كمنترين كصيحتن

KEMENTERIAN KESIHATAN
MINISTRY OF HEALTH
Negara Brunei Darussalam

NATIONAL PHYSICAL ACTIVITY GUIDELINES FOR BRUNEI DARUSSALAM

2022
Second edition

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Front cover photo courtesy of Justin Tan Kian Fook.

ISBN 978-99917-50-16-3
Second edition published in Brunei Darussalam 2022

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Secretariat:
National Physical Activity Guidelines Expert Committee
Health Promotion Centre,
Ministry of Health,
Bandar Seri Begawan BB3910
Brunei Darussalam Tel: +673 238 5800
Fax: +673 238 4223
Website: http://www.moh.gov.bn/Pages/Home.aspx

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Foreword

Alhamdulillah, with the blessings of Allah Subhanahu Wata'ala, it is my great pleasure to introduce the 2nd edition of the National Physical Activity Guidelines for Brunei Darussalam. These guidelines are aligned and based on the WHO Guidelines on Physical Activity and Sedentary Behaviour in 2020.

The past decade has seen increasing trends on the use of personal motorized transportation, technology and urbanization globally and locally, resulting in minimal increases in physical activity levels. Movement and physical restrictions caused by the COVID-19 pandemic has further aggravated these conditions over the last 2 years and most of us are now just in the beginning of our recovery phase. Some of us are more affected than others, particularly those living with non-communicable diseases, low income earners and also our children, who missed a significant amount of schooltime and outdoor activities due to COVID-19 pandemic.

Our National STEPS NCD Survey in 2016 has shown that there has been a decrease of about 10% in physical inactivity prevalence since 2011; however, a significant portion of our population, especially adolescents and women, are not sufficiently active to earn the health benefits of physical activity. Overweight and obesity rates are also high among this population group and in the general population.

While increased physical activity levels benefit all, there is strong evidence to suggest that the greatest health benefits occur when those least active in the population become moderately active. This can be achieved through opportunities in different settings such as schools and workplaces, as well as through various social occasions where people interact with each other.

One of the key policy recommendations in the WHO Global Action Plan on Physical Activity 2018-2030 is the development and scaling of innovative digital approaches to promote physical activity. In line with this, I am pleased to share in Brunei Darussalam, our Bruhealth app features will be expanded to empower Bruneians to manage their own health including, programmes to promote active living and reduce sedentery behaviour.

The 2nd edition of the National Physical Activity Guidelines for Brunei Darussalam are, therefore, timely as they take into account the new set of WHO evidence-based recommendations in physical activity and sedentary behaviour to support comprehensive approaches to increase physical activity levels among the various population groups. Together with the National Dietary Guidelines 2020, these guidelines complement each other to promote healthy lifestyle and reduce the risk of non-communicable diseases in the general population.

It is my hope that these guidelines will not only be used by our health professionals – wherever they are working – to complement their patient management; but also by other relevant stakeholders in the sports, education, social welfare and development sectors as well as by our local communities and civil society organisations to promote physical activity, directly and indirectly, across the life course.

Last but not least, I wish to commend and congratulate the National Physical Activity Guidelines Expert Committee, the secretariat at the Health Promotion Centre and all those who have contributed their time and efforts in the development of the 2nd edition of the National Physical Activity Guidelines for Brunei Darussalam.

Dato Seri Setia Dr Haji Md Isham bin Haji Jaafar
The Honorable Minister of Health
Brunei Darussalam

Preface

Alhamdulillah, by the Grace of Allah Subhanahu Wata'ala, the Ministry of Health has achieved another milestone in its continuing efforts to promote and improve physical activity levels in the Brunei population. The guidelines present clear, concise and user-friendly guidance to support health professionals, policy makers and relevant stakeholders in promoting physical activity in the general population.

The 2nd edition of the National Physical Activity Guidelines for Brunei Darussalam not only takes into consideration, evidence-based recommendations on different types of physical activity levels, intensity and duration for different population groups, including young children; but also sets out guidelines on amounts and types of sedentary behaviours for the population; screen time for children and a section on physical activity during Ramadhan.

The translation of these guidelines into action, therefore, needs the involvement of pertinent actors, sectors, organisations and communities to collaboratively work on a shared vision and framework for action to support everyone in our society – children, adolescents and young people, adults, pregnant women, older people and people with disabilities – to be as active as they can throughout their lives, for them to be able to function daily productively and recreationally, as well as enjoy the multiple health benefits from being physically active. For it is only by working together cohesively, we can support and empower our people to build a healthier nation.

Haji Maswadi bin Haji Mohsin
Permanent Secretary
Ministry of Health
Brunei Darussalam

Acknowledgement

The Ministry of Health would like to acknowledge the following members of the expert committee, specialists and organizations who contributed to the writing of the National Physical Activity Guidelines for Brunei Darussalam:

- Dr Ang Swee Hui, Deputy Permanent Secretary (Professional)
- Dr Haji Zulaidi bin Haji Abdul Latif, Former Deputy Permanent Secretary (Professional)
- Dr Hajah Norhayati binti Haji Md Kassim, Head of Health Promotion Centre
- Dr Abang Muhd Fahmy bin Awang Hepnie, Consultant Rehabilitation Medicine, Head of Rehabilitation Department, Pantai Jerudong Specialist Centre
- Dr Adrian Lim, Consultant Sports and Exercise Medicine, RIPAS Hospital
- Dr Alice Yong Moi Ling, Consultant Endocrinologist, RIPAS Hospital
- Dr Awang Haji Muhammad Syafiq bin Abdullah @ Lim, Consultant Oncologist, RIPAS Hospital
- Dr Essam Mohamed bin Mohamed Shaaban, Sports Medicine Physician, Head of Sport Medicine and Research Centre
- Dr Hajah Roslin binti Haji Sharbawi, Head of Maternal Health Services, Department of Health Services
- Dr Hajah Shodeena binti Haji Mohammad, Senior Medical Officer, Department of Health Services
- Dr Linda Lai, Senior Medical Officer, Head of Child Health Services, Department of Health Services
- Dr Maimunah binti Haji Mokim, Senior Medical Officer, Department of Health Services
- Dr Nik Ani Afiqah binti Haji Tuah, Senior Assistant Professor (Public Health), PAPRSB Institute of Health Sciences, University of Brunei Darussalam
- Dr Norhayati binti Haji Ahmad, Senior Medical Officer, Health Promotion Centre
- Dr Ong Sok King, Consultant, Head of NCD Prevention and Control Unit
- Dr Shyh Poh Teo, Consultant Geriatrician, RIPAS Hospital
- Dr Soon Ing Shian, Consultant Paediatrician, RIPAS Hospital
- Dr Wee Chun Yen, Senior Medical Officer, Department of Paediatric, RIPAS Hospital
- Hajah Wardah binti POKPSRDPSS Haji Suhaili, Senior Physiotherapist, RIPAS Hospital
- Jong Seng Khiong, Senior Occupational Therapist, RIPAS Hospital
- Noel Mendiola, Physiotherapist, Pusat Ehsan Al-Ameerah Al-Hajjah Maryam
- Norhartina binti Haji Sharbini, Senior Physiotherapist, RIPAS Hospital
- Pg Dr Ahmad Syukri bin Pg Haji Abdul Rahim, Medical Officer, Department of Health Services
- Pg Dr Hajah Roserahaini binti Pg Haji Idros, Senior Medical Officer, Maternal Health Services, Department of Health Services
- Ummi Salmah binti Arrif, Health Education Officer, Health Promotion Centre
- Waajidun Ni'am bin Haji Dollah, Health Education Officer, Health Promotion Centre

INTRODUCTION

Introduction

The National Physical Activity Guidelines provide recommendations on the amount of physical activity, the health benefits and disadvantages of sedentary behaviour for early age, children, adolescents, adults and older adults as well as those with chronic conditions and physical special needs. The guidelines were prepared in alignment with the recent WHO Guidelines on Physical Activity and Sedentary Behaviour.

The guidelines are intended for policy-makers in ministries responsible for developing national plans to increase physical activity and reduce sedentary behaviour. Private institutions and healthcare professionals can also use these guidelines as resource and help to support their communication, messages and advice about improving health through physical activity for the patients and public. There is currently few evidence on physical activity in Brunei Darussalam; Hence, investment in research is needed to build evidence, particularly, in the areas of physical activity among Bruneians.

The development of these guidelines is a key initiative to support Brunei Darussalam in achieving global and national targets to reduce physical inactivity by 15% by 2030.

Background

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure and can be performed as part of work, domestic chores, transportation or active recreation, or when participating in exercise or sports activities.

Physical inactivity is defined as not meeting the 2010 recommendations on physical activity and it is a leading contributor to global mortality. In Brunei Darussalam, national surveys revealed the physical inactivity rates of 25.3% in 2016 among adults and 88.5% in 2019 among adolescents. These figures showed that adolescents are less active than adults. The surveys also highlighted that women are less active than men. It is important that all Bruneian should engage in regular physical activity to improve their overall health and to reduce the risk of non-communicable diseases.

Sedentary behaviour is defined as any waking behaviour while in a sitting, reclining or lying posture with low energy expenditure. (1) The current technological innovation and the transition towards more sedentary occupations and recreation, and the increasing use of personal motorized transportation all contribute to changing patterns of physical activity and increased sedentary behaviour across the world. These guidelines also include recommendations on sedentary behaviour across the life course, including the associations between sedentary behaviour and health outcomes.

Guidelines Development Process

The National Physical Activity Expert Committee was set up in 2019 and was responsible for developing these guidelines based on the 2020 World Health Organization (WHO) guidelines on Physical Activity and Sedentary Behaviour together with other international guidelines which support the importance of physical activity. The Expert Committee also reviewed international research and evidence on physical activity especially on sub-population such as adults with diabetes, hypertension, obesity and also physical activity during the fasting period.

WHO representatives from the Physical Activity Unit in WHO also provided feedback on the draft guidelines and also to contextualise and tailor recommendations according to Brunei 's setting.

Key Updates

The 2nd edition of the guidelines provide more benefits of physical activity and outlines the amounts and types of physical activity recommended for different age group including the early years (birth to 5 years old). Physical activity recommendations for major groups of medical conditions or health risk factors such as cancer, diabetes, hypertension and asthma are also included together with recommendations for safe Ramadhan physical activity levels. Additionally, risks of sedentary behaviour including screen time are also included in these guidelines.

BENEFITS OF PHYSICAL ACTIVITY

Benefits of Physical Activity

Early age (Birth to 5 years)

- Improve physical fitness such as cardiorespiratory fitness, motor development and musculoskeletal fitness (for toddlers)
- Improve cardiometabolic health
- Reduce adiposity (for infants)
- Improve cognitive developement (for toddlers)

Children and adolescents (5 to 17 years)

- Improve physical fitness such as cardiorespiratory fitness, motor development and musculoskeletal fitness
- Improve cardiometabolic health such as blood pressure, dyslipidaemia, glucose and insulin resistance
- Reduce adiposity
- Improve cognitive function such as academic performance and executive function
- Improve mental health such as depression and anxiety
- Improve sleep
- Reduce risk of adverse events such as injuries and harms

Adult (18 to 64 years) and Older adults (65 years and above)

- Reduce risk of all-cause mortality including cardiovascular disease mortality
- Reduce risk of cardiovascular disease including heart disease and stroke
- Reduce risk of hypertension
- Reduce risk of site-specific cancers such as bladder, breast, colon, endometrial, oesophageal adenocarcinoma, gastric and renal
- Reduce risk of type 2 diabetes
- Reduce adiposity
- Improve cognitive function such as academic performance and executive function
- Improve mental health such as depression and anxiety
- Improve sleep
- Reduce risk of adverse events such as injuries and harms
- Reduce risk of osteoporosis, falls and falls- related injuries (for older adults)
- Improve health related quality of life

Women during pregnancy and the postpartum period

- Reduce risk of excessive gestational weight gain
- Improve mental health such as depression and anxiety
- Reduce risk of adverse events such as injuries and harms
- Reduce risk of delivery complications
- Reduce risk of gestational diabetes
- Reduce risk of gestational hypertension and pre-eclampsia
- Reduce risk of newborn complications
- No adverse effects on birthweight
- No increase in risk of stillbirth

(1, 2)

ADVERSE HEALTH EFFECTS OF SEDENTARY BEHAVIOUR

Adverse Health Effects of Sedentary Behaviour

Early age (Birth to 5 years)

- Reduce physical fitness such as cardiorespiratory fitness, motor development and musculoskeletal fitness
- Increase adiposity
- Reduce cognitive function (for toddlers)

Children and adolescents (5 to 17 years)

- Reduce physical fitness such as cardiorespiratory fitness, motor development and musculoskeletal fitness
- Reduce cardiometabolic health such as hypertension, dyslipidaemia and insulin resistance
- Increase adiposity
- Reduce cognitive function such as academic performance and executive function
- Increase risk of mental health such as depression and anxiety
- Reduce sleep duration
- Increase risk of adverse events such as injuries and harms

Adult (18 to 64 years) and Older adults (65 years and above)

