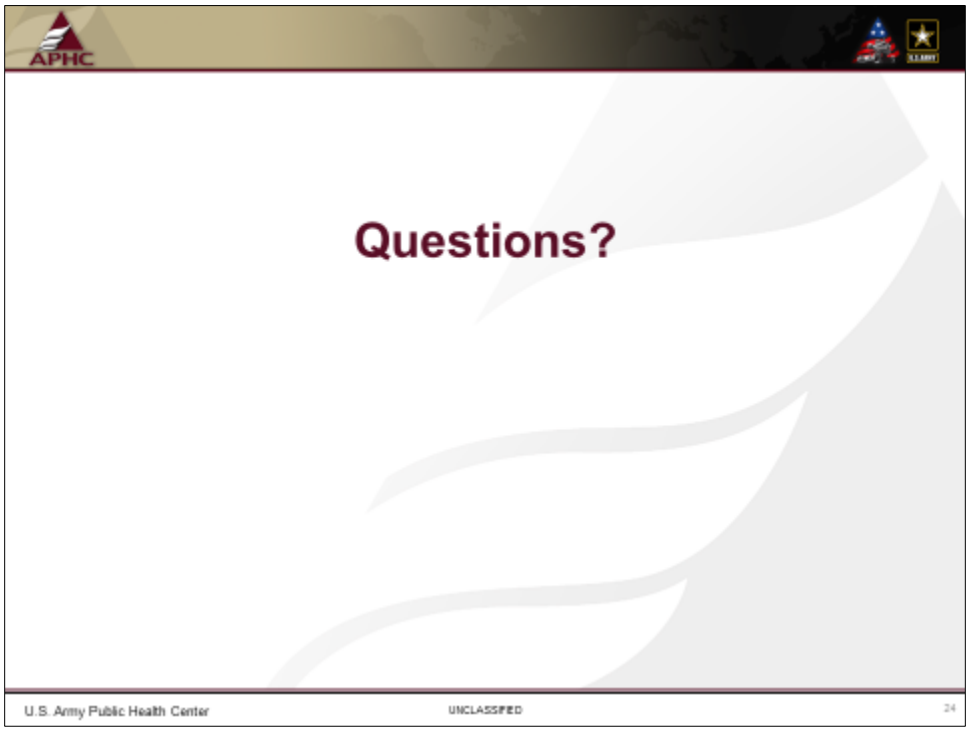
APHC
Questions?
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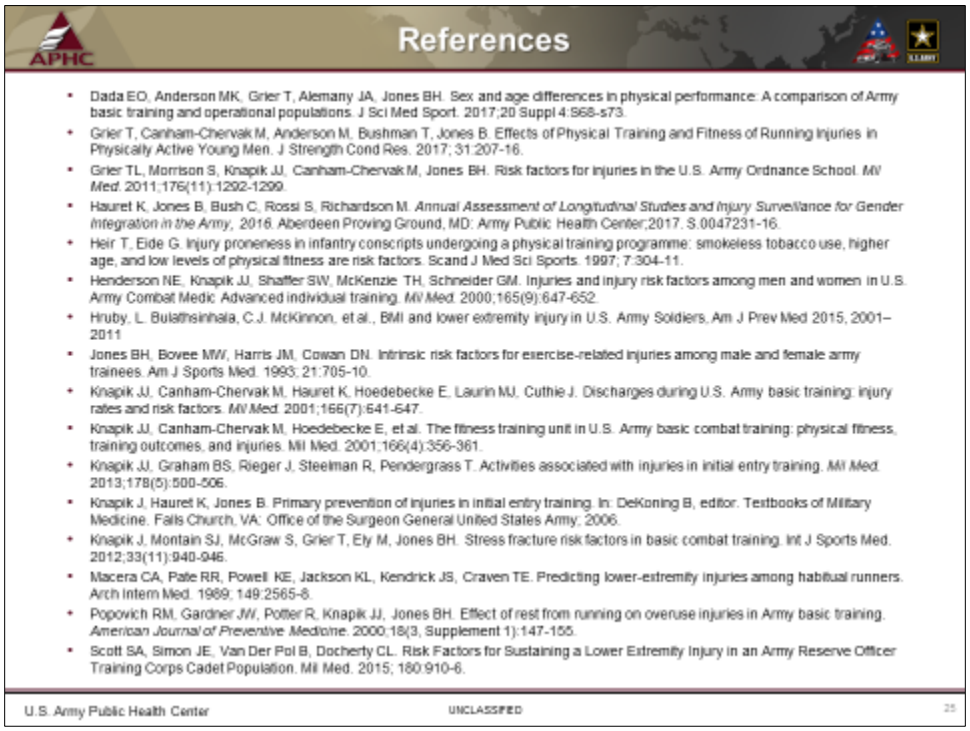

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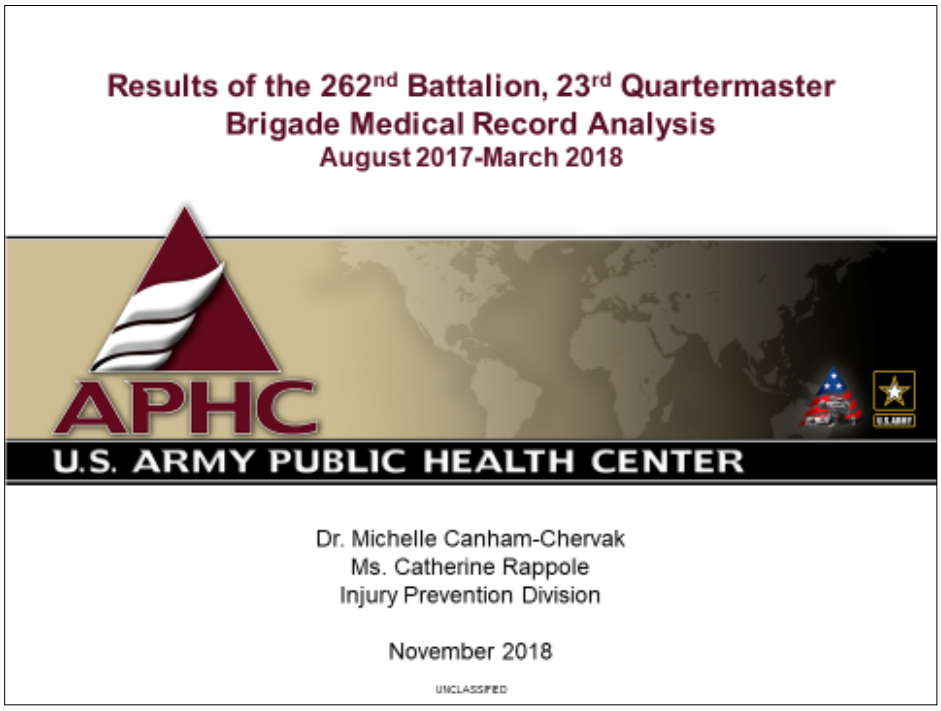
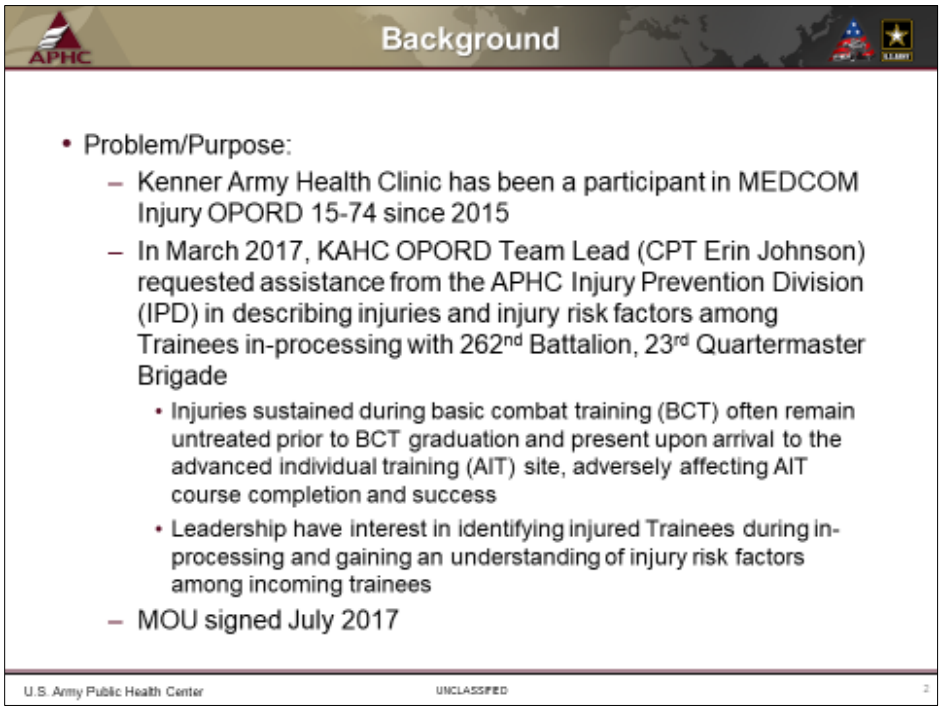
Appendix C

