

A systematic review of the effects of obesity prevention policies



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Introduction

- NIH has provided ~\$9.5 billion to obesity research over the last decade yet obesity remains a major public health challenge.
- What are the effects of obesity prevention policies on energy consumed and energy expended?
- This review studies:
 - Fiscal measures** - taxes, subsidies, and social services.
 - Physical environment and transportation system** - urban planning, public transport investments, zoning laws, establishing bike paths, active transport policies, “complete streets”, new food stores in underserved areas, and limiting fast food and convenience stores.
 - Worksite interventions** - employee wellness programs, standing desks, and work site cafeterias.
 - School-based interventions** - school and early child care center interventions
 - Food labeling** - different front-of package requirements for food and restaurant menus.
 - Education** - public health campaigns or nutrition education programs.
 - Supply of food & lifestyle commodities** - product reformulation, placement, & portion size changes.
 - Population-based health care interventions** - lifestyle counselling in healthcare settings.
 - Social group approaches** - initiated through social groups e.g., faith-based, YMCA, boy scouts.

Methods

- The systematic review protocol is published in PROSPERO (CRD42017077083).
- Searched PubMed, Cochrane Database of Systematic Reviews, Campbell Systematic Reviews, and Web of Science.
- Search strategy combined diet and physical activity interventions & obesity terms.
- Consulted with content experts to ensure no relevant research studies were missed.
- Study Selection - Eligibility criteria as documented in PICOTSS framework is:
 - Population – general population, “apparently healthy”
 - Intervention – see above
 - Comparator – concurrent or historic
 - Outcome - daily calorie consumption and daily energy expended
 - Setting – US and Mexico
 - Study Design – Primary research (N>100) since 2000; Systematic reviews since 2006. English.
- Two independent reviewers screened publications, conflicts resolved via discussion.
- Data Abstraction and Critical Appraisal
 - Abstracted reported daily calorie intake and daily energy expenditure in intervention and comparator group.
 - Assessed selection bias and confounding, performance bias, detection bias, attrition bias, and other sources of bias.
- Data Synthesis and Analysis – evidence quality assessed using the GRADE approach.