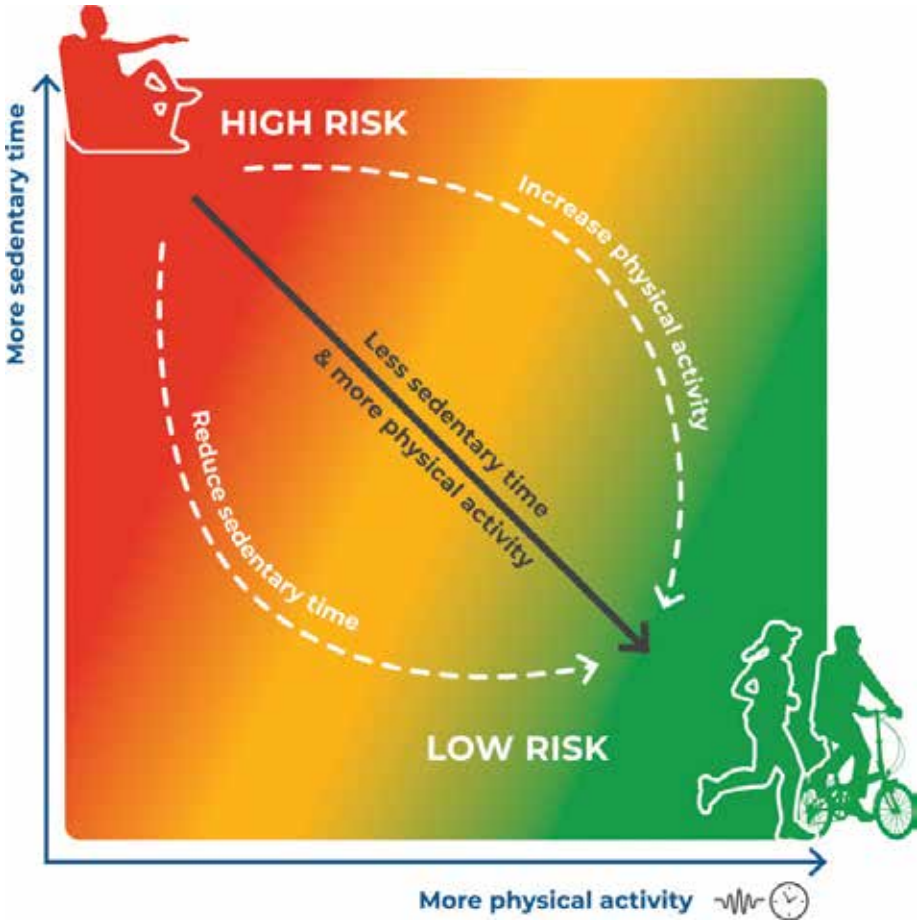
- Reduce physical fitness such as cardiorespiratory fitness, motor development and musculoskeletal fitness
- Increase risk of all-cause mortality including cardiovascular disease mortality and cancer mortality
- Increase risk of cardiovascular disease including heart disease and stroke
- Increase risk of cancers
- Increase risk of type 2 diabetes
- Increase adiposity
- Reduce cognitive function such as academic performance and executive function
- Increase risk of mental health such as depression and anxiety
- Reduce sleep duration
- Decrease health related quality of life

(1, 2)

THE RELATIONSHIP BETWEEN SEDENTARY BEHAVIOUR AND PHYSICAL ACTIVITY

The Relationship Between Sedentary Behaviour and Physical Activity

- The relationship between sedentary behaviour and all-cause mortality, cardiovascular disease and cancer mortality varies by amount of moderate to vigorous intensity physical activity.
- Higher amounts of moderate to vigorous intensity physical activity can reduce the detrimental association between sedentary behaviour and health outcomes.



This relationship between levels of sedentary behaviour and moderate to vigorous intensity physical activity is summarized in the systematic review by U.S Physical Activity Guidelines Advisory Commitee as shown in Figure above. (3)

PHYSICAL ACTIVITY LEVEL IN BRUNEI POPULATION

Physical Activity Level in Brunei Population

In Brunei Darussalam, noncommunicable diseases (NCDs), such as cancer, heart disease, diabetes and strokes have been the leading causes of death which accounted for 51.1% of total deaths in 2016.

The National NCD STEPS Survey in 2016 showed that 27.3% of men and 27.2% of women were obese. The proportions of obesity are expected to steadily increase over the next 20 years if the current trend continues. Obesity is considered as one of the major disease burdens on public health care systems. Obesity also results in considerable loss of quality of life to individuals and places stress on communities.

According to the Knowledge, Attitude and Practise of NCD survey (KAPSNCD in 2015), 82% of Brunei adults were aware of the benefits of physical activity. Physical inactivity rate in the general adult population has declined from 34.8% in 2011 to 25.3% in 2016. Despite that, a quarter of adults still did not meet the minimum standards of WHO guidelines which recommends no less than 150 minutes of moderate physical activity per week. This concern also extends to adolescents where the Global School Health Survey 2019 revealed that 88.5% of adolescents who were physically inactive.

Regular physical activity is proven to help prevent and treat noncommunicable diseases (NCDs) and also help to prevent overweight and obesity, as well as improve mental health, quality of life and well-being.

KEY PHYSICAL ACTIVITY CONCEPTS

Key Physical Activity Concepts

Physical Activity Terms and Dimensions

Physical Activity and Health

WHO defines physical activity as any movement produced by the skeletal muscles of the human body that uses energy. It covers a range of bodily movements and activities of daily life, such as playing, working, walking, household chores, sports and recreational activities. (1)

Health

Health is a human condition with physical, social, and psychological dimensions, each characterized on a continuum with positive and negative poles. Positive health is associated with a capacity to enjoy life and to withstand challenges; it is not merely the absence of disease. Negative health is associated with illness, and in the extreme, with premature death.(4)

Exercise

Exercise is a form of physical activity, a subcategory of physical activity that is planned, structured and repetitive, with the objective of improving or maintaining physical fitness, physical performance or health. Although all exercise is physical activity, not all physical activity is exercise.(4)

Sedentary Behaviour

Sedentary behaviour refers to any waking behaviour characterized by a low level of energy expenditure (less than or equal to 1.5 METs). In general, sedentary behaviour is about sitting or lying or reclining at work, at home, getting to and from places, or with friends, including time spent sitting at a desk, travelling in car or time spent using a device such as a smartphone, computer, television or video game console, but does not include time spent sleeping. (1) For children under 5 years of age, this includes time spent restrained in a car seat, high-chair, stroller, pram or in a carrying device or a caregiver's back.(2)

Types of Physical Activity

01
Aerobic Activity

This is any activity that can be maintained over a period of time that causes the body to use more oxygen and uses large muscle group. It makes the heart and lungs stronger, lower blood lipids, lower blood pressure and uses up blood sugar. Aerobic exercise includes walking briskly, cycling, dancing, swimming, jogging or some team sports (football, basketball, etc).

Exercising above your maximum aerobic level also causes the body to produce large amounts of free radicals, causing excessive oxidative stress. One of the useful ways to ensure that the exercise level stays in the aerobic zone is to use a heartrate monitor.(5)

02
Muscle Strengthening Activity

This kind of activity increases skeletal muscle strength, power, endurance and mass. It includes resistance training and weight lifting, causes the body's muscles to work or hold against an applied force or weight. These activities often involve lifting relatively heavy objects multiple times, such as weights, to strengthen various muscle groups. Muscle strengthening activity can also be done by using elastic bands or body weight for resistance (climbing a tree, lifting objects, sit-ups or doing push-ups, for example). The effects of muscle strengthening activity are limited to the muscles doing the work. It is important to work all the major muscle groups of the body—the legs, hips, back, abdomen, chest, shoulders and arms.(1, 4)

03
Bone Strengthening Activity

This kind of activity (sometimes called weight-bearing or weight-loading activity) produces a force on the bones of the body that promotes bone growth and strength. This force is commonly produced by impact with the ground. Examples of bone strengthening activity include jumping jacks, running, brisk walking, and weightlifting exercises. As these examples illustrate, bone strengthening activities can also be aerobic and muscle strengthening.(4)

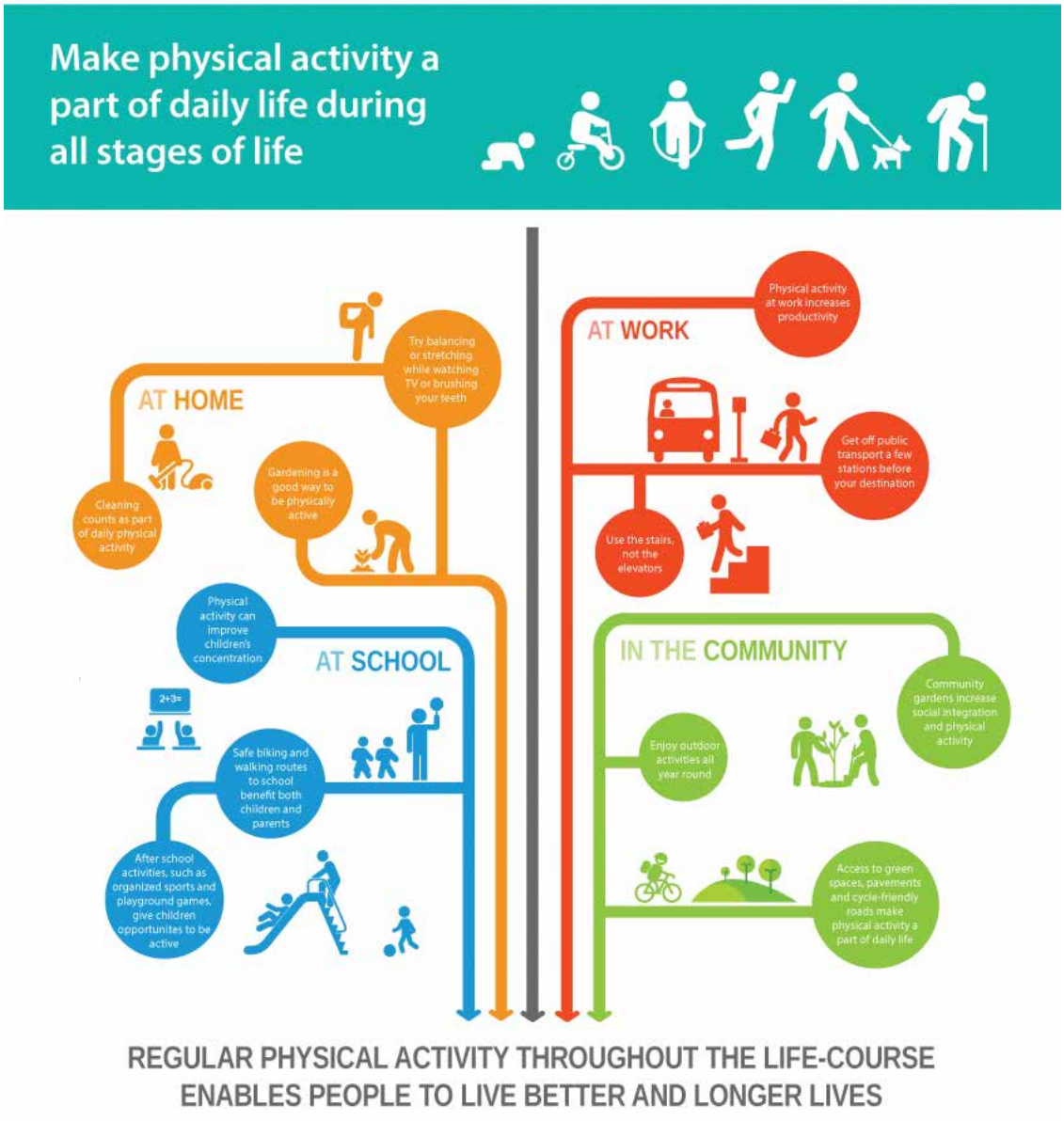
04
Balance Activity

This kind of activity can improve the ability to resist forces within or outside of the body that causes falls while a person is stationary or moving. Walking backwards, standing on one leg or using a wobble board are examples of balance activities. Strengthening muscles of the back, abdomen and legs also improves balance.(4)

05
Flexibility Activity

This kind of activity enhances the ability of a joint to move through the full range of motion. Stretching exercises are effective in increasing flexibility, allowing people to more easily do activities that require greater flexibility.(4) Examples: yoga, tai chi and pilates.

Domains of Physical Activity



Different domains of physical activity can provide favourable health outcomes. The followings are the different domains of physical activity(1):

Leisure Time

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 sports participation, exercise conditioning or training and recreational activities such as going for a walk, dancing and hiking.

Occupation/Work

Physical activity involving manual labour tasks undertaken during paid or voluntary work. Such activities include walking, carrying or lifting objects.

Education/School

Physical activity that comprised of physical education, sports or active transport (such as walking or cycling) undertaken in school environment.

Household

Physical activity undertaken in the home for domestic duties (such as cleaning, caring for children, gardening etc.).

Transportation

Physical activity performed for the purpose of getting to and from places which refers to walking, cycling and wheeling (the use of non-motorized means of locomotion with wheels, such as scooters, rollerblades, manual wheelchair etc.).

Exercise Prescription

Exercise prescription commonly refers to the specific plan of fitness-related activities that are designed by a specialist to use exercise as a medicine for the treatment and prevention of disease. It is an under-utilized tool for improving community health and in the right dose, physical activity can help to prevent, treat and manage a range of chronic health conditions that increasingly impact the quality of life and physical function of individuals on a global scale.

The dosage of aerobic exercise is a function of the frequency (F), intensity (I) and duration (time, T) of the exercise performed. In combination with the type (T) of exercise performed, these factors constitute the basic components of the core principle of exercise prescription (the FITT framework).

Key Components	
Frequency (F)	The number of days per week dedicated to an exercise session.
Intensity (I)	How hard a person works to do the activity. It can be defined on either an absolute or a relative scale. Absolute intensity refers to the amount of energy expended per min of activity, while relative intensity takes a person's level of exercise capacity or cardiorespiratory fitness into account to assess the level of effort. Either scale can be used to monitor the intensity of aerobic exercises.
Time (T)	The length of time in which an activity or exercise is per-formed. Duration is generally expressed in minutes.
Type (T)	The mode of exercise performed.

Borg RPE Scale

Rating of perceived exertion (RPE) is a widely used and reliable indicator to monitor and guide exercise intensity. The scale allows individuals to subjectively rate their level of exertion during exercise or exercise testing. It is developed by Gunnar Borg and often also referred to as the Borg Scale.

RPE scales are particularly valuable when heart rate measures of exercise intensity are inaccurate or dampened, such as in patients on beta blocker medication. This is due to the scale's ability to capture the perceived exertion from central cardiovascular, respiratory and central nervous system functions.

