AEROMEDICAL FLYER
ALPA AEROMEDICAL GROUP
alpa

NOVEMBER/DECEMBER 2010
VOLUME 5 • ISSUE 5

This edition of the *Aeromedical Flyer* includes articles on personal fitness and the cholera bacterial infection. Maintaining your personal fitness will enhance your immune response as you face the onset of the cold and flu season and the potential for exposure to diseases that are uncommon in the United States and Canada. The Aviation Medicine Advisory Service (AMAS) article has information and guidelines for all levels of fitness. The Spirit MEC update provides background information on cholera, as well as recommendations for traveling to destinations with recent outbreaks.

Up-to-date travel alert messages from the Centers for Disease Control (CDC) concerning cholera and other diseases can now be accessed through the Aeromedical website's CDC RSS feed. The next time you are on the ALPA website, click on the "Committees" drop-down tab, scroll down to "Pilot Assistance," then click on "Aeromedical" to reach our home page. You will see the latest travel advisories from the CDC, as well as health articles covering a wide range of concerns.

Fly Safe! Stay Healthy!

Captain R. A. Solik
Aeromedical Chairman

Contents

FYI: Table of contents entries, e-mail addresses, and Web addresses are hyperlinked.

The following is a bulletin originally published by the Spirit MEC on November 1, 2010.

Cholera Update

In just the last week, a case of cholera was confirmed in Haiti. This virulent bacterial infection is dangerous, and crewmembers should take precautions. However, since our actual time on the ground is short, risk to Spirit pilots is negligible. Below is the information provided to every crewmember by the company, which it received from the Centers for Disease Control (CDC). If you would like more information, we encourage you to visit the CDC site on the cholera case in Haiti at: http://www.cdc.gov/haiticholera/.

What Is Cholera?

Cholera is an acute, diarrheal illness caused by infection of the intestine with the bacterium *Vibrio cholerae*.

Where Is Cholera Found?

The cholera bacterium is usually found in water or food sources that have been contaminated by feces from a person infected with cholera. Cholera is most likely to be found and spread in places with inadequate water treatment, poor sanitation, and inadequate hygiene.

How Does a Person Get Cholera?

A person can get cholera by drinking water or eating food contaminated with the cholera bacterium. In an epidemic, the source of the contamination is usually the feces of an infected person that contaminates water or food. The disease can spread rapidly in areas with inadequate treatment of sewage and drinking water. The disease is not likely to spread directly from one person to another; therefore, casual contact with an infected person is not a risk for becoming ill.

Should I Be Worried About Getting Cholera from Others?

The disease is not likely to spread directly from one person to another; therefore, casual contact with an infected person is not a risk for becoming ill. According to the World Health Organization, more than a million cholera bacteria (about the amount found in a glass of contaminated water) are needed to cause illness. For this reason, human-to-human transmission is rare.

What You Should Do If You Think You Have Cholera

Cholera infection is often mild or without symptoms, but can sometimes be severe. Approximately one in 20 (5 percent) infected persons will have severe disease characterized by profuse watery diarrhea, vomiting, and leg cramps. In these people, rapid loss of body fluids leads to dehydration and shock. Shock refers to a massive drop in blood pressure, which starves the body of oxygen. Without treatment, death can occur within hours. This is preventable with cheap and simple antibiotics, fluids, and oral rehydration solutions.

Risk to Spirit

The risk to Spirit crewmembers and passengers is low due to the fact that we do not service the water or upload ice or food on our aircraft in Haiti. Although cholera is rarely spread by person-to-person contact, one of the most important steps we can take to avoid getting sick and spreading germs to others is keeping our hands clean.

Fitness Assessments & Exercise Recommendations

By Quay Snyder, M.D., MSPH
Aviation Medicine Advisory Service
ALPA Aeromedical Advisor

For many, focusing on fitness and exercise is a way of life and almost an addiction.

What Will Exercise Do for Me?

Physical fitness is an essential component of an overall wellness program. The benefits of exercise are too numerous to list, but include weight control, cardiovascular disease prevention, control of diabetes, lower blood pressure, enhanced immune response, prevention of osteoporosis and bone loss, improved mental health and well-being, sounder sleep, increased energy and stamina, enhanced self-esteem, longevity, and optimum quality of life.

For many, focusing on fitness and exercise is a way of life and almost an addiction. The so-called "runner's high" releases endorphins or other "pleasure chemicals" in the brain that give a feeling of satisfaction and happiness. For others, the thought of exercise is nearly terrifying. Most people, however, fall between these extremes. They know exercise is healthy and they usually enjoy some form of recreational activity but cannot seem to make the time or effort to participate in a program of regular exercise. The priorities assigned to other daily activities push fitness to a lower rung on the ladder of life. The question is, how do I make time for a regular fitness program of activities that I enjoy? The answer is much simpler than you would imagine, and the effort required for optimizing health is probably less than you guessed.

