

# Effects of different types of interventions for increasing physical activity behaviour



Charlie Foster – Senior Researcher

British Heart Foundation Health Promotion Research Group- University of Oxford

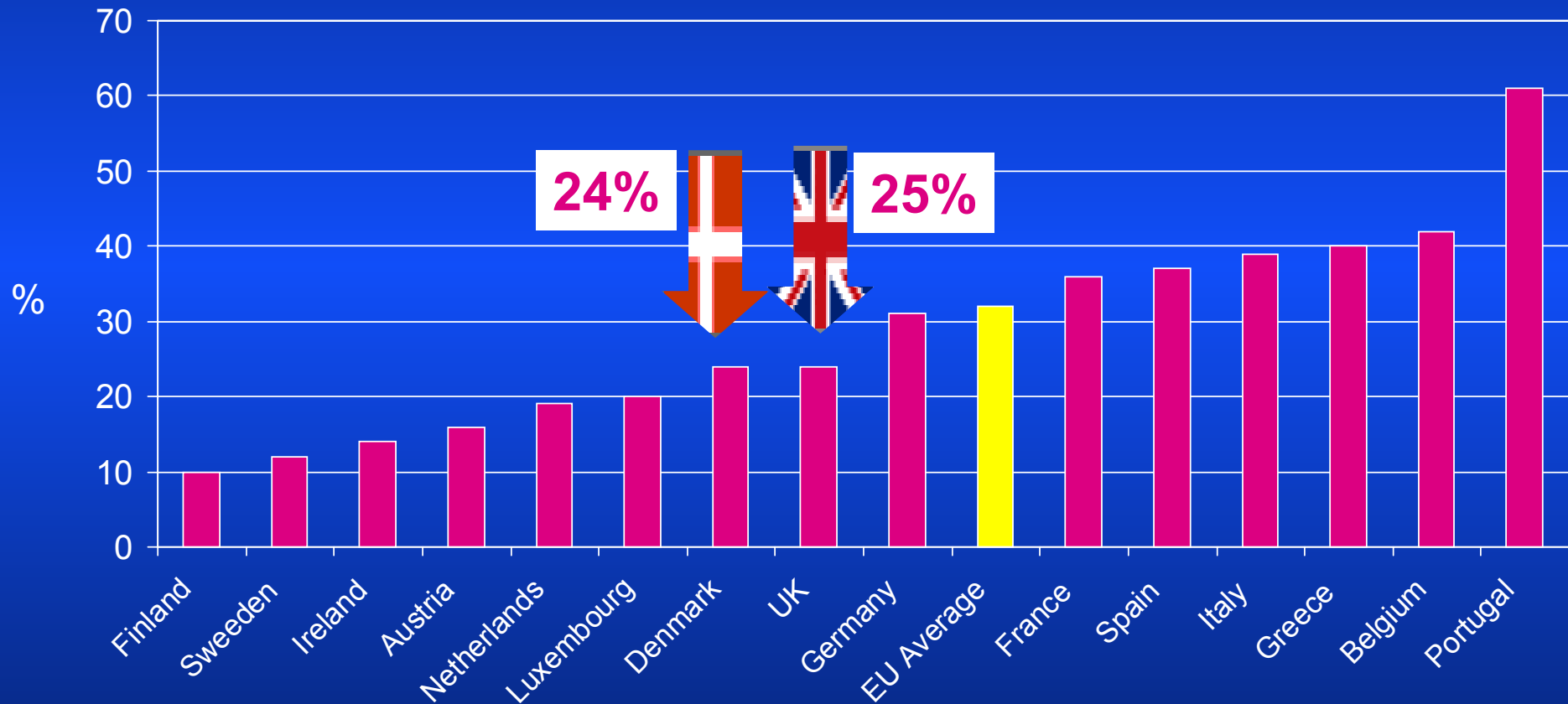
# Session Objectives

- To present on overview of the evidence of effectiveness for three types of health-enhancing physical activity intervention
  - » Individual
  - » Environmental
  - » Community based
- To make recommendations for developing effective interventions for physical activity



