



# Chapter 2

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## The Big Picture

### 2.1 Long Term Athlete Development & Active for Life

**Editor's Note:** *In the process of developing this guide BlazeSports America researched best practices in a number of fields. The information presented in section 2.1 and 2.2 is taken from the Canadian Sport for Life materials with permission. For more detailed information, visit [www.canadiansportforlife.ca](http://www.canadiansportforlife.ca)*

To promote each child's healthy and logical development in a sport or physical activity, Long Term Athlete Development (LTAD) identifies sequential stages for training and competition that respects their physical, mental, and emotional development. This approach encourages **lifelong physical activity** for athletes of all levels of ability and disability, and it also provides an effective route for athletes to pursue excellence at the national and international level of competition.

LTAD is NOT just about developing the athlete — it is about developing the system in which the athlete learns and performs the sport so that optimal long-term development is supported. For athletes with disabilities, this means making sure that each sport program plans for and delivers what the athlete needs at each stage of development.

LTAD IS about ensuring the opportunity for everyone, regardless of ability, to develop physical literacy in order to enjoy lifelong physical activity whether that include sport, recreation, or exercise and fitness.

A brief overview of the stages is given below. For more details, refer to Canadian Sport for Life document available at [www.canadiansportforlife.ca](http://www.canadiansportforlife.ca). The ages given below represent the normal range of ages at each stage for individuals without disability. Individuals with a disability, particularly those with an acquired disability, may pass through the stages at significantly different ages and at greater speed and time since acquiring a disability (rather than chronological age) becomes an important factor.

#### **Stage 1 - Active Start: Males & Females 0 - 6 yrs. Fun and varied activity everyday.**

Children need to be introduced to relatively unstructured play that incorporates a variety of body movements. An early active start enhances development of brain function, coordination, social skills, gross motor skills, emotions, leadership, and imagination. It also helps children build confidence, develop posture and balance, build strong bones and muscles, promote healthy weight, reduce stress, improve sleep, learn to move skillfully, and learn to enjoy being active.

#### **Stage 2 - FUNdamentals: Males 6-9, Females 6-8 yrs. Learn all fundamental movement skills, play many sports, focus on agility, balance, coordination and speed.**

Children need to participate in a variety of well-structured activities that develop basic skills. However, activities and programs need to maintain a focus on fun, and formal competition should only be minimally introduced.



**Stage 3 - Learning to Train: Males 9-12, Females 8-11 yrs. Learn overall sport skills as cornerstone of many sports. Play a variety of sports and develop specific skills in three sports.**

Children are ready to begin training according to more formalized methods, but the emphasis should still be on general sports skills suitable to a number of activities. While it is often tempting to over-develop “talent” at this age through excessive single sport training and competition (as well as early positioning in team sports), this can be very detrimental to later stages of development if the child is playing a late specialization sport: it promotes one-sided physical, technical, and tactical development and increases the likelihood of injury and burnout.

**Stage 4 - Training to Train: Males 12-16, Females 11-15 yrs.**

(The ages that define this stage for boys and girls are based on the onset and end of the growth spurt). Build endurance; develop speed and strength towards the end of the stage. Improve sport specific skills. Focus on two sports.

At this stage, they are ready to consolidate their basic sport-specific skills and tactics. These youths may play to win and do their best, but they still need to focus more time on skill training and physical development over competition. This approach is critical to the development of top performers and maintaining activity in the long-term, so parents should check with their national organization to ensure their child’s program has the correct training-to-competition ratio.

**Stage 5 - Training to Compete: Males 16-23 +/-, Females 15-21 +/- yrs. Optimize fitness preparation and sport, individual and position specific skills. Learn to compete internationally. Focus on one sport.**

This is where things get “serious.” They can either choose to specialize in one sport and pursue a competitive stream, or they can continue participating at a recreational level and thereby enter the Active for Life stage. In the competitive stream, high volume and high intensity training begins to occur year-round.

**Stage 6 - Training to Win: Males 19+/-, Females 18+/-yrs. Ages are sport specific. Podium Performances. One sport.**

Elite athletes with identified talent enter a stage where they may pursue the most intense training suitable for international winning performances. At this stage, both world-class athletes with a disability and able-bodied athletes require world-class training methods, equipment, and facilities that meet the demands of the sport and the athlete.

**Stage 7 - Active for Life: Any age. A smooth transition from a competitive career to lifelong physical activity and participation in sport.**

Young athletes can enter this stage at essentially any age. According to LTAD, if children have been correctly introduced to activity and sport through Active Start, FUNdamentals and Learning to Train programs, they will have the necessary motor skills and confidence (physical literacy) to remain Active for Life in virtually any sport they like. They may decide to continue playing their sport at the recreational level, or they may become involved in the sport as a game official or coach. They might also try new sports and activities: examples could be a hockey player taking up golf or a tennis player starting to cycle.



