SUPPLEMENTAL FILES

Appendix to: Cost-effectiveness of calorie labeling at large fast-food chains across the U.S.

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This study uses the Childhood Obesity Intervention Cost-Effectiveness Study (CHOICES) microsimulation model to project the future impact of an intervention strategy on population health and healthcare costs. The modeling methods and data sources are described in detail in Gortmaker et al. 2015 *Health Affairs*, Appendix A3[1] available at: https://www.healthaffairs.org/doi/suppl/10.1377/hlthaff.2015.0631. The current study uses the same approach, with updated model inputs and assumptions to reflect new data available and methodological refinements made over time.

Some of the content included in this supplement was copied from recent CHOICES work, including:

> Gortmaker SL, Wang YC, Long MW, et al. Three Interventions That Reduce Childhood Obesity Are Projected To Save More Than They Cost To Implement. Health Aff (Millwood). 2015;34(11):1932-1939.[1]
>
> Ward ZJ, Barrett JL, Cradock AL, Dupuis R, Lee MM, Long MW, Musicus AA, Gortmaker SL. Childhood Obesity Intervention Cost-Effectiveness Study (CHOICES) Microsimulation Model Technical Documentation: Details on Model Parameters (CHOICES v4.6.1). CHOICES Project Team at the Harvard T.H. Chan School of Public Health, Boston, MA; March 2023. Available at: https://choicesproject.org/methods/choices-model-technical-documentation/.[2]

Microsimulation model parameters

CHOICES microsimulation model methods and data sources were first introduced in Gortmaker et al. 2015 *Health Affairs,* Appendix A3,[1] available at: https://www.healthaffairs.org/doi/suppl/10.1377/hlthaff.2015.0631. Some model assumptions and data sources have been updated since introduced to reflect new data available and methodological refinements made over time. See CHOICES Microsimulation Model Technical Documentation for additional detail, available at: https://choicesproject.org/methods/choices-model-technical-documentation/.

Appendix Table 1. Microsimulation model parameters, CHOICES v4.6.1[a]

Model parameter	Modeling assumption	Sources
Demographic characteristics: Sex, race, ethnicity, census tract, and age	Individuals were sampled randomly within census tracts to create a simulated population of 1,000,000 children and adults at model initiation.	U.S. 2010 Census
Demographic characteristics: Household income, poverty ratio, public school attendance, and SNAP participation[b]	Individual demographic variables not included in 2010 Census were assigned using non-parametric statistical matching techniques conditional on age, sex, race, ethnicity, and census tract.[1,3–5]	2013-2017 American Community Survey 5-year microdata
Adult self-reported height and weight[b]	Individual self-reported height and weight were sampled (with replacement) proportional to sampling weights and assigned to individuals conditional on age, sex, race, ethnicity, household income, and state. Adjusted for self-report bias[6] (see measured height and weight below).	2013-2017 Behavioral Risk Factor Surveillance System
Child and adolescent parent-reported height and weight[b]	Individual parent-reported height and weight were sampled (with replacement) proportional to sampling weights and assigned to individuals conditional on age, sex, race, ethnicity, household income, and state. Recent National Survey of Children's Health releases do not report individual-level BMI, so BMI categories are used. Adjusted for self-report bias[7] (see measured height and weight below).	2003-2018 National Survey on Children's Health
Measured height and weight, and dietary intake[b]	Individual objectively-measured height and weight were sampled (with replacement) proportional to sampling weights and assigned to individuals conditional on age, sex, race, ethnicity, household income, and self- or parent-reported height and weight percentile. Food frequencies and dietary intake were sampled.	2011-2016 National Health and Nutrition Examination Survey (NHANES)

Model parameter	Modeling assumption	Sources
Lifetime height and weight trajectories[b]	Lifetime height and weight trajectories based on a published analysis of data synthesized from multiple longitudinal cohort studies.[8] Quantile regression used to account for secular trends. Trajectories calibrated to empirical data and projections of prevalence of 4 BMI categories (normal, overweight, obese, and severely obese) by sex, race/ethnicity, and age group (2-5, 6-11, 12-19, 20-39, 40-59, 60-79, 80+).	National Longitudinal Survey of Youth; National Longitudinal Study of Adolescent to Adult Health; Early Childhood Longitudinal Study-Kindergarten; Panel Survey on Income Dynamics; NHANES I Epidemiologic Follow-Up Study; NHANES 1999-2012
Baseline smoking prevalence and smoking trajectories	Individual smoking histories modeled based on initiation and cessation rates from published estimates.[9]	2011 Behavioral Risk Factor Surveillance System; 1965-2009 U.S. National Health Interview Surveys
Open population characteristics[b]	Infant population estimates were obtained from the Census for 2010-2018 by state and race (White, Black, American Indian/Alaska Native, Asian, Native Hawaiian/Pacific Islander, Two or more races) and ethnicity (Hispanic/Not Hispanic). Projections were made using a log-linear model. Population trajectories were sampled from the (joint-normal) distribution of regression coefficients. Trajectories were independently sampled for the state overall and for each race.	U.S. Census 2010-2018 National Population Projections
Baseline mortality rates	2010 age, sex, and race-ethnicity life tables adjusted for smoking and BMI based on data from 527,000 members of the NIH-AARP Diet and Health Study.[10]	U.S. 2010 Period Life Tables; NIH-AARP Diet and Health Study
BMI-related mortality reduction due to intervention	Based on data from 900,000 participants, each 5 BMI unit increase within the range of 25-50 BMI units was associated with a 30% higher risk of death (hazard ratio: 1.29; 95% CI: 1.27-1.32). The estimated hazard ratio was used to shift individual-level mortality risk due to BMI reductions compared to the individual's risk in the natural history model. Values are available at: https://doi.org/10.7910/DVN/H0OWKN.	Prospective Studies Collaborative[11]
Healthcare costs[b]	Annual total medical expenditures per person in the simulated population by BMI and age based on a published analysis of data.[12] Values are available at: https://doi.org/10.7910/DVN/872OW1.	2011-2016 Medical Expenditure Panel Survey (MEPS)

Model parameter	Modeling assumption	Sources
Health-related quality of life (HRQoL)[b]	HRQoL weights for males and females, age groups (18-25, 25-44, 45-64, 65-74, and >75), for three BMI categories: 23-25 (normal), 25-30 (overweight), >30 (obesity), using published EQ5D preference weights from 2006 analysis of MEPS 2000.[13] Utility weights for children extracted from meta-analysis of 16 studies by Kwon et al. 2018.[14] See the section "Health-related quality of life" below for more detail on assumptions about health-related quality of life.	2000 MEPS; Kwon et al. 2018 meta-analysis

BMI, body mass index

[a] CHOICES microsimulation model methods and data sources were introduced in Gortmaker et al. 2015 *Health Affairs*, Appendix A3,[1] available at: https://www.healthaffairs.org/doi/suppl/10.1377/hlthaff.2015.0631. Some model assumptions and data sources have been updated since introduced to reflect new data available and methodological refinements made over time.

