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MEMORANDUM FOR THE COMMANDANT OF THE MARINE CORPS

From: Brigadier General George W. Smith, Jr., Director, Marine Corps  
Force Innovation Office *Geo Smith 8/18/15*

Subj: UNITED STATES MARINE CORPS ASSESSMENT OF WOMEN IN SERVICE  
ASSIGNMENTS

Encl: (1) Research Organizations  
(2) OAD Research Integration Report  
(3) TECOM LOE 2 - Entry Level Training Research Assessment and  
Findings  
(4) MCOTEA LOE 3 - GCEITF Report  
(5) University of Pittsburgh GCEITF Physiology Report  
(6) United Kingdom Women in Ground Close Combat Review  
(7) MCFIP Research Products Table of Contents

### **I. Marine Corps Force Integration Plan**

The Marine Corps Force Integration Plan is the deliberate, measured and responsible implementation effort in response to then-Secretary of Defense Panetta's rescission of the Direct Ground Combat Definition and Assignment Rule (DGCDAR) in January 2013. This revised policy directed the Services and U.S. Special Operations Command to integrate female service members into the remaining closed occupational specialties and units throughout the Department of Defense. Imbedded in the Secretary of Defense memo are the Chairman, Joint Chiefs of Staff Guiding Principles, which included the following: "assimilation of women into heretofore 'closed units' will be informed by continual in-stride assessments and pilot efforts."

The rescission of the DGCDAR and the directive to integrate women into previously closed occupations and units is not about women in combat, as some have framed the discussion. Our female Marines have proudly served in combat for decades, most notably throughout over a dozen years of continuous combat in Iraq and Afghanistan. Moreover, visits to several allied militaries to better understand their gender integration experiences revealed that our female Marines very likely have more actual combat experience than any servicewomen in the world.

Our analysis highlighted that 422 of the 443 Combat Action Ribbons earned by female Marines since the inception of that award were for service in Iraq and Afghanistan. There is no more compelling evidence that our female Marines have served very capably and courageously in combat and have distinguished themselves in those non-linear, extremely complex operating environments. However, none of those awards reflected a female Marine having to "locate, close with and

destroy the enemy" in deliberate offensive combat operations. Rather, these actions were all in response to enemy action in the form of IED strikes, enemy attacks on convoys or friendly bases, or attacks on female Marines serving in the Lioness Program or on Female Engagement Teams.

Today, 94% of primary MOSs are open to female Marines (315 of 336 PMOSs). The Marine Corps' comprehensive research and analytical effort designed to inform final integration decisions has been focused on the 6% of primary MOSs (21 of 336 PMOSs), over half of which are in the 03xx occupational field, that have remained closed to female Marines and are associated with direct ground combat. Central to the overall research framework has been a broad-based effort to fully understand the unique physical requirements and associated performance standards within these occupations and units, while recognizing the unchanging nature of ground combat and the physiological differences between men and women.

This comprehensive approach included multiple Marine Corps analytical agencies as well as a number of external research partners, as reflected in enclosure (1). The synthesis of all of these research efforts is found in the Operations and Analysis Division's (OAD) report at enclosure (2). The research methodology for the Ground Combat Element Integrated Task Force (GCEITF) was peer reviewed by the Operations Analysis Department at George Mason University and an almost year-long external Red Team was organized and facilitated by Dr. Maren Leed of the Center for Strategic and International Studies (CSIS). This Red Team challenged our research methodology and focus at regular intervals, which served to continually tighten the analytical connections and enhance the overall research product. The Marine Corps was exceptionally well-served by the energetic support of this highly accomplished and diverse group.

Finally, it should be noted that any element of the research dealing with human subjects - Marine volunteers - was closely supervised by the Marine Corps' Institutional Review Board. This board's singular focus was the strict adherence to the Human Rights Protection Protocols surrounding the health and welfare of the participating Marines.

At the heart of the research effort was the analysis of female Marine volunteer performance at ground combat arms entry-level, MOS-producing formal schools and the performance of both male and female volunteers in the GCEITF. The research focused principally on physical performance and physiological characteristics of performance in physically demanding occupations, while also analyzing the more subjective aspects of unit cohesion and morale.

The results from the Training & Education Command entry-level training research provided insights into relative propensity among new female Marines to serve in various ground combat arms occupations, as well as relative success and injury rates and causes, by gender. These

results are captured within enclosure (3). Since the programs of instruction at these formal learning centers necessarily focus on 1000-level basic individual tasks, this research alone was unable to answer the broader questions: "What does it actually take to do the job in the operating forces within these MOSs?" And, "What is the impact of female integration in ground combat arms units on collective task performance under conditions that most closely approximate combat?" Because formal congressional notification requirements precluded simply introducing female Marines into previously closed ground combat units to answer the above broader questions, it was necessary to build a unit from whole cloth designed specifically to conduct such research - the GCEITF.

## **II. Performance Standards**

Research at entry-level MOS-producing schools highlighted that the Marine Corps has long relied heavily on the fundamental assumption that simply because a Marine in a particular ground combat arms MOS is a male, he should be capable of performing all of the physical tasks associated with the regular duties of that MOS. For all intents and purposes, that has been the only physical standard or screen applied in accessing new Marines into physically demanding ground combat arms occupational specialties. In turn, that assumption has resulted in certain programs of instruction being focused on the more technical aspects associated with an MOS. In some cases, such a technical focus did not adequately ensure that individual Marines possessed the baseline physical capabilities through demonstrated performance of physically demanding tasks directly associated with service in a particular ground combat arms occupation.

The National Defense Authorization Acts of 2014 and 2015 served as the impetus for each of the Services to validate that standards across all occupational specialties are operationally relevant, occupation-specific, gender-neutral, and reflect the knowledge, skills and abilities necessary to perform the tasks associated with a particular occupational specialty. In reviewing the standards associated with previously closed ground combat arms occupations and units, it became clear that the Marine Corps standards focus within the Ground Combat Element (GCE) has been largely on the collective/unit standard. That stands to reason, since Marines fight as units. To meet the congressionally-mandated requirement to review, validate and develop individual standards and ensure gender-neutrality, it was necessary to essentially deconstruct many collective ground combat arms tasks to identify what individual tasks and standards an individual Marine must achieve as a member of a team, squad or crew to be a fully contributing member of that unit.

This is perhaps the single-most important result of this almost three year process. Moving forward, the Marine Corps in general and the GCE of our Marine Air Ground Task Forces (MAGTF) in particular, will be more capable as a result of more clearly defined individual performance standards that will ensure that Marines are assigned to

MOSs for which they are best and most fully qualified. These additional MOS-specific performance standards included in the various entry-level programs of instruction will focus principally on the most physically demanding occupational tasks and will be preceded by MOS classification physical standards at the Recruit Depots.

In concert, these standards will serve to reduce some of the "wastage" that occurs in our ground combat arms units due to Marines being physically incapable of meeting the demands of service in those occupations. Succinctly, while this comprehensive review of standards has been driven by the broader female integration issue, at its core the necessity of this physical standards review is independent of that issue and will be of great utility in increasing the combat readiness of the force - today and into the future.

