

# CHOICES NATIONAL ACTION KIT:

## Improved WIC Food Package for 1-4-Year-Olds (2009) 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](http://www.choicesproject.org/actionkit).



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## 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.

*Strategy has been implemented nationally*

**Implementing the 2009 changes to the Special Supplemental Nutrition program for Women, Infants, and Children (WIC) food package for children (ages 1-4 years) to better align with dietary guidelines.**

### WHAT POPULATION BENEFITS?

Children ages 2-4 who participate in the WIC program.



✓ Prevent cases of obesity

### WHAT ARE THE ESTIMATED BENEFITS?

*Relative to not implementing the strategy*

Reduce child daily television time which can help promote healthy child weight.



✓ Projected to be cost-effective



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

➔ More details available on the CHOICES National Action Kit at [choicesproject.org/actionkit](http://choicesproject.org/actionkit)

### WHAT ACTIVITIES AND RESOURCES ARE NEEDED?

Activities	Resources	Who Leads?
Oversee WIC food package change activities at the federal level	<ul style="list-style-type: none"> <li>Time for National WIC Project Officer to oversee and manage the food package change</li> </ul>	National WIC Project Officer
Oversee and manage the food package change in each state	<ul style="list-style-type: none"> <li>Time for state WIC agency program staff to oversee and manage the food package change, including communicating the changes to WIC-eligible retailers and providing technical assistance to local WIC agencies</li> </ul>	State WIC Program Staff

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WHAT ACTIVITIES AND RESOURCES ARE NEEDED? *(continued)*

Activities	Resources	Who Leads?
<b>Update and maintain state information management systems</b>	<ul style="list-style-type: none"> <li>• Time for state database administrator to update and maintain the state’s information management system to reflect food package changes</li> </ul>	State WIC Agency Database Administrator
<b>Update retail store space, products, shelf tags, and equipment</b>	<ul style="list-style-type: none"> <li>• Cost to print and install shelf tags for grocery items that changed WIC eligibility due to the food package change</li> <li>• Time for store managers at small stores to reorganize shelf space to allocate space for WIC-eligible products</li> <li>• Cost of refrigeration equipment at small stores that require new refrigeration equipment to store newly WIC-eligible products</li> <li>• Time for store managers at small stores to add and acquire new products that meet WIC eligibility</li> </ul>	WIC-approved Retailers
<b>Train store managers and employees in all WIC-eligible stores on the food package changes</b>	<ul style="list-style-type: none"> <li>• Time for store managers to attend trainings held by state WIC offices, set up systems in the store to ring up new WIC-eligible items, and answer questions from store employees</li> <li>• Time for store employees to attend trainings</li> </ul>	State WIC Program Staff
<b>Communicate information about the food package changes to consumers in stores</b>	<ul style="list-style-type: none"> <li>• Production costs for in-store communication materials (posters, fliers) about the food package change</li> </ul>	National WIC Project Officer

- See our resource library for relevant peer-reviewed publications, research reports, & briefs at [choicesproject.org/resource-library](https://choicesproject.org/resource-library)
- Learn more about the evidence for the strategy Improved WIC Food Package for 1-4-Year-Olds (2009) in the CHOICES peer-reviewed publication: [Kenney et al. 2024 Pediatrics](#)

*Adapted from CHOICES Strategy Profile: Improved WIC Food Package for 1-4-Year-Olds (2009). CHOICES Project Team at the Harvard T.H. Chan School of Public Health, Boston, MA; March 2024.*