[b] Parameter differs from prior publication[1]

Health-related quality of life

One of the important consequences of excess body weight gain is reduced quality of life. We estimate the quality-adjusted life years (QALYs) for individuals ages 2 years and older in the simulated population using utility weights from prior studies, along with the estimated time spent with overweight and obesity. For those ages 18 years and older we used health-related quality of life (HRQoL) weights based on a published analysis of EQ-5D data from the 2000 Medical Expenditure Panel Survey,[13] using published preference weights from a nationally representative sample.[15] These preference weights follow the recommendations of the Second Panel on Cost Effectiveness in Health and Medicine[16] by being scaled from 0 to 1 and based on a time trade off method. The use of the EQ-5D also aligns with the U.K. National Institute for Health and Care Excellence (NICE) guidelines.[17] Across gender and age groups (18-25, 25-44, 45-64, ≥75 years), individuals with overweight and obesity had lower HRQoL weights compared to individuals with normal body weight, and the HRQoL weights declined with age. The decrements in HRQoL weights associated with obesity compared to those with a BMI of 23-25 kg/m^2 in this analysis across age and gender groups ranged from 0.033 to 0.11, indicating lower HRQoL associated with obesity compared with body weight in the normal range. Another recent meta-analysis of 12 adult studies using a few different HRQoL measures including the EQ-5D found similar decrements.[18]

For children ages 2-17 years we used results from a recent meta-analysis that calculated the decrement in HRQoL weights associated with overweight and obesity (compared to the reference category with BMI 23-25 kg/m^2) of 0.015 and 0.032 (i.e., lower HRQoL). Sixteen different studies were used in the estimation of HRQoL weights for overweight and obesity, using a variety of measures: the EQ-5D, EQ-5D VAS, AQoL-6D, CHUD9D, HUI2, HUI3.[14] We also used the published Muennig et al.[13] weights by age, gender and BMI category (23-25 kg/m^2, 25-29 kg/m^2, 30 kg/m^2 and above) to predict HRQoL weights for ages 2-17, relying on that fact that HRQoL weights decline substantially with age. Using the midpoints of the age categories, we fit linear regressions; these fit well with adjusted R2 ranging from 0.97 to 0.99. The predicted HRQoL weight for ages 2-17 with a BMI in the normal range (not having overweight or obesity) was 0.980, and the predicted HRQoL weights for this age group indicated decrements associated with overweight and obesity of -0.020 and -0.034, very similar to the results from the published meta-analysis.[14] We thus used the predicted HRQoL weight of 0.980 for children with BMI in the normal range, and the decrements reported from the meta-analysis of -0.015 and -0.032 to calculate HRQoL weights for overweight and obesity in the 2-17 age group (see Appendix Table 1.1). Incremental quality-adjusted life years were calculated by multiplying these HRQoL weights by the years spent in these states.

There are limited data concerning the validity of these estimated HRQoL weights associated with overweight and obesity among different racial/ethnic groups. One study reports HRQoL weights in an ethnically diverse sample of 10-12 year old children: the total sample of 4,979 individuals was 57% Hispanic, 21% Black, and 21% White. They used the HUI3 measure to obtain HRQoL weights. Results indicate utility decrements similar to other studies: Overweight: -0.01; Obesity: -0.019; Severe obesity: -0.046.[19]

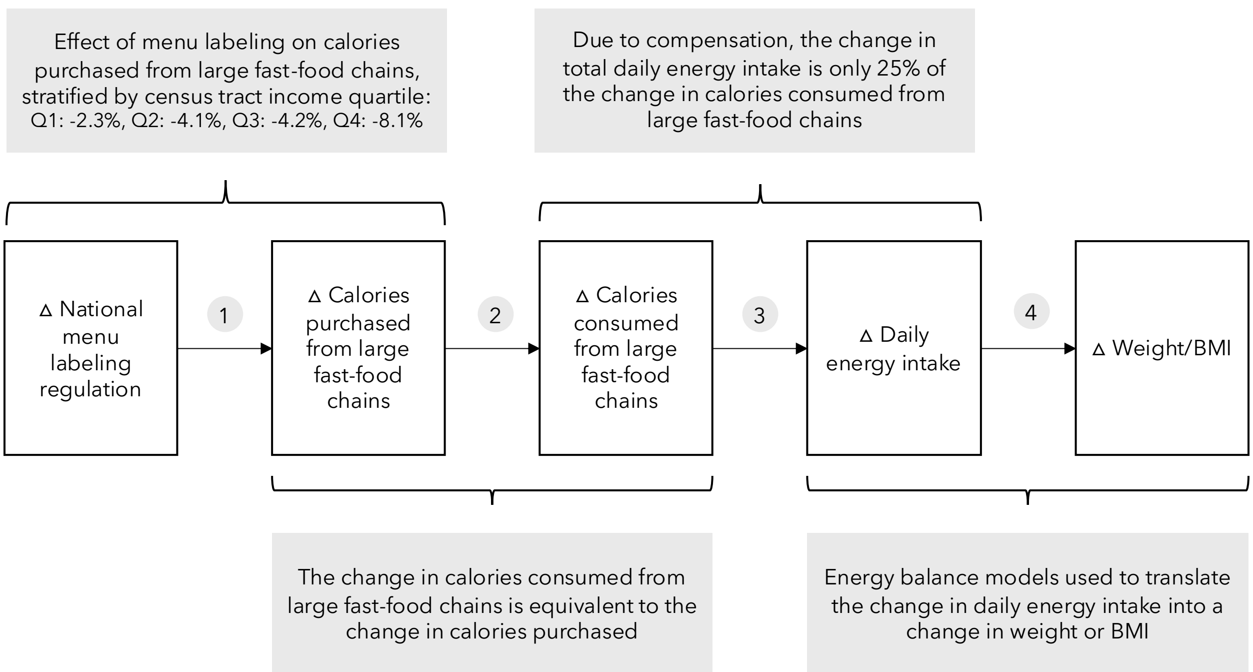
Appendix Table 1.1. Health-related quality of life weights for adults and children by body mass index category based on Muennig et al.[13] and Kwon et al.[14]

	Female			**Male**		
	BMI Category			**BMI Category**		
	<25	**25-29**	**30+**	**<25**	**25-29**	**30+**
Age (years)						
2-17	0.98048	0.96548	0.94848	0.98048	0.96548	0.94848
18-25	0.92516	0.90802	0.88316	0.95445	0.94077	0.91861
25-44	0.91075	0.88203	0.84476	0.92839	0.91870	0.88926
45-64	0.87366	0.83570	0.78697	0.87634	0.87358	0.83674
65-74	0.83138	0.79254	0.72933	0.81771	0.82209	0.77778
>75	0.80139	0.77603	0.69134	0.77192	0.78088	0.72911

BMI, body mass index.

Model assumptions for the effect of calorie labeling on weight

Appendix Figure 1. Logic model for the effect of calorie labeling on weight
Adapted from the logic model developed by the CHOICES team[1]



Caption
This figure represents the change model for how a change in calorie labeling regulation at large fast-food chain restaurants in the U.S. leads to a change in weight or BMI over the 10-year modeling period. Grey boxes reflect model assumptions for every step of the logic model. Assumptions adjusted in sensitivity models are noted.

- **Arrow 1.** Using restaurant-level transaction data, we assume individuals purchase fewer calories per transaction as a result of calorie labeling at large fast-food chain restaurants,[20] and the change in purchases varies by census tract income levels (supplemental analyses of data published by Petimar et al.). We assume that individuals who live in census tracts in the lowest income quartile purchase, on average, 2.3% fewer calories per transaction; individuals who live in census tracts in the second lowest income quartile purchase, on average, 4.1% fewer calories per transaction; individuals who live in census tracts in the second highest income quartile purchase, on average, 4.2% fewer calories per transaction; and individuals who live in census tracts in the highest income quartile purchase, on average, 8.1% fewer calories per transaction.
    - ***Sensitivity analyses.*** In sensitivity models 1 and 2, we assumed an overall effect of calorie labeling on calories purchased (-4.7%),[20] in place of effects stratified by census tract income level.

- **Arrow 2.** We assume that the change in calories consumed from large fast-food chains is equivalent to the change in calories purchased.

- **Arrow 3.** We assume that the change in daily energy intake is 25% of the change in calories consumed from large fast-food chains, meaning 75% of the change in calories purchased and consumed as a result of calorie labeling is compensated for. See a detailed description of our assumptions related to compensatory mechanisms below.