### **III. Risk and Mitigation**

As reflected in the Marine Corps Test and Evaluation Activity (MCOTEA) report on the GCEITF, collective task performance was evaluated at the Marine Corps Air Ground Combat Center, the Marine Corps Mountain Warfare Training Center and in the waters off of Camp Pendleton. Female Marines demonstrated that they were capable of performing the physically demanding tasks, but not necessarily at the same level as their male counterparts in terms of performance, fatigue, workload, or cohesion.

The assessment across all occupational specialties revealed that gender integrated teams, squads, or crews demonstrated, with very few exceptions, degraded performance in the time to complete tasks, move under load, and achieve timely effects on target as compared to all-male teams, squads, or crews. Most performance shortfalls observed in the low-density gender integrated teams, squads or crews were magnified in like units with a higher-density gender integration. The results detailing the specific performance results and potential operational significance are included in enclosure (4).

For context, it should be noted that the female volunteers within the GCEITF were universally considered to be an above average-to-well above average representation of the PFC-Sergeant female population throughout the Marine Corps, as one would expect of a self-selected population with much to prove. The male volunteers were considered by their unit leaders and research observers as being an average representation of their male peers within the same ranks and MOSs throughout the Marine Corps, with arguably less to prove.

The Marine Corps experiences some degree of risk today in its ground combat arms units as a result of heretofore insufficiently codified individual standards, specifically those designed to ensure that each Marine possesses the requisite physical capability to perform all the duties associated with his ground combat arms MOS. This risk manifests itself in myriad ways within the category of personnel readiness - the "wastage" previously referenced - and is borne mainly

by unit commanders. Bolstered physical performance standards at different points in the accessions and entry-level training continuum will likely mitigate much of that risk in the future within newly opened MOSs. This includes potential risks associated with the physiological differences between male and female Marines related to the physical demands of a particular ground combat arms occupational specialty.

It is my assessment that despite vastly improved and codified individual standards, some level of risk will remain in the infantry and special operator MOSs that I do not believe can be fully mitigated by simply applying a minimum standard. That risk is associated with the unique physical demands of service in the infantry, reconnaissance and special operations occupations that place a premium on the ability to conduct dismounted movements under load.

Marine infantry is very different from the various forms of Army infantry. While much of the Army's infantry sub-communities are organized differently and are platform specific such as Stryker and Air Assault battalions, Marine infantry is of uniform organization and, as importantly, is platform agnostic. This is not to say that Marine infantry does not plan or train to employ various methods of tactical conveyance. But, at its foundation, a Marine infantry unit must be fully capable of regularly moving dismounted for extended distances with heavy loads. This has been the coin of the realm for Marine infantry throughout history, and the requirement for more distributed operations with less reliance on external logistics support reflected in *Expeditionary Force 21* now places even greater demands on the individual infantry Marine.

The associated risk is directly linked to the physiological differences between males and females. Simply, size matters when executing a dismounted movement under load. Within that, the actual body composition of the individual Marine is of utmost importance. Our research, as well as reviews of the research conducted by several allied militaries on this subject reveal that lean body mass and absolute VO2 max are the two primary predictors of success for this particular infantry task. The physiological differences in body fat between males and females - body fat being synonymous with "dead weight" to be added to whatever external equipment load is already being carried in order to determine the true overall load, places females at a significant disadvantage from the start in infantry-related tasks.

On average, females possess significantly less lean body mass, a slighter build that affects stride length and stride frequency as loads increase, less absolute VO2 max production, and less power and anaerobic/aerobic capacity than males. The combination of these factors constitutes a potential risk to combat effectiveness for a force that must be self-sufficient for movement and fully capable of extended dismounted operations within the highest intensity portion of

the combat spectrum. The detailed results of the University of Pittsburgh's physiology study on the GCEITF are at enclosure (5).

These realities are clearly not insurmountable nor are they always manifested during a one-time march under load that reflects an entry-level performance standard. Rather, the risk lies in the cumulative impact of this physiological disadvantage over the course of regular, recurring and increasingly more challenging dismounted movements under load in the operating forces. This is exacerbated by other physiological factors that, in concert, make females much more susceptible to injuries, either caused by a specific event or through the cumulative impact of repetitive dismounted movements under load. The disparity in injury rates between males and females at the Infantry Training Battalion (ITB) and during the conduct of the GCEITF assessment, due principally to multiple marches under load, provides an early indicator to that effect.

The United Kingdom review on "Women in Ground Close Combat" at enclosure (6) highlighted 21 factors likely to change based on the integration of women into ground combat arms specialties, 11 of which would have a negative impact, three of those 11 negative impacts that they assessed could not be mitigated. Among the three factors that would negatively impact combat effectiveness without known mitigation strategies are survivability and lethality. This conclusion is based on the analysis that "a woman who is performing to the same physical performance standards as a man, will be working closer to her maximum capacity when carrying the same absolute combat load, and will fatigue sooner than her male counterpart." This conclusion was reinforced in our own research during the GCEITF assessment that highlighted the disparity between males and females in relative movement rates and lethality with various individual weapons within the infantry occupations. In particular, the overall accuracy of the female 0311 infantry volunteers declined and the disparity in accuracy relative to their male counterparts increased as the weight of the individual weapon system increased.

An additional consideration is the likely very small numbers of females that would potentially be serving in infantry MOSs throughout the operating forces in a steady state integration scenario. Based on individual propensity and the ability to meet minimum standards, it is difficult to project a number of female infantry Marines that does not exceed what could be viewed as tokenism. As a frame of reference, the Canadian Armed Forces have been fully integrated for over 25 years. After a quarter century of integration and with unquestionably much lower physical standards than the U.S. Marine Corps, the Canadian Army has .4% female enlisted infantry. The potentially very small number of female infantry Marines could pose a distinct challenge within the assignment process, as well as for commanders charged with leading infantry battalions of nearly 1,000 Marines.

Finally, in viewing this decision through a talent management lens, the Marine Corps risks losing a number of highly talented female Marines prematurely due largely to the often extreme physical demands of these infantry, reconnaissance and special operations occupations. The inextricable linkage between physical capacity and job performance in the infantry, reconnaissance and special operations occupations, specifically in the early stages of a young officer's or enlisted Marine's career, is very different from the vast majority of occupations throughout the military Services. Service in these uniquely physically demanding occupations will place the majority of female Marines at a competitive disadvantage relative to their male peers due to the heavy emphasis on demonstrated physical strength, anaerobic power, and anaerobic/aerobic capacity. These are physiological factors that directly impact physical performance and, in turn, inform the performance evaluation of an individual Marine.

The Marine Corps Recruiting Command (MCRC) has diligently worked to significantly increase the number of female accessions, both officer and enlisted, to unprecedented levels in the past few years. We need to continue to attract, develop, and retain our female Marine talent to meet future challenges across the range of military operations. The likelihood of a female Marine being less competitive in these significantly more physically demanding occupations may adversely impact the Marine Corps' ability to retain top female talent and enable their progression into more senior ranks. Simply, any loss of this MCRC-established momentum, or worse a downward trend in retaining our top female Marines, would be a tremendous loss for the Corps.

