Asthma Data 2005

Chronic Disease Epidemiology
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Introduction

Asthma is a disease that affects the lungs causing repeated episodes of wheezing, breathlessness, chest tightness, and nighttime or early morning coughing. Asthma prevalence is increasing in the United States and is one of the most common long-term diseases of children. We still don't know what causes this disease or how to cure it, but asthma can be well controlled (resulting in a reduction in symptoms) by following a medical management plan and by avoiding contact with environmental "triggers," such as cockroaches, dust mites, furry pets, mold, tobacco smoke, and certain chemicals.

The Vermont Asthma Program is currently funded by the Centers for Disease Control and Prevention (CDC) to create an asthma prevention program and surveillance system in Vermont. Surveillance is the ongoing systematic collection, analysis, and interpretation of asthma-related data for use in planning, implementation, and evaluation of public health practice. Asthma surveillance data will help direct and inform Asthma Program activities as well as provide information to the public about asthma in their communities.

We have identified data sources and indicators to monitor asthma trends throughout Vermont. Indicators help us to understand how asthma affects Vermonters of all ages, including prevalence, morbidity (symptom frequency, impact of asthma on quality of life, and comorbidities), risk factors, self and clinical management of asthma, indicators of poor management of asthma (urgent care and ER visits, hospitalizations, and deaths), and costs. A variety of data sources including surveys, population-based datasets, and school reports, assist us in learning more about these indicators.

The Department of Health would also like to thank its partners, who have made valuable contributions to statewide asthma surveillance, including the Department of Education, the Vermont Child Health Improvement Program, and the Vermont Association of Hospitals and Health Systems.

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Executive Summary

Prevalence

Current Prevalence:
The age and gender distribution of current asthma among Vermonters follows national trends suggesting those most affected by asthma are boys and women.

- 10% of Vermont adults and 8% of Vermont youth currently have asthma.
- The overall prevalence of asthma among adult men is 8% compared to a higher rate in women of 11%.

Adult Demographics:
Among Vermont adults, the highest rates of asthma are observed in non-whites, those with less education or lower income, and those that have health insurance. Although some variation is observed in asthma prevalence rates by county, when developing asthma prevention and control programs, it is important to target populations with known risk factors for asthma: income, education, health insurance, race, and age/gender.

- In Vermont, 15% of those making less than 125% of the Federal Poverty Level have asthma compared to only 5% in those making over 500% of the Federal Poverty Level.
- 14% of Vermonters with less than a high school diploma have asthma compared to 8% of those with a college degree or higher.
- 10% of insured Vermonters have asthma compared to 7% of those uninsured.
- There is little variation in asthma prevalence between counties in Vermont.
- Although not statistically significant, Vermont whites have lower asthma rates than non-whites (9% compared to 12%).

Adults – Time Trends:
With consistently higher rates of asthma in Vermont and throughout New England compared to the United States, preventing and controlling asthma is a top priority in Vermont.

- There have been no statistically significant changes in asthma prevalence in Vermont between 2001 and 2005.
- In 2005, the rate of current asthma in Vermont is higher than the U.S. rate.

Asthma in Schools:
Approximately 1 in 10 students currently has asthma, and 1 in 5 students has ever had asthma.

- Based on nurse reports, current asthma prevalence in Vermont schools (K-12) is 9%.
- 20% of all middle school students and 24% of all high school students have ever been diagnosed with asthma by a health care professional. Although high school students have higher rates than middle school students, the difference is not statistically significant. There are also no significant differences in asthma rates by gender in this population.

Morbidity

Impairment in Daily Function:
Having asthma may impair one's ability to effectively work and sleep. Programs aimed at improving the quality of life of those with asthma should be targeted to those with obesity, depression, and a low education.

- 50% of Vermonters with asthma report that their asthma symptoms made it difficult for them to stay asleep for one or more days in the past 30 days.
- 19% of Vermonters reported one or more days in the past 12 months that they were unable to work or carry out usual activities due to their asthma.
- Persons with asthma report being unable to work at three times the rate of people who do not have asthma.

Quality of Life and Depression:
Programs aimed at improving the quality of life of those with asthma should incorporate activities to promote both physical and mental health.

- In Vermont, people with asthma report having a "fair" or "poor" quality of life at higher rates than people without asthma (24% versus 10%).
- People with asthma are more likely to be depressed than those without asthma. Among Vermont adults: 18% of people with asthma report having depression compared to 10% of those without asthma in 2005.

Co-morbidities:
Given that people with asthma may be dealing with multiple chronic conditions, initiatives aimed at reducing chronic disease will benefit from working together.

- Compared to Vermonters without asthma, Vermonters with asthma are more likely to have arthritis, cardiovascular disease, diabetes, and obesity.

Risk Factors

Workplace Exposure:
Additional education and resources should be provided to schools in order to create and maintain healthy learning environments for all children.

- Of the 17 schools assessed in the Vermont Child Health Improvement Project's (VCHIP) Provider-School Nurse Coordination Project, seven (41%) had a written Indoor Air Quality management plan. Of these, 3 school plans included the reduction or elimination of allergens and irritants that exacerbate asthma (mold, pets, strong odors, dust mites, cockroaches).
- 6% of Vermonters with asthma <u>were told</u> by a health professional that their asthma was related to a job they have had.
- 6% of Vermonters with asthma <u>told</u> a health professional that their asthma was related to a job they had had.

Tobacco Smoke Exposure:
Programs must work to decrease smoking rates in Vermont, particularly among

students, with 1 in 10 middle school and 1 in 5 high school students currently smoking. Vermont should continue its efforts in increasing awareness of the dangers of secondhand smoke and in reducing exposure to secondhand smoke, particularly among those with asthma.

- Rates of smoking are similar in adults with and without asthma.
- Although not statistically significant, the prevalence of current smokers among middle and high school students is greater in those with asthma compared to those without asthma. Twice as many middle school students with asthma smoke compared to those without asthma (9% compared to 4%).
- Through combined efforts of the tobacco and asthma prevention programs, overall rates of exposure to secondhand smoke have decreased between 2002 and 2004. However, Vermonters with asthma report 20-25% higher rates of exposure to secondhand smoke in their homes and cars than people without asthma.
- Data from 2004 on secondhand smoke parental policies from the Adult Tobacco Survey report 82% of Vermont households with children prohibit smoking in their home and 90% of Vermonters with children prohibit smoking in their car.

Self and Clinical Care Management

Written Management Plans:

With only 1 in 5 Vermonters with asthma on a written asthma management plan, programs must work to increase use and awareness of the importance of these plans among both adults and youth.

- Use of written asthma management plans has decreased among adult Vermonters from 33% in 2001 to 23% in 2005.
- School nurses reported similar rates of use of asthma management plans (23%) among their students compared to the rate observed among adults.

Routine Care Visits and Asthma Education:

With less than half of Vermonters with asthma visiting their physician for routine care in the past year, physicians and other health care professionals must be educated on the importance of routine care visits for their patients with asthma.

- 39% of adults with asthma report that their doctor, nurse, or other health professional had talked with them about how to recognize early signs and symptoms of asthma attacks and how to respond to them in the past 12 months.
- Almost half of all adult Vermonters with asthma did not see a physician for a routine care visit in the past year.

Medication Use:

With only 1 in 4 Vermonters with asthma taking daily maintenance medication, it is crucial to increase physician education on the importance of use of appropriate daily medication for long-term control of persistent asthma.

- Among Vermonters with current asthma in 2005, when asked if they had used asthma medication in the past 30 days to prevent an asthma attack, 41% had

never used medication, approximately 36% used medication occasionally, and 23% took asthma medication daily or almost every day.

Immunizations:

Although rates of immunization are higher among those with asthma compared to the rest of the population, there are still a substantial number of Vermonters with asthma who are not receiving the proper immunizations. Asthma and immunization programs should work together to promote messaging on the importance of vaccinations in persons with asthma and other chronic conditions.

- Vermont adults with asthma are more likely to get a flu shot each year than those without asthma (39% versus 24%).
- Vermont youth (under 18) with asthma are also statistically more likely to get a flu shot than those without asthma (41.3% versus 13.7%).
- Vermonters with asthma are more likely to have ever had a pneumococcal vaccination (84% versus 65%).

Indications of Poor Asthma Management

Urgent Care Visits:

- Almost one quarter of people with asthma visited their health care professional for urgent treatment of worsening symptoms in the past year.

Emergency Room Visits:

The age and sex distribution of ER visits mirrors prevalence trends, suggesting asthma severity does not vary by age or sex. With roughly 1 in 8 Vermonters with asthma visiting an ER in the past year, increasing self and clinical care management of Vermonters with asthma should decrease the frequency of ER visits.

- Roughly 13% of Vermonters with asthma visited the ER or urgent care facility for their asthma in the past 12 months.
- There were a total of 2394 visits to the Emergency room by Vermont residents to Vermont and New Hampshire hospitals in 2003, up from 2221 visits in 2002.
- 2048 Vermonters made 2394 visits to the ER in 2003: (90% of these people made only one visit to the ER, 8% made 2 visits to the ER, and 3% made three or more visits to the ER).
- In addition to having overall higher prevalence rates than men, females visited the ER more often than males in 2003, with 1393 visits compared to 1001 visits among males.
- Females aged 20-39 and males aged 0-9 had the highest rates of ER visits. This age/gender distribution is similar to what is seen nationally.

Temporal Patterns in Emergency Room Visits:

With the seasonal variation in asthma-related ER visits in Vermont, the media could play a valuable role in publicizing the importance of asthma self– and clinical care management during times of the year with the highest rate of ER visits.

- Frequency of ER visits among people with asthma vary by the time of year, the rates peaking in September and October.

Risk Factors for Emergency Room and Urgent Care Visits:
Vermonters most at risk of visiting an ER or their physician for urgent care are those with the lowest incomes and those without health insurance. Efforts to increase self– and clinical care management, which will result in fewer ER visits, should focus on this population, in addition to those who smoke or are obese. It is also important to explore characteristics of the major health systems within the Vermont counties reporting the lowest and highest rates of ER visits.

- Having a low income is associated with an increased risk of visiting a doctor for urgent care of worsening symptoms due to asthma
- Not having health insurance, having a low income, being a smoker, and being obese are associated with an increased risk of visiting an emergency room due to asthma
- The county with the highest rates of asthma-related ER visits is Rutland.

Hospitalizations:
As rates of hospitalizations for asthma have stabilized, increased efforts are needed to continue the decline observed in the 1990s. Efforts to decrease the number of hospitalizations related to asthma should focus on the youngest and oldest age groups.

- Vermont has made significant progress in decreasing hospitalization rates between 1989 and 2004, mainly due to large decreases in rates among youth under 15 and adults 65 and older.
- Vermont contributed 444 discharges with a primary diagnosis of asthma in 2003 to the national total of 469,738.

Deaths:

- Between 1999 and 2003 there were 35 deaths due to asthma in Vermont.

Costs

Improvements in asthma management will result in decreases in the number of hospitalizations and emergency room visits related to asthma. In addition to improving the overall quality of life of those suffering from asthma, these efforts will dramatically decrease health care costs related to asthma.

