National Physical Activity Guidelines: Professional Guide
Contents

01
Foreword

02
National Physical Activity Guidelines (Adults & Older Adults)

03
National Physical Activity Guidelines Consensus Group

04
The Activity Level of Singaporean Adults & Older Adults

05
Health Benefits

06
Background

09
Evidence and Grade Assignment

10
Physical Activity Guidelines for Adults (19 – 49 Years Old)

11
Physical Activity Guidelines for Older Adults (50+ Years Old)

12
Physical Activity Guidelines for the Prevention of Weight Gain and Obesity (Adults & Older Adults)

13
Safety

15
Promotion of Physical Activity

16
References

17
Glossary of Terms

19
Appendix 1

21
Appendix 2

22
Appendix 3
Appendix 4

23
Appendix 5
Foreword

Regular physical activity is a core component of a healthy lifestyle, and critical for living well and living long. Yet this common knowledge is not being practised by many Singaporeans. The 2010 National Health Survey indicates that 39.1% do not obtain sufficient physical activity. This increases the risk of premature death, cardiovascular disease, metabolic disorders, cancers, weight gain, depression, and accelerated functional decline.

Singapore’s fast evolving urban lifestyle may be contributing to a more sedentary lifestyle. Singaporeans are increasingly employed in desk-bound jobs; and technological developments have made labour-saving devices more prevalent. Paradoxically, the most commonly-cited reasons for not exercising are a lack of time, or a lack of energy. Even while technology helps us work smarter, many choose to spend their time on more sedentary pursuits.

This is a point of concern as scientific evidence has evolved to demonstrate an increasingly clear link between one’s extent of sedentary behaviour and state of health and wellbeing. Lifestyle Physical Activity has emerged as an important concept, that physical activity can happen anytime, and in any place and that health benefits need not only come from dedicated exercise sessions requiring special equipment. Therefore, these guidelines aim to promote an ecological approach to active living which factors in lifestyle, aerobic, and strength activities in the domains of work/home, commuting, and leisure time.

Individuals can use Lifestyle Physical Activity towards reducing sedentary time throughout the day and towards accumulating the recommended 150 minutes a week of moderate-intensity aerobic activity. One can use the stairs rather than the lift, alight at an earlier bus stop to walk the rest of the way, or choose to play with the family at the park instead of lounging in front of the television. Older adults who participate in strength-building activities such as Health Qigong or Tai Chi at least twice a week will also experience better health and age better.

I would like to extend my appreciation and congratulations to the National Physical Activity Consensus Group for developing these guidelines. These guidelines are intended to be a national reference point for the various stakeholders promoting physical activity: medical professionals, health consultants, fitness professionals, workplace and community leaders. Together, we can work towards the goal of making physical activity an integral part of our communities, our organisations, and our everyday lives.

Ang Hak Seng
Chief Executive Officer
Health Promotion Board
National Physical Activity Guidelines
(Adults & Older Adults)

Physical inactivity has been identified by the World Health Organization as the fourth leading risk factor for global mortality (6% of deaths globally). This follows high blood pressure (13%), tobacco use (9%) and high blood glucose (6%). Overweight and obesity are responsible for 5% of global mortality.

According to the recent 2010 National Health Survey conducted by the Ministry of Health, 39.1% of Singaporeans (18 – 69 years old) are physically inactive and 10.8% are obese. The National Physical Activity Guidelines for Singapore provide practical guidance for apparently healthy adults and older adults on the types and volume of physical activities that prevent chronic disease, prolong life and enhance quality of life. The types of physical activity include lifestyle, aerobic and strength, which can be performed in the domains of work, home, commuting or leisure time.

Definition
Physical activity is defined as “any bodily movement produced by the contraction of skeletal muscles that increases energy expenditure above a resting level”.

Key Message
Some physical activity is better than none, and more is better than some.

Stakeholders
The guidelines are useful to any stakeholders involved in promoting health and physical activity in Singapore including:

- ministries, statutory boards and councils;
- health promotion and public health workers;
- health professionals such as physicians, physiotherapists, nurses, dietitians and occupational health workers;
- polytechnic and university staff;
- local sports partnerships, sports trainers, coaches, health and fitness trainers, personal trainers and club volunteers; and
- Voluntary Welfare Organisations (VWO), community and grassroots volunteers.
# National Physical Activity Guidelines Consensus Group

<table>
<thead>
<tr>
<th>Country</th>
<th>Name</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>Robert A. SLOAN PhD(c) Chair</td>
<td>Centre Head/Chief Exercise Physiologist, Physical Activity Centre of Excellence (PACE), Health Promotion Board</td>
</tr>
<tr>
<td>Singapore</td>
<td>Dr Michael CHIA</td>
<td>Professor of Paediatric Exercise Physiology, Dean for Faculty Affairs, National Institute of Education</td>
</tr>
<tr>
<td>Singapore</td>
<td>Dr Cormac O‘MUIRCEARTAIGH</td>
<td>Medical Director (Sports Medicine), Singapore Sports Institute, Singapore Sports Council</td>
</tr>
<tr>
<td>Singapore</td>
<td>Dr (Major) Alexander GORYN</td>
<td>Formation Medical Officer, HQ Commando, Singapore Armed Forces</td>
</tr>
<tr>
<td>Singapore</td>
<td>Connie YEO</td>
<td>Senior Curriculum Specialist, Physical Education, Curriculum Planning &amp; Development Division, Ministry of Education</td>
</tr>
<tr>
<td>Singapore</td>
<td>Dr Alex ONG</td>
<td>Assistant Director, School of Sports Health &amp; Leisure, Republic Polytechnic</td>
</tr>
<tr>
<td>Singapore</td>
<td>Dr LIM Boon Whatt</td>
<td>Programme Chair (Diploma in Health Management &amp; Promotion), School of Sports Health &amp; Leisure, Republic Polytechnic</td>
</tr>
<tr>
<td>Singapore</td>
<td>Dr TONG Khim Leng</td>
<td>Senior Consultant, Department of Cardiology, Changi General Hospital</td>
</tr>
<tr>
<td>Singapore</td>
<td>Dr WONG Mun Loke</td>
<td>Deputy Director, Youth Health Programme Development 1, Health Promotion Board</td>
</tr>
<tr>
<td>Singapore</td>
<td>Dr CHAN Mei Fen</td>
<td>Deputy Director, Research &amp; Evaluation, Health Promotion Board</td>
</tr>
<tr>
<td>Singapore</td>
<td>LIM Meng Thiam</td>
<td>Manager, Centre of Excellence (Nutrition), Health Promotion Board</td>
</tr>
<tr>
<td>Singapore</td>
<td>Philip TAN</td>
<td>Strength &amp; Conditioning Coach, Changi Sports Medicine Centre, Changi General Hospital</td>
</tr>
<tr>
<td>Singapore</td>
<td>Dr Noor Hafizah ISMAIL</td>
<td>Senior Consultant, Continuing and Community Care, Falls &amp; Balance Clinic, Geriatric Assessment, Tan Tock Seng Hospital</td>
</tr>
<tr>
<td>Singapore</td>
<td>CHOO Lin</td>
<td>Deputy Director, Healthy Ageing Programmes &amp; Healthcare Partnership, Health Promotion Board</td>
</tr>
<tr>
<td>Singapore</td>
<td>Grace POON Secretariat</td>
<td>Senior Manager, Physical Activity Centre of Excellence (PACE), Health Promotion Board</td>
</tr>
<tr>
<td>Finland</td>
<td>Dr Raija LAUKKANEN</td>
<td>Docent, Health Sciences, University of Oulu</td>
</tr>
<tr>
<td>Japan</td>
<td>Dr Susumu SAWADA</td>
<td>Visiting Associate Professor, Department of Exercise Physiology, School of Health and Sports Science, Juntendo University</td>
</tr>
<tr>
<td>USA</td>
<td>Dr I-Min LEE</td>
<td>Associate Professor of Medicine, Preventive Medicine, Harvard Medical School</td>
</tr>
<tr>
<td>USA</td>
<td>Dr Steven N. BLAIR</td>
<td>Professor, Departments of Exercise Science and Epidemiology/Biostatistics, University of South Carolina</td>
</tr>
</tbody>
</table>
The Activity Level of Singaporean Adults & Older Adults

