

UNIVERSITY
OF
CAMBRIDGE

**The secrets of longevity: genes,
hormones or environment?**

**長壽的秘密：基因、荷爾蒙或
環境的影響？**

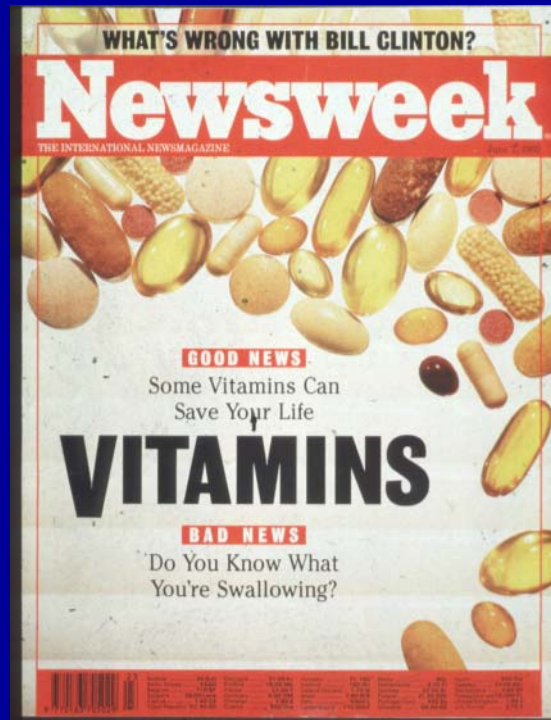
Kay-Tee Khaw

Possible antiageing interventions?

