

# Running the Numbers

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## The Health and Economic Burden of Chronic Diseases in North Carolina

As with other states, North Carolina's population experiences high rates of certain chronic diseases. Because a comprehensive assessment of the impact of preventable conditions on North Carolina can be lengthy, in this article we focus on the economic effects of selected preventable illnesses resulting in increased hospitalization.

In North Carolina, the direct medical costs related to tobacco use, physical inactivity, and inadequate nutrition alone are estimated to be at least \$6 billion per year.<sup>1</sup> These direct costs are potentially avoidable with changes in tobacco use, physical activity, and nutrition. One specific portion of the economic burden of chronic diseases in North Carolina is apparent in the crude hospitalization rates for the selected diagnosis codes at discharge for persons over 65 years old (see Table 1). Such persons will experience the largest effects from changes in behavior related to tobacco use, physical inactivity, and inadequate nutrition because North Carolina adults are somewhat more likely to smoke, have sedentary lifestyles, and be obese.<sup>2</sup>

**Table 1.**  
**2003-2007 North Carolina Crude Hospitalization Rates (per 100,000 population) for Selected Principal Diagnoses, Ages <65 years**

	<b>Total Discharges</b>	<b>NC Population</b>	<b>Crude Rate</b>	<b>Total Charges</b>
COPD	33,507	38,371,194	87.3	\$421,619,932
Lung Cancer	9,957	38,371,194	26.0	\$265,371,112
Diabetes	57,034	38,371,194	148.6	\$787,524,055
CVD	330,137	38,371,194	860.4	\$9,025,569,880
Stroke	47,514	38,371,194	123.8	\$1,124,060,900
HTN	2,682	38,371,194	7.0	\$28,702,085

Source: 2003-2007 North Carolina Resident Inpatient Hospital Discharge Data files. State Center for Health Statistics, November 2009.

Cardiovascular disease (CVD), a general category of disease that includes the first and third leading causes of death in North Carolina—heart disease and stroke—has become a major cause of premature death and years of potential life lost.<sup>3</sup> CVD is also a leading cause of hospitalization in North Carolina. During 2003-2007, the total number of discharges for CVD-related illness was 330,137, and the economic burden of CVD and stroke hospitalizations in North Carolina was approximately \$10.1 billion (see Table 1), money that could have been allocated to other needs in North Carolina during these difficult economic times. A comparison between the 2003-2007 rates and costs associated with those hospitalizations and the costs from 1995-1999, reveals that the total charges for hospitalizations doubled. Moreover, approximately 32,000 more discharges occurred during that five-year span (see Tables 1 and 2).

Diabetes is another major cause of disability and death in North Carolina as well as the nation. With a greater prevalence of obesity and an increase of older adults in the state, which are both risk factors for diabetes, that disease is approaching epidemic proportions. The prevalence of diagnosed diabetes in North Carolina has more than doubled during the last decade, increasing from 4.5% of the adult population in 1995 to 9.3% in 2008.<sup>2</sup> The actual prevalence might be twice as high, given estimates that one undiagnosed case of diabetes exists for every case that is diagnosed. A higher prevalence of all cardiovascular risk factors was identified among persons with diabetes than among those without diabetes.<sup>4</sup>

Chronic obstructive pulmonary disease (COPD) is also a critical public health and economic burden in the United States.<sup>5-10</sup> During 2003-2007, the total number of hospital discharges associated with COPD in North Carolina was 33,507, and the total hospitalization cost was \$421.6 million, compared with 28,496 and \$225.7 million during 1995-1999 (see Table 2). An estimated 40% of North Carolinians will experience cancer during their lifetime, and lung cancer was one of the leading causes of cancer deaths (5,356 deaths) in 2006.<sup>11</sup> Tobacco use is the main cause of lung cancer, which accounted for \$265.3 million in hospitalization costs during 2003-2007 (see Table 1), an increase of \$130 million from the 1995-1999 period (see Table 2). On January 2, 2010, North Carolina House Bill 2/S.L. 2009-27, An Act to Prohibit Smoking in Certain Public Places and Certain Places of Employment, took effect, and this act might help curb and discourage tobacco use in the state. Tobacco use remains the leading preventable cause of death in North Carolina and the nation.<sup>12</sup> It contributes to one of every five deaths in our state—this is more deaths than those attributable to alcohol, drug abuse, motor vehicle crashes, homicide, and HIV/AIDS combined. Approximately 38.1% of adults in North Carolina who are current smokers reported having COPD.<sup>13</sup>

**Table 2.**  
**1995-1999 North Carolina Crude Hospitalization Rates (per 100,000 population) for Selected Principal Diagnoses, Ages <65 years**

