



**Rhode Island Department of Health**

**Measuring Cardiovascular Disease in Rhode Island:  
Data Inventory**



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## INTRODUCTION

In the U.S., increasing quality and years of healthy life is a widely shared national objective.<sup>1</sup> Compelling evidence indicates increasing health disparities among U.S. populations, especially the poor and racial/ethnic minorities.<sup>2</sup> Reducing and eliminating disparities in health outcomes requires on-going surveillance of the determinants of disease, causes of health disparities, and effective interventions for prevention and treatment.<sup>2</sup>

Cardiovascular disease surveillance is the ongoing systematic collection, analysis, and interpretation of heart disease and stroke data for use in planning, implementation and evaluation of public health policy and programming.<sup>3</sup> Why should surveillance for cardiovascular disease be a state or national priority?

Heart disease is the leading cause of morbidity and mortality in Rhode Island (RI) and is a major cause of disability and impaired quality of life.<sup>4</sup> In RI, the number of cases of heart disease, hypertension and stroke (249,000) exceed the number of cases for other common chronic diseases, such as cancer (44,000), diabetes (52,000), mental disorders (149,000), and pulmonary conditions (218,000).<sup>4</sup> Heart disease also results in substantial health-care expenditures; for example, heart disease is projected to cost the U.S. health care system an estimated \$151.6 billion in direct and indirect costs in 2007.<sup>5</sup> RI's health care system is experiencing a similar burden in meeting the costs of treating cardiovascular disease cases. The human cost on Rhode Islanders with cardiovascular diseases also is great as measured by lost workdays and lower employee productivity. Moreover, the burden of cardiovascular disease is not borne equally by all Rhode Islanders. The proportion of premature heart disease deaths is higher among blacks as compared with whites in the general RI population.<sup>6</sup> Moreover, the prevalence of multiple risk factors for heart disease and stroke, such as high blood pressure and smoking, is higher among Rhode Islanders with less than a high school diploma (or equivalent) or a household income at or below 100% of the federal poverty level.<sup>7</sup>

Many modifiable risk factors for heart disease and stroke can be addressed through prevention, early recognition, and treatment. Monitoring the prevalence of heart disease and stroke and associated risk factors is essential for developing intervention that will help Rhode Islanders live heart-healthy and stroke-free lives.

*Measuring Cardiovascular Disease in Rhode Island: Data Inventory* is a compilation of data systems maintained by the Rhode Island Department of Health [HEALTH] with information specific to cardiovascular disease. Information is presented on RI's Behavioral Risk Factor Surveillance System (RI BRFSS), Youth Tobacco Survey (YTS), Youth Risk Behavior Survey (YRBS), Hospital Discharge Data (HDD), Vital Records, and Emergency Department and Observation Data (ED-OBS). HEALTH's Center for Health Data and Analysis oversees and maintains these databases.<sup>8</sup>

## **Measuring Cardiovascular Disease Prevalence**

Cardiovascular disease prevalence is measured by three questions in the RI BRFSS:

1. Ever told you had a heart attack, also called a myocardial infarction?
2. Ever told you had angina or coronary heart disease?
3. Ever told you had a stroke?

## **Measuring Cardiovascular Disease Events**

The state's overall mortality and hospitalization rates come from RI's Vital Records (death data) and RI's Hospital Discharge Data. Cardiovascular disease events are identified using the International Classification of Diseases 9<sup>th</sup> Revision (ICD-9-CM).

## **Measuring Cardiovascular Disease Modifiable Risk Factors**

The RI BRFSS monitors 6 modifiable cardiovascular disease risk factors: (1) high cholesterol, (2) high blood pressure, (3) diabetes, (4) smoking status, (5) weight status, and (6) leisure time physical activity.

## DATA INVENTORY

### Rhode Island Behavioral Risk Factor Surveillance System (RI BRFSS)

The RI BRFSS is an annual random-digit-dial (telephone) survey that measures health outcomes, health care access, and health risk behaviors among adults 18 years and older. Adults answer for themselves (self-report) and for their children for selected questions (proxy-report). RI has participated in the BRFSS every year since 1984. Core questions are asked every year. Optional modules related to cardiovascular disease are asked only in odd years.

