



Physical Activity and Health

What is Health?

To many people, health simply means absence of disease. However, according to the World Health Organization (WHO, 1948), “Health is a state of complete **physical, mental and social well-being and not merely the absence of disease or infirmity¹”.**

Global Health Status

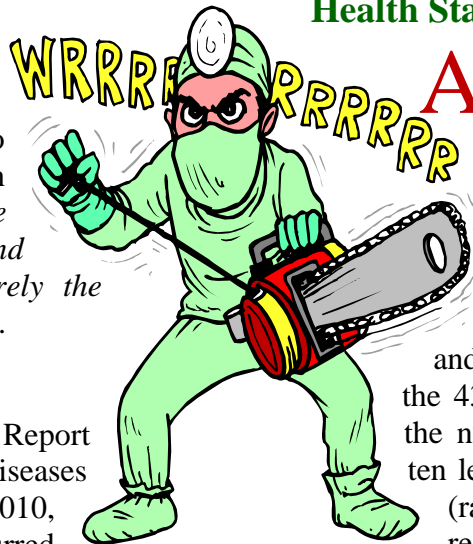
Based on the Global Status Report on Noncommunicable Diseases (NCD) published by WHO in 2010, a total of 57 million deaths occurred in the world during 2008. Thirty-six million (63%) were due to NCDs, principally cardiovascular diseases, diabetes, cancer and chronic respiratory diseases. Approximately 44% of all NCD deaths occurred before the age of 70. NCD deaths are projected to increase by 15% globally between 2010 and 2020 (to 44 million deaths). The leading causes of NCD deaths in 2008 were:

Causes	No. of Deaths (million)	% of NCD Deaths
1. Cardiovascular diseases	17	48
2. Cancers	7.6	21
3. Respiratory diseases ²	4.2	12
4. Diabetes	1.3	4

¹ Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948. The Definition has not been amended since 1948.

² Including asthma and chronic obstructive pulmonary disease.

Health Status of Hong Kong People



According to the Department of Health (HKSAR, 2013), there were more than 7.1 million of people living in 1,104.4 Km² of land area, with an annual population growth rate of 1.2%. The life expectancy at birth is 80.6 years for male and 86.3 years for female. Out of the 43,672 total deaths (all causes), the number of registered deaths by ten leading causes of death in 2012 (ranking based on the number of registered deaths in 2011) were:

Causes	No. of Deaths	% of Deaths
1. Malignant neoplasms	13,190	30.2
2. Diseases of heart	6,254	14.3
3. Pneumonia	6,866	15.7
4. Cerebrovascular diseases	3,251	7.4
5. Chronic lower respiratory diseases	1,980	4.5
6. External causes of morbidity and mortality	1,580	3.6
7. Nephritis, nephritic syndrome and nephrosis	1,617	3.7
8. Septicaemia	825	1.8
9. Dementia	895	2.0
10. Diabetes mellitus	397	0.9

So, it can be seen clearly that just like many countries in the world, noncommunicable diseases, particularly different types of cancers and cardiorespiratory diseases were the major causes of death in Hong Kong in 2012.

Global Risks for Mortality

The WHO's Global Health Risks Report 2009 showed that the top 5 global risks for mortality were:

Risks	% of Global Deaths
1. High blood pressure	13
2. Tobacco use	9
3. High blood glucose	6
4. Physical inactivity	6
5. Overweight and obesity	5

They are responsible for raising the risk of chronic diseases, such as heart disease and cancers.

Physical Inactivity

According to WHO (2010), approximately 3.2 million deaths each year are attributable to insufficient physical activity. People who are insufficiently physically active have a 20 to 30% increased risk of all-cause mortality compared to those who engage in at least 30 minutes of moderate-intensity physical activity on most days of the week. On the other hand, participation in 150 minutes of moderate physical activity each week (or equivalent) is estimated to reduce the risk of ischemic heart disease by approximately 30%, the risk of diabetes by 27%, and the risk of breast and colon cancer by 21 to 25%. Globally, 31% of adults aged 15 years or older were insufficiently active (men 28% and women 34%) in 2008.