The 0-10 scales are used in clinical practice to measure perceived exertion. Despite being a subjective measure of exercise intensity, RPE scales provide valuable information when used correctly. It is therefore important that clinicians take sufficient time to educate the patient and ensure appropriate understanding prior to use.
(6)

Rating of Perceived Exertion (RPE) Category-Ratio Scale

0	Nothing at all	
0.3		
0.5	Extremely weak	Just noticeable
0. 7		
1	Very weak	
1.5		
2	Weak	Light
2. 5		
3	Moderate	
4		
5	Strong	Heavy
6		
7	Very strong	
8		
9		
10	Extremely strong "Maximal"	
11		
• Absolute maximum		Highest Possible

Borg G. Borg's Perceived Exertion and Pan Scales. Champaign, IL: Human Kinetics, 1998

	Light Intensity	Moderate Intensity	Vigorous Intensity
Relative Intensity	No noticeable changes in heart rate and breathing rate.	Mild increase in heart rate and breathing rate.	Large increase in a heart rate and breathing rate.
	At a pace where able to easily talk and sing.	At a pace where able to comfortably talk but not sing.	At a pace where cannot say more than a few words without pausing for a breath.
		Develop a light sweat after about 10 minutes of activity. A general rule of thumb is that 2 minutes of moderate intensity activity counts the same as 1 minute of vigorous intensity activity.	Develop a sweat after only a few minutes of activity.
Absolute Intensity (for adults)	less than 3.0 METs	3.0 to 5.9 METs	6.0 or more METs
Target heart rate zone (for adults)		40 to about 60% of your maximum heart rate*	60 to about 85% of your maximum heart rate*
BORG Rating-of-perceived-exertion scale of 0 to 10 (0 is sitting and 10 is the greatest effort possible)	2	5 or 6	Begins at a 7 or 8
Examples	walking at a slow or leisurely pace, cooking activities or light household chores.	walking briskly or with purpose, cycling, mop-ping, vacuuming or Physical Education class.	walking very fast, running, fast cycling, hiking, carrying heavy groceries or other loads upstairs or participating in a strenuous fitness class. Martial arts, such as karate or silat. Sports such as football, soccer, rugby, basketball, swimming or tennis.

(1, 4, 6, 7)

It is important that safe and effective exercise prescription requires careful consideration for the target individual's health status, baseline fitness, goals and preferences. For any queries on exercise prescription, please contact Sports and Exercise Medicine Department.

Measuring Physical Activity

Use of questionnaires

Information for questionnaires usually comes from individuals reporting on their own physical activity behaviour. It may also come from proxy reporters, such as parents of young children, or observers watching the physical activity of others. Several general categories of questionnaires have been developed, as have large numbers of specific questionnaires within each category. Global questionnaires strive to place individuals into physical activity categories using one or more questions. Quantitative history questionnaires use more questions to inquire about participation in specific activities or activities of specific intensity, almost always moderate to vigorous intensity. Physical activity diaries are another form of questionnaire. Many recent questionnaires have begun to inquire about sedentary or sitting behaviours but, for the most part, questionnaires have focused upon moderate to vigorous physical activity because those activities are most easily remembered. Questionnaires are capable of determining the specific activities performed and the domains for those activities. Individuals can also report the relative intensity of their activities. The use of the internet to administer questionnaires and to collate the responses has reduced the burden on both respondents and researchers.(4)

GPAQ (Global Physical Activity Questionnaire)

The Global Physical Activity Questionnaire (GPAQ) is one such instrument that was endorsed by the WHO for its STEPwise Approach to Chronic Disease Risk Factor Surveillance (STEPS). (8) It collects information on physical activity participation in three settings (or domains) and sedentary behaviour.

These domains are:

- Activity at work
- Travel to and from places
- Recreational activities

GSHS (Global school-based Student Health Survey)

The Global school-based Student Health Survey (GSHS) is a school-based survey which uses a self-administered questionnaire to obtain data on young people's health behaviour and protective factors related to the leading causes of morbidity and mortality among children and adults. One of the core modules in GSHS is related to physical activity. (9)

Use of Devices

As the use of personal devices to measure physical activity has increased, volume is sometimes expressed as activity counts or step counts during a set period of time. Steps are easily counted. Step counts are easily understood by individuals and the media. They are a useful prescription tool for healthcare professionals and trainers. Step counts blend well with public health messages encouraging the use of stairs rather than elevators or parking at a distance from the final destination. Step counts include light as well as moderate and vigorous intensity physical activity. As a result, the number of steps that would be equivalent to 150 to 300 minutes per week of moderate to vigorous physical activity varies from individual to individual and it may be less than the commonly suggested 10,000 steps. Regardless, step counts are simple to use, can be tailored to meet individual needs and appear to be useful for monitoring progress toward personal goals.(4)

The types and accuracy of devices to measure physical movement have been improving rapidly and their cost has steadily declined. Formerly, devices were one of two general types: pedometers, devices that counted steps, and accelerometers, devices that measured truncal or limb movement. With current technology, accelerometers are now available as smart phone apps and components of wrist watches. They have become more accurate at assessing upper body as well as lower body movements and some are waterproof, enabling the assessment of water activities. Many of these systems use a variety of sensors and technologies and are referred to as “multi-sensor systems.” They measure steps, often are paired with global positioning systems providing estimates of speed and distance, and some include heart rate monitors, making estimates of relative as well as absolute energy expenditure possible. The advances in measurement of bodily movement, especially light intensity physical activities, will continue to improve knowledge and understanding of the relationship between physical activity and health.(4)

References
(1, 2, 4-9)

SAFETY CONSIDERATIONS FOR PHYSICAL ACTIVITY

Safety Considerations for Physical Activity

Safety Tips for Beginners

Always remember the golden rule of exercise safety:
1. Start slowly, and build up the intensity and duration of your exercise gradually.
2. Trying to make up for lost time, or go from couch potato to exercise maven overnight, is a prescription for problems.
3. Get fit to play and never play to get fit.
4. Never stretch a cold muscle

When to Stop: Warning Signs

A certain amount of discomfort during exercise is normal and inevitable—after all, you are challenging your body to do more than it is accustomed to. And you can expect to have some sore muscles after a vigorous workout; often the soreness doesn't show up until a day or two later, especially with strength training.

But pain and other symptoms that occur during exercise can be warning signs that something is wrong. You should stop exercising right away if you:
- Have pain or pressure in the left or middle part of your chest, or in the left side of your neck, left shoulder or left arm
- Persistent excessive shortness of breath that does not resolve on rest
- Feel dizzy or sick
- Break out in a cold sweat
- Have muscle cramps
- Feel sharp pain in your joints, feet, ankles or bones
- Notice that your heart starts racing or beating irregularly

If you start to experience these problems during high intensity aerobic exercise, it is best to immediately slow down. Allow your heart rate to drop gradually before stopping completely, since an abrupt stop can cause problems with blood circulation and fainting. However, in cases of severe and sudden pain, stop immediately, seek advice from your doctor. (10)

Gyms & Trainers: What to Look For

If you do some of your exercise in the gym, whether on your own, in group classes, or with a personal trainer, there are some simple precautions you can take to keep yourself safe:
- Ask if the gym's trainers or instructors have been trained and certified first aiders. They should also hold current CPR and first aid certifications, so they can take action if an emergency occurs.
- Ask the gym staff about the emergency action plan and equipment they have on hand, such as a basic first aid kid and an AED (Automated external defibrillator).
- Tell every personal trainer and fitness instructor who works with you about your limitations or medical conditions. Well-trained instructors should ask about this at the beginning of any group class or during your first session and be able to offer modifications.

- If you don't understand the instructions given, or the proper way to do an exercise or use a piece of equipment, always ask first. Improper technique or body position is a major cause of injury.
  (7, 10)

Know Your Limits & Your Needs

A big part of exercise safety is prevention. Your body will protect itself from injury when you give it the food, water, rest and attention it needs to operate at its best.

So, do your homework first, then get out there and start sweating!

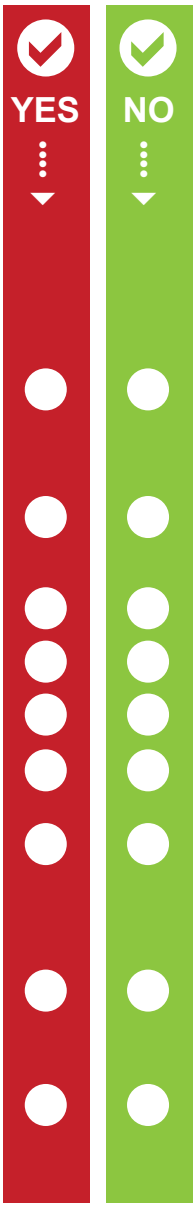
Avoid Overexerting Yourself

Beware of pushing yourself too hard too often. If you are short of breath, are in pain or cannot work out as long as you had planned, your exercise intensity is probably higher than your fitness level allows. Back off a bit and build intensity gradually.(11)

Physical Activity in the Heat

- Avoid participation in physical activity during the hottest parts of the day
- Use shaded areas whenever possible and especially between 10am and 3pm, when the sun is at the hottest
- In cases of extreme heat and humidity, restrict excessive physical activities outdoors
- Remind to drink enough water before, during and after physical activity
- Wear loose-fitting or light-coloured clothes and clothes that expose the skin to air in order to help sweat evaporate and cool the body
- Use sunscreen (sunblock) 20 minutes before going outdoors to protect entire skin exposed to the sun
- Physical activities in hot weather should only be at moderate level
- Splash your body with water to cool down before physical activity and during breaks
  (7, 12)

Get Active Questionnaire



The Get Active Questionnaire, developed by the Canadian Society for Exercise Physiology (CSEP), is intended to easily screen in adults or older adults to participate in physical activity and exercise safely. It can help to rule out any underlying health concerns that could worsen with any physical activity. (13)

1. Have you experienced **ANY** of the following (A to F) **within the past six months?**
   - **A.** A diagnosis of/treatment for heart disease or stroke or pain discomfort/pressure in your chest during activities of daily living or during physical activity?
   - **B.** A diagnosis of/treatment for high blood pressure (BP) or a resting BP of 160/90 mmHg or higher?
   - **C.** Dizziness or light headedness during physical activity?
   - **D.** Shortness of breath at rest?
   - **E.** Loss of consciousness/fainting for any reason?
   - **F.** Concussion?
2. Do you currently have pain or swelling in any part of your body (such as from an injury, acute flare-up of arthritis or back pain) that affects your ability to be physically active?
3. Has a healthcare professional told you that you should avoid or modify certain types of physical activity?
4. Do you have any other medical or physical condition (such as diabetes, cancer, osteoporosis, asthma or spinal cord injury) that may affect your ability to be physically active?

If you answer YES to any of the questions on this list and you are not use to being active, you may want to check in with your doctor before you start doing any physical activity. It is advisible for you to check with your doctor about the kinds of activities you wish to participate in and follow his/her advice.

Appropriate Attire

Many injuries and setbacks occur because people don't take the time to get themselves well-equipped for doing any physical activity. It is important to have the right footwear and clothing for any physical activity that can give both comfort and safety.

Fabrics

- Wear appropriate clothing. Fabrics that absorb sweat and dry quickly are best.
- Women should wear supportive sports bras that shouldn't be constricting or uncomfortable.
- Wearing hijab for muslim women. If the hijab is not selected properly, it can cause issues with sweating, discomfort and overheating. However, sports hijab, especially designed garment which provides breathable and also a practical alternative for Muslim women are now widely available.
- Socks also come in quick-drying fabrics that absorb sweat. They can help you stay cool, dry and avoid blisters.

Shoes

- Wear shoes that fit well and are capable of providing the right kind of support for the type of activity and body type.

Protective gear

- Use protective gear such as:
  - Helmets for biking or high-contact sports
  - Knee and elbow pads for skating
  - Reflective clothing and/or lights for evening exercise
  - Sunglasses, sunscreen and hats for outdoor exercise

Warm Up and Cool Down

Warm-up and cool-down activities are an acceptable part when doing physical activity. Commonly, the warm-up and cool-down involve doing an activity at a slower speed or lower intensity.

Warming-up may be 5 to 10 minutes of gentle stretching or slow walking. This helps to provide gradual increase in the heart rate and breathing at the start of the episode of activity. A warm-up for muscle strengthening activity commonly involves doing exercises with lighter weight.

Cool-down after activity allows a gradual decrease at the end of the episode. This allows your body to return more easily to a resting state while making sure that your heart gets the extra oxygen it needs. (7)

Measuring Heart Rate

Before starting any physical activity, you must determine your target heart rate. Heart rate is standard guide for determining moderate and high intensity heart rate ranges for adults. By feeling your own pulse, you can count your heart rate. One should feel a faint pounding as blood passes through the blood vessel. Each pounding is a beat. (14)

Radial pulse

Press the first two fingers of one hand gently down on the inside of the wrist to measure radial pulse.

Carotid pulse

Press the first two fingers under the jaw on the right or left side of the front of the neck to measure carotid pulse.

During physical activity, your target heart rate should be 40% to 60% of your maximum heart rate. Pulse rate should be measured on and off while you are doing the activity to make sure you stay within range. After about 6 months of regular physical activity, you may be able to increase your target heart rate to 85% but only if you can comfortably do so.

A general target heart rate of:

- Moderate intensity: 40 to about 60% of your maximum heart rate
- Vigorous intensity: 60 to about 85% of your maximum heart rate (4)

If you're not fit or you're just beginning to start doing physical activity, aim for the lower end of your target zone. Then, gradually build up the intensity. If you're healthy and want a vigorous intensity, opt for the higher end of the zone.

A note on medications:
A few types of high blood pressure medicine can lower the maximum heart rate and the target heart zone rate as well. If you are taking medication for high blood pressure, it is advisable to consult with your doctor.(7)

How to get Maximum Heart Rate:

220 - age = maximum heart rate
Your target heart rate zone is 50% to 75% of your maximum heart rate

How to tell if you're in the zone

So how do you know if you're in your target heart rate zone? Use these steps to check your heart rate while doing physical activity:

- Stop momentarily.
- Take your pulse for 15 seconds.
- Multiply this number by 4 to calculate your beats per minute.

