

兒童及青少年心臟健康、心臟病與體能活動

Heart health, heart problems and exercise in children



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Heart health refers to the health of the heart and blood vessels 心臟健康 / 心血管健康

= absence of cardiovascular disease: 無患上心血管病
coronary heart disease, stroke, heart failure, heart rhythm disorders, hypertension

= absence of risks of cardiovascular disease: 無心血管病風險因素

- obesity 肥胖
- high blood cholesterol 高血脂
- high blood pressure 高血壓
- tobacco 吸煙
- physical inactivity 缺乏運動

Physical Inactivity / Sedentary behaviour

缺乏運動

American Heart Association(AHA)

Scientific Position Statement

美國心臟協會科學聲明

“**Physical inactivity** (缺乏運動) is a major risk factor for developing coronary artery disease. It increases the risk of stroke and other major cardiovascular risk factors: obesity, high blood pressure, low HDL cholesterol and diabetes.”

休閒時間體能活動與死亡率

Leisure Time Physical Activity and Mortality in Hong Kong: Case-control Study of All Adult Deaths

TH Lam (2004) Annals of Epidemiology

- In 1998 deaths attributable to ***physical inactivity*** (6450) exceeded those due to smoking (5720)

	Proportion of all deaths	No. of deaths
Men 35+	25.3%	4,483
Women 35+	14.4%	1,968
Total	20.6%	6,450

Mortality attributable to physical inactivity

Final Summary Report

Commissioned by

Community Sports Committee
of the Sports Commission

Co-ordinated by



社區體適能調查 Physical Fitness Test for the Community 2012 study

Category (with modification)	Accumulation of moderate- or-above intensity physical activity in a week	Age (%)			Total (%)
		20–39	40–59	60–69	
IV	Highly active ≥ 300 minutes	14.7	16.3	16.7	15.7
III	Active 150–299 minutes	13.8	12.2	12.6	12.9
II	Some active 31–149 minutes	26.4	20.5	18.6	22.7
I	Sedentary ≤ 30 minutes	45.1	51.0	52.1	48.7

大約一半成年人缺乏運動

45% of young adults are inactive

2018 香港青少年體能活動成績咭

Results from the Hong Kong's 2018 report card on physical activity for children and youth

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“Children and youth in Hong Kong
have low physical activity and
physical fitness levels and high
sedentary behaviors”

香港兒童及青少年體適能水平偏低，
和缺乏運動

Grades according to physical activity indicator in the 2018 Hong Kong report card on physical activity for children and youth.

Indicator	2018 Grades	2016 Grades
<u>Overall Physical Activity</u>	C-	D
Organized Sport Participation	C	C-
Active Play	INC	INC
Active Transportation	B+	B
Sedentary Behaviors	C-	C
<u>Physical Fitness*</u>	D	—
Sleep*	C-	—
<u>Family</u>	D-	D
<u>School</u>	C	C
Community and Environment	B	B
Government	C	INC
Obesity*	D-	—

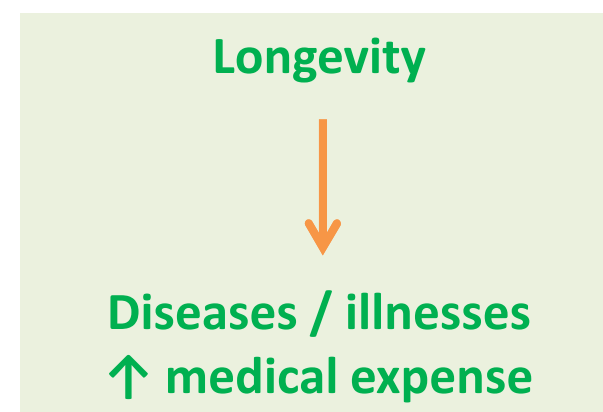
The grade for each indicator is based on the percentage of children and youth meeting a defined benchmark (except for Obesity):

A+ 94-100%	A 87-93%	A- 80-86%
B+ 74-79%	B 67-73%	B- 60%-66%
C+ 54- 59%	C 47- 53%	C- 40-46%
D+ 34-39%	D 27- 33%	D- 20-26%
F <20%		

Hong Kong Life Table (2020)

香港生命表 2020

age	Expectation of life	
	female	male
15	73	68
16	72	67
17	71	66
18	70	65
19	69	64
20	68	63
61	29	25
62	28	25
63	27	24
64	26	23
65	25	23



邁向 2025

非傳染病防控策略及行動計劃 (2018年5月)

減少缺乏運動

九項目標



Reduce premature mortality from NCD	Reduce harmful use of alcohol	Reduce physical inactivity
Reduce salt intake	Reduce tobacco use	Contain the prevalence of raised blood pressure
Halt the rise in diabetes and obesity	Prevent heart attacks and strokes through drug therapy and counselling	Improve availability of affordable basic technologies and essential medicines to treat major NCD