In Hong Kong, the Physical Fitness Test for the Community (Community Sports Committee, 2012) also indicated that **most people in Hong Kong were not physically active enough.**

Age Group	Meet Baseline Indicator (%)	Meet American Indicator (%)
Children (7-12) (excluding PE Lessons)	51.8	8.3
Adolescents (13-19)	42.3	8.4
Young adults (20-39)	37.1	28.5
Middle-aged (40-59)	37.2	28.5
Elderly (60-69)	36.5	29.3

WHO (2009): Top 5 Global Health Risks

High Blood Pressure

Globally, 51% of stroke (cerebrovascular disease) and 45% of ischemic heart disease deaths are attributable to high systolic blood pressure. Raised blood pressure changes the structure of the arteries. As a result, risks of stroke, heart disease, kidney failure and other diseases increase. Diet - specially too much salt and alcohol, lack of exercise and obesity all raise blood pressure, and these effects accumulate with age.

Tobacco Use

Globally, smoking causes about 71% of lung cancer, 42% of chronic respiratory disease and nearly 10% of cardiovascular disease. It is responsible for 12% of male deaths and 6% of female deaths in the world. Smoking substantially increases the risk of death from lung and other cancers, heart disease, stroke, chronic respiratory disease and other conditions.

High Blood Glucose

Globally, 6% of deaths are caused by high blood glucose. Raised blood glucose causes all diabetes deaths, 22% of ischemic heart disease and 16% of stroke deaths.

Physical Inactivity

Physical inactivity is estimated to cause around 21–25% of breast and colon cancer burden, 27% of diabetes and about 30% of ischemic heart disease burden.

Overweight and Obesity

WHO estimates that, in 2005, more than 1 billion people worldwide were overweight (BMI \geq 25) and more than 300 million were obese (BMI \geq 30). Globally, 44% of diabetes burden, 23% of ischemic heart disease burden and 7–41% of certain cancer burdens are attributable to overweight and obesity.

Remarks:

1. To meet the Baseline Indicator, all age groups must accumulate 30 minutes or more of moderate or above intensity physical activity per day, 3 days per week.
2. Please refer to the section on "2008 Physical Activity Guidelines for Americans" for how to meet the American Indicator.

Inactivity and CAD Studies

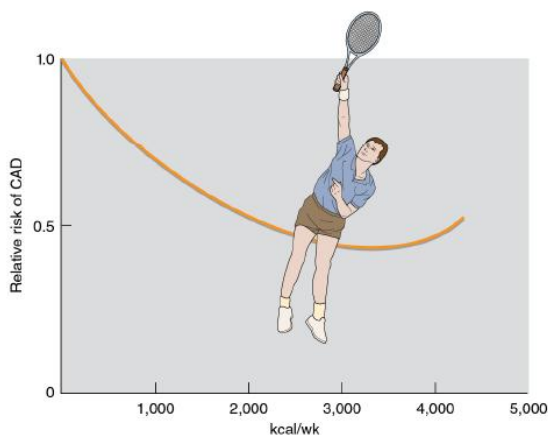
In 1954, Morris and Raffle compared the incidence of coronary artery disease (CAD) between bus drivers and conductors who went up and down the stairs of the double-decker bus in London. In this famous “London Bus Driver Study”, conductors were found to have a risk rate 30% below that of the drivers. Besides, the disease appeared earlier in drivers, and their mortality rate was more than twice as high following the first heart attack.



Paffenbarger et al. (1986) also conducted the “Harvard Alumni Study” to determine the influence of activity, vigorous activity, and sports on cardiovascular illness and death. They found that those who participated in moderate and high levels of activity had mortality **risk ratios** (RR) of .71 and .54, respectively³.

	Calories per week	R.R.
Less active	< 1,000 (less than 30 min of walking per day)	1.0
Moderate	1,000 - 2,500	.71
High activity	>2,500 (e.g., 40 km of jogging per week)	.54

In the same study, they also found that those who played light or moderately vigorous sports had mortality risk ratios of .79 and .63 when compared with those who played no sports, and concluded that moderately vigorous activity and sport were more effective in reducing the risk of CAD.