Development of athletes with disabilities requires two new stages in addition to the 7 stages listed above. These stages are called **Awareness** and **First Contact/Recruitment** and are particularly important for individuals with an acquired disability who, prior to injury or illness, may have had no contact with, and no knowledge of, sport for athletes with disabilities.

### **Awareness Stage**

Sport opportunities for people with a disability are not always well known and someone who acquires a disability may have no knowledge of what sports are available. Sports programs need to develop awareness plans to make their offerings known to prospective athletes with disabilities as well as the general public.

### **First Contact/Recruitment Stage**

Sports programs may only have one opportunity to create a positive environment for prospective athletes with disabilities. It may not be easy for them to make the first approach to a sport, and research shows that if they don't have a positive first experience, they may be lost forever to the sport and to a healthy lifestyle.

The period following acquisition of a disability is one of transition and great change for most individuals. Some activities in which they were previously engaged may no longer be open to them in the same form, and they may not be aware of the many sporting and recreation activities that are available. The purpose of the Awareness and First Contact/ Recruitment stages is, therefore, to inform individuals of the range of activities in which they can participate and to provide ways for them to experience those activities. A positive first experience can go a long way to engaging persons with a disability in both competitive and recreational sporting activities. Athletes who retire from disability competition need to be encouraged to remain involved in the sport as coaches, program volunteers, fundraisers, mentors, or officials.

## ***2.2 The 10 Key Factors Influencing LTAD for Athletes with Disabilities***

### **1. The 10-Year Rule**

Exactly how long it takes to become an elite athlete with a disability varies from sport to sport, with the nature of the disability, and considerably with the pre-injury sporting experience and expertise of trained athletes who acquire a disability. The highest level of performance in hotly contested sports appears to take the same time and level of commitment as it does for able-bodied athletes, which is approximately 10,000 hours of training over 10 years.

### **2. The FUNdamentals**

Athletes, with and without a disability, need to acquire FUNdamental movement and sport skills, or physical literacy, through fun and games, and these needs to be achieved prior to puberty. Children with a disability face difficulties in acquiring FUNdamental skills because:

- overly protective parents, caregivers, rehabilitation facility staff, teachers, and coaches shield them from the bumps and bruises of childhood play.
- adapted physical education is not well developed in all school systems.



- some coaches and programs do not welcome children with a disability to their activities because of a lack of knowledge about how to integrate them.
- it takes creativity to integrate a person with a disability into a group activity where FUNdamental skills are practiced and physical literacy is developed.

The physical literacy skills needed by children with a disability vary greatly depending on the nature and extent of their disability and should include all such skills learned by able-bodied children (modified as required) as well as the additional skills required for effective use of assistive devices. Regardless of their previous physical skill, individuals who acquire a disability often have to learn new physical literacy skills such as wheeling their wheelchair, using a prosthetic limb, or accommodating a restricted range of movement. Even though they may be adults, it is critical that individuals effectively learn the FUNdamentals of new movement and sport skills so that those skills can be applied to a wide range of sports and recreational activities.

### **3. Specialization**

Disability sports are late specialization sports (see Canadian Sport for Life document for more details, page 22) and it is critically important that children with congenital or early-acquired physical or intellectual disability be exposed to the full range of FUNdamentals before specializing in the sport of their choice. Similarly, adults with an acquired disability should master their new FUNdamental movement skills before specializing in a single sport.

### **4. Age Factors**

Some congenital disabilities are known to influence childhood and adolescent development and the timing of puberty; however, much more research is needed before a full understanding is achieved. Although the timing of puberty may vary, the sequence of development that the adolescent goes through usually does not. For example, children with spina bifida are known to experience puberty earlier than their peers and individuals with intellectual disability tend to enter puberty early but complete the process later. Because of variations in the timing of puberty (and therefore peak height velocity), it is likely that there will also be variations in the ages at which optimum periods of trainability occur.

### **5. Trainability**

Little or nothing is known about periods of optimum trainability for individuals with a disability. In the absence of information to the contrary, it is suggested that for children with a congenital disability, the ages of optimum trainability, as shown in Canadian Sport for Life, page 27, be adjusted based on the observed age of puberty. Whether there are optimum periods of trainability during post-injury rehabilitation needs to be investigated.

### **6. Physical, Mental, Cognitive, and Emotional Development**

Sport can play an important role in helping individuals with a physical or intellectual disability to develop a new, positive self-image as well as enhance their self-concept. For this reason, sport programs should consider the mental, cognitive, and emotional development of athletes with disabilities in addition to their physical development. Consideration of mental, social, and emotional development is particularly important when working with athletes with intellectual disability and the developmental characteristics and implications for coaches need to be interpreted in light of each athlete's mental and developmental age, rather than chronological age. With LTAD's holistic approach to athlete development, programs for athletes with disabilities need to place emphasis on ethical behavior, fair play, and character building throughout the various stages. Particularly for



athletes with an intellectual disability, consideration must be given to the athletes' ability to understand and apply these concepts.

