

Strategy Research Project

Professional Soldier Athlete: The Cornerstone of Strategic Landpower's Human Dimension

by

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Abstract

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Although technology has been able to advance warfare, the cornerstone of Landpower's historical and future success hinges around the human dimension. Physical and mental resilience are fundamental and often-unarticulated assumptions required to achieve national interests through Landpower. Although the military has struggled with negative impacts of poor sleep, activity, and nutrition throughout history, the current costs to readiness, recruitment, retention, and health require a comprehensive strategic plan to ensure the military is able to meet future security needs of our nation. The purposes of this review are to 1) outline the strategic importance of sleep, activity, and nutrition for both the military and nation's youth from a readiness and health perspective and 2) provide recommendations to enhance readiness and resilience of the future military force. This review incorporates perspectives from military leaders and historical data with a specific emphasis on interwar eras. The recommendations include a whole of government approach, cultural and system changes, military recruitment strategies, leveraging environmental and social networks, military recruitment, and squad level programs.

Professional Soldier Athlete: The Cornerstone of Strategic Landpower's Human Dimension

The strength of our nation is our Army. The strength of our Army is our Soldiers.

—General Raymond T. Odierno¹

General (GEN) Chandler Krulak, 31st Commandant of the U.S. Marine Corps, outlined a need for the military to prepare for a “three-block war, in which full-scale military action, peacekeeping operations, and humanitarian relief can occur within three-city blocks.”² Strategic Landpower requires physical and mental adaptability, stamina, and resilience for Soldiers to shift effectively among tasks. When Soldiers fail to transition appropriately or become fatigued, their actions at the tactical level can result in negative strategic ramifications; coined the “Strategic Corporal” effect.³ Challenges to the human dimension of warfare have real costs in combat and can lead to increased risk of injury, death, fratricide or war crimes. In garrison, decreased physical and mental resilience can lead to increased rates of medically non-ready, sexual assault, or suicide.

In every war since 1860, impaired physical readiness and the inability to endure the physical requirements of combat have resulted in casualties on the battlefield.⁴ Unfortunately, competing priorities and fiscal constraints have hampered physical readiness, especially during interwar periods. Dr. Whitfield East, a professor at the U.S. Military Academy, analyzed the history of physical readiness training and determined that the “Army’s emphasis on physical readiness has followed a sinusoidal pattern of surge and consolidation through multiple force mobilizations and times of peace.”⁵

The health and fitness of our Nation’s youth directly relates to the strength of our nation and future military readiness. Carl von Clausewitz recognized the importance of

the trinity between the people, the government, and the army as an essential basis to socially succeed at war.⁶ However, the extension of this concept to a whole-of-government approach to ensure next generation military recruits are prepared for the mental and physical rigors of war has had limited success.⁷ For example, Dr. East noted that after World War I, “Americans moved steadily away from a physically active [lifestyle] . . . to a sedentary urban society, which further deteriorated personal health and fitness,” leading to concerns about American preparedness for World War II.⁸ These concerns remain today, as America’s youth are becoming more unhealthy, overweight, and unfit.⁹

GEN Odierno’s *Readiness and Resilience Campaign* and The Surgeon General (TSG) of the U.S. Army, Lieutenant General (LTG) Patricia Horoho’s *Performance Triad Initiative* seeks to develop physical and mental resilience. The requirements to build resilience in Soldiers are similar to the requirements for professional athletes.¹⁰ The *Performance Triad Initiative* seeks to optimize military readiness and improve the health of the military force, and ultimately the nation, through optimal sleep, activity, and nutrition (SAN).¹¹ Poor SAN degrades readiness, recruitment, retention, and health. GEN Odierno’s *Waypoint #2* calls for Soldiers to be committed to the Army profession.¹² As part of that call, the military culture will need to embrace optimal SAN. A comprehensive strategic plan is necessary to ensure the military can meet our nation’s future national security needs. The purposes of this review are to: 1) outline the strategic importance of SAN for both the military and nation’s youth from a military readiness and health perspective and 2) provide recommendations to enhance military readiness and resilience of the future military force.

Health of Our Nation and Military

Healthcare costs are rising at an unsustainable rate. Underlying the national debate on the Affordable Care Act is the fact that federal healthcare costs rose from 4.9% Gross Domestic Product in 1960 to 16.4% in 2011, and healthcare costs contribute to over 50% of all personal bankruptcies.¹³ While the U.S. spends more on healthcare than any other country, it has one of the lowest life expectancies among high-income countries.¹⁴ Although the debate often focuses on the cost of healthcare, the reality is that the health of American citizens has decreased over time, which contributes to increased healthcare costs. The American adult obesity rate increased from less than 15% in 1991 to 34% in 2008 (Figure 1).¹⁵ Medical costs associated with obesity totaled \$147 billion in 2008; obesity is also associated with greater risk for diabetes, cardiovascular disease, and most causes of death.¹⁶ In 1994, the prevalence of diabetes was <6% for 49 of the 50 states, by 2010, all 50 states had prevalence rates >6%, with 15 states having prevalence rates >9%.¹⁷

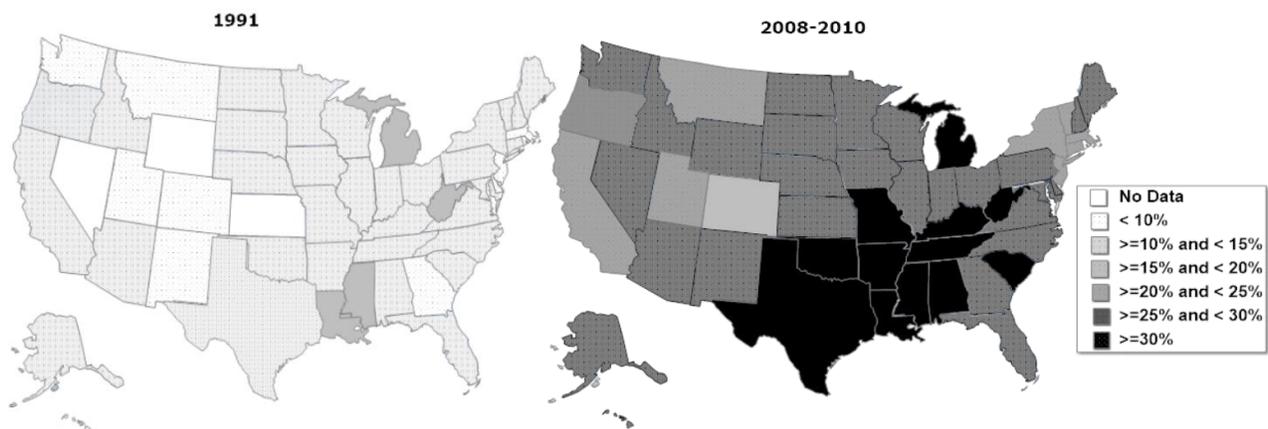


Figure 1. Obesity Trends Among U.S. Adults¹⁸

Despite the Army's physical fitness, body composition, and medical standards, nearly 66% of all military personnel are overweight and 12% are clinically obese.¹⁹ The medically non-deployable rate for active duty Soldiers is approximately 4% (20,820 Soldiers; equivalent to roughly six brigades) with another 5% (26,168 Soldiers; equivalent to roughly 7.5 brigades) having limited duty profiles.²⁰ In addition to their medical costs, the cost of salaries for Soldiers who cannot deploy is approximately \$3 billion annually.²¹ Musculoskeletal injuries result in approximately 750,000 injuries and over 25 million limited duty days annually.²² Many of these injuries are preventable, as over 80% of the musculoskeletal conditions are overuse in nature and relate to sports and physical training.²³

Not surprisingly, musculoskeletal conditions are the leading cause of all medical disability claims across the services; accounting for 40 to 75% of all claims.²⁴ While, active duty service members are generally considered to be younger and healthier than the civilian workforce, 130,000 service members, which includes 76,700 Soldiers, were evaluated for medical discharge between FY2007 and 2012.²⁵ The long-term cost of medical disability is staggering; approximately 35% of all claimants received a permanent medical retirement package. Furthermore, 60% of those Soldiers received a disability rating greater than 30%. Another 30% of Soldiers received a financial severance package as part of their military separation.²⁶ Although this review focuses on the costs to the Department of Defense (DoD), one should note that 56% (\$86.1 billion) of the FY 2014 Veteran's Administration budget covers mandatory entitlements for medical disability payments.²⁷

The health of the future force is dependent on America's youth. However, the health of America's youth is deteriorating. Poor health, fitness, and weight problems are the leading reason that 75% of 17 to 24 year old Americans are unfit for military service.²⁸ Obesity rates among 18 to 29 year olds have risen from 10% in 1995 to 19% in 2007 (Figure 2).²⁹ Per the National Health and Nutrition Examination Survey, 92% of American children between 12 to 19 years of age do not have healthy diets.³⁰ Not surprisingly, obesity accounted for 16.8% of all military medical disqualifications between FY2007 and FY2011.³¹

The health of America's youth already affects military costs. Overweight recruits are 47% more likely to become injured and they utilize 49% more healthcare resources during their first 90 days in the military.³² Physical performance among Army trainees has declined over time. First time failure rates on the modified fitness test during basic training increased from 4% to 40% for males and from 12% to 54% for females from FY 2000 to FY 2010.³³ During the first 90 days of basic training, 31% of Soldiers who failed a pre-accession fitness test become injured.³⁴

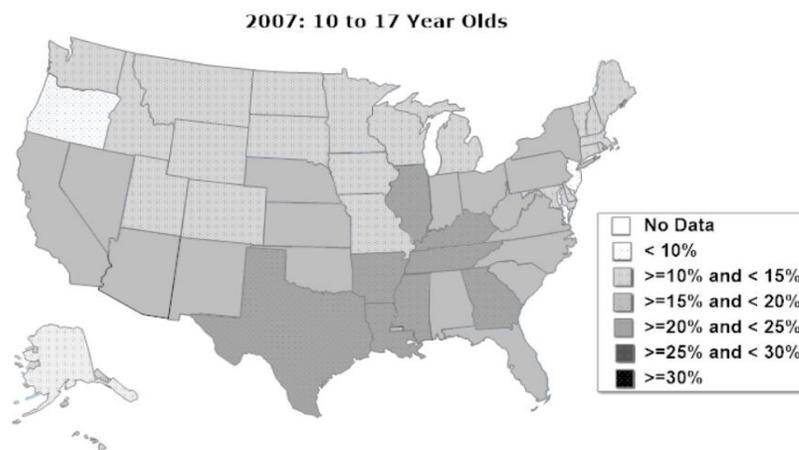


Figure 2. Proportion of Children Ages 10-17 Classified as Obese per State³⁵

Poor health and fitness levels among America's youth impair recruitment efforts and generates financial costs for the DoD. Attrition rates across the services range from 10% at 90 and 180 days and nearly 20% at two years of service.³⁶ The associated FY 2005 cost to recruit and train a Soldier through Army basic training was \$57,500 per recruit.³⁷ Based on 60,000 Army recruits, a 10% attrition rate at 180 days would cost the Army \$345 million annually in replacement costs.³⁸ Based on the additional training costs that occur after basic training, replacement costs associated with a Soldier discharged between one to two years of service would be greater than the replacement costs for those lost within the first 180 days. However, using the \$57,500 per Soldier estimate, the replacement cost would be at least \$683 million to replace the Soldiers discharged between one to two years of service.³⁹

The societal trends reviewed demonstrate systematic changes in personal readiness and health across the nation. Analysis of interwar eras and medical readiness data reveal the importance of personal readiness for military readiness. The next section will review the role of SAN in building personal readiness to meet future national security challenges. In addition to physical fitness training, the next section will outline why personal readiness and resilience requires a more comprehensive approach. Specifically, personal readiness also requires optimizing sleep and nutrition, while minimizing sedentary behaviors.

