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Executive Summary:
The purpose of this study is to examine the medical costs of childhood obesity in Maine. Primary data collected on school-aged children across the state, supplemented with statistics from the U.S. Centers for Disease Control and Prevention, indicate that 7.8 percent of Maine children and adolescents are obese. These statistics combined with adult obesity rates from the U.S. Centers for Disease Control and Prevention show that 23.1 percent of the overall Maine population is obese. Using information from published academic studies, we find that the annual medical costs of obesity in Maine are an estimated $452.7 million. Childhood obesity is particularly problematic because it contributes to higher medical costs today, and in the future because obese children and adolescents are more likely than their non-obese peers to become obese adults. The (discounted) medical costs of obesity associated with the current cohort of Maine children and adolescents—both those who obese and non-obese—will be an estimated $1.2 billion over the next twenty years. The study considers a few different outcomes that could lower the future medical costs associated with the current cohort of Maine children and adolescents as they transition into adulthood. Efforts could be aimed at reducing the incidence of childhood and adolescent obesity, or decreasing the likelihoods that children and adolescents—regardless of their current obesity status—become obese adults.

Keywords: Childhood Obesity, Costs of Obesity, Maine
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1. BACKGROUND AND INTRODUCTION

Obesity is one of the greatest healthcare issues of our time. According to the U.S. Centers for Disease Control and Prevention, 35.7 percent of U.S. adults were obese—defined as having a body mass index (BMI) of at least 30.0—in the years 2009-10 (Ogden et al. 2012).[1] This percentage has increased remarkably since 1960-62, when 12.8 percent of U.S. adults were obese (Flegal et al. 1998). The growth of obesity in the United States is a major health concern, given its association with numerous diseases and conditions including hypertension, type 2 diabetes, hypercholesterolemia, heart disease, stoke, asthma and arthritis (Hammond and Levine 2010).

The problem of obesity is not limited to adults, as 16.9 percent of U.S. children and adolescents were obese in 2009-10 (Ogden et al. 2012).[2] Childhood obesity is associated with diseases and conditions such as diabetes, slipped capital femoral epiphysis, gallbladder disease, obstructive sleep apnea, and mental health illnesses (Trasande and Chatterjee 2009). Childhood obesity is also problematic because it often leads to an unhealthy weight later in life. A published literature review on this topic

[1] This percentage does not include the U.S. adults who are "overweight," defined as having a BMI of between 25.0 and 29.9. In 2007-2008, 68.0 percent of U.S. adults were overweight or obese—with an obesity rate of 33.8 percent (Flegal et al. 2010).

[2] Obesity for children and adolescents is defined having a weight at or above the 95th percentile of the weight-for-recumbent-length growth charts. The 16.9 percent of U.S. children and adolescents who are obese does not include those who are "overweight," defined as those between the 85th and 95th percentiles on the weight-for-recumbent-length growth charts. In 2007-2008, 31.7 percent of U.S. children and adolescents were overweight or obese—with an obesity rate of 16.9 percent (Ogden et al. 2010).

concludes that "all studies [considered in the review] reported increased risk for overweight or obese youth to become overweight or obese in adulthood" (Singh et al. 2008, p.483).

Along with its adverse impacts on health and wellness, obesity imposes a major economic cost on individuals and society as a whole. These costs range from the direct medical expenditures to treat obesity-related conditions to the indirect costs of obesity resulting from lower workplace productivity, higher transportation costs, and a reduction in the acquisition of human capital (Hammond and Levine 2010). Finkelstein et al. (2009) indicate that the annual medical costs of adult obesity in the United States were $147 billion in 2008.[3] Childhood obesity in the United States is associated with an estimated $14.1 billion in additional prescription drug, emergency room and out-patient medical service costs annually (Trasande and Chatterjee 2009). Although estimates of the indirect costs of obesity vary widely—depending on the target population and types of costs examined—a study on the future costs associated with U.S. adolescents who are currently overweight found that the indirect costs due to lost productivity are about 4.5 times larger than the direct medical costs (Lightwood et al. 2009).

