Asthma in Iowa Burden Report

Surveillance Sub-Reports

Adult Asthma Prevalence: BRFSS Adult Data: 1999-2006
Adult Asthma Prevalence Data Tables

Child and Youth Asthma Prevalence Report: 2001-2006

Adult and Child Inpatient Hospitalizations from Asthma: 1995-2006

Adult and Child Asthma-Related Deaths: 1979-2007

Iowa Department of Public Health
2007-2009

Asthma in Iowa

Adult Asthma Surveillance Report

Iowa Behavioral Risk Factor Surveillance System (BRFSS) Data : 1999-2006

Center for Health Statistics
Iowa Department of Public Health
2007
Web Site: http://www.idph.ia.us/hpcdp/asthma.asp

In this Chapter on Adult Asthma Prevalence:

How many adults have asthma?

What are the risk factors for having asthma?

Who does well and who does poorly at managing their asthma?

Chapter Contents: Narrative and Charts

Chapter Appendix **Adult BRFSS Tables**

Background on Asthma Prevalence

For reasons not completely understood, asthma prevalence (the percentage of people with diagnosed asthma during the past year) in the U.S. has doubled since 1979 making asthma a profound and expensive public health problem. More than 200,000 Iowans, including 148,000 Iowa adults, have diagnosed asthma. Some studies suggest that as much as half of all asthma remains undiagnosed.

Characterized by wheezing, coughing, chest tightness and shortness of breath, asthma symptoms may range from mild to severe. In extreme cases, asthma can be life-threatening.

When poorly managed over the long term, asthma can lead to irreversible loss of lung function, similar to that seen in chronic obstructive lung disease in smokers.

While no one yet knows how to prevent people from first developing asthma, proper self and medical management largely avert asthma's ill-effects, allowing those with asthma to maintain healthy and active lives.

Summary of Key Findings from BRFSS

Adult asthma prevalence rates

Iowa adults with the highest asthma prevalence rates are:

- Women, especially minority women;
- Low-income;
- High school dropouts;
- Of poor health overall;
- Current and former smokers; and
- Obese.

Adult asthma prevalence case counts

Adult populations with the highest number of cases (as opposed to the highest rates) of asthma are:

- Women;
- Caucasian (men and women);
- Low or moderate income;
- High school graduates/have at least some college;
- Insured;
- Of poor health overall;
- Never-smokers;
- At least occasional participants in leisure exercises; and
- Obese.

Asthma attack rates

Adults with asthma who are most likely to have had an asthma attack in the past 12 months are:

- Women; and
- Uninsured.

Adults who seek emergency/urgent care for unmanaged symptoms

Those most likely to seek emergency department or urgent medical care for symptoms are:

- Women;
- Low or moderate income;
- Uninsured;
- Of poor heallth overall; and
- Nonparticipants in leisure exercises.

How BRFSS Data are Presented

Estimates of Iowa population rates and counts based on BRFSS sample data

In this chapter, estimated asthma prevalence rates and counts for the Iowa adult population (persons 18 years and older) and the differences between those rates and counts are presented by gender, race, and other key risk factors.

All data are taken from the Iowa Behavioral Risk Factor Surveillance System (BRFSS) database which began to collect information on asthma prevalence in 1999 and on asthma symptoms and on the use of services for asthma care in 2001. (In 2006, CDC initiated the voluntary Asthma Call-Back survey, which means that much of the BRFSS data after 2005 were collected using a different methodology than were data collected between 2001-2005 and may not be entirely comparable to one another. Due to the small sample size of the Asthma Call-Back Survey, data may not be available for subpopulations (race, income, educational attainment subgroups) for several years.)

Estimates of Iowa population rates and counts based on BRFSS sample data

Current asthma prevalence is defined as the number of adults *who have diagnosed asthma at any point during the calendar year*, whether they were diagnosed during that year or previously.

Because the BRFSS collects self-reported data from a representative sample of Iowa adults and not from the whole Iowa population, data presented here are *estimates* of actual Iowa adult population prevalence counts and rates. These estimates are obtained by weighing the sample so that it better reflects the broader population of Iowa adults.

Prevalence rates are given in percentages and are calculated by dividing estimates of the number of adults in a population with asthma by the total number of adults in that population times 100. (e.g., The estimated number of noninstitutionalized women in Iowa with asthma (n=92,100) / total number of noninstitutionalized women in Iowa (n=1,126,000) * 100 = 8.2% prevalence rate among Iowa women 18 years and older.) Asthma (and asthma risk-factors) given here are based on *weighted counts of the number of adults with asthma* (or an asthma risk factor) at the time they were interviewed for the BRFSS--regardless of when their case was diagnosed.

Confidence intervals, statistically significant differences in rates provided

For estimated prevalence rates, 95% confidence intervals are provided in the tables at the end of this chapter.

Confidence intervals are the range of values on either side of the estimated rate that the actual Iowa population value will fall into 95% of the time.

If the confidence intervals do not overlap for any two estimates being compared, one can assume, with 95% confidence, that the difference in values seen for the estimated rates reflects a real difference in those two values for the actual Iowa adult population.

Narrative and charts that identify statistically significant differences refer to rates that have confidence intervals that do not overlap. Confidence intervals for estimated counts are also given. (Confidence intervals, prevalence rates and counts were derived from BRFSS data using the surveymeans procedure of Statistical Analysis System (SAS) software. Tables and charts were constructed in Microsoft Excel.)

Multiple years of data aggregated to stabilize estimates

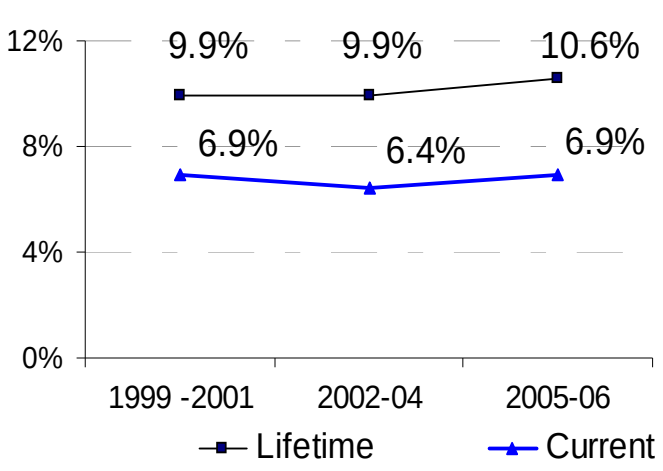
Due to small BRFSS sample size for many subgroups (e.g., race, gender-specific subsamples, etc.), many rates and counts given here are averages of multi-year periods. Multi-year estimates based on larger samples are more stable and have smaller confidence intervals. Smaller confidence intervals allow one to state with greater certainty that the differences found in the estimates reflect real differences in the Iowa population as a whole.

Even when six years of data are aggregreated, BRFSS sample sizes may be very small for specific racial and ethnic minorities--resulting in estimates with wide confidence intervals. As a result, racial and ethnic minorities are sometimes grouped into the category of All Minorities so that statistically significant differences can be measured more readily.

Counts are sometimes rounded for ease of interpretation (e.g., 144,900 may be rounded to 145,000 and 1,380 may be rounded to 1,400).

Current and Lifetime Asthma Prevalence Rates Overall

Current and Lifetime Asthma Prevalence
Average Annualized Rate
per 100 Iowa Adults
1999-2001, 2002-2004, 2005-2006



Iowa adult (18 years and older) current and lifetime asthma prevalence rates show no clear trend up or down between 1999 and 2006.

- Current asthma (sometimes referred to as still-has asthma) and lifetime asthma (sometimes referred to as ever-had asthma) are two terms by which asthma prevalence is most commonly characterized. On average each year between 1999 and 2006, an estimated 148,000 Iowa adults *currently had* asthma while an estimated 223,000 *had ever had* asthma.

(Three and two-year averages were used here to smooth differences in year-to-year rates that are an artifact of small sample size rather than variability in the real rate across time.)

Current and Lifetime Asthma Prevalence
Average Annualized Rates and Counts
per 100 Iowa Adults
1999-2001, 2002-2004, 2005-2006, 1999-2006

	1999-2001	2002-04	2005-06	1999-2006
	Count of Cases			
Lifetime	211,600	221,100	241,400	222,600
Current	147,000	143,200	155,600	147,700
Ratio of Current to Lifetime	.69	.65	.64	.66
	Prevalence Rate /100 Adults			
Lifetime	9.9	9.9	10.6	10.1
Current	6.9	6.4	6.9	6.7

Source: Iowa BRFSS, IDPH

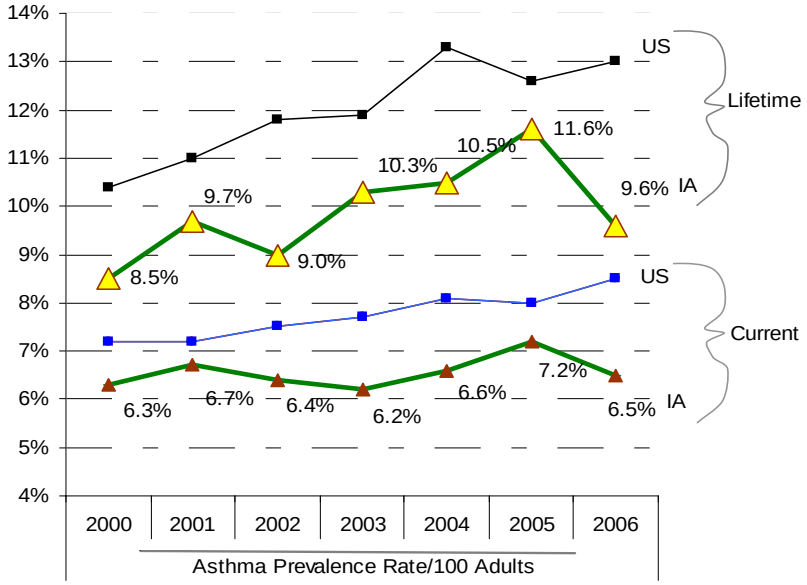
The ratio of Iowa adult current to lifetime asthma prevalence rate shows no clear trend of increase or decrease.

- The ratio of current to lifetime asthma prevalence rates is used as an indication of how well asthma is being controlled, treated and diagnosed. Between 1999-2001 and 2005-06, this rate ratio for Iowa adults varied from .64 to .69. Data do not show a strong trend up or down for this ratio.

Between 2000 and 2006, Iowa's ratios of current asthma to lifetime asthma prevalence are comparable to the national ratios which varied between .61 and .69.

Current and Lifetime Asthma Prevalence Rates, Iowa vs. the U.S.

Annual Prevalence Rate per 100 Iowa Adults, Current and Lifetime Asthma, Iowa
National Median Current and Lifetime median asthma prevalence rate, 2000-2006



Iowa adult current and lifetime asthma prevalence rates are consistently below national rates.

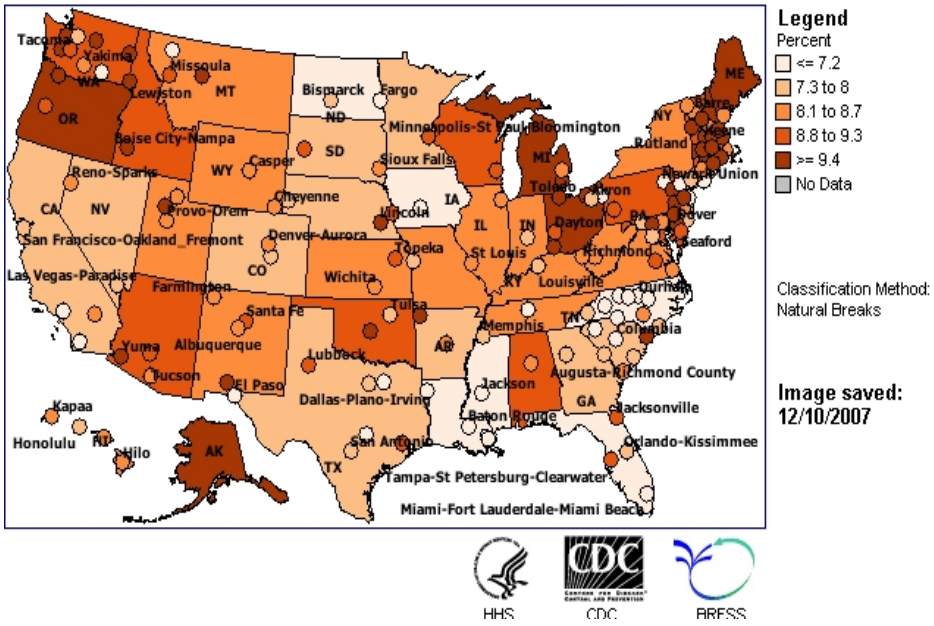
- For all seven years 2000-2006, both Iowa's current and lifetime asthma prevalence rates were below comparable same-year national rates.

- In comparing Iowa to other states, for all years 1999-2006, *for both current and lifetime asthma*, prevalence rates for Iowa adults are in the bottom third of the distribution of all states' comparable same-year rates.

(State and national asthma prevalence estimates are available on the CDC BRFSS program Web Site: http:/www.cdc.gov/brfss. National BRFSS-based adult asthma prevalence estimates are not available before 2000 due to the small number of states collecting asthma data in 1999.)

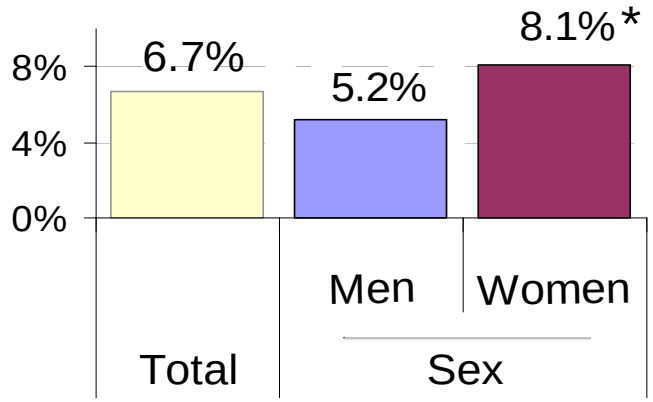
BRFSS Maps
Year - 2006

Percent of adults who reported currently having asthma



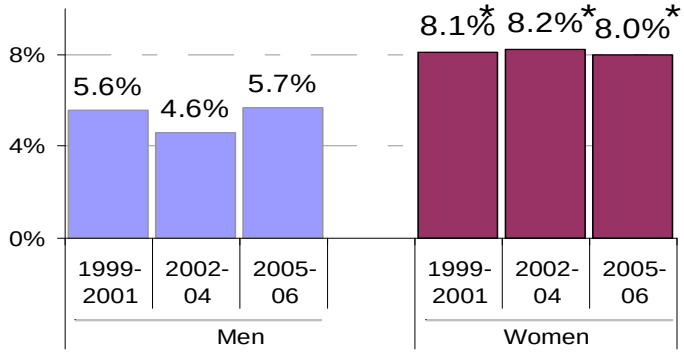
Rates by Sex

By Sex, Average Annualized Current Asthma Prevalence Rate per 100 Adults, Iowa, 1999-2006



*Rate for women statistically higher than that for men

By Sex, Average Annualized Current Asthma Prevalence Rate per 100 Adults, Iowa 1999-2001, 2002-04, 2005-06



*Rate for women statistically higher than that for men for each period.

Iowa women overall are 1.6 times more likely to report having asthma than are men.

- The ratio of the average current asthma prevalence rate for Iowa women to the current asthma prevalence rate for Iowa men (known as relative risk) was 1.6 (8.1 cases/100 women vs. 5.2 cases/100 men) over the 1999-2006 period, meaning women were 1.6 times more likely to have asthma.

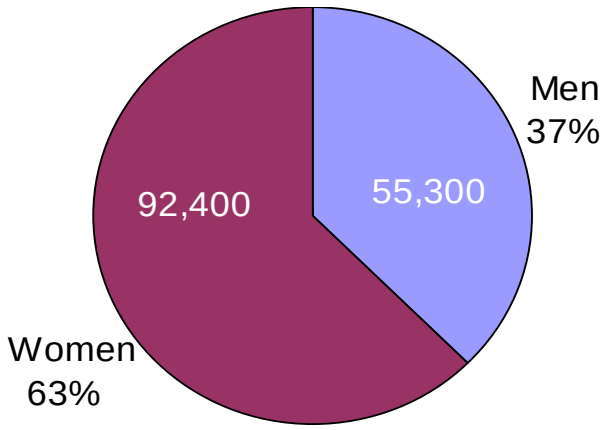
  Nationwide BRFSS data of the annual ratio of current asthma prevalence rates for women to men varied between 1.6 and 1.7 during the years 2001-2004. (National sex-specific BRFSS-based prevalence rates were last published on the CDC asthma program Web Site for 2004.)

- Not only for the overall eight-year period 1999-2006 was the current asthma prevalence rate 60 percent higher for women than men, but for all three periods shown, 1999-2001, 2002-04, and 2005-06, the rate of current asthma prevalence was significantly higher for Iowa women than for Iowa men.

  Similar rate differences between women and men were seen across all states.

Counts by Sex

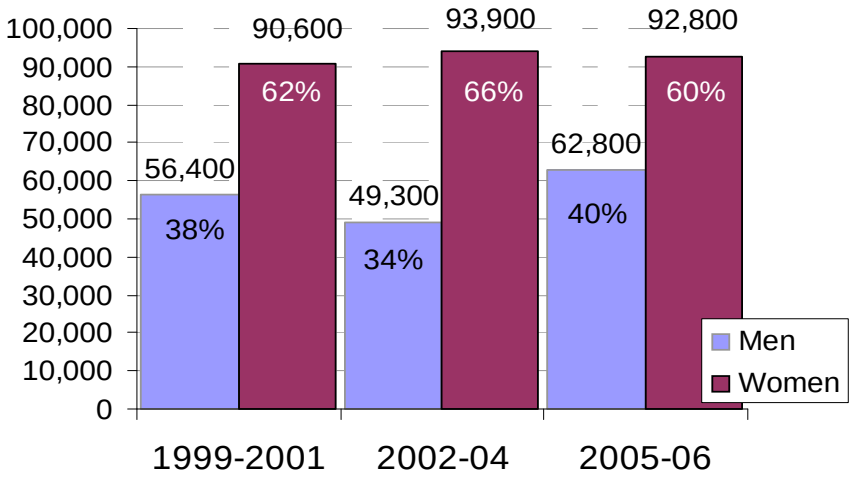
By Sex, Average Annualized Count of Current Asthma Cases, Iowa Adults, 1999-2006



Overall prevalence *count* of Iowa adult cases is 1.8 times greater for women than for men.

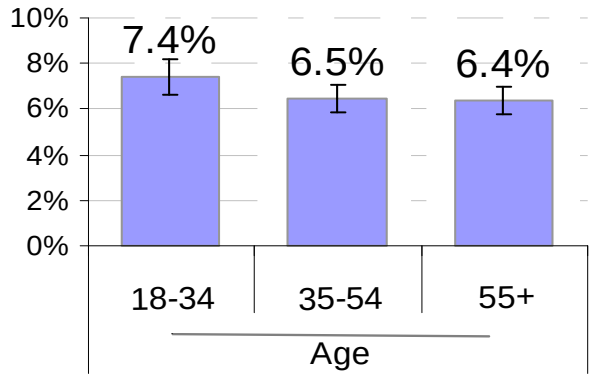
- Of the almost 148,000 average annual *count of current asthma cases* in adults in Iowa between 1999-2006, 92,000 (63%) occurred in women and 55,000 (37%) in men. The ratio of case counts in women vs. men was 92,000/ 55,000=1.74).
- As for prevalence rates, counts of current asthma cases for women exceeded that of men overall and for all strata of age, race, income, and educational attainment and for each of the periods 1999-2001, 2002-04, 2005-06.

By Sex, Average Annualized Count of Current Asthma Cases, Iowa Adults
1999-2001, 2002-2004, 2005-2006



Rates by Age and by Sex/Age

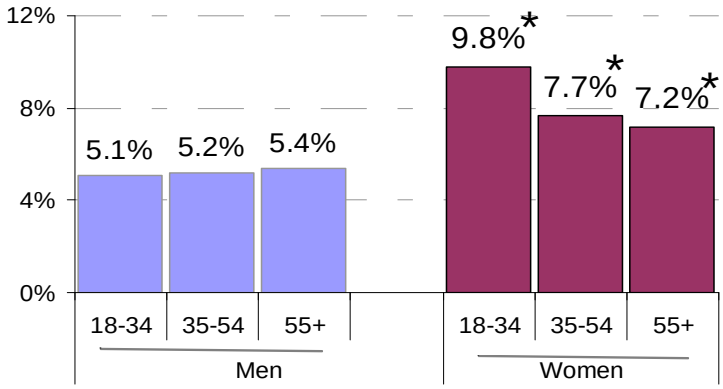
By Age, Average Annualized Current Asthma Prevalence Rate per 100 Adults, Iowa 1999-2006



Overall, differences in adult age-specific asthma prevalence rates are small.

- Overall, differences in age-specific current asthma prevalence rates were small for the 1999-2006 period but rates for the youngest group of adults was slightly higher (7.4%) than for middle-aged (6.5%) and older adults (6.4%).

By Sex & Age, Average Annualized Current Asthma Prevalence Rate per 100 Adults, Iowa 1999-2006



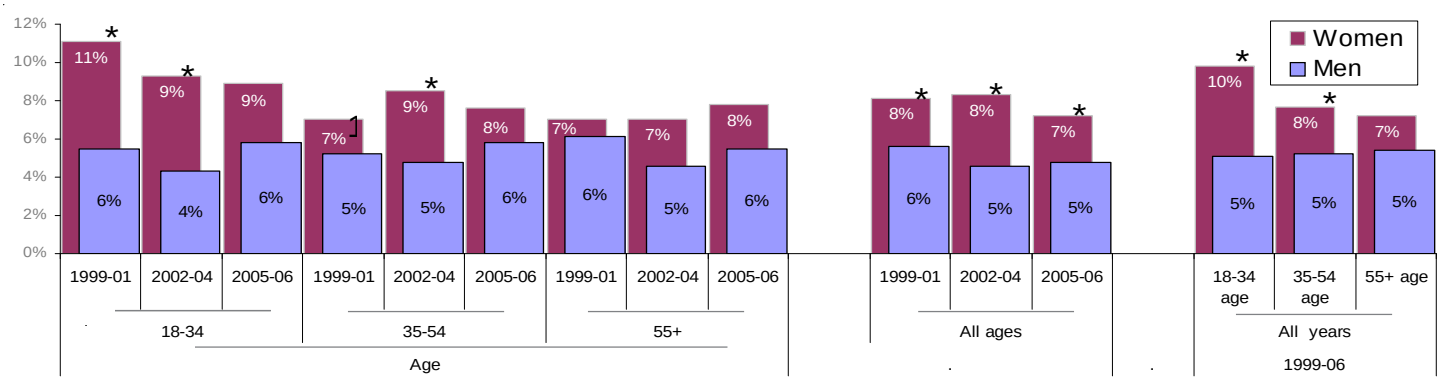
*Rate for women statistically higher than that for men for age group.

Across all years, all socio-demographic risk factors, women have higher rates than men.

- Higher rates of current asthma in young women (9.8%) accounted for all of the increased risk seen for young adults. Among men, rates differed little between age groups (5.1% to 6.4%) . (However, comparisons of age-specific rates by gender and race later in this report uncover statistically significant variability in current asthma prevalence rates between men by race.)

Overall for the period 1999-2006, gender-specific average annual prevalence rates for women were higher than those for men for *not only all* comparable subgroupings of age, but for all subgroupings of race, income and educational attainment. (See later sections in this report.) In children and youth, asthma prevalence rates are higher for males than females. (See chiild and youth report.)

By Year, Age and Sex, Average Annualized Current Asthma Prevalence
Rate per 100 Iowa Adults
1999-2001, 2002-04, 2005-06, 1999-2006



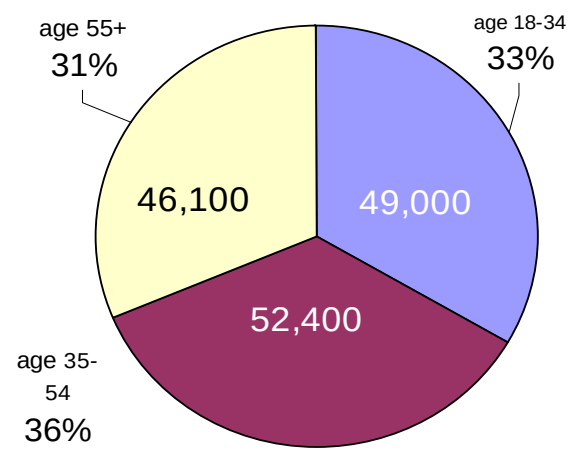
*Rate for women statistically higher than that for men for that same age group and period.

Sex-specific current asthma prevalence rates found Iowa women of all ages for all years at greater risk of current asthma compared to men.

Counts by Age and by Sex/Age

By Age, Average Annualized Current Asthma Case Count, All Iowa Adults

All adults, count by age, 1999-2006

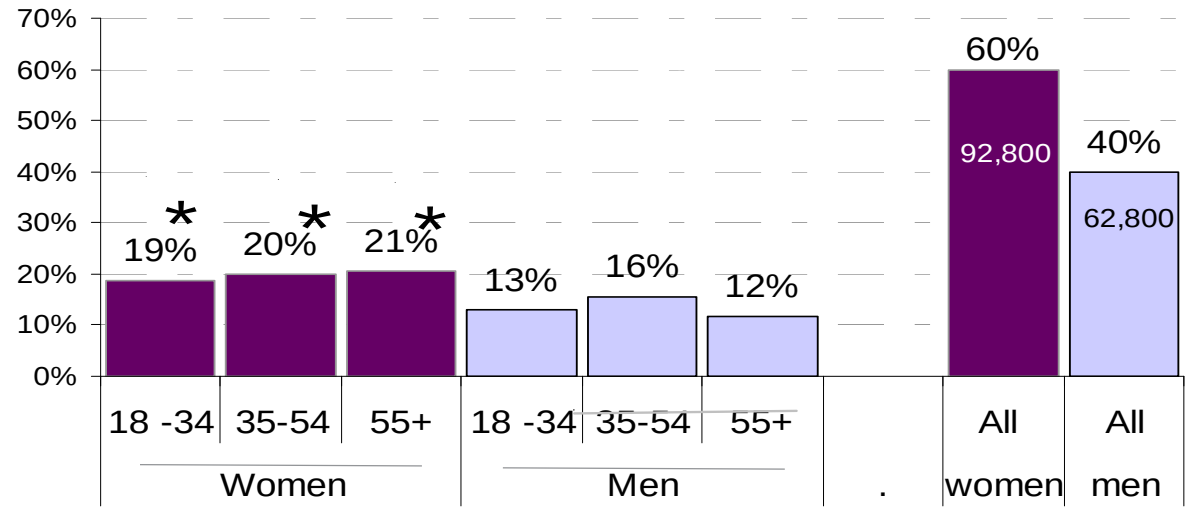


Adult current asthma case counts are relatively evenly distributed across three age groups for the two periods 1999-2006 and 2005-2006.

- As for the overall age-specific current asthma prevalence rates for Iowa adults (with the exception of elevated rates in younger adults) case counts were relatively evenly distributed by age. Of the almost 148,000 asthma cases prevalent in adults in Iowa each year, about one-third occurred in each age group.

However, as for rates, when age-specific case counts were broken down by gender, significant differences between genders became apparent in the count of cases.

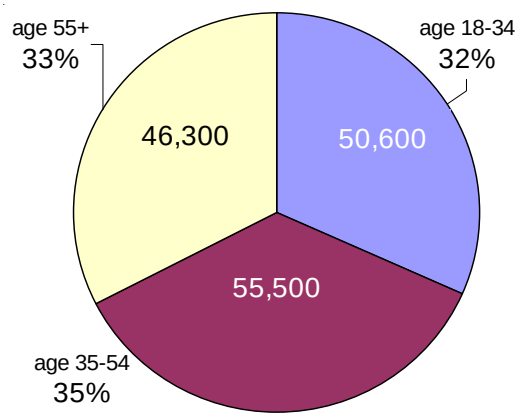
By Age and Sex, Percent Distribution of All Current Asthma Cases, Iowa Adults, 2005-2006



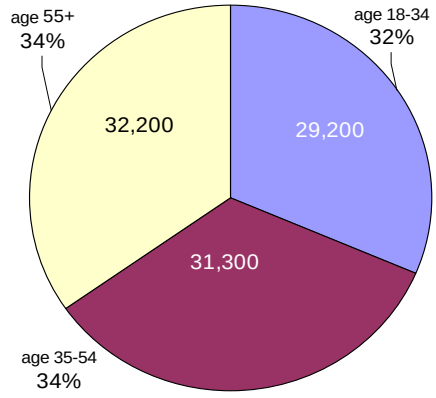
*Percent for women statistically higher than that for men of the same age group.

By Age and Sex, Average Annualized Current Asthma Case Count, Iowa Adults, 2005-2006

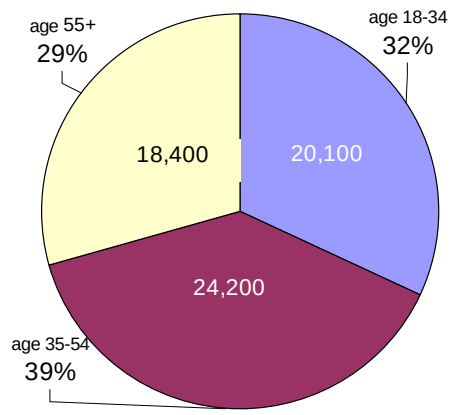
All adults, count by age



For women, count by age



For men, count for by age



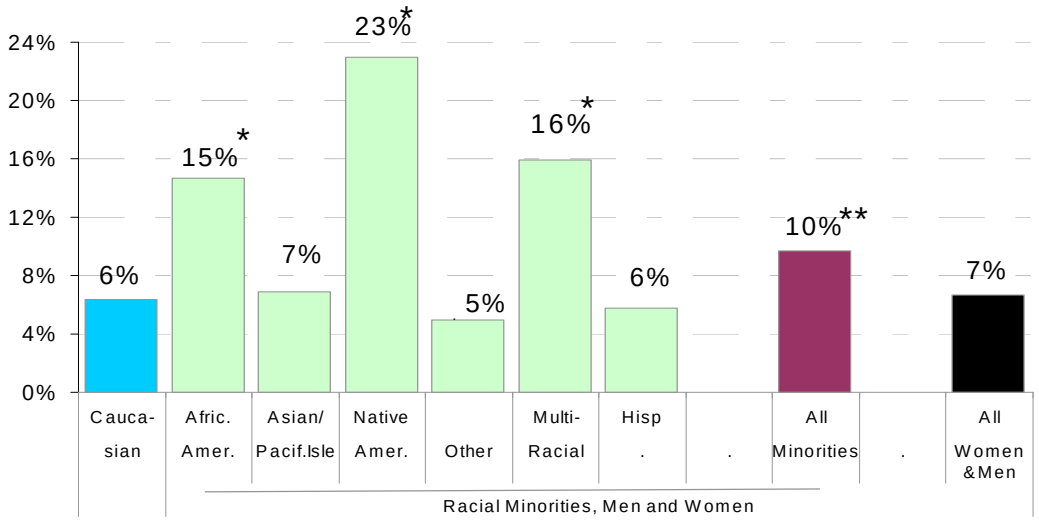
Sex-specific case counts show current asthma prevalence cases to be evenly distributed by age *within* the group of all adult women.

Sex-specific case counts show current asthma prevalence cases to be be some-what less evenly distributed among Iowa men than Iowa women, with middle-aged men accounting for 39% of cases, younger men 29%, and older men for 32% of current asthma cases.

- Even though within-gender comparisons by age show small differences in case counts, especially for women, between-gender comparisons find women to account for 59% of cases among those less than 35 years (29,200 cases in women vs. 20,100 cases in men), 56% of cases among those 35-55 years (31,300 cases in women vs. 24,200 cases in men), and 64% of cases among those more than 55 years of age (32,200 cases in women vs. 18,400 cases in men).
- The average annual case count for young women was 45% higher than that for young men. For middle-aged women the case count was 29% higher than for middle-aged men and for older women (age 55+) the case count was 75% higher than for older men.

Rates by Race

By Race, Average Annualized Current Asthma Prevalence Rate per 100 Adults
Iowa, 2001-2006



*Rate for this race group is statistically higher than rate for Caucasian and Hispanic racial/ethnic groups.

**Rate for All Minorities is statistically higher than rate for Caucasians.

By race, overall current asthma prevalence rates are highest for African-Americans, Native Americans/Alaskans, and Mulit-Racial adults.

- The 2001-2006 asthma prevalence rates for African-American, Native American, and Multi-Racial adults were at least double the current asthma prevalence rates for adults of other racial groups (Caucasian, Asian/Pacific Islander and Hispanic). The elevated rates for African-American, Native American and Mulit-Racial adults were statistically significantly higher than the rates for Causcasian and Hispanic adults

- The overall rate of current asthma prevalence among All Minorities (Hispanic and all racial minority adults) is higher than the rate for Caucasian (10% vs. 7%, difference statistically significant).

  This difference holds true for gender-specific rates as well. All Minority women (12%) vs. Caucasian women (7%); and All Minority men (7%) vs. Caucasian men (5%).