  - ***Sensitivity analyses.*** In sensitivity model 2, we assumed that the change in daily energy intake is 5% of the change in calories consumed from large fast-food chains

- **Arrow 4.** We use the energy balance models developed by Hall et al. for children and adults to translate the change in daily energy intake into a change in weight.[21–23]

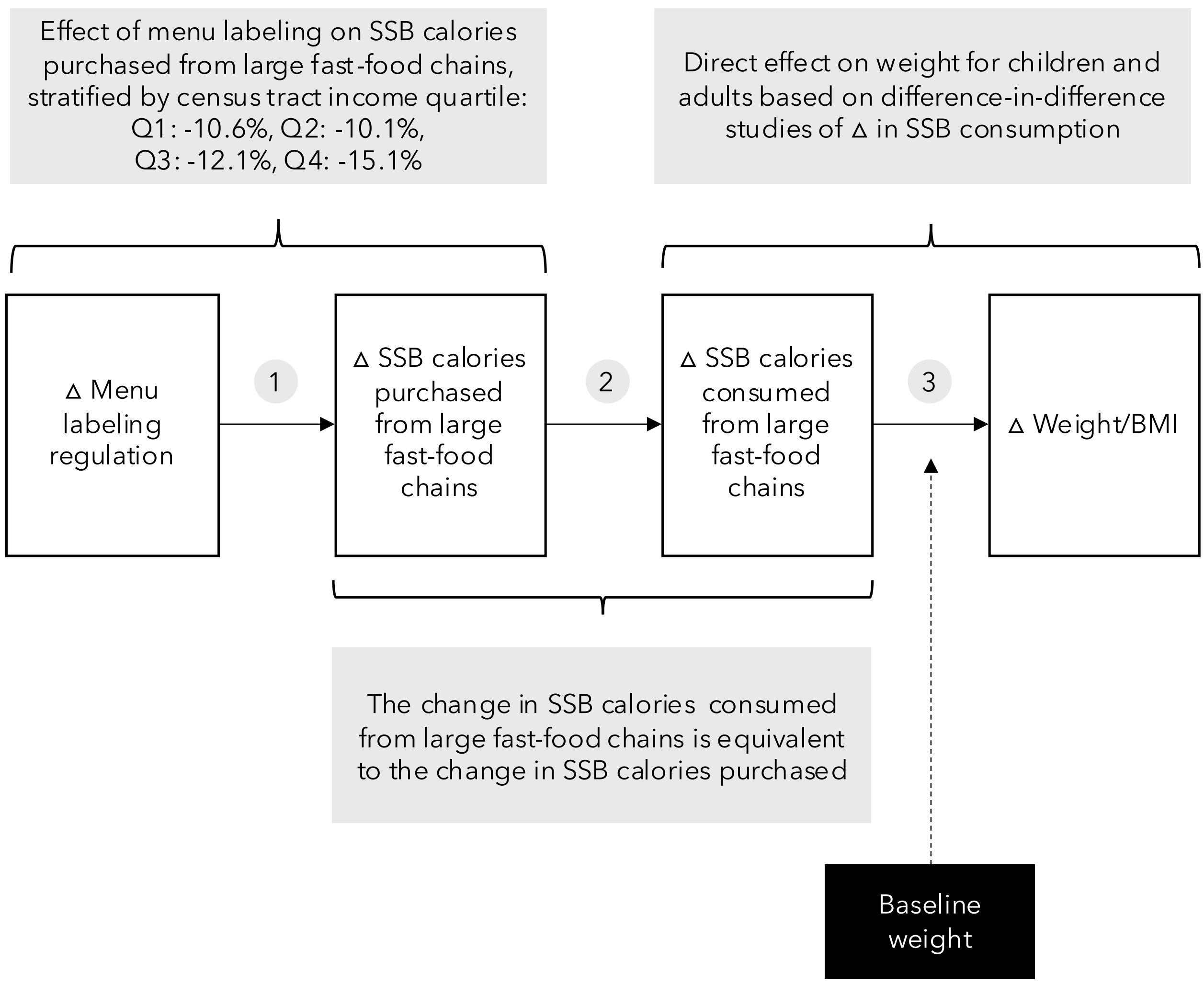
Compensatory mechanisms. Due to various compensatory mechanisms, the change in calories purchased and consumed due to calorie labeling does not directly translate into a change in weight. These mechanisms include short-term (e.g., daily) compensation in calorie consumption in response to hunger cues associated with consuming a lower-calorie diet. They also include longer-term "physiological adaptations to weight loss that decrease calorie expenditure and increase appetite" (p. 2337).[24] Work by Hall et al. suggests that compensation may be as high as 82%.[24]

We obtained this value by comparing the original rule of thumb developed by Hall et al. to translate a change in energy intake into a change in weight (△10kcals/day per 1lb) to their updated rule of thumb (△55kcals/day per 1lb, compensation = 1-10/55 = 0.82).

Fast-food meals typically include refined carbohydrates that would show properties similar to sugar-sweetened beverages (SSBs). In a study of masked replacement of SSB in children, the authors found that over the course of the 18-month trial, among children with lower BMI, 65% of the predicted daily reduction in caloric intake due to the intervention was compensated for, while among children with higher BMI this value was 13%.[25] Similar studies among adults suggest that compensation varies between 8-37%.[26–29] To be conservative in our cost-effectiveness analysis, in this model, we assume that 75% of the change in calories purchased and consumed as a result of calorie labeling is compensated for. Stated otherwise, the change in daily energy intake is estimated to be 25% of the change in calories consumed from large fast-food chains.

Time to effect and maintenance. The full steady-state impact of the calorie labeling regulation on individual weight was modeled after 24 months for children and 36 months for adults. If individuals in the simulated population were not exposed to the intervention for the entire time needed to reach full effect, they were assigned a portion of the full effect based on the duration of intervention received. Individuals were assumed to maintain the full effect of the intervention relative to their baseline weight trajectories for the remainder of the ten-year analytic timeframe.

Appendix Figure 2. Logic model for the effect of calorie labeling on sugar-sweetened beverage (SSB) consumption and weight



<u>Caption</u>

This figure represents the change model for how a change in calorie labeling regulation at large fast-food chain restaurants in the U.S. leads to a change in weight or BMI over the 10-year modeling period, focusing exclusively on the role of sugar-sweetened beverage (SSB) consumption. Grey boxes reflect model assumptions for every step of the logic model. The black box represents effect modification by baseline BMI.

- **Arrow 1.** In sensitivity model 3, using supplemental analyses of data published by Petimar et al. of restaurant-level transaction data, we assume the individuals who live in census tracts in the lowest income quartile purchase, on average, 10.6% fewer SSB calories per transaction as a result of calorie labeling at large fast-food chain restaurants.[20] This value is 10.1% for individuals who live in census tracts in the second lowest income quartile, 12.1% for the second highest income quartile, and 15.1% for the highest income quartile. We assume that the change in SSB calories is equal to the change in SSB ounces.

In sensitivity models 4 and 5, we assume that individuals purchase, on average, 12% fewer SSB calories per transaction as a result of calorie labeling at large fast-food chain restaurants (supplemental analyses of data published by Petimar et al.).[20]

- **Arrow 2.** We assume that the change in SSB calories consumed from large fast-food chains is equivalent to the change in SSB calories purchased.

- **Arrow 3.** In sensitivity models 3 and 4, we use values from published change-in-change studies in children and adults to directly translate the change in SSB calories purchased and consumed into a change in weight. These implicitly account for any compensatory mechanisms that occur over time. We stratify the effect of a change in SSB calories consumed on change in weight by baseline weight given the strong evidence for differences by baseline weight status.[25,30] See Supplemental Table 3.2 for specific values used in these models.

  In sensitivity model 5, we use an overall effect of a change in SSB calories consumed on change in weight for children and adults, separately (no interaction by baseline BMI).[31–36] See Supplemental Table 2 for specific values used in this model.