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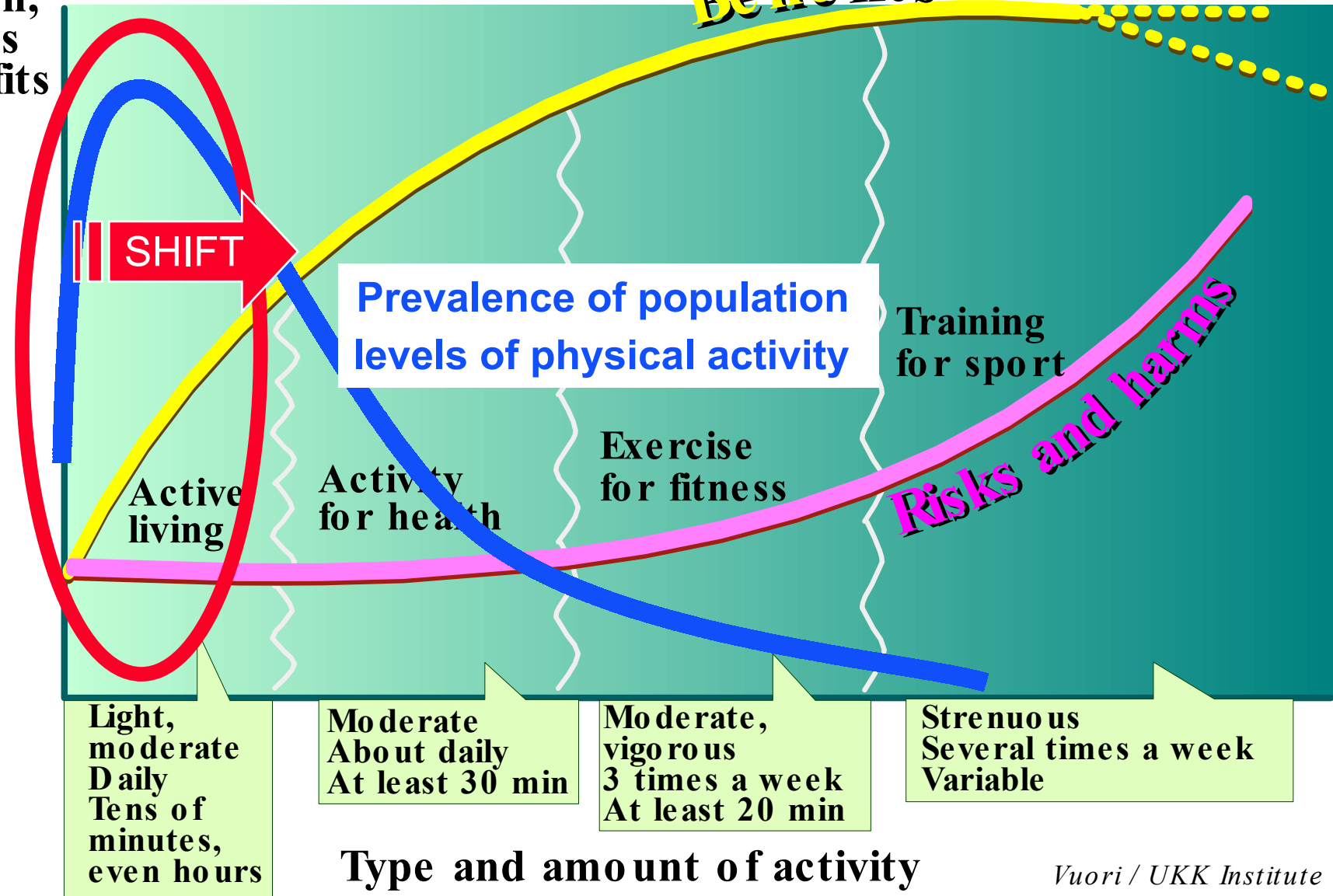
# The percentage of adults who take no physical activity in a typical week



Source: British Heart Foundation (2000). European cardiovascular disease statistics. British Heart Foundation, London. Original data from Institute of Food Studies. (1998). Pan-EU Survey on Consumer Attitudes to Physical Activity, Body-weight and Health. Institute of Food Studies, Dublin.