## **7. Periodization**

There is no evidence that periodization for an athlete with a disability is substantially different from that for able-bodied athletes. It is therefore suggested that the recommendations on periodization in Canadian Sport for Life document be followed. Since disability may reduce functional muscle mass and aerobic capacity, fatigue in athletes with disabilities should be carefully monitored, and rest and recovery periods should be adjusted accordingly.

## **8. Calendar Planning for Competition**

Within the Canadian sport system, under-training and over-competition are common and the ratios for training to competition should be applied. There is no evidence to suggest different ratios for athletes with disabilities. Effective competition for athletes with disabilities in all classifications needs to be matched to the athletes' stage of development. This can be a problem when there are few athletes in a particular sport or classification/division within that sport. Creative solutions to this problem need to be developed, particularly for athletes with greater levels of disability. Currently, local and international levels of competition (suitable for the Learning to Train and Training to Win stages) are more readily available than competition suitable for athletes at the Training to Train and Training to Compete stages. This gap in the competition calendar must be eliminated if optimum development is to occur.

## **9. System Alignment and Integration**

Since Canadian Sport for Life focuses on athlete development through Canada's sport system, No Accidental Champions focuses on aligning the many components of that system for athletes with disabilities. This includes development of competition, coaching, funding, facilities and equipment, training partners, sport science, ancillary services, daily living support, and talent identification and development. Without sport system alignment and integration, optimum benefits for an athlete with a disability will not be achieved.

## **10. Continuous Improvement**

Sport for athletes with disabilities is relatively young and, like many newer sports, is developing at an incredible rate. New research, new equipment, and new techniques appear rapidly worldwide, and to put Canadian athletes "out front", sport organizations must be on the alert to take advantage of all new information. Evaluating that information, selecting what information will be used, and then integrating it into programs and services must be an active, ongoing process, tied to the concept of continuous improvement, which permeates LTAD. This concept ensures that LTAD for athletes with disabilities:

- responds and reacts in a timely manner to new scientific and sport specific data, observations, and research
- is a continuously evolving vehicle for positive change in the sporting, recreation, and physical education lives of individuals with a disability.
- promotes ongoing education and sensitization of federal, provincial/territorial, and municipal governments, the mass media, and the Canadian sport system to the needs and expectations of athletes with disabilities.



- While there are many similarities between athletes with disabilities and able-bodied athletes, there are some differences that change the LTAD process. Athletes may have been born with a disability (congenital disability) or may have acquired a disability later in life.
- Children with a congenital disability may not have the same opportunity to learn FUNdamental movement skills because they do not always have the same opportunities for vigorous, physical play during their early years (Active Start). This is sometimes due to long periods of hospitalization and the lack of suitable physical education programs, but may also be due to parents or caregivers being overly protective, a situation that can also occur with an acquired disability.
- Athletes with disabilities may operate in a sport environment in which there are participants not found in able-bodied sport. For example, runners who are blind need sighted guides and most sports require officials who determine the classification or division of competition into which the athlete best fits to ensure fairness of competition. Failure of the sport system to develop these supporting roles will have a long-term negative impact on athlete development and the competition experience.
- Many athletes with disabilities require equipment or facilities adapted to take full advantage of their athletic ability and to minimize the sport-performance impact of their disability. Because there may be only a few other athletes with disabilities with the same type and/or level of disability, access to appropriate competitive experiences may be difficult.
- Some athletes with disabilities require personal care support, interpreters, and other personnel not found in sport for the general population.

## 2.3 What is Physical Fitness?

There are **six measures** of physical fitness:

**1. Cardiorespiratory Endurance or Aerobic Fitness** – the ability of the heart, lungs and blood vessels to work efficiently for an extended period of time EG fast walking, wheeling, jogging, running, swimming, biking, handcycling, and cross-country skiing.

The heart is a muscle that works to pump blood to the body. The harder the work or the more active an individual is the more blood your heart has to pump. Aerobic exercise or activity helps to make the heart fitter. **Aerobic** means "with air," so aerobic exercise is a form of activity that requires oxygen to be delivered to the working muscles of the body (for runners, the primary muscles are in the legs; for swimmers, muscles throughout the body are used; for a wheelchair track athlete, the primary muscles are in the arms). When breathing, your lungs (part of the *respiratory system*) take in oxygen, which is absorbed into the blood stream (part of the *vascular system*). Aerobic exercise makes a person breathe faster than normal (at rest) and also causes the heart to pump more rapidly and forcefully, while also making one sweat and breathe more frequently and deeply.

The more frequently one performs aerobic exercise the more activity the heart, lungs and blood vessels experience. Regular workouts help the cardiorespiratory and vascular systems deliver oxygen (in the form of oxygen-carrying blood cells) more efficiently to all parts of the body.



## 2. **Muscular Strength** – the ability of a muscle to create a force, EG weightlifting

Activities where the resistance against which the muscles work is medium to high will build muscle strength. For example, doing a push-up or pull-up will build muscles in the upper body. Weight lifting is the primary activity used by athletes for gaining increased muscle strength. Adults and teenagers who lift weights regularly will experience growth of their muscles. Due to some basic differences, a young woman who weight trains will gain in strength but her muscles are not likely to grow as much as a young man who lifts weights. Children are not likely to benefit very much from weight lifting so it is not a recommended activity until the teen years, and preferably at least 15 years of age.

