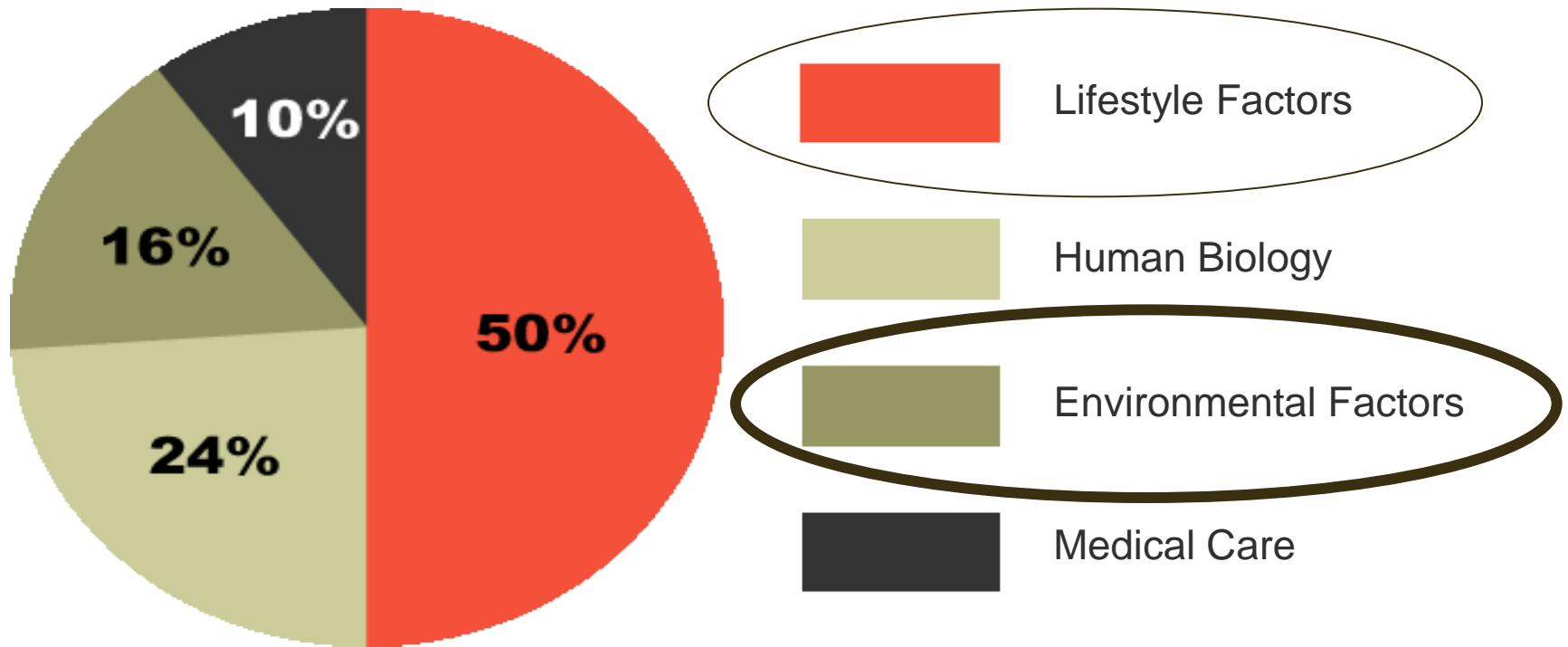


Are you ready for exercise?

□ 如試試運動?

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最能影響健康的原素



Source: Hinkle et al CDC 1997

When do we advise people to do exercise?

什麼時候拿出這個建議?