³ Moderate activity and High activity yielded a 29% and 46% reduction, respectively in risk.

Most other studies have shown that heart disease risk is inversely related to the amount of regular physical activity, be it occupational, leisure time, or vigorous sports. However, activity must be current or contemporaneous to be beneficial. Participation in high school or college sport did not confer protection later in life. On the other hand, regularly active adults maintain a lower risk of CAD whether or not they had been physically active during their youth (Sharkey & Gaskill, 2013).

CAD is not merely the concern of older people. Enos, Beyer and Holmes (1955) found that 77% of American soldiers killed in the Korean conflict had evidence of CAD, indicating that the pathology of atherosclerosis is developing by the age of 22 years. As reported by Tuzac (1999), when doctors examined teenage hearts donated after accidental deaths, they found that 1 in 6 already showed the blockage and plaque deposits characteristic of CAD. On the contrary, autopsies of older men (45 to 70 years) found that the incidence of scars, infarcts, and occlusions in the arteries were 30% less for those who had been moderately active and even lower for those who were heavily active (Morris & Crawford, 1958).

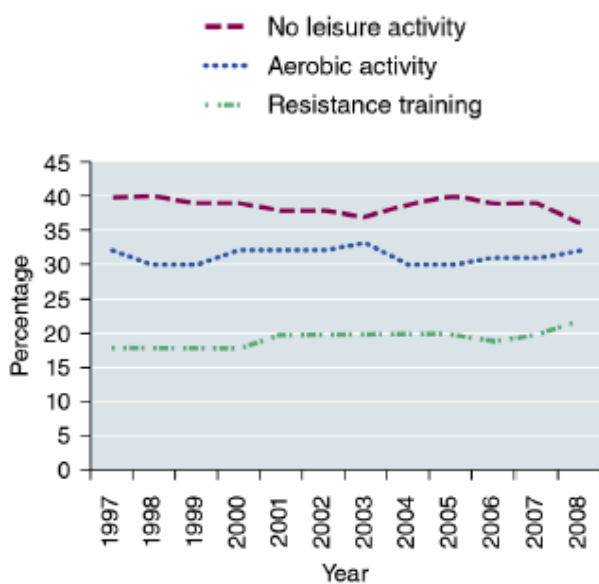
2008 Physical Activity Guidelines for Americans

In 1996, the US Department of Health and Human Services (USDHHS) published the “Physical Activity and Health: A Report from the Surgeon General”. Since then, the WHO and similar Health Departments of different countries in the world started to promote physical activity for health based on the guidelines suggested in the Report. Major conclusions from the Surgeon General’s Report include:

1. People of all ages, both male and female, benefit from regular physical activity.
2. Significant health benefits can be obtained by including a moderate amount of physical activity on most, if not all, days of the week. Through a modest increase in daily activity, most Americans can improve their health and quality of life.

3. Additional health benefits can be gained through greater amounts of physical activity. People who can maintain a regular regimen of activity that is of longer duration or of more vigorous intensity are able to derive greater benefit.
4. Physical activity reduces the risk of premature mortality in general, and of coronary heart disease, hypertension, colon cancer, and diabetes mellitus in particular. Physical activity also improves mental health and is important for the health of muscles, bones, and joints.

Although the Surgeon General’s Report gave high-level attention to the importance of physical activity, it did not ultimately spark the increase in physical activity desired and needed (ACSM, 2011). Over the 12-year time span from 1997 to 2008, little has changed (as indicated in the diagram showing the percentage of Americans meeting various activity targets below).



Ideally, a steady decline would be noted in sedentary behavior, but unfortunately, there has been no significant decrease in inactivity. Eventually, the USDHHS published the “2008 Physical Activity Guidelines for Americans” and provided clearer recommendations on physical activity for their US citizens. The “2008 Physical Activity Guidelines for Americans” includes information on activity for people of all ages, including those with special needs such as pregnant women and people with disabilities and chronic medical conditions.

