

CHOICES NATIONAL ACTION KIT:

Active Recess Strategy Report



CHOICES uses cost-effectiveness analysis to compare the costs and outcomes of different policies and programs promoting improved nutrition or increased physical activity in schools, early care and education and out-of-school settings, communities, and clinics. This strategy report describes the projected national population reach, impact on health and health equity, implementation costs, and cost-effectiveness for an effective strategy to improve child health. This information can help inform decision-making around promoting healthy weight. To explore and compare additional strategies, visit the CHOICES National Action Kit at www.choicesproject.org/actionkit.



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Contact the CHOICES Project: choicesproject@hsph.harvard.edu

STRATEGY PROFILE

Describes the estimated benefits, activities, resources, and leadership needed to implement a strategy to improve child health. This information can be useful for planning and prioritization purposes.

Active Recess is a program to increase physical activity during elementary school recess with structured activities, playground markings, and/or portable play equipment. This program is implemented in elementary schools to promote physical activity during recess.

WHAT POPULATION BENEFITS?

Children in grades K-5 (5-11 years old).

WHAT ARE THE ESTIMATED BENEFITS?

Relative to not implementing the strategy

Increase students' moderate-to-vigorous physical activity levels and, in turn, promote healthy child weight.



✓ Increase students' moderate-to-vigorous physical activity levels



✓ Prevent cases of obesity



✓ Projected to be cost-saving

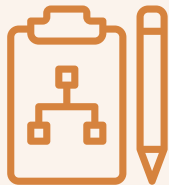


✓ Likely to improve health equity by race, ethnicity, and income

➔ More details available on the CHOICES National Action Kit at choicesproject.org/actionkit

WHAT ACTIVITIES AND RESOURCES ARE NEEDED?

Activities	Resources	Who Leads?
Train teachers and recess monitors on recess supervision strategies to increase physical activity	<ul style="list-style-type: none"> • Time for trainer to lead trainings on supervision strategies to increase physical activity • Time for teachers and recess monitors to attend trainings • Travel costs for the trainers, teachers, and recess monitors 	School district coordinator
Paint markings onto outdoor play spaces	<ul style="list-style-type: none"> • Time for volunteers to paint markings • Time for school staff member to supervise painting • Painting material costs 	School staff member
Purchase portable playground equipment	<ul style="list-style-type: none"> • Playground equipment costs 	Schools

**Strategy Modification**

Some state and local health agencies have added to this strategy the costs of coordinating a broader state-level program when envisioning it being implemented in more than one district. This would add time for a state-level coordinator in the Department of Education to oversee the program and provide training to participating district-level coordinators. With this modification, this strategy could reach more children.

- See our resource library for relevant peer-reviewed publications, research reports, & briefs at choicesproject.org/resource-library
- Learn more about strategy modifications and CHOICES projections of the strategy Active Recess for US states and local areas:
[Salt Lake County, Utah](#)
[Washington](#)
- Learn more about the evidence for the strategy Active Recess in the CHOICES peer-reviewed publication:
[Cradock et al. 2017 Am J Prev Med](#)

NATIONAL RESULTS

Projected national population reach, impact on health behaviors and prevention of excess weight gain, implementation costs, and health care cost savings for the strategy. These national results may help inform your organization's decision-making around promoting healthy weight.