Medical Encounter Results Brief




Background
• Problem/Purpose:
– Kenner Army Health Clinic has been a participant in MEDCOM Injury OPORD 15-74 since 2015
– In March 2017, KAHC OPORD Team Lead (CPT Erin Johnson) requested assistance from the APHC Injury Prevention Division (IPD) in describing injuries and injury risk factors among Trainees in-processing with 262nd Battalion, 23rd Quartermaster Brigade
• Injuries sustained during basic combat training (BCT) often remain untreated prior to BCT graduation and present upon arrival to the advanced individual training (AIT) site, adversely affecting AIT course completion and success
• Leadership have interest in identifying injured Trainees during in-processing and gaining an understanding of injury risk factors among incoming trainees
– MOU signed July 2017
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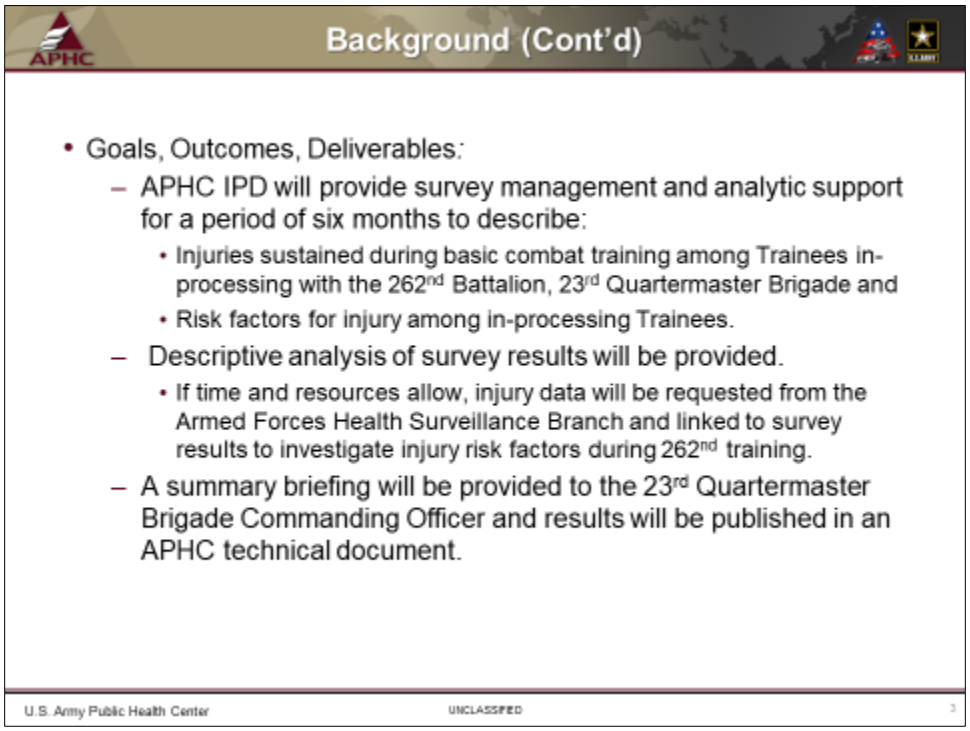
Background (Cont'd)
• Goals, Outcomes, Deliverables:
– APHC IPD will provide survey management and analytic support for a period of six months to describe:
• Injuries sustained during basic combat training among Trainees in-processing with the 262nd Battalion, 23rd Quartermaster Brigade and
• Risk factors for injury among in-processing Trainees.
– Descriptive analysis of survey results will be provided.
• If time and resources allow, injury data will be requested from the Armed Forces Health Surveillance Branch and linked to survey results to investigate injury risk factors during 262nd training.
– A summary briefing will be provided to the 23rd Quartermaster Brigade Commanding Officer and results will be published in an APHC technical document.
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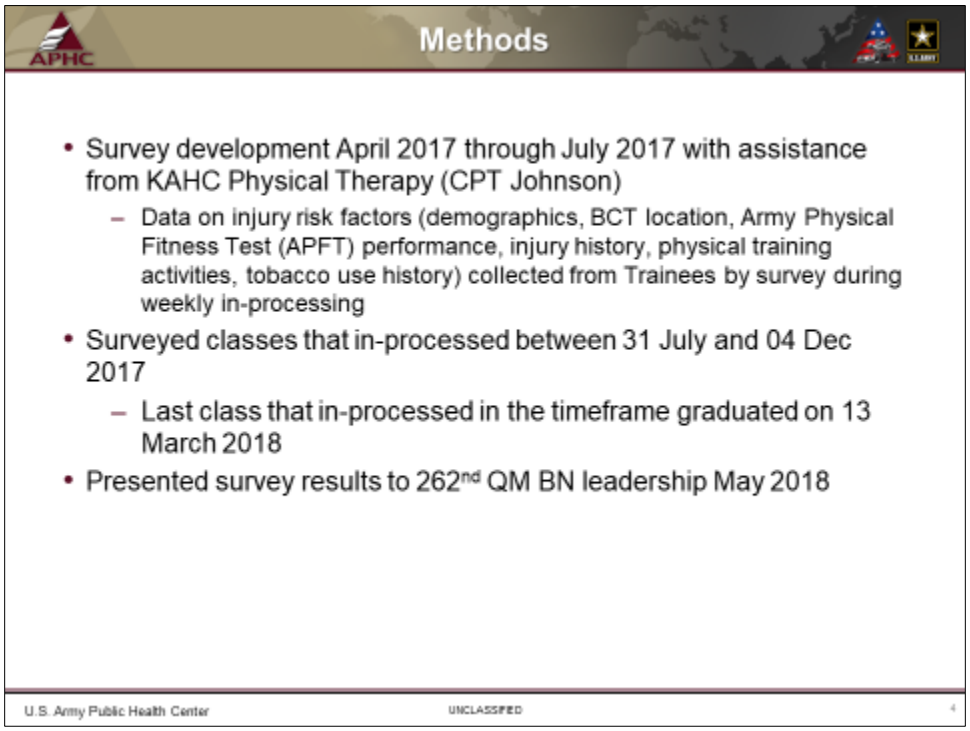
APHC
Methods
• Survey development April 2017 through July 2017 with assistance from KAHC Physical Therapy (CPT Johnson)
– Data on injury risk factors (demographics, BCT location, Army Physical Fitness Test (APFT) performance, injury history, physical training activities, tobacco use history) collected from Trainees by survey during weekly in-processing
• Surveyed classes that in-processed between 31 July and 04 Dec 2017
– Last class that in-processed in the timeframe graduated on 13 March 2018
• Presented survey results to 262nd QM BN leadership May 2018
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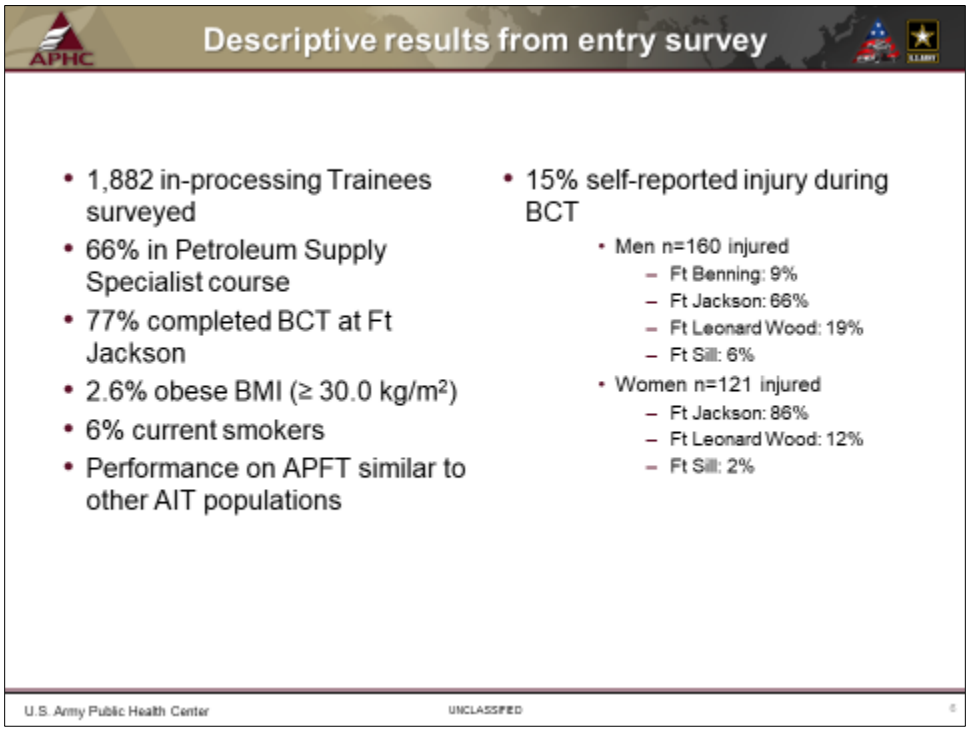
APHC
Descriptive results from entry survey
• 1,882 in-processing Trainees surveyed
• 66% in Petroleum Supply Specialist course
• 77% completed BCT at Ft Jackson
• 2.6% obese BMI (≥ 30.0 kg/m²)
• 6% current smokers
• Performance on APFT similar to other AIT populations
• 15% self-reported injury during BCT
• Men n=160 injured
– Ft Benning: 9%
– Ft Jackson: 66%
– Ft Leonard Wood: 19%
– Ft Sill: 6%
• Women n=121 injured
– Ft Jackson: 86%
– Ft Leonard Wood: 12%
– Ft Sill: 2%
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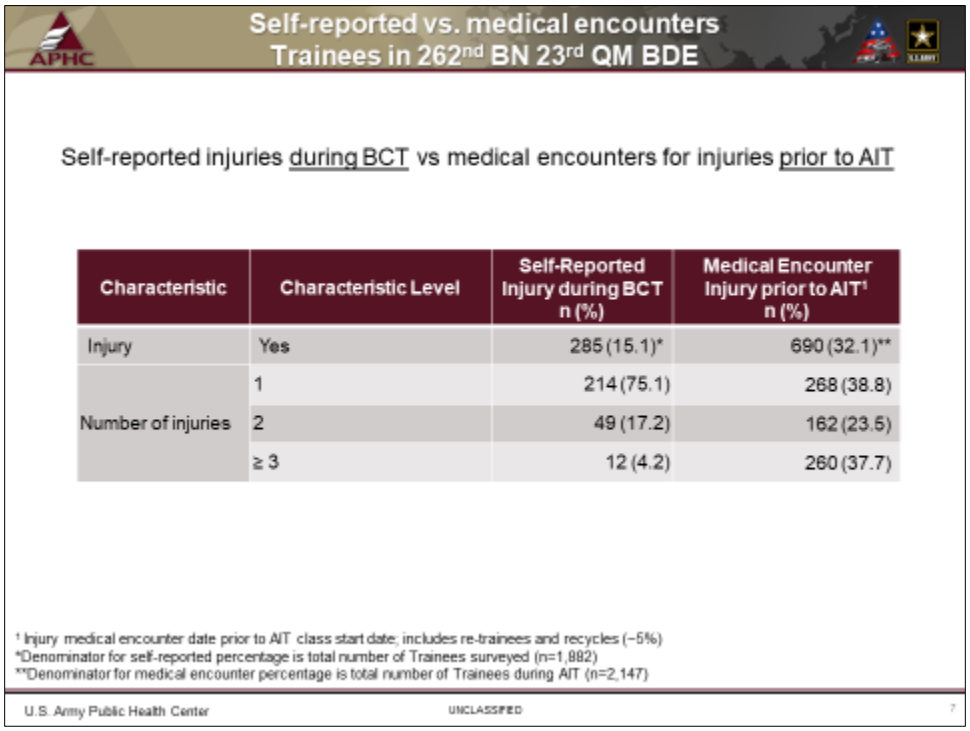

Self-reported vs. medical encounters Trainees in 262nd BN 23rd QM BDE

Self-reported injuries during BCT vs medical encounters for injuries prior to AIT

Characteristic	Characteristic Level	Self-Reported Injury during BCT n (%)	Medical Encounter Injury prior to AIT[1] n (%)
Injury	Yes	285 (15.1)*	690 (32.1)**
Number of injuries	1	214 (75.1)	268 (38.8)
	2	49 (17.2)	162 (23.5)
	≥ 3	12 (4.2)	260 (37.7)

[1] Injury medical encounter date prior to AIT class start date; includes re-trainees and recycles (~5%)
*Denominator for self-reported percentage is total number of Trainees surveyed (n=1,882)
**Denominator for medical encounter percentage is total number of Trainees during AIT (n=2,147)