Health Benefits Associated with Regular Physical Activity (USDHHS, 2008)

Children and Adolescents

Strong Evidence

- Improved cardiorespiratory and muscular fitness
- Improved bone health
- Improved cardiovascular and metabolic health biomarkers
- Favorable body composition

Moderate Evidence

- Reduced symptoms of depression

Adults and Older Adults

Strong Evidence

- Lower risk of early death
- Lower risk of coronary heart disease
- Lower risk of stroke
- Lower risk of high blood pressure
- Lower risk of adverse blood lipid profile
- Lower risk of type 2 diabetes
- Lower risk of metabolic syndrome
- Lower risk of colon cancer
- Lower risk of breast cancer
- Prevention of weight gain
- Weight loss, particularly when combined with reduced calorie intake
- Improved cardiorespiratory and muscular fitness
- Prevention of falls
- Reduced depression
- Better cognitive function (for older adults)

Moderate to Strong Evidence

- Better functional health (for older adults)
- Reduced abdominal obesity

Moderate Evidence

- Lower risk of hip fracture
- Lower risk of lung cancer
- Lower risk of endometrial cancer
- Weight maintenance after weight loss
- Increased bone density
- Improved sleep quality

Physical activity has been and is usually defined as any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level. However, in the “2008 Physical Activity Guidelines for Americans”, the term “physical activity” refers generally to “bodily movement that enhances health”. Bodily movement is further divided into two categories:

1. **Baseline activity** that refers to the light-intensity activities of daily life, such as standing, walking slowly, and lifting lightweight objects. People who do **only** baseline activity are considered to be **inactive**. Short episodes such as climbing a few flights of stairs will **not** count toward meeting the Guidelines.
2. **Health-enhancing physical activity** that refers to activity, when added to baseline activity, produces health benefits. In the “2008 Physical Activity Guidelines for Americans”, the term “physical activity” generally refers to “health-enhancing physical activity”. Brisk walking, jumping rope, dancing, lifting weights, climbing on playground equipment at recess, and doing yoga are all examples of physical activity. Some people (such as postal carriers or carpenters on construction sites) may get enough physical activity on the job to meet the Guidelines.

Key Guidelines for Children and Adolescents (Age: 6-17)

- Children and adolescents should do 60 minutes or more of physical activity daily.

Aerobic⁴: Most of the 60 or more minutes a day should be either moderate- or vigorous-intensity aerobic physical activity, and should include vigorous-intensity physical activity at least 3 days a week.

Muscle-strengthening: As part of their 60 or more minutes of daily physical activity, children and adolescents should include

muscle-strengthening physical activity⁵ on at least 3 days of the week.

Bone-strengthening: As part of their 60 or more minutes of daily physical activity, children and adolescents should include bone-strengthening physical activity⁶ on at least 3 days of the week.

- It is important to encourage young people to participate in physical activities that are appropriate for their age, that are enjoyable, and that offer variety.

Remarks:

1. *The greatest gains in bone mass occur during the years just before and during puberty.*
2. *As children become adolescents, they typically reduce their physical activity.*
3. *Children are naturally active in an intermittent way, particularly when they do unstructured active play.*
4. *Adolescents may meet the Guidelines by doing free play, structured programs, or both.*

Key Guidelines for Adults (Age: 18-64)

- All adults should avoid inactivity. Some physical activity is better than none, and adults who participate in any amount of physical activity gain some health benefits.
- For substantial health benefits, adults should do at least 150 minutes a week of moderate-intensity, or 75 minutes a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Aerobic activity should be performed in episodes of at least 10

⁵ Muscle-strengthening activity includes resistance training and lifting weights. These activities often involve relatively heavy objects, such as weights, which are lifted multiple times to train various muscle groups such as the legs, hips, back, abdomen, chest, shoulders, and arms. Muscle-strengthening activity can also be done by using elastic bands or body weight for resistance (e.g., doing push-ups).

