

**Rhode Island Asthma Facts:
Using Surveillance Data to Build a Healthier Rhode Island**



**Rhode Island Department of Health Asthma Control Program
January 2011**



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Rhode Island Asthma Facts: Using Surveillance Data to Build a Healthier Rhode Island

Introduction

Asthma is a public health priority in the United States, due to rising prevalence rates, high morbidity, and treatment costs. Approximately 34 million Americans have been diagnosed with asthma by a health professional during their lifetime.^{1,2} The cost of treating asthma is estimated at \$30 billion every year.³

No one really knows why some people develop asthma and others don't. Like other chronic diseases, asthma is probably caused by a combination of environmental and genetic (inherited) factors, which interact to cause asthma to develop, most often early in life.⁴

However, not all things are equal when it comes to the burden of asthma. National data show that asthma is more common and more severe among children, women, African-Americans, and Puerto Ricans.⁵ These at-risk groups are more likely to have above average rates of emergency department visits and inpatient hospital admissions for asthma and are more likely to die from asthma.⁵

Why are some groups more likely to develop asthma than others? The reasons for these disparities are complex. However, individuals at high risk of developing asthma may lack access to quality health care or experience prolonged exposure to irritants (e.g., tobacco smoke), pollutants (e.g., diesel-related particles), indoor allergens (e.g., cockroach and mouse allergen), and stress. All of these factors increase the likelihood of developing asthma and having more severe asthma once the disease develops.^{6,7} Once a person develops asthma symptoms they can improve quality of life by avoiding asthma triggers.

This issue of **Rhode Island Asthma Facts: Using Surveillance Data to Build a Healthier Rhode Island** uses the most recent data to present trends in asthma prevalence, hospitalizations and mortality in Rhode Island as well as information on asthma disparities. Asthma surveillance provides the quantitative information needed to help Rhode Island set priorities for asthma programs and policies. This brief will be updated annually as new data sources become available.

For more detailed information on asthma data in Rhode Island, please go to the web page for Rhode Island's Asthma Control Program at:

<http://www.health.state.ri.us/programs/asthmacontrol/index.php>

Here you will find a link to the report, [The Burden of Asthma in Rhode Island 2009](#). The full report as well as surveillance fact sheets can be downloaded from the web page.

Asthma Triggers

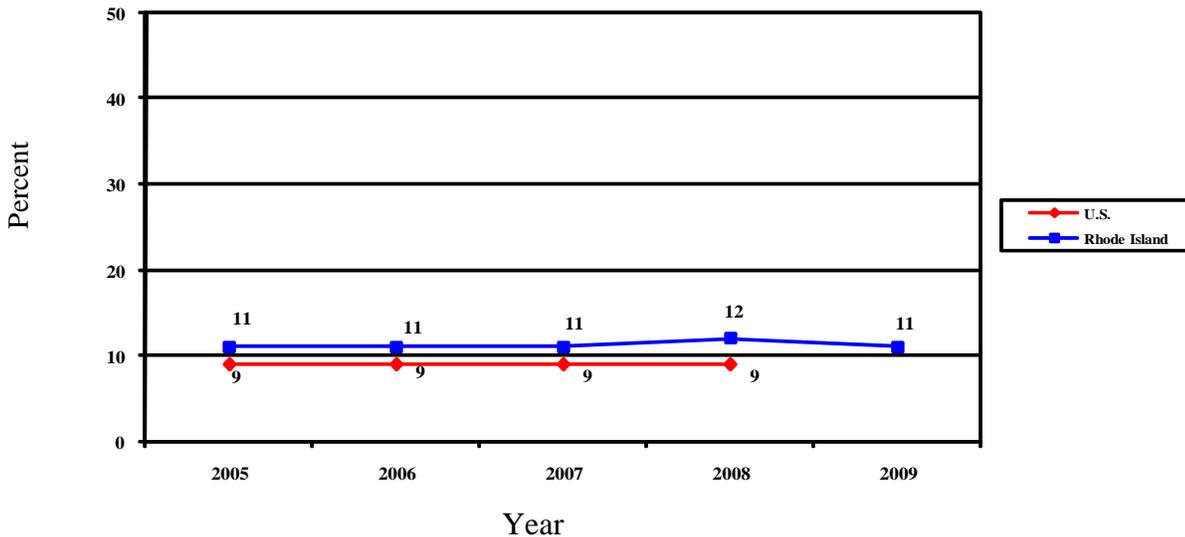
- Secondhand smoke
- Dust mites
- Molds
- Cockroaches and pests
- Pets
- Nitrogen Dioxide
- Outdoor air pollutants
- Strenuous exercise or exposure to cold, dry air
- Emotional anxiety or stress
- Viral and bacterial infections, such as the common cold

How common is asthma in Rhode Island?

Children

Current asthma. Asthma is the most common chronic illness in children. In 2009, approximately 25,000 children (0-17 years of age) in Rhode Island were reported as having doctor-diagnosed current asthma (11%). As shown in Figure 1, there has been little change in current asthma prevalence among children in Rhode Island and nationally. State asthma estimates for 2008 show that current asthma prevalence in children varied widely, ranging from 7% in Florida and Mississippi (data not shown) to 12% in Rhode Island.

Figure 1. Trends in current childhood asthma prevalence¹ by year, U.S. and Rhode Island, 2005 - 2009



¹The Behavioral Risk Factor Surveillance System (BRFSS) has two asthma prevalence measures. Lifetime asthma is defined as an affirmative response to the question "Have you ever been told by a doctor {nurse or other health professional} that you have asthma?" Current asthma is defined as an affirmative response to that question followed by an affirmative response to the subsequent question "Do you still have asthma?"

Data source: 2005 to 2009 Rhode Island Behavioral Risk Factor Surveillance System; weighted data, Rhode Island Department of Health, Center for Health Data and Analysis and 2005 to 2008 National Health Interview Survey; weighted data, available on-line at: <http://www.cdc.gov/asthma/nhis/default.htm>.

