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INSURANCE**THEME: MANAGING CHRONIC DISEASE****Managing Diabetes Through Physical Activity**

by George G.A. Pujalte, MD, FACSM



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Physical activity may not be commonly thought of as a key element in the treatment and prevention of type 2 diabetes mellitus. In reality, evidence shows that exercise can be an important tool in fighting diabetes. Exercise not only helps prevent type 2 diabetes, it also improves quality of life, extends life, lowers blood pressure and more. New studies are showing how quality of life, mortality, cardiovascular disease, blood pressure, cholesterol levels and type 2 diabetes

are all affected positively by physical activity. Combining modest weight loss with physical activity may lower the risk of getting type 2 diabetes by almost 60%. Both resistance and aerobic training have been shown to maximize the action of insulin, thereby helping prevent or treat diabetes.

Type 2 diabetes, also known as “adult-onset” or “non-insulin-dependent” diabetes, is a condition that affects the way the body breaks down sugar or glucose, which serves as the body’s main source of fuel. Type 2 diabetics either have bodies that resist the effects of insulin (the substance that regulates the movement of sugar in the cells of the body) or do not produce enough insulin to maintain a normal sugar level in the blood.

The number of people with type 2 diabetes has been increasing. About 60 million Americans are at risk for diabetes because of above normal blood sugar levels. One in three Americans born after 2000 will develop type 2 diabetes, and yet most people with type 2 diabetes are not active. This is unfortunate because more studies are coming out that point out the importance of physical activity for those with diabetes and those at risk for developing diabetes.

Exercise training should be an essential component of any treatment plan for all patients who have or are at risk for type 2 diabetes mellitus. In developing a treatment plan for prediabetics (people who have a high risk for diabetes) and diabetics, health care providers should make sure that physical activity is incorporated into the patients’ lifestyles, and that strategies are used to address psychosocial issues and concerns while promoting the health and behavioral changes needed. The expertise of behaviorists, exercise physiologists, peers and trainers could be tapped to develop a physical activity plan and maintain behavioral support.

Compelling evidence shows that physical activity can result in short-term improvements

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**Letter from the Editor**

by Dixie L. Thompson, PhD, FACSM

Welcome to the Spring 2014 edition of the *ACSM Fit Society® Page*, sponsored by Liberty Mutual. It is common to have some sort of chronic ailment — persistent allergies, high blood pressure, arthritis, etc. Exercise has been proven to provide relief from a variety of chronic diseases.

In this issue, you will read about managing chronic diseases like pulmonary disease, cardiovascular disease and diabetes. You’ll also read about the Exercise is Medicine® philosophy for disease prevention and management. We hope the information and tips contained here give you helpful advice and added motivation for building physical activity into your daily routine.

After you have read this information that ACSM experts have prepared for you, please feel free to share it with friends and family. We hope these articles will help as you pursue a healthy and active life.

Dixie L. Thompson, Ph.D., FACSM  
Editor, ACSM Fit Society® Page  
Email: dixielee@utk.edu

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**Managing Diabetes (continued from page 1)**

in the action of insulin that may last up to 72 hours. In high-risk adults, the best evidence shows that 2½ hours of moderate to vigorous exercise a week can prevent the onset of diabetes. Good evidence also shows that a combination of resistance and aerobic (e.g., swimming, cycling, running and walking) exercises may be more effective in improving blood sugar levels than any one activity by itself. Even patients who have arthritis, peripheral vascular disease or heart disease may engage in resistance and aerobic training, although sustained or vigorous exercise may be impossible or difficult for such individuals. Arthritis pain, sensations of numbness, tingling or chest discomfort may need to be addressed as they occur, and should be anticipated. Fortunately, water-based and low-impact exercises offer an alternative, and workouts can simply be shortened for such individuals.

Both resistance and aerobic exercises have been shown to improve the action of insulin and blood sugar levels. In type 2 diabetics, good

evidence exists that physical activity improves the quality of life and alleviates depression. In women with diabetes induced by their pregnancies, evidence shows that moderate exercise results in lower blood sugar levels. For those who have type 2 diabetes, evidence shows that at least 150 minutes per week of moderate-to-vigorous aerobic exercise lowers blood sugar levels in the long-term. It is recommended that these 150 minutes be done on at least three days per week, with no more than two consecutive days between episodes of aerobic activity.

The main fear some diabetic patients may have is that of getting low blood sugar, or hypoglycemia, while exercising, but they should be reassured that this occurs only rarely. Hypoglycemia occurs more frequently in patients on long-acting insulin or on multiple oral medications for diabetes, and in the elderly who have had the condition for a longer time. Closer blood glucose monitoring would need to be employed for such patients, and adjustments may need to be made to their exercise regimen,

meal timing and medication timing. For example, moderate-to-vigorous physical activity may be scheduled one hour after a meal to coincide with the rise in the blood glucose level.