- Hospital charges related to asthma were approximately $3.5 million in Vermont for 2004.
- Inpatient hospitalizations make up over two thirds of all hospital-related charges, costing over $6,000 per visit on average.
- Emergency room visits make up over one quarter of all hospital-related charges, costing roughly $400 per visit on average.

Vermont Blueprint for Health

The vision of the Vermont Blueprint for health is that Vermont will have a comprehensive, proactive system of care that improves the quality of life for people with or at risk for chronic conditions. A major area of emphasis in the Blueprint is that Vermonters with chronic conditions will be effective managers of their own health. For the past year, the asthma program has been incorporated into the Blueprint. The following is a summary of progress of the Blueprint since its start in 2005:

- Two hospital service areas were selected as pilot communities: Southwestern Medical Center in Bennington and Northeastern Regional Hospital in St. Johnsbury. Grants were awarded to fund local project managers to oversee implementation in both pilot communities. The Blueprint has now expanded to four additional communities.

- Grants were awarded to both pilot communities to develop neighborhood walking programs.

- Since 2005, 223 people have completed the "Healthier Living Workshop" developed by Stanford University and adopted by the Blueprint. This highly-acclaimed, evidence-based course teaches successful self-management of chronic conditions through a variety of techniques. At least 30 people have been trained to be workshop leaders throughout the state. To date, 38 of the enrolled participants listed asthma as their most important chronic condition.

- The Vermont Health Record, a web-based patient registry, is being tested by physician offices in pilot communities and other locations throughout the state. The registry will allow providers to proactively manage their patients' care, calling them in for needed care without relying on patients' memories. The Vermont Health Record will also give providers more complete information during visits.

- More than 75% of adult primary care providers in the pilot communities have signed up to participate in the pilot program. With the help of the Blueprint, providers are learning how to deliver effective proactive care to patients with chronic conditions.

- Standardized measures were developed to support payment reform in order to enhance collaboration between insurance carriers. An inventory and assessment of disease management services offered by Vermont insurance carriers is currently underway.

- The Agency for Healthcare Research and Quality of the federal Department of Health and Human Services is providing invaluable assistance in helping to design an evaluation strategy for the Blueprint.

More information on the Blueprint can be found at:
http://healthvermont.gov/blueprint.aspx

Healthy Vermonters 2010

Four Healthy Vermonters 2010 objectives were selected from Healthy People 2010 objectives as priorities related to asthma in our state. These objectives were designed to identify the most significant preventable threats to health for individuals with asthma, and to establish statewide goals to reduce these threats. The objectives challenge individuals, communities, and professionals to take specific steps to ensure that Vermonters with asthma lead healthy lives.

The four asthma-related objectives are:

1. Increase the percentage of people with asthma who receive education about recognizing early signs and symptoms and how to respond.

   Goal: To be developed
   VT 2005: 38.6%

2. Increase the percentage of people with asthma who receive written management plans from their health care professional.

   Goal: To be developed
   VT 2005: 23.1%

3. Reduce the percentage of young children who are regularly exposed to tobacco smoke in the home.

   Goal: 10%
   VT 2004: 18.3% (households with children that do not prohibit smoking in home)

   NOTE: Vermont has met this goal.

4. Further reduce hospitalizations for asthma among people under 18.

   Goal: 18.3/10,000
   VT 2003: 8.3/10,000

   NOTE: Vermont has met this goal.

Data Pages

Asthma Data 2005

Prevalence

Asthma Data
2005

Current Prevalence

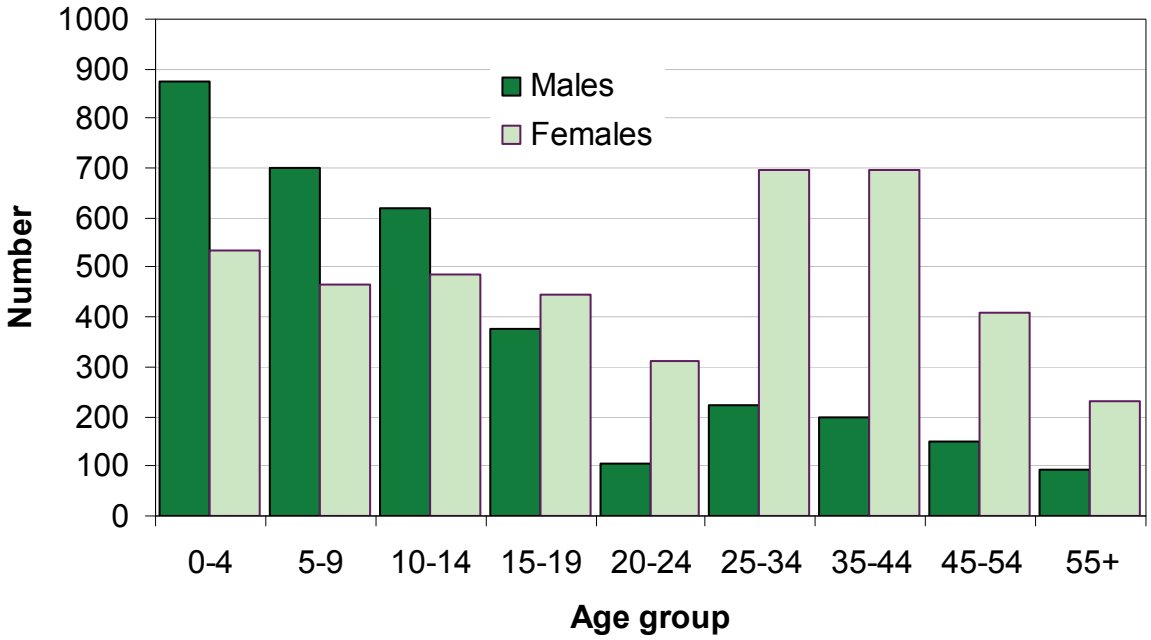
The age and gender distribution of current asthma among Vermonters follows national trends suggesting those most affected by asthma are boys and women.

In 2005, 9.8%, or approximately 48,000 adult Vermonters, and 8.2%, or approximately 11,000 Vermont youth (under 18), have current asthma according the Behavioral Risk Factor Surveillance System.

Asthma prevalence varies by age and gender. The overall prevalence of asthma among adult men in 2005 is 8.2% compared to a significantly higher rate in women, of 11.2% (See Table 1).

Figure 1 presents the distribution of asthma prevalence by gender and age group in the Vermont PC Plus population. The PC Plus Program is the primary care case management program for the Vermont Medicaid program, enrolling approximately two thirds of all Medicaid beneficiaries annually.

Figure 1. Prevalence of current asthma by age and sex – Vermont adult residents in the PC Plus population, 2004.



Data source: VPQHC Medicaid database

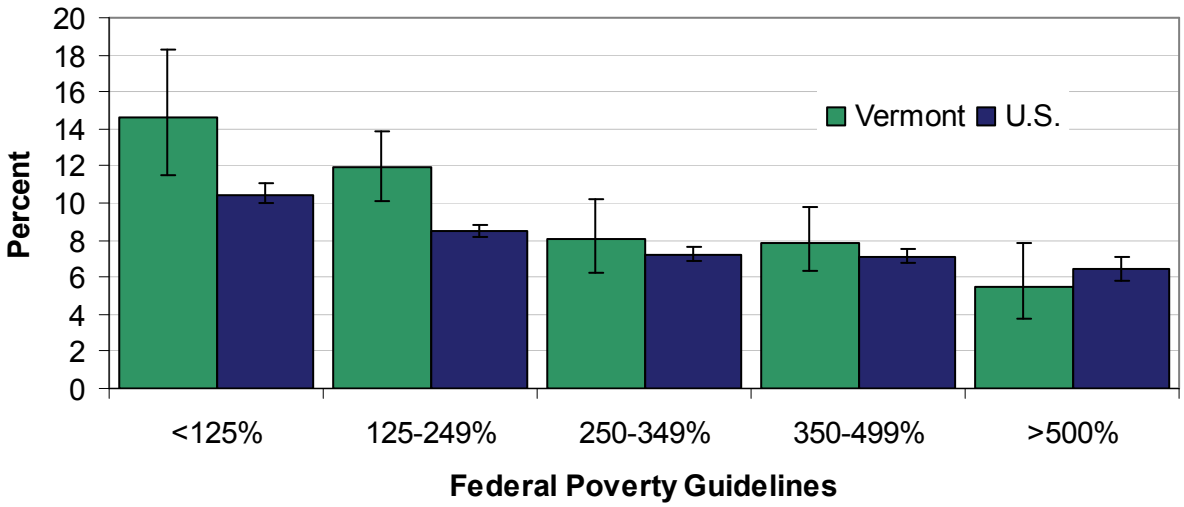
Adult Demographics

Among Vermont adults, the highest rates of asthma are observed in non-whites, those with less education or lower income, and those that have health insurance.

Race: In 2004-2005, whites have lower rates of asthma (9.0%) than non-whites (12.0%). This relationship is inconsistent with U.S. trends, which show whites having higher rates of asthma than non-whites (Table 1).

Income/Education: Adults with the lowest incomes and educational background have the highest rates of asthma. In Vermont, 14.6% of those making less than 125% of the Federal Poverty Level have asthma compared to only 5.4% in those making over 500% of the Federal Poverty Level; 13.8% of Vermonters with less than a high school diploma have asthma compared to 8.0% of those with a college degree or higher (Figure 2).

Figure 2. Prevalence of current asthma by income (as a measure of Federal Poverty Level) – Vermont and U.S. adult residents, 2005.



Health Insurance: Rates of asthma are higher among those with health insurance compared to the uninsured (10.3% versus 6.6%). This may be a result of an increased need for health insurance in those with asthma or an increased awareness of their diagnosis due to physician recognition.

Vermont and U.S. data tables are presented on the following page.

Data source: BRFSS
Age-adjusted rates for all except sex/age groups.
*2004-2005 data combined due to small numbers.

Adult Demographics

Table 1. Prevalence of current asthma by demographics – Vermont and U.S. adult residents, 2005.

	Vermont	US
	% (95% CI)	% (95% CI)
Total	9.8 (8.9-10.8)	7.9 (7.7-8.0)
Gender / Age		
Male	8.3 (6.8-9.9)	5.6 (5.4-5.8)
18-24	15.1 (8.4-25.5)	7.1 (6.2-8.1)
25-44	8.3 (6.5-10.6)	5.3 (5.0-5.7)
45-64	6.0 (4.7-7.6)	5.2 (4.9-5.6)
65+	6.8 (5.0-9.4)	5.7 (5.3-6.2)
Female	11.2 (10.1-12.4)	10.0 (9.8-10.3)
18-24	10.0 (5.9-16.3)	11.4 (10.5-12.4)
25-44	13.2 (11.3-15.4)	9.8 (9.5-10.2)
45-64	11.5 (9.9-13.4)	10.7 (10.3-11.1)
65+	8.0 (6.4-9.9)	8.5 (8.0-8.9)
Race		
White	9.0 (8.4-9.7)*	8.2 (8.0-8.4)
Non-white	12.0 (9.6-14.9)*	7.4 (7.1-7.8)
Household income		
<125% FPL	14.6 (11.5-18.3)	10.5 (10.0-11.0)
125-249% FPL	11.9 (10.2-13.9)	8.5 (8.2-8.9)
250-349% FPL	8.0 (6.3-10.3)	7.2 (6.8-7.6)
350-499% FPL	7.9 (6.3-9.8)	7.2 (6.8-7.6)
500% FPL	5.4 (3.7-7.9)	6.4 (5.8-7.1)
Education		
Less than high school	13.8 (10.2-18.5)	8.7 (8.2-9.3)
High school or G.E.D.	10.4 (8.7-12.3)	7.6 (7.3-7.9)
Some college or technical school	10.4 (8.7-12.4)	8.4 (8.0-8.7)
College degree or greater	8.0 (6.8-9.5)	7.4 (7.1-7.7)
Health insurance		
Yes	10.3 (9.3 (11.5)	8.2 (8.0-8.4)
No	6.6 (4.7-9.2)	6.9 (6.4-7.5)

Data source: BRFSS
Age-adjusted rates for all except sex/age groups.
*2004-2005 data combined due to small numbers.