How Much Exercise Do I Need?

The optimum amount of exercise for any individual depends on personal goals. The elite athlete training for world-class competition obviously needs much more exercise, both in duration and intensity, than an 85-year-old grandmother looking to minimize bone loss. People trying to improve their cardiovascular fitness have intermediate exercise needs. This article will limit its scope to those people, such as most pilots, trying to improve their health and optimize their wellness without entering into competitive sports. Competition may be a natural follow-on to those who find a certain talent and enjoyment for a sport, regardless of age. Many people will find the enjoyment of physical activity with a taste of competition through recreational sports leagues or intramural leagues. People should enjoy the activities they choose to ensure that they will continue to participate in them.

The amount of exercise required for improved fitness and health is surprisingly little. Many organizations scientifically studying this area recommend approximately 30 minutes of moderate-level activity most days of the week. Exercising 150 minutes divided into four or five days of the week and further divided into several five- to ten-minute sessions each day will suffice. You do not have to work out every day to a level that requires

perspiration and breathing hard to achieve and maintain fitness. Cardiovascular fitness improvement may require some degree of higher exertion, but not much more.

What Is the Best Exercise for Me?

Any enjoyable exercise is good for someone interested in fitness. A balance between aerobic exercise, resistance training, and flexibility provides optimum fitness and conditioning. However, people are not likely to continue an exercise program if it is not enjoyable, convenient, and affordable. Any exercise is better than no exercise. Conditioning results from any physical activity, not just that performed at a health club or gym, or only performed with expensive or bulky equipment. Pick activities you will enjoy and can participate in on a regular basis, and make exercise a regular part of your day. Several different activities may keep you from getting burned out on one. Sharing a program with a partner may help you with the motivation you need on difficult days. Look for exercises you can do at work, many times without anyone realizing you are exercising. One popular author compares fitness to religion, which benefits from some practice each day and faith to remain a participant, and yields lifelong rewards. The bottom line: do what you enjoy and do it every day.

Exercise for Non-Exercisers

Articles in the *Journal of the American Medical Association* point out that casual exercise programs, such as five- to ten-minute walks several times per day, are just as beneficial in reducing body fat, lowering blood pressure, and maintaining some aerobic fitness as a structured exercise program. Structured exercise programs are those that involve a regular fixed amount of activity, and typically are done at a gym or on a piece of home exercise equipment, such as riding a bicycle, swimming, or jogging. One study from the Cooper Institute for Aerobics Research demonstrated that casual increases in activity during the day gave the same benefits as a structured program in blood pressure reduction and body fat control within six months and in aerobic fitness after two years. A second study of overweight women done by Johns Hopkins University showed similar reductions in weight, blood pressure, LDL (bad cholesterol), and total cholesterol in both casual activity groups and structured exercises. The bottom line is that any level of activity will improve your fitness. Simple strategies include taking the stairs rather than the elevator, parking at the far side of the parking lot (or tarmac), going to personally talk to a coworker rather than using the intercom, and walking around your child's soccer field during games and practices rather than sitting on the sidelines.

What Are Low to Moderate Exercise Levels?

Low- to moderate-level activities include those that still allow an individual to talk easily during the exercise. Examples of these activities include walking, dancing, golfing, work around the home, walking up stairs, carrying groceries, and bicycling. The target heart rate is 50–75 percent of the predicted maximum heart rate (PMHR). To calculate the PMHR, subtract your age in years from 220. Next, multiply the PMHR by the percentage heart rate desired. For example, a 50-year-old would have a PMHR = (220-50) = 170. And 70 percent of that PMHR = (170 x 0.70) = 119 beats per minute, which is about 30 beats in a 15-second interval. This level of activity will have most of the benefits exercise can provide for an individual.

Moderate to High Activity Levels

A somewhat higher intensity level of activity is required to achieve athletic training levels of cardiovascular and aerobic conditioning, although cardiovascular benefits occur with almost any level of exercise. For those people interested in improved sustained maximum

performance, exercising at 75–85 percent of the PMHR for at least 25 minutes per session and 150 minutes or more per week is required. This level of exertion makes it difficult to speak in complete sentences during exercise and usually results in significant perspiration. Examples include running, fast swimming or bicycling, full-court basketball, aerobics, skiing, soccer, rowing machines, and stair climbers. These activities are known as aerobic since they impose ongoing requirements for oxygen at the cellular level, rather than just using stored energy.