In conclusion, physical activity is proven to be beneficial for patients at risk for or with type 2 diabetes, and should be incorporated into any treatment plan. In general, a minimum of 150 minutes of moderate- or vigorous -intensity exercise should be accumulated each week using a combination of both aerobic and resistance training to attain benefits. Health care providers should provide guidance, and patients are encouraged to ask about physical activity if it is not discussed during their regular provider visits.

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**Q&A**

by Anthony Luke, MD, FACSM



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**Q: I hear that "Exercise is Medicine" and that exercise is reported to improve just about everything. I have chronic obstructive pulmonary disease (COPD), and right now I get winded just going up the flight of steps in my house. How might exercise help me breathe better?**

**A:** We agree with you wholeheartedly when you write "Exercise is Medicine". It's a great philosophy to live by!

Seriously, you ask a very good question, one that addresses several important issues. Let's look at the issue of dyspnea, or "shortness of breath," first.

Dyspnea is the medical term for shortness of breath and is one of the hallmarks of COPD, one of the most common chronic lung diseases in the U.S. Part of the reason that a person feels short of breath with COPD is, indeed, that their lungs are not functioning properly. However, dyspnea is a complicated phenomenon and involves more than just the lungs; it involves the circulation, the brain and the muscles too. For example, we can feel short of breath if our muscles, including the leg muscles and diaphragm, are out of shape.

Studies have demonstrated objective improvements in both physical and psychological outcomes in COPD individuals who engage in regular exercise. It is recommended that individuals with a chronic condition like COPD consult their health care professional when embarking on an exercise program. Once cleared to do so, that person would want to have an initial goal of performing moderate intensity exercise at least 15 minutes, for at least three times a week, to begin to see benefits. Their ultimate goal would be to aim for sessions lasting 30 to 40 minutes, most days of the week. A mixture of both aerobic and resistance training for both the lower and upper extremities is ideal.

Check with your health care professional, and then start an exercise program. You'll find those stairs at home won't take the wind out of you quite so easily anymore!

**Q: I have Type I Diabetes (T1D) and have been working out for several years. I want to improve my performance in sports and fitness (continued on page 8)**

# Exercise is the Best “Medication” We Have! Go Get It!

by John Higgins, M.D., FACSM



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If I told you that I had a pill that can make you leaner (so you can fit into those ‘skinny jeans’), boost your energy and confidence, help you sleep better, lower your blood glucose/cholesterol/blood pressure, decrease your chances of stroke/heart attack/blood clots and build your bone strength, would you want it? And how about if it greatly increases your chances of living longer and being able to do more of those awesome things like fun family barbecues, traveling to exotic beaches, climbing a big mountain, biking for a charity or rocking out at a block party?

## How About If I Told You That You Can Get This today?!

This daily “medication” is as simple as consistently building physical activity into your daily routine. One approach is walking 10,000 steps per day. For many people this is roughly equivalent to adding 30 minutes of walking to their daily routine. This is only 2 percent of the entire day, and the investment is well worth it! If you want a buddy to help you out with exercise, I suggest you get a dog. Dogs are excellent personal trainers because they will give you a reason to take a walk every day!

We are now seeing more and more objective, well-conducted studies coming out in favor of exercise not only as an amazing preventive medicine, but also as a supplement to those who already have illness. In both cases, exercise decreases morbidity (ill health) and mortality (death) via direct and indirect ways. If we look at the major causes of death in the United States — cardiovascular disease (heart attack, stroke, peripheral vascular disease) and cancer — large studies have shown that people who exercise are less likely to develop these conditions. And, if they do develop these conditions, they are less likely to die from them.

While it has been long suspected that exercise is good, only recently have that studies shown that “good” is in fact “very good!” How good? In many cases, exercise was as good as many pharmaceutical drugs in reducing one’s chances of dying from coronary heart disease, stroke and heart failure. In addition to being a great “medication” against these diseases, it also lowers risk factors for many chronic diseases. Not only does exercise have benefits for physical conditions, but also psychological conditions such as anxiety and depression. In fact, exercise is such an important factor in preventing disease and maintaining health that the Global Burden of Disease & Institute for Health Metrics and Evaluation recently listed lack of exercise as one of the top five causes of disease in the USA (the other four were dietary risks, smoking, high blood pressure and high Body Mass Index).

