

# Tipping the Scales



How obesity and unhealthy lifestyles have become a weighty problem for the North Carolina economy.



[www.beactivenc.org](http://www.beactivenc.org)

# Contents

- 3** Executive Summary
- 3** Background and Scope of the Report
- 4** Key Findings
- 5** The Economic Costs of Risk Factors and Unhealthy Lifestyles Among North Carolina Adults
- 5** Prevalence of the Targeted Risk Factors and Their Relationship to Diseases/Conditions
- 6** Assessing the Eight Risk Factors
- 8** Tracking Medical Costs, Determining Causes
- 12** The Economic Costs of Risk Factors and Unhealthy Lifestyles Among North Carolina Youth
- 13** Medical Conditions and Their Costs
- 14** Recommendations from Be Active North Carolina
- 15** Appendix

Tipping the Scales: How obesity and unhealthy lifestyles have become a weighty problem for the North Carolina economy  
Be Active North Carolina, Inc.  
June 2008

1600 Perimeter Park Drive  
Suite 125  
Morrisville, North Carolina 27560  
[www.beactivenc.org](http://www.beactivenc.org)



# Executive Summary

North Carolinians are fat. Statewide, we are tipping the scales at an ever-increasing rate and adding pounds that are costing us money – big money. Who pays? Largely, it’s the employer. Although all North Carolinians who pay taxes are affected by these costs, employers are disproportionately burdened. That’s because they insure over 63 percent of all North Carolinians.

This economic study cites eight important risk factors among both adults and children that contributed to an annual loss of \$57.36 billion in 2006. By a large margin, excess weight – including being overweight or obese – is the most “expensive” risk factor with weighty impacts on medical care, prescription drugs and lost productivity. To put that \$57.36 billion figure into perspective, the entire 2008 annual budget for the state of North Carolina is over \$20 billion.

Alarming as the findings are, the study suggests things are likely to get worse. Without aggressive efforts to reverse the trend, the annual drain on North Carolina’s economy could jump to more than \$75.64 billion by 2011, a cumulative five-year increase of 31.8 percent.

North Carolinians are suffering from ill-health or have health and lifestyle habits that predispose them to a host of diseases. Tragically, even children are experiencing diseases and conditions that historically were associated with older adults. Lives are limited and, in some cases, cut short by health that is certainly not ideal. What’s more, poor health also has an economic cost. Nationwide, the annual bill for treating seven of the

most common chronic diseases is nearly \$300 billion; the lost productivity costs associated with these conditions are a staggering estimated \$1 trillion a year.<sup>1</sup>

Many public health experts believe that lifestyle choices account for more than half of the health problems that adults experience—and in the case of children, that is even more likely to be the case. That means how and what we eat, the amount of physical activity we get, how vigilant we are about health screenings and how disciplined we are in our habits can largely influence whether we stay healthy or stay sick.

Unfortunately for North Carolina, too few people are taking steps to improve their health habits and lifestyle. And the costs for treating diseases and conditions that often result from their choices are escalating. Unless a significant percentage of North Carolinians improve their health, employers, taxpayers and ultimately patients themselves will shoulder the burden of the increased cost of health care. This will leave less money for investment in statewide infrastructure, education, capital projects and job creation.

## Background and Scope of the Report

Be Active North Carolina is the nation’s best statewide organization for the promotion of health and physical activity<sup>2</sup>. As an organization dedicated to promoting health and fitness among all North Carolinians, Be Active is concerned about the escalating cost of medical problems caused by or related to lifestyle factors. The organization commissioned its first report on these costs in 1997, and issued follow-up reports in 2001 and 2005.

The 2005 report focused on four risk factors known to be precursors of chronic illness and other conditions:

- Excess weight
- Physical inactivity
- Type II diabetes
- Low dietary consumption of fruits and vegetables.

In that report, the price tag for 11 common medical conditions tied to these four risk factors was \$24.1 billion.<sup>3</sup> This figure included \$8 billion in direct and indirect medical care, \$16.1 billion in lost productivity among workers, and that is just the cost of caring for adults. For the state’s children (ages 5 to 17), the bill was estimated to be \$38.16 million in direct costs based on the prevalence of the three known risk factors associated with the most common chronic medical conditions. These risk factors, or precursory conditions, are physical inactivity, Type II diabetes and excess weight.

For this current study, which uses 2006 data, four new risk factors were added to the cost-appraisal analysis when looking at North Carolina’s adults:

- Hypertension (high blood pressure)
- Abnormal blood lipid level (high cholesterol)
- Depression
- Tobacco use

While only one of these risk factors is considered an actual habit—tobacco use—all four are modifiable and/or treatable. Since they are all closely linked with lifestyle choices, high incidences of chronic illness and high utilization of health care, adding them to the equation will produce a more comprehensive analysis of the challenges North Carolinians face.

1 “An Unhealthy America: The Economic Burden of Chronic Disease—Charting a New Course to Save Lives and Increase Productivity.” Report by Ross DeVol, Armen Bedroussian et. al. for the Milken Institute, October 2007.

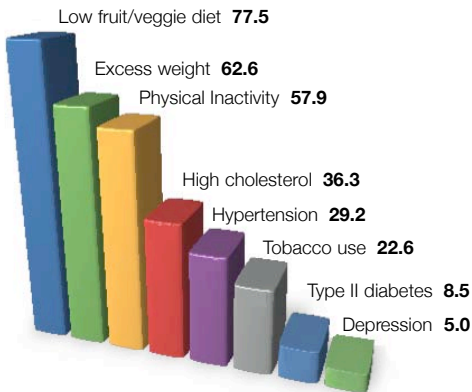
2 National Association for Health and Fitness (NAHF).

