Army Regulation 40–25
OPNAVINST 10110.1/MCO 10110.49
AFI 44–141

Medical Services

Nutrition and Menu Standards for Human Performance Optimization

Headquarters
Departments of the Army,
the Navy,
and the Air Force
Washington, DC
3 January 2017

UNCLASSIFIED

SUMMARY of CHANGE

AR 40–25/OPNAVINST 10110.1/MCO 10110.49/AFI 44–141
Nutrition and Menu Standards for Human Performance Optimization

This major revision, dated 3 January 2017—

- Renames the recommended nutrient standards, changing the term from "military recommended dietary allowances" to "military dietary reference intakes" (para 1–1).

- Updates information on energy expenditures under various environmental conditions, such as cold, hot, or high altitude environments, to include data from recent studies (para 2–3).

- Implements guidance from Department of Defense Directive 3235.02E and Department of Defense Instruction 6130.05 (throughout).

- Removes the nutrient density index and allows the Services to determine their own standards for meeting the requirements outlined in this document (throughout).

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***AFI 44–141**
Effective 3 February 2017

Nutrition and Menu Standards for Human Performance Optimization

By Order of the Secretaries of the Army, Navy, and Air Force, and the Commandant of the Marine Corps:

MARK A. MILLEY
General, United States Army
Chief of Staff

C. FORREST FAISON III
Surgeon General of the Navy

M. G. Dana
Deputy Commandant for Installations and Logistics

Official:

GERALD B. O'KEEFE
Administrative Assistant to the Secretary of the Army

MARK A. EDIGER
Lieutenant General, USAF, MC, CFS
Surgeon General

History. This publication is a major revision.

Summary. This regulation defines the nutritional responsibilities of the Surgeons General of the Army, the Navy, and the Air Force. It also updates nutrient standards, information, and education.

Applicability. This regulation applies to the Active Army, the Army National Guard/Army National Guard of the United States, and the U.S. Army Reserve, unless otherwise stated. It also applies to the following: uniformed Departments of the Navy, Air Force (including the Active and Reserve Components of each Service, and the Air National Guard), and Marine Corps; nonmilitary persons under military jurisdiction; selected Federal employees; selected employees of Department of Defense contractors; and Family members and other healthcare beneficiaries eligible for care within the military health care system. The nutrition and menu standards apply to the Services' hospital food service programs, the Services' food service programs, and the Department of Defense Combat Feeding Program. This regulation applies to the Services' medical, personnel, training, and logistics communities.

Proponent and exception authority. The proponent of this regulation is The Surgeon General. The proponent has the authority to approve exceptions or waivers to this regulation that are consistent with controlling law and regulations. The proponent may delegate this approval authority, in writing, to a division chief within the proponent agency or its direct reporting unit or field operating agency, in the grade of colonel or the civilian equivalent. Activities may request a waiver to this regulation by providing justification that includes a full analysis of the expected benefits and must include formal review by the activity's senior legal officer. All waiver requests will be endorsed by the commander or senior leader of the requesting activity and forwarded through their higher headquarters to the policy proponent. Refer to AR 25–30 for specific guidance.

Army internal control process. This regulation contains internal controls and identifies key internal controls that must be evaluated (see appendix C). Note: Air Force compliance items are identified by a Tier waiver authority number (T–0), which designates the proponent of this regulation as approval authority for waiver requests.

Supplementation. Supplementation of this regulation and establishment of command and local forms are prohibited without prior approval from the Department of the Army Surgeon General (DASG–HSZ), 7700 Arlington Blvd., Falls Church, VA 22041–5142; Department of the Navy, Bureau of Medicine and Surgery, 7700 Arlington Blvd., Falls Church, VA 22042–5120 or Air Force Surgeon General, HQ USAF/AFMSA, 7700 Arlington Blvd, Falls Church, VA, 22042–5158.

Suggested improvements. Army users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to HQDA (DASG–HSZ), 7700 Arlington Blvd., Falls Church, VA 22041–5142. Navy users may send comments and recommendations through normal channels to the Bureau of Medicine and Surgery, Attn: Navy Surgeon General, Falls Church, VA 22042–5120. Air Force users may send comments and recommendations to the Air Force Surgeon General, HQ USAF/AFMSA, 7700 Arlington Blvd., Falls Church, VA, 22042–5158. Marine Corps users may send comments and recommendations through normal channels to HQMC, MCICOM G–4, Attn: Warfighter and Performance Dietitian, Naval Support Facility-Arlington, 701 S. Courthouse Road, Bldg. 12, Rm. 2J155, Arlington, VA 22204–2469.

*This regulation supersedes AR 40–25/BUMEDINST 10110.6/AFR 160–95/AFI 44–141, dated 15 June 2001.

Committee continuance approval. AR 15–1 requires the proponent to justify establishing and/or continuing committee(s), coordinate draft publications, and coordinate changes in committee status with the U.S. Army Resources and Programs Agency, Department of the Army Committee Management Office (AARP–ZA), 9301 Chapek Road, Building 1458, Fort Belvoir, VA 22060–5527. Further, if it is determined that an established "group" identified within this regulation, later takes on the characteristics of a committee, as found in the AR 15–1, then the proponent will follow all AR 15–1 requirements for establishing and continuing the group as a committee.

Distribution. Army: This publication is available in electronic media only and is intended for command levels A, B, C, and D for Active Army, Army National Guard of the United States (ARNGUS), and U.S. Army Reserve (USAR). Navy: Ships and Stations having Medical Department Personnel. Navy documents are available at: http://doni.documentservices.dla.mil/default.aspx. The U.S. Marine Corps instructions and directives are available at: http://www.marines.mil/news/publications/electronic-library/. Air Force: Active Air Force, the Air National Guard, and Air Force Reserve. Instructions and directives are available at: http://www.e-publishing.af.mil. Records management (Air Force). Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33–363, Management of Records, and disposed of in accordance with Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS).

Contents (Listed by paragraph and page number)

Chapter 1
Introduction

1–1. Purpose

This regulation establishes nutritional standards, termed "military dietary reference intakes" (MDRIs) for military feeding and establishes nutritional standards for operational rations (NSORs) and nutritional standards for restricted rations (NSRRs). This regulation identifies the effects of environmental factors on energy and nutrient requirements and outlines nutrition educational policy. It implements Department of Defense (DOD) menu standards that are the minimum guidelines required for use by military food service programs during menu planning, food procurement, food preparation, and meal service. It describes the responsibilities of the Services' surgeons general and the Services' food service programs. This regulation supports human performance optimization (HPO) (see section II of the glossary for the definition). Nutrition is a key component of HPO. This regulation establishes requirements for all food service operations whether provided by Governmental sources or through contractor support.

1–2. References

See appendix A.

1–3. Explanation of abbreviations and terms

See the glossary.

1–4. Responsibilities

a. As the executive manager, Department of the Army (DA), The Surgeon General (TSG) exercises DOD responsibility for nutrition standards and education and will—

(1) Establish nutrition standards (MDRIs) for meals served to military personnel subsisting under normal operating conditions, training conditions, and while under simulated or actual combat conditions (app B).

(2) Collaborate with joint military food service forums to develop menu standards for meals served to military personnel subsisting under normal operating conditions, training conditions, and while under simulated combat conditions.

(3) Establish NSORs and NSRRs (app B).

(4) Revise MDRIs, NSORs, and NSRRs as additional scientific information on nutrient needs become available and as the Food and Nutrition Board (FNB) or other nationally recognized nutrition policy agencies adopt new recommendations. At a minimum, this regulation will be reviewed every 5 years to ensure alignment of military and national nutrition standards. In the interim period, between revisions to this regulation, should emerging science and technology warrant immediate revision to MDRIs, NSORs, NSRRs, and HPO products, the DOD Nutrition Committee (DOD Instruction (DODI) 6130.05) will make recommendations to the DA TSG to update this regulation.