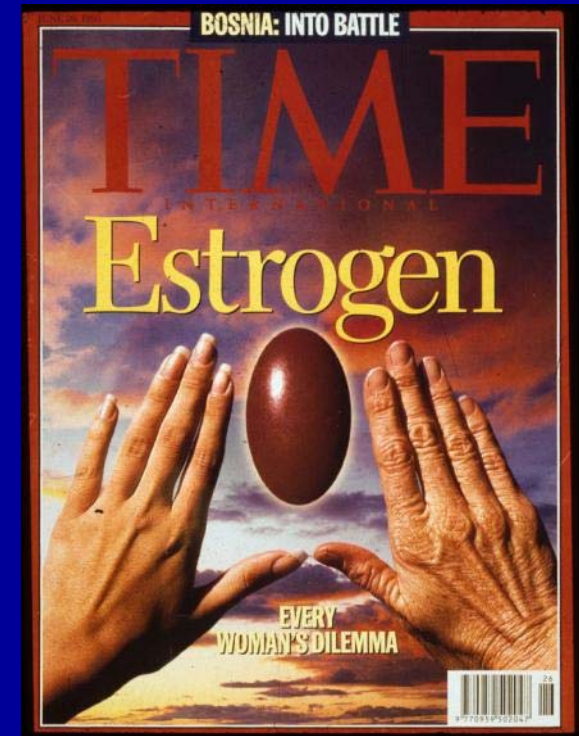
有可能抗老化的方法？



Extreme caloric restriction?
極度限制熱量？



Dietary supplements?
營養補充劑？

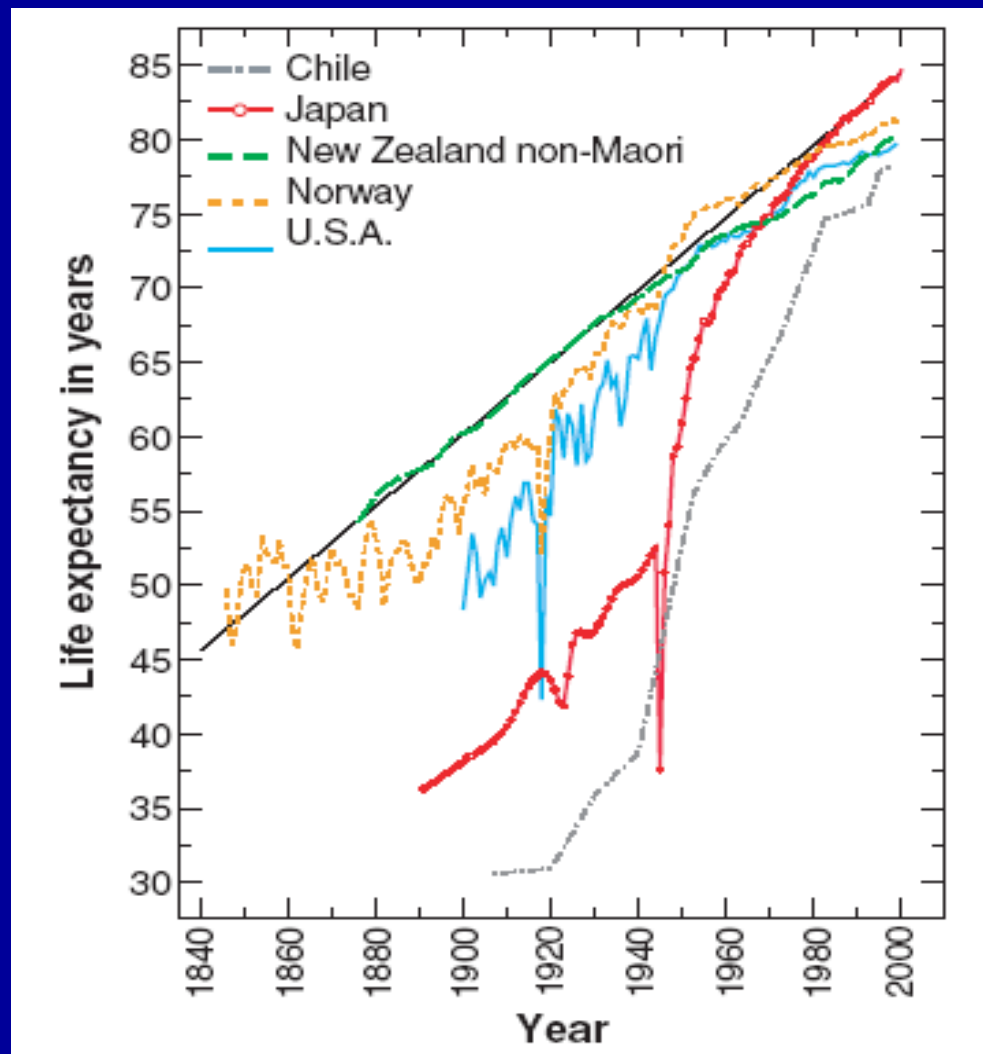


Hormones?
荷爾蒙？

No good evidence for any of these
以上方法並沒有證據支持

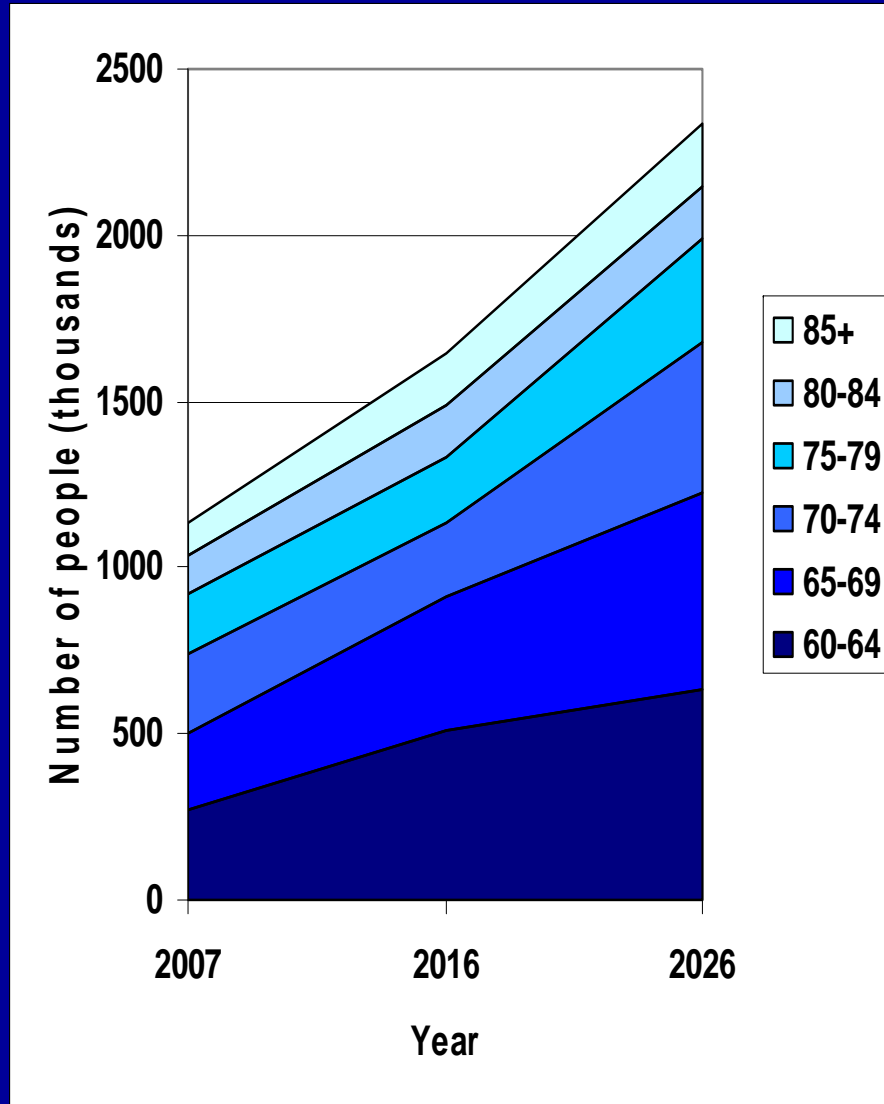
Female life expectancy in selected countries compared with trend in record life expectancy

不同年代、不同國家的女性生命壽數之比較



Projected numbers >60 years 2007-2026 Hong Kong

香港2007-2026年預計達60歲以上的人數



Percent population
over 60 years old
(達60歲以上的人數百分比)

2007 16%

2016 22%

2026 29%

Healthy life expectancy determined by a relatively limited number of chronic conditions

