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14. ABSTRACT

The primary purpose of the Occupational Physical Assessment Test (OPAT) is to ensure all trainees can meet the physical demands of their intended MOS and reduce the risk of musculoskeletal injury. This study investigated the relationship between performance on the OPAT and attrition/separation from the U.S. Army beginning with the end of Initial Entry Training (IET) and continuing through the first two-year term of service. Between January and December 2016, a total of 1,181 basic trainees (948 men, 233 women) performed the OPAT within the first two weeks of starting IET. From that initial population, 775 trainees (651 men and 124 women) provided additional consent to follow their attrition/retention over the course of their first unit assignment, a 2-year period (2016-2018) from when they commenced IET. The men were training for one of seven physically demanding, combat arms military occupational specialties (MOSs) and the women were from physically demanding, non-combat arms physically demanding MOSs. The OPAT consisted of four events: standing long jump (SLJ), seated power throw (SPT), strength deadlift (SDL), and interval aerobic run (IAR). The overall OPAT score was dependent upon the trainee's lowest scored event. 76% of the women and 22% of the men did not pass the OPAT at the Gold PDC (lowest physical demands) level. Alternatively, 67% of men and only 2% of the women passed the OPAT at the Black/Heavy PDC level.

Attrition data were collected for the two-year period beginning with trainees' arrival at IET. Over the course of IET, 15% of the trainees had attrited. By the end of the first two-yr term of service, nearly 25% of the original sample had attrited and the rates were similar between men (25%) and women (30%). There were no differences in age, height, and body mass at entry between Soldiers who did not attrit (retained) and those who attrited from service. At the two-year mark, the top three reasons for attriting were related to medical (10.2%), performance (includes marksmanship, land navigation and other measured skills) (7.4%) and misconduct (4.5%). The overall OPAT performance was not associated with two-yr attrition. For the individual event scores, the SLJ and SDL, were not related to two-yr attrition, but lower scores on the IAR and SPT were. More specifically, Trainees in the IAR Gray/Significant PDC were 1.6 times more likely to attrit than the Black/Heavy PDC while the SPT Gold/Moderate and the White/Not Prepared groups were 2.7 and 3.0 times more likely to attrit than the Black/Heavy PDC, respectively. There were no significant differences in the hazard ratios between sex and OPAT level.

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USARIEM TECHNICAL REPORT T23-008

**U.S. ARMY OCCUPATIONAL PHYSICAL ASSESSMENT TEST (OPAT):
ATTRITION AND RETENTION LONGITUDINAL VALIDATION STUDY (2016-2018)**

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LIST OF ACRONYMS

AFHSD	Armed Forces Health Surveillance Division
ASVAB	Armed Services Vocational Aptitude Battery
ATRRS	Army Training Resources and Requirements System
CI	Confidence Interval
CIMT	Center for Initial Military Training
CMTS	Criterion Measure Task Simulation
CPDT	Critical Physically Demanding Tasks
FAASV	Field Artillery Ammunition Supply Vehicle
IAR	Interval Aerobic Run
IET	Initial Entry Training
MAPS	Minimal Acceptable Performance Standard
MOS	Military Occupational Specialty
OPAT	Occupational Physical Assessment Test
PDC	Physical Demands Category
PDS	Physical Demands Study
SDL	Strength Deadlift
SLJ	Standing Long Jump
SPT	Seated Power Throw
TRADOC	Training and Doctrine Command
TRANSPROC	Transition Processing
USAREC	United States Army Recruiting Command
USARIEM	U.S. Army Research Institute of Environmental Medicine
DCPH-A	Defense Centers for Public Health – Aberdeen

EXECUTIVE SUMMARY

The primary purpose of the Occupational Physical Assessment Test (OPAT) is to ensure all trainees can meet the physical demands of their intended MOS and reduce the risk of musculoskeletal injury. This study investigated the relationship between performance on the OPAT and attrition/separation from the U.S. Army beginning with the end of Initial Entry Training (IET) and continuing through the first two-year term of service. Between January and December 2016, a total of 1,181 basic trainees (948 men, 233 women) performed the OPAT within the first two weeks of starting IET. From that initial population, 775 trainees (651 men and 124 women) provided additional consent to follow their attrition/retention over the course of their first unit assignment, a two-year period (2016-2018) from when they commenced IET. The men were training for one of seven physically demanding, combat arms military occupational specialties (MOSs) and the women were from physically demanding, non-combat arms physically demanding MOSs. The OPAT consisted of four events: standing long jump (SLJ), seated power throw (SPT), strength deadlift (SDL), and interval aerobic run (IAR). The overall OPAT score was dependent upon the trainee's lowest scored event, where 76% of the women and 22% of the men did not pass the OPAT at the Gold physical demands category (PDC) (lowest passable physical demands standard) level. Alternatively, 67% of men and only 2% of the women passed the OPAT at the Black/Heavy PDC (heaviest physical demands) level.

Attrition data were collected for the two-year period beginning with trainees' arrival at IET. Over the course of IET, 15% of the trainees had attrited. By the end of the first two-year term of service, nearly 25% of the original sample had attrited and the rates were similar between men (25%) and women (30%). There were no differences in age, height, and body mass at entry between Soldiers who did not attrit (retained) and those who attrited from service. At the two-year mark, the top three reasons for attriting were related to medical (10.2%), performance (includes marksmanship, land navigation and other measured skills) (7.4%), and misconduct (4.5%). The overall OPAT performance was not associated with two-year attrition. For the individual event scores, the SLJ and SDL, were not related to two-year attrition, but lower scores on the IAR and SPT were. More specifically, Trainees in the IAR Gray/Significant PDC were 1.6 times more likely to attrit than the Black/Heavy PDC while the SPT Gold/Moderate and the White/Not Prepared groups were 2.7 and 3.0 times more likely to attrit than the Black/Heavy PDC, respectively. There were no significant differences in the hazard ratios between sex and OPAT level.

Our earlier work had shown that as OPAT performance category decreased (i.e., achieving a lower PDC level), risk of attrition from IET increased. However, this study examined the association of the OPAT and attrition during the first two years of military service. With the current study population, the overall OPAT score would not be able to make that distinction. Alternatively, the OPAT individual IAR event may be useful in predicting those trainees who are prepared physically and likely to be retained through their first term of service. The OPAT individual SPT event may be useful in determining whether a recruit is unprepared for shipping to training.

INTRODUCTION

Recruitment, Attrition & Physical Fitness/Readiness

In 2016, the U.S. Department of Defense declared that 71% of America's youth between the ages of 17 and 24 would not meet the military's core eligibility requirements (10). Of the remaining 29%, only 13% would qualify, be available, and achieve a satisfactory score on the Armed Forces Qualification Test (11). In 2017, 11% (down from 13% in 2016) of 16- to 24-year-olds said they would definitely, or probably, be serving in the military in the next few years (12). This shrinking selection pool makes it difficult to reach the desired recruit quotas and makes it imperative that attrition rates are reduced so force readiness can be achieved. "The Occupational Physical Assessment Test (OPAT) is all about putting the right Soldier in the right job with the right abilities into the force and ready to fight" (13). Placing the right person in the right job will go a long way to improving force retention and readiness.

Attrition, separation, or discharge from Initial Entry Training (IET) and during the first term of service are most often for reasons cited as "medical issues existing prior to service", "failure to meet performance criteria" or "misconduct" (14). Ending military service for any reason results in a financial burden and an unprepared operational force. From Fiscal Year (FY) 2015 to FY 2017, the 12-month IET attrition incidence for the U.S. Army ranged from 9.6 to 11.6% of accessions (15). From 2010 to 2015, 12.3% of active component accessions attrited by the end of their first year in service (including IET) (16). According to a 2018 study (17) from FY2005 to FY2010 first term (e.g., two-years) attrition averaged 28%. In FY 2016, the average cost to recruit, in-process, and train Army future Soldiers attending Basic Combat Training (BCT) followed by the second phase of IET, Advanced Individual Training (AIT), was \$68.1K; the cost was \$50.6K for One Station Unit Training (OSUT where both BCT and AIT phases are conducted at one location) (18). Assuming approximately 70,000 recruits arrived at IET in any given year, an 11.6% attrition rate would equate to 8,120 first-year discharges, and at \$68.1K per Trainee, this would result in a \$553 million loss in training costs alone. This figure does not include signing bonuses in which up to 40,000 enlistees per year may be paid up to \$10,000 to attend IET and receive incremental \$10,000 installments over the remainder of their first term of service for up to \$40,000. Nor does it include the accompanied long-term costs associated with medical discharges. Attrition in IET directly affects the costs for recruiting and training as well as negatively impacts readiness of the operational units downstream that are scheduled to receive these trainees when they complete their IET (19).

Traditionally, physical readiness of military personnel was assessed through entry-level (recruits and trainees) and semi-annual (Soldiers) general physical fitness assessments of the legacy three-event Army Physical Fitness Test (APFT): push-ups, sit-ups, and two-mile run. Infantry basic trainees who were separated from service had lower APFT scores on all three test events (20). Another study (21) indicated that lower performance on any of the three APFT events resulted in a slightly higher risk of discharge. Aerobic

fitness levels have consistently predicted attrition, as poor performance on distance runs or multi-stage fitness tests have resulted in higher attrition/discharge from service (22, 23, 24, 25, 26, 27). Muscular endurance (push-ups/sit-ups) has also shown some evidence as predictor of poor performance resulting in higher attrition (28, 25). There is some evidence that lower muscular strength (reduced deadlift performance) and less muscular power (reduced standing long jump performance) result in higher attrition (9, 22), although these latter two physical fitness attributes have not been measured by assessments such as the legacy APFT.

The Assessment of Recruit Motivation and Strength (ARMS) study (29) was designed to pilot-test the use of a physical fitness screening tool for US Army applicants before basic training. The ARMS test consisted of a 5-minute step test and 2-minute push-up test. The pre-accession ARMS test performance was found to be significantly related to risk of attrition within 180 days in a study of 7,612 recruits between 2004 and 2005; the attrition hazard ratios for failing relative to passing the ARMS test were 2.27 (95% confidence interval [CI], 1.70 – 3.04) among female trainees and 1.36 (95% CI, 1.13 – 1.64) among male trainees. The attributable risk of attrition associated with failing the ARMS test was 40% among female subjects and 30% among male subjects. The ARMS study was the first prospective study conducted in the U.S. Army to assess physical fitness before accession. In other words, physical fitness and motivational factors were shown to correlate with attrition during initial entry training (29).