County-level Prevalence

Although some variation is observed in asthma prevalence rates by county, when developing asthma prevention and control programs, it is important to target populations with known risk factors for asthma: income, education, health insurance, race, and age/gender.

There is little variation in adult asthma prevalence between counties in Vermont according to BRFSS data from years 2001-2005 combined.

However, among Vermonters in the PC Plus Program, rates of current asthma between 2003 and 2004 were consistently higher in Bennington county and consistently lower in Essex county.

DATA TABLES

Table 2. Prevalence of current asthma by county – Vermont adult residents, 2001-2005.

	2001-2005
	% (95% CI)
Addison	9.0 (7.3-11.1)
Bennington	10.3 (8.5-12.5)
Caledonia	8.6 (7.1-10.5)
Chittenden	8.3 (7.4-9.2)
Essex	7.5 (4.9-11.3)
Franklin	10.4 (8.6-12.4)
Grand Isle	11.6 (8.1-16.2)
Lamoille	7.7 (6.0-9.8)
Orange	9.6 (7.9-11.8)
Orleans	10.2 (8.2-12.6)
Rutland	8.9 (7.7-10.3)
Washington	8.1 (6.9-9.5)
Windham	9.0 (7.7-10.5)
Windsor	8.4 (7.1-9.9)

Data Source: BRFSS, age-adjusted rates

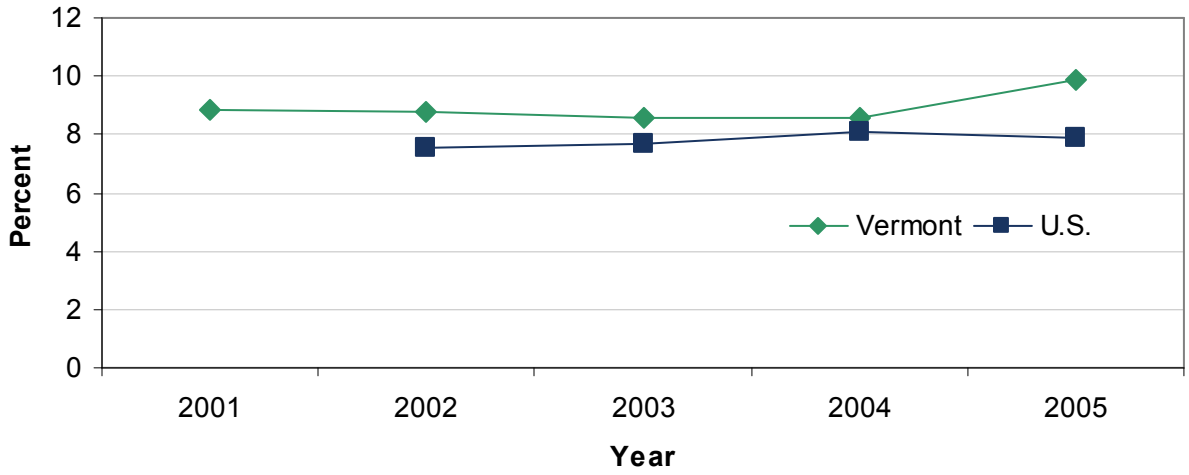
Adults—Time Trends

With consistently higher rates of asthma in Vermont and throughout New England compared to the United States, preventing and controlling asthma is a top priority in Vermont.

Based on the latest findings of the Asthma Regional Council, among adults, the prevalence of asthma in New England increased significantly between 2001 and 2004. However, when looking at only Vermont data, there have been no statistically significant changes in asthma prevalence in Vermont between 2001 and 2005.

The Asthma Regional Council also indicates that asthma rates in New England are consistently higher for both adults and children compared to the rest of the country. In 2002 and 2005, the prevalence of current asthma in Vermont is statistically significantly higher than the U.S. rate.

Figure 3. Prevalence of current asthma – Vermont and U.S. adult residents, 2001-2005, age-adjusted rates.



DATA TABLES

Table 3. Prevalence of current asthma – Vermont and U.S. adult residents, 2001-2005, crude and age-adjusted rates.

	Vermont		U.S.
	Crude	Age-adjusted	Age-adjusted
	% (95% CI)	% (95% CI)	% (95% CI)
2001	8.8 (7.9-9.9)	8.9 (7.9-9.9)	*
2002	8.7 (7.7-9.7)	8.8 (7.8-9.8)	7.6 (7.4-7.7)
2003	8.4 (7.4-9.4)	8.6 (7.6-9.7)	7.7 (7.5-7.9)
2004	8.5 (7.8-9.3)	8.6 (7.8-9.4)	8.1 (7.9-8.3)
2005	9.8 (8.9-10.8)	9.9 (8.9-10.9)	7.9 (7.7-8.0)

Data source: BRFSS
*Not available.

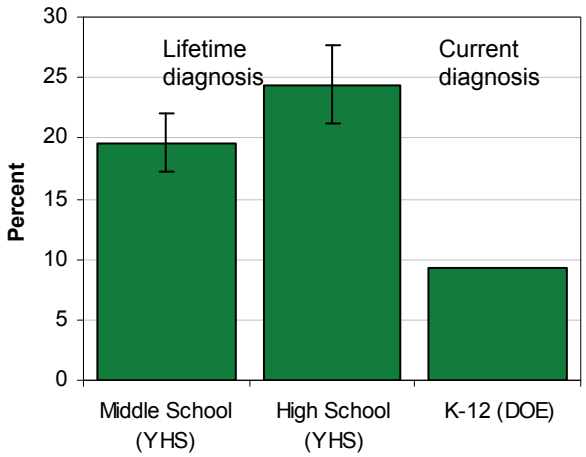
Asthma Prevalence in Schools

Approximately 1 in 10 students currently has asthma, and 1 in 5 students has ever had asthma.

The Vermont Department of Health uses a variety of sources to collect asthma data among students. Figure 5 presents all of our school-level asthma data. Note that the Youth Health Survey only collects lifetime prevalence (having ever been diagnosed) while the Department of Education captures current asthma prevalence.

The **Youth Health Survey (YHS)** measures lifetime asthma prevalence among middle and high school students. A total of 19.5 percent of all middle school students and 24.3 percent of all high school students have ever been diagnosed with asthma by a health care professional. Although high school students have higher rates than middle school students, the difference is not statistically significant. There are also no significant differences in asthma rates by gender.

Figure 4. Prevalence of lifetime and current asthma among youth—2004-2005.



The **Department of Education (DOE)** collected data on asthma prevalence as part of their School Nurse Reports during the 2005-2006 school year. Based on nurse reports, current asthma prevalence in Vermont schools (K-12) is 9.2%.

DATA TABLES

Table 4. Prevalence of lifetime asthma—Middle and high school students, 2002-2004.

	2002	2004
	% (95% CI)	% (95% CI)
Middle school (YHS)	18.1 (16.5-19.7)	19.5 (17.3-22.0)
Male	18.8 (16.3-21.6)	20.5 (17.2-24.3)
Female	17.3 (14.9-20.1)	18.3 (16.0-21.4)
High school (YHS)	*	24.3 (21.2-27.7)
Male	*	24.3 (20.5-28.1)
Female	*	24.1 (20.2-28.4)

* High school students not included in the survey in 2002.
Crude rates. Data source = YHS and Department of Education.

Morbidity

Asthma Data 2005

Impairment in Daily Function

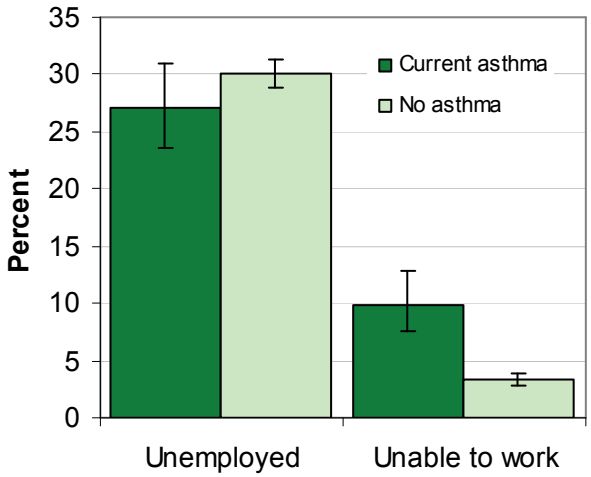
Having asthma may impair one's ability to effectively work and sleep. Programs aimed at improving the quality of life of those with asthma should be targeted to those with obesity, depression, and a low education, and to those that smoke.

Employment Status: As shown in Figure 6, persons with asthma report being unable to work at three times the rate of people who do not have asthma.

The models on the next page (Table 6) examine the relationship between certain variables and reporting impaired sleep or being unable to work. The adjusted model adjusts for gender, race, insurance status, household income, education level, smoking, obesity, and depression status, and race.

Unable to Work: 19.2% (95% CI: 15.6-23.3) of Vermonters with asthma reported one or more days in the past 12 months that they were unable to work or carry out usual activities due to their asthma (2005 BRFSS).

Figure 5. Employment status by asthma status – Vermont adult residents, 2005.



Being obese or depressed was associated with an increased risk of being unable to carry out work or daily activities due to asthma in the adjusted model.

Impaired Sleep: 50.0% (95% CI: 44.3-55.6) of Vermonters with asthma reported that their asthma symptoms made it difficult for them to stay asleep for one or more days in the past 30 days (2005 BRFSS). Being depressed and having a low education were associated with an increased risk of having impaired sleep due to asthma in the adjusted model.

DATA TABLES

Table 5. Employment status by asthma status – Vermont adult residents, 2005.

	Total population	Current asthma	No asthma
	% (95% CI)	% (95% CI)	% (95% CI)
Employed*	66.3 (65.1-67.6)	63.0 (58.7-67.1)	66.7 (65.4-68.0)
Unemployed**	29.8 (28.6-31.0)	27.1 (23.5-31.0)	30.1 (28.8-31.3)
Unable to work	3.9 (3.4-4.5)	9.9 (7.6-12.8)	3.3 (2.8-3.8)

* employed = employed for wages or self-employed, ** unemployed = out of work, student, homemaker, retired
Data source: BRFSS
Age-adjusted rates

Impairment in Daily Function

Table 6. Factors associated with impairment in sleep or unable to work due to asthma - Vermont adult residents with current asthma, 2004-2005 (combined).