Health,  
fitness  
benefits

**Benefits**



# Individual HEPA Interventions

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- Although a large body of evidence exists about the health benefits of physical activity, little is known about the effectiveness of strategies to enable people to achieve the necessary increases in physical activity
- Systematic review of this evidence base for Cochrane Collaboration

# Method - Searches

- Computerised searches
  - » Cochrane Library, MEDLINE, EMBASE, CINAHL, PSYCHLIT, BIDS ISI, SPORTDISCUS, SIGLE, SCISEARCH (from earliest date available to December 2001)
  - » references of reviews and study papers
- Limited to English language journals

# Method – Inclusion criteria

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- Randomised controlled trials
- comparing different interventions to encourage sedentary, community dwelling adults to become physically active
- a minimum of six months follow up from the start of the intervention to the collection of final data
- either used an intention to treat analysis or had no more than 20% loss to follow up.

# Method – Data collection & analysis

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- At least two reviewers independently assessed each study quality and extracted data
- Study authors were contacted for additional information where necessary
- Standardised mean differences and 95% confidence intervals were calculated for continuous measures of self reported physical activity and cardio-respiratory fitness
- For studies with dichotomous outcomes, odds ratios and 95% confidence intervals were calculated

# Results

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- 28236 hits
- 16 intervention studies were found
- 6255 participants
- Only two European studies

# What approaches did studies use?

- Intervention style
  - » one to one counselling
  - » one to one advice
  - » group counselling/advice
- Physical activity prescription
  - » choice/self directed by participant
  - » prescribed physical activity by professional
  - » delivered by one or a number of practitioners with various professional backgrounds including physicians, nurses, health educators, counsellors, exercise leaders, peers

# What approaches did studies use?

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- Physical activity programme
  - » supervised or unsupervised physical activity
  - » home-based or facility-based physical activity
- Support offered to participant during programme
  - » ongoing face-to-face support
  - » telephone support
  - » written education/motivation material
  - » self monitoring
  - » differing frequencies of follow up contact

# Limitations of studies

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- Lack of intention to treat analysis
- Failure to adjust outcomes for baseline levels of physical activity
- Misclassification of physical activity

# Limitations of studies

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- Recruitment and screening of participants
- The generalisability of the interventions into everyday practice
- Few attempts to look for effect modification

# Conclusions

- Implications for practice
  - » There is some evidence to suggest that interventions designed to increase physical activity can lead to moderate short and mid-term increases in physical activity (< 6 months)
  - » Interventions to promote physical activity to sedentary adults are probably moderately effective
  - » Interventions should offer both the chance to participate in a supervised programme of physical activity along with initial and follow up professional support

# Conclusions

- Implications for research
  - » Existing evidence is limited by
    - the recruitment of motivated volunteers
    - the lack of true no intervention control groups
    - the problems of measuring of physical activity using self report
  - » High quality studies are required with
    - larger numbers
    - greater variety of participants
    - longer follow up periods
  - » No studies examined the effect of interventions on participants from varying socioeconomic or ethnic groups
  - » There is also an urgent need for studies with cost-effectiveness data
  - » In order to better understand the independent effect of individual programme components, longer studies with greater power are required

# The environment and physical activity

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- Perhaps the challenges of changing individual's behaviour using behavioural approaches has lead us to examine wider influences on behaviour and hopefully new solutions

# The environment and physical activity

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- The environment is a mixture of social and physical factors
  - » people
  - » places
  - » spaces
  - » which physical activity
- These factors are constantly interacting and changing