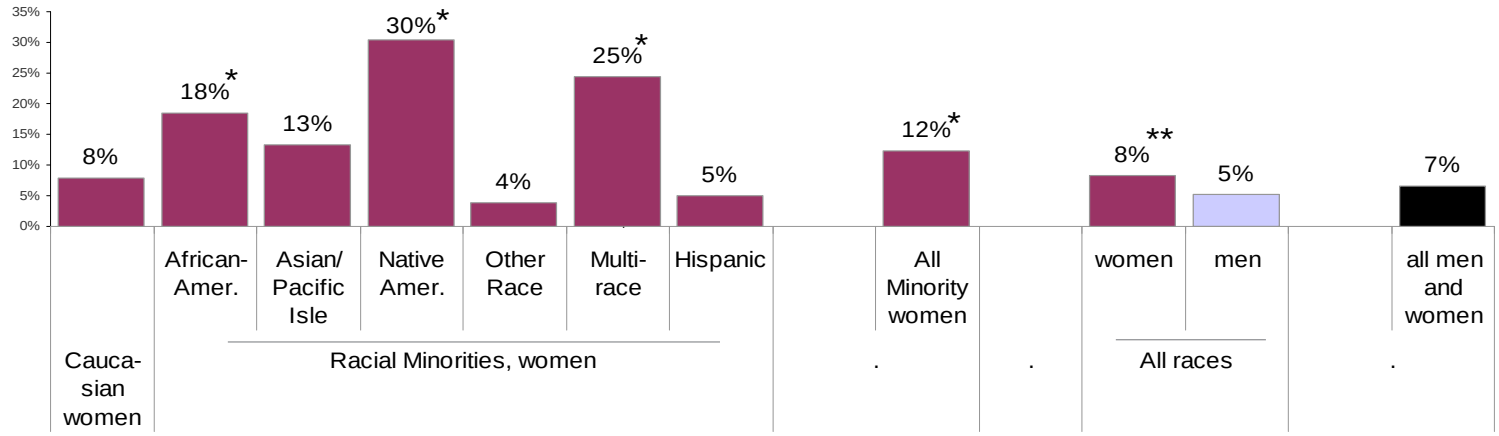
Race-specific rates for women were higher than the rates for men for all racial-ethnic groups with the exception of Hispanics. Hispanic men had a rate slightly higher (7%) than thst of Hispanic women (5%). This difference was not statistically significant. Due to the small sample size for minorities, the only difference in rates between genders of the same race that was statistically significant was that between White men (5%) and White women (8%).

- Within gender comparsions show that race-specific asthma prevalence rates among both men and women are highest for African-Americans, Native Americans and Multi-Racial adults. Rates for women in these three minority racial-ethnic groups were statistically higher than rates for Caucasian women. No race-specific asthma prevalence rate differences between men reached statistical significance.

Rates by Sex/Race

By Gender and Race, Average Annualized Current Asthma Prevalence Rate per 100 Adults
Iowa, 2001-06

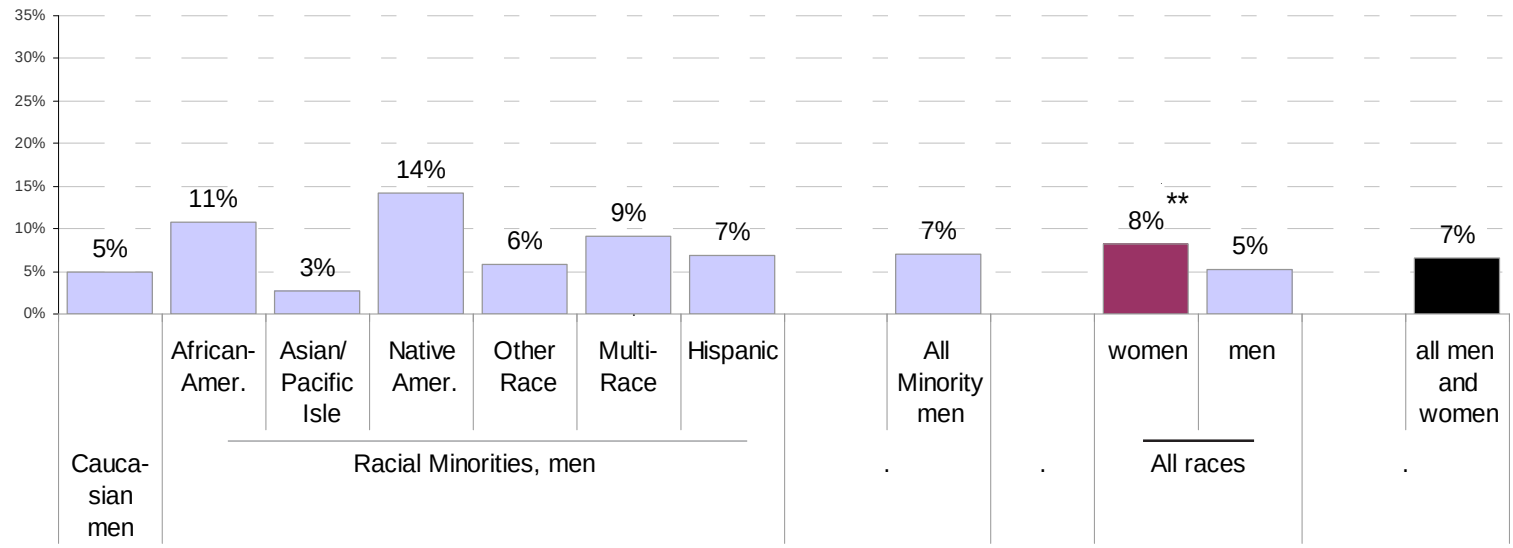
Women, 2001-2006



*Rate for this race group of women is statistically higher than rate for Caucasian and Hispanic women.

**Rate for all women is statistically higher than rate for all men.

Men, 2001-2006

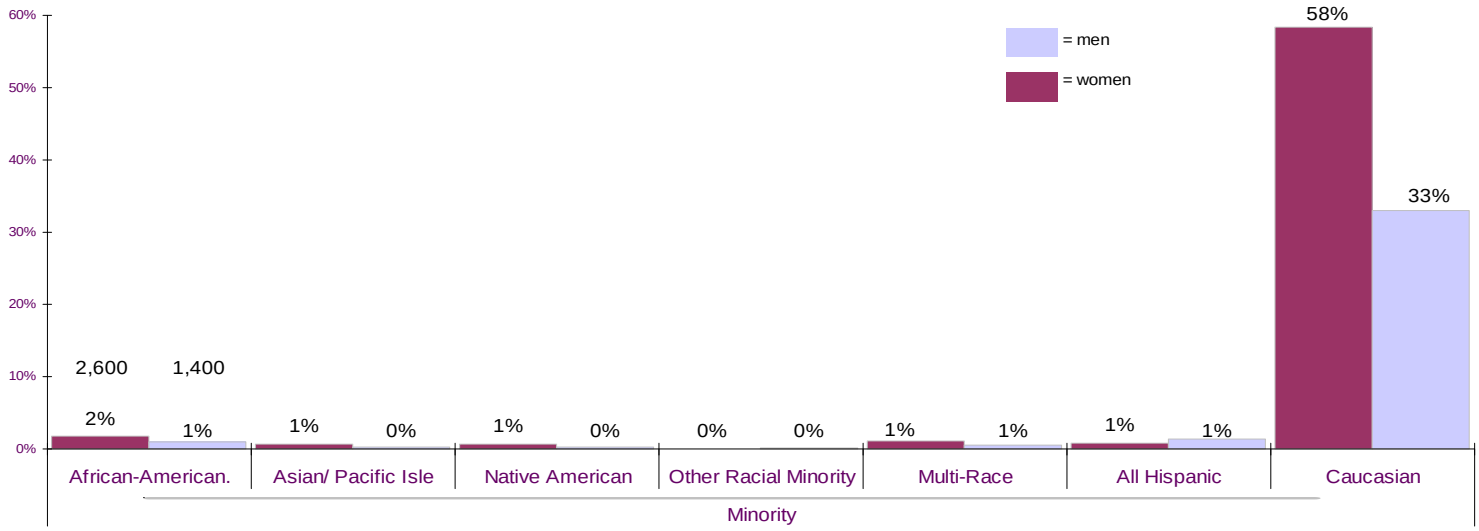


Prevalence rates among women are highest for Native American women, followed by Multi-Racial and African-American women.

Prevalence rates among men are highest for Native Americans, followed by African-American, Multi-Racial and Hispanic men. Differences in asthma prevalence rates between races among men, while generally generally mirrored those differences seen between women of different races.

Percent of All Cases by Sex/Race

By Race, Average Annualized Percent Distribution of All Adult Asthma Cases by Race and Gender
Iowa, 2001-2006



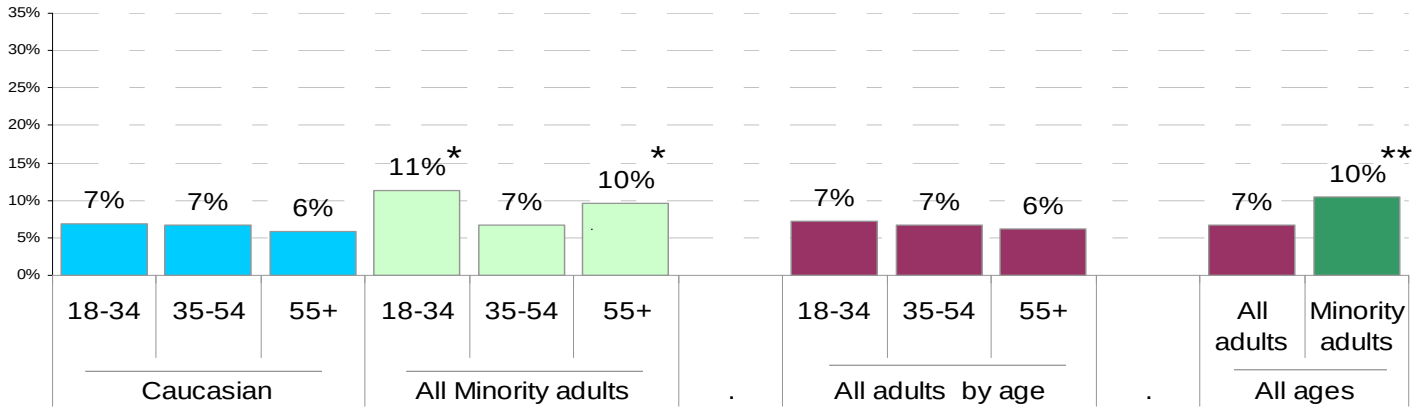
Rates for men are uniform across all age and age/race groups.

- Men's overall current rates were more stable than women's across age groups, ranging from 4.9/100 for men 18-34 years to 5.3/100 for men older than 55 years.
- Statistically significant rate differences were found between young women and young men (10.1/100 vs. 4.9/100, twice as high for young women) and middle-aged women and men (7.8/1000 vs. 5.0/100, about 1.6 times higher for middle-aged women). The difference in rates between men and women age 55 years and older was not statistically significant.
- Gender-age-race specific asthma prevalence rates were lower for men than for women across all comparable race-age groups.
- Of the almost 145,000 asthma cases prevalent in adults in Iowa each year, about 135,000 occur in Caucasians (93%). About 3,500 occur in African-Americans (2%), 4,000 in the Other Minority category of race (3%), and 2,500 in Hispanics (2%).

All Racial Minorities by Age

By Race and Age, Average Annualized Current Asthma Prevalence Rate per 100 Adults
Iowa, 2001-06

All Adults: All Minorities compared to Causcasians, 2001-2006



*Rate for this All Minorities age group is statistically higher than rate for same-age Caucasian group.

**Overall rate for All Minorities is statistically higher than overall rate for Caucasians.

Age-specific rates across three age groups showed little variability among Caucasians (range 6% to 7%), while age-specific rates among All Minorities were more variable (range 7% to 11%) and higher than those for Caucasians for all same-age groups. (Rate differences between Caucasian and All Minority same-age subgroups reached statistical significance for two of the age groups: 18-34 years and 55 years and older.)

Age-specific rates for Caucasian women trended downward with age, although differences between age groups were not great (range for Caucasian women: 9% for young women to 7% for older women).

For the group of All Minority women rates were also highest for women 18 - 34 years of age (15%) and 50% greater than that current asthma prevalence rate for All Minority women who were 35-54 years of age (rate of 10%) and 55 years and older (rate of 10%).

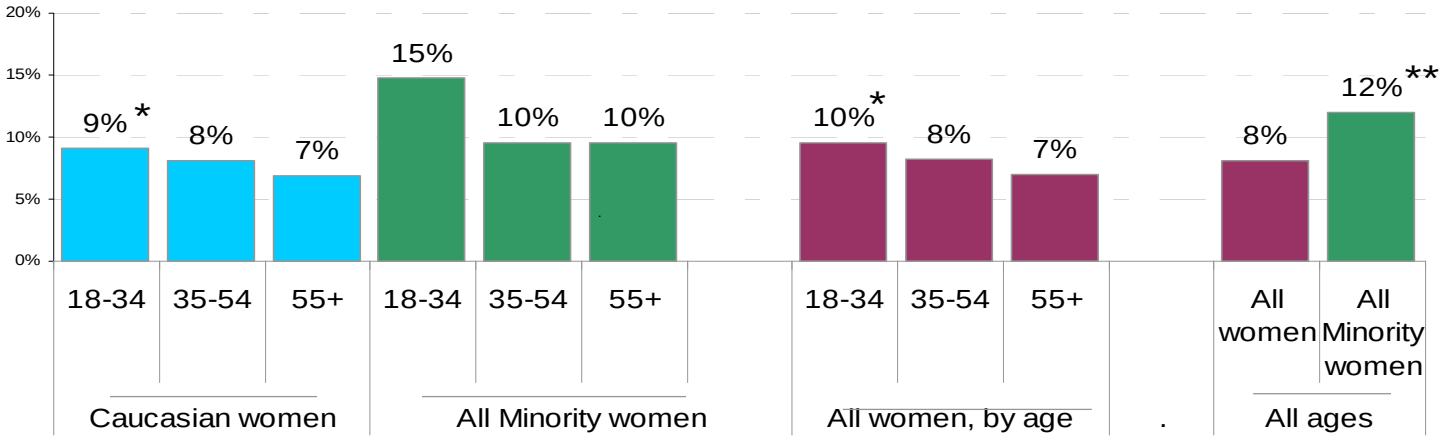
Rates for Caucasian men were uniform across age groups (5%).

Among All Minority men, the middle-aged had the lowest current asthma prevalence rates (4%), while 9% of young All Minority men and 11% of older All Minority men reported having current asthma.

All Racial Minorities by Sex/Age

By Race, Age and Gender, Average Annualized Current Asthma Prevalence Rate per 100 Adults
Iowa, 2001-06

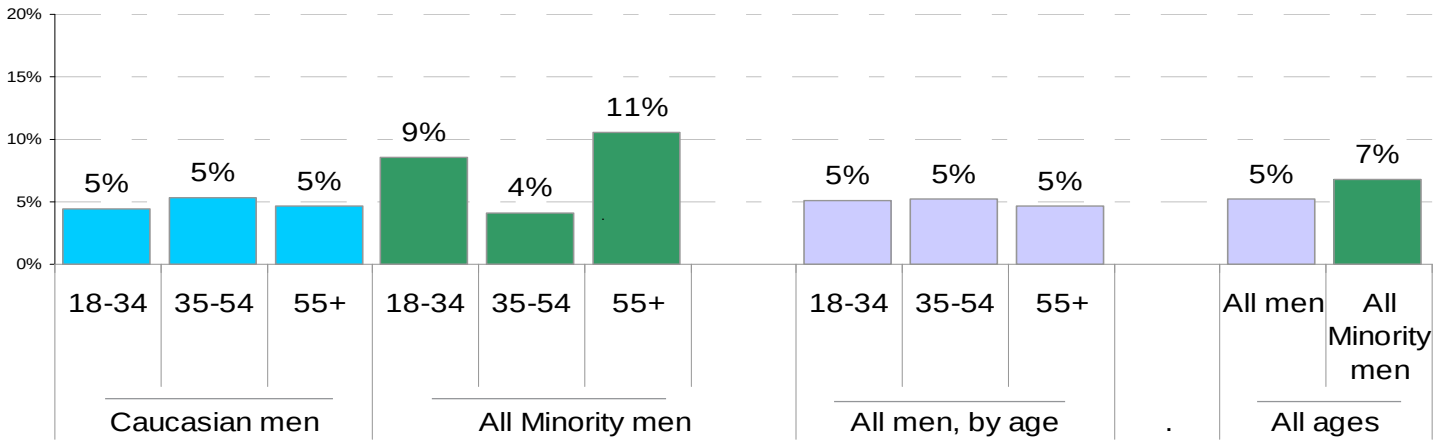
Women: All Minorities compared to Caucasians, 2001-2006



*Rate for this age group of women is statistically higher than rate for women 55+ years of age within this race group.

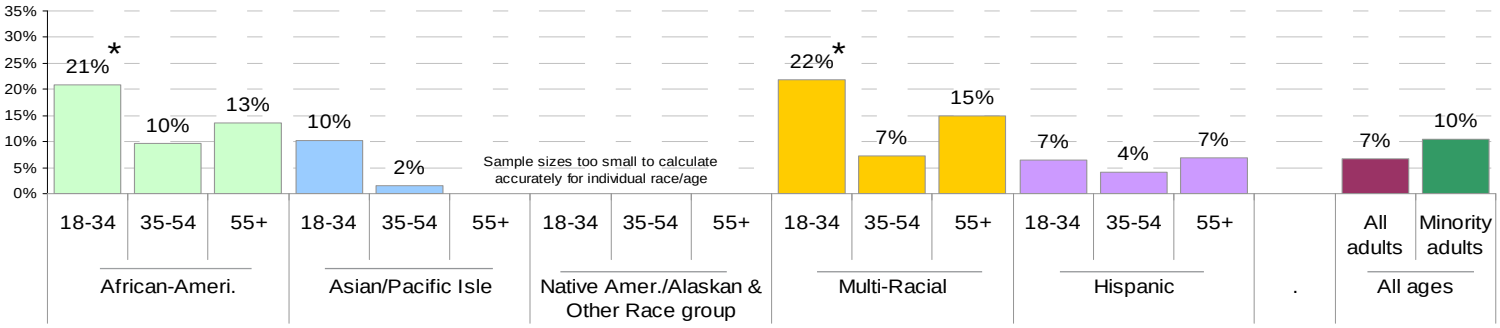
**Rate for All Minority women is statistically higher than rate for all Caucasian women.

Men: All Minorities compared to Caucasians, 2001-2006



Rates by Age for Specific Minorities

By Race and Age, Average Annualized Current Asthma Prevalence Rate per 100 Adults
Iowa, 2001-06



*Rate for this race/age group is statistically higher than rate for same-age Caucasian group.

**Overall rate for All Minorities is statistically higher than overall rate for Caucasians.

For all three Minority subgroups for whom sample size was large enough (African-Americans, Hispanics, and Multi-Racial adults) for age-specific rates to be reliably computed, middle-aged adults reported current asthma prevalence rates lower than did younger (age 18 - 34) and older (age 55+) adults. Age-specific rates of asthma for Hispanics adults in all age groups were lower than the same age-specific rates for both African-Americans and Multi-Racial adults.

- The rate of current asthma across age groups was fairly flat for Caucasian women (7/100 to 9/100) and Hispanic women (4/100 to 6/100), but showed considerabe diifferences for African-American women(15/100 for the two older age groups to 25/100 for the youngest age group)

- African-American women had the highest age-specific rates of current asthma prevalence when compared with Caucasian and Hispanic women of the same age group.

The rate of current asthma among young African-Americans (25%) was almost three times that found among young Caucasian women (9%) and more than six times that of young Hispanic women (4%).

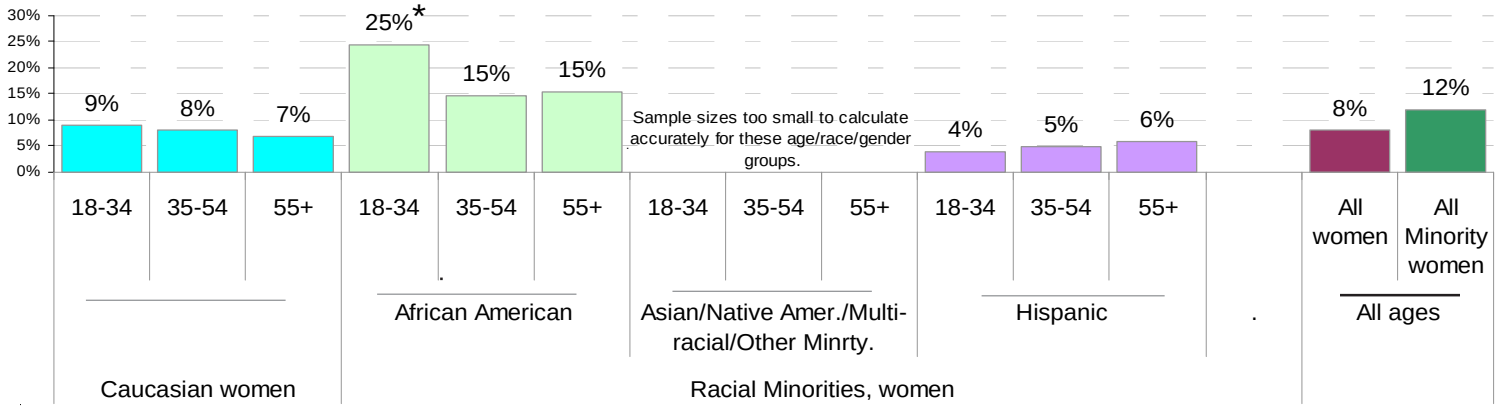
The asthma prevalence rate for Hispanic men of middle age (3%) was lower than than the rates of older (9%) and younger (8%) Hispanic men.

- Rates for Caucasian men were similar across all age groups. Hispanic and Caucasian men were the only racial-ethnic groups with sample sizes large enough to reliably compute age-gender specific rates. Age-specific rates for Hispanic men were found to be lowest among those of middle-age.

- Gender-age-race specific asthma prevalence rates were lower for men than for women across all same race-age groups for Caucasians and African-Americans. For the youngest and older Hispanic men, the rate of current asthma prevalence exceeded the same race-age rate for younger and older Hispanic women.

Rates by Age/Sex for Specific Minorities

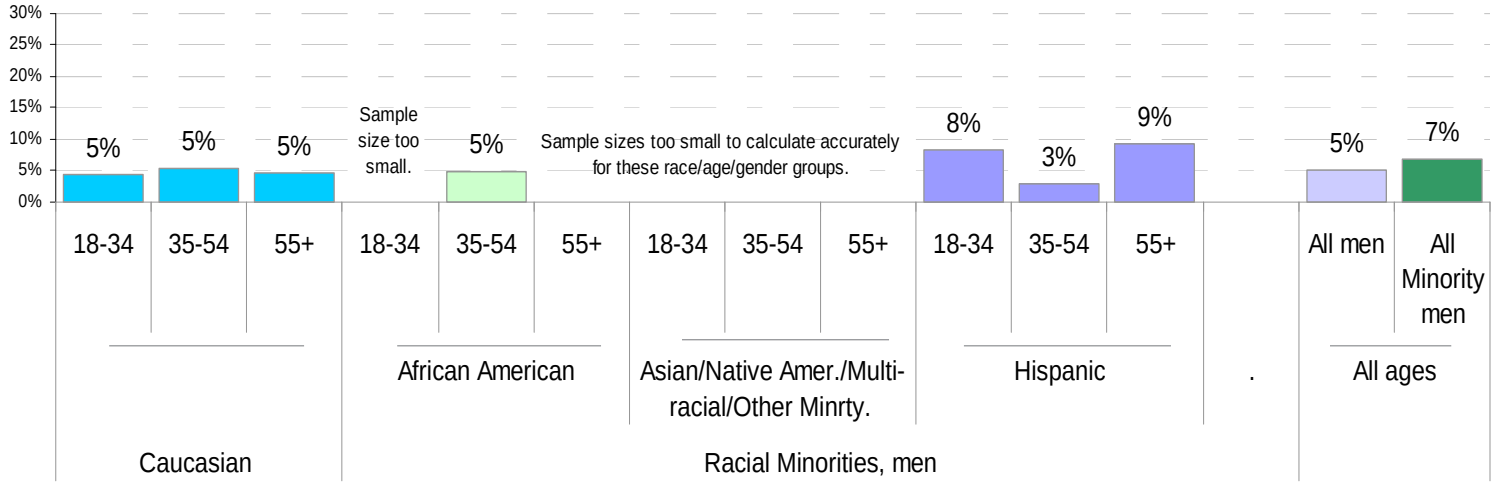
Women: Specific minority subgroups, 2001-2006



*Rate for African-Amreican women age 18-34 years is statistically higher than the rates for Caucasian and Hispanic women 18-34 years of age.

**Rate for All Minority women is statistically higher than rate for all Caucasian women.

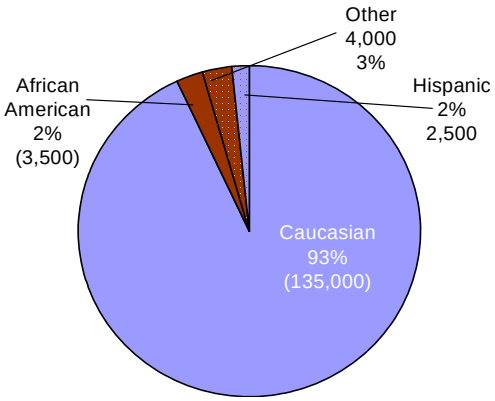
Men: Specific minority subgroups, 2001-2006



Counts by Race and Sex/Race

By Race, Average Annual Count of Cases
Iowa Adults, 1999-2004

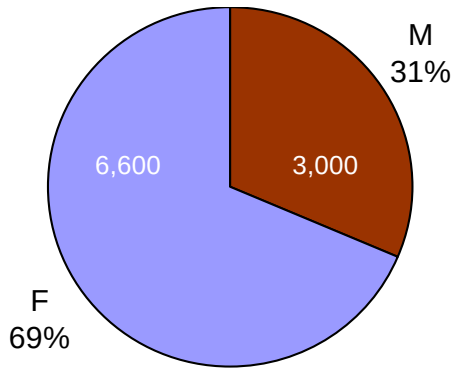
Overall count by race



Ninety-three percent of Iowa adult asthma cases were among Caucasians.

- Of the almost 145,000 asthma cases prevalent in adults in Iowa each year, about 135,000 occur in Caucasians (93%). About 3,500 occur in African-Americans (2%), 4,000 in the Other Minority category of race (3%), and 2,500 in Hispanics (2%).

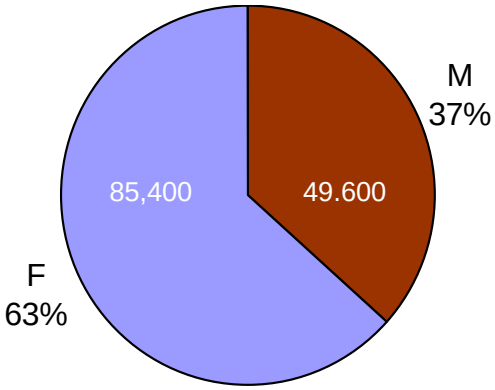
For All Minorities, count by sex



Among Minorities, women account for almost 70% (n=6,600) of Iowa adult asthma cases.

- Among the category of All Minorities, women account for 69% (n=6,600) and men for 31% (n=3,000) of cases. For all racial subgroups, women account for the majority of cases. (Women account for about 75% of cases in African-Americans (2,600 of 3,500 cases) and 56% of cases in Hispanics (1,400 of 2,500). See tables at end of chapter for additional information on case counts by race and gender.)

For Caucasians, count by sex

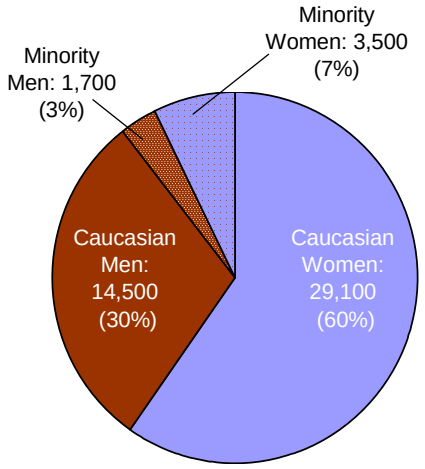


Among Caucasians, women account for about two-thirds (n=85,400) of adult asthma cases.

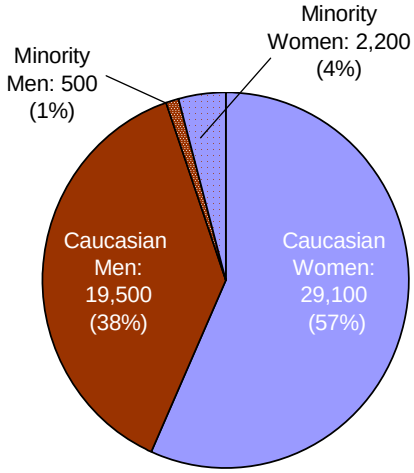
- Women account for 63% (85,400 of 135,000 cases) and men for 37% (49,600) of all cases among Caucasians. Overall, women account for a sligthly smaller proportion, about 60% of all cases (85,000 of 145,000), while men accout for about 40% (50,000 of 145,000) of all cases.

Counts by Age/Sex/Race

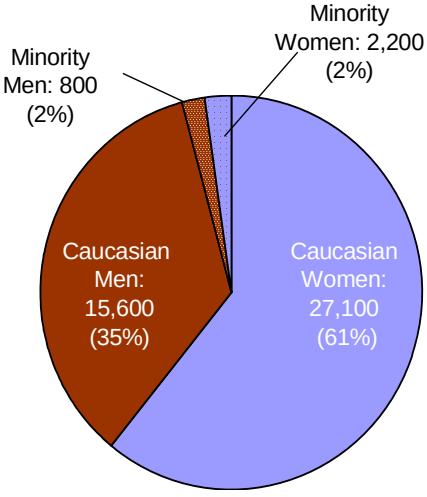
For 18-34 year-old adults count by gender and race



For 35-54 year-old adults count by gender and race



For 55+ year-old adults count by gender and race



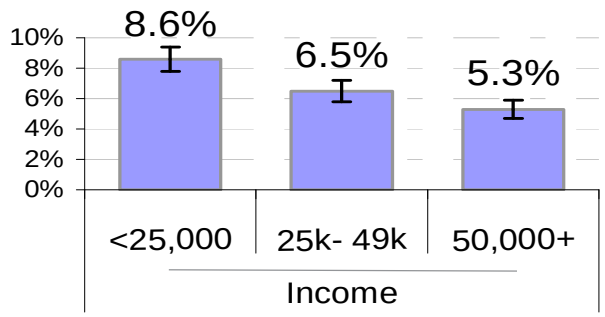
For all age groups, *counts* of cases for Minorities are less than for Caucasians.

For all race and race/age breakouts, counts of asthma cases for women exceed those for men.

- Sex-specific case counts by age showed women to account *for more than 60% of cases for each age* group: women acounted for 67% of cases among those less than 35 years, 61% of cases among those 35-55 years, and 63% of cases among those more than 55 years of age.
- As for age-specific rates, age-specific asthma counts of current asthma cases were evenly distributed by age overall. Of the almost 145,000 asthma cases prevalent in adults in Iowa each year, about one-third occurred in each age group. However, as for rates, when age-specific case counts were broken down by gender and race, significant differences were apparent.
- The average annual case count for young women was double that of young men (33,000 vs. 16,000); for middle-aged women the case count was 56% higher than middle-aged men (31,000 vs. 20,000). For older women (age 55+) the case count was about 75% higher than that of older men (28,000 vs. 16,000).
- Caucasians accounted for the vast majority of cases in all age-gender specific groups: for the youngest group, Caucasians made up 89% of cases (of both male and female cases). Among all older age groups, Caucasians accounted for more than 95% of all cases in both males and females.

Rates by Income and Education

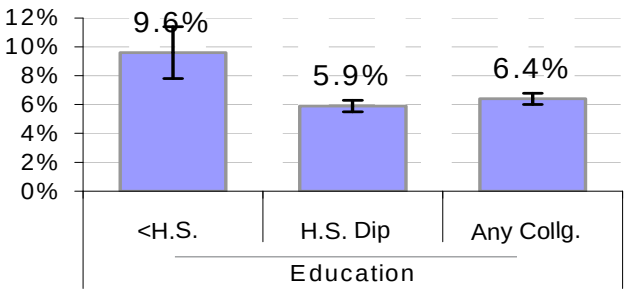
By Income, Average Annualized Current Asthma Prevalence Rate per 100 Adults, Iowa, 1999-2004



The Iowa adult asthma prevalence rate is 1.6 times greater for persons of the lowest income households vs. those of the highest income households.

- Asthma prevalence rates were about 30% higher for adults of low income(<$25,000) compared to adults of middle income ($25,000-$50,000) and 60% higher for low income adults compared to those with household incomes of more than $50,000.

By Education Level, Average Annualized Current Asthma Prevalence Rate per 100 Adults, Iowa 1999-2004



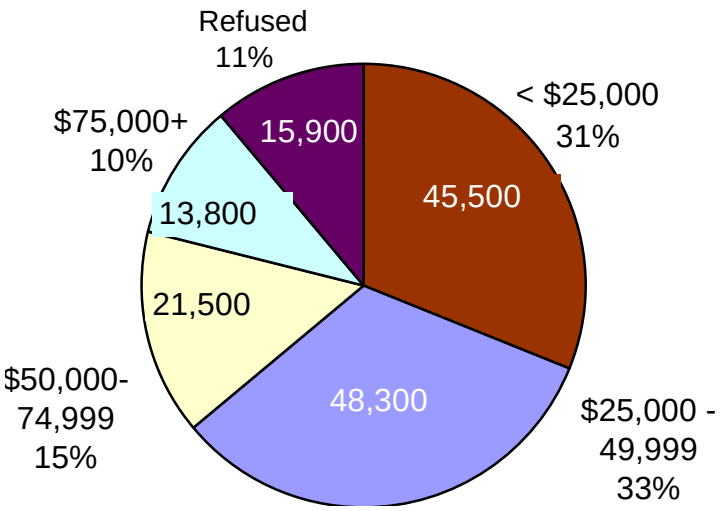
The adult asthma prevalence rate is 1.6 times greater for adults without a high school diploma vs. adults with a diploma and 1.5 times greater for those without a diploma vs. adults with at least some college

- Adults without a high school diploma were more at-risk (9.6 cases/100 adults) of having asthma than were adults with high school diplomas (5.9 cases/100 adults) and adults with at least some college education (6.5 cases/100 adults).