The Ministry of Health (MOH) conducted the 2010 National Health Survey (NHS) which includes the Global Physical Activity Questionnaire (GPAQ). The GPAQ is developed by the World Health Organization (WHO) for the purpose of global physical activity surveillance. It collects information on total physical activity participation in three domains.

These domains include:
Activity at work or home  |  Travel to and from places  |  Recreational activities

**Crude prevalence (%) of sufficient* total physical activity level among Singapore residents aged 18 – 69 years by gender, 2010**

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 – 29</td>
<td>64.0</td>
<td>66.9</td>
<td>61.1</td>
</tr>
<tr>
<td>30 – 39</td>
<td>57.9</td>
<td>55.2</td>
<td>60.6</td>
</tr>
<tr>
<td>40 – 49</td>
<td>63.0</td>
<td>54.2</td>
<td>71.8</td>
</tr>
<tr>
<td>50 – 59</td>
<td>58.9</td>
<td>56.7</td>
<td>61.1</td>
</tr>
<tr>
<td>60 – 69</td>
<td>60.0</td>
<td>59.9</td>
<td>60.0</td>
</tr>
<tr>
<td>18 – 69</td>
<td>60.9</td>
<td>58.5</td>
<td>63.3</td>
</tr>
</tbody>
</table>

Source: National Health Survey 2010, MOH

*Meets public health physical activity guideline for substantial health benefit*
Health Benefits

To promote and prolong good health, individuals of all age groups should engage in a physically active lifestyle. There is overwhelming scientific evidence to support the health benefits of physical activity for adults and older adults.10

These health benefits are seen across ethnic groups.

**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

**Moderate to strong evidence**
- Weight loss, particularly when combined with reduced calorie intake
- Improved cardiorespiratory and muscular fitness
- Prevention of falls
- Reduced depression

**Moderate evidence**
- Better functional health (for older adults)
- Reduced abdominal obesity
- Weight maintenance after weight loss
- Better cognitive function (for older adults)

**Moderate evidence**
- Lower risk of hip fracture
- Lower risk of lung cancer
- Lower risk of endometrial cancer
- Increased bone density
- Improved sleep quality
Physical activity is defined as “any bodily movement produced by the contraction of skeletal muscles that increases energy expenditure above a resting level”. It involves duration, frequency, intensity, volume and mode. Physical activity can be performed in the domains of work, home, commuting or leisure time.

The Health Promotion Board (HPB) recommends that adults and older adults participate in three forms of physical activity:

**Lifestyle activity** encompasses activities that one carries out in daily life, such as carrying groceries or taking the stairs.

**Aerobic activity** is any form of physical activity that utilises the aerobic energy-producing system, such as brisk walking, jogging, cycling and swimming.

**Strength activity** is any form of resistance or weight-bearing activity that improves bone, joint and skeletal muscle strength. It also improves power, mass, age-related sarcopenia and endurance.

Physically active adults and older adults who have a higher level of muscular and cardiorespiratory fitness tend to have a more favourable biomarker profile that is associated with the prevention or delay of all causes of mortality and most morbidities.

**Lifestyle Activity**

In a rapidly growing modern society, most adults and older adults may spend much of their day in a sedentary mode due to increased environmental factors: deskbound jobs, long commutes or too much TV/screen time. There is an increasing amount of evidence to support that lifestyle activity may be associated with health outcomes independent of the recommended aerobic activity minutes per week.

Lifestyle physical activities are generally associated with non-structured activities of daily living: taking the stairs instead of the lift, walking instead of driving to a destination to run errands, standing versus sitting, alighting one or more MRT/bus stops earlier or parking further away than usual to walk to a destination.

The term “non-exercise activity thermogenesis” (NEAT) appropriately defines lifestyle activities as all the daily energy expenditure that are not from sleeping, eating or planned exercise routines.

Over time, lifestyle physical activities may contribute to sizeable energy expenditures which may be useful to counter the small energy expenditures responsible for obesity in most adults and older adults.

Therefore, efforts to promote lifestyle physical activities to the public are justifiable. Encouraging Singaporeans to increase lifestyle activities are sensible for a variety of reasons:

1. Increasing lifestyle physical activities burns more calories and may serve as a sustainable strategy to manage weight or prevent weight gain.
2. Some lifestyle physical activities, such as taking the stairs, are weight bearing and may improve strength, bone-health and balance.
3. Lifestyle physical activities may be used towards accumulating weekly aerobic activity minutes, as long as each session is of moderate-intensity and lasts longer than 10 minutes.
4. Promoting lifestyle physical activities can help build a culture where physical activity becomes the social norm.
5. Encouraging sedentary individuals or beginners to increase lifestyle physical activities may provide a realistic starting point to gradually achieve and sustain physical activity.

**Aerobic Activity**

Aerobic activity, also referred to as endurance activity, has demonstrated a strong sum of evidence for providing substantial health benefits for adults and older adults. It occurs when the body’s large muscles move in a rhythmic manner for a sustained period of time. Some examples include brisk walking, jogging, swimming and cycling. Aerobic activity in adults and older adults helps to increase the efficiency and capacity of the cardiorespiratory system.

This enables the transportation of oxygen to skeletal muscles which are then able to use this oxygen efficiently. Regular participation in aerobic activity also has favourable effects on biomarker profiles: blood pressure, atherogenic lipoprotein profile and insulin sensitivity.
Internationally, when comparing the most active with the least active subjects, there is a clear inverse gradient relationship between volume of aerobic activity and all-cause mortality and most types of chronic diseases. For substantial health benefit, the evidence supports the equivalent accumulation of 150 minutes per week of aerobic activity.5, 9, 10, 11

This volume of aerobic activity is associated with a 20 – 50% lower risk of premature death and the incidence of cardiovascular disease, stroke, hypertension, colon cancer, breast cancer, type II diabetes, falls, depression and dementia. It is important to point out that the majority of these health benefits occur independent of body mass index classification.5, 9

Older adults who participate in physical activity are less susceptible to falls and have better cognitive functions. These include motor function, memory, reaction time, executive function and visual attention.5, 9, 11

The term “equivalent accumulation” refers to the total volume which includes the frequency, duration and intensity of aerobic activity. An equivalent mix of vigorous-intensity and moderate-intensity aerobic activities may be used to meet the public health recommendation of 150 minutes.