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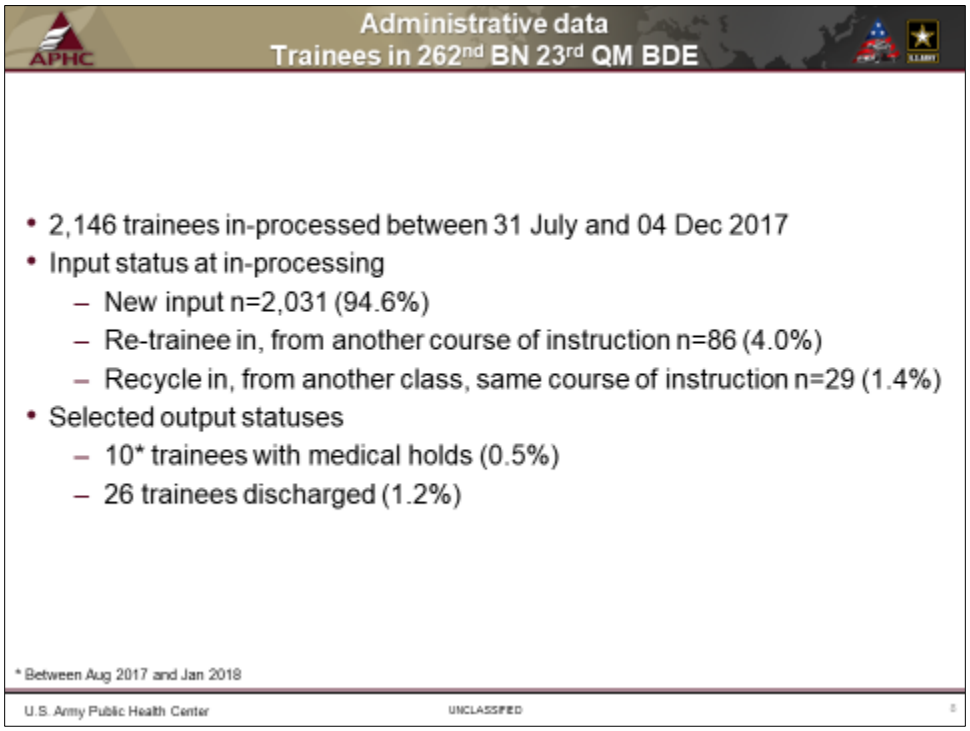
Administrative data
Trainees in 262nd BN 23rd QM BDE
• 2,146 trainees in-processed between 31 July and 04 Dec 2017
• Input status at in-processing
– New input n=2,031 (94.6%)
– Re-trainee in, from another course of instruction n=86 (4.0%)
– Recycle in, from another class, same course of instruction n=29 (1.4%)
• Selected output statuses
– 10* trainees with medical holds (0.5%)
– 26 trainees discharged (1.2%)
* Between Aug 2017 and Jan 2018
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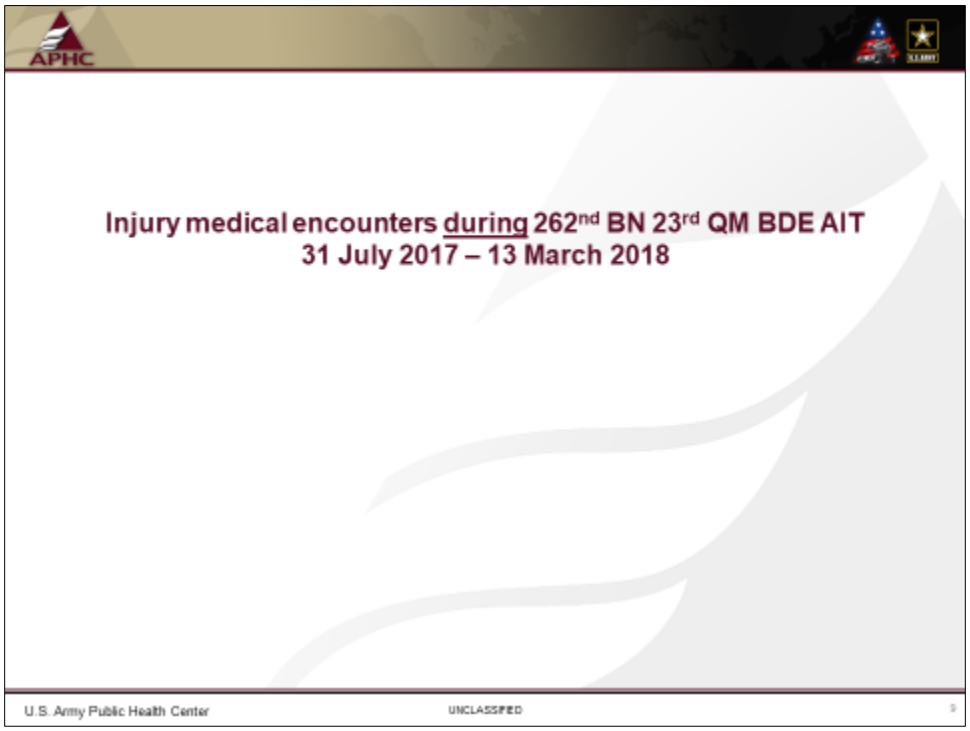
APHC
Injury medical encounters during 262nd BN 23rd QM BDE AIT
31 July 2017 – 13 March 2018
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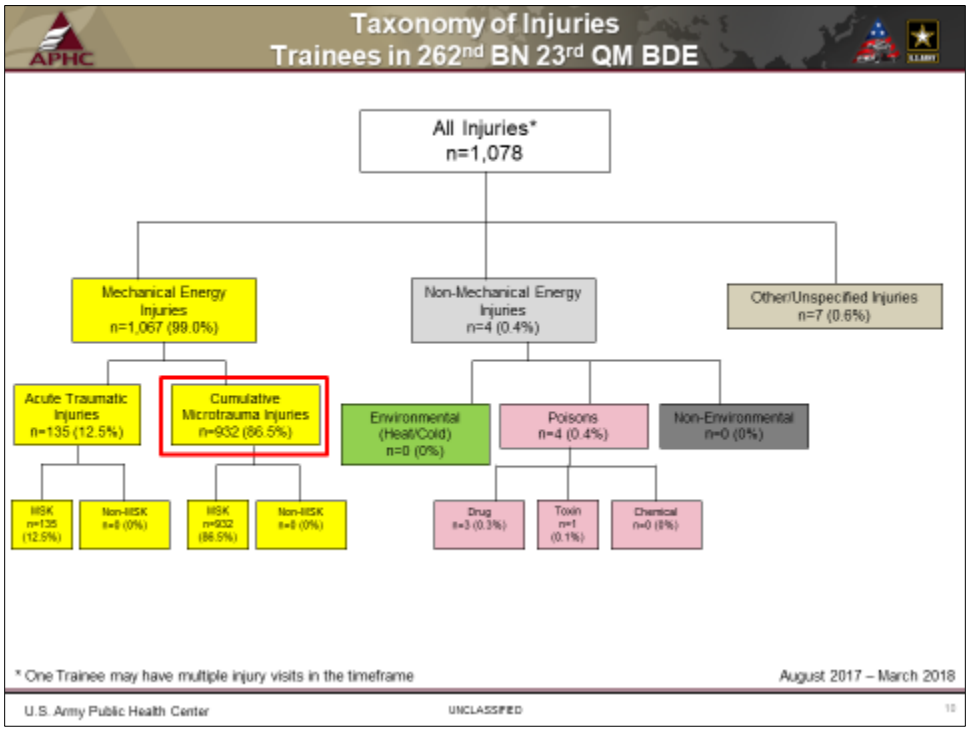
Taxonomy of Injuries
Trainees in 262nd BN 23rd QM BDE
APHC
All Injuries*
n=1,078
Mechanical Energy Injuries
n=1,067 (99.0%)
Non-Mechanical Energy Injuries
n=4 (0.4%)
Other/Unspecified Injuries
n=7 (0.6%)
Acute Traumatic Injuries
n=135 (12.5%)
Cumulative Microtrauma Injuries
n=932 (86.5%)
Environmental (Heat/Cold)
n=0 (0%)
Poisons
n=4 (0.4%)
Non-Environmental
n=0 (0%)
MSK
n=135
(12.5%)
Non-MSK
n=0 (0%)
MSK
n=932
(86.5%)
Non-MSK
n=0 (0%)
Drug
n=3 (0.3%)
Toxin
n=1
(0.1%)
Chemical
n=0 (0%)
* One Trainee may have multiple injury visits in the timeframe
August 2017 – March 2018
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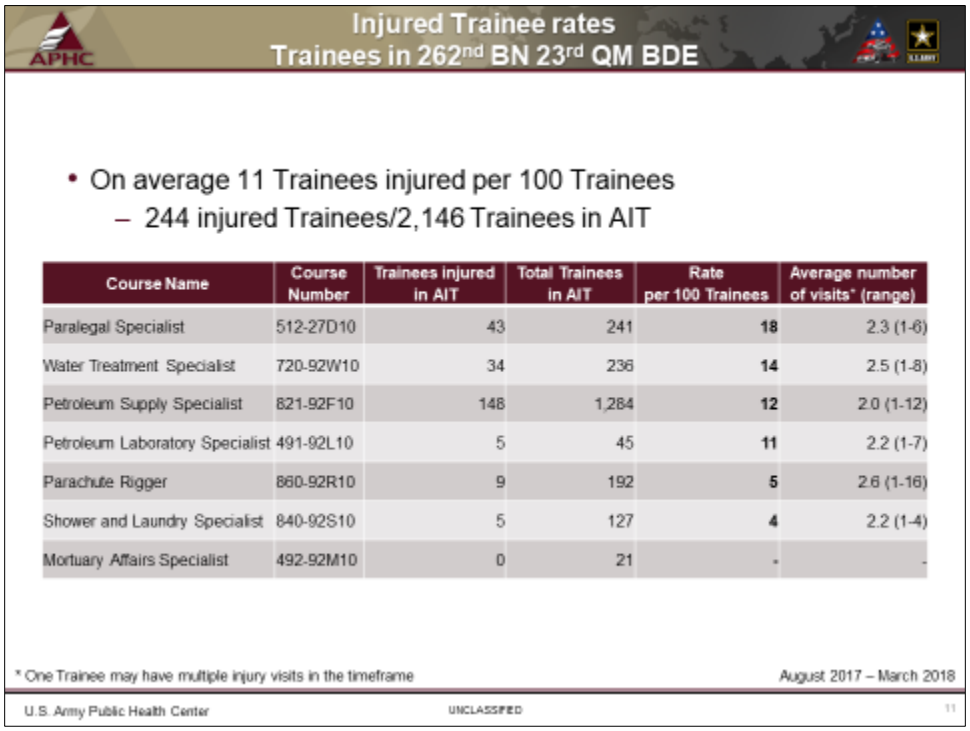

Injured Trainee rates
Trainees in 262nd BN 23rd QM BDE

- On average 11 Trainees injured per 100 Trainees
  - 244 injured Trainees/2,146 Trainees in AIT

Course Name	Course Number	Trainees injured in AIT	Total Trainees in AIT	Rate per 100 Trainees	Average number of visits* (range)
Paralegal Specialist	512-27D10	43	241	**18**	2.3 (1-6)
Water Treatment Specialist	720-92W10	34	236	**14**	2.5 (1-8)
Petroleum Supply Specialist	821-92F10	148	1,284	**12**	2.0 (1-12)
Petroleum Laboratory Specialist	491-92L10	5	45	**11**	2.2 (1-7)
Parachute Rigger	860-92R10	9	192	**5**	2.6 (1-16)
Shower and Laundry Specialist	840-92S10	5	127	**4**	2.2 (1-4)
Mortuary Affairs Specialist	492-92M10	0	21	-	-

* One Trainee may have multiple injury visits in the timeframe

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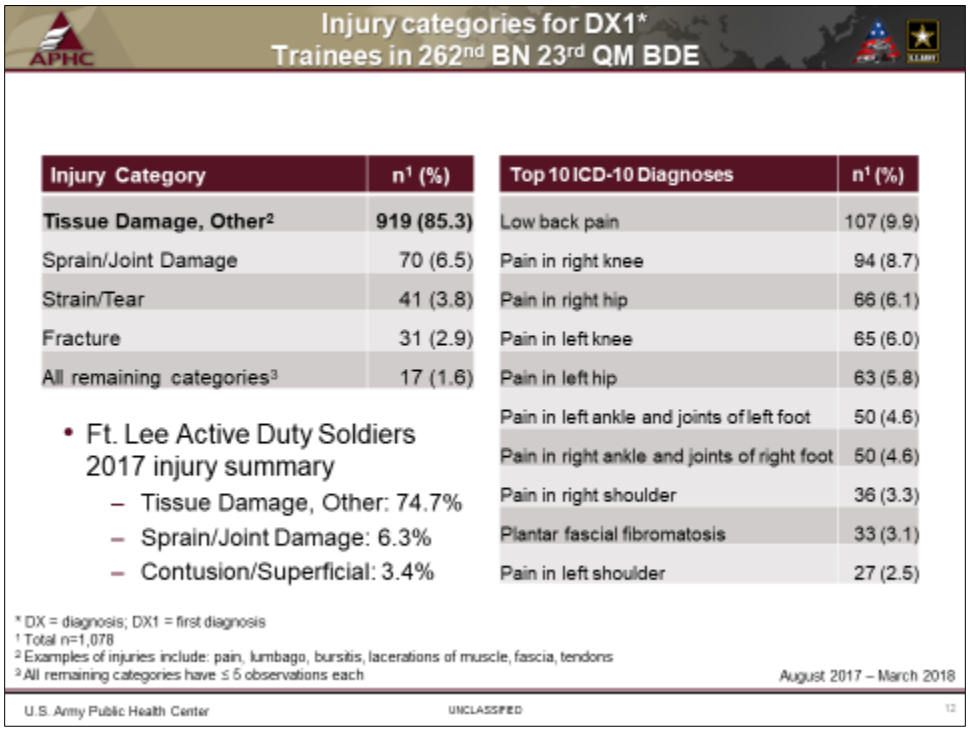

Injury categories for DX1* Trainees in 262nd BN 23rd QM BDE

Injury Category	n[1] (%)
Tissue Damage, Other[2]	**919 (85.3)**
Sprain/Joint Damage	70 (6.5)
Strain/Tear	41 (3.8)
Fracture	31 (2.9)
All remaining categories[3]	17 (1.6)

- Ft. Lee Active Duty Soldiers 2017 injury summary
  - Tissue Damage, Other: 74.7%
  - Sprain/Joint Damage: 6.3%
  - Contusion/Superficial: 3.4%

Top 10 ICD-10 Diagnoses	n[1] (%)
Low back pain	107 (9.9)
Pain in right knee	94 (8.7)
Pain in right hip	66 (6.1)
Pain in left knee	65 (6.0)
Pain in left hip	63 (5.8)
Pain in left ankle and joints of left foot	50 (4.6)
Pain in right ankle and joints of right foot	50 (4.6)
Pain in right shoulder	36 (3.3)
Plantar fascial fibromatosis	33 (3.1)
Pain in left shoulder	27 (2.5)

* DX = diagnosis; DX1 = first diagnosis
[1] Total n=1,078
[2] Examples of injuries include: pain, lumbago, bursitis, lacerations of muscle, fascia, tendons
[3] All remaining categories have ≤ 5 observations each

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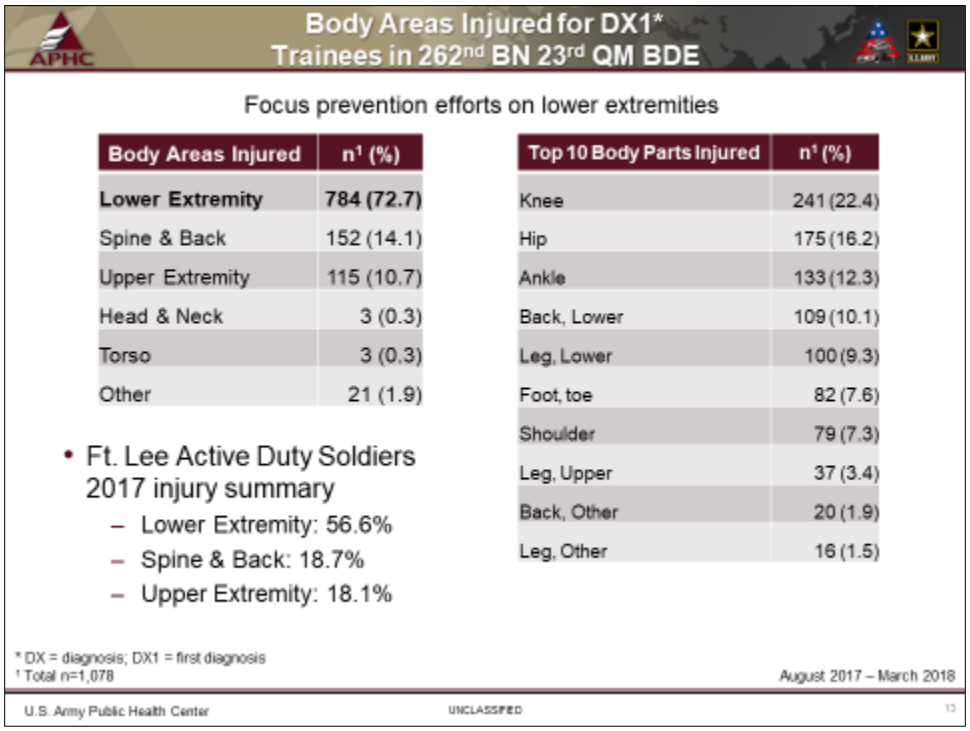