The myriad effects of exercise on our body, from improving our musculoskeletal and cardiopulmonary systems to enhancing neurological and endocrine function, can help prevent chronic diseases as well as help maintain independent and healthy living. The list of medical conditions improved by exercise includes:

- Hypertension: reduces risk by up to 40%
- Heart disease: reduces risk by up to 40%
- Stroke: reduces risk by up to 27%
- Cancer: reduces risk of colon cancer by up to 60%, reduces mortality due to and recurrence of breast cancer by up to 50%
- Diabetes: reduces risk by up to 58%
- Alzheimer’s disease: reduces risk by up to 40%
- Dementia: prevents dementia by up to 80%
- Peripheral artery disease: improves calf tissue oxygenation, so you can walk 50% further
- Exercise also improves high cholesterol, arthritis, respiratory illness, depression and anxiety

Here are some other ways that exercise can improve your daily life:

- Academic performance/Intelligence: higher SAT scores for children and adolescent exercisers; better results in math and English (there is a dose/response effect — the more exercise, the better!)
- Improves attention, concentration, memory, mood
- Boosts multitasking ability
- Enhances sleep
- Better sex life and less erectile dysfunction for men

The wonderful thing about exercise is that it’s cheaper than many medicines. In fact, many forms of exercise that you can do at home (e.g., sit-ups, push-ups, biking, brisk walking or jogging) are very cheap — other than some clothing and/or minimal equipment, you are good to go!

In 2007, the American College of Sports Medicine and American Medical Association launched Exercise is Medicine®. EIM is now a global health initiative which recognizes the importance of physical activity for health and well-being. It seeks to implement exercise as part of the health care management of all people. For information, please see [www.exerciseismedicine.org](http://www.exerciseismedicine.org).

A way that we physicians like to prescribe exercise is the “FITT PRO” model:

- The “F” stands for frequency. We recommend five or more days per week.
- The “I” stands for intensity. Exercise should be of a moderate or vigorous intensity. The heart rate should reach 50–70 percent of maximum predicted heart rate (where MPMR = 220-age). A general rule of thumb is that you will feel your heart beating faster, but you should still be able to carry on a conversation.
- The first “T” stands for type of exercise. It is recommended that patients engage in any activity that works large muscle groups, increases heart rate and causes them to lightly perspire. A good regimen includes aerobic exercises 3–5 days per week (e.g., brisk walking, jogging, treadmill, cycling, swimming, aquatic exercise) as well as 2–3 days of resistance/whole body strength training and some flexibility/balance work.
- The second “T” stands for time. We recommend that patients exercise for at least 30 minutes per day.
- The “PRO” stands for PROgression. Steadily increase the FITT elements above by as much as 10 percent each week (e.g., if you walked a total of 100 minutes last week, then consider increasing that to 110 minutes this week).

For tracking your exercise, there are many apps for your smartphone as well as many devices you can wear that will give you a great estimation of your total exercise energy consumption. Some examples include Fitbit, LifeTrak, Jawbone, Vivofit and Jaybird.

Ralph Waldo Emerson said, “The first wealth is health.” He was quite right, because if you have \$1,000,000 in the bank, health is the leading “1” and everything else in your life is the “0s” trailing behind. Without the “1” (health), the wealth and good times (“0s”) are meaningless. If you want to be healthy and wealthy from now on, commit to exercising regularly and getting your family and friends involved, too. After all, if you are going to live long and prosper, you want to have loved ones there to share the wealth of fun too, right?

# Exercising with Allergies and Asthma

by Paul Sorace, M.S., RCEP



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## Introduction

Allergies and asthma can make regular exercise and physical activity difficult, unpleasant and, sometimes, impossible. However, when properly managed, these conditions should not affect your ability to exercise recreationally or even competitively. Physician evaluation and treatment, understanding what causes or worsens your allergies and/or asthma, and knowing how to exercise safely and effectively will enable you to exercise without limitation.

## Environmental & Seasonal Allergies

Allergies are an abnormal response of the immune system. People who have allergies have an immune system that reacts to substances in the environment. These substances are called allergens and they are what trigger allergy symptoms. Typical allergens include pollen, ragweed, grass, mold, animal dander and dust mites. After the body has been exposed to a given allergen, the next time it is exposed to it, inflammatory chemicals such as histamine are released, causing allergy symptoms. Common allergy symptoms include sneezing, itching, watery eyes, post-nasal drip, runny or stuffy nose and a rash. Some people have seasonal allergies that start or get worse at a particular time during the year. Two common allergic conditions are rhinitis and sinusitis.

Rhinitis is inflammation of the mucous membranes in the nose. Symptoms include sneezing, nasal discharge, itching and congestion. Rhinitis can be allergic, nonallergic or both. Seasonal allergic rhinitis is often referred to as hay fever.

Sinusitis is an infection of the sinus cavities caused by bacteria. It is usually preceded by a cold, allergy attack or irritation by environmental pollutants. A cold or allergy attack causes the sinuses to become inflamed and unable to drain. This can result in congestion and infection.