Rhode Island also tracks current asthma prevalence through the Youth Risk Behavior Survey (YRBS). The YRBS is an anonymous and voluntary survey that collects information on adolescent health risks from public school students in grades 6 through 12. In 2009, 12% of RI high school students reported that they had been diagnosed with asthma and still had asthma.

The burden of asthma is experienced differently depending on a person's age, sex, and socioeconomic status.

Which children are more likely to have asthma?

National data show that current asthma prevalence is higher among boys than girls before adolescence.⁸ In Rhode Island, asthma is more common in boys ages 5-11 and 12-17 than in girls in these age groups (Table 1).

Why are boys more likely to get asthma than girls? Researchers are not sure why asthma and wheezing are substantially more common in boys than girls, but boys appear to have smaller airways in proportion to lung volumes than girls.^{9,10} It has also been suggested that there is an under diagnosis of asthma in girls, with girls more likely to be diagnosed with asthma after puberty, and boys more likely to be diagnosed with asthma before puberty.¹¹

Table 1. Current asthma prevalence¹ in Rhode Island children 0-to-17 years by gender and age group, 2005 - 2009

Gender	Age Groups			Overall
	0 to 4	5 to 11	12-17	
Girls	8%	9%	11%	9%
Boys	8%	15%	16%	13%

¹Current asthma is defined as children diagnosed with asthma by a physician and who still had asthma at the time of the survey as reported by a parent or primary caregiver.

Data source: 2005 – 2009 Rhode Island Behavioral Risk Factor Surveillance System combined file; weighted data, Rhode Island Department of Health, Center for Health Data and Analysis.

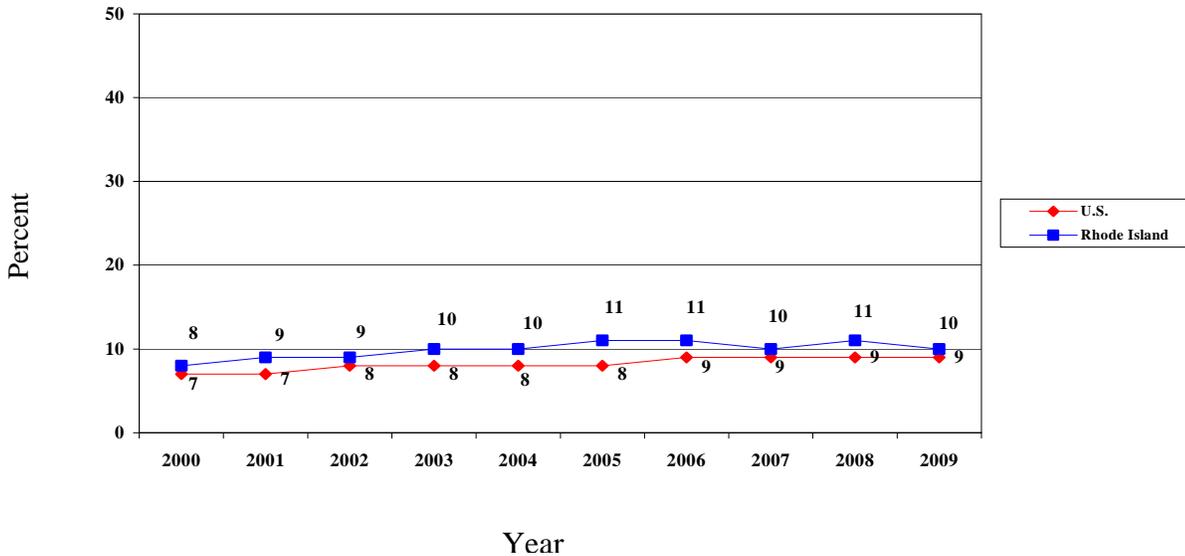
Adults

In 2009, just over 82,000 Rhode Island adults (ages 18+) reported that they currently had asthma. The percentage of adults with current asthma increased from 2000 to 2005, with a low of 8% in 2000 to a high of 11% in 2005. Between 2006 and 2009, the percentage of adults with self-reported current asthma was stable, ranging from 10% to 11% (Figure 2).

The Henry J. Kaiser Family Foundation has a map of the United States displaying adult self-reported current asthma prevalence by state. The information is available online at:

<http://www.statehealthfacts.org/comparemaptable.jsp?ind=87&cat=2>

Figure 2. Trends in current adult asthma prevalence¹ by year, U.S. and Rhode Island, 2000 - 2009



¹Current asthma is defined as adults diagnosed with asthma by a physician and who still had asthma at the time of the survey as reported by the respondent.
 Data source: 2000 to 2009 Rhode Island Behavioral Risk Factor Surveillance System; weighted data, Rhode Island Department of Health, Center for Health Data and Analysis.

Which adults are more likely to have current doctor-diagnosed asthma?

In Rhode Island, asthma is more common among women (13%) than men (7%). Among women, current asthma prevalence is higher in the 18–44 year old age group (14%) than in those 65 years of age and older (10%). National data also show that current asthma prevalence is higher among females (9%) than males (7%).¹²

Table 2. Current asthma prevalence¹ in Rhode Island adults aged 18 and older by gender and age group, 2007 - 2009

Gender	Age Groups		Overall
	18 to 64	65+	
Females	14%	10%	13%
Males	7%	6%	7%

¹Current asthma is defined as adults diagnosed with asthma by a physician and who still had asthma at the time of the survey.
 Data source: 2007 to 2009 Rhode Island Behavioral Risk Factor Surveillance System combined file; weighted data, Rhode Island Department of Health, Center for Health Data and Analysis.

It is unclear why current asthma prevalence is higher in women than men. Research studies have suggested that obesity is associated with the development of nonallergic asthma in women, but not in men, due to the influence of obesity on levels of female sex hormones.^{13,14} The evidence of a relationship between obesity and asthma is not conclusive.

Rhode Island data* show other groups that are disproportionately affected by asthma.