## NATIONAL RESULTS

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

<b>DESCRIPTION</b>	<i>Strategy has been implemented nationally</i> Implementing the 2009 changes to the WIC food package for children ages 1-4 years to better align with dietary guidelines
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OUTCOME	Mean (95% UI)*
<b>BEHAVIOR CHANGE PER PERSON</b> <i>Change in health behavior per person in the first year</i>	<i>Change in BMI was assessed directly. Individual health behaviors were not assessed.</i>
<b>COST PER PERSON</b> <i>Average annualized cost per person to implement the strategy over the model period</i>	<b>\$1.77</b> (\$1.74; \$1.81) <a href="#">See Cost Results</a>
<b>POPULATION REACH</b> <i>Reach over the model period</i>	<b>14,000,000</b> (13,700,000; 14,200,000)
<b>OBESITY PREVENTED</b> <i>Cases of obesity prevented in the final year</i>	<b>62,700</b> (53,900; 71,100)
<b>CHILD OBESITY PREVENTED</b> <i>Cases of child obesity prevented in the final year</i>	<b>62,700</b> (53,900; 71,100)
<b>HEALTH EQUITY IMPACT</b> <i>Impact on obesity-related health equity in the final year</i>	<i>Likely to improve health equity by race, ethnicity, &amp; income</i> <a href="#">See Health Equity Indicators</a>
<b>QUALITY-ADJUSTED LIFE YEARS (QALYS) GAINED</b> <i>Quality-adjusted life years (QALYs) gained (totals over the model period)</i>	<b>17,000</b> (15,400; 18,400)
<b>OBESITY YEARS PREVENTED</b> <i>Years with obesity prevented (totals over the model period)</i>	<b>362,000</b> (323,000; 405,000)
<b>HEALTH CARE COSTS SAVED PER \$1 INVESTED</b> <i>Total health care costs saved per total intervention costs over the model period</i>	<b>\$0.27</b> (\$0.27; \$0.28)
<b>COST PER QALY GAINED</b> <i>Net cost per quality-adjusted life year (QALY) gained (totals over the model period)</i>	<b>\$10,600</b> (\$9,760; \$11,700)

Projections for the model period 2010–2019 (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](https://choicesproject.org/action-kit-user-guide)
- ✓ Learn more about CHOICES Methods at [choicesproject.org/methods](https://choicesproject.org/methods)
- ✓ Find definitions of each modeled outcome in the [Glossary \(p.12\)](#) at [choicesproject.org/action-kit-glossary](https://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 cost estimates of the implementation of the improved WIC Food Package for 1-4-Year-Olds in the United States beginning in 2009. 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
Oversee WIC food package change activities at the federal level	<ul style="list-style-type: none"> <li>Time for National WIC Project Officer to oversee and manage the food package change</li> </ul>	\$0.01	Federal government	<1%
Oversee and manage the food package change in each state	<ul style="list-style-type: none"> <li>Time for state WIC agency program staff to oversee and manage the food package change, including communicating the changes to WIC-eligible retailers and providing technical assistance to local WIC agencies</li> </ul>	\$1.05	State government	59%
Update and maintain state information management systems	<ul style="list-style-type: none"> <li>Time for state database administrator to update and maintain the state's information management system to reflect food package changes</li> </ul>	\$0.003	State government	<1%
Update retail store space, products, shelf tags, and equipment	<ul style="list-style-type: none"> <li>Cost to print and install shelf tags for grocery items that changed WIC eligibility due to the food package change</li> <li>Time for store managers at small stores to reorganize shelf space to allocate space for WIC-eligible products</li> <li>Cost of refrigeration equipment at small stores that require new refrigeration equipment to store newly WIC-eligible products</li> <li>Time for store managers at small stores to add and acquire new products that meet WIC eligibility</li> </ul>	\$0.07	Industry (WIC retailers)	4%
Train store managers and employees in all WIC-eligible stores on the food package changes	<ul style="list-style-type: none"> <li>Time for store managers to attend trainings held by state WIC offices, set up systems in the store to ring up new WIC-eligible items, and answer questions from store employees</li> <li>Time for store employees to attend trainings</li> </ul>	\$0.56	Industry (WIC retailers)	31%
Communicate information about the food package changes to consumers in stores	<ul style="list-style-type: none"> <li>Production costs for in-store communication materials (posters, fliers) about the food package change</li> </ul>	\$0.08	Federal government	5%
<b>TOTAL</b>	--	<b>\$1.77</b>	--	<b>100%</b>

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 2010–2019 (10 years).