#### **IV. Policy Implementation**

The integration of female Marines into ground combat arms occupations to the fullest extent possible will expand the Marine Corps' talent-base to face the highly complex operational realities highlighted in *Expeditionary Force 21*. Clearly articulated and codified individual occupational standards will undoubtedly enhance our ability to place the best and most fully qualified Marines in the right occupations and increase the overall combat effectiveness and readiness of our MAGTFs. The critical element of successful policy implementation will be an unwavering adherence to these standards, which will: provide reasonable assurance of physical capability while mitigating injuries impacting combat effectiveness and readiness; enhance competitiveness and promote career viability, supporting individual Marine success and positively impacting retention; and, be the primary driver in overcoming gender bias through clearly demonstrated performance standards, which is fundamental to a cohesive unit with high morale.

As with any policy change in the Marine Corps, leadership will be the most critical component to successful gender integration into ground combat arms occupational specialties and units. Fully invested and unwavering demonstrations of support by commanders and leaders must set the example for Marines at all levels - "what right looks like" - and set the conditions for success within individual units and

throughout the institution. All of the analysis of allied military experiences as well as our own previous integration experiences speaks to the absolute primacy of leadership. Without a full 30" step by leadership at all levels toward embracing integration of female Marines into the ground combat arms, this integration effort will very likely be fraught with friction and unduly protracted - potentially a greater drain on combat effectiveness and unit readiness.

Gender integration into the ground combat arms will be a multi-step process. First, we must define gender integration success. Second, we must identify the challenges associated with gender integration. Third, we must involve stakeholders across the institution to develop and implement plans, policies and practices designed to ensure success. Fourth, we must design and initiate a long term assessment plan specifically to understand the results of gender integration as it occurs. Lastly, we must create the feedback mechanism that enables senior leaders to provide guidance throughout the process.

#### **Successful Integration Defined**

- Combat effectiveness and readiness are enhanced
- Validated operationally-relevant, occupation-specific, gender-neutral physical performance standards are universally applied to Marines serving in physically-demanding ground combat arms military occupational specialties (MOSs) and units
- Marines can compete for any MOS if they have the propensity and are fully qualified
- Systems, policies, and practices are in place that screen, classify, train, and develop Marines for physically demanding MOSs and assignments
- Commanders and leaders at all levels create positive command climates that lead to full recognition and acceptance of the best and most fully qualified Marines in the occupational specialties where they can make the strongest contributions to the Corps' missions
- Viable career paths are available to Marines across all MOSs
- Internal and external audiences understand that decisions and actions are rigorous and valid, empirical and fact-based, and withstand legal and societal scrutiny

#### **Potential Challenges to Integration**

- Identifying physiological and/or physical screening tools that accurately predict performance and mitigate injuries during entry-level training

- Codifying physical standards for occupations and assignments that are operationally-relevant, gender-neutral and highly predictive of physical performance in the operating forces
- Developing training to capitalize on the physical abilities of all Marines, regardless of gender
- Developing assignment policies and practices that discourage gender-favoritism, discrimination, and/or exclusion
- Identifying and overcoming institutional and individual gender bias
- Establishing task cohesion early in the gender integration process to ensure increased combat effectiveness and unit readiness
- Communicating the rationale of decisions and recommendations to internal and external audiences
- Marginalizing female Marines due to gender bias and misconceptions about female performance

Left unaddressed, these challenges at best leave combat effectiveness unchanged, or worse, compromised. The MCFIP applies the gender integration lessons learned from previous Marine Corps experiences, as well as lessons learned from allied militaries, to ensure combat effectiveness and readiness are ultimately enhanced.

#### **Path to Success**

- Codify and validate quantifiable, operationally-relevant, gender-neutral physical standards
- Enhance training for all Marines in developing their physical ability to meet those physical standards
- Update orders and directives as required to develop gender-neutral assignment policies and practices to place the best and most qualified Marines in the right billets, regardless of gender
- Create task cohesion in units as early in the gender integration process as possible, conducting unit training, field exercises or physical training to demonstrate that all Marines can actively and positively contribute to mission success
- Institute gender education packages for leaders and Marines, empowering them with knowledge to ensure a smooth transition

## **V. Long-term Study & Assessment**

Unlike previous integration experiences, the MCFIP will include a Long Term Assessment Plan designed to provide a detailed, quantitative assessment of all aspects of female integration to assess the relative success of implementation as well as inform in-stride policy adjustments, as required. As this is largely a personnel issue, the Deputy Commandant for Manpower and Reserve Affairs (DC, M&RA) will serve as the Office of Primary Responsibility. This multi-decade plan will involve key stakeholders across the Deputy Commandants (DCs), Training and Education Command (TECOM), Recruiting Command (MCRC), Marine Corps Systems Command (MCSC) and Marine Corps Forces Commanders (MARFOR Commanders).

The assessment will collect data from current manpower, recruiting and training systems. It also identifies additional data to collect specifically to understand individual motivations regarding a Marine Corps career. A proposed longitudinal study will evaluate physical performance in ground combat MOSs against physical training, nutrition and injury rates in a population of male and female Marines. The Center for Naval Analyses (CNA), RAND and others will support with studies on cohesion and morale in ground combat units compared with logistics or aviation units; case study research designed to understand the impacts of gender integration on deployability; studies designed to identify material and non-material adaptations to support gender integration, and others. The Long Term Assessment Plan calls for semi-annual updates to Marine Corps senior leaders (CMC/ACMC) during the first four years of integration, with annual updates thereafter for twenty years.

Specific metrics within the long-term assessment include:

### **Recruit**

- Female and male propensity and reasons to serve/not serve in the USMC (JAMRS data)
- Female and male propensity and reasons to serve/not serve in ground combat arms PEFs/QSNs (JAMRS data)
- PEF/QSN "take-rates" by gender
- PEF/QSN qualification rates by gender
- PEF/QSN reclassification rates by gender and reason
- Recruiting costs by gender and PEF/QSN
- Officer ground, air, and law contract rates by gender
- Officer MOS assignment by gender, class rank, and preference

### **Train**

- Training continuum performance (academic, military skills, leadership, physical events, etc.) by gender, MOS, age, fitness/health, and height/weight/body composition
- Training continuum (ELT, PME, and Continuing Education) attrition rates and reasons by gender, MOS, age, fitness/health, and height/weight/body composition
- Injury rate and type by gender, age, MOS, and unit (during training continuum and in the OpFor)
- MOS reclassification rates and reasons by gender, unit, and age
- PFT/CFT cumulative and individual event scores by gender, rank, age, MOS, and unit
- Rifle/pistol qualification scores by gender, MOS, and unit
- MCMAP belt qualification by gender, MOS, and unit
- Swim qualification by gender, MOS, and unit
- Assignment to body composition program (BCP) rates by gender, MOS, and height/weight
- Height/weight and body fat estimation of BCP Marines by gender, MOS, and unit

### **Develop**

- Formal unit assignments by gender and MOS
- Billet assignments by gender and MOS
- Assignment to key billet rates in occupational field by gender, MOS, and unit
- Selection rates for CCLEB/CPIB by gender, MOS, and unit
- Selection rates for resident PME and Continuing Education by gender, MOS, and unit
- Pro/Con scores by gender, MOS, rank, age, and unit
- FITREP relative value by gender, MOS, and unit
- MOS continuation rates by gender, MOS, rank, age, and reason

- Promotion rates by gender, MOS, and unit
- Selection rates for command by gender, MOS, and unit
- Remove by request (RBR) for command screening - rates and reason by gender, MOS, and unit
- Command climates (receptive to female Marines? Attitudes on gender integration, diversity, inclusion, etc.)