Some activities that help to build stronger and bigger muscles include:

- push-ups
- pull-ups
- wheeling up hills/on grass
- running (sprinting)
- weight lifting

## 3. **Muscular Endurance** – the ability to use muscles to create a force repeatedly or over a long period of time.

Regularly engaging in activities that offer low to medium resistance to the working muscles will promote increased muscular endurance. This means that muscles with greater endurance are able to work for a longer time than less fit muscles. Typically, if a movement activity can be repeated for more than about 15 times (called *repetitions*) when the resistance is low to medium then it produces improvement in muscular endurance. If the movement activity can be repeated fewer than about 15 times before the muscle becomes fully fatigued then it is considered to promote muscular strength.

Activities that promote muscular endurance include:

- weight training
- rowing/canoeing/kayaking
- running/wheeling
- dancing
- cycling/handcycling

## 4. **Flexibility** – the ability to have a large range of movement around a joint. If one has good flexibility they may be able to bend their joints and stretch their muscles very easily. However, flexibility varies from person to person and even joint-to-joint or muscle-to-muscle. Just like muscular strength and endurance, one must constantly work on flexibility or it will be lost. Flexibility is important as it helps to avoid injuries to muscles, joints, and soft tissue. Good flexibility is also very important for most sports and many jobs that require physical activity. Therefore, stretching muscles and joints frequently, ensure that one can move the body through a *full range of motion*. People who are flexible can move more freely and without tightness or pain. Sports or activities that require good flexibility include:

- wheelchair racing
- dancing
- martial arts
- yoga



## 5. **Skill** – agility, balance, reaction time and coordination.

Skill generally means having the ability to perform a complex movement activity very effectively. Typically, this means that the person possesses good coordination in addition to the other physical attributes required to perform the skill well. Good coordination means one's muscles; brain and nerves work very well together when performing the skill. Examples of activities requiring skill include:

- shot put/discus throw
- golf swing
- soccer kick
- tennis serve
- high jump
- throwing a ball

## 6. **Mental Attitude** – determination to maintain your activity (exercise, sport, physical work), train and succeed.

Most successful athletes have a good mental attitude about their sport. They are responsible and disciplined in preparing and training for success in the physical activity, which may require hard work, long hours, and focus. The same qualities are needed even if one is not an athlete but simply wants to be more physically fit. Becoming fit or maintaining fitness, once developed, also may require hard work, long hours, and focus. Anyone can benefit from having a good mental attitude about activities in their life no matter the purpose of the activity.

### **2.4 Principles of Fitness Training**

**Specificity** - choose the right kind of activities to affect each component of physical fitness. Strength training results in specific muscle strength changes. Also, train for the specific activity of interest. For example, if you desire to improve cardio respiratory/aerobic fitness then one must engage in appropriate activities and, likewise, if one desires to become stronger then one must engage in appropriate activities to promote stronger muscles. However, activities that promote increases in strength are not likely to promote better cardiorespiratory/aerobic fitness and vice-versa. To become a better runner, one then must train by running. To become a better soccer player then one must train for soccer specific skills and fitness. Playing one sport will not necessarily help play another sport any better. Likewise, physical fitness training for one aspect of fitness will not necessarily help improve another aspect of fitness (strength training does not improve flexibility, aerobic training does not improve sport skills, etc).

**Overload** – To work hard enough, at levels that are vigorous, and long enough to overload your body above its resting level, to bring about improvement.

**Regularity** - At least three balanced workouts a week are necessary to maintain a desirable level of fitness.

**Progression** - increase the intensity (how hard one works at the activity), frequency (how often one participates in the activity) and/or duration (how long one participates in the activity) of an activity over periods of time in order to improve.



## 2.5 Physical Activity

Physical activity promotes physical fitness. Physical activity is movement by a person of any type. Sport, exercise, physical work and leisure activities are all considered forms of physical activity. Some specific examples of physical activity are running, wheelchair racing, jumping, soccer, basketball, and weight lifting. Activities that we perform most everyday are also considered physical activity: walking, wheeling, climbing stairs, carrying groceries or working in the yard. Doing these activities on a regular basis can help improve our health or fitness. Health benefits can be achieved when the participant is active at a level or intensity that increases the heart rate (number of heart beats in one minute) and produces heavier than normal breathing.

Children can be physically active during the day by participating in physical education class, recess, and after school activity programs like sport, dance or play. If children live in a safe area or close to their school they can walk or ride their bike to and from school. Adults should also be physically active everyday. Parents and children can and should be active together. The benefits of regular physical activity include:

- Reduction in the risk for overweight, diabetes and other chronic diseases
- Improved academic performance
- Children feel better about themselves
- Reduction in risk for depression and the effects of stress
- Children prepare to be productive, healthy members of society and
- Improved overall quality of life.