## Exercise-Induced Anaphylaxis (EIA)

Anaphylaxis is a rare, yet severe allergic reaction that can involve the entire body and can be life-threatening. It can result in hives, trouble breathing, low blood pressure, dizziness, loss of consciousness and even death. Anaphylaxis is a medical emergency that requires immediate medical treatment. While there are a number of causes of anaphylaxis, exercise is an unpredictable cause. Exercise-induced anaphylaxis does not occur with every exercise session, and sometimes it occurs only after eating a specific food or any food. The exact mechanism is not fully understood. However, it is known that specific cells in the body break down, releasing histamine and other chemicals, leading to anaphylaxis symptoms. If it is a form of food-dependant EIA, this process is influenced by a sensitization by a known or unknown food. There is also medication-dependant EIA, in which EIA occurs only after taking a specific medication (e.g., aspirin). Other influencing factors include extreme temperatures, a family history of EIA and, for women, the menstrual period. Typical activities known to trigger EIA include running, cycling, swimming and even yard work. The true incidence of anaphylaxis is not known exactly and ranges from 1-3 per 10,000 population; other estimates place the number at 1-15 percent of the U.S. population at risk.

## Asthma

Asthma is a chronic lung disease that is characterized by inflammation in the airways. It affects approximately 20 million Americans, with approximately 5,000 asthma-related deaths occurring each year in this country. The inflammation in the airways makes the airways smaller, making breathing more difficult. When asthma symptoms become worse than usual, it is called an asthma attack. During an asthma attack, muscles around the airways tighten up, making the airways narrower so less air flows through. Common symptoms of asthma include coughing, wheezing, difficulty breathing and chest tightness.

There are a number of different causes or forms of asthma. A few include exercise-induced asthma and allergic asthma. Exercise-induced asthma is triggered by exercise, usually vigorous exercise such as running, and is very common in persons with chronic asthma. However, some people have only exercise-induced asthma, sometimes referred to as exercise-induced bronchoconstriction. Allergic asthma is the most common form of asthma. Allergic asthma

is triggered by breathing allergens such as dust mites, pet dander or pollens. These allergens cause the airways of the lungs to become inflamed and swollen, resulting in asthma symptoms.

## Exercise Tips for Persons with Allergic Conditions and Asthma

- Consult with an allergist and /or immunologist prior to starting an exercise program. The physician may test you to determine what you are allergic to and, possibly, diagnose asthma. The doctor can then effectively treat the symptoms and recommend activities to do and to avoid.
- Take all allergy and asthma medications as prescribed.
- Breathe through the nose as much as possible when exercising. The nasal passages act as natural filters and humidifiers to maintain air at proper temperatures, as well as filter out allergens, pollutants and irritants.
- Exercise indoors during extreme temperatures and when allergen counts are high; pollen counts are usually highest in the morning and increase again in the afternoon.
- When exercising indoors, keep windows and doors closed to reduce allergen exposure; try to exercise on mats rather than carpeting.
- When exercising outdoors, avoid areas that contain high concentrations of allergens and irritants (e.g., fields, trees, busy roads, factories).
- Always have your asthma rescue medication on hand when exercising; you may be instructed to take your medication shortly before exercise; use as prescribed by your physician.
- Perform a prolonged aerobic warm-up and cool-down (15 minutes each) if you have asthma; this can reduce the chances or severity of exercise-induced asthma.
- Postpone exercise if asthma symptoms are not well-controlled or if you have a cold or respiratory infection.
- If allergic to insect stings, carry prescribed epinephrine when exercising outside.
- Know that some activities such as running, cycling and basketball are more likely to cause exercise-induced asthma; resistance training, baseball and swimming are less likely.
- Persons with exercise-induced anaphylaxis should exercise with a partner and always carry injectable epinephrine with them.
- Know the early signs of EIA, so you can stop exercising before the symptoms progress to the later, more serious ones.
- Know what to avoid to reduce the likelihood of EIA; these include avoiding certain foods or all foods before exercise, avoiding certain medications before exercise, and being cautious in extreme temperatures.
- Talk with your doctor about the specifics of avoidance and prevention of EIA (e.g., how long to avoid foods and /or medication before exercise).

(continued on page 5)

## Summary

If you suffer from allergies or asthma, the first step is to see your doctor. Allergy and asthma management includes medical treatment (if needed), following proper avoidance and preventive strategies, and adhering to exercise recommendations specific to your condition(s). This will ensure safe, enjoyable and effective exercise.

### THEME: MANAGING CHRONIC DISEASE

# Heart Disease Prevention: Consistent Exercise is Key

by Thomas S Altena, Ed.D.



