Importance of Evidence

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Importance of physical activity

- Physical inactivity remains a concerning public health topic
- Lack of physical activity leads to poor health
- Regular physical activity helps reduce chronic diseases
- Improve health conditions and well-being

Source: Baker PRA, Francis DP, Soares J, Weightman AL, Foster C. Community wide interventions for increasing physical activity. *Cochrane Database of Systematic Reviews* 2015, Issue 1. Art. No.: CD008366. DOI: 10.1002/14651858.CD008366.pub3.

Objective

- To determine the effects of community wide, multi-strategic interventions on community levels of physical activity

Why a review is warranted:

- Few previous studies have published evaluations of their process or impact
- Earlier reviews lack of recent studies and newer health promotion strategies
- The Cochrane review combined a more in-depth, up-to-date exploration of the effectiveness of the interventions.

Search for studies

All relevant studies released between 1995 and 2014, regardless of language or publication status

- Databases and registries (e.g. Web of Science, MEDLINE)
- Websites (e.g. CDC, HealthEvidence.org)
- Reference lists of systematic reviews, guidelines, and primary studies
- Contacted experts in the field

Identified 27,089 potentially relevant studies

Inclusion criteria

- Examining a community wide intervention for physical activity
  - At least two broad strategies (e.g. social marketing, individual counselling)
  - Focused on the population as a whole
  - Community is geographically defined and not focused on particular subgroups
- Variety of designs (but no randomising individuals from the same community)
  - Cluster randomised controlled
  - Randomised controlled
  - Quasi-experimental with a control population
  - Interrupted time-series
  - Prospective controlled cohort
- At least six months intervention before measuring outcomes

Of the 27,089 studies examined, 33 met all inclusion criteria

Biases assessed

- **Selection bias**: samples selected are not representative of the population
- **Performance bias**: one group of subjects in an experiment gets more attention from investigators than another group
- **Attrition bias**: different rates of loss-to-follow-up that changes the original characteristics of the study group
- **Detection bias**: differences between groups in how outcomes are determined
- **Reporting bias**: selective disclosure of information including the design, conduct, analysis, or results of a study