The ratio of vigorous-intensity to moderate-intensity aerobic activities is approximately 2:1. Therefore, 75 minutes of vigorous-intensity aerobic activity is equivalent to 150 minutes of moderate-intensity aerobic activity. For accumulation, each session of aerobic activity should last at least 10 minutes.

For example:
- 10 minutes of vigorous-intensity aerobic activity = 20 minutes of moderate-intensity aerobic activity
- 45 minutes of high impact aerobics = 90 minutes of low impact aerobics
- 30 minutes of jogging = 60 minutes of brisk walking

An easy way to track weekly accumulation of aerobic activity is for individuals to use the simple HPB aerobic point score card (see Appendix 1) – score 1 point for each 10 minutes of moderate-intensity aerobic activity and 2 points for each 10 minutes of vigorous-intensity aerobic activity. The goal is to accumulate 15 or more points per week.

Table 1 provides three classifications of aerobic activity intensity. Intensity can be determined by using the talk test, percentage of heart rate max or the 0 to 10 relative-intensity rating scale.

### Table 1. Aerobic Activity Intensity Classifications

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Talk test</th>
<th>%Heart rate*</th>
<th>0 – 10 Scale**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light</td>
<td>Minimal increase in breathing rate – one is able to carry on a conversation</td>
<td>50 – 63%</td>
<td>3 – 4</td>
</tr>
<tr>
<td>Moderate</td>
<td>Noticeable increase in breathing rate – one is able to carry on a conversation but does not have enough breath to sing</td>
<td>64 – 76%</td>
<td>5 – 6</td>
</tr>
<tr>
<td>Vigorous</td>
<td>Large increase in breathing rate – one is not able to carry on a conversation but is not out of breath</td>
<td>77 – 89%</td>
<td>7 – 8</td>
</tr>
</tbody>
</table>

* To determine heart rate (HR) range, use 220 – age x %HR (see Appendix 2)  
** Sitting is 0 and the highest level of effort possible is 10 (see Appendix 3)

Although the equivalent accumulation of 150 minutes per week is the public health recommendation, it should not be seen as the absolute threshold for individuals to gain health benefits. Table 2 presents the fact that some physical activity is better than none, and more is better than some.

### Table 2. Classifications of Total Weekly Volume of Aerobic Physical Activity

<table>
<thead>
<tr>
<th>Range of moderate-intensity minutes per week</th>
<th>Summary of overall health benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 – 59</td>
<td>Minimal</td>
</tr>
<tr>
<td>60 – 149</td>
<td>Some</td>
</tr>
<tr>
<td>150 – 299</td>
<td>Substantial</td>
</tr>
<tr>
<td>300 – 420</td>
<td>Additional</td>
</tr>
</tbody>
</table>

Brisk walking is a practical form of aerobic activity that enhances health in adults and older adults. Individuals who brisk walk can lower their risk of type 2 diabetes, cardiovascular disease and all-cause mortality.

Studies have shown that there are greater benefits to walking at a brisk pace than walking at a slower pace. Those individuals who perform little activity will benefit from short and frequent sessions of walking. Bone density, cardiorespiratory and metabolic fitness can be improved in older adults who participate in brisk walking.
Appendix 4 (see page 22) provides the HPB brisk walking pace table based on the age, gender and aerobic fitness level of the average Singaporean.

**Strength Activity**
Additional health benefits can be acquired by participating in strength activities for muscles, bones and joints. Strong evidence shows that participating in regular strength activities provides increases in skeletal muscle mass, endurance, strength, power and intrinsic neuromuscular activation. Benefits of doing strength activities in older adults include functional ability (especially in adults with osteoarthritis) and improvement in joint pain, stiffness and muscle strength.

The evidence has also demonstrated that strength activities improve bone mineral density across the lifespan of an older adult.5, 9, 11 HPB recommends that adults and older adults participate in strength activities for a minimum of 2 days a week to maintain and increase muscular strength and endurance.

Improving or maintaining musculoskeletal fitness can:
- improve blood pressure, bone mineral density, and functional health
- help maintain muscle mass during weight loss
- improve balance and reduce the risk for falls
- reduce the risk of metabolic syndrome and prevent premature mortality

Standard resistance or weight training protocols recommend progressive routines that result in noticeable fatigue after completing 8 to 12 repetitions of each exercise set. One set is effective; however, limited evidence suggests that 2 or 3 sets may be more effective.5, 9, 10

All major muscle groups should be worked on for 2 or more days a week. These include the legs, hips, back, abdomen, chest, shoulders and arms. Some forms of mind body exercises (MBE) such as Qigong, Tai Chi, yoga and Pilates can also provide strength and health benefits.3, 4, 6, 9

Older adults who need to maintain muscle and bone strength should engage in resistance or muscle-strengthening exercises involving the major muscle groups of the body. Other lifestyle physical activities such as carrying, lifting and pushing tasks can also help maintain bone, joint and muscular strength.5, 9, 11

Since older adults have a lower capacity to exercise compared to younger adults, HPB recommends that older adults engage in strength activities that are relative to their capabilities. Examples of strength activities are:
- Digging, lifting and carrying heavy loads
- Body weight exercises such as push-ups and sit-ups
- Weight-bearing activities such as taking the stairs, brisk walking, hiking or jogging
- Exercises using resistance bands, calisthenics, weight machines, hand-held weights or chair exercises
- Some types of Qigong, Tai Chi, yoga or Pilates

Related to strength, falls have a significant impact on the ability of older adults to live independently. The treatment and management of injuries due to falls may consume enormous resources involving family, medical and long-term care.9

Clear evidence demonstrates that participation in physical activity programmes is safe and can effectively reduce falls in older adults who are at elevated risk for falls. Limited evidence indicates that physical activity programmes reduce injurious falls in older adults who are not at risk for falls.5, 9, 11

Maintaining or improving balance is a critical component of falls prevention. A recent Cochrane review5 concluded that subjects who engage in various types of physical activities such as brisk walking, stationary cycling, resistance training and Tai Chi or Qigong have better overall balance.