(5) Evaluate and approve current and proposed operational rations and recommend adjustments as well as other actions to ensure that the nutrient composition of the rations offered for consumption meet the nutritional requirements of personnel in all operational environments.

(6) Establish basic nutrition education standards for initial military training programs across the Services.

(7) Collaborate with the Services in the development of their nutrition education programs to include ration use and fueling for HPO.

(8) Maintain, through the U.S. Army Medical Research and Materiel Command, a military nutrition research capability to support further development and evaluation of nutritional requirements for operational conditions. This will include operations at altitude and under extreme climatic conditions and evaluate programs implemented to optimize intake of foods that enable Warfighters to meet those nutrient requirements.

(9) Conduct periodic assessments of military personnel on nutrient and fluid consumption patterns (see the United States Army Research Institute of Environmental Medicine (USARIEM) Web site at http://www.usariem.army.mil for current research findings).

b. The Surgeons General of the Army, Navy, and Air Force will—

(1) Review requests and make appropriate recommendations for deviations from established nutrition and menu standards.

(2) Develop and implement programs in accordance with the current U.S. Dietary Guidelines for Americans, and in support of HPO, that will—

(a) Influence food choices to ensure mission is met without sacrificing morale.

(b) Educate commanders, Servicemembers and Families, and food service personnel about requirements and strategies to ensure eating habits will promote HPO.

(c) Discourage the use of scientifically unproven nutritional products, ergogenic (performance enhancing) aids, fad diets, and/or supplements for which safety and efficacy have not been determined.

(d) Meet and promulgate scientifically based weight control and physical fitness principles.

(3) Provide qualified representatives to—

(a) Advise the Services' health promotion, food service, weight control, and physical fitness program proponents on the nutritional components of these programs to optimize human performance.

(b) Advise commanders, enlisted leaders, and local food service organizations on the nutritional components of the installation and/or shipboard health promotion, food service, weight control, and physical fitness programs to optimize human performance.

(c) Advise joint forums that focus on issues affecting nutrition and menu standards; nutrition education; and Services' health promotion, food service, weight control, and physical fitness programs to optimize human performance.

(4) Provide nutrition information and education to healthcare providers and other qualified healthcare personnel who discuss nutrition principles with patients.

(5) Establish and implement policies and procedures ensuring hospital menus and recommendations meet nutrition and menu standards.

(6) Ensure healthy foods are incorporated into menu planning, meal preparation, and serving strategies in hospital menus.

(7) Ensure contract statements of work for food service operations clearly describe the contractor's requirement to comply with this regulation and include food service employee training on basic nutrition concepts to optimize human performance.

(8) Ensure food service personnel are provided the training necessary for menu planning, product or ingredient evaluation, and food preparation that maximizes the nutritional value of foods.

c. The Deputy Chief of Staff, G–4, U.S. Army; The Commander, Naval Supply Systems Command, U.S. Navy; The Commander, Air Force Services Agency; The Deputy Chief of Staff for Installations and Logistics, U.S. Marine Corps will—

(1) Establish and implement policies to ensure menus meet nutrition standards and military food service programs comply with this regulation.

(2) Ensure healthy foods are incorporated into menu planning, meal preparation, and serving strategies.

(3) Ensure healthy foods are appealing and convenient.

(4) Facilitate access to healthy foods at reasonable prices whenever possible.

(5) Provide food service personnel with training necessary for menu planning and food preparation that maximizes the nutritional value and flavor of foods.

(6) Ensure curriculums for military career fields specializing in food service and/or nutrition incorporate principles of healthful menu planning, selection of healthy ingredients, healthy cooking techniques that enhance flavor, and assessment of menus for nutritional adequacy.

(7) Ensure that contract statements of work for food service operations clearly describe the contractor's requirement to comply with applicable nutrition and menu standards including food service employee training on basic nutrition concepts that optimize human performance. Provide qualified representatives to advise joint forums that focus on issues affecting nutritional quality of the military feeding programs, nutrition policy, nutrition standards, menu standards, nutrition education, and the promotion of nutrition for HPO.

Chapter 2
Nutrition and Menu Standards

2–1. Nutrition standards for military feeding

a. The current MDRIs are adapted from—

(1) The Dietary Guidelines for Americans (2010).

(2) FNB's Dietary Reference Intakes (DRIs) for—

(a) Calcium and Vitamin D (2011);

(b) Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride (1997);

(c) Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline (2000);

(d) Vitamin C, Vitamin E, Selenium, and Carotenoids,(2000);

(e) Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc (2001); and,

(f) Water, Potassium, Sodium, Chloride, and Sulfate (2005).

b. MDRIs are identical to recommended nutrient intakes cited in the above references except when known differences in the military population requires adjustment of a particular nutrient. Appendix B lists MDRIs which reflect the current DRIs. TSG, DA will update this regulation with each DRI update release or as recommended by the DOD Nutrition Committee (DOD Instruction 6130.05). A technical report by the USARIEM, in collaboration with the Navy and Air Force, will detail the basis for MDRIs.

c. MDRIs are intended for use by personnel involved in menu development, menu evaluation, nutrition education, nutrition research, and food research and development. When MDRIs are met through diets comprised of a variety of foods from diverse food groups, such diets will likely be adequate in all other nutrients for which neither DRIs nor MDRIs are currently established. MDRIs are quantitative estimates of nutrient intakes to be used for planning and assessing diets for the healthy military population.

d. MDRIs do not reflect the nutritional needs of pregnant or lactating military women or individuals requiring medical nutrition therapy for conditions such as illness, injury, infection, chronic disease, and trauma. These individuals require a nutritional needs assessment by qualified medical professionals.

e. Certain conditions impose impediments to feeding that are not covered in this regulation, for example, situations requiring tube feeding for sustenance such as Servicemembers performing high altitude long-range surveillance air flight missions and Servicemembers wearing chemical and biological protective clothing for prolonged periods of time. These conditions require consultation with the surgeon general of the appropriate Service.

f. Nearly all nutrients have an established recommended dietary allowance or adequate intake. In addition, nearly all nutrients have a tolerable upper limit (UL). Exceptions for military populations will be approved by TSG, DA acting as executive manager.

g. DOD installations and hospital dining facilities will serve as models to help Servicemembers, Family members, and DOD employees meet recommended nutritional guidelines. Menu design will incorporate principles of the current Dietary Guidelines for Americans (U.S. Department of Agriculture (USDA) and Health and Human Services), the ChooseMyPlate.gov (U.S. Department of Agriculture) and DOD menu standards (para 2–6). MDRIs will be met, when averaged, over a 5- to 10-day period. MDRIs will be compared with the calculated nutrient content of edible portions of food as offered for consumption. The most recent release of the United States Department of Agriculture Nutrient Database for Standard Reference will be used as the benchmark for nutrient composition.

h. The updated energy allowances shown in appendix B reflect the FNB's DRIs for energy, carbohydrates, fiber, fat, fatty acids, protein, amino acids, and specifically estimated energy requirements (EERs) for men and women 19 to 30 years of age. Protein recommendations also account for an increased protein requirement for periods of increased physical activity (2009) and negative energy balance based on current military research findings (2013). This EER is for individuals at various activity levels equitable to garrison and field military situations. EER levels were calculated by cited physical activity levels (PALs) and equations for men and women 19 to 30 years of age. All EER levels were calculated using the midpoint PAL cited in the DRI, except the "exceptionally-heavy activity level" in which the highest PAL within the range was used. Energy allowances are designed to allow active duty Service-members to maintain body weight under varying levels of physical activity in a temperate environment. MDRIs are subject to adjustments as outlined in paragraph 2–3.