3 Using 2003 data obtained/analyzed by Chenoweth & Associates, Inc.

# Key Findings

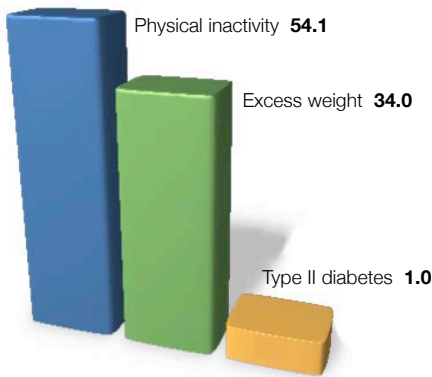
## The Eight Health Risk Factors in North Carolina Adults

Percentage Affected



## The Three Health Risk Factors in North Carolina for Youth

Percentage Affected



## Youth Risk Factor Responsibility for Medical Costs

Risk factor	Cost	% of all medical conditions
Phys. inactivity	\$41.38 million	12.18%
Excess weight	\$33.33 million	9.81%
Type II diabetes	\$30.43 million	8.96%

## What's the Big Deal...

Unhealthy eating and physical inactivity cost the State an estimated **\$57 billion annually** in avoidable medical expenses, workers compensation claims and lost productivity. That amount is predicted to sky rocket to **\$75 billion by 2011** unless preventative measures are taken. Of the risk factors contributing to this problem, excess weight is the “most expensive” for adults, while physical inactivity ranks at the top for children.

There is no question about the direct value of physical activity in preventing disease and the associated costs. Simply decreasing the prevalence of excess weight by a modest 3% could save North Carolinians \$152.5 million annually in healthcare costs.

- For adults, the total cost of medical conditions/diagnoses related to eight health risk factors was **\$57.36 billion** in medical care, prescription drug care and lost productivity in 2006.
- At the current rate of increase, the costs associated with the risk factors for adults will rise to **\$75.64 billion in 2011**, a cumulative **five-year increase of 31.8 percent**.
- **Sixty-one cents of every dollar** spent on primary medical care for the 11 common medical conditions in adults can be attributed to the eight risk factors.
- If the prevalence of the eight risk factors is reduced by a modest **three percent** among adults, North Carolina would **save \$2.25 billion per year**. **Losing weight would have the most impact**—a **\$610 million cost savings** between 2007-2011—due to its pervasiveness and its strong correlation with lost productivity costs.
- **Maintaining the three youth risk factors** at their current prevalence level would reduce potential costs by **\$15 million a year**.
- Although physical inactivity is the most expensive risk factor for kids, **excess weight** is the fastest growing. Moreover, excess weight results largely from physical inactivity and is a **physiological precursor to Type II diabetes**.

## and what does it mean for:

**Employers:** An overweight or obese adult will incur approximately **\$250,000 in lost productivity costs** during the span of their career. Did you know that by promoting healthier lifestyles and getting your employees moving, you could save up to **115 hours of lost productivity per employee each year**? Do the math – that's big money.

**Parents:** It's hard to admit, but there's a one in four chance that your child is overweight. It's estimated that **15-45% of all new diabetes cases in North Carolina children are Type II**, a disease previously found only in adults. In addition, 54.1% of North Carolina children are physically inactive, which means that they are 600 times more likely to develop heart disease as adults!

**Educators:** Incorporating at least **30 minutes of physical activity into the school day** to get up, stretch and get their hearts pumping will actually improve children's levels of focus and ability to retain information.

**Insurers:** Insurers are all too familiar with the economic impact of unhealthy lifestyles. In North Carolina, **three out of every four prescriptions written are for the treatment of illnesses and disorders linked to inactivity and unhealthy habits**.

**Government:** If just **three percent** of overweight or obese North Carolinians achieved a normal weight through healthy eating and regular movement, the result would be a savings of over **three billion dollars**. That's more than enough to fund the public university system for an entire year. It's also enough to fund 68,000 new jobs.

# The Economic Cost of Risk Factors and Unhealthy Lifestyles Associated with North Carolina Adults

## Prevalence of the Targeted Risk Factors and Their Relationship to Diseases/Conditions

Hard numbers bear what economists and health professionals have long observed: the cost of poor health is rising. Although some illnesses and most traumas have no known cause or are unpredictable, the majority of health problems adults suffer can be traced to the way they live their lives.

This report studied 11 common diagnoses known to be associated with eight known risk factors. These are:<sup>4</sup>

### **Musculo-skeletal conditions**

Many musculo-skeletal problems in adults are associated with several of the targeted risk factors, including physical inactivity, tobacco use and excess weight.

### **Cancer**

Research shows that several risk factors included in this analysis are linked with bladder, breast, colorectal, esophageal, endometrial, laryngeal, lung, ovarian, oral, prostate, stomach and renal cancer. These include tobacco use, excess weight, physical inactivity, low fruit and vegetable intake and depression.

### **Circulatory conditions**

All eight of the risk factors are implicated in circulatory conditions, which include cardiovascular disease, the number one killer of Americans.

### **Neuro-sensory disorders**

Cataracts and carpal tunnel syndrome are two of the neurological conditions associated with several of the risk factors in this analysis. In particular, these conditions are closely associated with tobacco use, low fruit and vegetable intake, excess weight and Type II diabetes.

### **Metabolic/endocrine/nutrition-related disorders**

Although Type II diabetes is one of the risk factors analyzed in this report because it is a contributing factor in many other diseases and conditions, it is also a diagnosis in itself.<sup>5</sup> Other metabolic/endocrine disorders include gout and impaired immune response. Research shows that these conditions are more prominent in people who use tobacco, do not eat the recommended amount of fruits and vegetables and are physically inactive.

### **Digestive disorders**

Four such disorders are directly associated with the risk factors analyzed: gallbladder disease, biliary and alcoholic pancreatitis, liver disease and end-stage renal disease. These conditions are most common in people with risk factors such as excess weight and tobacco use.

### **Complications of pregnancy**

Obstetric complications are most likely to occur in women who have several of the risk factors analyzed. These include excess weight, Type II diabetes, hypertension, tobacco use and low fruit and vegetable intake.

<sup>4</sup> The analysts recognize that physical inactivity, low fruit and vegetable consumption and cigarette smoking are primarily behavioral decisions while excess weight, Type II diabetes, depression, abnormal blood lipid level, hypertension and depression are often classified as signs, symptoms or conditions. However, they consider all these entities precursory risk factors that, independently or in conjunction, raise an individual's probability of incurring the 11 diagnoses discussed in this report.

<sup>5</sup> Ibid

One third of all persons with diabetes are unaware that they have the condition.



### **Certain injuries/complications**

Medical conditions such as post-infection wounds, heart disorders and hip fractures are related to four risk factors: tobacco use, excess weight, physical inactivity and low fruit and vegetable intake.