Example:
You are a healthy 50 years old.
While you are running, you measure your heart rate of 120 beats per minute.
Your maximum heart rate = 220 - age = 220 – 50 = 170 beats per minute
Target heart rate zone = 50% to 75% of maximum heart rate
= 85 to 128 beats per minute
If it’s under or over target heart rate zone, adjust the intensity of the physical activity. (7)

PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOUR GUIDELINES

Physical Activity and Sedentary Behaviour Guidelines

Early Age (Birth to 5 years)

Key messages

1. Physical activity is central to optimal growth and development in the under 5s.
2. Regular physical activity is valuable in developing motor skills, promoting healthy weight, enhancing bone and muscular development, and for developing social and learning skills.
3. Physical activity should be encouraged from birth, through floor-based play and water- based activities in safe environments.
4. Toddlers and children of pre-school age (2-5 years old) who are capable of walking unaided, should be physically active daily for at least 180 minutes (3 hours), spread throughout the day.
5. All under 5s should minimise the amount of time spent being sedentary (being restrained or sitting) for extended periods (except time spent sleeping).
6. It is important to establish a high level of physical activity at an early age in order to encourage activity patterns later in childhood/adolescence that are sufficient to benefit health.

Summary of evidence

During the early years, young children undergo rapid and wide-ranging physical and psychological developments that lay the foundation for their future health and well-being. The evidence base for early years is relatively new and predominantly obtained from observational research. However, evidence supports the conclusion that regular physical activity during the early years provides immediate and long-term benefits for physical and psychological well-being, and this includes developing motor skills, promoting healthy weight, enhancing bone and muscular development, and learning social skills. Physical activity has very low risks for most under 5s. However, the risk that childhood inactivity will lead to poor health in later life is very high.

Physical activity in the form of floor-based play and water-based activities (e.g., letting infants crawl, play and roll around on the floor in the home or childcare setting, or participating in ‘parent and baby’ swim sessions) is essential during the early years. These activities provide valuable opportunities to build social and emotional bonds with parents, siblings, other children and caretakers.

Children of pre-school age who are capable of walking unaided, should be physically active daily for at least 180 minutes (3 hours), spread throughout the day. There is evidence indicating that for older children activity typically declines with age, for example between childhood and adolescence. Studies support that higher level of activity in childhood lead to more sustained participation in physical activity in later years.

Sedentary behaviour refers to a group of behaviours that typically occur while seated or lying down and which require very low levels of energy expenditure. Typical sedentary behaviour

in the early years include being strapped in a car seat/stroller/highchair or placed in playpens, travelling in a car, watching television and playing with electronic devices. Prolonged sedentary behaviour during the early years is a barrier to physical activity, and is associated with overweight and obesity as well as lower cognitive development.

Developing healthy sleep hygiene in the early years is important: this includes having a calming bedtime routine with consistent bedtimes and wake-up times, avoiding screen time before sleep and keeping screens out of the bedroom.

Physical Activity and Sedentary Behaviour Recommendations

INFANTS (less than 1 year of age)

Physical Activity

Should be physically active several times a day through supervised interactive floor-based play such as tummy time activity, reaching for or grasping objects, or crawling, or through water-based play activities in a safe/supervised environment. For those not yet mobile, this includes at least 30 minutes in prone position (tummy time) spread throughout the day while awake.

Sedentary Behaviour

Should minimise time spent being sedentary during waking hours. This includes prolonged sitting or being restrained (e.g., in a walker, stroller, car seat or high chair) for more than 1 hour at a time. Screen time (e.g., TV, computer, electronic games, tablets, phones) is NOT RECOMMENDED at this age.

Sleep

14 to 17 hours (for those aged 0-3 months) and 12-16 hours (for those aged 4-11 months) of good quality sleep, including naps, is recommended.

TODDLERS (1-2 years)

Physical Activity

Should accumulate at least 180 minutes of physical activities, spread throughout the day. Such activities include energetic play or activities that develop movement skills (e.g., climbing stairs, moving around the home, walking, running, playing outside and exploring their environment); more is better.

Sedentary Behaviour

Should minimise time spent being sedentary during waking hours. This includes prolonged sitting or being restrained (e.g., in a stroller, playpens, high chair or car seat) for more than 1 hour at a time. Quality sedentary behaviour like reading, storytelling, singing and playing puzzles support healthier growth and development. Screen time (e.g., TV, computer, electronic games, tablets, phones) is NOT RECOMMENDED for those younger than 2 years. For those aged 2 years, sedentary screen time should be no more than 1 hour; less is better.

Sleep

11 to 14 hours of good quality sleep, including naps, with consistent sleep and wake- up times, is recommended.

PRE-SCHOOLERS (3 to 5 years)

Physical Activity

Should accumulate at least 180 minutes of a variety of physical activities, of which at least 60 minutes is energetic play, spread throughout the day (e.g., running, dancing, cycling, playing ball, playing outdoors); more is better.

Sedentary Behaviour

Should minimise time spent being sedentary during waking hours. This includes prolonged sitting or being restrained (e.g., in a stroller or car seat) for more than 1 hour at a time. When sedentary, engaging in pursuits such as reading, singing, playing puzzles, painting and storytelling with a parent/caregiver will further promote learning and attention skills, and develop social skills. Screen time (e.g., watching television, using computers, electronic games, tablets, phones) should be LIMITED to less than 1 hour in a day; less is better.

Sleep

10 to 13 hours of good quality sleep, which may include a nap, with consistent sleep and wake-up times, is recommended.

Special Considerations

- These guidelines are relevant to all children under 5 years of age, irrespective of gender, race or socio-economic status, but should be interpreted with consideration for individual physical and mental capabilities.
- All young children should be encouraged to be active to a level appropriate for their ability.
- Advice should be sought from healthcare professionals to identify the types and amount of physical activity that are appropriate for young children with special needs.

References
(15-19)

Children and Adolescents (5 to 17 years)

Key messages

1. Children and adolescents aged 5-17 should accumulate at least 60 minutes of moderate to vigorous physical activity daily
2. Amount of physical activity greater than 60 minutes provide additional health benefits
3. Most daily activity should be aerobic
4. Vigorous physical activity, muscle strengthening, bone strengthening and flexibility exercises should be incorporated at least 3 times a week
5. Children and adolescents should limit the amount of time spent being sedentary.

Summary of evidence

Scientific evidence suggests that participation in physical activity during childhood and adolescents have both immediate health outcomes, including overweight, obesity, skeletal health, metabolic risk factors and psychological health, and future adult health outcomes. In addition, physical activity has been reported to improve academic performance including improved grades, time management skills, and concentration and attentiveness at class. (20) A dose-response relationship between physical activity and health has been demonstrated, with high physical activity leading to greater benefits (21). Children and adolescents should therefore be engaged in various physical activities, both structured and unstructured, including active play, physical education, games, sports and planned exercise.

Physical Activity and Sedentary Behaviour Recommendations

Physical Activity

01

Children and adolescents aged 5-17 should accumulate at least 60 minutes of moderate to vigorous physical activity daily

Children and adolescents should spend at least 60 minutes of moderate to vigorous intensity physical activity daily and therefore should be given time for active playing. They can achieve substantial health benefits by doing 60 minutes or more each day of moderate to vigorous intensity physical activity. But remember, more is better. A combination of moderate to vigorous activities can build up throughout the day. Children and adolescents who are already active can accumulate more hours of physical activity per day, and those who are inactive are recommended to gradually increase their activity levels to reach the recommended amount. Encouraging physical activity at an early age establishes a routine that could stay with them throughout life.

02

Most daily activity should be aerobic

Aerobic activities are those where young people rhythmically move their large muscle. Running, hopping, dancing, skipping, jumping rope and bicycling are all examples of aerobic activities. Aerobic activities increase cardiorespiratory fitness.

03

Vigorous physical activity, muscle strengthening, bone strengthening and flexibility exercises should be incorporated at least 3 times a week

Children and adolescents should not do only moderate intensity physical activity. It is important to include vigorous activities because they improve cardiorespiratory fitness. Vigorous activities will make kids “huff and puff” and these include organized sports such as football and netball as well as activities such as ballet, running and swimming laps. Children typically accumulate activity in intermittent bursts ranging from a few seconds to several minutes so any sort of active play will usually include some vigorous activity.

Muscle strengthening activities make muscle do more work than usual daily activities of daily life. These activities strengthen the muscles. Muscle strengthening activities can be unstructured or part of play, such as playing on playground equipment, climbing trees and playing tug-of-war. Or they can be structured, such as lifting weights or working with resistance bands. Bone strengthening activities produce a force on the bones of the body that promotes bone growth and strength. This force is commonly produced by impact with the ground. Running, jumping rope, basketball and tennis are all examples of bone strengthening activities.

Sedentary Behaviour

Children and adolescents should limit the amount of time spent being sedentary.

Sedentary activities in children and adolescents include:

- Screen and computer-based leisure time such as television viewing, playing video and computer games.
- Leisure activities such as listening to music, sitting and talking to friends.
- Transport-related activities such as travelling by car or bus.

Spending large amounts of time in sedentary can put children and adolescents under higher risk of adverse health outcomes including weight gain, hypertension, adverse metabolic markers and poorer mental health.(22) The relationship between sedentary behaviour and obesity can probably be explained by high energy intake during inactivity time. Increase sedentary time may also displace time devoted to physical activity. It is recommended to break up sedentary periods lasting longer than 90 minutes with 5 to 10 minutes of standing, moving around, active play, or doing some physical activity.

Type of activity	Children	Adolescents
Aerobic Moderate intensity	Active recreation, such as hiking, skateboarding, roller-blading Bicycle riding Brisk walking Physical Education class	skateboarding, roller-blading, Brisk walking Bicycle riding Housework and garden work, such as sweeping or pushing a lawn mower Games of catch and throw, such as Olympic handball and frisbee Physical Education class

Type of activity	Children	Adolescents
Aerobic Vigorous intensity	Active games involving running, chasing, such as tag Bicycle riding Jumping rope Martial arts, such as karate Sports such as football, rugby, basketball, swimming, tennis Vigorous dancing	Active games involving running and chasing Bicycle riding Jumping rope Martial arts, such as karate Boxing Sports such as football, rugby, basketball, swimming, tennis Vigorous dancing
Muscle strengthening	Games such as tug-of-war Modified push-ups (with knees on the floor) Resistance exercises using body weight or resistance bands Rope climbing Sits-ups (curl-ups or crunches) Swinging on playground equipment or bars	Games such as tug-of-war Push-ups and pull-ups Resistance exercises with exercise bands, weight machines, hand-held weights Climbing walls Sits-ups (curl-ups or crunches)
Bone strengthening	Games such as hopscotch Hopping, skipping, jumping, Running Sports such as gymnastics, basketball, volleyball, tennis	Hopping, skipping, jumping Jumping rope Running Sports such as gymnastics, basketball, volleyball, tennis

Table 1. Examples of Aerobic, Muscle Strengthening and Bone Strengthening Physical Activities for Children and Adolescents
* Adapted from The National Guidelines on Physical Activity for Ireland (23)

Special Considerations

For children who are not active:

- Start off slowly. Build up to an extra 15-30 minutes of moderate intensity activity 1-2 days a week.
- Once you reach this, aim for 30 minutes of activity on most days of the week, for example progress from 30 minutes on 2-3 days a week, to 30 minutes on 3-4 days a week
- Become more active for longer – include some days with 60 minutes or more and choose more vigorous activity.
- As you progress, you will get closer to the goal of 60 minutes or more of moderate to vigorous physical activity every day

References
(1, 4, 19, 23, 24)

Children and Adolescents living with disability

Key messages

1. Physical activity is beneficial for everyone even for children and adolescents with disabilities.
2. It is important to consult a doctor prior to the start of any physical activity.
3. Select realistic and appropriate activities that will provide for the child's need and enjoyment. Starting with a shorter bout of 5-10 minutes of physical activity a day. Then slowly progress to 60 minutes.
4. Always monitor child's activity and their progression, make sure it is safe at all time.
5. Assess any barriers / facilitators that hinders / enhance participation of children with disabilities in any physical activity.

Summary of evidence

Engaging in a regular physical activity is beneficial for everyone even for children and adolescents living with disability. (4) However, many of these children and adolescents with disabilities are less engage in regular physical activity because of the barriers they faced everyday. (25) Often they will only get the opportunity of physical activity through therapeutic intervention. Hence, this limited engagement in physical activity increases their risk of health problems far more than general population.

To enhance the health benefits in children and adolescents living with disability starts with a regular physical activity programme. However, an important prerequisite before commencing any physical activity in this younger population, is to consult their doctor. Consulting their specialised healthcare professionals would provide a suitable type and amount of physical activity that match their abilities and prevent any unwanted effects related to their specific health conditions. Moreover, healthcare professionals together with the child and their parents will be able to mutually set goals. The adaptation of physical activity model for people with disability (PAD) will bring success in their planning. This conceptual model integrates and examine influential factors based on International Classification of Functioning, Disability and Health (ICF) framework (i.e. personal and environment factors) that will assist effectively in engaging in physical activity. (26)

Monitoring children and adolescents with disabilities on their effort to increase their daily physical activity is also essential. This will assist in the continuity of the programme and achieving the desired effects. When possible physical activity for children and adolescents with disabilities should meet the recommended guidelines similar to their peers with typical development.(4) [See chapter on **Children and Adolescent (5 to 17 years)**] However, if this is not achievable, it is recommended that they stay active at all time.(4, 23) Based on previous Brunei Darussalam National Physical Activity Guidelines, it is recommended to start the child's programme at 5-10 minutes for 1-2 days a week and slowly progress.(14) The starting minimal duration is an exact representation of "some physical activity is better than having none". The activity can be increase to 30 minutes a day for 3-4 days in a week when the child is ready and could be augmented up to the recommended 60 minutes of moderate to vigorous activity daily. The main proviso of augmenting physical activity in young individuals is to supervise their progress and making sure safety is not in anyway be compromised.