**The HPB-MOH Clinical Practice Guidelines for Functional Screening for Older Adults in the Community** provides guidance on how to determine if an older adult is at elevated risk for falls. Older adults identified at risk of falling should follow their doctor’s advice when participating in an appropriate physical activity programme.
Evidence and Grade Assignment

Level of Evidence Criteria

Level 1
• Randomised control trials without important limitations

Level 2
• Randomised control trials with important limitations
• Observational studies (non-randomised clinical trials or cohort studies) with overwhelming evidence

Level 3
• Other observational studies (prospective cohort studies, case-controlled studies, case series)

Level 4
• Inadequate or no data in population of interest
• Anecdotal evidence or clinical experience

Grade of Evidence Criteria

Grade A
• Strong recommendation (action can apply to most individuals in most circumstances)
• Benefits clearly outweigh risks (or vice-versa)
• Evidence is at Level 1, 2, or 3

Grade B
• Weak recommendation (action may differ depending on an individual’s characteristics or other circumstances)
• Unclear if benefits outweigh risks
• Evidence is at Level 1, 2, or 3

Grade C
• Consensus
• Recommendations (alternative actions may be equally reasonable) unclear if benefits outweigh risks
• Evidence is at Level 3 or 4

Adapted from Canadian Physical Activity Consensus Panel
Physical Activity Guidelines for Adults
(19 – 49 Years Old)

Lifestyle Activity
(every day)
Over a period of time, lifestyle physical activities may be useful to counter the small energy imbalance responsible for obesity in most adults.

Recommendations include:
• Taking the stairs regularly
• Walking to run errands instead of driving or riding
• Alighting one or more MRT/bus stops earlier or parking further away than usual to walk to a destination
• Breaking up sedentary periods lasting longer than 90 minutes with 5 to 10 minutes of standing, moving around or doing some physical activity

(References 1 and 8) {Level 3 – Grade A}

Aerobic Activity
(spread throughout the week)
To acquire substantial health benefits, adults need to accumulate 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic activity per week. Individuals can combine vigorous-intensity and moderate-intensity activities, with 1 minute of vigorous-intensity aerobic activity being equivalent to 2 minutes of moderate-intensity aerobic activity.

Aerobic activity should be performed for at least 10 minutes per session. Combinations of moderate-intensity and vigorous-intensity aerobic activities can be performed to meet this recommendation.

(References 2, 5, 7, 9, 10 and 11) {Level 2 – Grade A}

Strength Activity
(2 or more days per week)
Strength activities provide additional health benefits. These include muscle-, bone- and joint-strengthening activities (e.g. using hand-held weights, resistance bands, calisthenics, strength-training equipment, dragon boat, and rock climbing) and some mind-body exercises (e.g. Qigong, Tai Chi, yoga and Pilates). Strength activities should involve major muscle groups: legs, hips, back, abdomen, chest, shoulders and arms.

(References 2, 5, 7, 9, and 10) {Level 2 – Grade A}

For adults, a moderate-intensity aerobic activity causes a noticeable increase in breathing and heart rate. For instance, adults should still be able to talk but do not have enough breath to sing while engaging in brisk walking 5 – 7 km/h, dancing, low-impact aerobics, leisurely bike riding, snorkelling, playing doubles tennis or table tennis, etc.

For adults, a vigorous-intensity aerobic activity causes a large increase in breathing and heart rate. For instance, adults should still be able to say a few words but are not out of breath while engaging in jogging, step aerobics, swimming laps, fast bike riding, playing soccer, volleyball, basketball, netball or badminton, etc.
Physical Activity Guidelines for Older Adults (50+ Years Old)

**Lifestyle Activity**
(every day)
Over a period of time, lifestyle physical activities may be useful to counter the small energy imbalance responsible for obesity in most adults.

Recommendations include:
- Taking the stairs regularly
- Walking to run errands instead of driving or riding
- Alighting one or more MRT/bus stops earlier or parking further away than usual to walk to a destination
- Breaking up sedentary periods lasting longer than 90 minutes with 5 to 10 minutes of standing, moving around or doing some physical activity

(References 1 and 8) (Level 3 – Grade A)

**Aerobic Activity**
(spread throughout the week)
To acquire substantial health benefits, adults need to accumulate 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic activity per week. Individuals can combine vigorous-intensity and moderate-intensity activities, with 1 minute of vigorous-intensity aerobic activity being equivalent to 2 minutes of moderate-intensity aerobic activity.

Aerobic activity should be performed for at least 10 minutes per session. Combinations of moderate-intensity and vigorous-intensity aerobic activities can be performed to meet this recommendation.

(References 2, 5, 7, 9, 10 and 11) (Level 2 – Grade A)

**Strength Activity**
(2 or more days per week)
Strength activities provide additional health benefits. These include muscle-, bone- and joint-strengthening activities (e.g. using hand-held weights, resistance bands, callisthenics, strength-training equipment, carrying groceries and climbing the stairs) and some mind body exercises (e.g. Qigong, Tai Chi, yoga and Pilates). Strength activities should involve major muscle groups: legs, hips, back, abdomen, chest, shoulders and arms.

(References 2, 5, 7, 9, and 10) (Level 2 – Grade A)

**Balance**
In addition, balance ability may become a concern for some older adults as they age. Balance is maintained or improved by regularly following the physical activity guidelines for older adults.

References (3, 5, 9, 10, 11) (Level 2 - Grade A)

For older adults, a moderate-intensity aerobic activity causes a noticeable increase in breathing and heart rate, eliciting a relative intensity rating of 5 – 6*.
For instance, older adults should still be able to talk but do not have enough breath to sing while engaging in brisk walking, ballroom dancing, low-impact aerobics, leisurely bike riding, playing golf, table tennis, gardening or doing housework, etc.

For older adults, a vigorous intensity aerobic activity causes heavy breathing and increase in heart rate, eliciting a relative intensity rating of 7 – 8*.
For instance, older adults should still be able to say a few words but are not out of breath while engaging in brisk walking up hills, jogging, step aerobics, swimming, playing badminton, etc.

*Relative intensity is rated on a scale of 0 to 10, where sitting is 0 and the highest level of effort possible is 10. A moderate-intensity activity is a 5 or 6, and vigorous-intensity activity is a 7 or 8.
Physical Activity Guidelines for the Prevention of Weight Gain and Obesity (Adults & Older Adults)

Individuals who are overweight* should aim to reduce their weight and prevent obesity. There is strong evidence that regular physical activity reduces the risk of weight gain and is most effective when combined with a balanced diet.

Engaging in regular physical activity can provide substantial health benefits regardless of an individual’s BMI classification (normal, overweight or obese). Regardless of BMI classification, physically active/fit individuals are more likely to live longer, and lead healthier lives than inactive/unfit individuals.

Guidelines
Initially, individuals should accumulate 150 to 250 minutes of moderate-intensity aerobic activity per week while not exceeding caloric intake requirements. If necessary, individuals should adjust their aerobic activity and caloric intake to a point where it is individually effective for achieving a healthy body weight.

Some individuals may need to accumulate more than 250 minutes of aerobic activity per week to prevent weight gain. Individuals should progress gradually when increasing the volume of aerobic activity.

(References 1, 5, 9 and 10) (Level 2 – Grade A)

Increasing daily lifestyle activities expends more calories and may aid in the prevention of weight gain.

(References 1 and 8) (Level 3 – Grade A)

Muscle-strengthening exercises may promote loss of total body fat and mitigate intra-abdominal fat increase over time.