*Strengths.* The BRFSS can be weighted to be representative of the state population.

*Limitations.* With the growing popularity of cell phones, population coverage provided by landline telephones has eroded, raising concerns about the representativeness of the BRFSS, which relies on landline telephones.<sup>9</sup> BRFSS data do not adequately capture the racial/ethnic diversity of the RI population.

#### **Cardiovascular Disease Prevalence (Core)**

- Q. Ever told you had a heart attack, also called a myocardial infarction?
- Q. Ever told you had angina or coronary heart disease?
- Q. Ever told you had a stroke?

#### **Cardiovascular Disease Modifiable Risk Factors (Core)**

- Q. Have you ever had your blood cholesterol checked?
- Q. Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?
- Q. Have you ever been told by a doctor, nurse, or other health professional that you have high blood cholesterol?
- Q. Have you ever been told by a doctor that you have diabetes?
- Q. Do you smoke cigarettes every day, some days, or not at all?
- Q. During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?
- Q. *Weight status:* About how much do you weigh without shoes? About how tall are you without shoes?

#### **Cardiovascular Disease Health (Optional module)**

- Q. After you left the hospital following your heart attack did you go to any kind of outpatient rehabilitation? This is sometimes called "rehab."
- Q. After you left the hospital following your stroke did you go to any kind of outpatient rehabilitation? This is sometimes called "rehab."
- Q. Do you take aspirin daily or every other day?
- Q. Do you have a health problem that makes taking aspirin unsafe for you?

**RI BRFSS (cont'd)**

**Actions to Control High Blood Pressure (Optional module)**

- Q.** Are you changing your eating habits to help lower or control your high blood pressure?
- Q.** Are you cutting down on salt (to help lower or control your high blood pressure)?
- Q.** Are you reducing alcohol use (to help lower or control your high blood pressure)?
- Q.** Are you exercising to help lower or control your high blood pressure?
- Q.** Has a doctor or other health professional ever advised you to do any of the following to help lower or control your high blood pressure? *Ever advised you to....*
  - a. Change your eating habits to help lower or control your high blood pressure?
  - b. Cut down on salt to help lower or control your high blood pressure?
  - c. Reduce alcohol use to help lower or control your high blood pressure?
  - d. Exercise to help lower or control your high blood pressure?
  - e. Take medication to help lower or control your high blood pressure?
- Q.** Were you told on two or more different visits to a doctor or other health professional that you had high blood pressure?  
If yes and female: *Was this only when you were pregnant?*

**Heart Attack and Stroke Knowledge (Optional module)**

- Q.** Which of the following do you think is a symptom of a heart attack? *Do you think...*
  - a. Pain or discomfort in the jaw, neck, or back are symptoms of a heart attack?
  - b. Feeling weak, lightheaded, or faint are symptoms of a heart attack?
  - c. Chest pain or discomfort is a symptom of a heart attack?
  - d. Sudden trouble seeing in one or both eyes is a symptom of a heart attack?
  - e. Pain or discomfort in the arms or shoulder is a symptom of a heart attack??
  - f. Shortness of breath is a symptom of a heart attack?
- Q.** Which of the following do you think is a symptom of a stroke?
  - a. Sudden confusion or trouble speaking is a symptom of a stroke?
  - b. Sudden numbness or weakness of face, arm, or leg, especially on one side is a symptom of a stroke?
  - c. Sudden trouble seeing in one or both eyes is a symptom of a stroke?
  - d. Sudden chest pain or discomfort is a symptom of a stroke?
  - e. Sudden trouble walking, dizziness, or loss of balance is a symptom of a stroke?
- Q.** If you thought someone was having a heart attack or a stroke, what is the first thing you would do?
  1. Take them to the hospital
  2. Tell them to call their doctor
  3. Call 911
  4. Call their spouse or a family member

## Rhode Island Youth Tobacco Survey (RI YTS)

The RI Youth Tobacco Survey (RI YTS) is an anonymous and voluntary survey of public school attending students. Randomly selected students in either grades 6-8 or grades 9-12 participate in the survey with parental approval for participation (Self-reported data). The survey collects in depth information regarding tobacco use among adolescents, including cigarettes, smokeless tobacco, cigars and pipes, and unconventional cigarettes (bidis and kreteks). The YTS also measures exposure to second hand tobacco smoke and monitors knowledge, beliefs, and attitudes regarding tobacco use, health effects, and tobacco advertising.