2–2. Nutritional standards for operational and restricted rations

a. The NSORs and NSRRs are intended for use by the ration developers in planning and procurement of individual and group field rations for the healthy Warfighter.

(1) NSORs are considered nutritionally complete values for rations intended to provide sole-source sustenance to the Warfighter during long-term consumption periods lasting up to 21 consecutive days. For example, the Meal, Ready-to-Eat (MRE) may be consumed as the sole ration for up to 21 days. After 21 days, other appropriate rations (for example, the Unitized Group Ration-Heat and Serve (UGR–H&S) and Unitized Group Ration-A (UGR–A)) will be included in the daily mix of rations. This policy is based on extensive biochemical evaluations of Soldiers consuming MREs for 30 days during field training. No degradation of performance or nutritional deficit was found before 21 days. When the MRE is the sole ration, units will provide supplements (for example, milk) and enhancements (for example, bread and fresh fruit) whenever feasible. Appendix B, table B–2 has been updated to reflect recommended NSOR values based on the MDRI values reviewed above. Operational rations include the MRE, the primary general purpose individual ration, as well as the family of group rations to include the UGR–A, Unitized Group Ration-Marine (UGR–M), Unitized Group Ration-Express (UGR–E), and UGR–H&S. Operational ration menus will be designed so the menus, when averaged, meet the NSOR. The calculated or assayed nutrient content of edible portions of food as offered for consumption will be compared to the NSOR. Total calories from fat should not exceed 30 percent of calories for these rations. The Modular Operational Ration Enhancement (MORE) augments daily operational rations with additional components tailored to

particular environments. There are two types of MORE packs available, a high altitude/cold weather pack and a hot weather pack. Each pack provides approximately 1100 additional calories.

(2) The NSOR does not apply to restricted rations. Restricted rations are nutritionally incomplete rations used in certain operational scenarios, such as long-range patrol and reconnaissance, when Servicemembers are exposed to extreme environments or required to subsist for short periods (up to 10 days) carrying minimal weight. Standard issue of ration is specific to ration platform used and mission profile requirements. Policy exceptions may be needed due to situational conditions and military populations. The NSRR micronutrient content was calculated as half of the current NSOR. NSRR has been specifically defined as a minimum standard for use in planning restricted rations. Restricted ration menus will be designed so the menus, when averaged, meet the NSRR. Calculations considered adequate consumption over a 10-day period under the assumption that the Warfighters will attain the MDRI prior to, and following, missions under garrison feeding. Consultation by a physician or registered dietitian (RD) is required for specific nutrient supplementation during repeated missions (less than or equal to 10 days) with little time in garrison. Restricted rations include the Meal, Cold Weather (3 per day), intended for use in cold environments; Food Packet, Long-Range Patrol (1 per day), intended for initial assault, special operations, and long-range reconnaissance missions; and the First Strike Ration® (1 per day), designed for periods of intense or highly mobile training or conflict. NSRRs are identified in appendix B, table B–2. The MORE is also available to augment the daily use of restricted rations.

b. NSORs and NSRRs do not apply to survival rations. Survival rations include the Food Packet, Survival, General Purpose (1400 calories); the Food Packet, Survival, Abandon Ship (2400 calories); and the Food Packet, Survival, Aircraft/Life Raft ration (300 calories). These rations are intended for short-term survival and are not considered nutritionally complete.

c. Basic nutrient information on all rations is available in NATICK Pamphlet 30–25.

2–3. Energy requirements

a. *Military dietary reference intake calculation.* MDRIs for energy are calculated to represent the average needs of individuals with reference body heights and weights. These reference measures of height and weight represent the 50th percentile of military men and women.

b. *Body size.* Reference measures for weight and height of military members are 187 pounds (85 kilograms (kg)) and 69 inches (175 centimeters) for men and 152 pounds (69 kg) and 64 inches (163 centimeters) for women.

c. *Physical activity.* Physical activity affects energy needs. Servicemembers doing heavy work or involved in prolonged, vigorous physical training may have energy requirements that exceed 125 percent of the MDRI for energy (for example, 4000 to 5000 calories per day).

d. *Environmental factors.* MDRIs for energy are established for personnel working in temperate climates. Servicemembers training or fighting in more austere environments may need to adjust energy intake. Severe environmental conditions (for example, high altitude, extreme hot or cold weather) increase energy requirements due to a combination of heavy clothing and equipment, environmental terrain, and slight metabolic adjustments. Severe environmental conditions may also negatively affect appetite and thirst. In these circumstances, food and water intake may need to be encouraged to limit energy and fluid deficits.

(1) *Clothing and equipment.* When ambient temperatures warrant high levels of cold-weather clothing protection (for example, Extreme Cold Weather Clothing System, vapor barrier boot), energy requirements are increased due to the additional weight of excess layers of heavy clothing. In addition, weather can fluctuate widely adding to equipment needs (for example, skis, snowshoes, packs), while difficulty with re-supply may require carrying heavier loads. When the same quantity of work is performed under these conditions, average daily energy requirements may increase 25 percent.

(2) *Terrain.* Extreme environmental conditions are associated with terrain that may lack vegetation creating loose sand, gravel, volcanic ash, or snow and ice or present with excess vegetation such as in a jungle location all of which require an increase to energy demands. Associated maneuvers through extreme terrain may increase requirements by approximately 25 percent compared to similar maneuvers conducted on a solid grassy plot.

(3) *Metabolic adjustments.* Daily energy requirements consequent to the metabolic adjustments in extreme environmental conditions (for example, shivering in the cold) are negligible relative to the added energy requirements associated with increased clothing, load carried, and maneuvers through extreme terrain.

2–4. Nutrient requirements

a. *Carbohydrate.* MDRIs for carbohydrate (app B) are based on levels established in the DRIs and recommendations made in the Position Paper of the American Dietetic Association, Dietitians of Canada, and American College of Sports Medicine (Nutrition and Athletic Performance, 2009). During long periods of intense physical activity, these requirements range from 1.8 to 3.6 grams (g) of carbohydrate per pound of body weight (4 to 8 g carbohydrate per kg). In terms of the standard reference measures for military men and women, this equates to a carbohydrate range of 340 to 680 g per

day for men and 276 to 552 g per day for women. The MDRI for carbohydrate is easily met with carbohydrate intakes of 50 to 55 percent of the total calories within the acceptable macronutrient distribution range (AMDR), assuming adequate energy intake.

b. *Protein.* MDRIs for protein (app B) are based on levels established in the DRIs and on requirements during long periods of intense physical activity or periods of energy imbalance. They range from 0.8 to 1.6 g protein per kg (0.4 to 0.7 g protein per pound) body weight. In terms of the standard reference measures for the military, this equates to a protein range of 68 to 136 g per day for men and 55 to 110 g per day for women. The MDRI for protein is easily met with protein intakes of 10 to 35 percent of the total calories within the AMDR, assuming adequate energy intake.

c. *Fat.* Approximately 30 percent or less of the total calories should be consumed as fat. Fat intake should include consumption of the omega fatty acids, linoleic acid (17 g per day for men and 12 g per day for women) and alpha-linolenic acid (1.6 g per day for men and 1.1 g per day for women). Saturated fat, trans fatty acids, and dietary cholesterol should be as low as possible while consuming a nutritionally adequate diet (saturated fat less than 10 percent of calories). While these recommendations provide quantitative targets in agreement with the DRIs, they are applicable primarily to garrison personnel. Operational and restricted rations may require a higher fat content to meet the increased energy and shelf-stability requirements in fixed weight and volume.

d. *Fiber.* MDRIs for fiber equate with the current DRI, 34 g per day for men and 28 g per day for women. Recommendations may not be practical in ration development due to the required calorie density and weight limitations. Therefore, the MDRI fiber values for males and females were averaged for the NSOR value of 31 g per day.

e. *Iron.* MDRIs for iron reflect the DRI, 8 milligrams (mg) per day for men and 18 mg per day for women. Iron recommendations for NSOR account for an increased iron requirement for military females based on current military research findings (see app A reference McClung, 2009). The NSOR recommendation of 15 mg per day should provide enough iron to maintain physical and cognitive performance for military females without putting men at risk of iron overload. The iron recommendation for the NSRR is eight (8) mg per day. This level of iron should support iron balance and performance in most Service-members for periods of less than 10 days.

