Physical activity, wellbeing, health and economic benefits.

People Olympics.
1st dec 2014. Rome

Alain Belli. Laboratoire de Physiologie de l’Exercice. Université de Saint Etienne.
1) Effects of Physical Activity
- On mortality
- On chronic diseases

2) Health costs of inactivity
- Total health costs
- Inactivity costs

3) Economic benefits of physical activity
1) Effects of Physical Activity
Liisa Byberg et al. 35 year follow-up of population based cohort. BMJ 2009
Physical activity reduces the risk of premature mortality in general and in following chronic diseases in particular:

- Cardiovascular diseases and hypertension
- Colon cancer (+ breast, prostate, uterine, lung)
- Diabetes (type 2)
- Metabolic syndrome, obesity
- Osteoarthritis

Physical activity also improves:
- Mental health
- Health of muscles, bones and joints

Possible adverse effects:
- Musculo-skeletal injuries
- Serious cardio-vascular events
cardiac output

physical activity

cerebral blood flow

Neuro-Vascular Unit (UNV)

neurons

astrocytes microglia

endothelial cells

shear stress on cerebral endothelium
Effect of training on elderly people.
St Etienne. 2003

Force increase from +32% to +83%!
2) Health costs
Healthcare Spending as % GDP

OECD : 2008

E.U. : 7% to 11%
Gross Domestic Product

Note: For countries not reporting 2006 data, data from previous years is substituted.
## Total health costs

<table>
<thead>
<tr>
<th>Country</th>
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<th>France</th>
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<th>EU</th>
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</thead>
<tbody>
<tr>
<td>Healthcare ($/capita)</td>
<td>4 500</td>
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<td>8 500</td>
</tr>
<tr>
<td>Population (M)</td>
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<tr>
<td>Total (M$)</td>
<td>360 000</td>
<td>272 000</td>
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<td>1 750 000</td>
<td>2 720 000</td>
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</table>
3) Economic benefits of Physical Activity
Physical inactivity health costs

2.5% of total health costs


2.4%. Colditz G.A., Economic Costs of Obesity and Inactivity. Medicine and Science in Sports and Exercise, 1999. USA
22% of cardiovascular heart disease, 22% of colon cancer, 22% of osteoporotic fractures, 12% of diabetes and hypertension, and 5% of breast cancer, + 7% obesity (BMI >30)

Relative risks of death with various risk factors (COPD chronic obstructive pulmonary disease, BMI $\geq 30$, TC $\geq 5.70$ mmol/L total cholesterol level). Myers et al. 2002 (N Engl J Med).

Each 1-MET increase/day conferred a 12% improvement in survival.
METS : Metabolic Equivalents
(in proportion of resting energy expenditure)

1 Hour Exercise :
Walking 4.5 km/h : 3 METS
Running 10 km/h : 10 METS
Running 15 km/h : 15 METS

1 Hour Activity :
Washing floor : 3 METS
Ironing : 2 METS
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<tr>
<td>Inactivity Costs (M$)</td>
<td>9 000</td>
<td>6 800</td>
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<5 METS
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<td>20% new active (M$)</td>
<td>4 500</td>
<td>3 400</td>
<td>2 712</td>
<td>21 825</td>
<td>34 000</td>
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<tr>
<td>5 % new active (M$)</td>
<td>1 125</td>
<td>3 400</td>
<td>2 712</td>
<td>5 456</td>
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In Europe, Gain per re-active person / year = 219 $
(219 $ = 0.025 x 3500 / 0.4)

People olympics :
1 000 people = 0.2 M$ / year
10 000 people = 2.2 M$ / year
- 2.5 % Health Costs
+ Working days (+2,5%)
+ Happiness, Well being
+ Innovation, Creativity
Conclusion

Promoting physical activity in people, especially among people with increased risks, or who manifest poor health associated with physical inactivity can be regarded as very cost-effective.