- The risk ratio for those with less than a high school education to those with a high school diploma was 1.6 (9.6 cases /100 vs. 5.9 cases/100 adults) and for those without a high school diploma vs. those with at least some college was 1.5 (9.6 cases /100 adults vs. 6.5 cases/100 adults). These differences in rates between those adults without an high school educaton and those adults with more education were statistically significant.

Counts by Income and Education

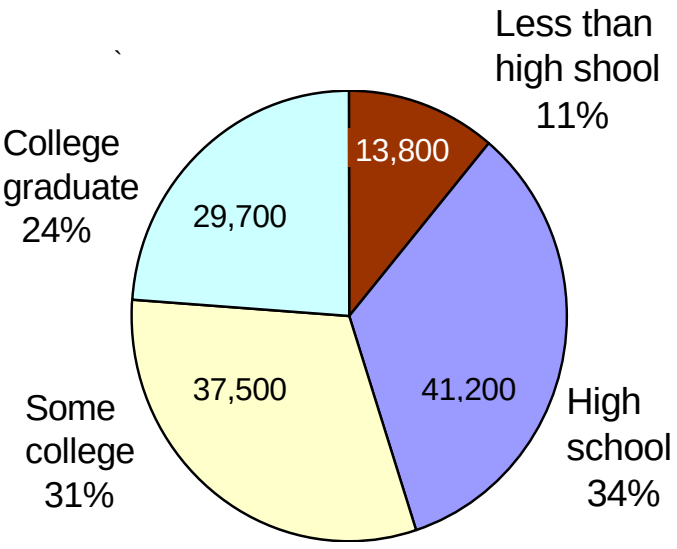
By Income Level, Average Annual Count of Current Asthma Cases, Iowa Adults, 1999-2004



About 65% of asthma cases occur in low income or moderate income households.

- Adults in low income households (<$25,000) account for about 46,000 of asthma cases (31%); adults in middle income households ($25,000 – $74,999) account for about 70,000 cases (48%); and, adults in higher income house holds (>$75,000) for about 14,000 (10%) of all prevalent adult asthma cases each year.

By Educational Level, Average Annual Count of Current Asthma Cases, Iowa Adults, 1999-2004

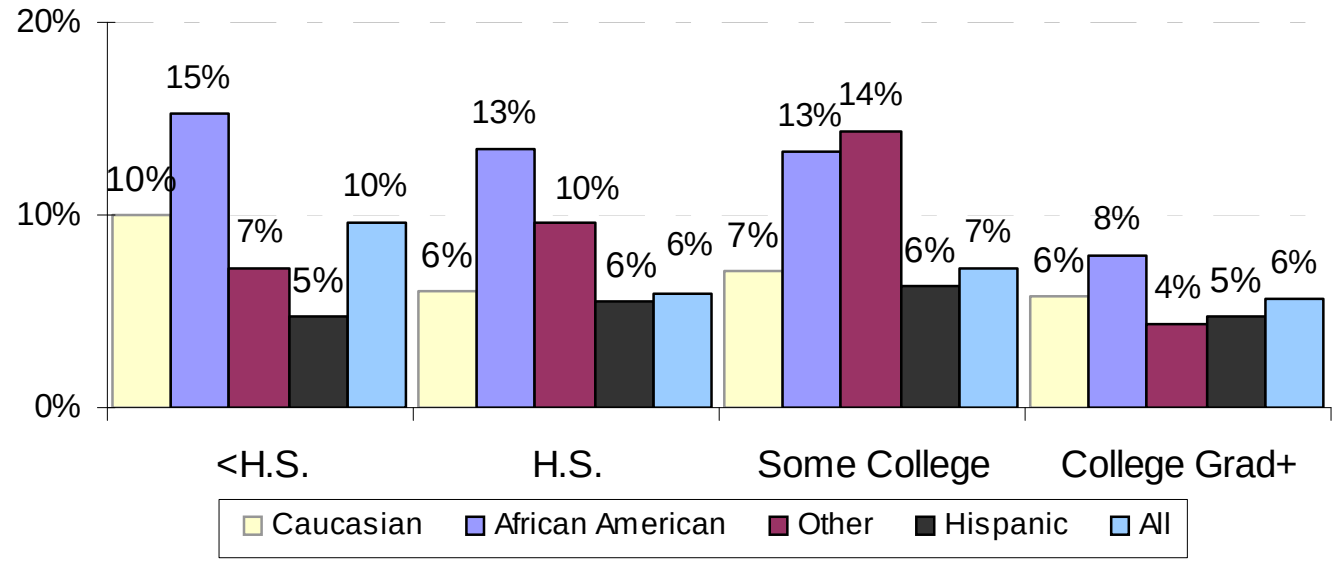


High school dropouts represent are one in ten cases, those with high school diplo-mas compose about one-third of all cases.

- Adults with less than a high school education account for only about 14,000 (11%) of all asthma cases. Those with a high school diploma account for 41,000 of cases (34%) while those with some college or a college degree comprise about 67,000 (55%) of all prevalent adult asthma cases each year.

Rates by Income/Race

By Race and Income Level, Average Annualized Asthma Prevalence Rate per 100 Adults
Iowa, 1999-2004

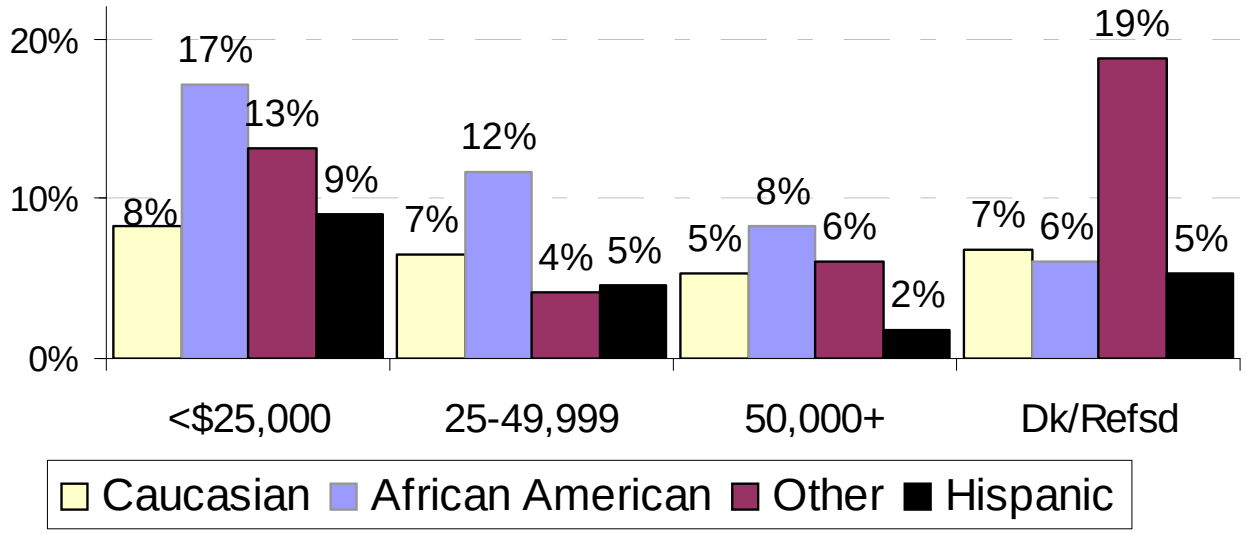


For all income levels, African-Americans have the highest prevalence rates while Hispanics have the lowest prevalence rates.

- By race, asthma prevalence rates declined with increasing household income for African-Americans and Caucasians, but were less consistent for other racial/ethnic minority groups. Rate differences between the highest and lowest income Caucasian groups shown here were statistically significant, while income-specific rate differences within the minority groups shown were not statistically significant. However, when all minority groups were combined (see Table 3), the rate differences between the highest and lowest income groups *did* reach statistical significance.

Rates by Education/Race

By Race and Educational Level, Average Annualized
Asthma Prevalence Rate per 100 Adults
Iowa, 1999-2004

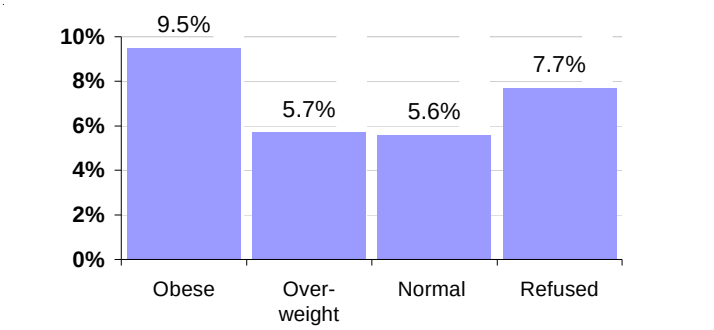


For all races except Hispanic, college graduates have the lowest asthma prevalence rates.

- Differences in rates by race and level of education attainment were less consistent, although, for all racial groups, except Hispanics who show no trending by educational attainment level, rates were lowest among those with a college degree. For Caucasians, but not other racial groups (attributable in part to small sample size), this rate difference was statistically significant.

Rates and Counts by Exercise and Weight Status

By Weight Status, Average Annualized Rate of Current Asthma Prevalence per 100 Adults, Iowa 1999-2004



Adults	Obese	Overweight	Normal Wt	Refused	All Adults
# w/asthma	51,300	49,600	38,300	5,600	144,900
# all adults	540,000	869,100	686,400	72,000	2,166,500
% w/asthma	9.5%	5.7%	5.6%	7.7%	6.7%
% of all adult asthma cases	37%*	36%*	27%*	3%	100%

*Denominator excludes those who refused to give weight.

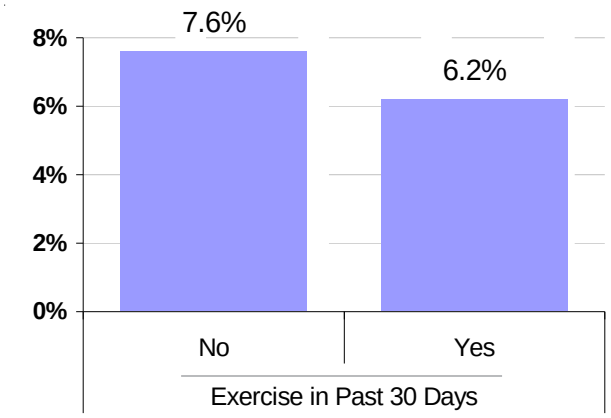
The obese were 70% more likely than those of normal weight or overweight to have asthma.

- Adults who were obese and had asthma (n=51,300) were 70 percent more likely than adults of normal weight or overweight to report having asthma. The differences in rates between the obese and adults of normal weight reached statistical significance.

- Of adults who had current asthma, 37 percent were obese and 36 percent were overweight during the 1999-2004 period. Of the larger Iowa adult population, only about 23 percent were obese while 38 percent were overweight. Twenty-seven percent of asthmatics were of normal weight while about 40 percent of the larger Iowa adult population was of normal weight during this time.

(Obesity is defined as having a body mass index (BMI = (weight in kilograms) / (height in meters squared)) equal to or greater than 30. Normal weight is defined as having a BMI of between 18.5 and 24.9 and overweight as having a BMI of 25 to 29.9)

By Leisure Excercise in Past 30 Days, Average Annualized Rate of Current Asthma Prevalence per 100 Adults, Iowa, 2000-2004



Adults	No Leisure Exercise	Yes Leisure Exercise	All Adults
# w/asthma	39,400	102,600	142,000
# all adults	519,100	1,666,100	2,184,700
% w/asthma	7.6%	6.2%	6.5%
% of all adult asthma cases	28%	72%	100%

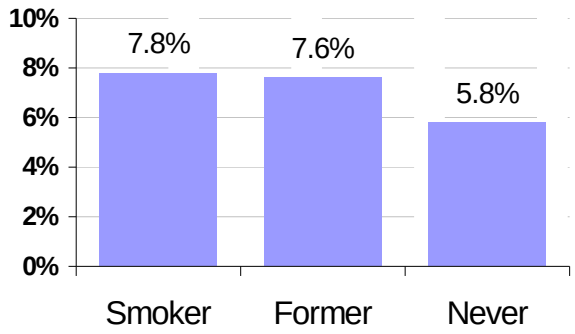
Asthma prevalence rates are higher among adults who are not exercising for leisure than are among adults who do exercise for leisure.

- Iowa adults who had not exercised for leisure in the past 30 days were about 20 percent more likely to report having asthma than were Iowa adults who had exercised for leisure--although this difference was not statistically significant.

- More than 70 percent of adults with asthma reported engaging in leisure exercise during the past 30 days, a proportion lower than the 79 percent of all Iowa adults who had exercised for leisure in the past 30 days.

Rates and Counts by Cigarette Smoking Status

By Cigarette Smoking Status, Average Annualized Rate of Current Asthma Prevalence per 100 Adults, Iowa, 1999-2004

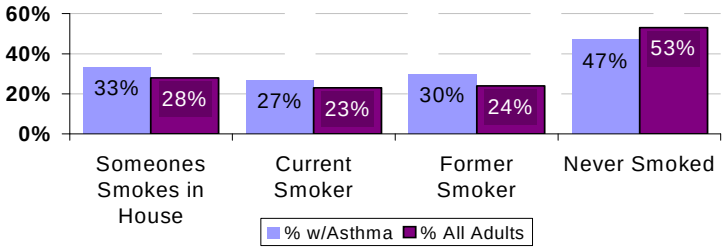


Adults	Current	Former	Never	Refused	All Adults
# w/asthma	37,600	38,900	68,200	100	144,900
# all adults	484,800	510,700	1,167,900	3,100	2,166,500
% w/asthma	7.6%	7.6%	5.8%	3.4%	6.7%
% of all adult asthma cases	26%	27%	47%	<1%	100%

Cigarette smokers and former smokers are at greater risk than never smokers of having asthma.

- Both adults who were current ciagarette smokers and adults who were former smokers were more likely to have asthma than were adults who had never smoked. The differences in asthma prevalence rates between current and never smokers and between former and never smokers were statistically significant.
- Among adults with asthma, 26% (n=37,600) were current and 27% (n=38,900) were former smokers. Among Iowa adults at-large, 22% were current and 24% were former smokers.

Of Iowa Adult Population with Current Asthma and of Total Iowa Adult Population Percent who Smokes or Has Someone Smoking in Home, Average Annualized Percent, Iowa, 1999

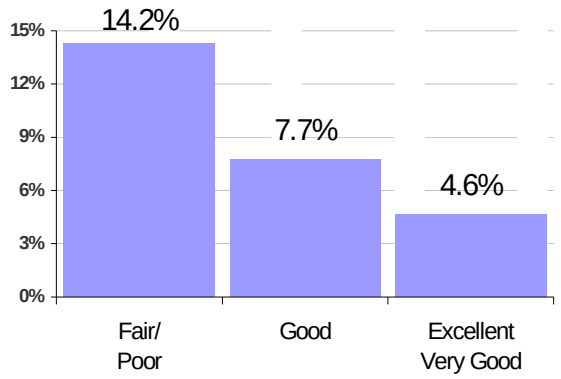


Adult current and former smokers are 30 percent more likely to have asthma than are adults who never smoked.

- Both adults who were current cigarette smokers and adults who were former smokers were more likely to have asthma than those adults who had never smoked: asthma prevalence rates were 7.8%, 7.6% and 5.8% , respectively. Asthma prevalence rate differences between current and never smokers and between former and never smokers were statistically significant.
- Among adults with asthma, 26% (n=37,600) were current and 27% (n=38,900) were former smokers. Among Iowa adults at large, 22% currently 24% formerly smoked.

Rates and Counts by Overall Health and Health Insurance Status

By Health Status, Average Annualized Rate of Current Asthma Prevalence per 100 Adults, Iowa, 1999-2004



Adults	Fair/Poor	Good	Excellent/ Very Good	Refused	All Adults
# w/asthma	36,000	50,300	58,000	500	144,900
# all adults	253,200	652,000	1,257,600	3,600	2,166,500
% w/asthma	14.2%	7.7%	4.6%	5.6%	6.7%
% of all adult asthma cases	25%	35%	40%	<1%	100%

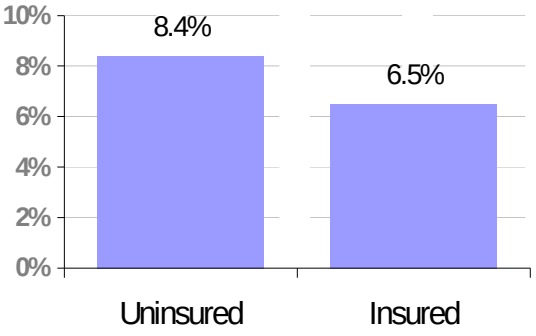
Adults with health that is fair or poor are more than three times as likely to have asthma as those with excellent or very good health.

- Both adults who rated their health as fair or poor and those who rated their health as good were subtantially more likely to report having asthma than were adults who reported their health as excellent or very good.

Those who rated their health as fair or poor were 3.1 times more likely to have asthma as were those who rated their health as excellent or very good (risk ratio of 14.2 cases/100 adults vs. 4.6 cases/100 adults). Those who rated their health as good were 1.6 times more likely to have asthma as those who rated their health as very good or excellent to have asthma (risk ratio of 7.7 cases/100 adults/4.6 cases per 100 adults).

- Those with poor fair or poor health were 1.8 times as likely to have asthma as were those with good health (risk ratio of 14.2 cases/100 adults/7.7 cases per 100 adults).

By Health Insurance Status, Average Annualized Rate of Current Asthma Prevalence per 100 Adults, Iowa, 1999-2004



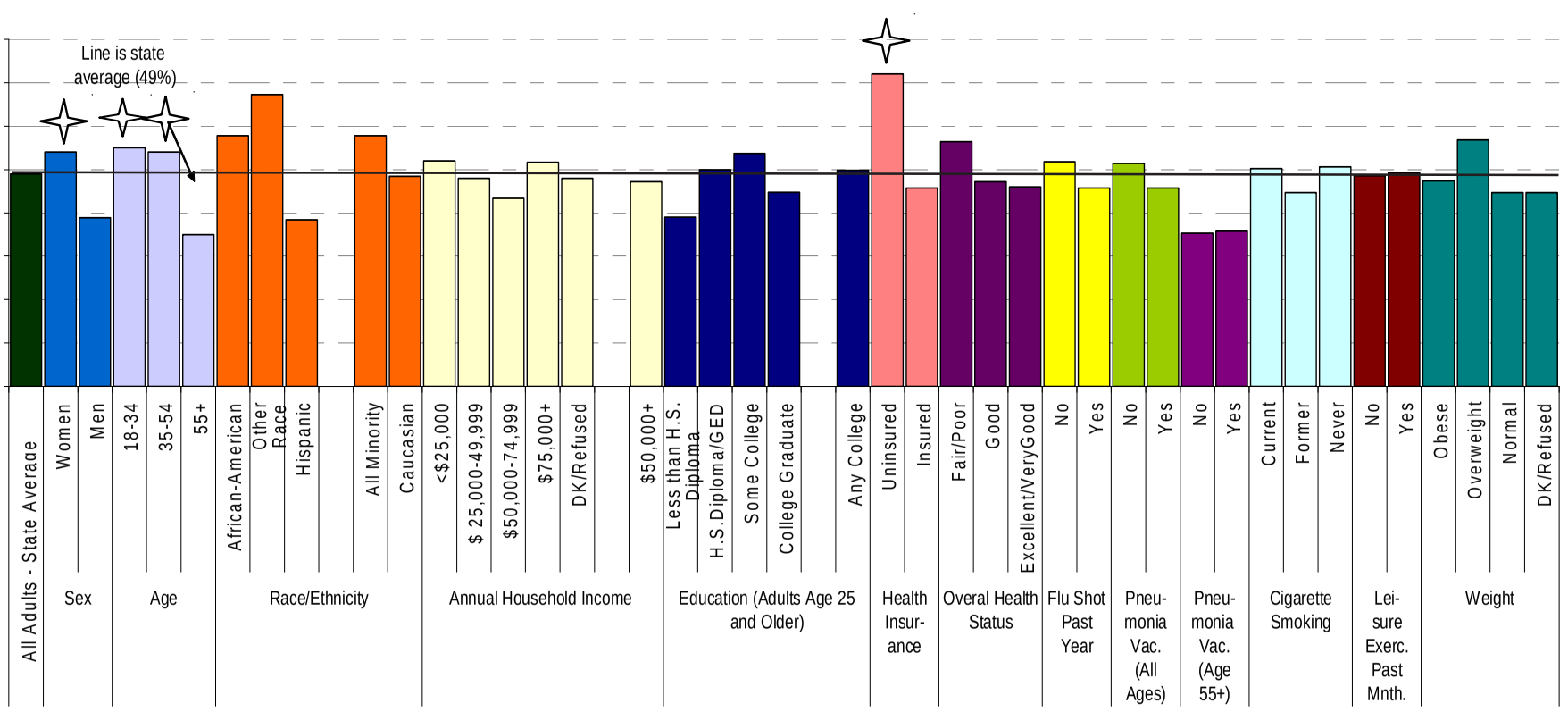
Adults	Uninsured	Insured	Refused	All Adults
# w/asthma	17,200	127,300	400	144,900
# all adults	205,000	1,955,400	6,100	2,166,500
% w/asthma	8.4%	6.5%	6.6%	6.7%
% of all adult asthma cases	12%	88%	<1%	100%

Uninsured adults are 30 percent more likely to have asthma than are the insured.

- Adults who were uninsured had a 30 percent greater risk of asthma then did adults with insurance (risk ratio: 8.4 cases/100 uniunsured/65cases/100 insured adults).

- The percent difference between rates of asthma prevalence among those who were uninsured and insured was 29 percent (8.4 cases/100 adults - 6.5 cases/100 adults) /6.5 cases/100 adults * 100) This difference in rates reached statistical significance.

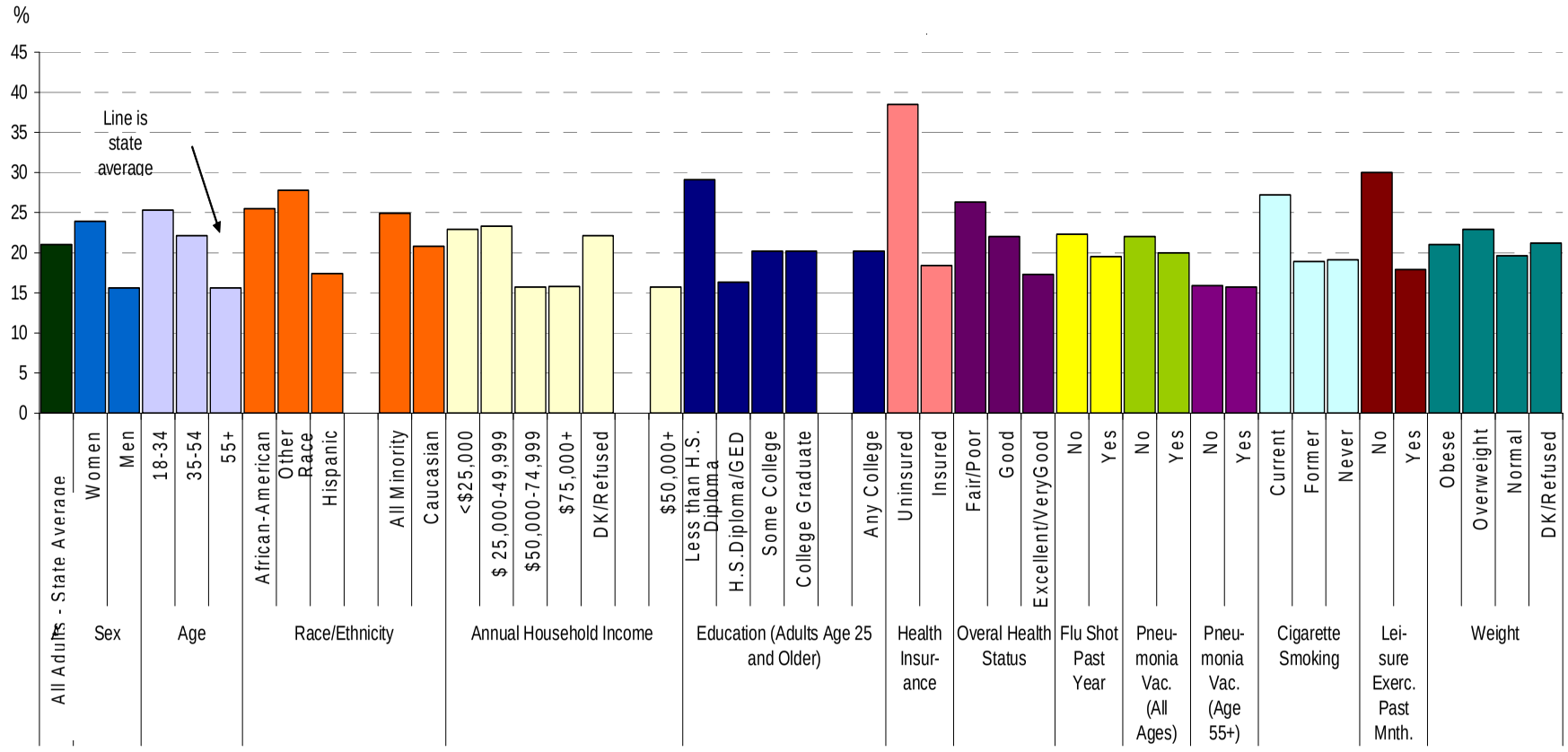
Percent of Iowa Adults with Current Ashma who have Experienced an *Asthma Attack* in the Past 12 Months by Socio-Demographic Risk Factor, BRFSS, 2001-2004,



All Adults	Women	Men	18-34	35-54	55+	African-Amer.	Other Race	Hispanic		All Minority	Caucasian	<$25,000	$ 25,000-49,999	$50,000-74,999	$75,000+	DK/Refused		$50,000+	< H.S. /GED	HS Dipl./GED	Some College	College Grad.		Any College	Uninsured	Insured	Fair/Poor	Good	Excellent/V.Good	No	Yes	No	Yes	No	Yes	Current	Former	Never	No	Yes	Obese	Overweight	Normal	DK/Refused
49	54	39	55	54	35	58	67	38		58	48	52	48	43	52	48		47	39	50	54	45		50	72	46	56	47	46	52	46	51	46	35	36	50	45	51	49	49	47	57	45	45

Percent of Adults with Asthma who have had an Asthma Attack (highlighted/starred = statistically elevated compared to others in same subcategory)

Average Annualized Percent of Iowa Adults with Current Asthma who Have Experienced *Any Activity Limitations* in the Past 12 Months Due to their Asthma, by Risk Factor, BRFSS, 2001-2004

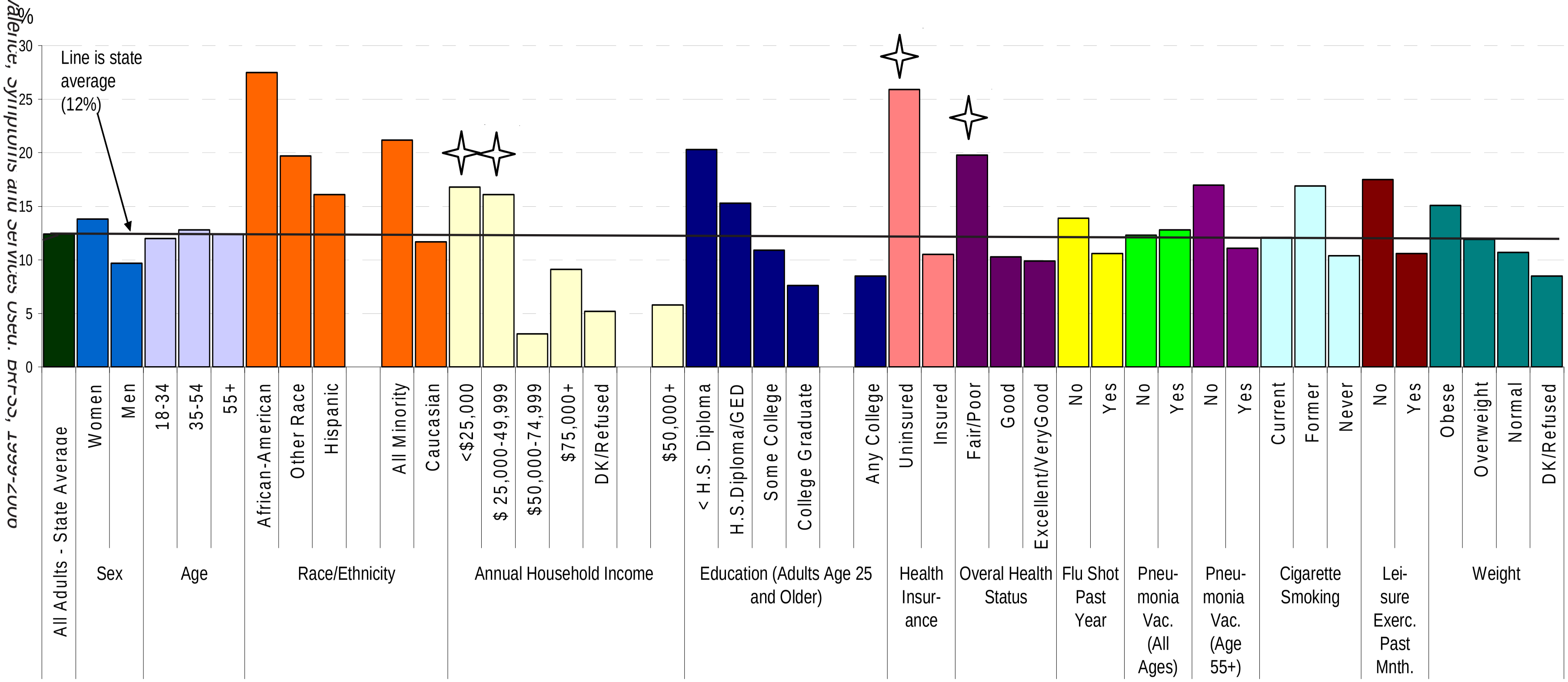


Percent

All Adults	Women	Men	18-34	35-54	55+	African-Amer.	Other Race	Hispanic		All Minority	Caucasian	<$25,000	$ 25,000-49,999	$50,000-74,999	$75,000+	DK/Refused		$50,000+	< H.S. /GED	HS Dipl./GED	Some College	College Grad.		Any College	Uninsured	Insured	Fair/Poor	Good	Excellent/V.Good	No	Yes	No	Yes	No	Yes	Current	Former	Never	No	Yes	Obese	Overweight	Normal	DK/Refused
21	24	16	25	22	16	26	28	17		25	21	23	23	16	16	22		16	29	16	20	20		20	39	18	26	22	17	22	20	22	20	16	16	27	19	19	30	18	21	23	20	21

Percent of Adults with Asthma with Activity Limitations (highlighted/starred = statistically elevated compared to others in same subcategory)

Average Annualized Percent of Iowa Adults with Current Asthma who Have Had *Any Emgency or Urgent Health Care Provider Visit (to the Emergency Dept. or anUrgent Care Center) to Treat Asthma Symptoms* in the Past 12 Months, by Risk Factor, BRFSS, 2001-2004



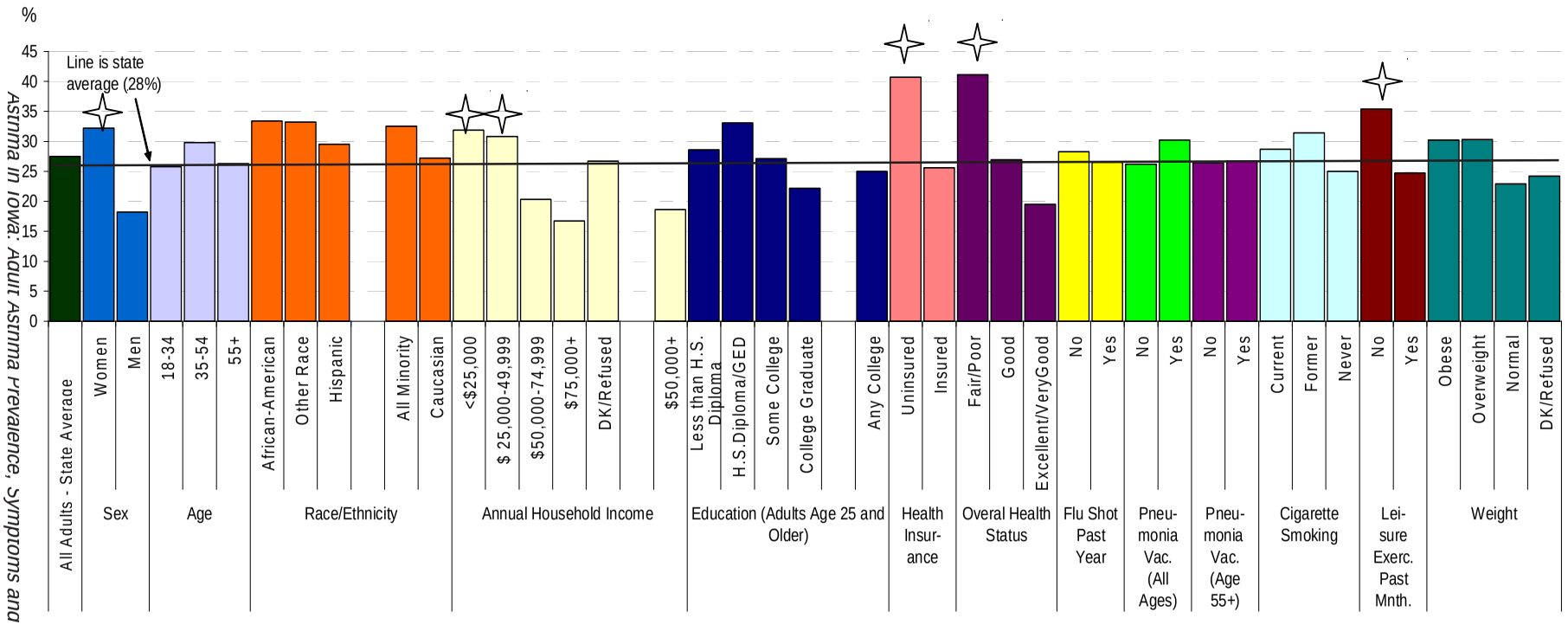
All Adults	Women	Men	18-34	35-54	55+	African-Amer.	Other Race	Hispanic		All Minority	Caucasian	<$25,000	$ 25,000-49,999	$50,000-74,999
12	14	10	12	13	12	28	20	16		21	12	17	16	3