### **Mental disorders**

Depression and anxiety are closely associated with several risk factors examined in this report. Research reveals that one or both of these conditions are more common in people with excess weight, physical inactivity and tobacco use.

### **Ill-defined signs/symptoms**

These conditions tend to be associated with physical inactivity, tobacco use and excess weight. However, they also include sleep apnea, urinary stress incontinence and impaired respiratory function.

### **Respiratory disorders**

Breathing problems such as asthma, bronchitis, chronic obstructive pulmonary disease (COPD) and impaired respiratory syndrome are associated with excess weight, tobacco use, physical inactivity and low fruit and vegetable intake.

## **Assessing the Eight Risk Factors**

These eleven common diagnoses are most commonly associated with the following eight risk factors:

### **Excess weight**

For this report, overweight is defined as a Body Mass Index (BMI)<sup>6</sup> of between 25 and 29.9. Obesity is defined as a BMI of between 30 and 39.9, with morbid obesity being a BMI of 40 or higher.

### **Physical inactivity**

One benchmark for measuring a person's physical activity level is to look at their participation in moderate physical activity over most of the week or shorter bursts of vigorous activity a few days a week. Fitness advocates now recommend that adults participate in 30 minutes or more a day of moderate physical activity for at least five days a week, or 20 minutes a day of vigorous activity for at least three days a week.

### **Type II diabetes**

This type of diabetes, also known as non-insulin dependent diabetes mellitus or adult-onset diabetes, affects 90 percent of the roughly 14.6 million people in the United States diagnosed with diabetes. It is the sixth leading cause of death in the nation and is responsible for more than 50 percent of all non-traumatic limb amputations. Diabetes is also the leading cause of blindness and end-stage renal disease in adults.

<sup>6</sup> BMI refers to a person's relative weight for height. The calculation is [weight in lbs/height in inches squared] x 704.5.

# Eight Risk Factors for Adults<sup>7</sup>

## Low dietary fruit/vegetable intake

Recent evidence has found that diets low in fruits and vegetables are strongly correlated with higher-than-normal rates of cardiovascular disease, obesity, diabetes, and certain cancers. Although it was once recommended that adults consume five servings of fruit and/or vegetables a day, the federal government in 2005 upgraded its standards to a recommended seven servings a day for women (expressed as 3.5 cups) and nine servings for men (expressed as 4.5 cups). Indeed, a growing body of research shows that additional health and potential disease-prevention benefits can accrue with a higher intake of such foods.

## Depression

Major depression is characterized by a persistent sad mood and/or an inability to experience pleasure. According to the National Institute of Mental Health, one in 10 American adults, or about 21 million people, suffer from a depressive illness each year. Most people view depression as a mood disorder. However, it is becoming clearer that it is strongly related (physiologically or behaviorally) to risk factors like tobacco use, obesity, physical inactivity, hypertension, abnormal blood lipids and diabetes.

## Abnormal blood lipid level (high cholesterol)

Abnormal cholesterol and triglyceride levels are strongly linked to cardiovascular disease. In most people, high-density lipoprotein or HDL, also known as “good” cholesterol, should be proportionately high, while low-density lipoprotein, i.e., “bad” cholesterol, should be low. Triglyceride, another blood lipid, is measured along with cholesterol and should, ideally, be no higher than 150 mg/unit. Although some poor blood lipid readings may be due to hereditary factors, cholesterol levels are often affected by diet. In recent years, North

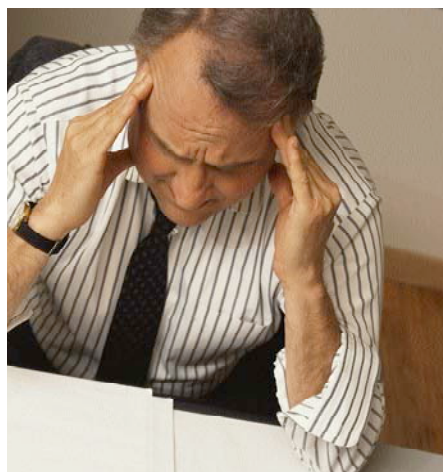
Carolinians’ rate of high cholesterol rose more than seven percent.

## Hypertension (high blood pressure)

High blood pressure is arguably one of the most widely known—and predictive—risk factors for cardiovascular disease. In fact, hypertension alone may contribute as much as 11 percent of the total risk for many types of cardiovascular disease. Blood pressure that stays between 120-139 systolic (the upper measurement) and 80-89 diastolic (the bottom measurement) is considered pre-hypertension, and readings above 140/90 are considered to be high blood pressure.

## Tobacco use

Although the percentage of adult smokers has dropped dramatically in the past three decades, cigarette smoking still accounts for 20 percent of all deaths in the United States each year. The U.S. Surgeon General has called smoking the single most preventable cause of death in the United States, and nationwide, smoking is responsible for an estimated \$157 billion in annual health-related losses. Smoking is responsible for approximately 30 percent of all coronary heart disease deaths in the United States. The ill-effects of smoking—as well as smokeless tobacco—are well documented. Yet Americans—primarily men, people from low socio-economic backgrounds and those with less than a high school education—continue to use tobacco products.



## Excess weight

In North Carolina, 62.6 percent of adults have excess weight (36.7 percent being overweight and 25.9 percent considered obese).

## Physical inactivity

In North Carolina, 57.9 percent of adults are physically inactive. Specifically, 40.4 percent reported getting some physical activity, but less than recommended, while 22 percent reported not being physically active at all.

## Type II diabetes

In North Carolina, an estimated 547,000 adults, or approximately 8.5 percent of the adult population, were diagnosed with Type II diabetes.

## Low dietary fruit/vegetable intake

Statistics show that 77 percent of North Carolina adults eat fewer than five daily servings of fruit and vegetables.

## Depression

In North Carolina, five percent of adults report being dissatisfied or very dissatisfied with life, an indicator of depression absent of a clinical diagnosis.

## Abnormal blood lipid level (high cholesterol)

In North Carolina, 36.3 percent of North Carolinians reported having abnormal blood lipid levels.

## Hypertension (high blood pressure)

In North Carolina, 29.2 percent of adults have been diagnosed with hypertension.

## Tobacco use

In North Carolina, 22.6 percent of all adults smoke cigarettes.