Adherence to physical activity is another crucial factor to consider, and that various barriers and facilitators that will influence their compliance should be observed and acknowledge. The WHO recognised that one of the most significant barrier for disability is the lack of opportunity due to environment.(27) Parents and healthcare professionals alike are valuable in recognising any barriers that hinders regular physical activity, especially when they are possess proficiency in the child's condition. On the other hand, facilitators of physical activity should be reinforced to encourage continuity of the programme. It reveals that most common perceived facilitators were parental support and inclusive community.(28)

In general, the benefits of physical activity for children and adolescents with disabilities have been studied and showed favourable effects. However, they should strive to meet the daily recommendation, if not at least making them active as much as possible. It is also imperative to consider that the activity should be appropriate, safe, enjoyable and inclusive. Moreover, the individualized planned activity is highly endorsed that will suits to the needs of young people with disabilities.

Physical Activity and Sedentary Behaviour Recommendations

Physical Activity

Children and adolescents living with disability should do at least an average of 60 minutes of moderate to vigorous intensity physical activity daily. Vigorous intensity aerobic activities, as well as those that strengthen muscle and bone should be incorporated at least 3 times a week.

Sedentary Behaviour

Children and adolescents living with disability should limit the amount of time spent being sedentary.

Guidelines for consulting with children and adolescents with disability

Physical activity guidelines for children and adolescents with disability can be highlighted in three stages; consultation, recommendation and implementation (Figure 1). It is highly advisable to consult specialised healthcare professionals before the start of any programme. This initial consultation is also crucial to determine any condition that need a special attention including difficulties in perception, cardiovascular fitness, effects of medication, etc. Recommendation, on the other hand, focuses on appropriate type of physical activity that match child's abilities; supporting the biopsychosocial needs of the child as he/she grows. Ultimately, a well guided implementation of the physical activity programme must be closely supervised and reviewed regularly. This three-stage continuum is critical to ensure that the recommended procedures are timely and appropriate followed while achieving the greatest gain in health and function of children and adolescents with disability. These stages are further elaborated in six prerequisite steps for promoting physical activity in this population and supported by the summary evidence presented above. (Table 2).

Figure 1: Guidelines for consulting with children and adolescents living with disability

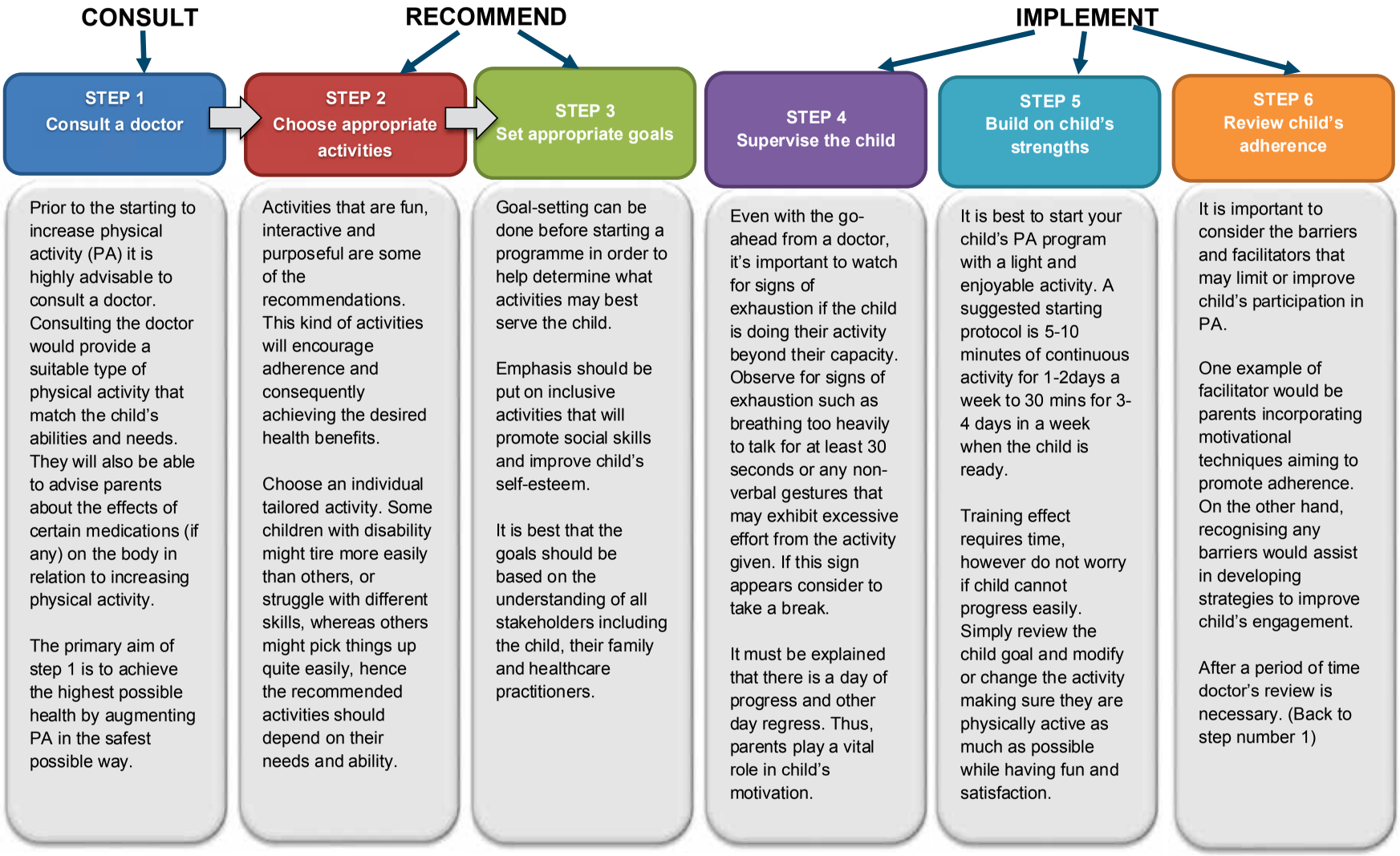


TABLE 2: Six Steps Recommendation for Promoting Physical Activity in Children and Adolescents with Disability

Special Considerations

Different conditions have different characteristics that need to be considered. These guidelines details some conditions including epilepsy, Down syndrome, autism and cerebral palsy.

Epilepsy / Seizures

Children and adolescents who have epilepsy can engage in most activities. However, it is important to know if their seizures are well controlled through medications. It is highly essential that primary healthcare professionals thoroughly assessed these children and adolescents with epilepsy prior to the start of physical activity programme. Poorly controlled epilepsy should be restricted from participation to prevent any injury to themselves and or to others.

The benefits of physical activity in people with disability are emerging; studies have shown that physical activities which are performed on a regular basis decrease the frequency of seizure. (29) In general, increasing physical activity are highly important as adjunct intervention in persons with epilepsy but it must be well monitored.

Down Syndrome (DS)

Children and adolescents with DS can participate in most forms of physical activity. Hence, recommended amount of activity would also be the same as those of their peers without disability. Albeit some adaptation can be done, such as a shorter bout of activity (i.e., 5 to 10 minutes) spread throughout the day. A study among the DS found that increasing activity through continued exercise improves cardiovascular fitness and strength.(30)

However, precaution is needed in preventing these individuals from any activity or sports that expose them into hyperextension of their neck. A quarter of individuals with DS is with atlanto-axial instability, which may cause a high level of spinal cord compression. This should be taken to account to prevent any injury during their engagement in physical activity especially in contact sports.

Autism Spectrum Disorder (ASD)

Parental understanding of their child with ASD is essential so that sensory, behavioural, cognition, communication, social and neurological considerations can be incorporated into any exercise programmers for individuals with ASD. These considerations are important in ensuring the programme's success.

Each individual with autism is different. Thus, each exercise plan should be tailored to the needs and likes of the individual child. Using the Physical Activity for Disability (PAD) conceptual model proposed by van der Pleog et al.(26) will be helpful, looking at various factors that will influence the compliance and adherence of the child in physical activity. For example, assessing attitude, settings, social influence, etc. Recent findings showed that children with ASD benefited from structured physical activity in their cognition, social skills and communication.(31)

Cerebral Palsy (CP)

Children and adolescents with CP engage in physical activity significantly lower in frequency than their peers. This is more apparent with severe limitation of gross movement. Most of this children and adolescents with CP tend to have their physical activity only through physiotherapeutic intervention. Due to lack of regular physical activity in this group of people, muscle strength and cardiorespiratory fitness are among the function being compromised. The goal of reducing sedentary lifestyle and a regular light exercise will be most beneficial in enhancing long term health for children and adolescents with CP.(32)

Benefits of physical activity such as resistance exercises improve muscular strength for people with CP. In addition, physical activity also prove that increasing activity helps to promote aerobic fitness, primary combatant for secondary complications and improvement of some aspects of cognition. (4)

References
(1, 4, 14, 23, 25-32)

Adults (18 to 64 years)

Key messages

1. If you are not active, start today.
2. Doing some physical activity is better than doing none. Be active in many ways as you can, and gradually increase the frequency, intensity and duration over time.
3. You can accumulate your activity by being active on most, preferably all,days every week.
4. If adults are not meeting these recommendations, doing some physical activity will benefit their health.
5. Break up long periods of sitting as often as possible.
6. Limit the amount of time spent being sedentary and replace with more physical activity of any intensity (including light intensity).

Summary of evidence

In adults, physical activity confers benefits for the following health outcomes: improve all-cause mortality, cardiovascular disease mortality, incident hypertension, incident site-specific cancers (bladder, breast, colon, endometrial, oesophageal adenocarcinoma, gastric and renal), incident type 2 diabetes, mental health (reduced symptoms of anxiety and depression); cognitive health and sleep; measures of adiposity may also improve.

In adults, higher amounts of sedentary behaviour are associated with the poor health outcomes such as all-cause mortality, cardiovascular disease mortality and cancer mortality and also incidence of cardiovascular disease, cancer and type 2 diabetes.(1)

Physical Activity and Sedentary Behaviour Recommendations

Physical Activity

1. The recommended amount of physical activity for healthy adults are:
   - At least 150 minutes of moderate intensity aerobic physical activity spread throughout the week or
   - At least 75 minutes of vigorous intensity aerobic physical activity spread throughout the week or
   - An equivalent combination of moderate and vigorous intensity activity spread throughout the week.
2. For additional health benefits, healthy adults should increase their physical activity to:
   - At least 300 minutes of moderate intensity aerobic physical activity spread throughout the week or
   - At least 150 minutes of vigorous intensity aerobic physical activity spread throughout the week or
   - An equivalent combination of moderate and vigorous intensity activity spread throughout the week.
3. Muscle and bone strengthening activities should be done involving major muscle groups on 2 or more days a week.

Sedentary Behaviour

- Adults should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.
- To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults should aim to do more than the recommended levels of moderate to vigorous intensity physical activity.

References
(1, 4)

Older Adults (65 years and above)

Key messages

1. If you are not active, start today.
2. Doing some physical activity is better than doing none. Be active in as many ways as you can, and gradually increase the frequency, intensity and duration over time.
3. You can accumulate your physical activity by being active on most, preferably all, days every week.
4. For older adults not meeting the recommendations, doing at least some physical activity will bring benefits to health.
5. Older adults should be as physically active as their functional ability allows, and adjust their level of effort for physical activity relative to their level of fitness.

Summary of evidence

Physical activity is important for older people to improve cardiorespiratory and muscular fitness, bone and functional health, and reduce the risk of non-communicable diseases, depression and cognitive decline. With improvements in life expectancy, it is crucial for older people to maintain a good functional ability. Functional ability is the ability to perform everyday activities without limitation, including playing with grandchildren, buying groceries, climbing stairs, gardening or attending social gatherings. Physical activity improves functional capacity and mobility, which helps reduce risk of disability, maintain a good quality of life and enable independent living without disability or dependence on family and other caregivers.

Physical activity should also be consistent, as the benefits of physical training are not sustained after four weeks of termination. For older people, confinement to bed for any reason, including illness or falls will lead to deconditioning and a significant decline in muscle strength. Sedentary behaviour is also associated with adverse outcomes. [See chapter on **Adverse Health Effects of Sedentary Behaviour**]. Family should support older people to remain active and provide a safe environment to enable physical activity.

The type and amount of physical activity recommended for healthy older people aged 65 and above are summarised in the key recommendations below. It is possible to reach the target of at least 150 minutes per week by performing activities in multiple shorter bouts, spread throughout the day and week to accumulate the recommended duration.

Examples:

To accumulate at least 150 minutes per week, perform at least 30 minutes of physical activity 5 times a week.

To accumulate at least 30 minutes of physical activity a day, combine a few shorter sessions of physical activity or do 30 minutes or more continuously.

The types of physical activity older people can engage in are summarised in the chapter on **Types of Physical Activity**

Physical Activity and Sedentary Behaviour Recommendations

Physical Activity

1. The recommended amount of physical activity for healthy older adults are:
   - At least 150 minutes of moderate intensity aerobic physical activity spread throughout the week or
   - At least 75 minutes of vigorous intensity aerobic physical activity spread throughout the week or
   - An equivalent combination of moderate and vigorous intensity activity spread throughout the week.
2. For additional health benefits, healthy older adults should increase their physical activity to:
   - At least 300 minutes of moderate intensity aerobic physical activity spread throughout the week or
   - At least 150 minutes of vigorous intensity aerobic physical activity spread throughout the week or
   - An equivalent combination of moderate and vigorous intensity activity spread throughout the week.
3. If the recommended amount of aerobic physical activities cannot be performed due to health conditions, healthy older people should be physically active as their abilities and conditions allow.
4. Muscle strengthening exercises should be performed at least 2 days per week.
5. Flexibility exercises should be performed twice a week for at least 10 minutes.
6. Balance training exercises are important for those with history of falls or poor mobility. For older adults with poor mobility, physical activity to improve balance and reduce falls risks should be performed 3 or more days per week.

