

# 儿童及青少年心脏健康、心脏病与体能活动

## Heart health, heart problems and exercise in children



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## Heart health refers to the health of the heart and blood vessels      心脏健康 / 心血管健康

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

= absence of risks of cardiovascular disease: 无心血管病风险因素

- obesity      肥胖
- high blood cholesterol      高血脂
- high blood pressure      高血压
- tobacco      吸烟
- physical inactivity      缺乏运动

## Physical Inactivity / Sedentary behaviour 缺乏运动

**American Heart Association(AHA)**

**Scientific Position Statement**

美国心脏协会科学声明

***“Physical inactivity (缺乏运动)*** 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.”

# 休闲时间体能活动与死亡率

## 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



# 小区体适能调查 Physical Fitness 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

45% of young adults are inactive

大约一半成年人缺乏运动

## 2018 香港青少年体能活动成绩咭

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”

香港儿童及青少年体适能水平偏低，  
和缺乏运动

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-	—

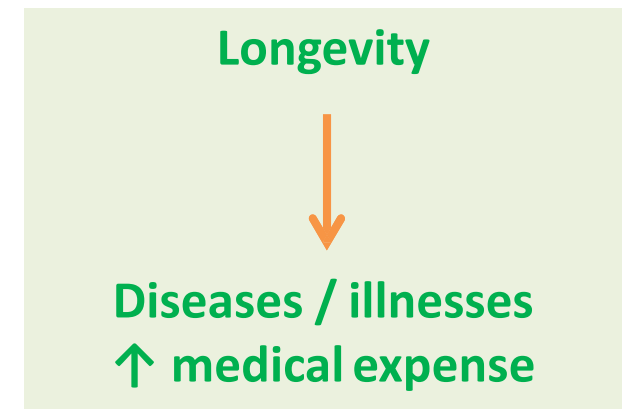
The grade for each indicator is based on the percentage of children and youth meeting a defined benchmark (except for Obesity):

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



迈向 2025

非传染病防控策略及行动计划 (2018年5月)

减少缺乏运动

九项目标



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

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

运动量与强度

## 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** 中等强度带氧运动,  
or
- at least 75 – 150 min of vigorous-intensity **aerobic PA** 高强度带氧运动 ,  
or
- an equivalent combination of moderate-intensity and vigorous-intensity activity **throughout the week**
- **muscle-strengthening activities** 肌肉强化运动 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中等至高强度带氧运动, **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.  
减少坐 / 卧时间,减少电视计算机时间

## Intensity of exercise 运动强度

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 说话测试

- 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**

运动与风险

## General advice for exercise

- Warm up      热身运动
- Stretching      伸展
- Cool down      缓和运动
- Prevention of dehydration, sunburn
- Protective gears

Increase physical activity gradually over time

增加运动量及强度要渐进

# Exercise and risks

- muscle ache 肌肉酸痛
  - muscle strain 肌肉拉伤
  - musculoskeletal injury 肌腱及骨骼创伤
  - over-use injury 劳损
  - overtraining 过度训练
- 
- dehydration
  - trauma
  - drowning
  - wilderness injury
  - high altitude illness
  - heat illness
  - cold exposure
  - lightning strike

运动可能令原有的疾病恶化

## Worsening of existing diseases:

- heart disease
- lung disease
- diabetes mellitus

**Sudden death** 猝死



## Recommendation from Hong Kong College of Cardiology

### Evaluation before exercise

### 运动前评估

“If one has any symptoms (chest pain胸痛, fainting 头晕 or undue breathlessness不寻常气喘) or

≥ 2 cardiac risk factors 心脏病风险因素:

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

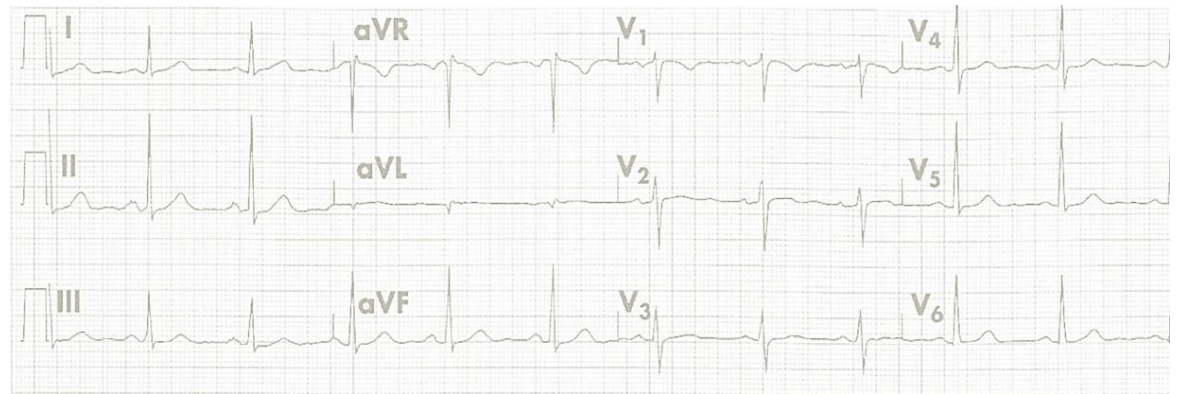
**YES to one or more questions**

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 儿童心脏病

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

3. Cardiac arrhythmias  
心律不正



# 先天性心脏病

## Congenital Heart Diseases

间隔	Septa :	Atrial septal defect	心房间隔缺损
		Ventricular septal defect	心室间隔缺损
血管	Vessels:	Ductus arteriosus	动脉导管未闭
		Coarctation of Aorta	大动脉收缩
心瓣	Valves:	Pulmonary valve stenosis	肺动脉瓣狭窄
		Aortic valve stenosis	大动脉瓣狭窄
心腔	Chambers:	Hypoplastic left ventricle	左心室发育不全
		Univentricular heart	单心室
复杂	Complex:	Tetralogy of Fallot	四联症
		Transposition of great vessels	大血管错位

## Signs and symptoms of heart disease in school age children: 心脏病的征状

1. **Poor exercise tolerance:** 运动耐量下降/低
  - low exertion intensity
  - short exercise time
  - extreme shortness of breath on mild exertion
2. **Symptoms during exercise:** 运动时出现病征
  - chest pain 胸痛
  - dizziness 头晕
  - syncope 昏厥
  - palpitations 心悸
3. **Palpitations** 心悸
4. **Cyanosis** 发绀，面色变紫

## General recommendation of exercise in the presence of heart diseases:

Most children with heart diseases should have the opportunity to participate in physical activities.大部份心脏病儿童可以参加中强度运动及参加体育课

- low to moderate intensity **isotonic exercise** is desirable.  
低至中强度等强运动是合适的
- short period of high intensity **isometric exercise** is permissible.  
短时间高强度等長运动是容许的
- prolonged high intensity isotonic / isometric Ex should **only be approved after detailed assessment.**  
参加長時間高强度运动需要详细评估

### 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

### 运动强度建议

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

## 运动时猝死的原因

### **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:**

猝死前可能出现的征状

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

学校及运动场的紧急事件应变准备

## Emergency response in school and sports venue

CPR

复苏法

AED

体外除颤器



## Summary:

- Inactivity is a major health hazard  
缺乏运动 – 重要健康风险因素
- Inactivity is common in young population  
年轻人缺乏运动是常见的
- Inactivity is modifiable  
缺乏运动是可以改变

## Summary:

- Most children with heart diseases can enjoy moderate intensity exercise and physical education sessions

大部份心脏病儿童可以参加中强度运动及参加体育课

- Risk of exercise (sudden collapse) in children with heart diseases after evaluation and treatment is very low.

儿童心脏病因为运动引起猝死非常罕见

- Preparation for emergency response is very important.

学校应有恒常的应急计划应付及防止运动产生危险和猝死

翁德璋医生

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兒童心臟基金會  
Children's Heart Foundation

儿童心脏基金会提供教育活动,医疗讲座增加公众对于心脏健康的认识,回答有关心脏健康与心脏疾病的问题

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