Other military services have also investigated the use of screening tools to predict attrition among military recruits. For example, from July 2012 to July 2014, injured US Air Force Basic Military Trainees with lower levels of aerobic (1.5 mi run) and muscular fitness (push-ups/sit-ups) were 3.01 times (95% CI = 2.85 – 3.18) as likely to be discharged, and injured trainees who did graduate were 2.88 times (95% CI = 2.72 – 3.04) as likely to graduate late (31). The Israeli Defense Force studied (30) the effectiveness of a modified version of the Ranger Test (MRT) in female light infantry soldiers. During the MRT, subjects wore an 8 kg load, and performed the maximum number of step-ups (0.4 m), while maintaining a pace of 25 steps per minute. The MRT score was a significant predictor of attrition, with each additional incremental increase in the MRT score reducing the attrition rate by 6.8% (OR=0.934; 95% CI, 0.895 – 0.975) (30). The Australian Defense Force utilized a 20 m Shuttle Run Time (20 mSRT) in their assessment of Recruit fitness (32). Recruits who scored poorly on the 20 mSRT were 25 times more likely to fail to complete training than the fitter recruits who scored highly (32). The British employed pull ups, static arm endurance, two-mile run (2 MR), and multi-stage fitness test along with anthropometric data to evaluate risk factors associated with medical discharge (27). Only the 2 MR remained a significant predictor in the multivariate analysis. Recruits with lower aerobic fitness had greater risks of medical discharge referral. These results agree with findings in both U.S. and Australian military populations. The explanation for the importance of aerobic fitness in determining training injuries is likely to be those individuals with lower aerobic fitness experience greater physical strain for any given task (27).

Phase one of the OPAT Longitudinal Validation study (33) prospectively evaluated the association of OPAT performance at the beginning of IET with final attrition from IET. Findings from phase one demonstrated that among sexes combined and men alone, achievement on the overall OPAT was inversely associated with IET attrition. Trainees in the lowest performing category had significantly higher IET attrition compared to trainees that met the standard for the highest performing level. Among sexes combined, there were significant inverse trends for IET attrition on the Strength Deadlift (SDL) and Interval Aerobic Run (IAR) events, such that final attrition risk increased as event performance decreased. Among men and women separately, men in the lowest (White; 'Not Prepared') OPAT performance category on the IAR event and women in the lowest (White; 'Not Prepared') performance category on the SPT and IAR events had significantly higher attrition compared to trainees in the respective highest (Black; 'Heavy') PDC within sex (33).

Occupational Physical Assessment Test development

Many military organizations utilize some form of pre-employment occupational screening. The United Kingdom's Army requires recruits to lift a weighted bag to a height of 1.45 m, carry 20-kg water cans and perform a 2.4-km run to qualify for a specific job (34). The Australian Army requires Soldiers to pass the 20 mSRT, push-ups and sit ups to a required standard for entrance, while trained Soldiers must pass occupational-specific performance standards after assignment to an occupation (35). The U.S. Army implemented the OPAT as a pre-enlistment screening test for all recruits beginning January 2017 (13). Previously, the U.S. Army relied on the Armed Services Vocational Aptitude Battery (ASVAB) which measures the four domains of verbal, math, science/technical and spatial to determine the best job for applicants. In 2013, the U.S. Army removed the direct ground combat exclusion rule thereby opening all Military Occupation Specialties (MOS)/jobs to women. The U.S. Army Research Institute of Environmental Medicine (USARIEM) was tasked by the U.S. Army Training and Doctrine Command (TRADOC) to conduct a multi-year research study following Federal guidelines (36) and best accepted practices (37) to identify gender-neutral physical fitness tests which appropriately predict performance on physically demanding tasks of seven combat arms MOSs (11B Infantryman, 11C Infantryman-Indirect Fire, 12B Combat Engineer, 13B Cannon Crewmember, 13F Fire Support, 19D Cavalry Scout, and 19K Armor Crewman).

TRADOC developed a list of 32 Critical Physically Demanding Tasks (CPDTs) relevant to the seven-combat arms MOSs. USARIEM then conducted the Physical Demands Study (PDS) that included three research studies. The first study (9, 38) was a job analysis that measured the physiological requirements of the CPDTs of each MOS. Of those 32 CPDTs, the eight most physically demanding tasks across these MOSs were identified from these data. A criterion measure task simulation (CMTS) was developed that replicated the physiological demands for each of eight tasks. Additionally, USARIEM conducted Job Analysis Questionnaires (39-42) wherein Soldiers were asked to rate the frequency, importance, and expectation regarding their MOS specific and

common occupational tasks performance. The second study (2) determined the reliability of the 8 CMTSs. Finally, predictor test batteries using cost, space, and time-efficient physical fitness tests were selected in the third study (6, 9) to screen recruits into the combat arms MOSs.

The eight CMTS, representing the CPDTs, identified for the seven-combat arms MOSs included tactical foot march, build a fighting position with sandbags, move under direct fire, evacuate a casualty from a vehicle, drag a casualty to safety, reload a Field Artillery ammunition supply vehicle (FAASV), reload the Abrams tank, and fire the main gun on an Abrams tank. Five of the MOSs had a common set of CMTSs (11B, 11C, 12B, 13F and 19D) and two MOSs (13B and 19K) had CMTSs that were unique to each job (Table 1).

Table 1. CPDTs by task type for each of the seven-combat arms MOSs.

	11B, 11C, 12B, 13F, 19D (Common Task MOSs)	13B	19K
Load Carriage	Foot March		Foot March
Repeated Lift and Carry	Prepare a Fighting Position	Transfer Ammo with a FAASV	Stow Ammo on an Abrams
Heavy Drag	Casualty Drag	Casualty Drag	Casualty Drag
Heavy Lift	Casualty Evacuation	Transfer Ammo with a FAASV	Casualty Evacuation
Controlled Heavy Transfer			Load Main Gun on an Abrams
Agility	Move Under Direct Fire		Move Under Direct Fire

Grayed cells indicate MOS(s) had no task in that physical domain.

In the next OPAT validation step, fourteen field predictor physical fitness tests from the domains of muscular strength, muscular endurance, muscular power, aerobic capacity, and agility were considered in order to predict CMTS performance. A series of regression analyses were conducted to predict performance of the CMTSs from the predictor tests. A set of four physical fitness predictor tests (called the OPAT) were selected that best predicted CMTS performance for all seven-combat arms MOSs (1, 2). The four event OPAT consists of the standing long jump (SLJ) to measure lower-body power, seated power throw (SPT) to measure upper-body power, the strength deadlift (SDL) to measure lower-body strength, and the interval aerobic run (IAR) to measure aerobic capacity.

All research to select the OPAT predictor tests was conducted on fully trained men in the combat arms MOSs and fully trained women from MOSs with comparable high physical demands (1, 2). Women were recruited from other MOSs because there were

no women serving in these combat arms jobs at the time of this study's data collection. The trained Soldiers performed both the OPAT and the CMTSs within a two-week period (concurrent validation). To ensure the OPAT accurately predicted the performance of new recruits at the end of IET, it was essential to conduct a predictive or longitudinal validation study.

While phase one of the OPAT longitudinal validation study was being conducted, the U.S. Army determined the OPAT would be used in the recruiting stations beginning in January 2017 to screen all incoming recruits (not just limited to combat arms MOSs) to assign them to an MOS for which they had the necessary physical readiness. TRADOC's Center for Initial Military Training (CIMT) set the standards, or cut-scores, for each OPAT test event (see Table 1). To ensure Soldiers can perform all the CMTSs, recruits must meet the minimum score on each OPAT test event to begin training in an MOS. The test event with the lowest performance level dictates the overall OPAT Physical Demand Category (PDC) achieved. Because the standards are based on the task requirements, all standards are independent of sex and age. All recruits are required to meet the same cut-score to begin training for a particular MOS.

TRADOC matched the current three PDC levels to a number of physically demanding MOSs: heavy (or **Black**, which includes all seven-combat arms MOSs and other very physically demanding occupations), significant (or **Gray**) and moderate (or **Gold**) physical demands. TRADOC leaders from each MOS determined which category was most appropriate for the MOS based on Subject Matter Expert identified physically demanding tasks. The **Black** category standards were based on the data collected for the combat arms MOSs. Those in the **White** category were deemed "*not yet ready to begin training.*" and instructed to physically train on their own, or with the recruiter, before returning to retest. The PDC definitions and required OPAT event cut-scores are listed in Table 2.

Table 2. TRADOC determined PDC performance cut-scores for the OPAT events.

Physical Demand Level*	Standing Long Jump Cut-Score	Seated Power Throw Cut-Score	Strength Deadlift Cut-Score	Interval Run Cut-Score (Level-shuttle #)
Black (Heavy)	160cm; 5'3"	450cm; 14'9"	72.7 kg	43 Shuttles (6-2)
Gray (Significant)	140cm; 4'7"	400cm; 13'1"	63.6 kg	40 Shuttles (5-8)
Gold (Moderate)	120cm; 3'11"	350cm; 11'6"	54.5 kg	36 Shuttles (5-4)
White (Not Prepared)	Any event score below Gold (Moderate).			

Study Purpose

The purpose of this second phase of the study, and this report, was to determine the relationship between the OPAT PDC and attrition from the U.S. Army during Initial Entry Training (IET) through the first two-year term of service. It was hypothesized that higher OPAT performance would be associated with lower attrition rates during the first term of service.

METHODS

Subjects

A total of 1,181 trainees (948 men, 233 women) completed the OPAT within the first two weeks of starting IET. A total of 775 trainees in the Army active component (651 men and 124 women) provided consent to researchers to follow their attrition/retention over the course of IET (Phase I) (33), from IET graduation through their first unit assignment (Phase II), roughly a two-year period (704 days from 2016-2018) from when they started IET. Trainees were not required to pass the OPAT PDC standard for their job prior to starting training, as the OPAT was not yet a formal requirement for incoming recruits at that time. Volunteers were briefed on all the testing requirements and signed a consent form prior to participation. See Appendix H for sample consent form.

Men enrolled in this study were training in IET for MOSs that had been categorized as a 'Heavy' (Black) PDC level (e.g., from Combat Arms MOSs), whereas most of the women enrolled were training in MOSs categorized as 'Significant' (Gray) or 'Moderate' (Gold) PDC level (e.g., 31B Military Police; 74D Chemical, Biological, Radiological and Nuclear Specialist). Data were collected from recruits during 27 field studies from January 2016 to December 2016. Field studies were conducted at the following IET sites: Ft. Benning, GA (Infantry and Armor, men only); Ft. Sill, OK (Field Artillery men and women, plus women from other MOSs) and Ft. Leonard-Wood, MO (Combat Engineer men and women, plus women from other MOSs).