Ultra-High-Intensity Training for Elite Athletes

Elite athletes may train for several hours per day at 95–100-plus percent of their PMHR. A growing amount of research finds that this intense level of exercise may cause physical damage through the excess release of damaging "free radicals" in the body. These free radicals cause damage to DNA in the cells and may speed the aging process or increase the risk of cancer and other chronic diseases. Nutrients termed "antioxidants" oppose the effect of free radicals by scavenging these molecules before they do significant harm. Dr. Kenneth Cooper, the physician who coined the term "aerobics" in the 1960s and suggested in the 1980s that cholesterol could be lowered by changing to a low-fat diet, cautions against intense levels of activity in his book, *Antioxidant Revolution.* Unless serious competition is your goal, moderate exercise will provide significant health benefits without the increased risks of free radical damage.

Types of Exercise

Exercise is divided into two major categories, aerobic and anaerobic. Both provide benefits for your health, and some activities combine the benefits of both. Stretching, which contributes to injury protection and flexibility, is another important component of a fitness program.

As noted above, aerobic exercise involves sustained activity at a moderate level, which requires the body to produce and deliver oxygen and nutrients to the cells to maintain this level of output. Aerobic activity is the best method of improving cardiovascular conditioning, reducing body fat, and increasing energy and endurance. Because the body must use stored fuels—mainly fat—for energy, aerobic activity is excellent for weight reduction and burning calories. The downside of aerobic activity is that it is very difficult to do in limited amounts of time, as it usually requires 30 minutes of exercise to achieve the 75–85 percent of PMHR for 25 minutes.

Heart rates may not be sustained at high levels with anaerobic exercise.

Anaerobic exercise involves "burst"-type activity of short duration, often requiring strength. Examples include weight lifting, jumping, throwing a ball, isometrics, swinging a golf club or a bat, calisthenics, and bowling. Generally, there is a rest period between exertions during which the body can recover. Heart rates may not be sustained at high levels with anaerobic exercise. The fuels used by the cells are readily available sugars and carbohydrates in the blood or stored in the liver. These activities increase lean muscle mass and will also increase basal metabolic rate. Some can be performed in an office or even in the cockpit. Calculation of calories burned during these activities is more difficult and highly variable depending on the level of exertion.

Stretching increases flexibility. Benefits include decreased injury from muscle and ligament strains, improved strength by increasing muscle length, and a greater comfort level when exercising and at rest after exercise. Lower incidences of chronic musculoskeletal pain such as lower back and neck pain are seen in people with a regular stretching program. Most stretching activities can be done anywhere, including the cockpit, terminal, or desk. Even couch potatoes can stretch while watch-

ing TV, although this does not burn many calories. Excellent suggestions for stretching exercises can be found in the *Fitting Fitness In* brochure from Shape Up America! We also recommend SUA's *99 Tips for Family Fitness Fun* and *On Your Way to Fitness.*

Cautions

If you are older than 35 and have not been exercising regularly, or if you have heart disease or other chronic diseases requiring medication, ***consult your doctor*** before beginning a moderate or higher level exercise program. Stretching is generally safe, but a new exercise program should start at a low level of intensity. Increase duration and intensity as each previous level becomes easier. Don't start off attempting to achieve your ultimate goal in the first sessions—you risk injury or medical complications. The American College of Sports Medicine has excellent guidance on exercise prescription and testing.

The *Journal of the American Medical Association* published an article titled "Preparticipation Cardiovascular Screening for U.S. Collegiate Student–Athletes" in its March 22, 2000, issue. It provides excellent guidelines for the younger athlete starting an aggressive exercise program. *American Family Physician* published "The Preparticipation Athletic Evaluation," an article for all ages, used to assess whether a vigorous exercise program is safe to begin.

Fitness Assessments

A common fallacy is that fitness should be assessed by weight. This is not true! Just as a person at the ideal body weight can be overfat, that person can also be poorly conditioned. Think of a thin smoker or bulimic individual with almost no lean muscle mass or cardiovascular conditioning. Remember also that an overweight person may still have very little fat and be in excellent cardiovascular and strength condition due to high muscle mass. Some collegiate and professional athletes may maintain a very heavy weight due to very high muscle mass, yet be extremely aerobically conditioned. Fitness assessment requires a careful evaluation of several factors. Excellent fitness also requires optimum nutrition to fuel the body and prevent free radical damage.

At least four elements of fitness should be considered in any fitness evaluation. These elements include cardiorespiratory fitness, strength, flexibility, and body fat percentage and weight control.

Cardiorespiratory Fitness describes the body's ability to deliver oxygen to the cells, primarily muscles, when stressed. Cardiorespiratory fitness has a direct protective effect on heart attacks, heart failure, strokes, high blood pressure, claudication, diabetes, and fat control. Scientific studies quantify cardiorespiratory fitness in terms of maximum capability of the body to deliver oxygen to cells in a minute. This is usually referred to as the "VO_2 maximum" or "VO_2 max." Elite cyclists and other endurance athletes may have VO_2 maximums of 70–80 ml/mg/min. The VO_2 max decreases with age as does the predicted maximum heart rate. Good weekend athletes may have values in the 35–50 range, while deconditioned people will have values less than 20.