$75,000+	DK/Refused		$50,000+	< H.S. /GED	HS Dipl./GED	Some College	College Grad.		Any College	Uninsured	Insured	Fair/Poor	Good	Excellent/V.Good
9	5		6	20	15	11	8		9	26	11	20	10	10

No	Yes	No	Yes	No	Yes	Current	Former	Never	No	Yes	Obese	Overweight	Normal	DK/Refused
14	11	12	13	17	11	12	17	10	18	11	15	12	11	9

Percent of Adults with Asthma with who had Emergency Dept./Urgent Care (highlighted/starred = statistically elevated compared to others in same subcategory)

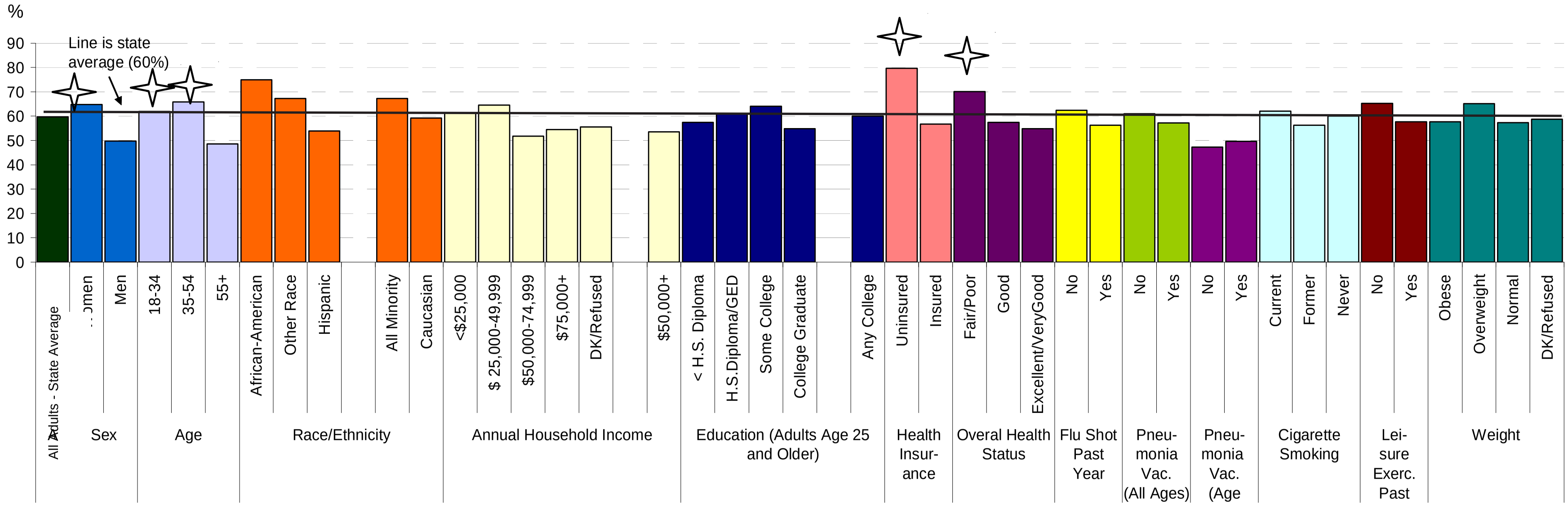
Average Annualized Percent of Iowa Adults with Current Asthma who Have Had *Any Health Care Provider Visit (to Emergency Dept., Urgent Care Center or Physician's Office) to Treat Asthma Symptoms(non-Preventive Visit)* in the Past 12 Months, by Risk Factor, BRFSS, 2001-2004



All Adults	Women	Men	18-34	35-54	55+	African-Amer.	Other Race	Hispanic		All Minority	Caucasian	<$25,000	$ 25,000-49,999	$50,000-74,999	$75,000+	DK/Refused		$50,000+	< H.S. /GED	HS Dipl./GED	Some College	College Grad.		Any College	Uninsured	Insured	Fair/Poor	Good	Excellent/V.Good	No	Yes	No	Yes	No	Yes	Current	Former	Never	No	Yes	Obese	Overweight	Normal	DK/Refused
28	32	18	26	30	26	33	33	30		33	27	32	31	20	17	27		19	29	33	27	22		25	41	26	41	27	20	28	27	26	30	26	27	29	31	25	35	25	30	30	23	24

Percent of Adults w/Asthma who Visited a Doctor's Office, Emerg. Dept./Urgent Care Visit to Treat Asthma (highlighted/starred = statistically elevated compared to others in same subcategory)

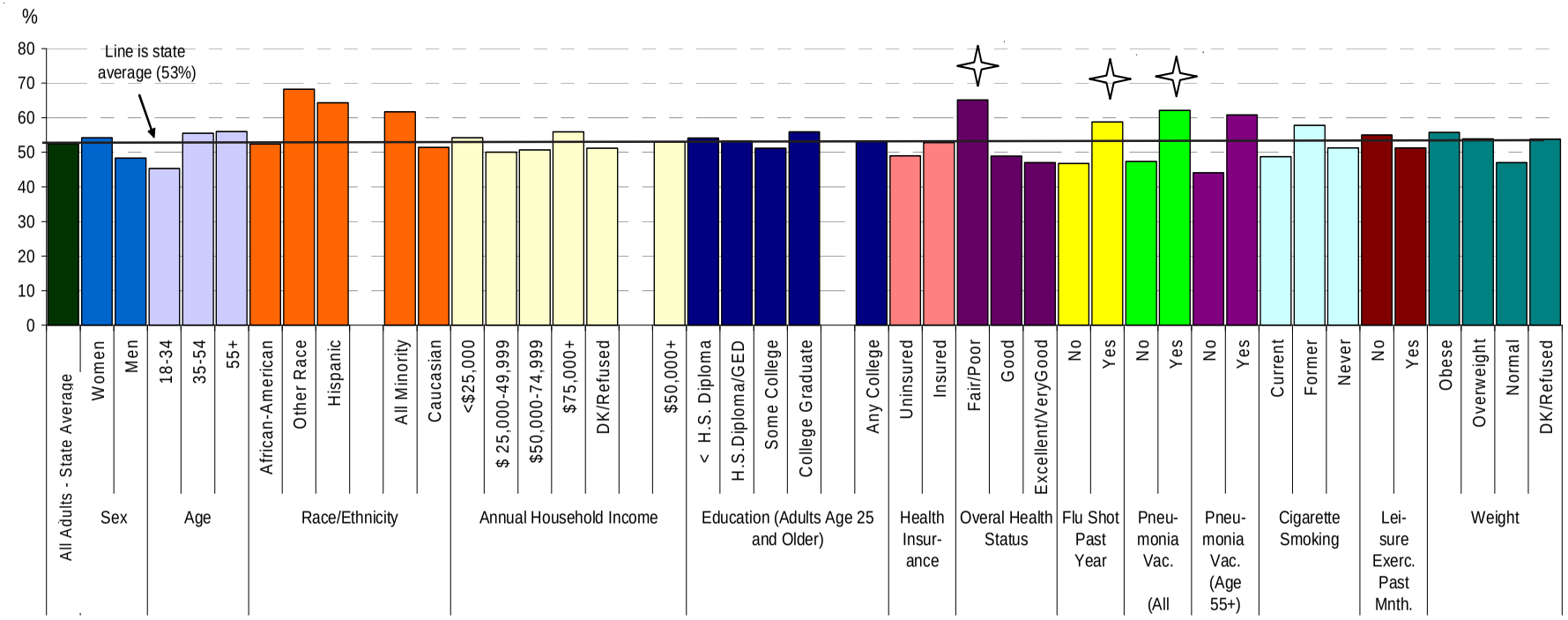
Average Annualized Percent of Iowa Adults with Current Asthma who Have Had *an Asthma Attack, Activity Limitation or Any Health Care Provider Visit to Treat Asthma Symptoms(non-Preventive Visit)* in the Past 12 Months, by Risk Factor, BRFSS, 2001-2004



All Adults	Women	Men	18-34	35-54	55+	African-Amer.	Other Race	Hispanic		All Minority	Caucasian	<$25,000	$ 25,000-49,999	$50,000-74,999	$75,000+	DK/Refused		$50,000+	< H.S. /GED	HS Dipl./GED	Some College	College Grad.		Any College	Uninsured	Insured	Fair/Poor	Good	Excellent/V.Good	No	Yes	No	Yes	No	Yes	Current	Former	Never	No	Yes	Obese	Overweight	Normal	DK/Refused
60	65	50	62	66	49	75	67	54		67	59	62	65	52	55	56		54	58	61	64	55		60	80	57	70	57	55	62	56	61	57	47	50	62	56	60	65	58	58	65	57	58

Percent of Adults w/Asthma who Had Any Abulatory Care for Symptoms, Asthma Attack or Activity Limitations (highlighted/starred = statistically elevated compared to others in same subcategory)

Average Annualized Percent of Iowa Adults with Current Asthma who Have Had *a Preventive Checkup* for Their Asthma in the Past 12 Months, by Risk Factor, BRFSS, 2001-2004



All Adults	Women	Men	18-34	35-54	55+	African-Amer.	Other Race	Hispanic		All Minority	Caucasian	<$25,000	$ 25,000-49,999	$50,000-74,999	$75,000+	DK/Refused		$50,000+	< H.S. /GED	HS Dipl./GED	Some College	College Grad.		Any College	Uninsured	Insured	Fair/Poor	Good	Excellent/V.Good	No	Yes	No	Yes	No	Yes	Current	Former	Never	No	Yes	Obese	Overweight	Normal	DK/Refused
53	54	48	45	56	56	52	68	64		62	51	54	50	51	56	51		53	54	53	51	56		53	49	53	65	49	47	47	59	47	62	44	61	49	58	51	55	51	56	54	47	54

Percent of Adults w/Asthma who Received Preventive Check-Up for Asthma (highlighted/starred = statistically elevated compared to others in same subcategory)

Background Information about the Iowa BRFSS

Established in 1988, the Iowa Behavioral Risk Factor Surveillance System (BRFSS) is a a Center for Disease Control funded annual household interview survey in which self-reported information about the burden of chronic diseases and their risk factors is collected for the non-institutionalized adult population ages 18 years and older in each state. In Iowa, the Iowa Department of Public Health manages the survey in which about 5,000 households participate each year.

Due to the small BRFSS sample size, in most instances, statewide, but not county or regional level prevalence rates and counts can be computed.

In 1999, the Iowa BRFSS began to include questions covering asthma prevalence. In subsequent years, questions about frequency of symptoms, and use of health care services related to asthma were added. In 2001, questions were first asked about childhood asthma.

Those adults classified in this report as currently having asthma answered yes to these two questions in the BRFSS: "Have you ever had asthma?" and "Do you still have asthma?" Childhood asthma prevalence is discussed elsewhere in this report.

The IDPH has published a number of reports covering other health issues based on BRFSS data. These reports are available at: http://www.idph.state.ia.us/brfss/default.asp). The CDC BRFSS web site, which houses BRFSS questionnaires, datasets, reports and background on methodologies, is: http://www.cdc.gov/brfss/

About the Iowa Asthma Control Program

The Iowa Asthma Control Program (IACP), administered by the Iowa Department of Public Health (IDPH) receives about $400,000 in CDC funding each year to plan for and administer asthma control programming across the state. This report is produced by the IDPH's Center for Health Statistics using IACP funding. Other current efforts of the IACP include: child care provider training, school health staff training, monitoring of local open burning ordinances, and staffing of the statewide Iowa Asthma Coalition.

Chapter Resources

Centers for Disease Control and Prevention, 2007 *Asthma Control Program Data and Surveillance* Web Site, http://www.cdc.gov/asthma/brfss/99/brfsstechinfo.htm.

Iowa Department of Public Health, Behavioral Risk Factor Surveillance System Web Site, Annual Reports: 1999-2006, http://www.idph.state.ia.us/brfss/default.asp, 2007

Iowa Department of Public Health, Behavioral Risk Factor Surveillance System Program, Unpublished 1999-2006 Data, 2007.

Citation to Use

Muldoon, J, *Asthma in Iowa: Adult Asthma Prevalence, Symptoms and Services Used: BRFSS: 1999-2006*, Center for Health Statistics, Iowa Dept. of Public Health, 2007.

Acknowledgement of CDC

This report was supported by a cooperative Agreement from the Centers for Disease Control and Prevention (CDC). Its contents are solely the responsibility of the author and do not necessarily represent the official views of CDC.

Where to Go for More Information on Asthma

For more information about the burden of asthma in Iowa or to review the full Asthma In Iowa report, its updates or newsletters published by the IACP, contact us at the IACP :

Web site address:

http://www.idph.state.ia.us/hpcdp/asthma.asp

Mailing address:

Asthma Epidemiologist

Center for Health Statistics, IA Deparment of Public Health
Fifth Floor, Lucas Bldg, 321 – E12th St
Des Moines, IA 50319

Phone:

(515) 242-5849

Fax:

(515) 281- 4529

E-mail:

Jmuldoon@idph.state.ia.us

For more information about IDPH asthma control program services for children and adults, visit the IACP web site listed above or contact the program at:

Phone: (515) 281-4779

E-mail: Ahoffman@idph.state.ia.us

Adult Asthma Report: BRFSS Data Tables

Table 1: By Age and Gender, Estimates of Adult: Current Asthma Prevalence Rate per 100 Population; Count with Current Asthma; and, Percent Distribution of Asthma Cases , Iowans 18 Years and Older, Annualized Average Estimates for 1999-2001, 2002-04, 2005-06, Iowa BRFSS Survey Sample Data

	Percent with Asthma (Prevalence Rate)						Percent Distribution of Cases			
Risk Factor	1999-01	2002-04	2005-06*	2005-06 % Range (95% Conf.Intrvl.)		1999-2006	1999-01	2002-04	2005-06**	1999-06
All Ages of Adults	6.9%	6.4%	6.9%	6.3%	7.5%	6.7%	100%	100%	100%	100%
Sex										
All men	5.6%	4.6%	5.7%	4.8%	6.6%	5.2%	38%	34%	40%	38%
All women	8.1%*	8.2%*	8%*	7.2%	8.8%	8.1%*	62%	66%	60%	59%
Age									100%	
Both Genders										
18 - 34	8.3%	6.7%	8.0%	5.7%	8.8%	7.4%	36%	31%	32%	28%
35 - 54	6.1%	6.7%	6.7%	5.8%	7.6%	6.5%	32%	39%	36%	35%
55+	6.7%	6.0%	6.8%	5.9%	7.6%	5.9%	31%	30%	33%	31%
Total									100%	
Men										
18 - 34	5.5%	4.3%	5.8%	3.7%	7.9%	5.1%	32%	30%	32%	28%
35 - 54	5.2%	4.8%	5.8%	4.5%	7.1%	5.2%	36%	41%	39%	41%
55+	6.1%	4.6%	5.5%	4.3%	6.7%	5.4%	32%	30%	29%	31%
Total									100%	
Women										
18 - 34	1.1%	9.2%	8.8%	6.6%	11.0%	7.8%	39%	32%	32%	29%
35 - 54	7.0%	8.5%	7.6%	6.5%	8.7%	7.0%	30%	38%	34%	35%
55+	7.0%	7.0%	7.8%	6.7%	8.9%	6.6%	31%	30%	35%	36%
Total									100%	

	Estimated Number with Asthma (# of Cases)						Sample Size (<50 = too small for reliable computations)			
Risk Factor	1999-01	2002-04	2005-06**	2005-06 Range (95% Conf.Intrvl.)		1999-2006	1999-01	2002-04	2005-06	1999-2006
All Ages of Adults	147,000	143,155	155,609	138,347	172,870	147,800	10,721	13,689	10,440	34,850
Sex										
All men	56,437	49,273	62,774	52,247	73,301	56,400	4,273	5,431	4,148	13,852
All women	90,583	93,882	92,835	81,390	104,279	90,600	5,448	8,258	6,292	19,998
Age										
Both Genders										
18 - 34	53,157	44,574	49,315	38,153	60,477	53,200	2,541	2,821	1,762	7,124
35 - 54	47,541	55,306	55,492	47,783	63,200	47,500	4,112	5,261	3,906	13,279
55+	46,161	43,039	50,581	42,756	58,407	46,200	4,007	5,536	4,693	14,236
Total										
Men										
18 - 34	18,092	14,514	20,122	12,521	27,723	18,100	1,101	1,204	716	3,021
35 - 54	20,070	20,095	24,221	18,744	29,698	20,100	1,735	2,235	1,672	5,642
55+	18,275	14,588	18,430	13,940	22,921	18,300	1,416	1,970	1,739	5,125
Total										
Women										
18 - 34	35,065	30,060	29,192	21,585	36,800	35,100	1,437	1,617	1,046	4,100
35 - 54	27,471	35,212	31,270	26,130	36,410	27,500	2,377	3,026	2,234	7,637
55+	27,887	28,451	32,151	26,932	37,370	27,900	2,591	3,566	2,954	9,111
Total										

* A boxed/bolded rate in the Percent(Rate) column means that the asthma prevalence rate is higher than the prevalence rate for at least one other subgroup of that risk factor in that column and that the difference between the higher and lower rate(s) reaches statistical significance at the .05 confidence level. Of the rates shown, only the overall rates for women were statistically higher than the overall rates for men. Differences in counts are similarly statistically significant if boxed and bolded.

** Note on Sample Size Totals: Sample size totals may vary between risk factors as the number of respondents answering don't know (DK) or refusing to answer varies by question. Totals for DK/Refusal counts estimates are not given unless >=1% of total count estimate.

Note on Rate/Count Differences: Statistical signficance at the 95% confidence level is reached when the 95% confidence interval (or the range into which an estimated rate would fall for 95% of random samples) for one rate does not overlap that of another--allowing one to assume that the difference between the estimated rates, derived from sample data, reflect actual differences in the real asthma prevalence rates of the Iowa adult population.

Table 2
By Race/Ethnicity, Age and Gender, Estimates of Adult: Current Asthma Prevalence Rate per 100 Population; Count with Current Asthma , Iowans 18 Years and Older, Annualized Average Estimates for 2001-2006, Iowa BRFSS Survey Sample Data

Risk Factor	Sample Size[1]	Current Asthma Prevalence Rate 2001-06	95% Confidence Level for Rate		Estimated Number w/Asthma	95% Confidence Level for Estimated #		2001-06 Count of Total IA Adult Pop.
All Adults	27,752	**6.6%**	6.3%	7.0%	**147,980**	136,009	159,951	2,266,636
SEX								
Men	11,058	**5.0%**	4.5%	5.5%	**54,025**	47,810	60,240	1,077,850
Women	16,694	**8.1%***	7.6%	8.7%	**93,955**	85,520	102,391	1,153,193
AGE								
18 - 34	5,419	7.3%	6.5%	8.1%	**48,507**	42,099	54,916	667,362
35 - 54	10,532	6.7%	6.1%	7.3%	**55,023**	49,237	60,808	822,346
55+	11,611	6.1%	5.6%	6.6%	**44,179**	39,858	48,499	729,229
RACE/ETHNICITY								
Black, Non-Hisp	347	**14.7%***	9.3%	20.2%	**4,074**	2,432	5,716	27,653
Asia/PI, Non-Hisp	183	**6.9%**	1.7%	12.0%	**1,467**	274	2,661	21,368
Native Amer. Non-Hisp	72	**22.8%***	11.9%	33.7%	**1,361**	644	2,077	5,963
Other race Non-Hisp	60	**5.0%**	0.0%	10.5%	**263**	0	560	5,237
Multi-Race, Non-Hisp	160	**15.9%***	9.3%	22.4%	**2,339**	1,252	3,426	14,734
All Hispanic	593	**5.8%**	3.0%	8.7%	**3,361**	1,688	5,034	57,451
All Minority Inc.Hisp	1,415	**9.7%***	7.7%	11.8%	**12,864**	9,890	15,838	132,405
White Non-Hisp	26,208	**6.4%**	6.1%	6.8%	**134,625**	123,573	145,677	2,089,098
SEX by RACE/ETHNICITY								
Men								
Black, Non-Hisp	133	**11%**	2.4%	19.1%	**1,400**			13,389
Asia/PI, Non-Hisp	92	**3%**	0.0%	5.9%	**400**			12,889
Native Amer. Non-Hisp	31	**14%**	2.3%	26.0%	**400**			2,762
Other race Non-Hisp	31	**6%**	0.0%	14.1%	**200**			3,076
Multi-Race, Non-Hisp	75	**9%**	1.2%	17.0%	**800**			8,260
All Hispanic	228	**7%**	1.8%	12.0%	**2,000**			29,566
All Minority Inc.Hisp	590	**7%**	4.4%	10.4%	**5,200**			69,943
White Non-Hisp	10,411	**5%**	4.3%	5.3%	**54,000**			1,002,932
Women								
Black, Non-Hisp	214	**18%****	12.0%	24.9%	**2,600**			14,264
Asia/PI, Non-Hisp	91	**13%**	1.4%	25.0%	**1,100**			8,479
Native Amer. Non-Hisp	41	**30%****	13.1%	47.5%	**1,000**			3,200
Other race Non-Hisp	29	**4%**	0.0%	9.3%	**83**			2,161
Multi-Race, Non-Hisp	75	**25%****	13.3%	35.7%	**1,600**			6,474
All Hispanic	365	**5%**	2.5%	6.9%	**1,300**			27,885
All Minority Inc.Hisp	815	**12%****	9.6%	15.1%	**7,700**			62,461
White Non-Hisp	16,795	**8%*****	7.3%	8.5%	**94,000**			1,086,166

***Rate is statistically higher than at least one other rate in the same subgroup of gender, race or age.**
****Rate for women of this race is statistically than the rate for Caucasian and/or Hispanic women.**
*****Rate for White women is statistically higher than rate for Hispanic woman and White men.**
[1] **Sample sizes of <50 are considered to yield unreliable estimates of rates and counts.**

RACE/ETHNICITY BY AGE	Sample Size[1]	Rate	95% CI for Rate		Estimated # w/Asthma	95% CI for #		Total IA Adult Pop.
Black, Non-Hispanic								
18 - 34	93	**20.8%***	9.3%	32.4%	**2,162**	751	3,572	10,373
35 - 54	152	**9.7%**	4.3%	15.1%	**1,095**	473	1,718	11,308
55+	96	**13.5%**	6.0%	20.9%	**775**	313	1,236	5,748
Asia/PI, Non-Hispanic								
18 - 34	88	**10.3%**	1.9%	18.7%	**1,358**	180	2,535	13,191
35 - 54	83	**1.5%**	0.0%	4.4%	**109**	0	324	7,310
55+	12	**NA**	.	.	**NA**	.	.	868
Native Amer., Non-Hispanic								
18 - 34	19	**16.5%**	0.2%	32.9%	**375**	1	749	2,268
35 - 54	37	**26.6%***	11.1%	42.0%	**690**	211	1,169	2,598
55+	16	**26.9%**	0.0%	55.2%	**295**	0	683	1,097
Other Race, Non-Hispanic								
18 - 34	21	**4.2%**	0.0%	10.1%	**99**	0	237	2,383
35 - 54	16	**.**	.	.	**.**	.	.	1,192
55+	23	**9.8%**	0.0%	24.9%	**164**	0	426	1,662
Multi-Race, Non-Hispanic								
18 - 34	47	**21.8%***	9.5%	34.2%	**1,525**	555	2,495	6,986
35 - 54	58	**7.2%**	1.1%	13.3%	**307**	40	573	4,263
55+	54	**14.9%**	3.1%	26.7%	**507**	66	949	3,409
All Hispanic								
18 - 34	248	**6.5%**	2.0%	11.1%	**2,109**	556	3,662	32,286
35 - 54	205	**4.1%**	1.4%	6.8%	**653**	213	1,093	16,026
55+	137	**6.8%**	2.4%	11.2%	**598**	194	1,003	8,810
All Minority Inc. Hisp								
18 - 34	516	**11.4%***	7.8%	14.8%	**7,628**	5,015	10,241	67,487
35 - 54	551	**6.7%**	4.4%	8.9%	**2,855**	1,847	3,862	42,697
55+	338	**10.8%***	6.9%	14.7%	**2,340**	1,450	3,229	21,595
White only, Non-Hispanic								
18 - 34	4,887	**6.8%**	6.0%	7.6%	**40,799**	35,193	46,405	598,114
35 - 54	9,948	**6.7%**	6.1%	7.3%	**51,952**	46,376	57,527	777,227
55+	11,208	**5.9%**	5.4%	6.4%	**41,725**	37,525	45,925	703,356

***Rate for this race/age group is statistically higher than rate for Whites or Hispanics in the same age-group.**

[1] Sample sizes of <50 are considered to yield unreliable estimates of rates and counts.

Table 2, continued, page 3 of 3

Risk Factor		Sample Size[1]	Current Prevalence Rate	95% Confid. Level for Rate		Estimated Number w/Asthma	95% Confidence Level for #		Count of Total IA Adult Pop.
RACE/ETHNICITY BY SEX AND AGE									
Men									
Black only, Non-Hisp	**18 - 34**	34	**17.2%**	0.0%	35.5%	**890**	0	1,992	5,174
	35 - 54	66	**5.3%**	0.0%	11.2%	**313**	0	671	5,936
	55+	32	**10.6%**	0.0%	24.2%	**239**	0	578	2,249
Asia/PI, Non-Hisp	**18 - 34**	42	**3.0%**	0.0%	7.6%	**241**	0	604	7,996
	35 - 54	43	**2.6%**	0.0%	7.5%	**109**	0	324	4,268
	55+	7	NA	.	.	NA	.	.	625
Native Amer., Non-	**18 - 34**	8	**9.9%**	0.0%	29.1%	**109**	0	322	1,091
	35 - 54	14	**20.5%**	0.0%	41.3%	**224**	0	490	1,093
	55+	9	**10.1%**	0.0%	24.7%	**58**	0	141	578
Other Race, Non-Hisp	**18 - 34**	11	**3.9%**	0.0%	11.7%	**50**	0	149	1,286
	35 - 54	9	NA	.	.	NA	.	.	790
	55+	11	**12.9%**	0.0%	36.8%	**129**	0	384	1,000
Multi-Race, Non-Hisp	**18 - 34**	22	**10.8%**	0.0%	25.0%	**418**	0	988	3,863
	35 - 54	28	**1.3%**	0.0%	3.9%	**33**	0	98	2,531
	55+	25	**16.2%**	0.0%	34.6%	**302**	0	688	1,865
All Hispanic	**18 - 34**	106	**8.4%**	0.9%	16.0%	**1,574**	73	3,074	18,691
	35 - 54	82	**3.0%**	0.0%	6.4%	**240**	0	515	7,983
	55+	38	**8.5%**	0.0%	17.8%	**229**	0	491	2,699
All Minority Inc. Hisp	**18 - 34**	223	**8.6%**	3.7%	13.5%	**3,281**	1,294	5,269	38,102
	35 - 54	242	**4.1%**	1.6%	6.5%	**920**	354	1,487	22,601
	55+	122	**10.6%**	4.2%	17.1%	**958**	329	1,586	9,017
White only, Non-Hisp	**18 - 34**	2,077	**4.5%**	3.5%	5.6%	**13,664**	10,349	16,980	301,267
	35 - 54	4,237	**5.3%**	4.5%	6.0%	**20,557**	17,307	23,808	388,394
	55+	4,055	**4.7%**	3.9%	5.4%	**14,425**	12,036	16,815	309,718
Women									
Black, Non-Hisp	**18 - 34**	59	**24.5%***	11.1%	37.8%	**1,272**	482	2,062	5,199
	35 - 54	86	**14.6%**	5.7%	23.5%	**782**	272	1,292	5,372
	55+	64	**15.3%**	6.6%	24.0%	**536**	222	849	3,499
Asia/PI, Non-Hisp	**18 - 34**	46	**21.5%**	3.6%	39.4%	**1,117**	0	2,240	5,194
	35 - 54	40	NA	.	.	NA	.	.	3,042
	55+	5	NA	.	.	NA	.	.	243
Native Amer.,Non-Hisp	**18 - 34**	11	**22.7%**	0.0%	48.7%	**267**	0	576	1,176
	35 - 54	23	**30.9%**	8.5%	53.4%	**466**	64	868	1,505
	55+	7	**45.7%**	0.3%	91.2%	**237**	0	616	518
Other Race, Non-Hisp	**18 - 34**	10	**4.5%**	0.0%	13.4%	**49**	0	145	1,097
	35 - 54	7	NA	.	.	NA	.	.	402
	55+	12	**5.2%**	0.0%	15.3%	**34**	0	101	662
Multi-Race, Non-Hisp	**18 - 34**	25	**35.5%**	14.1%	56.9%	**1,107**	320	1,894	3,123
	35 - 54	30	**15.8%**	2.0%	29.6%	**273**	15	532	1,731
	55+	29	**13.3%**	0.1%	26.6%	**206**	0	420	1,544
All Hispanic	**18 - 34**	142	**3.9%**	0.9%	6.9%	**535**	118	952	13,595
	35 - 54	123	**5.1%**	0.9%	9.4%	**413**	66	759	8,043
	55+	99	**6.0%**	1.1%	11.0%	**369**	58	680	6,111
All Minority Inc. Hisp	**18 - 34**	293	**14.8%**	9.7%	19.9%	**4,347**	2,706	5,988	29,384
	35 - 54	309	**9.6%**	6.1%	13.2%	**1,935**	1,166	2,703	20,096
	55+	216	**11.0%**	6.3%	15.7%	**1,382**	765	1,998	12,577
White, Non-Hisp	**18 - 34**	2,810	**9.1%****	7.9%	10.4%	**27,135**	22,762	31,508	296,847
	35 - 54	5,711	**8.1%****	7.2%	9.0%	**31,394**	27,261	35,527	388,832
	55+	7,153	**6.9%****	6.3%	7.6%	**27,299**	24,349	30,250	393,637

*** Rate for this race/age group is statistically higher than rate for same-age White group.**

****Rates statistically higher than same-age Hispanic women and White men**

[1]Sample sizes of <50 yield unreliable

Table 3.0: By Race & Gender, Estimates of Adult: Current Asthma Prevalence Rate/100 Population; Count of Population with Current Asthma; 95% Confidence Interval for Estimated Rate and Count; and, Percent Distribution of Asthmatic and Total Population, Iowans 18 Years and Older, Annualized Average Estimates for Six Years 1999-2004, Iowa BRFSS Survey Sample Data