The purpose of this study is to examine the medical costs of childhood obesity in Maine. The analysis focuses on the annual medical costs of childhood obesity in 2011, as well as the future costs of obesity as the current cohort of children and adolescents in Maine transition into adulthood. Information on childhood obesity in Maine is from primary data (e.g., body mass index measurements) collected by physical education

[3] The costs of obesity are borne by patients, insurance companies, and the public sector. Medicare and Medicaid spending would be 8.5 percent and 11.8 percent lower, respectively, in the absence of obesity (Hammond and Levine 2010; Finkelstein et al. 2009). A study by Bhattacharya and Bundorf (2009) shows that some of the medical costs associated with obesity—resulting in higher health insurance premiums—are passed on to obese workers through lower wages.

teachers in the state[4], while other obesity statistics and cost figures come from government reports and published academic studies. Results of the analysis show that the annual medical costs of obesity in Maine were an estimated $452.7 million in 2011 and—of this amount—$8.3 million is attributed to individuals between the ages of 5 and 20. Over the next twenty years, the total discounted medical costs of obesity for the current cohort of Maine children and adolescents—those who are and are not currently obese—will be an estimated $1.2 billion. These costs could be lowered substantially through outcomes such as lowering the percentage of children and adolescents who are obese, or reducing the likelihood that these individuals (obese or otherwise) are obese in adulthood.

2. ANNUAL MEDICAL COSTS OF OBESITY

Table 1 presents U.S. obesity statistics by gender and age cohort. The population figures are from the 2010 U.S. Census and the percentages of obese adults and children/adolescents are from a study by Ogden et al. (2012) that uses data from the *National Health and Nutrition Examination Study*, 2009-2010. The study does not report obesity rates for all of the age cohorts shown in Table 1. Instead, it provides obesity statistics for broader age categories; e.g., 20-39, 40-59, etc. Based on this information, we estimate that approximately 95 million Americans are obese, which accounts for 30.7 percent of the U.S. population.

Table 2 presents information on the annual medical costs of obesity in the United States. The obesity figures are the same as those shown in Table 1. Estimates of the annual medical costs per obese individual come from three studies. Finkelstein et al.

[4] Physical education teachers are collecting this information, along with other health and fitness data, as part of a multi-year project developed by the University of Maine.

(2009) report the obesity-related medical costs of inpatient, non-inpatient and Rx drug health services. We adjust these figures for inflation to arrive at an estimated $1,571 in additional annual medical costs per obese adult in the United States.[5] Trasande and Chatterjee (2009) present information—focusing on children and adolescents—on the obesity-related medical expenditures on prescription drugs, out-patient visits and emergency room visits, while Trasande et al. (2009) examine obesity-related (in-patient) hospitalization expenditures. Figures from both studies are combined and adjusted for inflation to arrive at the estimated annual medical costs per obese child aged 5 to 9 ($245), and individuals between the ages of 10 and 19 ($446).[6]

Applying these figures on the annual medical costs of obesity to the number of obese Americans, we arrive at an estimated $131.6 billion in obesity-related medical costs per year. This figure is low compared to other studies that have estimated the medical costs of obesity in the United States. For example, a recent study by Cawley and Meyerhoefer (2012) reports an estimate of $209.7 billion ($2008) in obesity-related medical costs for U.S. adults alone. Likewise, Finkelstein et al. (2009) suggest that medical-related issues of adult obesity could have cost $147 billion in 2008, an amount that is even higher than our 2011 estimate of the medical costs of adult and childhood/adolescent obesity. Along with being lower than figures reported in other studies on the medical costs of obesity, our estimates do not account for the indirect costs of obesity (e.g., reduced productivity in the workforce).

[5] Medical costs are adjusted for inflation using the (medical care) Consumer Price Index (2002 to 2011) of the U.S. Bureau of Labor Statistics.

[6] The age categories used by Trasande and Chatterjee (2009) and Trasande et al. (2009) do not match the age cohorts reported in Table 2.

Table 3 presents statistics on obesity in Maine by gender and age cohort. As in the previous analysis for the entire United States, the population figures are from the 2010 U.S. Census. Obesity statistics for the adult population come from the U.S. Centers for Disease Control and Prevention's 2011 *Behavioral Risk Factor Surveillance System*, which finds that 27.8 percent of Maine adults are obese. This figure is used as the overall rate of adult obesity in Maine[7], which is estimated for the Census age and gender cohorts using data from Ogden et al. (2012).[8]

The obesity rates of Maine children and adolescents come from primary data collected by physical education teachers across the state for those aged 10 to 14[9], and from the U.S. Centers for Disease Control and Prevention for high school students aged 15 to 19[10]. We used the primary data collected for Maine students aged 10 to 14 along with information from the study by Ogden et al. (2012) to estimate obesity rates for Maine children under the age of 10.[11] Results of the analysis indicate that a total of 307,037 Maine residents—or, 23.1 percent of the Maine population—are obese. The estimated obesity rates are 27.8 percent for Maine adults (from the U.S. Centers for

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7 Table 3 shows 282,839 obese adults in Maine, relative to a population aged 20 and older of 1,017,402. This equates to an adult obesity rate of 27.8 percent.