	Impaired sleep		Unable to work	
	Crude OR**	Adjusted OR	Crude OR	Adjusted OR
Sex				
Male	0.64*	0.72	0.82	0.79
Female	1.0	1.0	1.0	1.0
Ages				
18-24	1.0	1.0	1.0	1.0
25-44	1.73	2.1	1.09	1.32
45-64	1.74	1.76	1.47	1.41
65+	1.94	2.29	1.49	1.77
Insurance				
Yes	0.74	0.85	0.8	0.68
No	1.0	1.0	1.0	1.0
Household income				
<125% FPL	1.5	1.38	1.46	1.46
125-249% FPL	2.07	2.45	1.22	1.22
250-349% FPL	1.45	1.65	1.6	1.6
350-499% FPL	1.15	1.48	0.9	0.9
500% FPL	1.0	1.0	1.0	1.0
Education				
Less than high school	1.72	4.51*	1.59	1.82
High school or G.E.D.	1.08	1.09	1.3	1.05
Some college or technical school	1.02	0.87	1.39	1.45
College degree or greater	1.0	1.0	1.0	1.0
Current smoker				
Yes	1.0	1.0	1.0	1.0
No	0.82	1.17	0.51*	0.54
Obese				
Yes	1.41*	1.24	1.7*	2.08*
No	1.0	1.0	1.0	1.0
Depression				
Yes	2.21*	2.19*	2.21*	2.09*
No	1.0	1.0	1.0	1.0
Race				
White/Non-hispanic	0.71	0.73	0.55	0.74
Blacks and Hispanics	1.0	1.0	1.0	1.0

* = significance at 0.05
Data Source: BRFSS
** Odds Ratio - see Technical Notes

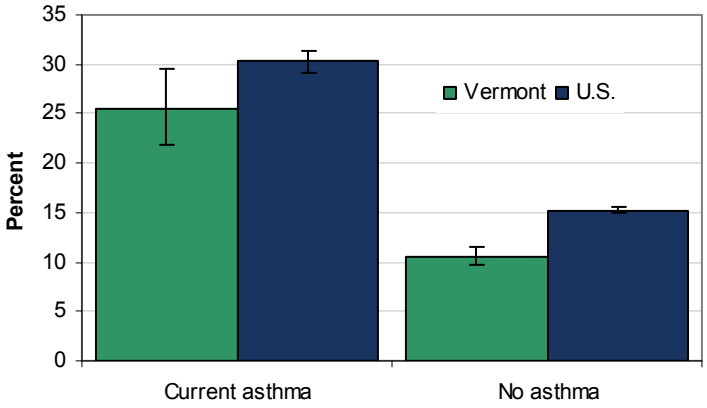
Quality of Life and Depression

Programs aimed at improving the quality of life of those with asthma should incorporate activities to promote both physical and mental health, as data show Vermonters with asthma are more likely to report being depressed or having a fair or poor quality of life.

Quality of Life: In Vermont, people with asthma report having a "fair" or "poor" quality of life at significantly higher rates than people without asthma (23.8% versus 9.9%).

Interestingly, overall rates of people reporting "fair" or "poor" quality of life are significantly lower in Vermont compared to the U.S.

Figure 6. Percent reporting "fair" or "poor" quality of life by asthma status – Vermont and U.S. adult residents, 2004.



Depression: People with asthma are significantly more likely to be depressed than those without asthma. Among Vermont adults in 2005:

- 18.2% (14.7-22.1) of people with asthma report having depression
- 9.6% (8.9-10.6) of people without asthma report having depression

DATA TABLES

Table 7. Percent reporting "fair" or "poor" quality of life by asthma status – Vermont and U.S. adult residents, 2004-2005.

	U.S.	Vermont	
	2004	2004	2005
	% (95% CI)	% (95% CI)	% (95% CI)
Current asthma	30.3 (29.2-31.4)	25.5 (21.9-29.5)	23.8 (20.5-27.6)
No asthma	15.2 (14.9-15.5)	10.6 (9.8-11.5)	9.9 (9.1-10.8)
Total population	16.4 (16.1-16.7)	11.8 (11.0-12.7)	11.2 (10.4-12.1)

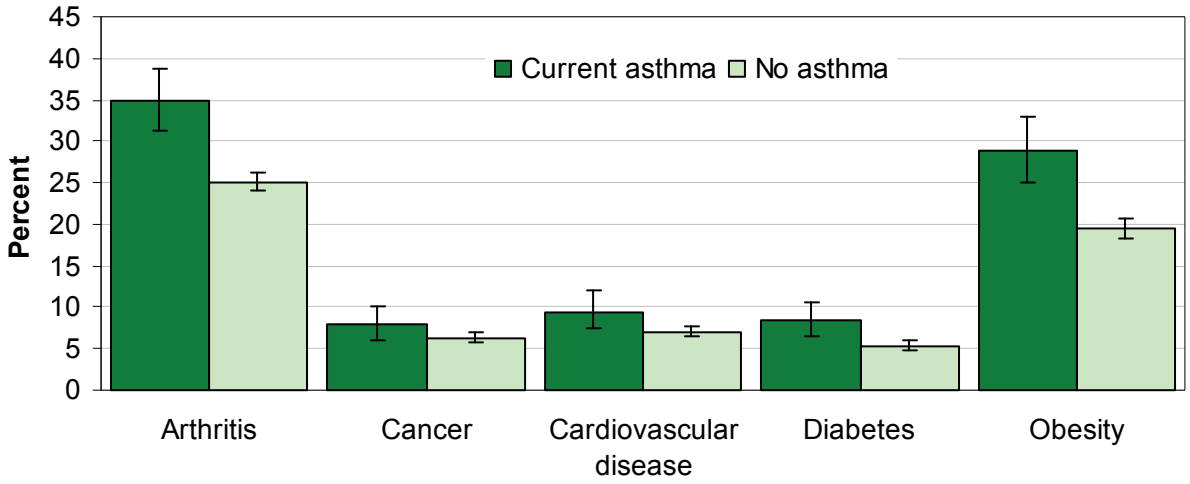
Data source: BRFSS
Age-adjusted rates

Co-morbidities

Given that people with asthma may be dealing with multiple chronic conditions, initiatives aimed at reducing chronic disease will benefit from working together.

Because many chronic diseases have similar risk factors, it is not surprising to find people with more than one chronic disease. Compared to Vermonters without asthma, Vermonters with asthma are significantly more likely to have arthritis, cardiovascular disease, diabetes, and obesity.

Figure 7. Asthma and chronic disease co-morbidities - Vermont adult residents, 2005.



DATA TABLES

Table 8. Asthma and chronic disease co-morbidities - Vermont adult residents, 2005.

	Total population	Current asthma	No asthma
	% (95% CI)	% (95% CI)	% (95% CI)
Arthritis	26.0 (25.0-27.1)	35.0 (31.4-38.8)	25.1 (24.0-26.2)
Cancer	6.5 (5.9-7.0)	7.9 (6.1-10.2)	6.3 (5.7-6.9)
Cardiovascular Disease	7.2 (6.6-7.9)	9.4 (7.5-12.0)	7.0 (6.4-7.6)
Diabetes	5.7 (5.1-6.3)	8.4 (6.5-10.7)	5.4 (4.8-6.1)
Obesity	20.4 (19.3-21.6)*	28.8 (25.0-32.9)	19.6 (18.4-20.8)

Data source: BRFSS
Age-adjusted rates
*Data for obesity are often presented for 20+

Risk Factors

Asthma Data 2005

Workplace and School Exposure

Additional education and resources should be provided to schools in order to create and maintain healthy learning environments for all children.

There is increasing concern and research regarding the possible role of environmental and occupational exposures in the development and exacerbation of asthma.

According to the 2005 Behavioral Risk Factor Surveillance System, 6.1% of Vermonters with asthma were told by a health professional that their asthma was related to a job they have had. 6.4% of Vermonters with asthma told a health professional that their asthma was related to a job they had had.

School-air quality: Of the 17 schools assessed in the Vermont Child Health Improvement Project's (VCHIP) Provider-School Nurse Coordination Project, seven (41%) had a written Indoor Air Quality management plan. Of these, 3 school plans included the reduction or elimination of allergens and irritants that exacerbate asthma (mold, pets, strong odors, dust mites, cockroaches).

ENVISION: Efforts to improve environmental health are also carried out through the "*ENVISION*—Promoting Healthy School Environments" program. ENVISION is a direct result of the passing of the Act 125 Legislation which directs the Commissioners' of Health, of Education, and of Buildings and General Services to:

- create and maintain a clearinghouse of environmental health information on the Department of Health's website
- provide technical assistance to schools
- provide workshops on environmental health for school personnel
- to develop a model environmental health plan and policy
- to encourage and assist schools in developing programs that will enable them to address and prevent environmental health issues through the voluntary participation of schools.

DATA TABLES

Table 9. Asthma related to work place exposure - Vermont adult residents, 2005.

	% (95% CI)
Ever told by health professional asthma related to job	6.1 (4.4-8.3)
Ever told health professional asthma related to job	6.4 (4.7-8.7)

Data source: BRFSS
Age-adjusted rates

Cigarette Smoking

Programs must work to decrease smoking rates in Vermont, particularly among students, with 1 in 10 middle school and 1 in 5 high school students currently smoking.

Smoking can exacerbate existing asthma, resulting in increased frequency and severity of symptoms.

Adults: As shown in Figure 10, rates of smoking are similar in people with and without asthma. Rates over the past 5 years have remained relatively stable.

Figure 8. Current smokers by asthma status - Vermont adult residents, 2001-2005.

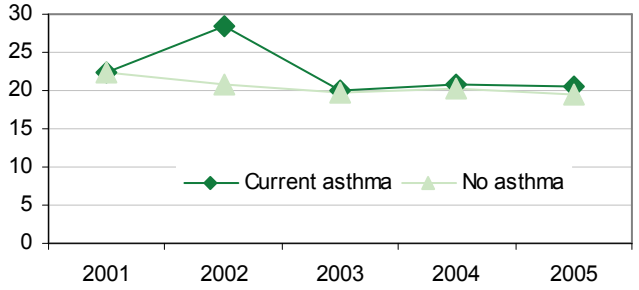
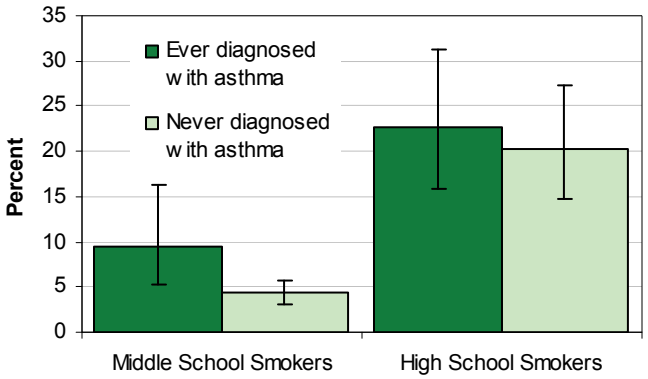


Figure 9. Current smoking status by lifetime asthma diagnosis - Vermont middle and high School students, 2004.



