

Research Update



Practical, leading edge research results applied to physical activity for older adults, in plain language for health practitioners and leaders.
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Physical Activity and Coronary Heart Disease It Is Never Too Late to Benefit

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Cardiovascular disease (CVD) remains the leading cause of death for older men and women, as it has been for over 25 years. Although the death rate has steadily decreased over that time, with the increase in the older adult population the absolute number with CVD has actually increased. Moreover, heart disease accounts for more disability in older people than any other single condition, except arthritis. While the disability of arthritis may be obvious in terms of pain, swelling and stiffness around the joints, other kinds of cardiorespiratory disabilities limit breathing and the ability to get blood to the various muscles, including the heart.

The immediate question is whether these relationships are inevitable. Can they be altered by lifestyle interventions? The good news and general consensus among researchers is that modest physical activity, adopted on a regular basis, provides significant cardiovascular benefits such as a lower resting heart rate, reduced blood pressure, and improved fitness. In fact, there is strong evidence that systematic physical activity over many years provides some protection against the development of cardiovascular disease.

It makes a lot of sense to adopt a healthy lifestyle of regular physical activity and good nutrition throughout the lifespan, starting as early as possible in life and continuing into the later years. The current childhood obesity epidemic indicates that society has failed miserably to override the seductions of exciting video/computer games and the lure of fat-laden fast foods. However, this burden of childhood obesity does not rest solely with electronic and fast food companies. The erosion of physical education classes, closing of swimming pools, neglect of parks, and unsafe walking paths have all contributed to indoor sources of “non-active” entertainment. Unchecked, this sedentary lifestyle pattern will inevitably result in an even greater prevalence of cardiovascular disease, with a much earlier onset of symptoms and death, as the population ages.



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While it is prudent to sustain a healthy lifestyle throughout life, there is compelling evidence that it is never too late to obtain cardiovascular benefits from lifestyle changes. As little as 30 minutes per day of moderate-intensity physical activity (e.g., brisk walking) can reduce the incidence of clinical cardiovascular events. In addition, regular exercise may slow the progression of fat accumulation in the arteries of the heart.

In this brief overview, the major focus will be on coronary heart disease and the role that physical activity and/or physical fitness plays to prevent its development and reduce the risk of premature death in those who have this “lifestyle disease.” The reason that coronary heart disease is often referred to as a lifestyle disease is because so many people make inappropriate decisions when it comes to nutrition, smoking and physical inactivity.

Coronary Heart Disease (CHD)

How does CHD differ from other cardiovascular diseases? CHD refers to the cholesterol (low-density lipoprotein) that accumulates in the walls of coronary arteries, the blood vessels that supply the heart itself. Progressively, the atherosclerosis gets larger in the wall and decreases the amount of blood that flows through the coronary artery. At some point, the atherosclerotic plaque may rupture and attract platelets to the injury, so that blood flow through the artery ceases. This is called a coronary thrombosis or myocardial infarction (MI), also known as a heart attack. It can be thought of as a problem with the “plumbing” compared to an “electrical” heart attack which causes fibrillation (all areas of the heart trying to contract at the same time) of the heart muscle. Fibrillation will almost certainly lead to sudden death without a special machine called a defibrillator.

In addition to coronary heart disease, there may be cardiomyopathy (disease of the heart muscle of unknown origin), peripheral vascular disease (mostly in the legs), cerebrovascular occlusion causing stroke, and other less common complications.



Although many people have had heart attacks and died because of chronic physical inactivity, there are no reports showing that the risk of CHD increases with manageable increases in physical activity. On the contrary, countless studies have shown an inverse relationship between exercise and risk of CHD (as exercise decreases, the risk of CHD increases). A 2002 report from the Health Professionals’ Follow-up Study, involving 44,452 men over 12 years of follow-up, documented that 30 minutes per day or more of brisk walking was associated with an 18% reduction in CHD incidence. Three years earlier, the Honolulu Heart Program reported that men aged 71 to 93 years who walked 1.5 miles per day experienced half the risk of CHD of those who walked less than a quarter mile per day.

Does Gender Affect the Level of Risk?

Much of the older data on CHD targeted middle-aged men. At that time, it was

mistakenly thought that CHD was predominantly a male disease. It is clear now that cardiovascular disease (including CHD) is also the number one killer of older women, but there seems to be about a ten year lag in symptom onset and accelerated risk. This is probably associated with the protection of estrogen up until menopause. Consequently, recent studies have focused exclusively on women, and the results, not surprisingly, are similar to the outcomes for men. For example, the Women's Health Initiative monitored physical activity in 73,743 postmenopausal women aged 50 to 79 years. Over 3.2 years of follow-up, walking briskly for at least 2.5 hours per week (i.e., 30 minutes 5 times per week) was associated with a 30% reduction in cardiovascular events. Another large project (72,488 healthy middle-aged female nurses) documented that 3 hours of brisk walking per week resulted in a 30% to 40% lower rate of myocardial infarction (MI) than was observed in sedentary women. Therefore the message of adopting an active lifestyle applies equally to older men and women.



As noted previously, it is never too late to gain a cardiovascular benefit from physical activity. For example, the British Regional Heart Study found that cardiovascular mortality was reduced by 34% in 5,934 men who took up even light activity in later life compared to those who remained sedentary. The key point is that exercise must be current and regular to confer cardiovascular protection. There is a saying that “the home run you hit yesterday will not win today’s ball game.”

Similarly, an active and vigorous lifestyle in younger years will not provide protection if you become inactive in later life.

How Much Physical Activity Is Enough?