⁶ Bone-strengthening activity (sometimes called weight-bearing activity) produces a force on the bones, commonly by impact with the ground, that promotes bone growth and strength. Examples of such activity include running, brisk walking, and weight-lifting exercises. Therefore, bone-strengthening activities can also be aerobic and muscle strengthening.

⁴ For aerobic activities, the body’s large muscle moves in a rhythmic manner for a sustained period of time. Brisk walking, running, bicycling, jumping rope, and swimming are examples.

minutes, and preferably, it should be spread throughout the week.

- For additional and more extensive health benefits, adults should increase their aerobic physical activity to 300 minutes a week of moderate-intensity, or 150 minutes a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity activity. Additional health benefits are gained by engaging in physical activity beyond this amount.
- Adults should also do muscle-strengthening activities that are moderate- or high-intensity and involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.

Remarks:

1. Current science does not allow identifying an upper limit of total activity above which there are no additional health benefits.⁷
2. Spreading physical activity across at least 3 days a week may help to reduce the risk of injury and avoid excessive fatigue.
3. For muscle-strengthening activities, one set of 8 to 12 repetitions of each exercise is effective, although two or three sets may be more effective.

Key Guidelines for Older Adults (Age: 65+)

The Key Guidelines for Adults also apply to older adults. In addition, the following Guidelines are just for older adults:

- When older adults cannot do 150 minutes of moderate-intensity aerobic activity a week because of chronic conditions, they should be as physically active as their abilities and conditions allow.
- Older adults should do exercises that maintain or improve balance if they are at risk of falling. Examples of such exercises

⁷ Animal studies agree that moderate activity is beneficial, but suggest that exhaustive or stressful effort may somehow accelerate the development of CAD. However, No evidence exists that enormous amounts of activity such as that performed by ultra-endurance athletes, is detrimental to their health (Sharkey & Gaskill, 2013).

include backward walking, sideways walking, heel walking, toe walking, and standing from a sitting position. The exercises can increase in difficulty by progressing from holding onto a stable support (like furniture) while doing the exercises to doing them without support.

- Older adults with chronic conditions should understand whether and how their conditions affect their ability to do regular physical activity safely.

✧ *Please refer to the original document of the “2008 Physical Activity Guidelines for Americans” for those activities suitable for women during pregnancy and postpartum period, adults with disabilities, and people with chronic medical conditions.*

More on Intensity (USDHHS, 2008)

Moderate-intensity

- Equivalent in effort to brisk walking (3 mph or faster).
- Equivalent to 40-59% Heart Rate Reserve (HRR).
- A person can talk, but not sing, during the activity.

Vigorous-intensity

- Equivalent in effort to jogging or running (6 mph or faster).
- Equivalent to 60-84% HRR.
- A person cannot say more than a few words without pausing for a breath.

General Rules of Thumb

- 2 minutes of moderate-intensity activity counts the same as 1 minute of vigorous-intensity activity.

Intensity of Physical Activity and Heart Rate

Everyone has experienced that an easy effort results in a low heart rate and a harder effort raises it. So, it is very often to use heart rate to monitor the intensity of a training program.



Measuring Heart Rate

Heart rate can be determined by feeling your pulse at the **radial artery** in the wrist, or the **carotid artery** in the neck.

The radial pulse is felt on the wrist, just under the thumb



When feeling for the carotid pulse under the angle of the jaw, use very light pressure



Heart rate can also be determined by using a **heart rate monitor**. This kind of equipment, although expensive, is particularly convenient for measuring the heart rate during exercise.



