
Asthma Burden Report New Hampshire 2010

Chapter 1: Asthma Prevalence and Incidence



Preface

In order to get these data to you in a timely manner, the New Hampshire Asthma Control Program has decided to publish chapters of the *Asthma Burden Report – New Hampshire 2010* as they are completed. When new chapters are published, the appendices will be updated if needed. The primary purpose of this report is to disseminate data to the Asthma Control Program’s partners, health care providers, insurers and public health professionals so this information can be used to develop, plan, implement and evaluate asthma-related activities.

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Asthma Prevalence and Incidence

Prevalence Highlights:

Adult Asthma

- In 2008, 10.5% (107,000) of adults 18 years of age and older in New Hampshire had current asthma.
- There are statistically significant differences in the prevalence of asthma by gender, age, household income, educational status, employment status and type of insurance.
- Trend data indicate that the prevalence of asthma is increasing faster among some groups compared with others. See page 1-7 for a summary of trend results.

Child Asthma

- Among children less than 18 years old, an average of 8.4% (25,000) had current asthma from 2006-2008.
- Children in households that earned less than \$25,000 per year were 1.7 times more likely to have asthma than those who lived in households that earned at least \$25,000 per year.

Incidence Highlights:

- Males in New Hampshire are more likely to be diagnosed with asthma as young children (0-9 years old) than females.
- Approximately 4,000 adults and 3,000 children are newly diagnosed with asthma every year in New Hampshire.

This chapter presents data from the 2000-2008 New Hampshire Behavioral Risk Factor Surveillance System (NH BRFSS), 2003 & 2007 National Survey of Children's Health (NSCH), 2004, 2007 & 2009 Youth Tobacco Survey (YTS) and 2006-2008 NH BRFSS Adult and Child Asthma Call-back Surveys (Adult and Child ACS). It includes information on lifetime and current asthma prevalence, age at diagnosis, time since diagnosis, and a calculated incidence rate for asthma among adults and children in New Hampshire. Where possible, data were analyzed by age, gender, educational level, household income, employment status and insurance status to determine whether asthma prevalence and incidence varied by these factors. Trend analyses are also presented when possible to assess any changes in prevalence and incidence that may have occurred over time.

Definitions

- Prevalence = The proportion of individuals in a population who have asthma at a given point in time or during a given time period. In this report prevalence is reported as a percent of the population.
- Lifetime Asthma = Proportion of respondents who answered "Yes" to "Have you ever been told by a doctor, nurse or other health professional that you had asthma?"
- Current Asthma = Proportion of respondents who answered "Yes" to both "Have you ever been told by a doctor, nurse or other health professional that you had asthma?" and "Do you still have asthma?"

Incidence = The number of new cases of a condition, symptom, death or injury that develop during a specific time period, such as a year. The number is often expressed as a rate per 1,000 people at risk of developing the disease.

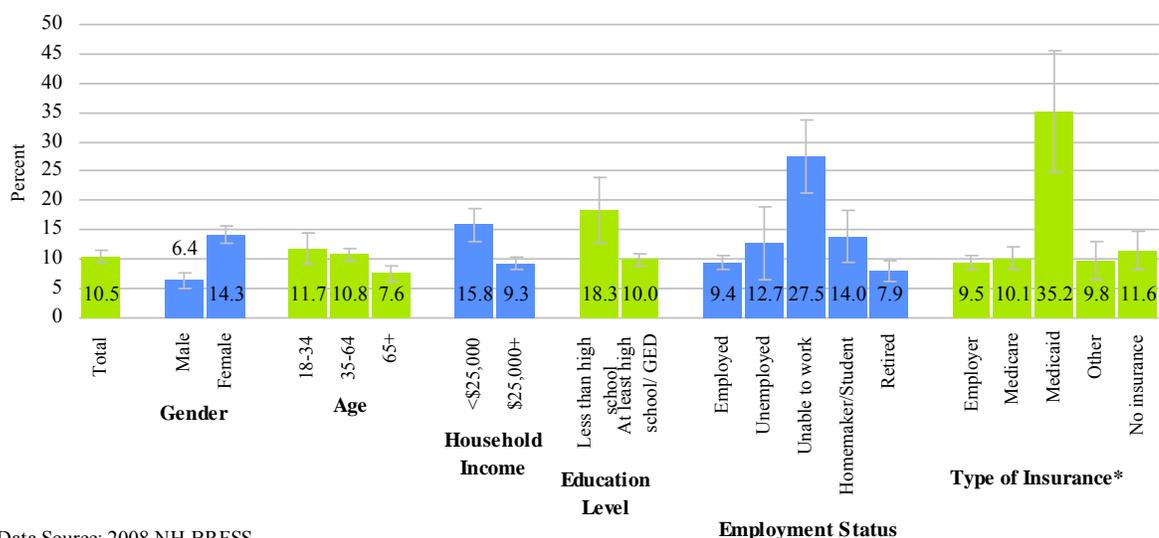
Population at Risk of Developing Asthma = For this report, the population at risk of developing asthma is defined as the number people never diagnosed with asthma plus the number of people diagnosed with asthma in the last 12 months.

See Appendix A for a description of the data sources and their limitations and Appendix B for technical notes and methods used to analyze the data; these documents are located at www.dhhs.nh.gov/dphs/cdpc/asthma/publications.htm

1.1 Asthma Prevalence

Prevalence data are used to estimate how many people have asthma and help characterize the population in terms of age, gender, and other demographic and socioeconomic factors. This type of information provides an indication of the burden of asthma on the population and helps identify groups that may be disproportionately affected by the disease. Prevalence data are also used to examine trends in the occurrence of asthma over time. Since the data in this section are survey data that determine asthma prevalence based on the two questions “Have you ever been told by a doctor, nurse or other health professional that you had asthma?” and “Do you still have asthma?” only those who have been diagnosed with asthma are captured. We do not know how many people in New Hampshire have undiagnosed asthma. Thus trends in asthma prevalence are affected by trends in asthma awareness and diagnosis.

Figure 1.1.1
Prevalence of current asthma among adults 18+ years old by demographic and socioeconomic factors - New Hampshire, 2008



Data Source: 2008 NH BRFSS

* Employer = insurance purchased by or paid for through an employer or spouse's employer; Other = VA or other military plan, COBRA, or a plan purchased by an individual.

See Table 1.1.1 at the end of this chapter for point estimates, confidence intervals and results from the trend tests for data presented in Figure 1.1.1

Asthma Prevalence Among Adults 18+ Years Old

Data on the previous page show that high prevalence estimates among adults are associated with: being female, being less than 65 years old, having a household income of less than \$25,000 per year, having less than a high school degree, being unable to work and having Medicaid insurance. Trend data on subsequent pages show that the prevalence of asthma is increasing faster among these groups.

