

# Tipping the Scales



**The High Cost  
of Unhealthy  
Behavior in  
North Carolina**

# Table of Contents

<b>1</b>	Executive Summary
<b>4</b>	Key Findings
<b>8</b>	The Risk Factors
<b>10</b>	Tallying the Medical Costs
<b>11</b>	Lost Productivity in the Workplace
<b>13</b>	The Solution: Be Active's Plan to Help Reduce Costs
<b>15</b>	Saving Seniors From Costly Falls
<b>16</b>	Who Pays The Bill?
<b>17</b>	Children Pay Physically While We Pay The Bill
<b>18</b>	Medical Diagnoses in Children
<b>19</b>	Pinning Down the Price
<b>20</b>	Recommendations from Be Active
<b>21</b>	About the Authors
<b>22</b>	Glossary of Terms
<b>23</b>	Appendix



## Executive Summary

# Imagine engineers trying to design a faster, more powerful car.

They tweak the horsepower, fiddle with the rate of combustion, make the chassis more aerodynamic, but the car still won't go as fast as they know it can. Finally, they discover that the parking brake has been engaged, creating such drag that it impeded the car's acceleration.

For all its progressiveness and relative prosperity, North Carolina is like a car with the parking brake on. Only the parking brake in this metaphor is the high economic cost of diseases and conditions that can largely be prevented. North Carolina's future economic viability is threatened because too many

of its residents are overweight and inactive. Chronic conditions hurt us directly by driving up medical bills, and indirectly by lowering the productivity of workers who provide our goods and services

The numbers speak for themselves: North Carolina spent almost **\$54 billion** in 2010 on medical bills and lost worker productivity associated with eight risk factors or precursory conditions known to cause chronic disease in adults. To put this in perspective, many small countries don't boast a gross domestic product this high. While this total is lower than the \$57.36 billion discussed in our last

analysis, the difference is due primarily to a change in the way lost productivity costs are calculated and current unemployment rates.

Fat is the leading culprit. The costs associated with adults who are considered overweight and obese amounted to more than \$17.6 billion in total medical bills and lost worker productivity in 2010. That's almost as much as the \$19.7 billion budget lawmakers approved for North Carolina in June 2011. Looked at another way, excess weight prevented an additional \$11.8 billion (or nearly 3 percent of North Carolina's gross state product) of goods and services from being produced in 2010. And physical inactivity prevented an additional \$4.7 billion in potential productivity gain.

Today, if you're normal weight or underweight, you're in the minority; only about 35 percent of adults in North Carolina aren't packing extra pounds.

And the scales keep going up, along with the prevalence of most of the other risk factors. If these trends don't reverse, we'll pay \$67.39 billion in 2015 for our unhealthy lifestyles and habits.

That's not taking into account the costs related to children and youth who are already tragically overweight, physically inactive and suffering from Type II diabetes. This trio of risk factors, which are associated with five chronic medical conditions or diseases, came with a price tag of \$107 million in 2010, up from \$105 million in 2006.

These costs, for both adults and children, are all the more painful because, to a large degree, they're unnecessary. Public health experts say that lifestyle choices account for more than half the chronic conditions that adults experience.

In children, whose youth affords protection from chronic disease, this number is likely much higher.

As grim as this picture is, there is a bright side: unlike many other expenses, lifestyle-associated costs aren't fixed. Even if medical inflation persists, we can make a serious dent in the total by working together to reduce the prevalence of excess weight and the other risk factors. In fact, the number of adults who are physically inactive and who smoke went down between 2005 and 2009, suggesting that public health initiatives can and do work.

If we want our children and grandchildren to live healthy, prosperous lives, we owe it to them to take this problem seriously. Otherwise, they'll inherit a car whose parking brake is always on.

## **Background and Scope of the Report**

Since 1991, Be Active North Carolina, Inc. has led programs and initiatives to help contain medical costs related to lifestyle factors such as inactivity. The organization published its first economic analysis of these costs in 1997, issuing follow-ups in 2001, 2005 and 2008. For this report, our analysis was based on data released in 2009 and 2010.

Our reports continue to point out the staggering costs of chronic conditions attributable to the growing prevalence of lifestyle-related risk factors in both adults and children.

The adult risk factors we considered for this report are:

- Excess weight
- Type II diabetes

- Low fruit and vegetable consumption
- High cholesterol
- Hypertension (high blood pressure)
- Depression
- Physical inactivity
- Tobacco use (smoking)

And for children (ages 5-17) the risk factors we looked at are:

- Physical inactivity
- Excess weight/obesity
- Type II diabetes

While medical costs attributable to the eight risk factors were up in 2010 over 2006, costs due to lost productivity dropped. This is due in part to economic factors: with fewer people on the payroll and the shift toward contract and part-time workers, employers pay medical bills (direct and indirect) for fewer people. In addition, there has been a recent change in the “attributable weights” portion of the formula used to calculate risk factors related to lost productivity. Therefore the \$53.8 billion price tag for unhealthy lifestyles—medical and lost productivity costs combined—is down slightly from 2006.

This dip should not be viewed as a trend, however—the risk factors that contribute to the high cost of caring for the chronically ill are becoming more prevalent, and medical costs show no signs of slowing down.

As in previous years, Be Active is releasing this report in an effort to empower stakeholders with the information they need to make crucial decisions about the health of their families,

their employees, their communities and their neighbors.

The solution lies in being able to motivate people to eat smart and move more, a one-two punch that leads to a reduction in the risk factors for chronic disease in both adults and children. These preventable diseases burden us with costs we will soon be unable to pay.

## Want to get involved?

**Sign up to participate in the Movement for Motion campaign launched by Be Active North Carolina**

Studies show that adults who get 30 minutes of activity most days of the week can reduce excess cholesterol by 36 percent and lower depressive episodes by 33 percent.

Movement for Motion has the potential to achieve \$292 million in medical treatment and lost productivity savings from 2011 to 2015.



[BeActiveNC.org](http://BeActiveNC.org)

## Key Findings

# How Unhealthy Lifestyles Are Driving Up Costs

The costs associated with chronic diseases and conditions—many of which are preventable—continue to burden North Carolinians, especially employers. In 2010, the price tag for medical treatment, workers compensation claims and lost productivity associated with eight risk factors, or precursory conditions, was \$53.8 billion.

If current trends continue, the total costs—medical care and lost productivity—associated with these risk factors will reach a staggering \$67.39 billion by 2015. And this is taking into account the progress that has been made in at least one area: physical inactivity.