生命壽歲受不同的健康情況影響

Cardiovascular diseases

心臟血管病

stroke中風, heart disease心臟病

Cancer癌症

breast乳癌, colon大腸癌,
prostate前列腺癌, lung肺癌

Neurological conditions

神經系統情況

Dementia老人痴呆,

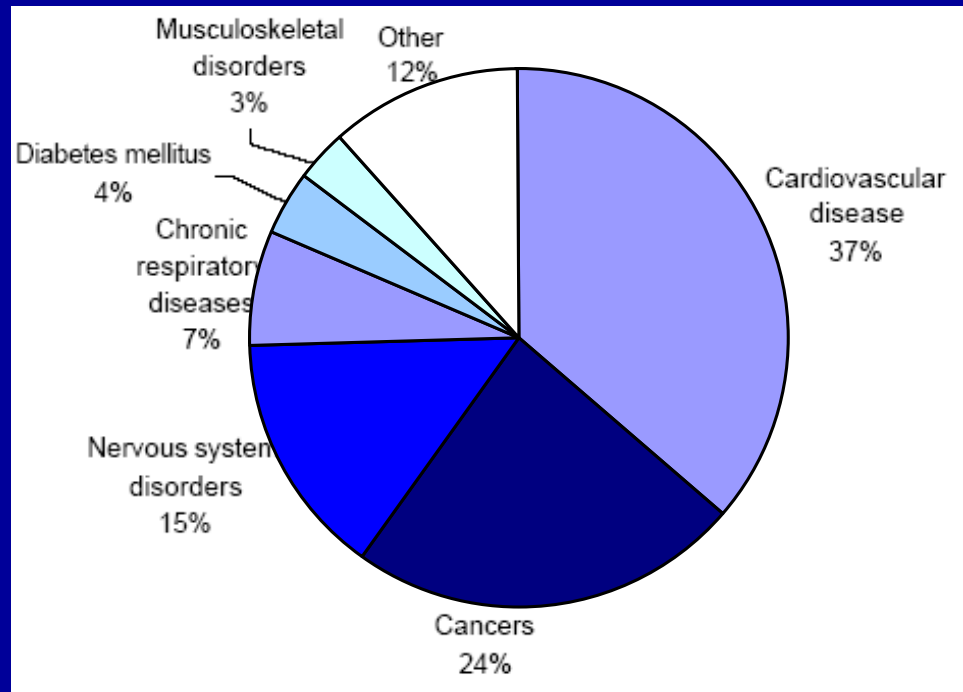
Blindness失明, hearing loss失聰

Respiratory diseases呼吸系統疾病

Musculoskeletal disorders

骨骼/肌肉異常

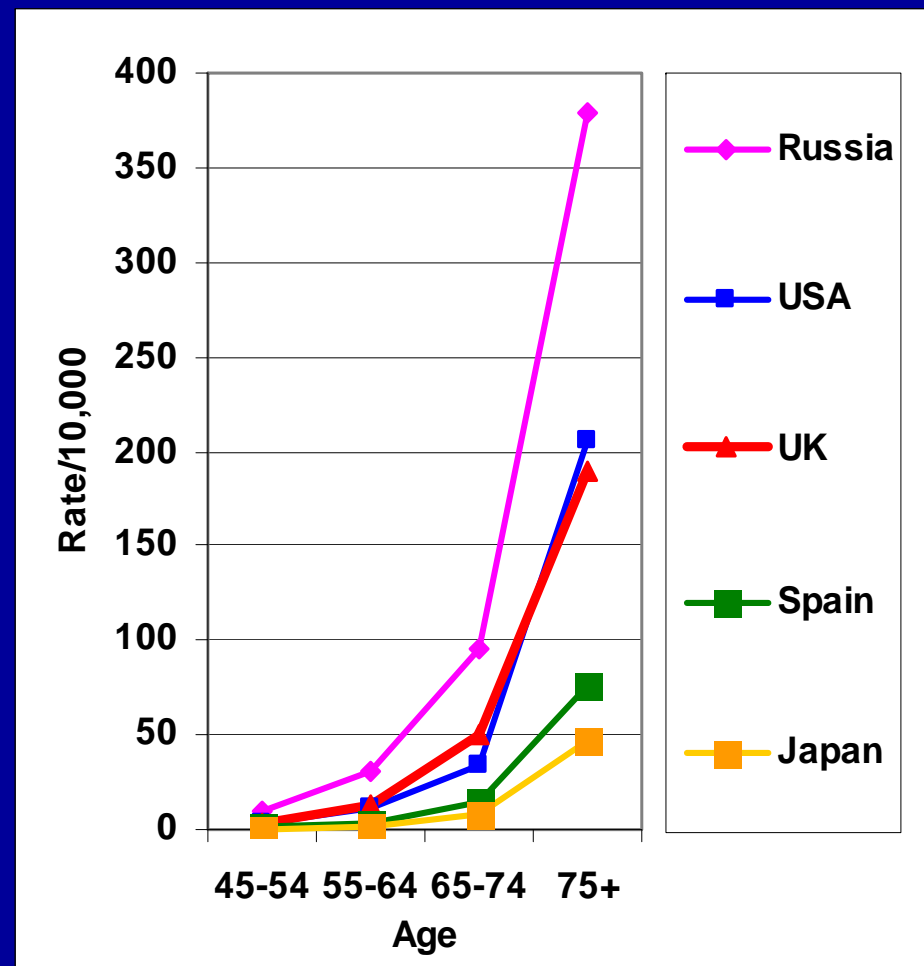
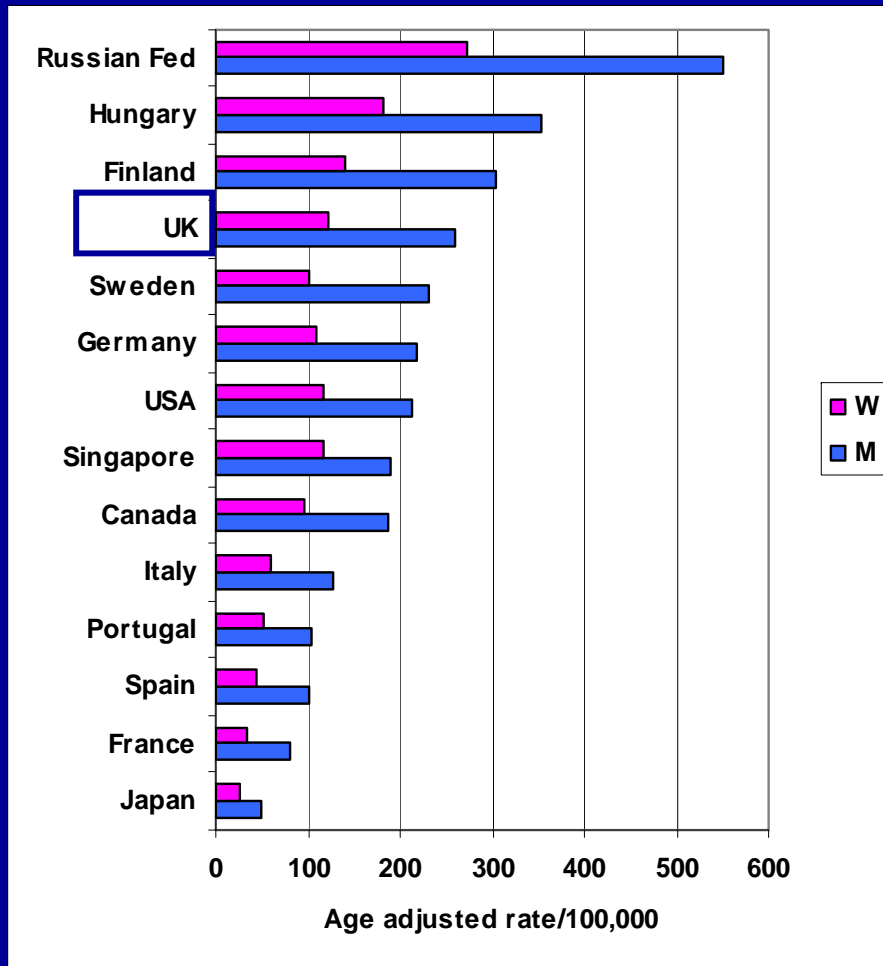
Osteoporotic fractures骨折,
arthritis風濕病, frailty脆弱



Main causes of disease burden >65 yrs
65歲以上人士主要疾病種類

International variation in coronary heart disease and rates with age in women selected countries

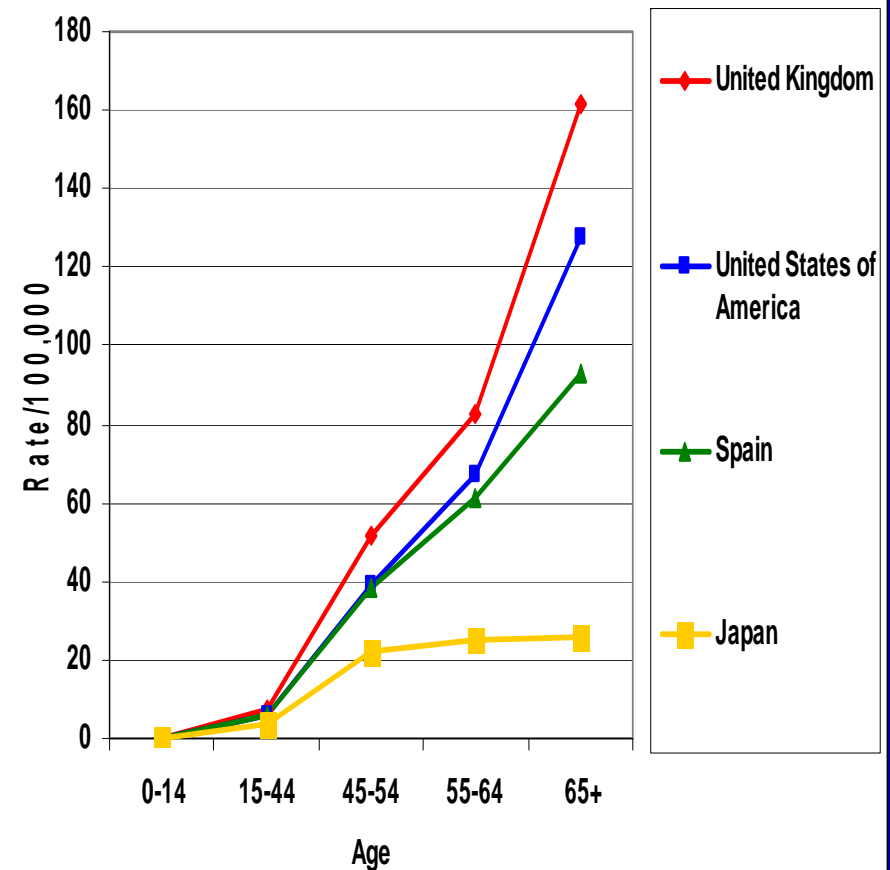
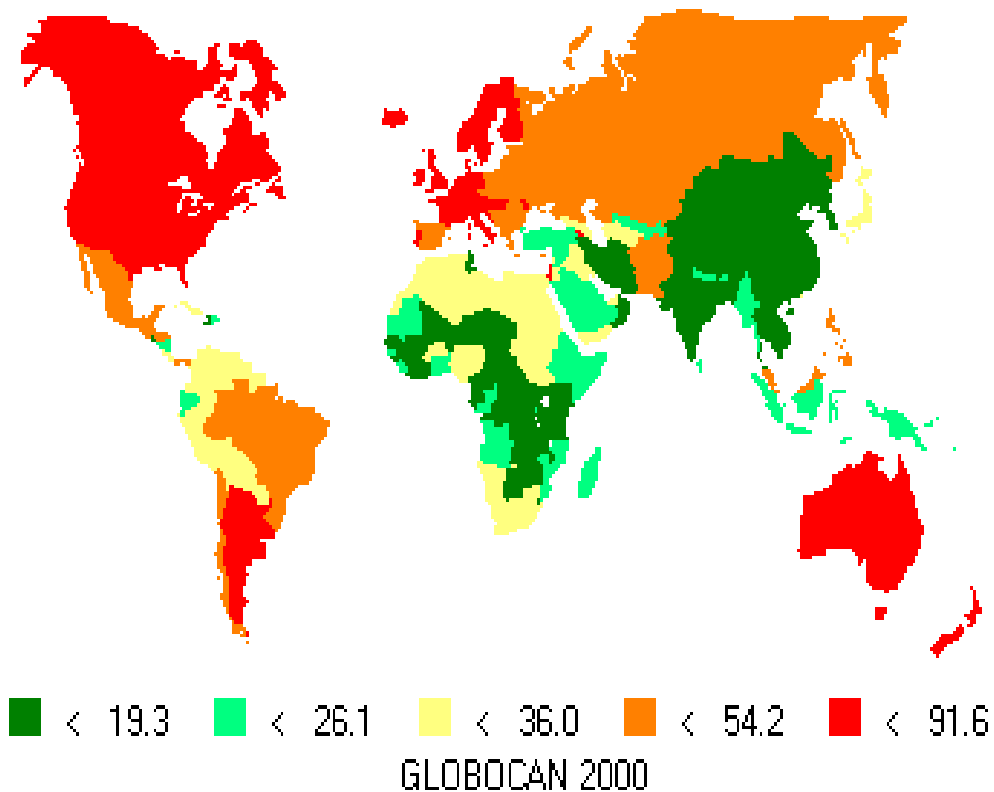
不同國家冠心病情況比較 及 冠心病與年齡的關係