<sup>7</sup> Source: The 2005 Behavioral Risk Factor Surveillance Survey by the N.C. State Center for Health Statistics.

Hard numbers bear what economists and health professionals have long observed: the cost of poor health is rising.

**Table 1: Medical Care Costs Associated With the Risk Factors**

Risk Factor	2004 Data <sup>8</sup>		2006 Data <sup>9</sup>	
	Medical Costs	% of All 11 Conditions	Medical Costs	% of All 11 Conditions
Excess weight	\$ 649.26 million	9.86%	\$ 2.81 billion	16.41%
Physical inactivity	\$ 422.20 million	6.41%	\$ 2.32 billion	13.49%
Low fruit/veggie intake	\$ 506.02 million	7.69%	\$ 2.29 billion	13.31%
Tobacco use	not analyzed		\$ 1.24 billion	7.18%
Poor blood lipids	not analyzed		\$ .86 billion	5.00%
Hypertension	not analyzed		\$ .73 billion	4.27%
Type II diabetes	\$ 15.92 million	<.01%	\$ .22 billion	1.29%
Depression	not analyzed		\$ .06 billion	<.50%
<b>TOTAL</b>	<b>\$ 1.59 billion</b>	<b>23.97%</b>	<b>\$ 10.53 billion</b>	<b>61.45%</b>

8 Based on a 2003 statewide hourly wage of \$13.17; fringe benefits of 18.24% of salary/wages; and number of full-time employed workers.

9 Based on a 2006 statewide hourly wage of \$14.41; fringe benefits of 18.24% of salary/wages; and number of full-time employed workers.

## Tracking Medical Costs, Determining Causes

### Outpatient and inpatient medical claims

The price tag for medical treatment of the 11 adult medical conditions examined in this report was \$17.12 billion in 2006. Of this number, the eight risk factors were responsible for \$10.53 billion. That is 61.45 percent of the total. To put it in perspective, 61 cents of every dollar spent on outpatient or hospital treatment of these conditions resulted from one or more of the risk factors.

That cost was borne by employers, workers, the government and taxpayers. Circulatory problems—including heart disease—top the list as the most expensive health problem, costing payers \$6.3 billion in 2006. This is not surprising, given the prevalence of heart disease in North Carolina and across the country. Cancer is the second-most-expensive condition in terms of outpatient and inpatient claims, costing taxpayers \$2.2 billion in 2006. Together, these two

conditions account for almost half of the total bill.

The most expensive risk factor is excess weight, which is responsible for \$2.81 billion in medical costs, or 16.41 percent of the \$17.12 billion total. This risk factor was followed by physical inactivity and low fruit and vegetable intake.

**Table 1** illustrates the proportionate distributions of medical care costs per risk factor.

### Factoring in Prescription Drug Costs

Because clinicians write a prescription in three out of every four health care encounters<sup>10</sup>, the cost of prescription drugs is responsible for a significant portion of health care expenses. If the current upward trend in prescription drug use continues, prescription drug spending will soon outpace spending for inpatient hospital services.

In 2006, prescription drug costs associated with the eight risk factors totalled \$4.22 billion, which is 55 percent of risk-factors specific to medical care costs and about 34 percent of the total medical

care costs. Combined outpatient, inpatient and prescription drug charges for the 11 conditions amounted to nearly \$17 billion in 2006. Drugs to treat digestive disorders were the most expensive category, followed by respiratory conditions, endocrine/metabolic conditions and circulatory conditions.

To determine the cost of drugs prescribed to treat the 11 conditions, analysts used a mathematical model that excluded drugs prescribed for conditions such as infections and non-risk-factor related causes. They found that the majority of drugs prescribed in North Carolina are commonly prescribed for conditions associated with the eight risk factors.<sup>11</sup>

Analysts used a second model to determine the approximate cost of prescription medicine tied to each risk factor individually rather than in the aggregate.<sup>12</sup> They found that, just as with outpatient and inpatient care, excess weight was the single most expensive risk factor in terms of prescription drug costs, followed by physical inactivity and low fruit and vegetable intake.

<sup>10</sup> McCaig, L. and Burt, C. National Ambulatory Medical Care Survey/2002 Emergency Department Summary. U.S. Dept. of Health and Human Services, March 2004.

<sup>11</sup> See Appendix B for a description of the analysts' prescription drug cost determination model.

<sup>12</sup> Ibid.



**Table 2: The Cost of Drugs to Treat Conditions Associated With Each Risk Factor In North Carolina**

Risk Factor	2004 Data	2006 Data
	Rx drug cost	Rx drug cost
Excess weight	\$175.4 million	\$960.9 million
Physical inactivity	\$114.0 million	\$792.9 million
Low fruit/vegetable intake	\$136.8 million	\$782.1 million
Tobacco use	not analyzed	\$423.1 million
Type II diabetes	\$ 1.3 million	\$425.1 million
Poor blood lipids	not analyzed	\$292.5 million
Depression	not analyzed	\$290.6 million
Hypertension	not analyzed	\$249.7 million
<b>TOTAL</b>	<b>\$427.5 million</b>	<b>\$4.22 billion</b>

**Table 2** above illustrates the proportionate distribution of prescription drug costs by risk factor.

Prescription drug costs continue to rise. They represent about 40 cents of every dollar spent on risk-factor based medical care costs (outpatient and inpatient services). The combined cost for medical care and prescription drugs linked to the eight risk factors was \$14.75 billion in 2006.

### The Cost of Lost Productivity in the Workplace

In most companies, personnel costs represent a significant percentage of operating costs. As a result, the impact of illness and other causes of absenteeism can be devastating to a business' economic performance. Even an employee who is present but performing below expectations due to a medical condition or injury (presenteeism) can greatly reduce a company's economic output.

In 2006, the cost of this loss of productivity associated with the eight risk factors was \$42.7 billion. This figure considers the measures of lost productivity (absences, short-term disability and pre-

senteeism).

### Tying risk factors to lost productivity

**Table 3** (page 10) illustrates the impact of lost productivity as a result of the risk factors. This \$42.7 billion cost is almost three times higher than the cost of medical and prescription drug costs combined despite the exclusion of low fruit and vegetable intake risk factors in the productivity calculation. **Table 4** (page 11) illustrates the distribution of risk-factor costs across all three cost-appraisal categories.

