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Interassociation Consensus Statement on Sports Nutrition Models for the Provision of Nutrition Services From Registered Dietitian Nutritionists in Collegiate Athletics

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Collegiate athletic programs are increasingly adding nutrition services to interdisciplinary sports medicine and sports performance departments in response to scientific evidence highlighting nutrition's integral role in supporting athletic performance and overall health. Registered Dietitian Nutritionists (RDNs) specializing in sports dietetics (ie, sports RDNs) and credentialed Board-certified Specialists in Sports Dietetics (CSSDs) are the preferred nutrition service providers for these programs. Their extensive training and proficiency in medical nutrition therapy, education and behavioral counseling, food-service management, exercise physiology, physical performance, and administration, as defined by the "Standards of Practice and "Standards of Professional Performance" for Registered Dietitian Nutritionists in Sports Nutrition and Human Performance," make these practitioners uniquely qualified to deliver the breadth of care required in the collegiate setting. Therefore, this document, guided by a multidisciplinary panel, introduces 4 sports nutrition models through which any collegiate athletic program can deliver sports RDN-directed nutrition services. In each model, the most effective staffing and scope of service are indicated and reviewed. In addition, recommended organizational structures for sports RDNs are provided that best support the delivery of the model's nutrition services in a variety of collegiate athletic programs and organizational settings. Lastly, future research initiatives and nutrition interventions to help improve the standard of care through these sport nutrition models are explored.

In response to scientific evidence highlighting nutrition's integral role in supporting athletic performance and overall health, collegiate athletic programs are increasingly adding nutrition services to their athletic medicine and sports performance departments.[1–3] From more simplistic early 20th-century evidence demonstrating that dietary carbohydrate and fat influence exercise performance,[4] dietary proteins affect skeletal muscle adaptation,[5] and carbohydrate manipulation enhances exercise capacity[6] to new, 21st-century scientific perspectives indicating greater metabolic and nutritional complexities for athlete readiness, sport performance, recovery, and health,[2,7] sports nutrition research[8] continues to identify an increasing need for highly skilled sports nutrition professionals and the provision of sports nutrition services. Accordingly, this professional expertise should be supplied by Registered Dietitian Nutritionists (RDNs) using on-campus student health services, off-campus providers, or, preferably, position(s) within athletic departments.[9,10] Specifically, RDNs who specialize in sports and human performance nutrition (ie, sports RDNs) are the preferred providers because of their extensive and varied training experiences. Sports RDNs have broad expertise and proficiency in clinical nutrition and medical nutrition therapy (MNT), education and behavioral counseling, food service and culinary nutrition, exercise physiology, and physical performance as well as administration, as defined by the "Standards of Practice [SOP] and Standards of

A summary and link to this consensus statement will be included in the Winter issue of *Expeditions,* the quarterly newsletter of the Sports and Human Performance Nutrition Dietetic Practice Group of the Academy of Nutrition and Dietetics. This statement has been endorsed by the American Medical Society for Sports Medicine, Collegiate and Professional Sports Dietitians Association, Collegiate Strength and Conditioning Coaches Association, and National Athletic Trainers' Association.

Professional Performance [SOPP] for Registered Dietitian Nutritionists in Sports and Human Performance Nutrition."[1] In the collegiate setting, sports RDNs are both uniquely qualified to supply a broad scope of sports nutrition services that adheres to current evidence-based practices and uniquely positioned to assist athletic departments in administering, evolving, and optimizing all aspects of a program's sports nutrition service model. However, despite significant growth in the field of collegiate sports nutrition, best practices have yet to be elucidated regarding how to effectively model appropriate sports nutrition staff and services for athletic departments of various sizes and competition levels. Therefore, this consensus statement aims to introduce sports nutrition staffing and service models, with multiple options to support various scopes of service, including recommendations for appropriate staffing, to better promote a sports RDN's effectiveness in a department's interdisciplinary health care (ie, along with team physicians, athletic trainers [ATs], allied health care professionals, and psychologists) and sports performance teams (ie, strength and conditioning, sports psychology, and food service and culinary nutrition). In addition, evidence-based services in the areas of clinical sports nutrition, nutrition education, food-service management, and performance nutrition are highlighted, and minimum standards for the integration of these services are established. Last, in an effort to guide the rapidly evolving specialty area of performance nutrition practice, recommendations are made for how sports RDNs should fit in the organizational structure for each model, including the position qualifications and titles that best support an athletic department's desired provision of nutrition services. Members of the Organizational Review Panel are listed in the Acknowledgments.

In summary, the intent of this consensus document is 3-fold:

1. To provide sports nutrition models suitable for a variety of departmental needs and settings, including the scope of available services and appropriate staffing.
2. To highlight minimum standards for the level of integration regarding services in the primary areas of care for student-athletes in the collegiate setting: clinical sports nutrition, nutrition education, food-service management, and performance nutrition.
3. To recommend the organizational structures along with suggested qualifications and titles for collegiate sports RDNs that best support the outlined sports nutrition models.

COLLEGIATE SPORTS RDN DEFINED

A *sports RDN* is a nutrition professional who has met the educational requirements to practice as an RDN and has the minimum competency levels to practice in a specialty area as set forth by the Commission on Dietetic Registration.[1] As institutions respond to calls for greater access to nutrition care, they must be aware of the differences among a nutritionist, RDN, and specialist in sports dietetics.[11] All RDNs are nutritionists.[12] However, not all nutritionists are RDNs. Anyone seeking to hire a nutrition professional should verify the candidate's credentials (Figure 1). The legality of one's ability to practice varies depending on the level of education and credential or title used, along with the practice and licensure laws specific to the state. A Board-certified specialist in sports dietetics (CSSD) will always be an RDN. Minimum standards for education, supervised practice, applied experience, and passing of a national qualifying examination are required to obtain a CSSD credential. For the remainder of this statement, *sports RDN* will be used to encompass all terms of qualification for RDNs practicing as specialists in sports dietetics in the United States, whether they hold a CSSD credential or not.

Departments that employ 1 or more sports RDNs—whether part time, full time, or as a consultant—are responsible for providing services across multiple functional areas, including clinical sports nutrition, nutrition education, food-service management, and performance nutrition. When hiring a sports RDN, each institution must determine the level of care and services best suited for its needs and consider not only the minimum education and credentialing requirements for becoming an RDN but also the level of specialty practice (Figure 2) desired as defined by the SOP and SOPP for RDNs in sports and human performance nutrition[1]:

- *Competent:* A newly credentialed RDN practicing at entry level or an experienced RDN starting in a new specialty.
- *Proficient:* An RDN who has been practicing for $\geq$3 years who has gained operational job performance skills and demonstrated success in the area of sports nutrition.
- *Expert:* An RDN recognized in the profession as practicing with a high degree of professional autonomy and responsibility. An expert sports RDN has mastered a high level of skill and knowledge in the specialty through experience, training, and formal education. An expert sports RDN demonstrates leadership qualities and the ability to manage complex processes and effectively plan, achieve, and evaluate outcomes.
- The CSSD is a specialty credential that sports RDNs may earn after meeting the minimum practice experience requirements and successfully passing the CSSD examination administered by the Commission on Dietetic Registration. This certification does not confer expert status but rather confirms a minimum level of knowledge and experience to practice as a sports RDN.