8 For example, the Ogden et al. (2012) study shows that 42.3 percent of females aged 60 and older are obese (see Table 1). Applying the U.S. adult obesity rates from Ogden et al. (2012) to Maine population figures, we arrive at a Maine adult obesity rate of 36.3 percent—larger than the CDC-reported rate of 27.8 percent. To reconcile this difference, we adjusted the Ogden et al. (2012) gender-age obesity data by the ratio of 27.8 percent to 36.3 percent (0.766) to arrive at gender-age adult obesity rates in Maine. Thus, the Ogden et al. (2012) U.S. obesity rate of 42.3 percent for females aged 60 and older is adjusted to 32.4 percent in Maine (i.e., 0.766 multiplied by 42.3 percent).

9 Body mass index measurements recorded by physical education teachers in Maine indicate that 51 of 821 (6.2 percent) males and 69 of 833 (8.3 percent) females aged 10 to 14 are obese.

10 The U.S. Centers for Disease Control and Prevention 2011 Youth Risk Behavior Surveillance survey shows that 7.7 percent of females and 15.0 percent of males in Maine high schools are obese.

11 For example, the U.S. obesity statistics presented in Table 1 indicate that the obesity rate of females under 5 years of age is 0.561 times as large as the obesity rate of females between 10 and 14 years old. To arrive at the 4.7 percent obesity rate for Maine females under 5 years of age, we multiply the obesity rate for Maine females aged 10 to 14—from the primary data collection—by 0.561.

Disease Control and Prevention), and 7.8 percent for children and adolescents—based largely on primary data collected in Maine schools.

Table 4 displays information on the estimated medical costs associated with obesity in Maine. Similar to our analysis for the entire United States, medical costs are estimated for each age cohort as the product of the number of obese individuals multiplied by the estimated costs per person. Using this approach, we arrive at an estimated $452.7 million in annual medical costs associated with obesity in Maine. Children and adolescents account for more than $8.3 million of this amount.

3. FUTURE MEDICAL COSTS OF OBESITY IN MAINE

Along with the medical costs associated with the current population of obese children and adolescents in Maine, a major concern looking into the future is that these individuals are more likely than their non-obese peers to become obese later in life, when these costs are considerably higher. For example, a study by Freedman et al. (2005) indicates that obese adolescents (between the ages of 15 and 17) have an 87.9 percent chance of remaining obese in adulthood (86 percent for males, 90 percent for females), while non-obese adolescents have a 20.7 percent chance of becoming obese adults (20.3 percent for males, 21.0 percent for females).

Table 5 presents information on the estimated 20-year discounted medical costs of obesity associated with the current cohort of Maine children and adolescents. A time frame of twenty years is used because over this period the entire cohort will transition into adulthood. Instead of conducting the analysis individually for each of the next twenty years, the figures are estimated in five-year increments; e.g., 5 years in the future, 10

years in the future, etc. This is done to correspond with the five-year age cohorts that are available from the U.S. Census Bureau; e.g., under 5 years, 5 to 9 years, etc. In Table 5, the first two columns show the number of years in the future and the age range—at that time—of the current cohort of Maine children and adolescents.

The center column of results shows the estimated number of obese individuals—from the current cohort of Maine children and adolescents—at the five-year intervals projecting into the future. For example, using the model parameters shown in Table 5, which are described earlier in the report, we estimate that 41,895 of the current cohort of 310,959 Maine children and adolescents will be obese in five years. At that time, this cohort will have an age range of 5 to 24 years, and the current group of teenagers aged 15 to 19 years old will have transitioned into adulthood. The estimate of 41,895 obese individuals five years in the future represents a substantial increase above the estimated 24,198 Maine children and adolescents who are currently obese.