Risk Factor*	Adult Asthma Prevalence Estimates				Percent Distribution within Risk Factor			Sample Size: Total for Six Years
	Percent with Asthma		Number with Asthma					
	Percent*	% Range (95%Conf.Intrvl.)	Number**	# Range (95% Conf. Interval)	Adults w/ Asthma**	vs.***	All Adults	
All Adults	6.7%	6.2 - 7.1	144,900	130,100 - 159,600	100%		100%	24,278
Sex								
Women	**8.2** ▲	7.6 - 8.8	**92,100** ▲	82,100 - 102,000	**64** ▲		52	14,614
Men	5.1	4.6 - 5.6	52,800	45,800 - 59,800	36		48	9,664
Total					100%		100%	
Age								
18 - 34	7.5	6.6 - 8.3	48,900	42,000 - 56,000	34 ▲		30	5,362
35 - 54	6.4	5.8 - 7.0	51,400	44,700 - 58,200	35		37	9,373
55+	6.3	5.7 - 6.9	44,600	39,300 - 49,900	31		33	9,243
Total					100%		100%	
Race/Ethnicity								
African-Amercn.	**12.7** ▲	7.8 - 17.7	3,300	1,900 - 4,500	2 ▲		1	282
Other Race	9.3	6.2 - 12.5	3,900	2,400 - 5,300	3 ▲		2	482
Hispanic	5.5	3.3 - 7.8	2,500	1,500 - 3,500	2		2	459
All Minorities	8.6	6.8 - 10.4	9,700	7,400 - 11,900	**7** ▲		6	1,223
Caucasian	6.6	6.2 - 7.0	**135,000** ▲	121,000 - 148,800	**93**		94	23,059
Total					100%		100%	
Family Income								
<$25,000	**8.6** ▲	7.8 - 9.5	**45,500** ▲	39,500 - 51,500	**31** ▲		24	6,512
25,000-49,999	**6.5** ▲	5.8 - 7.2	**48,300** ▲	42,000 - 54,700	**33**		34	8,191
50,000-74,999	5.9	5.1 - 6.8	**21,500** ▲	17,900 - 25,000	**15**		17	3,748
75,000+	4.5	3.7 - 5.4	13,800	10,800 - 16,800	10		14	3,226
DK/Rfsed	6.9	5.7 - 8.1	15,700	12,500 - 19,000	11		10	2,601
$50,000+	5.3	4.7 - 5.9	35,300	30,200 - 40,400	24		31	6,974
Total					100%		100%	
Education (Adults Ages 25 Years and Older)								
Less than High School (H.S.)	**9.6** ▲	7.8 - 11.5	13,800	10,800 - 16,800	11 ▲		8	1,778
H.S. Diploma/ GED	5.9	5.3 - 6.5	**41,200** ▲	36,000 - 46,300	**34**		37	8,398
Some College, <BS/BA	7.3	6.5 - 8.1	**37,500** ▲	31,100 - 42,800	**31** ▲		27	6,161
College Graduate	5.7	5.0 - 6.4	**29,700** ▲	25,100 - 34,200	24		28	6,084
Any College	6.5	6.0 - 7.1	67,100	59,0000 - 75,300	55		55	12,245
Total (>=25 years of age)			122,500		100%		100%	
Health Insurance								
Insured	6.5	6.1 - 6.9	**127,300** ▲	114,200 - 140,400	**88**		90	22,238
Uninsured	8.4	6.9 - 9.9	17,200	13,700 - 20,700	12 ▲		10	1,997
Total					100%		100%	
Overal Health Status								
Excellent/ Very Good	4.6	4.2 - 5.1	**58,000** ▲	50,800 - 65,200	**40**		58	13,564
Good	**7.7** ▲	6.9 - 8.5	**50,300** ▲	43,500 - 57,100	**35** ▲		30	7,631
Fair/Poor	**14.2** ▲	12.7 - 15.7	36,000	31,000 - 41,000	25 ▲		13	3,232
Total					100%		100%	

Overal Health Status								
Excellent/ Very Good	4.6	4.2 - 5.1	**58,000**	50,800 - 65,200	**40**		58	13,564
Good	**7.7**	6.9 - 8.5	**50,300**	43,500 - 57,100	**35**		30	7,631
Fair/Poor	**14.2**	12.7 - 15.7	36,000	31,000 - 41,000	**25**		13	3,232
Total					100%		100%	
Flu Shot Past Year								
Yes	**8.0**	7.4 - 8.7	64,400	57,000 - 71,900	**45**		37	9,922
No	5.9	5.4 - 6.4	79,900	70,100 - 89,600	55		62	14,246
Total					100%		100%	
Pneumonia Vaccine Ever (All Ages)								
Yes	**10.6**	9.8 - 11.5	51,900	45,700 -58,100	36		23	6,223
No	5.5	5.1 - 5.9	**87,700**	77,400 - 97,400	**61**		73	17,288
DK/Refused	6.3	4.3 - 8.3	5,300	3,500 - 7,200	4		4	767
Total					100%		100%	
Pneumonia Vaccine Ever (Age 55+)								
Yes	**9.2**	8.2 - 10.2	**32,800**	28,600 - 37,000	**74**		50	4,900
No	3.1	2.6 - 3.7	10,600	8300 - 12,800	24		47	4,400
DK/Refused	7.3	3.1 - 11.5	1200	500 - 1,900	3		3	200
Total(>=55 years of age)			44,600		100%		100%	
Smoking Status								
Current	**7.8**	6.8 - 8.7	**37,600**	32,000 - 43,300	**26**		22	5,103
Former	**7.6**	6.8 - 8.4	**38,900**	33,800 - 44,000	**27**		24	5,945
Never	5.8	5.4 - 6.3	68,200	60,000 - 76,500	47		54	13,164
Total					100%		100%	
Smoking in the Home in the Past 30 Days (1999 data only)								
Yes	7.9	6.1 - 6.7	48,500	37,400 - 59,700	31		29	272
No	7.6	6.2 - 9.0	**110,400**	90,900 - 129,900	**69**		68	3225
DK/Refused							3	
Total			158,900		100%		100%	
Any Leisure Exercise Past 30 Days (2000-2004 data only)								
Yes	6.2	5.7 - 6.7	**102,600**	89,700 - 115,600	**72**		79	15,526
No	7.6	6.7 - 8.4	39,400	33,100 - 45,700	**28**		21	5,254
Total			142,000		100%		100%	
Weight								
Normal	5.6	4.9 - 6.2	38,300	32,300 - 44,400	26		32	7,680
Overweight	5.7	5.1 - 6.3	49,600	43,600 - 55,700	34		40	9,488
Obese	**9.5**	8.7 - 10.4	**51,300**	45,100 - 57,500	**35**		25	6,190
DK/Refused	7.7	5.7 - 9.6	5,600	4,000 - 7,300	4		3	919
Total					100%		100%	

* A boxed/bolded rate in the *Percent* column means that the asthma prevalence rate for that subgroup is higher than the prevalence rate for at least one other subgroup of that risk factor in that column and that the difference between the higher and lower rate(s) reaches statistical significance at the .05 confidence level. (e.g., For the risk factor **Race/Ethnicity**, the difference in rates between African-Americans and at least one other race group (Caucasians in this case) reaches statistical significance--that is, as seen in the % Range column, the confidence intervals for the rates do not overlap.) In the *Risk Factor* col. (the first column of the table), a risk factor subgroup is boxed & bolded if, in the *Percent* column, its corresponding asthma prevalence rate is noted as statistically higher than that of other subgroup's rates for that risk factor.

** In the *Number* column, a count of asthma cases is boxed & bolded if it is higher than at least one other subgroup's count for that same risk factor with the difference being statistically significant at the .05 level. (e.g., For the risk factor **Sex**, the difference in the count of cases between women and men is statistically significant.)

The *Adults with Asthma* column contains the percent of the total count of cases by risk factor that each subgroup of the risk factor represents.

*** A percent in this column is bolded & boxed if the corresponding count of cases in the *Number* column is noted as being statistically high. An up-arrow in the *vs.* column means that the proportion of asthmatics with this risk factor is disproportionately high relative to all Iowa adults.(Stat. significance not tested).

Note on Sample Size Totals: Sample size totals may vary between risk factors as the number of respondents answering don't know (DK) or refusing to answer varies by question. Totals for DK/Refusal counts estimates are not given unless >=1% of total count estimate.

Note on Rate Differences: Statistical signficance at the 95% confidence level is reached when the 95% confidence interval (or the range into which an estimated rate would fall for 95% of random samples) for one rate does not overlap that of another--allowing one to assume that the difference between the estimated rates, derived from sample data, reflect actual differences in the real asthma prevalence rates of the Iowa adult population.

Table 3: By Race and Risk Factor, Estimated *Rate of Current Asthma and Count of Adults w/Current Asthma*, Iowans 18 Years and Older, Annualized Average Percent for Four Years 2001-2004, Iowa BRFSS

Risk Factor*	By Race for Iowa Adults, Population Estimates of Asthma Prevalence (BRFSS Sample Data, 1999-04)									All Races:			Sample Size--Six Year Total		
	Minority Race/Hispanic			Caucasian			All Races			Percent Distribution w/in Risk Factor					
	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**				Minor-ity	Cauca-sian	All Races
	Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Adults w/ Asthma**	VS. ***	All Adults			
All Women	**12.4%**	9.5 - 15.2	**6,600**	**8.0%**	7.4 - 8.6	**85,400**	8.2%	7.6 - 8.8	**92,100**	**64**	▲	52	648	13,915	14,563
All Men	5.2	3.0 - 7.4	3,000	5.0	4.5 - 5.6	49,600	5.1	4.6 - 5.6	52,800	36		48	475	9,144	9,619
All Adults	8.6			6.6			6.7			100%		100%			
Income															
Women															
<$25,000	**17.0**	11.7 - 22.3	**3,700**	**9.5**	8.2 - 10.7	**26,900**	**10.0**	8.8 - 11.1	**30,700**	**33**	▲	27	285	4,098	4,383
25k-49,999	9.2	4.6 - 13.9	**1,500**	7.9	6.8 - 8.9	**28,300**	7.9	6.9 - 9.0	**29,800**	**32**		33	186	4,523	4,709
50,000-74,999	9.7	0.1 - 18.8	500	6.9	5.5 - 8.2	11,100	7.0	5.6 - 8.3	11,600	13		15	56	1,926	1,982
75,000+	3.2	0.0 - 7.6	100	6.0	4.6 - 7.4	7,800	5.9	4.5 - 7.3	7,900	9		12	46	1,606	1,652
DK/Refused	12.4	4.2 - 20.5	800	8.4	6.7 - 10.1	11,300	8.5	6.9 - 10.1	12,200	13		13	75	1,762	1,837
$50,000+	6.8	1.3 - 12.4	600	6.5	5.5 - 7.5	18,900	6.5	5.5 - 7.5	19,500				102	3,532	3,634
Total										100%		100%			
Men															
<$25,000	**6.9**	2.6 - 11.3	1,500	**6.8**	5.4 - 8.2	**13,400**	**6.8**	**5.5 - 8.2**	14,900	**28**	▲	21	162	1943	2105
25,000-49,999	3.2	4.2 - 6.0	600	5.1	4.2 - 6.0	**17,800**	5.0	**4.2 - 5.9**	18,600	**35**		35	148	3312	3460
50,000-74,999	6.2	0.0 - 13.2	400	5.0	3.9 - 6.1	**9,500**	5.0	3.9 - 6.2	9,900	19		19	57	1702	1759
75,000+	2.1	0.0 - 5.9	100	3.6	2.5 - 4.6	5,800	3.5	2.5 - 4.5	6,000	11		16	63	1503	1566
DK/Rfsed	6.8	0.0 - 14.0	400	4.0	2.2 - 5.7	3,100	4.1	2.4 - 5.8	3,500	7		9	45	684	729
$50,000+	4.1	0.1 - 8.1	600	4.3	3.6 - 5.1	15,300	4.3	3.6 - 5.1	15,900				120	138	258
Total										100%		100%			

* A boxed/bolded rate in one of the *Percent with Asthma* columns means that the asthma prevalence rate for that subgroup is higher than the prevalence rate for at least one other subgroup of that risk factor in that column and that the difference between the higher and lower rates reaches statistical significance at the .05 confidence level--that is the confidence intervals for the rates do not overlap. (For further explanation, see note at end of this table) . In the *Risk Factor* column (first column in the table), a risk factor subgroup is boxed and bolded if, in at least one of the *Percent with Asthma* columns, its corresponding asthma prevalence rate is noted as being statistically higher than other subgroup rates (in the same column) for that risk factor .

** In the *Number with Asthma* column, a count of asthma cases is boxed and bolded if it is statistically higher than at least one other subgroup count for that particular risk factor within the same column with the difference reaching the .05 level of statistical significance.
The *Adults with Asthma* column contains the percent of the total count of cases by risk factor that each subgroup of a risk factor represents and is boxed and bolded if the corresponding count in the *All Races/Number with Asthma* column is statistically elevated.

*** An up-arrow in the *vs.* column means that the proportion is disproportionately high relative to all Iowa adults. (Statistical significance not tested).

Table 3: By Race and Risk Factor, Estimated *Rate of Current Asthma and Count of Adults w/Current Asthma*, Iowans 18 Years and Older, Annualized Average Percent for Four Years 2001-2004, Iowa BRFSS

Table 3, p. 2 of 8	By Race/Gender, Estimates of Asthma Prevalence, Iowa Adults, BRFSS, 1999-04												Sample Size--Six Year Total		
Risk Factor*	Minority Race/Hispanic			Caucasian			All Races			All Races			Minor-ity	Cauca-sian	All Races
	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent Distribution w/in Risk Factor					
	Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Adults w/ Asthma**	VS.	All Adults			
All Women	**12.4%**	9.5 - 15.2	**6,600**	**8.0%**	7.4 - 8.6	**85,400**	8.2%	7.6 - 8.8	**92,100**	**64**	▲	52	648	13,915	14,563
All Men	5.2	3.0 - 7.4	3,000	5.0	4.5 - 5.6	49,600	5.1	4.6 - 5.6	52,800	36		48	475	9,144	9,619
All Adults	8.6			6.6			6.7			100%		100%			
Education (Adults Ages 25 Years and Older)															
Women															
Less than High School	8.8	3.7 - 14.0	600	9.5	8.1 - 13.8	7,600	**10.8**	8.2 - 13.4	8,300	11	▲	8	93	992	1085
High School/GED	8.5	4.0 - 12.9	1,100	7.9	6.5 - 8.2	**25,800**	7.4	6.5 - 8.2	**26,800**	**35**		37	176	4869	5045
<BS/BA But Some College	16.2	9.7 - 22.7	1,700	8.4	7.0 - 9.1	**22,400**	8.3	7.3 - 9.3	**24,100**	**31**		31	148	3252	3400
College Graduate	7.7	3.0 - 12.3	800	6.5	5.9 - 8.2	**16,700**	7.1	6.0 - 8.2	**17,500**	**23**		24	136	3843	3979
Any College	12.1	8.1 - 16.1	2,500	6.9	6.8 - 8.4	39,100	7.7	7.0 - 8.5	41,600				284	7095	7379
Total (>=25 years of age)			4,200			72,500			76,700	100%		100%			
Men															
Less than H.S.	4.9	0.0 - 10.7	300	**8.8**	6.1 - 11.6	5,200	**8.3**	5.8 - 10.8	5,400	12	▲	8	60	615	675
High School/GED	3.4	0.0 - 7.2	400	4.3	3.5 - 5.2	**13,900**	4.3	3.5 - 5.1	**14,300**	**32**		38	118	3210	3328
<BS/BA But Some College	8.3	2.2 - 14.2	900	6.0	4.8 - 7.1	**12,400**	6.1	4.9 - 7.2	**13,400**	**30**		27	100	2056	2156
College Graduate	1.4	0.0 - 3.4	200	4.7	3.7 - 5.6	**11,800**	4.5	3.6 - 5.4	**12,200**	**27**		28	125	2542	2667
Any College	4.5	1.6 - 7.5	1,100	5.2	4.5 - 6.0	24,200	5.2	4.5 - 5.9	25,600				225	4598	4823
Total (>=25 years of age)			1900			43,300			45,200	100%		100%			

Table 3, p. 3 of 8

By Race/Gender, Estimates of Asthma Prevalence, Iowa Adults, BRFSS, 1999-04

Risk Factor*	Minority Race/Hispanic			Caucasian			All Races			All Races			Sample Size--Six Year Total		
	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent Distribution w/in Risk Factor			Minor-ity	Cauca-sian	All Races
	Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Adults w/ Asthma**	VS.	All Adults			
All Women	**12.4%**	9.5 - 15.2	**6,600**	**8.0%**	7.4 - 8.6	**85,400**	8.2%	7.6 - 8.8	**92,100**	**64**	▲	52	648	13,915	14,563
All Men	5.2	3.0 - 7.4	3,000	5.0	4.5 - 5.6	49,600	5.1	4.6 - 5.6	52,800	36		48	475	9,144	9,619
All Adults	8.6			6.6			6.7			100%		100%			
Health Insurance															
Women															
Insured	10.7	7.8- 13.6	4,700	7.7	7.1 - 8.4	**76,100**	7.9	7.5 - 8.4	**80,800**	**88**		92	528	12938	13466
Uninsured	17.7	9.6 - 25.9	1,700	11.1	8.3 - 13.8	9,300	**11.7**	9.2 - 14.2	11,000	12	▲	8	118	963	1081
Total										100%		100%			
Men															
Insured	3.5	1.6 - 5.3	1,500	5.1	4.5 - 5.6	**44,800**	5.0	4.5 - 5.5	**46,400**	**88**		89	380	8305	8685
Uninsured	9.8	3.0 - 16.7	1,600	4.9	3.2 - 6.6	4,600	5.6	3.8 - 7.4	6,200	**12**	▲	11	94	814	908
Total										100%		100%			
Overal Health Status															
Women															
Excellent/ Very Good	10.4	6,0 - 14.9	2,500	5.5	4.8 - 6.1	**33,900**	5.6	4.9 - 6.3	**36,400**	**40**		58	294	7802	8096
Good	11.2	6.7 - 15.9	2,200	**9.5**	8.4 - 10.7	**30,200**	**9.6**	8.5 - 10.7	**32,400**	**35**	▲	30	231	4202	4433
Fair/Poor	20.7	13.1 - 28,2	1,900	**16.4**	14.2 - 18.5	21,000	**16.6**	14.4 - 18.7	22,900	25	▲	12	120	1881	2001
Total										100%		100%			
Men															
Excellent/ Very Good	4.4	1.7 - 7.2	1,400	3.5	2.3 - 4.1	**20,100**	3.5	3.0 - 4.1	**21,600**	**41**		58	240	5184	5424
Good	4.8	0.1 - 8.7	900	**5.8**	4.7 - 6.9	17,000	**5.7**	4.7 - 6.7	17,900	34	▲	30	158	2803	2961
Fair/Poor	8.5	0.7 - 16.2	800	**11.7**	9.7 - 13.7	12,400	**11.4**	9.5 - 13.1	13,100	25	▲	11	77	1139	1216
Total										100%		100%			

Table 3: By Race and Risk Factor, Estimated *Rate of Current Asthma and Count of Adults w/Current Asthma*, Iowans 18 Years and Older, Annualized Average Percent for Four Years 2001-2004, Iowa BRFSS

Table 3, p. 4 of 8	By Race/Gender, Estimates of Asthma Prevalence, Iowa Adults, BRFSS, 1999-04											Sample Size--Six Year Total		
Risk Factor*	Minority Race/Hispanic			Caucasian			All Races			All Races				
	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent Distribution w/in Risk Factor			Minor-ity	Cauca-sian	All Races
	Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Adults w/ Asthma**	VS.	All Adults			
All Women	**12.4%**	9.5 - 15.2	**6,600**	**8.0%**	7.4 - 8.6	**85,400**	8.2%	7.6 - 8.8	**92,100**	**64**	▲	52	648	13,915	14,563
All Men	5.2	3.0 - 7.4	3,000	5.0	4.5 - 5.6	49,600	5.1	4.6 - 5.6	52,800	36		48	475	9,144	9,619
All Adults	8.6			6.6			6.7			100%		100%			
Flu Shot in Past Year															
Women															
Yes	12.2	6.6 - 17.7	1,900	9.2	8.3 - 10.1	40,300	**9.3**	8.4 - 10.2	42,300	46	▲	41	205	6223	6428
No	12.7	9,1 - 16.3	**4,700**	7.2	6.4 - 10.9	44,900	7.5	6.7 - 8.2	49,600	54		59	437	7635	8072
Total										100%		100%			
Men															
Yes	5.2	1.2 - 9.2	800	**6.5**	5.6 - 7.3	21,300	**6.4**	5.5 - 7.3	22,200	42	▲	33	131	3221	3352
No	4.9	2.2 - 7.6	2,100	4.4	3.7 - 5.0	28,100	4.4	3.8 - 5.0	30,300	57		66	337	5787	6124
Total										100%		100%			
Pneumonia Vaccine Ever (All Ages)															
Women															
Yes	19.9	11.9 - 27.9	1,800	**12.1**	10.8 - 13.5	31,400	**12.3**	11.0 - 13.5	32,300	36	▲	24	123	3883	4006
No	10.9	7.7 - 14.0	**4,400**	6.7	6.0 - 7.4	**52,200**	6.7	6.2 - 7.5	**56,600**	**62**		73	492	9745	10237
DK/Rfsd										2		3			
Total										100%		100%			
Men															
Yes	8.6	1.3 - 14.7	800	**8.6**	7.2 - 9.9	17,800	**8.8**	7.2 - 9.3	18,600	35	▲	24	89	2092	2181
No	4.6	2.1 - 7.1	2,100	4.0	3.4 - 5.4	**28,700**	4.0	3.5 - 4.5	**31,000**	**59**		73	359	6638	6997
DK/Rfsd										6		3			
Total										100%		100%			

Table 3, p. 5 of 8

By Race/Gender, Estimates of Asthma Prevalence, Iowa Adults, BRFSS, 1999-04

Risk Factor*	Minority Race/Hispanic			Caucasian			All Races			All Races			Sample Size--Six Year Total		
	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent Distribution w/in Risk Factor			Minor-ity	Cauca-sian	All Races
	Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Adults w/ Asthma**	VS.	All Adults			
All Women	**12.4%**	9.5 - 15.2	**6,600**	**8.0%**	7.4 - 8.6	**85,400**	8.2%	7.6 - 8.8	**92,100**	**64**	▲	52	648	13,915	14,563
All Men	5.2	3.0 - 7.4	3,000	5.0	4.5 - 5.6	49,600	5.1	4.6 - 5.6	52,800	36		48	475	9,144	9,619
All Adults	8.6			6.6			6.7			100%		100%			
Pneumonia Vaccine Ever (Age 55 Years and Older)															
Women															
Yes	16.6	6.5 - 26.7	800	**9.9**	8.7 - 11.1	20,500	**10.0**	8.8 - 11.3	**21,300**	**76**	▲	70	71	3267	3338
No	4.2	0.0 - 8.1	200	3.5	2.7 - 4.3	6,200	3.5	2.8 - 4.3	6,400	23		28	75	2648	2723
DK/Refusd										2		2	6	92	98
Total (>=55 years of age)			1,000			26,700			27,700	100%		100%			
Men															
Yes	16.9	2.7 - 31.0	300	7.8	6.3 - 9.3	**10,900**	**8.0**	6.4 - 9.5	**11,500**	**70**		72	38	1434	1472
No	4.2	0.0 - 12.1	100	2.3	1.7 - 3.6	4,000	2.7	1.7 - 3.6	4,100	25	▲	23	39	1652	1691
DK/Refusd										5		5	4	98	102
Total (>=55 years of age)			400			14,900			15,600	100%		100%			

Table 3: By Race and Risk Factor, Estimated *Rate of Current Asthma and Count of Adults w/Current Asthma*, Iowans 18 Years and Older, Annualized Average Percent for Four Years 2001-2004, Iowa BRFSS

Table 3, p. 6 of 8	By Race/Gender, Estimates of Asthma Prevalence, Iowa Adults, BRFSS, 1999-04												Sample Size--Six Year Total		
Risk Factor*	Minority Race/Hispanic			Caucasian			All Races			All Races			Minor-ity	Cauca-sian	All Races
	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent Distribution w/in Risk Factor					
	Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Adults w/ Asthma**	VS.	All Adults			
All Women	**12.4%**	9.5 - 15.2	**6,600**	**8.0%**	7.4 - 8.6	**85,400**	8.2%	7.6 - 8.8	**92,100**	**64**	▲	52	648	13,915	14,563
All Men	5.2	3.0 - 7.4	3,000	5.0	4.5 - 5.6	49,600	5.1	4.6 - 5.6	52,800	36		48	475	9,144	9,619
All Adults	8.6			6.6			6.7			100%		100%			
Smoking															
Women															
Current	16.3	9.8 - 22.8	2,300	**9.9**	8.5 - 11.7	21,500	**10.5**	8.9 - 12.0	23,900	26	▲	20	172	2648	2820
Former	15.4	6.8 - 23.9	1,000	**10.1**	8.7 - 11.5	20,700	**10.3**	8.9 - 11.6	21,800	24	▲	19	93	2806	2899
Never	10.1	6.5 - 13.7	3,200	6.6	5.9 - 7.3	**43,000**	6.8	6.1 - 7.4	**46,300**	**50**		61	381	8439	8820
Total										100%		100%			
Men															
Current	5.1	0.5 - 10.0	1,000	5.4	4.2 - 6.6	12,800	5.4	4.2 - 6.5	13,800	26	▲	25	145	2147	2292
Former	8.6	3.0 - 14.2	900	5.7	4.7 - 6.6	16,200	5.8	4.8 - 6.7	17,200	33	▲	29	102	2922	3024
Never	3.9	1.1 - 6.7	1,100	4.6	3.8 - 5.3	**20,700**	4.5	3.8 - 5.2	**21,900**	**41**		47	227	4062	4289
Total										100%		100%			
Smoking in Home Past 30 Days (1999 data only)															
Women															
Yes	22.1	4.7 - 39.5	3,900	9.7	7.0 - 12.3	27,400	10.4	7.7 - 13.1	31,300	32	▲	27	29	567	596
No	9.2	0.0 - 19.5	2,400	8.6	6.7 - 10.5	**64,600**	8.6	6.8 - 10.5	**66,900**	**68**		70	51	1461	1512
DK/Rfsd										0		3			
Total (1999 only)			6,300			92,000			98,200	100%		100%			
Men															
Yes	4.6	0.0 - 13.5	1,100	5.6	3.3 - 8.0	16,100	5.5	3.2 - 7.8	17,200	28		31	20	409	429
No	7.2	0.0 - 16.9	2,400	6.5	4.5 - 8.4	**41,100**	6.5	4.6 - 8.3	**43,400**	**72**	▲	66	45	893	938
DK/Refusd										0		3			
Total (1999 only)			3,500			57,200			60,600	100%		100%			

Table 3, p. 7 of 8	By Race/Gender, Estimates of Asthma Prevalence, Iowa Adults, BRFSS, 1999-04												Sample Size--Six Year Total		
Risk Factor*	Minority Race/Hispanic			Caucasian			All Races			All Races			Minor-ity	Cauca-sian	All Races
	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent Distribution w/in Risk Factor					
	Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Adults w/ Asthma**	VS.	All Adults			
All Women	**12.4%**	9.5 - 15.2	**6,600**	**8.0%**	7.4 - 8.6	**85,400**	8.2%	7.6 - 8.8	**92,100**	**64**	▲	52	648	13,915	14,563
All Men	5.2	3.0 - 7.4	3,000	5.0	4.5 - 5.6	49,600	5.1	4.6 - 5.6	52,800	36		48	475	9,144	9,619
All Adults	8.6			6.6			6.7			100%		100%			
Leisure Exercise Past 30 Days (2000 -2004 data only)															
Women															
Yes	12.7	8.6- 16.7	**4,600**	7.3	6.6 - 8.1	**59,300**	7.5	6.8 - 8.2	**63,900**	**70**		75	375	8808	9183
No	10.9	6.5 - 15.3	2,100	**9.5**	8.2 - 10.7	24,700	**9.5**	8.3 - 10.8	26,900	**30**	▲	25	193	3065	3258
Total (no 1999 counts)			6,700			84,000			90,800	100%		100%			
Men															
Yes	4.3	2.1 - 6.6	**2,000**	4.8	4.1 - 5.4	**36,500**	4.8	4.1 - 5.3	**38,500**	**75**		77	313	5963	6276
No	7.0	0.1 - 13.5	1,000	5.2	4.0 - 6.4	11,500	5.3	4.1 - 6.4	12,500	**25**	▲	23	97	1872	1969
Total (no 1999 counts)			3000			48,000			51,000	100%		100%			
Weight															
Women															
Normal	8.0	3.9 - 12.1	1,600	6.1	5.1 - 7.0	24,200	6.2	5.3 - 7.1	25,800	28		37	232	5061	5293
Overweight	11.9	6.3 - 17.5	1,800	7.2	6.1 - 8.1	25,500	7.4	6.5 - 8.3	27,400	30		33	186	4596	4782
Obese	**20.9**	13.7 - 28.0	2,900	**10.0**	10.5 - 13.4	**30,800**	12.4	11.0 - 13.8	**33,600**	**36**	▲	24	185	3496	3681
DK/Refusd	7.9	0.0 - 16.9	300	8.3	6.0 - 10.6	4,800	8.3	6.1 - 10.4	5,200	6		6	4	60	64
Total										100%		100%			
Men															
Normal	4.5	1.1 - 7.8	900	4.7	3.8 - 5.6	11,400	4.7	3.8 - 5.6	12,500	24		26	148	2207	2355
Overweight	4.3	1.2 - 7.4	1,000	4.5	3.7 - 7.8	**21,200**	4.5	3.7 - 5.2	**22,200**	**42**		48	83	4492	4575
Obese	6.0	0.2 - 11.7	900	**6.7**	5.6 - 7.8	**16,800**	**6.6**	5.5 - 7.7	**17,700**	**34**	▲	26	128	2362	2490
DK/Refusd	18.6	0.0 - 42.9	300	2.2	0.0 - 5.3	200	4.5	0 - 9.1	500	1		1	2	2	4
Total										100%		100%			

Table 3: By Race and Risk Factor, Estimated *Rate of Current Asthma and Count of Adults w/Current Asthma*, Iowans 18 Years and Older, Annualized Average Percent for Four Years 2001-2004, Iowa BRFSS

Table 3, p. 8 of 8	By Race/Gender, Estimates of Asthma Prevalence, Iowa Adults, BRFSS, 1999-04											Sample Size--Six Year Total		
Risk Factor*	Minority Race/Hispanic			Caucasian			All Races			All Races: Percent Distribution w/in Risk Factor			Minor-ity	Cauca-sian	All Races
	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Percent w/ Asthma		Number with Asthma**	Adults w/ Asthma**	VS.	All Adults			
	Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)		Percent*	% Range (95% C.I.)							
All Women	**12.4%**	9.5 - 15.2	**6,600**	**8.0%**	7.4 - 8.6	**85,400**	8.2%	7.6 - 8.8	**92,100**	**64**	▲	52	648	13,915	14,563
All Men	5.2	3.0 - 7.4	3,000	5.0	4.5 - 5.6	49,600	5.1	4.6 - 5.6	52,800	36		48	475	9,144	9,619
All Adults	8.6			6.6			6.7			100%		100%			
Age															
Women															
18-34	14.7	9.3 - 20.0	3,500	9.8	8.5 - 11.2	29,100	**10.2**	8.9 - 11.5	32,600	35	▲	28	600	2800	3400
35-54	11.4	7.2 - 15.5	2,200	7.6	6.6 - 8.6	29,100	7.8	6.8 - 8.7	31,300	34		36	300	5100	5400
55+	9.1	4.2 - 14.1	1,000	6.9	6.2 -7.7	27,100	7.0	6.2 - 7.8	28,200	31		36	200	6000	6200
Total										100%		100%			
Men															
18-34	5.4	1.9 - 9.0	1,700	4.5	3.8 - 5.9	14,500	4.9	3.9 - 5.9	16,300	31		32	200	2100	2300
35-54	2.4	0.0 - 4.4	500	5.1	4.4 -5.9	19,500	5.0	4.2 - 5.7	20,100	38		38	200	3700	3900
55+	11.5	3.1 - 19.8	800	5.1	4.3 - 6.1	15,600	5.3	4.5 -6.2	16,400	31	▲	30	100	3300	3400
Total										100%		100%			

* A boxed/bolded rate in one of the Percent with Asthma columns means that the asthma prevalence rate for that subgroup is higher than the prevalence rate for at least one other subgroup of that risk factor in that column and that the difference between the higher and lower rates reaches statistical significance at the .05 confidence level. (e.g, In the Caucasian column, Income risk factor row, the difference in rates between Caucasian men who have incomes of less than $25,000 and at least one of the rates for Caucasian men who are in one of the higher income groups reaches statistical significance--that is the confidence intervals for the rates do not overlap). In the Risk Factor column (first column in the table), a risk factor subgroup is boxed and bolded if, in at least one of the Percent with Asthma columns, its corresponding asthma prevalence rate is noted as being statistically higher than other subgroup rates (in the same column) for that risk factor .

** In the Number with Asthma column, a count of asthma cases is boxed and bolded if it is statistically higher than at least one other subgroup count for that particular risk factor within the same column with the difference reaching the .05 level of statistical significance. The Adults with Asthma column contains the percent of the total count of cases by risk factor that each subgroup of a risk factor represents and is boxed and bolded if the corresponding count in the All Races/Number with Asthma column is statistically elevated.

*** An up-arrow in the vs. column means that the proportion is disproportionately high relative to all Iowa adults. (Statistical significance not tested).

Note on Sample Size Totals: Sample size totals may vary between risk factors as the number of respondents answering don't know (DK) or refusing to answer varies by question. DK/Refusal count estimates are not given unless >=1% of total count estimate for risk factor.

Note on Combining All Minorities: Samples sizes were too small to provide for reliable rates when broken out by gender by individual race group, thus all racial minority groups were combined.