OPAT Events

Trainees performed all OPAT testing within the first two weeks of beginning IET. Most testing was conducted while trainees were still in the reception station, prior to beginning IET, while wearing the Army Physical Fitness Uniform (APFU). All OPAT events were completed on the same day. Trainees were divided into groups of 6 to 10. Each group was randomly assigned to begin at one of three OPAT event stations (standing long jump (SLJ), seated power throw (SPT), and strength deadlift (SDL)) and rotated through each station as a group. Each group then performed the interval aerobic run (IAR) last.



Trainees began the SLJ test standing behind a line marked on a broad jump mat (Sportime 22x144 in Standing Long Jump Test Mat, Sport Books Publisher, Niagara Falls, NY) with feet slightly apart. A two-foot take-off and landing was used with swinging of the arms (countermovement) and bending of the knees to provide forward drive. Trainees were instructed to jump as far as possible, landing on both feet without falling backwards. The distance of the jump was measured from the starting line to the back

Figure 1. Standing Long Jump (SLJ)

of the trainee's feet. Three trials were conducted, with roughly 30 seconds of rest between trials. The two furthest jumps were averaged to determine an overall score.



Trainees began the SPT test in a seated position on the floor with their legs straight out and slightly apart in front of them. Trainees held a 2-kg medicine ball with both hands. On command, the recruit touched the ball to their chest and pushed/putted the ball at a 45-degree angle as far forward as possible. The distance between the landing point and the wall was measured. Trainees were given two practices and three recorded trials, with roughly 30 seconds of rest between trials.

Figure 2. Seated Power Throw (SPT)

The distance of each trial was recorded. If there was more than a 10% difference between the three scores, they were given up to two additional trials. The two highest trials were averaged to determine an overall score. During the current study, Trainees were seated on the floor with a yoga block placed at their lower back to help prevent the shoulders from moving away from the wall.



Figure 3. Strength Deadlift (SDL)

Trainees began the SDL test in a standing position with their feet shoulder-width apart. They squatted down to grasp the handles of the barbell at their sides and lifted the barbell to a full standing position. The strength deadlift was performed using hexagon barbells (Rogue TB-2 Trap Bar, Columbus, OH) and standard weighted bumper plates (Diamond Pro Bumper Plates, Decatur, AL). The loads lifted were 60-, 100-, 140-, 180-, and 220 lbs. (a range of 27.3 kg-100 kg). The trainees were given instructions on proper

lifting technique prior to beginning the test. The starting weight was 60 lbs. (27.3 kg) with trainees completing three lifts at this weight to warm up and practice a safe lifting technique. The weight was increased by 40 lbs. (18.2 kg) with each subsequent single lift, with one minute of rest between lifts. This was repeated until the recruit had reached the heaviest weight they could lift, up to a maximum weight of 220 lbs. (100 kg). Study team members ensured proper lifting technique was maintained (e.g., head and back neutral, chest up, and straight arms). If trainees displayed poor form during the lift (e.g., rounded back, head looking up or down, or knees caving in/knocked knees), they were not permitted to lift more weight. The heaviest weight lifted with correct form was recorded.



Figure 4. Interval Aerobic Run (IAR)

Trainees began the IAR test by standing behind the starting line, facing a second line 20 meters away. When instructed by a recording, trainees began running at a slow pace back and forth between the two lines. Trainees continued running between the two lines, placing at least one foot on the opposite line and turning when signaled by the recorded beeps. After each minute, a different tone indicated an increase in speed, and the beeps sounded closer together. If the line was not reached before

the beep sounded; the recruit was given a warning. They were expected to finish running to the line, turn and catch up with the pace within two more 'beeps.' The test was stopped when the recruit failed to reach the line for two consecutive beeps after missing the first beep or when the recruit voluntarily stopped. The total number of

shuttles successfully completed (reached the line prior to the beep) was recorded. The IAR was always performed last of all events.

OPAT Cut-Scores

Additional modeling allowed for the development of contingency and expectancy tables that helped TRADOC identify appropriate PDC cut-score options for the OPAT in new recruits. Specifically, the expectancy tables provided details on the sensitivity and specificity measures observed for a range of possible cut-scores based on the passing criteria for the CMTS provided by TRADOC. TRADOC then utilized the information to set policies concerning appropriate OPAT PDC cut-scores in the IET setting as reported in Table 2. These TRADOC cut-scores were used to describe the OPAT event performance for the trainees in this study.

The overall OPAT PDC required soldiers seeking to enter the most physically demanding MOSs to score in the Heavy/Black PDC category or above in all four events. If a soldier scored in the Black-Heavy category for 3 events and the Gold-Moderate category for 1 event the final PDC was Gold-Moderate for that Soldier.

Longitudinal Databases & First-Term Attrition Determination

During the briefing and consent, study volunteers had the option to authorize access to their electronic information allowing researchers to follow them for service status (attrition date and reason code), injuries during IET as well as for up to their first two years in the Army. The trainees' Social Security number (SSN), or Department of Defense (DOD) identification number (DoDID), were used as the common code for obtaining these data. At the end of two years, subjects were coded as either having remained ('retained') in the Army, or attrited (separated/discharged) from military service. Attrition data during IET were obtained from the Army Training Resources and Requirements System (ATRRS), while the Transition Processing (TRANSPROC) and the Armed Forces Health Surveillance Division (AFHSD) databases were used to identify attrition/discharge dates and types of discharges during the first two years among the study volunteers.

Statistical Analyses

Descriptive statistics (frequencies and percentages) were used to describe participant characteristics and OPAT performance. OPAT performance was described by the sex-neutral TRADOC PDC level achieved on each of the individual OPAT events (Table 2), or as presented for the overall OPAT score (which was equivalent to the lowest PDC level achieved from among the four OPAT events). Raw event performance means and quartiles were reported for the SPT, SLJ and IAR events, and three weight categories were reported for the SDL event. Raw event performance data by sex and attrition status was analyzed with analysis of variance (ANOVA). After determining that Cox

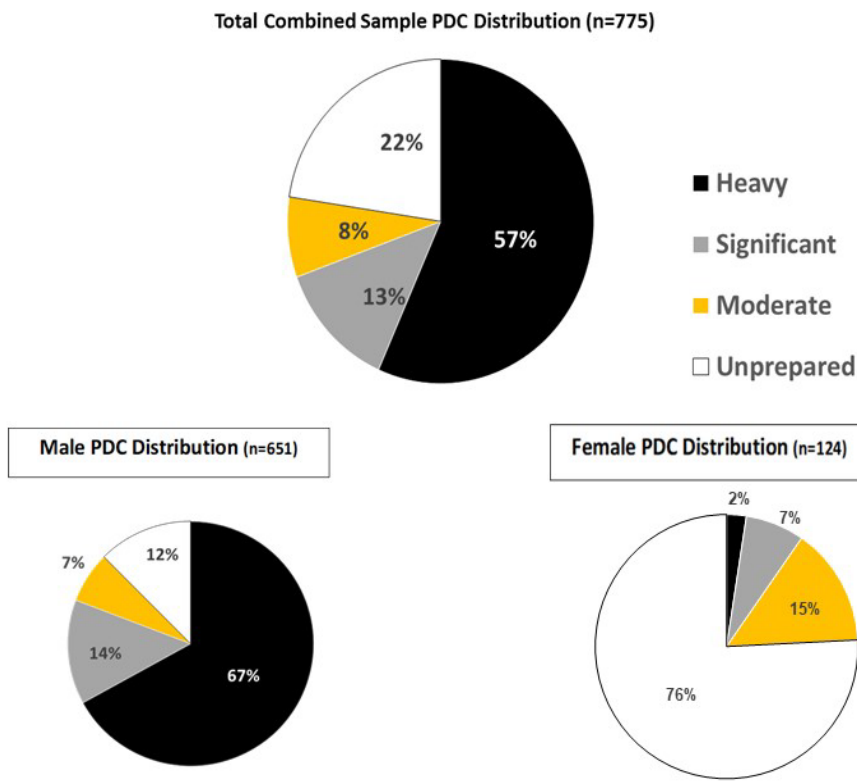
regression (univariate and multivariate) models met proportionality assumptions, the models provided hazard ratios and 95% confidence intervals (CIs) that were adjusted for sex and were used to determine if OPAT performance was associated with attrition. Cox regression analyses were run for the overall OPAT PDC achieved as well as for the PDC achieved in each of the four individual events. In Cox regression, a hazard ratio of 2 means the event will occur twice as often at each time point given a one-unit increase in the predictor (43). IBM SPSS Statistics for Windows, Version 25 was used for descriptive analyses, ANOVA, and Cox regression. For all statistical analyses, $\alpha \leq 0.05$ was set a priori.

RESULTS

Phase I Physical Demand Category (PDC) Sample Distribution (Figure 5)

Upon entering IET, 57% of the total combined (male and female) study sample population passed the OPAT at the Black-Heavy PDC level, whereas 67% of males and only 2% of the females passed the OPAT at the Black-Heavy PDC level. Alternatively, 76% of the females and 12% of the males scored in the White-Unprepared PDC level indicating they were unprepared to ship to training.

Figure 5. Physical Demand Category Sample Distribution: Total, Male and Female



PDC Level	Combined Subjects	Male Subjects	Female Subjects
Black	439	436	3
Gray	99	90	9
Gold	62	44	18
White	175	81	94
Total	775	651	124

Attrition by Phase, PDC and Sex (Tables 3, 4, and 5)

Out of the 775 trainees who consented to the longitudinal follow-up portion of the OPAT study, 118 trainees, or 15.2%, attrited during IET (Phase I). Of the remaining 657 IET graduates starting their first duty station (Phase II), 74, or 11.3% attrited. The Overall attrition rate for the entire two-year follow-up study was 24.8% (men: 23.8%; women: 29.8%).