Body Areas Injured for DX1* Trainees in 262nd BN 23rd QM BDE

Focus prevention efforts on lower extremities

Body Areas Injured	n[1] (%)
Lower Extremity	**784 (72.7)**
Spine & Back	152 (14.1)
Upper Extremity	115 (10.7)
Head & Neck	3 (0.3)
Torso	3 (0.3)
Other	21 (1.9)

Top 10 Body Parts Injured	n[1] (%)
Knee	241 (22.4)
Hip	175 (16.2)
Ankle	133 (12.3)
Back, Lower	109 (10.1)
Leg, Lower	100 (9.3)
Foot, toe	82 (7.6)
Shoulder	79 (7.3)
Leg, Upper	37 (3.4)
Back, Other	20 (1.9)
Leg, Other	16 (1.5)

- Ft. Lee Active Duty Soldiers 2017 injury summary
  - Lower Extremity: 56.6%
  - Spine & Back: 18.7%
  - Upper Extremity: 18.1%

* DX = diagnosis; DX1 = first diagnosis
[1] Total n=1,078

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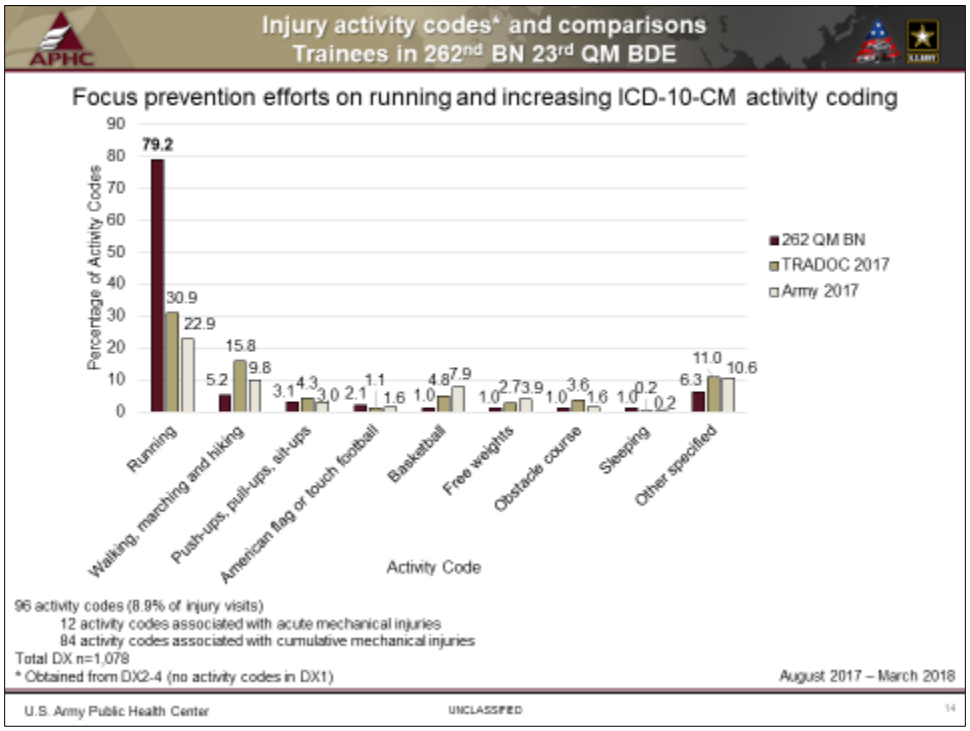
Injury activity codes* and comparisons
Trainees in 262nd BN 23rd QM BDE
APHC
Focus prevention efforts on running and increasing ICD-10-CM activity coding
Percentage of Activity Codes
90
80
70
60
50
40
30
20
10
0
79.2
30.9
22.9
5.2
15.8
9.8
3.1
4.3
3.0
2.1
1.1
1.6
1.0
4.8
7.9
1.0
2.7
3.9
1.0
3.6
1.6
1.0
0.2
0.2
6.3
11.0
10.6
262 QM BN
TRADOC 2017
Army 2017
Running
Walking, marching and hiking
Push-ups, pull-ups, sit-ups
American flag or touch football
Basketball
Free weights
Obstacle course
Sleeping
Other specified
Activity Code
96 activity codes (8.9% of injury visits)
12 activity codes associated with acute mechanical injuries
84 activity codes associated with cumulative mechanical injuries
Total DX n=1,078
* Obtained from DX2-4 (no activity codes in DX1)
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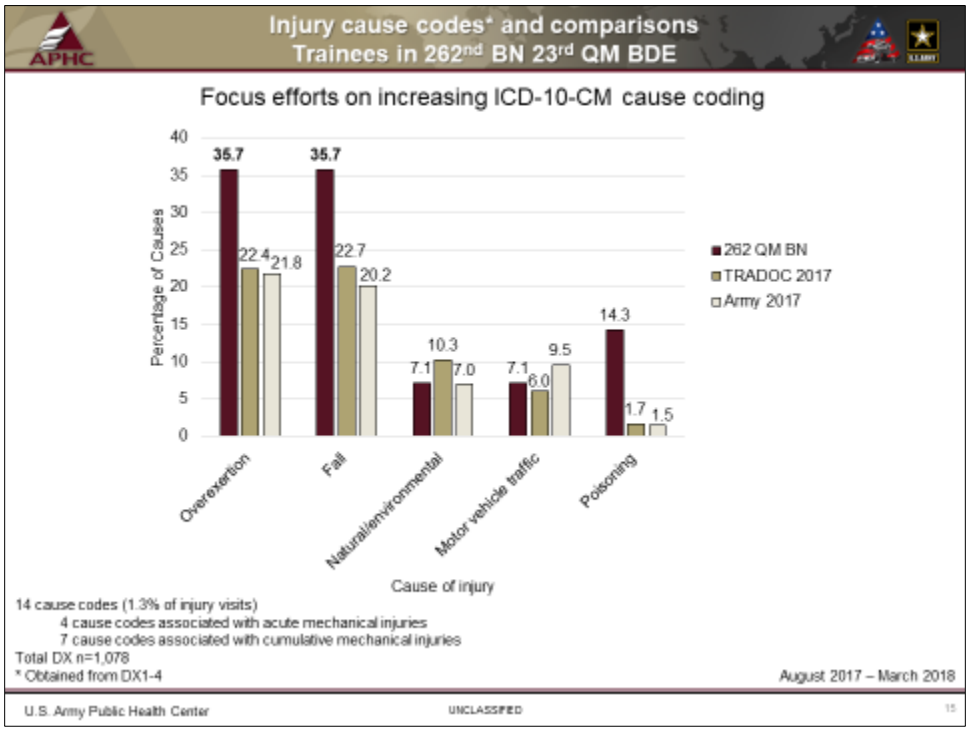
Injury cause codes* and comparisons
Trainees in 262nd BN 23rd QM BDE
APHC
Focus efforts on increasing ICD-10-CM cause coding
Percentage of Causes
40
35
30
25
20
15
10
5
0
35.7
22.4
21.8
35.7
22.7
20.2
7.1
10.3
7.0
7.1
6.0
9.5
14.3
1.7
1.5
Overexertion
Fall
Natural/environmental
Motor vehicle traffic
Poisoning
Cause of injury
262 QM BN
TRADOC 2017
Army 2017
14 cause codes (1.3% of injury visits)
4 cause codes associated with acute mechanical injuries
7 cause codes associated with cumulative mechanical injuries
Total DX n=1,078
* Obtained from DX1-4
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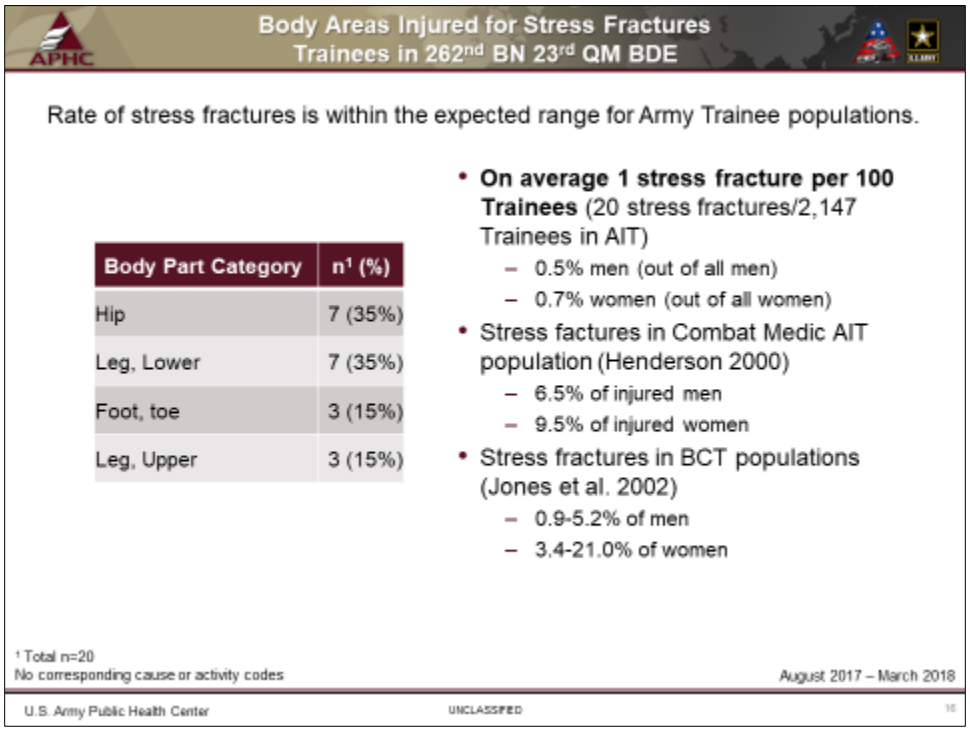
APHC
Body Areas Injured for Stress Fractures
Trainees in 262nd BN 23rd QM BDE
Rate of stress fractures is within the expected range for Army Trainee populations.
Body Part Category | n1 (%)
Hip | 7 (35%)
Leg, Lower | 7 (35%)
Foot, toe | 3 (15%)
Leg, Upper | 3 (15%)
• On average 1 stress fracture per 100 Trainees (20 stress fractures/2,147 Trainees in AIT)
– 0.5% men (out of all men)
– 0.7% women (out of all women)
• Stress factures in Combat Medic AIT population (Henderson 2000)
– 6.5% of injured men
– 9.5% of injured women
• Stress fractures in BCT populations (Jones et al. 2002)
– 0.9-5.2% of men
– 3.4-21.0% of women
1 Total n=20
No corresponding cause or activity codes
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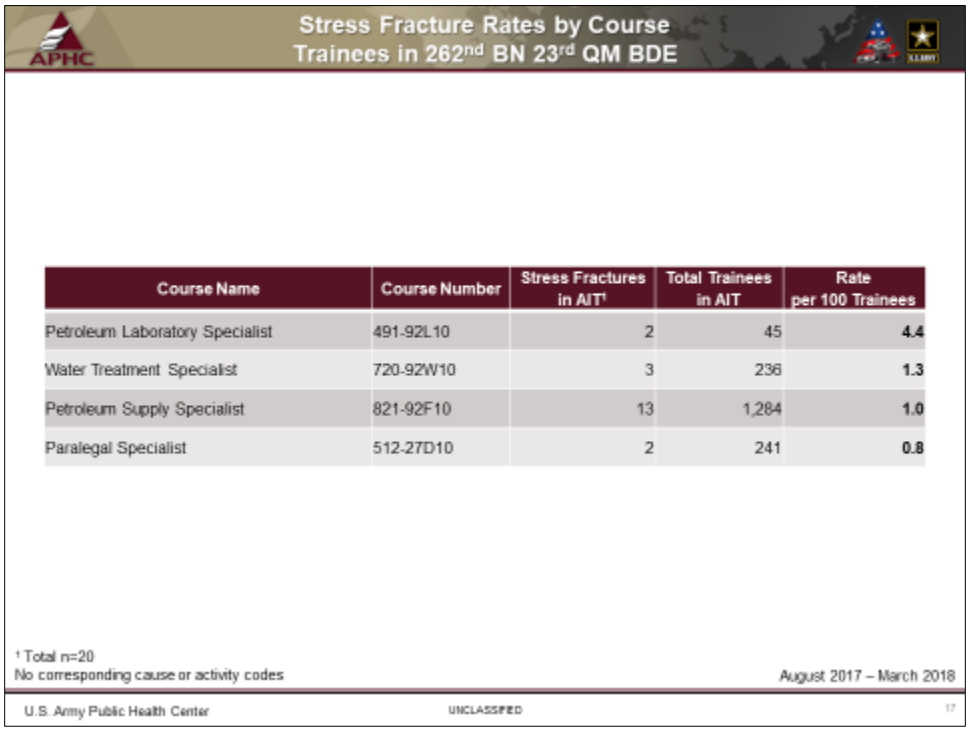