- Adults with less than a high school education are more likely to be diagnosed with current asthma compared with adults with more education (13% vs. 10%).
- Adults with household incomes below \$25,000 are more likely to have current asthma than adults with higher household incomes (12% vs. 10%).

Smoking and Asthma

Cigarette smoking plays a part in many diseases, including asthma. Tobacco smoke is a powerful trigger of asthma symptoms in persons with asthma and increases the severity of attacks. This is true whether a person with asthma smokes or a person with asthma is exposed to secondhand smoke from someone else's cigarette, cigar or pipe.¹⁵ Secondhand smoke is also called environmental tobacco smoke (ETS).

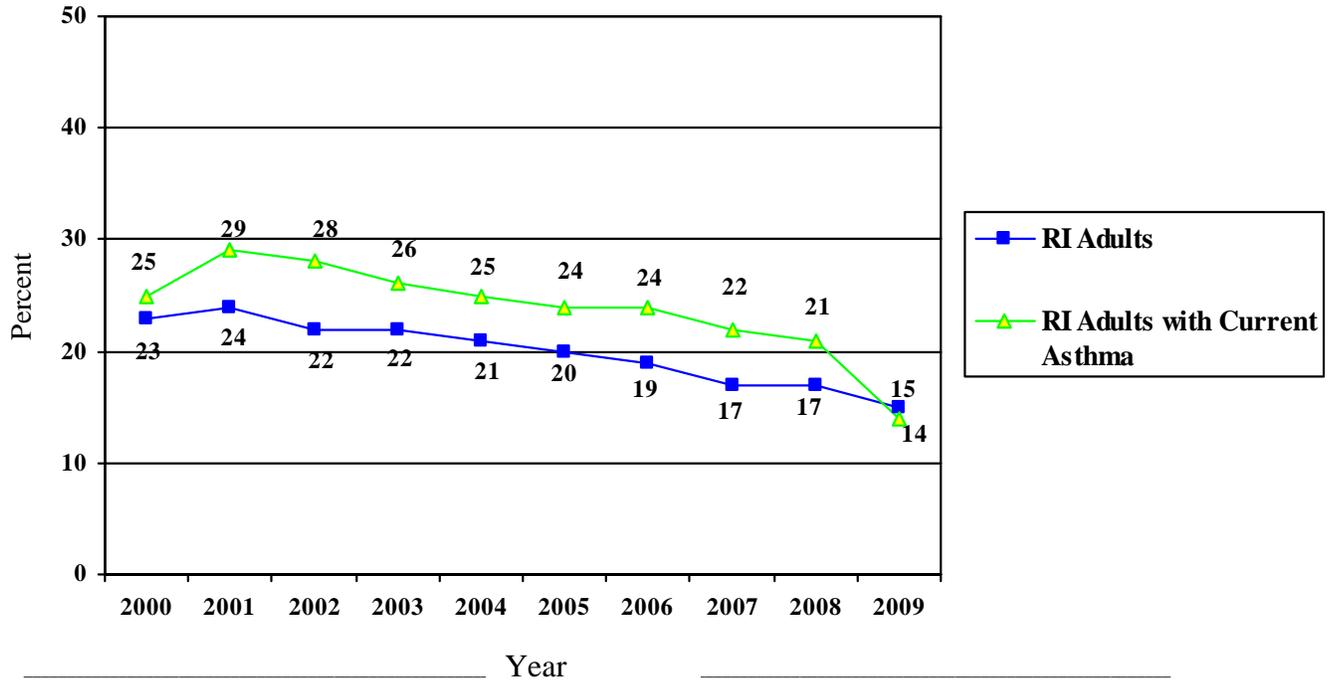
Current cigarette use among Rhode Island high school students is a concern because most young people who smoke regularly continue to smoke throughout adulthood. The Rhode Island Youth Risk Behavior Survey (YRBS) showed a modest decline in current cigarette use, from 15% in 2007 to 13% in 2009. The difference between the two years, however, was not statistically significant.

The percentage of Rhode Island adults aged 18 and older who currently smoke has dropped in recent years and is now lower than national cigarette smoking rates for U.S. adults. Rhode Island's adult smoking rate dropped from 23% in 2000 to 15% in 2009. In contrast, the nationwide smoking rate dropped from 23% in 2000 to 18% in 2009 (data not shown). The decline in smoking in Rhode Island started shortly after two changes in state law — the ban on smoking in indoor public places, which took effect in March 2005, and the increase in the cigarette tax, which is one of the highest in the nation.

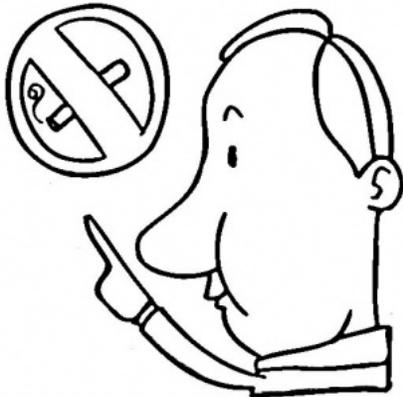
Just as smoking rates among Rhode Island adults have dropped in ten years, smoking rates among Rhode Island adults with asthma also have dropped (Figure 3). Still, it is a concern that 14% of Rhode Island adults with current asthma in 2009 smoked cigarettes. People with asthma may be unaware of, ignore, or underestimate the dangers of inhaling cigarette smoke. The findings in Figure 3 indicate a need for interventions to help adults with asthma quit smoking.

* Data source: 2007 -2009 Rhode Island Behavioral Risk Factor Surveillance System combined file; weighted data, Rhode Island Department of Health, Center for Health Data and Analysis.

Figure 3. Trends in current smoking prevalence by year, Rhode Island, 2000 to 2009



Data source: 2000 to 2009 Rhode Island Behavioral Risk Factor Surveillance System; weighted data, Rhode Island Department of Health, Center for Health Data and Analysis.



How are Rhode Islanders with asthma managing their asthma?