Table 3. Combined Men and Women Attrition by Phase and PDC

		Phase I (IET)			Phase II (IET Graduation to Two-year)			Overall		
		Attritted			Attritted			Attritted		
		Total Participants	n	%	Total Participants	n	%	Total Participants	n	%
Combined	Black	439	58	13.21	381	35	9.19	439	93	21.18
	Gray	99	19	19.19	80	9	11.25	99	28	28.28
	Gold	62	11	17.74	51	8	15.69	62	19	30.65
	White	175	30	17.14	145	22	15.17	175	52	29.71
	Total	775	118	15.23	657	74	11.26	775	192	24.77

Table 4. Male Attrition by Phase and PDC

		Phase I (IET)			Phase II (IET Graduation to Two-year)			Overall		
		Attritted			Attritted			Attritted		
		Total Participants	n	%	Total Participants	n	%	Total Participants	n	%
Men	Black	436	57	13.07	379	35	9.23	436	92	21.10
	Gray	90	18	20.00	72	9	12.50	90	27	30.00
	Gold	44	8	18.18	36	4	11.11	44	12	27.27
	White	81	14	17.28	67	10	14.93	81	24	29.63
	Total	651	97	14.90	554	58	10.47	651	155	23.81

Table 5. Female Attrition by Phase and PDC

		Phase I (IET)			Phase II (IET Graduation to Two-year)			Overall		
		Attritted			Attritted			Attritted		
		Total Participants	n	%	Total Participants	n	%	Total Participants	n	%
Women	Black	3	1	33.33	2	0	0.00	3	1	33.33
	Gray	9	1	11.11	8	0	0.00	9	1	11.11
	Gold	18	3	16.67	15	4	26.67	18	7	38.89
	White	94	16	17.02	78	12	15.38	94	28	29.79
	Total	124	21	16.94	103	16	15.53	124	37	29.84

Demographics of Trainees and Soldiers by Attrition Status (Table 6)

As shown in Table 6, there were no significant demographic differences between those who were retained and those who attritted from service in terms of age, height, and body mass. For further sample breakdown by sex see Appendix A.

Table 6. Demographics of Retained vs. Attritted population during Two-year follow-up.

		Retained Mean (SD)	Attritted Mean (SD)
Age (yrs)	All	20.5(3.0)	20.2(2.7)
	Men	20.7(3.1)	20.4(2.7)
	Women	19.8(2.3)	19.7(2.4)
Height (cm)	All	173.6(8.0)	172.3(8.2)
	Men	175.6(6.5)	175.1(6.7)
	Women	162.3(6.1)	161.0(5.3)
Body Mass (kg)	All	75.9(13.5)	75.6(14.6)
	Men	78.2(12.9)	78.8(13.8)
	Women	62.6(8.4)	62.3(9.5)

All = 775 trainees, Men = 651 trainees, Women = 124 trainees

OPAT Event Performance for Soldiers who Did Not Attrit (Retained) vs Attritted from Service during Two-year follow-up

At the start of IET, participants who did not attrit (retained) during IET vs. attritted from service after two years performed 6 more IAR shuttles ($p<0.05$). There were no other significant differences between the two groups regarding the performance on the other three OPAT events.

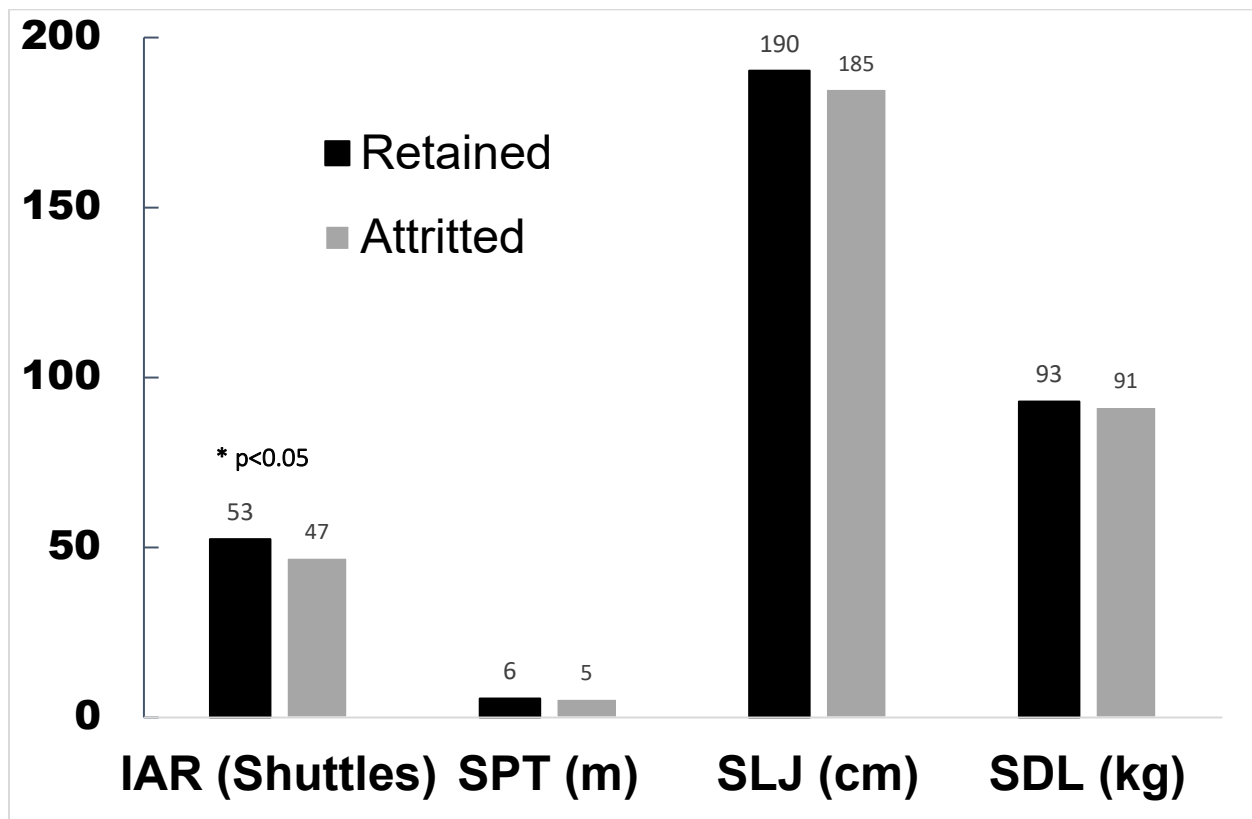


Figure 6. OPAT event performance for Soldiers who Did Not Attrit (Retained) vs Attritted from Service by the end of the two-year follow-up period.

Association of Overall OPAT Performance on Two-year Attrition

Results from the Cox regression analysis for the association of overall OPAT performance by PDC and two-year attrition are presented in Table 7. In this table, the Black/Heavy PDC is the referent group. For the sexes combined, the overall PDC achieved on the overall OPAT was not related to two-year attrition when adjusted for sex.

Table 7. Overall OPAT effects by PDC level on Attrition (Sexes combined; adjusted for sex)

	Physical Demand Category	Hazard Ratio	(95% CI)	p-value
OPAT *	Heavy	1.00		
	Significant	1.40	(0.91-2.14)	0.12
	Moderate	1.50	(0.90-2.49)	0.12
	Unprepared	1.45	(0.96-2.19)	0.08
	Sex	1.02	(0.65-1.58)	0.95

*OPAT= lowest performance category achieved by Trainee

Association of Individual OPAT Event Performance PDC on Two-year Attrition

IAR: The Significant group was 1.6 times more likely to attrite than Heavy (HR: 1.62; 95% CI, 1.05-2.51).

SPT: The Unprepared group was 3 times (HR: 3.03; 95% CI, 1.06-8.69) more likely to attrite than the Heavy group. The Moderate group was 2.7 times (HR: 2.74; 95% CI, 1.08-6.98) more likely to attrite than the Heavy group.

Performance on the SLJ and the SDL was not associated with attrition at the two-year/first term of service mark.

Table 8. Association of Individual OPAT Event Performance PDC and Two-year Attrition (sexes combined; adjusted for sex)¹

	Physical Demand Category	Hazard Ratio	(95% CI)	p-value
Interval Aerobic Run	Heavy	1.00		
	Significant	1.62	(1.05-2.51)	0.03
	Moderate	1.67	(0.98-2.85)	0.06
	Unprepared	1.42	(0.95-2.12)	0.09
	Sex	1.07	(0.70-1.63)	0.76
Seated Power Throw	Heavy	1.00		
	Significant	2.12	(0.98-4.61)	0.06
	Moderate	2.74	(1.08-6.98)	0.03
	Unprepared	3.03	(1.06-8.69)	0.04
	Sex	0.53	(0.23-1.24)	0.14
Standing Long Jump	Heavy	1.00		
	Significant	1.28	(0.80-2.07)	0.31
	Moderate	1.10	(0.60-2.02)	0.76
	Unprepared	1.52	(0.61-3.81)	0.37
	Sex	1.12	(0.69-1.80)	0.65
Strength Deadlift 3 Categories	100 kg	1.00		
	82 kg	1.48	(0.97-2.25)	0.07
	≤ 64 kg	1.11	(0.63-1.94)	0.72
	Sex	1.10	(0.68-1.78)	0.71

¹Hazard Ratios (95% CI) were adjusted for sex; those in **bold** are significant at the P<0.05 level.

For Phase I (during IET) Attrition Reasons: the number of combined (male + female) trainees that attrited was 118. Medical (n=57, 48%), Performance (n=55, 47%) and Misconduct (n=5, 4%) issues were the top grouped reasons for attrition/separation. See Table 9 for further breakdown by category.

For further detailed attrition reasons breakdown by subcategory and sex for both Phase I and Phase II, refer to Appendix B.

Table 9. Attrition Reasons for Combined (Male +Female) Trainees (n=118) Who Separated during Phase I (IET)

Attrition Reasons	Subtotal
Entry Level Separation (ELS) – failure to adapt	53
Legal	2
Medical - combat injury - severance pay	1
Medical - failed procurement standards–Existed Prior To Service	53
Medical - severance pay - enhanced	3
Misconduct - Drug	1
Misconduct - serious offense	1
Performance	1
Performance - entry level	1
Released from Active Duty (REFRAD)	1
Unknown	1
TOTAL	118

Attrition Reasons during Phase II (after IET completion through two-year mark)

There were 74 combined (male + female) Soldiers who attritted during Phase II. Misconduct (n=30 (41%)), medical (n=23 (31%)) and failure to pass the Army Physical Fitness Test (APFT)/ (n=7 (10%)) were the top grouped reasons for attrition/separation. Table 10 provides the distribution of attrition reasons by subcategories. See Appendix B for the sex-specific distribution of attrition reasons during Phase I and Phase II.