### Comparing 'apples to apples'

The \$57.36 billion total for all costs cannot be compared equitably with data from Be Active's last report because four additional risk factors are included in this analysis.

However, if just the original four risk factors studied in the 2005 report—physical inactivity, excess weight, low fruit and vegetable intake and Type II diabetes—are compared, it is clear that costs have risen dramatically. In the 2005 report, the total cost for medical care, prescription drugs and lost productivity was \$24.10 billion. In 2006, these

four risk factors were responsible for \$33.87 billion in costs. Adjusted for population growth and the variance in risk factor prevalence, that amounts to an increase of about 40 percent.

### One risk factor emerges as the most expensive of all

It comes as no surprise to North Carolina's public health community that excess weight is the most expensive risk factor. It has the highest contribution in all three cost-appraisal categories—medical costs, prescription drug costs and lost productivity—and has an economic impact of \$15.57 billion a year. Physical inactivity and poor cholesterol levels follow fairly closely in the rankings.

Excess weight was also the most expensive risk factor in the 2005 report. That percentage increased in total cost over the 2003-2006 period to 48.89 percent, followed by physical inactivity, which increased by 41 percent.

That excess weight is such a significant contributor to the negative impact of health risk factors is actually good news. Except in rare cases, people can control their weight. Unlike high blood pressure and high cholesterol, for instance, which have hereditary influences and often must be controlled with medication, weight is largely influenced by caloric balance. By eating a lower calorie diet and becoming more active, weight loss can be achieved. Even a weight loss of 10 to 15 percent of a person's body weight can improve many health indicators, including blood glucose, blood lipids and blood pressure.

### Who really pays?

In today's marketplace, the bulk of medical care, prescription drugs and lost productivity costs is paid by North Carolina's employers, workers and taxpayers (in the form of Medicaid and Medicare programs). But who pays

Unfortunately for North Carolina, too few people are taking steps to improve their health habits and lifestyles. The costs of treating the diseases and conditions that often result from their choices are escalating.

**Table 3: Lost Productivity Outcome Measures and Costs Tied to Selected Risk Factors**

Risk Factor	2004 Data <sup>13</sup>		2006 Data <sup>14</sup>	
	Hours Lost (yearly per worker)	Lost Productivity Cost	Hours Lost (yearly per worker)	Lost Productivity Cost
Excess weight	173.3	\$ 6.4 billion	267.4	\$11.8 billion
Poor lipids	not analyzed		359.0	\$ 9.2 billion
Low fruit/vegetable intake	not analyzed		not analyzed	
Physical inactivity	173.3	\$ 6.8 billion	215.3	\$ 8.8 billion
Hypertension	not analyzed		174.8	\$ 3.6 billion
Depression	not analyzed		1,015.4	\$ 3.6 billion
Type II diabetes	568.0	\$ 2.9 billion	511.8	\$ 3.1 billion
Tobacco use	not analyzed		163.6	\$ 2.6 billion
<b>TOTAL</b>	<b>914.7</b>	<b>\$16.1 billion</b>	<b>2,707.3</b>	<b>\$42.7 billion</b>

<sup>13</sup> Based on a 2003 statewide hourly wage of \$13.17; fringe benefits of 18.24% of salary/wages; and number of full-time employed workers.

<sup>14</sup> Based on a 2006 statewide hourly wage of \$14.41; fringe benefits of 18.24% of salary/wages; and number of full-time employed workers.

more? Although this study could not determine the actual distribution of costs among these payers, analysts isolated the most expensive risk factor—excess weight—and assigned costs based on the payers’ prevalence in the population. Hypothetically, if the costs associated with the eight risk factors were borne exclusively by any one of these payer groups, then:

- Each North Carolina taxpayer’s share of the cost of excess weight would be approximately \$1,740 per year.
- Each full-time worker’s share of the cost of excess weight would be approximately \$2,468 per year.
- Each non-farm worksite’s share would be approximately \$73,094 per year.

### Small changes yield big results

Given North Carolina’s population growth, upward trends in several of the risk factors and the rising costs of health care and prescription drugs, the \$57.36 billion cost associated with the risk factors will surely continue to increase.

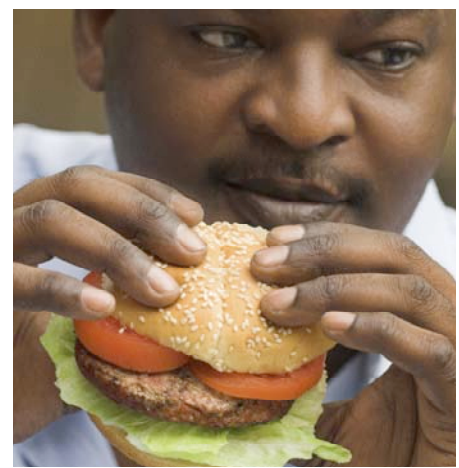
Analysts predict that unless people get healthier soon, the bill for the targeted risk factors in 2011 will total \$75.64 billion in medical costs, prescription drug expenses and lost productivity—a cumulative five-year increase of 31.8 percent.

Additionally, the five risk factors that became the most prevalent over the past few years will likely show associated cost increases in the future. On the other hand, the remaining risk factors (depression, tobacco use and physical inactivity) may display some cost-containment potential if their annual prevalence rates continue to improve to a level low enough to offset the cost inflation and statewide population growth.

Decreasing prevalence rates for tobacco and to a lesser extent, physical inactivity and depression, suggest that many North Carolinians have successfully reduced one or more of these risk factors over the past few years. In particular, the number of people who use tobacco decreased by 5.49 percent over the three-

year period examined. Combined, the three risk factors showed a baseline improvement index of 3.05 percent per year.

Analysts calculated what would happen to the aggregate risk factor cost dimensions—medical care, prescription drugs and lost productivity—if North Carolinians experienced an across the board improvement of 3.05 percent each year in the targeted risk factors. (An improvement means a reduction in the prevalence of each risk factor.) If such an improvement were to occur, North Carolina’s taxpayers would save \$10.65 billion between 2007-2011.