Stress Fracture Rates by Course
Trainees in 262nd BN 23rd QM BDE

Course Name	Course Number	Stress Fractures in AIT[1]	Total Trainees in AIT	Rate per 100 Trainees
Petroleum Laboratory Specialist	491-92L10	2	45	**4.4**
Water Treatment Specialist	720-92W10	3	236	**1.3**
Petroleum Supply Specialist	821-92F10	13	1,284	**1.0**
Paralegal Specialist	512-27D10	2	241	**0.8**

[1] Total n=20
No corresponding cause or activity codes

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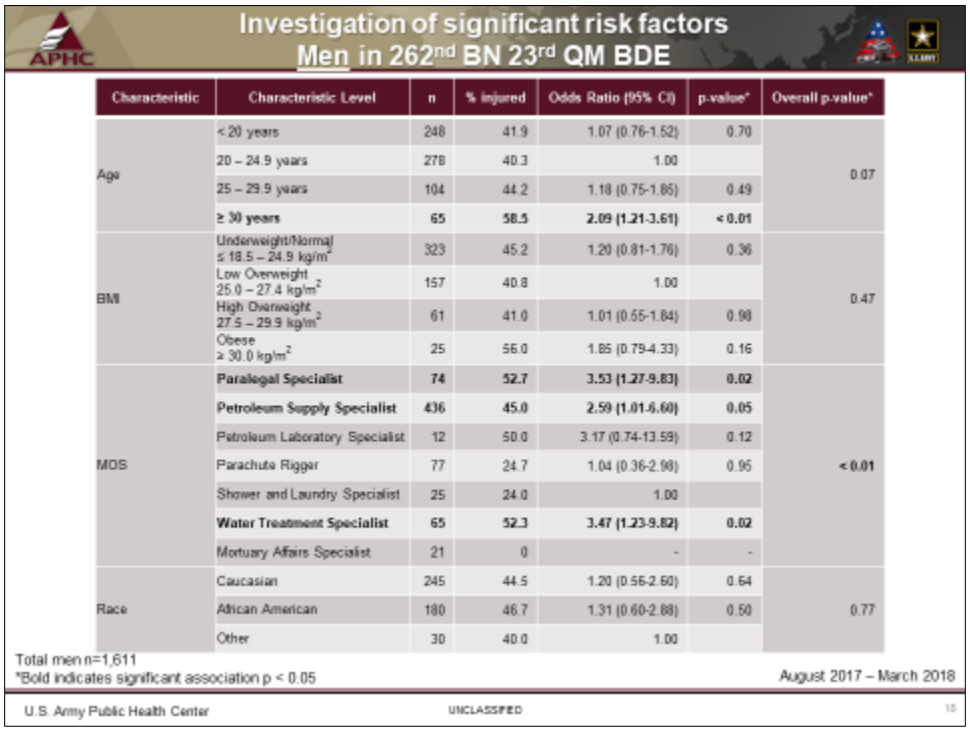

Investigation of significant risk factors
Men in 262nd BN 23rd QM BDE

Characteristic	Characteristic Level	n	% injured	Odds Ratio (95% CI)	p-value*	Overall p-value*
Age	< 20 years	248	41.9	1.07 (0.76-1.52)	0.70	0.07
	20 – 24.9 years	278	40.3	1.00		
	25 – 29.9 years	104	44.2	1.18 (0.75-1.86)	0.49	
	≥ 30 years	**65**	**58.5**	**2.09 (1.21-3.61)**	**< 0.01**	
BMI	Underweight/Normal ≤ 18.5 – 24.9 kg/m^2	323	45.2	1.20 (0.81-1.76)	0.36	0.47
	Low Overweight 25.0 – 27.4 kg/m^2	157	40.8	1.00		
	High Overweight 27.5 – 29.9 kg/m^2	61	41.0	1.01 (0.55-1.84)	0.98	
	Obese ≥ 30.0 kg/m^2	25	56.0	1.85 (0.79-4.33)	0.16	
MOS	**Paralegal Specialist**	**74**	**52.7**	**3.53 (1.27-9.83)**	**0.02**	**< 0.01**
	Petroleum Supply Specialist	**436**	**45.0**	**2.59 (1.01-6.60)**	**0.05**	
	Petroleum Laboratory Specialist	12	50.0	3.17 (0.74-13.59)	0.12	
	Parachute Rigger	77	24.7	1.04 (0.36-2.98)	0.95	
	Shower and Laundry Specialist	25	24.0	1.00		
	Water Treatment Specialist	**65**	**52.3**	**3.47 (1.23-9.82)**	**0.02**	
	Mortuary Affairs Specialist	21	0	-	-	
Race	Caucasian	245	44.5	1.20 (0.56-2.60)	0.64	0.77
	African American	180	46.7	1.31 (0.60-2.88)	0.50	
	Other	30	40.0	1.00		

Total men n=1,611
*Bold indicates significant association p < 0.05

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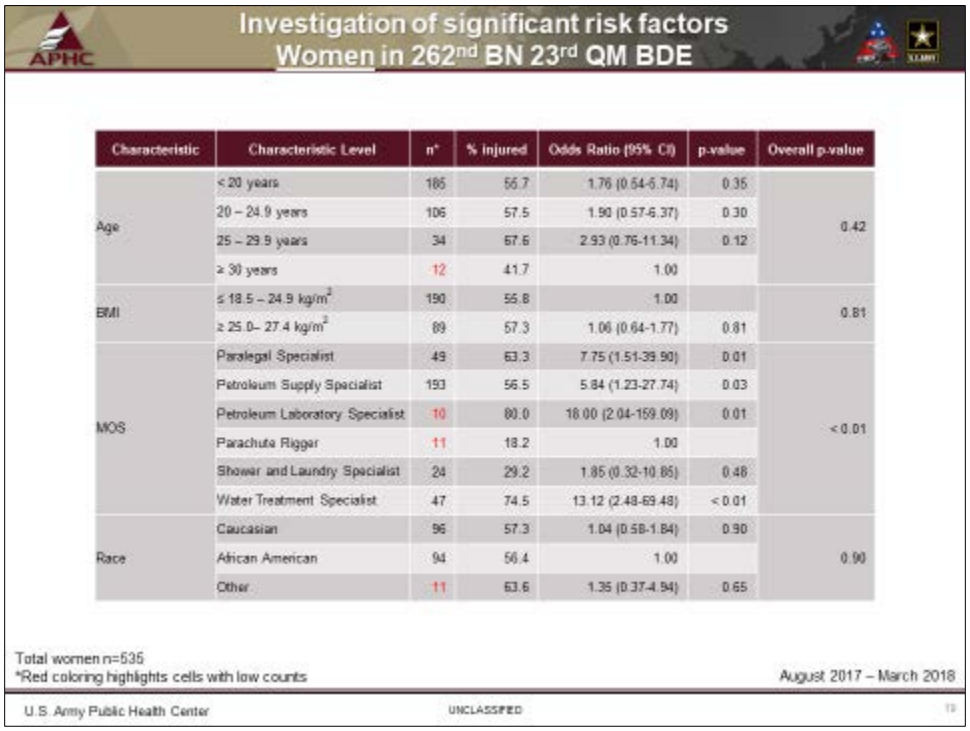

Investigation of significant risk factors
Women in 262nd BN 23rd QM BDE

Characteristic	Characteristic Level	n*	% injured	Odds Ratio (95% CI)	p-value	Overall p-value
Age	< 20 years	185	56.7	1.76 (0.54-6.74)	0.35	0.42
	20 – 24.9 years	106	57.5	1.90 (0.57-6.37)	0.30	
	25 – 29.9 years	34	67.6	2.93 (0.76-11.34)	0.12	
	≥ 30 years	12	41.7	1.00		
BMI	≤ 18.5 – 24.9 kg/m^2	190	55.8	1.00		0.81
	≥ 25.0– 27.4 kg/m^2	89	57.3	1.06 (0.64-1.77)	0.81	
MOS	Paralegal Specialist	49	63.3	7.75 (1.51-39.90)	0.01	< 0.01
	Petroleum Supply Specialist	193	56.5	5.84 (1.23-27.74)	0.03	
	Petroleum Laboratory Specialist	10	80.0	18.00 (2.04-159.09)	0.01	
	Parachute Rigger	11	18.2	1.00		
	Shower and Laundry Specialist	24	29.2	1.85 (0.32-10.85)	0.48	
	Water Treatment Specialist	47	74.5	13.12 (2.48-69.48)	< 0.01	
Race	Caucasian	96	57.3	1.04 (0.58-1.84)	0.90	0.90
	African American	94	56.4	1.00		
	Other	11	63.6	1.35 (0.37-4.94)	0.65	