Below is a detailed description of the demographic and socio-economic factors associated with high asthma prevalence estimates:

- **Gender:** There is a statistically significant difference between the prevalence of asthma among males and females. Females in New Hampshire are more than twice as likely as males to have current asthma, at 14.3% versus 6.4%.
- **Age:** Adults 18-34 and 35-64 years old in New Hampshire are more likely to have asthma compared with adults age 65 and older: 11.7%, 10.8% and 7.6%, respectively. There is a statistically significant difference between the prevalence of asthma among adults 18-64 years old and adults 65 and older.
- **Household Income:** There is a statistically significant difference between the prevalence of asthma among people in households that earn less than \$25,000 per year and those that earn at least \$25,000 per year. New Hampshire adults whose household income is less than \$25,000 per year are 1.7 times more likely to have asthma than those whose household income is at least \$25,000 per year, at 15.8% versus 9.3%. The household income categories (<\$25,000 and ≥ \$25,000) were determined based on statistical analysis that revealed the greatest difference in the prevalence of asthma occurred between those who reported a household income less than \$25,000 and those who reported a household income of at least \$25,000. The 3-year average median household income in New Hampshire was \$67,508.¹
- **Education:** New Hampshire adults without a high school degree or GED are 1.8 times more likely to have asthma than those who have at least a high school degree or GED, at 18.3% versus 10.0%. There is a statistically significant difference between the prevalence of asthma among these two educational levels. The education categories were determined based on statistical analysis that revealed the greatest difference in the prevalence of asthma occurred between those who did not complete high school and those who did.
- **Employment:** Individuals unable to work have the highest prevalence of asthma (27.5%) compared with those who are employed (9.4%), unemployed (12.7%), homemaker/student (14.0%) or retired (7.9%). New Hampshire adults who are unable to work are almost 3 times more likely to have asthma than those who are employed, more than twice as likely to have asthma as those who are unemployed, almost twice as likely to have asthma as homemakers/students, and 3.5 times more likely to have asthma than those who are retired. There are statistically significant differences in the prevalence of asthma among those unable to work and each of the employment status categories described above.
- **Insurance:** Adults insured by Medicaid have the highest prevalence of asthma, at 35.2%. This compares with prevalence estimates of 9.5% to 10.1% for all other types of insurers and 11.6% for those who are uninsured. Adults in New Hampshire with Medicaid insurance are more than 3 times as likely to have asthma as those with any other type of insurance or those without any insurance. There are statistically significant differences in the prevalence of asthma among those on Medicaid and each of the other insurance types.

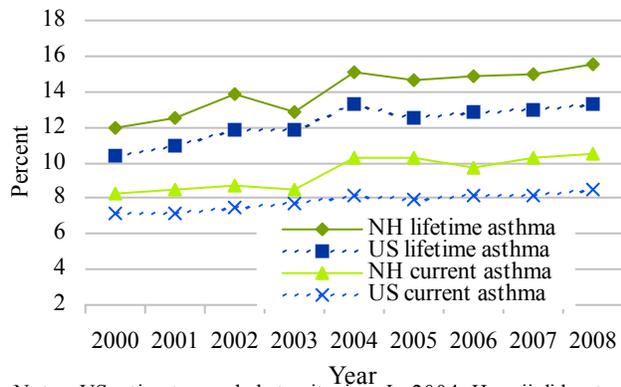
See Table 1.1.1 at the end of this chapter for point estimates and confidence intervals for data presented in Figure 1.1.1.

Adult Lifetime and Current Asthma Trends:

Between 2000 and 2008, there were statistically significant increases in the prevalence of both lifetime and current asthma in New Hampshire and the United States.

Comparing the years 2000 and 2008 only, there was a 29.2% increase for lifetime asthma in New Hampshire and 27.9% in the US. Likewise there was a 26.5% increase for current asthma prevalence in New Hampshire and 18.1% in the US.

Figure 1.1.2
Trend in prevalence of lifetime and current asthma among adults 18+ years old - New Hampshire and the United States, 2000-2008



Notes: US estimates exclude territories. In 2004, Hawaii did not participate in the BRFSS.

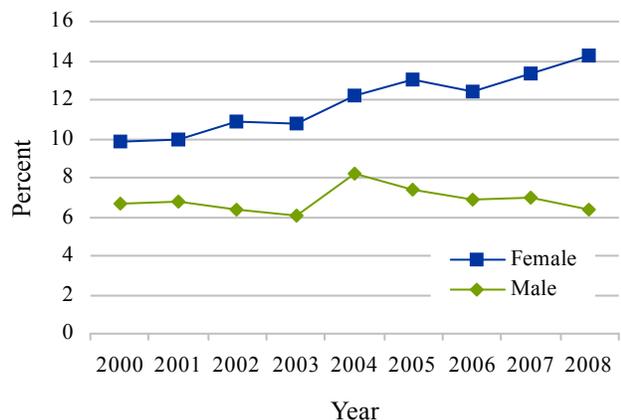
Data Source: 2000-2008 NH BRFSS

Adult Current Asthma by Gender:

Between 2000 and 2008, there was a statistically significant increase in the prevalence of current asthma among females but not males. For males, the prevalence of current asthma remained stable over this time period.

Based on the slopes of the best lines of fit from the trend analyses, it appears that the prevalence of asthma is increasing 13.8 times faster among females than males at an average rate of 0.55 percentage points per year.

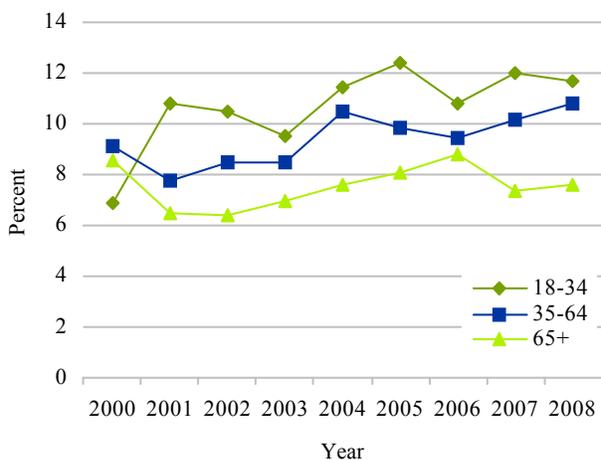
Figure 1.1.3
Trend in prevalence of current asthma among adults 18+ years old by gender - New Hampshire, 2000-2008



Data Source: 2000-2008 NH BRFSS

See Table 1.1.2 at the end of this chapter for point estimates, confidence intervals and results from the trend tests for data presented in Figure 1.1.2 and Table 1.1.3 for data presented in Figures 1.1.3-1.1.8.

Figure 1.1.4
Trend in prevalence of current asthma among adults 18+ years old by age group - New Hampshire, 2000-2008

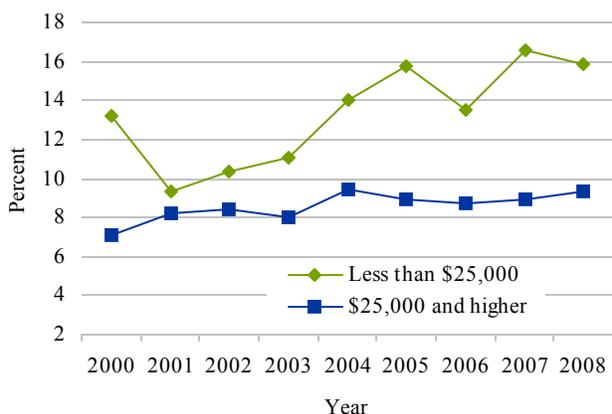


Data Source: 2000-2008 NH BRFSS

Adult Current Asthma by Age:

Between 2000 and 2008, there were statistically significant increases in the prevalence of current asthma among adults 18-34 and 35-64 years old but not for those 65 and older. However, there was a statistically significant increasing trend in the prevalence of asthma from 2001 to 2006 among those 65 and older; more data are needed to assess if there is a change in the trend after 2006.

Figure 1.1.5
Trend in prevalence of current asthma among adults 18+ years old by household income - New Hampshire, 2000-2008



Data Source: 2000-2008 NH BRFSS

Adult Current Asthma by Household Income:

Between 2000 and 2008, there were statistically significant increases in the prevalence of current asthma among people in households that earn both less than \$25,000 per year and at least \$25,000 per year.