Appendix Table 2. Key parameters used to estimate the effect of calorie labeling on weight in the cost-effectiveness analysis, by model

	Main model: Δ calories by census tract income, 25% change in daily energy intake	**Sensitivity model 1**: Δ calories overall, 25% change in daily energy intake	**Sensitivity model 2**: Δ calories overall, 5% change in daily energy intake	**Sensitivity model 3**: Δ SSBs by census tract income, effect on weight stratified by baseline BMI	**Sensitivity model 4**: Δ SSBs overall, effect on weight stratified by baseline BMI	**Sensitivity model 5**: Δ SSBs overall, effect on weight overall
Daily fast-food consumption	Weighted analyses of 2011-2016 NHANES data on total energy (calories) from fast-food stratified by age, sex, race, and ethnicity • Mean value for children ages 2-19: 267.7kcals • Mean value for adults ages 20-100: 301.1kcals			Weighted analyses of 2011-2016 NHANES data on total amount (ounces) of sugar-sweetened beverages from fast-food stratified by age, sex, and binary obesity status • Mean value for children ages 2-19: 1.65oz • Mean value for adults ages 20-100: 1.35oz		
Proportion of fast-food meals at large chains	69.4%[37]					
Expected percent decrease in calories purchased from large fast-food chains	Mean effect stratified by restaurant census tract income quartile: • Q1: -2.3% (95% CI -3.2%, -1.3%) • Q2: -4.1% (95% CI -5.1%, -3.1%) • Q3: -4.2% (95% CI -5.2%, -3.2%) • Q4: -8.1% (95% CI -8.9%, -7.2%) Source: Supplemental analyses of data published by Petimar et al.[20]	Overall mean effect: -4.7% (95% CI: -5.2%, -4.2%)[20]		Mean effect stratified by restaurant census tract income quartile: • Q1: -10.6% (95% CI -11.8%, -9.4%) • Q2: -10.1% (95% CI -11.5%, -8.7%) • Q3: -12.1% (95% CI -13.2%, -11.1%) • Q4: -15.1% (95% CI -16.2%, -14.1%) Source: Supplemental analyses of data published by Petimar et al.[20]	Overall mean effect: -12.0% (95% CI: -12.6%, -11.5%) Source: Supplemental analyses of data published by Petimar et al.[20]	

<table>
<tr><th></th><th>Main model:
Δ calories by census tract income, 25% change in daily energy intake</th><th>Sensitivity model 1:
Δ calories overall, 25% change in daily energy intake</th><th>Sensitivity model 2:
Δ calories overall, 5% change in daily energy intake</th><th>Sensitivity model 3:
Δ SSBs by census tract income, effect on weight stratified by baseline BMI</th><th>Sensitivity model 4:
Δ SSBs overall, effect on weight stratified by baseline BMI</th><th>Sensitivity model 5:
Δ SSBs overall, effect on weight overall</th></tr>
<tr><td>Δ in calories consumed from fast-food that translates into a Δ in weight</td><td colspan="2">25%</td><td>5%</td><td colspan="3">n/a (compensation accounted for in estimate of change in total daily SSB consumption on change in weight)</td></tr>
<tr><td>Mean effect of a change in total daily calories on change in weight</td><td colspan="3">Children: age- and sex-specific formulas over 24 months[21]

Adults: Δ 10 kcals over 36 months → Δ 1lbs[22]</td><td colspan="3">n/a</td></tr>
<tr><td>Mean effect of a change in total daily SSB consumption on change in weight</td><td colspan="3">n/a</td><td colspan="2">Children: Effect on weight per 8oz serving for children above or below the Dutch median BMI[25]
• Low BMI: Δ 0.62kg
• High BMI: Δ 1.53kg

Adults: BMI change per 12oz serving by baseline BMI status, based on published literature[30–35,38]
• Underweight & normal weight: 0.176
• Overweight: 0.413
• Obese & severely obese: 0.636

See the section “Methods for estimating effects of sugary drink intake on body weight” below for more detail on how these values were obtained.</td><td>Children: Δ 1.01kg per 8oz serving[36]

Adults: Δ 0.39 BMI units per 12oz serving[31–35]

See Long et al. 2015, Am J Prev Med for additional details on how estimates were obtained[31]</td></tr>
</table>

95% CI, 95% confidence interval; BMI, body mass index; SSB, sugar-sweetened beverage; NHANES, National Health and Nutrition Examination Survey

Methods for estimating effects of sugary drink intake on body weight
As of March 3, 2023
Authors: Matthew M. Lee, Jessica L. Barrett, Michael W. Long, Steven L. Gortmaker

We assume policies and programs that aim to reduce sugary drink intake can impact an individual's body weight via changes in sugary drink intake. To project changes in body weight resulting from changes in the intake of sugar-sweetened beverages (SSBs) in our microsimulation model, we used several results from recent studies suggesting differential impacts by an individual's body mass index (BMI) or weight category. We applied different treatment effects by baseline weight status for children (defined as 2-19 years) and adults (>19 years).

Children. For children, we use findings from a double-blinded randomized trial of 477 Dutch children by Katan et al. (2016),[25] who report changes in weight (in kilograms) following daily masked replacement of 8.4oz SSBs for artificially sweetened beverages over 18 months. Authors found that for those below the age- and sex-specific median BMI, weight gain over 18 months was 0.62kg lower (95% CI -1.26, -0.01) among children who consumed the artificially-sweetened beverages compared to children who consumed SSBs. Among children with BMI above the median, weight gain over 18 months was 1.53kg lower (95% CI -2.35, -0.70) in the group consuming artificially-sweetened beverages compared to the group consuming SSBs. We applied the treatment effect for individuals in the microsimulation population based on their BMI and whether it was above or below the thresholds shown in Appendix Table 2.1.[25] Consistent with standard cost-effectiveness analysis practices, we sampled values for these effects from Normal probability distributions to capture uncertainty: for those above the sex-age specific median these were drawn from a Normal distribution with mean 1.53 and standard deviation 0.42; for those below the sex-age specific median these were drawn from a Normal distribution with mean 0.62 and standard deviation 0.32.

Appendix Table 2.1. Median BMI for Dutch Children ages 2-19 years in 2009, by Age and Sex (doi:10.1371/journal.pone.0159771; doi:10.1371/journal.pone.0027608.t001)

Age, years	Male Median BMI	Female Median BMI
2	16.47	16.05
3	15.9	15.89
4	15.6	15.75
5	15.64	15.62
6	15.67	15.67
7	15.88	15.9
8	16.2	16.21
9	16.52	16.61
10	16.86	17.09
11	17.27	17.62
12	17.75	18.21
13	18.31	18.83
14	18.94	19.47
15	19.59	20.06
16	20.21	20.58
17	20.78	21.01
18	21.26	21.36
19	21.68	21.63

Adults. For adults (ages 20 years and above), we first pooled across four large, multi-year longitudinal studies to determine the overall population average effect of SSB consumption change on BMI, as done in previous cost-effectiveness analyses.[31,39] Based on the range of effects on BMI due to reducing sugary drink intake, a one-serving reduction was associated with a decrease of between 0.21 to 0.57 BMI units (or 1.3 to 3.6 lbs for the average adult) over a 36-month period.[32–35] We then scaled this estimate based on relative differences in the relationship between SSB intake (1 serving per day) and weight change (kg) by BMI category reported in two analyses of large prospective cohort studies (Pan et al. 2013; Stern et al. 2017).[30,38]

Pan et al. (2013) reported that across the three cohort studies, the pooled multivariate-adjusted change in absolute weight change (kg) for a 1 serving/day change in SSB intake was 0.36 (95%CI: 0.24 to 0.48). Stratified by BMI, the reported association was 0.14 (0.11 to 0.17) for those <25.0 kg/m^2, 0.40 (0.25 to 0.54) for those 25.0-29.9 kg/m^2, and 0.63 (0.41 to 0.85) for those ≥30 kg/m^2.[30] Stern et al. (2017) reported that in one cohort of women there was an average effect of 1.0 kg (95% CI 0.7-1.2) weight change for every 1-serving change in SSB consumption.[38] Stratifying the effects by BMI category at baseline, effects were 0.6 kg (95% CI 0.3-1.0) among adults of normal weight (BMI <25), 1.0 kg (95% CI 0.6-1.3) among adults with overweight (BMI 25-29.9), and 1.5 kg (95% CI 1.0-2.0) among adults with obesity (BMI 30+).