Summary of biases

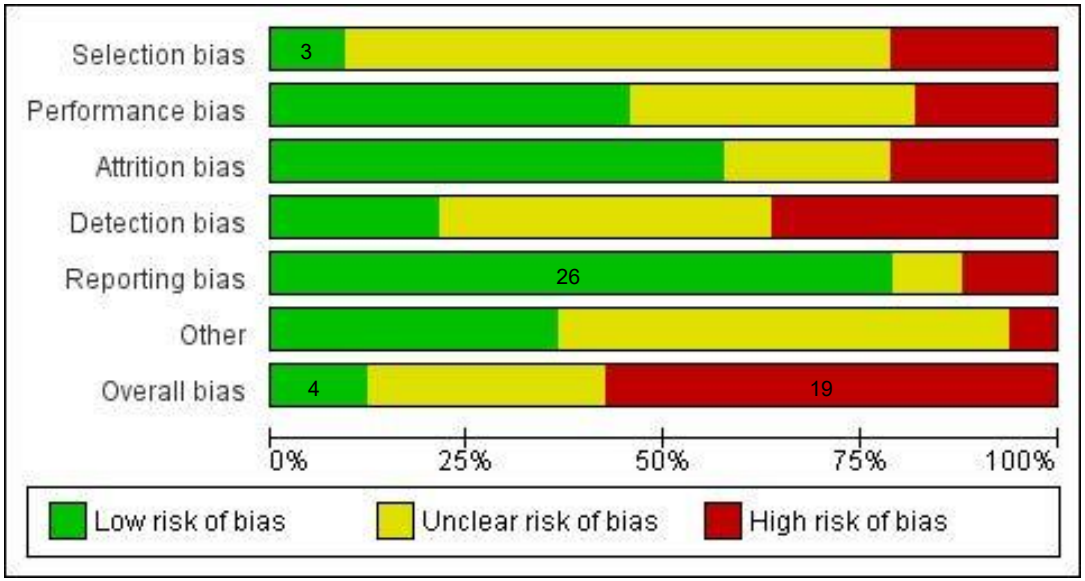


Figure 3. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

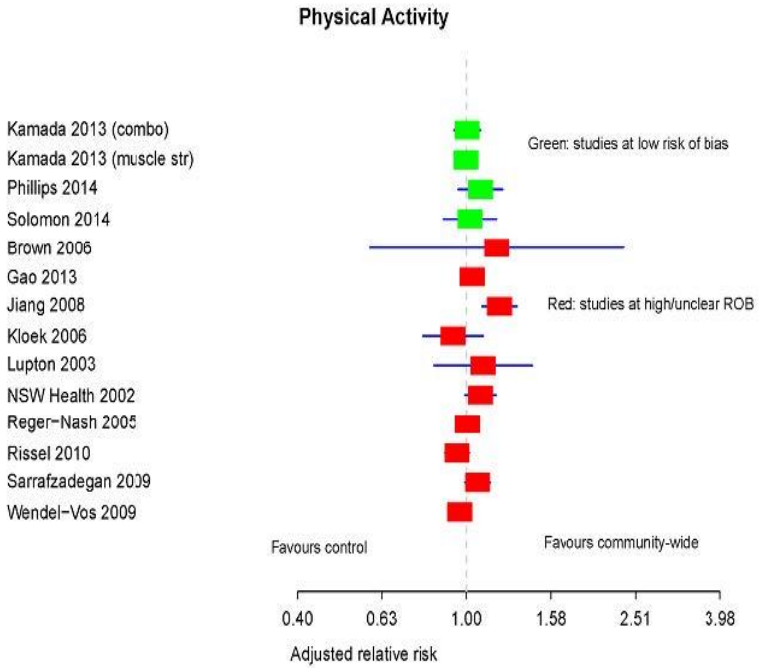
Which studies have low risk of bias?

- Randomized intervention
  - What if intervention cannot be assigned randomly?
- Valid and reliable measurement metrics for population level interventions
  - Avoid self-report
- Individuals sampled should be representative of the population
- Report all measures

Figure 4. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.

Results Summary

- Studies using **binary** physical activity measure as outcome
  - % physically active, % physically active during leisure time, % physically inactive
  - Expressed as relative risk (RR) and risk difference (RD)
  - Calculated adjusted RR/RD for comparison (e.g. Fig. 5)
- Studies using **continuous** physical activity measure as outcome
  - Leisure time physical activity time, walking time, energy expenditure
  - Calculated adjusted mean difference/percentage change
- Not all study results are reliable!
  - **Green** bar: studies at low risk of bias
  - **Red** bar: studies at high/unclear bias
- Summary of studies are on the next slide



Baker et al. (2015) Fig. 5

Table summary for all studies included

Report outcome	# of studies	# with evidence
Binary outcome		
Physically active	27	4 (2 in China, 1 in male and 1 in female)
Physically active during leisure time	3	2
Physically inactive	7	2 (1 found evidence in effectiveness and 1 found evidence of failure)
Continuous outcome		
Leisure time physical activity by time	3	3
Walking time	4	2 (both in Missouri)
Energy expenditure	5	2

Study conclusion

Generally, the studies **didn't find consistent evidence** to support the hypothesis that multi-component community wide interventions effectively increase population levels of physical activity.

- Heterogeneity among studies
  - intervention approaches, action intensity, outcome, and comparison communities.
- Best available evidence globally
  - Overall poor quality of included studies
  - Quality of evidence from studies improved over time
    - newest four studies have low risk of bias
- Study limitations
  - potential publication bias
  - Lack of data for subgroups
- Agreements and disagreements with other studies
  - Different inclusion criterias
  - E.g. Lancet series: a more mixed approach to typologies of interventions; pre-post measure only

Implications for Practice & Research

- Current research should improve design, implementation and evaluation of interventions
- New studies must be rigorously designed and analyzed that ensure to produce robust evaluation
- The assignment of comparison and control group should though randomisation
- Future studies should be careful for the sample size calculation to minimize risks of biases

Questions?