Table 10. Reasons for Attrition by Soldiers (n=74) who separated during Phase II (between IET graduation and the two-year mark)

Attrition Reasons	Subtotal
Body Composition	2
Death Battle Injury (BI)	1
Death Non-Battle Injury (NBI)	1
ETOH (ethyl alcohol) Failed Rehab	4
Legal	2
Medical - Behavioral Health	1
Medical - Existing Prior To Service (EPTS)	1
Medical - failed procurement standards – Existing Prior To Service (EPTS)	7
Medical - permanent disability	3
Medical - severance pay - enhanced	7
Misconduct	2
Misconduct - Drug	16
Misconduct - serious offense	10
Parenthood	2
Performance	3
Physical Standards –Army Physical Fit Test	7
Pregnancy	5
TOTAL	74

Combined Phase I + Phase II Reported Reasons for Attrition

The top three combined (male + female) reported reasons for the 192 Total trainees/Soldiers who attritted during Phase I (IET) + Phase II (IET graduates through two-year mark – first term of service) included 10.3% for medical, 7.4% for performance (includes marksmanship, land navigation and other measured skills), and 4.5% for misconduct issues. See table 11.

Medical was the top reason for males at 10.4% while performance issues was the top reason for females at 10.5%.

Table 11. Reported Reasons for Attrition by Total Sample (n=192) end of two-year period inclusive of Phase I (IET) and Phase II (two-year mark)

Attrition Reasons	Attrition Frequency (male/female)	Attrition Percent of Sample (male/female)
Medical	80 (68/12)	10.3 (10.4/9.7)
Performance (i.e. marksmanship)	57 (44/13)	7.4 (6.8/10.5)
Misconduct	35 (31/4)	4.5 (4.8/3.2)
Physical Fitness or Body Composition	9 (8/1)	1.2 (1.2/0.8)
Other	9 (4/5)	1.2 (0.6/4.0)
Unknown	1 (0/1)	0.1 (0/0.8)
Released from Active Duty	1 (0/1)	0.1 (0/0.8)
TOTAL (IET + two-year)	192 (155/37)	100.00

DISCUSSION

The purpose of this study was to determine the relationship between the PDC achieved by trainees on the OPAT, and attrition from the U.S. Army during Initial Entry Training (IET) through the first two-year term of service. It was hypothesized that higher OPAT PDC would be associated with lower attrition rates during the first term of service. The findings showed that the overall OPAT PDC was not associated with two-year attrition rates, nor were the individual event OPAT PDCs achieved for SLJ and SDL. However, lower PDCs on the Interval Aerobic Run (IAR) and Seated Power Throw (SPT) were associated with increased attrition during the first two years of service, but the association was not graded across physical demand categories (PDCs).

The study sample results for attrition are representative, though slightly lower than the most recent historical averages of first term (36 months) enlisted attrition during the years Q2 2012–Q1 2019. According to Army G-1 (personal communication, Military Strength Analysis and Forecasting Division, Office of the Deputy Chief of Staff for Personnel, Department of the Army, United States Army, also known as the G-1. POC MAJ Brett Ketchum, January 2020), the overall average for first term attrition during this time frame was approximately 28% with IET and first unit attrition both contributing about 14%. This suggests that our study group might have approximately 3-4% more attrition in their third year.

Attrition costs by the numbers

During the conduct of this study, the average cost of training a non-prior service U.S. Army recruit accessed in FY17 from the time the individual walks into a recruiting center until they reach their first duty station beyond IET was \$73.7K for MOSs attending BCT/AIT, and \$55.3K in costs for OSUT MOSs (44). Costs include those from USAREC, US Military Entrance Processing Command (USMEPCOM), and TRADOC. In this study, overall IET attrition was reported at 15% and two-year attrition was 25%. The Army averages 70,000 recruits/trainees each year (18). A rough estimate of lost training costs due to attrition during IET would be $70,000 \times 0.15 = 10,500$ trainee discharges. $10,500 \times \$73.7K =$ nearly \$800 million dollars in 2017 cost estimates during the time of this study for the U.S. Army alone.

Reasons for attrition/separation

In this study, the overall (male + female) attrition rate for IET was 15%. The top three combined (male + female) reported reasons for two-year attrition included 10.3% for medical, 7.4% for performance (includes marksmanship, land navigation and other measured skills), and 4.5% for misconduct issues. A broad encompassing 'Medical' category (e.g., failed procurement standards, severance pay, failed rehab, combat injury, etc.) was the top reason for male attrition at 10.4% while Performance (physical standards, APFT, etc.) was the top reason for female attrition at 10.5%. These rates are not too dissimilar to those reported in 2003 (14), where the Overall attrition from U.S. Army IET (Basic and advanced individual training) was roughly 14%. Approximately one third of the 14% who attritted in that report, or 4% to 5% of all enlistees, were discharged for an *Existing Prior to Service* (EPTS) medical condition, and a similar percentage were discharged for *Failure to Meet Performance Criteria* issue.

The lack of specificity in Army discharge codes limits the usefulness of analyses according to categories of attrition as the coded reasons for attrition are limited to a priori categories and may not be particularly accurate for IET (45). Separation discharges during IET at Fort Leonard Wood indicated that categorization codes often insufficiently characterized the underlying reasons for discharge, particularly with respect to medical and psychological factors (46). Perhaps, there may be a reluctance to label cause of separation as mental or physical injuries that could be interpreted as resulting from training incidents leading to additional DoD long-term costs through disability claims.

Limitations of the Study

At the time of this study (January–December 2016), trainees were unaware of, and not required to meet, the OPAT PDC standards for their job, as the OPAT was not a requirement until January 2017. Therefore, trainees in this study may not have performed maximally on the OPAT events, although it was encouraged by the study investigative team. Were it a requirement for their entry into service, or a particular desired MOS, performance effort may have been greater. In this study, with the exception of the IAR, trainees were given several practice attempts at each event in addition to 2-3 record trials where their best performance was utilized for analyses. This familiarization process of a somewhat novel fitness test may have resulted in accurate results. While not surveyed, it was anecdotally noted that trainees, either through scholastic physical education or youth sports involvement, had previous experience of many, if not all, of these fitness tests.

There was an uneven distribution of trainees across PDCs, particularly in the female SDL at the Black-Heavy and Gray-Significant levels which reduced the power to differentiate attrition across PDC levels. Perhaps if the study population were 10 times larger, or there were smaller gradations of weight lifted (less than 40 lbs/ 18 kg increments) the distribution would have yielded different results. Most likely, the physiological and biomechanical nature of the event and traditional sex strength differences effectively limit distribution (47). Were it not that the SDL was limited to a maximum load of 100 kg, a ceiling effect, the gap between the sexes might certainly be greater.

This study predominantly looked at trainees for combat arms MOSs with Black-Heavy level physical demands. Were researchers to look at trainees for other MOSs that are aligned with lower physical demands, perhaps the attrition rate and use of the OPAT to predict attrition would be different. A study (17) that looked at attrition data from FY2005 to FY2010 (average attrition rate = 26%) collapsed military occupation groups into 3 groups: Operations, Operational Support and Force Sustainment. The study found that the combat arms specialties in the Operations group reflected a higher attrition probability rate of 59%, which was 10% higher than the other military occupation groups.

CONCLUSIONS

The primary purpose of the OPAT screening tool is to place the right recruit (and later trainee) in the correct job/MOS to improve performance and reduce injuries, specifically during their IET. A secondary purpose of the screening tool is that those recruits who are ready to perform tasks of their qualified MOS/job, as measured by the OPAT, will incur lower attrition/higher retention rates not only during IET, but subsequently upon completion of their first two years of service, as well as throughout their military career. The MOSs of the subjects (trainees/Soldiers) in this study were not assigned based on their OPAT performance PDC but were assigned by Recruiters prior to shipping to training. Subjects performed the OPAT events during the first two weeks of training. Present day employment of the OPAT screening is performed at the Recruiter station and used as guidance to place recruits/trainees, future warriors, in the correctly identified physical demand category MOS. Future endeavors should analyze how effective the Recruit Command's MOS present placement, based on OPAT scores, reduces both attrition/retention and injury/disability rates. It is possible that long-term attrition and injury rates will be lower when studied once again with trainees who were placed into their MOS by virtue of their recruiter station OPAT scores.

RECOMMENDATIONS

- Conduct/employ just the OPAT IAR event if the goal is only to determine who might attrite from black/heavy MOSs after first term (2 years).
- Conduct/employ just the OPAT SPT if the goal is to determine who should not ship out (white level) for training or possibly other less physically demanding PDC (gray, gold) levels.
- Conduct a longitudinal study through the complete/full first three-year term with trainees who were placed in their MOS by virtue of recruiter station OPAT scores.
- Follow Soldiers as they mature through their career life cycle to ascertain how much of a “career-length life expectancy” can be attributed to correctly placing recruits into the MOS they qualified for through OPAT test given by Recruiters.
- Compare to a yearly reassessment of OPAT to determine how many Soldiers are still qualified to continue in their originally assigned/qualified MOSs.
- Utilize the OPAT to determine whether reclassifying injured or low performers into another MOS (lower PDC level) would result in lower attrition/increased retention by increasing the length of Service members’ careers lifespan.
- If there is concern that the OPAT is not being administered consistently across the numerous Recruiter sites, perhaps due to lack of time or lack of proper equipment, consider opting for employing just the IAR which requires no minimal equipment (stopwatch and 20m of floor/ground) and/or the SPT (medicine ball).
- OPAT PDC levels are set by TRADOC. The PDC threshold levels are on a sliding scale and could be modified based on needs to fill MOS quotas during poor (low quantity or quality) recruiting years. During ample/rich recruiting times, OPAT standards can be raised, better qualified recruit candidates can be selected for more physically demanding MOS which should result in lower attrition/higher retention levels in addition to fewer injuries. TRADOC should consider this sensitivity/specificity issue and study this possible effect with controlled modifications.
- Add the OPAT along with other tests such as ASVAB, APFT and newly instituted ACFT – Army Combat Fitness Test to strengthen attrition and retention modeling efforts by placing qualified trainees/Soldiers into the correct job.
- Consider strengthening attrition/separation code reporting for better understanding of OPAT, other testing, and programming effects.