#### **Deploy**

- Non-deployability rates and reasons by gender, MOS, and unit
- Light/limited duty by gender, MOS, and reason
- Pregnancy rates by MOS, unit, and rank
- Training days lost by gender, MOS, and reason
- Work days lost by gender, MOS, and reason
- Misconduct rates and type by gender, unit, and MOS
- Hazing, sexual harassment, and sexual assault rates by gender, unit, rank, and MOS
- Admin separation rates and reason by gender, MOS, and unit
- Cost, use, performance, and effectiveness of material and non-material adaptations by gender, MOS, and unit

#### **Retain**

- Retention rates by gender, MOS, and unit
- Reasons for separation by gender, MOS, and unit
- Reasons for retention by gender, MOS, and unit
- Medical separation rates and reason by gender, MOS, unit, and time in service (first-term and career force)

Unlike in previous Marine Corps integration experiences, senior leaders must be able to assess at regular intervals the relative success of the integration plan and, most importantly, institute in-stride adjustments. This comprehensive assessment effort cannot be personality-based, subject to steady erosion over time as a result of

senior leader assignment turbulence. Rather, to be successful it must be stitched tightly into the fabric of our 21<sup>st</sup> Century Talent Management Strategy.

## **VI. Winning**

The following passage from the 1992 Presidential Commission on the Assignment of Women in the Armed Forces, which upheld the restriction on women serving in ground combat occupations and units by a vote of 10 to 0, with 2 members abstaining, is central to the broader integration issue and worthy of reflection when considering not only research findings, but policy implementation strategies as well:

*"A military unit at maximum combat effectiveness is a military unit least likely to suffer casualties. Winning in war is often only a matter of inches, and unnecessary distraction or any dilution of the combat effectiveness puts the mission and lives in jeopardy. Risking the lives of a military unit in combat to provide career opportunities or accommodate the personal desires or interests of an individual, or group of individuals, is more than bad military judgment. It is morally wrong."*

In addition to the above reference to winning being "often only a matter of inches" I would add the following passage from Marine Corps Warfighting Doctrinal Publication 1, *Warfighting*, when considering the totality of research findings:

*"Of all the consistent patterns we can discern in war, there are two concepts of universal significance in generating combat power: speed and focus. Speed is rapidity of action. It applies to both time and space. Speed over time is tempo - the consistent ability to operate quickly. Speed over distance, or space, is the ability to move rapidly. Both forms are genuine sources of combat power. In other words, speed is a weapon."*

Affording equitable opportunities to the maximum extent possible for all Marines to request and subsequently compete to serve in occupational specialties for which they are most fully qualified is the right thing to do and aligns with our Corps' broader 21<sup>st</sup> Century Talent Management Strategy.

In that vein, the 1992 Presidential Commission also stated,

*"Service members are encouraged to pursue opportunities and career enhancements in the Armed Forces, limited only by the needs and good of the Service. But when it comes to combat assignments, the needs of the military must take precedence over all other considerations, including the career prospects of individual service members."*

This fundamental tenet that is as relevant today as it was nearly a quarter century ago must remain at the forefront of any decisions on integration, despite the significant cultural shifts toward increased

opportunities and inclusion within our nation since the Presidential Commission reached its conclusions. In the main, such shifts have been positive for our country in a broader context, but have perhaps diluted the paramount importance of winning in battle against our nation's foes - the sole reason for the existence of a Marine Corps.

To move forward in expanding opportunities for our female service members without considering the timeless, brutal, physical and absolutely unforgiving nature of close combat is a prescription for failure. Our future enemies will be the ultimate arbiter of such decisions - when lives of our Marines are in the balance. Those who choose to turn a blind eye to those immutable realities do so at the expense of our Corps' warfighting capability and, in turn, the security of the nation.



# Research Organizations



## Ops Analysis Division

- Overall Research Integration
- Lead for Expand Unit Assignments
- Long-term longitudinal study



## Center for Naval Analyses

- Analytical backbone
- Study of historical USMC integration efforts
- Current force research: deployability rates, physical performance



## George Mason University

- Peer review of GCEITF research plan



## Marine Corps Recruiting Command

- Propensity Studies



## Research and Development Corp

- Allied Nations integration efforts
- Long-term longitudinal study



## Center for Strategic & International Studies

- Research Red Team
- Evaluate all Research and Assessment



## Training & Education Command

- Lead for Expand ELT Research Studies



## Naval Health Research Center

- Stress indicators study



## Michigan State University

- Decision-making study



## Marine Corps Operational Test & Evaluation Activity

- Lead for GCEITF



## University of Pittsburgh

- GCEITF Focus
- Develop physical, physiological, and performance predictors of MOS success



## EXECUTIVE SUMMARY

*The Marine Corps Force Integration Plan*



### ***Background***

In 2013, the Secretary of Defense rescinded the Direct Ground Combat Definition and Assignment Rule. In this rescission, the Secretary instructed the Services to plan for gender integration of previously closed units and military occupational specialties (MOSs) beginning in January 2016.

### ***Purpose***

The purpose of this research is to provide analytical support to the Marine Corps' recommendation to the Secretary of Defense, in response to the direction to open all currently-closed Marine billets and units to females.

### ***Scope***

The research conducted in support of the Commandant of the Marine Corps' decision on gender integration of ground combat arms (MOSs and units) was a very large effort spanning three of the four lines of effort (LOEs):

- LOE 1: Expanded Unit Assignments (EUA)
- LOE 2: Entry Level Training (ELT)
- LOE 3: Ground Combat Element-Integrated Task Force (GCE-ITF)

This research was supported by a large number of analytical organizations, both within and external to the Marine Corps, to ensure the broadest possible analytical coverage.

### ***Methodology***

In order to support the Commandant's recommendation about the integration of females into combat arms MOSs and units, we researched the potential impacts of integration in four areas: Combat Effectiveness, Unit Readiness, Individual Marine Success, and Institutional Costs. The objective of this research was to identify positive implications, as well as risks/downsides, of integration. For those areas of risk, where possible and supported by research, we also provide potential mitigating factors to help reduce those areas of risk.

The objective of this report is not to provide a particular recommendation to open or close combat arms MOSs or units, but rather to assess the relative levels of risk and mitigation in doing so. In the end, the recommendation of the Commandant will have to be based on best military judgment, as there cannot be a definitive correct answer, but simply one that is best supported by empirical evidence, and formulated with the needs of the Marine Corps in mind.