2–5. Water, sodium, and carbohydrate-electrolyte beverages

a. Individuals should avoid excessive dehydration to maintain optimum performance. Cool water (plain or flavored) is the beverage of choice for preventing dehydration, except for conditions outlined in paragraph 2–5*e*. Flavored waters may increase voluntary fluid consumption.

b. Fluid requirements increase as work intensity increases and more sweat is produced. During periods of light to moderate activity in a temperate climate (less than 30 degrees Celsius/86 degrees Fahrenheit), an average daily fluid intake range of 2 to 5 quarts of fluid is a reasonable goal. Recommended fluid intakes are based on energy expenditure. Based on the current MDRIs, the fluid intake ranges are 3 to 4.5 quarts per day for men and 2 to 3 quarts per day for women.

c. In cold and high altitude environments, increased work intensity energy expenditure, added clothing insulation, low ambient humidity, and the diuretic response that often accompanies hypobaric hypoxia will increase fluid needs modestly.

d. Water requirements increase more drastically in hot weather. In hot weather, sweat losses during physical activity can double ordinary fluid needs. In extreme circumstances, fluid needs can even triple. Personnel working while wearing nuclear, biological, chemical clothing also require more water, even if weather is temperate. Therefore, water planning and personnel hydration management must be considered carefully. Further details are outlined in Field Manual 21–10 and Technical Bulletin Medical 507.

e. Hard physical work in a hot environment increases the amount of sodium lost in sweat. The need for extra salt (a source of sodium) depends on the severity of sweat loss and the degree of acclimatization. When sodium replacement is required, it is preferred that it be obtained through food, beverages, and as added salt to foods rather than concentrated salt formulations (for example, salt tablets and/or pills). The use of carbohydrate-electrolyte beverages is justified under the following conditions:

(1) When troops maintain vigorous physical activity for more than three (3) hours.

(2) When troops have poor nutritional intake or sustain an energy deficit of 1,000 calories or more per day.

(3) When sweat losses are high and electrolytes are not adequately replaced by diet.

f. There are a variety of carbohydrate-electrolyte beverages and beverage mixes currently available. Table 2–1 outlines criteria for a carbohydrate-electrolyte beverage. Further details are outlined in Technical Bulletin Medical 507.

Table 2–1
Criteria for carbohydrate-electrolyte beverages

Ingredient	Amount per 8 ounces (as served)
Sodium	82 - 163 mg
Potassium	18 - 46 mg
Carbohydrate	5 - 10 percent (12–24 grams carbohydrate per 237ml)

2–6. Department of Defense menu standards and additional nutrition guidelines

The following wellness and HPO guidelines are given to supplement and clarify DOD menu standards contained in DOD 1338.10–M. Together these are the minimum practical guidelines that military food service programs must use during menu planning, food procurement, food preparation, and meal service to support HPO.

a. Appropriated fund food service operations will use a color-coded nutrition labeling program such as the Go for Green® Nutritional Labeling Program (T–0). The criteria for Go for Green® will be located on the Human Performance Resource Center Web site: http://hprc-online.org/nutrition/go-for-green. The Go for Green® criteria supports implementation of the combined standards. Go for Green® will provide additional implementation guidelines for appropriated fund food service managers on specific topics. Service-specific branch exceptions may be necessary for the Services when products are not available. An example is the Navy afloat exception; these exceptions are only authorized in extreme circumstances (when products are unavailable).

b. Appropriated fund food service operations will not offer dietary supplements such as energy drinks, shots, and/or gels (T–0). Appropriated fund food service operations will not offer dietary supplements or any products that have fortification or enrichment in excess of 100 percent of the daily value or contain more than 100 mg of caffeine per single serving. Products containing either a non-nutritive ingredient (that is, not an essential or conditionally essential nutrient other than a generally-regarded-as-safe ingredient), proprietary labels, or excessive amounts of caffeine must be evaluated by the DOD Dietary Supplement and Food and Nutrition Subcommittees prior to acquisition for a waiver. Note: Caffeine is recognized for its use to enhance cognitive and physical performance, especially during sleep deprivation, and such use is well established in the scientific literature. Caffeine products can be used to temporarily reduce sleepiness and maintain performance. The recommended dose of caffeine for operational utility is 100 to 200 mg (100 mg per 2 hours or 200 mg per 4 hours). Doses over 200 to 300 mg (over a 4-hour period) may produce initial symptoms of restlessness, anxiety, increased heart rate, and insomnia. Higher doses can lead to more severe adverse reactions to include increased blood pressure, heart palpitations, dizziness, irritability, nausea, nervousness, jitters, and in some cases, death from caffeine overdose. Certain operational ration components (including caffeinated gum, Mocha First Strike Bar, caffeinated mints and pudding) contain caffeine and are currently available through the ration procurement system. The caffeine content of operational ration components is 100 to 200 mg per serving and is designed to help Warfighters utilize caffeine to promote optimal cognitive and physical performance. Warfighters should stop ingestion of caffeine products at least 6 hours before sleep periods to ensure sleep is not adversely affected by caffeine intake.

c. In addition to water, appropriated fund food service operations will promote consumption of nutrient dense beverages that may positively impact bone and dental health (for example, calcium and vitamin-D-fortified lactose-free milk, juices, dairy, soy, rice, or almond milk) (T–0). Unsweetened versions of beverages will be offered as the primary option if selections are limited (T–0).

d. Leaders and food service personnel will encourage and promote the consumption of foods in accordance with Choose My Plate (http://www.choosemyplate.gov/food-groups/) (T–0). Choose My Plate illustrates the five food groups that are the building blocks for a healthy diet, using a familiar image-a place setting for a meal. Leaders should lead by example and encourage Warfighters to "think about what goes on the plate or in the cup or bowl" using the following goals:

(1) Strive to make half the plate fruits and vegetables. At a minimum consume two and a half (2.5) cups of vegetables per day and two (2) cups of fruit per day.

(2) Consume whole grains at least half the time.

(3) Consume a good source of calcium and vitamin D at least three times per day. Good sources include one (1) cup of milk, yogurt, or fortified soy/almond/rice milk.

(4) Vary the protein food sources daily (lean meat, poultry, or fish; egg; tablespoon peanut butter; nuts or seeds; beans or peas).

e. Appropriated fund food service operations will ensure that carbohydrate-electrolyte beverages (beverages containing added carbohydrate, sodium, and potassium) are provided under conditions defined in paragraph 2–5*e* and meet requirements found in table 2–1 (T–0).

2–7. Energy balance to support human performance optimization

a. Nutrient timing supports HPO. The timing of nutrient intake will affect the individual's physical, behavioral, and cognitive well-being. Nutrient timing, therefore, is critical to maintain adequate energy before, during, and after missions to improve performance, sleep, and reduce recovery time. Food service establishments should consider the training schedule and missions of the populations they service to enable nutrient timing.

b. Carbohydrate-electrolyte beverages or carbohydrate-containing snack foods can sustain Warfighter performance during prolonged strenuous work in austere environments under conditions defined in paragraph 2–5*e*. One approach would be to alternate consumption of carbohydrate-electrolyte beverages and water during training or physical activity.

c. Reduced calorie menus support HPO.