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APPENDIX A

Body Demographics

Table 12. Body Fat Demographics by Female Sex

	Attritted anytime (Phase I or II)	N	Mean	Std. Deviation	Std. Error Mean
Age (yrs)	No	87.00	19.75	2.30	0.25
	Attrit	37.00	19.65	2.42	0.40
Height (cm)	No	87.00	162.28	6.08	0.65
	Attrit	37.00	160.97	5.27	0.87
Mass (kg)	No	87.00	62.61	8.41	0.90
	Attrit	37.00	62.25	9.52	1.56
BodyFatAll	No	87.00	29.88	4.30	0.46
	Attrit	37.00	30.05	5.02	0.83
Calc BMI (kg/m2)	No	87.00	23.74	2.63	0.28
	Attrit	37.00	23.99	3.15	0.52

Table 13. Levene's Test for Equality of Variances - t-test for Equality of Body Fat Means by Female Sex

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Age (yrs)	Equal variances assumed	0.28	0.60	0.22	122.00	0.83	0.10	0.46	-0.81	1.01
	Equal variances not assumed			0.21	64.98	0.83	0.10	0.47	-0.84	1.03
Height (cm)	Equal variances assumed	0.56	0.46	1.14	122.00	0.26	1.31	1.15	-0.97	3.58
	Equal variances not assumed			1.21	77.83	0.23	1.31	1.08	-0.85	3.47
Mass (kg)	Equal variances assumed	0.68	0.41	0.21	122.00	0.84	0.36	1.72	-3.04	3.76
	Equal variances not assumed			0.20	61.07	0.84	0.36	1.81	-3.25	3.97
BodyFatAll	Equal variances assumed	2.34	0.13	0.20	122.00	0.84	-0.18	0.89	-1.93	1.58
	Equal variances not assumed			0.19	59.48	0.85	-0.18	0.95	-2.07	1.71
Calc BMI (kg/m2)	Equal variances assumed	3.17	0.08	0.45	122.00	0.66	-0.24	0.55	-1.33	0.84
	Equal variances not assumed			0.41	58.44	0.68	-0.24	0.59	-1.42	0.94

Table 14. Body Fat Demographics by Male Sex

	Attritted anytime (Phase I or II)	N	Mean	Std. Deviation	Std. Error Mean
Age (yrs)	No	496.00	20.67	3.11	0.14
	Attrit	155.00	20.37	2.71	0.22
Height (cm)	No	495.00	175.58	6.54	0.29
	Attrit	155.00	175.12	6.72	0.54
Mass (kg)	No	496.00	78.16	12.92	0.58
	Attrit	155.00	78.81	13.79	1.11
BodyFatAll	No	495.00	18.13	4.83	0.22
	Attrit	155.00	18.45	4.99	0.40
Calc BMI (kg/m2)	No	495.00	25.31	3.66	0.16
	Attrit	155.00	25.65	3.93	0.32

Table 15. Levene's Test for Equality of Variances - t-test for Equality of Body Fat Means by Male Sex

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Age (yrs)	Equal variances assumed	2.46	0.12	1.09	649.00	0.28	0.30	0.28	-0.24	0.85
	Equal variances not assumed			1.17	291.66	0.24	0.30	0.26	-0.21	0.81
Height (cm)	Equal variances assumed	0.01	0.91	0.77	648.00	0.45	0.46	0.61	-0.73	1.65
	Equal variances not assumed			0.75	251.89	0.45	0.46	0.61	-0.75	1.67
Mass (kg)	Equal variances assumed	1.20	0.27	0.54	649.00	0.59	-0.65	1.21	-3.02	1.72
	Equal variances not assumed			0.52	244.35	0.61	-0.65	1.25	-3.11	1.82
BodyFatAll	Equal variances assumed	0.29	0.59	0.72	648.00	0.47	-0.32	0.45	-1.20	0.56
	Equal variances not assumed			0.71	250.75	0.48	-0.32	0.46	-1.22	0.57
Calc BMI (kg/m2)	Equal variances assumed	0.98	0.32	0.99	648.00	0.32	-0.34	0.34	-1.01	0.33
	Equal variances not assumed			0.95	243.41	0.34	-0.34	0.36	-1.04	0.36

APPENDIX B

Attrition by Phase, Reason and Sex

Table 16. Phase II (IET graduates – Two year mark) Attrition by Reason Category and Sex

	Female & Male Phase II (IET – Two-year mark) Attrition					Total
Reasons	Medical	Misconduct	Performance	Unknown	REFRAD	
ELS - FAILURE TO ADAPT	0	0	11	0	0	11
Medical - failed procurement standards - EPTS	6	0	0	0	0	6
Misconduct - serious offense	0	1	0	0	0	1
Performance - entry level	0	0	1	0	0	1
REFRAD	0	0	0	0	1	1
Unknown	0	0	0	1	0	1
FEMALE Totals	6	1	12	1	1	21
ELS - FAILURE TO ADAPT	0	1	41			42
Legal	0	2	0			2
Medical - combat injury - severance pay	1	0	0			1
Medical - failed procurement standards - EPTS	47	0	0			47
Medical - severance pay - enhanced	3	0	0			3
Misconduct - Drug	0	1	0			1
Performance	0	0	1			1
MALE Totals	51	4	42			97

Table 17. Phase I (during IET) Attrition by Reason Category and Sex

	Female & Male Phase I (during IET) Attrition					Total
Reasons	APFT and Body Comp	Medical	Misconduct	Performance	Other	
Legal	0	0	1	0	0	1
Medical - failed procurement standards - EPTS	0	3	0	0	0	3
Medical - permanent disability	0	1	0	0	0	1
Medical - severance pay - enhanced	0	2	0	0	0	2
Misconduct - Drug	0	0	1	0	0	1
Misconduct - serious offense	0	0	1	0	0	1
Performance	0	0	0	1	0	1
Physical Standards -APFT	1	0	0	0	0	1
Pregnancy	0	0	0	0	5	5
FEMALE Totals	1	6	3	1	5	16
Body Composition	2	0	0	0	0	2
Death BI	0	0	0	0	1	1
Death NBI	0	0	0	0	1	1
ETOH Failed Rehab	0	4	0	0	0	4
Legal	0	0	1	0	0	1
Medical - Beh Health	0	1	0	0	0	1
Medical - EPTS	0	1	0	0	0	1
Medical - failed prcurment standards - EPTS	0	4	0	0	0	4
Medical - permanent disability	0	2	0	0	0	2
Medical - severance pay - enhanced	0	5	0	0	0	5
Misconduct	0	0	2	0	0	2
Misconduct - Drug	0	0	15	0	0	15

Misconduct - serious offense	0	0	9	0	0	9
Parenthood	0	0	0	0	2	2
Performance	0	0	0	2	0	2
Physical Standards -APFT	6	0	0	0	0	6
MALE Totals	8	17	27	2	4	58

APPENDIX C

Attrition by OPAT events by PDC levels

Table 18. Attrition Summary OPAT Overall by PDC

		Phase I (IET)			Phase II (IET—Two-year)			Overall		
			Attrite			Attrite			Attrite	
		n	n	%	n	n	%	n	n	%
Men	Black	436	57	13.07	379	35	9.23	436	92	21.10
	Gray	90	18	20.00	72	9	12.50	90	27	30.00
	Gold	44	8	18.18	36	4	11.11	44	12	27.27
	White	81	14	17.28	67	10	14.93	81	24	29.63
	Total	651	97	14.90	554	58	10.47	651	155	23.81
Women	Black	3	1	33.33	2	0	0.00	3	1	33.33
	Gray	9	1	11.11	8	0	0.00	9	1	11.11
	Gold	18	3	16.67	15	4	26.67	18	7	38.89
	White	94	16	17.02	78	12	15.38	94	28	29.79
	Total	124	21	16.94	103	16	15.53	124	37	29.84
Combined	Black	439	58	13.21	381	35	9.19	439	93	21.18
	Gray	99	19	19.19	80	9	11.25	99	28	28.28
	Gold	62	11	17.74	51	8	15.69	62	19	30.65
	White	175	30	17.14	145	22	15.17	175	52	29.71
	Total	775	118	15.23	657	74	11.26	775	192	24.77

Table 19. Attrition Summary OPAT IR by PDC

		Phase I (IET)			Phase II (IET—Two-year)			Overall		
			Attrite			Attrite			Attrite	
		n	n	%	n	n	%	n	n	%
Men	Black	467	61	13.10	406	35	8.62	467	96	20.56
	Gray	70	14	20.00	56	9	16.07	70	23	32.86
	Gold	37	8	21.62	29	4	13.79	37	12	32.43
	White	77	14	18.18	63	10	15.87	77	24	31.17
	Total	651	97	14.90	554	58	10.47	651	155	23.81
Women	Black	21	4	19.05	17	3	17.65	21	7	33.33
	Gray	7	1	14.29	6	1	16.67	7	2	28.57
	Gold	11	2	18.18	9	2	22.22	11	4	36.36
	White	85	14	16.47	71	10	14.08	85	24	28.24
	Total	124	21	16.94	103	16	15.53	124	37	29.84
Combined	Black	488	65	13.32	423	38	8.98	488	103	21.11
	Gray	77	15	19.48	62	10	16.13	77	25	32.47
	Gold	48	10	20.83	38	6	15.79	48	16	33.33
	White	162	28	17.28	134	20	14.93	162	48	29.63
	Total	775	118	15.23	657	74	11.26	775	192	24.77

Table 20. Attrition Summary OPAT SPT by PDC

		Phase I (IET)			Phase II (IET—Two-year)			Overall		
		Attrite			Attrite			Attrite		
		n	n	%	n	n	%	n	n	%
Men	Black	638	92	14.42	546	58	10.62	638	150	23.51
	Gray	11	4	36.36	7	0	0.00	11	4	36.36
	Gold	2	1	50.00	1	0	0.00	2	1	50.00
	White	0	0	0	0	0	0	0	0	0
	Total	651	97	14.90	554	58	10.47	651	155	23.81
Women	Black	12	1	8.33	11	0	0.00	12	1	8.33
	Gray	31	4	12.90	27	5	18.52	31	9	29.03
	Gold	52	9	17.31	43	8	18.60	52	17	32.69
	White	29	7	24.14	22	3	13.64	29	10	34.48
	Total	124	21	16.94	103	16	15.53	124	37	29.84
Combined	Black	650	93	14.31	557	58	10.41	650	151	23.23
	Gray	42	8	19.05	34	5	14.71	42	13	30.95
	Gold	54	10	18.52	44	8	18.18	54	18	33.33
	White	29	7	24.14	22	3	13.64	29	10	34.48
	Total	775	118	15.23	657	74	11.26	775	192	24.77