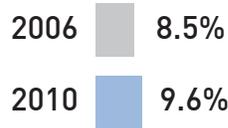
# Highlights of the data

The prevalence of six risk factors **increased**.

Obese or overweight



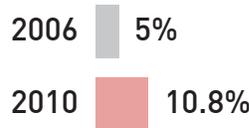
Type II Diabetes



Eating fewer than five servings of fruits and vegetables daily



Depression



High cholesterol



High blood pressure

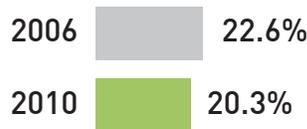


The prevalence of two risk factors **decreased**.

Physically inactive



Smoking



Taken together, these risk factors were responsible for \$16.40 billion in medical costs alone, up from \$14.75 billion in 2006.

Excess weight is the most expensive risk factor, responsible for more than \$17.6 billion a year in total costs; to put this in perspective, the most recent state budget passed by lawmakers in North Carolina to pay for all state services and salaries was \$19.7 billion. Physical inactivity is the second most expensive risk factor, with a price tag of \$8.3 billion.

Although lost productivity costs attributable to the eight risk factors were lower in 2010 than they were in 2006, this can be explained by a new formula used by health statisticians that assigns less weight to some factors. Even so, lost productivity costs borne by employers

totaled \$37.3 billion in 2010, more than twice as much as the cost of medical care for these risk factors.

The bottom line: These improvements in two risk factors that are completely within a person's control are statistically significant. This is important because smoking is a known health hazard, and being physically inactive is linked to virtually every expensive chronic disease.

While depression saw the biggest increase of all the risk factors—doubling since 2006 to 10.8 percent—this is in line with national statistics showing about 10 percent of the population suffers from depression. In addition, the increase may reflect a more direct questioning style introduced in the North Carolina Behavioral Risk Factor Surveillance survey in 2006<sup>1</sup>.

<sup>1</sup> More information about this survey is available in the Appendix.

# ...and Why You Should Care



## GOVERNMENT

For government officials faced with unprecedented budget pressures, implementing creative programs and incentives to encourage healthier, more physically active citizens is a relatively inexpensive investment in future cost savings. This can be done at the local, regional and state levels.

## EMPLOYERS

If you're an employer whose workforce has a high prevalence of the eight risk factors, you're losing money. Diabetes is responsible for the greatest impact on lost productivity (28.57 percent), followed closely by depression (25 percent), excess weight (11.97 percent), and hypertension (9.93 percent). Since all of these factors can be addressed by lifestyle modification—including increased physical activity—you should consider adopting a workplace wellness program or making preventive care more accessible.

## PARENTS

If you're a parent, you've probably heard—or noticed—that unprecedented numbers of children in North Carolina are overweight or obese. In fact, **41.4 percent** of children and youth in North Carolina are carrying excess weight, up from 34 percent in 2005. If they don't shed the weight before they enter adulthood, when losing weight becomes even harder, they face a lifetime of poor health and potentially lower earnings. If they become overweight adults, they'll incur \$210,000 in medical and lost productivity costs by the time they retire.

## EDUCATION

Education officials, if you're looking for ways to help students focus better and retain more information, ensure that students have access to physical education, recess and active classrooms. This will also help children and youth get the recommended 60 minutes of activity most days of the week, which will help reduce or eliminate their susceptibility to risk factors and potentially boost academic achievement<sup>2</sup>.

## WORKFORCE

If you're in the workforce, consider this: If the total costs for unhealthy living were assigned to a single group of "payers"—those who foot the bill, including employers, taxpayers, residents and workers—rather than shared across these groups, each worker in North Carolina would have had to write a check for \$13,323 in 2010.

<sup>2</sup> Studies such as those conducted by PE4life in Kansas City, MO, show a strong correlation between SAT scores and Fitness Standard Achievement scores.

## DIRECT MEDICAL COSTS

# Trending in the Wrong Direction: Most Risk Factors Are Up, and So Are the Medical Bills



**\$66.14  
billion**  
will be spent  
on medical  
care and lost  
productivity  
by 2015

Dramatic and cutting-edge care makes headlines; we gasp at the cost of face replacement surgery, brain-injury rehabilitation and months spent in intensive care for newborn octuplets. But it's really the conventional, chronic diseases and conditions that are sending medical costs soaring. Our analysis shows that 11 common chronic conditions or diseases account for the lion's share of medical bills North Carolinians receive.

The good news is, these conditions don't usually occur spontaneously. They're closely correlated with specific behavioral choices and medical risk factors that are all modifiable. In other words, many are preventable. We've been tracking these risk factors since 1997, and for the last four years have focused on eight risk factors strongly associated with these 11 expensive diagnoses.

Although some of the following risk factors are often classified as signs, symptoms or conditions themselves, experts consider them precursors that independently or in conjunction raise an individual's probability of incurring some of the diagnoses discussed in this report.

# The Risk Factors

## EXCESS WEIGHT

Although several weight-determining criteria exist, we use the Body Mass Index, or BMI, which gauges a person's weight in relation to his height. A person is considered overweight if his BMI is between 25 and 29.9. A BMI of between 30 and 39.9 is considered obese, and morbid obesity is a BMI of 40 or higher.

## PHYSICAL INACTIVITY

Long considered one of the pillars of good health, physical activity is increasingly hard for Americans to work into their hectic lives. Health and fitness experts recommend that in order to maintain their health, adults should get 30 minutes or more of moderate physical activity at least five days a week, or aim for 75 minutes a week of vigorous activity. Adults who don't meet this criterion are considered inactive.

## HYPERTENSION (HIGH BLOOD PRESSURE)

Often called the "silent killer," high blood pressure is strongly predictive of cardiovascular disease unless it's treated. Some research indicates high blood pressure alone may contribute as much as 11 percent of the total risk for many types of cardiovascular disease. Doctors diagnose pre-hypertension when a person's blood pressure consistently reads 120/80 to 139/89; hypertension is officially diagnosed when it reaches 140/90 and above.

## TOBACCO USE (SMOKING)

Aggressive anti-smoking campaigns, smoking bans and cigarette labeling can be credited with dramatically reducing the rate of smoking in this country. Nevertheless, about one-fifth of the population still lights up. The U.S. Surgeon General called smoking the single most preventable cause of death in the nation; in fact, smoking causes about 30 percent of all coronary disease deaths in the U.S. Today, smokers belong to a much narrower demographic than they used to: they're primarily men, those with low socio-economic backgrounds and people with less than a high school education.