To account for different effects by BMI category, we multiplied the overall population average effect[31,39] by the BMI category-specific ratio relative to the average effect that was observed in these two studies,[30,38] assuming a uniform distribution to account for the variation in the ratio between the two studies. The values of the ratio indicate the magnitude of the association of SSB intake on BMI for each weight category relative to the population average association. Appendix Table 2.2 shows details on the calculation of these ratios and the values used to scale the population average association of SSB intake on BMI for each weight category. For adults classified with underweight/normal weight, the association between SSB intake and BMI ranged from 39%-60% of the population average association. For adults classified with overweight, the association was 100%-111% of the population average. For adults classified with obesity (including severe obesity), the association was 150%-175% of the population average. We assumed these ratios based on reported changes in weight (kg) applied to changes in BMI units (kg/m^2).

Appendix Table 2.2. Estimates of change in weight (kg) per 1-serving change in sugary drinks among adults, by weight category

	Pan et al. (2013)[30]		**Stern et al. (2017)[38]**		**CHOICES Model Parameter Values**
	Estimate (95% CI)	*Ratio of estimate to population average*	*Estimate (95% CI)*	*Ratio of estimate to population average*	*Lower and Upper Bounds defining uniform distribution*
Population Average	0.36 (0.24 to 0.48)	1 (ref)	1.0 (0.7 to 1.2)	1 (ref)	N/A
Weight category					
Underweight/ Normal Weight	0.14 (0.11 to 0.17)	0.389	0.6 (0.3 to 1.0)	0.60	0.389 to 0.600
Overweight	0.40 (0.25 to 0.54)	1.111	1.0 (0.6 to 1.3)	1.00	1.00 to 1.111
Obesity	0.63 (0.41 to 0.85)	1.75	1.5 (1.0 to 2.0)	1.50	1.50 to 1.75

Appendix Table 3. Daily calories from fast-food at baseline, stratified by age, sex, race, and ethnicity
Weighted average of the unconditional mean daily calories from fast-food among NHANES 2011-2016 participants ages 2 and above

Age, sex, race, and ethnicity group	Mean	SE	n
Male, Black, not Hispanic or Latino			
2-4	187.16	25.75	239
5-11	222.88	28.45	476
12-19	405.23	34.48	479
20-39	574.04	40.49	524
40-59	452.07	39.20	524
60+	240.35	16.45	546
Female, Black, not Hispanic or Latino			
2-4	160.58	31.98	224
5-11	240.78	23.95	473
12-19	446.17	41.08	455
20-39	502.78	28.93	573
40-59	316.64	19.75	664
60+	174.62	19.89	512
Male, Hispanic or Latino			
2-4	114.58	16.37	275
5-11	222.99	21.01	619
12-19	399.53	26.49	559
20-39	505.10	39.40	611
40-59	273.66	38.25	555
60+	160.86	17.63	530
Female, Hispanic or Latino			
2-4	115.71	12.97	273
5-11	181.21	16.40	614
12-19	323.63	30.60	617
20-39	303.38	19.70	663
40-59	218.68	14.73	668
60+	111.89	11.80	573
Male, all other races, not Hispanic or Latino			
2-4	144.60	58.07	120
5-11	179.01	25.26	276
12-19	354.03	38.70	309
20-39	485.40	47.66	472
40-59	281.29	36.55	385
60+	84.21	20.68	217
Female, all other races, not Hispanic or Latino			
2-4	138.38	42.85	158
5-11	128.09	19.58	262
12-19	228.71	35.69	307
20-39	245.55	37.76	454
40-59	159.15	30.77	378
60+	96.76	24.94	230
Male, White, not Hispanic or Latino			

2-4	135.67	31.92	214
5-11	219.30	22.61	515
12-19	439.16	45.36	493
20-39	510.23	34.38	938
40-59	347.45	17.90	867
60+	173.82	16.31	1054
Female, White, not Hispanic or Latino			
2-4	140.28	26.42	226
5-11	232.59	27.49	462
12-19	262.66	23.85	425
20-39	334.51	25.71	912
40-59	235.42	12.68	925
60+	121.06	11.59	1090

Appendix Table 4. Daily sugar-sweetened beverages (SSBs) ounces from fast-food at baseline, stratified by age, sex, and binary obesity status

Weighted average of the unconditional mean daily SSB ounces from fast-food among NHANES 2011-2016 participants ages 2 and above

Age, sex, and binary obesity status groups	Mean	SE	n
Male, with normal weight			
2-11	0.95	0.12	2216
12-19	2.33	0.43	1440
20-39	3.37	0.33	1734
40-59	1.77	0.24	1454
60+	0.36	0.07	1524
Female, with normal weight			
2-11	0.63	0.07	2222
12-19	2.06	0.25	1381
20-39	2.19	0.19	1621
40-59	0.86	0.16	1371
60+	0.50	0.11	1336
Male, with obesity			
2-11	1.26	0.36	461
12-19	3.19	0.74	376
20-39	3.61	0.47	799
40-59	1.87	0.29	864
60+	0.65	0.21	775
Female, with obesity			
2-11	0.90	0.22	433
12-19	3.16	0.99	375
20-39	3.00	0.37	966
40-59	1.78	0.27	1239
60+	0.43	0.10	1037

Appendix Table 5. Detailed intervention costs, by payer

Activity	Item	Number of units	Cost per unit (in 2019 USD)	Number of menu items/ boards this applies to	Number of chains/ establishments this applies to	Years	Total (3% discount rate)	Source
Federal government (FDA)								
Menu labeling guideline communication	**FDA administrative staff labor**	10 FTEs	$194,000	n/a	n/a	**1**	**$1,900,000**	FDA Regulatory Impact Assessment;[37] U.S. Bureau of Labor Statistics
Restaurant industry								
Menu item analysis	**Baseline menu analysis**					**1**	**$10,100,000**	FDA Regulatory Impact Assessment;[37] U.S. Bureau of Labor Statistics; 2018 Country Business Patterns; Analysis of MenuStat data (https://www.menustat.org/)
	Dietician labor per menu item	4 hours	$45.50	180 menu items	236 chains[a]			
	Nutrition database cost per menu item	1	$64.00	180 menu items	236 chains			
	New chain menu analysis					**2-10**	**$3,680,000**	FDA Regulatory Impact Assessment;[37] U.S. Bureau of Labor Statistics; 2018 Country Business Patterns; Analysis of MenuStat data (https://www.menustat.org/)
	Dietician labor per menu item	4 hours	$45.50	180 menu items	2% of previous year (using n=502 in Y1)			
	Nutrition database cost per menu item	1	$64.00	180 menu items	2% of previous year (using n=502 in Y1)			
	Ongoing menu analysis					**2-10**	**$12,100,000**	FDA Regulatory Impact Assessment;[37] U.S. Bureau of Labor Statistics; 2018 Country Business Patterns; Analysis of MenuStat data (https://www.menustat.org/)
	Dietician labor per menu item	4 hours	$45.50	12 menu items	502 chains in year 2; +2% annually in years 3-10			
	Nutrition database cost per menu item	1	$64.00	12 menu items	502 chains in year 2; +2% annually in years 3-10			