The benefits of regular physical activity for children and adults with disabilities include:

- Improved cardiovascular and muscle fitness
- Improved mental health and better ability to do tasks of daily life
- Reduction in the risk for coronary heart disease, high blood pressure, colon cancer, and diabetes.
- Reduction in the risk for symptoms of anxiety and depression.
- Reduction in the risk for blood pressure in some people with hypertension
- Improved overall quality of life

The U.S. Department of Health and Human Services published the *2008 Physical Activity Guidelines for Americans*. These guidelines suggest that substantial health benefits will be gained by doing physical activity according to the Guidelines presented below for different groups.

### **Children and Adolescents (aged 6–17)**

- Children and adolescents should do 1 hour (60 minutes) or more of physical activity every day.
- Most of the 1 hour or more a day should be either moderate- or vigorous intensity aerobic physical activity.
- As part of their daily physical activity, children and adolescents should do vigorous-intensity activity on at least 3 days per week. They also should do muscle-strengthening and bone-strengthening activity on at least 3 days per week.



## Children and Adolescents with Disabilities

The U.S. Department of Health and Human Services suggest families work with the child's health care provider to identify the types and amounts of physical activity appropriate for children ages 6-17. When possible, children with disabilities should meet the guidelines for children and adolescents listed above or as much activity as their condition allows. Children and adolescents should avoid being inactive.

In turn, adults with disabilities should follow the adult guidelines listed below. If this is not possible, these persons should be as physically active as their abilities allow. Similar to children and adolescents, adults with disabilities should avoid inactivity.

### Adults (aged 18–64)

- Adults should do 2 hours and 30 minutes a week of moderate-intensity, or 1 hour and 15 minutes (75 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic physical activity. Aerobic activity should be performed in episodes of at least 10 minutes, preferably spread throughout the week.
- Additional health benefits are provided by increasing to 5 hours (300 minutes) a week of moderate-intensity aerobic physical activity, or 2 hours and 30 minutes a week of vigorous-intensity physical activity, or an equivalent combination of both.
- Adults should also do muscle-strengthening activities that involve all major muscle groups performed on 2 or more days per week.

### Adults with Disabilities

Follow the adult guidelines. If this is not possible, these persons should be as physically active as their abilities allow. They should avoid inactivity.

### Older Adults (aged 65 and older)

- Older adults should follow the adult guidelines. If this is not possible due to limiting chronic conditions, older adults should be as physically active as their abilities allow. They should avoid inactivity. Older adults should do exercises that maintain or improve balance if they are at risk of falling.

For all individuals, some activity is better than none. Physical activity is safe for almost everyone, and the health benefits of physical activity far outweigh the risks. People without diagnosed chronic conditions (such as diabetes, heart disease, or osteoarthritis) and who do not have symptoms (EG, chest pain or pressure, dizziness, or joint pain) do not need to consult with a health care provider about physical activity.

### BlazeSports Resources

BlazeSports has a variety of physical activity and sport instructional videos and webinars available on BlazeTV at: <http://www.youtube.com/blazesports>

For more information on the *2008 Physical Activity Guidelines for Americans* published by the U.S. Department of Health and Human Services (HHS) visit:

[www.health.gov/paguidelines/default.aspx](http://www.health.gov/paguidelines/default.aspx)



## 2.6. Healthy Eating for An Active and Healthy Lifestyle – The Game Plan

Healthy eating is important for everyone – with and without a disability, inactive or very active and from recreational enthusiast to the competitive athlete. It is an imperative part of being healthy along with being physically active and feeling good about oneself.

Making healthy choices however can be a struggle... juggling training/practice, workout, work, school, friends, family and other commitments.

### Healthy Eating has numerous benefits

- Contributes to overall health
- Provides more energy
- Decreases stress and helps promote healthy lifestyle
- Prevents many heart diseases or cardiovascular disease
- Maintains a healthy heart and helps fight infections
- Improves sport performance
- Maintains a healthy weight, which impacts all of the above

The **2010 Dietary Guidelines for Americans** (DGA)\*\* encompass two overarching concepts:

- 1) Maintain calorie balance over time to achieve and sustain a healthy weight.
- 2) Focus on consuming nutrient-dense foods and beverages.

### The DGA recommendations include:

- Balancing calories to manage weight
- Foods and food components to reduce
- Foods and nutrients to increase



My plate promotes eating foods from the different food groups and recommends being physically active. My Plate provides personalized nutrition information based on age, gender, and physical activity level. My Plate also includes snack ideas, handouts, and posters to share with program participants at: [www.choosemyplate.gov](http://www.choosemyplate.gov)



## Key Recommendations/Healthy Eating Patterns

**Not a quick fix.** Healthy eating is not a quick fix, the latest fad or a one shot deal. It is about enjoying food and making healthy choices most of the time.

**Balance, variety and moderation** are the keys to healthy eating. This includes choosing foods from every food group and mixing up choices within each food group.