Managing asthma can be complicated. With appropriate medication, medical care, and self-management, most asthma symptoms are preventable. How well are Rhode Islanders with asthma managing their asthma?[†]

Asthma symptoms and health care use

- ✓ 82% of Rhode Island adults with current asthma had at least one day in the past two weeks when they were completely symptom-free, that is no coughing, wheezing, or other symptoms of asthma.
- ✓ 63% of Rhode Island adults with current asthma had symptoms of asthma on at least one day during the past 30 days.
- ✓ 24% of Rhode Island adults with current asthma had symptoms of asthma that made it difficult to stay asleep on at least one day during the past 30 days.
- ✓ 53% of Rhode Island adults with current asthma had an episode of asthma or an asthma attack in the past year.
- ✓ 29% of Rhode Island adults with current asthma were unable to work or carry out their usual activities in the past year because of their asthma.
- ✓ 14% of Rhode Island adults with asthma visited an emergency room or urgent care center in the past year because of their asthma, and 3% were hospitalized in the past year because of their asthma.

Asthma management

- ✓ 67% of Rhode Island adults with current asthma have been taught by a doctor or other health professional how to recognize early signs and symptoms of an asthma episode.
- ✓ 76% of Rhode Island adults with current asthma have been taught by a doctor or other health professional what to do during an asthma episode or attack.
- ✓ 43% of Rhode Island adults with current asthma have been taught by a doctor or other health professional how to use a peak flow meter to adjust their daily medications.
- ✓ Only 26% of Rhode Island adults with current asthma have ever been given an Asthma Action Plan by a doctor or other health professional.
- ✓ Only 9% of Rhode Island adults with current asthma have ever taken a course or class on how to manage their asthma.

[†] 2008 and 2009 Rhode Island Adult Asthma Call Back Surveys combined file; weighted data, Rhode Island Department of Health, Center for Health Data and Analysis.

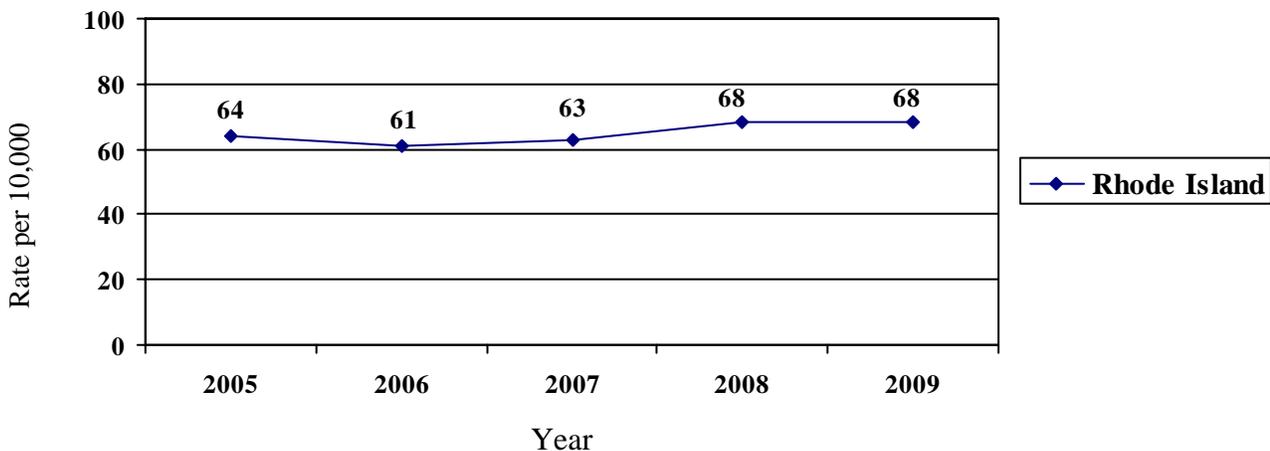
Emergency Room Visits for Asthma

Rhode Island began surveillance for emergency department visits in 2005. Emergency department visits include persons who went to the emergency room for their asthma and were sent home and persons who went to the emergency room for their asthma and were admitted to the hospital as an inpatient.

Rhode Island's age-adjusted asthma emergency department rate has remained fairly constant since 2005. The average annual age-adjusted rate is approximately 65 emergency department visits per 10,000 individuals (Figure 4).

Emergency department and hospitalization data are often presented as age-adjusted rates so the information presented can be compared to rates reported by other states and to national goals and objectives. The calculation of an age-adjusted rate is explained in Appendix A.

Figure 4. Trends in Rhode Island's asthma emergency department visit rates by year^{1,2} for asthma as the first diagnosis,³ 2005 - 2009



¹ Age-adjusted to the year 2000 U.S. standard population.

² All rates are per 10,000 Rhode Island residents. Out-of-state patients with an emergency department visit for asthma are not included in the age-adjusted rates.

³ The first diagnosis is defined as the principal or primary discharge diagnosis of asthma (ICD-9-CM codes 493.00 – 493.92).

Data Sources: 2005–2009 Rhode Island Emergency Department Data, Rhode Island Department of Health, Center for Health Data and Analysis.