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As our age increases, risks also increase for developing heart disease; it really is not a question of “if” but “when” heart disease develops. Exercise is centrally paramount for preventing heart disease along with diet, as the lifestyle choices for prolonging quality and quantity of life. Heart disease comes in many forms; atherosclerosis and hypertension are two examples of many different chronic conditions affecting heart health. Most professionals will agree prevention of heart disease occurs when dietary fat is controlled, when all forms of stress are decreased, if sodium intake is lowered and physical activity is regularly performed. Medical professionals and exercise scientists also agree that regular tests for cholesterol levels (HDL-C, LDL-C), triglycerides, etc., and annual physical exams will provide knowledge of our current health. Knowledge coupled with understanding maximizes our awareness of heart disease development risks. But if we honestly consider human behavior, most of us are prone to procrastination and we lean toward not following guidelines and rules as if we are immune to adversity; I have noticed very few people drive the posted speed limit. Decisions come to us each and every day and don’t always choose the best pathways.

Age is something that we cannot choose, and time marches on. We might want to say “40 is the new 30” but, in all honesty, we can’t beat the calendar — sorry to burst that bubble. With the aging process, risk for heart disease increases for men in their middle 40s and women near and after menopause. The old adage of “an ounce of prevention is worth more than a pound of cure” sounds cliché, but it indeed holds true. Last summer, I celebrated my 40th birthday and, like most people, I lamented over the number but was thankful concerning my health, which I believe is, in part, due to consistent exercise. Just like choosing to have the annual physical exam, blood work, fitness evaluations and make healthy lifestyle decisions, the choice to exercise consistently is one that often is missed. Approximately 70 percent of Americans do not perform the minimum of cardiorespiratory exercise of 30 minutes per day most days of the week. Exercise is a personal choice just like choosing not to smoke cigarettes. As New Year’s Day is behind us, many Americans rededicated their lives to exercise but after a few weeks or months they (or maybe “we”) are eventually off the wagon. Remaining consistent with exercise takes effort and dedication and might require sacrificing other aspects of our lives — including weekends sleeping in — with the goal of health improvement and prevention of heart disease.

Consistent exercise can be more difficult in the winter months when people must contend with dangerous cold temperatures and when ice and snow might cover our typical walking, jogging and cycling routes. Same things could be said about summer heat. When the weather has the upper hand, realistic options need to be considered so that exercise consistency is maintained. Having a treadmill, elliptical, spin bike, etc. in your home allows freedom in your schedule to exercise when desired. This is not a perfect situation because these take up a large space in a room and can be expensive. The “home grade” equipment will lack quality and operational smoothness as compared with the “commercial-grade” equipment found at your local gym and, in this case, spending a little more money for quality equipment is wise if you know it will be used regularly. Higher quality equipment typically is sold at specialty stores, but good deals can be found at garage sales and some specialty stores sell refurbished equipment for a fraction of new prices. Always make sure of their condition before finalizing the acquisition. Generally speaking, most home exercise equipment collects dust after a short time; if your personal exercise habits are the exception, this is a good way to remain consistent all year long.

If having cardio equipment is unfeasible due to cost or space, a month-by-month membership at a local fitness facility is another option. A

good fitness facility will have state-of-the-art commercial-grade equipment that is well-maintained; rather than having a single piece of equipment in your home. This variety of cardio equipment can keep you motivated, entertained and fit. Explore monthly costs for short-term use versus annual membership (including joining fees) but also evaluate the distance from your home or workplace and estimate drive-time, shower, etc. Being realistic with your time estimate might be the most important predictor for actual facility usage. Most fitness facilities are a social atmosphere that can reinforce accountability and include group classes for yoga, aerobic dance, spin cycling and clubs for runners and triathletes that are geared for all ranges of abilities and fitness levels. The group classes and clubs of the fitness facility promote togetherness in an encouraging social environment, which can be motivationally appealing for some people rather than exercising alone.

Along with the home equipment or fitness facility membership, a myriad of exercise resources exist online and in DVD series that can provide motivation, consistency and stimulate creativity. Considering all options available, the variety alone should stimulate exercise consistency even when weather might alter our decision. In many cases, motivation to be consistent with exercise often requires more than a personal interest but might require a financial investment or the social accountability of exercising with friends or group classes. Finding those factors that personally motivate is part of that personal ounce of prevention so that a cardiologist does not “force” exercise as a pound of treatment. Our personal goals for exercising might be for weight maintenance, preparation for road-races, remaining healthy for our family, out of fear of chronic disease, social stimulation or just the enjoyment of exercise. As casual parental observation, I notice children want and enjoy physical activity and it is a central part of playing. Maybe children are teaching the adults a lesson in health: eat five fruits and vegetables each day, brush your teeth twice a day, follow “the golden rule” and exercise. According to decades of scientific research, we really don’t need to know all of the scientific details of how exercise improves health because exercise automatically lowers heart disease risk factors like cholesterol, atherosclerosis, hypertension and triglycerides. Maybe we should just act like children and play: play with others and play with the variety of exercise options at home or the fitness facility. Although we can’t beat the calendar and “40 is not the new 30,” we can delay the development and progression of heart disease when we consistently find time each day to play and be physically active.