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Average Annual Strategy Implementation Cost by Payer and Cost Type			
Payer	Cost per Person†		
	All Costs (% of Total)	Budgetary Costs (% of All Costs by Payer)	Opportunity Costs (% of All Costs by Payer)
Federal government	\$0.09 (5%)	\$0.08 (92%)	\$0.01 (8%)
State government	\$1.06 (60%)	\$0.00 (0%)	\$1.06 (100%)
Local government	--	--	--
School district	--	--	--
School	--	--	--
Family/Individual	--	--	--
Industry (WIC retailers)	\$0.63 (35%)	\$0.02 (3%)	\$0.61 (97%)
Nonprofit	--	--	--
Health care	--	--	--
<b>TOTAL</b>	<b>\$1.07 (100%)</b>	<b>\$0.10 (6%)</b>	<b>\$1.67 (94%)</b>

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 2010–2019 (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.<sup>1</sup> 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.<sup>2-4</sup> Effective policy and programmatic strategies promoting improved nutrition and increased physical activity can reduce health disparities and improve health equity.

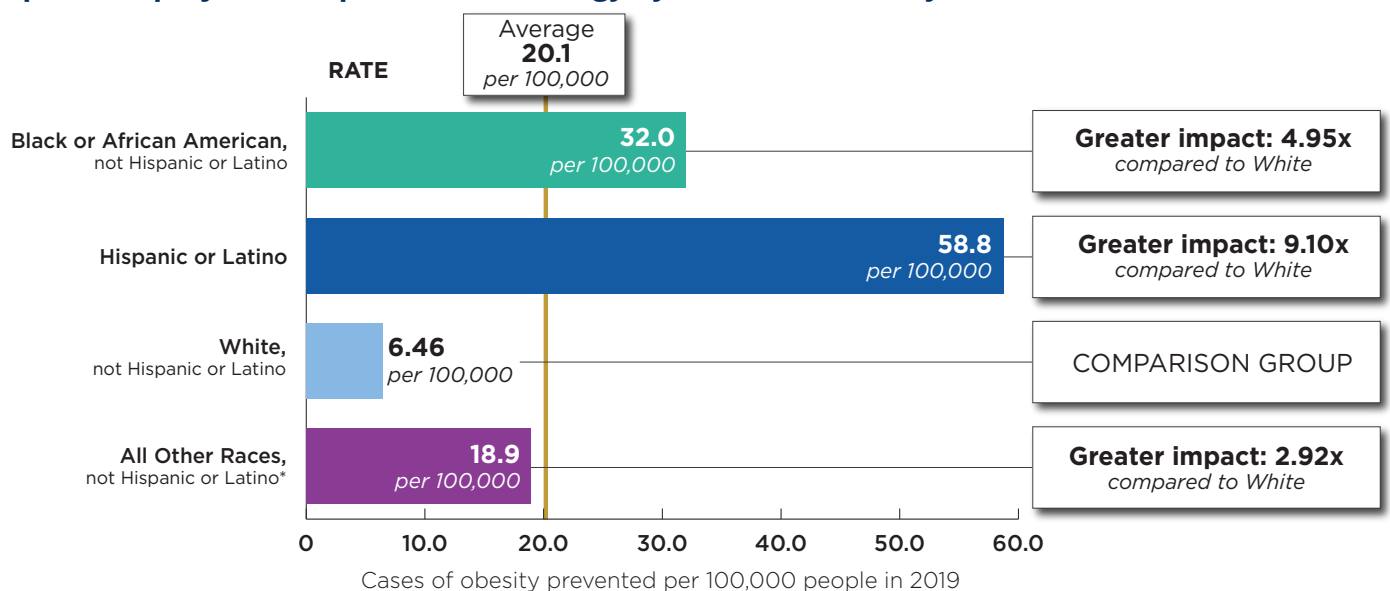
### KEY TAKEAWAYS

If implemented over 10 years (2010-2019), this strategy is projected to:

- ✓ Prevent 62,700 cases of obesity in 2019
- ✓ Prevent cases of obesity in all race and ethnicity groups and groups with lower household income
- ✓ Improve health equity by race, ethnicity, and income

Learn more about CHOICES methods for projecting health equity impacts at [choicesproject.org/methods/healthequity](https://choicesproject.org/methods/healthequity)