DESCRIPTION	Program to increase physical activity during elementary school recess with structured activities, playground markings, and/or portable play equipment
OUTCOME	Mean (95% UI)*
BEHAVIOR CHANGE PER PERSON <i>Change in health behavior per person in the first year</i>	638 more minutes of physical activity (141; 1,375) <i>Moderate-to-vigorous physical activity minutes, per year</i>
COST PER PERSON <i>Average annualized cost per person to implement the strategy over the model period</i>	\$4.43 (\$3.33; \$5.45) See Cost Results
POPULATION REACH <i>Reach over the model period</i>	37,300,000 (36,600,000; 37,900,000)
OBESITY PREVENTED <i>Cases of obesity prevented in the final year</i>	21,600 (2,300; 59,700)
CHILD OBESITY PREVENTED <i>Cases of child obesity prevented in the final year</i>	21,500 (2,300; 59,100)
HEALTH EQUITY IMPACT <i>Impact on obesity-related health equity in the final year</i>	Likely to improve health equity by race, ethnicity, & income See Health Equity Indicators
QUALITY-ADJUSTED LIFE YEARS (QALYS) GAINED <i>Quality-adjusted life years (QALYs) gained (totals over the model period)</i>	6,600 (744; 18,500)
OBESITY YEARS PREVENTED <i>Years with obesity prevented (totals over the model period)</i>	149,000 (16,400; 414,000)
HEALTH CARE COSTS SAVED PER \$1 INVESTED <i>Total health care costs saved per total intervention costs over the model period</i>	\$0.01 (\$0.00; \$0.04)
COST PER QALY GAINED <i>Net cost per quality-adjusted life year (QALY) gained (totals over the model period)</i>	\$247,000 (\$79,000; \$1,900,000)

Projections for the model period 2022-2031 (10 years, inclusive of the start and end years).

Costs are in 2019 dollars and discounted at 3% annually.

*Results displayed are the mean and 95% uncertainty interval (UI). CHOICES calculates 95% uncertainty intervals by running the model 1,000 times and reporting the range (95% of estimates, centered on the mean) of projected outcomes that account for uncertainty from data sources and population projections.

- ✓ Explore our User Guide for more information about the CHOICES National Action Kit at choicesproject.org/action-kit-user-guide
- ✓ Learn more about CHOICES Methods at choicesproject.org/methods
- ✓ Find definitions of each modeled outcome in the [Glossary \(p.12\)](#) at choicesproject.org/action-kit-glossary

COST RESULTS

Describes the estimated costs by activity and payer needed to implement a strategy to improve child health nationally. This information can be useful for planning and prioritization purposes.

This report includes estimates of the implementation costs of Active Recess if implemented in each school district in the United States. Costs are estimated from a societal perspective, meaning costs needed to implement the strategy are included regardless of who pays or whether the costs are budgetary or opportunity costs.

Average Annual Strategy Implementation Cost by Activity and Payer				
Activity	Resources	Cost per Person†	Payer	Percent of Total Cost
Train teachers and recess monitors on recess supervision strategies to increase physical activity	<ul style="list-style-type: none"> • Time for trainer to lead trainings on supervision strategies to increase physical activity • Time for teachers and recess monitors to attend trainings • Travel costs for the trainers, teachers, and recess monitors 	\$2.97	School	67%
Paint markings onto outdoor play spaces	<ul style="list-style-type: none"> • Time for volunteers to paint markings • Time for school staff member to supervise painting • Painting material costs 	\$1.09	School district; School	25%
Purchase portable playground equipment	<ul style="list-style-type: none"> • Playground equipment costs 	\$0.37	School	8%
TOTAL	--	\$4.43	--	100%

Costs are in 2019 dollars and discounted at 3% per year. Sums may not equal total due to rounding.

†Average annualized cost per person to implement the strategy over the model period 2022-2031 (10 years).

Average Annual Strategy Implementation Cost by Payer and Cost Type			
	Cost per Person†		
Payer	All Costs (% of Total)	Budgetary Costs (% of All Costs by Payer)	Opportunity Costs (% of All Costs by Payer)
Federal government	--	--	--
State government	--	--	--
Local government	--	--	--
School district	\$0.12 (3%)	\$0.00 (0%)	\$0.12 (100%)
School	\$4.30 (97%)	\$1.33 (31%)	\$2.97 (69%)
Family/Individual	--	--	--
Industry	--	--	--
Nonprofit	--	--	--
Health care	--	--	--
TOTAL	\$4.43 (100%)	\$1.33 (30%)	\$3.09 (70%)

Costs are in 2019 dollars and discounted at 3% per year. Sums may not equal total due to rounding.