In accordance with the 4 steps of the nutrition care process that direct patient care (assess, diagnose, intervene, monitor), sports RDNs collaborate with interdisciplinary health care and sports performance teams using evidence-based knowledge in practice to develop and deliver nutrition services.[1] This often includes serving as content experts for their departments and acting as resources for other providers, coaches, strength and conditioning coaches (SCCs), and administrative staff in addition to student-athletes. Because student-athletes obtain nutrition information from a variety of sources, including ATs and SCCs, awareness of the differences in education and scopes of practice among personnel is essential.[13,14] Although nutrition knowledge and nutrition education are included in the educational competencies and scopes of practice for ATs[15] and SCCs,[16] their scopes of practice in these areas are limited compared with those of sports RDNs (Figure 3). Nevertheless, ATs and SCCs must also meet educational

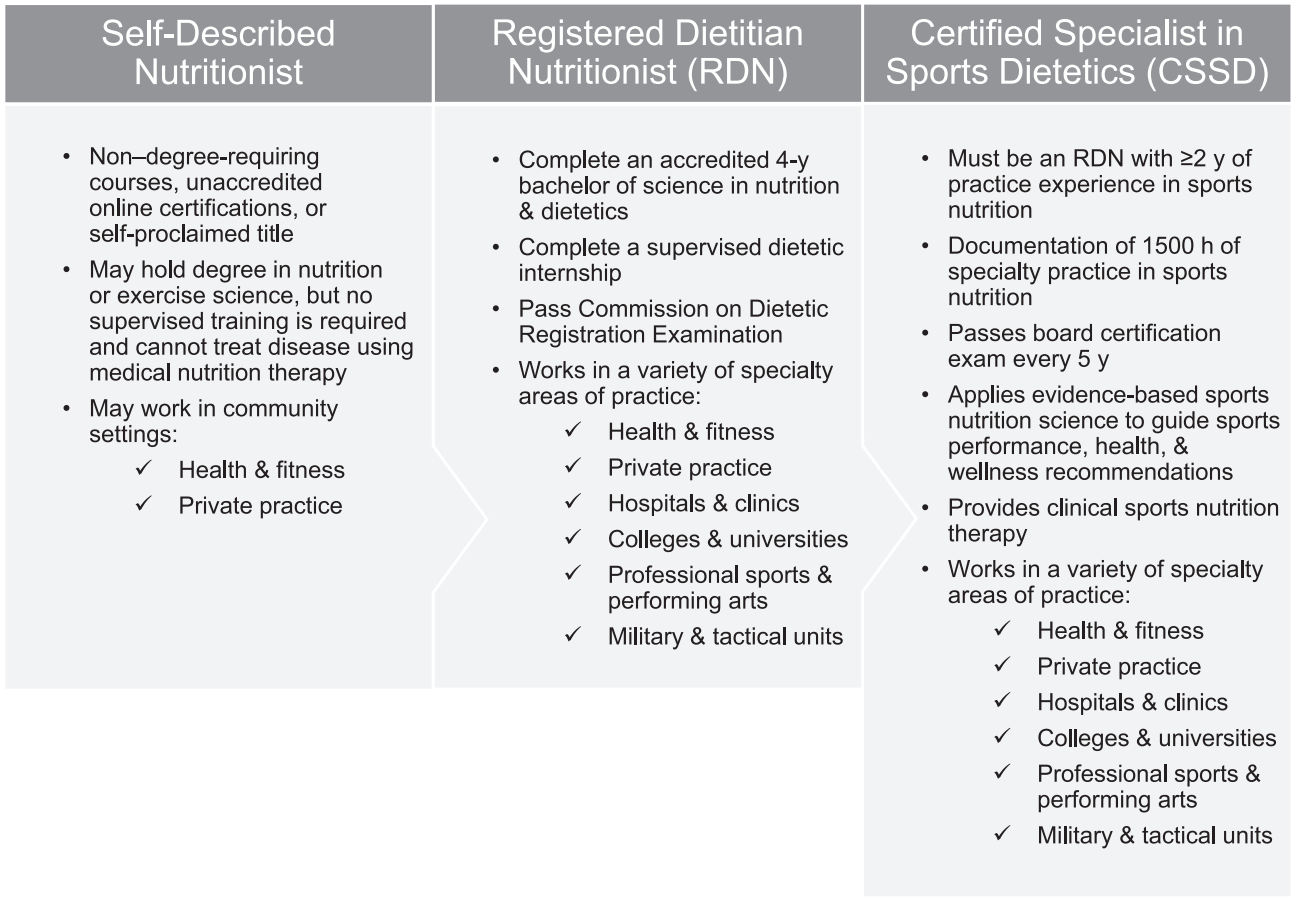

Figure 1. Comparison of education and credentials among nutritionist, Registered Dietitian Nutritionist, and Board–certified specialist in sports dietetics.

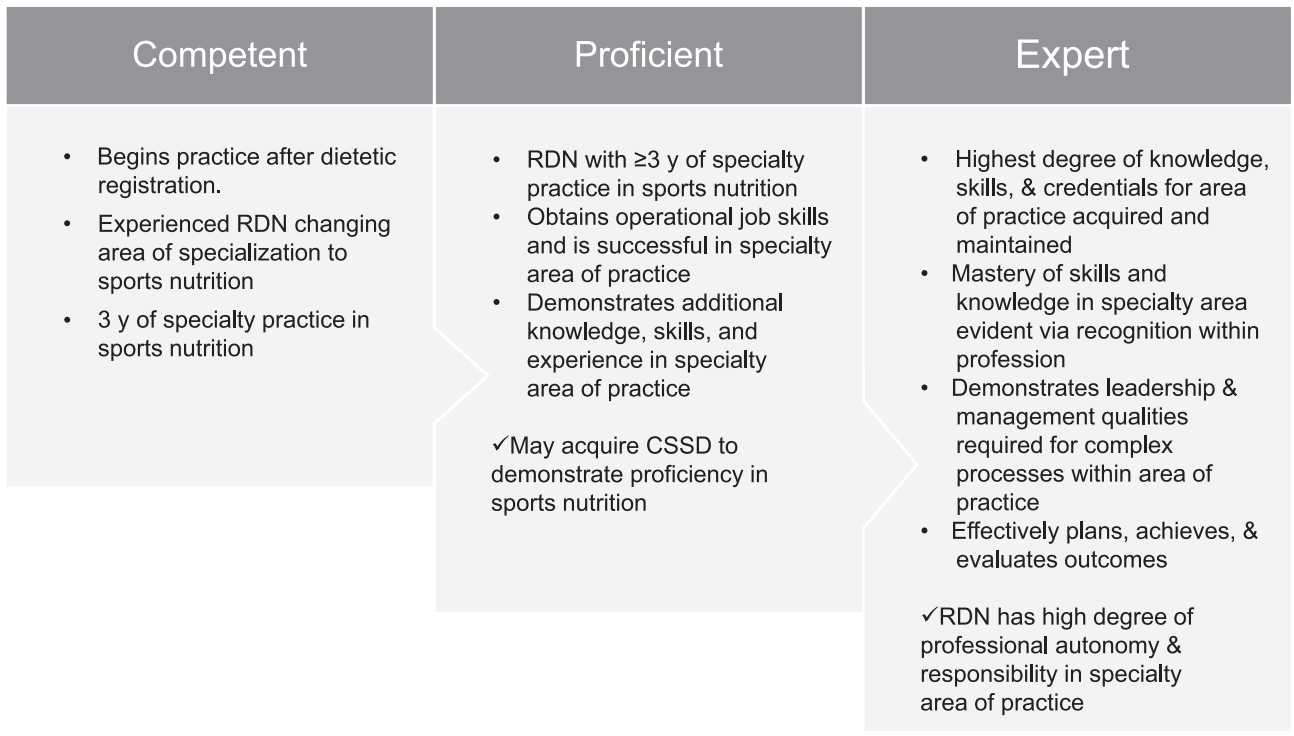

Figure 2. Levels of practice as defined by the "Standards of Practice" for sports RDNs. Abbreviations: CSSD, Certified Specialist in Sports Dietetics; RDN, Registered Dietitian Nutritionist.

Figure 3. Nutrition-related scope of practice and educational competencies by provider type. Abbreviation: RDN, Registered Dietitian Nutritionist.

competencies in exercise nutrition, hydration safety and monitoring, and supplement use and safety, which makes them natural partners for collaborating in the development and implementation of unified and evidence-based nutrition messaging and programming. These providers are also critically important in identifying and referring athletes who require greater nutritional care to the sports RDN.

SPORTS NUTRITION MODELS

Collegiate and university athletic programs exist in a wide variety of sizes and types. Four sports nutrition model options for levels of service and staffing are presented in Figure 4. Each model has been developed to assist a program in identifying the level of nutrition service best suited for its student-athletes and sports teams. These models offer the necessary framework to guide both administration and sports RDNs on how to properly staff each model to effectively develop, deliver, and integrate their preferred level of nutrition services. Moreover, these frameworks illustrate how a program's current model can evolve if personnel roles or scopes of services expand.