# Healthy Habits to Prevent and Manage Chronic Disease

by Brian B. Parr, Ph.D.



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Most common chronic diseases including obesity, diabetes, high blood pressure, high cholesterol, cardiovascular disease and lung disease, and many cancers are linked to health habits such as smoking, what you eat and how active you are. Changing these behaviors can have a big impact on your health and feelings of well-being.

There is no one set of recommendations to be healthy, and people with a wide range of health behaviors can be considered healthy. However, there are some habits that are common among healthy people.

## 1. Don't smoke

There is no way around this one—quit! Ask your doctor about prescription medications that can make quitting easier. Nicotine replacement therapy in the form of patches, gum and lozenges can help manage cravings and are available over the counter. Ultimately, though, quitting smoking is a behavior change that takes motivation, willpower and time.

## 2. Be active every day

You should strive to be as active as possible at work and at home. At a minimum, aim for 30 minutes of activity each day, but more is better. You can meet this goal by taking the dog for a walk, playing with your kids (or grandkids), and doing housework or yard work. Additionally, taking the stairs instead of the elevator, walking instead of driving short distances, even parking farther away and walking to your destination are good ways to make activity a habit.

## 3. Get regular exercise

While being active on a daily basis is a good goal, there are additional benefits of doing more, either for longer time or at a higher intensity. This is usually done through structured exercise which could include walking, running or cycling outdoors, visiting a fitness center, a group exercise class or a doing exercise at home. In addition to improving endurance, strength, and flexibility, regular exercise helps with weight control, lowers blood pressure, improves blood lipids and prevents and treats diabetes.

## 4. Don't sit too much

Prolonged sitting has been linked to negative health effects that are similar to those of not exercising. Even among people who do exercise, those who spend more time sitting tend to have more health problems than those who are more active during the day. The good news is that you can offset the health effects of sitting too much. Taking short breaks to get up and move at work can improve attention and productivity. The same is true at home—getting off the couch during TV commercials can have the same benefits.

## 5. Eat fruits and vegetables every day

If you are like most Americans, you aren't eating enough fruits and vegetables. At a minimum, you should be eating five servings of fruits and vegetables each day, but you should aim for twice that many. Most fruits and vegetables are low in calories and good sources of vitamins, minerals and fiber. A good goal is to fill half your plate with fruits and vegetables at meals. But watch out for added salt and sugar!

## 6. Don't eat too much added sugar or salt

The current American diet includes more processed foods than ever, many of which are high in added salt and sugar. Excessive salt intake can cause high blood pressure in some people and too much sugar contributes to weight gain and complicates blood glucose control for diabetics. You can reduce your salt and sugar intake by eating fresh fruits and vegetables, limiting the sauces and toppings you put on food, and reading the labels on prepackaged items.

## 7. Drink water when you are thirsty

The best way to maintain adequate hydration is to drink when you are thirsty, and the best thing to drink is water instead of sugar-sweetened or artificially-sweetened beverages. This helps you avoid unnecessary calories from sugar, which can lead to weight gain. And while artificial sweeteners are thought to be safe, there is no health benefit to consuming them. That said, there is no harm in drinking juice or even soda in moderation, but water should be your first choice.

## 8. Eat "real" food

If you are confused about what foods to eat, you are not alone. Our lack of knowledge about food has been replaced by a heightened awareness about nutrients. But the research to support the importance of these individual nutrients is often lacking. The best advice might be to focus on food, not nutrients. Instead of relying on processed foods at restaurants or prepackaged heat-and-eat meals we prepare at home, learn about the food you eat and cook meals at home more often. This, of course, is how people ate for years before the obesity and diabetes epidemics we are dealing with now, so eating real food again is a step toward reducing these, and other, health problems.

## 9. Keep track of your health

Keeping track of your health status and habits can help you set goals and evaluate your progress. Some of these are measurements your doctor will make including blood pressure, cholesterol and glucose. Others you can complete at home like your weight, what you eat and what you do for activity. You can do this by keeping track of everything you eat and do each day or by periodically "checking in" with yourself. Research shows that people who weigh themselves regularly are better able to maintain weight loss.