Total women n=535
*Red coloring highlights cells with low counts

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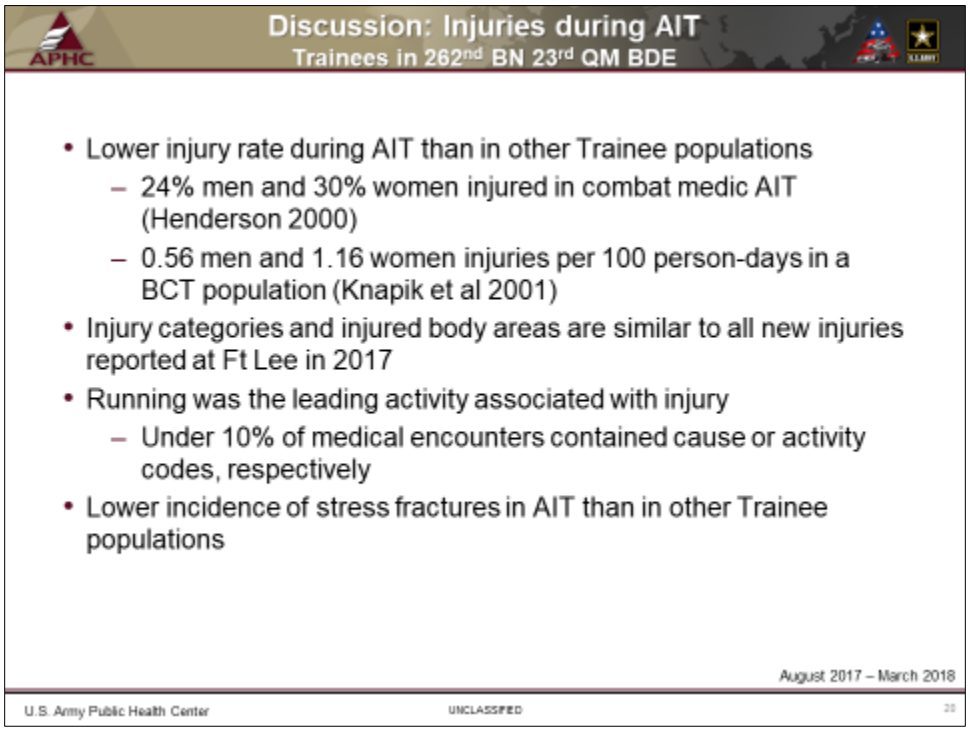
APHC
Discussion: Injuries during AIT
Trainees in 262nd BN 23rd QM BDE
• Lower injury rate during AIT than in other Trainee populations
– 24% men and 30% women injured in combat medic AIT (Henderson 2000)
– 0.56 men and 1.16 women injuries per 100 person-days in a BCT population (Knapik et al 2001)
• Injury categories and injured body areas are similar to all new injuries reported at Ft Lee in 2017
• Running was the leading activity associated with injury
– Under 10% of medical encounters contained cause or activity codes, respectively
• Lower incidence of stress fractures in AIT than in other Trainee populations
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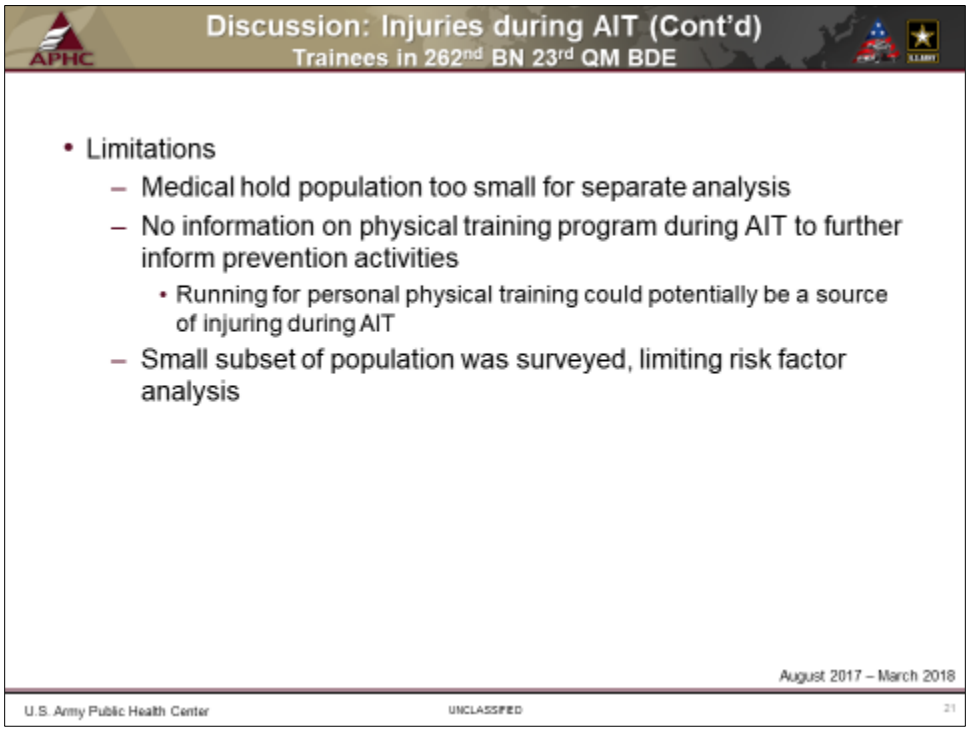
Discussion: Injuries during AIT (Cont'd)
Trainees in 262nd BN 23rd QM BDE
• Limitations
– Medical hold population too small for separate analysis
– No information on physical training program during AIT to further inform prevention activities
• Running for personal physical training could potentially be a source of injuring during AIT
– Small subset of population was surveyed, limiting risk factor analysis
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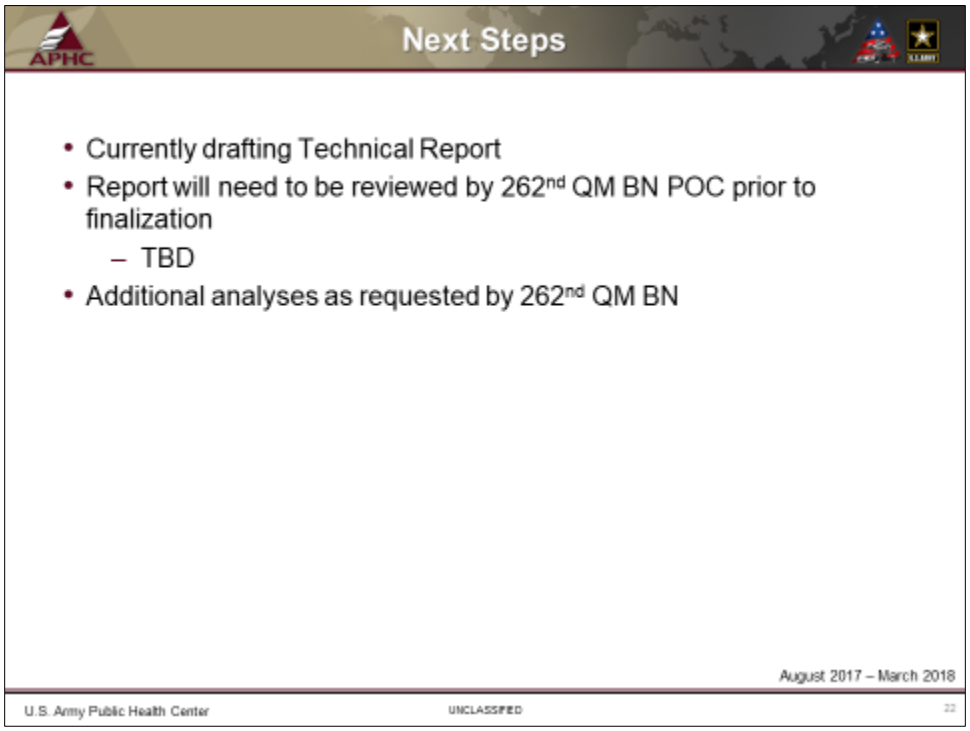
APHC
Next Steps
• Currently drafting Technical Report
• Report will need to be reviewed by 262nd QM BN POC prior to finalization
– TBD
• Additional analyses as requested by 262nd QM BN
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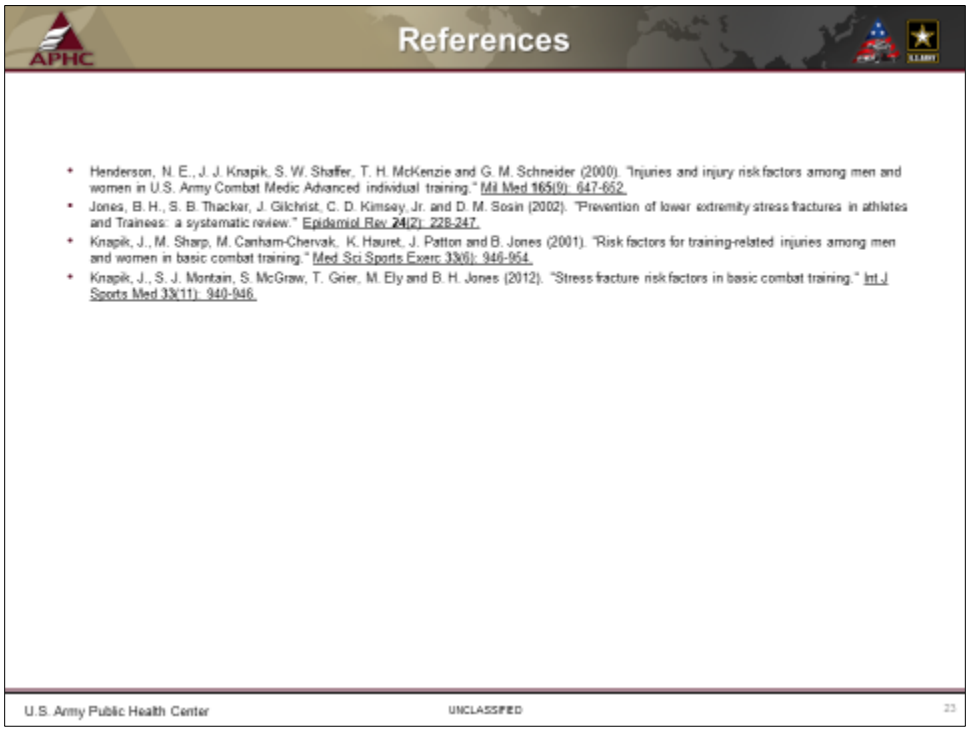
APHC
References
Henderson, N. E., J. J. Knapik, S. W. Shaffer, T. H. McKenzie and G. M. Schneider (2000). "Injuries and injury risk factors among men and women in U.S. Army Combat Medic Advanced individual training." Mil Med 165(9): 647-652.
Jones, B. H., S. B. Thacker, J. Gilchrist, C. D. Kimsey, Jr. and D. M. Sosin (2002). "Prevention of lower extremity stress fractures in athletes and Trainees: a systematic review." Epidemiol Rev 24(2): 228-247.
Knapik, J., M. Sharp, M. Canham-Chervak, K. Hauret, J. Patton and B. Jones (2001). "Risk factors for training-related injuries among men and women in basic combat training." Med Sci Sports Exerc 33(6): 946-954.
Knapik, J., S. J. Montain, S. McGraw, T. Grier, M. Ely and B. H. Jones (2012). "Stress fracture risk factors in basic combat training." Int J Sports Med 33(11): 940-946.
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APHC
Additional slides
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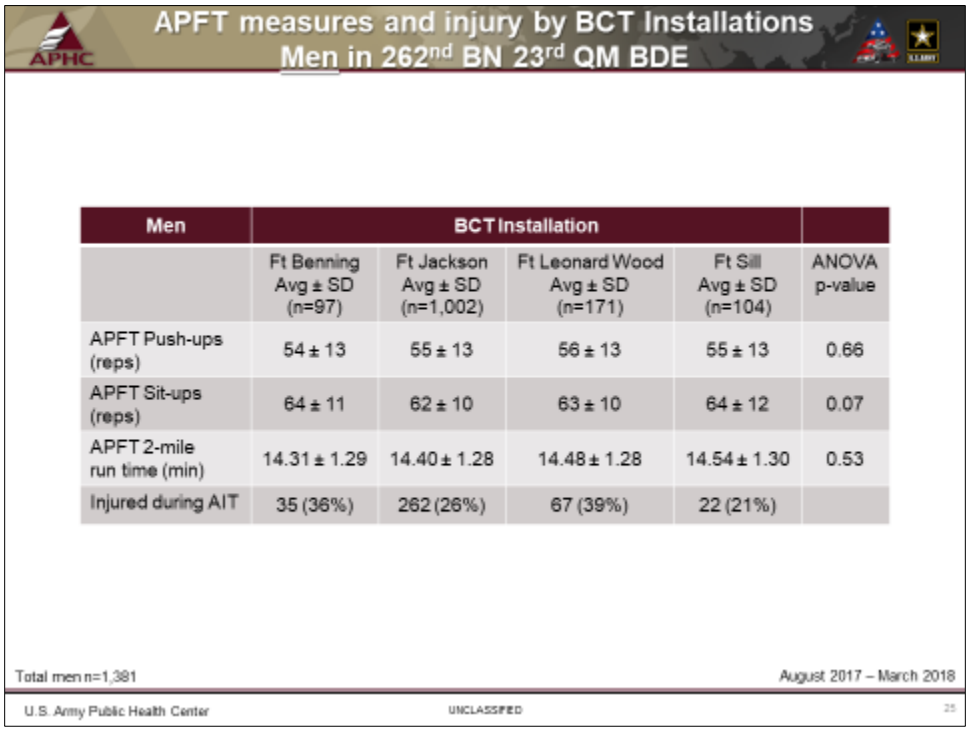

APFT measures and injury by BCT Installations
Men in 262nd BN 23rd QM BDE

Men	BCT Installation				
	Ft Benning Avg ± SD (n=97)	Ft Jackson Avg ± SD (n=1,002)	Ft Leonard Wood Avg ± SD (n=171)	Ft Sill Avg ± SD (n=104)	ANOVA p-value
APFT Push-ups (reps)	54 ± 13	55 ± 13	56 ± 13	55 ± 13	0.66
APFT Sit-ups (reps)	64 ± 11	62 ± 10	63 ± 10	64 ± 12	0.07
APFT 2-mile run time (min)	14.31 ± 1.29	14.40 ± 1.28	14.48 ± 1.28	14.54 ± 1.30	0.53
Injured during AIT	35 (36%)	262 (26%)	67 (39%)	22 (21%)	

Total men n=1,381

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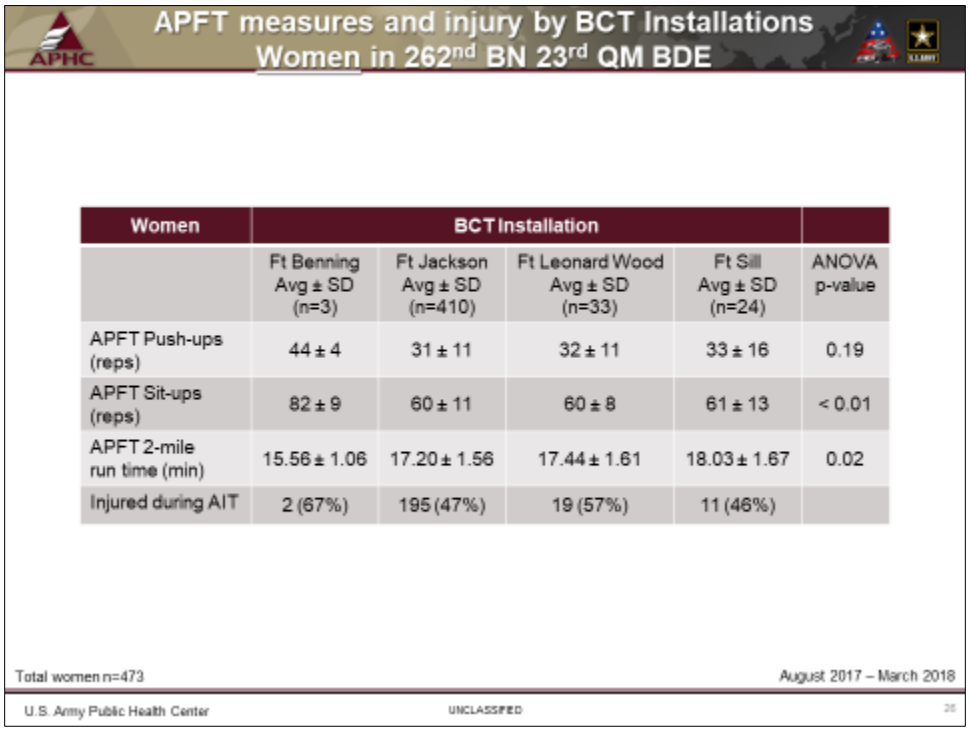