†Average annualized cost per person to implement the strategy over the model period 2022-2031 (10 years).

→ To compare the costs and impacts of strategies, use the [CHOICES National Action Kit comparison builder](#). The strategy implementation cost tables included in this report may provide information useful for planning purposes.

DEFINITIONS

All costs include budgetary and opportunity costs.

Budgetary costs refer to the actual financial costs incurred.

Opportunity costs refer to the value of what you have to give up in order to choose something else. For example, if an annual professional development training for bullying prevention is replaced with a training for active physical education, there is no budgetary impact, but costs for teachers to attend the training are considered an opportunity cost. The opportunity cost of their time is included in a cost analysis from a societal perspective.

HEALTH EQUITY INDICATORS

Describes the projected impact of implementing a strategy nationally on health equity by race, ethnicity, and income.

Every person deserves access to healthy foods and drinks and opportunities to be physically active, which can help them grow up and live at a healthy weight. However, obesity levels vary by race, ethnicity, and income. Nationally, current and future projected obesity levels are highest among Black or African American and Hispanic or Latino race and ethnicity groups and populations with low household incomes.¹ These disparities are driven by many forces, including commercial determinants leading to increased intake of highly processed and marketed foods and drinks, as well as structural racism and social and economic determinants of health.²⁻⁴ Effective policy and programmatic strategies promoting improved nutrition and increased physical activity can reduce health disparities and improve health equity.

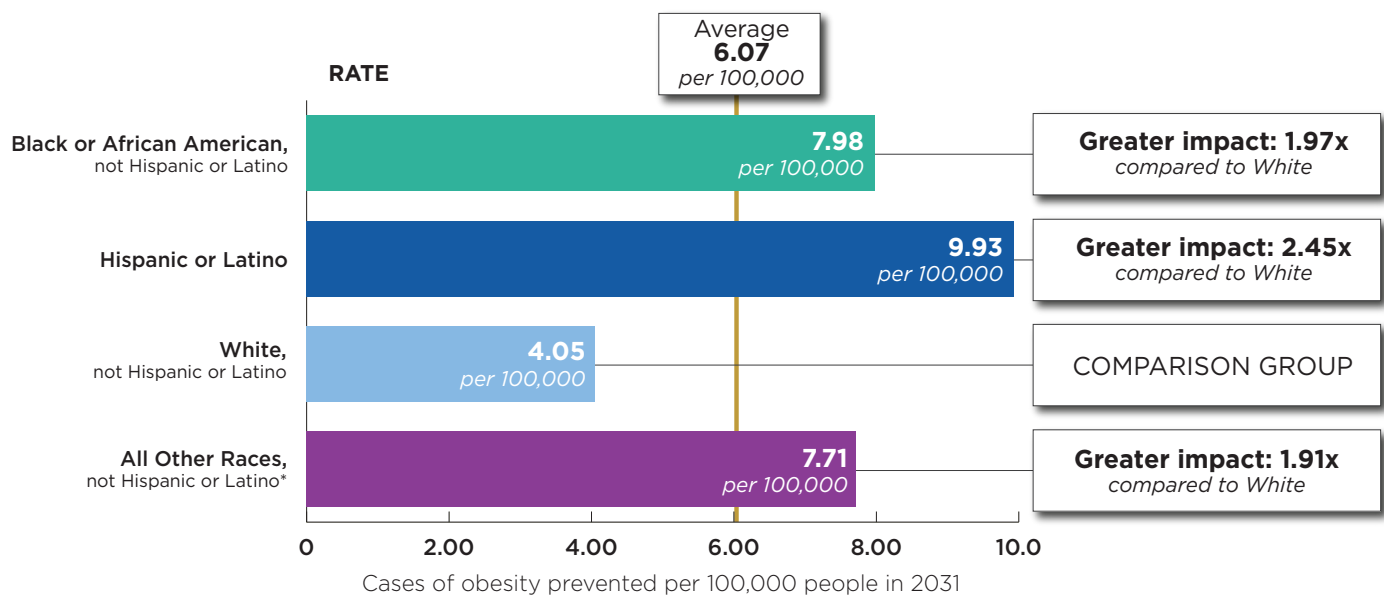
KEY TAKEAWAYS

If implemented over 10 years (2022-2031), this strategy is projected to:

- ✓ Prevent 21,600 cases of obesity in 2031
- ✓ Prevent cases of obesity in all race, ethnicity, and income groups
- ✓ Improve health equity by race, ethnicity, and income

Learn more about CHOICES methods for projecting health equity impacts at choicesproject.org/methods/healthequity

Comparative projected impact of the strategy by race and ethnicity



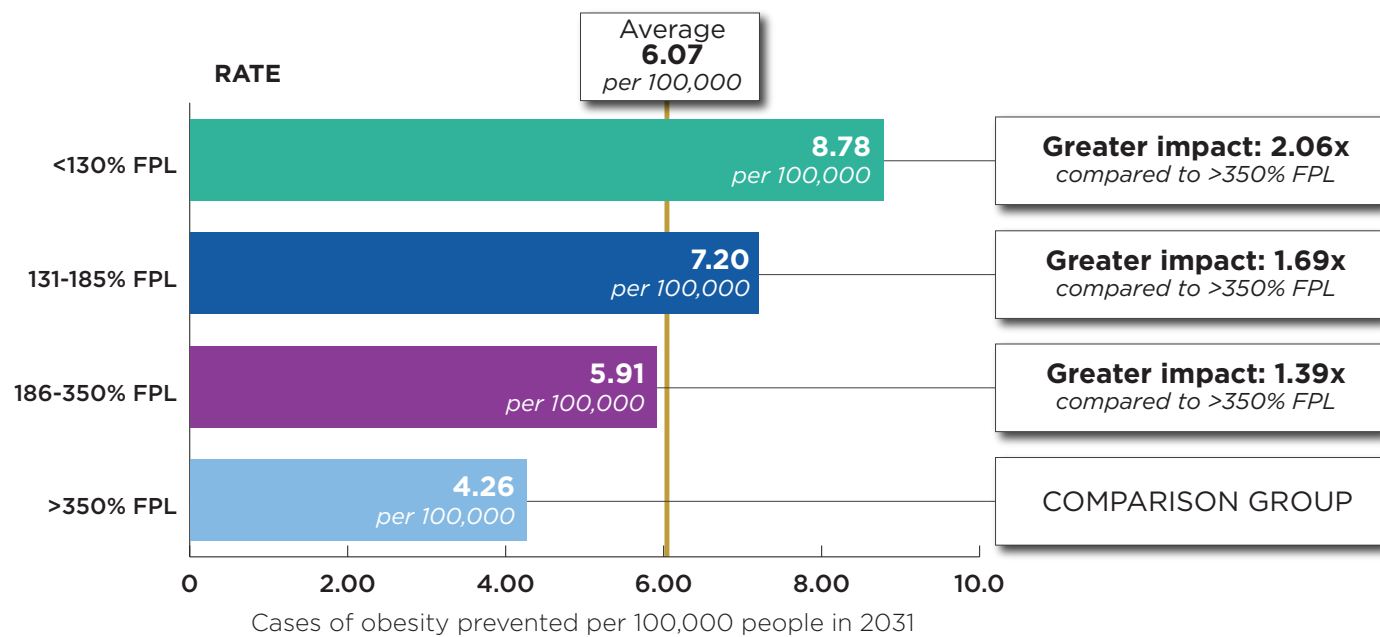
*All Other Races includes people who identify as American Indian/Alaska Native, Asian, Native Hawaiian or Pacific Islander, Multi-racial, or another race or ethnicity not represented in the categories shown. While each of these groups represent distinct populations with differences in health opportunities, risk, and outcomes, they are summarized together due to limited data in national- and state-level surveillance systems.