A couple of factors explain this large increase. First, in five years the current cohort of very young children will have moved from the "under 5 years" cohort, which has the lowest incidence of obesity (4.6 percent for males, 4.7 percent for females), into the "5 to 9 years" group, which has considerably higher rates of obesity (6.4 percent for males, 7.6 percent for females). Second, the current cohort of older adolescents in the "15 to 19 years" cohort will transition into young adulthood over the next five years. Projecting twenty years into the future, an estimated 79,812 of the current cohort of Maine children and adolescents—who, at that time, will have all transitioned into adulthood—will be obese. This translates into a 25.7 percent (79,812 / 310,959) obesity

rate, which is similar to the current estimated rates of obesity in Maine for males (25.4 percent) and females (24.4 percent) between the ages of 20 and 39.

The next column of figures shows estimates of the obesity-related medical costs—at the same five-year intervals projecting into the future—that are associated with the current cohort of children and adolescents in Maine. For example, the first figure of $197.5 million is estimated by adding—for each of the age cohorts; i.e., 5 to 10, 10 to 15, 15 to 20, and 20 to 25—the product of the count of obese individuals multiplied by the costs of obesity. This cost estimate, adjusted for inflation and discounted at a rate of seven percent per year, is used for the first five years into the future. As shown in the final column of Table 5, $98.3 million of these future medical costs of obesity are attributed to children and adolescents who are currently obese. The remaining $99.3 million of these costs are associated with individuals who are expected to become obese over the next five years. The fact that such a large amount of the future costs of obesity are attributed to people who are not currently obese should not be too surprising. As discussed above, the number of obese individuals from the current cohort of children and adolescents is estimated to increase from 24,198 to 41,895 over the next five years.

At the bottom of Table 5, we see that the current cohort of children and adolescents in Maine will have an estimated $1.2 billion in obesity-related medical costs over the next twenty years. In excess of 42 percent of these costs—or, $503.7 million—are attributed to currently obese children and adolescents, most of whom are expected to remain obese as adults.

4. REDUCING THE MEDICAL COSTS OF OBESITY IN MAINE

The parameters (shown at the bottom of Table 5) used in our simulations of the future medical costs of obesity determine the size of the obese population (center column of the table) from the current cohort of children and adolescents at the five-year intervals in time. These figures, along with the cost of obesity estimates from Tables 2 and 4, determine the future costs of obesity. Changes in the model parameters occurring as the result of obesity reduction and/or prevention initiatives could have sizable impacts—by lowering future obesity rates—on the estimated medical costs of obesity over the next twenty years.

To illustrate how different obesity reduction and prevention outcomes could impact future costs, we determine the changes in parameter values required to reduce the estimated 20-year medical costs of obesity by $100 million. First, in Table 6, we show the reduction in the rate of childhood and adolescent obesity needed to achieve such a cost savings. Model simulations show that it would take an obesity rate of 5.05 percent, which is considerably lower (34.3 percent) than the current rate of 7.75 percent, to arrive at $1.1 billion in future medical costs of obesity associated with the current cohort of Maine children and adolescents. Under this scenario, only about 30 percent of the 20-year costs would be related to children and adolescents who are currently obese. Instead, most of the costs are related to individuals who become obese in the future (e.g., as they transition into adulthood). This result, compared to the figures shown in Table 5, is not unexpected considering the sharp reduction in the incidence of childhood obesity under this scenario.

Table 7 examines the reductions in the probabilities that currently obese adolescents become obese adults required to lower by $100 million the future medical costs of obesity. To achieve this target, with the other model parameters at their original values, the likelihood that obese adolescents become obese adults would have to be 56.2 percent for males and 58.8 percent for females—considerably lower (e.g., reductions of about 35 percent) than the actual rates of 86.0 percent and 90.0 percent, respectively. Under this scenario, about 32 percent of the estimated 20-year medical costs of obesity would be related to the current cohort of obese children and adolescents. This share of the future medical costs of obesity is similar to the percentage from the first scenario (Table 6), but once again considerably lower than the share of costs (42 percent) related to the current cohort of obese children and adolescents in the baseline analysis (Table 5).

