CHOICES NATIONAL ACTION KIT:

Electronic Decision Support for Pediatric Medical Providers 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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Electronic Decision Support for Pediatric Medical Providers

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.

Promoting recognition and recommended management of obesity among children ages 6-12 through electronic decision supports for pediatric medical providers during well-child visits.

WHAT POPULATION BENEFITS?

Children ages 6-12 years old with obesity (BMI>95th percentile) who are being seen by primary care providers with fully-functioning electronic health records systems.

WHAT ARE THE ESTIMATED BENEFITS?

Relative to not implementing the strategy

Increase nutrition and physical activity health-promoting behaviors and, as a result, promote healthy child weight.

✓ **Prevent cases of obesity**

✓ **Projected to be cost-effective**

—***There is not enough evidence to assess the strategy's potential impact on health equity***

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

WHAT ACTIVITIES AND RESOURCES ARE NEEDED?

Activities	Resources	Who Leads?
Oversee and implement electronic decision support for pediatric medical providers	• Time for health system project coordinator to develop content for website, project dissemination plan, and training materials	Health system project coordinator
Modify electronic health record system to prompt providers to recognize and manage obesity at clinics	• Time for electronic health record system staff to update electronic health record system	Electronic health record system staff
Develop and maintain a website to share local nutrition and physical activity resources to support healthy behaviors	• Time to develop and maintain the website	Health system website developer and staff

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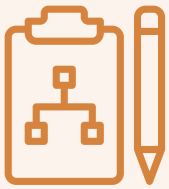
WHAT ACTIVITIES AND RESOURCES ARE NEEDED? *(continued)*

Activities	Resources	Who Leads?
Train in motivational interviewing and electronic health system changes and provide performance feedback to primary care providers	• Time for health system project coordinator and/ or electronic health records system manager to lead trainings and to provide performance feedback to primary • care providers • Time for primary care providers to attend trainings • Training material costs • Food costs to offer with trainings	Health system project coordinator, electronic health records system manager, practice coach, and/or operations manager
Develop and deliver direct-to-parent communications	• Time for the health systems project coordinator to develop content for communications materials for families • Costs for printing and mailing materials	Health systems project coordinator
Additional time in clinics by primary care providers	• Additional time for primary care clinicians to spend with patients in office	Primary care clinicians
Material costs for primary care offices	• Costs for printing posters to be displayed in primary care offices	Health system



Strategy Modification

Some state and local health agencies replaced parent mailings with text messages, following a strategy modification that was shown to be effective in a research study. In the text messaging scenario, this strategy could reach children ages 2-12 and we estimate BMI would decrease (-0.3 units or about -1.24 lbs for a 9-year-old of average height). If a text messaging platform already exists in clinics, this could be less expensive than parent mailings.

- 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 Electronic Decision Support for Pediatric Medical Providers for a US local area:

  Denver, CO
- Learn more about the evidence for the strategy Electronic Decision Support for Pediatric Medical Providers in the CHOICES peer-reviewed publication:

  Sharifi et al. 2017. *Pediatrics*

Adapted from CHOICES Strategy Profile: Electronic Decision Support for Pediatric Medical Providers. CHOICES Project Team at the Harvard T.H. Chan School of Public Health, Boston, MA; April 2022.

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	Promoting recognition and recommended management of obesity among children ages 6-12 through electronic decision supports for pediatric medical providers during well-child visits

OUTCOME	**Mean** (95% UI)*
BEHAVIOR CHANGE PER PERSON *Change in health behavior per person in the first year*	*Change in BMI was assessed directly. Individual health behaviors were not assessed.*
COST PER PERSON *Average annualized cost per person to implement the strategy over the model period*	**$16.60** ($13.60; $19.30) See Cost Results
POPULATION REACH *Reach over the model period*	**4,200,000** (3,180,000; 4,560,000)
OBESITY PREVENTED *Cases of obesity prevented in the final year*	**52,200** (16,300; 91,000)
CHILD OBESITY PREVENTED *Cases of child obesity prevented in the final year*	**48,100** (15,200; 81,200)
HEALTH EQUITY IMPACT *Impact on obesity-related health equity in the final year*	**Not assessed** *There is not enough evidence to assess the strategy's potential impact on health equity.*
QUALITY-ADJUSTED LIFE YEARS (QALYS) GAINED *Quality-adjusted life years (QALYs) gained (totals over the model period)*	**7,000** (2,180; 11,400)
OBESITY YEARS PREVENTED *Years with obesity prevented (totals over the model period)*	**301,000** (98,000; 489,000)
HEALTH CARE COSTS SAVED PER $1 INVESTED *Total health care costs saved per total intervention costs over the model period*	**$0.20** ($0.05; $0.38)
COST PER QALY GAINED *Net cost per quality-adjusted life year (QALY) gained (totals over the model period)*	**$79,100** ($34,500; $265,000)