(References 1, 9 and 11) (Level 2 – Grade B)

*The WHO defines overweight as body mass index (BMI) of 25 – 29.9.
The health benefits of physical activity far outweigh the possible risks. Few people are likely to injure themselves when they take part in moderate-intensity activities for the durations recommended in the guidelines.

There are factors that influence one’s susceptibility to adverse events. This includes the dose of activity (determined by frequency, duration and intensity), the personal characteristics (e.g. age), environmental conditions (e.g. weather and proximity to traffic), type of activity performed (e.g. walking versus playing rugby) and equipment or protective gear used (e.g. helmet). Adults and older adults who follow the physical activity guidelines for moderate-intensity aerobic activity are at low risk for adverse events.

The most common adverse event is musculoskeletal injury. The rate of injury is 1 in every 1,000 hours of participating in a walking exercise and 4 in every 1,000 hours of participating in a running exercise. Comparatively, the overall risks for adults and older adults who do not engage in any form of physical activity are higher than those who are active during the exercise period.

Adults and older adults who participate in physical activity should be aware of the potential risks associated with physical activity. Due to physiological changes with age, they are easily affected by physically-adverse events during exercise periods. The physiological changes include decline in balance, cardiac output, maximal heart rate and connective tissue elasticity. These changes may trigger adverse events in adults and older adults.

**Reduce the risk of injuries or adverse events**

HPB recommends that:

- **individuals who are planning to become more physically active than they are now should review the Physical Activity Readiness Questionnaire (PAR-Q) before they start.**
- **individuals with limitations, disabilities or with chronic conditions should follow their doctor’s advice on the volume and types of physical activities that are best for them.**
- **older adults who are concerned with the risk of falling should follow their doctor’s advice before participating in physical activity programmes.**
- **older adults should be aware of their relative intensity effort (on a scale of 0 to 10) during physical activity.**
- **beginners should gradually work towards meeting the recommended physical activity guidelines.**
- **each aerobic and strength exercise session should include 5 to 10 minutes each of warm-up and cool-down segments and flexibility exercises. These flexibility exercises can be an integral part of one’s weekly physical activity routine and may include mind body exercises.**

**Individuals should take note of the following: Injury**

- **Increase the intensity of their physical activity gradually. Exercising too much or too fast can cause injuries.**
- **Warm up before physical activity to prepare the mind and body for strenuous activities. For greater effectiveness, perform warm up exercises for at least 5 to 10 minutes at light- to moderate-intensity. It gradually increases the heart rate and breathing, and is usually done at a lower intensity from the main activity. It increases blood flow to the muscles and helps decrease the likelihood of injuries during the main activity.**
- **Cool down after physical activity for at least 5 to 10 minutes at light- to moderate-intensity. Cooling down involves slowed-down movements and stretching to allow gradual decrease in heart rate and breathing to pre-exercise levels.**
- **Select the appropriate attire for their physical activity. Certain types of physical activity require specific equipment and protective gear to reduce any risk of injury.**
- **Stop the physical activity immediately if they experience chest discomfort, pain, dizziness or other unusual symptoms.**
- **Refrain from exercising when they have fever, viral infection or are recovering from an illness.**
- **Jog on soft, even surfaces such as levelled grass field, a dirt path or a track. Hard or uneven surfaces, such as cement or rough fields, are more likely to cause injuries.**
- **Exercise in safe areas (e.g. do not jog alone on dark paths or roads).**
- **Watch out for moving cars when jogging or walking on the street and wear light-coloured clothing with a reflective band at night so that drivers can see them more easily.**
Always face on-coming traffic and remember that drivers cannot see them as well as they can see the vehicles.
Always wear a helmet when cycling. They should ride in the direction of the traffic and try to avoid busy streets. They should also use lights and reflectors at night.

Food intake
Avoid any strenuous physical activity for at least 2 hours after a meal.
Wait for about 20 minutes before eating if they have just completed any vigorous-intensity aerobic activity.
Bring a small snack along to keep their energy level up if they plan to be continuously active for more than 60 minutes. Good choices are carbohydrate-rich foods such as bananas, raisins or sports drinks.

Hydration
Always begin any exercise well-hydrated. They should consume about 500ml of water or isotonic/sports drink before their physical activity. In general, our urine colour is a good indicator of hydration status. Light-coloured urine indicates adequate hydration while dark urine indicates dehydration.
Adopt a regular drinking pattern (250 – 500ml each half hourly) to enhance fluid absorption during exercise. They should drink at a comfortable rate and amount to prevent bloating and discomfort. Thirst is not a good indicator of hydration status as by the time they feel thirsty, there is already a significant loss of fluids.
Continue to re-hydrate over the next few hours to replace fluid losses after exercise. They should consume about 1,000ml of water or isotonic or sports drinks after physical activity.
For a short (less than 60 minutes) light- to moderate-intensity aerobic activity (such as brisk walking), plain water is a good choice of fluids.
For physical activities that last longer than 1 hour, they may wish to consume isotonic or sports drinks instead.
Avoid strong coffee or alcohol to prevent dehydration.

Weather
Ensure that the environment is safe and suitable for the physical activity that they have in mind. If it is to be done outdoors, it is advisable to check the weather forecast first.
Tip: When one encounters hot, humid or stormy weather, consider exercising indoors.

For hot, humid weather
Avoid exercising during the hottest part of the day, that is, 10:30am – 3:30pm. On days with high temperatures, they may wish to consider scheduling physical activity in the early morning or late afternoon. If they choose to engage in physical activity in the late morning or early afternoon, they should consider wearing a cap or a hat and applying sunscreen to prevent sunburn.
Wear light, loose-fitting, “breathable” clothing.
Watch for symptoms of heat exhaustion and heat stroke. When one is active outdoors in hot, humid weather, one should be alert to signs of heat exhaustion and heat stroke.

The following are the main symptoms of each type of heat-induced condition:

<table>
<thead>
<tr>
<th>Heat exhaustion</th>
<th>Heat stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dizziness</td>
<td>Dizziness</td>
</tr>
<tr>
<td>Headache</td>
<td>Headache</td>
</tr>
<tr>
<td>Nausea</td>
<td>Nausea</td>
</tr>
<tr>
<td>Confusion</td>
<td>Confusion</td>
</tr>
<tr>
<td>Body temperature below normal</td>
<td>Muscle cramps</td>
</tr>
<tr>
<td></td>
<td>Sweating stops</td>
</tr>
<tr>
<td></td>
<td>High body temperature</td>
</tr>
</tbody>
</table>

Both heat exhaustion and heat stroke can be avoided through proper hydration.

For stormy weather
Cancel or postpone any outdoor activity if there are signs of heavy downpour or lightning.
Seek shelter if they are caught in stormy weather.

First aid
Equip themselves with emergency response skills such as First Aid, Cardio Pulmonary Resuscitation (CPR) and Automated External Defibrillator (AED) certification.
Call for medical assistance immediately if they see anyone experiencing a heart attack or stroke, or showing signs and symptoms of the condition(s).