The Black or African American and Hispanic or Latino populations are projected to experience preventive benefits that are 1.97 and 2.45 times greater compared to the White population. The comparative impact in each population group compared to the population average is provided in a table on [page 9](#).

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Comparative projected impact of the strategy by household income as a percentage of the federal poverty level (FPL)



Populations with lower household incomes (185% FPL or less) are projected to experience preventive benefits that are 1.69-2.06 times greater compared to populations with the highest income (>350% FPL). *The comparative impact in each population group compared to the population average is provided in a table on [page 9](#).*

How is this strategy expected to impact health equity?

Every child deserves opportunities to be physically active each day to support their health and wellbeing. Physical activity plays a vital role in children's physical and mental health.⁵ Not all children have access to safe streets, playgrounds, or spaces to be physically active.^{6,7} Recess provides an opportunity for students to be physically active during regularly scheduled periods within the school day, with play monitored by trained staff or volunteers. Together with physical education and other opportunities during the school day, recess contributes to a physically active school environment. While most elementary schools provide regularly scheduled recess, not all schools use best practices for promoting active recess, such as training recess supervisors.^{8,9} Active recess promotes increased physical activity by providing structured activities, playground markings, and/or portable play equipment in elementary schools. Helping all educators and recess monitors integrate these best practices for active recess will ensure more students can be active, healthy, and ready to learn. Implementing active recess in public schools is expected to improve student health and promote health equity for Black and Hispanic or Latino students and students from households with lower incomes, who are more likely to attend public schools compared with non-Hispanic/Latino White students and students in households with higher incomes.¹⁰⁻¹³

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Projected impact of the strategy by race, ethnicity and income, mean (95% UI)^a

	OBEESITY PREVENTED^b	OBEESITY PREVENTED PER 100,000^b	COMPARATIVE IMPACT^c	
	<i>Cases of obesity prevented in the final year</i>	<i>Cases of obesity prevented per 100,000 people in the final year</i>	<i>Ratio of obesity prevented per 100,000</i>	
Race and Ethnicity			<u>Compared with White, not Hispanic or Latino</u>	<u>Compared with Population Average</u>
Overall	21,600 (2,300; 59,700)	6.07 (0.644; 16.8)	--	1.00 (Reference) N/A
Black or African American, not Hispanic or Latino	3,620 (345; 10,200)	7.98 (0.766; 22.4)	1.97 (1.21; 2.91) >99% likelihood of greater impact	1.32 (0.93; 1.74) 94% likelihood of greater impact
Hispanic or Latino	7,210 (776; 20,600)	9.93 (1.07; 28.4)	2.45 (1.65; 3.88) >99% likelihood of greater impact	1.64 (1.26; 2.07) >99% likelihood of greater impact
White, not Hispanic or Latino	8,370 (889; 23,400)	4.05 (0.429; 11.3)	1.00 (Reference) N/A	0.67 (0.51; 1.81) >99% likelihood of lesser impact
All Other Races, not Hispanic or Latino ^d	2,430 (201; 6,840)	7.71 (0.636; 21.8)	1.91 (1.20; 2.79) 99% likelihood of greater impact	1.27 (0.86; 1.71) 89% likelihood of greater impact
Household Income as a percentage of the federal poverty level (FPL)			<u>Compared with >350% FPL</u>	<u>Compared with Population Average</u>
Overall	21,600 (2,300; 59,700)	6.07 (0.644; 16.8)	--	1.00 (Reference) N/A
<130% FPL	7,450 (746; 20,600)	8.78 (0.874; 24.3)	2.06 (1.49; 2.90) >99% likelihood of greater impact	1.45 (1.21; 1.74) >99% likelihood of greater impact
131-185% FPL	2,660 (287; 7,530)	7.20 (0.772; 20.3)	1.69 (1.07; 2.48) >98% likelihood of greater impact	1.19 (0.84; 1.58) 88% likelihood of greater impact
186-350% FPL	5,430 (545; 15,100)	5.91 (0.591; 16.5)	1.39 (1.01; 1.89) 98% likelihood of greater impact	0.97 (0.77; 1.17) 62% likelihood of lesser impact
>350% FPL	6,080 (632; 16,200)	4.26 (0.445; 11.3)	1.00 (Reference) N/A	0.70 (0.56; 0.85) >99% likelihood of lesser impact