International variation in breast cancer incidence and mortality rates by age in selected countries

不同國家乳癌情況比較 及 乳癌與年齡關係

Incidence of Breast cancer: ASR (World) (All ages)



International variations, time trends, migration studies suggest the major determinants of healthy ageing are environmental

環境是影響老年健康的最主要因素

Large body of evidence suggests lifestyle factors: diet, physical activity, smoking have a major impact

大量報告證明飲食、運動、吸煙對於健康有重大影響

EPIC*-Norfolk population study

歐洲癌症前瞻性調查--英國羅福城市研究



Aims: to identify major determinants of health in middle and later life

目的：研究生活模式與生理因素如何影響長者健康

30,000 men and women 40-79 years living in Norfolk, United Kingdom
(30000名年齡40-79歲居住英國羅福市的成年人)

First seen 1993-1997

Extensive lifestyle and biologic information

Followed up for health to present

(由93-97年招募，跟蹤至今，收集了大量生活模式與生理情況的資料)

* Part of European Prospective Investigation into Cancer:
a 10 country collaboration with 500,000 participants

What influences the rate of age-related changes in health and disability ?

什麼因素影響身體健康及殘缺的速度？

Disease/disability

疾病/殘缺

e.g. stroke 中風, Fractures 斷骨, Dementia 老人癡呆, cancer 癌症



Physiological risk factors

生理情況

e.g. lung function 肺功能, bone quality 骨骼質素, immune function 免疫功能, blood vessel function 血管功能