Table 4.1: By Risk Factor, Estimated *Percent of Adults w/Current Asthma* Who in the Past 12 Months Had an(a): Asthma Attack, Physican's Office Visit for Symptoms, Emergency Department (ED)/Urgent Care Visit, Regular Asthma Check-Up , or, Who in Past 30 Days Have Had Breathing/Sleeping Problems Related to Asthma, Iowans 18 Years and Older, Annualized Average Percent for Four Years 2001-2004, Iowa BRFSS

Risk Factor*	Percent of Iowa Adults with Current Asthma Who in Past 12 Months Had at Least One:*							Had Any Breathing / Sleeping Problem in Past 30 Days	BRFSS Sample Size: Range of Sizes for Cells in Row	
	Asthma Attack	Activity of Daily Living Limited by Asthma	Doctor Office Visit for Symptom	Emerg.Dpt (ED)/ Urgent Care Ctr Visit	ED/ Urgent Care Ctr or Doc. Office Visit for Symptom**	Attack/ Limited Activity or Had Amb'latry Care for Symptm***	Routine Asthma Preven-tive Check Up		Small-est	Larg- est
All Adults	**49.1%**	**21.1%**	**21.0%**	**12.4%**	**27.5%**	**59.7%**	**52.2%**	**75.3%**	1064	1098
Sex										
Women	**54.3**	**23.9**	**25.4**	13.8	**32.2**	**64.8**	54.2	75.8	759	819
Men	38.9	15.6	13.1	9.7	18.2	49.8	48.3	74.2	305	312
Age										
18 - 34	**54.8**	25.3	21.9	12.0	25.8	**62**	45.3	75.2	277	279
35 - 54	**54**	22.1	22.2	12.8	29.8	**65.8**	55.5	75.4	413	425
55+	35.3	15.6	19.0	12.4	26.3	48.6	56.0	75.2	374	397
Race/Ethnicity										
All Minorit's	57.8	24.9	20.4	21.2	32.5	67.3	61.7	70.1	72	76
Caucasian	48.4	20.8	21.3	11.7	27.2	59.2	51.4	75.7	990	1021
Family Income										
<$25,000	52.0	22.9	23.6	**16.8**	**31.9**	61.5	54.2	80.2	346	364
25k-49,999	48.0	23.3	21.1	**16.1**	**30.8**	64.6	50.0	75.3	326	333
50k--74,999	43.4	15.7	19.4	3.1	20.3	51.8	50.7	73.1	147	148
75,000+	51.7	15.8	14.8	9.1	16.7	54.5	55.9	67.2	124	124
DK/Rfsed	48.3	22.1	24.2	5.2	26.7	55.6	51.2	73.2	121	130
$50,000+	47.2	15.7	17.3	5.8	18.6	53.6	53.0	70.4	271	272
Education (Adults Age 25 and Older)										
Less than High School (H.S.)	38.9	29.1	10.8	20.3	28.6	57.5	54.1	74.5	85	93
H.S.Diplma. /GED	50.0	16.3	**26.3**	15.3	33.1	61.1	53.2	78.0	312	333
Some Collg. <BS/BA	53.7	20.2	20.6	10.9	27.1	64.1	51.2	76.0	309	321
College Graduate	44.8	20.2	19.8	7.6	22.2	54.8	55.9	70.3	258	261
Any College	49.8	20.2	20.2	8.5	25.0	60.0	53.2	73.5	567	581
Health Insurance										
Insured	45.7	18.4	20.0	10.5	25.6	56.8	52.8	74.8	952	989
Uninsured	**72.0**	**38.5**	29.2	**25.9**	**40.7**	**79.7**	49.0	79.6	102	112

Table 4.1, p. 2 of 2	Percent of Iowa Adults with Current Asthma Who in Past 12 Months Had at Least One:*							Had Any Breathing / Sleeping Problems in Past 30 Days	BRFSS Sample Size: Range of Sizes for Cells in Row	
Risk Factor*	**Asthma Attack**	**Daily Living Activity Limited by Asthma**	**Doctor Office Visit for Symptom**	**Emerg.Dpt (ED)/ Urgent Care Ctr Visit**	**ED/ Urgent Care Ctr or Doc. Office Visit for Symptom****	**Attack/ Limited Activity or Had Amb'latry Care for Symptm*****	**Routine Asthma Preven-tive Check Up**		Small-est	Larg- est
All Adults	**49.1%**	**21.1%**	**21.0%**	**12.4%**	**27.5%**	**59.7%**	**52.2%**	**75.3%**	1064	1098
Overal Health Status										
Excellent/ Very Good	46.0	17.3	15.1	9.9	19.5	54.9	47.0	70.4	404	405
Good	47.2	22.0	21.6	10.3	26.9	57.4	48.9	74.0	381	384
Fair/Poor	56.4	26.3	**30.3**	**19.8**	**41.1**	**70.1**	**65.1**	84.6	274	304
Flu Shot Past Year										
Yes	45.7	19.5	21.9	10.6	26.5	56.3	**58.8**	73.5	531	553
No	51.8	22.3	20.6	13.9	28.3	62.4	46.8	76.6	530	530
Pneumonia Vaccine Ever (All Ages)										
Yes	45.7	20.0	24.1	12.8	30.2	57.2	**62.1**	74.9	429	455
No	51.4	22.0	19.8	12.3	26.2	61.9	47.3	75.3	608	615
DK/Refused									27	28
Pneumonia Vaccine Ever (Age 55+)										
Yes	35.8	15.7	20.9	11.1	26.7	49.7	60.8	74.9	286	309
No	35.3	15.9	14.3	17.0	26.4	47.3	44.1	75.3	86	88
Smoking										
Current	50.2	27.2	23.0	12.1	28.7	62.1	48.7	**82.5**	248	269
Former	44.7	18.9	23.4	16.9	31.4	56.3	57.8	74.9	279	294
Never	50.6	19.1	19.3	10.4	25.0	60.1	51.3	71.9	535	545
Leisure Exercise Past 30 Days										
Yes	49.2	17.9	19.2	10.6	24.7	57.7	51.3	75.5	770	788
No	48.6	**30.0**	26.8	17.5	**35.4**	65.2	55.0	74.7	293	319
Weight										
Normal	44.7	19.6	18.6	10.7	22.9	57.3	47.0	75.6	336	346
Overweight	56.8	22.9	25.0	11.9	30.3	65.1	53.9	76.3	303	315
Obese	47.4	21.0	20.3	15.1	30.2	57.7	55.8	75.2	375	387
DK/Rfsd	44.7	21.2	23.2	8.5	24.2	58.8	53.8	66.6	50	52

* A bolded and outlined percent indicates that the difference between this higher percent and at least one other lower percent for subgroups of that risk factor in that column reaches statistical significance at the .05 confidence level. In the Risk Factor column, a risk factor subgroup is boxed and bolded if, in at least one of the Percent of Iowa Adults With Current Asthma columns, a percent for this risk factor subgroup is noted as being statistically higher than other subgroup percents for that risk factor (in the same column).

** This column includes anyone who reported in the past 12 months making a visit to the doctor's office, an emergency department or urgent care enter to treat acute asthma symptoms. i.e., This column includes all those who were previously listed in the two columns to its left.

*** This column includes anyone who reported in the past 12 months any symptoms/visits that were listed in any of the five columns to the left.

Table 4.2: By Risk Factor, Estimated *Count of Adults w/Current Asthma* Who in the Past 12 Months Had an(a): Asthma Attack, Physican's Office Visit for Symptoms, Emergency Department (ED)/Urgent Care Visit, Regular Asthma Check-Up , or, Who in Past 30 Days Have Had Breathing/Sleeping Problems Related to Asthma, Iowans 18 Years and Older, Annualized Average Percent for Four Years 2001-2004, Iowa BRFSS

Risk Factor*	Number of Iowa Adults w/Asthma Who in Past 12 Months Had at Least One:****							Had Any Breathing / Sleeping Problem in Past 30 Days	BRFSS Sample Size: Range of Sizes for Cells in Row	
	Asthma Attack	Activity of Daily Living Limited	Dr Office Visit for Symptom	ED Visit	ED / Urgnt Visit / Off'ce Visit for Symptom**	Visit for Care or Attack or Activity Limits***	Preven-tive Check-Up		Small-est	Larg-est
All Adults	**68,300**	**28,600**	**29,300**	**17,300**	**38,100**	**83,400**	**72,000**	**104,800**	1064	1098
Sex										
Women	49,900	21,300	23,200	12,700	29,500	59,700	49,300	69,500	759	819
Men	18,500	7,300	6,100	4,600	8,600	23,600	22,600	35,300	305	312
Age										
18 - 34	25,700	11,300	10,200	5,600	12,100	29,000	20,900	35,200	277	279
35 - 54	29,000	11,600	11,700	6,900	16,000	35,400	29,600	40,400	413	425
55+	13,700	5,700	7,200	4,800	10,000	19,000	21,400	29,200	374	397
Race/Ethnicity										
All Minorit's	5,900	2,400	2,100	2,200	3,300	6,900	6,300	7,200	72	76
Caucasian	62,300	26,100	27,200	15,100	34,800	76,400	65,500	97,400	990	1021
Family Income										
<$25,000	22,500	9,300	10,000	7,200	13,500	26,500	22,500	34,100	346	364
25k-49,000	21,600	10,300	9,400	7,200	13,800	29,100	22,500	33,900	326	333
50k--74,999	8,600	3,100	3,800	0,600	4,000	10,200	10,000	14,400	147	148
75,000+	8,500	2,600	2,400	1,500	2,700	9,000	9,100	11,000	124	124
DK/Rfsed	7,500	3,300	3,700	800	4,100	8,600	7,900	11,400	121	130
$50,000+	17,100	5,700	6,200	2,100	6,700	19,200	19,100	25,500	271	272
Education (Adults Age 25 and Older)										
<High School (H.S.)	4,000	7,100	1,100	2,100	2,900	6,000	5,400	7,600	85	93
H.S.Diploma /GED	18,400	29,200	9,700	5,600	12,200	14,400	19,600	28,700	312	333
Some Collg. <BS/BA	21,100	7,700	8,000	4,300	10,600	25,200	20,000	29,800	309	321
College Graduate	13,600	6,100	6,000	2,300	6,800	16,600	16,700	21,400	258	261
Any College	34,700	13,700	14,000	6,600	17,300	41,800	36,700	51,200	567	581
Health Insurance										
Insured	55,400	21,800	24,000	12,700	30,800	69,100	63,500	90,500	952	989
Uninsured	12,700	6,600	5,200	4,600	7,200	14,100	8,400	14,100	102	112

Table 4.2, p. 2 of 2	Number of Iowa Adults with Asthma Who in Past 12 Months Had at Least One:****								BRFSS Sample Size: Range of Sizes for Cells in Row	
Risk Factor*	**Asthma Attack**	**Activity of Daily Living Limited**	**Dr Office Visit for Symptom**	**ED Visit**	**ED / Urgnt Visit / Off'ce Visit for Symptom**	**Visit for Care or Attack or Actvty Limits**	**Preven-tive Check-Up**	**Had Any Breathing/ Sleeping Problems in Past 30 Days**	Small-est	Larg-est
All Adults	**68,300**	**28,600**	**29,300**	**17,300**	**38,100**	**83,400**	**72,000**	**104,800**	1064	1098
Overal Health Status										
Excellent/ Very Good	25,400	9,600	8,300	5,400	10,800	30,300	25,900	38,900	404	405
Good	23,200	10,700	10,600	5,100	13,100	28,200	23,600	36,300	381	384
Fair/Poor	19,400	8,200	10,200	6,800	14,000	24,400	22,200	29,100	274	304
Flu Shot Past Year										
Yes	28,200	11,600	13,300	6,500	16,100	34,800	35,900	45,200	531	553
⇨ **No**	40,100	17,000	16,000	10,800	21,900	48,500	35,900	59,400	530	530
Pneumonia Vaccine Ever (All Ages)										
Yes	22,000	9,100	11,300	6,200	14,300	27,700	29,300	35,900	429	455
⇨ **No**	44,400	18,700	17,100	10,600	22,700	53,500	40,600	65,100	608	615
DK/Refused									27	28
Pneumonia Vaccine Ever (Age 55+)										
⇨ **Yes**	10,400	4,300	5,900	3,200	7,600	14,400	17,200	22,100	286	309
No	3,300	1,500	1,300	1,600	2,500	4,500	4,200	6,700	86	88
Smoking										
Current	17,900	9,300	8,100	4,300	10,100	22,200	17,000	29,300	248	269
Former	15,500	6,300	8,000	5,900	10,900	19,600	19,700	26,000	279	294
⇨ **Never**	34,800	13,000	13,200	7,100	17,200	41,500	35,300	49,400	535	545
Leisure Exercise Past 30 Days										
⇨ **Yes**	50,300	17,900	19,600	10,800	25,200	59,000	52,100	77,200	770	788
No	18,000	10,600	9,700	6,500	12,900	24,200	20,000	27,500	293	319
Weight										
Normal	20,600	8,900	8,600	5,000	10,600	26,500	21,600	34,900	336	346
Overweight	22,400	8,800	9,800	4,700	11,900	25,800	20,800	30,200	303	315
Obese	22,500	9,600	9,500	7,100	14,100	27,400	26,200	35,500	375	387
DK/Rfsd	2,800	1,300	1,500	0,500	1,500	3,700	3,300	4,200	50	52

* A bolded and outlined count indicates that the difference between this higher count and at least one other lower count for subgroups of that risk factor in that column reaches statistical significance at the .05 confidence level. In the Risk Factor column, a risk factor subgroup is boxed and bolded if, in at least one of the Number of Iowa Adults With Current Asthma columns, a count for this risk factor subgroup is noted as being statistically higher than other subgroup counts for that risk factor (in the same column).

** This column includes anyone who reported in the past 12 months making a visit to the doctor's office, an emergency department or urgent care enter to treat acute asthma symptoms. i.e., This column includes all those who were previously listed in the two columns to its left.

*** This column includes anyone who reported in the past 12 months any symptoms/visits that were listed in any of the five columns to the left.

Table 5: By Risk Factor, Subgroups w/Asthma Prevalence Rates & Counts Statistically Significantly Higher than Rates & Counts in Comparable Subgroups, Rate per 100 Population, Iowans 18 Years & Older, Annualized Average Estimates, 1999-2004, Iowa BRFSS

By Subgroup Elevated Rate and Count Estimates				Comparable Subgroup with Statistically Lower Estimates	
	Subgroup	Elevated Rate (Percent)	Elevated Case Count	( ) =Lower Rate	( ) = Lower Case Count
All Iowa Adults		6.7	144,900	NA	NA
Sex					
	Women-All	8.2	92,100	Men (5.1)	Men (52,800)
Age	(None elevated)				
Race/Ethnicity					
	African-American	12.7		Caucasians (6.6)	
	Caucasian		135,000		All Minorities (9,700)
Family Income					
	<$25,000	8.6	45,500	$25,000-49,999 (6.5),$50,000-74,999 (5.9), $75,000+ (4.5)	$75,000+ (13,800)
	25,000-49,999	6.5	48,300	$75,000+ (4.5)	$75,000+ (13,800)
	50,000-74,999		21,500		$75,000+ (13,800)
Education (Adults Ages 25 Years and Older)					
	Less than High School	9.6		H.S. Graduates(5.9), College Graduates(5.7)	
	H.S. Diploma/ GED		41,200		< H.S. Diploma (13,800)
	Some College, <BS/BA		37,500		< H.S. Diploma (13,800)
	College Graduate		37,501		< H.S. Diploma (13,800)
Health Insurance					
	Insured**		127,300		Uninsured (17,200)
Overal Health Status					
	Excellent/Very Good		58,000		Fair/Poor (36,000)
	Good**	7.7	50,300	Excellent/VG Health (4.6)	Fair/Poor (36,000)
	Fair/Poor**	14.2		Excellent/VG Health (4.6), Good (7.7)	
Flu Shot					
	Yes**	8.0		No Flu Shot (5.9)	
Pneumonia Vaccine					
	Yes**	10.6		No Pneumonia Shot(5.3)	
	No		87,700		Yes (51,900)
Pneumonia Vaccine (Age 55+)					
	Yes**	9.2	32,800	No Pneumonia Shot (3.1)	No (10,600)
Smoking Status					
	Current	7.8		Never Smoked (5.8)	
	Former	7.6		Never Smoked (5.8)	
	Never Smoked		68,200		Current (37,600), Former (38,900)
Smoking in Home					
	No		110,400		Yes, Smoking in Home (48,500)
Any Leisure Activity					
	Women-No	9.5		Women-Yes (7.5) Men-No (5.2)	
	Yes		102,600		No (39,400)
Weight					
	Obese**	9.5	51,300	Normal Wt (5.6); Overweight (5.7)	Normal Wt (38,300)

** Gender-Specific Rates are elevated for both genders as well.

Table 6: By Risk Factor, Gender-Specific Subgroups w/Asthma Prevalence Rates & Counts Statistically Significantly Higher than Rates & Counts in Comparable Gender-Specific Subgroups, Rate per 100 Population, Iowans 18 Years & Older
Annualized Average Estimates, 1999-2004, Iowa BRFSS

By Gender-Specific Subgroup Elevated Rate and Count Estimates			Gender-Specific Risk FactorSubgroup with Statistically Lower Estimates	
Risk Group	**Elevated Rate (Percent)**	**Elevated Case Count**	**( ) =Lower Rate**	**( ) = Lower Case Count**
All Iowa Adults	**5.7**	**144,899**	NA	NA
All Women	**8.0**	**92,100**	Men (5.1)	Men (52,800)
Gender by Race				
Women-AfrnAm	**18.4**		Women- Caucasian (8.0)	
Women-OthrRace	**15.2**		Men-Other Race (5.1) Women-Caucasian (8.0)	
Women-Caucn	**8.0**	**85,400**	Men-Caucasian (5.1)	Men-Caucasian (49,600) Women-All Minorities (6,600)
Men-Caucn		**49,600**		Men--All Minorities (3,000)
Gender by Age				
Women 18-34 yrs	**10.2**		Men 18-34 years (4.9), Women 35-54 yrs. (7.8), Women 55+ (7.0)	
African-American	**12.7**		Caucasians (6.6)	
Caucasian		**135,000**		All Minorities (9,700)
Gender by Income				
<$25,000 -Women**	**10.0**	**30,700**	$75k+ -Women .(5.9) ; $50k-74,999 Women (7.0)	$50,000+ - Women Caucasian. (18,900)
<$25,000 -Men**	**6.8**	**14,900**	$75k+ -Men (3.5)	<$50,000-Minority Men (1,100)
$25,000-49,999 -Women		**29,800**		>$75,000 (7,900)
$25,000-49,999 -Men		**18,600**		$50,000-$74,999-Men (9,900) >$75,000-Men (6,000)
Education (Adults Ages 25 Years and Older)				
< High School -Women	**10.8**		College Graduates-Women (7.1)	
< High School-Men	**8.3**		College Graduates-Men (4.5)	
< High School-Caucn. Men	**8.8**		College Graduates-Men Caucn. (4.7); H.S.Graduates -Caucn Men (4.3)	
H.S. Diploma/GED-Women		**26,800**		< H.S. Diploma (8,300)
H.S. Diploma/ GED-Men		**14,300**		< H.S. Diploma (5,400)
Some College-Women		**24,100**		< H.S. Diploma (8,300)
Some College-Women		**13,400**		< H.S. Diploma (5,400)
College Graduate		**17,500**		< H.S. Diploma (8,300)
College Graduate		**12,200**		< H.S. Diploma (5,400)

** Race-specific rates are elevated for both Caucasians and All Minorities racial groups.

Background Information about the Iowa BRFSS

Established in 1988, the Iowa Behavioral Risk Factor Surveillance System (BRFSS) is a a Center for Disease Control funded annual household interview survey in which self-reported information about the burden of chronic diseases and their risk factors is collected for the non-institutionalized adult population ages 18 years and older in each state. In Iowa, the Iowa Department of Public Health manages the survey in which about 5,000 households participate each year.

Due to the small BRFSS sample size, in most instances, statewide, but not county or regional level prevalence rates and counts can be computed.

In 1999, the Iowa BRFSS began to include questions covering asthma prevalence. In subsequent years, questions about frequency of symptoms, and use of health care services related to asthma were added. In 2001, questions were first asked about childhood asthma.

Those adults classified in this report as currently having asthma answered yes to these two questions in the BRFSS: "Have you ever had asthma?" and "Do you still have asthma?" Childhood asthma prevalence is discussed elsewhere in this report.

The IDPH has published a number of reports covering other health issues based on BRFSS data. These reports are available at: http://www.idph.state.ia.us/brfss/default.asp). The CDC BRFSS web site, which houses BRFSS questionnaires, datasets, reports and background on methodologies, is: http://www.cdc.gov/brfss/ .

To view the Iowa Asthma Surveillance Report chapter that discusses the BRFSS data in this appendix, see the Iowa Asthma Control Program web site at the address noted abovew.cdc.gov/brfss.

About the Iowa Asthma Control Program

The Iowa Asthma Control Program (IACP), administered by the Iowa Department of Public Health (IDPH) receives about $400,000 in CDC funding each year to plan for and administer asthma control programming across the state. This report is produced by the IDPH's Center for Health Statistics using IACP funding. Other current efforts of the IACP include: child care provider

Chapter Resources

Centers for Disease Control and Prevention, *Asthma Control Program Data and Surveillance* Web Site, http://www.cdc.gov/asthma/brfss/99/brfsstechinfo.htm , 2006.

Iowa Department of Public Health, Behavioral Risk Factor Surveillance System Web Site, Annual Reports: http://www.idph.state.ia.us/brfss/default.asp, 2006

Iowa Department of Public Health, Behavioral Risk Factor Surveillance System Program, Unpublished 1999-2004 Data, 2005.

Citation to Use

Muldoon, J, *Asthma in Iowa: Adult Asthma Prevalence, Symptoms and Services Used: Appendix of 1999-2004 BRFSS Tables* , Center for Health Statistics, Iowa Dept. of Public Health, 2007.

Acknowledgement of CDC

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Where to Go for More Information on Asthma

For more information about the burden of asthma in Iowa or to review the full Asthma In Iowa report, its updates or newsletters published by the IACP, contact us at the IACP :

Web site address:

http://www.idph.state.ia.us/hpcdp/asthma.asp

Mailing address:

Asthma Epidemiologist

Center for Health Statistics, IA Dept. of Public Health

Fifth Floor, Lucas Bldg, 321 – E12th St

Des Moines, IA 50319

Phone:

(515) 242-5849

Fax:

(515) 281- 4529

E-mail:

Jmuldoon@idph.state.ia.us

For more information about IDPH asthma control program services for children and adults, visit the IACP web site listed above or contact the program at:

Phone: (515) 281-4779

E-mail: Ahoffma@idph.state.ia.us

Asthma in Iowa

Child and Youth Asthma Prevalence

A Surveillance Report Based on Surveys with Iowa Data:

Behavioral Risk Factor Surveillance System (BRFSS)
Child Data: 2001-2006

IowaYouth Tobacco Survey (IYTS): 2004

Iowa Child and Family Household Survey (ICFHHS): 2005

Iowa Youth Risk Behavior Survey (IYRBS): 2005

National Survey of Children's Health (NSCH): 2003-04

National Health Interview Survey (NHIS): 2001-2005

Center for Health Statistics
Iowa Department of Public Health
2007
Web Site: http://www.idph.ia.us/hpcdp/asthma.asp

In this report on childhood asthma in Iowa:

Why is childhood asthma a priority?

How many Iowa children have asthma?

What is the frequency of asthma symptoms and services use by Iowa children?

What is the rate of asthma among Iowa children by demographic, socioeconomic and smoking status?

Report contents

Overview

Across the United States for reasons not completely understood, asthma prevalence (the percentage of people who have asthma) has doubled since 1979 making asthma a profound and expensive public health problem. Asthma is now one of the most common chronic diseases of childhood.

Between 45,000 and 50,000 Iowa children (7%) currently have health care provider-diagnosed asthma. Many studies suggest that just as many Iowa children have asthma which is undiagnosed.

Even for those children whose asthma is diagnosed, treatment is often inadequate. A recent Iowa study found that fewer than two of every five preschool and younger age children with asthma has received an asthma management plan from their health care provider. (ICFHHS, 2005) National standards of care, consider asthma management plans to be essential to the provision of quality asthma care.

In Iowa and nationally, not all children are at equal risk of having asthma. The prevalence of diagnosed childhood asthma increases with age--with high school youth having the highest rates. Children who are of a racial minority have higher asthma prevalence rates than Caucasian children. Families that are of lower socioeconomic status are at greater risk of having children with asthma than are families of high socioeconomic status. Iowa youth who smoke cigarettes, especially youth who are heavy smokers, have rates of asthma much greater than those of nonsmoking youth.

Characterized by wheezing, coughing, chest tightness and shortness of breath, asthma symptoms may range from mild to severe. In extreme cases, asthma can be life-threatening.

When poorly managed over the long term, asthma can lead to irreversible loss of lung function, similar to that seen in chronic obstructive lung disease in elderly smokers.

With the exception of some occupational exposures that are known to induce asthma, no one yet knows how to prevent people from first developing asthma. However, it is known that proper self and medical management and proper environmental controls can largely avert asthma's ill-effects, allowing those with asthma to maintain healthy and active lives.

Knowing that an epidemic of asthma is underway and that proper medical and environmental managment reduces exacerabations and can avert costly hospital stays and emergency department visits, many national, state and local efforts have been inititated to address the asthma epidemic. (See Background section of this report.)

This child asthma surveillance report is one in a series of reports that addresses the asthma epidemic in Iowa. This series of reports provides information to guide the design of more effective asthma control interventions and to evaluate progress toward reducing the problem of asthma. The reports are written by staff of the Iowa Department of Public Health's Center for Health Statistics and funded through the Iowa Asthma Control Program. The Iowa Asthma Control Program's budget is wholly received from the Federal Centers for Disease Control and Prevention, USDHHS.

Oversight in writing these reports was provided by members of the Surveillance Committee of the Iowa Asthma Coalition and members of the Iowa Asthma Coalition themselves, staff of the Iowa Asthma Control Program and others inside and outside the Iowa Department of Public Health. A list of contacts and contributors is given at the end of this report. You are invited to read this report and provide feedback on what was useful or could be more made more useful to you.

Key Findings on Child Asthma

7% of Iowa children have diagnosed asthma
9% have ever had diagnosed asthma

- Between 9% and 10% of Iowa children (62,000 to 67,000 of all 0 to 17 year olds) have ever had diagnosed asthma (had *lifetime* asthma). (Chart 2)

- 7% of Iowa children (45,000 to 50,000) have diagnosed *current* asthma. (Chart 1)

- Accounting for a change in survey methods within the Behavioral Risk Factor Surveillance System, the only database that has collected data on Iowa children over multiple years, no trend of increase or decrease in child current and lifetime asthma prevalence rates is apparent between 2001 through 2006, the years for which data are available. (Chart 3)

  Both Iowa and national rates fail to show any trends across these most recent years.

Iowa rates of diagnosed child asthma are lower than rates for nation, most other states

- The Iowa child diagnosed current and lifetime asthma prevalence rates consistently fell within the bottom third of all states' current and lifetime asthma prevalence rates for all three databases for which state-specific rates were available--the Behavioral Risk Factor Surveillance System, the National Survey of Children's Health and the National Health Interview Survey.

  Predictably, the Iowa child current and lifetime diagnosed asthma prevalence rates fell significantly below the national average child current and lifetime asthma prevalence rates for all three of these three databases for all years for which data were available as well. (Table 2)

Older youth have highest rates of diagnosed asthma

- Diagnosed child current asthma rates both nationally and in Iowa are lowest for children of elementary school age and younger and highest for children of middle and high school age.

  The National Survey of Children's Health and the Iowa Child Family and Household Health Survey, which rely on parents reporting information on their children, found rates of diagnosed current child asthma prevalence to range from 4% to 5% in Iowa children who were of elementary school age and younger.

  For middle and high school youth these two surveys found diagnosed current asthma prevalence in the state to range from 7% to 10%.

  Two other surveys, the Youth Risk Behavior Survey and the Iowa Youth Tobacco Survey which rely on self-reporting by older youth, revealed even higher current asthma prevalence rates among older Iowa youth: 12% for middle school youth and 13% to 14% for high school youth. (Chart 4)

Key Findings on Child Asthma, continued

Undiagnosed cases of asthma as prevalent in children as diagnosed cases

- As for adult asthma, many cases of child asthma are never diagnosed.
- A University of Iowa study found that more than 50% of children in Keokuk and Louisa counties who had chronic respiratory symptoms indicative of asthma had not been diagnosed with asthma. (Chrischilles, 2004)
- A recent study of 33,000 children in middle school in North Carolina found that while 10% reported health care practitioner diagnosed currrent asthma, another 7% had frequent wheezing but no asthma diagnosis. (Yeatts, 2000)
- Only one of the six databases on which this report relies, the Iowa Youth Tobacco Survey, collected data on undiagnosed asthma. The Youth Tobacco Survey found that while 12% of *middle school* youth reported having current asthma, 15% reported having at least one episode of wheezing in the past year and 17% reported wheezing after exercise in the past year. (Charts 14 and 15)

  High school students reported similar rates of asthma-like symptoms. (Chart 15)

.

Gender differences found for middle school-aged youth
Iowa gender-specific asthma prevalence data lacking for younger children

- National current asthma prevalence age-specific rates for boys have been found to be higher by two or three percentage points than the current asthma prevalence rate for girls in all comparable age groups. (NHIS, 2001-2005)
- In Iowa, gender-specific rates were not available for younger children but were for middle and high school aged youth. For *middle school-aged* youth, Iowa boys were found to have rates 3 percentage points higher than girls (14% vs. 11%). (Chart 6)
- For Iowa *high school* youth, across several databases, neither gender had consistently higher current asthma prevalence rates. Small sample size may explain some or all of the apparent divergence from national trends for gender-specific current asthma prevalence rates in high school students. (Chart 4). (Among adults, women have diagnosed asthma prevalence rates consistently higher than men.)
- The Iowa State Inpatient Database showed Iowa boys to have higher rates of inpatient hospitalizations than girls for all age groups. (In adulthood, however, this trend reverses: Women are seen to have higher rates of hospitalization from asthma than men for all age groups of adults. Among adults in Iowa and nationally, asthma *prevalence* also is higher for women than men across all age groups, with the difference being greatest between young women and young men. A report of asthma-related hospitalizations for Iowa is available on the IDPH web site.)

Youth Tobacco Survey shows minority high school students rates' to be 40% to 100% higher than that of Caucasian students

- With the exception of the Iowa Youth Tobacco Survey, for which race-specific rates were available for middle and high school students for four racial groups (African-American, Caucasian, Hispanic, and Other Race), the databases used in this report did not have available current asthma rates for Iowa children who are of a racial minority--due to small sample size. Larger sample sizes for Caucasian children, allowed rates to be computed from the National Survey of Children's Health and the Youth Risk Behavior Survey databases for these children.

- The National Survey of Children's Health found Caucasian children in Iowa to have current asthma prevalence rates below the Iowa prevalence rate for children for all races combined (6% in Caucasian vs. 7% all races), indicating that the prevalence rates in at least some groups of minority children was sufficiently higher than that of Caucasian children to raise the overall Iowa child prevalence rate slightly. (Chart 7)

- Similar differences in current asthma prevalence rates for Caucasian vs. all youth were seen in both the Iowa Youth Tobacco Survey and the Youth Risk Behavior Survey. These surveys cover only middle and high school youth. (Charts 8 and 9)

- Race-specific rates available from the Iowa Youth Tobacco Survey for *middle* and *high school* students showed large, although not statistically significant, difference in race-specific asthma prevalence rates both for high school and middle school youth. (Chart 8)

  The rate for Iowa African-American high school students was double that of Caucasians (24% vs. 12%). Rates for Hispanic high school students and and Other Race youth were 40% to 80% higher than for Caucasian high school students. Similarly large, although again not statistically significant, differences in race-specific rates were seen for middle school students. (Chart 8)

Households of lower socioeconomic status most likely to include child who has ever had asthma

- Households with the lowest incomes (<$15,000) were more likely to include children less than 18 years of age who had ever had asthma than were households with higher incomes. (Charts 10 and 11)

- Households in which at least one adult had a college degree were least likely to report having a child less than 18 years of age who had ever had asthma. Conversely, adults who had less than a high school diploma were most likely to live in households that included children who had ever had asthma. (Charts 12 and 13) Differences seen were not statistically significant.

Key Findings on Child Asthma, continued

Older children most likely to have had an asthma attack in past year

- Four surveys used in this report asked questions about child asthma attack rates. Two surveys asked about asthma attacks in children that had ever had diagnosed asthma, another survey asked about asthma attacks in children that had current diagnosed asthma, while the fourth survey asked about asthma attacks, regardless of asthma status. Thus, very different rates of asthma attacks in children were found.

- Asthma attack rates varied from 6% to 13% for Iowa high school students from 7% to 14% for middle school students; from 3% to 7% for elementary age students; and, from 3% to 4% for children 0 to 4 years of age. (Charts 14 and 15)

- The Iowa Youth Tobacco Survey asked youth, regardless of their reported diagnosed asthma status, whether they had experienced an asthma attack in the past 12 months. The reported asthma attack rates from this survey were almost double those of the two surveys that asked about attacks only if the youth also reported having *diagnosed* asthma. (e.g., 13% for IYTS vs. 7% and 6% for the other two surveys, Chart 14). Some of this difference may be attributed to respondents in the Iowa Youth Tobacco Survey self-reporting, while for all other surveys used in this report, parents or guardians provided responses on behalf of their children.

8% of Iowa children and youth who have ever had asthma have not seen a physician for their asthma in more than 3 years

- Among all children and youth who have ever had asthma, 25% had not seen a physician for asthma care within the past year--including 8% who had not seen a physician for care in more than 3 years and 17% who had last seen a physician 1-3 years ago.

- Among children preschool age and younger who have ever had diagnosed asthma, 7 percent had not seen a physician for their asthma in the past year. (Chart 16)

  Due to how data was available--only for children who ever had asthma, not just for those who currently had asthma, one cannot tell whether children were not seen because they no longer had asthma or because their current asthma was not being appropriately cared for.

4% of Iowa children and youth who have ever had diagnosed asthma were hospitalized at least once in the past year for asthma

- While 4% of all children and youth who have ever had asthma were hospitalized for asthma in the past 12 months. Among 0 to 4 yeasr olds, 11% were hospitalized for their asthma in the past 12 months. Four percent of children 0 to 4 years of age who had ever had asthma were hospitalized two or more times for their asthma in the past year. (Charts 17 and 18)

- Nationally, asthma is the second leading cause of hospitalization for children and youth 17 years of age and younger--behind injuries. (Health, United States, 2006) The Federal Agency for Health Quality Research has chosen pediatric inpatient hospitalizations for asthma as one of its priority pediatric preventive indicators, since study has shown a signficiant proportion of hospitalizations of hospitalizations for asthma could be averted with proper management in the ambulatory care setting.

Fewer than half of all Iowa children who have ever had diagnosed asthma have ever been given an asthma action plan by a health care provider

- Among children and youth, only 41% who had ever had asthma have ever been given an asthma action plan.