Projections for the model period 2022-2031 (10 years, inclusive of the start and end years).

^aResults displayed are the mean and 95% uncertainty interval (UI). CHOICES calculates 95% uncertainty intervals by running the model 1,000 times and reporting the range (95% of estimates, centered on the mean) of projected outcomes that account for uncertainty from data sources and population projections.

^bMost cases of obesity prevented are among children, since most people reached by the strategy would still be children in the final model year.

^cRatio that compares cases of obesity prevented per 100,000 in each population group with the reference group. When the value is greater than 1.0 for a population group, we project a greater health benefit for that group compared with the reference group. When the value is less than 1.0, we project a lesser health benefit. Note: Ratios are sensitive to extremely high and low rates, so they should be interpreted in the context of the absolute rates, represented by Obesity Prevented per 100,000 here. Results may differ if estimating absolute rates and relative impacts among children only. Likelihood of greater or lesser impact compared with the reference group is estimated based on running the model 1,000 times.

^dAll Other Races includes people who identify as American Indian/Alaska Native, Native Hawaiian or Pacific Islander, Multi-racial, or another race or ethnicity not represented in the categories shown. While each of these groups represent distinct populations with differences in health opportunities, risks, and outcomes, they are summarized together due to limited data in national- and state-level surveillance systems.

STRATEGY DETAILS & MODELING METHODS

Describes the reach, effect, and cost assumptions used to make national projections for the strategy, and provides links to additional resources related to the strategy.

STRATEGY

The CHOICES model for nationwide implementation of the Active Recess intervention involves implementation of a district-level program where elementary schools promote physical activity during recess via installation of playground markings, provision of portable play equipment, and/or provision of structured activities designed to increase students' activity levels.¹⁴ Examples of programs to promote active recess include Peaceful Playgrounds¹⁵ and Playworks.¹⁶ Resources from the Centers for Disease Control and SHAPE America detail strategies and tools for promoting active recess in schools.¹⁷

REACH

The intervention reaches children in grades kindergarten through 5 (ages 5-11) who attend public elementary schools not already implementing active recess strategies that choose to newly adopt the active recess program.¹⁴ It is estimated that 73.4% of elementary schools are not already implementing active recess strategies,⁹ and assumed that 100% of eligible schools newly adopt the active recess program and 67% of adopting schools will implement the active recess strategy.¹⁸⁻²⁰

The Active Recess intervention would have a 10-year reach of 37.3 million children.

EFFECT

Based on estimates from nine experimental studies,²¹⁻²⁹ it was estimated that Active Recess would lead to a 13.4 percentage point increase in the percentage of recess time students are engaged in moderate-to-vigorous physical activity (MVPA). We assumed that elementary school students are provided with 27 minutes of daily recess, on average.³⁰ We estimated that every 1-minute increase in MVPA per day would correspond with a lower BMI change of 0.02 units.³¹

Active Recess would engage children in 638 more minutes of MVPA per year. In year 2031, 21,500 cases of child obesity would be prevented.