Activity	Item	Number of units	Cost per unit (in 2019 USD)	Number of menu items/ boards this applies to	Number of chains/ establishments this applies to	Years	Total (3% discount rate)	Source
Menu and menu board design and replacement	**Menu redesign**	1	$4200	n/a	502 chains	**1**	**$2,080,000**	FDA Regulatory Impact Assessment;[37] 2018 Country Business Patterns
	Menu board replacement	1	$625	3 menu boards	109,152 establishments	**1**	**$202,000,000**	FDA Regulatory Impact Assessment;[37] 2018 Country Business Patterns
	Menu board installation					**1**	**$11,200,000**	FDA Regulatory Impact Assessment;[37] U.S. Bureau of Labor Statistics; 2018 Country Business Patterns
	Restaurant manager labor	1 hour	$26.90	3 menu boards	109,152 establishments			
	Restaurant staff labor	0.5 hours	$17.40	3 menu boards	109,152 establishments			
	Printed individual menus	1	$0.07	360 menus	109,152 establishments	**1**	**$2,640,000**	FDA Regulatory Impact Assessment;[37] 2018 Country Business Patterns
Industry legal review	**Lawyer labor**	10 hours	$105.60	n/a	502	**1**	**$515,000**	FDA Regulatory Impact Assessment;[37] U.S. Bureau of Labor Statistics; 2018 Country Business Patterns
	Lawyer labor	10 hours	$105.60	n/a	2% of previous year (using n=502 in Y1)	**2-10**	**$88,000**	FDA Regulatory Impact Assessment;[37] U.S. Bureau of Labor Statistics; 2018 Country Business Patterns
Local government								
Compliance monitoring	**Public health inspector labor**	0.0005 FTEs	$58.50	n/a	109,152 establishments in year 1; +2% annually in years 2-10	**1-10**	**$58,600,000**	Previous cost-effectiveness analysis (Gortmaker et al.);[1] U.S. Bureau of Labor Statistics; 2018 Country Business Patterns

USD: U.S. dollars

FTE: Full-time equivalent
[a]502 chains in 2018, 47% of which do not have prior menu labeling (n=236)

Sensitivity model results

Sensitivity model 1: Overall Δ calories consumed from fast-food, assuming the change in daily energy intake is 25% of the change in calories consumed

Appendix Table 6. Mean reach, cost, effect, and cost-effectiveness outcomes for sensitivity model 1

Outcome	Mean (95% uncertainty interval)
10-year population reach	349,000,000 (348,000,000, 350,000,000)
First year population reach	314,000,000 (314,000,000, 315,000,000)
10-year intervention implementation cost	$305,000,000
Annual intervention implementation cost	$30,500,000
First-year intervention implementation cost	$236,000,000
Annual intervention implementation cost per benefiting person	$0.10
Healthcare costs saved over 10 years (millions)	$6,970 ($6,180, $7,750)
Net cost difference (millions)	-$6,660 (-$7,440, -$5,880)
Healthcare costs saved per $1 invested	$22.90 ($20.30, $25.40)
Deaths averted	18,000 (13,600, 22,800)
QALYs gained	270,000 (241,000, 299,000)
Cost per QALY gained	Cost-saving
Reduction in adult + childhood obesity prevalence (overall) in 2027 alone (%)	0.178 (0.159, 0.198)
Cases of adult + childhood obesity prevented per 100,000 people in 2027 alone	178 (159, 198)
Cases of adult + childhood obesity prevented in 2027 alone	559,000 (501,000, 620,000)
Reduction in childhood obesity prevalence in 2027 alone (%)	0.061 (0.048, 0.075)
Cases of childhood obesity prevented per 100,000 people in 2027 alone	61 (48, 75)
Cases of childhood obesity prevented in 2027 alone	43,100 (33,700, 53,000)

Appendix Table 7: Intervention effect and health equity metrics in final model year (2027) alone, with 95% uncertainty intervals, for sensitivity model 1

Panel A. By race and ethnicity

	Black or African American, not Hispanic or Latino	**Hispanic or Latino**	**All other races, not Hispanic or Latino[a]**	**White, not Hispanic or Latino**
Cases of adult + childhood obesity prevented per 100,000 people	210 (181, 240)	175 (156, 196)	126 (109, 150)	180 (156, 202)
Cases of adult + childhood obesity prevented	82,800 (70,800, 94,900)	108,000 (96,300, 121,000)	34,300 (29,500, 40,700)	333,000 (291,000, 375,000)
Relative reduction in cases of adult + childhood obesity prevented per 100,000 people	1.170 (1.025, 1.353)	0.976 (0.884, 1.103)	0.704 (0.609, 0.824)	reference
Cases of childhood obesity prevented per 100,000 people	79 (55, 109)	67 (51, 87)	51 (32, 75)	56 (38, 74)
Cases of childhood obesity prevented	7,590 (5,250, 10,500)	12,200 (9,260, 15,800)	3,810 (2,340, 5,560)	19,500 (13,400, 25,900)
Relative reduction in cases of childhood obesity prevented per 100,000 people	1.408 (0.965, 2.137)	1.191 (0.875, 1.755)	0.917 (0.568, 1.456)	reference

[a] This category includes people who identify as American Indian/Alaska Native, Asian, Native Hawaiian or Pacific Islander, Multi-racial, or another race/ethnicity not represented in the other three categories.

Panel B. By household income as a percentage of the federal poverty level (FPL)

	0-130% FPL	131-185% FPL	186-350% FPL	351-1000% FPL
Cases of adult + childhood obesity prevented per 100,000 people	169 (151, 187)	174 (154, 197)	185 (164, 211)	180 (159, 202)
Cases of adult + childhood obesity prevented	122,000 (110,000, 136,000)	55,800 (49,200, 63,700)	150,000 (132,000, 170,000)	231,000 (203,000, 259,000)
Relative reduction in cases of adult + childhood obesity prevented per 100,000 people	0.937 (0.854, 1.011)	0.965 (0.880, 1.062)	1.027 (0.952, 1.112)	reference
Cases of childhood obesity prevented per 100,000 people	65 (52, 81)	63 (46, 82)	62 (47, 80)	56 (40, 73)
Cases of childhood obesity prevented	14,300 (11,300, 17,700)	5,380 (3,810, 7,000)	11,100 (8,390, 14,300)	12,300 (8,900, 16,100)
Relative reduction in cases of childhood obesity prevented per 100,000 people	1.167 (0.990, 1.439)	1.127 (0.906, 1.460)	1.116 (0.877, 1.383)	reference

Sensitivity model 2: Overall Δ calories consumed from fast-food, assuming the change in daily energy intake is 5% of the change in calories consumed

Appendix Table 8. Mean reach, cost, effect, and cost-effectiveness outcomes for sensitivity model 2

Outcome	Mean (95% uncertainty interval)
10-year population reach	349,000,000 (348,000,000, 350,000,000)
First year population reach	314,000,000 (314,000,000, 315,000,000)
10-year intervention implementation cost	$305,000,000
Annual intervention implementation cost	$30,500,000
First-year intervention implementation cost	$236,000,000
Annual intervention implementation cost per benefiting person	$0.10
Healthcare costs saved over 10 years (millions)	$1,400 (1,220, $1,560)
Net cost difference (millions)	-$1,090 (-$1,250, -$918)
Healthcare costs saved per $1 invested	$4.58 ($4.01, $5.11)
Deaths averted	3,600 (1,850, 5,870)
QALYs gained	54,000 (45,800, 62,700)
Cost per QALY gained	Cost-saving
Reduction in adult + childhood obesity prevalence (overall) in 2027 alone (%)	0.036 (0.032, 0.039)
Cases of adult + childhood obesity prevented per 100,000 people in 2027 alone	36 (32, 39)
Cases of adult + childhood obesity prevented in 2027 alone	112,000 (99,300, 124,000)
Reduction in childhood obesity prevalence in 2027 alone (%)	0.012 (0.009, 0.015)
Cases of childhood obesity prevented per 100,000 people in 2027 alone	12 (9, 15)
Cases of childhood obesity prevented in 2027 alone	8,520 (6,480, 10,800)