Results

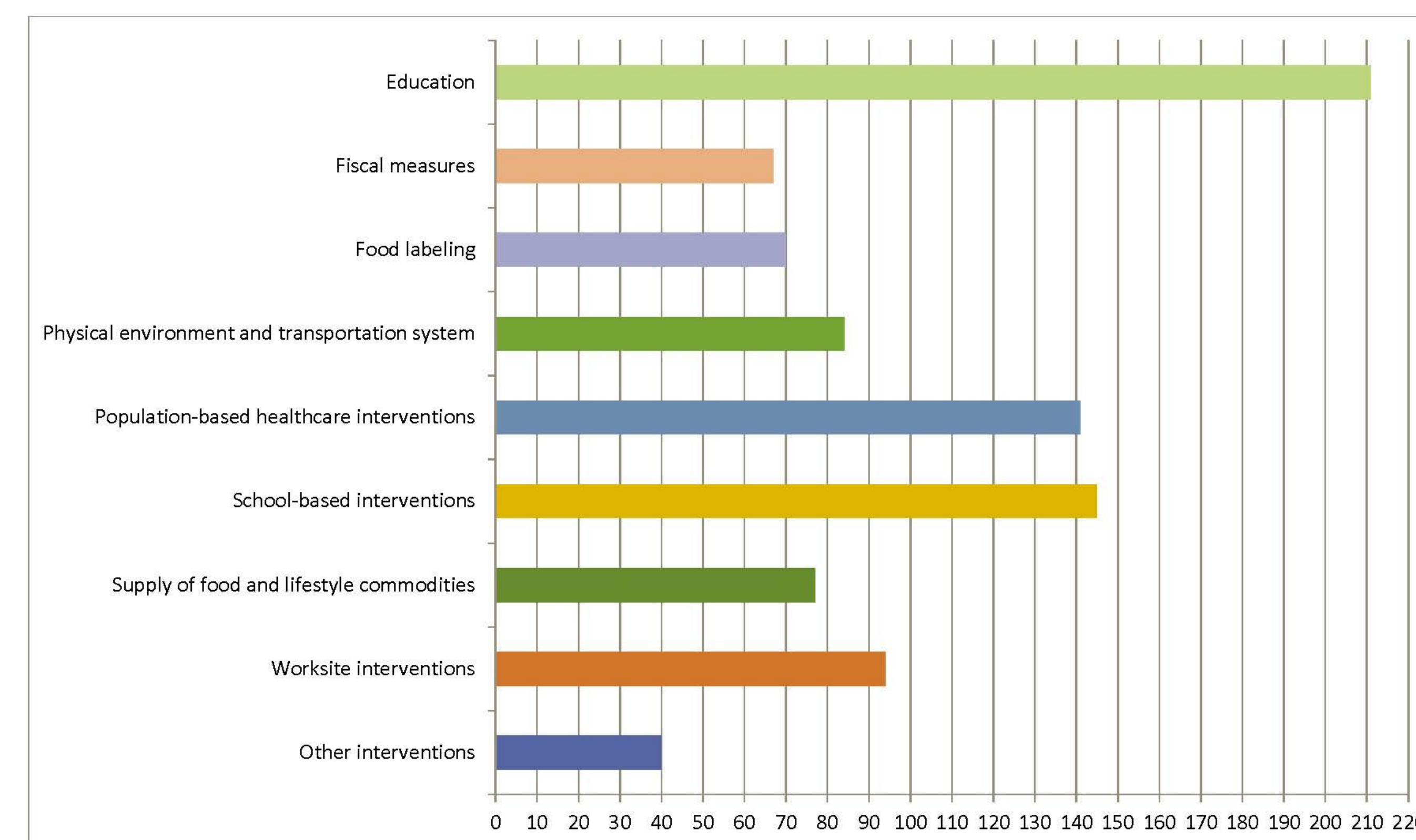
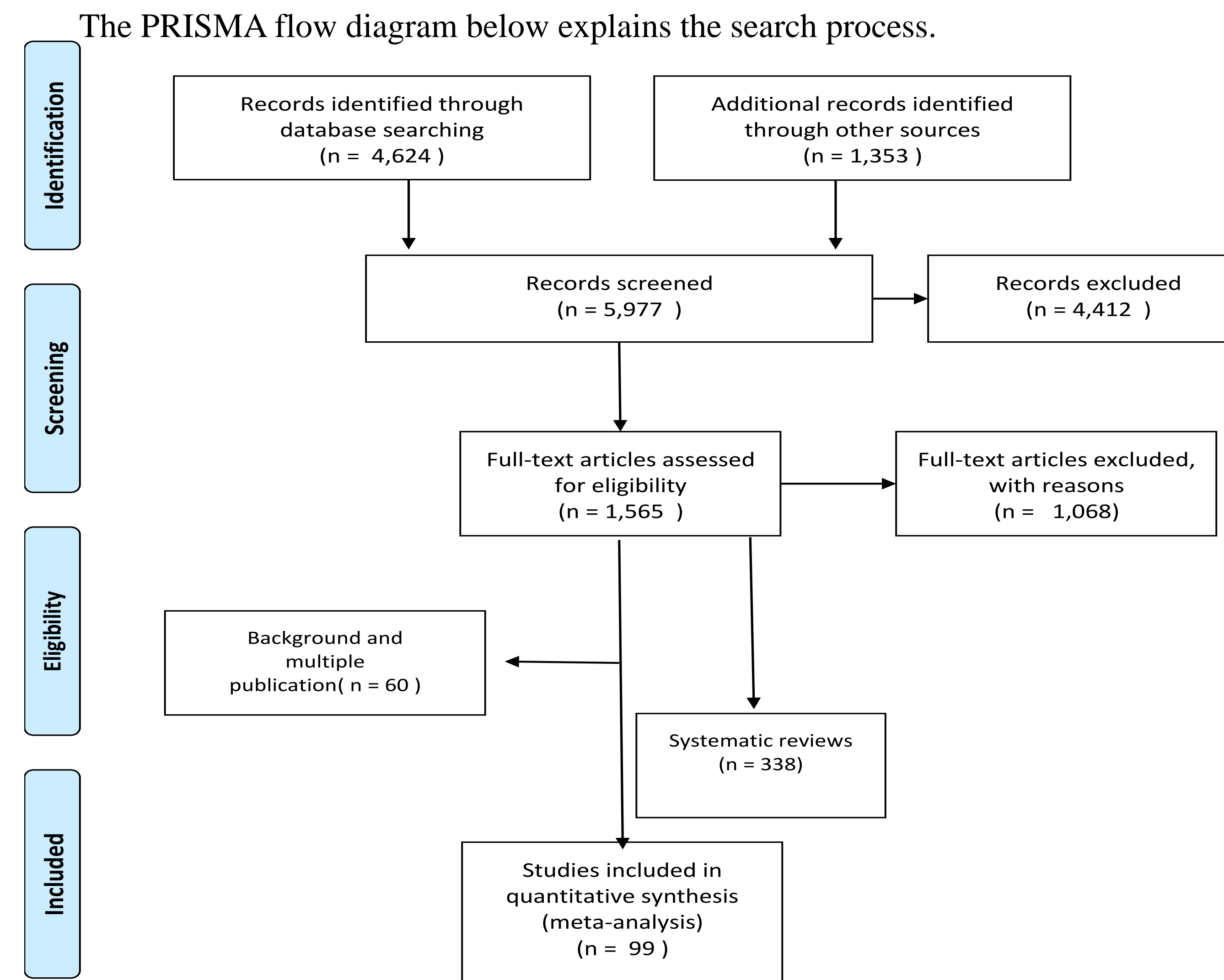


Figure above shows studies categorized according to intervention types.