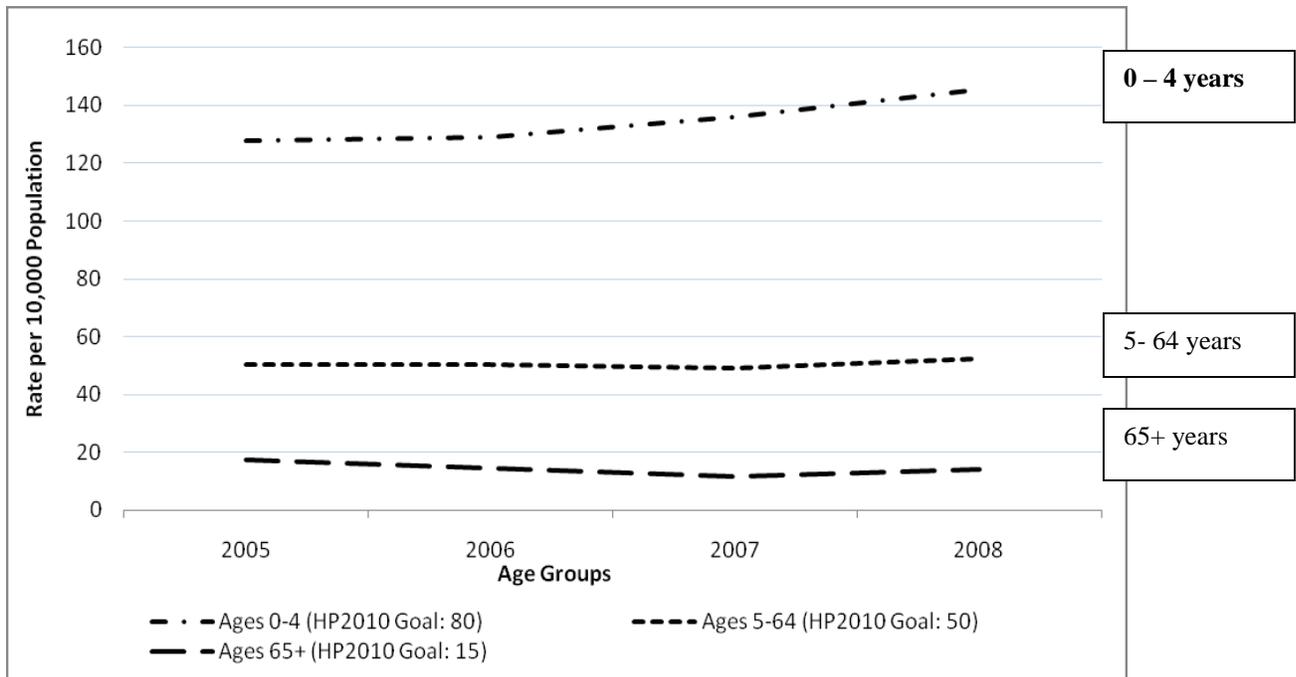
How well is Rhode Island Meeting Healthy People 2010 Objectives for Asthma Emergency Department Visits?

Sponsored by the U.S. Department of Health and Human Services, *Healthy People 2010* is a comprehensive set of disease prevention and health promotion objectives for the nation. The *Healthy People 2010* objectives are national benchmarks. In using these objectives for asthma, Rhode Island can direct its efforts to achieving national goals, compare its asthma burden to other states, and measure progress over time in achieving these objectives.

Healthy People 2010 has age-specific target goals to reduce emergency department visits for asthma. These goals are 80 emergency department visits for asthma per 10,000 children under age 5 years, 50 emergency department visits for asthma per 10,000 children and adults aged 5 to 64, and 15 emergency department visits for asthma per 10,000 adults ages 65 years and older.¹⁶

Rhode Island's emergency department visit rates for asthma either met or were only slightly higher than the *Healthy People 2010* targets for children and adults aged 5-64 and adults aged 65+ (Figure 5). The asthma emergency department visit rate for children under age 5 was significantly higher than the *Healthy People 2010* target rate for this age group. However, asthma in young children (aged 0 to 5 years) can be hard to diagnose. It can be difficult to tell whether a child has asthma or another respiratory disease because the symptoms of asthma can be similar to other respiratory conditions in young children.¹⁷

Figure 5. Trends in Rhode Island’s asthma emergency department visit rates by year¹ for asthma as the first diagnosis,² 2005 - 2008



¹ Rates for children under age 5 are age-specific asthma emergency department rates. Rates for Rhode Islanders aged 5 to 64 years and adults aged 65 and older are asthma emergency department rates age-adjusted to the year 2000 U.S. standard population.

² The first diagnosis is defined as the principal or primary discharge diagnosis of asthma (ICD-9-CM codes 493.00 – 493.92).

Data Sources: 2005-2008 Rhode Island Emergency Department Data, Rhode Island Department of Health, Center for Health Data and Analysis.

People who are hospitalized for asthma represent only a small proportion of people with asthma, because hospitalizations for asthma occur among people whose condition is serious enough to require a hospital stay.

Hospitalizations for Asthma

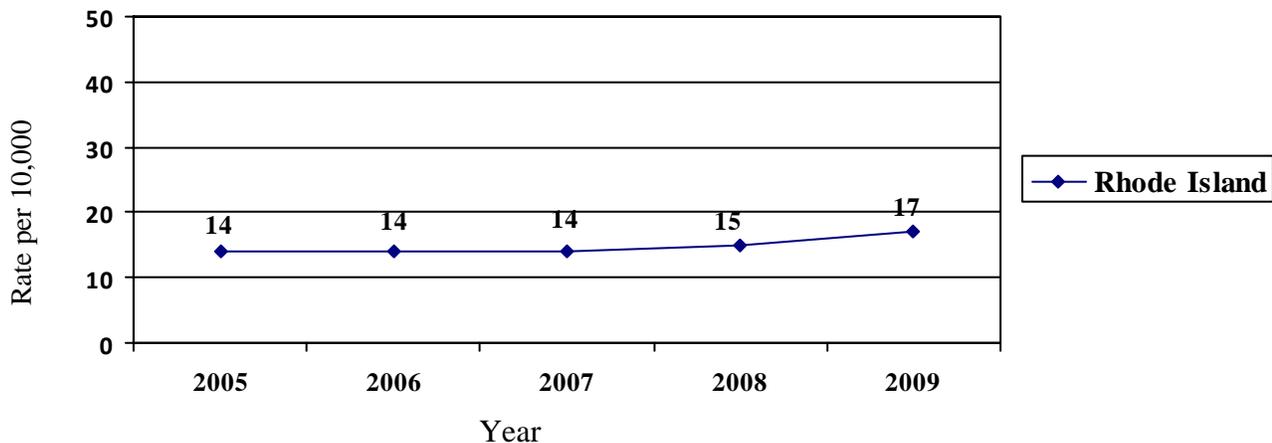
Hospital Discharges

In 2009, there were 1,750 hospital discharges where asthma was the principal (first) reason for admission. These admissions were for Rhode Island residents. Out-of-state patients admitted to a Rhode Island hospital for asthma were not included.