The final scenario, shown in Table 8, is to determine the reductions in the probabilities that currently non-obese adolescents become obese adults that would be necessary to reduce by $100 million the future medical costs of obesity. To reach this target, the likelihood that a non-obese adolescent becomes an obese adult would have to fall from 20.3 percent to 17.9 percent for males, and 21.0 percent to 18.5 percent for females. This represents about a 12 percent reduction in the probability of becoming an obese adult; e.g., 17.9 percent is 12 percent lower than 20.3 percent. Under this scenario, the future medical costs related to children and adolescents who are currently obese is similar to the baseline value. This is because the parameters used for the percentage of obese children and adolescents, as well as the likelihoods that they become obese adults, are similar to those used in the baseline analysis. Under this scenario that targets children and adolescents who are not currently obese, the share of the future medical costs of

obesity related to children and adolescents who are currently obese is the highest among the three scenarios presented in the report; i.e., 46.3 percent, which is 503.7 million divided by 1.09 billion.

The objective of these scenarios is not to suggest that a single approach should (or even could) be used to address the medical costs of obesity. For example, it is likely that any approach aimed at lowering the incidence of childhood obesity would also decrease the probability that adolescents—both those who are obese and non-obese—become obese adults. Rather, these scenarios are intended to illustrate how different outcomes (e.g., reduction in current population of obese children, decrease in the likelihood that children become obese adults) have different impacts on the future costs of obesity. Additionally, the scenarios show the differences in "effort" among target groups that would be required to achieve a similar reduction in the costs of obesity. For example, it would take a very substantial (e.g., 34 percent) decrease in the percentage of Maine children who are currently obese to achieve a $100 million reduction in the 20-year medical costs of obesity (related to the current cohort of Maine children and adolescents). A similar reduction in costs could be achieved through just a 12 percent reduction in the likelihood that a non-obese adolescent becomes an obese adult.

5 SUMMARY AND CONCLUSIONS

The purpose of this study was to examine the medical costs of childhood obesity in Maine—both today and into the future as the current cohort of children and adolescents transition into adulthood. Current statistics from the U.S. Centers for Disease Control and Prevention show that an estimated 27.8 percent of Maine adults are obese,

and primary data collected as part of the multi-year University of Maine project indicate that 6.2 percent of males and 8.3 percent of females aged 10 to 14 years old are obese. Using these obesity figures and information from the U.S. Centers for Disease Control and Prevention, we estimate that 7.8 percent of all Maine children and adolescents are obese.

The medical costs of obesity, which are only one component of its overall cost to individuals and society, are quite high. Results presented in the report show that the 2011 medical costs of obesity in Maine were $452.7 million—$444.3 million (98.2 percent) of this amount is attributed to adult obesity and $8.3 million (1.8 percent) is related to childhood obesity. The overall costs of obesity are higher for adults than children because a larger percentage of the adult population is obese, and the per-person medical costs associated with obesity are higher for adults than children.

The medical costs of obesity associated with the current cohort of all Maine children and adolescents—those who are currently obese and non-obese—will be an estimated $1.2 billion over the next twenty years. The method used to arrive at this figure uses statistics on the percentage of obese children in Maine, as well as published estimates of the likelihoods that obese and non-obese children become obese adults. In addition, the method accounts for increases over time (i.e., inflation) in the cost of healthcare and discounts future values at a rate of 7.0 percent per year. Discounting future values means that costs incurred near the end (e.g., 15 to 20 years) of the period of analysis do not add very much to the estimated total medical costs of $1.2 billion.

The study examined a few different outcomes that could lower the future medical costs associated with the current cohort of Maine children and adolescents as they

transition into adulthood. Efforts could be aimed at reducing the incidence of childhood and adolescent obesity, or decreasing the likelihoods that children and adolescents—regardless of their current obesity status—become obese adults. Reducing the likelihood that non-obese children become obese adults by 12.0 percent—e.g., from 20.97 percent to 18.46 percent for females—could lower the 20-year (discounted) medical costs of obesity by $100 million. Similar reductions in obesity costs could also be achieved by either lowering the incidence of childhood obesity or by reducing the likelihood that obese children become obese adults by about 35 percent.

When thinking about the 20-year medical costs of obesity, it is important to keep in mind that they are related to the current cohort of Maine children and adolescents. Over the next twenty years, there will be additional medical costs of obesity in Maine that are related to people who are currently adults. That is, Maine adults who are currently obese and those who become obese over the next twenty years will have obesity-related costs in addition to those estimated for children and adolescents. In addition, the 20-year cost figure is for the current cohort of children and adolescents, but does not include the medical costs of obesity related to future cohorts of children. For example, a new cohort of residents aged four and younger will emerge in five years, and this group of children (and the cohorts that follow) will have medical costs of obesity over the next twenty years that are not figured in our analysis.