Appendix Table 9: Intervention effect and health equity metrics in final model year (2027) alone, with 95% uncertainty intervals, for sensitivity model 2

Panel A. By race and ethnicity

	Black or African American, not Hispanic or Latino	Hispanic or Latino	All other races, not Hispanic or Latino[a]	White, not Hispanic or Latino
Cases of adult + childhood obesity prevented per 100,000 people	42 (35, 49)	35 (30, 40)	25 (21, 30)	36 (32, 40)
Cases of adult + childhood obesity prevented	16,500 (13,700, 19,300)	21,800 (18,600, 24,500)	6,800 (5,740, 8,030)	66,800 (58,500, 74,500)
Relative reduction in cases of adult + childhood obesity prevented per 100,000 people	1.164 (0.997, 1.318)	0.980 (0.865, 1.104)	0.696 (0.603, 0.817)	reference
Cases of childhood obesity prevented per 100,000 people	16 (9, 23)	13 (9, 18)	11 (6, 19)	11 (7, 15)
Cases of childhood obesity prevented	1,500 (875, 2,190)	2,430 (1,670, 3,220)	796 (412, 1,420)	3,800 (2,420, 5,250)
Relative reduction in cases of childhood obesity prevented per 100,000 people	1.424 (0.868, 2.320)	1.217 (0.790, 1.983)	0.983 (0.486, 1.834)	reference

[a] This category includes people who identify as American Indian/Alaska Native, Asian, Native Hawaiian or Pacific Islander, Multi-racial, or another race/ethnicity not represented in the other three categories.

Panel B. By household income as a percentage of the federal poverty level (FPL)

	0-130% FPL	**131-185% FPL**	**186-350% FPL**	**351-1000% FPL**
Cases of adult + childhood obesity prevented per 100,000 people	34 (30, 38)	35 (29, 40)	37 (32, 42)	36 (32, 40)
Cases of adult + childhood obesity prevented	24,600 (21,700, 27,700)	11,200 (9,290, 12,900)	29,800 (26,000, 34,300)	46,300 (40,800, 52,000)
Relative reduction in cases of adult + childhood obesity prevented per 100,000 people	0.938 (0.839, 1.041)	0.966 (0.832, 1.085)	1.023 (0.929, 1.127)	reference
Cases of childhood obesity prevented per 100,000 people	13 (10, 17)	12 (8, 17)	12 (9, 17)	11 (7, 15)
Cases of childhood obesity prevented	2,880 (2,080, 3,780)	1,040 (643, 1,470)	2,180 (1,540, 2,990)	2,420 (1,600, 3,350)
Relative reduction in cases of childhood obesity prevented per 100,000 people	1.196 (0.880, 1.765)	1.111 (0.731, 1.723)	1.113 (0.829, 1.598)	reference

Sensitivity model 3: Δ SSBs consumed during fast-food purchases stratified by census tract income quartile, effect on weight stratified by baseline BMI

Appendix Table 10. Mean reach, cost, effect, and cost-effectiveness outcomes for sensitivity model 3

Outcome	**Mean (95% uncertainty interval)**
10-year population reach	349,000,000 (348,000,000, 350,000,000)
First year population reach	314,000,000 (314,000,000, 315,000,000)
10-year intervention implementation cost	$305,000,000
Annual intervention implementation cost	$30,500,000
First-year intervention implementation cost	$236,000,000
Annual intervention implementation cost per benefiting person	$0.10
Healthcare costs saved over 10 years (millions)	$1,360 ($789, $1,940)
Net cost difference (millions)	-$1,050 (-$1,630, -$484)
Healthcare costs saved per $1 invested	$4.45 ($2.59, $6.36)
Deaths averted	2,700 (926, 5,250)
QALYs gained	48,100 (30,600, 66,300)
Cost per QALY gained	Cost-saving
Reduction in adult + childhood obesity prevalence (overall) in 2027 alone (%)	0.039 (0.025, 0.053)
Cases of adult + childhood obesity prevented per 100,000 people in 2027 alone	39 (25, 53)
Cases of adult + childhood obesity prevented in 2027 alone	122,000 (77,600, 167,000)
Reduction in childhood obesity prevalence in 2027 alone (%)	0.037 (0.016, 0.061)
Cases of childhood obesity prevented per 100,000 people in 2027 alone	37 (16, 61)
Cases of childhood obesity prevented in 2027 alone	26,200 (11,100, 43,100)

Appendix Table 11: Intervention effect and health equity metrics in final model year (2027) alone, with 95% uncertainty intervals, for sensitivity model 3

Panel A. By race and ethnicity

	Black or African American, not Hispanic or Latino	Hispanic or Latino	All other races, not Hispanic or Latino[a]	White, not Hispanic or Latino
Cases of adult + childhood obesity prevented per 100,000 people	37 (23, 52)	46 (29, 63)	35 (22, 50)	37 (24, 52)
Cases of adult + childhood obesity prevented	14,600 (9,060, 20,600)	28,300 (17,700, 38,900)	9,530 (5,920, 13,600)	69,400 (44,200, 96,100)
Relative reduction in cases of adult + childhood obesity prevented per 100,000 people	0.988 (0.817, 1.180)	1.227 (1.008, 1.529)	0.940 (0.781, 1.138)	reference
Cases of childhood obesity prevented per 100,000 people	36 (15, 62)	45 (19, 75)	33 (13, 57)	34 (15, 58)
Cases of childhood obesity prevented	3,490 (1,470, 6,020)	8,260 (3,370, 13,600)	2,470 (977, 4,270)	11,900 (5,040, 20,300)
Relative reduction in cases of childhood obesity prevented per 100,000 people	1.056 (0.752, 1.573)	1.315 (1.050, 1.797)	0.969 (0.657, 1.379)	reference

[a] This category includes people who identify as American Indian/Alaska Native, Asian, Native Hawaiian or Pacific Islander, Multi-racial, or another race/ethnicity not represented in the other three categories.

Panel B. By household income as a percentage of the federal poverty level (FPL)

	0-130% FPL	131-185% FPL	186-350% FPL	351-1000% FPL
Cases of adult + childhood obesity prevented per 100,000 people	40 (26, 55)	40 (25, 55)	41 (26, 56)	36 (23, 50)
Cases of adult + childhood obesity prevented	29,200 (18,700, 40,200)	12,900 (7,740, 17,900)	33,200 (20,900, 45,900)	46,600 (29,300, 64,300)
Relative reduction in cases of adult + childhood obesity prevented per 100,000 people	1.104 (0.912, 1.347)	1.103 (0.917, 1.315)	1.129 (0.998, 1.303)	reference
Cases of childhood obesity prevented per 100,000 people	38 (16, 63)	38 (14, 63)	39 (16, 67)	35 (15, 59)
Cases of childhood obesity prevented	8,340 (3,550, 13,700)	3,240 (1,210, 5,300)	7,000 (2,780, 12,000)	7,590 (3,390, 13,000)
Relative reduction in cases of childhood obesity prevented per 100,000 people	1.101 (0.900, 1.410)	1.099 (0.805, 1.535)	1.139 (0.838, 1.432)	reference

Sensitivity model 4: Δ SSBs consumed during fast-food purchases, effect on weight stratified by baseline BMI

Appendix Table 12. Mean reach, cost, effect, and cost-effectiveness outcomes for sensitivity model 4