Table 21. Attrition Summary OPAT SLJ by PDC

		Phase I (IET)			Phase II (IET—Two-year)			Overall		
		Attrite			Attrite			Attrite		
		n	n	%	n	n	%	n	n	%
Men	Black	591	85	14.38	506	54	10.67	591	139	23.52
	Gray	43	9	20.93	34	4	11.76	43	13	30.23
	Gold	16	3	18.75	13	0	0.00	16	3	18.75
	White	1	0	0.00	1	0	0.00	1	0	0.00
	Total	651	97	14.90	554	58	10.47	651	155	23.81
Women	Black	31	5	16.13	26	2	7.69	31	7	22.58
	Gray	36	7	19.44	29	4	13.79	36	11	30.56
	Gold	42	5	11.90	37	8	21.62	42	13	30.95
	White	15	4	26.67	11	2	18.18	15	6	40.00
	Total	124	21	16.94	103	16	15.53	124	37	29.84
Combined	Black	622	90	14.47	532	56	10.53	622	146	23.47
	Gray	79	16	20.25	63	8	12.70	79	24	30.38
	Gold	58	8	13.79	50	8	16.00	58	16	27.59
	White	16	4	25.00	12	2	16.67	16	6	37.50
	Total	775	118	15.23	657	74	11.26	775	192	24.77

Table 22. Attrition Summary OPAT SDL by PDC

		Phase I (IET)			Phase II (IET—Two-year)			Overall		
		Attrite			Attrite			Attrite		
		n	n	%	n	n	%	n	n	%
Men	Black	627	93	14.83	534	57	10.67	627	150	23.92
	Gray	18	3	16.67	15	1	6.67	18	4	22.22
	Gold	0	0	0	0	0	0	0	0	0
	White	6	1	16.67	5	0	0.00	6	1	16.67
	Total	651	97	14.90	554	58	10.47	651	155	23.81
Women	Black	57	10	17.54	47	8	17.02	57	18	31.58
	Gray	49	7	14.29	42	6	14.29	49	13	26.53
	Gold	0	0	0	0	0	0	0	0	0
	White	18	4	22.22	14	2	14.29	18	6	33.33
	Total	124	21	16.94	103	16	15.53	124	37	29.84
Combined	Black	684	103	15.06	581	65	11.19	684	168	24.56
	Gray	67	10	14.93	57	7	12.28	67	17	25.37
	Gold	0	0	0	0	0	0	0	0	0
	White	24	5	20.83	19	2	10.53	24	7	29.17
	Total	775	118	15.23	657	74	11.26	775	192	24.77

Table 23. Attrition Summary OPAT SDL by Weight

		Phase I (IET)			Phase II (IET—Two-year)			Overall		
		Attrite			Attrite			Attrite		
		n	n	%	n	n	%	n	n	%
Men	220	561	75	13.37	486	54	11.11	561	129	22.99
	180	66	18	27.27	48	3	6.25	66	21	31.82
	140	24	4	16.67	20	1	5.00	24	5	20.83
	Total	651	97	14.90	554	58	10.47	651	155	23.81
Women	220	13	2	15.38	11	1	9.09	13	3	23.08
	180	44	8	18.18	36	7	19.44	44	15	34.09
	140	67	11	16.42	56	8	14.29	67	19	28.36
	Total	124	21	16.94	103	16	15.53	124	37	29.84
Combined	220	574	77	13.41	497	55	11.07	574	132	23.00
	180	110	26	23.64	84	10	11.90	110	36	32.73
	140	91	15	16.48	76	9	11.84	91	24	26.37
	Total	775	118	15.23	657	74	11.26	775	192	24.77

APPENDIX D

Attrition Hazards Ratio by Sex as Predicted by PDC

Table 24. Attrition Hazards Ratio for Combined Sex as Predicted by OPAT Physical Demand Category for each Event

					Adjusted for Sex			Adjusted for Sex, Age, %BF		
		HR	(95% CI)	p-value	HR	(95% CI)	p-value	HR	(95% CI)	p-value
OPAT	Black	1.00						1.00		
	Gray	1.40	(0.92-2.13)	0.12	1.40	(0.91-2.14)	0.12	1.38	(0.90-2.12)	0.14
	Gold	1.50	(0.92-2.46)	0.11	1.50	(0.90-2.49)	0.12	1.50	(0.90-2.50)	0.12
	White	1.46	(1.04-2.05)	0.03	1.45	(0.96-2.19)	0.08	1.47	(0.97-2.24)	0.07
IAR	Black	1.00			1.00			1.00		
	Gray	1.63	(1.05-2.52)	0.03	1.62	(1.05-2.51)	0.03	1.64	(1.05-2.54)	0.03
	Gold	1.69	(1.00- 2.87)	0.05	1.67	(0.98-2.85)	0.06	1.69	(0.99-2.89)	0.06
	White	1.46	(1.04-2.06)	0.03	1.42	(0.95-2.12)	0.09	1.45	(0.96-2.18)	0.08
SPT	Black	1.00			1.00			1.00		
	Gray	1.37	(0.78-2.42)	0.27	2.12	(0.98-4.61)	0.06	2.26	(1.02-5.03)	0.05
	Gold	1.51	(0.92-2.45)	0.10	2.74	(1.08-6.98)	0.03	3.07	(1.17-8.03)	0.02
	White	1.63	(0.86-3.09)	0.14	3.03	(1.06-8.69)	0.04	3.40	(1.15-10.10)	0.03
SLJ	Black	1.00			1.00			1.00		
	Gray	1.34	(0.74-3.80)	0.18	1.28	(0.80-2.07)	0.31	1.29	(0.80-2.07)	0.30
	Gold	1.18	(0.71-1.98)	0.52	1.10	(0.60-2.02)	0.76	1.07	(0.58-1.98)	0.83
	White	1.68	(0.74-3.80)	0.21	1.52	(0.61-3.81)	0.37	1.57	(0.62-3.95)	0.34
SDL (lbs)	220	1.00			1.00			1.00		
	180	1.53	(1.06-2.22)	0.02	1.48	(0.97-2.25)	0.07	1.57	(1.01-2.43)	0.04
	≤140	1.18	(0.77-1.83)	0.45	1.11	(0.63-1.94)	0.72	1.22	(0.67-2.22)	0.51

Table 25. Attrition Hazards Ratio for **Male** Sex as Predicted by OPAT Physical Demand Category for each Event

					Men, Adjust for Age, %BF			
		HR	(95% CI)	p-value		HR	(95% CI)	p-value
OPAT	Black	1.00			Black	1.00		
	Gray	1.51	(0.98-2.32)	0.06	Gray	1.49	(0.97-2.29)	0.07
	Gold	1.34	(0.73-2.44)	0.35	Gold	1.34	(0.73-2.45)	0.34
	White	1.46	(0.93-2.29)	0.10	White	1.49	(0.94-2.36)	0.09
					Age (yrs)	0.97	(0.91-1.02)	0.23
					% BF	1.01	(0.97-1.04)	0.62
IAR	Black	1.00			Black	1.00		
	Gray	1.71	(1.08-2.69)	0.02	Gray	1.73	(1.09-2.73)	0.02
	Gold	1.68	(0.92-3.07)	0.09	Gold	1.71	(0.94-3.12)	0.08
	White	1.60	(1.02-2.50)	0.04	White	1.65	(1.04-2.61)	0.03
					Age (yrs)	0.96	(0.91-1.02)	0.20
					% BF	1.00	(0.97-1.04)	0.83
SPT	Black	1.00			Black	1.00		
	Gray-Gold-White	1.97	(0.81-4.79)	0.14	Gray-Gold-White	2.14	(0.86-5.34)	0.10
								0.25
					Age (yrs)	0.97	(0.91-1.02)	
					% BF	1.02	(0.99-1.05)	0.27
SLJ	Black	1.00			Black	1.00		
	Gray	1.33	(0.75-2.34)	0.33	Gray	1.31	(0.74-2.32)	0.74
	Gold-White	0.74	(0.24-2.33)	0.61	Gold-White	0.74	(0.23-2.32)	0.23
					Age (yrs)	0.97	(0.91-1.02)	0.91
					% BF	1.01	(0.98-1.05)	0.98
SDL (lbs)	220	1.00			220	1.00		
	180	1.53	(0.97-2.43)	0.07	180	1.45	(1.00-2.12)	0.05
	≤140	0.93	(0.38-2.27)	0.87	≤140	1.07	(0.68-1.70)	0.76
					Age (yrs)	0.97	(0.92-1.02)	0.29
					% BF	1.01	(0.99-1.04)	0.28

Table 26. Attrition Hazards Ratio for **Female** Sex as Predicted by OPAT Physical Demand Category for each Event

					Women, Adjust for Age, %BF			
		RR	(95% CI)	p-value		HR	(95% CI)	p-value
OPAT	Black-Gray	1.00			Black-Gray	1.00		
	Gold	2.49	(0.52-12.00)	0.26	Gold	2.51	(0.52-12.09)	0.25
	White	1.85	(0.44-7.75)	0.40	White	1.86	(0.44-7.82)	0.40
					Age (yrs)	0.99	(0.86-1.14)	0.90
					%BF	1.01	(0.94-1.09)	0.81
IAR	Black-Gray	1.00			Black-Gray	1.00		
	Gold-White	0.91	(0.43-1.93)	0.81	Gold-White	0.91	(0.43-1.94)	0.82
					Age (yrs)	0.99	(0.86-1.14)	0.88
					%BF	1.01	(0.94-1.09)	0.85
SPT	Black-Gray	1.00			Black-Gray	1.00		
	Gold	1.50	(0.68-3.27)	0.31	Gold	1.58	(0.71-3.51)	0.27
	White	1.64	(0.68-3.93)	0.27	White	1.76	(0.70-4.41)	0.23
					Age (yrs)	0.99	(0.86-1.13)	0.83
					%BF	1.02	(0.95-1.11)	0.57
SLJ	Black	1.00			Black	1.00		
	Gray	1.41	0.55-3.64)	0.48	Gray	1.43	(0.53-3.71)	0.46
	Gold	1.37	(0.55-3.42)	0.51	Gold	1.35	(0.53-3.40)	0.53
	White	1.86	(0.62-5.53)	0.27	White	1.92	(0.63-5.81)	0.25
					Age (yrs)	0.97	(0.84-1.13)	0.72
					%BF	1.00	(0.93-1.08)	0.92
SDL (lbs)	220	1.00			220	1.00		
	180	1.48	(0.43-5.10)	0.54	180	1.48	(0.42-5.19)	0.54
	≤140	1.23	(0.37-4.17)	0.74	≤140	1.25	(0.34-4.62)	0.74
					Age (yrs)	0.99	(0.86-1.14)	0.88
					%BF	1.01	(0.93-1.09)	0.90