With technical assistance from the Centers for Disease Control and Prevention (CDC), over 40 states and U.S. territories have administered the YTS. RI data are available for 2001, 2003 and 2005.

Most adolescents believe they can quit smoking anytime they want. But young people become just as addicted to nicotine as adults do. In fact, smoking habits in youth influence cigarette consumption throughout adulthood. There is also evidence that children and youth who begin smoking before age 20 have the highest incidence and earliest onset of coronary heart disease and high blood pressure

*Strengths.* The YTS can be weighted to be representative of the state's public school attending students in middle school and high school.

*Limitations.* Although students are assured that the YTS is confidential, middle and high school students may underreport at-risk behaviors for fear of disclosure. Students reading below grade level may have difficulty answering some of the questions.

### **Cigarette Smoking and Exposure to 2<sup>nd</sup> hand Smoke**

**Q.** During the past 30 days, how many days did you smoke cigarettes?

**Q.** During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?

**Q.** During the past 7 days, how many days were you in the same room as someone who was smoking cigarettes?

**Q.** During the past 7 days, how many days did you ride in the same car as someone who was smoking cigarettes?



## **Rhode Island Youth Risk Behavior Survey (RI YRBS)**

The Youth Risk Behavioral Survey (YRBS) is an anonymous and voluntary survey that is administered every other year to a random sample of high school students in over 50 states, territories, and municipalities nationwide. The Centers for Disease Control and Prevention developed the YRBS to monitor risk behaviors for the major causes of mortality, disease, injury, and social problems among youth and adults in the United States. Survey questions about tobacco use and weight status are helpful in providing information about modifiable cardiovascular risk factors in RI's youth.

RI survey data are available for 1997, 2001, 2003, 2005 and 2007. In 2007, the survey was administered for the first time to both public middle and high school students. The RI Departments of Health, Education, and Mental Health, Retardation, and Hospitals provide funding and other support for the YRBS.

*Strengths.* The YRBS can be weighted to be representative of the state's public school attending high school students. In 2007, the YRBS can be weighted to be representative of the state's public school attending middle and high school students.

*Limitations.* Although students are assured that the YRBS is confidential, high school students may underreport at-risk behaviors for fear of disclosure. Students reading below grade level may have difficulty answering some of the questions.

### **Cigarette Smoking (Middle and High School student)**

- Q. Have you ever tried cigarette smoking, even one or two puffs?
- Q. During the past 30 days, on how many days did you smoke cigarettes?
- Q. During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?
- Q. Have you ever smoked cigarettes daily, that is, at least one cigarette every day for 30 days?
- Q. During the past 12 months, have you tried any flavored cigarettes, other than menthol?
- Q. During the past 12 months, did you ever try to quit smoking cigarettes?

### **Exposure to 2<sup>nd</sup> hand smoke (Middle School students only)**

- Q. Does anyone who lives with you now smoke cigarettes?

### **Tobacco Education (Middle School students only)**

- Q. During this school year, were you taught in any of your classes about the dangers of tobacco use?

### **Weight status**

- Q. How tall are you without your shoes on?
- Q. How much do you weigh without your shoes on?

**Rhode Island Event Level Data: Hospital Discharge Data (RI HDD), Rhode Island Emergency Department (ED) and Observation (OBS) Data and Rhode Island Vital Records (Death Records)**

Rhode Island has three event-level data sets. These datasets provide information on persons admitted to hospitals (e.g., Hospital Discharge Data (RI HDD), Rhode Island Emergency Department (ED) and Observation (OBS) Data) or who die in the state (e.g., Rhode Island Vital Records).

Hospital admissions and deaths attributable to cardiovascular diseases are identified through the International Classification of Diseases (ICD) The International Classification of Diseases, Clinical Modification (ICD-9-CM) is used to code and classify morbidity and mortality data from inpatient and outpatient records, and physician offices. The International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10-CM) is a coding of diseases and signs, symptoms, abnormal findings, complaints, social circumstances and external causes of injury or diseases, as classified by the World Health Organization. ICD-9-CM and ICD-10-CM codes for cardiovascular diseases are shown below.