- Older children and youth who had ever had asthma were somewhat more likely than children less than 5 years of age to ever have been given an asthma action plan: 45% of 5 to 9 year olds, 46% of 10 to 14 year olds; and 48% of 15 to 17 year olds while only 39% of 0 to 4 year olds had ever received an action plan.

Key Findings on Child Asthma, continued

Iowa youth who smoke the most have the most asthma-related symptoms--some symtoms are 800 times higher in heavy smokers vs. nonsmoking youth

- Between 18% and 22% of Iowa high school youth and about 8% of middle school youth were found to smoke cigarettes.

- Among Iowa high school-aged youth, rates of cigarette smoking appeared to be slightly lower in female (20%) vs. male (24%) students. (Charts 21-24)

- High school youth with current asthma were slightly more likely to smoke one or more cigarettes per day (18%) than were high school students overall (15%). Middle school youth with current asthma also were slightly more likely to smoke cigarettes daily than were middle school youth overall (8% vs. 7%). (Charts 23 and 24)

- Among middle and high school youth, a dose response relationship was seen between the amount of cigarettes smoked and the likelihood of having asthma or asthma-related symptoms. Current asthma prevalence rates, lifetime asthma prevalence rates, asthma attack rates, any wheezing in the past 12 months, wheezing after exercise in the past 12 months, dry cough at night, and inability to speak due to wheezing all were highest among those youth that smoked the most. (Charts 25 - 28)

For example, very heavy smokers (>20 cigarettes per day) in middle and high school reported rates of sleep disturbances due to dry cough in the past 12 months that were 800% higher than that of fellow students who did not smoke. (Charts 26, 28)

- Other significant differences were found between students who were heavy smokers (smoked 20 or more cigarettes per day) versus those who were not. Among high school students:

  While 41% of heavy smokers reported having current asthma (diagnosed or undiagnosed), only 12% of high school students who did not smoke reported having current asthma;

  While 65% of heavy smokers reported having any wheezing in the past 12 months, only 20% of nonsmokers reported wheezing.

  While 51% of heavy smokers reported wheezing after exercise in the past 12 months, only 20% of nonsmokers reported wheezing after exercise.

Background

Why Asthma?

At the international, national and state levels asthma is recognized as a priority public health problem. Why?

- Asthma has doubled in prevalence since 1980. Nationally, nearly 20 million Americans now have asthma. Almost 200,000 Iowans have diagnosed asthma, including approximately 45,000 children. Twice that number of children may have undiagnosed asthma. It is one of the most common chronic conditions of childhood, one of the most common causes of activity limitations among children and youth and one of the most common causes of hospitalization in children less than 5 years of age. (Health, United States, 2007, Healthy People 2010)

- Asthma is expensive, the Asthma and Allergy Foundation of America (AAFA) estimates annual direct and indirect asthma costs at about $900 per person, meaning asthma costs Iowans $174,000,000 per year. About 30% ($52 million) of these costs are attributable to pediatric asthma, and 40% of that $52 million is attributable to direct health care costs to treat asthma in children. (AAFA, 2007)

- Poorly managed asthma is a leading cause of lost school days for children and lost work days for adults--and compose much of the indirect costs of asthma.

- The average child with asthma in the U.S. misses four days of school every year due to his/her asthma. The average parent misses two to three days of work every year due their child's asthma. Almost 40% of parents of children with asthma miss a least one day of work each year due to their child's asthma. (Asthma in America, 2007)

- Nearly two-thirds (62%) of children with asthma are limited by their asthma in participating in organized sports, outdoor activities, having pets, sleeping through the night, doing things with their family, doing well in school and participating in school activities.(Children and Asthma in America, 2007)

- Asthma hospitalizations are considered 'ambulatory care-sensitive'. As much as 40% of inpatient hospitalizations for asthma as well as a sizeable proportion of emergency room visits for asthma could be avoided with proper self and medical management in the physician's office setting.(Flores, 2003; Healthy Iowans 2010)

- Disparities exist in asthma prevalence and care. Minority children and children of low socioeconomic status are at increased risk of having asthma. National data show that children of low socioeconomic status with asthma are more likely to visit hospital inpatient and emergency departments than are children with asthma of higher socioeconomic status. (Healthy People 2010)

- For these reasons, a number of national and state plans have set goals to reduce asthma related-hospitalizations in children and youth. (Iowa Asthma Control Program Work Plan, 2006-2008, Healthy Iowans 2010, Iowa Asthma Coalition Strategic Plan, Healthy People 2010. Please visit the Iowa Asthma Control Program or the Iowa Asthma Coalition web site for more details. Web site addresses are given at the end of this report.)

Data Sources

Six Databases Used

In this report, estimated asthma prevalence rates and counts for Iowa children and youth (Iowans 17 years of age and younger) are presented based on the sample survey data from six databases, the:

- Iowa Youth Risk Behavior Survey (YRBS)
- Iowa Behavioral Risk Factor Surveillance System (BRFSS)
- Iowa Youth Tobacco Survey (IYTS)
- Iowa Child and Family Household Health Survey (ICFHHS)
- National Survey of Children's Health (NSCH)
- National Health Interview Survey (NHIS)

The YRBS, IYTS and the ICFHHS are completed only intermittently and included questions about asthma for the first time in 2004 (IYTS) and 2005 (YRBS, ICFHHS). The BRFSS has collected data on child asthma prevalence in Iowa for every year in since 2001 (and on adult asthma since 1999).

The NSCH was first completed in 2004, repeated in 2007 and is scheduled to be completed every four years in the future. It is a national survey of sufficient sample size (more than 100,000) to allow for state level analyses. More than 1,000 Iowa households are included in the study.

Ongoing since 1957 and including questions on asthma since 1980, the NHIS was designed to allow for national and regional level estimates of health status. The NHIS can yield state level estimates when multiple years of data are aggregated, which CDC did for the years 2001-2005 in the report, *The State of Childhood Asthma, United States, 1980-2005*, published in 2006.

Database Description	Databases w/Asthma Prevalence Data for Iowa Children					
	YRBS	BRFSS	IYTS	ICFHHS	NSCH	NHIS
Years child asthma data collected	2005	2001-06	2004	2005	2003-04	2001-05
Frequency of collection	every other year	every year	every other year	every 5 years	one time	every year*
Child population included						
0-17 years of age		√		√	√	√
Middle school			√			
High school	√		√			
Adult asthma data collected		√				√
National asthma data collected	√	√			√	√
Sample Size	1,400	1,000 - 1,600**	1,800	3,900	> 1,000	Unk
State agency responsible	IA Dept. Education	IA. Dept. Public Health	IA. Dept. Public Health	IA. Dept. Public Health	None- Federal survey	None-Federal survey

*State-level data only available through aggregation of multiple years of data

**Size varies by year √ = data collected

The ICFHHS, BRFSS, NHIS and the NSCH collect health data on all Iowa children age 17 years and younger through telephone or in-person inteviews with a child's parent or guardian.

The YRBS is limited to youth in high school and relies on written surveys completed by youth at school. Like theYRBS, the IYTS relies on written surveys completed at school, but unlike the YRBS, includes not only high school but middle school youth.

All six of the surveys used in this report collect data on a representative sample of Iowa children.

The surveys employed all collect information about child lifetime and current asthma. Some collect additional information about asthma attacks, other asthma-related symptoms and health care services use.

Surveillance Definitions and Issues

Surveillance case definitions for lifetime and current asthma prevalence

The YRBS and the IYTS, which cover only older children and youth of middle and/or high school aged, ask theses youth to complete written surveys. To obtain lifetime asthma prevalence, youth are asked: *Have you ever been told by a doctor, nurse or other health care provider that you have asthma?* In the case of the BRFSS, ICFHHS, NSCH, and NHIS which collect data on children age 0 to through 17 years of age, parents are asked similarly worded questions about lifetime asthma in their child

The YRBS and IYTS identify children with current asthma by asking: of those youth who have noted that they have ever had diagnosed asthma: *Do you still have asthma*? In the case of the BRFSS, ICFHHS, NSCH, and NHIS, parents similarly are asked if a child still has asthma if they reported previously that child had ever had diagnosed asthma.

The IYTS is the only survey of the six used in this report that attempts to measure the prevalence of *undiagnosed* lifetime and current asthma, querying youth about the prevalence of asthma-related symptoms whether or not the youth reported diagnosed asthma.

Children and youth identified as having current asthma in this report may have been initially diagnosed at any age.

How Iowa child prevalence rates and counts were computed

Asthma prevalence rates are given in percentages and are calculated by dividing the estimated number of children in a population with asthma by the total number of children in that population times 100. (e.g., Based on the ICFHHS, the estimated rate of child current asthma prevalence is: number of noninstitutionalized children in Iowa with asthma (45,000) / total number of noninstitutionalized children in Iowa (1,126,000) * 100 = 7% prevalence rate among Iowa children age 17 years and younger.

Most rates provided in this report are rounded to the nearest whole percent. (e.g., 7.1% is presented at 7% and 8.8 % is rounded to 9%.)

As previously noted, all of the surveys used in this report collect data from *representative samples*, and not the whole population of Iowa children about whom they wish to make estimates of health status. Therefore, data presented here are *estimates* of Iowa child population asthma prevalence counts and rates and not actual prevalence rates and counts for the Iowa child and youth populations.

Confidence intervals, statistically significant differences in rates provided

For estimated prevalence rates, when available, 95% confidence intervals are provided in the charts of this report.

Confidence intervals are the range of values on either side of an estimated rate that the actual Iowa population value will fall into 95% of the time. If the confidence intervals do not overlap for any two estimates being compared, one can assume, with 95% confidence, that the difference in values seen for the estimated rates reflects a real difference between those two values for the actual Iowa child population.

Confidence intervals, prevalence rates and counts were derived from BRFSS and IYTS databases using the surveymeans procedure of Statistical Analysis System (SAS) software or SUDAAN software. For other databases, confidence intervals for estimates given in this report were taken from existing publications that are listed in the *References* section at the end of this report.

Diagnosed vs. undiagnosed asthma: Half of asthma cases undiagnosed?

With the exception of some estimates from the IYTS, all of the counts and rates of current and lifetime asthma in this report refer to parent-reported or youth self-reported cases of health care practitioner *diagnosed* asthma and understate the actual child asthma prevalence since much of child and adult asthma is never diagnosed.

Consensus about the prevalence rate of *undiagnosed asthma* is lacking, but a number of studies have found that as much as half or even more of all cases of child asthma cases remain undiagnosed.

A 2000-2002 University of Iowa study of 3,100 children age 6 to 14 years in Keokuk and Louisa Counties found that of the 14% of children who had frequent respiratory symptoms indicative of asthma (frequent wheezing, coughing after exercise), only 42% (6% of all youth) had been diagnosed with asthma. (Chrischilles, 2004)

A North Carolina study of 33,000 middle school students found that while 10% reported physician-diagnosed asthma, another 7% had frequent wheezing (wheezing at least once a month for the past 12 months) but no diagnosis of asthma. (Yeatts, 2000)

A prospective study of a cohort of 613 Australians who were tracked from age 9 through age 26 and seen seven times for follow-up assessments during the course of the 17-year study found that more than 70 percent reported wheezing in the past 12 months at *one or more* of the seven follow-up visits. More than 50 percent of study subjects reported wheezing in the past twelve months *at the time of two or more* follow-up visits.

In this Australian study, 15% of those studied reported persistent wheezing—that is, once they reported wheezing in the past 12 months at one of the follow-up visits, they reported wheezing during the past 12 months at all subsequent follow-up visits.

Surveillance Definitions and Issues, cont.

Undiagnosed asthma, cont.

One in four subjects experienced either persistent wheezing or relapsed wheezing (relapsed wheezing is reporting wheezing in the past 12 months at one follow-up visit, followed by remission, then once again reporting wheezing at a later follow-up visit.) (Sears, 2003)

Data from the IYTS presented in this report indicate that while 13% of high school and 12% of middle school youth reported currently having diagnosed asthma, 22% of high school students and 15% of middle school students reported wheezing at least once in the past month and 22 percent of high school students and 17% of middle school students report wheezing at least once after exercise in the past 12 months. (Veale, 2005)

Based on the studies cited here, while wheezing in and of itself is common may not always be indicative of asthma, many children with chronic wheezing and chronic dry cough are likely to have asthma that remains undiagnosed.

Diagnosis of Asthma

Asthma is complex but treatable

Asthma is a complex, but treatable, chronic respiratory disease characterized by recurrent wheezing, breathlessness, coughing, and chest tightness.

The symptoms of asthma are caused by two underlying conditions: airway inflammation and airway hyperresponsiveness. Airway inflammation is an immune response that produces redness, swelling, excessive fluid and sticky mucus in the bronchial tubes. Airway or bronchial hyperresponsiveness is the over-constriction of the smooth muscles of the bronchial tubes.

The recurrent, intermittent symptoms or 'attacks' which typify asthma can vary in severity, duration and frequency and are usually worse in the early morning and at night, often causing sleep disturbances. For about half of all patients, symptoms are most severe four to eight hours after initial airway constriction. About half of all asthma cases begin in childhood and between 50 and 80 percent of childhood cases of asthma begins before age five.

Triggers of asthma may differ for each person

The underlying conditions of asthma, inflammation and over-constriction of the airways, occur when the a combination of host factors and environmental stimuli are present. The precipitating combination of stimuli differs for each person with asthma.

For most people with asthma, protection from or removal of key environmental agents and proper medical and self-management significantly decrease or completely eliminate the frequency and severity of episodes. Reducing the severity and frequency of episodes not only improves the health and well being of people with asthma but reduces their own and society's expenditures for avoidable emergency department visits, hospitalizations and lost days of work and school. (NHLBI, 1997: ACAAI, 2002; DHHS, 2000)

How asthma is diagnosed

Since the causes of asthma are complex and not completely understood and can differ for each person with asthma, it is often difficult to diagnose and treat appropriately.

Asthma is diagnosed based on patient history, symptoms, clinical examination, and spirometry tests for abnormal lung function. Airflow (airway) obstruction is the abnormal lung function characteristic of asthma. Health care providers normally define airflow obstruction as the inability to forcibly exhale in one second more than 65% to 70% of the maximum volume of air that one can inhale. (Peak flow monitoring, another type of lung function measurement undertaken by those with asthma, is used to monitor and manage but not to diagnose asthma.)

Findings of 'reversible airway obstruction' distinguish asthma from most other common chronic obstructive lung diseases. Reversible airway obstruction means that the airflow obstruction is temporary. It subsides significantly either spontaneously or after the person with asthma has inhaled or taken orally a bronchodilator and/or cortiosteriod.

Long-term, poorly controlled asthma may result in fibrosis and other structural changes of the lung and presents with more continuous, less reversible airflow obstruction and symptoms.

Types/Classifications of Asthma

The continuous nature of persistent asthma, makes it difficult to distinguish from chronic obstructive pulmonary disease (COPD--chronic bronchitis and emphysema) in which symptoms of airflow obstruction are also continuous. As a result, asthma is often overlooked and underreported in adults who are also susceptible to COPD, including adults with a history of exposure to tobacco smoke.

In children less than age four or five years of age, spirometry tests are difficult to administer. This results in significant under or misdiagnosis since more than half of all children with asthma develop the disease before age five.

Attacks can be deadly, persistent asthma can cause fibrosis

For many children and most adults, a diagnosis of asthma is for life: Even after many years without an episode, they remain susceptible to recurrence. (NHLBI, 1997, Mayo Clinic, 2000)

While rare, acute asthma episodes can become life-threatening if not properly diagnosed and controlled. People with asthma also may die from fibrosis and other chronic irreversible changes in the lungs that take place over time (airway remodeling) when severe asthma is untreated.

How asthma is classified?

Medical researchers classfiy asthma by its severity, frequency, causes, and age of onset.

Severity and frequency classifications

The G*uidelines for the Diagnosis and Mangement of Asthma*, produced by the National Heart, Lung and Blood Institute's (NHLBI, NIH) National Asthma Education and Prevention Program identify four categories of asthma severity:

mild intermittent;
mild persistent;
moderate persistent; and
severe persistent.

These categories are referred to as the NIH Severity Index. About 10% to 20% of all cases of asthma can be classified as severe, about 20% as moderate, and 55% to 70% of cases as mild. (*Asthma in America*, NHLBI, 1996) The morst recently updated NHLBI guidelines place strong emphasis on asthma management and control regardless of asthma severity.

Triggers-based and age-of-onset asthma classifications

Because the origins and treatment of asthma are complex, some health scientists now believe that asthma, like diabetes, arthritis, and other chronic diseases, may best be classified based on its causes or triggers, as well as how it behaves and responds to different types of management and treatment. Under such a scheme, types of asthma could include those related to viral agents, bacteria/fungal agents, allergic sensitizers, exercise, and aging. (NIAID, 2002).

Clinicians also typify asthma as either intrinsic (nonallergic: primarily caused by host factors or other poorly understood mechanisms) or extrinsic (allergic: primarily caused by environmental factors) asthma.

They may also classify asthma as child-onset or adult-onset asthma. Most child-onset asthma is extrinsic (allergic) . Most adult-onset asthma is classfiied as intrinsic, and is frequently triggered by occupational exposures.

Causes of Asthma

Risk factors classified in two ways:

The origins of asthma are just beginning to be understood. Known and suspected risk factors for or causes of asthma are classified in two ways, by their:

1) Sequence in the chain of events or circumstances leading to asthma, including:

Predisposing factors which make one susceptible*;*
Initiating factors which initiate new disease; or,
Triggering factors which are responsible for recurrent episodes in those already initiated.

2) Relation to the person with asthma:

Intrinsic (factors of the host); or
Extrinsic (factors of the host's environment).

Host (intrinsic) factors

Host or intrinsic factors important in the development and recurrence of asthma include:

- personal or family history of atopy (genetic predisposition to develop allergic responses, including respiratory allergies, to common air-borne allergens);
- gender;
- physical exertion/hyperventilation;
- obesity/lack of exercise, poor diet;
- gastroesophageal reflux disease (GERD);
- extreme emotional expression;
- susceptibility to viral respiratory infections; and
- low personal socioeconomic status.

Environmental (extrinsic factors) causes

Environmental risk factors can be biological (e.g., viruses), chemical (e.g., irritants in tobacco smoke or air), or physical agents (e.g., cold and humidity) or factors of the host's socioeconomic/cultural systems. Important environmental risk factors for asthma include:

- allergens such as pollen, cockroaches, dust mites, animal dander, rodents, fungi;
- airborne pollutants indoors and outdoors, including tobacco smoke;
- cold air, humidity;
- foods, food additives (sulfites), and drugs, including aspirin;
- respiratory viruses;
- occupational exposures to sensitizers and irritants; and
- living in an urban area.

While the exact contribution of each of these environmental risk factors to the overall burden of asthma in Iowa is not known, for children less than five years of age, exposure to viral infections, allergens and tobacco smoke appear to be key factors. For adults, an estimated 15% to 30% of asthma is attributable to workplace exposures. (EPA, 2002)

Both host and environmental factors may contribute to disease initiation and recurrence. Factors which appear to both initiate asthma as well as trigger recurrent asthma, include: indoor and outdoor allergens and air pollution (including tobacco smoke), and certain occupational sensitizers. (NHLBI, 1997, DHHS, 2000, ACAAI, 2002)

Causes of Asthma, cont.

Some host risk factors (e.g., race, income, education) which have been linked to increased risk of asthma, in part, may be surrogate measures for other causal lifestyle factors (e.g., exposure to tobacco smoke, allergens in the home, or customarily seeking medical care only when severely ill) or for causal socioeconomic factors (e.g., lack of insurance, lack of access to patient education programs). Nevertheless, these factors are important to track, not only because reducing health disparities are national and state public health goals, but also because these factors identify at-risk populations for whom public health interventions are needed.

Identifying, monitoring and evaluating asthma risk factors and prevalence are key to effective asthma control in Iowa.

What factors caused the recent epidemic?

Why asthma is so much more prevalent now than 20 years ago is not known for certain. Health scientists believe that the increase may be due to:

- increased exposure to indoor allergens and irritants due to buildings being more tightly sealed and people spending more time indoors;
- decreased exposure to infectious agents in early childhood, making immune systems more likely to overreact with allergic inflammation to common stimuli and environmental agents;
- increased outdoor air pollution in certain areas; and
- decreased exercise and increased obesity. (CDC, 2001)

What are the Health Consequences of Untreated Asthma?

The health consequences of untreated or poorly controlled asthma include preventable and costly:

- hospitalizations;
- emergency department and urgent care visits;
- deaths;
- sick days from school and work; and
- activity limitations, which may contribute to the higher than expected rate of obesity in those with asthma.

Hospitalizations, emergency department visits and urgent care visits are all more expensive than routine preventive primary care services.

The direct health care cost of treating asthma in Iowans is estimated to be between $400 and $450 per person with asthma per year. Indirect costs, including those attributable to lost wages and absences from school and work, are estimated to be between $300 and $340 per person with asthma per year. Total asthma related costs are estimated to be around $150 million each year. (ACAAI, AAFA, 2002)

Risk Factors for Asthma

Host Factors

- -Genetic predisposition
- -Allergies
  - Sensitivity to aspirin, sulfites
  - Atopy
- -Airway hyperresponsiveness
- -Colds/respiratory infections (protects/ triggers)*****
- -Parasitic infections
- -Gastroesophageal reflux disease (GERD)
- -Gender/Race/Age
- -Obesity
- -Behaviors
  - Exercise, hyperventilation*****
  - Tobacco use
  - Compliance with care plans
  - Scheduling/receipt of preventive services
  - Consumption of foods, drugs, or additives know to induce allergies or asthma*****
  - Use environmental protections at home and work
- -Psycho-Socioeconomic
  - Educational attainment
  - Language
  - Attitudes, beliefs about health
  - Occupation
  - Income
  - Insurance status
  - Geographic access to provider
  - Condition of housing
  - Knowledge about asthma
  - Extreme emotional expression*****

*****Factors important primarily in the exacerbation or recurrence of existing asthma. (Source: Global Initiative for Asthma)

Physical and Social Environmental Factors

- -Indoor allergens
  - Dust mites
  - Animal allergens
  - Cockroach allergens
  - Fungi, molds, yeasts
- -Outdoor allergens
  - Pollen
  - Molds
- -Indoor/Outdoor Irritants
  - Air pollutants, sulfur dioxide*****, paint fumes*****, household sprays*****
  - Tobacco smoke-active and passive
  - Cold, heat, humidity, changes in weather*****
- -Occupational Sensitizers
  - Isocyanates
  - Plant and animal products
  - Cold, heat, humidity*
  - Dust
- -Foods, drugs, or additives which are sensitizers

- -Health Care System
  - Private sector interventions, policies, resources
  - Public sector: Asthma Coalition, MCH, Primary Care/Rural Health, Linkages to private sector
- -School Systems
- -Other Social Systems
  - Housing code enforcement, inspections
  - Taxes on tobacco products
  - Laws on insurance coverage for asthma patient education
  - Economy: price of drugs, insurance, health services
  - Drug industry, research, marketing of new drugs

Child Asthma Data: Charts and Narrative

Chart 1

Prevalence of Diagnosed *Current* Asthma
Rate per 100 Population (Percent)
Number with Asthma
Iowa Children and Youth
0 - 17 Years of Age

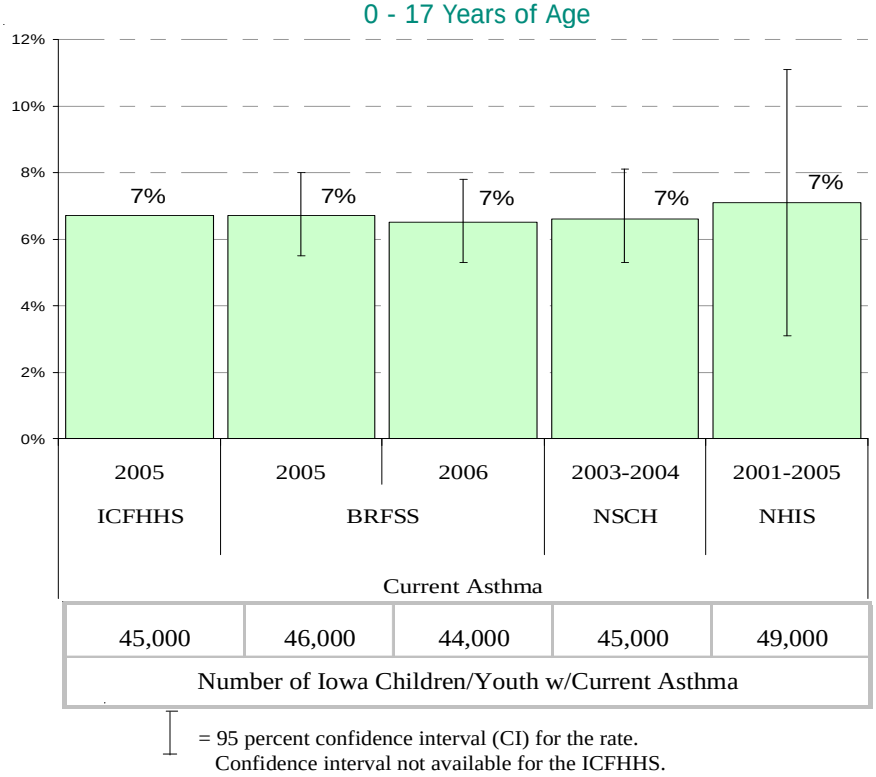


Chart 1: Overall child current asthma prevalence

The four surveys that collect asthma prevalence data for the population of all Iowa children ages 0 to 17 years all yield an Iowa child current asthma prevalance rate of 7%. (The ICFHHS, BRFSS, NSCH, NHIS collect data by asking parents about their child's diagnosed asthma. All rates rounded to the nearest whole percent.)

Estimates are that between 45,000 and 49,000 Iowa children currently have diagnosed asthma.

As many as half of all cases of child current asthma may remain undiagnosed. (Chrischilles, 2004, Yeatts, 2000, Akinbami, 2006, Veale, 2005)

BRFSS estimates of adults with current asthma for the 2001-2006 period hover between 6% and 7%. (140,000 to 150,000 Iowa adults). All told, about 200,000 Iowa chldren and adults currently have diagnosed asthma.

NOTE ON BRFSS CHILD ASTHMA PREVALENCE ESTIMATES:
CDC changed the BRFSS's data collection method for child asthma beginning with the 2005 survey. For the years 2001 through 2004 when it was used, the old method yielded lower rate and count estimates of child asthma than does the methodology currently employed.

Rates found using the older method are not given in Charts 1 and 2, which show only the *most recent child current and lifetime asthma prevalence rates available* from four databases. Chart 3 shows trends over time and includes these older rates.

Chart 2

Prevalence of Diagnosed *Lifetime* Asthma
Rate per 100 Population (Percent)
Number with Lifetime Asthma
Iowa Children and Youth
0 - 17 Years of Age

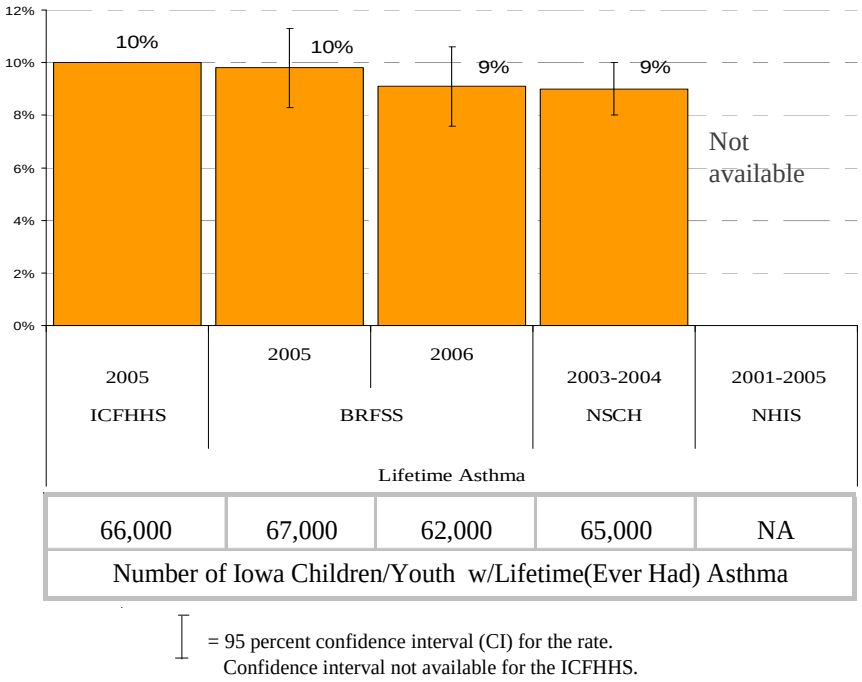


Chart 2 : Overall child lifetime asthma prevalence

For Iowa, overall diagnosed child lifetime asthma prevalence rates varied from 9% to 10% .

Between 62,000 and 65,000 Iowa children are estimated to have ever had diagnosed asthma.

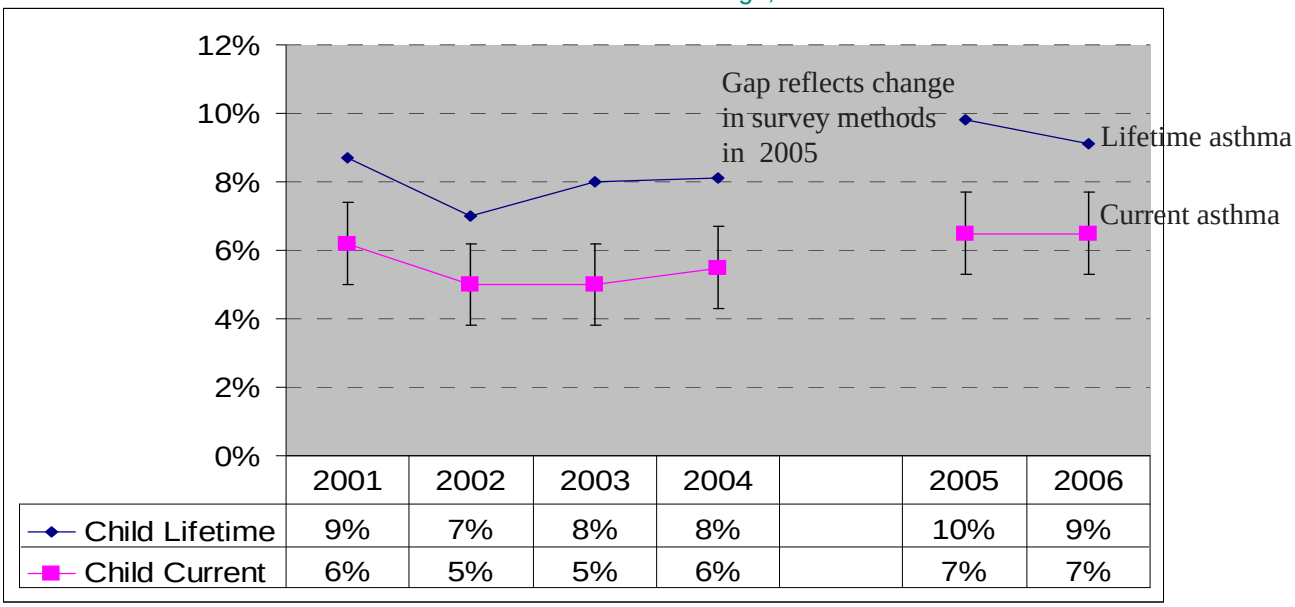
Estimates of *adult* with diagnosed lifetime asthma also have hovered between 9% and 10% (BRFSS, 2001-2006: 210,000 to 230,000 Iowa adults).

In all, about 300,000 Iowa adults and children have ever been diagnosed with asthma.

Sources: Iowa Child and Family Household Health Survey (ICFHHS), 2005
Iowa Behavioral Risk Factor Surveillance System (BRFSS), 2003-2006
National Survey of Children's Health (NSCH), 2003-2004
National Health Interview Survey (NHIS), 2001-2005

Chart 3

Trends in Prevalence of Diagnosed Lifetime and Current Asthma
Rate per 100 Population
Number with Asthma
Iowa Children and Youth 0 - 17 Years of Age, 2001 - 2006



	2001	2002	2003	2004		2005	2006
Child Lifetime	9%	7%	8%	8%		10%	9%
Child Current	6%	5%	5%	6%		7%	7%

Lifetime	59,000	50,000	56,000	57,000		67,000	62,000
Current	37,000	35,000	36,000	37,000		46,000	44,000

Number of Iowa Children/Youth w/Current Asthma

I = 95 percent confidence interval for the rate

Source: Iowa Behavioral Risk Factor Surveillance System (BRFSS), 2001-2006

Table 1

BRFSS estimates of percent of *U.S.* children 17 years of age and younger with current and lifetime asthma (rounded to nearest whole percent)

	Old Method of Calculating Rates					New Method of Calculating Rates	
Year	2001	2002	2003	2004		2005	2006
Lifetime Asthma	NA	12%	12%	12%		NA	NA
Current Athma	NA	8%	8%	8%		NA	NA

Chart 3: Trends in *rate* of current asthma prevalence in Iowa

For the years 2001 through 2006, the Iowa BRFSS prevalence rate estimate for child diagnosed current asthma ranged from 5% to 7%. The Iowa BRFSS child diagnosed *lifetime* asthma prevalence estimate ranged from 7% to 10% for those six years. At the time of writing this report, the BRFSS was the only survey with statewide Iowa child asthma prevalence data for multiple years.

As previously noted, CDC significantly changed the methodology by which the BRFSS collects and analyzes child asthma data in 2005. Some proportion of the higher Iowa child asthma prevalence rates seen in 2005 and 2006 are likely attributable to this change.

Taking into account this new methodology, Iowa BRFSS child current and lifetime asthma prevalence rates between 2001 and 2006 show no clear trend of increase or decrease. None of the differences seen reached statistical significance.

