Bending the Obesity Cost Curve in Massachusetts:

REducing the average body mass index in the state by 5 percent could lead to health care savings of more than $5 billion in 10 years and $14 billion in 20 years.

The number of obese adults has grown dramatically in Massachusetts over the past 15 years, and is expected to grow significantly in the next 20 years. However, by using evidence-based strategies to improve nutrition and increase physical activity in our schools, neighborhoods and work places, Massachusetts could significantly reduce obesity-related diseases and health spending.

A new analysis commissioned by the Trust for America’s Health (TFAH) and the Robert Wood Johnson Foundation (RWJF) and conducted by the National Heart Forum (NHF) found that if Massachusetts could reduce the average body mass index (BMI) of its residents by only 5 percent, the state could help prevent thousands of cases of type 2 diabetes, coronary heart disease and stroke, hypertension, cancer and arthritis, while saving millions of dollars. For a six-foot-tall person weighing 200 pounds, a 5 percent reduction in BMI would be the equivalent of losing roughly 10 pounds.

Body mass index (BMI) is a calculation based on an individual’s weight and height:

\[
\text{BMI} = \frac{\text{Weight in pounds}}{\text{Height in inches}} \times \frac{\text{Height in inches}}{703}
\]

Obesity is defined as an excessively high amount of fatty tissue in relation to lean tissue. An adult is considered to be obese if his or her BMI is 30 or above.

PROJECTIONS FOR ANNUAL OBESITY-RELATED HEALTH SPENDING IN MASSACHUSETTS, 2010-2030

*In millions of dollars
Potential Health and Cost Savings by Top Obesity-Related Health Problems

<table>
<thead>
<tr>
<th>Health Problem</th>
<th>2010 Number of Cases</th>
<th>Potential Cases Avoided by 2020 if BMI is Reduced by 5% (cumulative)*</th>
<th>Potential Cost Savings by 2020, if BMI is Reduced by 5% (cumulative)</th>
<th>Potential Cases Avoided by 2030 if BMI is Reduced by 5% (cumulative)</th>
<th>Potential Cost Savings by 2030, if BMI is Reduced by 5% (cumulative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 2 Diabetes</td>
<td>483,855</td>
<td>77,206</td>
<td>$1,656,000,000</td>
<td>155,532</td>
<td>$5,436,000,000</td>
</tr>
<tr>
<td>Obesity-Related Cancers*</td>
<td>102,436</td>
<td>6,851</td>
<td>$250,000,000</td>
<td>13,109</td>
<td>$489,000,000</td>
</tr>
<tr>
<td>Coronary Heart Disease &amp; Stroke</td>
<td>375,028</td>
<td>65,085</td>
<td>$2,358,000,000</td>
<td>138,075</td>
<td>$5,918,000,000</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1,258,549</td>
<td>75,888</td>
<td>$340,000,000</td>
<td>135,308</td>
<td>$952,000,000</td>
</tr>
<tr>
<td>Arthritis</td>
<td>1,270,472</td>
<td>40,777</td>
<td>$439,000,000</td>
<td>76,086</td>
<td>$1,257,000,000</td>
</tr>
</tbody>
</table>

2010 baseline for potential cases, costs and savings
* National Heart Forum provided the total cases and cases avoided per 100,000 people, and TFAT used the state’s 2011 census data to translate to the full population-based estimates.
* Top obesity-related cancers include endometrial (uterine), esophageal, kidney, colon and post-menopausal breast cancer.

Adult Obesity Rates in Massachusetts

<table>
<thead>
<tr>
<th>Obesity Rate in 1995</th>
<th>Obesity Rate in 2011</th>
<th>Projected Obesity Rate in 2030 based on current trajectory*</th>
<th>Projected Obesity Rate in 2030 if BMI Decreased by 5%*</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.6%</td>
<td>22.7%</td>
<td>48.7%</td>
<td>42.4%</td>
</tr>
</tbody>
</table>

*All ages, all genders, adjusted for self-reporting bias.