Resting Heart Rate (HR_{rest})

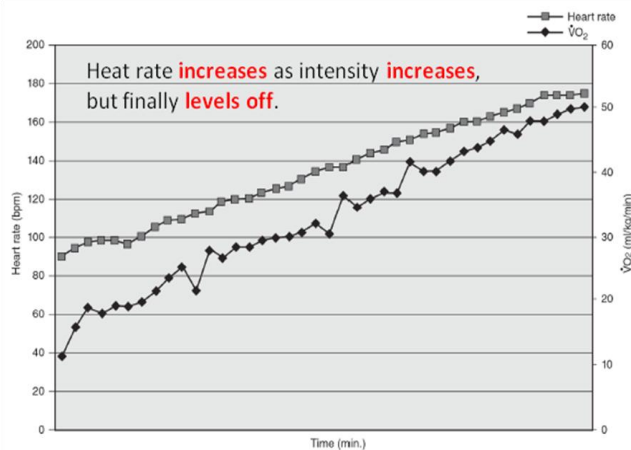
The HR_{rest} is best assessed by counting the number of beats for 60 seconds **before** getting out of bed in the morning. For most adults, the resting heart rate is 60-100 beats per minute (bpm). As fitness increases, resting heart rate decreases (ACSM, 2011).

Exercise Heart Rate

Without using a heart rate monitor, simply take the pulse for 15 seconds **immediately** at the end of exercise and multiply the resulting number by 4 to get the exercise heart rate in bpm (ACSM, 2011).

Maximal Heart Rate (HR_{max})

HR_{max} is the fastest, highest number of times the heart can beat in a minute (Benson & Connolly, 2011).



One of the formulae to estimate the HR_{max} in bpm is

$$HR_{max} = 220 - \text{Age} \quad (\text{ACSM, 2014})$$

However, HR_{max} is highly variable, with a standard deviation (SD) of 12 bpm (Sharkey & Gaskill, 2013). Therefore, 68% of subjects fall within ± 1 SD, 95% of subjects fall within ± 2 SD, and 99% of subjects fall within ± 3 SD; or 1 in 100 subjects of 40 years old will have a HR_{max} below 144 (i.e., $180 - 3 \times 12$) or above 216 (i.e., $180 + 3 \times 12$) bpm.

Target (Training) Heart Rate (THR)

For a person who is 40 years old with a resting heart rate of 70 bpm (ACSM, 2014),

$$\begin{aligned} \text{HRR (Heart Rate Reserve)} &= HR_{max} - HR_{rest} \\ \text{HRR} &= (220 - 40) - 70 = 110 \text{ bpm} \end{aligned}$$

For **moderate**-intensity physical activity i.e., 40-59% of HRR (USDHHS, 2008),

$$\begin{aligned} \text{THR}_{\text{lower limit}} &= 0.4 \times 110 + 70 = 114 \text{ bpm} \\ \text{THR}_{\text{upper limit}} &= 0.59 \times 110 + 70 = 135 \text{ bpm} \end{aligned}$$

For **vigorous**-intensity physical activity i.e., 60-84% of HRR (USDHHS, 2008),

$$\begin{aligned} \text{THR}_{\text{lower limit}} &= 0.6 \times 110 + 70 = 136 \text{ bpm} \\ \text{THR}_{\text{upper limit}} &= 0.84 \times 110 + 70 = 162 \text{ bpm} \end{aligned}$$

That is, for a person who is 40 years old, his exercise heart rate (i.e., his heart rate during his training session) should be between 114 bpm and 135 bpm if he is training at moderate-intensity. Similarly, his exercise heart rate should be between 136 bpm and 162 bpm if he is training at vigorous-intensity. Training intensity below 114 bpm will be considered too light while training intensity above 162 bpm will be considered too tough for him.

Risks of Physical Activity

In general, exercise does not provoke cardiovascular events in healthy individuals with normal cardiovascular systems. The risk of sudden cardiac arrest or myocardial infarction is very low in apparently healthy individuals performing moderate-intensity physical activity. However, the risk of these events during exercise increases with the prevalence of cardiovascular diseases in the population (ACSM, 2014).

Sudden Cardiac Death among Young Individuals

The risk in individuals younger than 30-40 years is very low. The most common causes of death are congenital and hereditary abnormalities including hypertrophic cardiomyopathy, coronary artery abnormalities, and aortic stenosis. Annual incidence of cardiovascular deaths among young competitive athletes in the US is estimated as 1 death per 185,000 men; and 1 death per 1.5 million women (ACSM, 2014).