Exposure

影響因素

{ Genetic 遺傳
Environmental 環境

e.g. diet 飲食, stress 壓力, physical activity 體能活動, Infection 感染, smoking 吸煙

**Predictors of 1) subjective health
2) objective health (mortality) in men and
women aged 45-79 years**

影響45-79歲成年人健康的主觀及客觀因素

Good lung function 良好肺功能

Low pulse rate 低脈搏率

Good bone health 良好骨骼健康

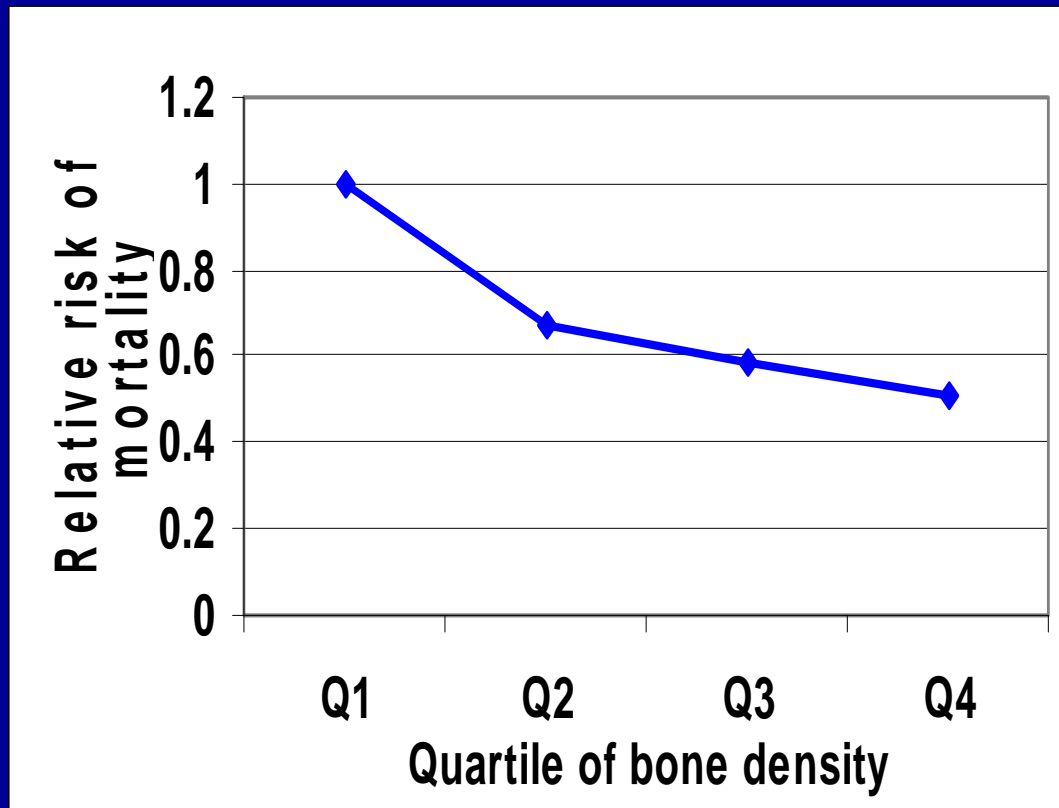
Lower blood glucose levels 較低血糖水平

Low levels of inflammation 少感染

(Good muscle strength) 良好肌肉能量

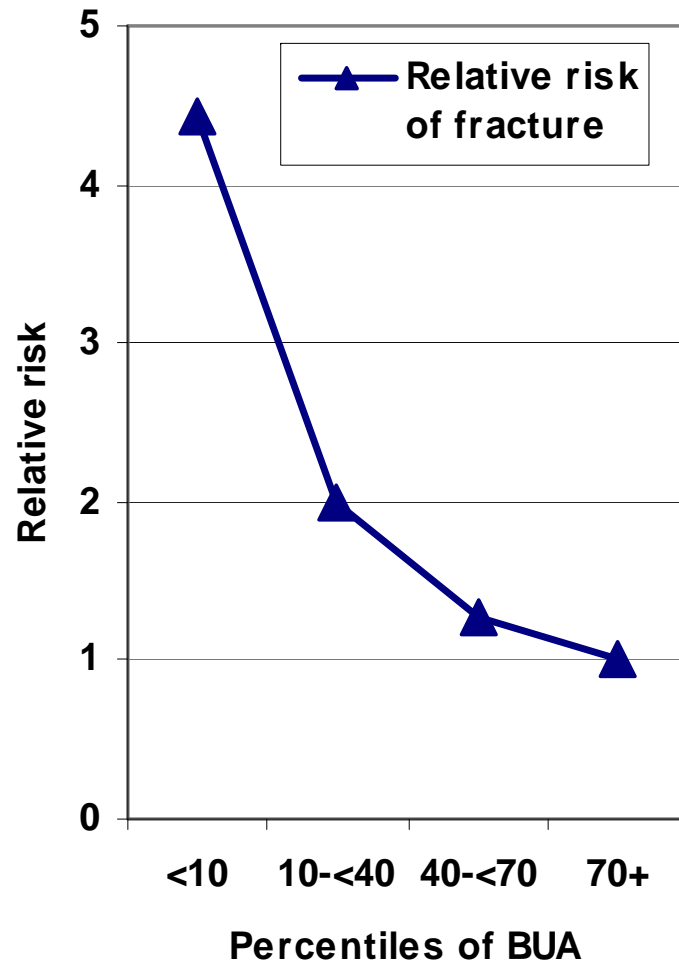
Women with stronger bones have lower death rates and live longer

較好骨骼健康的婦女死亡率較低及較長壽



Men and women with stronger bones are less likely to have fractures

較好骨骼健康的人士較少出現骨折



Khaw et al Lancet 2004

As we age, many of our usual functions decline
隨著年齡增加，身體機能漸漸退化，

What are the factors that can influence this decline?

什麼因素影響退化速度？

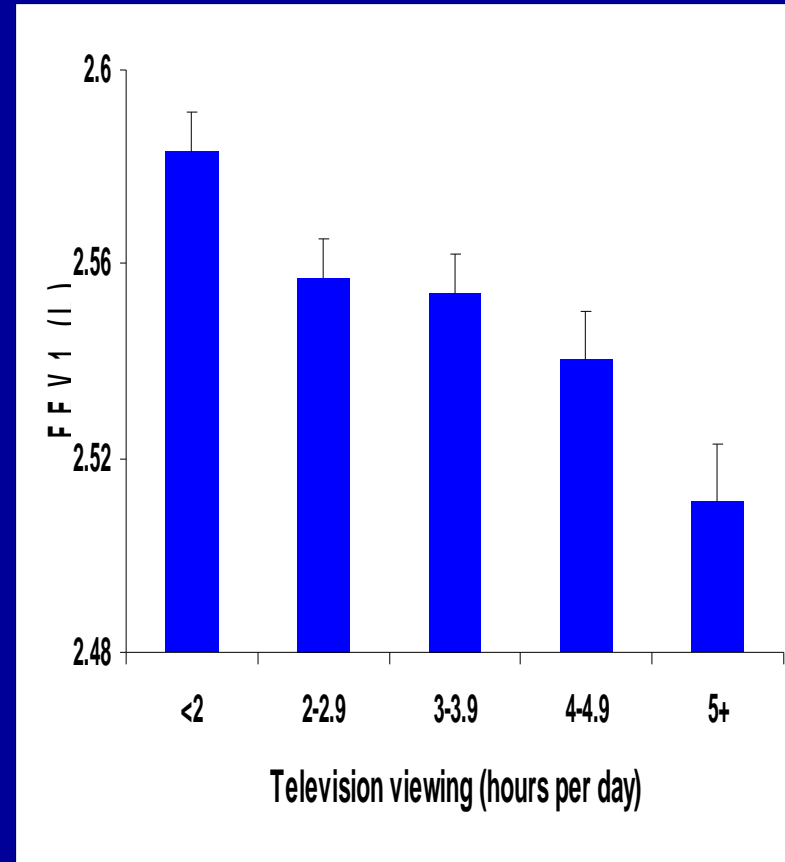
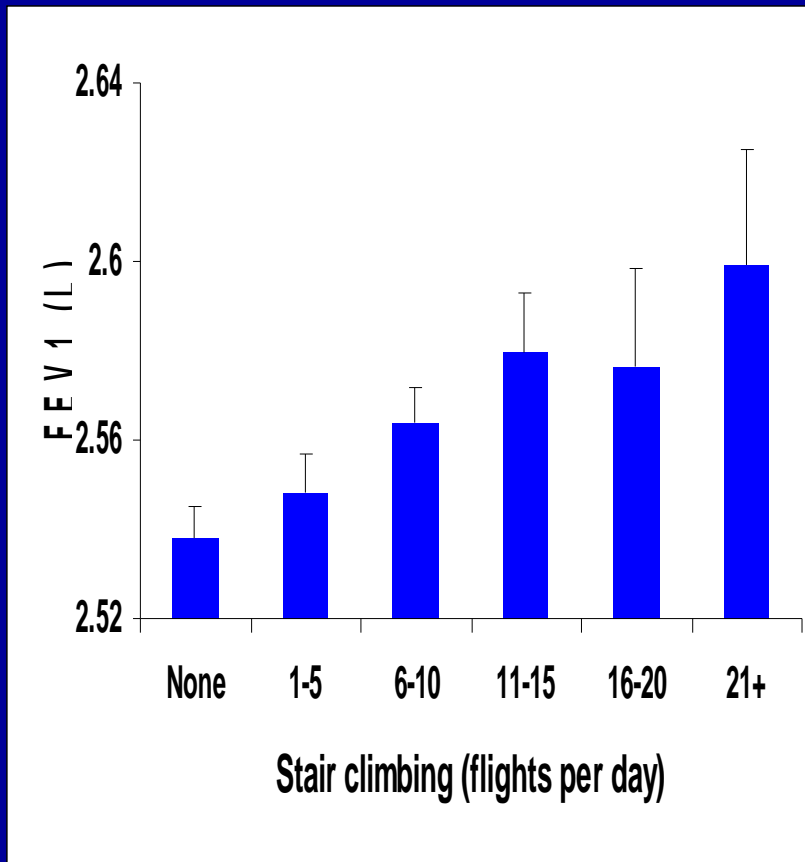
Physical activity 體能活動