### Comparative projected impact of the strategy by race and ethnicity



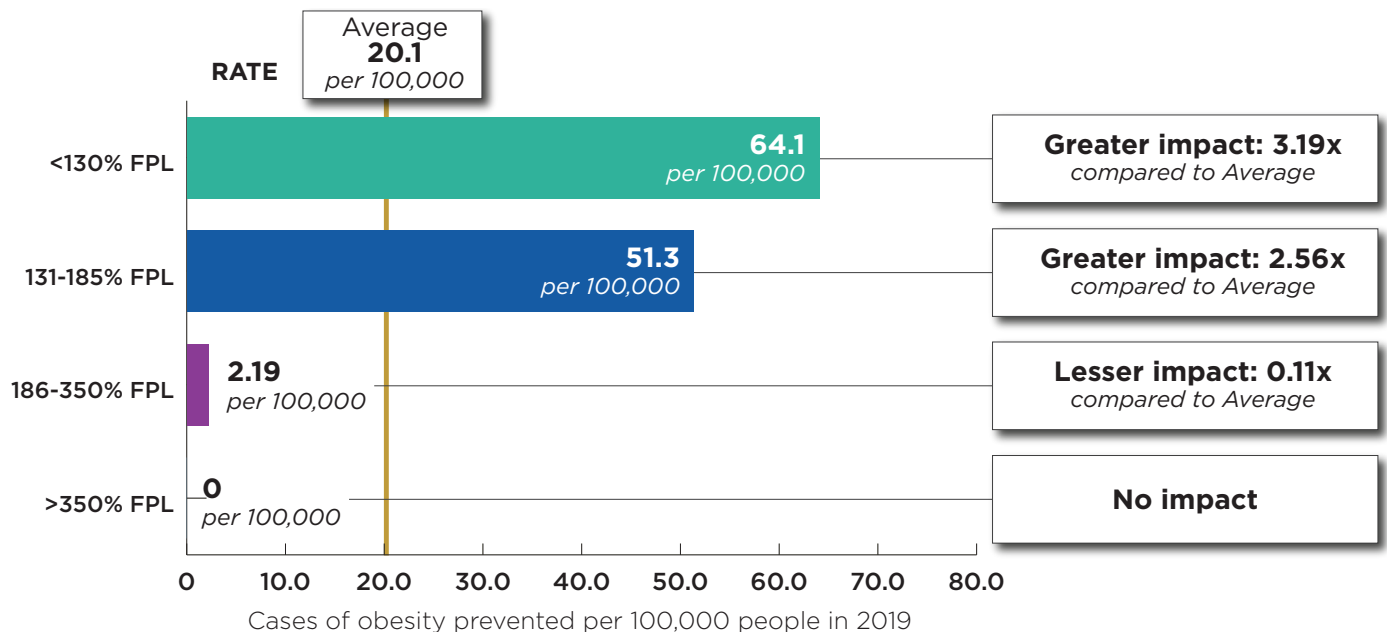
\*All Other Races includes people who identify as American Indian/Alaska Native, Native Hawaiian or Pacific Islander, Multi-racial, or another race or ethnicity not represented in the categories shown. While each of these groups represent distinct populations with differences in health opportunities,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



The Black or African American and Hispanic or Latino populations are projected to experience preventive benefits that are 4.95 and 9.10 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 the greatest preventive benefits, while the highest income group (household income >350% FPL) is not projected to experience any preventative benefits because they are not the population focus for this strategy. *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 grow up at a healthy weight. Ensuring that young children have access to healthful foods during the critical period of early development is essential for promoting healthy growth and reducing the risk of excess weight gain.<sup>5</sup> However, families with lower household incomes experience systemic and environmental barriers to accessing healthful foods,<sup>6-8</sup> and children from families with low incomes are at greater risk of inadequate nutrition<sup>9</sup> and obesity.<sup>10,11</sup> The Special Supplemental Nutrition for Women, Infants, and Children (WIC) program provides federal grants to all U.S. states to provide nutritional assistance to women and their children up to age 5 years who have low family income and are at nutritional risk.<sup>12</sup> The U.S. Department of Agriculture (USDA) administers WIC and specifies the WIC food package, a list of foods and beverages that can be obtained with WIC vouchers.<sup>12</sup> In 2009, the USDA modified the WIC food package to promote foods that could reduce future chronic disease risk as well as support adequate nutrition.<sup>13</sup> The strategy is estimated to promote health equity related to healthy weight by improving diet quality<sup>14-18</sup> and reducing obesity risk<sup>19-21</sup> among young children from households with lower incomes.