**Table 4: Aggregate Costs Associated with Eight Targeted Risk Factors**

Risk Factor	Medical Cost	Prescription Drug Cost	Lost Productivity Cost	TOTAL
Physical Inactivity	\$ 2.32 billion	\$ .79 billion	\$ 8.79 billion	\$11.9 billion
Excess weight	\$ 2.81 billion	\$ .96 billion	\$11.80 billion	\$15.5 billion
Low fruit/vegetable diet	\$ 2.29 billion	\$ .78 billion	not analyzed	\$ 3.1 billion
Poor blood lipids	\$ 0.86 billion	\$ .29 billion	\$ 9.19 billion	\$10.3 billion
Tobacco use	\$ 1.24 billion	\$ .42 billion	\$ 2.61 billion	\$ 4.3 billion
Depression	\$ 0.06 billion	\$ .29 billion	\$ 3.58 billion	\$ 3.9 billion
Hypertension	\$ 0.73 billion	\$ .25 billion	\$ 3.60 billion	\$ 4.6 billion
Diabetes	\$ 0.22 billion	\$ .43 billion	\$ 3.07 billion	\$ 3.7 billion
<b>TOTAL</b>	<b>\$10.53 billion</b>	<b>\$4.21 billion</b>	<b>\$42.64 billion</b>	<b>\$57.37 billion</b>

Excess weight is the risk factor with the most cost-savings potential. This is because excess weight has a high prevalence among North Carolinians (62.6 percent) and comprises a substantial portion (27.6 percent) of lost productivity costs. A 3.05 percent drop in those clas-

sified as overweight or obese would save **\$3.03 billion** over the 2007-2011 period.

It is apparent that even small changes—such as 3 out of every 100 overweight or obese people achieving a normal weight—can mean big savings for the

state. The impact of an annual cost savings from a **3.05% improvement** in risk-factor prevalence could fund (in today's dollars) nearly **68,000 full-time jobs** in North Carolina. ■

## Glossary of terms

**Absenteeism:** Absenteeism is the act of consistent absence from work or school due to poor health.

**Body Mass Index (BMI):** This equation is a person's weight in kilograms divided by height in meters squared ( $BMI = \text{kg}/\text{m}^2$ ). Generally, "healthy weight" is defined as a BMI equal to or greater than 19 and less than 25 among all people aged 20 and over. Obesity is generally considered to be a BMI equal to or greater than 30 (roughly 30 pounds of excess weight).

**Cardiovascular Disease:** Also known as heart disease, cardiovascular disease includes a number of conditions affecting the heart such as congestive heart failure, congenital heart disease and heart attack.

**High Cholesterol:** Cholesterol is a waxy, fat-like substance made in the liver and found in certain foods, such as food from animals like dairy products (whole milk), eggs and meat. Bad cholesterol, also known as low-density lipoprotein (LDL), contributes to heart disease by laying down artery-clogging plaque; good cholesterol, or high-density lipoprotein (HDL), helps clear it away.

**Hypertension (High Blood Pressure):** Hypertension is diagnosed by a consistently elevated blood pressure reading that exceeds 140 systolic pressure over 90 diastolic pressure. Normal blood pressure is generally considered to be 120 systolic pressure over 80 diastolic pressure.

### Non-Insulin Dependent (Type II)

**Diabetes:** A form of diabetes mellitus characterized by diminished tissue sensitivity to insulin and sometimes impaired beta cell function, exacerbated by obesity and often treatable by diet and exercise.

**Obese:** Women with over 30% body fat and men with over 25% body fat are considered obese.

**Overweight:** The National Institutes of Health defines overweight in terms of a BMI of 27.3% or more for adult women and a 27.8% or more for men.

**Presenteeism:** Presenteeism is the act of regularly attending work or school, without the ability to perform at full capacity due to poor health.

# The Economic Cost of Risk Factors and Unhealthy Lifestyles Associated with North Carolina Youth

**M**ore than a third of North Carolina youth are classified as overweight. For the first time in history, this generation may be sicker and die younger than their parents. Across the country and here in North Carolina, 34% of children ages 2 to 17 are battling excess weight or are at risk for becoming overweight.<sup>15</sup>

Children who are overweight and physically inactive are now exhibiting cases of Type II diabetes, a diagnosis once unheard of in children. In addition, they are not getting enough exercise or eating

enough fruits and vegetables, leading to a host of chronic conditions.

Five of those conditions were selected for this study. Only inpatient and outpatient treatment were examined.<sup>16</sup>

Researchers sought first to identify the risk factors/lifestyle habits associated with ill-health in youth, and to measure prevalence of these risk factors among the population. The risk factors and their prevalence are as follows:

## **Physical inactivity**

In 2005, the last year for which figures were available, 54.1 percent of school-aged children were physically inactive.<sup>17</sup>

While that number represents an improvement of about 3.4 percent over the level of physical inactivity in 2003, it is still disturbing that more than half of North Carolina's children are participating in little to no exercise.

## **Excess weight**

The term "excess weight" is used to describe children and adolescents whose body mass index (BMI) is at or above the 95th percentile for kids of the same age and sex. Based on the 2005 Behavioral Risk Factor Surveillance Study (BRFSS) targeting the State's youth, 34 percent fall into the "excess weight," category, with 16 percent classified as overweight and 18 percent at risk of overweight.

## **Diabetes**

An estimated 15-45% of all new diabetes diagnoses in children fell into the Type II category. In North Carolina, approximately one percent of all children and adolescents were diagnosed with Type II diabetes or pre-diabetic syndrome, based on a study by UNC-Chapel Hill researchers.

<sup>15</sup> "At risk" of overweight means that a child's BMI is between the 85th and 95th percentile.

<sup>16</sup> Unlike in the adult analysis, prescription drug costs and lost productivity costs were not included. That is because children do not work and are prescribed prescription drugs in insufficient quantities to produce valid analysis.

<sup>17</sup> 2005 NC Youth Risk Surveillance Survey (YRSS)



## Medical Conditions and Their Costs

This report studied five common diagnoses known to be associated with three known risk factors or precursory conditions.

### Musculo-skeletal

As with adults, overweight children and adolescents who do not exercise their muscles, joints and tendons regularly are prone to musculo-skeletal injuries and conditions. Other risk factors for such problems are high-risk activities, being male, having a medical history and experiencing high levels of stress.

### Circulatory

Medical evidence indicates that the same risk factors linked to circulatory conditions in adults are also responsible for such problems in youth. In addition to the three risk factors—excess weight, physical inactivity and Type II diabetes—other risk factors for circulatory diseases in youth include depression, hypertension, abnormal blood lipids, family history and tobacco use.