APFT measures and injury by BCT Installations
Women in 262nd BN 23rd QM BDE

Women	BCT Installation				
	Ft Benning Avg ± SD (n=3)	Ft Jackson Avg ± SD (n=410)	Ft Leonard Wood Avg ± SD (n=33)	Ft Sill Avg ± SD (n=24)	ANOVA p-value
APFT Push-ups (reps)	44 ± 4	31 ± 11	32 ± 11	33 ± 16	0.19
APFT Sit-ups (reps)	82 ± 9	60 ± 11	60 ± 8	61 ± 13	< 0.01
APFT 2-mile run time (min)	15.56 ± 1.06	17.20 ± 1.56	17.44 ± 1.61	18.03 ± 1.67	0.02
Injured during AIT	2 (67%)	195 (47%)	19 (57%)	11 (46%)	

Total women n=473

August 2017 – March 2018

U.S. Army Public Health Center

UNCLASSIFIED

Appendix D

23rd Quartermaster Brigade Entry Survey

PRIVACY ACT STATEMENT –
HEALTH CARE RECORDS, FITNESS TEST SCORES, AND QUESTIONNAIRE

1. AUTHORITY FOR COLLECTION OF INFORMATION INCLUDING SOCIAL SECURITY NUMBER

Public Law 104-191, Section 1178; Executive Order 9397; Section 8103, Title 5, United States Code

2. PRIVACY ACT DATA: TO BE USED ON ALL DOCUMENTS CONTAINING PERSONAL INFORMATION

This survey is subject to the Privacy Act of 1974. The contents will not be disclosed, discussed, or shared with individuals unless they have a direct need-to-know in the performance of official duties. The following survey may contain personal or privileged information and will be treated as "For Official Use Only." Unauthorized disclosure of this information may result in civil and criminal penalties.

3. PRINCIPLE PURPOSES FOR WHICH INFORMATION IS INTENDED TO BE USED

This form provides you the advice required by the Privacy Act of 1974. The purpose of this survey is to obtain information on current physical fitness activities, tobacco use, and previous or current injuries. The information obtained will be used for injury prevention planning and to improve the health and fitness of Soldiers in your unit. We will need to obtain your social security number in order to link your survey information with other data such as a unit roster and medical diagnoses for injuries treated in the next 6 months. Using your social security number is the only way we can do this. We will strictly limit access to your social security number by storing data on CAC-enabled U.S. government computers and networks approved for sensitive data and removing SSNs and names after data are linked.

4. ROUTINE USES

The primary use of this information is to improve the health of those in your unit. The data obtained from the surveys will be included in a database that contains the same information for all Soldiers participating in the survey. The only personnel having access to this information will be the public health officials who will analyze the data. You will not be personally identified in any report or any output of any type since the interest is in the health and fitness of the unit and not the health and fitness of any single individual.

5. WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION

Disclosure of the requested information is voluntary. If you do not disclose the information you will not be included in the database and you will not participate in the project designed to reduce injuries and improve the health and fitness of Soldiers in your unit. If you decide not to participate there will not be any negative consequences to you as a result of your decision.

23rd QUARTERMASTER BRIGADE ENTRY SURVEY

DEMOGRAPHICS

Directions: Please carefully read the directions for each section. Be sure to darken bubbles completely. Do not use checks or "x's or special characters" to fill in the bubbles. Please be sure to write legibly where a written answer is required and keep entries within the boxes provided.

LAST NAME

A	A	A	A	A	A	A	A	A	A
B	B	B	B	B	B	B	B	B	B
C	C	C	C	C	C	C	C	C	C
D	D	D	D	D	D	D	D	D	D
E	E	E	E	E	E	E	E	E	E
F	F	F	F	F	F	F	F	F	F
G	G	G	G	G	G	G	G	G	G
H	H	H	H	H	H	H	H	H	H
I	I	I	I	I	I	I	I	I	I
J	J	J	J	J	J	J	J	J	J
K	K	K	K	K	K	K	K	K	K
L	L	L	L	L	L	L	L	L	L
M	M	M	M	M	M	M	M	M	M
N	N	N	N	N	N	N	N	N	N
O	O	O	O	O	O	O	O	O	O
P	P	P	P	P	P	P	P	P	P
Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
R	R	R	R	R	R	R	R	R	R
S	S	S	S	S	S	S	S	S	S
T	T	T	T	T	T	T	T	T	T
U	U	U	U	U	U	U	U	U	U
V	V	V	V	V	V	V	V	V	V
W	W	W	W	W	W	W	W	W	W
X	X	X	X	X	X	X	X	X	X
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Z	Z	Z	Z	Z	Z	Z	Z	Z	Z

FIRST NAME

A	A	A	A	A	A	A	A	A	A
B	B	B	B	B	B	B	B	B	B
C	C	C	C	C	C	C	C	C	C
D	D	D	D	D	D	D	D	D	D
E	E	E	E	E	E	E	E	E	E
F	F	F	F	F	F	F	F	F	F
G	G	G	G	G	G	G	G	G	G
H	H	H	H	H	H	H	H	H	H
I	I	I	I	I	I	I	I	I	I
J	J	J	J	J	J	J	J	J	J
K	K	K	K	K	K	K	K	K	K
L	L	L	L	L	L	L	L	L	L
M	M	M	M	M	M	M	M	M	M
N	N	N	N	N	N	N	N	N	N
O	O	O	O	O	O	O	O	O	O
P	P	P	P	P	P	P	P	P	P
Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
R	R	R	R	R	R	R	R	R	R
S	S	S	S	S	S	S	S	S	S
T	T	T	T	T	T	T	T	T	T
U	U	U	U	U	U	U	U	U	U
V	V	V	V	V	V	V	V	V	V
W	W	W	W	W	W	W	W	W	W
X	X	X	X	X	X	X	X	X	X
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Z	Z	Z	Z	Z	Z	Z	Z	Z	Z

DEMOGRAPHICS

Example: If you are 5 feet 7 inches tall:

5	0	7

SSN: (no dashes)

0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9

HEIGHT:

Feet	Inches	
X	0	0
X	1	1
X	X	2
X	X	3
4	X	4
5	X	5
6	X	6
7	X	7
X	X	8
X	X	9

WEIGHT: (lbs)

0	0	0
1	1	1
2	2	2
3	3	3
X	4	4
X	5	5
X	6	6
X	7	7
X	8	8
X	9	9

DATE OF BIRTH: YYYY/MM/DD

				/			/		

X	0	0	0		0	0		0	0
1	X	X	1		1	1		1	1
2	X	X	2		X	2		2	2
X	X	X	3		X	3		3	3
X	X	X	4		X	4		X	4
X	X	X	5		X	5		X	5
X	X	6	6		X	6		X	6
X	X	7	7		X	7		X	7
X	X	8	8		X	8		X	8
X	9	9	9		X	9		X	9

DEMOGRAPHICS

1. Today's date:

Month	① Jan	② Feb	③ Mar	④ Apr	⑤ May	⑥ Jun	⑦ Jul	⑧ Aug	⑨ Sep	⑩ Oct	⑪ Nov	⑫ Dec
Day	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔	㉕
㉖	㉗	㉘	㉙	㉚	O 31							

2. Are you… ⓪ Male
① Female

3. At which installation did you complete Basic Combat Training?

① Fort Benning, GA
② Fort Jackson, SC
③ Fort Leonard Wood, MO
④ Fort Sill, OK

4. What is your rank?

① E1
② E2
③ E3
④ E4

ARMY PHYSICAL FITNESS TEST (APFT)

5. What was the date of your most recent Army Physical Fitness Test (APFT)?

Year ① 2016 ② 2017

Month ① Jan ② Feb ③ Mar ④ Apr ⑤ May ⑥ Jun ⑦ Jul ⑧ Aug ⑨ Sep ⑩ Oct ⑪ Nov ⑫ Dec

6. What were the raw scores on your final Army Physical Fitness Test (APFT) from BCT? *(Select "Did not complete" if event was not completed.)*

a. Push-Ups

⓪ Did not complete

repetitions

⓪	⓪	⓪
①	①	①
ⓧ	②	②
ⓧ	③	③
ⓧ	④	④
ⓧ	⑤	⑤
ⓧ	⑥	⑥
ⓧ	⑦	⑦
ⓧ	⑧	⑧
ⓧ	⑨	⑨

b. Sit-Ups

⓪ Did not complete

repetitions

⓪	⓪	⓪
①	①	①
ⓧ	②	②
ⓧ	③	③
ⓧ	④	④
ⓧ	⑤	⑤
ⓧ	⑥	⑥
ⓧ	⑦	⑦
ⓧ	⑧	⑧
ⓧ	⑨	⑨

c. Run

⓪ Did not complete

min

⓪	⓪
①	①
②	②
③	③
ⓧ	④
ⓧ	⑤
ⓧ	⑥
ⓧ	⑦
ⓧ	⑧
ⓧ	⑨

sec

⓪	⓪
①	①
②	②
③	③
④	④
⑤	⑤
⑥	⑥
ⓧ	⑦
ⓧ	⑧
ⓧ	⑨

ILLNESS AND INJURY HISTORY

7. Do you presently have an illness that would adversely affect your performance during AIT?

⓪ No
① Yes

Please keep in mind, 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.

8. Do you presently have an injury that would adversely affect your performance during AIT?

⓪ No
① Yes

9. Were you injured during Basic Combat Training (BCT)?

⓪ I was NOT injured in BCT ***Skip to question #19.***

① I was injured in BCT

10. If you were injured during BCT, how many injuries did you experience? *Fill in the bubble that has the number of injuries you experienced during BCT.* ***(Select one)***

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

If you experienced an injury during BCT, please answer the following questions. If you experienced more than 1 injury during BCT, please answer the following questions for your **MOST RECENT** injury.

11. When did your **most recent** injury occur during BCT?

Year ① 2016 ② 2017

Month	① Jan	② Feb	③ Mar	④ Apr	⑤ May	⑥ Jun	⑦ Jul	⑧ Aug	⑨ Sep	⑩ Oct	⑪ Nov	⑫ Dec

12. This injury was: ***(Select <u>one</u>)***

⓪ a new injury (that occurred for the first time)
① a re-injury (related to an injury experienced prior to BCT)

13. What was the primary body part injured in your **<u>most recent</u>** injury during BCT? ***(Select <u>one</u>)***

① Head/face
② Neck
③ Shoulder
④ Upper arm (e.g., bicep, tricep)
⑤ Lower arm (e.g., forearm)
⑥ Elbow
⑦ Wrist
⑧ Hand/Fingers
⑨ Chest/ribs
⑩ Upper back
⑪ Abdominal area
⑫ Lower back
⑬ Spine
⑭ Hip
⑮ Pelvic area
⑯ Upper leg (e.g., thigh, hamstring)
⑰ Knee
⑱ Lower Leg (e.g., calf, shin)
⑲ Ankle
⑳ Foot
㉑ Heat/cold injury – non-specific body part

14. What was the type of your **<u>most recent</u>** injury during BCT? ***(Select <u>one</u>)***

① Sprain (ligament or joint)
② Strain (tendon or muscle)
③ Dislocation (joint)
④ Broken/fractured bone
⑤ Bruise (contusion)
⑥ Scrape/abrasion
⑦ Cut/laceration/puncture
⑧ Tendonitis or bursitis
⑨ Nerve injury
⑩ Traumatic brain injury (e.g., concussion)
⑪ Blister
⑫ Burn
⑬ Pain
⑭ Heat or cold injury (e.g., heat exhaustion, frostbite)
⑮ Tear (muscle/ligaments/meniscus/cartilage)
⑯ Spinal injury (e.g., bulging or slipped disk)
⑰ Other (please specify) |___|___|___|___|___|___|___|___|

15. What activity was associated with your **<u>most recent</u>** injury during BCT? ***(Select <u>one</u>)***

① Running (for unit or personal PT)
② Weight lifting (e.g., using free weights, dumbbells, kettlebells, hammer-strength machines, etc. for unit or personal PT)
③ Physical training other (e.g., agility drills, interval training, etc.) (please specify)
|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|
④ Lifting or moving heavy objects (not weight training)
⑤ Repairing or maintaining equipment
⑥ Riding, driving, or moving in/around a motorized vehicle
⑦ Rough-housing or fighting or wrestling
⑧ Combatives training
⑨ Sports/recreation (e.g., football, basketball, soccer, skiing, etc.)
⑩ Climbing (e.g., climbing a ladder, into a vehicle, etc.)
⑪ Walking or hiking
⑫ Marching - with load
⑬ Marching - no load
⑭ Other (please specify) |___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|

16. Related to the activity named above, what caused your **most recent** injury during BCT? ***(Select one)***

① Falling onto an object/surface/the ground
② Contacting (hit by/against) an object/surface (please specify object)
|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|___|
③ Cutting or puncture by a sharp tool, object or instrument
④ Directly contacting a person
⑤ Overuse/repetitive use
⑥ Single overexertion/over-extension/twisting effort
⑦ Contact with fire, hot substance or object, or steam
⑧ Exposure to temperature (hot or cold)
⑨ Animal bite
⑩ Insect bite
⑪ Other (please specify) |___|___|___|___|___|___|___|___|___|___|___|___|

17. For your **most recent** injury during BCT, were you seen by a medical professional (e.g., medic, nurse, doctor, physician assistant, athletic trainer, physical therapist, etc.)?