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**Projected impact of the strategy by race, ethnicity and income, mean (95% UI)<sup>a</sup>**

	OBSESITY PREVENTED <sup>b</sup>	OBSESITY PREVENTED PER 100,000 <sup>b</sup>	COMPARATIVE IMPACT <sup>c</sup>	
	<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>	
<b>Race and Ethnicity</b>			<u><i>Compared with White, not Hispanic or Latino</i></u>	<u><i>Compared with Population Average</i></u>
<b>Overall</b>	<b>62,700</b> (53,900; 71,100)	<b>20.1</b> (17.3; 22.7)	--	<b>1.00 (Reference)</b> N/A
Black or African American, not Hispanic or Latino	<b>12,400</b> (9,900; 15,300)	<b>32.0</b> (25.5; 39.4)	<b>4.95</b> (3.55; 6.75) >99% likelihood of greater impact	<b>1.59</b> (1.30; 1.93) >99% likelihood of greater impact
Hispanic or Latino	<b>33,100</b> (27,200; 39,600)	<b>58.8</b> (48.1; 70.3)	<b>9.10</b> (6.65; 12.4) >99% likelihood of greater impact	<b>2.93</b> (2.57; 3.26) >99% likelihood of greater impact
White, not Hispanic or Latino	<b>12,400</b> (9,340; 16,400)	<b>6.46</b> (4.87; 8.53)	<b>1.00 (Reference)</b> N/A	<b>0.32</b> (0.26; 0.40) >99% likelihood of lesser impact
All Other Races, not Hispanic or Latino <sup>d</sup>	<b>4,820</b> (3,270; 6,660)	<b>18.9</b> (12.8; 26.1)	<b>2.92</b> (1.73; 4.04) >99% likelihood of greater impact	<b>0.94</b> (0.65; 1.22) 66% likelihood of lesser impact
<b>Household Income as a percentage of the federal poverty level (FPL)</b>			<u><i>Compared with &gt;350% FPL</i></u>	<u><i>Compared with Population Average</i></u>
<b>Overall</b>	<b>62,700</b> (53,900; 71,100)	<b>20.1</b> (17.3; 22.7)	--	<b>1.00 (Reference)</b> N/A
<130% FPL	<b>44,200</b> (36,900; 51,300)	<b>64.1</b> (53.8; 74.2)	Not compared since no impact in reference group	<b>3.19</b> (2.93; 3.38) >99% likelihood of greater impact
131-185% FPL	<b>16,800</b> (13,000; 20,200)	<b>51.3</b> (39.7; 62.1)		<b>2.56</b> (2.16; 3.09) >99% likelihood of greater impact
186-350% FPL	<b>1,800</b> (1,080; 2,990)	<b>2.19</b> (1.31; 3.61)		<b>0.11</b> (0.07; 0.18) >99% likelihood of lesser impact
>350% FPL	<b>0</b> (0; 0)	<b>0</b> (0; 0)		<b>0</b> (0; 0) >99% likelihood of lesser impact

Projections for the model period 2010–2019 (10 years, inclusive of the start and end years).

<sup>a</sup>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.

<sup>b</sup>All cases of obesity prevented are among children, since all people reached by the strategy would still be children in the final model year.

<sup>c</sup>Ratio 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.

<sup>d</sup>All 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.*

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### STRATEGY

We modeled nationwide implementation of the 2009 changes to the WIC food package for 1-4-year-old children.<sup>22</sup> These changes directed WIC benefits toward less juice, cheese, and eggs, more whole grains, and low-fat or nonfat milk, and added a cash value voucher for fruits and vegetables.<sup>13</sup>

Cost-effectiveness estimates for this strategy that has been implemented nationally can inform federal government decision making as further food package changes are considered. Revised WIC food packages were finalized in April 2024, with updates aiming to promote equitable access to nutritious foods by encouraging fruit and vegetable consumption, providing WIC participants with a greater variety of foods that align with the latest nutritional science, and allowing WIC state agencies greater flexibility to tailor food packages, including accommodating cultural food preferences.<sup>23</sup>

### REACH

We evaluated the impact of the 2009 WIC package change on children ages 2 to 4 years.<sup>22</sup> Although the food package is for 1-4-year-olds, we focused on 2-4-year-olds because obesity prevalence is not calculated by WIC in 1-year-olds and our analyses estimate health outcomes using BMI z-scores, which are not defined for children under 2 years of age.

