



## Körperliche Inaktivität und häufigste Erkrankungen

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## Types of evidence for Public Health

### Type I evidence

Disease ← risk factor (e.g. physical inactivity)  
“Why should something be done?”

### Type II evidence

Intervention → prevalence of risk factor  
“What should be done?”

Cavill et al 2005, adapted from Brownson et al 1999

## Körperliche Inaktivität und häufigste Erkrankungen

- Bewegung und Gesundheit bei Erwachsenen
- Empfehlungen für Erwachsene
- Die Situation bei Kindern
- Was wissen wir heute über die Dosis-Wirkungskurve?



„Bewegung und Gesundheit.  
Ein Bericht des  
(US-amerikanischen)  
Surgeon General“

300 Seiten

CDC. Physical activity and health: a report of the Surgeon General. Atlanta (GA), US Department of Health and Human Services, Centers for Disease Control and Prevention, 1996.

[www.cdc.gov/nccdphp/sgr/sgr.htm](http://www.cdc.gov/nccdphp/sgr/sgr.htm)

## Erste erwähnte Studien im Surgeon General's Report

### Bewegung und Herz-Kreislauf-Krankheiten

Morris JN, Heady JA, Raffle PAB, Roberts CG, Parks JW. Coronary heart disease and physical activity of work. Lancet 1953;2:1111–1120.

### Bewegung und Krebs

Polednak AP. College athletes, body size, and cancer mortality. Cancer 1976;38:382–387.

CDC. Physical activity and health: a report of the Surgeon General. Atlanta (GA), US Department of Health and Human Services, Centers for Disease Control and Prevention, 1996.

„Bericht des beratenden Komitees zu den Bewegungsempfehlungen“ (-> USA und WHO)

683 Seiten

Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, DC: U.S. Department of Health and Human Services, 2008.

[www.health.gov/paguidelines](http://www.health.gov/paguidelines)

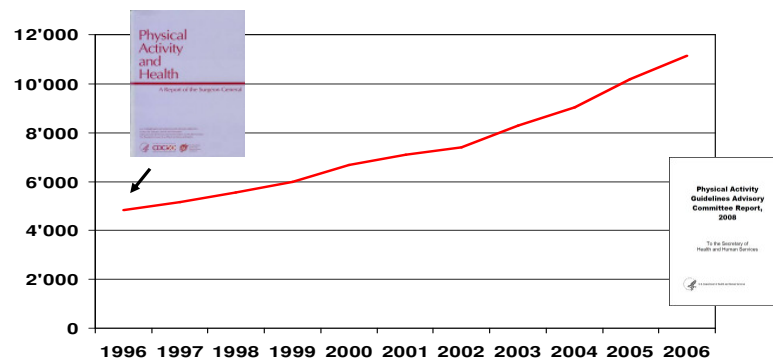
### **Physical Activity Guidelines Advisory Committee Report, 2008**

To the Secretary of Health and Human Services



## Wissenschaftliche Publikationen mit Bezug zum Thema „Bewegung“ in der Datenbank Pubmed

MeSH terms „physical activity“ OR „exercise“ OR „sport“ OR „sports“



www.pubmed.org, 22.08.2007

## Overall Benefits of Physical Activity on Health

### **Physical Activity Guidelines Advisory Committee Report, 2008**

To the Secretary of Health and Human Services



„Very strong scientific evidence based on a wide range of well-conducted studies shows that physically active people have higher levels of health-related fitness, a lower risk profile for developing a number of disabling medical conditions, and lower rates of various chronic diseases than do people who are inactive.“

## Health benefits of physical activity in adults

- |                                  |                          |
|----------------------------------|--------------------------|
| ↑ Life expectancy                | ↓ Coronary heart disease |
| ↑ Cardiorespiratory fitness      | ↓ High blood pressure    |
| ↑ Muscular fitness               | ↓ Stroke                 |
| ↑ Healthy body mass              | ↓ Diabetes type II       |
| ↑ Healthy body composition       | ↓ Metabolic syndrome     |
| ↑ Bone health                    | ↓ Colon cancer           |
| ↑ Sleep quality                  | ↓ Breast cancer          |
| ↑ Health-related quality of life | ↓ Depression             |

Additionally in older adults:

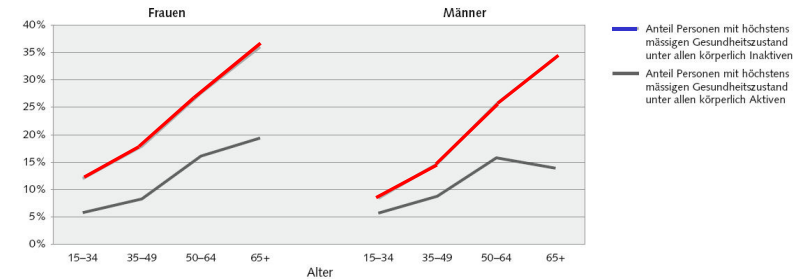
- |                      |                   |
|----------------------|-------------------|
| ↑ Functional health  | ↓ Risk of falling |
| ↑ Cognitive function |                   |

↑ **strong evidence**  
 ↑ **modest evidence**

Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, DC: U.S. Department of Health and Human Services, 2008.

## Bewegung und Gesundheit in der Schweizerischen Gesundheitsbefragung 2002

Anteile der Frauen und Männer mit höchstens mittelmässigem Gesundheitszustand unter den körperlich Aktiven und den Inaktiven, nach Alter G 13



Quelle: BFS, Schweizerische Gesundheitsbefragung 2002, n=18'715. Prozent der Antworten «mittelmässig», «schlecht» und «sehr schlecht» auf die Frage: «Wie geht es Ihnen zur Zeit gesundheitlich?».

© Bundesamt für Statistik (BFS)

Lamprecht M, Stamm HP. Bewegung, Sport, Gesundheit. Fakten und Trends aus den Schweizerischen Gesundheitsbefragungen 1992, 1997, 2002. StatSanté, Resultate zu den Gesundheitsstatistiken in der Schweiz, 1/2006.

## The INTERHEART Study

Effect of potentially modifiable risk factors associated with myocardial infarction in 51 countries: case-control study (n=15'152+14'820)

Risk factor	Sex	Control (%)	Case (%)	Odds ratio (99% CI)
Exercise	F	16.5	9.3	0.48 (0.39-0.59)
	M	20.3	15.8	0.77 (0.69-0.85)

Lancet 2004; 364: 937-52

## The Harvard Alumni Health Study

Harvard University freshmen 1916-1950  
 (16'936 male participants)

Measurement of predictors

- Questionnaire 1962 or 1966
- Questionnaire 1977
- Questionnaire 1988

Measurement of outcomes

- continuous registration of deaths since 1962 or 1966 (1'413 deaths)

## The Harvard Alumni Health Study

### Results 1986

Physical activity 1962/66 [kcal per week]	Relative risk of death
<2000	1.00
>=2000	0.72

N Engl J Med 1986; 314: 605-13

## The Harvard Alumni Health Study

### Results 1986

Physical activity 1962/66 [kcal per week]	Relative risk of death
<500	1.00
500-999	0.78
1000-1499	0.73
1500-1999	0.63
2000-2499	0.62
2500-2999	0.52
3000-3499	0.46
>=3500	0.62

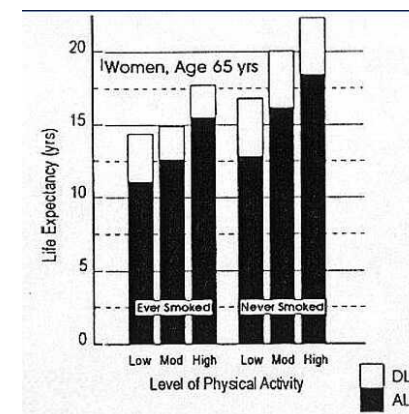
N Engl J Med 1986; 314: 605-13

### Active and disabled life expectancy according to physical activity

The effect of smoking and physical activity on active and disabled life expectancy was estimated using data from the Established Populations for Epidemiologic Studies of the Elderly (EPESE). Population-based samples of persons aged > or = 65 years from the East Boston, Massachusetts, New Haven, Connecticut, and Iowa sites of the EPESE were assessed at baseline between 1981 and 1983 and followed for mortality and disability over six annual follow-ups. A total of 8,604 persons without disability at baseline were classified as "ever" or "never" smokers and doing "low," "moderate," or "high" level physical activity.