(1) In support of HPO, each garrison military dining facility will offer reduced calorie menus (1,500 to 1,600 calories a day), reflecting the guidelines of ChooseMyPlate.gov to help maintain the weight of the Force (T–0). Total fat should not exceed 30 percent of the energy value. Each meal should contain approximately 500 calories. Implementation procedures and exceptions to policy for reduced calorie menus will be prescribed by each military Service.

(2) In support of HPO, garrison military dining facilities serving populations with high energy expenditures, such as initial entry trainees, will offer a reduced calorie menu containing 600 to 700 calories per meal (1,800 to 2,100 calories a day), reflecting the guidelines of ChooseMyPlate.gov (T–0). Physically active individuals who are in energy deficit due to mission constraints or for the purposes of weight loss will benefit (muscle mass retention) from consuming protein approximately 1.6 g/kg day through meals and snacks.

Chapter 3
Nutrition Education for Human Performance Optimization

3–1. Policy

a. In order to maintain health and optimize human performance, all Services will provide Servicemembers with a fundamental knowledge of nutrition during initial military training. The curricula will include basic nutrition principles that relate to optimal physical and cognitive performance across one's life span. Additionally, all Services will incorporate nutrition education throughout each Servicemember's career life. To provide a consistent message, nutrition education will incorporate the ChooseMyPlate.gov Web site and the current Dietary Guidelines for Americans from the USDA and U.S. Department of Health and Human Services. Trainers will use effective educational techniques, current nutrition knowledge, scientific research findings, and other appropriate information such as Healthy People 2020 (U.S. Department of Health and Human Services). Military food establishments will provide a variety of healthy food and beverage choices for all members and use color-coded nutritional labeling such as Go for Green® to reinforce the nutrition message and to encourage healthy eating habits.

b. In support of military weight control programs and healthy eating initiatives, the Services will develop and refine programs that promote and support healthy and adequate dietary intake. Programs include—

(1) Weight management. The Services will provide comprehensive weight management programs to train the Service-member for effective weight management. At a minimum, these programs will include the following components: assessing readiness for change, lifestyle changes (individualized), nutrition counseling, self-monitoring, behavioral training, physical training, and relapse prevention.

(2) Initial military training performance fueling programs (T–0).

(3) Diner nutrition educational programs (T–0).

(4) Vending machine educational programs (T–0).

c. In support of nutrition education throughout the Servicemember's career life cycle, the Services will provide education to include, but not limited to—

(1) Nutrient timing to maintain adequate energy before, during, and after missions and/or training exercises.

(2) Ration education to include nutrition composition and intended uses of specific enhancement packs and rations and/or meals in a field environment.

3–2. Nutrition education professionals

a. RDs, registered dietitian nutritionists (RDNs), and other qualified personnel will develop-using a variety of applicable modalities-nutrition education curricula for military treatment facilities, the DOD work site, food service personnel, and military food service occupational specialty curricula. RDs and RDNs are trained and proficient in practical application of nutrition science to individual lifestyles, food choices, strategies of nutrition education, and medical nutrition therapy.

b. Other personnel (for example, health educators, healthcare providers, food service technicians, and military educators), when given appropriate training, may provide basic nutrition education. This will not include nutrition counseling, which is a component of medical nutrition therapy.

Appendix A

References

Section I

Required Publications

This section contains no entries.

Section II

Related Publications

Army publications are available at http://www.apd.army.mil/ unless noted otherwise. DOD issuances are available at http://www.dtic.mil/whs/directives/index.html. Air Force publications available at http://www.e-publishing.af.mil/.

AFI 34–239
Food Service Management Program

AFI 36–2905
Fitness Program

AFI 40–101
Health Promotion

AFI 40–104
Health Promotion Nutrition

AFMAN 33–363
Management of Records

AFMAN 34–240
Food Service Program Management

AFMAN 44–144
Nutritional Medicine

American Dietetic Association; Dietitians of Canada; American College of Sports Medicine, Rodriguez NR, Di Marco NM, Langley S.
American College of Sports Medicine position stand. Nutrition and athletic performance. Med Sci Sports Exerc. 2009 Mar;41(3):709–31 (Available at http://www.ncbi.nlm.nih.gov/pubmed/19225360.)

AR 11–2
Managers' Internal Control Program

AR 15–1
Boards, Commissions, and Committees - Committee Management

AR 25–30
The Army Publishing Program

AR 30–22
Army Food Program

AR 40–3
Medical, Dental, and Veterinary Care

AR 600–9
The Army Body Composition Program

AR 600–63
Army Health Promotion

Army Technical Bulletin Medical 507 / Air Force Pamphlet 48–152(I)
Heat Stress Control and Heat Casualty Management (Available at http://armypubs.army.mil/med/dr_pubs/dr_a/pdf/tbmed507.pdf.)

ATTP 4–41 (Army)
Army Field Feeding and Class I Operations (Available at http://armypubs.army.mil/doctrine/dr_pubs/dr_a/pdf/attp4_41.pdf.)

BUMEDINST 6110.13A
Navy Medical Department Health Promotion Program (Available at http://www.med.navy.mil/directives/externaldirectives/6110.13a.pdf.)

BUMEDINST 10110.5
Medical Nutrition Management Program. (Available at http://www.med.navy.mil/directives/externaldirectives/10110.5.pdf.)

Choose MyPlate.gov.
U.S. Department of Agriculture, Washington, DC (Available at http://www.choosemyplate.gov/.)

Dietary Guidelines for Americans, 2010
U.S. Department of Agriculture and U.S. Department of Health and Human Services. Washington, DC, U.S. Government Printing Office, 2010 (Available at http://health.gov/dietaryguidelines/2010/.)

Dietary Guidelines for Americans, 2015–2020
U.S. Department of Agriculture and U.S. Department of Health and Human Services, Washington, DC, U.S. Government Printing Office, 2015 (Available at http://health.gov/dietaryguidelines/2015/)

Dietary Reference Intakes for Calcium and Vitamin D
National Research Council. Dietary Reference Intakes for Calcium and Vitamin D. Washington, DC: The National Academies Press, 2011. (Available at http://www.nap.edu/catalog/13050/dietary-reference-intakes-for-calcium-and-vitamin-d.)

Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride
Food and Nutrition Board, Institute of Medicine. Washington, DC, National Academy Press, 1997 (Available at Superintendent of Documents, U.S. Government Printing Office, P.O. Box 371954, Washington, DC 20402 (202) 512–1800 or at http://www.iom.edu/reports.aspx.)

Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macronutrients)
National Research Council. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macronutrients). Washington, DC: The National Academies Press, 2005 (Available at http://www.nap.edu/catalog.php?record_id=10490.)

Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline
Food and Nutrition Board, Institute of Medicine, Washington, DC, National Academy Press, 2000. (Available at Superintendent of Documents, U.S. Government Printing Office, P.O. Box 371954, Washington, DC 20402 (202) 512–1800 or at http://www.iom.edu/reports.aspx.)

Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc
National Research Council. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Washington, DC: The National Academies Press, 2001. (Available at http://www.nap.edu/catalog.php?record_id=10026.)

Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids
Food and Nutrition Board, Institute of Medicine, Washington, DC, National Academy Press, 2000. (Available at Superintendent of Documents, U.S. Government Printing Office, P.O. Box 371954, Washington, DC 20402 (202) 512–1800, or at http://www.iom.edu/reports.aspx.)

Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate
National Research Council. Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate. Washington, DC: The National Academies Press, 2005 (Available at http://www.nap.edu/catalog.php?record_id=10925.)

DOD 1338.10–M
DOD Food Service Program (DFSP)

DODD 3235.02E
DOD Combat Feeding Research and Engineering Program, DOD Combat Feeding Research and Engineering Board, and DOD Nutrition Committee

DODI 1010.10
Health Promotion and Disease Prevention

DODI 1338.10
Department of Defense Food Service Program (DFSP)

DODI 6130.05
DOD Nutrition Committee

Field Manual 21–10 (Army)
Field Hygiene and Sanitation (Available at http://armypubs.army.mil/doctrine/dr_pubs/dr_a/pdf/fm21_10.pdf.)

Healthy People 2020. Understanding and Improving Health
Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services. Washington, DC: U.S. Government Printing Office, 2000. (Stock Number 017–001–00543–6) (Internet address: www.health.gov/healthypeople/). (Available at Superintendent of Documents, U.S. Government Printing Office, P.O. Box 371954, Washington, DC 20402 (202) 512–1800 or at http://www.healthypeople.gov/2020/default.aspx.)

Improving America's Diet and Health: From Recommendations to Action
Food and Nutrition Board, Institute of Medicine. Washington, DC: National Academy Press, 1991. (Available at Superintendent of Documents, U.S. Government Printing Office, P.O. Box 371954, Washington, DC 20402 (202) 512–1800.)

McClung JP, Karl JP, Cable, SJ, Williams KW, Young, AJ, Lieberman, HR
Longitudinal decrements in iron status military training in female Soldiers. Br J Nutr 2009a:102:605–609. (Available at http://www.usariem.army.mil/index.cfm/publications/articles#pubs-2009.)

MCO 10110.14M, Chapter 20
Marine Corps Food Service and Subsistence Program (Available at http://www.marines.mil/news/publications/electronic-library/.)

NATICK PAM 30–25, 9th Edition (2012)
Operational Rations of the Department of Defense (Available at http://nsrdec.natick.army.mil/media/print/op_rations.pdf.)

NAVSUP P–486
Food Service Management General Messes (Available at https://nll2.ahf.nmci.navy.mil/default.cfm)

OPNAVINST 6100.2A
Health and Wellness Promotion Program (Available at http://doni.documentservices.dla.mil/)

OPNAVINST 6110.1J
Physical Readiness Program (Available at http://doni.documentservices.dla.mil/)

Pasiakos SM, Cao JJ, Margolis LM, Sauter ER, Whigham LD, McClung JP, Rood JC, Carbone JW, Combs GR, Jr, Young, AJ.
Effects of high-protein diets on fat-free mass and muscle protein synthesis following weight loss: a randomized controlled trial. FASEB J. 2013; 27(9): 3837–47 (Available at http://www.usariem.army.mil/index.cfm/publications/articles#pubs-2013.)

Recommended Dietary Allowances, 10th Edition
Food and Nutrition Board, Institute of Medicine. Washington, DC: National Academy Press, 1989 (available at Superintendent of Documents, U.S. Government Printing Office, P.O. Box 371954, Washington, D.C. 20402 (202) 512–1800).

USARIEM Technical Note TN–00/10
Military Dietary Recommended Intakes: Rationale for Tabled Values. (Available from Commander, U.S. Army Research Institute of Environmental Medicine, Attn: MCMR–UE–NBD, Natick, MA 01760–5007 or www.dtic.mil/cgi-bin/gettrdoc?ad=ada387084.)

USDA Nutrient Database for Standard Reference, U.S. Department of Agriculture
Available at http://www.ars.usda.gov

Section III

Prescribed Forms

This section contains no entries.

Section IV

Referenced Forms

Except where otherwise indicated below, DA Forms are available on the APD Web site (http://www.apd.army.mil).

DA Form 11–2
Internal Control Evaluation Certification Statement

DA Form 2028
Recommended Changes to Publications and Blank Forms

Appendix B

Military Diet and Nutritional Standards

B–1. Military diet

Table B–1 provides MDRIs per day.

Table B–1
Military dietary reference intakes[1] per day

Nutrient	Unit	Men	Women
Energy[2] General/routine[3]:	kcal/d	3400	2300
Light activity	kcal/d	3000	2100
Moderate activity	kcal/d	3400	2300
Heavy activity	kcal/d	3700	2700
Exceptionally-heavy activity	kcal/d	4700	3000
Protein[4]	g/d	102 (68–136)	83 (55–110)
Carbohydrate[5]	g/d	510 (340–680)	414 (276–552)
Fiber	g/d	34	28
Fat[6]	g/d	<113 (100–157)	<77 (70–100)
Linoleic acid	g/d	17	12
α-linolenic acid	g/d	1.6	1.1
Vitamin A[7]	µg RAE/d (IU/d)	900 (3000)	700 (2333)
Vitamin D[8]	µg/d	15	15
Vitamin E[9]	mg/d	15	15
Vitamin K	µg/d	120	90
Vitamin C	mg/d	90	75
Thiamin (B_1)	mg/d	1.2	1.1
Riboflavin (B_2)	mg/d	1.3	1.1
Niacin[10]	mg NE/d	16	14
Vitamin B_6	mg/d	1.3	1.3
Folate[11]	µg DFE/d	400	400
Vitamin B[12]	µg/d	2.4	2.4
Calcium[12]	mg/d	1000	1000
Phosphorus[13]	mg/d	700	700
Magnesium[14]	mg/d	420	320
Iron[15]	mg/d	8	18
Zinc	mg/d	11	8
Sodium[16]	mg/d	<2300	<2300
Iodine	µg/d	150	150
Selenium	µg/d	55	55
Fluoride[17]	mg/d	4	3
Potassium[18]	mg/d	4700	4700

Note.

[1] Values for energy, protein, and associated nutrients are expressed as average daily nutrient intakes based on moderate activity levels and reference body weights of 85 kg (187 pounds) for military men and 69 kg (152 pounds) for military women. Reference anthropometrics values characterize the averages of actual measurements attained from a 2007 pilot study of active and reserve duty Army Soldiers (Paquette, 2009). Data were weighted by sex to match 2007 Total Army Component by age and by racial and/or ethnic distributions as reported by Defense Manpower Data Center.

[2] Energy recommendations for various activity levels are estimates only and vary among individuals. The general values are for moderate levels of activity and are appropriate for most personnel in garrison. Values are rounded up to the nearest 50 kilocalories (kcal).

[3] Recommended protein intakes (0.8 to 1.6 g protein per kg body weight) for stated activity levels should be consistent with the AMDR (10 to 35 percent of total calories).

[4] The initial values in the table represent the midpoints of the ranges calculated using military reference body weights and protein intake recommendations of 0.8 to 1.6 g per kg body weight.

[5] See paragraph 2–4a.

[6] Total energy from fat should not exceed 30 percent of total kcal. The DRI range for total fat is 25 to 30 percent of total calories. The initial value in the table was calculated using the omega fatty acids linoleic and α-linolenic, and should be included in this 30 percent calculation.

[7] The unit of measure is microgram of retinol activity equivalent (µg RAE). 1 µg RAE = 1 µg retinol = 12 µg ß-carotene = 24 µg other provitamin A carotenoids. Vitamin A will also be expressed in international units (IUs), a standard unit for the nutrition labeling in the United States. 1 IU = 0.3 µg retinol = 0.6 µg ß-carotene = 1.2 µg provitamin A carotenoids.

[8] As calciferol. 1µg calciferol = 40 IUs vitamin D.

[9] The unit of measure is milligram α-tocopherol that includes RRR-α-tocopherol, the only form of α-tocopherol that is found in food and the 2R-stereoisomeric forms that are found in fortified foods and dietary supplements. This does not include the 2S-stereoisomeric forms that are also found in fortified foods and dietary supplements.