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Table 1. Incidence of Obesity in the United States

Age Cohort	2010 Population Male	2010 Population Female	% Obese Male	% Obese Female	Obese Population Male	Obese Population Female	Obese Population Total
Under 5 years	10,319,427	9,881,935	14.4%	9.6%	1,485,997	948,666	2,434,663
5 to 9 years	10,389,638	9,959,019	20.1%	15.7%	2,088,317	1,563,566	3,651,883
10 to 14 years	10,579,862	10,097,332	19.6%	17.1%	2,073,653	1,726,644	3,800,297
15 to 19 years	11,303,666	10,736,677	19.6%	17.1%	2,215,519	1,835,972	4,051,490
20 to 24 years	11,014,176	10,571,823	33.2%	31.9%	3,656,706	3,372,412	7,029,118
25 to 29 years	10,635,591	10,466,258	33.2%	31.9%	3,531,016	3,338,736	6,869,753
30 to 34 years	9,996,500	9,965,599	33.2%	31.9%	3,318,838	3,179,026	6,497,864
35 to 39 years	10,042,022	10,137,620	33.2%	31.9%	3,333,951	3,233,901	6,567,852
40 to 44 years	10,393,977	10,496,987	37.2%	36.0%	3,866,559	3,778,915	7,645,475
45 to 49 years	11,209,085	11,499,506	37.2%	36.0%	4,169,780	4,139,822	8,309,602
50 to 54 years	10,933,274	11,364,851	37.2%	36.0%	4,067,178	4,091,346	8,158,524
55 to 59 years	9,523,648	10,141,157	37.2%	36.0%	3,542,797	3,650,817	7,193,614
60 to 64 years	8,077,500	8,740,424	36.6%	42.3%	2,956,365	3,697,199	6,653,564
65 to 69 years	5,852,547	6,582,716	36.6%	42.3%	2,142,032	2,784,489	4,926,521
70 to 74 years	4,243,972	5,034,194	36.6%	42.3%	1,553,294	2,129,464	3,682,758
75 to 79 years	3,182,388	4,135,407	36.6%	42.3%	1,164,754	1,749,277	2,914,031
80 to 84 years	2,294,374	3,448,953	36.6%	42.3%	839,741	1,458,907	2,298,648
85 to 89 years	1,273,867	2,346,592	36.6%	42.3%	466,235	992,608	1,458,844
90 years +	515,812	1,357,162	36.6%	42.3%	188,787	574,080	762,867
Total	151,781,326	156,964,212			46,661,521	48,245,847	94,907,367

Notes: Population statistics are from the 2010 U.S. Census. Obesity statistics are from a 2012 study by Ogden et al. Figures are subject to rounding.

Table 2. Estimated Annual Medical Costs of Obesity in the United States

Age Cohort	Obese Population Total	Medical Costs (2011$) Per Obese Individual	Estimated Medical Costs of Obesity
Under 5 years	2,434,663	NA	NA
5 to 9 years	3,651,883	$245	$894,711,335
10 to 14 years	3,800,297	$446	$1,694,932,462
15 to 19 years	4,051,490	$446	$1,806,964,540
20 to 24 years	7,029,118	$1,571	$11,042,744,378
25 to 29 years	6,869,753	$1,571	$10,792,381,963
30 to 34 years	6,497,864	$1,571	$10,208,144,344
35 to 39 years	6,567,852	$1,571	$10,318,095,492
40 to 44 years	7,645,475	$1,571	$12,011,041,225
45 to 49 years	8,309,602	$1,571	$13,054,384,742
50 to 54 years	8,158,524	$1,571	$12,817,041,204
55 to 59 years	7,193,614	$1,571	$11,301,167,594
60 to 64 years	6,653,564	$1,571	$10,452,749,044
65 to 69 years	4,926,521	$1,571	$7,739,564,491
70 to 74 years	3,682,758	$1,571	$5,785,612,818
75 to 79 years	2,914,031	$1,571	$4,577,942,701
80 to 84 years	2,298,648	$1,571	$3,611,176,008
85 to 89 years	1,458,844	$1,571	$2,291,843,924
90 years +	762,867	$1,571	$1,198,464,057
Total	94,907,367		$131,598,962,322

Notes. Data on the medical costs of obesity are from studies by Finkelstein et al. (2009), Trasande and Chatterjee (2009), and Trasande et al. (2009). Medical costs are adjusted for inflation and expressed in 2011 dollars using the (medical care) Consumer Price Index (2002 to 2011) of the U.S. Bureau of Labor Statistics. Figures are subject to rounding.