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## ***Summary and Conclusions***

As a general comment, we see very little data that distinguishes the effects of integration within the non-infantry combat arms MOSs (08xx, 1371, 18xx). Within the infantry occupational field, a portion of the data (such as Formal Learning Center [FLC] attrition, injuries, etc.) does not distinguish individual MOSs. However, performance results from the GCE-ITF indicate integration of the crew-served weapons MOSs (0331/41/51) may impose a greater risk on infantry battalions compared to the integration of 0311s because of the larger impact on combat effectiveness. Further, we have very little data to distinguish between opening an MOS versus opening an associated unit to assignment for female non-combat arms MOSs (e.g., 0311s and infantry battalions). What we do have on these categories comes from the Provisional Infantry in the GCE-ITF research, which does not shed clear light on distinguishing between those two. Thus, for the remainder of this section, the only distinctions we will make are those between infantryman and crew-served infantry MOSs and units, as well as the overall infantry occupational field compared to non-infantry, combat arms MOSs and units. Any further distinctions would not be supported by analysis.

One byproduct of this entire gender integration discussion is the development of gender-neutral standards, MOS school classification standards, and MOS-specific performance standards to augment/replace the current Training & Readiness (T&R) Manual standards, which are currently not fully adequate. Regardless of the way ahead on female integration, all of the aforementioned standards should strengthen the current Marine Corps' processes for selection to an MOS and training, and continuation in an MOS, and may ultimately improve such intangible factors such as unit morale and task cohesion.

Before getting into some of the detailed discussions of the potential positive and negative aspects of integration, it is worthwhile to point out that some of the initial negative impacts are likely to diminish over time. Based on Marine Corps' experiences with previous integration efforts (such as aviation and logistics), as well as the experiences of foreign militaries, we can expect gradual improvements in certain areas over time. For example, the initial numbers of females integrated into these units are likely to be very small, but can be expected to increase gradually over time. However, based on the experience in other nations, it is likely the ultimate numbers in the combat arms will never reach the current 7% figure for females in the Marine Corps today. Similarly, while we might initially expect higher (both end of active service [EAS] and non-EAS) female attrition rates when compared to male attrition rates, these are also likely to diminish over time. Furthermore, any initial detrimental effects on cohesion can eventually be mitigated with good training and solid leadership.

### ***Positive Implications of Integration***

Further integration of females into the combat arms brings with it many of the general benefits of diversity that we experience across the spectrum of the workforce, both within the military as well as the private sector. This was perhaps best illustrated in a decision-making study that we ran in which all-male and integrated groups attempted to solve challenging field problems. Each of the problems involved varying levels of both physical and cognitive difficulty. For those more cognitively challenging problems, the female integrated teams (with one female, and three to four males), performed as well or better than the all-male teams.

We also see benefits to integrated units in areas in which females traditionally have better outcomes than males, e.g., incidents pertaining to disciplinary issues. Integration of females is likely to

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lower the instance of disciplinary action, and this has been shown in general across the Marine Corps, as well as in the comparison of integrated (e.g., Aviation Combat Element [ACE], Logistics Combat Element [LCE]) to non-integrated units.

From a recruiting and propensity perspective, the opening up of these formerly closed MOSs/units would likely have a neutral to positive effect, based on survey data. However, this presumes a voluntary assignment process; if females were to be involuntarily ordered into combat arms units, this could actually lower propensity and female enlistments.

We also identified some physiological characteristics (e.g., lactate threshold and flexibility), and a few performance tasks (e.g., .50 caliber marksmanship), in which females, or female-integrated groups, excelled. However, none of these formed strong predictors of overall improved mission performance or reduced injuries.

### *Negative Implications of Integration*

Throughout the research effort, there were numerous indications of lower performance levels from combat arms females, or female-integrated groups. The most direct results come from the GCE-ITF, in which, of the 134 different observed tasks, 93 showed statistically significant differences **when comparing the all-male control group and at least one of the integrated groups (low and/or high density)**. **Of these 93, the all-male control group performed statistically better than at least one of the integrated groups in 88 of the tasks. Moreover, at least one of the integrated groups performed statistically better than the all-male control group in 5 of the tasks. Furthermore, of the 134 tasks and within the 93 that showed statistical differences, 30 tasks showed statistical significance of a 30% or greater difference. Of these 30, the all-male control group performed 30% better than at least one of the integrated groups in 28 of the tasks. Also, at least one of the integrated groups performed 30% better than the all-male control group in 2 of the tasks (both were employment of the M2 machine gun).** Of the group of 30 tasks with operationally relevant differences, the majority occurred in the infantry and Provisional Infantry, again with the all-male teams typically performing better.

Moreover, within these units, there were significant differences (e.g., lower performance levels, especially in hiking under load) between crew-served weapons MOSs and 0311s. It is significant that the majority of the operationally relevant differences occurred in the most physically demanding tasks, such as casualty evacuations, long hikes under load, and negotiating obstacles. This is consistent with the research results, both within the Marine Corps as well as across many foreign nations, indicating that men have significantly higher upper- and lower-body strength and VO<sub>2</sub> max,<sup>1</sup> which leads to less fatigue in physically demanding tasks and better performance.

In addition to the strict performance data from the GCE-ITF, we have also qualitative/subjective observations that have further discerned differences. These are important because a live test that measures team performance can mask individual differences. We have seen numerous cases of compensation during physically demanding tasks, in which males have shifted positions to take over certain aspects of the tasks from females, such as loading ammo into trucks or heaving loaded packs on top of a wall.

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<sup>1</sup> VO<sub>2</sub> max is a measure of the maximum volume of oxygen that an athlete can use. It is measured in milliliters per kilogram of body weight per minute (ml/kg/min).

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Earlier indicators of differences can be observed in the performance at the formal learning centers. While the ability to drop on request (DOR) for the female volunteers confounds the statistical analysis of the school graduation rate analysis, the differences are large enough to draw conclusions about the relative ability of females versus males at these schools. The difference is most stark for the infantry. At the Infantry Training Battalion (ITB), the graduation rates for females range from 36% (including DORs) to 46% (excluding DORs), compared to the male graduation rate of about 98%. For the other combat arms schools (e.g., artillery, tanks, Amphibious Assault Vehicles [AAVs]), graduation rates range from approximately the same (excluding DORs), to somewhat lower for females (with DORs). Further, a more careful examination of some of the physically demanding tasks, such as artillery projectile lift/load and tank ordnance handle/load, showed significantly higher initial completion rates by males. Some of these tasks were not even graduation requirements, although that may change shortly with the development of the MOS-specific performance standards. Furthermore, the success rate for female Marine officers at Infantry Officer Course (IOC), albeit based on a small sample, is 0%. Thus, integration of females into the infantry runs the risk of having very few officer role models for these new infantry females.