Youth: Although not statistically significant, the prevalence of current smokers among middle and high school students is greater in those with asthma compared to those without asthma (Figure 10). Twice as many middle school students with asthma smoke compared to those without asthma (9.4% compared to 4.3%).

DATA TABLES

Table 10. Current smokers by asthma status - Vermont adult residents, 2001-2005.

	Total current smokers	People with asthma who are current smokers	People without asthma who are current smokers
Adults	**% (95% CI)**	**% (95% CI)**	**% (95% CI)**
2001	22.4 (21.0-23.8)	22.3 (17.9-27.4)	22.4 (21.0-24.0)
2002	21.4 (20.0-22.9)	28.5 (23.8-33.7)	20.7 (19.2-22.2)
2003	19.8 (18.3-21.3)	20.1 (16.1-24.8)	19.8 (18.3-21.4)
2004	20.2 (19.0-21.4)	20.7 (17.1-24.9)	20.2 (18.9-21.5)
2005	19.6 (18.4-20.9)	20.6 (16.7-25.2)	19.4 (18.2-20.7)
Youth			
HS - 2004	22.4 (17.1-28.8)	22.6 (15.8-31.2)	20.3 (14.8-27.3)
MS - 2004	5.8 (4.4-7.8)	9.4 (5.2-16.3)	4.3 (3.1-5.8)

Data source: BRFSS (Adults), YHS (youth)
Age-adjusted rates (Adults), Crude (youth)

Secondhand Smoke Exposure

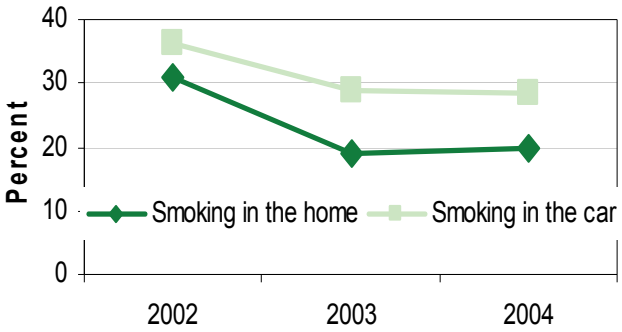
Vermont should continue its efforts in increasing awareness of the dangers of secondhand smoke and in reducing exposure to second-hand smoke, particularly among those with asthma.

Exposure to secondhand smoke can exacerbate existing asthma, resulting in increased frequency and severity of symptoms.

As shown in Figure 11, overall rates of exposure to secondhand smoke have decreased between 2002 and 2004 through combined efforts of the tobacco and asthma prevention programs.

Adults: However, Vermonters with asthma report 20-25% higher rates of exposure to secondhand smoke in their homes and cars than people without asthma.

Figure 10. Exposure to secondhand smoke in past 7 days – Vermont adult residents with asthma, 2002-2004.



- 19.8% of Vermonters with asthma reported exposure to smoke in the home versus 16.0% Vermonters without asthma
- 29.4% of Vermonters with asthma reported exposure to smoke in the car versus 21.0% of Vermonters without asthma.

Youth: Of particular concern is secondhand smoke exposure in children, as there is evidence that this can promote the development of asthma. The 2004 Adult Tobacco Survey reports:

- 81.7% of Vermont households with children prohibit smoking in their home, and
- 90.4% of Vermonters with children prohibit smoking in their car.

VCHIP's Provider-School Nurse Coordination Project provides data on the number of schools with smoke-free policies. Of the 17 schools assessed, all but one of the 17 schools are smoke-free at all times, including during school-sponsored sporting events.

DATA TABLES

Table 11. Exposure to secondhand smoke in the home in past 7 days by asthma status – Vermont adult residents, 2002-2004.

	Smoking in the home*		Smoking in the car**	
	With asthma	Without asthma	With asthma	Without asthma
2002	30.9%	24.6%	36.3%	25.1%
2003	19.0%	18.1%	28.9%	23.3%
2004	19.8%	16.0%	28.4%	21.0%

*Smoking in the home is defined as those that reported that on at least 1 of the last 7 days someone smoked in their home.
**Smoking in the car is defined as those that reported being in a car with someone who was smoking in the last 7 days.
Data source: ATS
Crude rates

Self– and Clinical Care Management

Asthma Data
2005

Written Management Plans

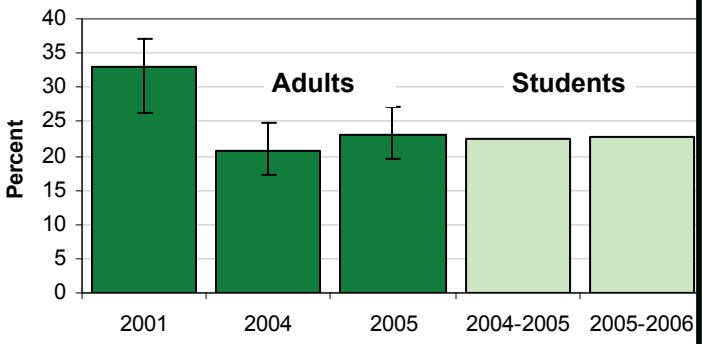
With only 1 in 5 Vermonters with asthma on a written asthma management plan, programs must work to increase use and awareness of the importance of these plans among both adults and youth.

The National Heart, Lung, and Blood Institute recommends that seeing a physician for regular check-ups, using medications as directed by a doctor, and **following an asthma action plan prescribed by a doctor** can prevent or decrease asthma symptoms. (source: National Heart, Lung, and Blood Institute).

Adults: Use of written asthma management plans has decreased significantly among adult Vermonters from 32.9% in 2001 to 23.1% in 2005 (Figure 13).

Youth: The Department of Education also collected data on use of the Vermont Asthma Action Plan (VAAP) in schools. School nurses reported similar rates of use of asthma management plans (22.9%) among their students compared to the rate observed among adults. There was no change from the rate of use among students from the 2004-2005 school year.

Figure 11. Asthma self-management plan use – Vermont residents with asthma, 2001, 2004-2006.



Of the 17 schools assessed with VCHIP's Provider-School Nurse Coordination Project, 35% reported all of their students with asthma were on written management plans and 50% had a system in place to obtain an updated management plan annually.

DATA TABLES

Table 12. Asthma self-management plan use – Vermont residents with asthma, 2001, 2004-2006.

	2001	2004	2005	2004-2005	2005-2006
	% (95% CI)	% (95% CI)	% (95% CI)	%	%
Written asthma plan – adults*	32.9 (27.9-38.2)	20.7 (17.2-24.8)	23.1 (19.5-27.2)		
Written asthma plan – students**				22.6	22.9

Data sources: BRFSS (adults) and Department of Education, School Nurse Survey (students)
BRFSS: Age-adjusted rates, School Nurse Survey: Crude rates
*Respondents indicated they and their doctor or other health care provider had worked out a written plan for taking care of their asthma in the past 12 months (written asthma plans can include information about medicines, asthma triggers, and what to do when you have an attack).
**Nurse reported Asthma Action Plan on file.

Routine Care Visits and Asthma Education

With less than half of Vermonters with asthma visiting their physician for routine care in the past year, physicians, other health care professionals, and patients must be educated on the importance of routine care visits for persons with asthma.

The National Heart, Lung, and Blood Institute recommends that **seeing a physician for regular check-ups,** using medications as directed by a doctor, and following an asthma action plan prescribed by a doctor can prevent or decrease asthma symptoms. (source: National Heart, Lung, and Blood Institute).

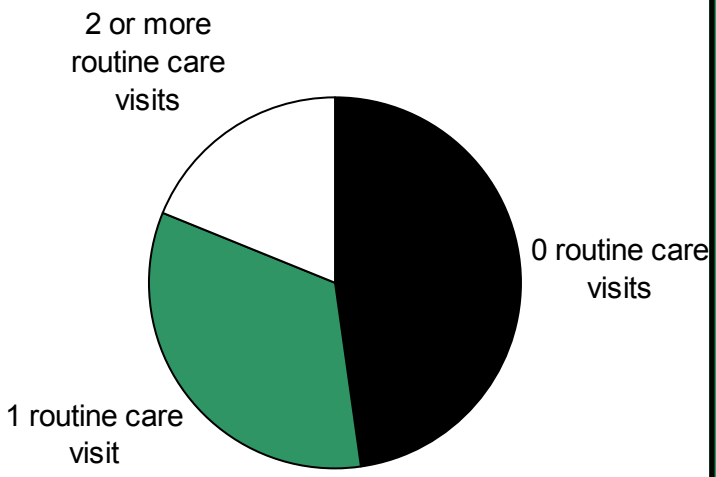
Routine Care Visits

Adults: Almost half of Vermonters with asthma did not see a physician for a routine care visit in the past year (Figure 14).

Asthma Education

Asthma: The BRFSS collected data on whether the doctor, nurse, or other health professional of a Vermonter with asthma had talked with them about how to recognize early signs and symptoms of asthma attacks and how to respond to them. In 2005, only 38.6% (33.8-43.5) of people with asthma had received physician education in the past 12 months.

Figure 12. Frequency of routine care visits in past year for asthma - Vermont adult residents with current asthma, 2005.



Youth: Of the 17 schools assessed with VCHIP's Provider-School Nurse Coordination Project, 73% of school nurses reported providing education to their students with asthma, 35% of schools teach asthma awareness and lung health education as part of the health education curriculum, 24% of parents of students with asthma participated in asthma education programs, and 19% of school staff received education on asthma.

DATA TABLES

Table 13. Frequency of routine care visits in past year for asthma - Vermont adult residents with current asthma, 2005.

	0 routine care visits	1 routine care visit	2 or more routine care visits
	% (95% CI)	% (95% CI)	% (95% CI)
2002	42.3 (36.7-48.2)	34.6 (29.1-40.5)	23.1 (18.4-28.5)
2003	48.2 (41.8-54.8)	34.0 (28.1-40.5)	17.8 (13.9-22.5)
2004	49.1 (44.1-54.0)	30.9 (26.7-35.5)	20.0 (16.5-24.1)
2005	47.8 (42.5-53.2)	33.2% (27.8-39.0)	19.0 (15.8-22.7)

Data source: BRFSS, Crude rates

Medication Use

With only 1 in 4 Vermonters with asthma taking daily maintenance medication, it is crucial to increase physician and patient education on the importance of use of appropriate daily medication for long-term control of persistent asthma.