## LOW DIETARY FRUIT/VEGETABLE INTAKE

Your grandmother was right: an apple a day does seem to keep the doctor away. Although the minimum recommendation for fruits and vegetables used in this analysis is five servings a day, in 2005 the federal government upped its standards to a recommended seven servings a day for women (3.5 cups) and nine for men (4.5 cups). Research shows that higher fruit and vegetable consumption reduces risk for many chronic conditions.

## TYPE II DIABETES

Type II diabetes—also known as non-insulin dependent diabetes mellitus—is considered a risk factor for other diseases/conditions as well as being a diagnosis in and of itself. Type II diabetes is the sixth-leading cause of death in the country, is responsible for more than 50 percent of all non-accident limb amputations, and is the leading cause of blindness and end-stage renal disease.

## ABNORMAL BLOOD LIPIDS (HIGH CHOLESTEROL)

Not all fat in the blood is a bad thing. For instance, you want your "good" cholesterol--HDL, or high-density lipoprotein—to be relatively high. And conversely, for maximum protection against heart disease, you want your "bad" cholesterol, or LDL—low-density lipoprotein—to be as low as possible. Although a high total cholesterol level—considered 240 mg/dl or higher—can sometimes be attributed to genetics, it's also related to diets high in saturated fats and processed foods.

## DEPRESSION

Mental health professionals characterize depression as a persistent sad mood and/or an inability to experience pleasure. About 21 million American adults suffer from a depressive illness every year, a number that has doubled in the last decade, according to the National Institute of Mental Health. Evidence suggests that depression is strongly related to some of the other risk factors in our study, including tobacco use, obesity, physical inactivity, hypertension, abnormal blood lipids, and diabetes.

# Highlighting the Diagnoses Prompted by Unhealthy Habits

The common diagnoses strongly associated with the eight risk factors we discuss are:

## MUSCULO-SKELETAL

Physical inactivity, excess weight and even tobacco use are linked to several musculo-skeletal conditions; the most common of these - and one responsible for expensive joint replacement surgeries - is osteoarthritis.

## CANCER

Although there is a genetic basis to many occurrences of cancer, some of the most common forms of cancer are associated with several lifestyle choices and behaviors. In particular, bladder, breast, colorectal, esophageal, endometrial, laryngeal, lung, ovarian, oral, prostate, stomach and renal cancers are linked to tobacco use, excess weight, physical inactivity, low fruit and vegetable consumption and depression.

## CIRCULATORY CONDITIONS

Cardiovascular disease, the No. 1 killer in the country, can be caused by all eight of the risk factors.

## NEURO-SENSORY DISORDERS

They're not usually life-threatening, but many of these disorders, including carpal tunnel syndrome and cataracts, are closely associated with tobacco use, not eating fruits and vegetables, being too heavy and having Type II diabetes.

## METABOLIC/ENDOCRINE/NUTRITION-RELATED DISORDERS

While type II diabetes contributes to the incidence of several chronic conditions discussed in this report, it is also a diagnosis that often requires treatment. It is joined in this category by gout, thyroid disorders and impaired immune response. According to the data, such disorders are associated with smoking,

consuming too few fruits and vegetables and not getting enough activity.

## DIGESTIVE DISORDERS

Gallbladder disease, biliary and alcoholic pancreatitis, liver disease and end-stage renal disease are four digestive disorders that can be positively correlated with several risk factors, mainly excess weight and tobacco use.

## COMPLICATIONS OF PREGNANCY

While not a disease, complications of pregnancy can be serious and expensive to treat. Most complications occur in women who have several of the risk factors - primarily excess weight, Type II diabetes, hypertension, tobacco use and low fruit and vegetable intake.

## INJURIES/COMPLICATIONS

Our data suggests that people who use tobacco, are overweight or obese, don't get enough physical activity and eat too few fruits and vegetables are more likely to more likely to suffer post-infection wounds, heart disorders and hip fractures.

## MENTAL DISORDERS

Depression may be considered a risk factor, but it's also a diagnosis, along with other mental disorders such as anxiety. One or both of these conditions is strongly correlated with the following risk factors: Excess weight, physical inactivity and tobacco use.

## ILL-DEFINED SIGNS/SYMPTOMS

These conditions, which include sleep apnea, urinary stress incontinence and impaired respiratory function, are linked to physical inactivity, tobacco use and excess weight.

## RESPIRATORY DISORDERS

Breathing troubles—which range from asthma to chronic obstructive pulmonary disease (COPD) and many conditions in between—don't usually occur in a vacuum. Such difficulties are linked to excess weight, tobacco use, physical inactivity and a diet low in fruits and vegetables.