In addition to performance, we see significant evidence of higher injury rates for females when compared to males. The aforementioned upper- and lower-body strength and higher fatigue levels lead to greater incidents of overuse injuries, such as stress fractures. This leads to significantly higher levels of non-deployable status for females, of which, medical non-deployability comprises the largest fraction. We have seen this not only for GCE-ITF and ITB females, but also for female Marines in general, and for females throughout foreign militaries that were studied. Further, for all GCE-ITF volunteers, we saw higher levels of injuries within the 'hiking' MOSs (03xx [less 0313] and 1371) compared to the 'riding' ones (08xx, 18xx, and 0313).

When we examine the institutional costs of integrating females into the combat arms, it helps to divide this into the direct and indirect costs. The direct costs, such as modifications to equipment and facilities, are likely to be relatively small. The indirect costs, such as increases to the training, transient, prisoner, and patient (T2P2) population, medical separations, non-deployability rates, attrition, and recycling or reclassification, will be more significant.

### ***Mitigation to Risks***

Along with the negative implications of integration, we have learned that there are many actions the Marine Corps could take to mitigate the risks of those implications. While most of these would not likely eliminate entire shortfalls, they could certainly lessen the risks. These typically fall in the areas of screening and standards, and training and education.

While we have seen FLC graduation rates that range from comparable to considerably lower for females, when compared against males, by better screening students before entry, we can substantially improve female graduation rates (the example for ITB showed the potential to improve the graduation rate from 35% to approximately 64%). The downside of such screening is that we would drastically reduce the number of females eligible for these schools; as a result, leadership must weigh this against the improved graduation rates. We would also slightly reduce the number of males eligible; however, this may also serve to cull the lower-performing male combat arms Marines. Screening has also been shown to reduce the numbers of injuries in these schools. Similar screening techniques could also be used to determine eligibility for non-combat arms Marines (both male and female), who are eligible for assignment to combat

arms units, to better ensure success in those units. Useful screening measures include pull-ups, components of the Combat Fitness Test (CFT), and lean body mass (LBM) (because LBM is not readily available, we use height and weight as a surrogate). Interestingly, LBM was also a good predictor of injuries in LOE 3 – the higher the LBM, the lower the injury rate.

In addition to screening at the end of recruit training for ultimate eligibility for combat arms FLCs, we could also develop initial screening tests for the recruiters to better assign program enlisted for (PEF) codes to Marine poolees. This action could effectively reduce the likelihood of PEF reclassification at the end of recruit training. The Marine Corps can develop and refine occupational field standards to ensure trained Marines can continue to satisfactorily perform the tasks necessary for their MOSs.

When we looked into height and weight standards as possible screening criteria, we also uncovered a discrepancy in these standards between male and female Marines, with a stricter resultant body mass index (BMI) standards for females (25) than for males (27.5). This appears to be counterproductive, especially for enabling females to enter physically demanding MOSs, as the higher weight and body fat female Marines may actually be more successful in these MOSs than lower-weight Marines possessing less body fat who currently meet the current standards.

Numerous studies and live tests have indicated that physical training regimens are critical to success in preparing service men and women for entering physically demanding MOSs. Experience in separated training at Marine recruit training, along with the recent United Kingdom (UK) experience of moving to integrated, and then back to separated initial training, indicated that initial training can be better tailored when men and women are separated early on. However, even with gender-separated initial training, the Marine Corps should look for integrated training opportunities in order to prepare these young men and women to serve together in the near future. Beyond initial training, we have seen tremendous value in assigning physical trainers to units at the battalion level to help tailor physical training, identify sources of injury, and to help commanders and staffs construct training regimens to support training objectives while minimizing injuries.

In addition to physical training, the Marine Corps should provide training in other aspects of integrating units, ranging from sexual harassment, common obstacles in integration, and general respect for others, to best ensure success, especially during the early years of integration. The ground combat units have many years of historical bias, much of which will take time to eliminate.

While we described the potential negative implications to readiness earlier, predominantly from medical issues, our analysis has showed that the number of females entering these combat arms MOSs and units likely will be a very small percentage—significantly lower than the current 7% female Marine Corps population overall. Thus, the overall impact on unit readiness will be buffered by the dominant numbers of male Marines, and should not show a significant difference.

### *Conclusions*

Based on the body of evidence developed in support of this research, as well as existing related research, the integration of females into the combat arms MOSs and units will add a level of risk in performance/effectiveness and cost. While this risk can be mitigated by various methods to address failure rates, injuries, and ability to perform the mission, the bottom line is that the physiological differences between males and females will likely always be evident to some extent.

The decision to recommend the opening of an MOS and unit will never be a black and white one; it is not simply a matter of setting standards and letting any Marine into the MOS or unit who passes those standards. There are costs to the institution to be considered in the final recommendation. Setting standards too high will preclude many qualified Marines from serving, while setting them too low will introduce high levels of risk for attrition, injury, and degradation of unit performance. The data in this report indicates that even striking what appears to be a balance for setting standards will likely introduce some level of risk across all of these factors. That level of risk is highest for infantry MOSs and units, and within the infantry, highest for the crew-served weapons MOSs. The risks appear to be significantly lower for the non-infantry combat arms.

The recommendation to open or to request an exception to policy for any MOS or unit will depend on the Marine Corps' tolerance for the level of risk that such a change would impose. This report can help quantify those risks, and the effects of certain mitigation efforts, but it cannot analytically provide a definitive answer to the level of risk tolerable by the Marine Corps—that is a decision that can only be made by senior Marine Corps leadership. This decision will clearly be influenced by the levels of risk described, and the ability to mitigate those risks, balanced against the beneficial aspects of integration. Many of the mitigation efforts identified in this report would serve the Marine Corps well and would help strengthen performance and reduce risks for both male and female Marines, regardless of the recommendation pertaining to integration.



# Key Findings

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## Propensity

- 42% (1504 of 3614) of MCRD females met the ITB physical prerequisites (3<sup>rd</sup> Class Male PFT/CFT)
- 34% (516 of 1504) of eligible females volunteered for ITB
- Only 5% (24 of 454) of BOC females elected to volunteer for IOC

## Performance

- 48% (124 of 257) of ITB females were physical performance drops
- Height & Weight were significant predictors for 03xx graduation
- 97% (28 of 29) of IOC females were physical performance drops

## Injuries

- ITB females had a 13% injury rate versus a 2% male injury rate
- 27% of ITB female injuries were attributed to marching under load
- 28% of the hike-related injuries resulting in a course drop

## Executive Summary

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### **Purpose**

This Experimental Assessment Report (EAR) formally records MCOTEA's assessment of experimental results.

### **Background**

The Commandant of the Marine Corps authorized the formation of a Ground Combat Element Integrated Task Force (GCEITF), and the Assistant Commandant of the Marine Corps assigned the Marine Corps Operational Test and Evaluation Activity (MCOTEA) the responsibility of conducting an experiment on the GCEITF. The task force trained female Marine volunteers in closed military occupational specialty (MOS) skills and integrated them into a combat arms unit, while a dedicated research team observed the unit's performance in an operational environment.

### **Scope**

The task force was built around an infantry battalion minus (-) reinforced with attachments in the Battalion Landing Team model as a notional ground combat element component. This unit formed in July 2014 and remained in place until July 2015. MCOTEA used data obtained from GCEITF experimental events and non-experimental event periods to answer objectives identified in the Experimental Assessment Plan.