Note: For more information, visit the following web links:
http://www.myheart.org.sg/heart-facts/heart-conditions/#stroke
http://www.myheart.org.sg/heart-facts/heart-conditions/#heartattack

HPB recommends that organisations or communities that conduct physical activity programmes or events, follow the Physical Activity Safety Guide (see Appendix 5).
Promotion of Physical Activity

**Promotion of Physical Activity**

Stakeholders can promote the accumulation of the recommended amounts of physical activity as follows:

- Provide environmental inducements to physical activity, such as safe, accessible and attractive trails for walking and cycling, and sidewalks with curb cuts.

- Open up schools for community recreation, form neighbourhood watch groups to increase safety, and encourage malls and other indoor or protected locations to provide safe places for walking exercises in any weather.

- Provide community-based programmes to meet the needs of specific populations, such as racial and ethnic minority groups, women, older adults, persons with disabilities, and low-income groups.

Table 3 provides a 3x3 matrix of the potential ways in which physical activity can be realistically accumulated by considering the association of domain and type. The matrix may provide insight for developing strategies and tactics to promote physical activity at the individual, community and worksite levels.

**Table 3.**

3x3 Physical Activity Strategies

<table>
<thead>
<tr>
<th>Domain type</th>
<th>Work/home</th>
<th>Active transport (commuting)</th>
<th>Leisure-time physical activity (exercise, recreation &amp; sports)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lifestyle</strong></td>
<td>• Doing household chores</td>
<td>• 5-minute walk to the bus stop</td>
<td>• Playing catch or frisbee</td>
</tr>
<tr>
<td>Intermittent light- or moderate-intensity activity</td>
<td>• Taking the stairs</td>
<td>• Going for a stroll</td>
<td>• Flying a kite</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Standing</td>
<td>• Playing miniature golf</td>
</tr>
<tr>
<td><strong>Aerobic</strong></td>
<td>• Mopping the floor</td>
<td>• 15-minute brisk walk (~5 km/h) from the MRT station to home</td>
<td>• Doing low-impact aerobics</td>
</tr>
<tr>
<td>Moderate- or vigorous-intensity for more than 10 minutes at a time</td>
<td>• Doing manual work</td>
<td>• Carrying groceries</td>
<td>• Brisk walking or jogging</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Taking the stairs</td>
<td>• Playing soccer</td>
</tr>
<tr>
<td><strong>Strength</strong></td>
<td>• Lifting/moving moderately heavy objects</td>
<td>• Carrying groceries</td>
<td>• Using hand weights</td>
</tr>
<tr>
<td>Moderate- or vigorous-intensity using 0 to 10 scale</td>
<td></td>
<td>• Taking the stairs</td>
<td>• Using resistance band</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Doing Qigong/Tai Chi</td>
</tr>
</tbody>
</table>
References


Physical activity:  
Any bodily movement produced by the contraction of skeletal muscles that increases energy expenditure above a resting level.

Domains of physical activity:  
Physical activity levels can be assessed in various domains, including one or more of the following: leisure-time activity, occupational activity, household activity and commuting activity.

Inactive:  
Not meeting the physical activity guideline for substantial health benefit.

Sedentary activity:  
An activity that does not increase energy expenditure substantially above the resting level. Examples include sleeping, sitting, lying down, watching television and other forms of screen-based entertainment.

Leisure-time physical activity:  
Physical activity performed by an individual that is not required as an essential activity of daily living and is performed at the discretion of the individual. Such activities include exercise conditioning or training, sports participation, and recreational activities such as going for a walk, dancing and gardening.

Exercise  
is a sub-category of leisure-time physical activity that is planned, structured, repetitive and purposeful in the sense that the improvement or maintenance of one or more components of physical fitness is the objective.

Sport  
covers a range of activities performed within a set of rules and undertaken as part of leisure or competition. Sporting activities usually involve physical activities carried out by teams or individuals and are supported by an institutional framework, such as a sporting agency.

Volume (i.e. how much in total):  
Physical activity exposures can be characterised by an interaction between bout of intensity, frequency and duration of activity. The product of these characteristics can be thought of as volume.

Frequency (i.e. how often):  
The number of times an exercise or activity is performed. Frequency is generally expressed in sessions, episodes, or bouts per week.

Intensity (i.e. how hard a person works to do the activity):  
The rate at which the activity is being performed or the magnitude of the effort required to perform an activity or exercise.

Moderate-intensity physical activity:  
On an absolute scale, moderate intensity refers to performing an activity at 3.0 – 5.9 times the intensity of rest. On a scale relative to an individual’s personal capacity, moderate-intensity physical activity is usually a 5 or 6 on a scale of 0 to 10.

Vigorous-intensity physical activity:  
On an absolute scale, vigorous intensity refers to performing an activity at 6.0 or more times the intensity of rest. On a scale relative to an individual’s personal capacity, vigorous-intensity physical activity is usually a 7 or 8 on a scale of 0 to 10.

Duration (i.e. how long in terms of time):  
The length of time in which an activity or exercise is performed. Duration is generally expressed in minutes.

Accumulation:  
The concept of meeting a specific physical activity dose or goal by performing activity in short bouts (e.g. 10 minutes), and then adding together the time spent during each of these bouts.

Glossary of Terms
**Mode:**
The type of activity or exercise that is being performed. Cycling, walking, playing table tennis, and doing Qigong/Tai Chi and weight-lifting are all examples of different modes of activity.

**Progression:**
The process of increasing the intensity, duration, frequency, or amount of activity or exercise as the body adapts to a given activity pattern.

**Lifestyle activity:**
This term is frequently used to encompass activities that one carries out in the course of one’s daily life, that can contribute to sizeable energy expenditure, e.g. taking the stairs instead of using the lift, walking to do errands instead of driving, getting off one bus stop earlier or parking further away than usual to walk to a destination.

**Aerobic activity:**
Also called endurance activity, this activity improves cardio-respiratory fitness. Examples include: brisk walking, running, cycling, jumping rope and swimming.

**Muscle-strengthening activity:**
Physical activity and exercise that increase skeletal muscle strength, power, endurance, and mass (e.g. strength training, resistance training, or muscular strength and endurance exercises). Major muscle groups include the legs, hips, back, abdomen, chest, shoulders and arms.

**Bone-strengthening activity:**
Physical activity primarily designed to increase the strength of specific sites in bones that make up the skeletal system. It produces an impact or tension force on the bones that promotes bone growth and strength.

**Mind body exercise (MBE):**
A form of exercise that combines body movement with mental focus and controlled breathing to improve strength, balance, flexibility and overall health. Examples include Qigong, Tai Chi, yoga and Pilates.

**Balance training:**
Static and dynamic exercises that are designed to improve an individual’s ability to withstand challenges from postural sway or destabilising stimulus caused by self-motion, the environment or other objects.

**Flexibility exercise:**
Exercises that enhance the ability of a joint to move through its full range of motion.

**Apparently healthy adult:**
An individual without chronic conditions such as heart disease, diabetes, COPD, and kidney disease. There is an absence of disease based on clinical signs and symptoms and function, which are normally assessed by routine laboratory methods and physical evaluation.