PEER-REVIEWED PROJECTIONS OF FUTURE TRENDS

The analysis is based on a model developed by researchers at the National Heart Forum (NHF). Micro Health Simulations used the model in a peer-reviewed study, “Health and Economic Burden of the Projected Obesity Trends in the USA and UK,” published in 2011 in The Lancet. The full methodology is available in Appendix C of the 2012 F as in Fat report (available at www.healthyamericans.org).

All models have limitations in forecasting the future, but they help predict the trajectory of trends based on past data. Trends can, of course, change significantly over time for a variety of reasons. However, having a sense of potential scenarios is particularly helpful to understanding patterns, such as potential growth rates for diseases and costs projections, which can inform policy priorities and decisions.

The NHF study published in The Lancet in 2011 developed national projections for adult obesity in the United States and the potential growth in related disease rates and costs between 2010 and 2030, using data from the National Health and Nutrition Examination Survey (NHANES).

The NHF study found the number of obese Americans could grow from 32 percent now to around 50 percent (+/- 5 percent) in 2030.

Based on the predicted rise in obesity, researchers found the baseline potential growth in related costs could be $66 billion (+/- 45 billion). Within the potential range, it could be as low as $21 billion or as high as $111 billion.

In addition, due to expected increases in obesity, the projected baseline estimates for:

- The number of new cases of diabetes could be 7.9 million (+/- 1.6 million) per year, which means it could be as low as 6.3 million or as high as 9.5 million;
- The number of new cases of chronic heart disease and stroke could be 6.8 million (+/- 1.5 million) per year, which means it could be as low as 5.3 million or as high as 8.3 million; and
- The number of new cases of cancer could be 500,000 (+/- 0.1 million) per year, which means it could be as low as 400,000 or as high as 600,000.

The projections in the state-by-state analysis featured in the 2012 F as in Fat report are considered to be marginally more accurate than those reported in the national study, because the state-by-state study is based on data from the Behavioral Risk Factor Surveillance System (BRFSS) instead of NHANES. BRFSS provides more data points than NHANES (10 versus seven), which enables researchers to estimate projections more precisely.
**ENDNOTES**

1 The BMI of a 6-foot (72-inch) tall, 200-pound person is calculated as follows:

\[
\text{BMI} = \left( \frac{\text{Weight in Pounds}}{\text{Height in inches} \times \text{Height in inches}} \right) \times 703
\]

\[
\text{BMI} = \left( \frac{200}{(72 \times 72)} \right) \times 703
\]

\[
\text{BMI} = 27.12
\]

A 5% reduction in BMI for this individual would be:

\[
\text{5\% of Original BMI} = \text{Original BMI} \times 0.05
\]

\[
\text{5\% of Original BMI} = 27.12 \times 0.05 = 1.36
\]

The individual’s BMI after the 5% reduction would be:

\[
\text{Reduced BMI} = \text{Original BMI} - 5\% \text{ of Original BMI}
\]

\[
\text{Reduced BMI} = 27.12 - 1.36 = 25.76
\]

The individual’s weight after reducing his/her BMI to 25.76 would be:

\[
\text{Reduced BMI} = \left( \frac{\text{Reduced Weight}/(\text{Height in Inches} \times \text{Height in Inches})}{703} \right)
\]

\[
25.76 = \left( \frac{\text{New Weight}}{(72 \times 72)} \right) \times 703
\]

\[
\text{Reduced Weight} = 189.96
\]

The number of pounds the individual lost by reducing his/her BMI by 5% would be:

\[
\text{Pounds lost} = \text{Original Weight} - \text{Reduced Weight}
\]

\[
\text{Pounds lost} = 200 - 189.96 = 10.04 \text{ pounds}
\]


3 Note: Hypertension and arthritis were not included in the *Lancet* study, but were included in the state-by-state analysis. Potential new cases of hypertension and arthritis were calculated using the same process as used for diabetes, chronic heart disease and stroke and cancer.


