Background
Heart disease (also known as cardiovascular disease) is the leading cause of death for both men and women in the United States. About 35 percent of women in the U.S. have some form of heart disease, while the estimate for men is about 38 percent.¹ The most common form of heart disease is known as coronary heart disease (CHD), which is a narrowing of the small blood vessels that supply blood and oxygen to the heart. Though there have been noticeable reductions in CHD deaths in men over the past 40 years, the decline in CHD death rates among women continues to lag behind that of men.²

The American Heart Association categorizes risk factors for heart disease into three groups: major risk factors, contributing risk factors, and modifiable risk factors.³ Major risk factors are those that cannot be changed such as advancing age or heredity. Contributing risk factors are those such as stress, where the significance or contribution to the disease has yet to be precisely determined. Modifiable risk factors for heart disease are risk factors (also major) that can be modified, treated, or controlled by medicine and/or lifestyle changes. These risk factors include smoking tobacco, high blood pressure, high cholesterol, physical inactivity, obesity and diabetes. More recently, poor sleep has been recognized as an important risk factor.⁴

This brief report examines trends in cardiovascular disease (CVD) and modifiable risk factors for CVD among women with and without disabilities.

Methods
The results of this study were derived from the North Carolina Behavioral Risk Factor Surveillance System (BRFSS) Survey. The outcome variable, history of CVD, was based on self-reports of ever being told by a doctor that the respondent had a heart attack, or had coronary heart disease, or had a stroke.

The definition for disability was derived from an affirmative response to at least one of four survey questions on (1) having an activity limitation; (2) having the need for special equipment, e.g., wheelchair; (3) believing (self-perception) one has a disability; or (4) having trouble learning, remembering, or concentrating.⁵

Two analyses were conducted for this study. In the first, we examined the rate of CVD over a five-year period from 2005 to 2009, for women with and without disabilities (Figure 1). Because women with disabilities tend to be older and given that advancing age is associated with CVD, we computed age-standardized rates. North Carolina’s 2000 census population of females ages 18 and older was selected as the reference population because we compared two groups of females who reside in the state.

In the second analysis, we examined seven different risk factors for CVD using data from the 2009 survey (see Table 1). These risk factors included self-reports of doctor-diagnosed diabetes, high blood pressure, or high cholesterol. In addition, we included current smoking (daily or occasional); no leisure time activity in the past month; obesity (BMI greater than 35.0); and frequent poor sleep, defined as not getting enough rest or sleep in at least 14

---

¹ North Carolina is the only state to use four BRFSS screener questions to identify adults with disabilities. It is important to note that the use of these four screener questions leads to a significantly larger disability population than would otherwise be obtained with fewer screener questions.

² The Behavioral Risk Factor Surveillance System (BRFSS) is a random telephone health survey of non-institutionalized adults aged 18 and older in households sponsored by the Centers for Disease Control and Prevention (CDC). The North Carolina BRFSS operates through the State Center for Health Statistics’ Survey Center, Division of Public Health, conducting interviews monthly in both English and Spanish. Go to www.schs.state.nc.us/SCHS/brfss/questions.html to view the 2009 questionnaire. For more detailed information about the survey, please visit the NC-BRFSS website at www.schs.state.nc.us/SCHS/brfss or contact the BRFSS Coordinator at (919) 855-4485.
days out of the past 30 days. A summary index variable, “risk index,” was also constructed for those having three or more risk factors, among the seven studied. For each risk factor, we computed the age-adjusted prevalence and corresponding relative risk for those with a disability versus those without a disability.

### Results

The results shown in Figure 1 highlight the elevated prevalence of CVD found among women with disabilities. From 2005 through 2009, the rate of CVD for women with disabilities ranged from a high of 16.2 percent in 2007 to a low of 12.3 percent in 2009. After adjusting for differences in age, the five-year annual rates of CVD were at least three times higher for women with disabilities compared to women without disabilities.

Table 1 shows that both the age-adjusted prevalence and relative risk for each of the risk factors, including the index variable, was significantly higher for women with disabilities compared to women without disabilities. The largest difference in prevalence was observed for poor sleep; among women with disabilities, the prevalence was 22.1 percentage points higher. For obesity, high blood pressure, and current smoking, the difference in prevalence rates was at least 10 percentage points higher for women with disabilities. Furthermore, almost 50 percent of women with disabilities, compared to about 21 percent with no disabilities, reported having at least three of the seven CVD risk factors shown in Table 1.

When we calculated the age-adjusted relative risks, we found that for all indicators in Table 1, the corresponding relative risk was statistically significantly higher for women with disabilities. The likelihood of reporting poor sleep or being a current smoker was at least 80 percent higher for women with disabilities, while the risk of having three or more risk factors present was 2.2 times higher.

Findings from this study reveal that women with disabilities have a persistently high prevalence of CVD. One of the reasons for this may be due to the multiplicity of risk conditions found among women with disabilities — even among young age groups.

We found that among women ages 18 to 44, the likelihood of having three or more risk factors for CVD was 2.9 times higher for women with disabilities compared to their counterparts in the same age group (results not shown). The National Lung, Blood and Heart Institute reports that having three or more risk factors can increase your risk of CVD more than tenfold. It follows that the challenge for public health is to intervene early in the lives of women with disabilities, when the opportunity for prevention of CVD due to high-risk behaviors, or incipient chronic disease, is most likely to be effective.

### Table 1.

<table>
<thead>
<tr>
<th>Risk Factors for CVD</th>
<th>Prevalence</th>
<th>Relative Risk</th>
<th>95% C.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disability Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (%)</td>
<td>No (%)</td>
<td>aRR</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>15.2</td>
<td>6.7</td>
<td>2.3*</td>
</tr>
<tr>
<td>Obesity</td>
<td>41.1</td>
<td>25.5</td>
<td>1.6*</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>39.5</td>
<td>25.9</td>
<td>1.4*</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>47.1</td>
<td>30.8</td>
<td>1.4*</td>
</tr>
<tr>
<td>Current smoker</td>
<td>26.1</td>
<td>15.2</td>
<td>1.8*</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>39.9</td>
<td>24.4</td>
<td>1.7*</td>
</tr>
<tr>
<td>Poor sleep</td>
<td>49.9</td>
<td>27.8</td>
<td>1.9*</td>
</tr>
<tr>
<td>INDEX variable: three or more risk factors present</td>
<td>48.3</td>
<td>20.9</td>
<td>2.2*</td>
</tr>
</tbody>
</table>

* p < 0.05; *aRR – age-adjusted relative risk (Mantel–Haenszel); *C.I. – confidence interval.

### References


**Suggested citation:** Herrick H, Luken K, Dickens P. *Women with Disabilities and Heart Disease*. North Carolina BRFSS Surveillance Update, No. 5. Raleigh, NC, July 2011. DHHS, Chronic Disease and Injury Section, State Center for Health Statistics. North Carolina Office on Disability and Health, University of North Carolina, Chapel Hill.