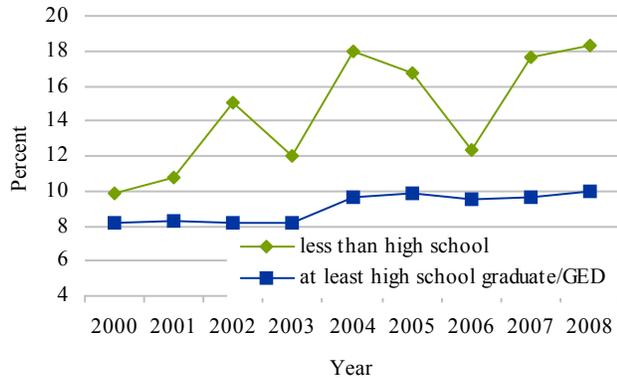
Based on the slopes of the best lines of fit from the trend analyses, it appears that the prevalence of asthma is increasing 4.7 times faster in households that earn less than \$25,000 per year compared with those that earn at least \$25,000 per year.

Adult Current Asthma by Educational Level:

Between 2000 and 2008, there were statistically significant increases in the prevalence of current asthma among both educational levels presented in the figure.

Based on the slopes of the best lines of fit from the trend analyses, it appears that the prevalence of asthma is increasing 3.2 times faster among those who did not complete high school compared with those who have at least a high school education or their General Equivalency Diploma (GED).

Figure 1.1.6
Trend in prevalence of current asthma among adults 18+ years old by educational level - New Hampshire, 2000-2008

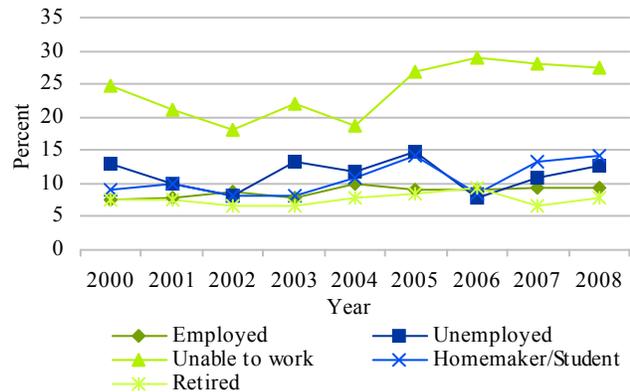


Data Source: 2000-2008 NH BRFSS

Adult Current Asthma by Employment Status:

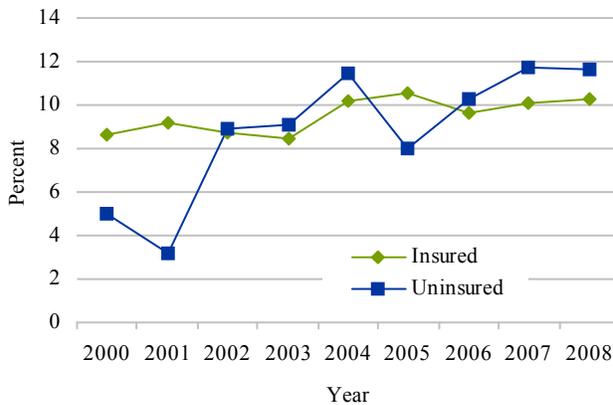
Between 2000 and 2008, there were statistically significant increases in the prevalence of current asthma among both the employed and those unable to work. There were no statistically significant trends among the unemployed, homemakers/students, or retired.

Figure 1.1.7
Trend in prevalence of current asthma among adults 18+ years old by employment status - New Hampshire, 2000-2008



Data Source: 2000-2008 NH BRFSS

Figure 1.1.8
Trend in prevalence of current asthma among adults 18+ years old by insurance status - New Hampshire, 2000-2008



Data Source: 2000-2008 NH BRFSS

Adult Current Asthma by Insurance Status:

Between 2000 and 2008, there were statistically significant increases in the prevalence of current asthma among both the uninsured and insured.

Based on the slopes of the best lines of fit from the trend analyses, it appears that the prevalence of asthma is increasing 4.7 times faster among those who are uninsured compared with those who are insured.

Figure 1.1.1 reports asthma prevalence by insurance type (e.g., Medicaid); however, these data are not available every year so trend analysis could not be done by insurance type.

Summary of Findings:

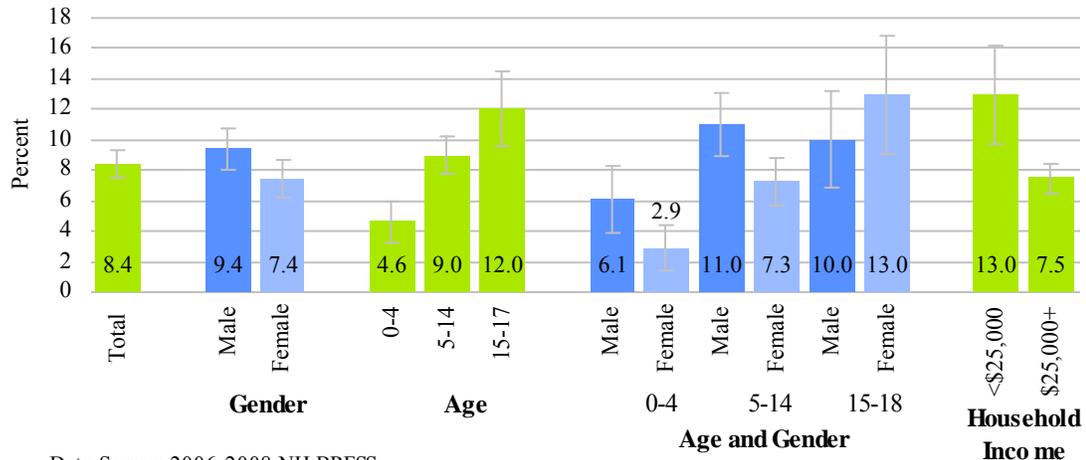
The data in Figure 1.1.1 show differences in the prevalence of current asthma according to gender and socio-economic status. Specifically, that females and individuals with less education and income are significantly more likely to have current asthma. National data and data from other states reveal these same disparities associated with gender, education, and income.² Why the prevalence data consistently show statistically significant increasing trends from 2000-2008 among females and all income and education groups is less clear.

Among adults there appear to be significant increases in the prevalence of asthma among most groups; however, the prevalence of asthma is increasing faster for some groups compared with others. Based on the slope of the best lines of fit from the trend analyses, it appears that from 2000 to 2008 the prevalence of asthma increased:

- 13.8 times faster among women than men
- 4.7 times faster among those whose household income is less than \$25,000 per year compared with those whose household income is at least \$25,000 per year
- 3.2 times faster among adults with less than a high school degree compared with graduates
- 4.7 times faster among the uninsured compared with the insured.

Asthma Prevalence Among Children <18 Years Old

Figure 1.1.9
Prevalence of current asthma among children <18 years old by demographic and socioeconomic factors - New Hampshire, 2006-2008



Data Source: 2006-2008 NH BRFS

Current Asthma Prevalence Among Children:

The most important factors associated with differences in prevalence of current asthma among children appear to be age and household income.

- **Age:** Since the diagnosis of asthma is based on a history of asthma symptoms as well as lung function tests, it is expected that there will be an increase in prevalence by age among children. This is expected because it takes time to establish a history of symptoms (sometimes several years) and it can be difficult to perform the lung function test on young children needed to confirm diagnosis.
- **Household Income:** Children who live in households that earn less than \$25,000 per year were 1.7 times more likely than children who live in households that earn at least \$25,000 per year to have current asthma, 13.0% versus 7.5%.
- No statistically significant differences are seen by gender or age and gender. However, studies show that asthma prevalence estimates tend to be higher in boys than girls among children 0-14 years old, and that girls tend to have a higher prevalence from 15-17 years old.^{3,4,5} Several reasons are suggested for these differences, including:
 - *Sex hormones* – there is conflicting evidence on whether these have a beneficial⁶ or negative^{7,8} impact on developing asthma.⁹
 - *Lung development* – airways are not as developed in young males as in young females.¹⁰
 - *Genetics* – at least one study has suggested a gene on the X chromosome is related to asthma.¹¹ Other studies suggest asthma is linked to genes that are not on the sex chromosomes.^{12,13,14}

See Table 1.1.4 at the end of this chapter for point estimates and confidence intervals for data presented in Figure 1.1.9.