Sedentary Behaviour

- Older adults should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.
- To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults should aim to do more than the recommended levels of moderate to vigorous intensity physical activity.

Special Considerations

- Warm-up, cool-down, stretching and a gradual build-up from an inactive level is recommended for moderate or vigorous intensity physical activity in line with most recommended fitness training recommendations.
- Individuals with specific health conditions such as cardiovascular disease and diabetes may need to seek medical advice before striving to achieve the recommended levels of physical activity for older adults.
- Older adults living with disability should do varied multicomponent physical activity that emphasizes functional balance and strength training at moderate or greater intensity on 3 or more days a week to enhance functional capacity and prevent falls.

References
(1, 4, 24, 33-35)

Women during Pregnancy and the Postpartum Period

Key messages

1. Physical activity during pregnancy and postpartum period benefits woman and fetal overall health.
2. Doing some physical activity is better than doing none. Pregnant and postpartum women should be active in many ways as you can, and gradually increase the frequency, intensity and duration over time.
3. If pregnant and postpartum women are not meeting the recommendations, doing some physical activity will benefit their health.
4. Pregnant and postpartum women should listen to their body and adapt.
5. Pelvic floor muscle training may be performed on a daily basis to reduce the risk of urinary incontinence.

Summary of evidence

Physical activity during pregnancy and postpartum confers benefits on the following maternal and fetal health:

- Decrease risk of pre-eclampsia
- Decrease risk of gestational hypertension
- Decrease risk of gestational diabetes
- Decrease risk of excessive gestational weight gain
- Decrease risk of delivery complications
- Decrease risk of postpartum depression
- Less newborn complications
- No adverse effects on birthweight
- No increase in risk of stillbirth
- No adverse effects on breast milk volume or composition

Physical activity also helps women achieve and maintain a healthy weight during the postpartum period.

Physical Activity and Sedentary Behaviour Recommendations

Physical Activity

1. All pregnant and postpartum women without contraindication should:
   - undertake regular physical activity;
   - do at least 150 minutes of moderate intensity aerobic physical activity throughout the week for substantial health benefits;
   - incorporate a variety of aerobic and muscle strengthening activities; and
   - add gentle stretching which may also be beneficial.
2. Women who, before pregnancy, habitually engaged in vigorous intensity aerobic activity, or who were physically active, can continue these activities during pregnancy and postpartum period, provided they remain healthy and discuss with their healthcare professionals how and when activity should be adjusted over time.

3. Pregnant and postpartum women should be under the care of a healthcare professional for antenatal and postnatal care who can advise on special considerations given their medical history and any contraindications to participating in physical activity.
4. Women with absolute contraindications may continue their usual activities of daily living but should not participate in more strenuous activities.

The following are absolute contraindications to exercise:

- Ruptured membranes
- Premature labour
- Unexplained persistent vaginal bleeding
- Placenta praevia after 28 weeks' gestation
- Pre-eclampsia
- Incompetent cervix
- Intrauterine growth restriction
- High-order multiple pregnancy (e.g., triplets)
- Uncontrolled type 1 diabetes
- Uncontrolled hypertension
- Uncontrolled thyroid disease
- Other serious cardiovascular, respiratory or systemic disorder

5. Women with relative contraindications should discuss the advantages and disadvantages of moderate-to-vigorous intensity physical activity with their obstetric care professional prior to participation.

The following are relative contraindications to exercise:

- Recurrent pregnancy loss
- Gestational hypertension
- A history of spontaneous preterm birth
- Mild/moderate cardiovascular or respiratory disease
- Symptomatic anaemia
- Malnutrition
- Eating disorder
- Twin pregnancy after the 28th week
- Other significant medical conditions

Sedentary Behaviour

- Pregnant and postpartum women should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.
- A sensible approach would be to avoid prolonged periods of sitting and to break up sedentary time. This reflects the guidelines for the adult population.

Special Considerations

- Examples of physical activity that have been extensively studied in pregnancy and found to be safe and beneficial:
  - Walking
  - Stationary Cycling
  - Aerobic exercises
  - Dancing
  - Resistance exercises (e.g., using weights, elastic bands)
  - Stretching exercises
  - Hydrotherapy or water aerobics

- Additional safety considerations for pregnant women when undertaking physical activity are:
  - Avoid physical activity during excessive heat, especially with high humidity;
  - Stay hydrated by drinking water before, during, and after physical activity;
  - Avoid participating in activities which involve physical contact such as netball or martial arts; pose a high risk of falling; or might limit oxygenation (such as activities at high altitude, when not normally living at high altitude);
  - Avoid activities in supine position after the first trimester of pregnancy;
  - When considering athletic competition, or exercising significantly above the recommended guidelines pregnant women should seek supervision from a specialist healthcare professional;
  - Pregnant women should be informed by their healthcare professional of the danger signs alerting them as to when to stop; or to limit physical activity; and to seek medical attention immediately for any of the danger signs occur such as:
    - Persistent excessive shortness of breath that does not resolve at rest
    - Severe chest pain
    - Abdominal pain or regular uterine contractions
    - Vaginal bleeding
    - Persistent loss of fluid from the vagina indicating rupture of the membrane
    - Persistent headache or dizziness or faintness that does not resolve at rest

- Physical activity may be resumed gradually after pregnancy as soon as medically safe, depending on the mode of delivery (vaginal or caesarean birth) and the presence or absence of medical or surgical complications.

References
(1, 35-37)

Adults living with disability

Key messages

1. Doing some physical activity is better than doing none. Be active in many ways as you can, and gradually increase the frequency, intensity and duration over time.
2. Adults living with disability may need to consult a health-care professional or specialist to help determine the type and amount of activity appropriate for them.
3. Appropriate physical activity done at the appropriate intensity is safe for adults living with disability.
4. Physical activity will bring benefits to health and reduces the risk of chronic diseases for disabled adults.
5. Physical activity should be progressive, building up first in frequency and duration and then later raising intensity, especially for inactive disabled persons and those with existing health conditions.

Summary of evidence

There is evidence that physical activity has a positive relationship and is effective to improve the health of disabled adults. It is recommended that some physical activity is better than nothing, but for substantial health gains disabled adults should engage in 150 minutes of physical activity at a moderate to vigorous intensity per week. They should also do challenging strength and balance exercises on at least 2 days per week. With respect to safety, no evidence exists that suggests appropriate physical activity is a risk for disabled adults.

Physical Activity and Sedentary Behaviour Recommendations

Physical Activity

1. The recommended amount of physical activity for adults living with disability are:
   - At least 150 minutes of moderate intensity aerobic physical activity spread throughout the week or
   - At least 75 minutes of vigorous intensity aerobic physical activity spread throughout the week or
   - An equivalent combination of moderate and vigorous intensity activity spread throughout the week.
2. For additional health benefits, adults living with disability should increase their physical activity to:
   - At least 300 minutes of moderate intensity aerobic physical activity spread throughout the week or
   - At least 150 minutes of vigorous intensity aerobic physical activity spread throughout the week or
   - An equivalent combination of moderate and vigorous intensity activity spread throughout the week.
3. Muscle strengthening activities should be done involving major muscle groups on 2 or more days a week.
4. When adults with disabilities are not able to meet the above recommendations, they should engage in regular physical activity according to their abilities and should avoid inactivity.

Sedentary Behaviour

- Adults living with disability should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.
- To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults living with disability should aim to do more than the recommended levels of moderate to vigorous intensity physical activity.

Special Considerations

Some of the examples of physical activity for different types of disability

Types of disability	Examples of physical activity
Mobility: Serious difficulty walking or climbing stairs	• Wheeling oneself in wheelchair • Water aerobics • Yoga • Upper body workout • Doing household chores • Adaptive sports such as: o Hand crank bicycle o Wheelchair basketball o Wheelchair table tennis o Wheelchair tennis o Para powerlifting o Boccia o Archery
Cognitive: Serious difficulty concentrating, remembering or making decisions	• Brisk walk • Running • Cycling • Hiking • Dancing • Yoga • Doing household chores • Sports (football, badminton, etc)
Vision: Serious difficulty seeing, even with wearing glasses	• Guide brisk walk • Guide running • Dancing • Yoga • Adaptive sports such as: o Judo o Bowling o Swimming o Tandem cycling o Powerlifting

Types of disability	Examples of physical activity
Hearing: Serious difficulty hearing	• Brisk walk • Running • Dancing • Yoga • Doing household chores • Adaptive sports such as: o Swimming o Football o Playing golf o Cycling o Tennis o Badminton o Bowling o Basketball o Netball o Martial arts

(38-40)

References
(1, 38-41)

INDIVIDUALS WITH CHRONIC MEDICAL CONDITIONS

Individuals with Chronic Medical Conditions

Diabetes Mellitus

Key messages

1. Doing some physical activity is better than doing none. Be active as you can and gradually increase the frequency, intensity and duration over time.
2. When not able to meet the recommendations, people with diabetes should aim to engage in physical activity according to their abilities.
3. Adults with diabetes may wish to consult with a specialist, diabetes nurse educator or healthcare professional for advice on the types and amounts of activity appropriate for their individual needs, abilities, functional limitations/complications, diabetes medications and overall treatment plan.

Summary of evidence

Regular aerobic exercise of at least 150 minutes a week has been clearly shown to improve glycaemic control in type 2 diabetes. Strengthening activities (free weights or weight machines) increases strength in adults with type 2 diabetes by about 50% and improves HbA1c by 0.75%. Therefore, adults with type 2 diabetes are recommended to perform both aerobic and strengthening activities for optimal diabetes control and health outcomes. To gain more health benefits from physical activity programs, participant in supervised training is recommended over non-supervised programs.

However, the WHO Guidelines on Physical Activity and Sedentary Behaviour has recommended adults with diabetes to do at least 150-300 minutes of moderate-intensity aerobic physical activity; or at least 75-150 minutes of vigorous intensity activity throughout the week for substantial health benefits.

Children and adolescents with type 2 diabetes should be encouraged to meet the same physical activity goals set for youth in general. Pre-exercise clearance is generally unnecessary for asymptomatic individuals prior to beginning low or moderate intensity physical activity not exceeding the demands of brisk walking or everyday living.

All adults, and particularly those with type 2 diabetes, should decrease the amount of time spent in daily sedentary behaviour. Prolonged sitting should be interrupted with bouts (≤ 5 minutes) of light activity every 30 minutes for blood glucose benefits, at least in adults with type 2 diabetes. The above two recommendations are additional to, and not a replacement for, increased structured exercise and incidental movement.

Structured lifestyle interventions that include at least 150 minutes a week of physical exercise and dietary changes resulting in weight loss of 5%-7% are recommended to prevent or delay the onset of type 2 diabetes in populations at high risk and with prediabetes.

Physical Activity and Sedentary Behaviour Recommendations

Physical Activity

01

Recommended physical activity for people with diabetes

- Adults should do at least 150-300 minutes of moderate-intensity aerobic physical activity weekly; or at least 75-150 minutes of vigorous intensity physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week.
- Adults should also do muscle strengthening activities at moderate or greater intensity that involves all major muscle groups on 2 or more days a week, preferably on non-consecutive days.
- Flexibility activities and balance activities are recommended in 2-3 times a week for older adults with diabetes. Yoga and Tai Chi may be included based on individual preferences to increase flexibility, muscular strength and balance.

02

Physical activity and type 2 diabetes

- Daily exercise, or at least not allowing more than 2 days to elapse between exercise sessions is recommended to enhance insulin action.
- Adults with type 2 diabetes should perform both aerobic physical activity and strengthening activities for optimal glycaemic and health outcomes.

03

Physical activity and type 1 diabetes

- Youths and adults with type 1 diabetes can benefit from being physically active, and activity should be recommended to all.
- Additional carbohydrate intake and/or insulin reductions are typically required to maintain glycaemic balance during and after physical activity. Frequent blood glucose checks are required to implement carbohydrate intake and insulin dose adjustment strategies.

Sedentary Behaviour

- Adults with diabetes should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.
- To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults with diabetes should aim to do more than the recommended levels of moderate to vigorous intensity physical activity.

Special Considerations

Managing physical activity with complications:

- Physical activity with vascular disease can be undertaken safely but with appropriate precaution.
- Physical activity done with peripheral neuropathy necessitates proper foot care to prevent, detect, and prevent problems early to avoid ulceration and amputation.
- The presence of autonomic neuropathy may complicate being active, certain precautions are warranted to prevent problems during activity.

- Vigorous intensity aerobic physical activity or strengthening activities; jumping, jarring, head down activities; and breath holding should be avoided in anyone with severe non proliferative and unstable proliferative diabetic retinopathy.
- Moderate to vigorous intensity physical activity does not accelerate progression of kidney disease and can be undertaken safely, even during dialysis sessions.
- Regular stretching and appropriate progression of activities should be done to manage joint changes and diabetes-related orthopaedic limitations.

Exercise in the presence of non-optimal glycaemia control:

- Hyperglycaemia: When individuals with type 1 diabetes are deprived of insulin for 12-48 hours and are ketotic, physical activity can worsen hyperglycaemia and ketosis. Therefore, vigorous intensity aerobic physical activity should be avoided in the presence of ketosis. However, it is not necessary to postpone exercise based simply on hyperglycaemia, provided that the individual feels well and urine ketones are negative.
- Hypoglycaemia: In individuals taking insulin and/or insulin secretagogues, physical activity can cause hypoglycaemia if medication dosages or carbohydrate consumption is not altered. For those on these therapies, added carbohydrate intake should be taken if pre-exercise glucose levels are ≤5.6mmol/L. Hypoglycaemia is rare in individuals with type 2 diabetes who are not treated with insulin or insulin secretagogues, and no preventive measures for hypoglycaemia are needed. [Refer to **Appendix**] for avoidance of hypoglycaemia in exercise setting.