Diet 飲食

Smoking 吸煙

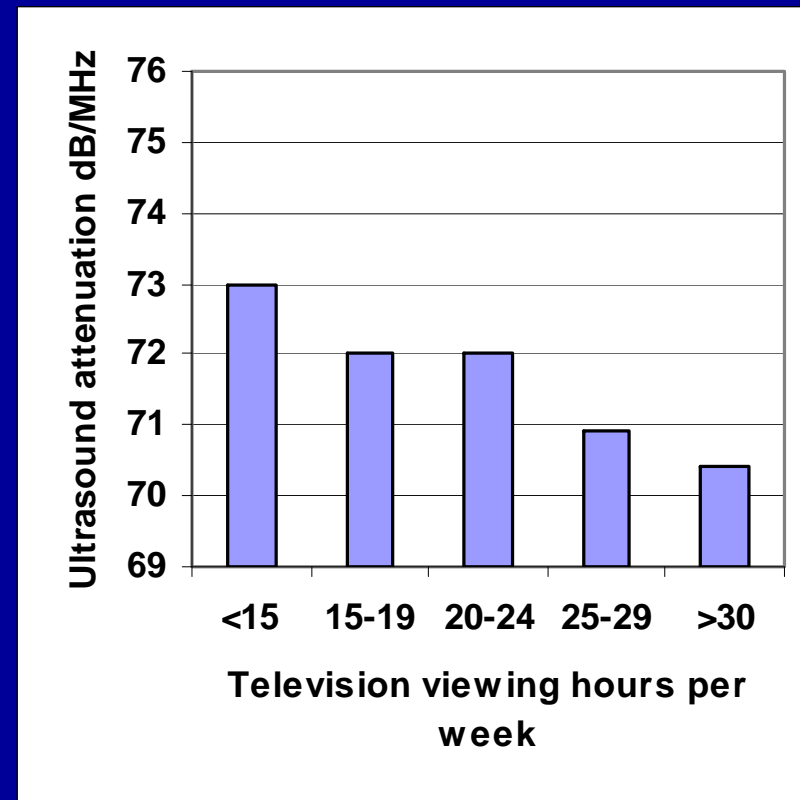
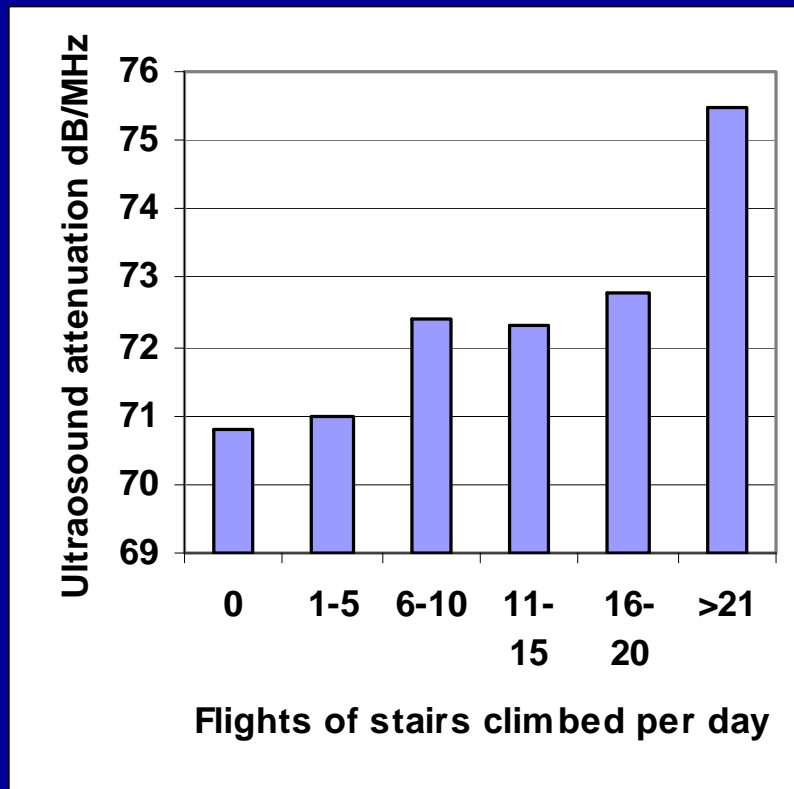
Stress 壓力

E.g. PHYSICAL ACTIVITY? 體能活動
Better lung function in men and women with
who have more moderate physical activity
活動較多的人士有較好的肺功能



Better bone health in men and women who have more physical activity

活動較多的人士有較好的骨骼健康

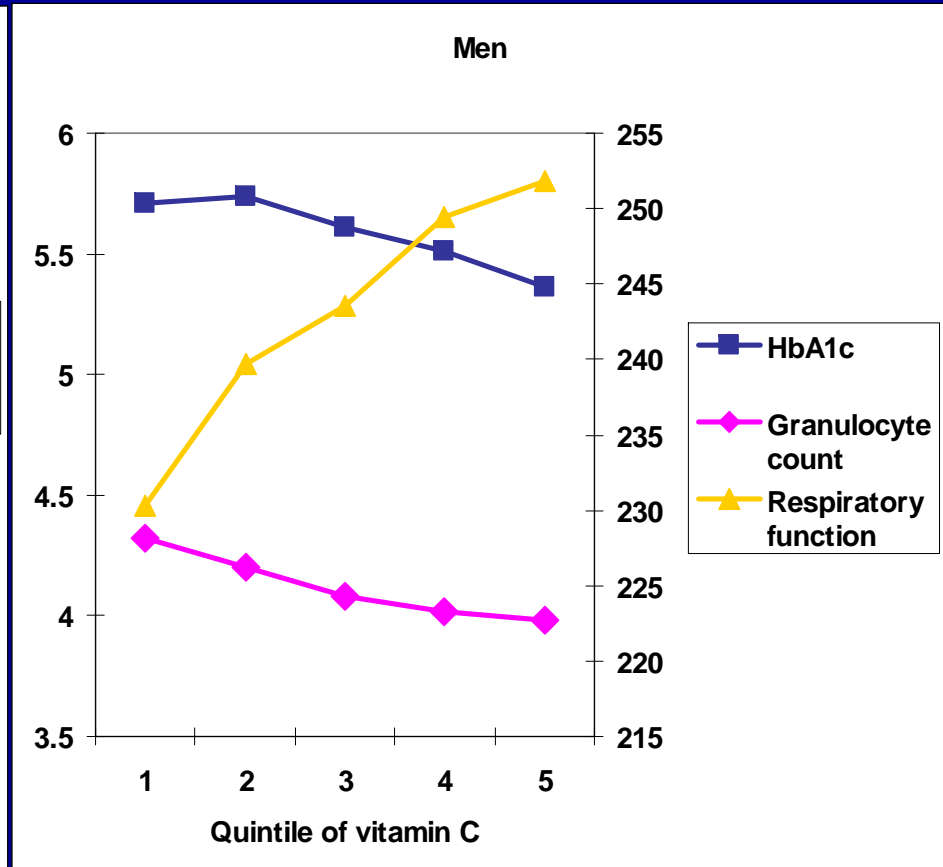
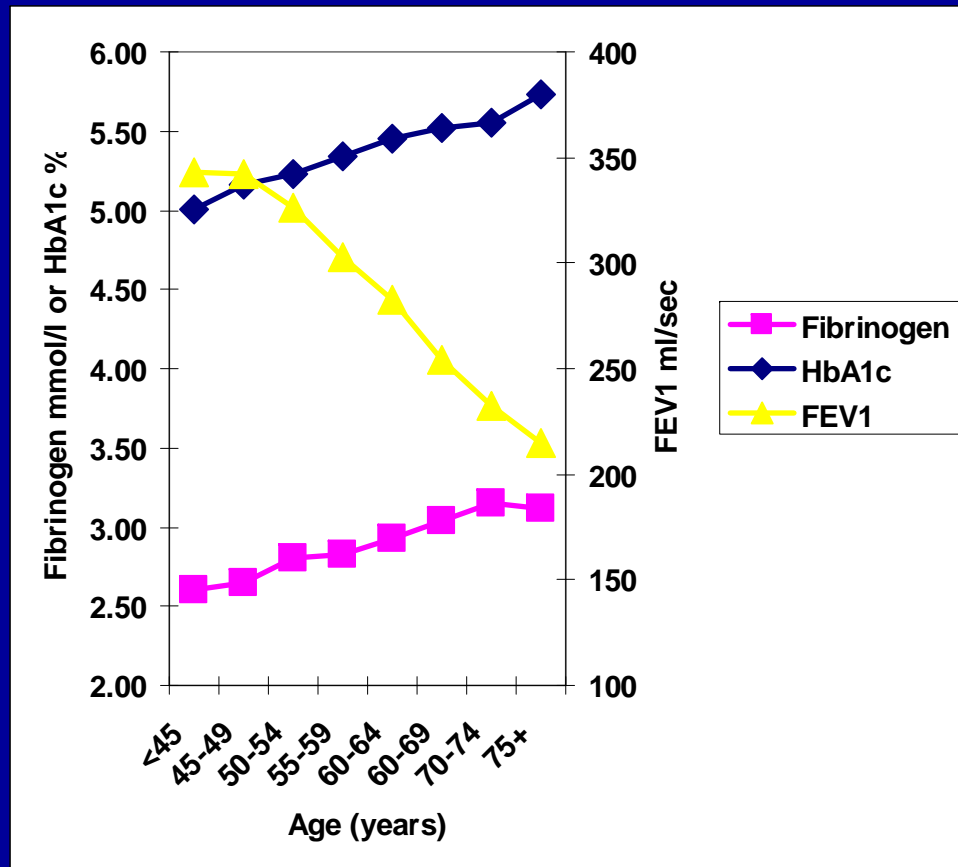