## MEDICAL COSTS: \$16.4 BILLION

**Excess weight**  
\$5.77 billion

**Physical inactivity**  
\$3.67 billion

**Tobacco use**  
\$1.78 billion

**Low fruit/  
vegetables**  
\$1.53 billion

**High  
cholesterol**  
\$1.30 billion

**Hypertension**  
\$1.17 billion

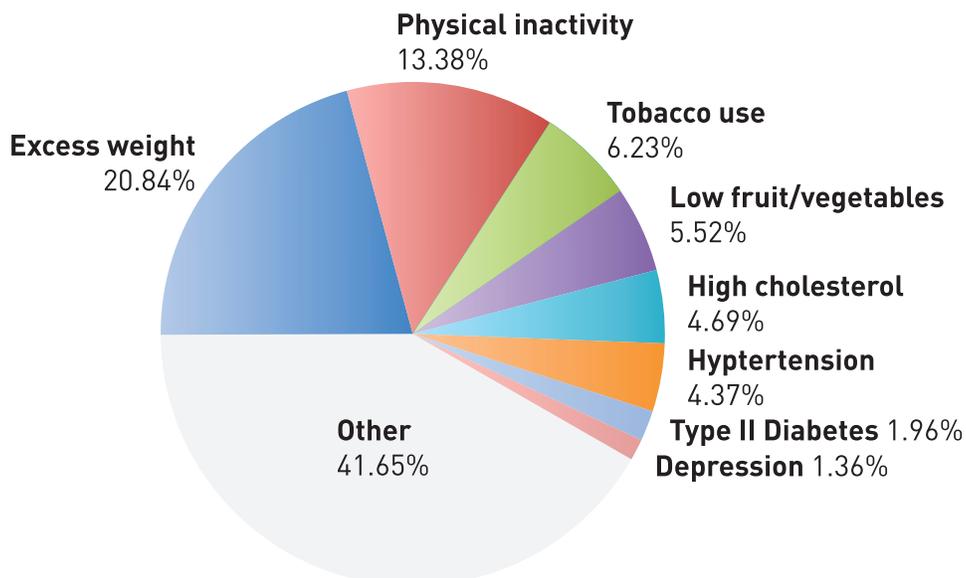
**Type II  
Diabetes**  
\$.53 billion

**Depression**  
\$.43 billion

## Tallying the Medical Costs

Medical costs incurred for all of the targeted conditions, including prescription drugs and hospital stays, were \$27.68 billion in 2010, up from \$17.2 billion in 2006. Of this number, the eight targeted risk factors accounted for \$16.40 billion, up from \$14.75 billion in 2006. The bottom line: **the eight risk factors are responsible for 58.35 percent of the medical costs** associated with these conditions.

## % OF ALL CONDITIONS: 58.35%





## Not Just Medical Bills: Lost Productivity in the Workplace

Because employers provide the lion's share of insurance for working-age adults in North Carolina, they pay the highest price when unhealthy employees rack up big medical bills. But these costs aren't just limited to health insurance. Worker productivity, or lack thereof, also affects a company's bottom line. Lost productivity can be attributed to disability, absenteeism or "presenteeism," wherein employees come to work but are limited in their ability to perform their tasks due to a health condition or

chronic disease. A large nationwide study showed<sup>3</sup>:

- The average worker loses 115 hours per year due to a health condition
- Most people experiencing an episodic or chronic-episodic health condition go to work rather than call in sick
- Almost 75 percent of missed productive work time occurs while workers are actually on the job
- The top five reported worker complaints are headache/pain, cold/flu, fatigue/depression, digestive problems, and arthritis

Research has consistently shown that healthy workers are more productive than their unhealthy colleagues. In fact, employees who have one or more of seven targeted risk factors<sup>4</sup> are more likely to be injured on the job (disability), call in sick (absenteeism) or do less than their best (presenteeism).

Our analysis reveals that in 2010, these seven risk factors were responsible for lost productivity costs of nearly \$37.63 billion, or about \$5.4 billion per risk factor. The greatest percentage of risk factor-specific lost productivity costs is tied to excess weight – followed by high cholesterol, physical inactivity, and hypertension.

Unlike medical costs associated with the risk factors, lost productivity costs have not increased since the last analysis, which used 2006 data—in fact, they've dropped. For that year, lost productivity costs were \$42.7 billion.

There are two reasons for this. The first is tied to the sluggish economy, which has compelled employers to contain or cut wages, shorten the work week, use more hourly workers, or lay off workers, all of which dilute the impact that lost worker productivity has on their bottom line.

The second reason is that attributable lost

<sup>3</sup> Stewart, W. et al (2003) Lost Productive Work Time Costs from Health Conditions in the United States: Results from the American Productivity Audit. *Journal of Occupational & Environmental Medicine*, 45, 12, 1234-1246.

<sup>4</sup> Low fruit and vegetable intake, one of the eight risk factors contributing to high medical costs in North Carolina, was not used in the lost productivity analysis this year due to a lack of published research showing a direct relationship between diet and lost productivity.

productivity weights assigned to several risk factors have been lowered by econometrics experts, based on recently published research. However, these changes don't affect the validity of previous reports.

Given the changes in attributable weights assigned to several of the risk factors, it's not possible to make an apples-to-apples comparison of lost productivity in 2010 vs. 2006. However, it's still the case that unhealthy workers increase a company's operating costs. In fact, the \$37.63 billion lost productivity burden for 2010 is more than twice as high as the cost of medical care despite the exclusion of the low fruit and vegetable intake risk factor in the productivity calculation.

What would happen to productivity if we could just erase a specific risk factor from the equation? For example, excess weight prevented an additional \$11.8 billion (or nearly 3 percent of North Carolina's gross state product) of goods and services from being produced in 2010. And physical inactivity prevented an additional \$4.7 billion in potential productivity gain. Clearly, we could be a much more prosperous state if we were slimmer and fitter.

## Putting it Into Perspective: Tallying the Totals

When medical costs—which include doctor's visits, hospitalization/surgery and prescription drugs—are added to the costs of lost productivity, the eight risk factors cost us dearly. The total cost to North Carolina for these risk factors was \$53.8 billion in 2010.

Of all the risk factors, excess weight is by far the costliest, responsible for more than \$17.6 billion a year in total costs. Physical inactivity is the second most expensive, with a price tag of \$8.3 billion.

Although this nearly \$54 billion total is lower than the \$57.36 price we paid in 2006 due to the previously discussed changes in the way lost worker productivity is determined, a closer look at how many people have

unhealthy habits or behavior risk factor prevalence trends doesn't paint a bright picture for the future.

As a state, we're growing bigger—and older. Medical and prescription drug cost increases show no sign of slowing. If current trends continue, the total costs associated with the risk factors in North Carolina will reach \$67.39 billion by 2015, a cumulative five-year increase of more than 25 percent.

First, it's true that two risk factors—high cholesterol and low fruit and vegetable intake—cost less in 2010 than in the previous analysis, even though their

**The total cost to  
North Carolina in 2010  
was \$53.8 billion.**

prevalence is greater among adults. The overall cost of high cholesterol was lower due a lower productivity weight used in the overall calculus, based on new research. And the total costs of low fruit/vegetable intake were lower in 2010 due to recently published research that prompted analysts to exclude certain types of neuro-sensory disorders, conditions with ill-defined signs and symptoms, and injury-related conditions that were included in the last analysis.

Six of the eight selected risk factors cost more in 2010 than in 2006, even though two of them—smoking and physical inactivity—decreased in prevalence. Formulas aside, the six risk factors showing increased prevalence over the past few years can be expected to get more expensive in the future.

If smoking rates continue to drop or merely even stabilize, then future tobacco-related costs would be kept at bay. But the prevalence of North Carolinians who are physically active needs to increase at a more rapid clip in order to offset the combined effects of annualized costs and population growth. In fact, the number of physically active people needs to increase at least 2.04 percent per year in order to lower costs associated with inactivity.