Sudden Cardiac Death in Adults

The risk is higher in middle-aged and older adults than in younger individuals. Annual incidence of cardiovascular deaths during vigorous-intensity physical activity is estimated as 1 for every 15,000 to 18,000 previously asymptomatic individuals. The risk is also disproportionately higher in the most sedentary individuals when they perform unaccustomed or infrequent exercise. However, the physically active or fit adult has about 30-40% lower risk of developing cardiovascular disease compared to those who are inactive (ACSM, 2014).

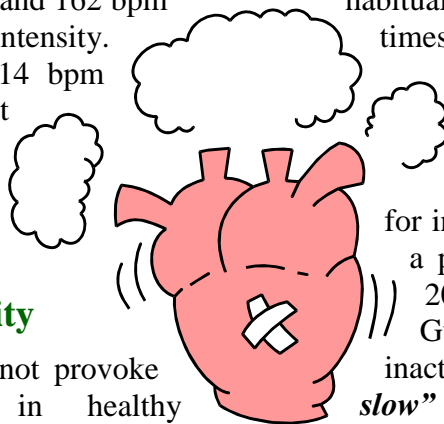
It is true that 10% of heart attacks are associated with physical activity. However, 90% are not. Inactive people are 50 times more likely to have a heart attack during exertion. In contrast, the risk for those who engaged in habitual vigorous activity increases only 5 times during exercise. The overall risk for the active people was only 40% that of sedentary people (Siscovick et al., 1984). In order to lower the risk of a heart attack during exercise for inactive people, it is important to start a program slowly (Sharkey & Gaskill, 2013). The 2008 Physical Activity Guidelines for Americans also advises inactive people to “*start low and go slow*” by gradually increasing how often and how long activities are done. Besides, the health benefits of physical activity far outweigh the risks (USDHHS, 2008).

Preparticipation Health Screening

The American College of Sports Medicine (ACSM) and The American Heart Association (AHA) jointly stated in a paper that “*physicians should not overestimate the risks of exercise because the benefits of habitual physical activity substantially outweigh the risks*” (ACSM & AHA, 2007). However, to reduce the risk of taking part in physical activity, ACSM (2014) advises that preparticipation health screening by self-reported medical history or health risk appraisal such as the

- [Physical Activity Readiness Questionnaire \(PAR-Q\)](#), or
- [AHA/ACSM Health/Fitness Facility Preparticipation Screening Questionnaire](#)

should be done for **all** individuals wishing to initiate a physical activity program. Individuals with known or suspected cardiovascular, pulmonary, metabolic, or renal disease should obtain medical clearance before beginning a vigorous-intensity physical activity program.



Components of the Exercise Training Session

The American College of Sports Medicine (2014) suggests that an exercise training session should be composed of the following components:

1. **Warming-up**
At least 5-10 minutes of light-to-moderate intensity cardiorespiratory and muscular endurance activities (e.g., walking or jogging).
2. **Conditioning**
At least 20-60 minutes of aerobic, resistance, neuromotor, and/or sports activities (exercise bouts of 10 minutes are acceptable if the individual accumulates at least 20-60 minutes per day of daily aerobic exercise).
3. **Cooling-down**
At least 5-10 minutes of light-to-moderate intensity cardiorespiratory and muscular endurance activities.
4. **Stretching**
At least 10 minutes of stretching exercises performed after the warm-up or cool-down phase.

Increasing Physical Activity Gradually Over Time

To be safe and active, it is important to choose the types of physical activity that are appropriate for the current fitness level and health goals. When the amounts of physical activity need to be increased to meet the Guidelines or personal goals, physical activity should be increased gradually over time, no matter what the person's current level of physical activity (USDHHS, 2008).

Since a standard for how to gradually increase physical activity over time has not been established, the USDHHS (2008) gives some general guidance for inactive people and those with low levels of physical fitness on how to increase physical activity:

- Generally start with relatively moderate-intensity aerobic activity (e.g. brisk walking). Avoid relatively vigorous-

intensity activity (e.g., running). Those with a low level of fitness may need to start with light activity (e.g., slow walking), or a mix of light- to moderate-intensity activity.