References
(1, 42, 43)

Hypertension

Key messages

1. When not able to meet the recommendations, adults with hypertension should aim to engage in physical activity according to their abilities.
2. Doing some physical activity is better than doing none. Be active in many ways as you can, and gradually increase the frequency, intensity and duration over time.
3. Adults with controlled hypertension should start by doing small amounts of physical activity and gradually increase the frequency, intensity and duration over time.
4. Adults with hypertension may wish to consult with specialist or healthcare professional for advice on the types and amounts of activity appropriate for their individual needs, abilities, functional limitations/complications, medications, and overall treatment plan.

Summary of evidence

Physical activity is recommended for the prevention, treatment and control of hypertension as well as its cardiovascular disease protective effects. There is strong evidence that physical activity of moderate to vigorous intensity produce clinically important reductions systolic blood pressure by approximately 12mm Hg and diastolic blood pressure by approximately 6mm Hg in adults and also improve their health-related quality of life.(1) There is also strong evidence that physical activity reduces the progression of cardiovascular disease. The main focus is to get active without exhausting or overexerting people with hypertension.

Physical Activity and Sedentary Behaviour Recommendations

Physical Activity

1. Recommendation for adults and older adults with controlled hypertension with no suspected cardiovascular disease should do:
   - At least 150 minutes of moderate intensity aerobic physical activity or
   - At least 75 minutes of vigorous intensity aerobic physical activity or
   - an equivalent combination of moderate and vigorous intensity activity throughout the week for substantial health benefits.
2. Adults and older adults with controlled hypertension and no suspected cardiovascular disease should also do muscle strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week.
3. As part of their weekly physical activity, older adults with controlled hypertension and no suspected cardiovascular disease should do varied multicomponent physical activity that emphasizes functional balance and strength training at moderate or greater intensity on 3 or more days a week, to enhance functional capacity and prevent falls.
4. When not contraindicated, adults and older adults with controlled hypertension:
   - May increase moderate intensity aerobic physical activity to more than 300 minutes or
   - Do more than 150 minutes of vigorous intensity aerobic physical activity or
   - an equivalent combination of moderate and vigorous intensity activity throughout the week for additional health benefits.

Sedentary Behaviour

- Adults and older adults with hypertension should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.
- To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults and older adults with hypertension should aim to do more than the recommended levels of moderate to vigorous intensity physical activity.

Special Considerations

1. The individual must not exercise if they have contraindications as follows:
   - Uncontrolled severe hypertension (>180/110mm Hg);
   - recent significant change in resting ECG suggesting significant ischaemia;
   - recent myocardial infarction or other acute cardiac event/unstable angina;
   - uncontrolled cardiac dysrhythmia causing symptoms or haemodynamic compromise;
   - symptomatic severe aortic stenosis;
   - uncontrolled symptomatic heart failure;
   - acute pulmonary embolus or pulmonary infarction;
   - acute myocarditis or pericarditis;
   - suspected or known dissecting aneurysm; and
   - acute systematic infection accompanied with fever, body aches, or swollen lymph glands.

2. Anti-hypertension Medication
   - Beta-blocker and diuretics can interfere with body temperature possibly causing overheat during rigorous exercise. People with hypertension should avoid overheating and ensure adequate hydration.
   - Alpha-blockers, vasodilators and calcium channel blockers can cause blood pressure to drop if exercise is abruptly halted. This can be avoided by doing cool-down stretching at the end of exercise.

References
(1, 4, 44-46)

Asthma

Key messages

1. All individuals with asthma must have an up-to-date Asthma Action Plan.
2. Individuals with asthma can enjoy any type of physical activity as long as the asthma is controlled and known triggers are avoided.
3. There is no reason to limit the choice of physical activity for individuals with well-controlled asthma who are well and fit.

Summary of evidence

Several population-based studies have shown individuals with asthma engage in less physical activity and are more sedentary than their non-asthmatic counterparts. The decreased levels of physical activity are related to the fear of triggering asthma symptoms, weather affecting asthma, time constraints and the belief that physical activity should be avoided in asthma, and not because of their degree of airway obstruction.

Adults with asthma are actually cutting down their risk of asthma symptoms by giving their lungs a regular workout through:

- Improving their lung's capacity to work so they have more stamina and get less breathless
- Boosting their immune system so their asthma is less likely to be triggered by coughs and colds
- Supporting weight loss, which will cut their risk of symptoms and asthma attacks
- Releasing endorphins thus reducing their level of stress or depression – which have been linked to higher risk of asthma symptoms.

Physical Activity and Sedentary Behaviour Recommendations

Physical Activity

1. Recommendation for adults with asthma should do:
   - At least 150 minutes of moderate intensity aerobic physical activity or
   - At least 75 minutes of vigorous intensity aerobic physical activity or
   - an equivalent combination of moderate and vigorous intensity activity throughout the week for substantial health benefits.
2. Adults with asthma should also do muscle strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week.

Sedentary Behaviour

- Adults with asthma should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.
- To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults with asthma should aim to do more than the recommended levels of moderate to vigorous intensity physical activity.

Special Considerations

1. All individuals with asthma must have their own Asthma Action Plan. The plan should include identification of disease severity, known triggers and allergens, current medication and what to do in the event of an emergency.
2. In individuals with Exercise Induced Bronchospasm (EIB), bronchoconstriction typically occurs after 8 minutes to 15 minutes of physical activity and resolves within 60 minutes. Factors that can trigger or worsen EIB are cold air, dry air, air pollution such as smoke or smog, high pollen counts and chemicals like chlorine and paints.
3. Ensure inhaler is readily available. Inhaler to be used 15-20 minutes prior to any physical activity.
4. Inform the fitness instructor, teacher, coach or an exercise buddy when doing any physical activity, so they able to recognize asthma attack symptoms and seek help if they get worse.
5. Individuals with asthma must restrict exercise when they have viral infections, like coughs and colds.
6. For individuals with asthma, stop exercising and take reliever inhaler if they:
   a. Start coughing or wheezing
   b. Are gasping for air, or very short of breath, or cannot get enough air
   c. Feel tightness in the chest
   d. Have trouble speaking in short sentences.
7. If asthmatic symptoms do not improve or worsen, seek for medical attention.
8. Some of the recommended physical activity for individuals with asthma:
   - Walking – a form of aerobic exercise that most can fit easily into their lives.
   - Badminton or table tennis – these racket sports usually involve less running around compared to tennis or squash.
   - Team sports such as netball and volleyball - these activities involve short, intermittent periods of exertion that give time to rest in between bursts of activity.
   - Swimming is a good all-round exercise, and is generally well-tolerated by many people with asthma.
   - Yoga, Pilates or Tai Chi.

References
(1, 47-49)

Cancer

Key messages

1. Physical activity is associated with reduced risk of developing cancer.
2. Physical activity is beneficial for cancer survivorship.

Summary of evidence

Physical activity is associated with reduced risk of developing cancer. It is beneficial for cancer survivorship. Evidences are increasingly available to correlate physical activity and risk of cancer.(50) There are 3 types of cancer where metanalyses have shown such positive effect. In Colon cancer, 16 to 24% reduced risk as well as reduced risk of precancerous adenoma. (51, 52) In breast cancer, 12% risk reduction and the benefit continues even after menopause. (53) In endometrial cancer, 20% risk reduction.(54) In general, many other types are also associated with lower risk as well.(51, 55, 56)

Research also indicates that physical activity may have beneficial effects for several aspects of cancer survivorship--specifically, weight gain, quality of life, cancer recurrence or progression, and prognosis (likelihood of survival). Most of the evidence for the potential benefits of physical activity in cancer survivors comes from people diagnosed with breast, prostate or colorectal cancer. (57-59)

Physical Activity and Sedentary Behaviour Recommendations

Physical Activity

1. The recommended amount of physical activity for cancer survivors are:
   - At least 150 minutes of moderate intensity aerobic physical activity spread throughout the week or
   - At least 75 minutes of vigorous intensity aerobic physical activity spread throughout the week or
   - An equivalent combination of moderate and vigorous intensity activity spread throughout the week.
2. Cancer survivors should also do muscle strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week.
3. As part of their weekly physical activity, older cancer survivors should do varied multicomponent physical activity that emphasizes functional balance and strength training at moderate or greater intensity on 3 or more days a week, to enhance functional capacity and prevent falls.
4. When not contraindicated, cancer survivors may increase their physical activity to:
   - At least 300 minutes of moderate intensity aerobic physical activity spread throughout the week or
   - At least 150 minutes of vigorous intensity aerobic physical activity spread throughout the week or
   - An equivalent combination of moderate and vigorous intensity activity spread throughout the week.

Sedentary Behaviour

- Cancer survivors should avoid sedentary for extended period and should regularly interrupt with physical activity where possible

Special Considerations

It is advised to find out the extent of the cancer before prescribing physical activity to a cancer survivor. It would be common for individual to experience some discomfort or with low grade pain/stiffness if he or she had never being physically active before. If he or she is experiencing chest pain or syncope during their physical activity, this should be investigated further.

References
(1, 4, 50-59)

Obesity

Key messages

1. Obesity is associated with several chronic non-communicable diseases such as diabetes, heart diseases and high blood pressure, and regular physical activity can help manage and reduce the risk of developing such diseases.
2. Regular physical activity induces a wide range of health benefits for adults with obesity, even in the absence of weight loss.

Summary of evidence

Adults who are overweight or obese should be encouraged to increase their physical activity levels even if they do not lose weight as a result, because physical activity can bring other health benefits such as reduced risk of type 2 diabetes and cardiovascular disease. Overweight or obese adults should be encouraged to perform at least 30 minutes of at least moderate-intensity physical activity on 5 or more days a week. The activity can be undertaken in one session or several lasting 10 mins or more. For those who have already achieved this level of activity, an increase in the amount of their physical activity is a reasonable component of any strategy to lose weight. It is generally estimated that (0.45 kg) of body fat loss requires about 3,500 kcal of energy consumption. As studies on the effect of prescription of muscle strengthening exercise on weight loss are limited, it seems reasonable to recommend overweight/obese people to follow the same muscle strengthening exercise recommendations for the general population for having a balanced exercise programme.

Physical Activity and Sedentary Behaviour Recommendations

Physical Activity

1. Sedentary adults with obesity should:
   - undertake regular physical activity 5 days or more weekly.
   - do a minimum of 150 minutes (30 minutes/day) of moderate intensity aerobic physical activity spread throughout the week progressing to 300 minutes (45-60 minutes/day) of moderate intensity aerobic physical activity spread throughout the week.
   - be encouraged to incorporate vigorous intensity aerobic physical activity into the total volume of exercise to maximise health benefits and this is best done gradually after the initial 4 -12 weeks period of moderate intensity aerobic physical activity.
   - perform aerobic physical activity as their primary type of exercise. Brisk walking can be a good starting point for sedentary obese adults. Brisk walking often constitutes a moderate intensity aerobic physical activity.
   - do muscle strengthening activities (resistance exercise) and flexibility exercise to be included in a balanced exercise program. This may be performed on 2 or more days a week.
2. Adults who have been obese and have lost weight should be advised that they may need to undertake at least 250 minutes of physical activity spread throughout the week to avoid regaining weight.
3. For adults with obesity, healthy eating habit, reduce sedentary behaviour and regular physical activity can result in significant long-term weight loss and achieve healthy body weight.

Sedentary Behaviour

- Adults with obesity should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.
- To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults with obesity should aim to do more than the recommended levels of moderate to vigorous intensity physical activity.
- It is advisable that they should aim to break sedentary time with multiple frequent bouts of standing or light- to moderate-intensity walking, for instance, two to five minutes every 30 minutes.

Special Considerations

- It is important to ensure that those adults with obesity have no contraindication to exercise before commencing any physical activity. As many adults with obesity may present with comorbidities, such as diabetes, hypertension, dyslipidaemia and/or musculoskeletal condition, it may be necessary for medical screening prior to any physical activity and tailor their exercise accordingly.
- Pragmatically, sedentary adults with obesity may build up their physical activities gradually to their target over several weeks, starting with 10 to 20 minutes of physical activity on alternate days during the first week or two, to minimise the risk of fatigue and injury.
- Increasing the intensity of exercise, including high-intensity interval training (HITT) can achieve greater increases in cardiorespiratory fitness and reduce the time required to achieve similar benefits as from moderate intensity aerobic physical activity. Because vigorous intensity exercise is associated with a greater potential for injuries, it may not be appropriate for the very obese (BMI > approximately 35 kg/m^2).
- For the very obese individuals, as weight-bearing physical activity may prove difficult, particularly if they have musculoskeletal conditions such as osteoarthritis, gradually increasing non-weight-bearing moderate-intensity physical activities is recommended (e.g., cycling, swimming, water aerobics).

References
(5, 60-64)

Physical Activity during Fasting Period

Key messages

1. Stay active even if it is just walking in fasting month of Ramadhan.
2. Best to exercise during the dark hours.
3. Listen to your body and adapt.

Summary of evidence

Ramadhan occurs in the ninth month of the Islamic calendar and fasting in the holy month of Ramadhan is one of the five pillars of the Islamic religion. Fasting during Ramadhan incorporates refraining from food, fluids, oral drugs or smoking during the daylight hours of the holy month. The experience of fasting teaches Muslims on self-discipline and self-restraint, and reminds them of the feelings of the impoverished. Fasting is not obligatory for children. Menstruating women as well as sick and travelling people are excused from fasting. While pregnant and lactating women are permitted to postpone the fasting during Ramadhan, however, they should fast during another month of the year, when they have no reason for exemption.

Physical inactivity during the holy month of Ramadhan has been clearly shown to result in a decrease in strength and fitness.

Special Considerations

- Physical activity can still be done during the month of Ramadhan as long as it is at a moderate intensity (e.g., brisk walking)
- Ideal time for adults to do physical activity:
  - 30-60 minutes before iftar (sungkai/sunset) and it is preferably in an air-conditioned place.
  - After sunset.
  - After evening prayer (Terawih and Witir prayers).
- During post-fasting (dark hours) you should focus on the hydration and consuming sufficient fluids to prevent dehydration during physical activity and the next fasting day.