## The Solution



# Be Active's Plan to Help Reduce Costs

Since its founding in 1991, Be Active North Carolina has been a leading voice linking healthy habits—especially physical activity—to better medical outcomes, and, consequently, lower costs. Its latest initiative is an ambitious campaign aimed at dramatically increasing the prevalence of physical activity in our state. Clinicians and researchers know that when a person becomes more physically fit, it often has a dramatic domino effect on other costly risk factors, namely high cholesterol, high blood pressure, diabetes and pre-diabetes, and excess weight.

The Movement for Motion campaign has a goal to spread the get-active message to at least one million sedentary North Carolinians by 2015 through regular engagement, education and encouragement. If just 45 percent of the people who hear our message do become physically active—that is, engage in a minimum of 150 minutes a week of moderate-intensity activity—the results will translate into lower health-related costs for all who bear them.

### Sedentary adults who become active<sup>5</sup>:

- **Reduce excess weight** by an average of 4.25 percent
- **Reduce excess cholesterol** by an impressive 36 percent on average
- **Reduce high blood pressure** by an average of 7.42 percent
- **Reduce high blood sugar levels** by an average of 7.5 percent
- **Reduce depressive episodes** by a significant 33 percent on average
- **Increase daily fruit and vegetable intake** by 2.48 percent

<sup>5</sup> Smoking wasn't included in this analysis because there isn't enough evidence linking increased activity with decreased rates of smoking.



**How will these benefits translate into dollars saved?**

Our analysis indicates that if 68,130 newly active adults experience these improvements in their risk factors, they would likely generate nearly \$55 million in medical care and lost-productivity savings within the first year (2011), as the table below illustrates:

**Projected Cost Savings at Published Risk Reduction Impacts Achieved by Movement for Motion Participants**

RISK FACTOR	APPROX. IMPACT	COST PER CAPITA	ESTIMATED IMPACTS	% IMPACTS WITH RISK FACTOR	ESTIMATED COST-SAVINGS
Depression	0.33	\$6,102	68,130	0.108	\$14,816,591
Diabetes	0.075	\$6,613	68,130	0.096	\$3,243,915
Excess weight	0.0425	\$3,800	68,130	0.654	\$7,195,959
High lipids	0.36	\$2,545	68,130	0.4	\$24,968,282
Hypertension	0.0742	\$2,610	68,130	0.315	\$4,156,170
Low fruit/ vegetable intake	0.0248	\$273	68,130	0.794	\$366,246
				<b>Total</b>	<b>\$54,747,163</b>

What’s more, it’s likely that projected cost-savings in subsequent years would rise each year. North Carolina could achieve nearly \$292 million in cumulative cost savings from 2011 to 2015. Together with other health and fitness awareness initiatives and employer-sponsored health promotion incentives, the Movement for Motion campaign can go a long way toward easing the heavy economic burden of an unhealthy population.

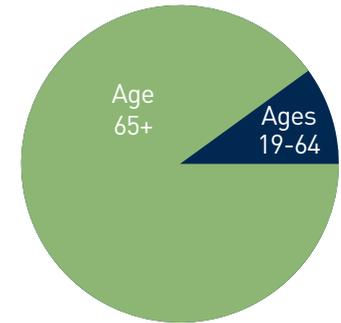
# Saving Older Adults From Costly Falls

Research shows that physical inactivity increases the risk of hip fracture in aging adults by 21 percent to as much as 50 percent. So it's especially important to reach senior citizens who are sedentary because they're at greater risk of falling than their more active counterparts or younger adults.

And falls resulting in fractures often result in a downward health spiral, resulting in permanent disability or even death. Fractures, especially of the hip, are expensive to treat as well. Through Movement for Motion, Be Active North Carolina aims to provide seniors with the knowledge and skills to become fitter and more confident in their ability to be active in order to avoid accidental falls.

Based on published research, some of North Carolina's hip fracture-related medical care costs could be prevented by getting more senior citizens to adopt physically active lifestyles, which the Movement for Motion campaign targets and promotes. Even if Movement for Motion reaches only 1 percent of the 65-plus population in North Carolina, the cost savings from fewer fractures would be significant. And if the campaign could increase the activity of 5 percent of seniors, the impact would be even greater, as the following illustration shows:

## Number of Inpatient Hip Fractures



Ages 19-64

**1,133<sup>a</sup>**

Age 65+

**10,197<sup>b</sup>**

Total

**11,330**

## Estimated Medical Cost Savings Attributed to Three Levels of Physical Activity Impacts

	1% PENETRATION RATE	5% PENETRATION RATE	10% PENETRATION RATE
Gross # of impacts	113	556	1,133
Attributable risk	0.21	0.21	0.21
Net # of impacts	23.73	118.86	237.93
Avg. medical cost <sup>c</sup>	\$13,658	\$13,658	\$13,658
<b>Cost-savings</b>	<b>\$324,104</b>	<b>\$1,623,390</b>	<b>\$3,249,648</b>

<sup>a</sup> Actual number of inpatient hip fracture discharges based on 2010 data provided by the North Carolina Hospital Association.

<sup>b</sup> Estimated: based on published reports that 90 percent of hip fractures occur in persons 65+ years of age.

<sup>c</sup> Actual average inpatient cost per hip injury claimant; based on data provided by the North Carolina Hospital Association.

# Who pays the bill?



We like to think that our health is our business, but given our health insurance model, it's our employers' business, too. Most North Carolinians receive health insurance through their employers. Increasingly, employees are asked to share in this cost by paying for part of their premiums or having plans with high deductibles and co-pays. In addition to employers

and workers, taxpayers in general shoulder some of the cost of health care - in the form of Medicare and Medicaid.

The chart below illustrates the huge financial toll that targeted risk factor costs would have on a particular sector if a single group had to pay the entire tab:

## Risk Factor-Specific Per Capita Cost Comparisons State of North Carolina

RISK FACTOR	ANNUAL COST	RESIDENT	ADULT	WORKER	WORKSITE
Depression	\$4,667,447,556	\$491	\$659	\$1,155	\$20,730
Diabetes	\$4,496,655,419	\$473	\$635	\$1,113	\$19,971
Excess weight	\$17,601,582,201	\$1,850	\$2,485	\$4,355	\$78,174
High lipids	\$7,210,640,201	\$758	\$1,018	\$1,784	\$32,025
Hypertension	\$5,822,895,628	\$612	\$822	\$1,441	\$25,861
Low fr/veg intake	\$1,533,721,498	\$161	\$217	\$380	\$6,812
Phys. Inactivity	\$8,386,140,781	\$882	\$1,184	\$2,075	\$37,246
Tobacco use	\$4,125,009,761	\$434	\$582	\$1,021	\$18,321
<b>Total</b>	<b>\$53,844,093,045</b>	<b>\$5,661</b>	<b>\$7,603</b>	<b>\$13,323</b>	<b>\$239,139</b>

The cost distribution clearly shows the huge financial liability that each of the eight selected risk factors would have on a particular payer group. Of the four groups cited above, employers (worksites) bear the heaviest cost burden because they typically provide employer-sponsored health insurance and pay directly for lost worker productivity. Their share

each year would be \$239,139 per worksite if the cost for all the risk factors was theirs alone.