The strategy was estimated to reach 31% of children ages 2 to 4 years, for a total of 3.78 million children, in the first year of implementation. We accounted for differences in WIC participation among eligible children by state, age, race, and ethnicity.<sup>24</sup> The percentage of children ages 2 to 4 reached varies by state according to differences in the percent of children eligible for and participating in WIC.

The 2009 WIC package change was estimated to have a 10-year reach of 14 million children.<sup>22</sup>

### EFFECT

To estimate the impact of the 2009 WIC food package change on weight change, we used state-specific estimates from a natural experimental study with an interrupted time series analysis examining the association of the 2009 package change with changes over time in obesity prevalence among children participating in WIC.<sup>19,22</sup> This analysis found that obesity prevalence among 2- to 4-year olds participating in WIC declined by an estimated 0.34 percentage points per year after the package change was implemented, while prevalence had been increasing by 0.23 percentage points per year before the package change was implemented.<sup>19</sup> Supplementary analyses of these data estimated the average BMI change associated with the package change (comparing BMI trends after the package change with those before the package change) was -0.162 over 2 years. State-specific BMI effects were used to account for strong observed state-level variation.

With the 2009 WIC food package in place, we estimate that, in 2019, the strategy prevented 62,700 cases of obesity, all of which were among children.<sup>22</sup>

### COST

Costs to implement the 2009 WIC food package change included costs incurred by the federal government, state governments, and WIC retailers.<sup>22</sup> Federal government labor costs to oversee and manage the WIC food package change at the federal level and production costs for in-store communication materials about the food package change were included. State government

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## IMPROVED WIC FOOD PACKAGE FOR 1-4-YEAR-OLDS (2009) STRATEGY DETAILS & MODELING METHODS

(continued)

labor costs to oversee and manage the WIC food package change in each state, including communicating the changes to WIC-eligible retailers and providing technical assistance to local WIC agencies, and to update and maintain state information management systems to reflect the food package changes were included. For WIC retailers, we assumed labor and equipment costs to update retail store space, products, shelf tags, and equipment, as well as labor costs to store managers and employees to attend trainings on the food package changes. No additional food costs were included, since the package change was designed to be cost-neutral and has not increased the average food package cost.<sup>25</sup> Costs were estimated based on administrative reports and personal communication with WIC agency staff.<sup>22</sup>

We estimated that the 2009 WIC food package change incurred an annual cost per child of \$1.77.<sup>22</sup>

### 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](https://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,<sup>26</sup> greater healthcare expenditures,<sup>27</sup> and increased mortality risk.<sup>28</sup> 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 (m<sup>2</sup>).<sup>29</sup> 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.<sup>30,31</sup> 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.<sup>32</sup> 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.

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### For Additional Information

Contact the CHOICES team at [choicesproject@hsph.harvard.edu](mailto:choicesproject@hsph.harvard.edu) for additional information about model assumptions.

# CHOICES NATIONAL ACTION KIT: MODELED OUTCOMES GLOSSARY

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

Modeled Output	Definition
<b>BEHAVIOR CHANGE PER PERSON*</b> <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>
<b>COST PER PERSON</b> <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 <a href="#">Cost Results</a> 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>
<b>POPULATION REACH*</b> <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>
<b>OBESITY PREVENTED*</b> <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>
<b>CHILD OBESITY PREVENTED*</b> <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>
<b>HEALTH EQUITY IMPACT*</b> <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. <a href="#">Learn more about our methods for projecting health equity impacts.</a></p>
<b>QUALITY-ADJUSTED LIFE YEARS (QALYS) GAINED</b> <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 <a href="#">User Guide</a> for more information about QALYs.</p>
<b>OBESITY YEARS PREVENTED</b> <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>
<b>HEALTH CARE COSTS SAVED PER \$1 INVESTED</b> <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 <a href="#">Cost Results</a> for a breakdown of implementation costs by activity and payer.</p>
<b>COST PER QALY GAINED</b> <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 <a href="#">User Guide</a> 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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