Diabetes and Ramadhan

- Fasting during Ramadhan in people with diabetes can present specific challenges such as the need to adapt meals and medications. Pre-Ramadhan education on adequate nutrition and meal intake, adjustments of dose, timing and type of medications, recognising the symptoms of hypo- and hyperglycaemia, and when to break the fast to avoid harm is essential.
- Most individuals with diabetes can continue to exercise during Ramadhan. However, changes to activity levels and exercise schedules will need to be discussed with the healthcare professionals prior to Ramadhan to ensure the best fitting plan.
- Healthcare professionals may inform people with diabetes to avoid excessive physical activityduring the day unless the diabetes is controlled with diet only, or controlled with medications that do not increase the risk of hypoglycaemia. It is generally advisable for individuals treated with sulphonlyureas and insulin to do light exercise after the breaking of fast.
- Vigorous exercise should be avoided, particularly during the last hours of fasting (before sunset) because it may lead to an increased risk of hypoglycaemia and/or dehydration.

- There will be a greater need to monitor blood glucose levels and stay on top of hydration requirements at Iftar if individuals are going to practice the Terawih prayer. Individuals with diabetes should be reminded that the physical exertions involved in the Terawih prayers should be considered part of their daily exercise activities.

References
(65-67)

PROMOTION OF PHYSICAL ACTIVITY

Promotion of Physical Activity

Dissemination and implementation of the guidelines

According to the International Society for Physical Activity and Health (ISPAH), there are eight investments that can support physical activity, as follows:

1. Whole-of-school programme
2. Active Transport
3. Active Urban Design
4. Healthcare
5. Public Education including mass media
6. Sport and Recreation for all
7. Workplaces
8. Community-wide programmes

It is, therefore, important for key stakeholders and audiences to be aware and understand these guidelines, including:

- Policy-makers
- Non-governmental organisations, academic and research organisations
- Private sector as well as the media and research funders
- Professionals in sports, education, transport or planning sectors
- General public and specific population subgroups

Timely and strategic dissemination of the guidelines and key messages can help increase awareness and knowledge about the multiple benefits of regular physical activity and reducing sedentary behaviours. However, these guidelines must also be supported by appropriate policies and programmes in order to achieve national targets to reduce physical inactivity by 10% by 2025, and 15% by 2030.

Brunei Darussalam in its effort to curb the increasing trend of noncommunicable diseases using a “whole of government” approach recently launched the Brunei Darussalam Multisectoral Action Plan for the Prevention and Control of Noncommunicable Disease (BruMAP-NCD) 2021-2025. Several outcome and initiatives been identified in BRUMAP-NCD 2021-2025 that create appropriate opportunities for people to participate in physical activity and support physical activity promotion where relevant, these guidelines should be incorperated into the initiatives to underscore the importance of physical activity. These guidelines should also be considered in any future policies and programmes that create supportive environments which enable people to be active.

Evidence and Research Needs

In Brunei Darussalam, there is still a need to do further research to establish consistent results related to physical activity among early age, children, adolescents, adults, older adults, people living with disability and/or chronic disease. Also, there was insufficient evidence to identify the amount of time of sedentary behaviour among the Brunei population. This requiring further research in these areas.

Some of the propose research recommended in the future:

- Types of physical activity among Bruneians across the life course
- Enablers and barriers to physical activity in Brunei Darussalam
- Association between physical activity and health outcomes in the Brunei population
- Association between sedentary behaviour with general health outcome and mental outcome across the life course in Brunei Darussalam

Glossary

Absolute Intensity	based on the rate of energy expenditure during the activity, without taking into account a person's cardiorespiratory fitness. It is the amount of energy expended per minute of activity and it is usually measured as metabolic equivalent of task (MET)
Aerobic	Needing oxygen
Aerobic activity	This physical activity (also called an endurance activity or cardio activity) moves the body's large muscles in a rhythmic manner for a sustained period of time. Brisk walking, running, bicycling, jumping rope and swimming are all examples. Aerobic activity causes a person's heart to beat faster than usual.
Asthma	a chronic inflammatory disorder of the airways associated with hyperresponsiveness of the airways and reversible airflow limitation that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing.
Balance activity	This kind of activity can improve the ability to resist forces within or outside of the body that causes falls while a person is stationary or moving. Walking backward, standing on one leg, or using a wobble board are examples of balance activities. Strengthening muscles of the back, abdomen and legs also improves balance.
Bone strengthening activity	This kind of activity (sometimes called weight-bearing or weight-loading activity) produces a force on the bones of the body that promotes bone growth and strength. This force is commonly produced by impact with the ground. Examples of bone strengthening activity include jumping jacks, running, brisk walking and weight-lifting exercises As these examples illustrate, bone strengthening activities can also be aerobic and muscle strengthening.
Cancer	Cancer is a large group of diseases that can start in almost any organ or tissue of the body when abnormal cells grow uncontrollably, go beyond their usual boundaries to invade adjoining parts of the body and/or spread to other organs. The latter process is called metastasizing and is a major cause of death from cancer.
Cardiometabolic health	The interplay of blood pressure, blood lipids, blood glucose and insulin on health.
Cardiorespiratory fitness (endurance)	A health-related component of physical fitness. The ability of the circulatory and respiratory systems to supply oxygen during ustained physical activity. Usually expressed as measured or estimated maximal oxygen uptake (VO2 max).
Cognitive function	Cerebral activities, i.e., reasoning, memory, attention, and language that lead to the attainment of information and knowledge. This can also include learning.
Diabetes mellitus	A disorder affecting carbohydrate metabolism in which blood glucose (sugar) are not utilized efficiently due to lack of insulin or reduced activity of this hormone. The most common is type 2 diabetes, usually in adults, which occurs when the body becomes resistant to insulin or doesn't make enough insulin. Type 1 diabetes, once known as juvenile

	diabetes or insulin-dependent diabetes, is a chronic condition in which the pancreas produces little or no insulin by itself.
Exercise	a form of physical activity, a subcategory of physical activity that is planned, structured and repetitive, with the objective of improving or maintaining physical fitness, physical performance or health. Although all exercise is physical activity, not all physical activity is exercise.
Executive function	Includes constructs such as: working memory, cognitive flexibility (also called flexible thinking) and inhibitory control (which includes self- control).
Fitness	A measure of the body's ability to function efficiently and effectively in work and leisure activities, and includes, for example, physical fitness and cardiorespiratory fitness
Flexibility activity	This kind of activity enhances the ability of a joint to move through the full range of motion. Stretching exercises are effectively increase flexibility, and allowing people to more easily do activities that require greater flexibility.
Heart Rate	The number of times that the heart beats in any one minute. Measured in beats per minutes (bpm).
Hypertension	High blood pressure
Insulin	A hormone released from the pancreas into the bloodstream to lower blood glucose levels and which affects carbohydrates and fat metabolism.
Insulin Secretagogues	Medicine that stimulates the ceta pancreatic cell to secrete insulin. Secretagogues include the sulphonylureas and glinides classes of anti oral hypoglycaemic agents.
Light intensity physical activity	No noticeable changes in heart rate and breathing rate. At a pace where able to easily talk and sing. Absolute intensity less than 3.0 METs. Relative intensity (Borg RPE scale) - 2
Major muscle groups	Major muscle groups include the legs, back, abdomen, chest, shoulders and arms.
Maximum heart rate	The maximum amount of times an individual's heart can beat per minute when maximally stressed.
Metabolic equivalent of task (MET)	The metabolic equivalent of task, or simply metabolic equivalent, is a physiological measure expressing the intensity of physical activities. One MET is the energy equivalent expended by an individual while seated at rest. The MET values for different types of physical activity and sports can be found in https://sites.google.com/site/compendiumofphysicalactivities/home
Moderate intensity physical activity	Activity causing a slight, but noticeable increase in breathing and heart rate and may cause light sweating after about 10 minutes of activity. At a pace where able to comfortably talk but not sing. Absolute intensity - 3.0 to 5.9 METs Relative intensity (Borg RPE scale) - 5 or 6
Multicomponent physical activity	For older adults, multicomponent physical activity is important to improve physical function and decrease the risk of falls or injury from a fall. These activities can be done at home or in a structured group setting. Multicomponent physical activity is a combination of all types of exercise including aerobic, muscle strengthening, and balance activities into a session. An example of a

	multicomponent physical activity could include walking (aerobic activity), lifting weights (muscle strengthening), and incorporates walking backwards or sideways (balance activity). Dancing also combines aerobic and balance components.
Muscle strengthening activity	Physical activity and exercise that increase skeletal muscle strength, power, endurance and mass. It is also known as strength training, resistance training or muscular strength and endurance exercises. Muscle strengthening activity can also be done by using elastic bands or body weight for resistance (climbing a tree, lifting objects, sit-ups or doing push-ups, for example). The effects of muscle strengthening activity are limited to the muscles doing the work. It is important to work all the major muscle groups of the body—the legs, hips, back, abdomen, chest, shoulders and arms.
Obesity	A condition characterized by the excessive storage of body fat subcutaneously. Clinically this is considered when fat storage is greater than 20% in excess of the recommended value for individual's height and weight. BMI ≥ 30
Physical activity	Any bodily movement produced by skeletal muscles that requires energy expenditure.
Physical inactivity	An insufficient physical activity level to meet present physical activity recommendations.
Pilates	An exercise aimed at increasing the body's strength and flexibility with a focus on core strength.
Postpartum	In the period just after delivery. Postpartum refers to the mother and postnatal to the baby.
Relative intensity	Describes a person's level of effort relative to his/her fitness. As a rule of thumb, on a scale of 0 to 10, where sitting is 0 and greatest effort possible is 10, moderate intensity activity is a 5 or 6 while vigorous activity is at level of 7 or 8.
Sedentary behaviour	Refers to any waking behaviour characterized by a low level of energy expenditure (less than or equal to 1.5 METs). In general, sedentary behaviour is about sitting or lying or reclining at work, at home, getting to and from places, or with friends, including time spent sitting at a desk, travelling in car or time spent using a device such as a smartphone, computer, television, or video gameconsole, but does not include time spent sleeping.
Sport	Sport covers a range of activities performed within a set of rules and undertaken as part of leisure or competition.
Tai Chi	A Chinese exercise discipline aimed at harmonizing the body and mind to raise energy levels. This is done through slow and focused movement patterns. Tai chi is typically classified as a light-intensity physical activity but may be considered relatively moderate intensity for some adults. It includes balance activities, and some forms may be considered muscle strengthening.
Vigorous intensity physical activity	Activity causing hard and fast breathing with increased heart rate. Develop a sweat after only a few minutes of activity. At a pace where cannot say more than a few words without pausing for a breath. Absolute intensity - 6.0 or more METs Relative intensity (Borg RPE scale) - 7or 8

Contact Information

Health Promotion Centre
Ministry of Health
Commonwealth Drive
Bandar Seri Begawan
Negara Brunei Darussalam BB3910
Tel: +673 2385800
Email: hpc@moh.gov.bn
IG: hpcbrunei
Facebook: Health Promotion Centre

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Appendix

Hypoglycaemia can occur during or long after physical activity. It is more likely to occur if the individuals:

- Are on insulin or an insulin secretagogue e.g., gliclazide, tolbutamide
- Have exercised for a long time
- Have exercised strenuously
- Have skipped meals

It is advised to check the blood glucose before and after exercise. Also check blood glucose at bedtime and take 15 grams of complex carbohydrate if blood glucose is less than 5.0mmol/L to avoid delayed hypoglycaemia.

Table I: Management of hypoglycaemia during exercise:

Step 1	• Check blood glucose • Blood glucose is low if it is less than 4.0 mmol/L
Step 2	• Take 15 grams of fast-acting carbohydrate
Step 3	• Repeat blood glucose after 15 minutes • If blood glucose is still less than 4.0 mmol/L, take another 15 grams of fast-acting carbohydrate
Step 4	• Repeat these steps every 15 minutes until your blood glucose is more than 5.0 mmol/L • Only resume exercise when blood glucose is more than 5.0 mmol/L o Ingest 15 grams of complex carbohydrate before resuming exercise o For prolonged activities at a moderate intensity, consume additional 15 grams of complex carbohydrate for every extra 30 minutes of exercise

Table II*: Suggested carbohydrate intake or other actions based on blood glucose levels at the start of exercise

Pre-exercise blood glucose	• Carbohydrate intake or other action
<5.0 mmol/L	• Ingest 15–30 grams of fast-acting carbohydrate prior to the start of exercise • For prolonged activities at a moderate intensity, consume additional 15-30 grams of complex carbohydrate for every extra 30 minutes of exercise
5.0–8.0 mmol/L	• Ingest 15 grams of complex carbohydrate prior to the start of exercise • For prolonged activities at a moderate intensity, consume additional 15 grams of complex carbohydrate for every extra 30 minutes of exercise
8.0–14.0 mmol/L	• Initiate exercise and delay consumption of complex carbohydrate until blood glucose levels are <8.0 mmol/L
>14.0 mmol/L	• Test for ketones: o Do not perform any exercise if moderate-to-large amounts of ketones are present o If negative, or small amount of ketones are present, initiate mild-to-moderate intensity exercise • Intense exercise should be delayed until glucose levels are <14.0 mmol/L because intense exercise may exaggerate the hyperglycemia

*Adapted from Zaharieva and Riddell

Reference

(68)

Table III: Examples of 15 grams of fast-acting carbohydrates

Fruit juice 	½ cup
Soda - Do not use diet or light variety 	½ can
Sweets 	4-6 pieces
Honey 	1 tablespoon or 3 teaspoons
Sugar 	1 tablespoon or 3 teaspoons

Table IV: Examples of 15 grams of complex carbohydrates

Banana 	½ large or 1 medium or 2 small
Apple 	1 medium
Bread 	1 slice
Crackers 	3 pieces

EVERY MOVE COUNTS

Being active has significant benefits for hearts, bodies and minds, whether you're walking, wheeling or cycling, dancing, doing sports or playing with your kids.