COST

The model assumes that schools would implement one or more of the three active recess strategies as observed in the nine studies used to estimate the effect:²¹⁻²⁹ Fifty-six percent of schools implemented teacher training for promoting structured activities during recess, 78% installed playground markings on play spaces used for recess, and 78% provided portable equipment for use in recess time.¹⁴

For structured activity promotion, all teachers and recess monitors would receive a full training in the first year of implementation. In following years, new teachers and all recess monitors would receive the full training and returning teachers would receive a shorter refresher training. Playground markings would be painted using commercially available kits onto outdoor play spaces by volunteers (e.g., parents) supervised by school staff and would last for 10 years before needing replacement. Portable equipment would be purchased at the start of implementation and replaced after 5 years.¹⁴

The Active Recess intervention would incur an annual cost per child of \$4.43.

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CHOICES METHODS

CHOICES uses cost-effectiveness analysis to compare the costs and outcomes of different policies and programs promoting improved nutrition or increased physical activity in schools, early care and education and out-of-school settings, communities, and clinics. Our methods include:

- **Key partner consultation:** Working with key partners & researchers to identify the most promising programs & policies for evaluation
- **U.S. population model:** Building a computer model of the U.S. population & projecting Body Mass Index (BMI) changes & health outcomes over time
- **Systematic reviews & meta-analyses:** Synthesizing scientific literature to estimate the likely effects of promising obesity prevention interventions on BMI & physical activity
- **Cost-effectiveness analysis:** Integrating information on the economic costs & health effects of interventions, utilizing a structured & transparent process
- **Health equity lens:** Projecting the impact of effective intervention strategies on population health and health equity

Learn more about CHOICES methods at choicesproject.org/methods.

WHY DOES CHOICES USE BMI AS A POPULATION HEALTH INDICATOR?

CHOICES focuses on programs and policies that can help reverse the societal and environmental conditions that drive increases in excess body weight and that emphasize healthy eating, improved physical activity, and reduced screen viewing. Excess body weight is associated with reduced quality of life and increased risk for chronic diseases like diabetes, heart disease, and cancers,³² greater healthcare expenditures,³³ and increased mortality risk.³⁴ Obesity is a category of excess weight defined by body mass index (BMI), which is calculated as the ratio of a person's weight (kg) to their height squared (m²).³⁵ Obesity is a chronic health condition recognized by the National Institutes of Health, the American Medical Association, Medicare, and Medicaid.

BMI is a useful population health indicator, although it does have limitations. BMI has been shown to be a good measure of individual-level adiposity, correlating highly ($r=0.8$) with gold standard measures of percent body fat, among adults, children and adolescents and for different gender and racial and ethnic groups.^{36,37} BMI is relatively simple to collect and easy to calculate, and it is used widely in medical and scientific research to measure population health.

However, weight stigma occurs when people are blamed for their weight. Weight stigma can increase a person's risk of engaging in unhealthy eating behaviors and low levels of physical activity and can reduce both the quality of health care a person receives and their utilization of care, all undermining public health.³⁸ CHOICES evaluates the cost-effectiveness of policies and programs aimed at improving nutrition and physical activity environments, promoting related health behaviors, and promoting a healthy weight across all population groups and BMI levels.

For Additional Information

Contact the CHOICES team at choicesproject@hsph.harvard.edu for additional information about model assumptions.

For more information about this strategy, see:

Cradock AL, Barrett JL, Kenney EL, Giles CM, Ward ZJ, Long MW, Resch SC, Pipito AA, Wei ER, Gortmaker SL. Using cost-effectiveness analysis to prioritize policy and programmatic approaches to physical activity promotion and obesity prevention in childhood. *Prev Med.* 2017 Feb;95 Suppl: S17-S27. doi: 10.1016/j.ypmed.2016.10.017. Supplemental Appendix with strategy details available at: <https://ars.els-cdn.com/content/image/1-s2.0-S0091743516303395-mmc1.docx>

CHOICES NATIONAL ACTION KIT: MODELED OUTCOMES GLOSSARY

Provides definitions for each modeled output displayed in the National Results table.