Impact of Sleep, Activity, and Nutrition

The leading cause of disability or death is from preventable chronic conditions (e.g., musculoskeletal conditions, cardiovascular disease, obesity, and diabetes).⁴⁰ Considerable evidence supports the benefits of healthy lifestyle choices in preventing a wide range of physical and behavioral health conditions (e.g., musculoskeletal

conditions, cardiovascular disease, diabetes, cancer, hypertension, hyperlipidemia, obesity, osteoporosis, depression, and other mood related conditions).⁴¹ Conversely, lack of sleep, physical inactivity, and poor nutritional choices are contributing factors to the prevalence and cost of these conditions.⁴²

In 1860 the British military wrote, “The power of the man and the serviceability of the Soldier are inseparable conditions.”⁴³ This statement underlines the historical importance placed on healthy lifestyle choices to enhance physical and mental resilience required for combat. Ultimately, the process of building physical and mental resilience endows Soldiers with the understanding that they can overcome the difficulties encountered during combat based on confidence in their strength, endurance, power, mental focus, and resolve.⁴⁴ To assess personal readiness, the upcoming sections use the U.S. Department of Health and Human Services’ *Healthy People 2020 Initiative* as a framework for evaluating SAN among American adults, adolescents, and service members.⁴⁵

Sleep

B. H. Liddell Hart warns military leaders that Soldiers will “succumb quickest to paralysis of the brain.”⁴⁶ Researchers have associated insufficient sleep with decreased mental effectiveness and increased risk of errors and accidents.⁴⁷ Specifically, 20-25 hours without sleep degrades performance equivalent to a blood alcohol concentration of 0.10%; the criterion for alcohol intoxication in most states.⁴⁸ *Healthy People 2020’s* goal is for 71% of the population to sleep 7-8 hours nightly.⁴⁹ Service members sleep less than their civilian counterparts as less than 41% report sleeping 7-8 hours, with more than 11% reporting four hours or less a night.⁵⁰ Only 20% of those with high levels of anxiety, depression, anger propensity, or post-traumatic stress reported sleeping 7-8

hours and 30% reported sleeping four hours or less nightly.⁵¹ Current sleep trends of America’s youth could influence our future military force. Sufficient sleep is important for childhood development, yet only 30% of high school students get adequate sleep.⁵² Insufficient sleep degrades performance and impairs combat effectiveness; while increasing risk for disease, injuries, and obesity (Table 1).

Table 1. Sleep

Physical Performance	<ul style="list-style-type: none"> • Fatigue and sleepiness are a leading cause of motor vehicle and industrial accidents.⁵³ • Reaction time decreases with sleep restriction.⁵⁴ • Maximum bench press decreases by 20 lbs after four days of restricted sleep.⁵⁵ • Perception of exertion increases 17-19% after 30 hours without sleep.⁵⁶
Mental Performance	<ul style="list-style-type: none"> • Increased sleep led to quicker reaction times, improvement in split-second decision-making, and improved targeting (9% improvement in free throw and 3-point shooting accuracy).⁵⁷ • Increased sleep duration is associated with greater visuospatial processing.⁵⁸ • Psychomotor and cognitive speed, vigilant and executive attention, working memory, learning, and higher cognitive abilities decrease with sleep deprivation.⁵⁹ • Exhaustion occurs 11% quicker with sleep deprivation. • Greater risk taking occurs with sleep deprivation.⁶⁰
Health Implications	<ul style="list-style-type: none"> • Insufficient sleep is associated with mental distress, obesity, diabetes, coronary heart disease, stroke, high blood pressure, asthma, and arthritis.⁶¹ • Fewer than four hours of sleep increases likelihood of depressive symptoms and suicidal ideation, but not suicide attempts.⁶² • Unhealthy habits such as smoking, heavy and binge drinking, physical inactivity, and unhealthy food habits are associated with poor sleep.⁶³
Links to Activity	<ul style="list-style-type: none"> • Sleep deprivation results in decreased physical activity, less vigor, and heavy or binge drinking.⁶⁴ • Sports and work-related injuries increase with decreased sleep and fatigue.⁶⁵ • The risk of a work related injury is 86% greater for those with less than six hours of sleep.⁶⁶

Links to Nutrition	<ul style="list-style-type: none"> • Increased sleep duration is associated with greater weight reductions for those enrolled in a weight management program.⁶⁷ • Poor sleep is associated with increased consumption of desserts and sweets.⁶⁸ • Sleep restriction leads to a 30-40% reduction in glucose metabolism.⁶⁹
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Physical Activity (Activity)

The Department of the Army wrote in 1946 that, “war places a great premium upon the strength, stamina, agility, and coordination of the Soldier because victory and his life are so often dependent upon them.”⁷⁰ Units in combat are more resilient when its leaders and Soldiers are physically fit.⁷¹ Although physical requirements of combat exceed the requirements for healthy living and physical fitness, national guidelines provide a foundation to compare fitness levels. The American College of Sports Medicine, the American Heart Association, and the Centers for Disease Control and Prevention recommend that 18-65 year olds perform a minimum of 30 minutes of moderate-intensity exercise five days a week or a minimum of 20 minutes of vigorous-intensity exercise three days a week.⁷² *Healthy People 2020s* goal is to have 48% of the population meet this goal by 2020.⁷³ Although service members (63%) more readily achieve these recommendations than their civilian counterparts (44%), service members’ compliance is much lower than expected given the physical requirements of combat and mandatory physical training.⁷⁴ Specifically, less than 40% perform 150 minutes of moderate intensity exercise weekly and less than 50% perform 75 minutes of vigorous intensity exercise weekly.⁷⁵ Upon departing the military, former service members tend to perform less physical activity than their civilian counterparts.⁷⁶ In regards to our future force, only 18% of adolescents meet current physical activity

guidelines.⁷⁷ Additionally, the average American spends 7.7 hours a day in sedentary behaviors that expend very little energy.⁷⁸ Insufficient activity and sedentary lifestyles degrades performance and impairs combat effectiveness; while increasing risk for disease, injuries, and obesity (Table 2).

Table 2. Activity

Physical Performance	<ul style="list-style-type: none"> Physical inactivity, smoking, or being overweight limits physical performance before onset of physical disease.⁷⁹ Physical inactivity, smoking, being overweight, and a prior history of injury decreases physical performance of Soldiers by up to 10%.⁸⁰
Mental Performance	<ul style="list-style-type: none"> Physical activity improves cognition, executive functions, and learning.⁸¹ Fatigue leads to decreased executive functions that impair decision-making.⁸²
Health Implications	<ul style="list-style-type: none"> Regular physical activity can improve health, quality of life, and lower the risk of early death, coronary artery disease, stroke, high blood pressure, type 2 diabetes, breast and colon cancer, and depression.⁸³ Sitting more than ten hours per day results in 34% higher overall mortality; even after accounting for physical activity levels.⁸⁴ Physical inactivity is associated with the development of psychological disorders.⁸⁵ Routine physical activity helps manage mild-to-moderate mental health diseases (e.g., depression and anxiety) and is as effective as prescribing anti-depressants for first-line treatment.⁸⁶
Links to Sleep	<ul style="list-style-type: none"> Routine physical activity is associated with improved sleep.⁸⁷ Increased television and computer use is associated with decreased sleep.⁸⁸
Links to Nutrition	<ul style="list-style-type: none"> Fasting increases both non-contact and training overuse injuries.⁸⁹ Physical inactivity is associated with decreased consumption of fruits and vegetables and increased consumption of soft drinks and unhealthy snacks.⁹⁰ Physical inactivity and increased sedentary behaviors are associated with increased body weight.⁹¹

Nutrition

Optimizing nutrition enhances Soldier performance, physical activity, and recovery from exercise.⁹² However, 76% of Americans have a poor diet and do not meet basic dietary recommendations.⁹³ Ironically, overweight and obese Americans are

frequently undernourished due to poor food choices, as fats and sugars comprise over 34% of their total caloric intake.⁹⁴ Chronic malnutrition leads to stunting of growth despite children being overweight.⁹⁵ Environment plays a key role in food choices. Urban areas with low densities of grocery stores, high densities of fast food restaurants, and lower rates of fruit and vegetable consumption are associated with higher rates of obesity and chronic disease.⁹⁶ *Healthy People 2020s* goal is to increase the percentage of the population obtains a healthy weight from 31 to 34% by 2020.⁹⁷ Despite mandated military body composition standards, only 36% of service members reported a healthy weight.⁹⁸ This problem worsens upon departing the military; with an average weight gain of 5.7 kg, and 6.3 kg for men and women, respectively.⁹⁹ The concern for tomorrow's military is that nearly 18% of 6 to 19 year old American youths are clinically obese.¹⁰⁰ Poor nutrition degrades performance and impairs combat effectiveness; while increasing risk for disease, injuries, and obesity (Table 3).

The evidence reviewed advocates for optimizing SAN to improve personal readiness and health. In addition to building physical resilience, the evidence demonstrates that enhancing SAN provides a positive foundation for building mental resilience. The confluence of benefits associated with optimal SAN on the military and the nation suggests the need for a comprehensive strategy. The next section will provide analysis and recommendations to improve physical and mental resilience and the health and wellness for both the military and the Nation.

Table 3. Nutrition

Physical Performance	<ul style="list-style-type: none"> • Optimal nutrition enhances performance and exercise recovery.¹⁰¹ • Carbohydrate and proteins are required to replenish glycogen stores and repair tissue.¹⁰² • Caffeine can improve short-term muscular strength and reduce perceived exertion and muscle pain.¹⁰³
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Mental Performance	<ul style="list-style-type: none"> Higher body mass index and obesity are associated with decreased attention and processing speed, memory, verbal fluency, learning, and executive functioning in the brain.¹⁰⁴
Health Implications	<ul style="list-style-type: none"> Diets that include more nutritious foods decrease likelihood of depression; diets that include more processed and unhealthy foods are associated with increased rates of depression and anxiety.¹⁰⁵ Obesity is associated with greater risk for diabetes, cardiovascular disease (e.g., heart disease, hypertension, and cerebrovascular accidents) and most causes of death.¹⁰⁶ Obesity is associated with increased risk of mental illness (e.g., major and moderate-to-severe depression).¹⁰⁷ Higher body mass index values are associated with higher prevalence of injury, illness, and cost of care compared to those with normal weight in the military.¹⁰⁸
Links to Sleep	<ul style="list-style-type: none"> Poor nutrition and obesity are linked with poor sleep quality.¹⁰⁹ Caffeine consumption can degrade sleep.¹¹⁰
Links to Activity	<ul style="list-style-type: none"> For every 1% increase in prevalence of physical activity in a U.S. county, obesity prevalence decreases by 0.11%.¹¹¹ Higher body mass index values have been associated with increased risk for musculoskeletal injury. Specifically, the odds of sustaining an injury are 15% greater for those considered overweight, and increase incrementally (up to 48% greater injury risk) with each progressive class of obesity (e.g., types I to III).¹¹²

Analysis and Recommendations

Ultimately, improving personal readiness and health requires individuals to develop healthier habits, set personal goals, and make better decisions regarding SAN. Societal trends leading to decreased personal readiness, health, and fitness are complex; countering these trends requires a synchronized effort that ranges from the whole-of-government approach to addressing personal health habits. The analysis and recommendations focus on developing appropriate strategic policies, infrastructure, and cultural changes to help engineer healthier choices as the easy choice.

Although these lifestyle behaviors have negative health consequences, approaching the problem from a health perspective may have limited appeal among younger Americans.¹¹³ Therefore, the analysis and recommendations presented will

focus on specific strategies to develop an environment and culture that emphasizes optimal SAN to improve performance and readiness and encourages Soldier to view themselves as “Professional Soldier Athletes.”¹¹⁴ Additionally, the strategies suggested to enhance military readiness will focus on today’s Soldier, the military Family, and our nation’s youth.

During the build-up for World War I, Major General Leonard Wood reminded military leaders that:

there is nothing in the education of the Soldier of more vital importance than this [physical and mental readiness]...The objectives in order of importance should be: (a) general health and bodily vigor, (b) muscular strength and endurance, (c) self-reliance, and (d) smartness, activity, and precision.¹¹⁵

However, the American healthcare system has over-medicalized life. It is easy to suggest that results of poor SAN are solely a healthcare issue. However, TSG for the Army reminds us that the average Soldier seeks healthcare about five times a year, with the average encounter lasting approximately 20 minutes. Combined, those 100 minutes are typically a time when the patient has an acute crisis or need. Hence, health and readiness occurs where people make decisions influencing health and well-being during the other 525,500 minutes a year.¹¹⁶ Understanding this, TSG of the Army challenged the medical community to transition from a healthcare system to a “System for Health” to better support the health and readiness of the total force; including Family members, retirees, and Department of Army civilians.¹¹⁷ Therefore, the recommendations outlined will embrace a holistic approach supporting TSG’s vision for health and GEN Odierno’s vision for strategic Landpower which requires a trained, ready, and professional force.¹¹⁸

Thinking back to the origins of the anti-smoking efforts that started in the 1960s, the running boom in the 1970s, the movement to improve seatbelt use in the 1980s, and

the nationwide campaign to curb drinking and driving in the 1990s, the possibility of starting a nationwide movement towards health and personal readiness in our country has historical precedence. These campaigns focused on the health of our nation; while improving the health of the military force. The following analysis and recommendations will outline why leadership at all levels will be required to create and sustain changes in health, physical and mental resilience, and personal readiness.