# Environmental HEPA Interventions

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- Supportive environments have been suggested to influence behaviour
- Correlate studies show a range of associations with both perceived and objective measures of the environment and different types of physical activities
- Little understood about the relative impact of environmental interventions compared to modest impact of one-to-one interventions

# Definitions used in review

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- Environment

- » any aspect of the physical (natural) environment or the man made (urban or constructed) environment that unconsciously or consciously impacts with an individual and their HEPA behaviour

- Community

- » a geographical area, such as a city or town, defined by geopolitical boundaries (Sharpe 2003)

# Method - Searches

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- Computerised searches
  - » MEDLINE, CINAHL, EMBASE, AMED, PSYCHLIT, SCISEARCH, GEOBASE, SIGLE and SPORTDISCUSS from earliest records till – December 2001.
- References of reviews and study papers
- Limited to English language journals

# Method – Inclusion criteria

- Observational research using an experimental study design
- The aim of the study was (i) to examine the effect of changing any aspect of the environment on HEPA behaviour, (ii) to use a natural or man-made element of the environment as mechanism to increase HEPA behaviour
- HEPA or physical fitness was the dependent variable
- The impact of the environmental change was compared against a control, non intervention group or a pre/post measure of HEPA
- A study population (over 18 years)

# Results

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- 14000 hits
- 17 intervention papers were found
- Seven studies were conducted in the UK, six in the USA, and one each from Australia, Finland and Switzerland.
- 2 groups of studies
  - » Physical environment change interventions
  - » Stair based interventions

# Physical environment change interventions

- Linenger *et al.*, 1991

- » USA navel bases were altered to support an active lifestyle. Policy, access to facilities, physical changes to infrastructure, educational materials were all used to support HEPA

- Vuori *et al.*, 1994

- » Factory employees had new showers and changing facilities built. Local authority lobbied to improve cycle routes to workplace. Travel diaries, educational events, fitness testing, lottery incentives also provided

- Peel and Booth, 2001

- » Air force pilots and navigators - Policy, access to facilities, physical changes to infrastructure, training courses, events and medical support for personnel to be more active, especially vigorous physical activities

# Physical environment change interventions

- Effect

- » Navel base

- Small significant difference between fitness scores of intervention site and others. Self-reported leisure time physical activity did not show improve

- » Population sample

- Small significant differences in physical activity between intervention and control participants. Greater improvements in levels of vigorous physical activity also seen over time

# Stair based interventions

- 16 “stair v escalator” or “stair v lift” studies
- All used a “before and after” measure
- Different behavioural settings
  - » public transportation (rail, bus or underground stations and airports)
  - » commercial settings (shopping centres, banks)
  - » workplaces (offices)
  - » a university (library)