- At diagnosis of diabetes or obesity related disease
- All people in poor metabolic control (ABC and Weight)
- At onset of complications
- At time of any need in treatment change, or major social or physical change
- Anytime the you feel you need it

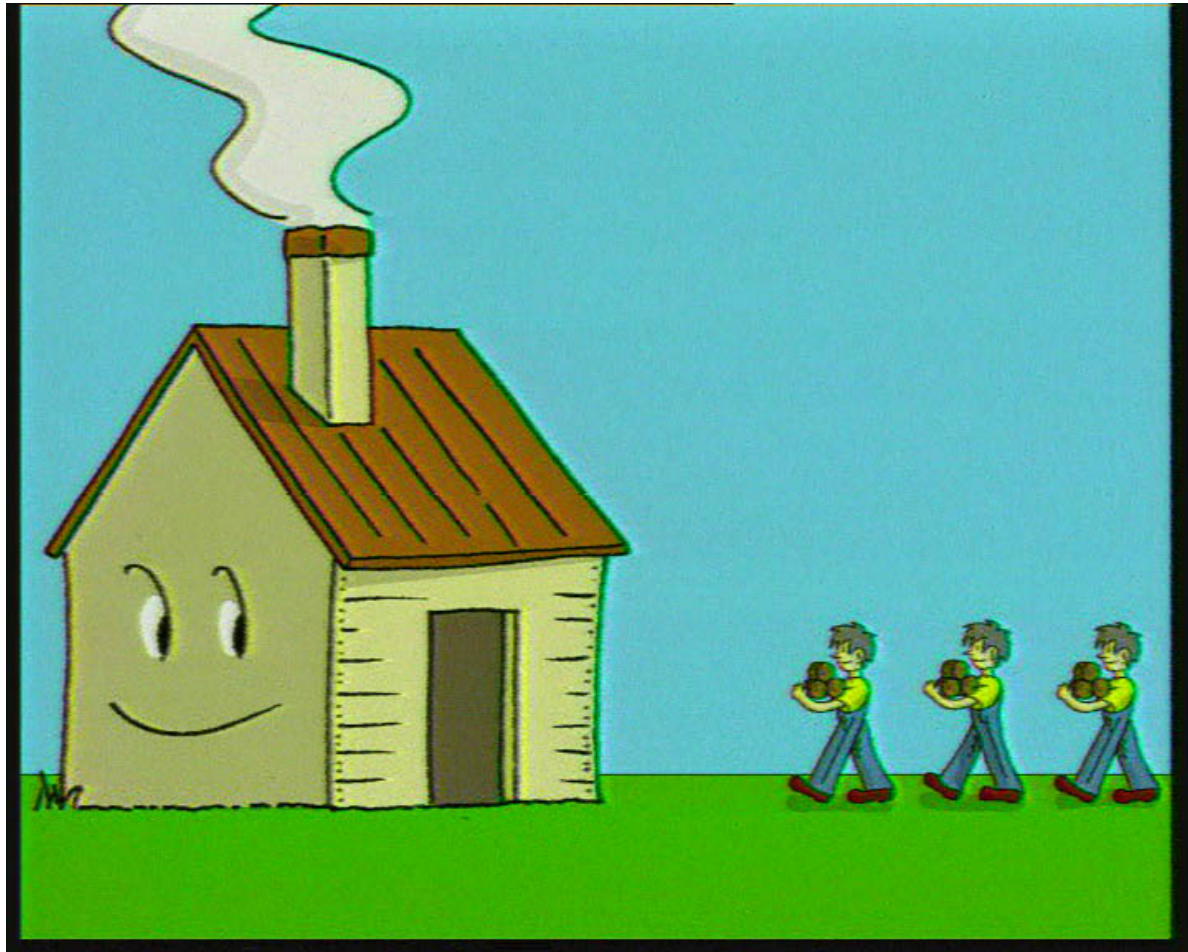
誰提出個建議？



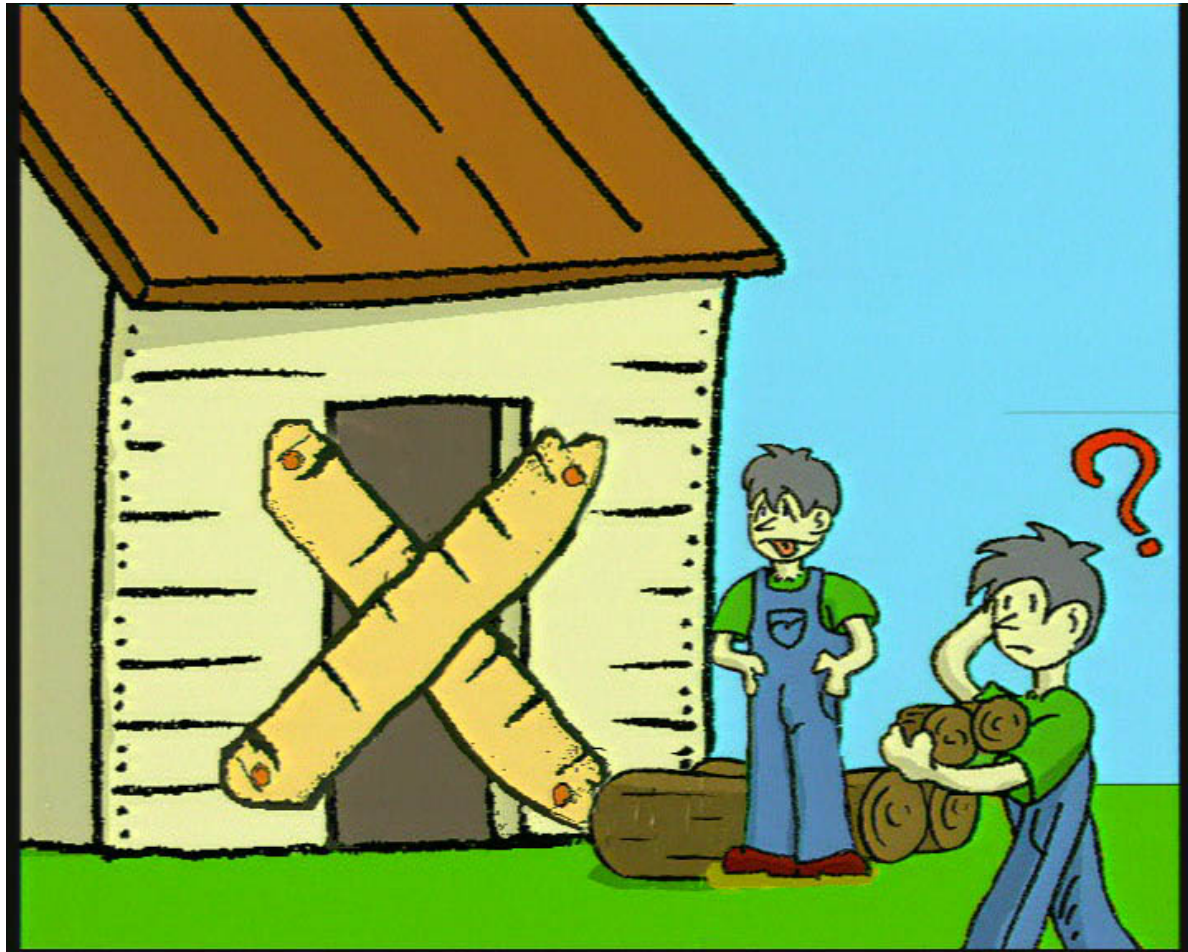
運動的好處

- 有助改善胰島素抗拒性，從而維持或減低**血糖**水平
- 有助減低**血壓**
- 有助維持**體重**或達致減肥效果
- 有助減少三酸甘油脂及提高高密度**膽固醇**水平
- 強化肌肉及骨骼，改善姿勢及平衡
- 鬆弛身心、增加活力

胰島素抗拒性



胰島素抗拒性



改善血糖水平

- Systematic and meta-analysis
 - Structured exercise interventions in clinical trials ≥ 8 weeks duration in type 2 dm
 - Exercise group vs control group 運動與對照組
 - 7.65% vs 8.31% ($p < 0.001$)
 - No weight difference noted between exercise group and control group
- Exercise intensity predicted post-intervention weighted mean difference in Hba1c ($r = -0.91$, $p = 0.002$)
 - compare with exercise volume ($r = -0.46$, $p = 0.26$)

減少死亡率

- Large cohort study:
 - Higher level of habitual aerobic exercise associated with significantly lower CVS or overall mortality

Quartile of cardiorespiratory fitness	RR for overall mortality
1 st	1
2 nd	1.6
3 rd	2.8
4 th	4.5