Modeled Output	Definition
BEHAVIOR CHANGE PER PERSON* <i>Change in health behavior per person in the first year</i>	<p>The change in health behavior a person is projected to have after a strategy is put in place. Health behavior changes may include decreases in sugary drink intake, increases in physical activity, decreases in time spent watching TV, or increases in water intake. Behavior change per person is reported when the strategy aims to improve a specific health behavior and data are available to project how much a behavior would improve.</p> <p><i>Averaged across people who actually receive the strategy.</i></p>
COST PER PERSON <i>Average annualized cost per person to implement the strategy over the model period</i>	<p>The average annualized cost to implement the strategy over the model period (e.g., 10 years) per person reached over the model period. This includes cost by all payers (government, private sector, non-profit, individual/family).</p> <p>See the Cost Results for a breakdown of implementation costs by activity and payer.</p> <p><i>Averaged across people in the intended population of focus where the strategy is adopted (that is, people who are eligible based on age, income, geographic area, and/or participation in the setting or program of focus, and who could potentially receive the strategy based on estimated adoption rates).</i></p>
POPULATION REACH* <i>Reach over the model period</i>	<p>The number of people reached by the strategy over the model period.</p> <p><i>Includes all people in the intended population of focus where the strategy is adopted (that is, people who are eligible based on age, income, geographic area, and/or participation in the setting or program of focus, and who could potentially receive the strategy based on estimated adoption rates).</i></p>
OBESITY PREVENTED* <i>Cases of obesity prevented in the final year</i>	<p>In the final year of the model, the difference in the projected number of people with obesity if the strategy were not put in place and the projected number of people with obesity if the strategy were put in place.</p>
CHILD OBESITY PREVENTED* <i>Cases of child obesity prevented in the final year</i>	<p>In the final year of the model, the difference in the projected number of children with obesity if the strategy were not put in place and the projected number of children with obesity if the strategy were put in place.</p>
HEALTH EQUITY IMPACT* <i>Impact on obesity-related health equity in the final year</i>	<p>The projected impact on differences in obesity levels between population groups defined by race, ethnicity, and by household income. Learn more about our methods for projecting health equity impacts.</p>
QUALITY-ADJUSTED LIFE YEARS (QALYS) GAINED <i>Quality-adjusted life years (QALYs) gained (totals over the model period)</i>	<p>The difference in total number of quality-adjusted life years (QALYs) in the population over the model period if the strategy were not put in place compared with if the strategy were put in place. A QALY is a measure of both the quantity and quality of life. CHOICES estimates the QALYs gained as a measure of how much implementing a strategy to prevent future excess weight gain could improve the quantity and quality of life for a population. See our User Guide for more information about QALYs.</p>
OBESITY YEARS PREVENTED <i>Years with obesity prevented (totals over the model period)</i>	<p>The difference in total number of person-years lived without obesity if the strategy were not put in place compared with if the strategy were put in place. This measure sums up portions of years lived without obesity across all the persons in the model, comparing the result if the strategy were put in place or not.</p>
HEALTH CARE COSTS SAVED PER \$1 INVESTED <i>Total health care costs saved per total intervention costs over the model period</i>	<p>The amount avoided in health care cost related to excess weight for every dollar spent to implement the strategy over the model period.</p> <p>See the Cost Results for a breakdown of implementation costs by activity and payer.</p>
COST PER QALY GAINED <i>Net cost per quality-adjusted life year (QALY) gained (totals over the model period)</i>	<p>The total cost impact to improve population health in terms of quality-adjusted life years gained. Cost per QALY gained is a measure of cost-effectiveness. It includes costs to implement a strategy, cost savings due to efficiencies when implementing a strategy, and health care cost savings related to reductions in excess weight after a strategy is implemented. See our User Guide for more information about QALYs and cost per QALY gained.</p>

All metrics reported for the population over the model period and discounted at 3% per year, unless otherwise noted. Definitions for these modeled outputs are all written assuming that an intervention is implemented.

* Not discounted.

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