Reviewing the sports RDN-to-student-athlete ratio is important to help determine the appropriate staffing levels for each model. However, for collegiate sports RDNs, no ratio standards have been identified for any conference or division level of competition. The RDN staffing ratios have been assessed outside of collegiate athletics by the Academy of Nutrition and Dietetics. The academy reported that acute care RDNs cared for 9 patients per day, on average.[17] Beyond RDNs, within the collegiate setting, the National Athletic Trainers' Association (NATA) has developed a system, "Appropriate Medical Coverage for Intercollegiate Athletics" (AMCIA),[18] for defining appropriate medical coverage that balances the needs of patient care with the flexibility different programs require. As a starting point, the NATA recommended 1 full-time AT for 12 health care units (*health care units* are measurements of time based on the workload used to determine staffing needs for ATs). This ratio of health care providers to athletes considers sport injury rates, the time required for treatment and rehabilitation, travel demands, on-site medical coverage needs, and administrative demands on the athletic health care staff.[18] A survey[19] of sports medicine coverage and the application of AMCIA recommendations among 104 National Collegiate Athletic Association (NCAA) Football Bowl Subdivision–level universities indicated that for football, one-third (26) of the respondents met the staffing recommendations and two-thirds (50) did not. Of the total, 37 reported not using the AMCIA guidelines to determine staffing needs, citing a lack of administrative time and funding to support its implementation. Furthermore, the departments that did not meet the recommended staffing ratios were 1 to 3 full-time equivalents (FTEs) short according to the guidelines, but a majority of ATs interviewed believed the AMCIA guidelines supported justifications for additional staffing.

In another survey[20] of 325 universities across all 3 NCAA divisions, staffing varied greatly, ranging from 21 to 525 athletes per AT. Division (D) II and III institutions had less

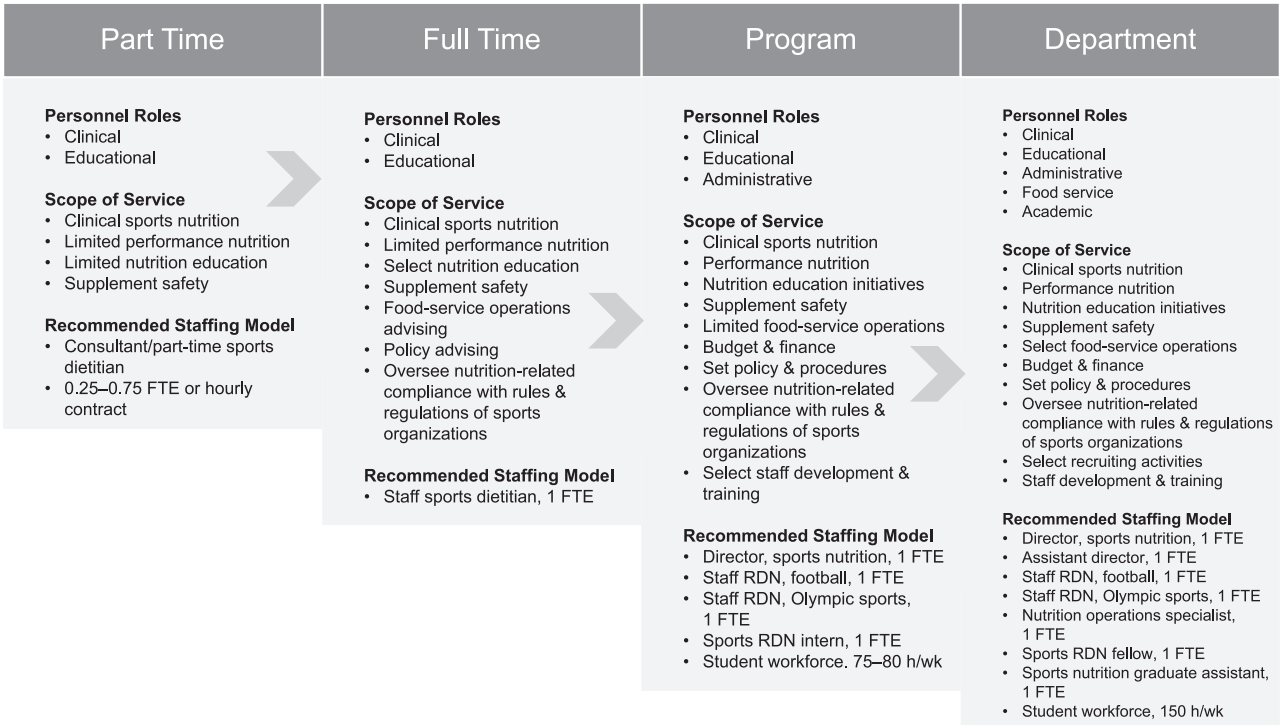

Figure 4. Sports nutrition models in collegiate athletics. Abbreviations: FTE, full-time equivalent; RDN, Registered Dietitian Nutritionist.

coverage despite caring for nearly 2 to 2.5 times the number of athletes as DI ATs. In this same survey, ATs in organizations that used an athletics organizational model cared for 1.2 times more athletes than those using a medical organizational model (Figure 5), in which a medical department rather than an athletics department oversees athletic medicine. The authors also noted that no NCAA staffing guidelines were available for sports medicine coverage and no interassociation consensus statements had been written on the topic thus far. With regard to sports performance training, the National Strength and Conditioning Association[21] stated that professional-to-participant ratios should be 1 : 10 for junior high school, 1 : 15 for high school, and 1 : 20 for college during planned activities to meet the recommended guidelines for the minimum average floor space allowance per participant (100 sq ft). In the collegiate setting, this recommended ratio of strength coaches to student-athletes can vary based on the division and competition level. Therefore, the National Strength and Conditioning Association[21] advised that in ideal environments, where safety and efficacy are optimized (ie, during exercise training), collegiate athletic departments will have 1 strength and conditioning coach for every 10 to 20 student-athletes. However, for football teams, the NCAA rules state that 5 strength and conditioning coaches are permitted, which provides a

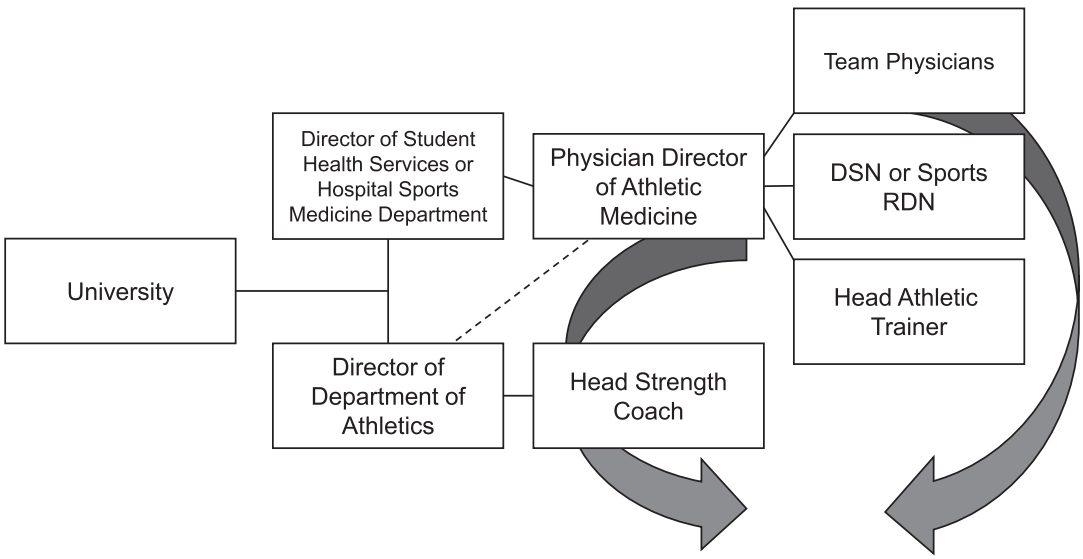

Figure 5. Medical model reporting structure. Abbreviations: DSN, director of sports nutrition; RDN, Registered Dietitian Nutritionist.

staffing ratio of 1 : 25 to 1 : 35 student-athletes, depending on the size of the team, highlighting allowable variations in sport-specific staffing ratios.[22]

Despite the variations in staffing ratios, each recommendation provides insight into potential staffing needs for a sports RDN in the collegiate setting. Though these specific recommendations cannot be directly applied to the collegiate sports nutrition models presented here due to differences in the physical space where work is completed, as well as the types of services and activities performed, the ratios offer possible starting points and areas for future research regarding all provider types in determining staffing needs along with the model of organization best suited for supplying the highest quality of care while preventing provider burnout. Nevertheless, current staffing-ratio practices among existing sports nutrition programs resemble, to an extent, the models presented in Figure 4, which can range from 1 part-time staff sports RDN in settings where the student-athlete population is small or nutrition services are limited in scope all the way to comprehensive sports nutrition departments, in which 100 to 125 student-athletes are assigned per sports RDN. In the latter model, as many as 6 sports RDNs plus additional support staff may be required. Hence, these models aim to provide an athletic department and sports RDN insight into adequate staffing practices to better support and deliver model-specific scopes of service and ensure sports RDN effectiveness while maintaining a high standard of care.