[10] The unit of measure is niacin equivalent (NE). 1 mg NE = 1 mg niacin or 60 mg dietary tryptophan.

[11] The unit of measure is micrograms of dietary folate equivalent (µg DFE). 1 µg DFE = 1 µg food folate = 0.6 µg of folate from fortified foods with meals or 0.5 µg folate from fortified foods on an empty stomach.

[12] The MDRI for calcium will meet the needs of most military personnel. However, personnel less than 19 years old have higher calcium needs not accounted for by the MDRI. A more appropriate dietary goal of personnel in this age group is 1300 mg per day.

[13] The MDRI for phosphorus will meet the needs of most military personnel. However, personnel less than 19 years old have higher phosphorus needs not accounted for by the MDRI. A more appropriate dietary goal of personnel in this age group is 1250 mg per day.

[14] The MDRI for magnesium will meet the needs of most military personnel. However, female personnel less than 19 years old have higher magnesium needs not accounted for by the MDRI. A more appropriate dietary goal of personnel in this age group is 360 mg per day.

[15] The MDRI for iron will meet the needs of most military personnel. However, male personnel less than 19 years old have higher iron needs not accounted for by the MDRI. A more appropriate dietary goal of personnel in this age group is 11 mg per day.

[16] Sodium recommendations are based on the DRI, which for sodium is an upper limit.

[17] The MDRI is based on a recommended daily intake of 0.05 mg/kg body weight.

[18] The minimal requirement for potassium is approximately 1600 to 2000 mg per day. The MDRI is based on a recommended daily intake of 40 mg/kg body weight.

B–2. Nutritional standards

Table B–2 provides NSORs and NSRRs.

Table B–2
Nutritional standards for operational rations, and nutrition standards for restricted rations[1]

Nutrient	Unit	Operational rations	Restricted rations
Energy	kcal	3600	1500
Protein[2]	g	102	68
Carbohydrate	g	510	210
Fat	g	[3]	[3]
Linoleic acid	g	17	8.5
α-linolenic acid	g	1.6	0.8
Fiber	g/d	32	16
Vitamin A[4]	µg RAE (IU)	900 (3000)	450 (1500)
Vitamin D[5]	g	5	2.5
Vitamin E[6]	mg	15	7.5
Vitamin K	µg	120	60
Vitamin C	mg	90	45
Thiamin (B_1)	mg	1.2	0.6
Riboflavin (B_2)	mg	1.3	0.7
Niacin[7]	mg NE	16	8
Vitamin B[6]	mg	1.3	0.7
Folate[8]	µg DFE	400	200
Vitamin B_{12}	µg	2.4	1.2
Calcium	mg	1000	500
Phosphorus	mg	700	350
Magnesium	mg	420	210
Iron	mg	15	8
Zinc	mg	11	5.5
Sodium[9]	mg	5000–7000	2500–3500
Iodine	µg	150	75
Selenium	µg	55	28
Fluoride	mg	4.0	2.0
Potassium	mg	4700	2350

Note.

[1] Values are minimum standards at the time of consumption, except for fat (which does not have an absolute standard value) and sodium (which presents minimum and maximum content levels). Nutritional standards for rations are based on the MDRIs established for healthy, active military personnel.

[2] When protein requirements are increased, particularly during energy deficit (2013) and for periods of intense physical training (2009), supplemental high-quality protein should be consumed in 25 to 30 g servings in order to achieve protein intakes at the upper end of the MDRI at 1.6 g/kg.

[3] Total energy from fat should not exceed 30 percent of total kcal. The omega fatty acids, linoleic and α-linolenic, should be included in this 30 percent calculation.

[4] The unit of measure is microgram retinol activity equivalents (µg RAE). 1 µg RAE = 1 µg retinol = 12 µg ß-carotene = 24 µg other provitamin A carotenoids. Vitamin A will also be expressed in IUs, a standard unit for the nutrition labeling in the United States. 1 IU = 0.3 µg retinol = 0.6 µg ß-carotene = 1.2 µg provitamin A carotenoids.

[5] As calciferol. 1µg calciferol = 40 IUs vitamin D.

[6] The unit of measure is milligram α-tocopherol that includes RRR-α-tocopherol, the only form of α-tocopherol that is found in food and the 2R-stereoisomeric forms that are found in fortified foods and dietary supplements. This does not include the 2S-stereoisomeric forms that are also found in fortified foods and dietary supplements.

[7] The unit of measure is NE. 1 mg NE = 1 mg niacin or 60 mg dietary tryptophan.

[8] The unit of measure is DFE. 1 µg DFE = 1 µg food folate, 0.5 µg synthetic folic acid taken on an empty stomach, or 0.6 µg synthetic folic acid taken with meals.

[9] These values do not include the salt packet. The sodium content of restricted rations may not be adequate for military personnel operating in hot environments, especially if they are not acclimatized.

Appendix C

Internal Control Evaluation

C–1. Function

The function covered by this evaluation is the management of nutrition and menu standards for human performance optimization.

C–2. Purpose

The purpose of this evaluation is to assist commanders and management control administrators in evaluating key management controls as required by AR 11–2. It is not intended to cover all controls.

C–3. Instructions

Answers must be based on the actual testing of key internal controls (for example, document analysis, direct observation, sampling, simulation, and auditing). Answers that indicate deficiencies must be explained and corrective action taken will be indicated in supporting documentation. These internal controls must be evaluated at least once every 3 years. Certification that this evaluation has been conducted must be accomplished on DA Form 11–2 (Internal Control Evaluation Certification Statement). Supplemental internal controls and test questions should be developed as appropriate to ensure management of nutrition and menu standards for human performance optimization in accordance with this regulation and other governing laws and directives.

C–4. Test questions

a. Are MDRIs established?

b. Are menu standards established for meals served to military personnel in appropriated funded facilities?

c. Are NSORs and NSRRs established?

d. Are basic nutrition education standards for initial military training programs established?

e. Is there a process through the U.S. Army Medical Research and Materiel Command to develop and evaluate nutritional requirements for operational conditions to maximize intake of foods that enable the Warfighter to meet the nutrient and fluid requirements?

f. Is this regulation readily available for reference?

g. Is a reduced calorie (500 or 700 calorie) menu offered in appropriated fund food service dining facilities?

h. Is the appropriated fund food service operation in compliance with the policy to not offer dietary supplements such as energy drinks, shots, and/or gels?

C–5. Supersession

This checklist is the initial internal control checklist for use in nutrition and menu standards for human performance optimization.

C–6. Comments

Help make this a better tool for evaluating internal controls. Submit comments to: Commander, USAMEDCOM (MCHO–CL–R), 2748 Worth Road, Joint Base San Antonio Fort Sam Houston, TX 78234–6010.

Glossary

Section I

Abbreviations

AMDR
acceptable macronutrient distribution range

DA
Department of the Army

DFE
dietary folate equivalent

DOD
Department of Defense

DODD
Department of Defense directive

DODI
Department of Defense instruction

DRI
dietary reference intake

EER
estimated energy requirement

FNB
Food and Nutrition Board

g
gram

HPO
human performance optimization

IU
international unit

kcal
kilocalories

kg
kilogram

MDRI
military dietary reference intake

mg
milligrams

MORE
Modular Operational Ration Enhancement

MRE
meal, ready-to-eat

NE
niacin equivalent

NSOR
nutritional standards for operational rations

NSRR
nutritional standards for restricted rations

PAL
physical activity level

RAE
Retinol activity equivalent

RD
registered dietitian

RDN
registered dietitian nutritionist

TSG
The Surgeon General

UGR–A
unitized group ration-A

UGR–E
unitized group ration-express

UGR–H&S
unitized group ration-heat and serve

UGR–M
unitized group ration-Marine

UL
upper limit

USARIEM
United States Army Research Institute of Environmental Medicine

USDA
U.S. Department of Agriculture

Section II

Terms

Calorie
A unit of energy used to describe the amount of energy released by foods.