National Strategy: Whole of Government Approach

Analysis

In addition to the role of SAN on health and readiness, SAN influences public education. Dr. Edward Hartwell, the forefather of physical education in the U.S., recognized in 1871 that physical readiness should be a component of public education; as fitness training was required at an early age to serve as the foundation for future military superiority.¹¹⁹ Understanding the importance of building physical resilience in American youth, Benjamin Franklin stated, “education forms the national ethos” as he advocated for building physical resilience within the school system.¹²⁰ Facing the demobilization of the Army after World War I, GEN George C. Marshall advocated for universal military training in public schools as “the only sensible, business-like, democratic, and financially possible way” to ensure national preparedness for future conflicts with a smaller standing Army.¹²¹ Despite the wide-ranging benefits of ensuring physically fit youth, the political will to influence the preparedness of America’s youth has been limited. LTG (Retired) Mark P. Hertling once wrote:

After every major war in our nation’s history, dating to the Revolution, bills had been presented in the House and Senate seeking appropriations for military and physical training programs for non-aged (e.g., pre-draft) youth. In every instance, these post-war bills were initiated because of inadequate military fitness levels shown by the men conscripted at the

start of the recently completed war. As an example, between 1918 and 1941 only one of six bills promoting military training in schools introduced into Congress was passed after debate; of twenty-four bills introduced on behalf of physical education in schools for military, none passed.¹²²

The benefits of emphasizing SAN in our nation's public school systems extend beyond military preparedness. Insufficient sleep degrades academic performance and simple solutions such as delaying start times can increase sleep duration, alertness, and student performance.¹²³ From an activity perspective, cardiovascular fitness improves academic performance and incorporating physical activity into the school day does not hinder academic achievement.¹²⁴ Despite the evidence, less than 10% of all public schools require physical education and only 60% of school districts require or recommend dedicated time for elementary school recess.¹²⁵ Congress initiated the federally funded school lunch program at the end of World War II based on the difficulty of military recruitment due to malnutrition and the problems associated with being underweight.¹²⁶ Ironically, students currently using the program are 20 to 43% more likely to be overweight or obese compared to those who pack a lunch.¹²⁷ Only eight states have incentive policies for schools to follow national dietary guidelines, while less than 7% of school districts require availability of fruits and vegetables, and over 90% of schools sell or offer calorically sweetened beverages.¹²⁸

Recommendations

The declining health of our nation and the increased cost of healthcare combined with the positive influence of SAN on academic achievement and military preparedness provide an opportunity for a whole-of-government approach. A synchronized effort between the Departments of Education, Health and Human Services, Veterans' Affairs, and Defense could facilitate the change required for the country to embrace SAN as

fundamental requirements for optimal health and well-being. Although some think of the “whole-of-government” approach as one focused internationally around diplomacy, development, and defense, President Obama defined it broader in the National Security Strategy as “our strategy starts by recognizing that our strength and influence abroad begins with the steps we take at home.”¹²⁹ President John F. Kennedy requested a similar whole-of-government approach:

The physical vigor of our citizens is one of Americas most precious resources . . . throughout our history we have been challenged to armed conflict by nations which sought to destroy our independence or threatened our freedom . . . our growing softness, our increasing lack of physical fitness, is a menace to our society . . . the stamina and strength which the defense of liberty requires are not the product of a few weeks’ basic training or a month’s conditioning . . . however, they] come from bodies which have been conditioned by a lifetime of participation in sports and interest in physical activity.¹³⁰

Historically, when the government has approach health and wellness from a whole-of-government approach the nation responded. Over 70% of high schools implemented the Victory Corps fitness program and over 50% fully adopted the program in preparation for World War II.¹³¹ A relatively simple first step would be to gain interdepartmental support for such policies as the Physical Activity Guidelines for Americans, the National Prevention Strategy, the Healthy, Hunger-Free Kids Act of 2010 (P.L. 111-296), FY2010 Agriculture Appropriation Act (P.L. 111-80), the Reauthorization of the Elementary and Secondary Education Act, and the Food Guidelines for Federal Worksites.¹³² Interdepartmental support for existing programs such as Michelle Obama’s *Let’s Move* Initiative or the National Football League’s *Play 60* program could improve the programs reach and success.¹³³

Military Strategy: Culture

Analysis

GEN (Retired) Gordon Sullivan addressed the Army's historical tendency to decrease emphasis on physical readiness during interwar years. GEN Sullivan warned that failure to prioritize and sufficiently fund physical readiness efforts results "in an Army that [is] ill prepared, physically, mentally, or emotionally for combat."¹³⁴ The sinusoidal support for the U.S. Army Physical Fitness School (USAPFS) and the Master Fitness Trainer (MFT) programming exemplifies GEN Sullivan's concerns (Table 4).

One of the possible reasons for the sinusoidal support for physical readiness is the belief that "we've got this" or its "part of our DNA" based on the familiarity of daily physical training. For example, the Army established the *Comprehensive Soldier and Family Fitness* (CSF2) program in 2008 to enhance the social, emotional, spiritual, Family, and physical fitness of Soldiers and their Families. Due to the widely held belief that the Army had already codified the physical domain within its culture, CSF2 did not incorporate the physical domain until January 2014.¹³⁵ Unfortunately, the self-reported rates of poor sleep hygiene, the high rates of sports and training related injuries, and the difficulty with maintaining body fat standards previously presented challenge those assumptions. Additionally, differences between Marine and Army discharge rates suggest there may be systematic cultural differences that may be beneficial for developing physical readiness. Although Soldiers and Marines report similar sleep durations and physical activity rates, the Marines have a 14% lower rate of medical disability due to musculoskeletal injuries.¹³⁶ Additionally, the Marines have a lower rate of obesity (5%) than the Army (16%) does.¹³⁷ Understanding cultural differences between the services may provide additional avenues for enhancing readiness.

Table 4. Support for the U.S. Army Physical Fitness School (USAPFS) and Utilization of Master Fitness Trainers (MFT)¹³⁸

1920	Physical training and bayonet school established at Camp Benning, GA.
1946-1953	USAPFS established at Ft. Bragg, NC. The Army terminated the program in 1953 to save \$225,000/year.
1970	Fourth time a formal recommendation to establish a school to train commissioned and non-commissioned officers in physical readiness programming since 1885.
1980	President Jimmy Carter orders an assessment of physical readiness of the Armed Forces.
1982	Army declares the "Year of Fitness" and establishes the USAPFS at Ft Benjamin Harrison.
1983	A four week MFT training program established, resulting in an additional skill identifier (ASI): 03C.
1987	MFT program terminated due to lack of support from key leaders.
1990	Reduction in staffing at USAPFS and MFT skill identifier eliminated.
1991	Army Chief of Staff approved elimination of USAPFS in FY92. The Army transferred policy functions to the U.S. Army Infantry Center.
1992	Army approved mobile training teams develop MFTs and issued ASI of 6P until 2002.
2001	Army terminated MFT mobile training teams and removed the 6P ASI from the Army personnel system. Policy functions remained.
2007	USAPFS moved to Ft Jackson.
2013	Army reestablished the MFT course and ASI.

Changing cultural views towards sleep may be more difficult than the modifications required to enhance activity and nutrition. GEN George S. Patton's statement that, "a pint of sweat saves a gallon of blood," reflects the well-understood link between physical activity and battlefield survivability.¹³⁹ This cultural acceptance still holds true today as an officer returning from Afghanistan stated, "it may not be the most important thing we do in a day, but it's the most important thing we do every day."¹⁴⁰ Despite current trends in poor nutrition habits and obesity rates, military leadership has traditionally acknowledged the importance of proper nutrition for military performance. Sir Basil Liddell Hart stated, "nothing undermines morale more decisively than hunger . . . An Army fights on its stomach, and falls if its stomach is upset."¹⁴¹ Similarly, Frederick the Great stated in 1747 that "hunger exhausts men more surely than

courage.”¹⁴² However, despite field manuals outlining operational sleep requirements, military culture has traditionally placed less emphasis on the importance of sufficient sleep for optimal performance.¹⁴³ For example, Napoleon Bonaparte stated, “it is at night when a commander must work . . . A commander is not expected to sleep.”¹⁴⁴

Recommendations

As the Army enters a fiscally constrained post-war era, its senior leadership must apply lessons learned from prior interwar eras. Senior leaders must instill a sense of urgency consistent with John Kotter’s first step of leading organizational change.¹⁴⁵ GEN Odierno stated that it is “important that we instill a mindset of resiliency and self-reliance over dependency. We must create a culture of resiliency.”¹⁴⁶ GEN Odierno’s *Readiness and Resilience Campaign* and LTG Horoho’s *Performance Triad Initiative* have created a guiding coalition and developed a vision for change.¹⁴⁷ However, gaining buy-in at the operational and tactical levels will be challenging. The Sergeant Major of the Army establishes themes to help facilitate change across the Army. The most recent was “The Year of the Non-Commissioned Officer.” To improve the fitness of the force, the Sergeant Major of the Army claimed 1982 as “The Year of Fitness.”¹⁴⁸ Establishing 2015 as the “Year of the Professional Soldier Athlete” could enhance communication channels, improve buy-in, and generate the momentum required to facilitate the movement towards health and readiness.

GEN Martin Dempsey, Chairman of the Joint Chiefs of Staff, recognized that “we need to institutionalize resiliency. It is not an additional training task; it is a way of life.”¹⁴⁹ How the Army institutionalizes these changes within its military culture will be critical for long-term success. Kotter’s eighth step for leading change highlights the importance of developing new organizational norms and shared values while gaining the support of a

majority within the organization to embrace the new culture.¹⁵⁰ History provides lessons-learned and highlights the Army's sinusoidal support for personal readiness, but questions remain regarding the path forward. Will policy changes hold leaders accountable for improving personal readiness by optimizing SAN within their unit? Will the USAPFS and the MFT program survive the upcoming budget cuts? Will the Army leverage the availability of organic medical assets (e.g., physical therapists, physician assistants, and dietitians) to establish a cultural focus on physical readiness or relegate these assets to their traditional roles of intervening after injury and disease has occurred? Finally, will the Army model the Australian Defence Force program, which established permanent medical occupational specialties that focus solely on readiness?¹⁵¹ Ultimately, strategic policies with associated infrastructure that supports personal readiness will be required to drive and codify the cultural changes.

Military Strategy: Environment and Social Networks

Analysis

The physical environment influences personal health and readiness. Not surprisingly, the deployment environment degrades sleep for approximately 75% of service members.¹⁵² Environmental factors such as neighborhood cleanliness, noise, and crime; and bedroom factors such as light, noise, and temperature also degrades sleep regardless of deployment status.¹⁵³ Physical activity increases with specific community characteristics, including proximity to recreational facilities, high density of walk/cycle paths, and workplace proximity.¹⁵⁴ Accessibility to food stores with fruits and vegetables increases consumption, improves dietary behaviors, and decreases saturated fat intake.¹⁵⁵

Social dynamics with Family, friends, and co-workers influence personal choices regarding health and readiness and can create a “social contagion.”¹⁵⁶ Family stress, educational levels, and Family norms concerning electronics use in the bedroom influences sleep quality and duration.¹⁵⁷ Parents and peers influence exercise programs and physical activity levels.¹⁵⁸ Further, the influence of social networks on food choice and body composition is considerable. The chance of becoming obese increases by 37%, 40%, or 57% if one’s spouse, sibling, or friends are obese; demonstrating how obesity can be socially contagious.¹⁵⁹

Recommendations

The Army should support public health programs that make the healthy choice the easy choice. New York City’s public health initiatives decreased intake of sugar-sweetened drinks by 8% and increased fruit and vegetable consumption by 4% within six years in the city’s poorest neighborhoods.¹⁶⁰ Military leadership should maintain support for DoD’s *Operation Live Well, Healthy Base Initiative*, and the Army’s *Go for Green* programs that have similar aims.¹⁶¹ Additionally leadership should pursue initiatives to bring Farmer’s Markets on post, increase access to fruits and vegetables at shoppettes and dining facilities, and increase availability of walking and biking areas in residential areas.