Nutrition Services: Evidence and Minimum Standards

Clinical Sports Nutrition. Medical nutrition therapy in sport (ie, clinical sports nutrition) provided by a sports RDN includes the evaluation and implementation of individualized care to manage medical conditions, optimize physical performance, and promote lifelong health.[1] Sports RDNs deliver MNT when nutrition therapy is indicated for such diagnoses as nutrient deficiencies, metabolic diseases, and eating disorders, among others.[1] The following sections, though not including all potential nutrition-related problems an athlete or department may encounter, illustrate the essential nature of clinical sports nutrition and interdisciplinary care in collegiate athletic medicine, regardless of the size of the institution or level of competition.

Nutrient Deficiencies. The most recent position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and American College of Sports Medicine was that supplementation of micronutrients is generally not needed in an athletic population if the diet adequate in energy and nutrient density is consumed.[2] However, recent observations[23] among athletic populations indicated a moderate to high prevalence of deficiencies in iron, magnesium, zinc, folate, vitamin D, and vitamin B12 as a result, most often, of inadequate energy and macronutrient (ie, carbohydrate, fat, and protein) consumption with respect to sport-related energy requirements, which can subsequently impair performance. For example, inadequate dietary iron intake or increased iron losses (or both) experienced by athletes can lead to iron-deficiency anemia and impair their capacity for physical training for up to 12 weeks while iron stores are replenished.[24]

Also, a retrospective review[25] of laboratory results obtained from 2749 athletes on 25 DI sport teams over a 12-year period showed that 30.9% of the female athletes and 2.9% of the male athletes were iron deficient without anemia and 2.2% and 1.2%, respectively, had iron-deficiency anemia. Of the affected female athletes, only 1 in 20 were identified at their preparticipation examinations. In addition, more athletes today are turning to vegetarian and vegan diets.[26] Careful attention to food selection and meal planning can allow these dietary approaches to fully support health and performance, but a lack of attention to detail or poor nutritional guidance may increase a vegetarian or vegan athlete's risk for micronutrient (eg, iron, zinc, vitamin B12) deficiencies due to increased nutrient requirements, reduced absorption rates, or a lack of specific nutrients in plant foods.[26,27] Furthermore, athletes' adherence to therapeutic diets even when not prescribed appeared common. In 1 investigation,[28] 60% of athletes self-identified as gluten intolerant and 41% fully adhered to a gluten-free diet without a formal diagnosis, leaving them at risk for deficiencies if appropriate substitutions are not made.

To better support student health and well-being, the standard of care should incorporate screening, evaluation, and individualized treatment (ie, dietary, supplementation, or both) provided by a sports RDN, along with comprehensive preventive programming to reduce the prevalence of nutrient deficiencies.[23]

Metabolic Health and Cardiovascular Disease. *Metabolic syndrome* refers to a group of cardiometabolic risk factors and diseases that negatively affect metabolic health and increase the risk of many chronic diseases, including heart disease and cancer. An estimated one-third of US adults experience some form of metabolic syndrome.[29] Participation in a collegiate varsity sport does not prevent a student-athlete from having risk factors associated with metabolic syndrome or cardiovascular disease (CVD). For example, of 87 NCAA DI football players (30 linemen and 57 nonlinemen), linemen were more likely to present with impaired glucose tolerance, prehypertension or hypertension, and pathologic left ventricular hypertrophy than were nonlinemen and age-matched control individuals over the course of a single season.[30] However, other researchers[31] classified 75% of 75 first-year NCAA DI football players in every position as prehypertensive or hypertensive, indicating that this cardiovascular risk factor may be prevalent in this entire sport population and not limited primarily to linemen.

The omega-3 index is a biomarker of the essential long-chain omega-3 fatty acids docosahexaenoic acid and eicosapentaenoic acid contained in the membrane of red blood cells and reflects dietary omega-3 intake.[32] This index has been used to assess athletic populations for CVD risk.[32] A meta-analysis of 10 studies demonstrated that the omega-3 index was inversely related to the CVD risk such that a red blood cell omega-3 membrane content of $>8\%$ was associated with the greatest cardioprotection, and a value $<4\%$ provided the least protection.[33] The authors of 2 studies, one on 138 NCAA DI football athletes[34] and another on 1500 male and female student-athletes in various collegiate sports,[35] determined that approximately one-third of sampled athletes had an omega-3 index of $<4.5\%$. These findings suggest that student-athletes'

dietary omega-3 intake is insufficient, comparable with that of the general US population, and places them at an increased risk for CVD, thus highlighting the metabolic health concern for all collegiate athlete populations. Fortunately, nutrition education provided by a sport RDN was effective in educating student-athletes on dietary habits, such as decreased fast-food consumption, increased intake of fruits and vegetables, and advance planning of meals that reduce the risk and progression of these identified risk factors for CVD.[36]

Although football players are not the only student-athletes at risk of metabolic syndrome, as previously noted, the emphasis on size and weight for various playing positions in this sport raises significant concerns for the current and future metabolic health of this sport population.[37] Previous investigators[38] reported a strong association between obesity and insulin resistance in DI collegiate football players. Insulin resistance has also been associated with bulimia nervosa and binge eating disorder, making screening of athletes for not only cardiometabolic problems but also eating disorders and disordered eating very important, especially when they are encouraged to maintain artificially high body weights.[39] Also, weight gain throughout a football playing career has been linked to an increased prevalence of CVD and cardiometabolic disease during middle age.[40] Furthermore, postcareer increases in body mass index were independently and positively associated with a higher prevalence of cardiometabolic disease, including coronary heart disease, diabetes, and hypertension.[41] Thus, weight gain throughout the sport life cycle of a collegiate football player makes early nutrition intervention a critical component in supporting the long-term health and quality of life in this population. In a similar sporting population, nutrition education provided by sports RDNs that yielded increases in knowledge and understanding of appropriate nutrient intakes was positively correlated with favorable changes in body composition among Australian Football athletes.[42]

Postcareer metabolic health concerns are not limited to football athletes. The Trojan Lifetime Champions Health Survey, composed of 496 students and alumni, demonstrated a low correlation between being a former collegiate athlete and participating in lifetime exercise activities, suggesting that the cardiovascular benefits of athletic participation may not protect metabolic health during middle age.[43] We find it interesting that athletes' retirement from sport participation negatively influenced nutritional habits.[44] More specifically, the dietary habits of former athletes (in sports including basketball, diving, figure skating, hockey, soccer, swimming, tennis, track and field, and volleyball) had lower nutritional index scores than current athletes, indicating lower-quality nutrition lifestyles after their playing careers. These dietary changes and apparent reduced prioritization of healthy nutrition habits are suggested to occur, in part, because athletes are unsure of how to adjust their diets in accordance with significant changes in daily physical activity and energy requirements after sport retirement.[45]

Therefore, for student-athletes, particularly those at risk for CVD, providing MNT or nutrition counseling or services during sport participation, before graduation, or after collegiate sport retirement can be beneficial. Referrals to RDNs from other medical providers are standard practice in nearly all clinical settings. In collegiate athletics, ATs and team physicians, as well as sports psychologists and SCCs, are well positioned to refer players to sports RDNs to enhance the standard of care by providing these critical prevention services aimed at improving metabolic and cardiovascular health.