**Apparently healthy older adult:**
A community-dwelling older adult, not in a nursing home or long-term care environment, and not classified as “frail”. An individual without a specific chronic disease or condition (e.g. diabetes, heart disease, prior stroke, dementia, Alzheimer’s disease or clinical depression).

*(References 5, 9 and 10)*
Appendix 1

## HPB Aerobic Points

For substantial health benefits, adults and older adults should aim to accumulate 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic activity per week. You can take part in a mix of moderate-intensity and vigorous-intensity aerobic activities, but each session should last at least 10 minutes.

An easy way to track weekly aerobic activity is to use the simple HPB aerobic point score card:
- Score 1 aerobic point for each 10 minutes of moderate-intensity aerobic activity
- Score 2 aerobic points for each 10 minutes of vigorous-intensity aerobic activity

The goal is to accumulate a total of 15 or more aerobic points per week.

### Range of HPB aerobic points per week

<table>
<thead>
<tr>
<th>Range of HPB aerobic points per week</th>
<th>Summary of overall health benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 5 (beginner)</td>
<td>Minimal</td>
</tr>
<tr>
<td>6 – 14 (intermediate)</td>
<td>Some</td>
</tr>
<tr>
<td><strong>15 – 29 (regular)</strong></td>
<td>Substantial</td>
</tr>
<tr>
<td>30 – 42 (advanced)</td>
<td>Even more</td>
</tr>
</tbody>
</table>

### Summary of overall health benefits

- Minimal
- Some
- Substantial
- Even more

### Examples of moderate-intensity aerobic activity (Score 1 aerobic point for each 10 minutes)

- Brisk walking (during leisure time or commuting)
- Household chores (e.g. sweeping, mopping, vacuuming, washing windows and washing car)
- Low-impact aerobics
- Leisurely bike riding
- Tennis (doubles)
- Table tennis
- Dancing (e.g. waltz, foxtrot, slow dancing, disco, folk, square, line and belly dancing)

### Examples of vigorous-intensity aerobic activity (Score 2 aerobic points for each 10 minutes)

- Jogging or running
- Recreational sports (e.g. soccer, basketball, netball, volleyball and badminton)
- Step/high impact aerobics or circuit training
- Fast bike riding
- Swimming laps
- Tennis (singles)
- Dancing (e.g. quick step, hip hop, street and salsa)
- Digging or raking
- Walking up hills or hiking
## HPB Aerobic Point Score Card

<table>
<thead>
<tr>
<th>Day</th>
<th>Activity</th>
<th>Intensity</th>
<th>Daily Minutes ÷ 10 Minutes</th>
<th>10 Minutes x Intensity Point(s) = Aerobic Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>Brisk walking</td>
<td>Moderate</td>
<td>30 minutes</td>
<td>1 point = 3 aerobic points</td>
</tr>
<tr>
<td></td>
<td>Jogging</td>
<td>Vigorous</td>
<td>15 minutes</td>
<td>2 point = 3 aerobic points</td>
</tr>
<tr>
<td>Mon</td>
<td>Moderate</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>1 point = _____ aerobic points</td>
</tr>
<tr>
<td></td>
<td>Vigorous</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>2 point = _____ aerobic points</td>
</tr>
<tr>
<td>Tue</td>
<td>Moderate</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>1 point = _____ aerobic points</td>
</tr>
<tr>
<td></td>
<td>Vigorous</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>2 point = _____ aerobic points</td>
</tr>
<tr>
<td>Wed</td>
<td>Moderate</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>1 point = _____ aerobic points</td>
</tr>
<tr>
<td></td>
<td>Vigorous</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>2 point = _____ aerobic points</td>
</tr>
<tr>
<td>Thu</td>
<td>Moderate</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>1 point = _____ aerobic points</td>
</tr>
<tr>
<td></td>
<td>Vigorous</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>2 point = _____ aerobic points</td>
</tr>
<tr>
<td>Fri</td>
<td>Moderate</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>1 point = _____ aerobic points</td>
</tr>
<tr>
<td></td>
<td>Vigorous</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>2 point = _____ aerobic points</td>
</tr>
<tr>
<td>Sat</td>
<td>Moderate</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>1 point = _____ aerobic points</td>
</tr>
<tr>
<td></td>
<td>Vigorous</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>2 point = _____ aerobic points</td>
</tr>
<tr>
<td>Sun</td>
<td>Moderate</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>1 point = _____ aerobic points</td>
</tr>
<tr>
<td></td>
<td>Vigorous</td>
<td>_____</td>
<td>_____ 10 minutes</td>
<td>2 point = _____ aerobic points</td>
</tr>
</tbody>
</table>

**Total Weekly Aerobic Points:**

Aim to accumulate a total of 15 or more points per week
Appendix 2

Heart Rate Table

Moderate-Intensity and Vigorous-Intensity Heart Rate Ranges

You can determine your heart rate by taking your pulse with the help of a wristwatch or timer. Follow the steps below:

**Step 1:**
Locate your age category and recommended heart rate range for moderate or vigorous-intensity aerobic activity.

**Step 2:**
Feel for the pulse on the wrist. When there is a constant heart beat, start counting the number of beats for 15 seconds. The heart rate should be checked immediately after the activity (as heart rate drops rapidly when the activity stops).

**Step 3:**
Multiply the count by 4 to get the heart rate (in beats per minute).

<table>
<thead>
<tr>
<th>Age</th>
<th>Moderate-intensity beats per minute</th>
<th>Vigorous-intensity beats per minute</th>
<th>Moderate-intensity beats per 15 seconds</th>
<th>Vigorous-intensity beats per 15 seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 – 34</td>
<td>120 – 143</td>
<td>145 – 175</td>
<td>30 – 35</td>
<td>36 – 44</td>
</tr>
<tr>
<td>40 – 44</td>
<td>114 – 135</td>
<td>137 – 166</td>
<td>28 – 33</td>
<td>34 – 41</td>
</tr>
<tr>
<td>45 – 49</td>
<td>110 – 131</td>
<td>133 – 161</td>
<td>28 – 32</td>
<td>33 – 40</td>
</tr>
<tr>
<td>60 – 64</td>
<td>101 – 120</td>
<td>122 – 147</td>
<td>25 – 29</td>
<td>30 – 37</td>
</tr>
<tr>
<td>75 – 79</td>
<td>92 – 109</td>
<td>110 – 133</td>
<td>23 – 27</td>
<td>28 – 33</td>
</tr>
</tbody>
</table>

Source: ACSM Guidelines for Exercise Testing and Prescription, 8th edition

A note on medications:
A few types of high blood pressure medicine can lower the maximum heart rate and the target zone rate as well. If you are taking medication for high blood pressure, consult your doctor to find out whether you need to adjust your activity programme.
Appendix 3

Relative Intensity Scale

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light</td>
<td>0</td>
<td>Sleeping</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Doing desk work or using a computer</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Light-intensity leisure walk</td>
</tr>
<tr>
<td>Easy</td>
<td>3</td>
<td>Minimal effort – you have enough breath to sing during warm-up or cool-down sessions</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Your breathing and heart rate are starting to noticeably increase</td>
</tr>
<tr>
<td>Moderate</td>
<td>5</td>
<td>You can talk without pause but do not have enough breath to sing</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>You can still carry on a conversation but it is a little more challenging</td>
</tr>
<tr>
<td>Vigorous</td>
<td>7</td>
<td>You cannot say more than a few words without pausing for a breath</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>You are unable to speak as your breathing is very fast</td>
</tr>
<tr>
<td>Very Hard</td>
<td>9</td>
<td>Near maximum effort – you can only maintain this intensity for about 1 minute</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Maximum effort – you can only maintain this level of effort for a few seconds</td>
</tr>
</tbody>
</table>

Appendix 4

Brisk Walking Pacing Guide for Healthy Adults and Older Adults

Use the recommended pace range as a guide for brisk walking on a level surface. The talk test is to be used to determine if one is walking at moderate-intensity pace.