Army leadership should support programs that harness the positive influences of social and Family networks on behavioral change. Coordinating programs designed to improve Soldier’s health and readiness with sister programs for military Family members (sponsored by the U.S. Army Medical Command, the U.S. Army Installation Command (IMCOM), and the U.S. Army Morale, Welfare, and Recreation Activity (MWR)) have the greatest change for success. Within the military, the squad functions

as a Soldier's military Family and can provide a social network that can influence personal readiness. A focus on the squad aligns with military guidance to concentrate on squad level training to build their capabilities as a decisive force.¹⁶² The size and organizational structure of the squad provides a foundation for future initiatives focused on improving readiness and health of the force.

Military Strategy: Recruitment of Personnel

Analysis

As previously discussed, approximately 4% (20,820 Soldiers; approximately six brigades) of active duty Soldiers are medically non-deployable, while another 5% (26,168 Soldiers; approximately 7.5 brigades) are on limited duty profiles.¹⁶³ President Theodore Roosevelt believed that "the unfit should be ruthlessly weeded out."¹⁶⁴ However current policy options are limited based on the low propensity for military service in the American population combined with the fact that 75% of all 17 to 24 year olds in America are unfit for military service.¹⁶⁵ Of those who enlist, nearly 20% are medically discharged before two years in service.¹⁶⁶ Additionally, the Army incurs greater attrition rates (4% higher) and medical discharge rates due to musculoskeletal conditions (14% higher) than the Marine Corps.¹⁶⁷ This raises the question whether there is a better way to build readiness upon eligible youth that have agreed to enlist in the military.

The U.S. Marine Corps' *Delayed Entry Program* may provide a strategy to build physical and mental resilience prior to entering the military. The Marine Corps reduced its attrition by 8% from FY12 to FY13 and 18% since inception of this program.¹⁶⁸ The program requires recruiters to provide weekly preparedness training for new recruits between the time of enlistment and reporting for basic training.¹⁶⁹ Since, the greatest

gains in aerobic and strength occur during the first two to three months after starting a training program, this approach follows evidence-based recommendations.¹⁷⁰ The Army's Fitness Training Units (FTU) displayed similar success rates, with 97% of recruits in the FTU eventually meeting basic training fitness requirements and saving over \$14 million in attrition-based costs annually in the early 2000s.¹⁷¹ However the FTU program was ultimately terminated because it occurred after recruits started basic training; which resulted in increased training days and staffing requirements.

Recommendations

Although the Army's recruiting mission is larger, adopting the Marine Corps' *Delayed Entry Program* could assist in decreasing attrition while addressing FTU-related concerns. Recruiters could leverage technology solutions (e.g., personal readiness devices, web-based virtual coaches, etc.) to provide personal training programs to recruits in geographically dispersed locations. Altering programs such as, CSF2's *Army Fit* and TSG's *Performance Triad* to accommodate this population would also assist recruiters. The combination of these tools would allow recruiters to develop a virtual social network, distribute personal readiness information, and conduct weekly challenges to develop the recruits prior to attending basic training. Interactive dashboards could alert recruiters to possible recruits with poor compliance with pre-basic training developmental programs. Once altered for this population, these tools could be applied to Reserve Officer Training Corps' Program (ROTC) and Junior ROTC programs. Finally, children with military parents are twice as likely to consider joining the military.¹⁷² Therefore, programs sponsored by DoD Dependent Schools, IMCOM and MWR could be adjusted to incorporate SAN to facilitate health and readiness in this population.

Military Strategy: Operational and Tactical Level

Analysis

Improving readiness and health requires that people make healthier decisions. Daily choices concerning sleeping, moving, and eating can increase longevity and decrease disease risk if one consistently adheres to these choices.¹⁷³ Traditional programs designed to help people make healthier decisions center around goal setting. Although setting goals is an effective strategy for changing health behaviors, developing healthy habits is critical in creating and sustaining health and readiness.¹⁷⁴ Habits account for about 45% of daily activities and habitual events trigger many decisions related to SAN.¹⁷⁵ Behavior change interventions are more effective when they incorporate the automatic bases of behaviors.¹⁷⁶ Healthy habits can act as a substitute for self-control.¹⁷⁷ Developing and reinforcing good habits increase compliance with personal goals when stress or fatigue complicate decision-making.¹⁷⁸ Interventions with the greatest chance for success incorporate personal goals when creating new healthy habits while simultaneously disrupting context-cues that trigger existing unhealthy habits.¹⁷⁹

Technology can help track and achieve personal health and readiness goals. Regular self-monitoring, often within the context of goal setting, has been effective for improving sleep, physical activity, diet, and body composition.¹⁸⁰ Tracking sleep patterns induces healthier sleep habits and can improve sleep duration by an average of 50 minutes nightly.¹⁸¹ Physical activity tracking can increase physical activity by 27% and are associated with improved weight and blood pressure levels.¹⁸² Tracking caloric intake, weight, and physical activity can double one's weight loss or triple the number of people who meet weight loss goals.¹⁸³ Social networks, which provide social

reinforcement, can result in more people adopting healthy behaviors.¹⁸⁴ Findings ways to leverage technology to assist with personal health and readiness goals may decrease barriers to tracking personal readiness and provide cost-effective solutions for our geographically dispersed force.

Recommendations

Ultimately, any strategy designed to improve readiness requires people to take action. TSG's *Performance Triad Initiative* is a strategy to improve readiness and resilience through improved SAN and leader involvement. This initiative provides evidence-based strategies that help teach Soldiers and their Families "how" the healthy choice can be the easy choice and "why" it is important for their health and well-being. Unlike traditional programs that focus on "what" people should do, the *Performance Triad Initiative* provides a series of weekly challenges tailored to for each person and designed to build healthy habits, while reducing unhealthy habits. Upon completing the weekly challenge, the program incorporates reflection to help determine how the simple change improved stamina, mood, relationships, or work performance. The program challenges people to maintain the most beneficial and newly acquired healthier habits.

Engaging the squad leader to be the agent of change may have the greatest chance for success. This approach aligns with the current Army training philosophy to focus on building the squad as the cornerstone for the military's decisive force.¹⁸⁵ Squad leaders coach, mentor, and train their Soldiers. Providing squad leaders additional tools and resources would allow them to be more effective in building resilience and readiness. The *Performance Triad Initiative* provides the squad leader with resources, educational materials, and weekly challenges to facilitate this role. The newly established Master Resiliency Trainer (MRT) program and the reinstatement of the MFT

program provide additional organic resources to assist the squad leader.¹⁸⁶ Physical therapists, dietitians, sleep experts, and health educators, either organic to the military unit or at the local medical treatment facility can provide additional subject matter expertise for the squad leader. Squad and inter-squad challenges and competitions could help facilitate the weekly personal challenges. Recognition of outstanding squad-level resilience and readiness could facilitate implementation of SAN across squads.

Kotter's eighth step of organizational change highlights the importance of anchoring change within the culture for long-term success.¹⁸⁷ Currently, 52% of recent graduates from Professional Military Education (PME) reported that training did not teach them how to develop others, and only 61% of Soldiers surveyed stated that their leader focused on coaching and mentoring.¹⁸⁸ Codifying these changes within the military culture will require integration into the PME system. The Army should add motivational interviewing technique instruction and additional practical exercises to facilitate preparedness and readiness at all levels of the PME system.¹⁸⁹ The combination of MRT and MFT into a military occupational specialty would provide units with a resource trained in all five domains: social, emotional, spiritual, Family, and physical. Similar to warfighting mission essential tasks, leaders should be accountable for improving the health and preparedness of their unit. Development of appropriate metrics and holding leaders accountable for improving performance on those metrics could lead to innovative solutions that improve unit readiness.

In 1945 concerns were raised that, "modern machines have to a great extent emancipated our muscles from work . . . and . . . have resulted in a lack of physical fitness in the youth of America, which seriously handicapped our war effort."¹⁹⁰ Although

this was a quote from an Army publication before World War II, it rings true today. However, there are many options today where technology can assist with improving SAN. The *Performance Triad Initiative* uses a combination of personal readiness devices and web or mobile applications to facilitate changes in health and readiness. As outlined above, personal readiness devices that automatically track SAN can decrease the barriers to creating healthier habits. The Army should update regulations to allow the purchase and wear of these devices. The new *ArmyFit* platform provides assessments, educational tools, and social networking capabilities to facilitate a “social contagion” towards health and readiness.¹⁹¹ Finally, the Army should consider developing on-line resources similar to those of the Canadian Defense Forces (www.DFit.ca) to provide personalized physical readiness programs designed around a Soldier’s deployment cycle.¹⁹²

Strategy: Fiscally Constrained Environment

Establishing new programs and initiatives is a challenge in today’s fiscally constrained environment. However, the impact of poor SAN on recruitment, attrition, readiness, health, and medical discharges necessitates action and provides an opportunity for significant cost reductions. Lessons learned from prior interwar eras helped shape the recommendations outlined. As GEN Marshall remarked in the build-up to World War II, “the Army used to have all the time in the world and no money; now we’ve got all the money and no time.”¹⁹³ Focusing on improving SAN during this postwar period can improve physical resilience and partly address the concerns of an unsatisfied force due to limited training dollars. During the build-up to World War II, military leaders used physical conditioning programs in the morning and used afternoon sessions for sports, mass athletics, games, and testing.¹⁹⁴

Although today's programs to build physical resilience and readiness would differ from those of GEN Marshall's era, the concept remains the same. The recommendations outlined focus on providing preparedness tools for the squad leader. Programs such as the CSF2 and the *Performance Triad Initiative* contain costs through a centralized development but decentralized execution model that provides tools for military leaders to implement. No additional cost would be required for naming 2015 as the year of the "Professional Soldier Athlete," as the costs have already been programmed. Other recommendations include building partnerships that would distribute costs through the whole-of-government approach or aligning programs from IMCOM, MWR, and Army Medicine to better support CSA's *Readiness and Resilience Campaign*. The costs associated with the rest of the recommendations are minimal compared to costs associated with poor physical resilience and readiness as outlined in the *Health of the Nation* section of this manuscript. Dr. East wrote the following regarding the cost-benefit analysis:

The most precious and irreplaceable resource in the U.S. Army is the individual Soldier. We must do all we can to develop and preserve this resource. Throughout the history of the Army, physical readiness training has been universally recognized as a force multiplier that enhances combat effectiveness, resilience, and survivability on the battlefield. We spend billions of dollars each year developing and producing tactical weapons and funding the associated training necessary to deploy them. Although we have the most technologically advanced Army in the world, our commitment to physical readiness training is derisory by comparison. As the Army moves to a smaller, lighter, more mobile force in the fight against the global war on terrorism, a long-term, comprehensive commitment to the highest quality physical readiness training is mandatory to ensure our future success.¹⁹⁵

Summary of Recommendations (Table 5)

Table 5. Summary of Recommendations

Whole-Of-Government Approach	A synchronized effort among the Departments of Education, Health and Human Services, Veterans' Affairs, and Defense would facilitate changes required for the country to embrace SAN as fundamental to optimal health and physical readiness.
Cultural: Communicating the Vision and Creating Buy-In	Senior military leaders appreciate the urgency of the changes required, have created a vision, and through different initiatives have built a coalition to drive change. However, gaining buy-in throughout the organization is required. Designating 2015 as the "Year of the Professional Soldier Athlete" could help communicate the vision and create the buy-in required for organizational change.
Cultural: Codifying Change in the Organization	<ol style="list-style-type: none"> 1. Development of a military occupational specialty that combines the skill sets of the Master Resiliency and Fitness Trainers. 2. Revise Professional Military Education to incorporate training on how leaders can enhance SAN to optimize readiness.
Environment	Continue to support DoD's <i>Healthy Base Initiative</i> , whose goal is to make the healthy choice the easy choice by shaping the environment.
Social Networks	Social networks influence sleep duration, Family activities, and meal planning. The Army should support programs that incorporate or encourage Family involvement.
Recruiting	The U.S. Army should adapt the U.S. Marine Corps <i>Delayed Entry Program</i> as it provides a unique approach to addressing attrition rates prior to recruits reporting for basic training.
Creating Change	Programs that provide tools on "how" and "why" to change may be more effective than educational programs telling people "what" to change. TSG's <i>Performance Triad</i> provides weekly challenges and tools for leaders to facilitate SAN.
Squad Leader Focus	Programs that provide tools to the squad leader to lead, coach, mentor, and teach may be the most effective and efficient way to improve readiness.
Technology	<ol style="list-style-type: none"> 1. Technology can enhance programs focused on improving health and readiness by decreasing barriers related to behavioral change. 2. Technology can provide a cost-effective means to reach our geographically dispersed population.