Eating Disorders. Athletes at all levels of competition are at greater risk for developing eating disorders than nonathletes, have a higher prevalence of disordered eating than do nonathletes, and are more likely to engage in pathological weight control behaviors than nonathletes.[46] The exact prevalence of eating disorders among athletes is difficult to determine due to underreporting of symptoms by athletes, a lack of screening and identification, variations in study design, and changes to the diagnostic criteria used to define eating disorders over the years.[46] In several studies of elite athletes,[46] investigators found that 18% to 25% of female athletes and 8% to 22% of male athletes met the full diagnostic criteria for eating disorders, versus 9% of female and 0.5% of male age-matched control nonathletes.

In college-aged athletes who do not otherwise meet the full diagnostic criteria for an eating disorder, a higher prevalence of disordered eating behaviors, excess exercise and training outside of practice, body dissatisfaction, and weight preoccupation was observed than in nonathlete peers.[47] A survey of 204 DI athletes in 17 sports at 3 universities showed that 2% of female athletes met the diagnostic criteria for an eating disorder, but 25.5% exhibited subclinical symptoms.[48] In addition, a survey of 203 DI male athletes from 3 universities (50% in football) revealed that nearly 20% reported significant pathological eating and weight control behaviors.[49]

In the first research[50] comparing eating behaviors and body image disturbances between DI and DIII female athletes in refereed sports, the highest rates of disordered eating behaviors were 40.4% in DI and 49.2% in DIII athletes. A total of 24.2% of DI and 30.7% of DIII athletes were either very or mostly dissatisfied with their overall appearance, whereas DIII athletes described higher levels of bulimic behaviors and weight preoccupation than did DI athletes.[50] This important work makes it very clear that athletes are at risk, regardless of the level of competition or size of the institution. Furthermore, even though they do not meet the full diagnostic criteria, athletes with subclinical disordered eating behaviors and concerns are just as reflective of the level of worry, intrusion, or risk to health and safety as those with fully diagnosed eating disorders; in some athletes, subclinical symptoms represent a critical opportunity for early intervention at all levels of competition.[47,50]

The effects of eating disorders in sport are well studied and pose serious medical, physical, and psychological health risks for student-athletes.[47,51] Although the overall prevalence is low compared with other injuries and illnesses common to athletic participation, the potential for lasting harm to the athlete and the demands placed on sports medicine departments to provide acute and often long-term care warrant serious attention by athletic departments.[46,47,51,52] In addition, life transitions, such as graduating from high school and going to college, are known risk factors for the new onset of eating disorders or relapses in eating disorders in high-risk individuals of every gender.[48] Thus, athletic programs must have robust

screening and referral processes in place that include care provided by RDNs with specialty training in eating disorders, whether they are staff, consultants, or providers in the local community.[53] Several position papers and consensus statements[9,46,52–54] written by professional organizations involved in athlete care have been published on the identification and treatment of eating disorders. Each document stated the need for access and referrals to qualified RDNs for their nutrition-specific expertise and ability to deliver advanced nutrition education and behavioral counseling techniques.

As with any serious injury, collaboration and careful treatment planning are required to provide the best possible care for student-athletes with eating disorders, regardless of the level of competition, NCAA division, or athletic conference.[9] Regular meetings and frequent communication among the sports coach, athlete, team physician, AT, psychologist or therapist, family, and human performance team are essential once proper releases of information are obtained.[9,46,52,53] Building a cohesive interdisciplinary team with systems and policies in place to facilitate the coordination of care demonstrates a priority for athlete health and safety.[55] Because caring for athletes with eating disorders is labor intensive and requires a level of expertise not all collegiate athletic programs have on staff, departments may choose to refer athletes to student health services or off-campus providers. In that case, regular communication with outside providers is necessary to make decisions regarding the athlete's return to participation. Coordination of care should be assigned to a qualified staff member on the athletic medicine team.[55]

Minimum Standards for Integrated Clinical Sports Nutrition Services. A core function of sports nutrition and a priority in all models is the extent of integration of clinical sports nutrition services, which may be determined by the sports RDN's level of specialty practice, annual FTE appointment, sports RDN-to-student-athlete ratio, and the organizational model used (Figure 4) in each athletic department:

- Apply the nutrition care process to provide individualized, culturally appropriate, evidence-based MNT, education, and nutrition counseling for student-athletes.
- Engage in preparticipation physical examinations and develop screening tools to identify student-athletes at risk for nutrition-related medical and mental health diagnoses, such as the athlete triad and energy deficiency, eating disorders, irritable bowel syndrome and other functional gut disorders, metabolic disorders, and chronic disease.
- Apply evidence-based sports nutrition guidelines and establish MNT protocols for nutrition-related diagnoses in collaboration with the athletic medicine team.

Nutrition Education. Sports RDNs interpret and translate scientific research into easily applied recommendations that increase knowledge and facilitate behavioral change in support of performance enhancement and overall health and safety.[1] As a component of every nutrition evaluation, the sports RDN assesses the athlete's current level of knowledge and nutritional behavior and identifies the appropriate mode of education before providing the necessary educational interventions.[1] These interventions may take place in various locations and can include the individual, team, or staff levels as discussed in the following sections.

Nutrition Knowledge and Behavior. Collegiate athletes, both men and women, who lack nutrition knowledge and misunderstand nutrition-related concepts have been reported to consume insufficient amounts of the energy and macronutrients (ie, carbohydrate, fat, and protein) necessary for health and sport performance.[56,57] Clinical observations from nutrition services provided to DI athletes revealed that a significant proportion were misinformed about nutrition, consumed diets of limited variety, and unnecessarily restricted their dietary intake.[58] These knowledge gaps and behaviors pose risks by negatively affecting *energy availability* (EA), or the energy available to provide essential bodily functions for metabolism, growth, reproduction, thermoregulation, immunity, and physical activity[59]; this is calculated as dietary energy intake minus exercise energy expenditure (as determined by physical activity requirements).[60] Because the exercise energy expenditure in athletes can be significant, misinformation or limited knowledge about nutrition can inadvertently lead to poor energy intake behaviors and low EA, which is associated with menstrual and fertility dysfunction, decreased bone density, increased risk of bone stress injuries, reduced resting metabolic rate, and increased occurrence of illness.[61] Moreover, these health effects due to low EA can limit the adaptive response to training as a result of inadequate muscle recovery, leading to diminished muscle function and development, poor sleep quality, and increased risk of injury.[3,54,62]

Fortunately, recent research[63] in a sample of athletes at risk for low EA demonstrated that services guided by sports RDNs specific to nutrition education and dietary intake strategies increased their nutrition knowledge and prevented low EA. Furthermore, these athletes had notable and desirable increases in exercise-related power output as well as markers of skeletal health and bone mineral density in comparison with similar at-risk athletes who did not receive such services.[63] Thus, within an athletic department, sports RDN services specifically targeted at increasing an athlete's nutrition and sport nutrition–related knowledge are well positioned to proactively help minimize potential energy imbalances between dietary intake and sport-related activities, which, in turn, support sport performance and long-term health.

The authors[64] of a cross-sectional examination of the relationship between self-reported eating behavior and nutrition knowledge identified that college students with a greater knowledge of nutrition consumed more fruit, protein, dairy, and whole grains than college students with poor nutrition knowledge. Knowledge does not always translate into improved behaviors, yet regular breakfast consumption, overall diet quality, and reduced intake of foods low in nutrient density have been positively associated with academic achievement in children, adolescents, and college students.[65,66]

In addition to breakfast consumption and overall diet quality, the consumption of at least 2 regular daily meals by college students was associated with higher grade point averages and better cognitive performance, which is believed to result from the steady supply of energy and nutrients to the brain.[66] Among male college students, an afternoon energy food source positively influenced atten-

tion-requiring cognitive performance tasks.[67] Conversely, short-term fasting (eg, skipping breakfast) by preadolescents was related to transient decreases in late-morning cognitive performance, indicating that early-day absence of food energy (ie, fasting) was linked with a decreased ability to problem solve.[68] Alternatively, consuming a balanced meal of energy and nutrients has been associated with positive cognitive changes involving disposition, attentiveness, and motivation among individuals 19 to 33 years of age.[69]

For these reasons, sports RDN–directed nutrition education and instruction along with the provision of consistently timed, high-quality nutrition in a collegiate athletics department can also play vital roles in supporting cognitive performance and mood with the potential for improving the academic performance of sport teams.