	<b>Total Discharges</b>	<b>NC Population</b>	<b>Crude Rate</b>	<b>Total Charges</b>
COPD	28,496	33,597,767	84.8	\$225,690,716
Lung Cancer	8,663	33,597,767	25.8	\$136,481,326
Diabetes	43,227	33,597,767	128.7	\$342,811,840
CVD	298,124	33,597,767	887.3	\$4,260,891,597
Stroke	39,762	33,597,767	118.4	\$536,315,038
HTN	2,259	33,597,767	6.7	\$11,793,320

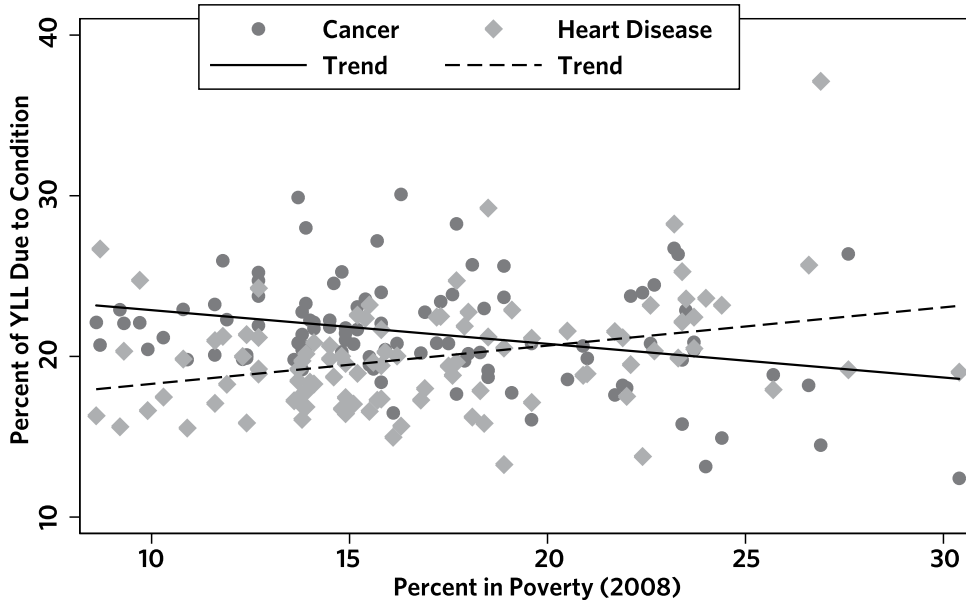
Source: 1995-1999 North Carolina Resident Inpatient Hospital Discharge Data files. State Center for Health Statistics, November 2009.

Sixty-eight percent of all North Carolina premature deaths are preventable, and the leading causes of premature deaths in the state involve modifiable behaviors. Among the leading causes of premature death are tobacco use, unhealthy diet/physical inactivity, alcohol misuse, falls, motor vehicle injuries, and illicit drug use.<sup>1</sup> The combination of physical inactivity and unhealthy eating is the second leading preventable cause of death in North Carolina. Physical inactivity and unhealthy eating increase the risk for chronic diseases (e.g., cardiovascular disease, diabetes, and cancer).

North Carolina's chronic disease burden is not distributed equally among its counties, making geography a correlate of disease burden as a marker for selected health determinants (e.g., socioeconomics, personal behaviors, and environments). To characterize the burden of premature death, years of life lost (YLL)—the difference between the actual age of death and life expectancy—can be used to estimate the relative burden of disease on a population. The percentage of a population's YLLs caused by a specific condition can be used as a measure of the relative burden for a disease on a population. Counties with a

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**Figure 1.**  
**North Carolina Counties with Higher Poverty Rates are Disproportionately Affected by Heart Disease**



Source: Authors' calculations using North Carolina Vital Statistics and Small Area Income Poverty Estimates, US Census Bureau.

larger percentage of the population living below the federal poverty level tend to have a disproportionate burden of heart disease, whereas more affluent counties have a higher mortality burden of cancer (see Figure 1). Metropolitan counties, which tend to be more affluent, have higher burdens of cancer, whereas counties with a lower socioeconomic status suffer disproportionately more YLLs because of heart disease. Improving prevention programs can help address the chronic disease burden throughout the state.

In our society, maintaining healthy behaviors can be difficult with the barrage of advertisements we experience for fast food, sugar-sweetened products, and tobacco products through television and print media. Creating environments that support healthy eating, physical activity, and smoke-free zones have been demonstrated to improve health. We should also invest in our children's future by promoting healthy eating and physical activity in schools as a way to reduce the health and economic burden of chronic diseases. Preventing chronic diseases and reducing the resulting economic burden can be enhanced by providing families, communities, and policymakers with the knowledge and skills to initiate health behavior changes.

**Note:** The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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