Child Asthma Prevalence Trends

Historically, states have tracked the prevalence of asthma among children using different survey methods making it difficult to assess trends over time. The following three surveys can estimate the prevalence of asthma among children in New Hampshire: the Behavioral Risk Factor Surveillance System (BRFSS) survey, the National Survey of Children’s Health (NSCH), and the Youth Tobacco Survey (YTS).

From the 2002-2004 BRFSS, the estimated prevalence was based on the percent of households with children (not individual children) who had asthma. Starting in 2005, a more accurate prevalence could be estimated by adding the Random Child Selection and Child Asthma Prevalence Modules to the BRFSS. The Random Child Selection Module randomly selects a child in the household to be the subject of the interview, and the Child Asthma Prevalence Module asks if a doctor, nurse or other health professional has ever said that the child has asthma and if they still have asthma. The survey design and questions are different from the 2002-2004 BRFSS and both these modules have to be used together to arrive at an accurate child prevalence estimate. Because all states do not add both these modules to their BRFSS every year, national estimates using the BRFSS cannot be obtained.

The National Survey of Children’s Health (NSCH) is another instrument used to estimate the prevalence of asthma. It can provide both state and national estimates, but it has only been conducted twice – in 2003 and again in 2007.

Unlike the BRFSS and NSCH, the Youth Tobacco Survey (YTS) provides asthma prevalence estimates based on responses from children in middle and high school. The BRFSS and NSCH estimate asthma prevalence for children 0-17 years old based on responses from the child’s parent or guardian. National estimates cannot be obtained from this survey because not all states ask about asthma on their YTS.

The table below summarizes the changes that have occurred in the questions asked and the child population used to calculate prevalence using the BRFSS, NSCH and YTS. It is also important to note that each of these surveys uses different methods to collect the data so that comparisons across data sources should be made with caution; it is more appropriate to look at changes that occur over time within each survey than to compare the results from one survey to another.

Lifetime and Current Childhood Asthma Prevalence Questions

2002-2008 BRFSS and 2003 & 2007 NSCH

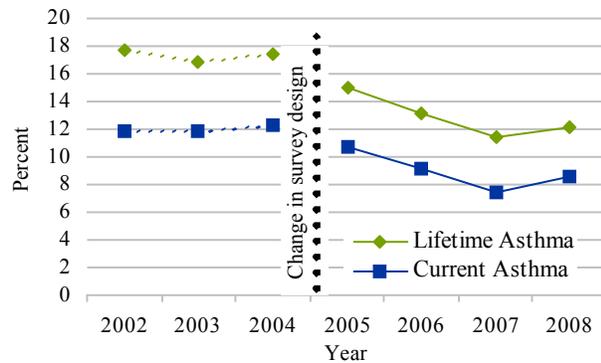
Years	Child Population	Lifetime Prevalence Question	Current Prevalence Question
2002-2004 BRFSS	All non-institutionalized children 0-17 living in a household	How many of these children have ever been diagnosed with asthma?	Does this child/ how many of these children still have asthma?
2005- present BRFSS and 2003 & 2007 NSCH	One randomly selected non-institutionalized child 0-17 years old in the household	Has a doctor, nurse or other health professional ever said that the child has asthma?	Does the child still have asthma?
2004, 2007, & 2009 YTS	Randomly selected children in public middle and high schools. In 2009, only high school students were surveyed	Has a doctor, nurse or other health professional ever said you had asthma?	Do you still have asthma?

See Appendix A for a complete description of these data sources.

Child Lifetime and Current Asthma Trends:

Because of the changes made in the BRFSS survey design and questions asked, more years of data are needed to assess if there are significant trends in the data.

Figure 1.1.10
Trend in prevalence of lifetime and current asthma among children <18 years old - New Hampshire, 2002-2008



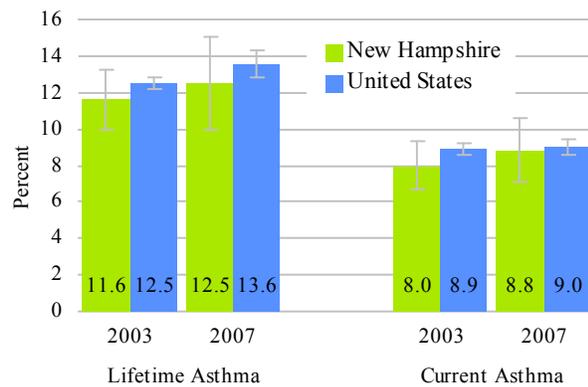
Data Source: 2002-2008 NH BRFSS

Notes: Child prevalence estimates prior to 2005 were estimated based on the percent of households with children who had asthma.

Child Lifetime and Current Asthma in New Hampshire versus the United States:

Data from the 2003 & 2007 NSCH show that there are no statistically significant differences between NH and US lifetime and current asthma prevalence estimates for children less than 18 years old.

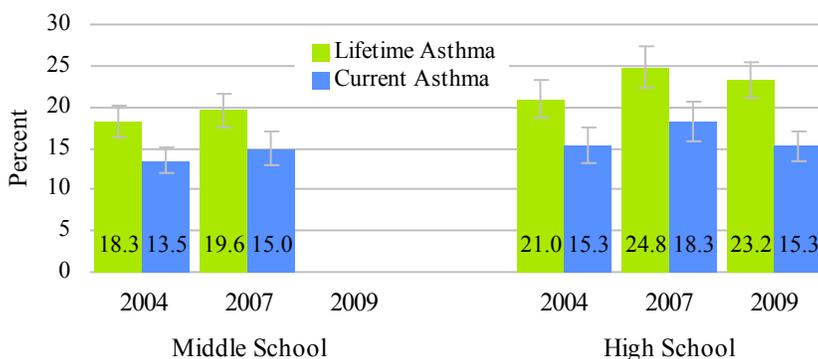
Figure 1.1.11
Prevalence of lifetime and current asthma among children <18 years old - New Hampshire and the United States, 2003 & 2007



Data Source 2003 & 2007 NSCH

See Tables 1.1.5 and 1.1.6 at the end of this chapter for point estimates and confidence intervals for data presented in Figures 1.1.10 and 1.1.11.

Figure 1.1.12
Prevalence of lifetime and current asthma among middle and high school students - New Hampshire 2004, 2007, & 2009



Data Source: 2004, 2007 & 2009 YTS

* In 2009, only High School Students were surveyed.

Adolescent Lifetime and Current Asthma:

In both the BRFSS and NSCH, the data are reported by a parent or guardian and not the child. In the Youth Tobacco Survey (YTS), data are reported by the child. Figure 1.1.12 shows asthma prevalence estimates as reported by middle and high school students in 2004, 2007 & 2009.