Carbohydrate
Carbohydrates are one of the main categories of nutrients. They are the most important source of energy for your body. The digestive system changes carbohydrates into glucose (blood sugar). The body uses this sugar as energy to fuel cells, tissues, and organs. Carbohydrates are called simple or complex, depending on their chemical structure. Simple carbohydrates include sugars found naturally in foods such as fruits, vegetables, milk, and milk products. They also include sugars added during food processing and refining. Complex carbohydrates include whole grain breads and cereals, starchy vegetables, and legumes. Many of the complex carbohydrates are good sources of fiber.

Cholesterol
A fat-like substance present in all animal foods. Dietary cholesterol, to a lesser extent than saturated fats, raises blood cholesterol levels in many individuals, increasing their risk for heart disease.

Dietary reference intakes
Nutrient values established by the Food and Nutrition Board of the Institute of Medicine, designed to reflect the latest understanding about nutrient requirements, which are based on optimizing health in individuals and groups.

Electrolytes
Electrolytes are naturally occurring minerals in the body that carry an electric charge. Electrolytes aid in the movement of water throughout the compartments of the body. Electrolytes affect the amount of water in your body, the acidity of your blood (pH), your muscle function, and other important processes. Electrolytes are lost in sweat and therefore must be readily replaced by consuming foods or drinks containing electrolyte minerals. Examples: sodium, potassium, chloride, calcium, magnesium, phosphorus.

Enhancements
Additional food components recommended, but not required, for use with operational rations to provide additional variety and alternate sources of nutrients. Because taste fatigue is common when consuming the same ration at each meal over several days, enhancements are recommended. In some instances, enhancement packs such as the MORE, augment the daily use of operational rations, providing the additional calories needed under certain environmental conditions.

Fat
Fat is a category of nutrients. Fat is needed in the diet in small amounts. Fats provide energy and help the body absorb vitamins. Dietary fat also contributes to cholesterol levels. Fats are a general term; there are many types of fats, to include: saturated fats such as butter, solid shortening, and lard; trans fats such as vegetable shortenings, some margarines, crackers, cookies, snack foods, and other foods made with, or fried in, partially hydrogenated oils. Both saturated and trans fat intakes should be limited. Replacing with unsaturated fats such as canola, olive, safflower, sesame, or sunflower oils are considered healthier alternatives. Fat (nine (9) calories per gram) has twice as many calories as proteins or carbohydrates (four (4) calories per gram).

Fatty acids
Fatty acids describe the biochemistry of the fat molecule. The shape and size of the fat molecule's tail determines the saturated or unsaturated structure and function in the body.

Fiber
Fiber is a substance in plants. Dietary fiber is the kind you eat. It's a type of carbohydrate. You may also see it listed on a food label as soluble fiber or insoluble fiber. Both types have important health benefits.

Gram
A unit of measure for mass equal to 0.035 ounce.

Healthy foods
Foods known to promote health by their nutrient density. Examples include fresh and frozen fruits and vegetables, legumes, whole-grains, low-fat meats, and low-fat dairy products.

Human performance optimization
Process of applying knowledge, skills, and emerging technologies to improve and preserve the capabilities of military (team) members (individuals), families, and organizations to execute essential tasks.

Kilocalorie
Common unit used to describe energy needs. The term "calorie "is used in the text of this document in place of the term "kcal."

Kilogram
A unit of measure for mass; is equal to 1,000 grams and 2.2 pounds.

Medical nutrition therapy
The use of specific nutrition services (assessment of nutritional status, individualized diet modification and nutrition counseling, and specialized nutrition therapy) to treat an illness, injury, or medical condition.

Microgram (µg)
A unit of measure for mass; is equal to 1/1,000,000 gram.

Military dietary reference intakes
Nutritional standards, based on the Food and Nutrition Board's Dietary Reference Intakes, and intended for use by professional personnel involved in menu development, menu evaluation, nutrition education, nutrition research, and food research and development.

Milliequivalent
A unit of measure; 1/1,000 of an equivalent of a chemical element (for example, potassium).

Milligram
A unit of measure for mass; is equal to 1/1,000 gram.

Nutrition counseling
Nutrition counseling is a supportive process, characterized by collaborative counselor-patient, client, and/or group relationship. Nutrition counseling integrates information obtained from nutrition assessment and diagnostic processes to establish food, nutrition and physical activity priorities, goals and action plans in order to empower individuals and/or groups to take responsibility for self-care to enhance performance and/or treat an existing disease, injury, or health con-

dition. Nutrition counseling for human performance optimization and/or for medical nutrition therapy (patients with a condition, illness, or injury) includes a comprehensive, evidence-based nutritional assessment and treatment based on the status or goals of the patient, client, and/or group.

Nutrition education
Nutrition education is defined as the formal process to instruct or train patient(s) and/or client(s) in a skill or to impart knowledge to help patient(s) and/or client(s) voluntarily manage or modify food choices and eating behavior to maintain or improve health. Learning situations are designed to allow client(s) to learn more about food choices and eating habits that optimize health and performance. Effective nutrition education is based on the client's perceived education needs. The education is developmental (for example, builds on previous learning), and results in increased knowledge and should result in changed eating behaviors.

Operational ration
A nutritionally adequate ration composed of semi-perishable and/or shelf-stable pre-prepared food items for use under actual or simulated combat conditions. Operational rations include the MRE, UGR–A, UGR–E, UGR–H&S, and UGR–M(tm).

Protein
Protein is a category of nutrients. Protein is required to build and maintain bones, muscles, and skin. Proteins sources in the diet are meat, dairy products, nuts and certain grains, and beans. Proteins from meat and other animal products are considered complete proteins. This means they supply all of the essential amino acids the body requires and cannot make. Plant proteins are called incomplete proteins. Plant proteins require a combination of different sources to provide the body with all the essential amino acids the body needs.

Reference measures
Body heights and weights that represent the 50th percentile of military men and women for height and weight. Reference measures are used in this regulation to estimate energy needs, protein, and other nutrient standards that are computed on a per kilogram of body weight basis.

Restricted ration
Restricted rations are nutritionally incomplete rations used in certain operational scenarios, such as long-range patrol, reconnaissance, and cold weather when Servicemembers are exposed to extreme environments or required to subsist for short periods (up to 10 days) carrying minimal weight. Restricted rations provide suboptimal levels of energy (approximately 1500 calories) and nutrients, and are intended for only short periods of use. Restricted rations include the Meal, Cold Weather (3 issued for each day), intended for use in cold environments; Food Packet, Long-Range Patrol (1 issued for each day), intended for initial assault, special operations, and long-range reconnaissance missions and the First Strike Ration(r) (1 issued for each day), designed for periods of intense or highly mobile conflict.

Saturated fats
Fats found in large amounts in meat and dairy products, and in some vegetables such as coconut, palm, and palm kernel oils. Eating large amounts of saturated fats raises blood cholesterol levels in many individuals, increasing their risk for heart disease.

Supplements
The addition of foods to make an operational ration nutritionally complete. Bread and milk are required supplements to group operational rations.

Survival ration
A high-carbohydrate, low-protein ration, designed to minimize the effects of acute starvation. This ration is stored in life-saving craft aboard ships and in emergency kits aboard aircraft.

Section III

Special Abbreviations and Terms

This section contains no entries.