The estimated average cost per Rhode Island patient discharged from the hospital where asthma was the first reason for the admission was \$4,380 with a range of \$4,100 to \$4,676. Nearly all of these asthma hospitalizations came through the emergency room (94%). Information on the number of hospitalizations for asthma only tells us about how many instances of asthma were serious enough to require a hospital stay.

Figure 6 shows trends in the age-adjusted hospitalization rate for discharges with asthma as the principal diagnosis. Over a five-year period (2005 to 2009), the rate of asthma hospitalizations slowly increased from 14 per 10,000 Rhode Islanders in 2005 to 17 per 10,000 Rhode Islanders in 2009.

Figure 6. Trends in Rhode Island’s asthma hospitalization rates by year,^{1,2} for asthma as the first diagnosis,³ 2005 - 2009



¹ Age-adjusted to the year 2000 U.S. standard population.

² All rates are per 10,000 Rhode Island residents. Out-of-state patients hospitalized for asthma are not included in the age-adjusted rates.

³ The first diagnosis is defined as the principal or primary discharge diagnosis of asthma (ICD-9-CM codes 493.00 – 493.92).

Data Sources: 2001–2009 Rhode Island Hospital Discharge Data, Rhode Island Department of Health, Center for Health Data and Analysis.

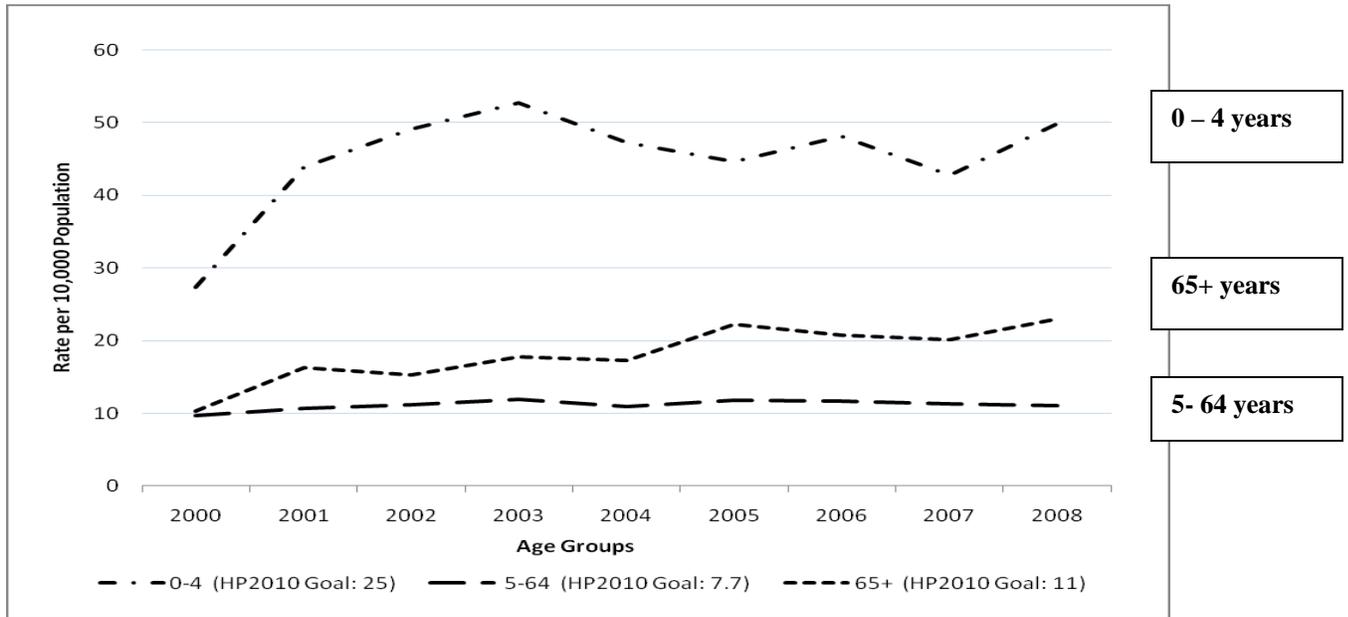
How well is Rhode Island Meeting Healthy People 2010 Objectives for Asthma Hospital Admissions?

Healthy People 2010 has age-specific target goals to reduce asthma hospitalizations. These goals are: (1) an age-specific rate of 25 per 10,000 children under age 5 years, (2) an age-standardized rate of 7.7 per 10,000 children and adults aged 5-64 years, and (3) an age-standardized rate of 11 per 10,000 adults ages 65 years and older.¹⁶

Shown in Figure 7 are Rhode Island asthma hospitalization rates in relation to *Healthy People 2010* target goals. In 2008, the asthma hospitalization rate was 49.9 per 10,000 for children under age 5, 11 per 10,000 children and adults aged 5-64 years, and 23 per 10,000 adults aged 65+. The asthma hospitalization rate for Rhode Islanders aged 5-64 was slightly greater than the *Healthy People 2010* specified target.

Very young children (aged 0-4 years) had asthma hospitalization rates that far exceeded the *Healthy People 2010* target. As noted previously, it can be difficult for a doctor to tell whether a young child has asthma or another respiratory disease with asthma-like symptoms.¹⁷

Figure 7. Trends in Rhode Island’s asthma hospitalization rates by year¹ and by age groups for asthma as the first diagnosis,² 2000 - 2008



¹ Rates for children under age 5 are age-specific asthma emergency department rates. Rates for Rhode Islanders aged 5 to 64 years and adults aged 65 and older are asthma emergency department rates age-adjusted to the year 2000 U.S. standard population.

²The first diagnosis is defined as the principal or primary discharge diagnosis of asthma (ICD-9-CM codes 493.00 – 493.92).