Now that it is clear that systematic physical activity confers a cardiovascular benefit, the next logical question is: How much is enough? There have been lengthy debates over the years between those who claim that only “vigorous” physical activity will provide protection, and others who recommend that accumulated volume of activity is what counts, regardless of intensity. In traditional fashion, it seems like a compromise between these two extremes is practical, feasible and effective. Specifically, the Surgeon General of the United States, Health Canada and a host of other experts and regulatory bodies are comfortable with “at least 30 minutes of moderate-intensity physical activity (i.e., brisk walking) on most, and preferably all, days of the week.” However, a “dose-response relationship” (i.e., more investment = more improvement) does exist and it is reasonable to expect that another 30 minutes of daily exercise would, on average, confer additional protection against CVD, especially in populations with low baseline physical activity levels.

In several studies, brisk walking and more vigorous exercise were associated with similar risk reductions in cardiovascular events. Given that two-thirds of the adult population is not currently involved in regular physical activity, it does not make sense to establish a public health message which is unrealistic in terms of intensity or volume. Consequently, at least 30 minutes per day of moderate-intensity exercise seems manageable even for a previously sedentary adult. The recommendation is made even more palatable when it is noted that the cardiovascular benefits can be accrued in bouts of activity lasting as little as 10 minutes each. Just imagine letting the dog walk you briskly for 10 minutes three times per day!

However, be advised that anything less than moderate-intensity may feel good but it is not associated with typical cardiovascular benefits. To the extent that this large group of physically inactive adults is also overweight or obese, it has been shown that multiple short-bouts of exercise may enhance exercise adherence.

Physically Active or Physically Fit?

Sometimes there is confusion between physical activity and physical fitness. Physical activity refers to the various games, exercises, bike rides, walks, etc. that one does on any given day. Physical fitness refers to a person's existing capacity to perform the activity at a very high, moderate or low level of energy. One does not invariably correlate closely with the other and this may have something to do with genetic capacity. A plough horse will never win the Kentucky Derby, although it may consistently expend more calories on a daily basis than a thoroughbred. Two studies, one for men and one for women, have each documented the independent relationship of higher fitness level and reduced death rate. In the St. James Women Take Heart Study, 5,721 asymptomatic women underwent baseline fitness tests in 1992 and all-cause deaths were noted over the next 8 years. Mean age at baseline was 52 +/- 10 years for the study. The adjusted mortality risk decreased by 17% for every metabolic equivalent increase in exercise capacity (based on speed and grade of treadmill). Meanwhile, Dr. Terry Kavanagh, one of the leading cardiac rehabilitation scientists in Canada, reported the results of 12,169 men, aged 55 +/- 10 years, who performed maximal treadmill tests as part of the cardiac rehabilitation program at the Toronto Rehab Centre. Most of these men reported a myocardial infarction or coronary artery bypass graft prior to joining the rehab program. Similar to the St. James Study, there was an inverse relationship between exercise capacity on a treadmill and risk of death. It seems patently clear from these two studies alone that

increased fitness level provides some protection against premature death. Many other studies, including those from the well-known Cooper Clinic in Texas, corroborate this observation.

Resistance Exercise as an Aerobic Strategy

Most people think of resistance exercise as an activity which is essential to preserve musculoskeletal function. The typical image might be shiny weight-lifting machines in sweaty gyms, but climbing stairs, shoveling dirt in the garden and carrying grocery bags are practical examples of resistance exercises. Attention to this kind of physical activity is particularly important for women, who are more susceptible to osteoporotic fractures than are men. In spite of this strong relationship, less than 10% of women aged 65 years and older report ever engaging in strengthening activities. This is unfortunate because at least one major study demonstrated the twin benefits of strength improvement and a reduction in CHD incidence. In the Health Professionals' Follow-up Study, men who trained with weights for at least 30 minutes per week were 23% less likely to develop CHD over an 8-year follow-up period. More studies are needed to confirm that these positive gains would also apply to women.

Stroke

It would appear that both increased fitness level and increased physical activity are both associated with a lower risk of stroke. The data are less extensive than those for CHD, but the trends point in the same direction. For example, 16,878 men aged 40 to 87 were followed for 10 years in the Aerobics Centre Longitudinal Study. Compared to the least fit individuals, all others at higher fitness levels had at least a 60% reduction in total stroke mortality. Two other large studies (72,488 nurses over 8 years and 21,823 men over 11 years) showed strong inverse gradients of risk with volume of physical activity.

The views expressed in this newsletter are those of the authors and do not necessarily reflect those of Health Canada or ALCOA.

Summary

The evidence is overwhelming that a systematically active lifestyle reduces the risk of coronary heart disease and premature death. The key is to build in at least 30 minutes more moderate-intensity activity than is part of a normal day. Brisk walking is often referred to as an example of how vigorous one should be. However, it is critical for participants to enjoy this enhanced physical activity, or it is unlikely to become part of their lifestyle. Therefore, a person may choose swimming, biking, dancing, gardening etc., as long as the activity increases breathing and heart rate. Many people are finding that pedometers are useful both as a motivator and as a way of monitoring the volume of added physical activity (steps) each day. If increased activity in an older person is not something that has been part of a regular lifestyle,

it would be advisable to check with a physician first, especially if the person already has a documented occurrence of coronary heart disease.

An excellent resource for those who decide to increase their activity profile is Canada's Physical Activity Guide to Healthy Active Living for Older Adults.

A free copy of the Guide and Handbook can be obtained from 1-888-334-9769 or www.paguide.com.

The second edition of the Canadian Guidelines for Cardiac Rehabilitation and Cardiovascular Disease Prevention, published by the Canadian Association of Cardiac Rehabilitation, will be available from January 2005. For further information, go to www.cacr.ca

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