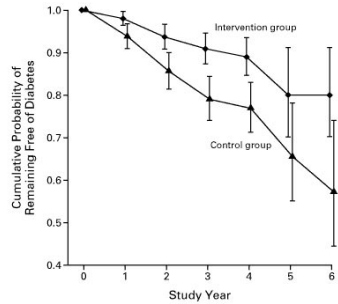
Ferrucci L et al. Smoking, physical activity, and active life expectancy. Am J Epidemiol 1999; 14: 645-653

### Active and disabled life expectancy according to physical activity



Ferrucci L et al. Smoking, physical activity, and active life expectancy. Am J Epidemiol 1999; 14: 645-653

### Tuomilehto J et al. Prevention of Type 2 Diabetes Mellitus by Changes in Lifestyle among Subjects with Impaired Glucose Tolerance



**Figure 1. Proportion of Subjects without Diabetes during the Trial.**

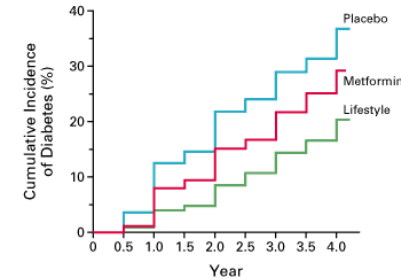
The vertical bars show the 95 percent confidence intervals for the cumulative probability of remaining free of diabetes. The relative risk of diabetes for subjects in the intervention group, as compared with those in the control group, was 0.4 (P<0.001 for the comparison between the groups).

SUBJECTS AT RISK

Total no.	507	471	374	167	53	27
Cumulative no. with diabetes:						
Intervention group	5	16	22	24	27	27
Control group	16	37	51	53	57	59

N Engl J Med 2001; 344 (18): 1343-1350

### Diabetes Prevention Program Research Group. Reduction in the Incidence of Type 2 Diabetes with Lifestyle Intervention or Metformin

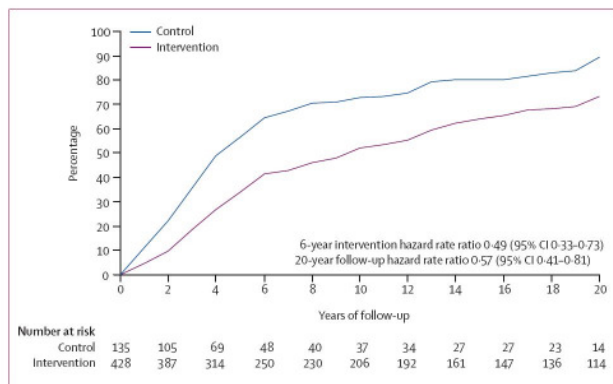


N Engl J Med 2002; 346 (6): 393-403

**Figure 2. Cumulative Incidence of Diabetes According to Study Group.**

The diagnosis of diabetes was based on the criteria of the American Diabetes Association.<sup>11</sup> The incidence of diabetes differed significantly among the three groups (P<0.001 for each comparison).

### The long-term effect of lifestyle interventions to prevent diabetes: a 20-year follow-up study



Guangwei L et al. Lancet 2008; 371: 1783-89

Figure 2: Cumulative incidence of diabetes mellitus during follow-up in China Da Qing Diabetes Prevention Outcome Study

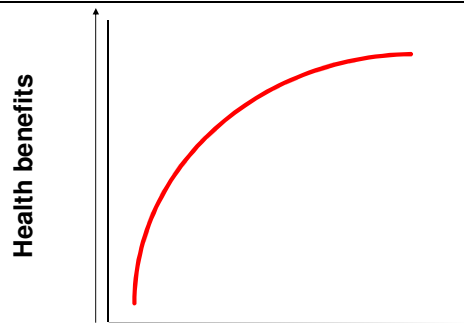
### Pattern of Physical Activity and Health 1/2

- ↑ • “The dose-response curves for the major health benefits clearly indicate an inverse relation between the dose of activity and rate of disease.”
- ↑ • “Although the minimum amount of activity needed to produce a benefit cannot be stated with certainty, nothing would suggest a threshold below which there are no benefits.”
- ↑ • “Reasonably strong evidence demonstrates that participating in moderate to vigorous physical activity for more than 150 minutes per week is associated with greater health benefits for a variety of health outcomes (...). However, in a number of studies where such a dose response is observed (...), the relation appears to be curvilinear.
- ↑ This means that the absolute increase in benefits becomes less and less for any given increase in the amount of physical activity.”

↑ **strong evidence**  
 ↑ **modest evidence**

Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, DC: U.S. Department of Health and Human Services, 2008.