**Making Healthy Choices – My Plate.** Following the US Department of Agriculture’s, My Plate ([www.choosemyplate.gov](http://www.choosemyplate.gov)) can help make healthy choices every day through balance, variety and moderation.

**Focus on fruits.** Eat a variety of fruits - fresh, frozen, dried or canned. Choose real fruit as opposed to fruit juice for most of your fruit choices. For a 2,000-calorie diet, eat 2 cups of fruit each day (for example, 1 small banana, 1 large orange, and 1/4 cup of raisins).

**Vary your veggies.** Eat more dark-green veggies, such as broccoli, spinach and other dark leafy greens; orange veggies, such as carrots, sweet potatoes, pumpkin, and winter squash; and beans and peas, such as pinto beans, kidney beans, black beans, garbanzo beans, split peas, and lentils.

**Make half your grains whole.** Eat at least 3 ounces of whole-grain cereals, breads, crackers, rice, or pasta every day. One ounce is about 1 slice of bread, 1 cup of breakfast cereal, or 1/2 cup of cooked rice or pasta. Look to see that grains such as wheat, oats, or corn are referred to as “whole” in the list of ingredients.

**Eat calcium-rich foods.** Get 3 cups of low-fat or fat-free milk, or an equivalent amount of low-fat yogurt and/or low-fat cheese (1-1/2 ounces of cheese equals 1 cup of milk)— every day. For kids aged 2 to 8, its 2 cups of milk. If you cannot consume milk, choose lactose-free milk products and/or calcium-fortified foods and beverages.

**Go lean with protein.** Choose lean meats and poultry. Bake it, broil it, or grill it. And vary protein choices with more fish, beans, peas, nuts, and seeds.

**A calorie is a calorie is a calorie.** At the end of the day, excess calories, whether they come from fat, protein or carbohydrate, will be converted into fat in the body. Choosing smaller portions is key. US Dietary Guidelines recommend choosing most of one’s daily calories from carbohydrates (55-65%), then protein, (<20%), followed by fat (<30%). Some carbohydrates such as whole grain breads and cereals, fruit, vegetables, beans and lentils (have more fiber) are better than others.

## Special Nutrition Considerations for Individuals with Spinal Cord Injury and Other Mobility-Related Disabilities

Individuals with a spinal cord injury are susceptible to weight gain and other conditions related to weight gain. This is largely because after a spinal cord injury there is a loss in muscle resulting in a lower body metabolism (ranging from 12% to as high as 54% depending on the level of the spinal cord injury). A lower metabolism means that fewer calories are burned and most people with a spinal cord injury or other mobility-related disability can compensate with just everyday activities. This makes physical activity (aerobic and strengthening exercises) and healthy eating all the more important.

**\*\*Note:** For more details, please see Appendix 1



## **Other nutrition considerations for individuals with physical disability include:**

### **Fiber**

- Helps maintain digestive system and maintain regular bowel function
- Fiber also helps in maintaining a healthy heart.
- Need 20-35 grams/day (increase amount gradually)
- Food sources: fruits, vegetables, whole grains (such as whole wheat bread, All Bran, brown rice, etc). Natural sources of fiber are best.

### **Calcium**

- Helps to build teeth and bones and maintain bone mass (especially for women with a spinal cord injury or those who cannot ambulate).
- Also needed for blood clotting, and muscle and nerve functioning.
- Vitamin D is also needed to help calcium do its job in the body.
- Need 2-3 cups of dairy everyday (1 cup=1 cup milk or yogurt, 1-1/2 oz cheese) talk to health care providers about the need for a calcium supplement.
- Food sources: dairy products (milk, cheese, yogurt), fortified soy milk, green vegetables

### **Protein**

- Helps build muscle, skin, and fight infections. Helps prevent and treat pressure sores/ulcers.
- Protein for people with spinal cord injury is generally the same as people without (unless active wound healing) – 0.8 g/kg of body weight.
- Food sources: Eggs, fish, lean meat, seafood, low-fat milk, cheese, beans and lentils.
- Ensure is a great source of protein during active wound healing.
- High protein/low carbohydrate diet can lead to constipation and kidney stress.

### **Sodium**

- Helps regulate fluid balance in the body and important for nerve transmission and muscle contraction.
- Limit intake to less than 2300 mg/day (~1 tsp). For people with hypertension, older adults, and African Americans, limit to no more than 1500 mg/day
- Sources: table salt, canned foods, pre-packaged meals and other prepared foods

### **Potassium**

- Assists in muscle contraction, maintains fluid and electrolyte balance in cells, transmits nerve impulses, and releases energy during metabolism.
- Helps lower blood pressure and may reduce the risk of developing kidney stones.
- Can lower blood pressure by blunting the adverse effects of sodium on blood pressure.
- May help reduce an individual's risk of developing kidney stones and decrease bone loss.