Workers bear the second-greatest percentage of the cost burden by paying a portion of the employer-sponsored health insurance; and hourly wage earners would also lose income due to risk factor-generated absenteeism and short-term disability.

# Our Children Pay With Their Health

Youth was once considered a natural protector against chronic disease and disability. When our ancestors had concerns about their children's health, their number one fear was acute, usually communicable diseases—scourges like typhoid, cholera, and diphtheria. Although immunizations and improved hygiene have eliminated these diseases in the western world, today's parents have a different concern: lifestyle conditions that are making their children prone to risk factors and chronic conditions once unheard of in children and teens.

According to a national study, between 1980 and 2005, the number of overweight adolescents grew from 5 percent to 17 percent. In children ages 6-11 during the same period, the prevalence of excess weight more than doubled, from 7 percent to 19 percent. Overweight children face many of the same chronic problems that overweight adults do, including Type II diabetes, a diagnosis that was unheard of in children a generation ago. What's more, they're susceptible to remaining overweight into adulthood, when such problems become worse—and more expensive.

Excess weight is one of three risk factors in children and youth that Be Active has studied over the years. The other two are physical inactivity and Type II diabetes. The prevalence of these three risk factors in children ages 5-17 has been increasing nationwide; they're associated with at least five chronic medical diagnoses, all of which come with a high price tag. Unfortunately, our research shows the incidence of these risk factors is remaining static or increasing.

## EXCESS WEIGHT

According to data collected in 2009, 41.4 percent of children and youth in North Carolina are carrying excess weight, up from 34 percent in 2005. Of this number, based on the Body Mass Index (BMI) criterion, 28 percent of children and youth are classified as overweight and 13.4 percent as obese.

## PHYSICAL INACTIVITY

Children are meant to be in motion. Therefore, they need even more activity than adults to stay healthy. The Centers for Disease Control & Prevention (CDC) recommends that school-age children and teens engage in moderate-to-vigorous physical activity for 60 minutes a day at least five days a week. Yet 54 percent of children in our state are considered physically inactive, according to 2009 data. This is slightly less than the 54.1 percent reported inactive in 2005, but not statistically significant enough to signify an improvement.

## TYPE II DIABETES

Until fairly recently, the only kind of diabetes children were diagnosed with was Type I, or juvenile diabetes, which is an autoimmune disorder requiring daily treatment with insulin. In the last decade, doctors have started seeing Type II diabetes—also called non-insulin dependent diabetes mellitus, or adult-onset diabetes—in children and adolescents. This type of diabetes is strongly associated with excess weight, poor diet and physical inactivity. In 2009, approximately 1 percent of children ages 5-17 had Type II diabetes or a precursor condition called pre-diabetic syndrome. This prevalence is unchanged from 2005, suggesting that the diagnosis rate is holding steady—or that, given the prevalence of physical inactivity and excess weight, many children with pre-diabetes or diabetes remain undiagnosed.



## Medical diagnoses in children/youth associated with the risk factors

Children increasingly are being diagnosed with chronic conditions that are largely preventable—and expensive. Five conditions have been targeted by our analysts for review. They are:

### MUSCULO-SKELETAL

Carrying excess weight or being inactive is strongly linked to musculo- skeletal injuries or conditions in kids, just as they are in adults. Common diagnoses within this category include osteoarthritis of the knee or hip, rheumatoid arthritis, low back pain and tendonitis and bursitis.

### RESPIRATORY AILMENTS

Several respiratory conditions for which children seek treatment are linked to physical inactivity and excess weight, including impaired respiratory function, acute bronchitis and asthma.

### METABOLIC-ENDOCRINE

While type 1, or juvenile diabetes, is a spontaneously occurring autoimmune disease, other metabolic

disorders like gout and impaired immune response—both of which are being seen in children and youth—are largely the result of modifiable behaviors.

### CIRCULATORY

In adults, research shows that physical inactivity, excess weight and Type II diabetes are major risk factors for cardiovascular ailments. Evidence suggests that there is a similar association between these risk factors and the diagnosis of circulatory problems in children and youth.

### MENTAL HEALTH

Just as physical inactivity and other risk factors have been linked to depression and anxiety in adults, they are also thought to be responsible for mental disorders in children and youth. One North Carolina study showed that youngsters who are substantially overweight throughout their childhood and adolescence have a higher incidence of depression than those whose weight is normal.

# Pinning Down the Price

## The costs will jump to more than \$158.87 million in 2015

Total medical costs incurred by children diagnosed with these five conditions in 2010 were \$439.95 million<sup>6</sup>, up from \$339 million in 2006. Based on our analysis, the three youth risk factors we've been examining—excess weight, physical inactivity and Type II diabetes—were responsible for \$107.18 million, or nearly 25 percent of this total, up from \$105.13 million in 2006.

In other words, one dollar out of every four spent on primary medical care for these five chronic conditions can be attributed to three risk factors. (Since children/youth don't work, or aren't in the workforce full-time, lost productivity wasn't part of this analysis as it was in the adult study.)

As in the adult analysis, excess weight is clearly the most expensive risk factor in children/youth, followed by physical inactivity and Type II diabetes, as the following chart illustrates:

RISK FACTOR	COSTS (MILLIONS)	% OF ALL CONDITIONS
Excess weight	\$50.66	11.52
Physical inactivity	\$46.63	10.60
Type II diabetes	\$9.89	2.24
<b>Total</b>	<b>\$107.18</b>	<b>24.36%</b>

In the study we published in 2008, physical inactivity was the most expensive risk factor for children, followed by excess weight; the results of this study show these two risk factors have traded places. The good news is that since physical inactivity prevalence among children didn't increase, and in fact decreased by a fraction, inroads can be easily made through outreach campaigns such as those sponsored by Be Active and its partners. However, the fact that children and youth are getting heavier is an issue that needs to be addressed urgently in order

to prevent a public health crisis and an even heavier economic burden.