There are no statistically significant differences between the prevalence estimates for middle and high school students. The asthma prevalence estimates from the YTS are higher than those from the BRFSS and NSCH. There are several reasons for this including:

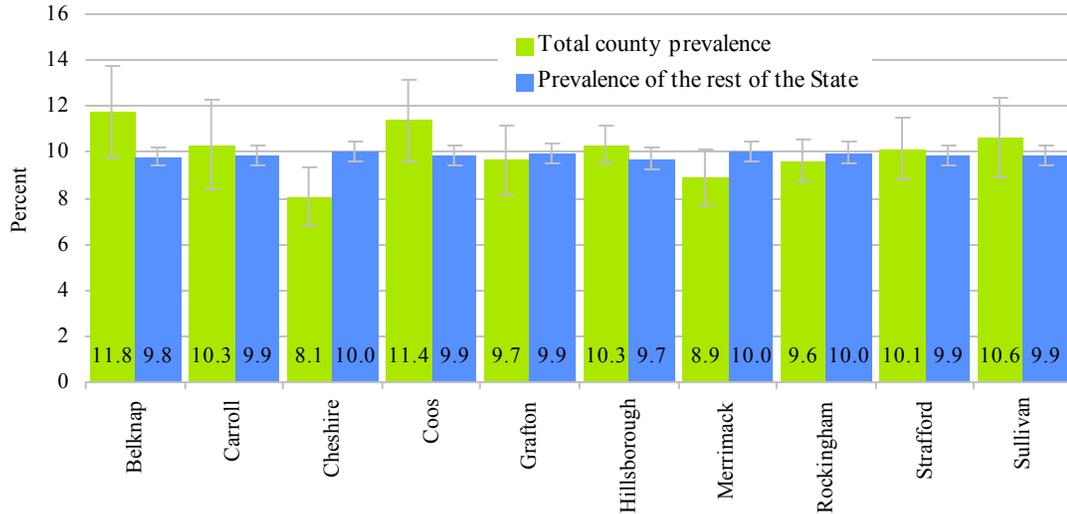
- Methods of administration are different: both the BRFSS and NSCH are telephone surveys and the YTS is a paper survey that is administered in schools.
- Respondents are different: the parent or guardian is the respondent for both the BRFSS and NSCH, and the child is the respondent for the YTS.
- Question order: questions preceding the item of interest can influence the response to subsequent questions. The questions that precede the asthma questions are different in each of these surveys.

Since the design and administration of the YTS, BRFSS and NSCH are different from each other, comparisons across data sources should be made with caution. It is more appropriate to look at changes that occur over time within each survey than to compare the results from one survey to another.

See Table 1.1.7 at the end of this chapter for point estimates and confidence intervals for data presented in Figure 1.1.12.

Asthma Prevalence by County

Figure 1.1.13
Total current asthma prevalence by county compared with the rest of the State -
New Hampshire, 2005-2008



Data Source: 2005-2008 NH BRFSS

Current Asthma Prevalence by County:

For total current asthma prevalence, which includes both children and adults, there is a statistically significant differences between Cheshire County and the rest of the State. See Appendix B for technical notes and methods used to calculate the total prevalence for each county. The prevalence estimates for the rest of the State vary because the county that it is compared with is excluded from the analysis. This allows us to compare mutually exclusive categories and is more likely to show differences if they exist.

Estimates of current asthma for adults and children, and the calculated total prevalence are available in Table 1.1.8 located at the end of this chapter.

For adults, there are no statistically significantly differences between counties and the rest of the State; however, some counties have statistically significantly higher rates compared with other counties. Cheshire and Merrimack have the lowest adult asthma prevalence estimates and Belknap and Coos have the highest.

For children, Cheshire County has a statistically significant lower prevalence than the rest of the State; however, unlike adults, no statistically significant differences were observed between counties for children.

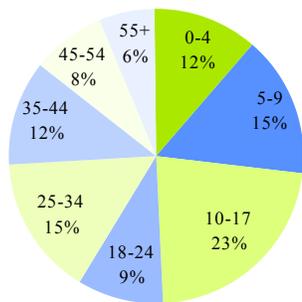
1.2 Asthma Incidence

Based on results of Section 1.1 Asthma Prevalence in this chapter, we know that the prevalence of asthma is increasing in New Hampshire; however, an increase in asthma prevalence does not by itself imply that the incidence of asthma - the number or rate of new cases - is increasing. Asthma prevalence – the proportion of people with asthma in a given time period – is related to both the number of new cases of asthma in a given time period as well as the duration of the disease in individuals over time: an increase in either of these factors increases asthma prevalence. To understand whether the number of new cases of asthma each year is increasing, we must measure asthma incidence.

Age of First Diagnosis of Asthma

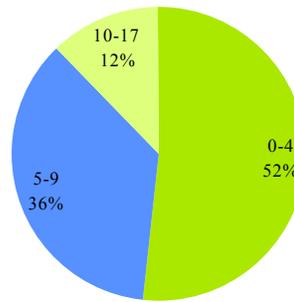
Age of first diagnosis of asthma is based on responses to the following question in the NH BRFSS Adult and Child Call-back Surveys: “How old were you when you were first told by a doctor or other health professional that you had asthma?”

Figure 1.2.1
Age of asthma diagnosis among adults 18+ years old with lifetime asthma - New Hampshire, 2006-2008



Data Source: 2006-2008 NH BRFSS Adult Asthma Call-back Survey

Figure 1.2.2
Age of asthma diagnosis among children <18 years old with lifetime asthma - New Hampshire, 2006-2008



Data Source: 2006-2008 NH BRFSS Child Asthma Call-back Survey

Age of Asthma Diagnosis Among Adults: Many adults in New Hampshire were diagnosed with asthma as a child (49%); however, as seen in Figure 1.2.1, asthma can develop and manifest at any time across the life span.

Age of Asthma Diagnosis among Children: The majority of children who have ever been diagnosed with asthma were diagnosed when they were 0-4 years old (52%).

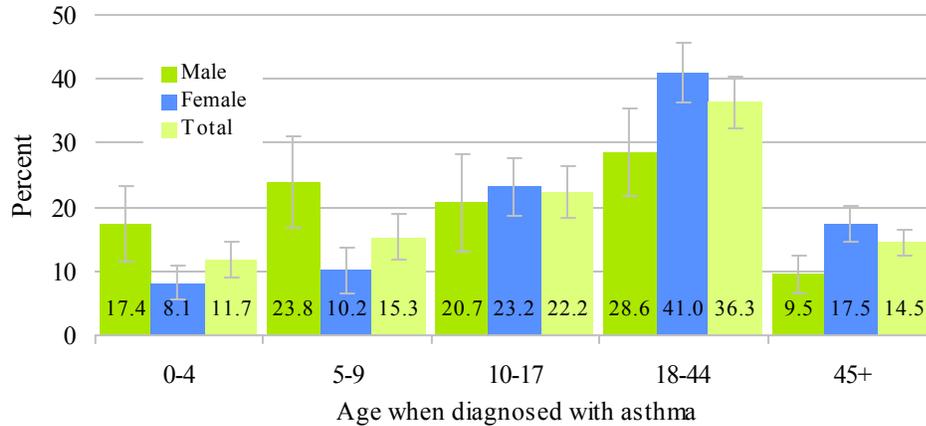
Note of Caution: It is important to use caution when interpreting the results from Figures 1.2.1 and 1.2.2. These data are not asthma prevalence estimates: they are the distribution of age at diagnosis based on those responding to the survey. This is important to keep in mind because, for example, if most of the survey respondents were 25-34, then there would be fewer respondents diagnosed at later ages; however, if most respondents were over 65, then there may be a more even distribution of ages at diagnosis.

See Table 1.2.2 at the end of the chapter for point estimates and confidence intervals for data presented in Figures 1.2.1 and 1.2.2.

Age of Asthma Diagnosis among Adults by Gender:

More adult males than females in New Hampshire were diagnosed with asthma when they were 0-9 years old. Conversely, adult females were more likely than males to be diagnosed with asthma after they turned 10.