## The Bottom Line

- Choose a variety of foods from all food groups.
- Choose whole grain breads and cereals – whole wheat, brown rice, and oatmeal.
- Focus on fruits and vegetables: *color your world*
- Make dairy low-fat: *Choose 1% or skim milk, yogurt and cheese*
- Choose Eggs, nuts, lean meats, poultry and fish to build healthy skin and muscle, and fight infection
- Use good fat for cooking like canola and olive oil
- Choose water (at least 8 cups - 64oz/day) over juice or soda. If you drink juice, make sure the label says 100% fruit juice.
- Limit salt, alcohol, and caffeine
- Portion control – watch portion sizes
- Calories count whether from fat, carbohydrates or protein. At the end of the day, it's total calories that count.
- Eat breakfast every day – this is an important weight management tool for adults as it stimulates the metabolism and important for school-age children to be ready to perform well in school.
- Be a good role model and mentor parents/caregivers to be the same.
- Encourage families to eat meals together as often as possible.
- Be active every day, at least 30 minutes/day for adults (10-minute increments count).
- Make it easier to make healthy choices: encourage your facility (EG local parks and recreation, university, hospital, school) to include healthy snacks in vending machines and concession stands.

## Goal Setting

Setting realistic and achievable goals is the first step to lasting change. Choose short (a few weeks) and long-term goals. Start small and choose ones that are realistic. Ask your self; what is one change I can make now? For example, replace sodas with water. Revisit your goals often.

## Eating to Win...the Power of Food

It is not about the latest pill or powder and all about the power of food not just on game day but everyday!

### Eating to Win Checklist

- Eat three balanced meals everyday – especially breakfast
- Choose healthy snacks – mid-morning and mid-afternoon
- Any fresh fruit, yogurt, carrots (or other vegetable) and low-fat salad dressing, cheese and crackers, 100% fruit juice (make sure label says 100% fruit juice).
- Listen to your body...when you feel full and when you feel hungry
- Focus on fruits and vegetables – More Matters!
- Choose good fats: nuts and seeds, olives, fish, peanut butter, low-fat milk and cheeses, avocados
- Take a daily multi-vitamin, especially if you have a restricted diet such as vegetarian.
- Water, water, water.
- Important: find what works best for you and your exercise program; it may take some trial and error.



## It's All in the Timing

### Before You Exercise or Before Your Game

- Carbohydrates are the primary and most important source of fuel for athletic performance. Carbohydrates before exercise help reload glycogen stores. Carbohydrates are stored in the muscles and liver as glycogen.
- 2-4 hours before: eat a small meal (high carbohydrate, low protein and low fat)
- 30-90 minutes before: eat a high carbohydrate snack such as a banana, fruit smoothie, cup of chocolate milk/soymilk, a cup of non-fat/low-fat yogurt.

### During Exercise

- Drink water every 15-20 minutes
- Sports drinks with electrolytes can be consumed to delay onset of fatigue, primarily for training and competitions that last more than one hour

### After Exercise

- Protein is most important after you exercise
- Combine with a carbohydrate to restore glycogen synthesis
- Too much protein can result in dehydration and mineral losses

### Water

- Drink water, drink water, and drink more water – before, during and after physical activity/competition
- Water must be consumed daily in order to prevent dehydration.
- Drink water and other fluids with few or no calories.
- Individual water requirements can vary greatly, even on a day-to-day basis, primarily because of differences in physical activity and environmental conditions and differences in diet.
- Keep a water bottle with you at all times.
- Drink 6-8 cups of water everyday
- Drink about 16oz (2 glasses full) two hours before competition.
- During competition, it is important to drink water regularly (every 15-20 minutes) even if you don't feel thirsty. When you feel thirsty, your performance is already at a 2% decrease and dehydration has begun.
- If your competition lasts more than an hour, consider consuming a sports drink with electrolytes to delay onset of fatigue.



## In Summary...

	Before	During	After (30 minutes and 2 hours)
<b>Carbohydrate</b>	High	Low	High
<b>Protein</b>	Moderate	None	Low
<b>Fat</b>	Low	None	Low
<b>Foods</b>	<p>2-4 hours before: Eat a regular balanced meal (carbohydrate, protein, fat) (E.G. turkey sandwich on wheat bread and fruit)</p> <p>30-90 minutes before <u>workout/competition</u> (high carbohydrate) Small banana, cup of non-fat/low fat yoghurt, goldfish crackers/animal crackers, 8oz fruit smoothie</p>	<p>Simple carbohydrate, E.G. 1 cup Gatorade for every 2 cups water</p>	<p>Pasta, bagels, yogurt, cheese, 100% fruit juice, cereal and milk, cottage cheese</p>
<b>Water</b>	Drink before competition	Drink every 15-20 minutes	Drink at least 2 cups