Conclusion

The U.S. Army Training Manual No. 1 (*Studies in Citizenship for Recruits*, 1922) states, "No nation has ever survived, and no nation ever will survive, whose people are not physically, mentally, and morally fit for survival."¹⁹⁶ The health of our nation and the health of our military are mutually dependent. To implement the *National Security Strategy* and strategic Landpower, we need a healthy Nation and a fit force. This

requires a whole-of-government approach to address a range of issues including public education, healthcare, military readiness, and medical disabilities. Within the Army, we must create a culture that values SAN. This requires communicating our leaders' vision, creating buy-in across the organization, and codifying those changes within our systems. Three common principles underlie the recommendations: 1) distribute tools and resources to military leaders to implement, 2) provide expertise and reach-back capability for the military leaders as they implement change, and 3) create an environment that makes the healthy choice the easy choice. At the close of World War I, Secretary of War Newton B. Baker "hoped that we will not again fall into the habit of slighting the body as we were on the point of doing when the war forced us to realize its importance as the basis of our national strength."¹⁹⁷ As we wind down from Afghanistan the question remains...will we learn from history?

Endnotes

¹ General Raymond T. Odierno, U.S. Army Chief of Staff, "Initial Thoughts – Chief of Staff, U.S. Army," <http://usarmy.vo.llnwd.net/e2/c/downloads/219032.pdf> (accessed March 21, 2014).

² Paul T. Bartone, Charles L. Barry, and Robert E. Armstrong, "To Build Resilience: Leader Influence on Mental Hardiness," *Defense Horizons* no. 69 (November 2009): 2; A. Walter Dorn and Michael Varey, "The Rise and Demise of the Three Block War," *Canadian Military Journal* 10, no. 1 (2009): 38.

³ Lynda Liddy, "The Strategic Corporal: Some Requirements in Training and Education," *Australian Army Journal* II, no. 2 (2005): 139.

⁴ Whitfield B. East, *A Historical Review and Analysis of Army Physical Readiness Training and Assessment* (Fort Leavenworth, KS: Combat Studies Institute Press, 2013), 197.

⁵ Ibid.

⁶ Carl von Clausewitz, *On War* (New York: Penguin Classics, 1982), 121-2.

⁷ Gwendolyn Drew, "A Historical Study of the Concern of the Federal Government for the Physical Fitness of Non-Age Youth with Reference to the Schools, 1790-1941," *Research Quarterly* 16, no. 3 (1945): 204-5.

⁸ East, *A Historical Review and Analysis*, 79.

⁹ The United States Department of Health and Human Services, "2020 Topics and Objectives," <http://www.healthypeople.gov/2020/topicsobjectives2020/default.aspx> (accessed February 12, 2014).

¹⁰ Carl Clausewitz concept of 'coup d'oeil' is very similar to a professional soldier athlete being 'in the zone'. Both of these concepts require optimal physical and mental resilience. Physical and mental resilience serves as the foundation for personal readiness and preparedness. Just like professional athletes, Soldiers must focus on sleep, activity, and nutrition to ensure optimal performance. This paper focuses on the direct and indirect role of sleep, activity, and nutrition on physical and mental resilience, respectively. Additionally, since young Soldiers are often less worried about their health; focusing on sleep, activity, and nutrition from a performance perspective may lead to greater buy-in and acceptance in this population; Clausewitz, *On War*, 141.

¹¹ Patricia D. Horoho, "A System for Health: Essential Element of National Security," *U.S. Army Medical Department Journal*, (October-December 2013): 4.

¹² Raymond Odierno, "Waypoint #2: Follow Up to CSA's Marching Orders," February 19, 2014, linked from the *U.S. Army Home Page* at http://www.army.mil/article/118873/Waypoint_2_Follow_up_to_CSA_s_Marching_Orders/ (accessed March 6, 2014).

¹³ U.S. Congressional Budget Office, *CBO's 2013 Long Term Budget Outlook* (Washington, DC: U.S. Congressional Budget Office, September 2013), 29; David U. Himmelstein, "Illness and Injury as Contributors to Bankruptcy," *Health Affairs*, January-June Supplement 2005, W5-63.

¹⁴ Samuel H. Preston and Andrew Stokes, "Contribution of Obesity to International Differences in Life Expectancy," *American Journal of Public Health* 101, no. 11 (November 2011): 2137.

¹⁵ Trust for America's Health, *F as in Fat: How Obesity Threatens America's Future: 2011* (Washington, DC: Trust for America's Health, 2011), 11.

¹⁶ Centers for Disease Control and Prevention, "Adult Obesity, Obesity Rises Among Adults," <http://www.cdc.gov/vitalsigns/AdultObesity/> (accessed February 12, 2014); Min Hae Park et al., "Overweight in Childhood, Adolescence and Adulthood and Cardiovascular Risk in Later Life: Pooled Analysis of Three British Cohorts," *PloS One* 8, no. 7 (2013): e70684; Amir Tirosh et al., "Adolescent BMI Trajectory and Risk of Diabetes Versus Coronary Disease," *New England Journal of Medicine* 364, no. 14 (2011): 1315.

¹⁷ Centers for Disease Control and Prevention, "Maps of Trends in Diagnosed Diabetes," http://www.cdc.gov/diabetes/surveillance/diabetes_slides.htm (accessed February 9, 2014).

¹⁸ Adapted from: Trust for America's Health, *F as in Fat*, 11.

¹⁹ *Ibid.*, 16.

²⁰ Brigade size of 3,5000 Soldiers was used for calculation; Roman Bilynsky, *Medical Readiness Status: 2014 January Monthly Update Brief* (Washington, D.C., U.S. Army Medical Command, January 2, 2014).

²¹ Bradley C. Nindl et al., “Strategies for Optimizing Military Physical Readiness and Preventing Musculoskeletal Injuries in the 21st Century,” *U.S. Army Medical Department Journal*, October-December 2013, 7.

²² Of the 25 million limited duty days per year; 40% belong to the Army. The 10 million limited duty days per year in the Army equates to 27,000 man-years each year; Keith G. Hauret et al., “Musculoskeletal Injuries: Description of an Under-Recognized Injury Problem Among Military Personnel,” *American Journal of Preventive Medicine* 38, no. 1 (2010): S61; Bruce A. Ruscio et al., “A Process to Identify Military Injury Prevention Priorities Based on Injury Type and Limited Duty Days,” *American Journal of Preventive Medicine* 38, no. 1 (2010): S19.

²³ Hauret, “Musculoskeletal Injuries,” S61; Ruscio, “Process to Identify,” S19.

²⁴ Accession Medical Standards Analysis and Research Activity (AMSARA), *Tri-Service Disability Evaluation Systems Database Analysis and Research: Annual Report 2013* (Silver Spring, MD: Walter Reed Army Institute of Research, 2013), 1, 12, http://www.amsara.amedd.army.mil/Documents/DES_AR/DES%20AR%202013%20_Final.pdf (accessed February 12, 2014).

²⁵ Ibid.

²⁶ Ibid., 1, 12, 29.

²⁷ U.S. Department of Veterans Affairs, *Fiscal Year 2104 Budget Submission Volume I* (Washington, DC: U.S. Department of Veterans Affairs, 2013), 1A-5, http://www.va.gov/budget/docs/summary/Fy2014_Volume_I-Summary_Volume.pdf (accessed February 12, 2014).

²⁸ William Christenson, Amy Dawson Taggart, and Soren Messner-Zidell, *Too Fat to Fight*, (Washington, DC: Mission: Readiness, 2010), 3, <http://www.missionreadiness.org/2010/too-fat-to-fight/> (accessed February 12, 2014).

²⁹ Sheryl A. Bedno et al., “Association of Weight at Enlistment with Enrollment in the Army Weight Control Program and Subsequent Attrition in the Assessment of Recruit Motivation and Strength Study,” *Military Medicine* 175, no. 3 (March 2010): 188.

³⁰ Alan S. Go et al., “Heart Disease and Stroke Statistics—2013 Update: A Report from the American Heart Association,” *Circulation* 127, no. 1 (January 2013): e.25.

³¹ Accession Medical Standards Analysis and Research Activity (AMSARA), *Attrition and Morbidity Data for 2012 Accessions: Annual Report 2013* (Silver Spring, MD, Walter Reed Army Institute of Research, 2013), 41, www.amsara.amedd.army.mil/Documents/AMSAARA_AR/AMSARA%20AR%202013_final.pdf (accessed February 12, 2014).

³² Bedno, “Association of Weight at Enlistment,” 188.

³³ Joseph M. Molloy et al., "Physical Training Injuries and Interventions for Military Recruits," *Military Medicine* 177, no. 5 (2012), 555.

³⁴ Sheryl A. Bedno et al., "Effect of Pre-Accession Physical Fitness on Training Injuries Among US Army Recruits," *Work* 44, no. 4 (2013): 509.

³⁵ Adapted from: Trust for America's Health, *F as in Fat*, 22.

³⁶ AMSARA, *Attrition and Morbidity*, 65.

³⁷ Molloy, "Physical Training Injuries," 553.

³⁸ Bedno, "Association of Weight at Enlistment," 188; Molloy, "Physical Training Injuries," 553.

³⁹ The Army's attrition rate between one to two years of service is 20%. The perspective provided is that the recruiting and training cost to replace a Soldier that is discharged during this time would be greater than those lost during initial entry training based on the additional training and expertise that would be required to replace that Soldier. However, others may argue that the Soldier that remains on active duty after initial entry training costs less as they have started to provide the organization a return on investment. The goal of this paper is not to settle that debate but to highlight the time and cost required to replace Soldiers that are medically separated from the service.

⁴⁰ Christopher JL Murray et al., "The State of US Health, 1990-2010: Buren of Disease, Injuries, and Risk Factors," *Journal of American Medical Association* 310, no. 6 (2013): 591; Ruscio, "A Process to Identify," S19.

⁴¹ Darren E. Warburton, Crystal W. Nicol, and Shannon S. Bredin, "Health Benefits of Physical Activity: The Evidence," *Canadian Medical Association Journal* 174, no. 6 (2006): 801; Frank J. Penedo and Jason R. Dahn, "Exercise and Well-Being: A Review of Mental and Physical Health Benefits Associated with Physical Activity," *Current Opinion in Psychiatry* 18, no. 2 (2005): 189.

⁴² Aviva Must et al., "The Disease Burden Associated with Overweight and Obesity," *Journal of American Medical Association* 282, no. 16 (1999): 1523; Centers for Disease Control and Prevention, "Physical Activity and Good Nutrition: Essential Elements to Prevent Chronic Disease and Obesity 2003," *Nutrition in Clinical Care* 6, no. 3 (2003): 135; I.M. Vuori, "Health Benefits of Physical Activity with Special Reference to Interaction with Diet," *Public Health Nutrition* 4, no. 2b (2001): 517; Yong Liu et al., "Association Between Perceived Insufficient Sleep, Frequent Mental Distress, Obesity and Chronic Disease Among US Adults, 2009 Behavioral Risk Factor Surveillance System," *BMC Public Health* 13, no. 1 (2013): 84; Anoop Shankar, Shirmila Syamala, and Sita Kalidindi, "Insufficient Rest or Sleep and its Relationship to Cardiovascular Disease, Diabetes, and Obesity in a National, Multiethnic Sample," *PLoS One* 5, no. 11 (2010): e14189.

⁴³ East, *A Historical Review and Analysis*, 13.

⁴⁴ Ibid.

⁴⁵ Jonathan Fielding and Shiriki Kumanyika, "Recommendations for the Concepts and Form of Healthy People 2020," *American Journal of Preventive Medicine* 37, no. 3 (2009): 255; Howard K. Koh, "A 2020 Vision for Healthy People," *New England Journal of Medicine* 362, no. 18 (2010): 1653.

⁴⁶ B.H. Liddell Hart, *Strategy* (New York: Meridian, 1991), 30.

⁴⁷ Nancy J. Wesensten and Thomas J. Balkin, "The Challenge of Sleep Management in Military Operations," *U.S. Army Medical Department Journal*, October-December 2013, 109.