Figure 1.2.3
Age of asthma diagnosis among adults 18+ years old with lifetime asthma by gender - New Hampshire, 2006-2008

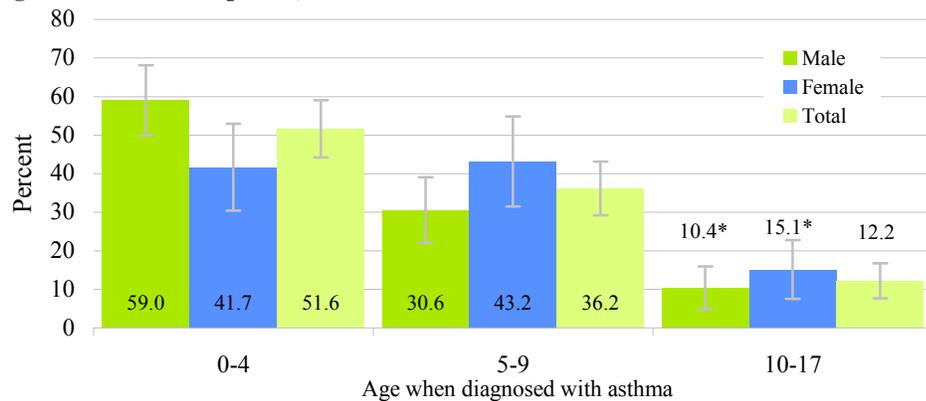


Data Source: 2006-2008 NH BRFSS Adult Asthma Call-back Survey

Age of Asthma Diagnosis Among Children by Gender:

As seen among adults, male children tend to be diagnosed at younger ages than female children.

Figure 1.2.4
Age of asthma diagnosis among children <18 years old with lifetime asthma by gender - New Hampshire, 2006-2008



Data Source: 2006-2008 NH BRFSS Child Call-back Survey

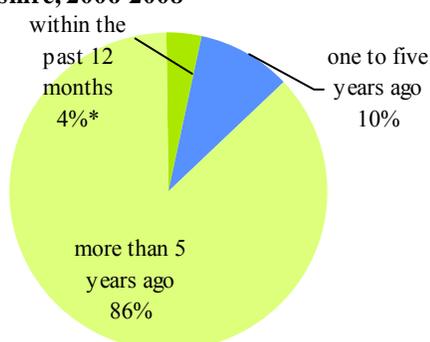
*Relative standard error is greater than 30% - interpret with caution.

See Tables 1.2.3 and 1.2.4 at the end of the chapter for point estimates and confidence intervals for data presented in Figures 1.2.3 and 1.2.4.

Time Since Diagnosed with Asthma

Time since diagnosed with asthma is based on responses to the following question in the NH BRFSS Adult and Child Asthma Call-back Surveys: “How long ago was that? Was it... [within the past 12 months, 1-5 years ago, more than 5 years ago]?” This question follows the question that asks: “How old were you when you were first told by a doctor or other health professional that you had asthma?”

Figure 1.2.5
Time since diagnosed with asthma among adults 18+ years old with current asthma - New Hampshire, 2006-2008

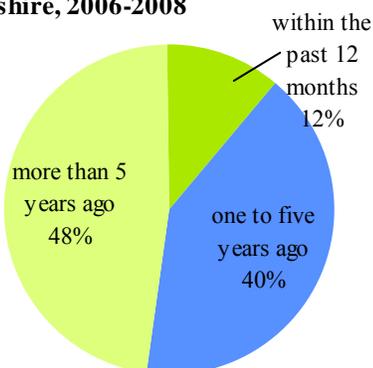


Data Source: 2006-2008 NH BRFSS Adult Asthma Call-back Survey
 *Relative standard error is greater than 30% - interpret with caution

Time Since Diagnosed with Asthma Among Adults:

Very few adults with current asthma indicated they were diagnosed in the last year. Most adults were diagnosed more than five years ago (86%).

Figure 1.2.6
Time since diagnosed with asthma among children <18 years old with current asthma - New Hampshire, 2006-2008



Data Source: 2006-2008 NH BRFSS Child Asthma Call-back Survey

Time Since Diagnosed with Asthma Among Children:

While 88% of children less than 18 years old with current asthma were diagnosed one or more years ago, approximately 12% were diagnosed within the last year.

See Table 1.2.5 at the end of this chapter for point estimates and confidence intervals for data presented in Figures 1.2.5 and 1.2.6.

Calculated Incidence

See Appendix B for the methods used to calculate the incidence of asthma.

Incidence of Asthma among Adults and Children:

On average, 4,000 adults and 3,000 children are diagnosed with asthma every year in New Hampshire.

The asthma incidence rate is approximately 2.5 times higher for children than for adults: 11.0 per 1,000 New Hampshire children at risk of developing asthma versus 4.3 per 1,000 New Hampshire adults at risk of developing asthma.

Although the number of people newly diagnosed with asthma is higher among adults compared with children, the proportion of people who are newly diagnosed is greater among children as seen in Figures 1.2.5 and 1.2.6. The reason the proportion of children is greater even though the number of new cases is smaller is because there are fewer children in New Hampshire than there are adults as seen in Table 1.2.1 below. As a result, the incidence of asthma is greater among children even though the number of new cases is greater among adults. Unfortunately, due to the small sample size, we can not look at incidence rates by demographic and socio-economic status.

The incidence rates in New Hampshire reflect national trends. The Centers for Disease Control and Prevention (CDC) calculated national asthma incidence rates from 1980-1996 using data from the National Health Interview Survey. During this time period, there was an increasing trend in the incidence of asthma nationally, a greater increase among children than adults, and a greater increase among females than males.¹⁵ Although the survey methods used to collect these data are different than the ones used to collect the data presented in Table 1.2.1, the questions that were asked were the same and the results obtained are similar to those listed in the table below.

Table 1.2.1
Average yearly incidence rate of asthma per 1,000 at-risk residents -
New Hampshire 2006-2008

	Average number of new asthma diagnoses each year	Average number of people at-risk of developing asthma each year	Incidence Rate*	95% CI
Adults 18 and older	3,764	871,968	4.3	3.4 - 5.2
Children <18 years old	2,890	262,570	11.0	9.4 - 12.6
Total (Adults and Children)	6,654	1,134,538	5.9	5.2 - 6.6

Data Source: 2006-2008 NH BRFSS & NH BRFSS Adult and Child Asthma Call-back Surveys

*Incidence Rate is per 1,000 at-risk NH residents; at-risk residents are those who had never had a diagnosis of asthma plus those who were diagnosed within the last year.

Additional information:

For information on what causes adult onset asthma and asthma in children, go to the Asthma and Allergy Foundation website at: <http://www.aafa.org/>

Supporting Tables

Table 1.1.1
Prevalence of asthma among adults 18+ years old -
New Hampshire 2008

	Lifetime Asthma		Current Asthma [Figure 1.1.1]	
	Percent	95% CI	Percent	95% CI
Total	15.5	14.3 - 16.7	10.5	9.5 - 11.5
Gender				
Male	11.1	9.4 - 12.8	6.4	5.1 - 7.7
Female	19.6	18.0 - 21.3	14.3	12.8 - 15.8
Age				
18-34	19.0	15.7 - 22.3	11.7	9.0 - 14.3
35-64	15.2	13.8 - 16.5	10.8	9.6 - 11.9
65+	10.8	9.2 - 12.3	7.6	6.3 - 8.9
Household Income				
<\$25,000	23.7	19.8 - 27.6	15.8	12.9 - 18.8
\$25,000+	13.7	12.4 - 15.0	9.3	8.2 - 10.4
Education Level				
Less than high school	22.0	16.0 - 28.0	18.3	12.6 - 23.9
At least high school/ GED	15.1	13.9 - 16.3	10.0	9.0 - 11.0
Employment Status				
Employed	14.4	12.9 - 15.8	9.4	8.2 - 10.5
Unemployed	21.3	12.8 - 29.8	12.7	6.7 - 18.8
Unable to work	32.5	26.1 - 38.9	27.5	21.4 - 33.7
Homemaker/Student	19.8	14.9 - 24.8	14.0	9.6 - 18.5
Retired	11.4	9.5 - 13.3	7.9	6.2 - 9.6
Insurance status				
Employer	14.6	13.1 - 16.0	9.5	8.3 - 10.7
Medicare	13.2	11.1 - 15.3	10.1	8.1 - 12.0
Medicaid	42.6	32.2 - 53.0	35.2	24.8 - 45.6
Other	14.5	10.5 - 18.4	9.8	6.4 - 13.1
No insurance	20.0	15.2 - 24.9	11.6	8.2 - 14.9

Data Source: 2008 NH BRFSS

* Employer = insurance purchased by or paid for through an employer or spouse's employer;
 Other = VA or other military plan, COBRA, or a plan purchased by an individual.