### **Conclusions**

(FOUO) The female Marines integrated into the closed MOS units demonstrated that they are capable of performing the physically demanding tasks, but not necessarily at the same level as their male counterparts in terms of performance, fatigue, workload, or cohesion.

(FOUO) Integrated units, compared with all-male units, showed degradations in the time to complete tasks, move under load, and achieve timely effects on target. The size of the differences observed between units and tasks varied widely. The more telling aspect of the comparisons is the cumulative impacts. The pace, timing, and accuracy of any singular task is not necessarily important, but taken together, and in the context of actual combat operations, the cumulative differences can lead to substantial effects on the unit, and the unit's ability to accomplish the mission.

(FOUO) Gender and MOS type are the best predictors of occupational injuries. In particular, we found that females are more likely to incur occupational injuries, resulting in reduced readiness compared to their male counterparts. Males, on the other hand, are more likely to incur non-occupational injuries. Additionally, Marines in vehicle MOSs tended to have lower injury rates than those in MOSs that march (i.e., foot mobile) or Artillery MOSs.

(FOUO) No clear conclusions can be drawn from the Proficiency and Conduct ratings of the GCEITF volunteers.



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EXECUTIVE SUMMARY MEMORANDUM

14 AUGUST 2015

University of Pittsburgh/United States Marine Corps Ground Combat Element Integrated Task Force Research

1. Research aims have enabled a thorough scientific approach to testing and analysis of tactical requirements and musculoskeletal and physiological profiles of Marines by identifying modifiable contributors to injury and optimal physical readiness, providing injury surveillance, and identifying and assessing tactical demands of male and female Marines during ground combat element training and operational assessments (ONR Award #N00014-14-1-0021).
2. Key Findings
  - 2.1. On average, male Marines performed significantly better than female Marines on strength, physiology, and field tests of power and agility; female Marines performed significantly better than male Marines on the majority of flexibility variables, balance, and biomechanical variables; male and female Marines performed comparably on the balance scores associated with the NeuroCom Sensory Organization Test (SOT) and Functional Movement Screen.
  - 2.2. When female Marines were assessed to determine the percent who met or exceeded the bottom 5<sup>th</sup> percentile male score, a proportion of female Marines met or exceeded the 5<sup>th</sup> percentile of male Marines for all variables; the lowest proportion was observed for absolute shoulder external rotation strength (7%), and the highest proportions were observed for the vestibular SOT score, sit and reach (flexibility), and fat mass (100%).
  - 2.3. Forty-three percent of male Marines and 46% of female Marines reported supplementation usage.
  - 2.4. Better aerobic and anaerobic capacity, ankle strength, and knee biomechanics were associated with MOS School graduation (significant point-biserial correlation, excluding motivational drops from analysis).
  - 2.5. Higher aerobic capacity and shoulder external rotation strength were associated with decreased odds of injury (Odds Ratio (OR) =0.999 and 0.987, respectively;  $p < 0.05$ ) for all Marines during GCE ITF training and operational assessments; when just field tests were considered, longer standing broad jump was associated with decreased odds of injury (OR=0.982,  $p = 0.022$ ) (excluding motivational drops from analysis).
  - 2.6. During GCE ITF training and operational assessments, 40.5% of female Marines and 18.8% of male Marines reported at least one musculoskeletal injury; the highest percentage of injuries were located at the hip for female Marines and foot/toes for male Marines, respectively, and the highest percentage of injuries were attributed to ruck marching for both male and female Marines.
3. Current and Future Activities
  - 3.1. Continue analyses of data beyond final report to answer remaining research questions.
    - 3.1.1. Analysis of data relative to MCOTEA tactical outcomes, heart rate data, fatigue data.
    - 3.1.2. Further analyses of data collected as part of UPitt aims.
  - 3.2. Plan for and initiate longitudinal research aims, secure funding for continued execution of aims.
4. Longitudinal research aims (in support of MCFIO/OAD long-term integration research framework)
  - 4.1. Longitudinal surveillance and analysis of musculoskeletal injuries beyond the GCE ITF.
  - 4.2. Identify physical, physiological, musculoskeletal, and nutritional predictors of injury and optimal performance throughout a tactical lifespan.
  - 4.3. Develop intervention strategies to maximize resiliency and physical preparedness of Marines throughout tactical lifespan.
  - 4.4. Provide recommendations and/or additional research aims as needed/requested by Command.
5. POC for this memorandum is Dr. Katelyn Allison at 412-246-0460 (kaf14@pitt.edu)

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# Combat Effectiveness

**Speed/Tempo:** *“Of all the consistent patterns we can discern in war, there are two concepts of universal significance in generating combat power: speed and focus. Speed is rapidity of action. It applies to both time and space. Speed over time is tempo – the consistent ability to operate quickly. Speed over distance, or space, is the ability to move rapidly. Both forms are genuine sources of combat power. In other words, speed is a weapon.” MCDP-1*

## Final MCRD CFT

- MTC Time: Female 95<sup>th</sup> percentile = male 16<sup>th</sup> percentile
- MANUF Time: Female 95<sup>th</sup> percentile = male 9<sup>th</sup> percentile
- Linkages: Health & Welfare of Marines; Talent Management -> relative competitiveness within a MOS cohort that emphasizes physical ability, especially among junior enlisted Marines and company grade officers

## GCEITF

- Female-integrated teams, squads, and crews demonstrated lower performance levels = reduced combat effectiveness on 69% of tasks (93 of 134) as compared to all-male teams, squads, and crews (majority of tasks were time-based)
- 28 tasks showed >30% performance degradation. The majority occurred in the infantry and provisional infantry and consisted largely of the most physically demanding tasks



# Combat Effectiveness

## Speed/Tempo (cont)

- All-male squads, regardless of 03xx MOS, were faster than the gender integrated squads in tactical movements. The differences were more pronounced in non-0311 squads that carried the assault load plus the additional weight of crew-served weapons and ammo.
- Integrated 03xx teams and squads did not meet the hiking standard of 4 kilometers per hour, with the exception of the 0311 integrated squads
- Integrated 0311, 0331, and 0341 squads took longer than their all-male counterparts to complete their movement to the limit of advance during the live-fire attack
- Casualty evacuation rates were higher in all integrated 03xx MOSs, except where male compensation was the primary factor
- All-males squads were faster than integrated squads on hikes, gorge crossings, and cliff ascents during the assessment in different environmental settings at MWTC
- When negotiating an 8ft wall, females were noted as having required assistance from male squad members to get their packs onto the wall
- The movement and emplacement of the machinegun took longer with both low and high-density gender integrated teams when compared to all-male teams
- A UK review highlighted that military females perform 11-38% slower than males on loaded marching tasks. The heavier the load carried, the greater the decrement.