Onsite Delivery of Nutrition Education. The provision of high-quality food and meals in support of training and competition has a history dating back to the 1924 Olympic Games, when the first dining hall served 3 meals per day.[70] Conducting nutrition education in the places where athletes eat helps them to better meet their nutrition needs and enhances the quality of their food choices.[70,71] At an international competition, among surveyed athletes from 21 teams or events and more than 50 countries, 79% of respondents thought it was important or very important to provide nutrition information for menu items, 59% stated nutrition labels would assist them in meeting their needs, and 59% considered nutrition labels to be useful or very useful.[71] In college students, point-of-choice food labeling by RDNs (eg, signage and educational materials in dining areas) resulted in students making better informed and higher-quality food choices in those settings.[72] After 3 weeks of nutrition education in a dining hall via signage and displayed messaging about the benefits of specific food choices, 20% of students described being more aware of healthful food choices. More students chose low-fat cottage cheese and fresh fruit, and 7 of 14 indicators of nutritious eating behaviors improved.[72]

Considerations for travel nutrition are increasingly important given the unique challenges presented by the combined effects of travel and demands for high-level performance.[73] Altered nutrition and hydration needs during travel, increased gastrointestinal infections associated with travel, food-safety concerns, and access to quality nutrition in unfamiliar venues and locations are known difficulties; specific nutrition education and strategies assist athletes in not only coping with the challenges of travel but arriving prepared to compete.[73] Research at the collegiate level is currently lacking and would be beneficial in elucidating the effectiveness of delivering nutrition education in dining halls and training locations and during travel, including the influence of such education on health and academic performance. Nevertheless, sports RDN–directed services that provide targeted onsite nutrition information and education (ie, within department or university dining halls and during travel) relevant to the athletes' nutritional requirements may help improve food selections and balanced intakes by increasing nutrition knowledge and supporting healthful behaviors.

Minimum Standards for Integrated Nutrition Education Services. The integration of nutrition education services varies depending on the sports RDN's level of specialty practice, annual FTE appointment, sports RDN-to-student-athlete ratio, and the organizational model used (Figure 4) in each athletic department:

- Conduct sports nutrition educational sessions for teams, coaches, sports medicine and sports performance staff and the broader athletics community when feasible.
- Instruct in the practical application of nutrition education via grocery store tours and cooking demonstrations.
- Develop culturally appropriate nutrition education materials, web content, and social media programs as tools.
- Supply culturally appropriate nutrition education through high-quality training table meals, preworkout and postworkout fueling, competition fueling, and education "directly from the plate" during individual meals or while serving in an advisory role.

Food-Service Management. A sports RDN in a food-service management role directs and manages the daily operations and requirements of a comprehensive food-service program in partnership with athletic administration, athletic medicine, and campus food-service professionals.[1] By selecting and providing appropriate nutrition during training and competition as well as for meals and snacks, the sports RDN ensures that athletes are meeting their daily nutritional requirements for both performance and health.[2] This can be accomplished in a variety of ways, depending on the college or university setting and available staffing. In many instances, food-service management can be supported by a sports RDN through advising, collaboration, and partnership with often well-established professional food-service departments, rather than by directly serving in these roles. For example, the sports RDN can establish quality standards and portion sizes and create macronutrient templates for the food-service department to integrate and oversee, thus allowing the sports RDN to focus on nutrition education at mealtimes. Some campus food-service departments already employ culinary dietitians or food-service professionals who serve as chefs and managers, which creates natural partnerships. Similarly, sports RDNs can consult on guidelines and standards to be followed by ATs, SCCs, and sport coaches and operations staff when planning for fluids and fuel at the individual-team level.

It is regrettable that access to an adequate and nutritious food supply is not available to all students, and not every institution can provide training tables or on-campus meals despite these being permitted since the 2014 NCAA rule revisions.[74,75] In a pilot study of 272 male and female student-athletes at 2 small colleges in the National Association of Intercollegiate Athletics conference, the perceived availability of fruits and vegetables influenced their consumption: if the students had access to nutritious food, they ate it.[75]

In the largest investigation of its kind, 30 000 college students from 121 colleges and universities across 26 states (including 70 community colleges in 24 states) were asked about their levels of food and housing security.[74] More than half reported some level of food insecurity, ranging from worry over having enough to eat to actually not having enough to eat. Not being able to afford balanced meals was cited by 43% to 50% of students, and 21% to 36% noted feeling hungry but not being able to eat due to insufficient money for food. This report sheds light on a serious problem among US college students. The intersection of food-service operations and nutrition education has been

Table. Sports Registered Dietitian Nutritionist (RDN) Path of Promotion and Personnel and Staffing Options With Suggested Reporting Structure

Position Title	Experience	Suggested Reporting Structure
Associate AD of sports performance	10+ y	Reports to AD
Assistant AD for sports nutrition	8+ y	Reports to Associate AD of performance or AD who oversees athletic medicine and strength and conditioning
DSN	7–8 y	Reports to Assistant AD of sports nutrition, AD of performance, or AD who oversees athletic medicine and strength and conditioning
Assistant DSN	5–7 y	Reports to DSN
Head sports RDN	5–7 y	Reports to AD who oversees athletic medicine and strength and conditioning when a DSN position does not exist
Associate sports RDN	3–5 y	Reports to DSN
Assistant sports RDN	3+ y	Reports to DSN
Sports RDN	2+ y	Reports to DSN or AD who oversees athletic medicine and strength and conditioning or head team physician in an athletic medicine department or head athletic trainer when no physician is on staff
Culinary RDN	2+ y	Reports to DSN or food-service director
Sports RDN fellow	1–2 y	Reports to Sports RDN
Intern (RDN eligible)	0–1 y	Reports to Sports RDN
Undergraduate volunteer or graduate assistant (student)	0 y	Reports to Sports RDN

Abbreviations: AD, athletic director; DSN, director of sports nutrition.

elucidated in previous sections. However, little research exists regarding the integration of sports nutrition expertise in food-service or catering operations and its influence on improved quality of food selections, increased access to adequate nutrition, the ability of departments to meet the cultural needs of students through regional or traditional cuisines, or teaching nutrition-related life skills to student-athletes. Such assessments across divisions would benefit clinicians, administrators, and student-athletes alike.

Minimum Standards for Integrated Food-Service Management Services. The extent of select food-service–operations integration varies depending on the sports RDN's level of specialty practice, annual FTE appointment, sports RDN-to-student-athlete ratio, and the organizational model used (Figure 4) in each athletic department:

- Collaborate with dining services professionals on the planning, selection, and delivery of meals.
- Establish the food supply chain and select quality vendors in partnership with dining services.
- Set guidelines for menu planning and establish menu cycles to be implemented by the dining services department.
- Ensure that student-athletes with food allergies, religious preferences, and clinical diagnoses that require prescription diets have access to appropriately modified meals.
- Set standards for and advise athletics operations staff on negotiating with food-service providers for meal price and quality, particularly with respect to off-site meals.
- Negotiate cost-effective purchasing of NCAA–compliant products and supplements.
- Provide food safety education for athletes and staff, especially as it pertains to the storage and consumption of food and meals away from dining facilities as needed.

Performance Nutrition. In the area of performance nutrition for collegiate athletes, the primary role of the sports RDN is to read, interpret, and translate human performance research into easily applied strategies that enhance or optimize sports performance and recovery.[2] Detailed recommendations regarding specific nutrients, nutrient timing, and diet manipulation to support metabolic adaptations are available for review in the research referenced in this statement and the scientific literature.[2] This section will focus on the evidence for individualized care and the importance of offering same, not only for enhancing performance but also for safety and risk management as they pertain to hydration and supplement use.