Data Sources: 2000-2008 Rhode Island Hospital Discharge Data, Rhode Island Department of Health, Center for Health Data and Analysis.

Are there racial and ethnic disparities in use of hospital services for asthma?

Asthma hospitalization rates indicate persistent disparities in the use of hospital services for asthma among racial and ethnic groups (Table 4)

- ✓ *Ages 0 - 4.* For children under age 5, the asthma hospitalization rate was 89.5 per 10,000 population for non-Hispanic blacks, and 58.5 per 10,000 population for Hispanics, but only 38.4 per 10,000 population for non-Hispanic whites.
- ✓ *Ages 5 - 64.* For children and adults aged 5-64, the asthma hospitalization rate was 30.4 per 10,000 population for non-Hispanic blacks, and 15.2 per 10,000 population for Hispanics, but only 8.3 per 10,000 population for non-Hispanic whites.
- ✓ *Ages 65 and older.* For adults age 65 and older, the asthma hospitalization rate was 36.6 per 10,000 population for non-Hispanic blacks, and 55.8 per 10,000 population for Hispanics, but only 18.9 per 10,000 population for non-Hispanic whites.
- ✓ *Healthy People 2010.* Only hospital discharges for asthma among non-Hispanic whites were close to *Healthy People 2010* targets as measured in the period from 2006-2008.

Table 4. Hospitalization rates for Rhode Islanders (all ages) by age group and race/ethnicity, for asthma as the first diagnosis,¹ 2006-2008

Population Groups	Age-specific Rate Per 10,000 population ²	<i>Healthy People 2010</i> Goals ²
Non-Hispanic Black		
0 - 4	89.5	25
5- 64	30.4	7.7
65+	36.6	11
Hispanic		
0 - 4	58.5	25
5- 64	15.2	7.7
65+	55.8	11
Non-Hispanic White		
0 - 4	38.4	25
5- 64	8.3	7.7
65+	18.9	11

¹ The first diagnosis is defined as the principal or primary discharge diagnosis of asthma (ICD-9-CM codes 493.00 – 493.92).

² All rates are per 10,000 population.

Data Source: 2006 - 2008 Rhode Island Hospital Discharge Data combined file, Rhode Island Department of Health, Center for Health Data and Analysis and Healthy People 2010 objectives for respiratory diseases.

Disparities also exist in asthma hospitalizations based on geography. The asthma hospitalization rate for the city of Providence is nearly twice that for the state as a whole (Providence: 18.9 per 10,000 vs. RI: 10.6 per 10,000).

Providence is the most populous city in the state with the highest percentage of minority residents. Although nearby cities like Boston and Hartford have longer-standing black and Latino communities, Providence now surpasses both in the density of its minority population, with non-Hispanic whites comprising less than half of the city's population. The city has one of the highest rates of poverty in the nation with 29.1% of the population and 23.9% of families living below the [poverty line](#) in 2000. As of the 2000 census, Providence's poverty rate was among the ten highest for cities over 100,000 ($\geq 30\%$).¹⁸ Residents in low-income communities are often at increased risk of asthma because available housing may be damp and cockroach infested, which are known asthma triggers.



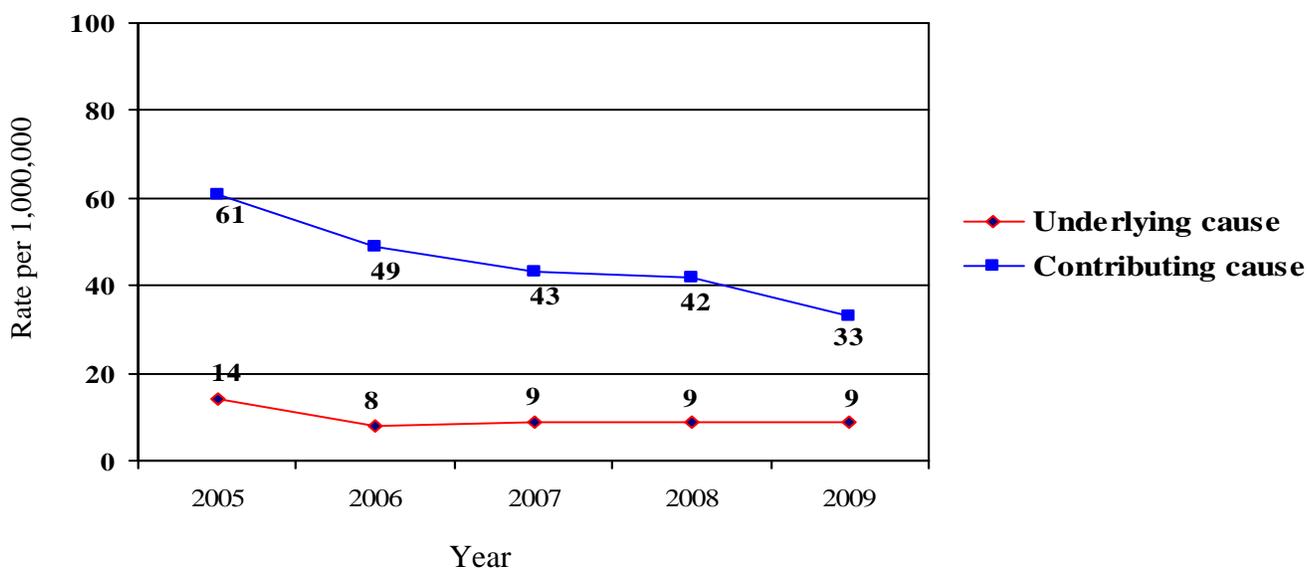
Doyle Avenue, Providence Rhode Island

Asthma Deaths

Figure 8 shows trends in the age-adjusted mortality rate from 2005 to 2009 for which asthma was the underlying cause of death and contributing cause of death for adults aged 18 and older. An underlying cause of death is the leading cause of death. The contributing cause of death is a condition that is listed as an additional cause of death, but it is not the principal cause of death.