APPENDIX E

Attrition Hazards Ratio by Sex as Predicted by PDC Quartiles

Table 27. Attrition Hazards Ratio for Males as Predicted by OPAT Event Quartile

					Adjust for Sex, Age, %BF			
IAR Quartiles	Q1: ≤42	2.37	(1.47-3.81)	0.00	Q1: ≤ 42	2.47	(1.51-4.02)	0.00
	Q2: 43-52	1.74	(1.04-2.92)	0.04	Q2: 43.-52	1.77	(1.05-2.98)	0.03
	Q3: 53-66	1.60	(0.96-2.68)	0.07	Q3: 53-66	1.61	(0.96-2.70)	0.07
	Q4: ≥67	1.00			Q4: ≥67	1.00		
					Age (yrs)	0.96	(0.91-1.02)	0.20
					% BF	1.00	(0.97-1.03)	0.90
SPT Quartiles	Q1: ≤538	1.05	(0.67-1.65)	0.84	Q1: ≤ 538	1.14	(0.70-1.85)	0.61
	Q3: 539-588	1.28	(0.82-2.00)	0.28	Q3: 539-588	1.36	(0.85-2.18)	0.20
	Q3: 589-638	1.00	(0.62-1.61)	1.00	Q3: 589-638	1.01	(0.63-1.64)	0.96
	Q4: ≥639	1.00			Q4: ≥639	1.00		
					Age (yrs)	0.97	(0.91-1.02)	0.25
					% BF	1.02	(0.99-1.06)	0.24
LJ (cm) Quartiles	Q1: ≤176.50	1.24	(0.78-1.96)	0.36	Q1: ≤176.50	1.23	(0.77-1.96)	0.39
	Q2: 176.51-197.50	1.29	(0.82-2.05)	0.27	Q2: 176.51-197.50	1.29	(0.81-2.05)	0.28
	Q3: 197.51-217.00	1.24	(0.78-1.96)	0.36	Q3: 197.51-217.00	1.25	(0.79-1.98)	0.35
	Q4: ≥217.01	1.00			Q4: ≥217.01	1.00		
					Age (yrs)	0.97	(0.91-1.02)	0.23
					% BF	1.01	(0.98-1.05)	0.49
SDL (lbs) Quartiles	≤140	0.93	(0.38-2.27)	0.87	≤140	1.07	(0.68-1.70)	0.76
	180	1.53	(0.97-2.43)	0.07	180	1.45	(1.00-2.12)	0.05
	220	1.00			220	1.00		
					Age (yrs)	0.97	(0.92-1.02)	0.29
						% BF	1.01	(0.99-1.04)

Table 28. Attrition Hazards Ratio for Females as Predicted by OPAT Event Quartile

					Adjust for Sex, Age, %BF			
IAR	Q1: ≤22	1.08	(0.48-2.44)	0.86	Q1: ≤22	1.11	(0.47-2.59)	0.82
	Q2: 23-26	0.44	(0.15-1.28)	0.13	Q2: 23-26	0.44	(0.15-1.29)	0.13
	Q3: 27-38	0.79	(0.33-1.91)	0.60	Q3: 27-38	0.79	(0.33-1.90)	0.60
	Q4: ≥39	1.00			Q4: ≥39	1.00		
					Age (yrs)	0.97	(0.84-1.12)	0.71
					%BF	1.01	(0.94-1.09)	0.84
SPT	Q1: ≤350	1.54	(0.64-3.75)	0.34	Q1: ≤350	1.64	(0.65-4.16)	0.30
	Q3: 351	1.03	(0.36-2.95)	0.95	Q3: 351	1.08	(0.37-3.12)	0.89
	Q3: 376	1.24	(0.43-3.53)	0.69	Q3: 376	1.25	(0.43-3.59)	0.68
	Q4: ≥401	1.00			Q4: ≥401	1.00		
					Age (yrs)	0.99	(0.86-1.15)	0.94
					%BF	1.02	(0.94-1.10)	0.64
SLJ	Q1: ≤128.00	1.40	(0.53-3.69)	0.49	Q1: ≤128.00	1.41	(0.53-3.73)	0.49
	Q2: 128.01	1.71	(0.67-4.34)	0.26	Q2: 128.01	1.70	(0.66-4.38)	0.27
	Q3: 141.01-	1.25	(0.45-3.45)	0.67	Q3: 141.01-	1.25	(0.45-3.48)	0.67
	Q4: ≥159.76	1.00			Q4: ≥159.76	1.00		
					Age (yrs)	1.00	(0.86-1.15)	0.96
					%BF	1.00	(0.93-1.08)	0.98
SDL (lbs)	≤140	0.93	(0.38-2.27)	0.87	≤140	1.07	(0.68-1.70)	0.76
	180	1.53	(0.97-2.43)	0.07	180	1.45	(1.00-2.12)	0.05
	220	1.00			220	1.00		
					Age (yrs)	0.97	(0.92-1.02)	0.29
					%BF	1.01	(0.99-1.04)	0.28

APPENDIX F

OPAT Events (IAT, SPT & SLJ) Means

Table 29. OPAT Event (IAR, SPT & SLJ) Means Demographics by Females

	Attritted anytime (Phase I or II)	N	Mean	Std. Deviation	Std. Error Mean
Interval Aerobic Run (shuttles)	No	87.00	29.48	10.91	1.17
	Attrit	37.00	30.59	13.70	2.25
Seated Power Throw (m)	No	87.00	3.81	0.48	0.05
	Attrit	37.00	3.69	0.41	0.07
Standing Long Jump (cm)	No	87.00	146.26	23.94	2.57
	Attrit	37.00	141.19	23.12	3.80

Table 30. Levene's Test for Equality of Variances - t-test for Equality of OPAT Event (IAR, SPT & SLJ) Means by Female Sex

		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Interval Aerobic Run (shuttles)	Equal variances assumed	3.26	0.07	-0.48	122.00	0.63	-1.11	2.32	-5.70	3.47
	Equal variances not assumed			-0.44	56.34	0.66	-1.11	2.54	-6.19	3.97
Seated Power Throw (m)	Equal variances assumed	1.03	0.31	1.23	122.00	0.22	0.11	0.09	-0.07	0.29
	Equal variances not assumed			1.32	79.24	0.19	0.11	0.09	-0.06	0.28
Standing Long Jump (cm)	Equal variances assumed	0.13	0.72	1.09	122.00	0.28	5.08	4.65	-4.13	14.28
	Equal variances not assumed			1.11	70.22	0.27	5.08	4.59	-4.07	14.22

Table 31. OPAT Event (IAR, SPT & SLJ) Means Demographics by Males

	Attritted anytime (Phase I or II)	N	Mean	Std. Deviation	Std. Error Mean
Interval Aerobic Run (shuttles)	No	496.00	56.55	17.69	0.79
	Attrit	155.00	50.86	16.77	1.35
Seated Power Throw (m)	No	496.00	5.92	0.81	0.04
	Attrit	155.00	5.88	0.79	0.06
Standing Long Jump (cm)	No	496.00	197.92	29.25	1.31
	Attrit	155.00	195.27	28.04	2.25

Table 32. Levene's Test for Equality of Variances - t-test for Equality of OPAT Event (IAR, SPT & SLJ) Means by Male Sex

		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Interval Aerobic Run (shuttles)	Equal variances assumed	0.74	0.39	3.53	649.00	0.00	5.68	1.61	2.52	8.84
	Equal variances not assumed			3.63	269.63	0.00	5.68	1.56	2.60	8.76
Seated Power Throw (m)	Equal variances assumed	1.11	0.29	0.53	649.00	0.60	0.04	0.07	-0.11	0.18
	Equal variances not assumed			0.53	263.11	0.59	0.04	0.07	-0.11	0.18
Standing Long Jump (cm)	Equal variances assumed	0.44	0.51	1.00	649.00	0.32	2.65	2.67	-2.58	7.89
	Equal variances not assumed			1.02	266.99	0.31	2.65	2.61	-2.48	7.79

APPENDIX G

Anytime Attrition by OPAT Event

Table 33. Attritted anytime (Phase I or II) OPAT Event (SDL by 3 weight (lbs) categories) Means Demographics by Female, Male & Combined Sex

Gender Recoded for Body Fat				Attritted anytime (Phase I or II)		Total
				No	Attrit	
Female	SDL_3Cats	≤140	Count	48	19	67
			% within SDL_3Cats	71.60%	28.40%	100.00%
			% within Attritted anytime (Phase I or II)	55.20%	51.40%	54.00%
		180	Count	29	15	44
			% within SDL_3Cats	65.90%	34.10%	100.00%
			% within Attritted anytime (Phase I or II)	33.30%	40.50%	35.50%
		220	Count	10	3	13
			% within SDL_3Cats	76.90%	23.10%	100.00%
			% within Attritted anytime (Phase I or II)	11.50%	8.10%	10.50%
	Total		Count	87	37	124
			% within SDL_3Cats	70.20%	29.80%	100.00%
			% within Attritted anytime (Phase I or II)	100.00%	100.00%	100.00%
Male	SDL_3Cats	≤140	Count	19	5	24
			% within SDL_3Cats	79.20%	20.80%	100.00%
			% within Attritted anytime (Phase I or II)	3.80%	3.20%	3.70%
		180	Count	45	21	66
			% within SDL_3Cats	68.20%	31.80%	100.00%
			% within Attritted anytime (Phase I or II)	9.10%	13.50%	10.10%
		220	Count	432	129	561
			% within SDL_3Cats	77.00%	23.00%	100.00%
			% within Attritted anytime (Phase I or II)	87.10%	83.20%	86.20%
	Total		Count	496	155	651
			% within SDL_3Cats	76.20%	23.80%	100.00%
			% within Attritted anytime (Phase I or II)	100.00%	100.00%	100.00%

Combined	SDL_3Cats	≤140	Count	67	24	91
			% within SDL_3Cats	73.60%	26.40%	100.00%
			% within Attritted anytime (Phase I or II)	11.50%	12.50%	11.70%
		180	Count	74	36	110
			% within SDL_3Cats	67.30%	32.70%	100.00%
			% within Attritted anytime (Phase I or II)	12.70%	18.80%	14.20%
		220	Count	442	132	574
			% within SDL_3Cats	77.00%	23.00%	100.00%
			% within Attritted anytime (Phase I or II)	75.80%	68.80%	74.10%
	Total		Count	583	192	775
			% within SDL_3Cats	75.20%	24.80%	100.00%
			% within Attritted anytime (Phase I or II)	100.00%	100.00%	100.00%