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Session 4108.0 Session Organizer: Steven Gortmaker, PhD
Modeling the cost effectiveness of childhood obesity interventions and policies: an evaluation of methods to evaluate four strategies in the United States

Updated Abstracts

Oral Presentation #284079: Cost-effectiveness of a Sugar-sweetened Beverage Excise Tax in the United States

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Background: Reducing sugar-sweetened beverage (SSB) consumption through taxation is a promising public health response to the obesity epidemic. This study quantifies the expected health and economic benefits of a national SSB excise tax of 1 cent per ounce.
Methods: The Assessing Cost Effectiveness modeling methodology was adapted to the US to estimate impact of the tax on body mass index (BMI) after four years of implementation. National health care costs were estimated from Medical Expenditure Panel Survey data; costs and DALYs averted were discounted at 3.5%. The model was developed in a compiled programming language. Assuming maintenance of the BMI effect, lifetime disability-adjusted life years (DALYs) and healthcare costs averted were estimated for the 2005 U.S. population of children and adults.
Results: Implementing the tax nationally would cost $147 million over the four years needed to reach full effect on BMI. In the short term, implementing the tax would reduce SSB consumption by 26% and cost $2.64 per BMI unit reduced (95% Uncertainty Interval (UI):

$1.06; $7.05) across the entire population, or $6.44 per BMI unit reduced among youth (95% UI: $2.54; $18.60). In the long term, the policy would avert 5.56 million DALYS (95% UI: 1.81; 14.1 million), and result in $47.1 billion (95% UI: $16.6; $116 billion) in discounted healthcare cost savings. The tax would generate $12.4 billion in annual revenue (2005 dollars) (95% UI: $7.45; $14.3 billion).

Conclusions: The proposed tax could substantially reduce BMI and healthcare expenditures, and increase healthy life and revenue for health promotion.

Oral Presentation #284416 Cost-effectiveness of a state policy requiring minimum levels of moderate-to-vigorous physical activity during elementary school physical education classes

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Background: Children are not meeting physical activity recommendations; typical physical education (PE) classes engage children in moderate-to-vigorous physical activity (MVPA) less than half of instruction time. U.S. states have considered active PE policies specifying minimum percent of PE time spent in MVPA.

Purpose: This study estimates the cost-effectiveness of a proposed state policy implemented nationally requiring at least 50% of elementary school PE time devoted to MVPA.

Methods: The Assessing Cost-Effectiveness model adapted to the U.S. was used to estimate costs and body mass index (BMI)-related health benefits of an active PE policy intervention for the lifetime of a simulated cohort of the 2005 U.S. population aged 5-11 years.

Results: Implementation of an elementary school active PE policy would increase mean per capita physical activity levels by 156 minutes/year MVPA (95% Uncertainty Interval (UI): 11–588) among 16.6 million U.S. children (95% UI: 13.8–19.4 million) aged 5-11 years reached. Implementing the policy nationally would cost $54.7 million/year (95% UI: $35.9–$79.7 million/year) at a rate of $191 per BMI unit reduced (95% UI: $44-$4,086). If BMI changes are maintained, the policy would avert 19,600 DALYs (95% UI: 900-85,500), reducing healthcare costs by $161 million (95% UI: $7-$692 million) and saving $2.94 per dollar spent implementing the policy (95% UI: $0.13-$13.08).

Conclusions: Implementing an active PE policy is a cost-effective strategy for reducing BMI and could improve longer term disease burden, provided BMI effects attained in childhood are maintained. The policy may have additional positive impacts related directly to physical activity increases.

Oral Presentation #284542 Potential Impact of Eliminating the Tax Subsidy of Food and Beverage Television Advertising Directed at Children and Adolescents on BMI, DALYs, and Healthcare Costs in the United States

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Background: Food and beverage television (TV) advertising contributes to childhood obesity. The current tax treatment of advertising as an ordinary business expense in the United States subsidizes marketing of nutritionally-poor foods and beverages to children.
Purpose: To model the effect of modifying the tax treatment of advertising expenses.
Methods: Using best available evidence, we modeled the effect of a national intervention that eliminates the tax subsidy of advertising nutritionally-poor foods and beverages on TV to children ages 2-19. We adapted the Assessing Cost Effectiveness methodology to the U.S., using Medical Expenditure Panel Survey data on costs, and assessing effects on BMI and related disease rates for a simulated cohort of the 2005 U.S. population. For longer term outcomes we assumed maintenance of the BMI reduction; costs and Disability-Adjusted Life Years (DALYs) are discounted at 3.5%.
Results: We estimate the intervention would cost an estimated $755,000 (95% Uncertainty Interval (UI): $430,000; $1,140,000) per year, reduce mean per-child BMI by 0.132 units (95% UI: 0.048; 0.227), and cost $0.08 per BMI unit reduced (95% UI: $0.04-$0.23). Over the long term the intervention would avert an estimated 694,000 (95% UI: 201,000; 1,114,000) DALYs, and reductions in BMI-related disease would result in a $5.73 billion (95% UI: $1.84; $10.87 billion) reduction in discounted health care cost savings over the life of the cohort, and save an estimated $7,587 for every dollar spent. At least 20 years of maintenance is required for the intervention to be cost saving. This change in the tax subsidy could generate $356 million/year in revenue.
Conclusions: Eliminating the tax subsidy of TV advertising costs for nutritionally-poor foods and beverages advertised to children and adolescents could reduce BMI at low cost and with long term maintenance lead to a cost saving intervention that could substantially reduce healthcare expenditures.

Oral Presentation #284359 Impact and Cost-Effectiveness of Childcare Center Policy Changes on BMI and Healthcare Costs in the United States

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Introduction: Childcare facilities influence nutrition and physical activity behaviors, making them ideal for obesity prevention. We quantified the health and economic impact of a multi-component regulatory intervention in licensed U.S. childcare facilities.

Methods: Using data from published research, we estimated the short-run costs and changes in body mass index (BMI) resulting from changes in beverage consumption, physical activity, and screen time viewing regulations among 6.2 million 3-5 year olds in childcare facilities. We adapted the Assessing Cost Effectiveness model to the U.S. setting to simulate the impact of short-run BMI changes in the 2005 U.S. population on lifetime healthcare expenditures and Disability-Adjusted Life Years (DALYs), assuming maintenance of intervention effects. We simulated uncertainty intervals (UI) around outcomes and discounted outcomes at a 3.5% annual rate.

Results: Regulatory changes would lead to children, on average, watching 28 hours less television, exercising for 27 more hours, and consuming four fewer 12-ounce servings of sugar-sweetened beverages annually. National implementation would lead to a BMI per person decrease of 0.42 kg/m2 (95% UI: [0.17 kg/m^2, 0.74 kg/m^2]), cost $6.4 million, with a cost/BMI unit change of $6.07. Long term intervention effects were modeled to yield 61,000 (95% UI: [14,000, 144,000]) lifetime DALYs averted. The intervention was cost saving, with a net cost of -$0.6 billion (95% UI: [-$1.4 billion, -$ 0.2 billion]) over the population's lifetime. The intervention would save $98 per intervention dollar spent.

Discussion: Changing childcare facility regulations can improve BMI and reduce long-term healthcare expenditures.