## 10. Use medications (and supplements) wisely

Many people take medications, both prescribed and over-the-counter, that they don't need or they take them incorrectly. This can lead to lower effectiveness or negative side effects. Tell your doctor about any nutritional supplements you are taking as they can worsen some health conditions or interfere with prescription medications.

Adopting these habits can help you prevent and treat many chronic diseases. Some of these behaviors may be difficult to change. But keep in mind that you don't have to be perfect—even small changes in your diet and activity can have big health benefits!

# Caffeine: Performance Enhancement in a Mug

by Nancy Clark MS RD CSSD



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Whether you are looking for a hit, boost, pleasing stimulant or excuse to socialize with your friends, coffee is the go-to beverage for many athletes. Coffee-drinkers enjoy the way a cup of morning brew enhances their feelings of well-being and their ability to accomplish daily tasks. An estimated 80 percent of us drink coffee daily. Why, we are more likely to drink coffee than eat fruit! Thank goodness moderate coffee intake is typically not associated with health risks.

For athletes, caffeine is a proven performance enhancer. In their new book *Caffeine for Sports Performance*, sports dietitians Louise Burke and Ben Desbrow and exercise physiologist Lawrence Spriet address “all-things-caffeine” that an athlete might want to know. Here are just a few tidbits that I gleaned from this comprehensive resource. Perhaps the information will help you add a little bit of zip to your workouts.

Note: No amount of caffeine will compensate for a lousy diet. If you choose to use caffeinated products to enhance your sports performance, make sure you are also fueling wisely!

A cup of pre-exercise coffee can help most athletes work harder—without realizing it. Caffeine has been shown to enhance performance by about 1 percent to 3 percent, particularly in endurance sports. For example, cyclists who consumed caffeine prior to a 24-mile (40-km) time-trial generated 3.5 percent more power than when they did the ride without caffeine.

Athletes vary in their responsiveness to caffeine, from highly effective to negative. Some of the side effects associated with too much caffeine include higher heart rate, anxiety, “coffee stomach”, irritability and insomnia.

The recommended performance-enhancing dose of caffeine is about 1.5 mg/lb (3 mg/kg) body weight. This can be consumed one hour before the event, and/or during the event (such as a caffeinated gel or defizzed cola every hour). For example, triathletes commonly consume caffeinated gels before each segment, to distribute the caffeine throughout the event rather than have a big pre-race jolt that might make them feel shaky and unable to concentrate. Some athletes delay caffeine intake until fatigue starts to appear, and then they ingest 0.5-1 mg/lb (1-2 mg/kg) body weight.

Caffeine’s ergogenic effect maxes out at about 200 to 250 mg caffeine. (This is much less than previously recommended.) More is not better. Experiment during training to learn what amount (if any) works best for your body!

Because the amount of caffeine in coffee and tea varies, elite athletes commonly use caffeine pills or commercial products to ensure the desired intake. A comparison of the caffeine content in 16 ounces of coffee from 20 coffee vendors ranged from about 60 to 260 mg. Even when the researchers purchased the same brand of coffee (Starbucks Breakfast Blend) on six consecutive days, the caffeine content ranged from about 260 to 565 milligrams per 16 ounces.

Research suggests the caffeine content of espresso also varies. A customer might get served 0.5 to 3.0 ounces of espresso (depending on the barista’s generosity) with a caffeine range of 25 to 214 mg. In general, the larger vendors (such as Starbucks) offer a more consistent product. But this means you don’t know what you will be getting if you plan to purchase a pre-exercise espresso or coffee.

Energy drinks are a popular source of caffeine. A study of 500 college students in North Carolina reports 51 percent drank at least one energy drink in an average month in the semester. Sixty-seven percent used the energy drink to stay awake; 65 percent, to increase energy; and 54 percent, to drink with alcohol while partying. Of the party-drinkers, 49 percent consumed three or more energy drinks.

Caffeinated chewing gum is popular among (sleep deprived) soldiers. The gum effectively boosts physical and mental performance and helps maintain reaction time, vigilance and ability to think clearly. The caffeine in chewing gum gets delivered quicker than via a pill (achieving significant levels in the blood in 5 vs. 30 minutes) because it gets absorbed into the bloodstream through the cheeks, not the gut.

Caffeinated colas offer not only caffeine but also a hefty dose of sugar. Colas, taken later in an event, can provide a much-needed source of fuel so the combination of caffeine plus sugar can provide a nice boost! Hence, some athletes claim defizzed Coca-Cola is their preferred sports drink despite having only 35 mg caffeine per 12-ounce can.

Caffeine is only a weak diuretic and is no longer considered to be dehydrating. A novice coffee drinker can become tolerant to the diuretic effects of caffeine in 4 to 5 days of regular caffeine intake. Even high doses (3 mg/lb; 6 mg/kg) have no significant effect on urine production in coffee or tea drinkers. Hence, there appears to be no hydration-related reason for athletes to avoid caffeinated beverages.