Applied Performance Nutrition. Today, we have greater awareness of the importance of individualizing performance nutrition recommendations on the basis of the unique needs of every athlete's annual periodized training calendar and the different demands of each sport regarding nutrient timing, body composition, and competition schedules.[2] Because intensive physical training is required to achieve a maximal adaptive response, the risk of injury and illness associated with periods of high training volume must be mitigated by ensuring that athletes achieve and maintain adequate EA, which can best be done on an individual basis.[2] Individualized performance nutrition recommendations may also include but are not limited to the guidance regarding and selection of food and fluids that optimize sport performance and limit gastrointestinal intolerance; altering nutritional intake to safely elicit changes to body composition or body weight and enhance sport performance; and modifying nutritional needs, including meal planning and scheduling, in response to athletes with varied medical or cultural requirements to minimize potential negative effects on performance.[2]

When not every athlete can be seen individually, sports RDNs can establish policies and set guidelines for applying the previously described recommendations and evidence more broadly. Thus, the term *applied performance nutrition* is used here to describe the ways in which a sports RDN can provide individualized team services that target sport-specific strategies identified in the research as performance enhancing. These services can include establishing the timing and makeup of recovery meals and snacks on the basis of team practice schedules and determining the sports foods and hydration products authorized for team purchase.[1,2] They may also involve identifying and managing any logistical challenges presented by different sporting venues in ensuring that adequate nutrition is available and accessible.[1,2] Furthermore, acting as an advisor in some

cases, sports RDNs can both identify and implement assorted team nutritional strategies throughout the annual periodized training cycle to ensure that evidence-based nutrition recommendations are effectively applied and align with sport training to optimize overall performance.

Hydration and Heat Illness. Proper hydration strategies serve 2 main purposes. First, they enhance physical performance by supporting efficient thermoregulation, and second, they prevent dehydration and heat illness. Although investigators continue to enhance our understanding of the amounts of fluid and electrolytes required to support optimal human performance, extremes in hydration status can result in dangerous, life-threatening situations during athletic training and competition.[76] Aside from conditions of extreme cold or high altitude, excessive fluid losses are most commonly the result of sweat losses and inadequate fluid replacement practices, which can impair thermoregulation due to competition between the central and peripheral circulations for limited blood volume, thereby increasing the risk for heat exhaustion and subsequent exertional heat stroke.[77,78] Conversely, exercise-associated *hyponatremia* (ie, low sodium concentration in blood) has been observed in athletes with increased sweat sodium losses and overconsumption of hypotonic fluids.[76] Dehydration is more common and may cause heat illness, yet falling plasma sodium levels are more dangerous and the symptoms are often confused with those of dehydration, yielding devastating effects that can include death.[76]

To avoid heat illness and hyponatremia and support quality athletic performance, individualized fluid-replacement strategies for athletes should be implemented before, during, and after exercise.[2,79] Multiple factors, such as sex, body size, the amount of clothing and equipment worn, and the weather, warrant individual assessments.[76] Routine monitoring of hydration status under a variety of conditions may include prepractice and postpractice body weight measurements, urine specific gravity testing, and the assessment of electrolyte losses.[79] Safety is enhanced when these tasks are coordinated via the sports RDN, AT, and SCC staff throughout the various stages of training.[2,79] Using individual assessment data, qualified sports RDNs recommend the proper dose and timing of fluid, electrolytes, and food intake to ensure athlete safety by preventing underhydration and overhydration practices that can lead to heat illness and hyponatremia.[1]

Management of Dietary Supplements and Banned Substances. Dietary supplements include but are not limited to vitamins and minerals, omega-3 fatty acids, amino acids, herbs, and botanicals. The NCAA places protein powders; carbohydrate products such as gels, chews, and sports drinks; and energy and protein-replacement products such as bars and shakes in the dietary supplement category as well.[22] When considering how to balance decreasing the potential risk to the student-athlete and athletics department while providing permissible supplements that may offer a health and wellness benefit for the student-athlete, sports RDNs must perform complex evaluations of the rules and regulations of the NCAA and other governing bodies and take into account all the evidence regarding the safety and efficacy of popular supplements.[80] According to the 1994 Dietary Supplement Health and Safety Education Act,[81] supplement manufacturers are not required to provide the Food and Drug Administration with evidence regarding safety or purity before their product is marketed and sold. Some products may contain ingredients not listed on the label, contain more or less of the ingredients listed, be contaminated, or be improperly labeled. For these reasons, the risk of dangerous side effects and the potential for exposure to NCAA–banned substances remains high.[82] Although the NCAA and the National Center for Drug Free Sport work to educate student-athletes about the risks associated with the use of dietary supplements and performance-enhancing substances (PESs), athlete knowledge regarding supplement safety and efficacy is low and use by both male and female athletes remains high, approaching 90% in some cases.[83] In addition, heavier alcohol consumption and higher rates of cigarette smoking and marijuana and amphetamine and narcotic use were observed in NCAA male athletes who took PESs, making enhanced and ongoing supplement education and prevention programs vital.[84]

Sports RDNs stay current regarding changes in the supplement industry, are skilled in providing supplement safety education, and can implement a full array of risk-management policies, which are critical professional services in collegiate athletic programs and important for maintaining NCAA compliance.[1] These services can also include directing all dietary supplementation prescriptions to treat nutrient deficiencies, such as iron deficiency or a low vitamin D level.[2] Current NCAA legislation permits collegiate athletic departments to supply student-athletes with vitamins, minerals, and fatty acids. As with all supplements, products considered generally safe and even those prescribed by a physician should be thoroughly evaluated by a sports RDN for safety and efficacy, meaning that an evidence base exists for their use, they are free of banned substances, and they are complementary to a "food-first" approach.[80,85] Because both ATs and sports RDNs are primary sources of information on this topic, coordinated efforts are essential for educating student-athletes on the safe and proper use of prescribed supplements, as well as the risks and potential harms associated with their use as PESs.[86] Evidence is lacking regarding the direct outcomes of supplement education by sports RDNs, and clinical research to answer questions about different types of interventions and their effectiveness as well as the proper use of supplements is warranted.

Minimum Standards for Integrated Performance Nutrition Services. The extent of individualized performance nutrition integration varies depending on the sports RDN's level of specialty practice, annual FTE appointment, sports RDN-to-student-athlete ratio, and the organizational model used (Figure 4) in each athletic department:

- Offering team and individual nutrition education and counseling to enhance performance, health, and wellness.
- Determining and developing applied performance nutrition strategies for individual athlete and team training cycles to enhance overall performance and wellness.
- Directing or conducting hydration testing, monitoring, and education.
- Developing nutrition and supplementation protocols for safety, compliance, and performance enhancement.

Sports Nutrition Organization and Staffing. Because sports RDNs' roles and responsibilities extend across multiple departments (student-athlete health, athletic med-

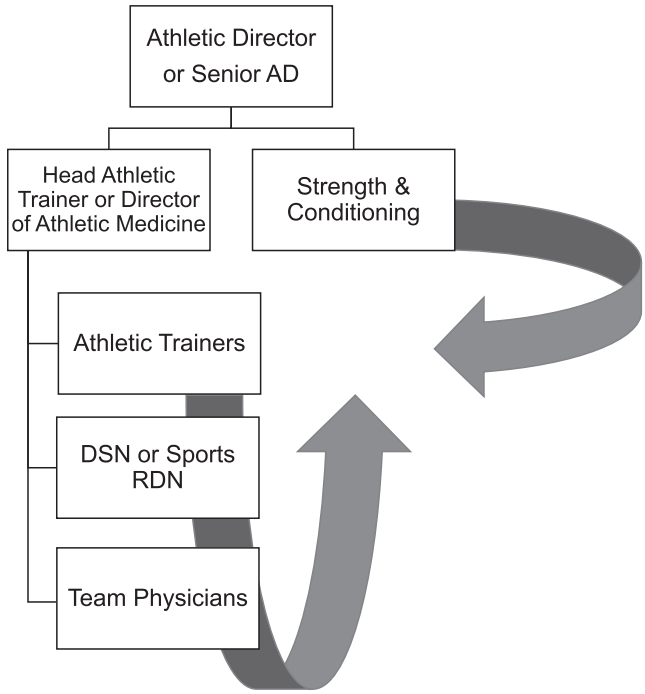

Figure 6. Head of athletic medicine reporting structure. Abbreviations: AD, athletic director; DSN, director of sports nutrition; RDN, Registered Dietitian Nutritionist.

icine, dining and facilities, operations and travel, strength and conditioning, and sports performance), their supervisors need a high level of organizational awareness to provide oversight. This makes it essential that sports RDNs report to an athletics administrator, whether it be the head AT overseeing a sports medicine department (Figure 6) or a senior athletics administrator for all remaining athletics models that include permanent full-time sports RDNs working as interdisciplinary high-performance team members (Figure 7). The benefits of a medical model (Figure 5) in collegiate athletics as a means of prioritizing patient-centered care, avoiding conflicts of interest in medical decision making, advancing adequate staffing, and reducing work-life conflicts for ATs are emerging.[20,87] The medical model may similarly benefit nutrition programs, and more thorough examinations of staffing, quality of care, and work-life balance for sports RDNs in each organizational type are needed. Also, in alignment with professional training and development pathways similar to those of athletic medicine and strength and conditioning departments, this consensus statement includes a sample pathway for the sports RDN's growth and advancement in the Table.