## Dose-response relationship for physical activity and health



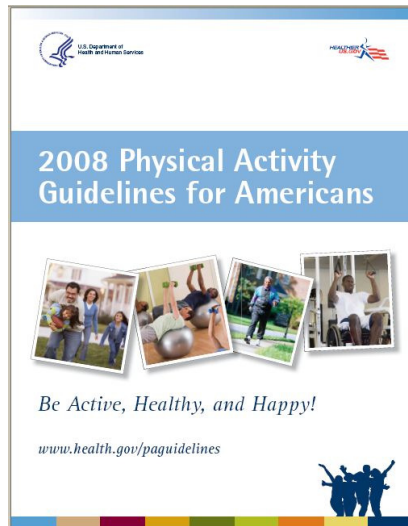
Adapted from Haskell, 1994

## Pattern of Physical Activity and Health 2/2

- ↑ • “Strong evidence indicates that an increase in intensity is associated with greater improvements for some health outcomes compared to those observed with moderate intensity activity (...). However, it should be noted that an increase in intensity was often associated with an increase in volume of activity for many observational and experimental studies, and it is difficult to separate the benefits of each.”
- ↑ • “Although the data are limited, the results suggest that for health and fitness benefits, the frequency of activity is much less important than the amount or intensity.”
- ↑ • “Some scientific evidence of moderate strength suggests that accumulating 30 or more minutes of moderate- to vigorous-intensity aerobic activity throughout the day in bouts of 10 minutes or longer produces improvements (...). Data on the effects of accumulating activity involving multiple short bouts (...) are very limited.”

↑ **strong evidence**  
 ↑ **modest evidence**

Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, DC: U.S. Department of Health and Human Services, 2008.

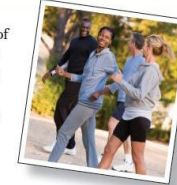


www.health.gov/paguidelines

## 2008 Physical activity guidelines for Americans

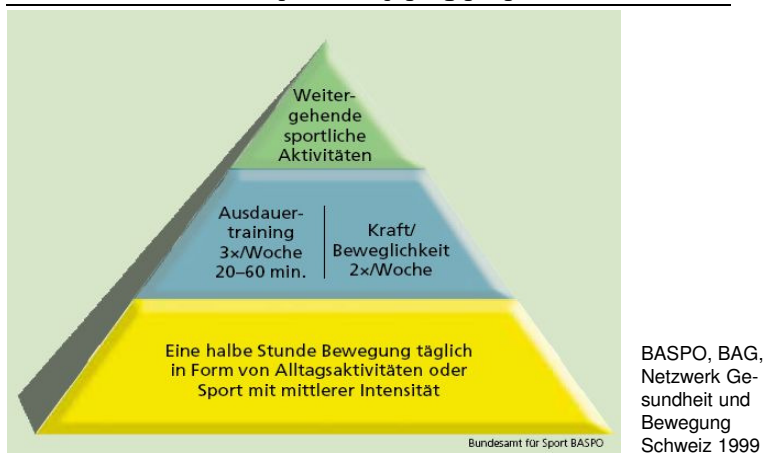
### Key Guidelines for Adults

- All adults should avoid inactivity. Some physical activity is better than none, and adults who participate in any amount of physical activity gain some health benefits.
  - For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Aerobic activity should be performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week.
  - For additional and more extensive health benefits, adults should increase their aerobic physical activity to 300 minutes (5 hours) a week of moderate-intensity, or 150 minutes a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity activity. Additional health benefits are gained by engaging in physical activity beyond this amount.
- Adults should also do muscle-strengthening activities that are moderate or high intensity and involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.



www.health.gov/paguidelines

## Schweizer Bewegungsempfehlungen für Erwachsene



## Weiterer gesundheitlicher Nutzen von Bewegung und Sport

Menschen, die körperlich aktiver sind, rauchen auch weniger und ernähren sich bewusster. Dieser insgesamt gesündere Lebensstil spricht zusätzlich für die Förderung von Bewegung und Sport.

(...)

Im Stressmanagement, im Aufbau des Selbstwertgefühls, in der sozialen Integration von Einzelpersonen und verschiedensten Gruppen sowie in der Therapie und Rehabilitation einer ganzen Reihe von Erkrankungen und Beeinträchtigungen bestehen weitere Einsatzmöglichkeiten für Bewegung und Sport in spezifischen Organisations- und Durchführungsformen.