Between 2005 and 2009, the age-adjusted asthma mortality rate by year in Rhode Island has remained low. The good news is that when asthma is indicated as the contributing cause of death for adults age 18 and over, these rates have been going down over the past five years (2005 to 2009). Asthma deaths among Rhode Island children are rare. Four children died of asthma between 2005 and 2009. Age-adjusted mortality rates for asthma are based on a small number of events and should be interpreted with caution.

Figure 8. Asthma mortality rates^{1,2} for Rhode Island adults aged 18 and older by underlying and contributing cause of death³



Number of Adult Asthma Deaths in Rhode Island, By Year					
Year	2005	2006	2007	2008	2009
Underlying	9	7	8	8	8
Contributing	52	42	37	36	29

¹All rates are per 1,000,000 Rhode Island residents age >18 years.

²Age-adjusted to the year 2000 U.S. standard population.

³ Asthma listed as the underlying or contributing cause of death (ICD-10 codes J45 and J46)

Data Source: 2005 to 2009 Rhode Island Vital Record cause of death data, Rhode Island Department of Health, Center for Health Data and Analysis.

Conclusion

Asthma continues to disproportionately affect Rhode Island's racial/ethnic minorities, especially Blacks and Hispanics. This uneven burden in asthma emergency department visits and inpatient hospital admissions has been increasing despite medical advancements in the diagnosis and treatment of asthma. Many factors have contributed to these inequities in asthma outcomes. Increasingly, public health researchers have shown that Black and Hispanic neighborhoods in the U.S. are plagued by persistent poverty, residential racial segregation, psychosocial stress, unemployment, inadequate transportation, high crime rates, and disproportionate exposure to outdoor environmental pollution.^{6,7}

Rhode Island's Asthma Control Program, Asthma Control Coalition, and other stakeholders are working together to improve health outcomes for Rhode Islanders with asthma, especially children and adults in low-income urban neighborhoods. These initiatives are reaching Rhode Islanders at highest risk of having severe asthma through educational, clinical, environmental, and policy interventions.

The Asthma Control Program will continue to work with stakeholders from around the state to create and implement strategies for reducing the burden of asthma in Rhode Island. As part of this effort, Rhode Island will continue to strive to improve surveillance of asthma by adding new data sets, as available, to provide a comprehensive picture of asthma in the state.

Appendix A. Terms and definitions

In this public health brief we use the terms prevalence, age-specific rate, and age-adjusted rate. **Prevalence** is a statistical measure to estimate how common a condition is within a population over a certain period of time. The total number of new and existing cases in a population is divided by the number of individuals in the population. **Incidence** is different from prevalence. Incidence measures the total number of new cases in a population divided by the number of individuals in the population

Age-specific inpatient and emergency department discharge rates and age-specific mortality rates identify trends and patterns in asthma events for different age groups in a population. These rates can be further tabulated for males and females, to display age-sex-specific rates. If the number of cases or events is large enough to generate stable rates, these rates can be further subdivided to display age-sex-race-specific rates. An age-specific rate is calculated so that both the number of events (numerator) and the population at risk for that event are restricted to a given age group. An example of how to calculate an age-specific hospitalization rate is shown below.

Age-specific Hospitalization Rate

Total hospitalizations in a specified age group
(e.g., 0 to 17) in a specified time period _____ x 1,000 or 10,000 or 100,000
Total population in a specified age group
(e.g., 0 to 17) in a specified time period

Age-adjusted rates are used because almost all diseases or health outcomes occur at different rates in different age groups. Most chronic diseases occur more often among older people. Other outcomes, such as many types of injuries, occur more often among younger people. A community with older individuals will have higher crude rates of chronic diseases than one with younger individuals. A community with a large number of teenagers will have higher crude rates of motor vehicle injuries than a community with more elderly residents. Thus, the age distribution of a community can affect rates of diseases and injuries, hospitalization and mortality rates. An age-adjusted rate removes confounding caused by age. This makes it possible to compare rates across geographical areas or time periods. Age-adjustment is accomplished by first multiplying an age-specific rate for each age group by an age-specific weight. The weight used in calculating an age-adjustment rate for each age group is based on the proportion of that age group in the population. In this brief, age-adjusted rates are based on the 2000 U.S. Census. The weighted rates are then summed across the age groups to give an overall age-adjusted rate.

Appendix B. Data Sources

Data sets used in Rhode Island Asthma Facts are shown in the Table 5 below. For a complete list of health department data sets see: [A Health Data Inventory: A Compendium of Databases Maintained by the RI Department of Health](#), fifth edition, June 2008. The inventory is available on-line at:

<http://www.health.ri.gov/publications/datareports/HealthDataInventory.pdf>

Table 5. Rhode Island Asthma Facts Data Sources

Data Sets	Survey design and Population
Behavioral Risk Factor Surveillance System (BRFSS)	The BRFSS is an on-going telephone health survey system, tracking health conditions and risk behaviors of a random sample of adults (18+) in the United States (national data) and by state. The BRFSS includes a module to identify children with asthma.
BRFSS Adult Asthma Call-Back Survey	The BRFSS Adult and Child Call-back Surveys converts the National Asthma Survey to a call-back survey administered as part of BRFSS. It first became available in 2005, when it was piloted as a 3-state sample. In 2008, RI began using the BRFSS Call-back Survey. Adults who have asthma at the time of the BRFSS survey, or who have a child in the household with asthma at the time of the BRFSS survey, are invited to participate in the in-depth call-back surveys.
Hospital Discharge Data and Emergency Department (ED) Data	Data on <u>patient demographics, clinical items, and hospital charges</u> are used to measure health status, health outcomes, and health care use for all persons, regardless of state of residence, with an ED visit or inpatient admission in a <u>licensed acute care hospital in RI</u> .
Vital Records—Death certificate data	Deaths occurring in RI are available within one year after the end of the calendar year. Death records include all persons who die in RI and all RI residents who died out-of-state.

References

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