# Combat Effectiveness

## Lethality

- The all-male 0311 squads had a higher probability of hits compared to integrated group for the M4, M27, and M203.
- There is a difference between genders for every weapon system within the 0311 squads, except for the probability of hit & near miss with the M4.
- Male provisional infantry had higher hit percentages than the 0311 females
  - M4: 44% vs 28%,
  - M27: 38% vs 25%,
  - M16A4w/M203: 26% vs 15%
- Integrated 035X squads took longer to engage targets and registered fewer hits on target as compared to the all-male squads during the engagements. The combination makes the integrated squads more vulnerable and less lethal than their all-male counterparts.
- Among the three factors that the UK review found would negatively impact combat effectiveness without known mitigation strategies are survivability and lethality. This conclusion is based on the analysis that “a woman who is performing to the same physical performance standards as a man, will be working closer to her maximum capacity when carrying the same absolute combat load, and will fatigue sooner than her male counterpart.”



# Combat Effectiveness

## Cohesion

- Depending on the unit, male GCEITF volunteers perceived that combat effectiveness declined with female Marines presence, and that the GCEITF performed worse than their previous units
  - Numerous cases of compensation observed during physically demanding tasks, in which males shifted positions to take over certain aspects of tasks from females
- Post-home station training @ CLNC, cohesion levels averaged medium to good across the ITF with 31 percent males and 36 percent females reporting very good cohesion
- Post-assessment @ MCAGCC, MWTC, and CAMPEN, cohesion level averages dropped to medium, trending downward
- Volunteers' perceptions tended to be less positive over time with regard to: gender integration, combat effectiveness, unit cohesion, unit morale (negative trend could be attributed to general fatigue over the course of the GCEITF assessment)
- Linkages: Health & Welfare of Marines; Talent Management and ability to retain top talent, both male and female



# Health & Welfare of Marines

## Injury Rates

- Recruit Training: Female injury rate of 6% vs. a 3.6% male injury rate
- MCT: Female injury rate of 3.17% vs. a 0.4% male injury rate
- ITB: Female injury rate of 13% vs. a 2% male injury rate
  - 27% of ITB female injuries were attributed to marching under load vs. 13% of male injuries
  - 28% of the female hike-related injuries resulted in a course drop
  - ITB females shipping weight – female 95<sup>th</sup> percentile = male 24<sup>th</sup> percentile

## GCEITF Volunteer Physiology

- Body Composition: Males averaged 178 lbs. w/20% body fat; females averaged 142 lbs., with 24% body fat
- Anaerobic Power: Females possessed 15% less power than males; female top 25<sup>th</sup> percentile overlaps with bottom 25<sup>th</sup> percentile of males
- Anaerobic Capacity: Females had 15% less capacity; top 10<sup>th</sup> percentile of females overlaps with bottom 50<sup>th</sup> percentile of males
- Aerobic Capacity (VO2Max): Females had 10% lower capacity; top 10<sup>th</sup> percentile females overlaps bottom 50<sup>th</sup> percentile of males
- Medicine Ball Toss (upper body power): Females 26% shorter tosses
- Broad Jump (lower body power): Females 20% shorter distances
- Pro-Agility: Females 10% slower times in both L/R directions



# Health & Welfare of Marines

## GCEITF Injury Rates

- Females were 19% more likely than males to incur an occupational-related injury (males 12% more likely to experience non-occupational related injury)
- Percentage of overall load (81lb fighting load + BF) was less than 100% of lean body mass for almost all of the males; percentage of overall load (81lb fighting load + BF) was over 100% for ~75% of the females
- Musculoskeletal Injury Rates: 40.5% of females vs. 18.8% of males
- Injury rate for hiking MOSs (03XX, 1371) was 45.3% while vehicle MOSs was 11.1%
- Of the females' 21 preventable, time-loss injuries, 19 were lower extremity injuries and 16 occurred during movement under load
- GCEITF Marines who possessed higher amounts of fat-free mass had lower injury rates
- Linkages: Combat effectiveness related to unique physical demands, particularly recurring movements under heavy loads -> combat readiness related to relative injury rates; Talent Management and ability to train, develop and retain female Marines



# Talent Management

## American population eligible for military service is shrinking

- 75 percent of young Americans can't join the military because they did not graduate from high school, have criminal records or are physically unfit (overweight/overfat)

## MCRC Female Accessions

- Increased female enlisted accession to 10.8% in 2014 -- ~4.5% increase since 2008
- Increased female officer accession to 11.6% in 2014 -- ~5% increase since 2008
- Female officer applicants represent a growing percentage of the applications received each year, increasing in FY10-14 -- 8.9% to 13.7%
- Over the past two fiscal years the percentage of selected females who accept their Marine Corps NROTC scholarship is higher than the selected male scholarship acceptance rate

## Infantry Entry-level Training

- IOC Graduation: 0% of 29 females vs. 71% of 978 males
- ITB Graduation: 36% (w/DORs) /46% (w/o DORs) of females vs. 98% of males
- LOE2 infantry gender-neutral PFT/CFT
  - Final PFT: 95% female = 15% male
  - Final CFT: 95% female = 3% male



# Talent Management

The Marine Corps risks losing a number of highly talented female Marines prematurely due largely to the often extreme physical demands of these infantry, reconnaissance and special operations occupations. The inextricable linkage between physical capacity and job performance in the infantry, reconnaissance and special operations occupations, specifically in the early stages of a young officer's or enlisted Marine's career, is very different from the vast majority of occupations throughout the military Services. Service in these uniquely physically demanding occupations will place the majority of female Marines at a competitive disadvantage relative to their male peers due to the heavy emphasis on demonstrated physical strength, anaerobic power, and anaerobic/aerobic capacity. These are physiological factors that directly impact physical performance and, in turn, inform the performance evaluation of an individual Marine.

The Marine Corps Recruiting Command (MCRC) has diligently worked to significantly increase the number of female accessions, both officer and enlisted, to unprecedented levels in the past few years. We need to continue to attract, develop, and retain our female Marine talent to meet future challenges across the range of military operations. The likelihood of a female Marine being less competitive in these significantly more physically demanding occupations may adversely impact the Marine Corps' ability to retain top female talent and enable their progression into more senior ranks. Simply, any loss of this MCRC-established momentum, or worse a downward trend in retaining our top female Marines, would be a tremendous loss for the Corps.



# Considerations

**Combat Effectiveness:** The size of the differences observed between units and tasks varied widely. The more telling aspect of the comparisons is the cumulative impacts. The pace, timing, and accuracy of any singular task is not necessarily important, but taken together, and in the context of actual combat operations, the cumulative differences can lead to substantial effects on the unit, and the unit's ability to accomplish the mission.

## **Physical performance**

- Female GCEITF and ELT volunteers were screened against a minimum male passing PFT/CFT, which does not correlate to higher levels of physical performance and does not provide reasonable assurance of adequate physical conditioning required to perform physically demanding tasks
- It is unknown how much a stricter (higher) physical screen would have improved the physical performance of female volunteers

## **Injury Rates**

- Analysis of LOE 2 data showed that a stricter physical screening tool would have eliminated all the female Marines who sustained injury and were dropped during ITB
- When fitness is considered, female injury rates are similar/the same as male injury rates
- Studies show that strength training, fitness, and calcium/vitamin D supplements decreases risk of injury to women