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.9) 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 the strategy Electronic Decision Support for Pediatric Medical Providers if implemented in pediatric medical practices across 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
Oversee and implement electronic decision support for pediatric medical providers	• Time for health system project coordinator to develop content for website, project dissemination plan, and training materials	$0.003	Health care	<1%
Modify electronic health record system to prompt providers to recognize and manage obesity at clinics	• Time for electronic health record system staff to update electronic health record system	$0.74	Health care	4%
Develop and maintain a website to share local nutrition and physical activity resources to support healthy behaviors	• Time to develop and maintain the website	$1.02	Health care	6%
Train in motivational interviewing and electronic health system changes and provide performance feedback to primary care providers	• Time for health system project coordinator and/ or electronic health records system manager to lead trainings and to provide performance feedback to primary care providers • Time for primary care providers to attend trainings • Training material costs • Food costs to offer with trainings	$0.21	Health care	1%
Develop and deliver direct-to-parent communications	• Time for the health systems project coordinator to develop content for communications materials for families • Costs for printing and mailing materials	$12.53	Health care	76%
Additional time in clinics by primary care providers	• Additional time for primary care clinicians to spend with patients in office	$2.05	Health care	12%
Material costs for primary care offices	• Costs for printing posters to be displayed in primary care offices	$0.004	Health care	<1%
TOTAL	--	**$16.60**	--	**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).

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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	--	--	--
School	--	--	--
Family/Individual	--	--	--
Industry	--	--	--
Nonprofit	--	--	--
Health care	$16.60 (100%)	$0.75 (5%)	$15.80 (95%)
TOTAL	**$16.60 (100%)**	**$0.75 (5%)**	**$15.80 (95%)**

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.

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 involves nationwide implementation of modifications to electronic medical records to prompt providers to recognize and manage pediatric obesity.[1] This strategy was based on an intervention evaluated in a cluster-randomized clinical trial called the Study of Technology to Accelerate Research (STAR).[2,3] The STAR clinical intervention is a childhood obesity intervention that utilizes decision support tools in electronic medical records to facilitate the recognition and management of pediatric obesity by primary care providers, such as pediatricians, at annual well-child care visits.

More information on STAR materials, tools, and trainings are available on the Massachusetts General Hospital website.[4]

REACH

This intervention would reach all children ages 6 to 12 years old in the United States, with obesity (BMI > 95th percentile), who are currently being seen by primary care physicians who have fully-functioning electronic medical records systems that are capable of the type of clinical decision support tools used in STAR.[5-7]

The expected population reach of the strategy Electronic Decision Support for Pediatric Medical Providers if implemented in eligible pediatric medical practices across the U.S. over 10 years is 4.2 million children.

EFFECT

The STAR trial found that children seen at pediatric medical practices that adopted clinical decision support tools experienced a 1-year BMI change that was 0.5 units (kg/m^2) lower than BMI changes among children receiving usual care.[3] Impacts on specific health behaviors were not assessed.

By 2031, 52,200 cases of obesity would be prevented.

POTENTIAL IMPACT ON HEALTH EQUITY

There is not enough evidence to assess the strategy's potential impact on health equity. However, assuming children of all races, ethnicities, and incomes have equitable access to pediatric medical providers with fully-functional electronic medical records systems,[8] this strategy could improve health equity by race, ethnicity, and income. A model of this strategy in Denver, Colorado, was projected to improve health equity by race and ethnicity.[9] Implementation of STAR was modeled in Denver Health, a health system that predominantly serves a higher proportion of racial and ethnic minority groups. The strategy was projected to result in greater health improvements among Hispanic and Black populations in Denver compared to White populations.[9]

COST

Cost estimates for the national model were based on the STAR trial[3] conducted at 2 multi-site group practices in Massachusetts. The model assessed one-time, start-up intervention costs related to electronic medical records modifications, website development, training of primary care physicians (PCPs), and the development of materials for self-guided behavior change support for parents.

Ongoing costs were included for continued training and performance feedback to PCPs, website maintenance, additional clinical time spent by PCPs per child, and mailings to families.

Electronic Decision Support for Pediatric Medical Providers would incur an annual cost per child of $16.60.

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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,[10] greater healthcare expenditures,[11] and increased mortality risk.[12] 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^2).[13] 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.[14,15] 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.[16] 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:

Sharifi M, Franz C, Horan CM, Giles C, Long M, Ward Z, Resch S, Marshall R, Gortmaker S, Taveras E. Cost-Effectiveness of a Clinical Childhood Obesity Intervention. Pediatrics. 2017; 140(5): e20162998.

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* *Change in health behavior per person in the first year*	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. *Averaged across people who actually receive the strategy.*
COST PER PERSON *Average annualized cost per person to implement the strategy over the model period*	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). See the Cost Results for a breakdown of implementation costs by activity and payer. *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).*
POPULATION REACH* *Reach over the model period*	The number of people reached by the strategy over the model period. *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).*
OBESITY PREVENTED* *Cases of obesity prevented in the final year*	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.
CHILD OBESITY PREVENTED* *Cases of child obesity prevented in the final year*	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.
HEALTH EQUITY IMPACT* *Impact on obesity-related health equity in the final year*	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.
QUALITY-ADJUSTED LIFE YEARS (QALYS) GAINED *Quality-adjusted life years (QALYs) gained (totals over the model period)*	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.
OBESITY YEARS PREVENTED *Years with obesity prevented (totals over the model period)*	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.
HEALTH CARE COSTS SAVED PER $1 INVESTED *Total health care costs saved per total intervention costs over the model period*	The amount avoided in health care cost related to excess weight for every dollar spent to implement the strategy over the model period. See the Cost Results for a breakdown of implementation costs by activity and payer.
COST PER QALY GAINED *Net cost per quality-adjusted life year (QALY) gained (totals over the model period)*	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.

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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