Outcome	**Mean (95% uncertainty interval)**
10-year population reach	349,000,000 (348,000,000, 350,000,000)
First year population reach	314,000,000 (314,000,000, 315,000,000)
10-year intervention implementation cost	$305,000,000
Annual intervention implementation cost	$30,500,000
First-year intervention implementation cost	$236,000,000
Annual intervention implementation cost per benefiting person	$0.10
Healthcare costs saved over 10 years (millions)	$1,360 ($779, $1,940)
Net cost difference (millions)	-$1,050 (-$1,640, -$474)
Healthcare costs saved per $1 invested	$4.45 ($2.56, $6.38)
Deaths averted	2,720 (919, 5.250)
QALYs gained	48,300 (29,700, 67,600)
Cost per QALY gained	Cost-saving
Reduction in adult + childhood obesity prevalence (overall) in 2027 alone (%)	0.039 (0.024, 0.054)
Cases of adult + childhood obesity prevented per 100,000 people in 2027 alone	39 (24, 54)
Cases of adult + childhood obesity prevented in 2027 alone	123,000 (75,900, 169,000)
Reduction in childhood obesity prevalence in 2027 alone (%)	0.038 (0.018, 0.059)
Cases of childhood obesity prevented per 100,000 people in 2027 alone	38 (18, 59)
Cases of childhood obesity prevented in 2027 alone	26,600 (12,900, 42,000)

Appendix Table 13: Intervention effect and health equity metrics in final model year (2027) alone, with 95% uncertainty intervals, for sensitivity model 4

Panel A. By race and ethnicity

	Black or African American, not Hispanic or Latino	**Hispanic or Latino**	**All other races, not Hispanic or Latino[a]**	**White, not Hispanic or Latino**
Cases of adult + childhood obesity prevented per 100,000 people	39 (24, 54)	47 (29, 65)	35 (22, 50)	37 (23, 51)
Cases of adult + childhood obesity prevented	15,400 (9,570, 21,600)	29,200 (18,100, 40,200)	9,460 (5,870, 13,400)	68,500 (42,200, 94,800)
Relative reduction in cases of adult + childhood obesity prevented per 100,000 people	1.055 (0.883, 1.262)	1.280 (1.069, 1.561)	0.946 (0.791, 1.148)	reference
Cases of childhood obesity prevented per 100,000 people	39 (17, 66)	47 (23, 76)	33 (15, 57)	34 (16, 56)
Cases of childhood obesity prevented	3,730 (1,600, 6,380)	8,560 (4,090, 13,800)	2,460 (1,110, 4,250)	11,900 (5,510, 19,600)
Relative reduction in cases of childhood obesity prevented per 100,000 people	1.135 (0.810, 1.658)	1.373 (1.078, 1.861)	0.972 (0.673, 1.411)	reference

[a] This category includes people who identify as American Indian/Alaska Native, Asian, Native Hawaiian or Pacific Islander, Multi-racial, or another race/ethnicity not represented in the other three categories.

Panel B. By household income as a percentage of the federal poverty level (FPL)

	0-130% FPL	131-185% FPL	186-350% FPL	351-1000% FPL
Cases of adult + childhood obesity prevented per 100,000 people	42 (26, 58)	41 (25, 57)	41 (26, 57)	36 (22, 49)
Cases of adult + childhood obesity prevented	30,400 (18,900, 42,100)	13,200 (8,130, 18,400)	33,300 (20,700, 46,400)	45,700 (28,300, 63,700)
Relative reduction in cases of adult + childhood obesity prevented per 100,000 people	1.174 (0.975, 1.419)	1.153 (0.970, 1.368)	1.154 (1.029, 1.340)	reference
Cases of childhood obesity prevented per 100,000 people	40 (19, 64)	39 (18, 64)	40 (19, 65)	34 (16, 56)
Cases of childhood obesity prevented	8,780 (4,040, 14,000)	3,330 (1,490, 5,380)	7,040 (3,340, 11,600)	7,460 (3,520, 12,300)
Relative reduction in cases of childhood obesity prevented per 100,000 people	1.181 (0.972, 1.501)	1.151 (0.858, 1.615)	1.166 (0.856, 1.478)	reference

Sensitivity model 5: Δ SSBs consumed during fast-food purchases

Appendix Table 14. Mean reach, cost, effect, and cost-effectiveness outcomes for sensitivity model 5

Outcome	Mean (95% uncertainty interval)
10-year population reach	349,000,000 (348,000,000, 350,000,000)
First year population reach	314,000,000 (314,000,000, 315,000,000)
10-year intervention implementation cost	$305,000,000
Annual intervention implementation cost	$30,500,000
First-year intervention implementation cost	$236,000,000
Annual intervention implementation cost per benefiting person	$0.10
Healthcare costs saved over 10 years (millions)	$906 ($523, $1,310)
Net cost difference (millions)	-$601 (-$1,000, -$291)
Healthcare costs saved per $1 invested	$2.97 ($1.72, $4.30)
Deaths averted	1,910 (309, 4,010)
QALYs gained	37,900 (23,900, 51,900)
Cost per QALY gained	Cost-saving
Reduction in adult + childhood obesity prevalence (overall) in 2027 alone (%)	0.030 (0.020, 0.040)
Cases of adult + childhood obesity prevented per 100,000 people in 2027 alone	30 (20, 40)
Cases of adult + childhood obesity prevented in 2027 alone	93,100 (61,500, 124,000)
Reduction in childhood obesity prevalence in 2027 alone (%)	0.028 (0.015, 0.042)
Cases of childhood obesity prevented per 100,000 people in 2027 alone	28 (15, 42)
Cases of childhood obesity prevented in 2027 alone	19,500 (10,200, 29,300)

Appendix Table 15: Intervention effect and health equity metrics in final model year (2027) alone, with 95% uncertainty intervals, for sensitivity model 5

Panel A. By race and ethnicity

	Black or African American, not Hispanic or Latino	Hispanic or Latino	All other races, not Hispanic or Latino[a]	White, not Hispanic or Latino
Cases of adult + childhood obesity prevented per 100,000 people	29 (19, 40)	35 (23, 47)	27 (17, 36)	28 (18, 38)
Cases of adult + childhood obesity prevented	11,600 (7,360, 16,000)	21,600 (14,200, 29,300)	7,250 (4,730, 9,830)	52,600 (33,900, 71,000)
Relative reduction in cases of adult + childhood obesity prevented per 100,000 people	1.036 (0.856, 1.240)	1.235 (1.042, 1.500)	0.944 (0.792, 1.147)	reference
Cases of childhood obesity prevented per 100,000 people	29 (14, 48)	34 (17, 53)	25 (12, 40)	25 (13, 38)
Cases of childhood obesity prevented	2,800 (1,390, 4,660)	6,220 (3,110, 9,750)	1,840 (848, 2,980)	8,640 (4,600, 13,300)
Relative reduction in cases of childhood obesity prevented per 100,000 people	1.171 (0.805, 1.679)	1.372 (1.069, 1.874)	0.996 (0.693, 1.513)	reference

[a] This category includes people who identify as American Indian/Alaska Native, Asian, Native Hawaiian or Pacific Islander, Multi-racial, or another race/ethnicity not represented in the other three categories.

Panel B. By household income as a percentage of the federal poverty level (FPL)

	0-130% FPL	131-185% FPL	186-350% FPL	351-1000% FPL
Cases of adult + childhood obesity prevented per 100,000 people	31 (21, 41)	31 (20, 41)	31 (20, 42)	27 (18, 37)
Cases of adult + childhood obesity prevented	22,900 (15,100, 30,200)	9,890 (6,380, 13,400)	25,100 (16,500, 34,200)	35,200 (22,500, 47,700)
Relative reduction in cases of adult + childhood obesity prevented per 100,000 people	1.145 (0.965, 1.416)	1.120 (0.932, 1.345)	1.130 (1.001, 1.330)	reference
Cases of childhood obesity prevented per 100,000 people	30 (16, 45)	28 (14, 44)	29 (15, 46)	25 (13, 38)
Cases of childhood obesity prevented	6,450 (3,420, 9,750)	2,420 (1,180, 3,760)	5,140 (2,620, 8,210)	5,480 (2,800, 8,310)
Relative reduction in cases of childhood obesity prevented per 100,000 people	1.180 (0.966, 1.485)	1.135 (0.850, 1.563)	1.158 (0.874, 1.496)	reference

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