As services are added and programs evolve, departments must recognize the differences in the capacity and scope of responsibility between the part-time or single full-time sports RDN models and sports nutrition programs or department models that include a director of sports nutrition plus supporting staff. For example, a sports RDN serving as the director of sports nutrition not only directs and manages the effective delivery of nutrition programs and services[1] but also seeks continuous improvement by, for example, evaluating staff and service effectiveness to ensure that fiscal resources are appropriately used and managed, developing and implementing policies in the sports nutrition program or department, and advocating and providing justification for the expansion of services and staff when necessary.[1]

Minimum Standards for Integrated Sports Nutrition Organization and Staffing. Although appropriate for all models (Figure 4), the level of organizational leadership required increases as programs and departments expand. The extent of integration varies depending on the sports RDN's level of specialty practice, annual FTE appointment, and sports RDN-to-student-athlete ratio in each athletic department:

Leadership

- Set mission, vision, and values for the sports nutrition program or department.
- Participate in organization-wide strategic planning.
- Collaborate on departmental initiatives.
- Serve on administrative committees and act as a liaison for campus collaboration.

Personnel Management

- Recruit, hire, and mentor staff RDNs and train individuals for positions.
- Assign and delegate department responsibilities effectively.
- Serve as an expert in nutrition science.

Budget Management

- Develop an operating budget for the department and multisport program.
- Organize billing and invoice procedures.
- Monitor departmental expenses.

Clinic Management

- Supervise the provision of services and access to care.
- Develop appropriate documentation processes.
- Build secure, confidential Health Insurance Portability and Accountability Act (HIPPA)– and Family Educational Rights and Privacy Act (FERPA)–compliant services.
- Monitor and implement all federal and state regulatory requirements related to the practice of dietetics and food service.

Contract and Compliance Management

- Interact with fundraising and sponsorship personnel to support nutritional initiatives.
- Build a culture of supplement safety across the interdisciplinary departments and sport programs.
- Assess product selection and use for compliance with NCAA rules and regulations.
- Evaluate meal and snack provision for compliance with NCAA rules and regulations.

Sample Position Titles and Minimum Qualifications Across Models

Head Sports Dietitian, Director of Sports Nutrition, or Assistant Athletics Director of Sports Nutrition

- Bachelor's degree in nutrition or closely related field.
- RDN credential through the Commission on Dietetic Registration.

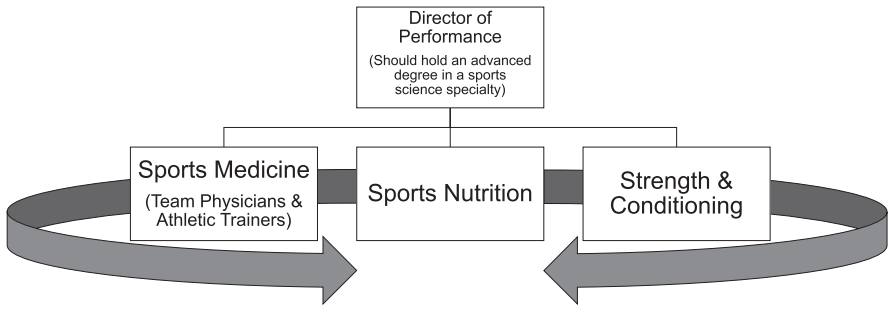

Figure 7. High-performance team reporting structure.

- Licensed Dietitian Nutritionist (LDN) credential if applicable in the state of residence.
- CSSD credential through the Commission on Dietetic Registration.
- Master's degree in nutrition, exercise physiology, or a related field when required. (The entry-level RDN educational requirements will change from a baccalaureate degree to a minimum graduate degree in 2024.)
- Expert practitioner of sports nutrition and dietetics.

Associate Sports Dietitian, Assistant Sports Dietitian, or Sports Dietitian

- Bachelor's degree in nutrition or a closely related field.
- RDN credential through the Commission on Dietetic Registration.
- LDN credential if applicable in the state of residence.
- CSSD credential through the Commission on Dietetic Registration.
- Master's degree in nutrition, exercise physiology, or a related field preferred when required. (The entry-level RDN educational requirements will change from a baccalaureate degree to a minimum graduate degree in 2024.)
- Proficient practitioner of sports nutrition and dietetics.

Culinary Dietitian

- Bachelor's degree in nutrition or closely related field.
- RDN credential through the Commission on Dietetic Registration.
- LDN credential if applicable in the state of residence.
- Culinary training with chef status.

Sports Nutrition and Dietetics Fellow or Sports Nutrition Assistant

- Bachelor's degree in nutrition or a closely related field.
- RDN credential through the Commission on Dietetic Registration.
- LDN credential if applicable in the state of residence.
- Master's degree in nutrition, exercise physiology, or a related field preferred when required. (The entry-level RDN educational requirements will change from a baccalaureate degree to a minimum graduate degree in 2024.)

Dietetic Interns, Graduate Assistants, or Other Postbaccalaureate Trainees

- Bachelor's degree in nutrition or a closely related field.
- Enrolled in or completed the most recent level of education required to sit for the registration examination.

Sports Nutrition Models and Future Research

Future investigators might benefit from using these sports nutrition models to create a consistent and unified organizational framework across institutions as clinical nutrition research is integrated with expanding scopes of service. Emerging areas of study have major implications for nutrition practice going forward in the collegiate setting. For example, nutrition for injury prevention and treatment[88–90] and nutrition-related neuroprotection from sport-related head trauma[91] are 2 highlighted areas of current interest that, in collaboration with a department's sports nutrition model of staff and services, can support future clinical nutrition research involving collegiate sport populations. Also, as our understanding of the gut-brain axis and the role of nutrition in preventing and treating conditions such as anxiety and depression evolves, specific nutrition interventions will likely be developed. These sports nutrition models could support translational science to help determine an intervention's effectiveness in a collegiate sport setting to help refine and improve the standard of care.[92,93] In addition, use of these models may better support future research collaborations between sports RDNs and scientific investigators regarding nutrition's role in mental health, life skills, and self-care. As applied sports nutrition research continues to emerge, collaborative efforts will be needed between researchers and athletic department staffs, including (among others) sports RDNs, SCCs, and ATs, to conduct examinations that not only increase our understanding but also inform student-athlete care on how to evolve and optimize nutrition services and staff using the models presented here.[94]

CONCLUSIONS

With tremendous growth of the sports nutrition field over the last decade, sports RDNs have quickly become essential staff for collegiate athletic programs.[94] However, despite established minimum competencies and standards of practice for sports RDNs,[1] a clear pathway for organization and development in athletic departments has not emerged. Therefore, in this consensus statement, we sought to introduce sports nutrition models, along with the core roles and responsibilities of the sports RDN, to assist collegiate athletic departments with the tasks of identifying, developing, and integrating sports RDN staff. We realize that programs have various degrees of support from sports RDNs and that a variety of organizational structures can be effective; thus, the outlined sports nutrition models are intended to provide an initial framework for aligning the level of service with the appropriate staffing level and scope

of services, regardless of the size of the institution or its funding opportunities, as well as to illustrate how current approaches and models might be organized and developed to ensure high-quality care.

Irrespective of collegiate division membership and athletic department size, sports RDN services provide departments an integral resource for supplying athlete-centered care through partnership and collaboration with sports medicine and sports performance personnel. As the emphasis on individualized athlete-centered care in collegiate athletics continues to evolve, the sports nutrition models are presented with the goal of better positioning departments to establish critical services and roles that use every aspect of sports RDN training and credentials for the benefit of student-athletes, athletic departments, and the colleges or universities at which they are employed. A refined appreciation of sports RDN qualifications and areas of expertise by the administrative and athletic department staff, as highlighted in this statement, will elevate the quality of care by ensuring that student-athlete needs are matched to a suitable sports nutrition model and qualified sport RDN personnel.

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