<i>ICD-9-CM and ICD-10-CM codes Mortality and Hospital Data</i>	<i>Death ICD-10</i>	<i>HDD ICD-9 CM</i>
<i>All cardiovascular disease (CVD)</i>	<i>I00-I78</i>	<i>390-434, 436-448</i>
<i>Ischemic heart disease (IHD)</i>	<i>I20-I22, I24, I25</i>	<i>410-414, 429.2</i>
<i>Stroke</i>	<i>I60-I69</i>	<i>430-434, 436-438</i>

**Hospital Discharge Data (RI HDD),**

Data on inpatient discharges come from the eleven general hospitals, two psychiatric hospitals, and one inpatient rehabilitation facility in RI. The Hospital Discharge Data include patient demographics, clinical items, and hospital charges. The data can be used to measure health status and outcomes, health care utilization, and access to health care. Hospitals report inpatient discharge data to HEALTH’s Center for Health Data and Analysis within 90 days after the end of each calendar quarter.

**Emergency Department (ED) and Observation (OBS) Data**

Data on emergency department visits and observation stays are collected from licensed acute care hospitals in RI. Data collection began with discharges occurring on or after January 1, 2005. Information on patient demographics, clinical items and hospital charges can be used to measure health status and outcomes, emergency department utilization, access to health care, and for disease and injury surveillance.

**Hospital Discharge Data and Emergency Department Data (Selected fields)**

Facility	Admission Date
Patient sex	Discharge Date
Patient date of birth	Principal Diagnosis
Patient race/ethnicity	Additional Diagnoses
Patient census tract	Payer source

**Rhode Island Vital Records (Death Records)**

Death data are collected from funeral directors who are responsible for obtaining the cause of death from physicians. The definition of a case or record in the Death Records is a person who died in RI or a RI resident who has died out-of-state. Preliminary data on deaths occurring in RI are available within one year after the end of the calendar year. Final data, including out-of-state deaths of RI residents, are available 2 years after the end of the calendar year.

**Vital Record Data Fields (Selected fields)**

Patient date of birth	Patient marital status
Patient date of death	Patient census tract
Patient sex	Underlying Diagnosis
Patient race/ethnicity	Contributing Diagnoses

*Strengths* (HDD, Vital Records, ED-OBS). Morbidity and mortality rates are calculated from these data sets.

*Limitations* (HDD, Vital Records, ED-OBS). Race/ethnicity and census tract from addresses may be missing or incomplete.

**DISPARITIES**

The prevalence of certain heart diseases varies between men and women, among various levels of education achievement, among racial/ethnic groups, and among cities and towns in RI. Providence, RI’s capitol and largest city, differs significantly from the state as a whole. Providence has a higher proportion of low income and low education residents than the state and more than half of Providence’s population is comprised of minorities, compared with 18% statewide.

Tracking disparities in heart disease and stroke prevalence and related risk factors is an important component of the RI Heart Disease and Stroke Surveillance System. Shown in Table 1 are the variables used for identifying disparities.

**Table 1. Rhode Island’s asthma surveillance system for identifying disparities by age, race, gender, socioeconomic status, and geographic area**

Usefulness:	+ (Full)	- (Partial)	0 (None)			
Surveillance Data	Age	Race	Gender	SES	Geography	
BRFSS	+	+	+	+		
YTS	+	+	+	0	0	θ
YRBSS	+	+	+	0	0	θ
HDD	+	- *	+	- **	+	§
EDD	+	- *	+	- **	+	§
Death records	+	+	+	0	+	§

**Notes:**

- \* Race/ethnicity may not be routinely reported.
- \*\* SES must be inferred by type of health insurance.
- § Geographic detail is available at census tract level
- θ SES of school must be inferred from average SES of municipality.

**Abbreviations:**

- BRFSS Behavioral Risk Factor Surveillance System
- YTS Youth Tobacco Survey
- YRBSS Youth Risk Behavior Surveillance System
- HDD Hospital Discharge Data
- EDD Emergency Department Data (*under development*)
- Death records Death Records (Office of Vital Records)

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