⁴⁸ Nicole Lamond and Drew Dawson, "Quantifying the Performance Impairment Associated with Fatigue," *Journal Sleep Research* 8, no. 4 (1999): 255.

⁴⁹ The United States Department of Health and Human Services, "Sleep Health," <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=38> (accessed February 12, 2014).

⁵⁰ Frances M. Barlas et al., *2011 Department of Defense Health Related Behaviors Survey of Active Duty Military Personnel* (Fairfax, VA: Department of Defense, February 2013), ES-6, <http://tricare.mil/tma/dhcape/surveys/coresurveys/surveyhealthrelatedbehaviors/ADS.aspx> (accessed February 12, 2014).

⁵¹ Ibid.

⁵² Jodi A. Mindell et al., "Development Aspects of Sleep Hygiene: Findings from the 2004 National Sleep Foundation Sleep in America Poll," *Sleep Medicine* 10, no. 7 (2009): 771; The United States Department of Health and Human Services, "Sleep Health."

⁵³ Pierre Philip, "Sleepiness of Occupational Drivers," *Industrial Health* 43, no. 1 (2005): 30; Scot A. Mountain et al., "The Impact of Housestaff Fatigue on Occupational and Patient Safety," *Lung* 185, no. 4 (2007): 203.

⁵⁴ Paul D. Bliese, Nancy J. Wesensten, and Thomas J. Balkin, "Age and Individual Variability in Performance During Sleep Restriction," *Journal of Sleep Research* 15, no. 4 (2006): 376.

⁵⁵ Thomas Reilly and Mark Piercy, "The Effect of Partial Sleep Deprivation on Weight-Lifting Performance," *Ergonomics* 37, no. 1 (1994): 107.

⁵⁶ Bruce Martin and Gary Gaddis, "Exercise after Sleep Deprivation," *Medicine and Science in Sports and Exercise* 13, no. 4 (1980): 220.

⁵⁷ Cheri D. Mah et al., "The Effects of Sleep Extension on the Athletic Performance of Collegiate Basketball Players," *Sleep* 34, no. 7 (2011): 943; Todd W. Maddox et al., "The Effects of Sleep Deprivation on Information Integration Categorization Performance," *Sleep* 32, no. 11 (2009): 1439.

⁵⁸ Julia F. Dewald-Kaufmann, F.J. Oort, and A.M. Meijer, "The Effects of Sleep Extension on Sleep and Cognitive Performance in Adolescents with Chronic Sleep Reduction: An Experimental Study," *Sleep Medicine* 14, no. 6 (2013): 510.

⁵⁹ Namni Goel et al., "Neurocognitive Consequences of Sleep Deprivation," *Seminars in Neurology* 29, no. 4 (2009): 320; Santiago Perez-Lloret et al., "A Multi-Step Pathway Connecting Short Sleep Duration to Daytime Somnolence, Reduced Attention, and Poor Academic Performance: An Exploratory Cross-Sectional Study in Teenagers." *Journal of Clinical Sleep Medicine* 9, no. 5 (2013): 469.

⁶⁰ Bruce J. Martin, "Effect of Sleep Deprivation on Tolerance of Prolonged Exercise," *European Journal of Applied Physiology and Occupational Physiology* 47, no. 4 (1981): 345; William D. Killgore, Thomas J. Balkin, and Nancy J. Westensten, "Impaired Decision Making Following 49 Hours of Sleep Deprivation," *Journal of Sleep Research* 15, no. 1 (March 2006): 7.

⁶¹ Shankar, "Insufficient Rest or Sleep," e14189.

⁶² Jae Hong Park, Jae-Ho Yoo, and Seong Hwan Kim, "Associations Between Non-Restorative Sleep, Short Sleep Duration and Suicidality: Findings from a Representative Sample of Korean Adolescents," *Psychiatry and Clinical Neurosciences* 67, no. 1 (2013): 28; Young K. Do et al., "The Associations Between Self-Reported Sleep Duration and Adolescent Health Outcomes: What is the Role of Time Spent on Internet Use?," *Sleep Medicine* 14, no. 2 (2013): 195.

⁶³ Peppi Haario et al., "Bidirectional Associations Between Insomnia Symptoms and Unhealthy Behaviours," *Journal of Sleep Research* 22, no. 1 (2013): 89; Luana P. Hoefelmann et al., "Lifestyle, Self-Reported Morbidities, and Poor Sleep Among Brazilian Workers," *Sleep Medicine* 13, no. 9 (2012): 1198.

⁶⁴ Haario, "Bidirectional Associations Between Insomnia," 89; Lindsay E. Bromley et al., "Sleep Restriction Decreases the Physical Activity of Adults at Risk for Type 2 Diabetes," *Sleep* 35, no. 7 (2012): 977.

⁶⁵ Anthony Luke et al., "Sports-Related Injuries in Youth Athletes: Is Overscheduling a Risk Factor?," *Clinical Journal of Sports Medicine* 21, no. 4 (July 2011): 307; Matthew D. Milewski, "Chronic Lack of Sleep is Associated with Increased Sports Injuries in Adolescent Athletes," *Journal of Pediatric Orthopaedics* 34, no. 2 (2014): 129; David E. Lombardi et al., "Independent Effects of Sleep Duration and Body Mass Index on the Risk of Work-Related Injury: Evidence from the US National Health Interview Survey (2004-2010)," *Chronobiology International* 29, no. 5 (2012): 556.

⁶⁶ Lombardi, "Independent Effects of Sleep Duration," 556.

⁶⁷ Bethany J. Sallinen et al., "Longer Weekly Sleep Duration Predicts Greater 3-Month BMI Reduction Among Obese Adolescents Attending a Clinical Multidisciplinary Weight Management Program," *Obesity Facts* 6, no. 3 (2013): 239.

⁶⁸ Dean W. Beebe et al., "Dietary Intake Following Experimentally Restricted Sleep in Adolescents," *Sleep* 36, no. 6 (2013): 827.

⁶⁹ Karine Spiegel, Rachel Leproult, and Eve Van Cauter, "Impact of Sleep Debt on Metabolic and Endocrine Function." *The Lancet* 354, no. 9188 (1999): 1435.

⁷⁰ East, *A Historical Review and Analysis*, 101.

⁷¹ Kenneth E. Hamburger, *Leadership in Combat: An Historical Appraisal*, (Ft Knox, KY: U.S. Army Armor School, 1983), 3-7.

⁷² William L. Haskell et al., "Physical Activity and Public Health: Updated Recommendations for Adults from the American College of Sports Medicine and the American Heart Association," *Circulation* 116, no. 9 (2007): 1081.

⁷³ The United States Department of Health and Human Services, "Physical Activity," <http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=33> (accessed February 12, 2014).

⁷⁴ Barlas, "2011 Department of Defense Health," ES-5.

⁷⁵ *Ibid.*, ES-6.

⁷⁶ Katherine D. Hoerster et al., "Health and Health Behavior Differences: U.S. Military, Veteran, and Civilian Men," *American Journal of Preventive Medicine* 43, no. 5 (2012): 483.

⁷⁷ The United States Department of Health and Human Services, "Physical Activity."

⁷⁸ Charles E. Matthews et al., "Amount of Time Spent in Sedentary Behaviors in the United States, 2003-2004," *American Journal of Epidemiology* 167, no. 7 (2008): 875.

⁷⁹ Dieter Leyk et al., "Physical Fitness, Weight, Smoking, and Exercise Patterns in Young Adults," *Deutsches Arzteblatt International* 109, no. 44 (2012): 737.

⁸⁰ Deydre S. Teyhen et al., "Influence of Physical Activity, Weight, Smoking, and Prior Injury on Physical Performance," *Journal of Orthopaedic Sports and Physical Therapy* 44, no. 1 (2014): A167.

⁸¹ Joseph E. Donnelly and Kate Lambourne, "Classroom-Based Physical Activity, Cognition, and Academic Achievement," *Preventive Medicine* 52, Supplement 1 (2011): S36.

⁸² Aaron PJ Roberts and John C. Cole, "The Effects of Exercise and Body Armor on Cognitive Function in Healthy Volunteers," *Military Medicine* 178, no. 5 (2013): 479.

⁸³ The United States Department of Health and Human Services, "Physical Activity."

⁸⁴ Josephine Y. Chau et al., "Daily Sitting Time and All-Cause Mortality: A Meta-Analysis," *PLoS One* 8, no. 11 (2013): e8000.

⁸⁵ Peter J. Carek, Sarah E. Laibstain, and Stephen M. Carek, "Exercise for the Treatment of Depression and Anxiety," *The International Journal of Psychiatry in Medicine* 41, no. 1 (2011): 15.

⁸⁶ Carek, "Exercise for the Treatment,"": 15; Scott A. Paluska and Thomas L. Schwenk, "Physical Activity and Mental Health," *Sports Medicine* 29, no. 3 (2000): 167.

⁸⁷ Karim M. Awad et al., "Effects of Exercise and Nutritional Intake on Sleep Architecture in Adolescents," *Sleep and Breathing* 17, no. 1 (2013): 117.

⁸⁸ Amy A. Drescher et al., "Caffeine and Screen Time in Adolescence: Associations with Short Sleep and Obesity," *Journal of Clinical Sleep Medicine* 7, no. 4 (2011): 337.

⁸⁹ Karim Chamari et al., Injury Rates in Professional Soccer Players During Ramadan. *Journal of Sports Science* 30, no. 1 (2012): S93.

⁹⁰ Marita Sodergren et al., "Associations Between Fruit and Vegetable Intake, Leisure-Time Physical Activity, Sitting Time and Self-Rated Health Among Older Adults: Cross-Sectional Data from WELL Study," *BMC Public Health* 12, no. 1 (2012): 551; Mekdes K. Gebremariam et al., "Are Screen-Based Sedentary Behaviors Longitudinally Associated with Dietary Behaviors and Leisure-Time Physical Activity in the Transition into Adolescence?," *International Journal of Behavioral Nutrition and Physical Activity* 10, no. 9 (2013): <http://www.biomedcentral.com/content/pdf/1479-5868-10-9.pdf> (accessed February 12, 2014).

⁹¹ Melissa Wake, Kylie Hesketh, and Elizabeth Waters, "Television, Computer Use, and Body Mass Index in Australian Primary School Children," *Journal of Pediatrics and Child Health* 39, no. 2 (2003): 130.

⁹² Nancy R. Rodriguez et al., "Position of the American Dietetic Association, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance," *Journal of American Dietetic Association* 109, no. 3 (2009): 509.

⁹³ Veronique L. Roger et al., "AHA Statistical Update: Heart Disease and Stroke Statistics – 2011 Update," *Circulation* 123, no. 4 (2011): e18.

⁹⁴ The United States Department of Health and Human Services, "Nutrition and Weight Status," <http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=29> (accessed February 12, 2014).

⁹⁵ Celia Iriart et al., "Chronic Malnutrition Among Overweight Hispanic Children: Understanding Health Disparities," *Journal of Immigrant and Minority Health* 13, no. 6 (2011): 1069.

⁹⁶ Celia Larson et al., "Peer-Reviewed: Development of a Community-Sensitive Strategy to Increase Availability of Fresh Fruits and Vegetables in Nashville's Urban Food Deserts, 2010-2012," *Preventing Chronic Disease* 10, (2013): E125.

⁹⁷ The United States Department of Health and Human Services, "Nutrition and Weight Status."

⁹⁸ Barlas, "2011 Department of Defense Health," ES-4.

⁹⁹ Alyson J. Littman et al., "Weight Change Following US Military Service," *International Journal of Obesity* 37, no. 2 (2013): 244.

¹⁰⁰ The United States Department of Health and Human Services, "Nutrition and Weight Status."

¹⁰¹ Rodriguez, "Position of the American Dietetic," 509.

¹⁰² Ibid.

¹⁰³ Michael J. Duncan and Samuel W. Oxford, "The Effect of Caffeine Ingestion on Mood State and Bench Press Performance to Failure," *The Journal of Strength and Conditioning Research* 25, no. 1 (2011): 178; Michael J. Duncan et al., "Acute Caffeine Ingestion Enhances Strength Performance and Reduces Perceived Exertion and Muscle Pain Perception During Resistance Training," *European Journal of Sports Science* 13, no. 4 (2013): 392.