Table 3. Incidence of Obesity in Maine

Age Cohort	2010 Population Male	2010 Population Female	% Obese Male	% Obese Female	Obese Population Male	Obese Population Female	Obese Population Total
Under 5 years	35,767	33,753	4.6%	4.7%	1,632	1,570	3,202
5 to 9 years	38,081	36,035	6.4%	7.6%	2,426	2,741	5,166
10 to 14 years	40,495	38,518	6.2%	8.3%	2,516	3,191	5,706
15 to 19 years	45,541	42,769	15.0%	7.7%	6,831	3,293	10,124
20 to 24 years	40,426	39,220	25.4%	24.4%	10,278	9,581	19,859
25 to 29 years	36,145	36,536	25.4%	24.4%	9,190	8,925	18,115
30 to 34 years	35,662	36,281	25.4%	24.4%	9,067	8,863	17,930
35 to 39 years	39,302	40,603	25.4%	24.4%	9,992	9,919	19,911
40 to 44 years	44,957	46,514	28.5%	27.6%	12,807	12,823	25,631
45 to 49 years	52,861	54,758	28.5%	27.6%	15,059	15,096	30,155
50 to 54 years	54,129	56,827	28.5%	27.6%	15,420	15,667	31,087
55 to 59 years	49,861	52,580	28.5%	27.6%	14,204	14,496	28,700
60 to 64 years	44,361	45,299	28.0%	32.4%	12,434	14,674	27,108
65 to 69 years	31,432	33,582	28.0%	32.4%	8,810	10,878	19,688
70 to 74 years	22,234	25,403	28.0%	32.4%	6,232	8,229	14,461
75 to 79 years	17,338	21,556	28.0%	32.4%	4,860	6,983	11,842
80 to 84 years	12,125	18,274	28.0%	32.4%	3,398	5,920	9,318
85 to 89 years	6,705	12,467	28.0%	32.4%	1,879	4,039	5,918
90 years +	2,634	7,330	28.0%	32.4%	738	2,374	3,113
Total	650,056	678,305			147,775	159,262	307,037

Notes: Population statistics are from the 2010 U.S. Census. Obesity statistics are from primary data collection, the 2011 Youth Risk Behavior Surveillance survey, the U.S. Centers for Disease Control and Prevention, and a 2012 obesity study by Ogden et al. Figures are subject to rounding.

Table 4. Estimated Annual Medical Costs of Obesity in Maine

Age Cohort	Obese Population Total	Medical Costs (2011$) Per Obese Individual	Estimated Medical Costs of Obesity
Under 5 years	3,202	NA	NA
5 to 9 years	5,166	$245	$1,265,670
10 to 14 years	5,706	$446	$2,544,876
15 to 19 years	10,124	$446	$4,515,304
20 to 24 years	19,859	$1,571	$31,198,489
25 to 29 years	18,115	$1,571	$28,458,665
30 to 34 years	17,930	$1,571	$28,168,030
35 to 39 years	19,911	$1,571	$31,280,181
40 to 44 years	25,631	$1,571	$40,266,301
45 to 49 years	30,155	$1,571	$47,373,505
50 to 54 years	31,087	$1,571	$48,837,677
55 to 59 years	28,700	$1,571	$45,087,700
60 to 64 years	27,108	$1,571	$42,586,668
65 to 69 years	19,688	$1,571	$30,929,848
70 to 74 years	14,461	$1,571	$22,718,231
75 to 79 years	11,842	$1,571	$18,603,782
80 to 84 years	9,318	$1,571	$14,638,578
85 to 89 years	5,918	$1,571	$9,297,178
90 years +	3,113	$1,571	$4,890,523
Total	307,037		$452,661,206

Notes. Data on the medical costs of obesity are from studies by Finkelstein et al. (2009), Trasande and Chatterjee (2009), and Trasande et al. (2009). Medical costs are adjusted for inflation and expressed in 2011 dollars using the (medical care) Consumer Price Index (2002 to 2011) of the U.S. Bureau of Labor Statistics. Figures are subject to rounding.