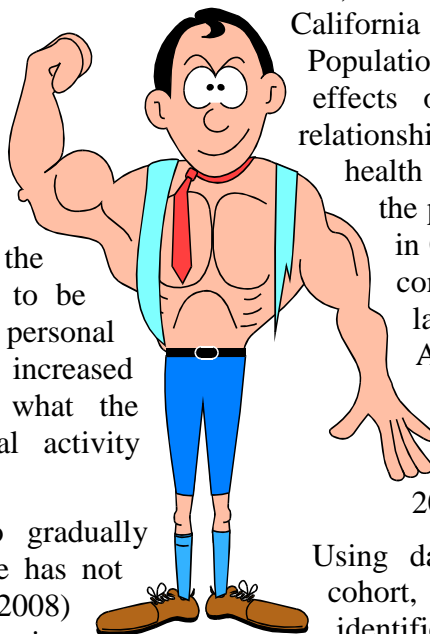
- When increasing the amounts of physical activity, increase the number of minutes per session (duration), and the number of days per week (frequency) of **moderate-intensity** activity first. Later, increase the intensity, if desired.
- Pay attention to the relative size of the increase in physical activity each week. For example, a 20-minute increase each week is safer for a person who does 200 minutes of walking a week (a 10% increase), than for a person who does 40 minutes of walking a week (a 50% increase).

Improving Your Quality of Life

To be physically active is only part of the game for optimal health. Attention must be paid in other practices of health in order to achieve health and wellness⁸.

In order to discover the effect of personal health habits on quality of life, chronic conditions, and mortality, several researchers in California developed the “Human Population Laboratory” to access the effects of health habits and social relationships on physical and mental health among a probability sample of the population of Alameda County in California. This sample, which consists of 6,928 respondents, later known as the “1965 Alameda cohort”, was accessed and surveyed subsequently in 1973, 1985, 1988, 1994, and 1999 (Housman & Dorman, 2005).

Using data from the 1965 Alameda cohort, Belloc and Breslow (1972) identified 7 health habits, later known



⁸ Wellness is a conscious and deliberate approach to an advanced state of physical and psychological/spiritual health (Ardell, 1984). Wellness involves disease prevention and promotion of behaviors that lower the risks of illness and injury (Sharkey & Gaskill, 2013).

as the “Alameda 7”. Further data analyses also suggested a cumulative effect of these behaviors. This study provided initial empirical support for the link between lifestyle and health outcomes. The 7 health habits or behaviors are:

1. Adequate sleep (7 to 8 hours per day)
2. Nutritious breakfast
3. Regular meals (avoid snacks)
4. Weight Control
5. Avoid smoking
6. Limited alcohol consumption
7. Regular physical activity

Belloc (1973) investigated the relationship between health practices and mortality, using the same set of data. Men and women practicing six or seven health habits of the “Alameda 7” lived 11 and 7 years longer, respectively, than those practicing fewer than 6 health habits. Similarly, Breslow and Enstrom (1980) revealed that good health practices and not the initial health status of the survey respondents were largely responsible for the observed mortality rates. When Kaplan et al. (1987) reexamined health practices of the older people (65+ years old) in the 1965 Alameda cohort in 1987, they found strong negative associations between the “Alameda 7” health behaviors and cancer, heart disease, stroke, diabetes, high blood pressure, and trouble breathing. This study provided evidence that the relationship between health practices and mortality was consistent over time.

Subsequent studies using the 1965 Alameda cohort continued to provide supporting results indicating a link between personal health behaviors (the “Alameda 7”), social interactions (social/marital relationships), socioeconomic status, educational levels, religiosity (religious attendance), and long-term health outcomes, quality of life, and mortality. All these results have firmly established lifestyle as a major determinant of health outcomes (Housman & Dorman, 2005).

Finally, the following comments from Sharkey and Gaskill (2013) are used to conclude this report.

“Active live is keystone of health and wellness.”

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