¹⁰⁴ Kelly M Stanek et al., "Body Mass Index and Neurocognitive Functioning Across the Adult Lifespan," *Neuropsychology* 27, no. 2 (2013): 141; John Gunstad et al., "Longitudinal Examination of Obesity and Cognitive Function: Results from the Baltimore Longitudinal Study of Aging," *Neuroepidemiology* 34, no. 4 (2010): 222; Ioannis Vassiloudis et al., "Academic Performance in Relation to Adherence to the Mediterranean Diet and Energy Balance Behaviors in Greek Primary Schoolchildren," *Journal of Nutrition Education and Behavior* (2014): <http://dx.doi.org/10.1016/j.jneb.2013.11.001> (accessed February 12, 2014).

¹⁰⁵ Felicia N. Jacka et al., "The Association Between Habitual Diet Quality and the Common Mental Disorders in Community-Dwelling Adults: The Hordaland Health Study," *Psychosomatic Medicine* 73, no. 6 (2011): 483; Ting-Ting Weng et al., "Is There Any Relationship Between Dietary Patterns and Depression and Anxiety in Chinese Adolescents?," *Public Health Nutrition* 15, no. 4 (2012): 673.

¹⁰⁶ Centers for Disease Control and Prevention, "Adult Obesity, Obesity Rises Among Adults," <http://www.cdc.gov/vitalsigns/AdultObesity/> (accessed February 12, 2014); Min Hae Park et al., "Overweight in Childhood, Adolescence and Adulthood and Cardiovascular Risk in Later Life: Pooled Analysis of Three British Birth Cohorts," *PLoS One* 8, no. 7 (2013): e70684; Amir Tirosh et al., "Adolescent BMI Trajectory and Risk of Diabetes Versus Coronary Disease," *New England Journal of Medicine* 364, no. 14 (2011): 1315.

¹⁰⁷ Guixiang Zhao et al., "Waist Circumference, Abdominal Obesity, and Depression Among Overweight and Obese US Adults: National Health and Nutrition Examination Survey 2005-2006," *BMC Psychiatry* 11, no. 1 (2011): 130.

¹⁰⁸ Joseph J. Knapik et al., "Discharge During US Army Basic Training: Injury Rates and Risk Factors," *Military Medicine* 166, no. 7 (2001): 641; Jonathan Peake et al., "The Health and Cost Implications of High Body Mass Index in Australian Defence Force Personnel," *BMC Public Health* 12, no. 1 (2012): 451.

¹⁰⁹ Mary J. Smith et al., "Psychosocial Variables and Self-Rated Health in Young Adult Obese Women," *Applied Nursing Journal* 27, no. 1 (2014): 67; Virginia Quick et al., "Eat, Sleep, Work, Play: Associations of Weight Status and Health-Related Behaviors Among Young Adult College Students," *American Journal of Public Health* (2013): <http://dx.doi.org/10.4278/ajhp.130327-QUAN-130> (accessed February 12, 2014).

¹¹⁰ Hans-Peter Landolt, "No Thanks, Coffee Keeps Me Awake: Individual Caffeine Sensitivity Depends on ADORA2A Genotype," *Sleep* 35, no. 7 (2012): 899.

¹¹¹ Laura Dwyer-Lindgren et al., "Prevalence of Physical Activity and Obesity in US Counties, 2001-2011: A Road Map for Action," *Population Health Metrics* 11, no. 1 (2013): 1.

¹¹² This paper focuses on the cost of overweight and obese young adults entering the military. It is also important to note that underweight Soldiers are also at a greater risk for injury upon entering the military. Additionally, once an Soldier completes initial entry training, the relationship between weight and injuries is less consistent; Eric A. Finkelstein et al., "The Relationship Between Obesity and Injuries Among US Adults," *American Journal of Health Promotion* 21, no. 5 (2007): 460; Julie Gilchrist et al., "Exercise-related Injuries Among Women: Strategies for Prevention from Civilian and Military Studies," *Morbidity and Mortality Weekly Report* 49, no. RR-2 (2000): 15; Bruce Jones et al., "Intrinsic Risk Factors for Exercise-Related Injuries Among Male and Female Army Trainees," *American Journal of Sports Medicine* 21, no. 5 (1993): 705; Elizabeth Packnett et al., "Body Mass Index, Medical Qualifications Status, and Discharge During the First Year of U.S. Army Service," *American Journal of Clinical Nutrition* 93, no. 3 (2011): 608.

¹¹³ Park, "Overweight in Childhood," e70684; Tirosh "Adolescent BMI Trajectory," 1315; Con Hrysomallis, "Injury Incidence, Risk Factors and Prevention in Australian Rules Football," *Sports Medicine* 43, no. 5 (2013): 339.

¹¹⁴ Hrysomallis, "Injury Incidence, Risk Factors," 339.

¹¹⁵ East, *A Historical Review and Analysis*, 49.

¹¹⁶ Stephen G. Jones, "Perspectives," *U.S. Army Medical Department Journal*, (October-December 2013): 1.

¹¹⁷ Horoho, "A System for Health," 4.

¹¹⁸ The U.S. Army, "Ready and Resilient Campaign," <http://www.army.mil/readyandresilient/> (accessed February 15, 2014); Odierno, "Waypoint #2: Follow Up."

¹¹⁹ East, *A Historical Review and Analysis*, 36.

¹²⁰ *Ibid.*, 21.

¹²¹ Mark A. Stoler, *George C. Marshall: Soldier-Statesman of the American Century* (New York: Twayne, 1989), 143.

¹²² Mark P. Hertling, *Physical Training for the Modern Battlefield: Are We Tough Enough?*, Student Monograph (Fort Leavenworth, KS: U.S. Army Command and General Staff College), 29; Drew, "A Historical Study," 204-5.

¹²³ Shenghui Li et al., "Sleep, School Performance and a School-Based Intervention Among School-Aged Children: A Sleep Series Study in China," *PLoS One* 8, no. 7 (July 2013): e67928; Edward S. Gibson et al., "Sleepiness: is Serious in Adolescence: Two Surveys of 3235 Canadian Students," *BMC Public Health* 2, no. 6 (2006): 116; Amy R. Wolfson and Mary A. Carskadon, "Sleep Schedules and Daytime Functioning in Adolescents," *Child Development* 69, no. 4 (1998): 875.

¹²⁴ Duncan P. Van Dusen et al., "Associations of Physical Fitness and Academic Performance Among Schoolchildren," *Journal of School Health* 81, no. 12 (December 2011): 733; Francois Trudeau and Roy J. Shephard, "Physical Education, School Physical Activity,

School Sports, and Academic Performance,” *International Journal of Behavioral Nutrition and Physical Activity* 5, no. 10 (February 2008): 1; <http://www.ijbnpa.org/content/5/1/10> (accessed February 13, 2014).

¹²⁵ The United States Department of Health and Human Services, “Physical Activity.”

¹²⁶ Christenson, *Too Fat to Fight*, 3.

¹²⁷ Diane W. Schanzenbach, “Do School Lunches Contribute to Childhood Obesity?,” *Journal of Human Resources* 44, no. 3 (Summer 2009): 702.

¹²⁸ The United States Department of Health and Human Services, “Nutrition and Weight Status.”

¹²⁹ Jim Garamone, “New National Strategy Takes “Whole-of-Government Approach,” *American Forces Press Service*, May 27, 2010, <http://www.defense.gov/news/newsarticle.aspx?id=59377> (accessed February 13, 2014).

¹³⁰ East, *A Historical Review and Analysis*, 127-8.

¹³¹ *Ibid.*, 93.

¹³² Trust for America’s Health, *F as in Fat*, 74-78, 97-99.

¹³³ The Let’s Move Home Page, <http://www.letsmove.gov> (accessed February 13, 2014); The National Football League’s Play 60 Home Page, http://nflrush.com/play60/?campaign=rush_nav_play60 (accessed February 13, 2014).

¹³⁴ East, *A Historical Review and Analysis*, 119.

¹³⁵ Comprehensive Soldier and Family Fitness, “Comprehensive Soldier and Family Fitness Launches New Social Media Platform Army-Wide,” January 28, 2014, http://www.army.mil/article/118898/Comprehensive_Soldier_and_Family_Fitness_launches_new_social_media_platform_Army_wide/ (accessed February 14, 2014).

¹³⁶ Differences between the U.S. Army and the U.S. Marine Corps attrition, retention, discharge and obesity rates may be multifactorial. Differences in culture, selection process, retention process, and fitness standards influence the obesity and injury rates. Studying these differences may provide additional insights on how to improve readiness and preparedness within the Army; Barlas, “2011 Department of Defense Health,” ES-3, 4; ASMARA, *Tri-Service Disability Evaluation*, 18, 20.

¹³⁷ Barlas, “2011 Department of Defense Health,” ES-3,4.

¹³⁸ East, *A Historical Review and Analysis*, 139, 155, 179, 183, 189, 198, 215-6, 227-9; The United States Army Stand-To: “Master Fitness Trainer Course,” January 8, 2013, <http://www.army.mil/standto/archive/issue.php?issue=2013-01-08> (accessed February 14, 2014).

¹³⁹ Peter G. Tsouras, ed., *The Greenhill Dictionary of Military Quotations* (London: Greenhill Books, 2000), 486.

¹⁴⁰ East, *A Historical Review and Analysis*, 205.

¹⁴¹ Tsouras, *Greenhill Dictionary Military Quotations*, 241.

¹⁴² Ibid.

¹⁴³ U.S. Department of the Army, *Combat and Operational Stress Control Manual for Leaders and Soldiers*, Field Manual 6-22.5 (Washington, DC: U.S. Department of the Army, March 18, 2009), 4-1; http://armypubs.army.mil/doctrine/DR_pubs/dr_a/pdf/fm6_22x5.pdf (accessed March 6, 2014).

¹⁴⁴ Tsouras, *Greenhill Dictionary Military Quotations*, 195.

¹⁴⁵ John Kotter, *Leading Change* (Boston: Harvard Business Review Press, 1996), 21.

¹⁴⁶ Kenneth Riddle, "Comprehensive Soldier and Family Fitness: Mater Fitness Trainer," Washington D.C., U.S. Army, September 27 2012, <https://www.us.army.mil/suite/doc/37950876> (accessed March 6, 2014).

¹⁴⁷ C. Todd Lopez, "Army's 'Readiness and Resilience Campaign' Kicks Off," March 13, 2013, linked from the U.S. Army Home Page at http://www.army.mil/article/98315/Army_s_Ready_and_Resilient_Campaign_kicks_off/ (accessed March 6, 2014); Horoho, "A System for Health," 4; Kotter, *Leading Change*, 21.

¹⁴⁸ Using the theme of "Professional Soldier Athlete" could help teach Soldiers the importance of treating their body like an athlete to optimize their personal readiness and health. However, many Soldiers may have a desk job and may not relate to the athlete concept. Other possible titles include the "Year of the Performance Triad", "Year of Readiness," or "Year of Preparedness;" East, *A Historical Review and Analysis*, 155.

¹⁴⁹ Riddle, "Comprehensive Soldier and Family Fitness."

¹⁵⁰ Kotter, *Leading Change*, 21.

¹⁵¹ The Australian Defence Force utilizes physical training instructors (PTI) to design, conduct, and evaluate unit physical training and combat fitness leaders to lead combat-focused physical training under the supervision of a PTI. The PTI program is 18 weeks in length. These positions are not an additional skill identifier they are the Soldier's military occupational specialty; East, *A Historical Review and Analysis*, 216-7.

¹⁵² Alan L. Peterson et al., "Sleep Disturbance During Military Deployment," *Military Medicine* 173, no. 3 (2008): 230.

¹⁵³ Terrence D. Hill, Amy M. Burdette, and Lauren Hale, "Neighborhood Disorder, Sleep Quality, and Psychological Distress: Testing a Model of Structural Amplification," *Health and Place* 15, no. 4 (2009):1006; Charles M. Morin et al., "Psychological and Behavioral Treatment of Insomnia: Update of the Recent Evidence (1998-2004)," *Sleep* 29, no. 11 (2006):1398.