Gesundheitswirksame Bewegung. Empfehlungen von BASPO, BAG und „Netzwerk Gesundheit und Bewegung Schweiz“

## Health benefits of physical activity in children

- |   |                       |
|---|-----------------------|
| ↑ Physical fitness                          | ↓ Body fatness        |
| ↑ Cardiorespiratory endurance               | ↓ Anxiety symptoms    |
| ↑ Muscular strength                         | ↓ Depression symptoms |
| ↑ Health status                             |                       |
| ↑ Favourable cardiovascular risk profile    |                       |
| ↑ Favourable metabolic disease risk profile |                       |
| ↑ Bone health                               |                       |

↑ *strong evidence*  
 ⬆ *modest evidence*

Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, DC: U.S. Department of Health and Human Services, 2008.

## Warum ist die Evidenz bei Kindern (noch) so viel schlechter?

- Körperliche Inaktivität führt generell zu chronischen und nicht akuten Krankheiten
- Schlechtes Tracking des Bewegungsverhaltens (mit seinen Vor- und Nachteilen)
- Messungen von komplexen Endpunkten (z. B. motorische Entwicklung) sehr anspruchsvoll
- Standardisierung der Messmethoden für körperliche Aktivität noch im Gange

## Schweizer Bewegungsempfehlungen für Kinder und Jugendliche



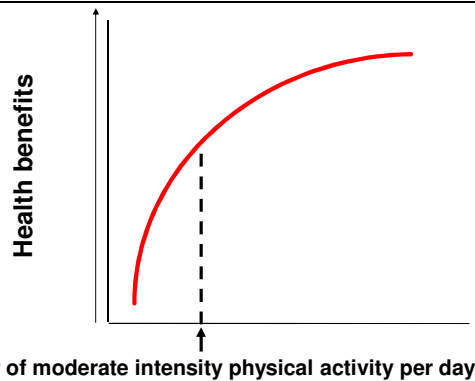
BASPO, BAG,  
Netzwerk Gesundheit und  
Bewegung  
Schweiz 2006

## Schweizer Bewegungsempfehlungen für Kinder und Jugendliche

„Es wird aus gesundheitlicher Sicht empfohlen, sich täglich zu bewegen. Nach heutigen Erkenntnissen sollte dies bei Jugendlichen gegen Ende des Schulalters während mindestens einer Stunde pro Tag geschehen; bei jüngeren Kindern noch deutlich mehr (...). Aus praktischen Gründen wird empfohlen, im Hinblick auf die Mindestempfehlungen alle Aktivitäten ab etwa 10 Minuten Dauer mitzuzählen.“

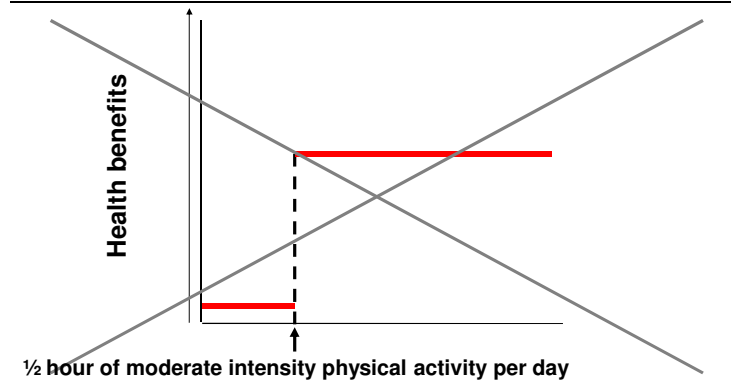
BASPO, BAG,  
Netzwerk Gesundheit und  
Bewegung  
Schweiz 2006