**How much exercise, and what
level of intensity ?**

運動量與強度

World Health Organization 2020 guidelines on physical activity and sedentary behaviour

All adults should do

- at least 150 – 300 min of moderate-intensity **aerobic PA** 中等強度帶氧運動,
- or
- at least 75 – 150 min of vigorous-intensity **aerobic PA** 高強度帶氧運動 ,
- or
- an equivalent combination of moderate-intensity and vigorous-intensity activity **throughout the week**
- **muscle-strengthening activities** 肌肉強化運動 at moderate or greater intensity on **2 or more days a week**

N.B. 2 minutes of a moderate-intensity activity is about equal to 1 minute of a vigorous activity.

Children and adolescents (aged 5–17 years), including those living with disability

- at least an average of **60 min/day** of moderate-to-vigorous intensity, mostly aerobic, physical activity 中等至高強度帶氧運動, **across the week**;
- **Vigorous-intensity** aerobic activities, as well as those that **strengthen muscle and bone** should be incorporated **at least 3 days a week**.
- Children and adolescents should limit the amount of time spent being sedentary, particularly the amount of recreational screen time.
減少坐 / 卧時間,減少電視電腦時間

Intensity of exercise 運動強度

Intensity	Signs	Examples
Light	Breathing rate and heart rate normal; able to talk normally	Slow walking
Moderate	Slight increase in heart rate and breathing rate; able to talk in short sentences or single words	fast walking, cycling, paddling, slides, swinging, circuit games
Vigorous	Significant increase in heart rate and breathing rate; unable to talk normally	running, rope skipping, dancing, football, swimming

Talk test 說話測試

- A person doing **moderate-intensity exercise** can talk, but not sing.
- A person doing **vigorous-intensity** activity cannot say more than a few words without pausing for a breath.

最高心率百分比

Percentage of Maximum Heart Rate

Max Heart Rate = $(220 - \text{age})$ beats / minute

Intensity of Ex	% HR max	
light	50-65	lowest level to improve fitness
moderate	60-85	fat burning, aerobic zone
vigorous	85-90	anaerobic training

Exercise and risks

運動與風險

General advice for exercise

- Warm up 熱身運動
- Stretching 伸展
- Cool down 緩和運動
- Prevention of dehydration, sunburn
- Protective gears

Increase physical activity gradually over time

增加運動量及強度要漸進

Exercise and risks

- muscle ache 肌肉酸痛
- muscle strain 肌肉拉傷
- musculoskeletal injury 肌腱及骨骼創傷
- over-use injury 勞損
- overtraining 過度訓練

- dehydration
- trauma
- drowning
- wilderness injury
- high altitude illness
- heat illness
- cold exposure
- lightning strike

運動可能令原有的疾病惡化

Worsening of existing diseases:

- heart disease
- lung disease
- diabetes mellitus

Sudden death 猝死



Recommendation from Hong Kong College of Cardiology

Evaluation before exercise

運動前評估

“If one has any symptoms (chest pain胸痛, fainting 頭暈 or undue breathlessness不尋常氣喘) or

≥ 2 cardiac risk factors 心臟病風險因素:

male >45 or female >55, smoking, hypertension, diabetes, high cholesterol, overweight, family history,

one should get advice from health care professionals before exercise participation.”



Physical Activity Readiness Questionnaire

(The Canadian Society for Exercise Physiology)

YES	NO	
<input type="checkbox"/>	<input type="checkbox"/>	1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
<input type="checkbox"/>	<input type="checkbox"/>	2. Do you feel pain in your chest when you do physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	3. In the past month, have you had chest pain when you were not doing physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	4. Do you lose your balance because of dizziness or do you ever lose consciousness?
<input type="checkbox"/>	<input type="checkbox"/>	5. Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
<input type="checkbox"/>	<input type="checkbox"/>	7. Do you know of any other reason why you should not do physical activity?

If you answered

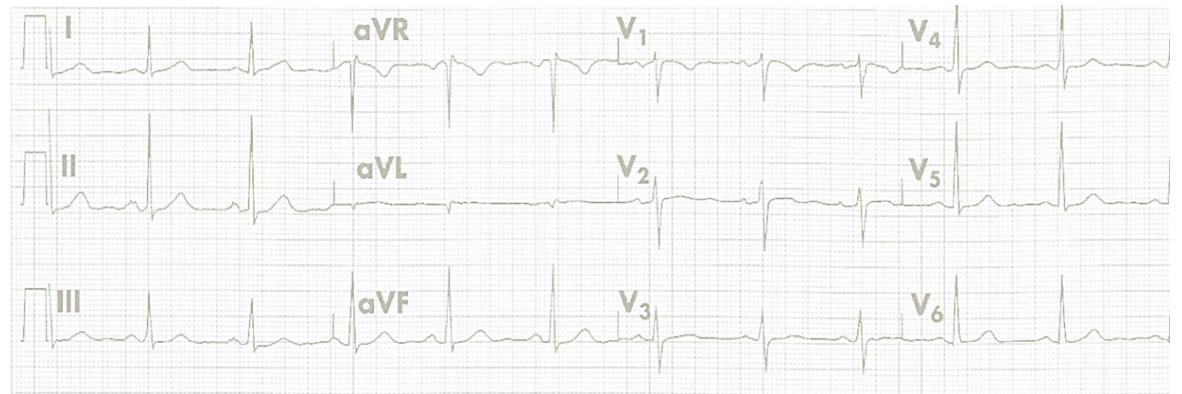
YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