If medical costs to continue to rise an average of 6.7 percent a year, the costs associated with treating conditions related to the youth risk factors we've identified will jump to more than \$158.87 million in 2015. That's a cumulative five-year increase of more than 48 percent.

Containing this trio of risk factors at their current prevalence levels will put the brakes on this cost spiral, saving \$112 million over five years, or more than \$22 million per year.

But what if the most expensive of these factors—excess weight—continues to be a problem for our young people and their parents, who are responsible for their health care? It's clear that it will be our problem, too. Currently, each overweight youngster costs North Carolina \$76 per year, up from \$62 per year in 2006. Attributed to health care inflation, per capita excess weight-specific costs are expected to reach \$145, more than doubling over the next decade.

And when our kids enter the workforce as overweight employees at around age 23, they will become even more expensive to society. As adults, they will be more susceptible to chronic sickness and injury than children, and now that these overweight North Carolinians are working, lost productivity costs will be factored in as well.

By the time they've reached the mid-point of their career, an overweight worker will have incurred more than \$27,000 in medical and lost productivity costs. And by the time they reach retirement age, this bill will top \$210,000. This staggering sum could be put to so many better uses, including expanding businesses, hiring more workers, investing in infrastructure, or paying higher wages.

<sup>6</sup> Unlike in the adult medical cost analysis, only inpatient/outpatient care was considered; children aren't prescribed prescription drugs in sufficient quantities to provide a valid analysis.

Americans have a proud history of battling public health crises, from poor sanitation to infectious diseases to, most recently, smoking. In fact, getting so many smokers to quit, and preventing many more from starting, can be viewed as a triumph of public health. The number of smokers nationwide and in North Carolina—once the epicenter of the tobacco industry—continues to decline by about 3 percent each year.

Even though smoking is still a leading cause of preventable death and causes costly medical problems, it's less of a problem each year. If anti-smoking campaigns can work, it stands to reason that diet and activity level can be influenced by smart health-promotion efforts. Children are especially amenable to positive motivational campaigns, assuming their parents are also on board.

## **Focus on daily physical activity for children**

So many groups and individuals have a stake in the outcome of these efforts that one single approach won't work. In the case of children and youth, schools and childcare centers have been willing partners in the effort to promote more physical activity, especially through recent increases in the amount of time devoted to physical education, recess and active classroom time. The focus on daily physical activity should continue, as higher levels of physical activity help normalize weight and reduce the risk of Type II diabetes. Such efforts—and others focusing on getting children to eat more healthfully—are especially necessary in the state's most rural counties, where children are more likely to be overweight, physically inactive, and suffer from Type II diabetes or pre-diabetes.

## **Consider employee wellness programs**

And since they have so much at stake, all employers should consider implementing some form of employee wellness program. Such programs don't have to be

expensive or fancy; at some workplaces, the entire wellness program consists of giving employees extra time at lunch to go for a walk or replacing junk food with healthy snacks in the break room. A growing body of research suggests that comprehensive workplace wellness plans do return a measurable return on investment, so these should be considered by companies with more resources.

## **Get other stakeholders involved**

Other stakeholders can do their part, too. A successful community based, socio-ecological approach targeted toward adults and children should be:

- Initiated at all public and private schools and childcare centers as well as churches and community centers
- Inclusive of all demographics, including age, sex, or socioeconomic status
- Customized to meet the needs and interests of each group
- Aligned to each community's assets and physical environment
- Subjected to formal process impact and outcome evaluations to measure results

## **Sign up for Movement for Motion**

Be Active North Carolina (Be Active) is optimistic that its initiative, the Movement for Motion campaign, can encourage one million sedentary North Carolinians to engage in 30 minutes of activity a day.

To date, more than 65,000 people have joined the movement by signing up on Be Active's website. We invite you to learn more by visiting [www.beactivenc.org](http://www.beactivenc.org). If you're already active, commit to supporting a friend or family member, your classroom, school, church, or workplace in becoming physically active, which is the first—and easiest—step to achieving better health.

# About the Authors

## Be Active North Carolina, Inc.

Be Active North Carolina, Inc. is a statewide nonprofit organization committed to empowering North Carolinians to live healthy, physically active lives. Through community engagement, education and encouragement, Be Active is determined to help one million North Carolinians become more active, more often.

Be Active uses a community-based approach to help individuals and organizations create partnerships, programs, policies and environmental changes that make physical activity the easy choice. Since 1991, the organization has worked to increase public awareness of the benefits of physical activity, build grassroots advocacy, create model statewide programs and advocate for policies that reduce barriers and create opportunities for physical activity.

The *Movement for Motion* is Be Active North Carolina's statewide effort to help one million North Carolinians become more active, more often. The Movement is spreading across the state but is rooted in communities. One million starts with friends and family, in the classroom, at church, in the workplace and in your neighborhood. One million starts with YOU.

## Be Active supports YOU.

**Early Childhood** - Be Active provides physical activity related support and resources to individuals caring for children ages birth to five – the most critical time for creating healthy behaviors. Through Be Active Kids®, Be Active uses a developmentally appropriate curriculum and various training modules to increase physical activity of both children and adults in early childhood settings.

**Youth** - Be Active is committed to helping youth make physical activity the norm, shaping healthy kids and successful students. At Be Active, we know that healthy, physically active children learn better than their overweight and inactive classmates. Be Active works in elementary, middle and high schools, with after school programs and with families to encourage physical activity in the classroom, at home and in the community.

**Adults** – Be Active promotes physical activity at worksites, churches and within communities to give adults the knowledge and power to create an environment that supports physical activity and healthy choices for both themselves and their families. Through worksite policy change, physical activity challenges at church or the creation of neighborhood trails, Be Active helps adults get more physically active.

**Older Adults** – Be Active helps North Carolinians become or stay active as they age. Through falls prevention and pain management programs, physical activity support and resources for all older adults and the promotion of active ways to be involved in the community, Be Active helps older adults stay active and improve their quality of life.

## Be Active supports YOUR COMMUNITY.

Be Active works to provide convenient, low cost physical activity opportunities to citizens within their own communities. Be Active begins by gaining a commitment from key community leaders and assembling a wellness coalition that represents the diverse needs of the community. We then help the coalition assess the community's strengths and weaknesses, create an action plan to increase physical activity and implement the planned programs, policies and built environment changes. Be Active follows the same approach, working with child care centers, schools, worksites, churches, senior centers and other community groups to assure that physical activity opportunities are available for everyone.