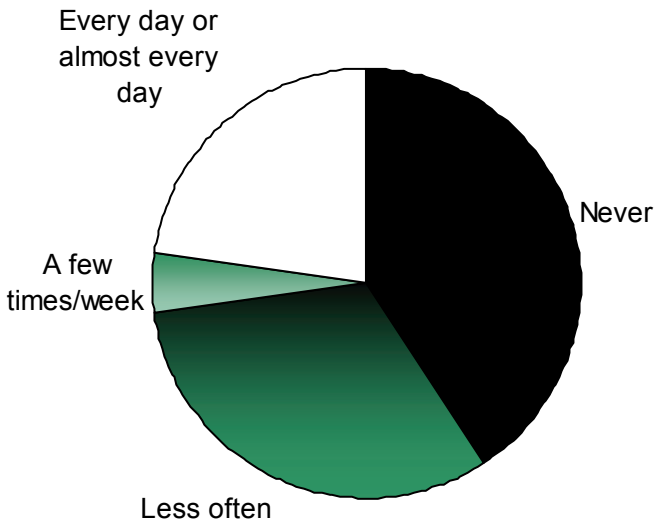
The National Asthma Education Prevention Program Guidelines recommend **daily medication** for long-term control of persistent asthma among adults. (source: NAEPP Expert Panel Report Guidelines for the Diagnosis and Management of Asthma-Update on Selected Topics).

Adults

Among Vermonters with current asthma in 2005, when asked if they had used asthma medication in the past 30 days to prevent an asthma attack, 40.6% had never used medication, 36.0% used medication occasionally, and 22.7% took asthma medication daily or almost every day.

Those reporting asthma medication use less than once per day may represent those using rescue medication only, meaning medication they need during an asthma attack. Vermonters reporting that they used asthma medication one or more times a day may represent those that have been prescribed maintenance medication for their asthma by a physician.

Figure 13. Frequency of asthma medication used to prevent as asthma attack in past 30 days – Vermont adult residents with current asthma, 2005.



Youth

Of the 17 schools assessed with VCHIP's Provider-School Nurse Coordination Project, 71% have a written policy allowing children to take asthma medications at school and 83% of these policies specify that children may carry and administer their own medication.

DATA TABLES

Table 14. Frequency of asthma medication used to prevent as asthma attack in past 30 days – Vermont adult residents with current asthma, 2002-2004.

	None	Less than once/week	Once or twice/week	More than twice/week	Once every day	Two or more times/day
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
2002	31.4	11.1	13.2	5.7	16.2	22.4
2003	30.6	12.7	11.2	8.4	17.5	19.7
2004	29.3	10.9	9.8	5.5	20.2	24.3

Data source: BRFSS, Crude rates
NOTE: Wording of the question changed in 2005 to ask if medication was used to prevent an asthma attack

Immunizations

Although rates of immunization are higher among those with asthma compared to the rest of the population, there are still a substantial number of Vermonters with asthma who are not receiving the proper immunizations. Asthma and immunization programs should work together to promote messaging on the importance of vaccinations in persons with asthma and other chronic conditions.

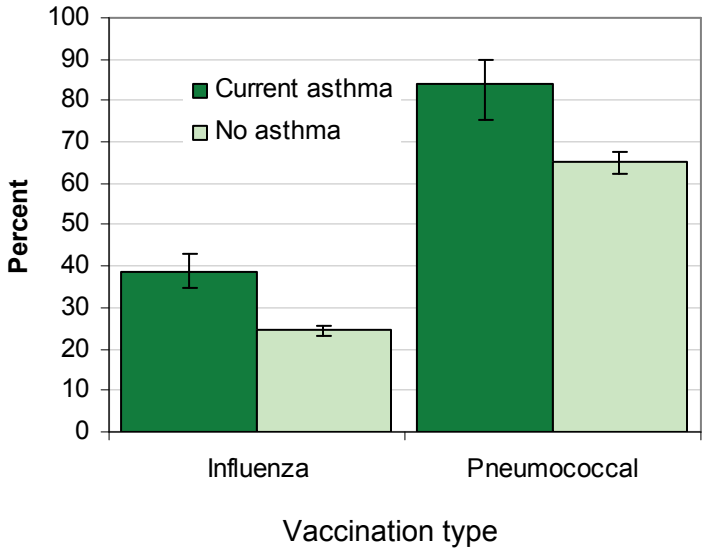
The Centers for Disease Control and Prevention (CDC) recommend that people with chronic health conditions including asthma, as well as those age 65 and over, get a pneumococcal vaccination; the recommendation for an annual flu shot is for those with a chronic condition and all adults 50 and older. (Source: CDC).

Influenza vaccination
Adults: Vermont adults with asthma are statistically more likely to get a flu shot each year than those without asthma (38.7% versus 24.4%).

Youth: Vermont youth (under 18) with asthma are also statistically more likely to get a flu shot than those without asthma (41.3% versus 13.7%).

Pneumonia vaccination
Adults: Vermonters with asthma are statistically more likely to have ever had a pneumococcal vaccination (83.9% versus 65.2%).

Figure 14. Immunization for influenza and pneumonia by asthma status - Vermont adult residents, 2005.



DATA TABLES

Table 15. Immunization for influenza and pneumonia by asthma status - Vermont adult residents, 2005.

	Flu shot in past year		Ever had pneumococcal vaccine	
	With asthma	Without asthma	With asthma	Without asthma
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Adults	38.7 (34.7-42.9)	24.4 (23.2-25.5)	83.9 (75.6-89.8)	65.2 (62.5-67.8)
Youth	41.3% (32.5-50.7)	13.7% (11.9-15.7)		

Data source: BRFSS, Age-adjusted rates

Indications of Poor Asthma Management

Asthma Data
2005

Emergency Room Visits by Age and Sex

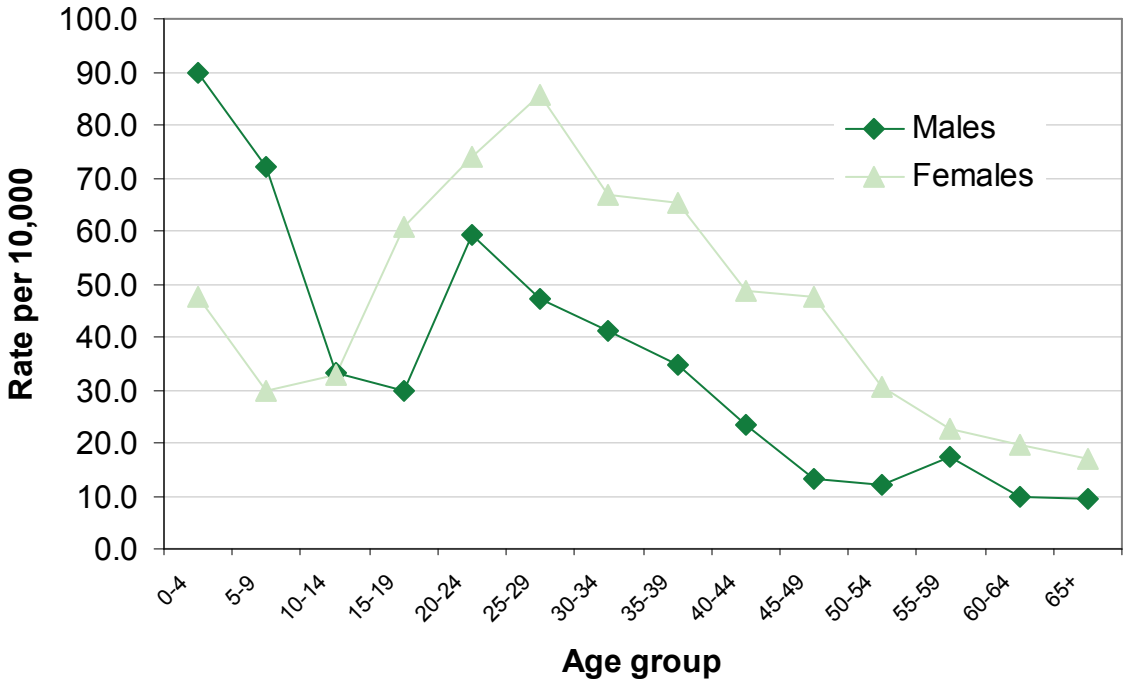
The age and sex distribution of ER visits mirrors prevalence trends, suggesting asthma severity does not vary by age or sex.

There were a total of 2394 visits (38.7 per 10,000) to the Emergency room by Vermont residents in 2003, up from 2221 visits (36.1 per 10,000) in 2002. Some of these visits were multiple visits by the same person. In 2003:

- 89.6% of these people made only one visit to the ER,
- 7.6% made 2 visits to the ER, and
- 2.7% made three or greater visits to the ER.

In addition to having overall higher prevalence rates than men, females visited the ER for their asthma more often than males in 2003, with 1393 visits or 44.2 visits per 10,000 population compared to 1001 visits, or 32.9 visits per 10,000 among males. Within each gender, females aged 20-39 and males aged 0-9 had the highest rates of ER visits. This age/gender distribution is similar to what is seen nationally. Vermont data tables are presented on the following page.

Figure 15. Emergency room visits for asthma by age and sex – Vermont residents, 2003.



Data source: Hospital Discharge Data
NOTE: ER visits that result in a hospital admittance are excluded

Emergency Room Visits by Age and Sex

Table 16. Emergency room visits for asthma by age and sex – Vermont residents, 2003.

	Total		Males		Females	
Age group	#	Rate (per 10,000)	#	Rate (per 10,000)	#	Rate (per 10,000)
0-4	231	69.5	155	89.8	76	47.5
5-9	183	51.3	131	71.9	52	29.8
10-14	141	33.0	73	33.4	68	32.7
15-19	204	44.6	70	29.7	134	60.6
20-24	303	66.5	139	59.3	164	74.1
25-29	220	66.1	79	47.0	141	85.6
30-34	201	54.0	76	41.1	125	66.7
35-39	223	50.4	75	34.8	148	65.2
40-44	190	36.2	60	23.4	130	48.6
45-49	162	30.8	34	13.2	128	47.7
50-54	104	21.6	29	12.3	75	30.7
55-59	79	20.1	34	17.3	45	22.8
60-64	43	14.9	14	9.9	29	19.8
65-69	20	9.2	8	7.6	12	10.7
70-74	27	14.1	7	8.2	20	18.8
75-79	30	18.4	7	10.0	23	24.7
80-84	17	14.6	6	13.3	11	15.3
85+	16	14.3	4	12.0	12	15.3
All ages	2394	38.7	1001	32.9	1393	44.2

Data source: Hospital Discharge Data
NOTE: ER visits that result in a hospital admittance are excluded

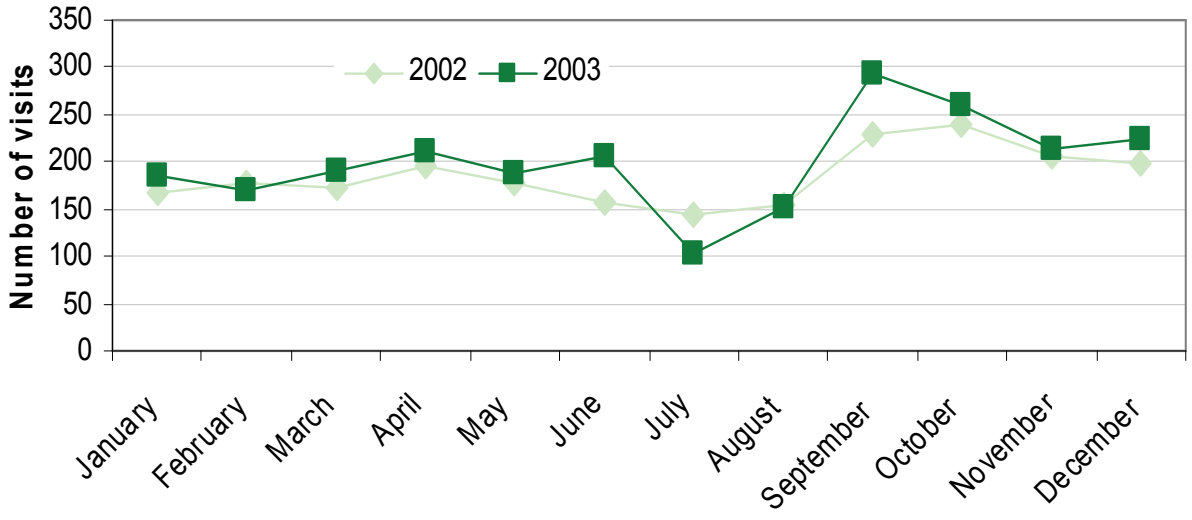
Temporal Patterns of Emergency Room Visits

With the seasonal variation in asthma-related ER visits in Vermont, the media could play a valuable role in publicizing the importance of asthma self– and clinical care management during times of the year with the highest rates of ER visits.