# Stair based intervention at CDC - USA

Before



After

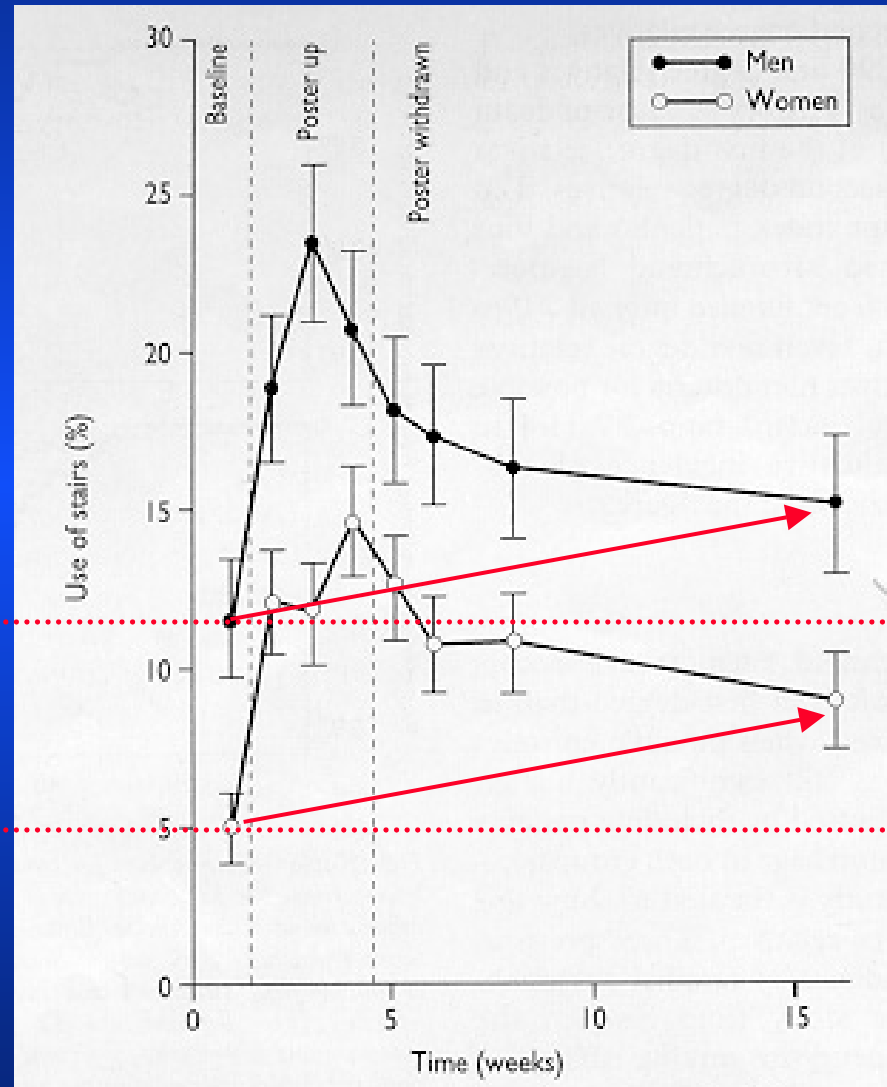


Decoration  
Art  
Motivational signs  
Music

From CDC StairWELL to Better Health

<http://www.cdc.gov/nccdphp/dnpa/stairwell/index.htm>

# Blamey et al, 1995



Observations were significantly above baseline at 12 weeks post intervention

# Stair based interventions

- Most have seen a short-term effect up to three months with one study seeing an effect at 6 months post baseline (+29%) (Kerr *et al.*, 2001c)
- Some attempts have been made to adjust the impact of these studies statistically for potential confounders like pedestrian traffic volume, age, sex and ethnicity
- The efficacy of the stair intervention was different within the study populations with different effects seen for different age groups, gender, observed BMI and ethnicity

# Limitations of studies

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- No real control groups
- No randomisation
- Possible misclassification bias of observations
- Other “setting dependent” factors that may influence stair use
- Interventions were not comparable as they use different foci for their stair prompt messages, e.g. health, fitness, concern for others or weight control

# Limitations of review

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- Publication bias
  - » English language only
- Not enough studies

# Conclusions

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- Short term effects are observed but not maintained
- No conclusions can be drawn on effectiveness
- But a way to assess physical capacity everyday – could be helpful

# Recommendations

- Development of theory that explain interaction of the environment with physical activity
- Using objective measures of the environment and HEPA behaviour
  - (i) what aspects of the environment are related to what types of HEPA behaviour for what kinds of people?
  - (ii) how do these aspects of the environment impact upon HEPA and sedentary behaviour?
  - (iii) of these aspects of the environment which ones can be changed to impact on HEPA?
  - (iv) what are the efficacy, effectiveness and efficiency of these interventions?
  - (v) how can these interventions be implemented in practice?