減少心血管疾病

- In a cohort of 44,452 men (age 40 to 75) enrolled in the Health Professionals' Follow-up Study, several types of physical activity were associated with a significant reduction in CHD risk :
- Running for one hour or more per week – RR: 0.58 (CI 0.44-0.77)
- Rowing for one hour or more per week – RR: 0.82 (CI 0.68-0.99)
- Brisk walking for 30 minutes or more per day – RR:0.82 (CI 0.67-1.00)
- Lifting weights for 30 minutes or more per week – RR 0.77 (CI0.61-0.98)

JAMA. 2002;288(16):1994.

Even small amount of exercise are better than no exercise

改善身體代謝狀況

- Reduce body weight 減少、保持體重
 - Exercise alone, without concomitant caloric restriction and behaviour modification, produce only modest weight loss of around 2 kg
 - Optimal volume to exercise to achieve sustained major weight loss is much larger than needed to achieve improved glycemic control and CVS health
 - Observational study: individuals who maintain large weight loss > 1 yr has typically performed about 7hrs/ week of moderate to vigorous intensity exercise
- Lower blood pressure 改善血壓
- Increase HDL 提升高密度膽固醇

What is metabolic control

身體代謝狀況

A

B

C

W

- HbA1c 糖化血紅素
- Blood Pressure 血壓
- Cholesterol 膽固醇
- Weight 體重控制

Obesity related disease 肥胖相關疾病

- Diabetes mellitus
- Joint problem e.g. osteoarthritis
- Hypertension, Stroke, AF, CAD
- Cancer e.g. colon, kidney, endometrium, thyroid, breast
- Obstructive sleep apnoea syndrome
- Gall bladder disease

How often/ long should I do it?

做多少才足夠？

- Aerobic exercise 耐力運動(有氧或帶氧)
 - Should not be more than 2 consecutive days without aerobic exercise
 - Effect of a single bout of exercise on insulin sensitivity lasts 24-72 hrs
 - Usual recommendation is 150- 175 minutes per week, 5-7 days 每星期 5-7天，約150分鐘
- Resistance exercise 阻力運動
 - May last longer compare with aerobic exercise
 - 2 times per week is advised 每星期兩次

Resistance exercise 阻力運動

- Being often underuse as preventive and treatment modalities
- Most studies use a moderate exercise intensity (50-70% RM)
 - RM: 1 repetition maximum
 - Typical program:
 - Approximately 9 upper and lower body exercises, 3 d/ week, progressive resistance 50-85% of 1 RM, 3 sets of 8-10 repetitions
- Increase in muscle strength, mobility, reduce adiposity
- Combined aerobic and resistance exercise is better in terms of
 - absolute difference in A1C was significantly improved only in combined program compared with controls
 - lost significantly more weight than the control and resistance training groups (-1.5, +0.4, -0.3 kg respectively)

Precautions with exercise 運動須知

- Hyperglycemia 血糖不穩定，在運動前先檢查血糖
 - Avoided if fasting glucose > 14 mmol/l and ketosis +ve
- Exercise related hypoglycemia
 - Advise additional CHO before exercise if pre exercise glucose < 5.6 mmol/l and on insulin/ sulphonylurea
- CVS disease 心絞痛、心臟病、或氣徵狀
 - Seek advice from Dr if hx of angina
 - Resistance exercise may be safer compare with aerobic exercise

Precautions with exercise 運動須知

- CVS: resistance exercise may be safer心臟病
 - Lower heart rate
 - Lower rate x SBP (rate pressure product: reflection of myocardial oxygen consumption)可選擇阻力運動
- Peripheral neuropathy 足部神經病變
 - Choose non weight bearing exercise like cycling or swimming more often 宜選擇非負重運動，如游泳、單車
 - Proper footwear for weight bearing exercise
 - Examine feet after exercise
- Nephropathy 腎病變者
 - SBP should not be > 180 mmHg during exercise 不應選擇阻力運動，如掌上壓、舉重, 伸縮血壓□宜 > 180 mmHg
- Proliferative retinopathy 視網膜病變
 - Not for resistance training, high impact aerobic activities and activities that involves lowering the head 不應選擇阻力運動，高負重運動如跑步及跳繩