Frequency of ER visits among people with asthma often vary by the time of year. The reason for this variation remains unclear however there are several known causes of asthma attacks that may correspond with seasonal patterns. Tree and grass pollen, known allergens that can cause asthma attacks, have the highest counts in spring and early fall. Cold air, or changes in weather may also cause asthma attacks. (source: National Heart, Lung, and Blood Institute)

In Vermont, ER visits for asthma peak in September and October, as demonstrated in Figure 17.

Figure 16. Emergency Room visits for asthma by month – Vermont residents, 2002-2003 combined.



DATA TABLES

Table 17. Emergency Room visits for asthma by month – Vermont residents, 2002-2003.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	#	#	#	#	#	#	#	#	#	#	#	#
2002	166	177	173	196	178	158	145	155	229	240	205	199
2003	185	170	190	212	187	205	104	151	293	259	214	224

Data source: Hospital Discharge Data

Frequency of Emergency Room and Urgent Care Visits

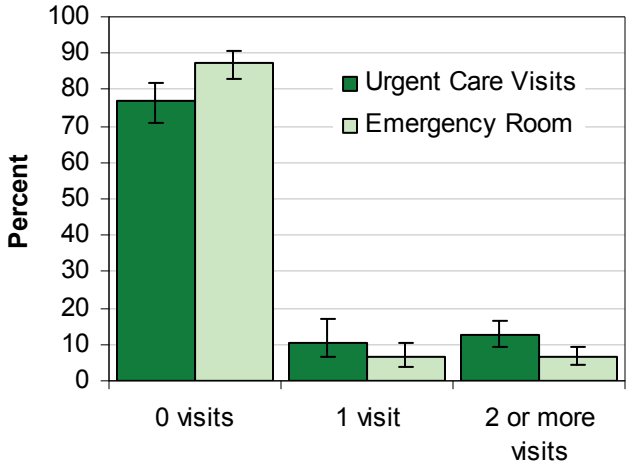
With roughly 1 in 8 Vermonters with asthma visiting an ER in the past year, increasing self and clinical care management of Vermonters with asthma should decrease the frequency of ER visits.

With proper management of asthma, many asthma symptoms can be prevented, resulting in a reduction of visits to the Emergency room or doctor's office for urgent care.

Urgent Care: Almost one quarter of people with asthma visited their health care professional for urgent treatment for worsening symptoms in the past year. This percent has remained fairly constant over the last four years.

Emergency Room: Roughly 13% of Vermonters with asthma visited the ER* for their asthma in the past 12 months. This percent has also remained fairly constant over the last four years.

Figure 17. Frequency of visits to a health care provider for urgent treatment of worsening symptoms and emergency room visits for asthma in past year – Vermont residents with asthma, 2005.



DATA TABLES

Table 17. Frequency of visits to a health care provider for urgent treatment of worsening symptoms and emergency room visits for asthma in past year – Vermont residents with asthma, 2002-2005.

	0 visits		1 visit		2 or more visits	
	Dr. Office - Urgent Care	ER*	Dr. Office - Urgent Care	ER*	Dr. Office - Urgent Care	ER*
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
2002	74.6 (69.0-79.6)	85.7 (81.0-89.4)	12.3 (8.7-17.1)	6.9 (4.6-10.2)	13.1 (9.5-17.7)	7.4 (4.7-11.4)
2003	80.4 (75.1-84.7)	87.9 (83.2-91.5)	10.2 (6.9-14.7)	7.5 (4.6-12.0)	9.5 (6.7-13.3)	4.5 (2.8-7.3)
2004	75.8 (71.4-79.7)	87.3 (83.8-90.1)	11.2 (8.7-14.4)	6.5 (4.5-9.5)	13.0 (9.9-16.8)	6.2 (4.4-8.6)
2005	76.7 (70.7-81.7)	87.2 (82.8-90.6)	10.6 (6.5-16.8)	6.4 (3.8-10.6)	12.7 (9.6-16.7)	6.5 (4.5-9.2)

Data source: BRFSS, Crude rates
* Emergency Room or Urgent Care Center

Risk Factors for Emergency Room and Urgent Care Visits

Vermonters most at risk of visiting an ER or their physician for urgent care are those with the lowest incomes and those without health insurance. Efforts to increase self– and clinical care management, which will result in fewer ER visits, should focus on this population, in addition to those who smoke or are obese. It is also important to explore characteristics of the major health systems within the Vermont counties reporting the lowest and highest rates of ER visits.

The models on the next page examine the relationship between certain variables and visiting an emergency room or a physician for urgent care for worsening symptoms related to asthma. The adjusted model adjusts for gender, race, insurance status, household income, education level, smoking, obesity, and depression status, and race.

Urgent Care: Having a low income is associated with an increased risk of visiting a doctor for urgent care of worsening symptoms due to asthma based on the adjusted model.

Emergency Room: Not having health insurance, having a low income, being a smoker, and being obese are associated with an increased risk of visiting an emergency room due to asthma based on the adjusted model.

We can also look at variation in ER visit rates by county. The county with the highest rates of ER visits is Rutland, with 68.3 visits/10,000 population. When looking at the PC Plus Medicaid program, Rutland, Windsor, and Orange counties reported the highest rates of hospitalizations. Bennington and Addison reported the lowest ER rates.

DATA TABLES

Table 18. Emergency Room visits for asthma by county – Vermont residents, 2003.

	Number	Rate (per 10,000)
Lamoille	83	34.2
Orange	100	34.4
Orleans	134	49.4
Rutland	434	68.3
Washington	196	33.3
Windham	144	32.4
Windsor	226	39.0

	Number	Rate (per 10,000)
Addison	102	27.7
Bennington	110	29.6
Caledonia	135	45.1
Chittenden	462	31.0
Essex	31	47.2
Franklin	207	44.0
Grand Isle	30	40.1

Data source: Hospital Discharge Data
Data are for visits to emergency rooms in Vermont and New Hampshire hospitals.

Risk Factors for Emergency Room and Urgent Care Visits

Table 20. Factors associated with physician visits for urgent care or emergency room visits due to asthma - Vermont adult residents with current asthma, 2004-2005 (combined).

	Urgent care visits		Emergency room visits	
	Crude OR	Adjusted OR	Crude OR	Adjusted OR
Sex				
Male	0.74	0.61	0.7	0.55
Female	1.0	1.0	1.0	1.0
Ages				
18-24	1.0	1.0	1.0	1.0
25-44	0.64	0.58	0.63	0.82
45-64	0.8	0.68	0.78	1.01
65+	0.6	0.64	0.55	1.07
Insurance				
Yes	0.95	1.5	0.31*	0.32*
No	1.0	1.0	1.0	1.0
Household income				
<125% FPL	2.77*	1.75*	3.17*	2.69*
125-249% FPL	2.13	1.71	3.84	3.88
250-349% FPL	1.71	1.33	2.66	2.95
350-499% FPL	1.01	0.68	1.34	0.92
500% FPL	1.0	1.0	1.0	1.0
Education				
Less than high school	1.58	0.97	4.06*	2.16
High school or G.E.D.	1.68	1.27	2.51	1.97
Some college or technical school	1.29	0.89	2.78	2.5
College degree or greater	1.0	1.0	1.0	1.0
Current smoker				
Yes	1.0	1.0	1.0	1.0
No	0.67	0.71	0.5*	0.5*
Obese				
Yes	1.16	1.2	1.68*	2.16*
No	1.0	1.0	1.0	1.0
Depression				
Yes	1.47	1.32	1.75	1.23
No	1.0	1.0	1.0	1.0
Race				
White/Non-hispanic	1.0	0.94	0.53	0.6
Blacks and Hispanics	1.0	1.0	1.0	1.0

* = significance at 0.05
Data Source: BRFSS

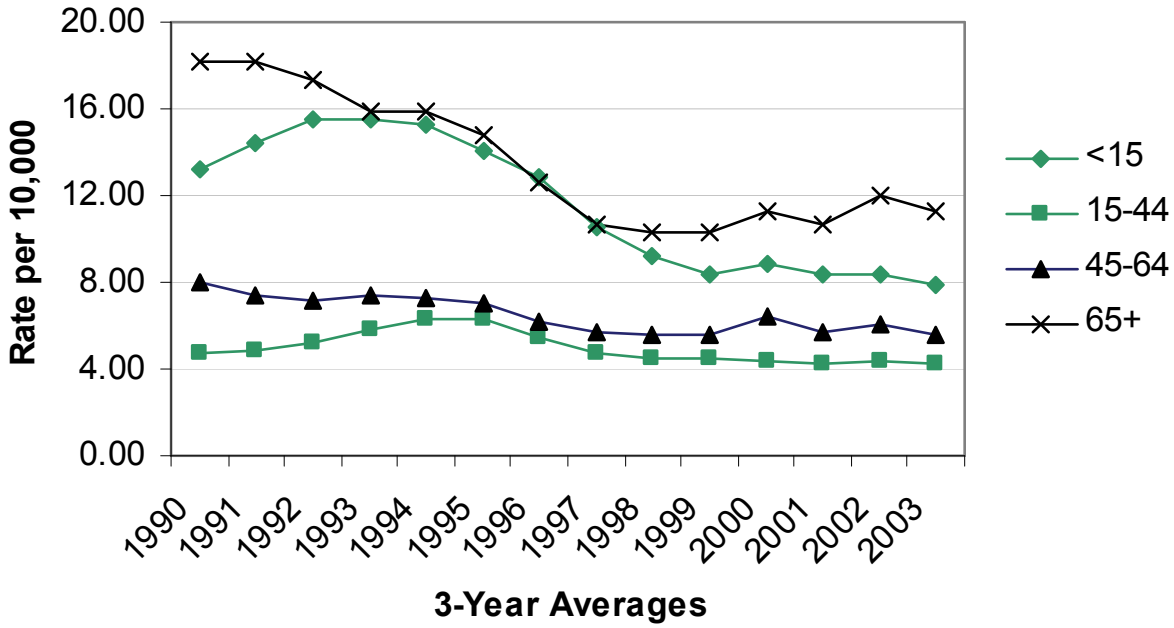
Hospitalizations and Deaths

As rates of hospitalizations for asthma have become relatively stable in the past five years, increased efforts are needed to continue the decline observed in the 1990s. Efforts to decrease the number of hospitalizations related to asthma should focus on the youngest and oldest age groups.