## Be Active supports YOUR REGION.

**Western Region** - The Be Active-Appalachian Partnership works to increase the physical activity of people in western North Carolina. Through its community outreach, the Partnership has developed collaborative relationships with community partners in 28 western counties since its launch in 2005. The Partnership works closely with county health departments, senior centers, school systems, state parks and local foundations – to sponsor research on health related topics, loan physical activity equipment through its Lending Library Initiative, and promote

physical activity through outdoor recreation.

**Triad Region** - The Be Active-UNCG Partnership promotes physical activity for the citizens living and working in the Triad region of North Carolina. Through its community outreach, the Partnership develops collaborative relationships with school systems, health departments, government agencies and other community partners in 12 Triad counties.

**Triangle Region** - Be Active works throughout the Triangle to increase opportunities for physical activity and create environments that make being active the easy choice. By collaborating with local partners, Be Active transforms childcare centers, schools, worksites and neighborhoods into places that make being active a way of life. From supporting built environment changes at schools to giving seniors the tools to be active in their own home – Be Active works across the life span to make the Triangle a healthier place to live.

## Be Active supports NORTH CAROLINA.

It is our vision that all North Carolinians will have the knowledge and skills to lead healthy, physically active lives. At the state level, we work to increase the number of policies that support physical activity, encourage the use of evidence-based and award winning programs that help people become more active, and distribute resources that give community leaders the tools to promote physical activity. Be Active works to establish a collaborative infrastructure that allows communities to work together across the state to get more people, more active more often. Through partnerships with Appalachian State University in Western North Carolina and UNC Greensboro in the Triad, Be Active expands its reach, while maintaining its roots in the culture of the region.

Help Be Active get more people, more active, more often and let it begin with YOU!

For more information about how to get active, and promote physical activity in your community, visit [www.beactivenc.org](http://www.beactivenc.org).

## Chenoweth & Associates

Chenoweth & Associates, Inc., is a leading econometrics consulting firm in New Bern, North Carolina, headed by Dr. Dave Chenoweth. Since 1979,

the firm has provided strategic econometric services to businesses as well as industrial, health care and governmental organizations. It has more than a decade's worth of experience conducting chronic disease risk factor analyses for various states, including California, Washington, Michigan, Massachusetts, New York and Maine. This report represents its fourth collaboration with Be Active North Carolina.

## Glossary of Terms

**Absenteeism:** 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 ( $BMI = kg/m^2$ ). In general, healthy weight is defined as a BMI equal to or greater than 19 and less than 25 among all people 20 and over. Obesity is considered a BMI equal to or greater than 30, which amounts to roughly 30 excess pounds.

**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 also found in certain food sources. Having high total cholesterol or high "bad" cholesterol—low-density lipoprotein, or LDL—contributes to heart disease by coating arteries with plaque; good cholesterol, or high-density lipoprotein (HDL), helps clear it away.

**Lost productivity:** Labor productivity is typically measured as a ratio of output per labor-hour, an input. Thus, productivity is lost when output goes down even though labor hours, or the amount of money allocated to worker salaries, stay the same.

**Gross domestic product:** The total value of goods produced and services provided in a country during one year; also referred to as gross state product when referring to economic activity within a state.

# Appendix

## A. Summary of the Methodology

Chenoweth & Associates, the health care econometrics firm that performed the research for this report and the others that preceded it, used many sources and methods to obtain and analyze data pertaining to medical and lost productivity costs in North Carolina.

Statistics on the prevalence of risk factors in North Carolina adults is taken from the 2009 Behavioral Risk Factor Surveillance System (BRFSS), a survey conducted by the North Carolina State Center for Health Statistics. A similar survey by the same organization, called the Youth Risk Factor Surveillance Survey (YRFSS), was used to determine the child and youth risk factor prevalence.

The North Carolina Hospital Association provided inpatient claim data and costs associated with the targeted medical conditions. The state's largest private insurer, Blue Cross and Blue Shield of North Carolina, provided outpatient claim data and costs tied to the target conditions, as did the Division of Medical Assistance of the North Carolina Department of Health and Human Services (Medicaid).

The analysts based their calculations of prescription drug costs—which are folded into the total medical costs discussed—on national norms provided by several industry-leading vendors. This is because there is no public statewide database on prescription drug usage and cost patterns.

Similar sources and methods were used in the analysis of the economic impact of three risk factors in children and youth. However, prescription drug costs and lost productivity costs were not examined in this analysis.

To calculate lost worker 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 worksite case studies of American companies. They obtained wage and salary information for 2010 from the North Carolina Department of Commerce.

## B. Methodology Used To Analyze Costs

Chenoweth & Associates customized a Proportionate Risk Factor Cost Appraisal™ (PRFCA) to use with the medical care and prescription drug cost 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 a person with one or more of the risk factors will experience a specific illness or medical condition. Risk factor weights are subject to change as new scientific evidence is revealed or health care utilization patterns change.

## C. Medical Care Costs, Including Rx Drugs <sup>7</sup>

The analysts began with outpatient claim data provided by Blue Cross and Blue Shield of North Carolina and the Division of Medical Assistance of the North Carolina Department of Health and Human Services, as discussed above. Together, these two organizations provide medical coverage for approximately 23.9 percent of the state's adults. Inpatient data was supplied by the North Carolina Hospital Association. It should be noted that by factoring in all health care delivery sites, the PRFCA™ can statistically account for the fact that individual inpatient claims are significantly less common, yet significantly more expensive, than outpatient claims. Upon comparing premium differences between the composite population and the remaining groups who make up those receiving medical care (the uninsured, those insured by other companies, those on Medicare and those with individual insurance), a multiple of 8.46 was determined to compute state-wide claim and cost norms related to eight risk factors.

## D. Lost Productivity

Absenteeism, short-term disability and “presenteeism” rates associated with seven of the eight risk factors deemed relevant to lost productivity were estimated and based on actual U.S. workplace case studies. Wage and salary information for 2010 was obtained from the North Carolina Department of Commerce.

<sup>7</sup> Unlike in the adult medical cost analysis, only inpatient/outpatient care was considered; children aren't prescribed prescription drugs in sufficient quantities to provide a valid analysis.