Precautions with exercise 運動須知

- Insulin requiring patients 注射胰島素者
- Decrease the insulin dose that affects time of the day when exercise will be performed by about 30 %, especially if exercise > 60 mins 減少劑量約30%
- Inject the insulin in a site other than the muscles to be exercised e.g. arm area for cycling, abdomen tennis or badminton 或轉換注射部位
- Administer insulin 60 -90 minutes before exercise to minimize the problem of increased absorption 於運動前60-90分鐘注射

Is stress testing required?

須詳細檢查心臟嗎？

<input type="checkbox"/> 須詳細心臟檢查	須詳細心臟檢查
從沒有心絞痛、心臟病、或氣喘徵狀	心絞痛、心臟病、或氣喘病史
從沒有心臟病徵狀	心絞痛、或氣喘徵狀
沒有末梢血管病變或心血管病	檢查或臨床有末梢血管病變或心血管病
心電圖正常	心電圖 <input type="checkbox"/> 正常
輕至中度運動	強度運動

Risk classification for exercise training: class A: apparently healthy individuals

This classification includes:

1. Children, adolescents, men <45 years, and women <55 years who have no symptoms or known presence of heart disease or major coronary risk factors.
2. Men ≥ 45 years and women ≥ 55 years who have no symptoms or known presence of heart disease and with <2 major cardiovascular risk factors.
3. Men ≥ 45 years and women ≥ 55 years who have no symptoms or known presence of heart disease and with ≥ 2 major cardiovascular risk factors.

Activity guidelines:

No restrictions other than basic guidelines.

Supervision required

None*

ECG and blood pressure monitoring:

Not required

男 > 45歲
女 > 55歲
> 2個心血管病誘因

* It is suggested that persons classified as Class A-2 and particularly Class A-3 undergo a medical examination and possibly a medically supervised exercise test before engaging in vigorous exercise.

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Prevention of diabetes 預防糖尿

1997年發表的中國黑龍江省大慶研究經過六年追蹤研究，四個組別糖尿病的發生率	對象：577位葡萄糖耐量異常人士
對照組	67.7 %
飲食治療組	43.8%
運動組	41.1%
飲食合併運動組	46%

Prevention of diabetes 預防糖尿

<p>2001年發表的芬蘭糖尿病預防研究</p> <p>為期3年的糖尿病防治計劃</p> <p>兩個組別糖尿病的發生率</p>	<p>對象：522位肥胖的的葡萄糖耐量異常的中年人</p>
<p>對照組</p>	<p>23%</p>
<p>治療組 (飲食合併運動)</p>	<p>11%</p>

Strategy for staying active 持續運動

- **Expert Approach 專家式**

- Talk on benefits of exercise
- Aim at improving knowledge on exercise
- “I need to find a solution for you”
- Use close ended questions
- “Each patient has a problem I need to solve.”

- **Coach Approach 導師式**

- Share on benefits of exercise when pt ready
- Looks for feelings behind words or feedback of patients
- “The patient has the solution to his/ her problem.”
- Use open ended questions
- “Each client has a journey he needs to experience.”

M.O.S.S. tool

- **Motivation**誘因: What motivate your patient?
- **Obstacle**障礙: e.g. no swimming suit, don't know racket game, no time
- **Strategies**策略: e.g. group class, partner, use of lunch hour, walking up escalators, change jobs, do more housework
-
- **Strengths**強項: Identify their strengths

Strategy for staying active 持續運動

- Interesting exercise could enhance compliance
- Simple/ easy to learn exercise for beginners
- Group exercise may enhance compliance for those that do not perform exercise
- High intensity exercise may suit those that have hectic lifestyle
- Non weight bearing / resistance exercise good for cardiac/ obese patients
- Health care personnel who exercise themselves could give more effective counselling

齊來凝做運動文化

Level the environmental gradient

Individual behaviour change



The gradient is steep

Individual behaviour change



Changing the gradient will make it easier to change behaviour