Strength is a reflection of muscle mass. Good assessments evaluate both upper- and lower-body strength for an overall picture. Swimmers may have excellent upper-body strength with little lower-body strength, while cyclists may have the opposite profile. Rowers, boxers, and weight lifters often have balanced upper-

Excess body fat is related directly to diabetes, high cholesterol, and gall bladder disease.

and lower-body strength. Back, neck, and abdominal muscle conditioning may prevent chronic back and neck pain and poor posture.

Flexibility is described above. As with strength, both upper- and lower-body flexibility should be assessed. Many sports and exercises do not require the muscles to stretch to their full length. This decreases the maximum power they can generate, but also limits flexibility. Limited flexibility contributes to injuries, soreness, and chronic pain. Bouncing type stretching exercises, called "ballistic stretching," may cause injuries if one is not already limber and flexible. Static (stretch and hold) and proprioceptive (contract/relax) stretching are excellent methods for novice exercisers to increase flexibility.

Body Fat Percentage and Weight Control comprise the fourth component of a comprehensive fitness assessment. As mentioned above, and in the weight control and body shaping section, weight and body fat are not necessarily related. An anorexic individual can have a very high body fat percentage, while a huge wrestler may have almost no body fat. Excess body fat is related directly to diabetes, high cholesterol, and gall bladder disease. There may be some relationship to breast and other cancers as well as heart disease. Optimum body fat percentages in women tend to run about 4–8 percent more than in men of the same age. Healthy young men tend to have body fat percentages in the 12–18 percent range and 16–24 percent as they age. Currently, the Body Mass Index (BMI) is used as an estimate of healthy weight and fat distribution, but it fails to account for extremes of lean muscle mass.

American College of Sports Medicine Fitness Guidelines

The American College of Sports Medicine recently revised its "Guidelines for Exercise to Maintain Fitness." The previous guidelines included recommendations for cardiorespiratory and muscular fitness. The revised guidelines include recommendations for flexibility training as a component of a comprehensive physical conditioning program.

How Fitness Affects Your Health

The benefits of regular exercise and a fitness program are almost too numerous to describe. Below is a list of some of the benefits well studied in medical research.

Weight Control: regular exercise consumes calories that are converted into fat if not used. It also helps build lean muscle mass, which burns calories faster than an equal amount of fat.

Cardiac Health: aerobic exercise in particular increases blood supply to the heart, increases the pumping efficiency of the heart, and decreases the risk of both fatal and nonfatal heart attacks.

Blood Pressure: blood pressure is reduced by regular exercise combined with proper diet and weight control. Heavy weight lifting may cause temporary increases in blood pressure during exercise, which return to normal with rest.

Stroke: exercise decreases the risk of stroke, the third-leading cause of death in the United States.

Cholesterol: aerobic exercise decreases total cholesterol and triglyceride levels while raising HDL (good) cholesterol levels.

Cancer: colon cancer incidence is reduced in exercisers. Other cancers may also be reduced by exercise and fat reduction, such as breast and prostate cancer.

Blood Sugar and Diabetes: exercise burns calories and helps control blood sugar, possibly reducing the need for diabetic medications and reducing the complications of diabetes.

Osteoporosis and Bone Loss: weight-bearing exercise reduces the rate of bone loss in older Americans, adds bone mass to younger people, and reduces the risk of fractures and collapse of bones of the spine.

Mood and Depression: exercise increases endorphins and other "pleasure chemicals" of the brain, reduces effects of stress and anxiety, and improves mood.

Sleep: sleep studies indicate that exercise improves quality of sleep and aids in falling asleep.

Back Pain: stretching and abdominal exercises reduce the risk of chronic low back pain and improves posture.

Physical Appearance and Energy: through weight loss and muscle toning, exercise firms up the body while blood count improves, giving more daily energy and stamina.

Mental Function: exercise improves mental activities, particularly when taking breaks during busy days.

AMAS Aeromedical Assistance for ALPA Pilots

Pilots contemplating starting a new exercise program should consult with their personal physician. Some preparticipation screening tests, such as exercise stress testing or coronary artery calcium scoring, may be reportable to the FAA and may have medical certification implications. The physicians at the Aviation Medicine Advisory Service (AMAS), ALPA's aeromedical office, are available to address specific aeromedical certification concerns and reporting requirements.

AMAS's free, confidential aeromedical certification assistance is available to ALPA members in good standing Monday–Friday from 8:30 a.m to 4:00 p.m. (MT), by calling 303-341-4435. Information on FAA policy regarding this article and many other medical conditions and medications is available on the AMAS website at www.aviationmedicine.com. A version of this article with active hyperlinks is available on the website by typing "fitness" in the search box on any page.

Get moving!

Enjoy some exercise today!

Stay healthy!

Fly safely!