## Dose-response relationship for physical activity and health



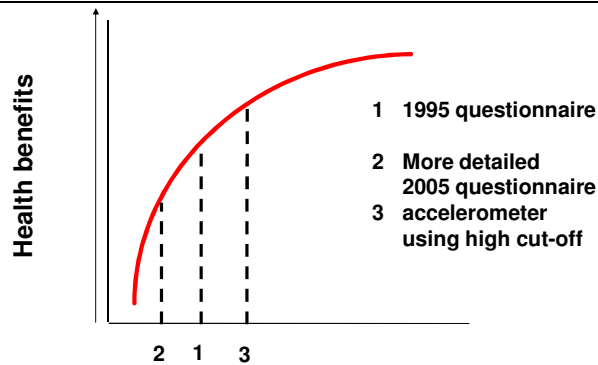
Adapted from Haskell, 1994

## Dose-response relationship for physical activity and health

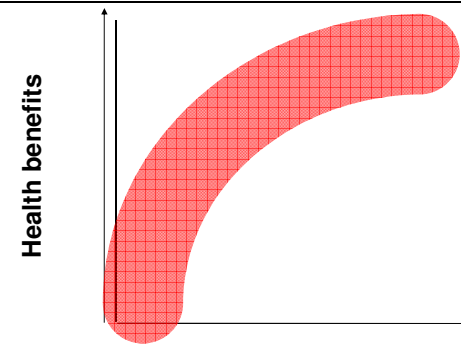




### ½ hour physical activity per day measured with different questionnaires

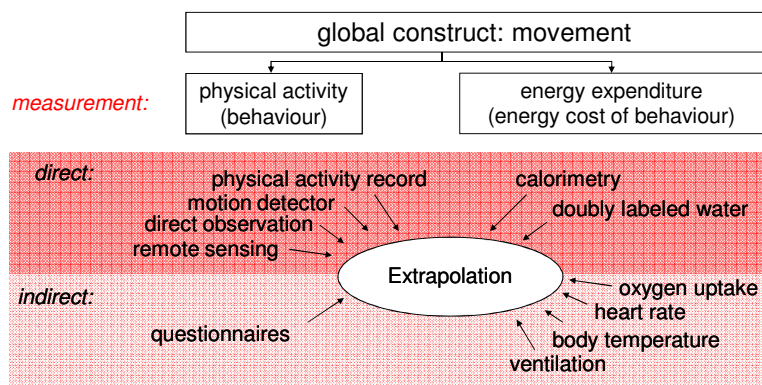


### Dose-response relationship for physical activity and health



Adapted from Haskell, 1994

### Conceptual framework for the measurement of movement as a global construct



Ainsworth BE, Levy SS. Assessment of Health-Enhancing Physical Activity. In Oja P, Borms J (eds). Health Enhancing Physical Activity. Oxford, Meyer & Meyer Sport (UK) Ltd, 2004

### Körperliche Aktivität und häufigste Erkrankungen - Zusammenfassung

- Gute Evidenz für eine grosse Anzahl von Gesundheitseffekten von regelmässiger Bewegung
- Kein Hinweis auf einen unteren Schwellenwert, Dosis-Wirkungsbeziehung grundsätzlich klar
- Wegen ungenauer Messinstrumente bis jetzt de facto nur semi-quantitative Beschreibung der Zusammenhänge
- Methodische Fortschritte werden in naher Zukunft genaue quantitative Aussagen bezüglich Effekten und Monitoring erlauben

## Recommended further reading for evidence on health effects of physical activity

CDC. Physical activity and health: a report of the Surgeon General. Atlanta GA, US Department of Health and Human Services, Centers for Disease Control and Prevention, 1996.

Oja P, Borms J (eds). Health Enhancing Physical Activity. Perspectives – The Multidisciplinary Series of Physical Education and Sport Science; Vol 6. Oxford, Meyer & Meyer Sport (UK) Ltd, 2004

Bouchard C, Blair SN, Haskell W (eds). Physical activity and health. Human Kinetics Inc, 2007.

Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, DC: U.S. Department of Health and Human Services, 2008. [www.health.gov/paguidelines](http://www.health.gov/paguidelines)

Grundlagendokument

### Gesundheitswirksame Bewegung



Grundlagendokument  
Gesundheitswirksame Bewegung  
Broschüre für Jugendliche  
Broschüre für Erwachsene

hempa.ch


Gesundheitshilfsleistung Schweiz  
Promotionale Santé-Güter  
Promotionale Santé-Güter

## Grundlagendokument gesundheitswirksame Bewegung


### Netzwerk Gesundheit und Bewegung Schweiz



[www.hepa.ch](http://www.hepa.ch)




EUROPE



4th annual meeting of HEPA Europe  
European network for the promotion of health-enhancing physical activity

Report of a WHO meeting  
10 September 2008  
Glasgow, United Kingdom



**HEPA Europe**  
European network for the promotion of health-enhancing physical activity

## Activity reports and work programmes in the reports of the annual meetings

[www.euro.who.int/hepa](http://www.euro.who.int/hepa)

## Danke für ihre Aufmerksamkeit!



Get your 30 mins a day, any way.

British Heart Foundation  
bhf.org.uk

Handout unter [www.panh.ch](http://www.panh.ch) oder [www.physicalactivityandhealth.ch](http://www.physicalactivityandhealth.ch)