Jakes et al BMJ 2001

E.g. DIET? 飲食

Better lung function, blood glucose and lower inflammation in those who have a higher fruit and vegetable intake

多吃水果蔬菜的人士有較好的肺功能、血糖水平及較少感染

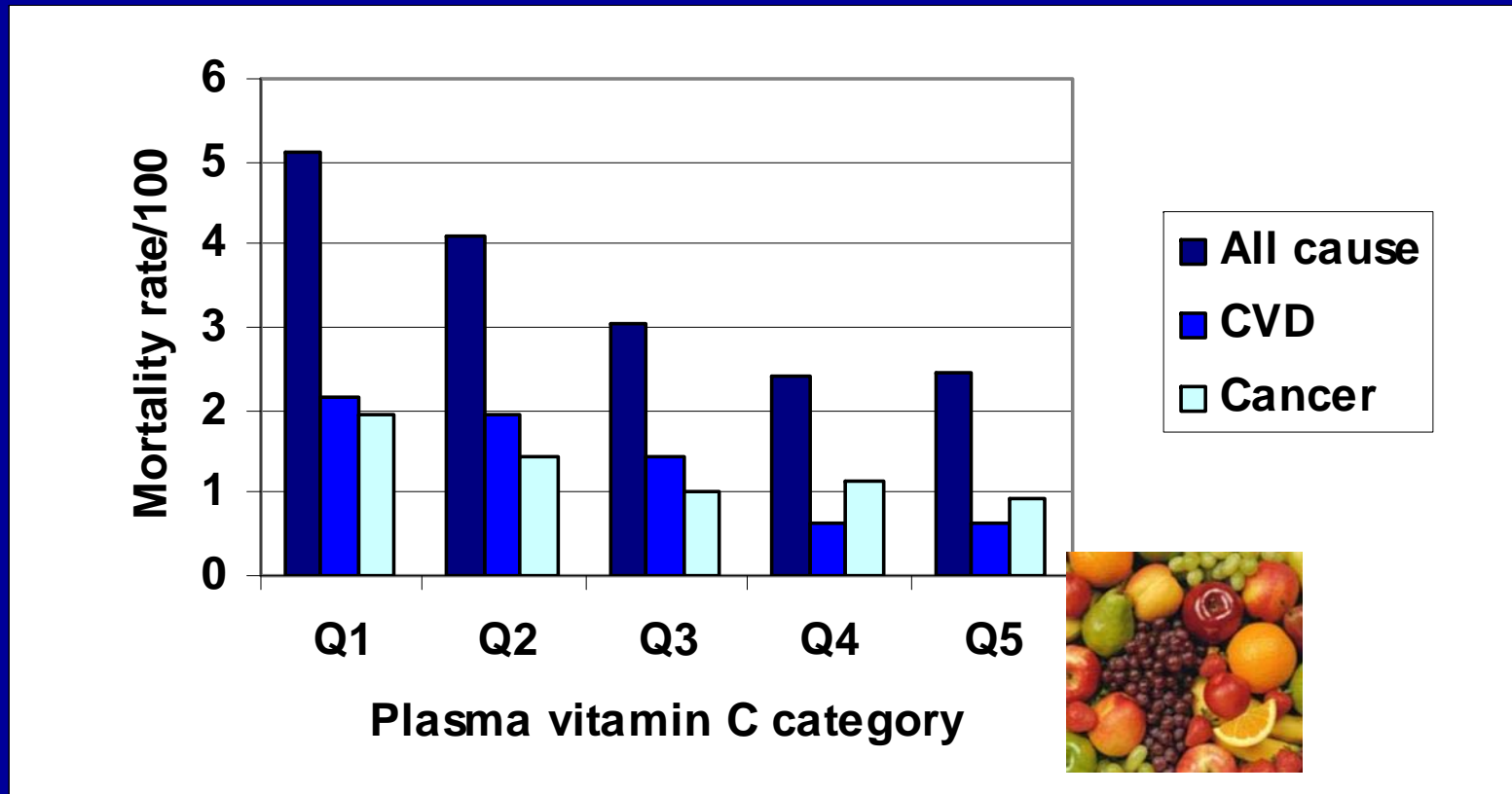


Ness 1998, Sargeant 2001

Diet? 飲食

Lower death rates from any cause, cancer and cardiovascular diseases in those with higher fruit and vegetable intake