Heart Diseases in Children 兒童心臟病

1. Congenital Heart diseases 先天性
2. Acquired Heart diseases 後天性
 - Kawasaki disease 川崎症 affecting coronary arteries
 - Myocarditis 心肌炎
 - infective endocarditis 心內膜炎
 - Cardiomyopathies 心肌病

3. Cardiac arrhythmias
心律不正



先天性心臟病

Congenital Heart Diseases

間隔	Septa :	Atrial septal defect	心房間隔缺損
		Ventricular septal defect	心室間隔缺損
血管	Vessels:	Ductus arteriosus	動脈導管未閉
		Coarctation of Aorta	大動脈收縮
心瓣	Valves:	Pulmonary valve stenosis	肺動脈瓣狹窄
		Aortic valve stenosis	大動脈瓣狹窄
心腔	Chambers:	Hypoplastic left ventricle	左心室發育不全
		Univentricular heart	單心室
複雜	Complex:	Tetralogy of Fallot	四聯症
		Transposition of great vessels	大血管錯位

Signs and symptoms of heart disease in school age children: 心臟病的徵狀

1. **Poor exercise tolerance:** 運動耐量下降/低
 - low exertion intensity
 - short exercise time
 - extreme shortness of breath on mild exertion
2. **Symptoms during exercise:** 運動時出現病徵
 - chest pain 胸痛
 - dizziness 頭暈
 - syncope 昏厥
 - palpitations 心悸
3. **Palpitations** 心悸
4. **Cyanosis** 發紺，面色變紫

General recommendation of exercise in the presence of heart diseases:

Most children with heart diseases should have the opportunity to participate in physical activities.大部份心臟病兒童可以參加中強度運動及參加體育課

- low to moderate intensity **isotonic exercise** is desirable.
低至中強度等強運動是合適的
- short period of high intensity **isometric exercise** is permissible.
短時間高強度等長運動是容許的
- prolonged high intensity isotonic / isometric Ex should **only be approved after detailed assessment.**
參加長時間高強度運動需要詳細評估

Isotonic exercise (aerobic activities)

- rhythmic muscular contraction that develops small force

Isometric exercise (muscle power)

- generation of large force by muscles, e.g. weight lifting.

Recommendation on Intensity Level of Exercise

No Restriction

運動強度建議

Activities may include endurance training, athletic competition, contact sports.

Moderate Exercise

Activities include regular physical education classes, tennis, baseball.

Light Exercise

Activities include non-strenuous team games, recreational swimming, jogging, cycling, golf.

Moderate Limitation

Activities include attending school, but no participation in physical education classes.

Total Restriction

運動時猝死的原因

Causes of sudden death / cardiac arrest during exercise

- >30 year old : coronary artery disease 冠心病
- <30 year old : cardiomyopathies / genetic arrhythmias 心肌病 / 心律失常

Warning cardiac symptoms during or after exercise:

猝死前可能出現的徵狀

- syncope
- chest pain
- palpitation
- cyanosis , paleness
- excessive dyspnea
- excessive fatigue

學校及運動場的緊急事件應變準備

Emergency response in school and sports venue

CPR
復蘇法

AED
體外除顫器



Summary:

- Inactivity is a major health hazard
缺乏運動 – 重要健康風險因素
- Inactivity is common in young population
年輕人缺乏運動是常見的
- Inactivity is modifiable
缺乏運動是可以改變

Summary:

- Most children with heart diseases can enjoy moderate intensity exercise and physical education sessions
大部份心臟病兒童可以參加中強度運動及參加體育課
- Risk of exercise (sudden collapse) in children with heart diseases after evaluation and treatment is very low.
兒童心臟病因為運動引起猝死非常罕見
- Preparation for emergency response is very important.
學校應有恆常的應急計劃應付及防止運動產生危險和猝死

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兒童心臟基金會
Children's Heart Foundation

兒童心臟基金會提供教育活動,醫療講座增加公眾對於心臟健康的認識,回答有關心臟健康與心臟疾病的問題

如有查詢,請致電: 2553 0331 或電郵至: chf@childheart.org.hk 聯絡基金會職員。