# Community-based HEPA Interventions

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- The public health impact of individual HEPA interventions is likely to remain relatively low due to the limited reach possible with such labour-intensive techniques and low exposure rates (King AC, 1998)

# Method - Searches

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- Computerised search
  - » PubMed (Dec 2004)
  - » references of study papers
- Limited to English language journals

# Method – Inclusion criteria

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- Review papers
- Focus of review on primary prevention studies
- A change in physical activity was main outcome variable
- Multiple risk factor interventions were included where physical activity was a documented component of intervention
- Community was unit of intervention

# Results

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- 7 reviews found
- All narrative synthesis of original studies
- Overlap of studies between review papers
- Studies evaluated effect using “before and after” measures

# Results

- Three types of outcome variables
  - » proximal variable
    - change in knowledge, self-efficacy, awareness
  - » intention to be more active
  - » change in self reported physical activity
    - estimated energy expenditure
    - prevalence of population proportions of physical inactivity or physical activities (light, moderate or vigorous intensities)

# Results

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- Four types of community interventions
  - » Comprehensive integrated community approaches
  - » Community-wide 'campaigns' using mass media
  - » Community-based approaches using person-focused techniques
  - » Community approaches to environmental change

# Results

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- Comprehensive integrated community approaches
  - » Stanford Five City project (Young et al 1996)
  - » Minnesota Heart Health Project (Luepker et al 1994)
  - » Pawtucket Heart Health Project (Eaton et al 1999)

# Results

- Stanford Five City project (Young et al 1996)
  - » Walking events and groups led by volunteers
  - » Health screening
  - » Coalition development
- Minnesota Heart Health Project (Luepker et al 1994)
  - » Mass media
  - » Community events
  - » Risk factor screening
- Outcome evaluation showed modest changes in physical activity
- Process evaluation showed high participation levels and support for activities

# Results

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- Different conclusions reached across reviews about effect (using same studies)
  - » Kahn et al (2002) “strong”
  - » Taylor et al 1998 “minimal” ,
  - » King (1998) “modest”
  - » Marcus et al (1999) “have not had much impact”

# Implications for future community interventions

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- Define an appropriate community
  - » focus at what draws people together
- Build community coalitions
  - » Stakeholder organisations
- Use multiple-level strategies
  - » environmental, legislative, fiscal, policy, community, family and individual levels

# Implications for future community interventions

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- Evaluate
  - » Formative
  - » Process
  - » Outcome

# What types of evaluation could you do?

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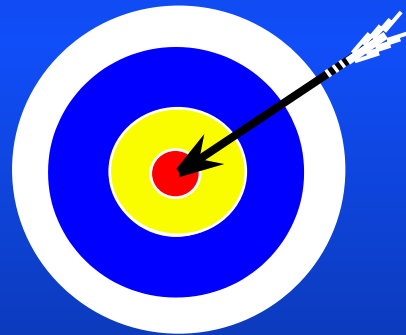
- **Formative**
  - » Evaluation that creates something, e.g. training resources
- **Process**
  - » Evaluation of the project's experiences
- **Outcome evaluation**
  - » Evaluation of the project's impacts

# Have you hit your target group?

Demography

Geography

Psychology



Health status

PA behaviour

# Evaluation - Things to think about...

- Who do I currently serve?
  - » Population groups
  - » Parts of town
- If the right people turn up the effect of your project will happen (if they turn up enough)
  - » Change in fitness, physical activity levels
  - » Quality of life

# Conclusions

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- Review-level evidence for the effectiveness of community interventions to promote physical activity remains equivocal
- Better evaluation of our present interventions and acting on findings can only build a better evidence base

# Final thoughts

- There is some evidence for the effectiveness of individual to promote physical activity
  - » Individual HEPA interventions - our findings indicate that professional advice and support as well as access to physical activity programmes can encourage people to be more active in the short and mid-term
  - » High quality studies that test interventions which are transferable to real life

# Final thoughts

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- There is very little evidence for the effectiveness of environmental interventions
- More is needed to understand the nature of the relationship of the environment to HEPA behaviour
- Future research in this area should focus on what aspects of the environment are related to what types of HEPA behaviour for what kinds of people?

# Final thoughts

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- The review-level evidence for the effectiveness of community interventions to promote physical activity remains equivocal
- While the larger-scale community programmes have had some positive results, they have not tended to demonstrate population-level impact
- Smaller community scale interventions with lots of evaluation are needed