## Nutrition and Physical Activity Resources

Dietary Guidelines for Americans	<a href="http://www.dietaryguidelines.gov">http://www.dietaryguidelines.gov</a>
MyPlate	<a href="http://www.choosemyplate.gov">http://www.choosemyplate.gov</a>
Physical Activity Guidelines for Americans	<a href="http://www.health.gov/paguidelines">http://www.health.gov/paguidelines</a>
Nutrition	<a href="http://www.nutrition.gov">http://www.nutrition.gov</a>
Health Finder	<a href="http://www.healthfinder.gov">http://www.healthfinder.gov</a>
Health	<a href="http://www.health.gov">http://www.health.gov</a>
U.S. Department of Agriculture (USDA)	<a href="http://www.usda.gov">http://www.usda.gov</a>
Center for Nutrition Policy and Promotion (CNPP)	<a href="http://www.cnpp.usda.gov">http://www.cnpp.usda.gov</a>
Food and Nutrition Service (FNS)	<a href="http://www.fns.usda.gov">http://www.fns.usda.gov</a>
National Institute of Food and Agriculture (NIFA)	<a href="http://www.nifa.usda.gov">http://www.nifa.usda.gov</a>
U.S. Department of Health and Human Services (HHS)	<a href="http://www.hhs.gov/">http://www.hhs.gov/</a>
Office of Disease Prevention and Health Promotion (DPHP)	<a href="http://odphp.osophs.dhhs.gov">http://odphp.osophs.dhhs.gov</a>
Food and Drug Administration (FDA)	<a href="http://www.fda.gov">http://www.fda.gov</a>
Centers for Disease Control and Prevention (CDC)	<a href="http://www.cdc.gov">http://www.cdc.gov</a>
National Institutes of Health (NIH)	<a href="http://www.nih.gov">http://www.nih.gov</a>
Let's Move!	<a href="http://www.letsmove.gov">http://www.letsmove.gov</a>
Healthy People	<a href="http://www.healthypeople.gov">http://www.healthypeople.gov</a>
U.S. National Physical Activity Plan	<a href="http://www.physicalactivityplan.org">http://www.physicalactivityplan.org</a>

### How to find a registered dietitian:

A registered dietitian can help assess individual dietary needs and develop individual goals and diet plan. To find a registered dietitian in your area, ask your physician/health care provider for a referral or go to the American Dietetic Association website ([www.eatright.org](http://www.eatright.org)) and click on "Find a Nutrition Professional."

For more information: <http://www.dietitian.com/calcbody.php>

This section was compiled and reviewed to assimilate relevant information about nutrients and their direct and indirect impacts on leading a healthy lifestyle. Information in this section is based on the 2010 Dietary Guidelines for Americans (DGA) and a Report of the 2010 Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans. **The federal government released this evidence-based nutritional guidance to promote health, reduce the risk of chronic diseases, and reduce the prevalence of overweight and obesity through improved nutrition and physical activity. The new**



guidelines are available online at: [www.dietaryguidelines.gov](http://www.dietaryguidelines.gov). This is the seventh edition of the dietary guidelines. This edition places a stronger emphasis on reducing calorie consumption and increasing physical activity than prior iterations of the guidelines due to the growing number of youth and adults who are considered obese.

#### Sources:

1. Center for Disease Control and Prevention (CDC).
2. US Department of Agriculture (USDA), My Plate, [www.choosemyplate.gov](http://www.choosemyplate.gov). 2010. Accessed June 27, 2011.
3. US Department of Agriculture (USDA), Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2010.

## 2.7 Additional Resources to Support Healthy Lifestyles

*President's Council on Fitness, Sports, and Nutrition* – has a number of resources including:

*Presidential Active Lifestyle Award (PALA)*: <http://www.presidentschallenge.org/>

*Let's Move!*: [www.letsmove.gov](http://www.letsmove.gov)

*White House Task Force Report on Childhood Obesity*:

<http://www.letsmove.gov/white-house-task-force-childhood-obesity-report-president>

*America's Great Outdoors Initiative*: <http://americasgreatoutdoors.gov/>

*National Physical Activity Plan*: <http://www.physicalactivityplan.org>

### National Statistics

According to the National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention (CDC) and the most recent data from the National Health and Nutrition Examination Survey (NHANES):

- 17.1% of children and adolescents 2 to 19 years (over 12.5 million) were overweight;
- an estimated 16.9% of children and adolescents aged 2-19 years are obese;
- 32.2% of adults (over 66 million) were obese.
- Some experts claim that by 2015, 75% of adults will be overweight with 41% obese.
- National data indicate that approximately twice as many adults with a disability (25.6%) were physically inactive than adults without a disability (12.8%).
- Data from a national study conducted in Canada comparing health risk behaviors of adolescents with physical disabilities to adolescents without a disability found that physical inactivity was 4.5 times higher among people with disabilities compared to youth without a disability.
- People with disabilities are more likely to be obese (median: 31.2% vs. 19.6%) and physically inactive (median: 22.4% vs. 11.9%) compared to people without disabilities (median: 11.9%).

According to the Centers for Disease Control and Prevention (CDC), studies have shown that individuals with disabilities are more likely than people without disabilities to report poorer overall health, physical inactivity and smoking, and less access to adequate health care.

For all individuals, especially an individual with a disability, understanding how to prevent illness and manage these secondary health conditions is an important part of healthy living.