### Metabolic/endocrine-related disorders

While diabetes is the most prevalent of these conditions and is a category for treatment in itself, researchers also included it as a risk factor condition (same as the adult study). Other metabolic/endocrine conditions include gout and impaired immune response. In addition to excess weight and physical inactivity, risk factors for these problems include smoking, genetics, high cholesterol, being of Hispanic or African-American descent, poverty, substance abuse and hypertension.

18 As a risk factor for the targeted conditions, diabetes is estimated to cost approximately \$430,092 in direct medical care. The \$30.43 million figure represents insurance/medical claims coded specifically as Type II diabetes.

### “Ill-defined” signs and symptoms

Several medical conditions that fall into this category are associated with physical inactivity and excess weight, including impaired respiratory function, sleep apnea and urinary stress incontinence. Research shows that these conditions are associated with smoking, existing illness, air pollution and genetics/family history.

### Mental disorders

Recent studies suggest that depression stemming from physical inactivity and/or obesity is not limited to adults. One study shows that youth who are substantially overweight throughout their childhood and adolescence have a higher incidence of depression than their healthy-weight peers.

### Tallying the Toll

The cost to treat the five medical conditions associated with the child/youth risk factors was \$339.64 million in 2006. Of that total, \$105.13 million can be directly attributed to the three risk factors. Physical inactivity was the most expensive risk factor, accounting for \$41.38 million in health care costs, or 12.18 percent of the total tab. Approximately \$1 of every \$3.23 spent to treat the targeted medical conditions can be traced to one or more of the risk factors. **Table 5** below illustrates the total cost and distribution of risk factors for the targeted medical conditions.

**Table 5: Risk Factor Responsibility for Youth Medical Costs**

Risk factor	Cost	% of all medical conditions
Phys. inactivity	\$41.38 million	12.18%
Excess weight	\$33.33 million	9.81%
Type II diabetes <sup>18</sup>	\$30.43 million	8.96%

The \$105.13 million cost associated with the three risk factors is likely to increase. As North Carolina’s population grows, so will the prevalence of high risk factors and general medical costs. Without any containment, these costs could reach \$164.59 million in 2011, an increase of more than 56 percent.

Containing these factors at their current prevalence levels would generate cumulative cost savings of approximately \$77 million by 2011—or \$15 million per year.

Although physical inactivity has the highest impact among the risk factors, excess weight is growing in prevalence at the fastest rate. By examining the cost of risk factors among North Carolinian adults, it is clear that excess weight will continue to be the most expensive of all chronic diseases in children.

This is clearly shown in the per-capita costs of excess weight. Currently, that figure stands at \$62 per child per year with excess weight each year (2006 dollars). With medical care inflation at about 7.7 percent each year, the excess weight cost would more than double—from \$62 to \$130 per child per year—in a decade. When today’s youth join the workforce at approximately age 23, the price tag of their excess weight will substantially increase because lost productivity costs will also enter the equation. Per capita medical care and lost productivity costs among North Carolina’s overweight adults are about \$4,000 per capita each year. Furthermore, an overweight or obese adult in North Carolina will incur costs of more than \$28,619 by the halfway point in their career—and more than \$250,000 by the time they reach retirement age. So, the benefit of reducing the number of youth who enter adulthood with excess weight is obvious. ■

# Working together to make it happen

## Recommendations from Be Active North Carolina, Inc.

### Community Wide Efforts

Once considered just a personal problem, it is now clear that excess weight and other risk factors studied in this report have a profound impact on North Carolina's families, communities and businesses. Employers in particular bear most of the cost because they provide health insurance to the majority of North Carolinians. Employers also suffer the consequences of lost productivity. Shouldering such expenses limits companies ability to boost the economy through capital investment and job creation.

In fact, some State leaders worry that the unhealthy habits and poor health profiles of so many North Carolinians are making the state less competitive, both nationally and globally.

North Carolina needs well-crafted efforts across communities to reduce the unacceptably high prevalence of the eight risk factors. It is essential that these efforts be:

- Initiated in all public and private schools as well as churches, community centers and workplaces.
- Directed to all people regardless of sex, age, lifestyle, socioeconomic status or other segmentation factors.
- Customized to meet the unique needs and interests of each group.
- Aligned to each community's physical environment.
- Subjected to formal process, impact and outcome evaluations to determine short-term, intermediate and long-term results.

### Moving Toward Healthier Children

North Carolina's schools and other organizations with a stake in the welfare of our children need to be more involved in promoting healthy lifestyles. One of the most effective ways to boost physical fitness levels in students—and thereby reduce their risk for excess weight and Type II diabetes—is through daily physical activity. School-based obesity prevention programs were found to be a cost-effective way to prevent at-risk youth from developing adult obesity. School districts that require daily physical education typically report higher academic achievement among their students than systems without such mandates. The gap in academic performance between fit and unfit youth can significantly increase in as little as two years.<sup>19</sup>

All communities must join in the effort to reduce the number of children who suffer from Type II diabetes, have excess weight or are physically inactive. That includes the State's most rural counties, where the prevalence rates for the three risk factors are disproportionately higher than they are in urban or suburban areas.

For programs to be effective, it is essential that they be:

- Initiated in schools, day care centers, churches, community centers and other venues frequented by children and adolescents.
- Customized to meet the unique needs and interests of all groups.
- Receptive to process, impact and outcome evaluations to measure short-term, intermediate and long-term results.

Be Active North Carolina has long expressed concern about the physical health and wellness of North Carolinians. Obesity and other problems create health threats that damage the quality of life for many North Carolinians. This study and others like it continue to provide tangible, solid evidence about the negative impact of unhealthy lifestyles on our economy. The challenge lies in convincing North Carolinians to take genuine steps toward improvement.

<sup>19</sup> See Appendix B for more information.