⓪ No
① Yes

18. For your **most recent** injury during BCT, were you put on temporary profile or limited duty?

⓪ No
① Yes

If YES, please enter the number of days were you were on temporary profile or had limited duty, ONE number to a box:

			days

PHYSICAL TRAINING (PT) DURING BCT

The following questions will ask about these physical training activities during BCT:

Distance running: Running continuously for 1 mile or greater.
Sprint or interval training: 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.
Agility training: Agility drills are drills requiring lateral movements, typically using cones or ladders, obstacle course, etc.
Resistance training: Resistance training is weight lifting using free weights, dumbbells, kettlebells, hammer-strength machines, etc.

Distance running: Running continuously for 1 mile or greater.

19. For physical training during BCT, on average, how many <u>times per week</u> did you perform distance running? ***(Select <u>one</u>)***

Times per week	⓪	①	②	③	④	⑤	⑥	⑦	⑧
	Did not perform	1	2	3	4	5	6	7	> 7

20. For physical training during BCT, each time you ran, on average, how many <u>miles</u> did you run? ***(Select <u>one</u>)***

Miles per run	⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
	Did not perform	1	2	3	4	5	6	7	8	9	10	> 10

Sprint or interval training: 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.

21. For physical training during BCT, on average, how many <u>times per week</u> did you perform sprint or interval-style running? ***(Select <u>one</u>)***

Times per week	⓪	①	②	③	④	⑤	⑥	⑦	⑧
	Did not perform	1	2	3	4	5	6	7	> 7

22. For physical training during BCT, on average, how many <u>minutes</u> did you perform sprints or interval training each time you performed it? ***(Select <u>one</u>)***

Minutes per event	⓪	①	②	③	④	⑤	⑥	⑦
	Did not perform	10	20	30	40	50	60	> 60

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

23. For physical training during BCT, on average, how many <u>times per week</u> did you perform agility drills? ***(Select <u>one</u>)***

Times per week	⓪	①	②	③	④	⑤	⑥	⑦	⑧
	Did not perform	1	2	3	4	5	6	7	> 7

24. For physical training during BCT, on average, how many <u>minutes</u> did you perform agility drills each time you performed it? ***(Select <u>one</u>)***

Minutes per event	⓪	①	②	③	④	⑤	⑥	⑦
	Did not perform	10	20	30	40	50	60	> 60

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

25. For physical training during BCT, on average, how many times per week did you perform resistance training? ***(Select one)***

Times per week	⓪ Did not perform	① 1	② 2	③ 3	④ 4	⑤ 5	⑥ 6	⑦ 7	⑧ > 7

26. For physical training during BCT, on average, how many minutes did you perform resistance training each time you performed it? ***(Select one)***

Minutes per event	⓪ Did not perform	① 10	② 20	③ 30	④ 40	⑤ 50	⑥ 60	⑦ > 60

TOBACCO USE

Please answer these questions with regard to your past and current tobacco use.

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

⓪ No
① Yes

28. During the 30 days prior to BCT, on how many days did you smoke cigarettes? *Enter number of days in the boxes below, ONE number to a box. Enter 00 if you did not smoke during the 30 days prior to BCT.*

		days

29. During the 30 days prior to BCT, on the days you smoked, how many cigarettes did you smoke per day on average? *Enter number of cigarettes per day in the boxes below, ONE number to a box. Enter 00 if you did not smoke during the 30 days prior to BCT.*

		cigarettes

30. Have you **ever** used smokeless tobacco (e.g., chewing tobacco, snuff, dip, etc.) **even one time**?

⓪ No
① Yes

31. During the 30 days prior to BCT, on how many days did you use smokeless tobacco? *Enter number of days in the boxes below, ONE number to a box. Enter '00' if you did not use smokeless tobacco in the last 30 days.*

		days

32. E-cigarettes are battery-powered devices that usually contain liquid nicotine and do not produce smoke. Have you **ever** used an e-cigarette **even one time**?

⓪ No
① Yes

33. During the 30 days prior to BCT, on how many days did you use e-cigarettes? *Enter number of days in the boxes below, ONE number to a box. Enter '00' if you did not use e-cigarettes during the 30 days prior to BCT.*

		days

Thank you for completing this questionnaire.

Appendix E

BCT Unit Physical Training Data

Tables E-1 and E-2 summarize unit physical training (PT) during BCT.

- For men and women combined, 1,801 Trainees (96%) with completed surveys reported unit PT activity frequencies and durations during BCT.
- Ninety-eight percent of men and women, respectively, conducted distance running for unit PT. Men averaged 6.0 miles (± 3.2 miles) of distance running per week while women averaged 5.6 miles (± 3.2 miles) of distance running per week (p=0.01).
- Ninety-eight percent of men and women, respectively, conducted sprints for unit PT. Men averaged 49.4 minutes (± 31.8 minutes) of sprints per week while women averaged 49.0 minutes (± 32.5 minutes) of sprints per week (p=0.85).
- Seventy percent of men and women, respectively, conducted agility drills for unit PT. Men averaged 36.7 minutes (± 43.6 minutes) of agility drills per week while women averaged 40.2 minutes (± 44.6 minutes) of agility drills per week (p=0.14).
- Thirty-two percent of men and 22% of women conducted resistance training for unit PT. Men averaged 20.7 minutes (± 41.7 minutes) of resistance training per week while women averaged 14.9 minutes (± 37.9 minutes) of resistance training per week (p<0.01).

Table E-1. Average Unit Physical Training during BCT (n=1,801)

Unit PT exercise	Men		Women		t test p-value
	n	Total miles/minutes Mean ± SD*	n	Total miles/minutes Mean ± SD*	
Distance Running (miles/week)	1,310	6.0 ± 3.2	454	5.6 ± 3.2	0.01
Sprints (min/week)	1,316	49.4 ± 31.8	449	49.0 ± 32.5	0.85
Agility Drills (min/week)	1,326	36.7 ± 43.6	450	40.2 ± 44.6	0.14
Resistance training (min/week)	1,338	20.7 ± 41.7	463	14.9 ± 37.9	< 0.01

Note: *Standard deviation

- Among those who performed distance running for unit PT, approximately one-third averaged 2-3 distance runs per week, respectively. About half of respondents ran an average of 2 miles per run.
- Among those who performed sprints for unit PT, 44% ran sprints twice per week. Approximately one-third sprinted an average of 20-30 minutes each time they ran sprints, respectively.
- Among those who performed agility drills for unit PT, about one-quarter conducted agility drills an average of 1-2 times per week, respectively. Approximately one-third performed agility drills an average of 10-20 minutes each time they completed agility drills.
- Among those who conducted resistance training for unit PT, 36% averaged two sessions per week. Thirty-five percent of Trainees performed resistance training for an average of 20 minutes each time they conducted resistance training.

Table E-2. Unit Physical Training during BCT (n=1,738)

Variable	Categories	Men		Women		Total	
		n	(%)	n	(%)	n	(%)
Distance running frequency (per week)	Did not perform	21	(-)	12	(-)	33	(-)
	1	229	(17.8)	95	(21.5)	324	(18.8)
	2	448	(34.9)	131	(29.6)	579	(33.5)
	3	484	(37.7)	165	(37.3)	649	(37.6)
	4	78	(6.1)	36	(8.1)	114	(6.6)
	5	36	(2.8)	12	(2.7)	48	(2.8)
	6	7	(0.5)	3	(0.7)	10	(0.6)
	7	3	(0.2)	0	(-)	3	(0.2)
Distance running mileage (per distance run)	1	4	(-)	0	(-)	4	(-)
	2	73	(5.7)	120	(11)	193	(8.1)
	3	652	(50.7)	20	(1.8)	672	(28.3)
	4	420	(32.7)	5	(0.5)	425	(17.9)
	5	114	(8.9)	442	(40.4)	556	(23.4)
	6	25	(1.9)	32	(2.9)	57	(2.4)
Sprints frequency (per week)	Did not perform	13	(-)	3	(-)	16	(-)
	1	307	(23.8)	120	(27.2)	427	(24.7)
	2	604	(46.9)	152	(34.5)	756	(43.7)
	3	265	(20.6)	121	(27.4)	386	(22.3)
	4	62	(4.8)	26	(5.9)	88	(5.1)
	5	29	(2.2)	11	(2.5)	40	(2.3)

Variable	Categories	Men		Women		Total	
		n	(%)	n	(%)	n	(%)
	6	13	(1)	6	(1.4)	19	(1.1)
	7	3	(0.2)	3	(0.7)	6	(0.3)
	8	6	(0.5)	2	(0.5)	8	(0.5)
Minutes of sprints (per training session)	10	14	(-)	5	(-)	19	(-)
	20	326	(25.3)	136	(30.8)	462	(26.7)
	30	427	(33.1)	129	(29.3)	556	(32.1)
	40	400	(31)	145	(32.9)	545	(31.5)
	50	78	(6.1)	19	(4.3)	97	(5.6)
	60	17	(1.3)	2	(0.5)	19	(1.1)
	70	37	(2.9)	8	(1.8)	45	(2.6)
Agility drills frequency (per week)	Did not perform	403	(-)	128	(-)	531	(-)
	1	263	(28.6)	84	(26.2)	347	(20.1)
	2	277	(30.1)	103	(32.1)	380	(22)
	3	225	(24.5)	86	(26.8)	311	(18)
	4	72	(7.8)	20	(6.2)	92	(5.3)
	5	59	(6.4)	17	(5.3)	76	(4.4)
	6	19	(2.1)	9	(2.8)	28	(1.6)
	7	2	(0.2)	0	(-)	2	(0.1)
	8	2	(0.2)	2	(0.6)	4	(0.2)
Minutes of agility drills (per training session)	10	4	(-)	1	(-)	5	(-)
	20	347	(37.8)	97	(30.2)	444	(25.7)
	30	280	(30.5)	99	(30.8)	379	(21.9)
	40	196	(21.3)	95	(29.6)	291	(16.8)
	50	54	(5.9)	15	(4.7)	69	(4)
	60	9	(1)	1	(0.3)	10	(0.6)
	70	29	(3.2)	10	(3.1)	39	(2.3)
Resistance training frequency (per week)	Did not perform	901	(-)	361	(-)	1262	(-)
	1	95	(21.9)	17	(16.7)	112	(6.5)
	2	144	(33.2)	45	(44.1)	189	(10.9)
	3	127	(29.3)	24	(23.5)	151	(8.7)
	4	32	(7.4)	8	(7.8)	40	(2.3)
	5	24	(5.5)	5	(4.9)	29	(1.7)

Variable	Categories	Men		Women		Total	
		n	(%)	n	(%)	n	(%)
	6	6	(1.4)	3	(2.9)	9	(0.5)
	7	2	(0.5)	0	(-)	2	(0.1)
	8	4	(0.9)	0	(-)	4	(0.2)
Minutes of resistance training (per training session)	10	3	(-)	22	(-)	25	(-)
	20	110	(25.3)	36	(19.8)	146	(8.4)
	30	150	(34.6)	25	(13.7)	175	(10.1)
	40	114	(26.3)	12	(6.6)	126	(7.3)
	50	39	(9)	1	(0.5)	40	(2.3)
	60	2	(0.5)	6	(3.3)	8	(0.5)
	70	16	(3.7)	102	(56)	118	(6.8)