## Common Sources of Caffeine

For a 150-pound (68 kg) athlete, the recommended dose of caffeine is about 200 mg one hour before exercise. That’s the amount in a large mug (16 oz) of coffee. No problem for most coffee-drinkers!

| Food Item                 | Size                       | Amount of Caffeine (mg)    |
|---------------------------|----------------------------|----------------------------|
| Brewed coffee             | 250 ml (about 8 oz; small) | 80 (ranges 40-110)         |
| Starbucks Breakfast Blend | 600 ml (20 oz; venti)      | 415 (range 256-564)        |
| Tea, black                | 250 ml (about 8 oz; small) | 25-110                     |
| Tea, green                | 250 ml (about 8 oz; small) | 30-50                      |
| Coca-Cola                 | 1 can (12 oz / 335 ml)     | 34                         |
| Red Bull                  | 1 can (8 oz / 250 ml)      | 80                         |
| PowerBar caffeinated gels | 1 pouch (1.25 oz / 40 g)   | 25-50                      |
| GU caffeinated gel        | 1 pouch (1 oz / 32 g)      | 20-40                      |
| Jolt Caffeine Energy Gum  | 1 piece                    | 33                         |
| NoDoz                     | 1 tablet                   | 200 (USA), 100 (Australia) |

Caution: Consuming caffeine might contribute to negative effects. For example, let’s say you are running, rowing or swimming in more than one competitive event in a day. If caffeine helps you go harder in the first event, will that “fry” you for the second event? Can taking another dose of caffeine counter that fatigue? With a weekend tournament, will too much caffeine on the first day ruin your sleep, so you are unable to perform as well on the second day? More research is needed to answer those questions but, for the moment, these situations provide good examples of why advice to use the smallest effective dose of caffeine is sensible.

In 1984, caffeine was banned by the International Olympic Committee (IOC) and the World Anti-Doping Agency (WADA). But in 2004, WADA reversed the ruling. New research indicated the amount of caffeine needed to reach the threshold dose was detrimental to performance. Although caffeine is no longer banned by WADA, it is on the

**and I've read that high-intensity interval training (HIIT) is a way of doing this. Can I do HIIT with T1D?**

**A:** HIIT, as you know, refers to a type of training regimen which includes performing exercises at very high intensities for brief periods of time. HIIT regimens often begin with a warm-up and end with a cool down; in between those activities, the actual workout itself can last as little as four minutes. But for the time you are doing a HIIT workout, you are working out at near maximal intensity. Studies have demonstrated significant improvements in aerobic and anaerobic capacity, and reductions in waist and hip circumference, in as little as two weeks of HIIT training. So HIIT can be very valuable indeed!

All exercise can significantly affect blood glucose levels in a patient with T1D, and HIIT is no different. Before jumping into HIIT, someone with T1D needs to think about this issue seriously.

Most exercise, especially aerobic exercise, tends to promote hypoglycemia acutely; that is, there is a trend toward lower blood glucose levels both during and after exercise. There are several reasons for this trend. For instance, exercise

increases glucose transport into the active muscle, and exercise also increases blood flow to the muscle, which improves glucose uptake by the muscle as well. People with T1D can sometimes have their blood glucose drop so low after exercise they can have a hypoglycemic crisis, which is a serious medical concern. This hypoglycemia can sometimes be delayed several hours after exercise.

There is, however, a hyperglycemic trend in many individuals during high intensity exercise (85 percent to 100 percent VO<sub>2</sub>max); that is, there is trend toward higher blood glucose levels during this type of exercise. This occurs because such exercise triggers the liver to produce glucose (gluconeogenesis), and the amount produced can exceed the muscles' need for it. And so, blood glucose levels rise.

Consulting a qualified exercise professional and one's health care professional would be prudent before embarking on a significant change in an exercise regimen. But HIIT can be doubly beneficial for a person with T1D seeking a boost in their fitness: for a relatively small investment in time, one can expect marked benefits in fitness levels, while possibly ameliorating exercise-induced hypoglycemia. That combo is definitely worth looking into!

banned list for the NCAA, the governing body of collegiate sports. Collegiate athletes can be cited for doping if their caffeine level is higher than 15 micrograms/ml urine — a level that is difficult to achieve through normal caffeine intake. (A normal urine caffeine level is between 1-2 micrograms).

Youth athletes should be fully mature and eating an optimal sports diet before even considering the use of caffeine. Again, no amount of caffeine will compensate for lousy fueling practices.

For even more helpful tips and tid-bits, get a copy of Caffeine for Sports Performance. This book is filled with fascinating information.



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