The Relative Intensity Scale (Appendix 3) should be used in conjunction with this pace guide, especially for those older adults over 65 years old.

<table>
<thead>
<tr>
<th>Female</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>km/hr</td>
<td>min/km</td>
<td>min/2km</td>
<td>min/3km</td>
</tr>
<tr>
<td>20 – 29</td>
<td>5.5 – 7.0</td>
<td>8:30 – 11:00</td>
<td>17:00 - 22:00</td>
<td>25:30 – 33:00</td>
</tr>
<tr>
<td>30 – 49</td>
<td>4.5 – 6.5</td>
<td>9:00 – 13:30</td>
<td>18:00 - 27:00</td>
<td>27:00 – 40:30</td>
</tr>
<tr>
<td>50 – 59</td>
<td>3.5 – 6.0</td>
<td>10:00 – 17:00</td>
<td>20:00 - 34:00</td>
<td>30:00 – 51:00</td>
</tr>
<tr>
<td>60 – 69</td>
<td>2.5 – 4.5</td>
<td>13:30 – 24:00</td>
<td>27:00 - 48:00</td>
<td>40:30 – 72:00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Male</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>km/hr</td>
<td>min/km</td>
<td>min/2km</td>
<td>min/3km</td>
</tr>
<tr>
<td>20 – 29</td>
<td>6.5 – 7.5</td>
<td>8:00 – 9:00</td>
<td>16:00 - 18:00</td>
<td>24:00 – 27:00</td>
</tr>
<tr>
<td>30 – 49</td>
<td>6.0 – 7.0</td>
<td>8:30 – 10:00</td>
<td>17:00 - 20:00</td>
<td>25:30 – 30:00</td>
</tr>
<tr>
<td>50 – 59</td>
<td>5.0 – 6.5</td>
<td>9:00 – 12:00</td>
<td>18:00 - 24:00</td>
<td>27:00 – 36:00</td>
</tr>
<tr>
<td>60 – 69</td>
<td>3.5 – 6.0</td>
<td>10:00 – 17:00</td>
<td>20:00 - 34:00</td>
<td>30:00 – 51:00</td>
</tr>
</tbody>
</table>

Adapted from the SSC Sports for Life UKKWT evaluation and the ACSM Guidelines for Exercise Testing and Prescription.
Appendix 5

Physical Activity Safety Guide

General
- Outdoor exercise is not recommended between 10:30am and 3:30pm and during adverse weather conditions.
- Each exercise session to be between 10 and 60 minutes, plus 5 to 10 minutes of warm-up and cool-down.
- All certified trainers/fitness instructors/event organisers to be AED- and CPR-certified and have access to a first-aid kit and AED.
  *Note: If none is certified, external certified personnel may be engaged on site.
- The number of participants in an exercise class to be based on the square footage that allows each participant unrestricted and safe movement in various types of exercises (includes building code restrictions).
- A medical emergency response plan to be in place and to be reviewed quarterly for any changes.
- Each programme and programme venue to have a risk assessment plan in place (sample templates and guides are available at the Sports Safety section of the Singapore Sports Council’s website, www.ssc.gov.sg; or the Resources section of the Workplace Safety and Health Council website, www.wshc.sg).
  *Note: Service providers should preferably be trained in Risk Assessment (e.g. through SSC’s Risk Assessment Management Course for the Sports Fraternity or similar).

Before Exercise
- An annual exercise pre-participation form to be signed by all participants in cases of ongoing or multiple-session physical activity programmes; verbal PAR-Q should at least be conducted in cases of one-off mass events where it is not practical to implement a written PAR-Q.
  - PAR-Q for 15 years old and above (valid for 1 year).
  - If a participant answers ‘Yes’ to any of the questions in the PAR-Q then the participant will be given the PARmed-X form and advised to obtain medical clearance.
- Verbal PAR-Q before each exercise session/event to be conducted.
  *Note: Participation is allowed only upon clearance of the PAR-Q or PARmed-X.
- All participants to be in the appropriate attire and footwear.

During and After Exercise
Warm-up:
5 to 10 minutes of light-to moderate-intensity cardio-vascular and muscular endurance activities to be performed.

Exercise Intensity:
All participants to exercise within the intended intensity level:
  - Light (i.e. it causes a minimal increase in breathing and heart rate)
  - Moderate (i.e. it causes a noticeable increase in breathing and heart rate)
  - Vigorous (i.e. it causes a large increase in breathing and heart rate but one is not out of breath)

Cool-down:
5 to 10 minutes of light- to moderate-intensity cardio-vascular and muscular endurance activities and light stretching to be performed.

Hydration:
All participants to be instructed to drink cool water before, during and after the session/event.

Recommended Emergency Medical Response Plan
1. Once notified of an emergency, <name of trainer/fitness instructor/event organiser/personnel on site> to call “995” to initiate public safety agencies and provide the following information:
  - Type of emergency
  - Address of facility
  - Location of emergency
  - Phone number they are calling from
  - Further information requested from the “995” operator

2. Once notified of an emergency, <name of trainer/fitness instructor/event organiser/personnel on site> to make primary assessment and judgement of the medical emergency:
  - Sudden cardiac arrest – The responder to perform CPR or proceed with AED use.
  - Other medical emergencies – The responder to only provide the patient care that is consistent with his/her training.

3. <Name of trainer/fitness instructor/event organiser/personnel on site> to inform the building security to clear the emergency parking space for the ambulance if required.

4. <Name of trainer/fitness instructor/event organiser/personnel on site> to stay with the patient until the ambulance personnel arrive at the scene.

5. <Name of trainer/fitness instructor/event organiser/personnel on site> to accompany the patient to hospital and contact the staff on duty (or programme/event organiser) and to inform the patient’s family of the situation.

6. A list of medical facilities in the vicinity of event venue, contact numbers and their operating hours to be on hand.
National Physical Activity Guidelines: Professional Guide is useful to:

- ministries, statutory boards and councils;
- health promotion and public health workers;
- health professionals such as physicians, physiotherapists, nurses, dietitians and occupational health workers;
- polytechnic and university staff;
- local sports partnerships, sports trainers, coaches, health and fitness trainers, personal trainers and club volunteers; and
- Voluntary Welfare Organisations (VWO), community and grassroots volunteers.