Discussion

Figure: School-based initiatives – Energy consumed

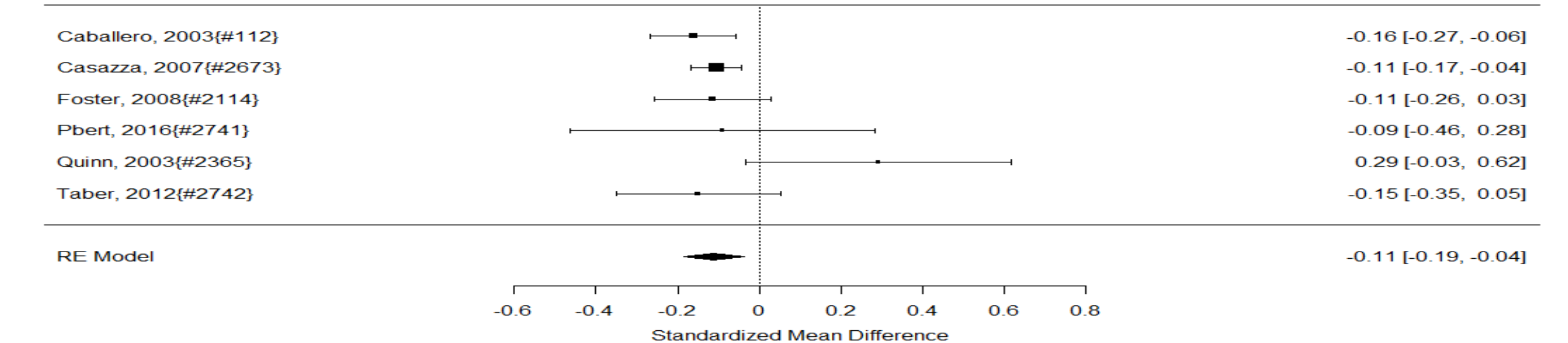
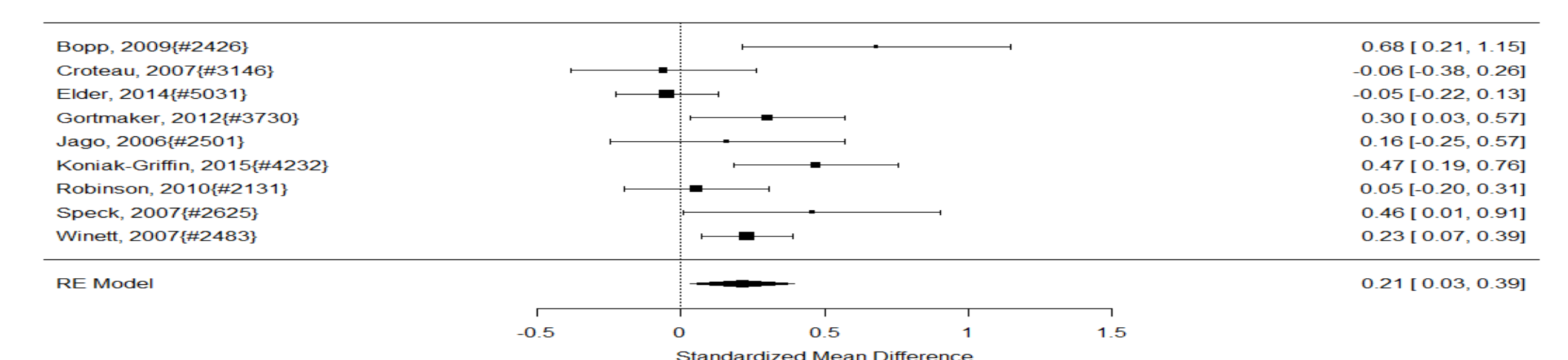


Figure: Social group interventions – Energy expended



- Little evidence these interventions impacted energy intake and expenditure.
- Education interventions were the largest proportion of studies, food labeling was the smallest group.
- On reducing energy expenditure the largest effect was from population healthcare intervention. On increasing energy expenditure, the social group interventions showed the greatest effect.
- Identified a critical gap in the literature - we had to exclude 94% of studies because the outcome did not measure energy consumption or expenditure. It is sorely needed if we are to understand obesity intervention effects.
- Challenging to accurately measure energy intake and expenditure. Population-based studies rely on self-reported food intake. Even 24 hour dietary recalls (best method) are limited by misreporting and limited nutrient databases relative to the massive number of items available for consumption. Thus, developing new technologies to collect the types and amounts of foods and beverages people eat in real time is sorely needed to significantly improve the accuracy with which we can measure diet.
- With technological advances researchers may be able to better collect dietary and activity data in real-time. Linking people in place and time capturing high quality space-time-behavior data is a promising approach.

Conclusion

- Understanding the impacts of environmental obesity interventions on energy balance is critical to reducing population-level obesity.
- School-based interventions have the strongest impact on childrens’ energy intake.
- Social support based interventions showed the strongest effects on increasing energy expenditure.
- We recommend that future research aim to address the divide between environmental obesity interventions and energy balance to clarify how prevention and treatment efforts fail and succeed.