# Appendix

## A: Summary of the Methodology

A variety of sources and methods were used to obtain the patient data collected to analyze medical and lost productivity costs in North Carolina. Inpatient medical claims and costs tied to the targeted medical conditions were provided by the North Carolina Hospital Association. Outpatient medical claims and costs tied to the target conditions were provided by the state's largest private insurer, Blue Cross and Blue Shield of North Carolina, as well as the Division of Medical Assistance of the North Carolina Department of Health and Human Services. Because there is no public statewide database on prescription drug usage and cost patterns in North Carolina, the analysts based their calculations on national norms provided by several industry-leading vendors. They estimated prescription drug costs for each of the medical conditions based on median costs of selected drugs, estimated annual prescription drug use, and the number of North Carolina adults with selected medical conditions.

Similar sources and methods were used to analyze the cost impact of the risk factors in children and youth. Prescription drug costs and lost productivity costs were not analyzed for children.

For their analysis of lost productivity costs, Chenoweth & Associates based their estimates of the costs of absenteeism, short-term disability and “presenteeism”—defined as working at less than full capacity—on U.S. worksite case studies. They obtained wage and salary data for 2006 from the North Carolina Department of Commerce.

## B: Methodology Used in Analyzing Costs

This report was prepared using data collected and analyzed by Chenoweth & Associates, Inc. To analyze medical costs for both children and adults, and prescription drug and lost productivity costs for adults, C&A obtained statistics from insurers, associations and government agencies. The firm's analysts customized a Proportionate Risk Factor Cost Appraisal™ (PRFCA) to use with the medical care and prescription drug data they received. PRFCA is an epidemiologically based appraisal framework based on each risk factor's prevalence in North Carolina, the total value of inpatient and outpatient claims and charges for each diagnosis, and the premise that an individual with one or more of the targeted risk factors will experience a specific illness or medical condition. Risk factor weights are subject to change as new scientific evidence evolves or health care utilization patterns change.

Below is an overview of the methods C&A used to produce its analysis.

### Medical Care Costs

Inpatient medical claims and costs tied to targeted medical conditions were provided by the North Carolina Hospital Association (NCHA). Outpatient medical claims and costs tied to targeted medical conditions were provided by BlueCross BlueShield of North Carolina (BCBSNC) and the Division of Medical Assistance (DMA) of the North Carolina Department of Health & Human Services. Collectively, BCBSNC and DMA subjects comprise approximately 24.54 percent of the state's adult population. Upon comparing (a) this composite percentage to the size of the remaining sectors and (b) the composite annual premium against those of the remaining four sectors, a multiple of 5.45 was calculated and used to estimate state wide

outpatient claims and costs for each of the selected target areas.

### Prescription Drug Costs

A public access state-wide database or clearinghouse on prescription drug usage and cost patterns in North Carolina does not currently exist.

Prescription drug utilization and costs associated with each of the targeted medical conditions was based on national norms provided by several industry-leading vendors.

Estimated prescription drug costs for each of the targeted medical conditions were based on (1) median costs of selected drugs, (2) estimated annual prescription drug usage, and (3) the number of North Carolina adults with the selected medical conditions.

Estimated prescription drug costs for each of the targeted risk factors were based on multiplying the risk factor-specific cost per medical condition by the percentage of total prescription drug costs to total medical care costs.

### Lost Productivity

Absenteeism, short-term disability and “presenteeism” rates associated with seven of the eight targeted risk factors were estimated and based on actual U.S. worksite case studies.

Wage and salary data was obtained for the calendar year of 2006 from the North Carolina Department of Commerce.

## C: The Link Between Fitness and Scholastic Aptitude

School-based obesity<sup>20</sup> prevention programs have been found to be a cost-effective way to prevent at-risk youth from adulthood obesity. Studies such as those conducted by PE4Life<sup>21</sup>, Kansas City, MO show a strong correlation between Scholastic Aptitude Tests (SAT) and Fitness Standard Achievement scores.

20 Wang, L. et al (2003) Economic analysis of a school-based obesity prevention program. Obesity Research, 11, 1313-1324

21 PE4Life, Kansas City, MO

## Authors of this report

### **About Be Active North Carolina, Inc.**

Be Active North Carolina, Inc. is a 501(c)3 nonprofit organization dedicated to increasing physical activity levels and promoting healthy lifestyles among all North Carolinians. Since 1971, the organization has worked to increase public awareness of the effects of physical inactivity, build grassroots advocacy and volunteerism, create model statewide programs, and advocate for policies that reduce barriers and create opportunities for physical activity.

Long before it was popular, Be Active was in the forefront building awareness about the human and financial costs of sedentary lifestyles and developing programs to combat obesity.

For the past seventeen years, the organization has raised over \$16 million and has grown to a staff of fourteen. Be Active continues to expand with a regional office on the campus of university partner Appalachian State University and programs in all 100 counties.

Today, Be Active is nationally recognized for its work and offers a wide variety of signature programs to get North Carolinians started and to keep them moving toward a healthy active lifestyle. In 2007, Be Active North Carolina was named the nation's best statewide organization for health and physical activity by The National Association for Health and Fitness (NAHF).

### **About Chenoweth & Associates**

Chenoweth & Associates, Inc. (C&A) is a leading econometrics consulting firm based in New Bern, North Carolina. Since 1979, C&A has provided strategic econometric services to business, industrial, health care, and governmental organizations. Since the late 1990's, C&A has conducted chronic disease risk factor analyses for various states – California (2005-6), Washington (2004), Michigan (2003), Massachusetts (2003), New York (1999 and 2001), Maine (2006) and three separate appraisals for North Carolina (1997, 2001, and 2005).

To analyze medical costs for both children and adults, and prescription drug and lost productivity costs for adults, C&A obtained statistics from insurers, associations, and government agencies. The firm's analysts customized a Proportionate Risk Factor Cost Appraisal™ (PRFCA) to use with the medical care and prescription drug data they received. PRFCA is an epidemiologically based appraisal framework based on the risk factor's prevalence in North Carolina, the total value of inpatient and outpatient claims and charges for each diagnosis, and the premise that an individual with one or more of the targeted risk factors will experience a specific illness or medical condition. Risk factor weights are subject to change as new scientific evidence evolves or health care utilization patterns change

Tipping the Scales: How obesity and unhealthy lifestyles have become a weighty problem for the North Carolina economy

Be Active North Carolina, Inc.  
June 2008

1600 Perimeter Park Drive  
Suite 125  
Morrisville, North Carolina 27560  
[www.beactivenc.org](http://www.beactivenc.org)



[www.beactivenc.org](http://www.beactivenc.org)