¹⁵⁴ Gavin R. McCormack and Alan Shiell, "In Search of Causality: A Systematic Review of the Relationship Between the Built Environment and Physical Activity Among Adults," *International Journal of Behavior, Nutrition, and Physical Activity* 8, no. 1 (2011): 125; James F. Sallis et al., "Role of Built Environments in Physical Activity, Obesity, and Cardiovascular Disease," *Circulation* 125, no. 5 (2012): 729; Brian E. Saelens et al., "Neighborhood-Based Differences in Physical Activity: An Environment Scale Evaluation," *American Journal of Public Health* 93, no. 9 (2003): 1552; Ester Cerin et al., "Destinations that Matter: Associations with Walking for Transport," *Health and Place* 13, no. 3 (2007): 713; Helene Charreire et al., "Identifying Built Environmental Patterns Using Cluster Analysis and GIS: Relationships with Walking, Cycling and Body Mass Index in French Adults," *International Journal of Behavior, Nutrition, and Physical Activity* 9, no. 1 (2012): 59.

¹⁵⁵ Catlin E. Caspi et al., "The Relationship Between Diet and Perceived and Objective Access to Supermarkets Among Low-Income Housing Residents," *Social Science and Medicine* 75, no. 7 (2012): 1254; Gilly Hendrie et al., "Change in the Family Food Environment is Associated with Positive Dietary Change in Children," *International Journal of Behavioral Nutrition and Physical Activity* 10, no. 1 (2013): 4; Joseph R. Sharkey, Cassandra M. Johnson, and Wesley R. Dean, "Food Access and Perceptions of the Community and Household Food Environment as Correlates of Fruit and Vegetable Intake Among Rural Seniors," *BMC Geriatrics* 10, no. 1 (2010): 32.

¹⁵⁶ Lisa F. Berkman, and Ichiro Kawachi, "A Historical Framework for Social Epidemiology." in *Social Epidemiology* (New York: Oxford University Press; 2000), 3–12; Nicholas A. Christakis and James H. Fowler, "Social Contagion Theory: Examining Dynamic Social Networks and Human Behavior," *Statistics in Medicine* 32, no. 4 (2013): 556.

¹⁵⁷ Avi Sadeh, Amiram Raviv, and Reut Gruber, "Sleep Patterns and Sleep Disruptions in School-Age Children," *Developmental Psychology* 36, no. 3 (May 2000): 291; Judith Owens, et al., "Television-Viewing Habits and Sleep Disturbances in School Children," *Pediatrics* 104, no. 3 (September 1999): e27.

¹⁵⁸ Nell H. Gottlieb and Judith A. Baker, "The Relative Influence of Health Behaviors, Parental and Peer Behaviors and Exercise Program Participation on Smoking, Alcohol Use, and Physical Activity," *Social Science and Medicine* 22, no. 9 (1986): 915.

¹⁵⁹ Mark A. Pachucki, Paul F. Jacques, and Nicholas A. Christakis, "Social Network Concordance in Food Choice Among Spouses, Friends, and Siblings," *American Journal of Public Health* 101, no. 11 (2011): 2170; Nicholas A. Christakis and James H. Fowler, "The Spread of Obesity in a Large Social Network over 32 Years," *New England Journal of Medicine*, 357 (July 2007): 370.

¹⁶⁰ New York City Department of Health and Mental Hygiene, "New York City Adults Have Better Eating Habits Following Mayor Bloomberg's Healthier Living Initiatives," September 29, 2011, <http://www.nyc.gov/html/doh/html/pr2011/prdmgibbs.shtml> (accessed February 14, 2014).

¹⁶¹ Department of Defense Military One Source *Operation Live Well Home Page*, <http://www.militaryonesource.mil/olw> (accessed February 14, 2014); Department of Defense Military One Source Health Base Initiative Home Page, <http://www.militaryonesource.mil/hbi> (accessed February 14, 2014); Barry St. Clair, "Go for Green to Optimize Health and Fitness," January 27, 2012, linked from the U.S. Army Home Page at

[http://www.army.mil/article/72643/Go For Green to optimize health and fitness/](http://www.army.mil/article/72643/Go_For_Green_to_optimize_health_and_fitness/) (accessed February 14, 2014).

¹⁶² Rob McIvaine, "Squad Needs 'Overmatch' Capability," October 23, 2011, linked from the United States Army Home Page at <http://www.army.mil/article/67175/> (accessed February 14, 2014).

¹⁶³ Bilynsky, "*Medical Readiness Status*" January 2, 2014.

¹⁶⁴ East, *A Historical Review and Analysis*, 50.

¹⁶⁵ From 1976 to 1997, the number of high school students that stated they would probably or definitely serve in the military was less than 10%; David R. Segal et al., "Propensity to Service in the U.S. Military: Temporal Trends and Subgroup Differences," *Armed Forces and Society* 25, no. 3 (Spring 1999): 413; Christenson, *Too Fat to Fight*, 3.

¹⁶⁶ AMSARA, *Attrition and Morbidity*, 64.

¹⁶⁷ AMSARA, *Attrition and Morbidity*, 64, 80; AMSARA, *Tri-Service Disability Evaluation*, 18, 20.

¹⁶⁸ Tyler Hlavac, "Marine Recruiters Utilize Delayed Entry Program to Reduce Attrition," November 1, 2013, linked from 4th Marine corps District: Marine Corps Recruiting Command, <http://www.mcrc.marines.mil/4thmcd/News/NewsArticleDisplay/tabid/16019/Article/153712/marine-recruiters-utilize-delayed-entry-program-to-reduce-attrition.aspx>. (accessed February 14, 2014).

¹⁶⁹ Ibid.

¹⁷⁰ William J. Kraemer et al., "American College of Sports Medicine Position Stand. Progression Models for Healthy Adults" *Medicine and Science of Sports and Exercise* 34, no. 2 (2002): 364; Bengt Saltin et al., "Fiber Types and Metabolic Potentials of Skeletal Muscles in Sedentary Man and Endurance Runners," *Annals of the New York Academy of Sciences* 301, no. 1 (1977): 3.

¹⁷¹ Molloy, "Physical Training Injuries," 555.

¹⁷² Dennis S. O'Leary, "*Decision Brief: Obesity and Overweight in the Military*," Washington, DC, Defense Health Board, August 19, 2013.

¹⁷³ Tom Rath. *Eat Move Sleep: How Small Choices Lead to Big Changes* (Missionday, 2013), 3; Lars Wilhelmsen et al., "Factors Associated with Reaching 90 Years of Age: A study of Men Born in 1913 in Gothenburg, Sweden," *Journal of Internal Medicine* 269, no. 4 (April 2011): 441; Heart and Stroke Foundation of Canada, "Simple Lifestyle Changes Can Add a Decade or More Healthy Years to the Average Lifespan, Canadian Study Shows." *Science Daily* (October 2011); <http://www.sciencedaily.com/releases/2011/10/111021074730.htm> (accessed February 15, 2014).

¹⁷⁴ Dena M. Bravata et al., "Using Pedometers to Increase Physical Activity and Improve Health: A Systematic Review," *Journal of American Medical Association* 298, no. 19 (2007):

2296; Theresa M Marteau, Gareth J. Hollands, and Paul C. Fletcher, "Changing Human Behavior to Prevent Disease: The Importance of Targeting Automatic Processes," *Science* 337, no. 6101: (2012): 1492; Joanne M. Spahn et al., "State of the Evidence Regarding Behavior Change Theories and Strategies in Nutrition Counseling to Facilitate Health and Food Behavior Change," *Journal of American Dietetic Association* 110, no. 6 (2010): 879.

¹⁷⁵ Bas Verplanken and Wendy Wood, "Interventions to Break and Create Consumer Habits," *Journal of Public Policy and Marketing* 25, no. 1 (2006): 90; Wendy Wood, Jeffrey M. Quinn, and Deborah A. Kashy, "Habits in Everyday Life: Thought, Emotion, and Action," *Journal of Personality and Social Psychology* 83, no. 6 (2002): 1281.

¹⁷⁶ Marteau, "Changing Human Behavior," 1492.

¹⁷⁷ Wendy Wood, Leona Tam, and Mellissa G. Witt, "Changing Circumstances, Disrupting Habits," *Journal of Personality and Social Psychology* 88, no. 6 (2005): 918.

¹⁷⁸ David T. Neal, Wendy Wood, and Aimee Drolet, "How Do People Adhere to Goals When Willpower is Low? The Profits (and Pitfalls) of Strong Habits," *Journal of Personality and Social Psychology* 104, no. 6 (2013): 959.

¹⁷⁹ David T. Neal et al., "The Pull of the Past: When Do Habits Persist Despite Conflict with Motives?," *Personality and Social Psychology Bulletin* 37, no. 11 (2011): 1428; Wendy Woo and David Neal, "The Habitual Consumer," *Journal of Consumer Psychology* 19, no. 4 (2009): 579; Wendy Wood and David T. Neal, "A New Look at Habits and the Habit-Goal Interface," *Psychology Review* 114, no. 4 (2007): 843.

¹⁸⁰ Bravata, "Using Pedometers to Increase," 2296; Jeremy D. Akers et al., "Daily Self-Monitoring of Body Weight, Step Count, Fruit/Vegetable Intake, and Water Consumption: A Feasible and Effective Long-Term Weight Loss Maintenance Approach," *Journal of the Academy of Nutrition and Dietetics* 112, no. 5 (2012):685; Lora E. Burke et al., "The Effect of Electronic Self-Monitoring on Weight Loss and Dietary Intake: A Randomized Behavioral Weight Loss Trial," *Obesity* 19, no. 2 (2011): 338; Lora E. Burke, Jing Wang, and Mary A. Sevick, "Self-Monitoring in Weight Loss: A Systematic Review of the Literature," *Journal of the American Dietetic Association* 111, no. 1 (2011): 92; Alireza S. Shirazi et al., "Already Up? Using Mobile Phones to Track and Share Sleep Behavior," *International Journal of Human-Computer Studies* 71, no. 3 (2013): 878.

¹⁸¹ Shirazi, "Already Up?," 878; Daniel J. Prestwich et al., "Tracking Sleep Times to Reduce Tiredness and Improve Sleep in College Students," *California Journal of Health Promotion* 5, no. 2 (2007): 148.

¹⁸² Bravata, "Using Pedometers to Increase," 2296.

¹⁸³ Burke, "Self-Monitoring in Weight Loss,"92; John C. Guare et al., "Analysis of Change in Eating Behavior and Weight Loss Type II Diabetic Patients. Which Behaviors to Change," *Diabetes Care* 12, no. 7 (1989): 500; Rena R. Wing and James O. Hill, "Successful Weight Loss Maintenance," *Annual Review of Nutrition* 21, no. 1 (2001): 323; Rena R. Wing et al., "Improving Weight Loss Outcomes of Community Interventions by Incorporating Behavioral Strategies," *American Journal of Public Health* 100, no. 12 (2010): 2513.

¹⁸⁴ Damon Centola, "The Spread of Behavior in an Online Social Network Experiment," *Science* 329, no. 5996 (2010): 1194.

¹⁸⁵ Rob McIvaine, "Squad Needs 'Overmatch' Capability," October 23, 2011, linked from the United States Army Home Page at <http://www.army.mil/article/67175/> (accessed February 14, 2014).

¹⁸⁶ The United States Army Stand-To!: "Master Fitness Trainer Course;" The United States Army Stand-To!: "Comprehensive Soldier Fitness Master Resilience Trainers," July 1, 2009, 2013, <http://www.army.mil/standto/archive/2009/07/01/> (accessed March 6, 2014).

¹⁸⁷ Kotter, *Leading Change*, 21.

¹⁸⁸ John Steele, *2010 Center for Army Leadership Annual Survey of Army Leadership (Casal): Volume 1, Executive Summary* (Fort Leavenworth, KS: Leadership Research, Assessment and Doctrine Division, May 2011), 7.

¹⁸⁹ Sune Rubak et al., "Motivational Interviewing: A Systematic Review and Meta-Analysis," *British Journal of General Practice* 55, no. 513 (2005): 305.

¹⁹⁰ East, *A Historical Review and Analysis*, 79.

¹⁹¹ Comprehensive Soldier and Family Fitness, "Launches New Social Media;" Centola, "Spread of Behavior," 1194.

¹⁹² Canadian Forces, "Discover DFit.ca," http://www.cfmws.com/en/AboutUs/PSP/DFIT/Fitness/Pages/DFit_ca-.aspx (accessed February 15, 2014).

¹⁹³ Tsouras, *Greenhill Dictionary Military Quotations*, 310.

¹⁹⁴ East, *A Historical Review and Analysis*, 83-4.

¹⁹⁵ *Ibid.*, 220.

¹⁹⁶ *Ibid.*, 67.

¹⁹⁷ *Ibid.*, 60.