Table 1.1.2
Trend in prevalence of lifetime and current asthma among adults 18+ years old -
New Hampshire and the United States, 2000-2008 [Figure 1.1.2]

	Lifetime Asthma				Current Asthma			
	NH		US		NH		US	
	Percent	95%CI	Percent	95%CI	Percent	95%CI	Percent	95%CI
2000	12.0	10.3 - 13.7	10.4	10.2 - 10.7	8.3	6.9 - 9.7	7.2	7.0 - 7.4
2001	12.5	11.3 - 13.7	11.0	10.8 - 11.2	8.4	7.4 - 9.4	7.2	7.0 - 7.4
2002	13.9	12.8 - 15.0	11.8	11.6 - 12.0	8.7	7.8 - 9.6	7.5	7.3 - 7.7
2003	12.9	11.8 - 14.0	11.9	11.6 - 12.1	8.5	7.6 - 9.4	7.7	7.5 - 7.9
2004	15.0	13.9 - 16.2	13.3	13.1 - 13.6	10.3	9.3 - 11.3	8.1	7.9 - 8.3
2005	14.7	13.5 - 15.8	12.5	12.2 - 12.7	10.3	9.3 - 11.2	7.9	7.7 - 8.0
2006	14.9	13.7 - 16.1	12.8	12.5 - 13.0	9.7	8.8 - 10.7	8.2	8.0 - 8.4
2007	15.0	13.8 - 16.2	13.0	12.7 - 13.2	10.2	9.2 - 11.2	8.2	8.0 - 8.4
2008	15.5	14.3 - 16.7	13.3	13.1 - 13.5	10.5	9.5 - 11.5	8.5	8.3 - 8.6

Trend Analysis								
	Slope	95% CI						
	0.41	0.25 - 0.57	0.33	0.22 - 0.44	0.30	0.17 - 0.43	0.16	0.13 - 0.19
	P-value		P-value		P-value		P-value	
	0.002		<0.001		0.003		<0.001	

Data Source: 2000-2008 NH BRFSS

Note 1: Slight change in question from 2001 to 2002. From 2000-2001 asked, "Did a doctor ever tell you that you had asthma?" and " Do you still have asthma?"; from 2002- present asked, " Have you ever been told by a doctor, nurse or other health professional that you had asthma?" and "Do you still have asthma?"

Note 2: US estimates exclude territories. In 2004, Hawaii did not participate in the BRFSS.

Slope (slope of the best line of fit calculated using JoinPoint Software)= the average percentage point increase or decrease per year (e.g a slope of 1.0 indicates that the prevalence increased on average one percentage point per year).

P-value gives the probability of finding no trend. A p-value of 0.05 or less is considered statistically significant because there is less than a 5% chance that there is no trend in the data.

**Table 1.1.3
Trend in prevalence of current asthma among adults 18+ years old by demographic and socioeconomic factors - New Hampshire, 2000-2008**

Data	2000										2001										2002										2003										2004										2005										2006										2007										2008										Trend Analysis*	
	Percent		95%CI		Percent		95%CI		Percent		95%CI		Percent		95%CI		Percent		95%CI		Percent		95%CI		Percent		95%CI		Percent		95%CI		Percent		95%CI		Percent		95%CI		Slope		95% CI of slope		P-value																																															
NH Total																																																																																												
Gender [Figure 1.1.3]																																																																																												
Male																																																																																												
Female																																																																																												
Age [Figure 1.1.4]																																																																																												
18-34																																																																																												
35-64																																																																																												
65+																																																																																												
Household Income [Figure 1.1.5]																																																																																												
Less than \$25,000																																																																																												
\$25,000+																																																																																												
Education Level [Figure 1.1.6]																																																																																												
Less than high school																																																																																												
At least high school graduate/GED																																																																																												
Employment status [Figure 1.1.7]																																																																																												
Employed																																																																																												
Unemployed																																																																																												
Unable to work																																																																																												
Homemaker/Student																																																																																												
Retired																																																																																												
Insurance Status [Figure 1.1.8]																																																																																												
Insured																																																																																												
Uninsured																																																																																												

Data Source: 2000-2008 NH Behavioral Risk Factor Surveillance System (BRFSS)

* Unless otherwise noted, the trend analyses were conducted for the entire time period (2000 to 2008).

Slope (slope of the best line of fit calculated using JoinPoint Software) = the average percentage point increase or decrease per year (e.g. a slope of 1.0 indicates that the prevalence increased on average one percentage point per year).

P-value gives the probability of finding no trend. A p-value of 0.05 or less is considered statistically significant because there is less than a 5% chance that there is no trend in the data.

† There was not a statistically significant trend in the data from 2000 to 2008; however, there was a statistically significant trend from 2001-2006.

‡ Relative standard error is greater than 30% - interpret with caution.

Table 1.1.4
Prevalence of current asthma among children <18 years old by demographic and socioeconomic factors - New Hampshire, 2006-2008 [Figure 1.1.9]

	Percent	95% CI
Total	8.4	7.5 - 9.3
Gender		
Male	9.4	8.1 - 10.8
Female	7.4	6.2 - 8.7
Age		
0-4	4.6	3.2 - 5.9
5-14	9.0	7.7 - 10.2
15-17	12.0	9.4 - 14.3
Age and Gender		
0-4 Male	6.1	3.9 - 8.3
0-4 Female	2.9	1.5 - 4.4
5-14 Male	11.0	8.7 - 12.8
5-14 Female	7.3	5.7 - 8.8
15-17 Male	10.0	7.3 - 13.6
15-17 Female	13.0	9.5 - 17.3
Household Income		
<\$25,000	13.0	9.8 - 16.2
\$25,000+	7.5	6.5 - 8.4

Data Source: 2006-2008 NH BRFSS

Table 1.1.5
Trend in prevalence of lifetime and current asthma among children <18 years old - New Hampshire, 2002-2008 [Figure 1.1.10]

	Lifetime Asthma		Current Asthma	
	Percent	95%CI	Percent	95%CI
2002	17.7	15.7 - 19.7	11.9	10.1 - 13.6
2003	16.8	14.9 - 18.8	11.8	10.2 - 13.5
2004	17.5	15.5 - 19.5	12.3	10.5 - 14.0
2005	15.0	13.1 - 17.0	10.7	9.0 - 12.3
2006	13.1	11.2 - 14.9	9.1	7.4 - 10.7
2007	11.4	9.6 - 13.2	7.5	6.0 - 9.1
2008	12.1	10.3 - 13.8	8.6	7.0 - 10.2

Data Source: 2002-2008 NH BRFSS

Note: Child prevalence estimates prior to 2005 were estimated based on the percent of households with children who had asthma.