Hospitalization for asthma is a sign of ineffective management of the disease.

Vermont contributed 364 discharges with a primary diagnosis of asthma in 2003 to the national total of 418,789. CDC's national objective is to decrease hospitalization rates for asthma by 9% from 2000 to 2009. Vermont has made significant progress in decreasing hospitalization rates between 1989 and 2004, mainly due to large decreases in hospitalizations among youth under 15 and adults 65 and older. However, rates in Vermont have remained relatively unchanged since 2000. Vermont data tables are presented on the following page.

Figure 18. Asthma hospital discharge rates by age group, 3-year moving averages - Vermont residents, 1989-2004.



Deaths: Between 1999 and 2003 there were 35 deaths due to asthma in Vermont. Because of small numbers, data cannot be presented by year or other demographic breakdown. Research has suggested that following an asthma management plan may prevent deaths related to asthma.

Data source: Hospital Discharge Data
NOTE: These data include ER visits when the ER visit resulted in a hospital admittance
Data source: Vermont Vital Statistics

Hospitalizations

Table 21. Asthma hospital discharge rates by age group - Vermont residents, 1989-2004.

	1989	1990	1991	1992	1993	1994	1995	1996
Total number of hospitalizations	469	486	525	503	551	581	546	486
Rate per 10,000								
<15	11.6	12.8	15.4	15.0	16.1	15.4	14.4	12.3
15-44	5.1	4.5	4.7	5.1	5.6	6.8	6.5	5.6
45-64	8.6	8.4	7.0	6.7	7.9	7.7	6.3	7.1
65+	15.9	18.4	20.3	15.8	15.8	16.2	15.9	12.3
Total	8.4	8.6	9.3	8.8	9.5	9.9	9.2	8.1

	1997	1998	1999	2000	2001	2002	2003	2004
Total number of hospitalizations	396	350	408	380	428	336	444	364
Rate per 10,000								
<15	1.8	7.7	8.1	9.5	9.2	6.5	9.4	7.6
15-44	4.1	4.4	4.9	4.2	4.2	4.2	4.6	3.9
45-64	5.3	4.7	6.6	5.6	7.0	4.6	6.7	5.4
65+	9.5	10.0	11.4	9.4	13.0	9.7	13.4	10.6
Total	6.6	5.8	6.8	6.2	7.0	5.5	7.2	5.9

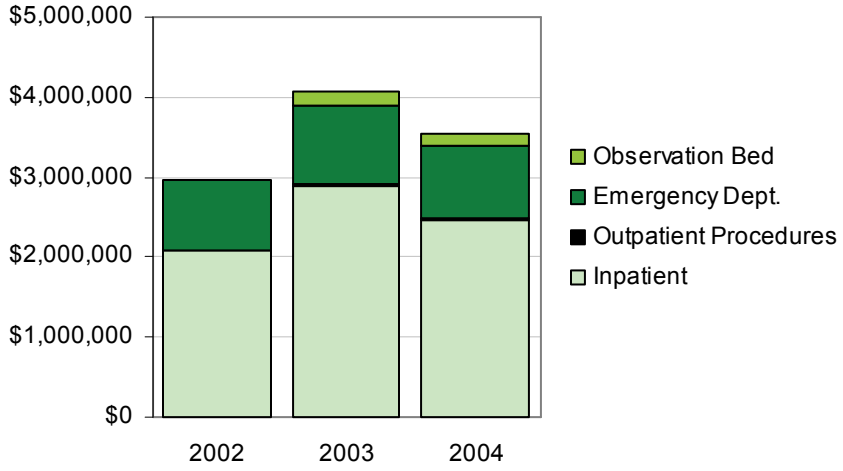
Data source: Hospital Discharge Data
NOTE: These data include ER visits when the ER visit resulted in hospital admittance

Costs

Improvements in asthma management will result in decreases in the number of hospitalizations and emergency room visits related to asthma. In addition to improving the overall quality of life of those suffering from asthma, these efforts will dramatically decrease health care costs related to asthma.

Hospital charges related to asthma were approximately $3.5 million in Vermont for 2004. The national estimate for all hospital discharges with a primary diagnosis of asthma was over $5 billion.

Figure 19. Costs related to asthma hospital visits – Vermont, 2002-2004.



Inpatient hospitalizations make up over two thirds of all hospital-related charges, costing over $6,000 per visit on average. Emergency room visits make up over one quarter of all hospital-related charges, costing roughly $400 per visit on average.

DATA TABLES

Table 22. Costs related to asthma hospital visits – Vermont, 2002-2004.

	2002	2003	2004
In-patient	$2,074,843	$2,897,237	$2,454,523
Out-patient	$7,730	$7,153	$34,624
Emergency room	$880,944	$985,229	$914,517
Observation beds	NA	$177,294	$139,543
Total	$2,963,517	$4,066,913	$3,543,207

Data source: Hospital Discharge Data

Data Sources

Behavioral Risk Factor Surveillance System (BRFSS): Since 1990, Vermont and 49 other states and three territories have tracked risk behaviors using a telephone survey of adults (age 18+) called the Behavioral Risk Factor Survey. These data are self-reported and therefore may differ from information obtained from records of health-care providers. The sample is also limited to adults with telephones. Because there is variation in the content of the questionnaire between states, U.S. estimates, in some cases, may represent a subset of all states. *Suggested Citation: Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2005. http://www.cdc.gov/brfss/index.htm

Adult Tobacco Survey (ATS): The Adult Tobacco Survey (ATS) is a list-assisted, random digit dialed telephone sample survey of 2,000 non-institutionalized Vermont adults (age 18 or older); both the smoker and 18-24 year old populations are over-sampled. The Vermont Department of Health has conducted the ATS annually since 2001, with the questionnaire revised and updated each year as well.

Youth Health Survey (YHS): The YHS (formally the Youth Tobacco Survey or YTS) is a self-administered survey of all students in randomly selected classes in randomly selected schools statewide. Data for years 2000 and 2002 include only middle school students. Data for year 2004 includes both middle and high school students. Data are collected during March and April in schools.

Vital Statistics (Mortality Data): Vermont vital records system includes the following vital events: births, deaths, fetal deaths, abortions, marriages, divorces, civil unions and reciprocal beneficiaries relationships. Although a physician is responsible for filing the death certificate, the job may be, and often is, delegated to the funeral director. Health Department staff code and enter all vital records received into a computerized database, and send a data file containing some of the information from the records to the National Center for Health Statistics to become part of a national database.

Hospital Discharge Data (HDD): Vermont's acute care hospitals participate in the state's hospital data system by supplying discharge abstracts of comparable information to Health Care Investment Analysts, a subsidiary of AMBAC, under contract with the Vermont Association of Hospitals and Health Systems (VAHHS). VAHHS, using its EXPLOR data system, then provides data to the Department of Health, the hospital discharge data management designee of the Division of Health Care Administration. Records from Massachusetts, New Hampshire and New York hospitals are obtained from the Massachusetts Health Data Consortium, the New Hampshire Division of Public Health and the New York Department of Health respectively. The Veterans Administration provides discharge records from the VA hospital in White River Junction. National data for comparison purposes is available through the Healthcare Cost and Utilization Project (HCUP) maintained by the Agency for Healthcare Research and

quality (AHRQ). HCUP is a Federal-State-industry partnership to build a standardized, multistate health data system and companion set of complementary resources. HCUP databases are a family of longitudinal, administrative databases—including State-specific hospital-discharge databases and a national sample of discharges from community hospitals.

School Nurse Survey: The Vermont Department of Education sends a Health Services Screening Report to all school nurses every year. The Vermont Asthma Program has been able to include two questions at the end of the form on asthma prevalence and use of written management plans through an agreement with the Department of Education beginning in 2003-2004.

VCHIP Provider School Nurse Coordination Survey: In the Spring of 2004, VCHIP in collaboration with the Vermont Department of Health and the Department of Education began the School Asthma Project. The goal of this project is to improve coordination of care in two Vermont communities for school-aged children who have asthma. Before initiating the coordination project, VCHIP collected a baseline measure of use of asthma management plans. The most recent needs assessment was undertaken in February 2006 and included 17 schools. A follow-up assessment is planned for Fall 2006.

Asthma Prevalence in the PC Plus Program Using a Hybrid Classification System, 2003-2004 (Medicaid Data): The Vermont Program for Quality in Health Care produced this report examining the distribution of asthma related health-seeking behaviors in the PC Plus Program. The PC Plus Program is the primary care case management program for the Vermont Medicaid Program, enrolling approximately two thirds of all Medicaid beneficiaries annually.

Technical Notes and Definitions

Prevalence: Prevalence is defined as the number of current cases per the population at risk at a certain point in time or period.

Statistical Significance: Because of random variability around a trend or point, rates observed at any given time are best considered estimates of the underlying or true rate. Confidence intervals are calculated to set a range of values, above and below the estimate that likely contains the true rate. (Confidence intervals are shown as error bars on graphs in this report and are calculated at the 95% level). If the confidence intervals of two groups (such as males and females, or Vermont and the U.S.) overlap, we use this as a conservative test that the difference is not statistically significant.

Crude and Age Adjusted Rates: Age adjustment is usually done when comparing two or more populations, particularly when they have different age structures. Age adjustment, using the direct method, is the application of age-specific rates in a population of interest to a standardized age distribution to eliminate differences in observed rates that result from age differences in the population composition. Age adjusted rates are useful for comparison purposes only, not to measure absolute magnitude. To measure absolute magnitude, crude rates are presented. Age adjustment was standardized by the direct method to the year 2000 standard U.S. population using the following age distribution:18-24, 25-34, 35-44, 45-64, 65+.

- *See Klein, RJ, Schoenborn CA. Age adjustment using the 2000 projected U.S. population. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics, 2001. Healthy People 2010 statistical notes, no. 20.* http://hlunix.hl.state.ut.us/ibisq/statnt20.pdf

Odds Ratios (OR): The odds ratio is a way of comparing whether the probability of a certain event is the same for two groups. An odds ratio of 1 implies that the event is equally likely in both groups. An odds ratio greater than one implies that the event is more likely in the first group. An odds ratio less than one implies that the event is less likely in the first group.

Crude and Adjusted Odds Ratios: Crude and adjusted OR's are presented for logistic regression models, the crude rate resulting from the univariate model and the adjusted rate resulting from the multivariate model.

Federal Poverty Guidelines: Poverty thresholds are used for calculating all official poverty population statistics and are updated each year by the Census Bureau. The HHS Federal Poverty guidelines are a simplified version of the federal poverty threshholds used for administrative purposes, and are often refered to as "federal poverty level." Guidelines vary by family size. In addition, there is one set of figures for the 48 contiguous states and D.C.; one set for Alaska; and one set for Hawaii. For more information on poverty guidelines please visit:
http://aspe.hhs.gov/poverty/05poverty.shtml