Table 5. Estimated 20-Year Medical Costs of Obesity for Current Cohort of Maine Residents under 20 Years of Age

Years in Future	Age Range	Obese Population	Estimated Medical Costs of Obesity	Costs Related to Currently Obese Children & Adolescents
5	5 to 24	41,895	$197,533,272	$98,269,202
10	10 to 29	56,450	$285,029,282	$123,091,312
15	15 to 34	69,934	$341,274,778	$140,284,070
20	20 to 39	79,812	$364,725,156	$142,096,340
		Total	$1,188,562,488	$503,740,924

Key Model Parameters	
% Currently Obese Children & Adolescents	7.75%
% Obese Male Adolescents Who Become Obese Adults	86.00%
% Obese Female Adolescents Who Become Obese Adults	90.00%
% Non-Obese Male Adolescents Who Become Obese Adults	20.29%
% Non-Obese Female Adolescents Who Become Obese Adults	20.97%

Notes: Medical costs are adjusted for inflation using historical data (2002 to 2011) from the (medical care) Consumer Price Index of the U.S. Bureau of Labor Statistics. Future values are discounted at a rate of 7.0 percent per year. Parameters on the obesity/non-obesity transitions between adolescence and adulthood are from a study by Freedman et al. (2005).

Table 6. Reducing by $100 Million the Estimated 20-Year Medical Costs of Obesity for Current Cohort of Maine Residents under 20 Years of Age: Focus on the Percentage of Currently Obese Children and Adolescents

Years in Future	Age Range	Obese Population	Estimated Medical Costs of Obesity	Costs Related to Currently Obese Children & Adolescents
5	5 to 24	33,644	$174,283,773	$64,038,923
10	10 to 29	48,805	$259,989,557	$80,214,706
15	15 to 34	62,916	$314,540,436	$91,418,680
20	20 to 39	74,346	$339,748,722	$92,599,679
		Total	$1,088,562,488	$328,271,989

Key Model Parameters			
% Currently Obese Children & Adolescents	5.05%	Compared to	7.75%
% Obese Male Adolescents Who Become Obese Adults	86.00%		
% Obese Female Adolescents Who Become Obese Adults	90.00%		
% Non-Obese Male Adolescents Who Become Obese Adults	20.29%		
% Non-Obese Female Adolescents Who Become Obese Adults	20.97%		

Table 7. Reducing by $100 Million the Estimated 20-Year Medical Costs of Obesity for Current Cohort of Maine Residents under 20 Years of Age: Focus on the Percentage of Obese Adolescents who Become Obese Adults

Years in Future	Age Range	Obese Population	Estimated Medical Costs of Obesity	Costs Related to Currently Obese Children & Adolescents
5	5 to 24	39,877	$183,042,045	$76,235,568
10	10 to 29	52,622	$261,381,659	$87,217,185
15	15 to 34	64,410	$311,923,799	$95,765,484
20	20 to 39	72,698	$332,214,986	$92,778,941
		Total	$1,088,562,488	$351,997,177

Key Model Parameters			
% Currently Obese Children & Adolescents	7.75%		
% Obese Male Adolescents Who Become Obese Adults	56.15%	Compared to	86.00%
% Obese Female Adolescents Who Become Obese Adults	58.76%	Compared to	90.00%
% Non-Obese Male Adolescents Who Become Obese Adults	20.29%		
% Non-Obese Female Adolescents Who Become Obese Adults	20.97%		

Table 8. Reducing by $100 Million the Estimated 20-Year Medical Costs of Obesity for Current Cohort of Maine Residents under 20 Years of Age: Focus on the Percentage of Non-Obese Adolescents who Become Obese Adults

Years in Future	Age Range	Obese Population	Estimated Medical Costs of Obesity	Costs Related to Currently Obese Children & Adolescents
5	5 to 24	39,875	$183,023,807	$98,269,202
10	10 to 29	52,623	$261,385,723	$123,091,312
15	15 to 34	64,411	$311,931,936	$140,284,070
20	20 to 39	72,699	$332,221,023	$142,096,340
		Total	$1,088,562,488	$503,740,924

Key Model Parameters			
% Currently Obese Children & Adolescents	7.75%		
% Obese Male Adolescents Who Become Obese Adults	86.00%		
% Obese Female Adolescents Who Become Obese Adults	90.00%		
% Non-Obese Male Adolescents Who Become Obese Adults	17.86%	Compared to	20.29%
% Non-Obese Female Adolescents Who Become Obese Adults	18.46%	Compared to	20.97%