Table 1.1.6
Prevalence of lifetime and current asthma among children <18 years old - New Hampshire and the United States, 2003 & 2007 [Figure 1.1.11]

	Lifetime Asthma				Current Asthma			
	NH		US		NH		US	
	Percent	95%CI	Percent	95%CI	Percent	95%CI	Percent	95%CI
2003	11.6	10.0 - 13.2	12.5	12.1 - 12.8	8.0	6.7 - 9.3	8.9	8.6 - 9.2
2007	12.5	10.0 - 15.0	13.6	12.8 - 14.4	8.8	7.0 - 10.6	9.0	8.5 - 9.5

Data Source: 2003 & 2007 National Survey of Children's Health (NSCH)

Table 1.1.7
Prevalence of lifetime and current asthma among middle and high school students - New Hampshire, 2004, 2007, & 2009 [Figure 1.1.12]

	Lifetime Asthma				Current Asthma			
	Middle School		High School		Middle School		High School	
	Percent	95% CI	Percent	95% CI	Percent	95% CI	Percent	95% CI
2004	18.3	16.4 - 20.2	21.0	18.6 - 23.4	13.5	11.9 - 15.2	15.3	13.0 - 17.6
2007	19.6	17.5 - 21.7	24.8	22.3 - 27.3	15.0	12.8 - 17.1	18.3	15.9 - 20.8
2009	Data Not Available		23.2	21.0 - 25.4	Data Not Available		15.3	13.5 - 17.2

Data Source: 2004, 2007, & 2009 Youth Tobacco Survey (YTS)

Note: In 2009, the survey was only conducted in high schools.

Table 1.1.8
Current asthma prevalence by county compared to the rest of the State - New Hampshire, 2005-2008
 [Figure 1.1.13]

County:		Adults		Children		Total*	
		County Prevalence	Prevalence for the rest of the State	County Prevalence	Prevalence for the rest of the State	County Prevalence	Prevalence for the rest of the State
Belknap	Percent	12.8	10.0	7.8	9.0	11.8	9.8
	95 % CI	10.3 - 15.4	9.5 - 10.6	4.5 - 11.1	8.2 - 9.9	9.8 - 13.8	9.4 - 10.2
Carroll	Percent	9.7	10.2	12.0	8.9	10.3	9.9
	95 % CI	7.6 - 11.9	9.7 - 10.7	7.3 - 16.7	8.0 - 9.7	8.4 - 12.3	9.5 - 10.3
Cheshire	Percent	8.6	10.3	6.0	9.1	8.1	10.0
	95 % CI	7.1 - 10.0	9.7 - 10.8	3.7 - 8.3	8.3 - 10.0	6.8 - 9.3	9.6 - 10.5
Coos	Percent	12.1	10.1	8.5	9.0	11.4	9.9
	95 % CI	10.0 - 14.3	9.6 - 10.6	5.3 - 11.8	8.1 - 9.8	9.6 - 13.2	9.4 - 10.3
Grafton	Percent	9.6	10.2	9.9	8.9	9.7	9.9
	95 % CI	7.8 - 11.4	9.7 - 10.7	6.4 - 13.3	8.1 - 9.7	8.1 - 11.2	9.5 - 10.4
Hillsborough	Percent	10.9	9.8	8.3	9.3	10.3	9.7
	95 % CI	9.9 - 12.0	9.3 - 10.4	6.9 - 9.7	8.3 - 10.3	9.5 - 11.1	9.3 - 10.2
Merrimack	Percent	8.6	10.4	9.9	8.8	8.9	10.0
	95 % CI	7.2 - 10.0	9.8 - 10.9	7.1 - 12.6	8.0 - 9.7	7.7 - 10.1	9.6 - 10.5
Rockingham	Percent	9.7	10.3	9.4	8.8	9.6	10.0
	95 % CI	8.6 - 10.8	9.7 - 10.9	7.5 - 11.3	7.9 - 9.7	8.7 - 10.5	9.5 - 10.5
Strafford	Percent	10.3	10.1	9.4	8.9	10.1	9.9
	95 % CI	8.7 - 12.0	9.6 - 10.7	6.8 - 12.1	8.1 - 9.8	8.8 - 11.5	9.4 - 10.3
Sullivan	Percent	10.8	10.1	9.9	9.8	10.6	9.9
	95 % CI	8.7 - 12.9	9.6 - 10.7	6.2 - 13.6	8.9 - 10.7	8.9 - 12.4	9.5 - 10.3
Urban Areas:							
Manchester	Percent	11.8	10.0				
	95 % CI	9.7 - 14.0	9.5 - 10.5				
Nashua	Percent	11.5	10.1	Data Not Available			
	95 % CI	9.3 - 13.8	9.6 - 10.6				
Rest of Hillsborough	Percent	10.4	10.2				
	95 % CI	9.0 - 11.7	9.6 - 10.7				
State Prevalence	Percent	10.2	Not Applicable	9.0	Not Applicable	9.9	Not Applicable
	95 % CI	9.7 - 10.7		8.1 - 9.8		9.5 - 10.3	

Data Source: 2005-2008 NH BRFSS

* Calculated based on the prevalence of asthma among adults and children; see Appendix B for technical notes and methods used.

Table 1.2.2
Age of asthma diagnosis among adults 18+ years old and children <18 years old with lifetime asthma - New Hampshire, 2006-2008

Age when diagnosed	Adults [Figure 1.2.1]		Children [Figure 1.2.2]	
	Percent	95% CI	Percent	95% CI
0-4	11.7	8.8 - 14.5	51.6	44.2 - 59.1
5-9	15.3	11.8 - 18.9	36.2	29.2 - 43.2
10-17	22.2	18.2 - 26.3	12.2	7.7 - 16.7
18-24	9.2	6.9 - 11.5		
25-34	15.5	12.6 - 18.5		
35-44	11.6	9.4 - 13.8	Not Applicable	
45-54	8.5	6.8 - 10.1		
55+	6.0	4.8 - 7.3		

Data Source: 2006-2008 NH BRFSS Adult Asthma Call-back Survey

Table 1.2.3

Age of asthma diagnosis among adults 18+ years old with lifetime asthma by gender - New Hampshire 2006-2008 [Figure 1.2.3]

	Male		Female		Total	
	Percent	95% CI	Percent	95% CI	Percent	95% CI
0-4	17.4	11.5 - 23.3	8.1	5.5 - 10.8	11.7	8.8 - 14.5
5-9	23.8	16.7 - 30.9	10.2	6.6 - 13.8	15.3	11.8 - 18.9
10-17	20.7	13.1 - 28.4	23.2	18.7 - 27.6	22.2	18.2 - 26.3
18-44	28.6	21.7 - 35.4	41.0	36.4 - 45.6	36.3	32.4 - 40.2
45+	9.5	6.4 - 12.6	17.5	14.7 - 20.3	14.5	12.4 - 16.6

Data Source: 2006-2008 NH BRFSS Adult Asthma Call-back Survey

Table 1.2.4

Age of asthma diagnosis among children <18 years old with lifetime asthma by gender - New Hampshire 2006-2008 [Figure 1.2.4]

	Male		Female		Total	
	Percent	95% CI	Percent	95% CI	Percent	95% CI
0-4	59.0	49.9 - 68.1	41.7	30.4 - 52.9	51.6	44.2 - 59.1
5-9	30.6	22.0 - 39.1	43.2	31.5 - 54.9	36.2	29.2 - 43.2
10-17	10.4*	4.9 - 15.9	15.1*	7.5 - 22.8	12.2	7.7 - 16.7

Data Source: 2006-2008 NH BRFSS Child Asthma Call-back Survey

* Relative standard error is greater than 30% - interpret with caution.

Table 1.2.5

Time since diagnosed with asthma among those with current asthma - New Hampshire 2006-2008

	Adults		Children	
	[Figure 2.2.1]		[Figure 2.2.2]	
	Percent	95% CI	Percent	95% CI
within the past 12 months	3.6*	1.7 - 5.6	11.5	6.5 - 16.6
one to five years ago	9.7	6.9 - 12.6	40.4	31.6 - 49.1
more than 5 years ago	86.7	83.3 - 90.0	48.1	39.4 - 56.8

Data Source: 2006-2008 NH BRFSS Adult & Child Call-back Surveys

*Relative standard error is greater than 30% - interpret with caution.

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