多吃水果蔬菜的人士的死亡率較低、較少死於癌症及心臟血管病

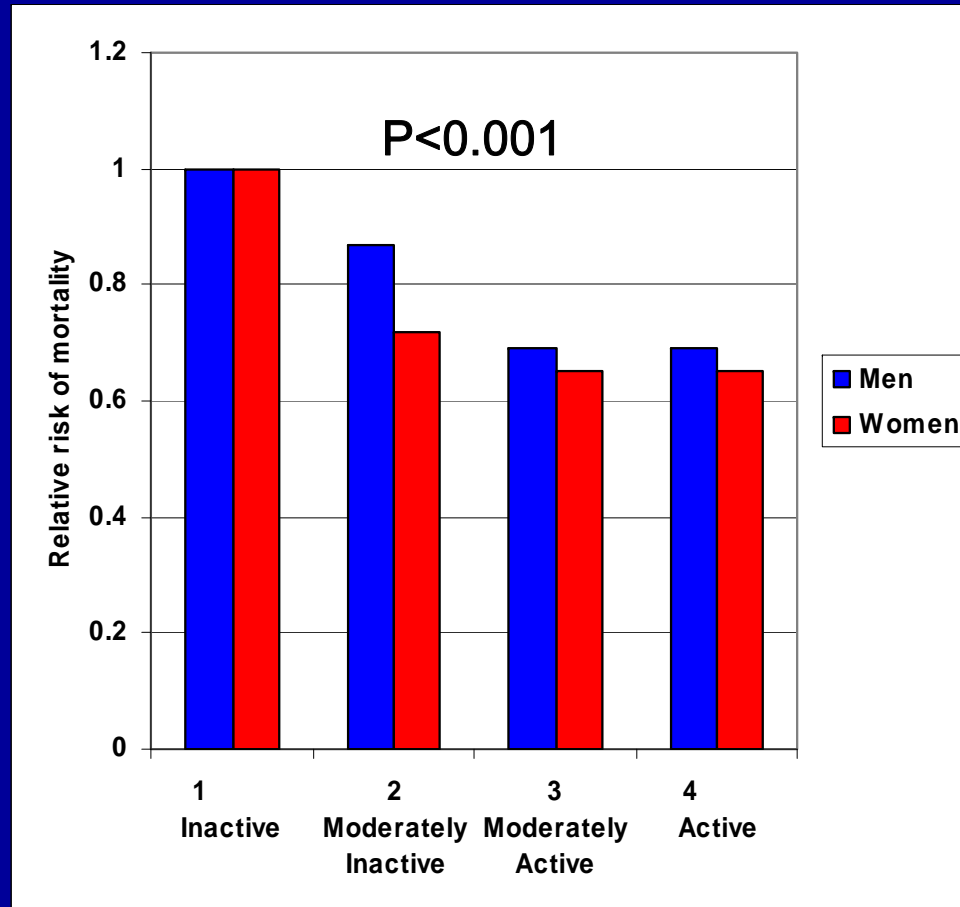


Increase in intake 50g/day fruit/vegetables 每日多吃50克水果/蔬菜
associated with 20% lower mortality 死亡風險可調低20個百分比

Physical activity? 體能活動

Lower deaths rates in people who are physically active

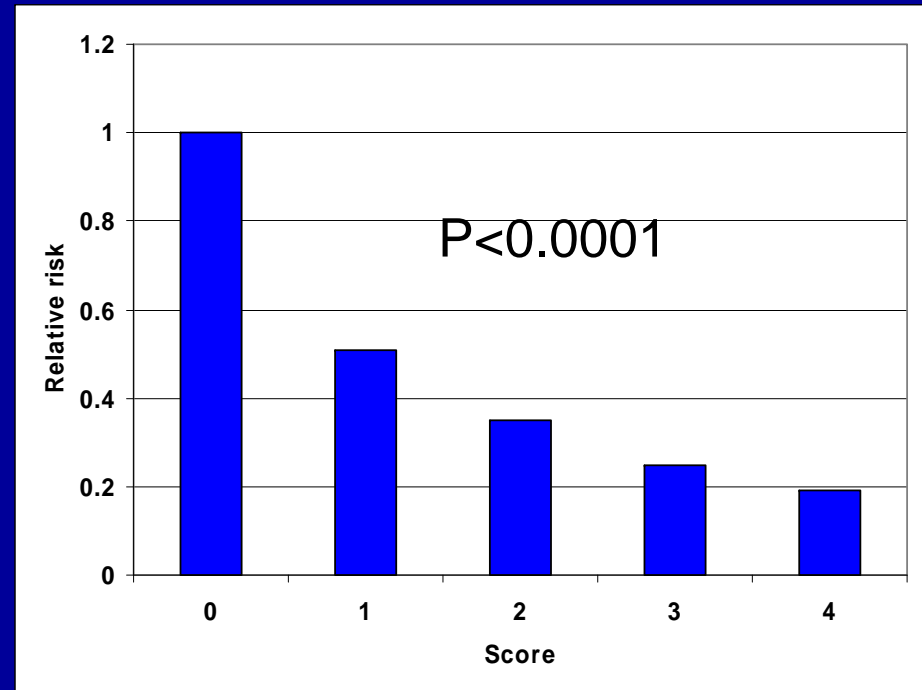
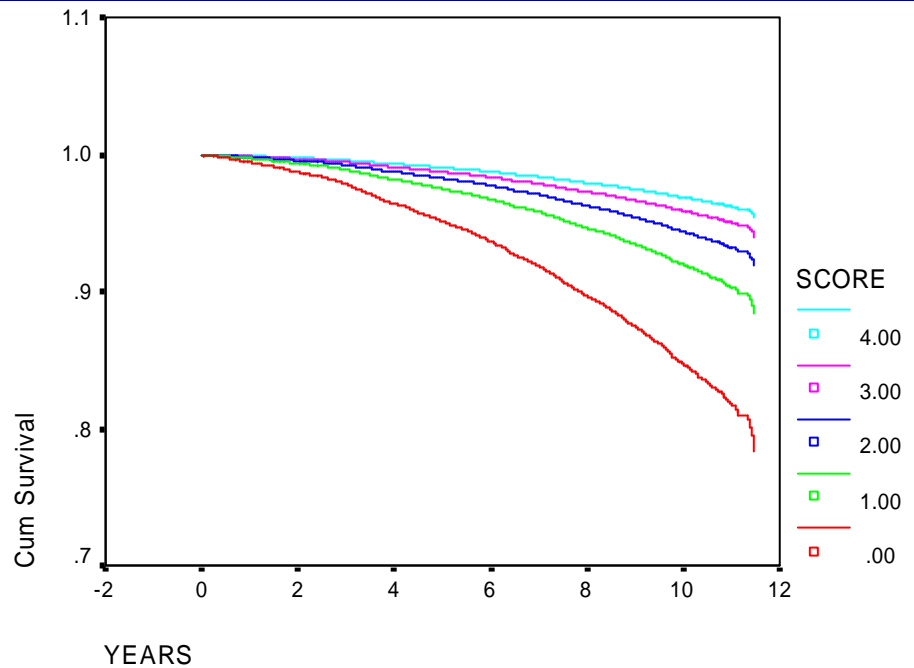
活動較多的人士的死亡率較低



*adjusted BMI, LDL-C, HDL-C, SBP, diabetes, smoking, social class

Four simple health behaviours associated with major differences in longevity in men and women aged 40-79 years

四個與長壽有關的因素



Score 0-4

Equivalent 14 years

- 1 Non smoker 不吸煙者
- 1 Alcohol >0 <21 units/wk 每週飲少於21單位的酒
- 1 Not inactive 保持活動
- 1 Blood vitamin C >60 mmol/l
血維他命C水平超過60毫摩/升
(5 servings fruit and vegetable daily)
(每日5份水果蔬菜)



如何可以
快樂地活
到100歲？

Possible interventions 可能的方法

Reduce damage
減少身體損壞

smoking 吸煙
pollution 污染
infection 感染

lung function 肺功能
cardiovascular
disease 心臟血管病,
cancer 癌症

Increase
protection
and repair
強化身體及修護功能

adequate nutrition
fruit, vegetables
vitamins, minerals
足夠營養、食水果蔬菜、
維他命/礦物質

heart disease 心臟病,
cancer 癌症
bone health 骨骼健康

Prevent
disuse
避免退化

physical activity 體能活動
mental activity 精神活動
social activity 社交活動

bone health 骨骼健康
cognitive function
認知能力

Years to life

Life to years

Small changes make a big difference

Never too early or too late

雖然年歲漸長

只要把握時機

“小轉變”亦可以帶來“大不同”