Chart 3: Trends in *counts* of current asthma cases in Iowa

Between 2001 and 2006, BRFSS estimates of the *number* of children in Iowa with diagnosed *current* asthma ranged from 35,000 to 46,000, while the number with diagnosed *lifetime* asthma ranged from 50,000 to 62,000.

As for the BRFSS Iowa child asthma prevalence *rates*, the *counts* of Iowa children with diagnosed current and lifetime asthma for the six years 2001 to 2006 do not trend up or down, after taking into account the change in sampling methods that began in 2005. None of the differences seen in asthma prevalence counts reached statistical significance.

BRFSS estimates of the rate of asthma in children and of the count of asthma cases in children for the years 2005 and 2006 (when the revised sampling methodology was used) were comparable to those rates seen in the NHIS, ICFHHS, NSCH. (Charts 1 and 2)

Table 1: Trends in asthma prevalence in U.S.: BRFSS

At the time this report was written, U.S. child *current* asthma prevalence rates were available for 2002, 2003 and 2004, but not for 2001, 2005 and 2006 from the national BRFSS database.

Iowa BRFSS child *current* asthma prevalence rates were lower than national rates for the three years 2002 through 2004, with the differences reaching statistical significance each year.

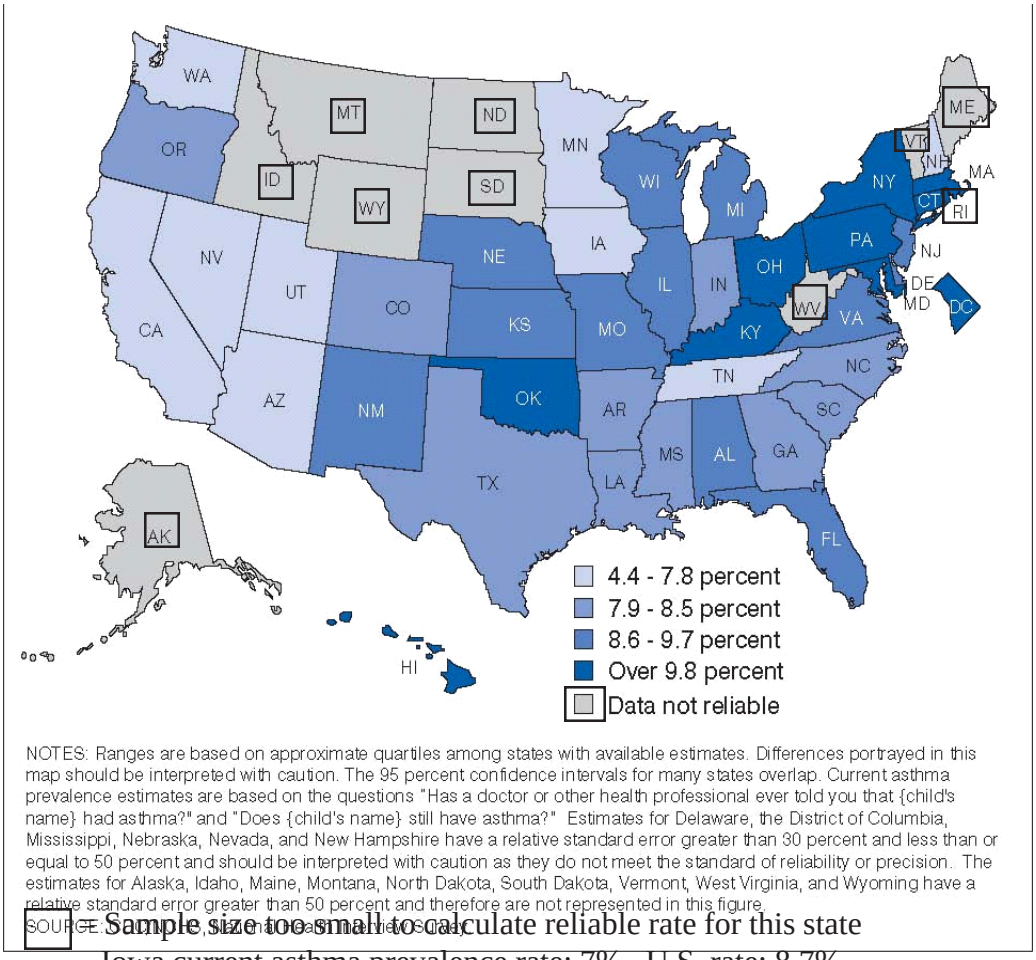
BRFSS national child *lifetime* asthma prevalence rates were 12% for each year 2002, 2003 and 2004.

For each year, the child lifetime asthma prevalence rate for the U.S. was statistically higher than the same-year the rate for Iowa children. (Table 3)

Iowa's BRFSS-based diagnosed child current and lifetime asthma prevalence rates are consistenly among the lowest in the distribution of all states' BRFSS-based child current and lifetime rates. (Table 3)

Map 1

States by Quartile into which their Diagnosed Child Current Asthma Prevalence Rate Falls
Average Annualized Rate per 100 Population (Percent)
Children and Youth 0 - 17 Years of Age
2001-2005



NOTES: Ranges are based on approximate quartiles among states with available estimates. Differences portrayed in this map should be interpreted with caution. The 95 percent confidence intervals for many states overlap. Current asthma prevalence estimates are based on the questions "Has a doctor or other health professional ever told you that {child's name} had asthma?" and "Does {child's name} still have asthma?" Estimates for Delaware, the District of Columbia, Mississippi, Nebraska, Nevada, and New Hampshire have a relative standard error greater than 30 percent and less than or equal to 50 percent and should be interpreted with caution as they do not meet the standard of reliability or precision. The estimates for Alaska, Idaho, Maine, Montana, North Dakota, South Dakota, Vermont, West Virginia, and Wyoming have a relative standard error greater than 50 percent and therefore are not represented in this figure.
SOURCE: [illegible]

= Sample size too small to calculate reliable rate for this state

Iowa current asthma prevalence rate: 7%, U.S. rate: 8.7%

Source: National Health Interview Survey (NHIS), 2001-2005

Map 1 and Table 2: Current prevalence rates in U. S. and other states: NHIS

The NHIS Iowa child current asthma prevalence rate of 7% places Iowa in the lowest quartile of rates for the 41 states for which rates could be reliably computed for the 2001-2005 period. States' rates derived from the NHIS ranged from 4% to 12%.

This low ranking of the NHIS Iowa child current asthma prevalence rate is consistent with the rankings of Iowa child current asthma prevalence rates from the NSCH and the BRFSS. (Table 2)

State-specific child lifetime asthma prevalence rates from the NHIS have not been published.

Table 2

Child *Current* Asthma Prevalence
Rate per 100
Iowa, U.S., Other States
by Database and Year

	ICFHHS 2005	BRFSS 2003	BRFSS 2004	BRFSS 2005	BRFSS 2006	NSCH 2003-2004	NHIS 2001-2005
Iowa	7%	5%	6%	7%	7%	7%	7%
U.S.	NA	8%*	8%*	NA	NA	9%*	9%*
Other States-range of rates	NA	5% - 13%	6% - 11%	NA	NA	NA	4% - 12%

*National rate is statistically higher than Iowa rate

Table 3

Child *Lifetime* Asthma Prevalence
Rate per 100
Iowa, U.S., Other States
by Database and Year

	ICFHHS 2005	BRFSS 2003	BRFSS 2004	BRFSS 2005	BRFSS 2006	NSCH 2003-2004	NHIS 2001-2005
Iowa	10%	8%	8%	10%	9%	9%	NA
U.S.	NA	12%*	12%*	NA	NA	13%*	13%*
Other States-range of rates	NA	7% - 17%	8% - 14%	NA	NA	NA	NA

*National rate is statistically higher than Iowa rate

BRFSS rates for the U.S. based on data collected from states choosing to complete the optional BRFSS child asthma module in each of the years shown. The number of states participating was: 8 in 2001; 25 in 2002, 22 in 2003; 27 in 2004. The national and state child asthma prevalence data and the number of states completing the BRFSS child module in 2005 and 2006 were not available from the CDC web site.

Sources: Iowa Child and Family Household Health Survey (ICFHHS), 2005
Iowa Behavioral Risk Factor Surveillance System (BRFSS), 2003, 2004
National Survey of Children's Health (NSCH), 2003-2004
National Health Interview Survey, 2005

Table 2: *Current* child asthma prevalence rates in U.S. and other states: NSCH

While the BRFSS and NHIS are ongoing surveys, the 2003-2004 NSCH was a one-time national survey of sufficient sample size (more than 100,000 surveys nationwide and more than 1,000 from Iowa) to allow state-level estimates to be calculated.

As for the BRFSS and the NHIS, Iowa child lifetime and current asthma prevalence rates obtained from the NSCH place Iowa child rates below the national average and in the lowest quartile of the distributions of all states' rates.

The 2003-2004 NSCH Iowa *current* child asthma prevalence rate was 7%, while the national rate was 9%.

Table 3: *Lifetime* child asthma prevalence rates in U.S. and other states:

The 2003-2004 NSCH Iowa lifetime child asthma prevalence rate was 9%, while the national rate awas 13%. (Table 3)

The differences between Iowa and national current and lifetime asthma prevalence rates reached statistical significance.

All rates were rounded to the nearest whole percent.

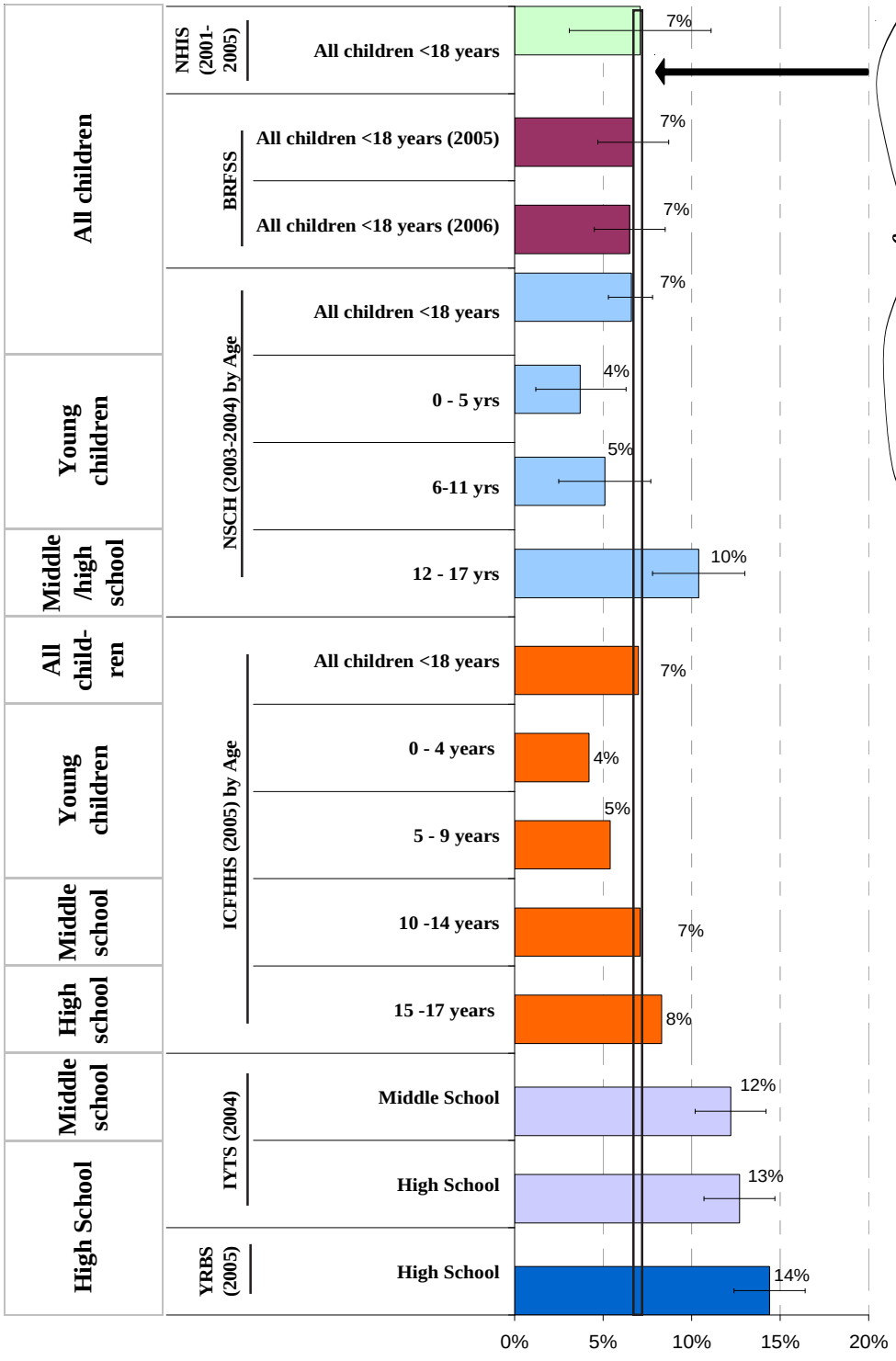
Summary of estimates of child current asthma prevalence in Iowa vs. U.S (Tables 1-3)

CDC has published national and state-specific child asthma prevalence using the NHIS, BRFSS and the NSCH databases.

For all three surveys, Iowa's rates, for both diagnosed child lifetime and current asthma prevalence were lower than national rates, with these differences reaching statistical significance in all cases.

Chart 4

By Age and Grade Level, Prevalence of Diagnosed *Current* Asthma*, *Rate* per 100 Population
Iowa Children and Youth 0 - 17 Years of Age



These two lines reflect the upper and lower range of Iowa state average child current asthma prevalence rate (rate for all children ages 0-17 years) found by four surveys: NSCH, BRFSS, ICFHHS and NHIS. The state child current asthma prevalence rate from each of these surveys rounds to 7%.

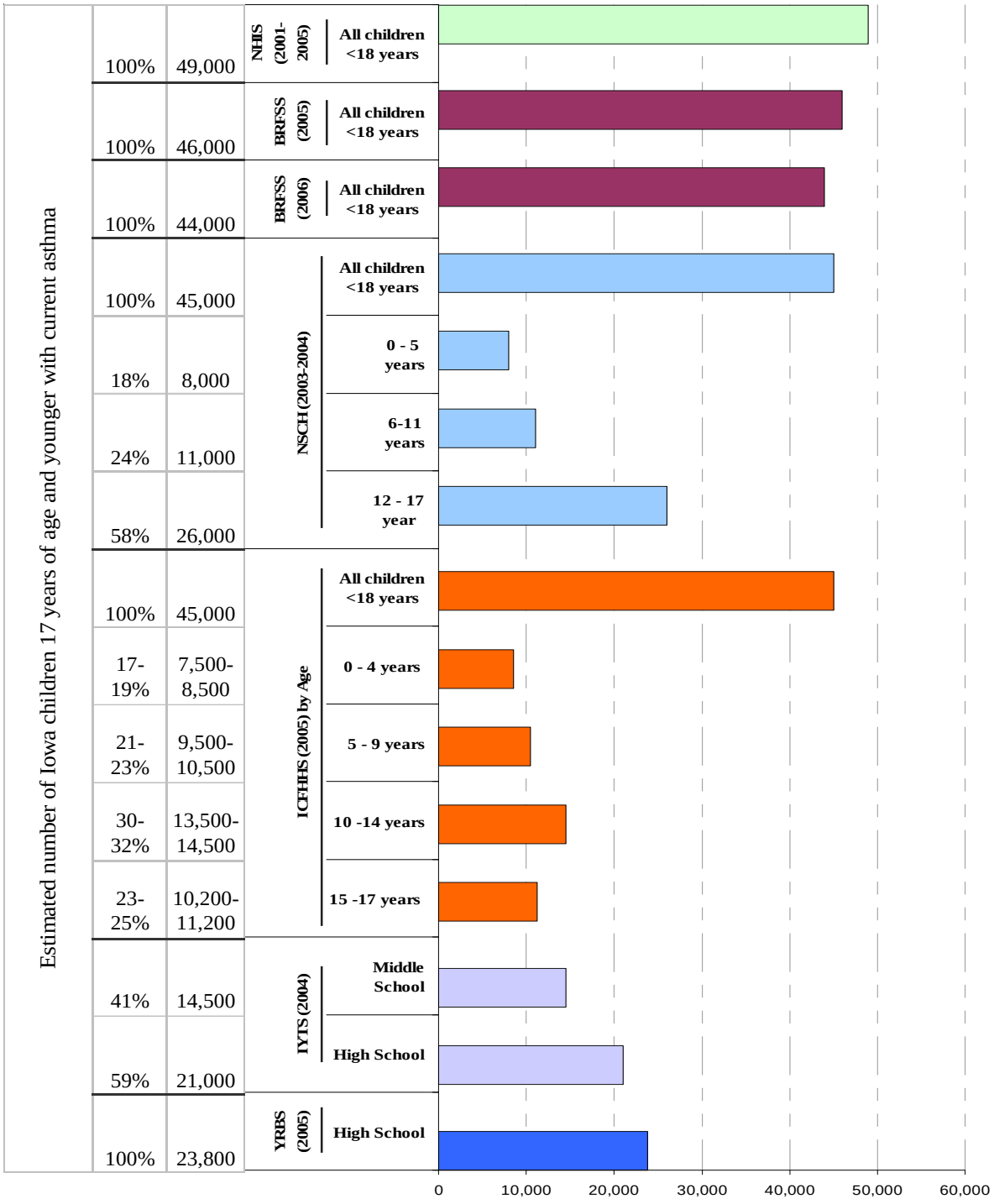
Sources: Iowa Youth Risk Behavior Survey (IYRBS, 2005)
Iowa Child and Family Household Health Survey (ICFHHS), 2005
Iowa Behavioral Risk Factor Surveillance System (BRFSS), 2005, 2006
National Survey of Children's Health (NSCH, 2003-2004)
National Health Interview Survey (NHIS), 2001-2005

[= 95 percent confidence interval for the rate

* Iowa Youth Tobacco Survey (IYTS), 2004 (IYTS rates are based on student-reported diagnosed and undiagnosed asthma.

Chart 5

By Age and Grade Level, Prevalence of Diagnosed *Current* Asthma*
Number of Iowa Children and Youth 0 - 17 Years of Age



Sources: Iowa Youth Risk Behavior Survey (IYRBS, 2005)
Iowa Child and Family Household Health Survey (ICFHHS), 2005
Iowa Behavioral Risk Factor Surveillance System (BRFSS), 2005, 2006
National Survey of Children's Health (NSCH, 2003-2004)
National Health Interview Survey (NHIS), 2001-2005

* Iowa Youth Tobacco Survey (IYTS), 2004 (IYTS counts are based on student-reported diagnosed and undiagnosed asthma.)

Chart 4: Iowa child current asthma prevalence: rate by age/grade (Data from from six surveys)

For two surveys, the 2003-2004 NSCH and the 2005 ICFHHS, *age-specific* child current asthma prevalence rates were available for all children between the ages of 0 and 17 years.

Both surveys' rates showed a strong positive association between increasing child age and the prevalence of diagnosed current asthma.

The current asthma prevalence rate from the NSCH for high school and middle school youth was double that of children less than 12 year of age (10% vs. 5%) and more than double that of children less than 5 years of age (10% vs. 4%).

The current asthma prevalence rate from the ICFHHS was 8% for youth ages 15 to 17 years, 7% for youth 10 to 14 years of age, 5% for children 5 to 9 years of age and 4% for children less than 4 years of age.

Two other Iowa surveys, the ITYS and the YRBS, that focus solely on middle and high school age youth and found current asthma prevalence rates to be even higher in older youth than did the NSCH and the ICFHHS. (The IYTS and YRBS do not collect data on younger children)

The 2005 YRBS found current asthma prevalence for Iowa high school youth to be 14%. The IYTS found the current asthma prevalence rate for Iowa middle school youth to be 12% and for high school youth to be 13%.

The IYTS and YRBS rely on youth self-reported asthma while the ICFHHS and the NSCH query parents and guardians for information.

Several studies have shown that parents tend to underestimate, if not diagnosed asthma, the presence of wheezing in their adolescent children, which may explain why the IYTS and YRBS that rely on student self-reporting found higher levels of asthma prevalence than did the ICFHHS and NSCH that interview parents and guardians.

Prevalence data from IYTS are obtained from questions that ask students both about diagnosed and undiagnosed self-reported asthma. All of the other surveys employed in this report ask only about diagnosed asthma.

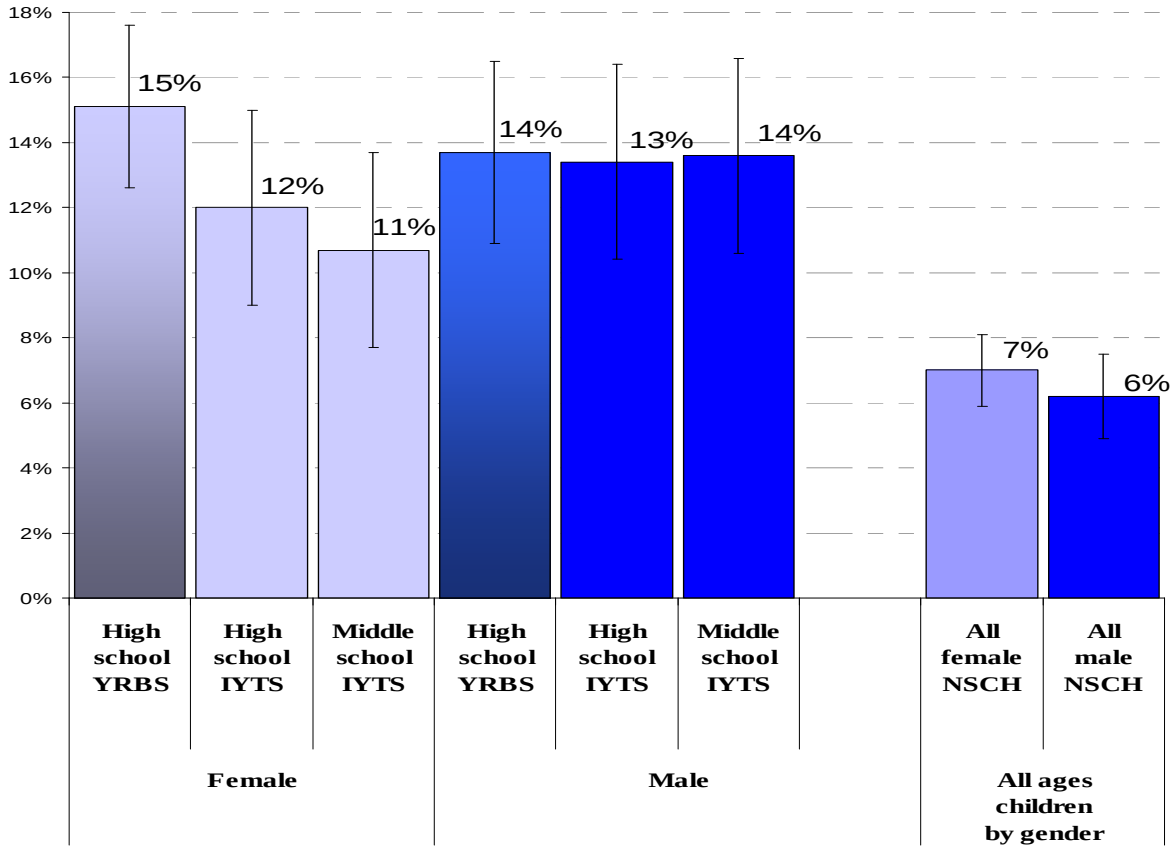
Chart 5: *Number* of Iowa children with current asthma by age/grade (Data from six surveys)

As for age-specific rates, age-specific counts of children with current diagnosed asthma were highest for older children. (NSCH, ICFHHS)

Of the approximately 45,000 to 50,000 cases of child diagnosed current asthma in Iowa, an estimated 55% to 65 % occured in middle and high school age youth, 20% to 25% in elementary age youth, and between 15% and 20% in children of preschool age and younger.

Chart 6

By Gender
Prevalence of Diagnosed Current Asthma*
Rate per 100 Population
Number with Asthma
Iowa Children and Youth
0 - 17 Years of Age



12,400	10,200	6,400	11,400	10,900	8,100		23,000	22,000

Estimated number of Iowa children 17 years of age and younger with current asthma by gender:

= 95 percent confidence interval for the rate

Sources: Iowa Youth Risk Behavior Survey (IYRBS), 2005
National Survey of Children's Health (NSCH), 2003-04
Iowa Youth Tobacco Survey (IYTS), 2004

* The IYTS estimates are based on youth self-reported diagnosed and undiagnosed asthma.)

Chart 6: Gender-specific rate of diagnosed child current asthma by age/grade

Gender-specific rates for Iowa child current asthma prevalence were available from three surveys, the:

- IYTS (rates for middle and high school youth only);
- YRBS (rates high school youth only); and
- NSCH (gender-specific rates for all ages-combined only).

Overall, among Iowa children 0 to 17 years of age, no significant difference was found between the current asthma prevalence rate for boys (6%) and that for girls (7%). (NSCH)

For *middle school* youth, boys (14%) were shown to have a current asthma prevalence rate 3 percentage points higher than girls (11%), although this gender difference was not statistically significant. (IYTS)

For *high school* youth, current asthma prevalence rate differences between boys and girls were not consistently higher for boys or girls. (Chart 6, IYTS, YRBS) The YRBS was conducted only with high school youth.

For Iowa children younger than middle-school age, *gender/age*-specific current asthma prevalence rates were not available from any of the four databases (BRFSS, NSCH, NHIS, ICFHHS) that have data on asthma in children younger than middle school age.

The NSCH did have *gender*-specific rates for all children 0 to 17 years of age combined, but not *gender/age*-specific rates.

(The IDPH will have available gender/age-specific data for younger children in the future from the BRFSS and ICFHHS, but may not have such rates for the NHIS and NSCH which are national data sets consisting of a limited number of Iowa records and housed outside of the IDPH.)

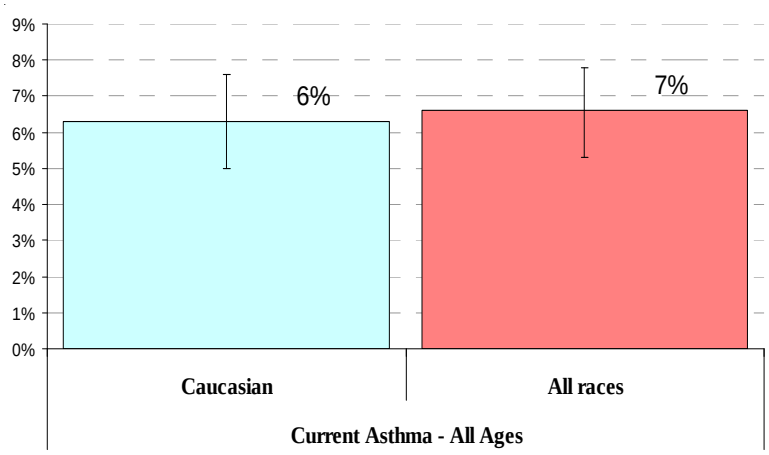
Nationally, NHIS data show boys to have current asthma prevalence rates two to four percentage points higher than girls for all age groups 0 to 4 years, 5 to 10 years, and 11 to 17 years.

NHIS data also show boys to have higher rates of asthma-related ambulatory visits, emergency department visits, inpatient stays and deaths compared to girls. These patterns reverse by young adulthood. (NHIS, 2001-2005)

In line with national rates, Iowa adult women age 18 and older have current asthma prevalence rates about 60% higher than men. Rates for young women are especially high relative to young men.

Chart 7

By Race/Ethnicity
Prevalence of Diagnosed Current Asthma
Rate per 100 Population
Number with Asthma
Iowa Children and Youth
0 - 17 Years of Age



39,000	45,000
Estimated number of Iowa children 17 years of age and younger with current asthma by race	

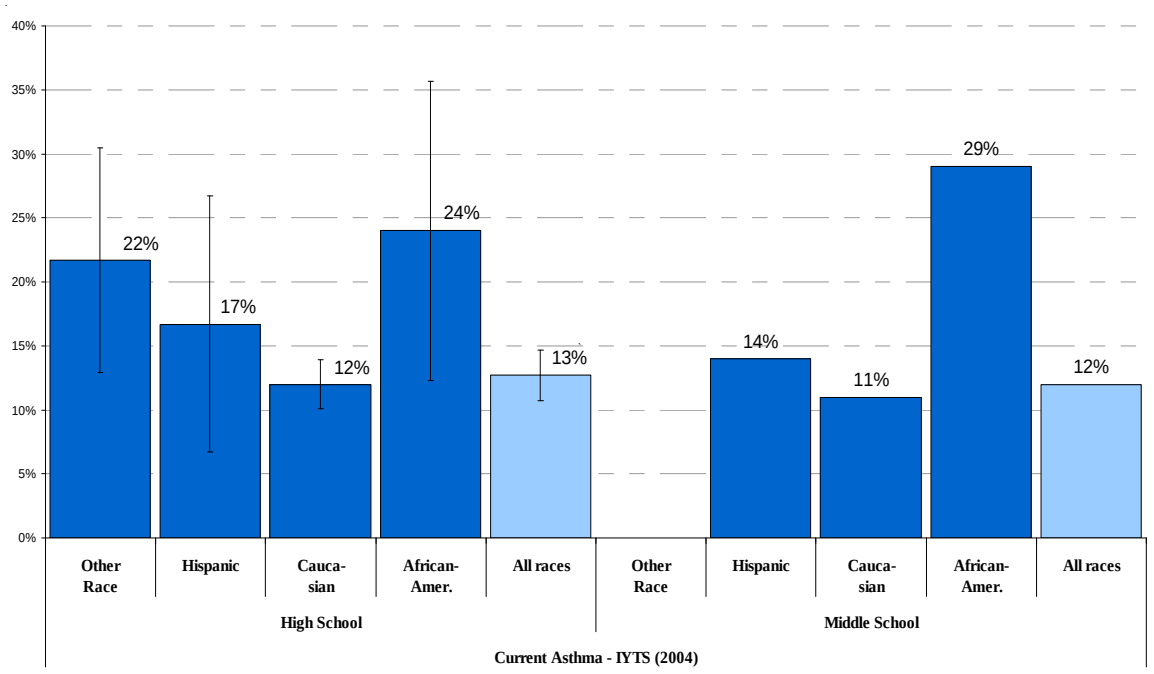
= 95 percent confidence interval for the rate

Source: National Survey of Children's Health (NSCH), 2003-04

Chart 8

Not available

By Race/Ethnicity
Prevalence of Diagnosed and Undiagnosed Current Asthma
Rate per 100 Population and Number
Iowa Middle and High School Youth



600	1,200	18,000	1,400	21,000	500	1,000	12,000	1,100	14,500

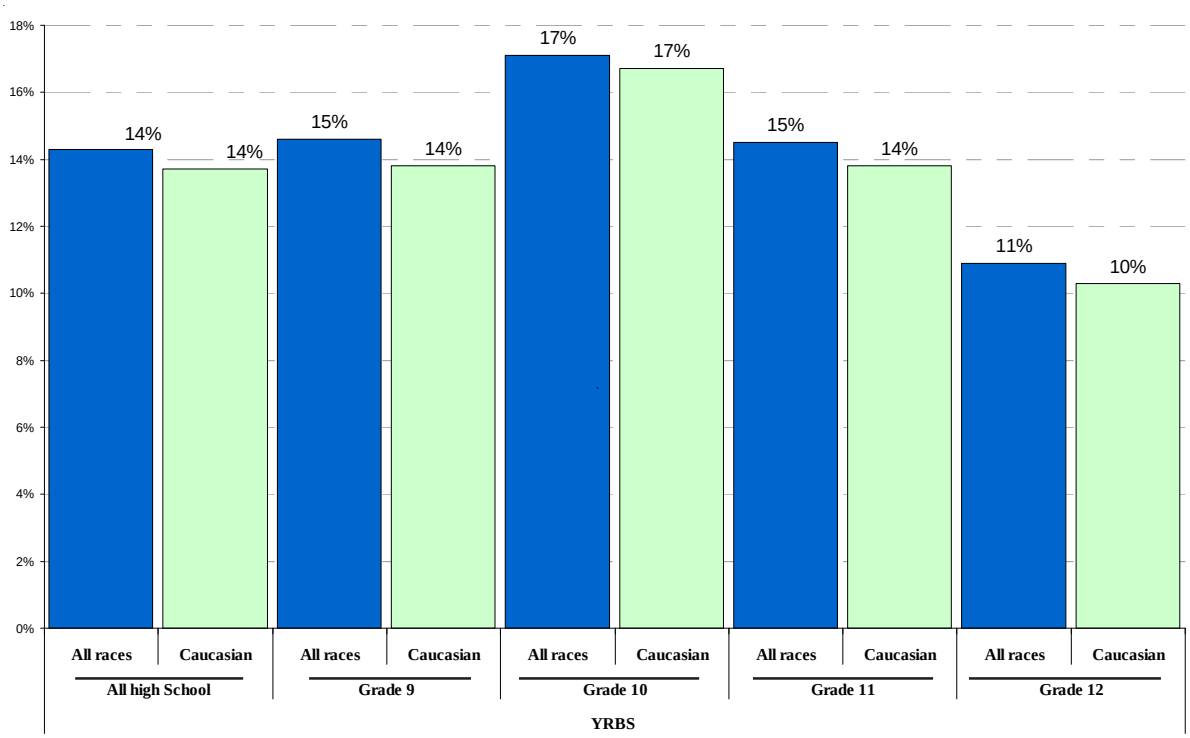
Estimated number of Iowa children 17 years of age and younger with current asthma by race/ethnicity

I = 95 percent confidence interval for the rate
Confidence intervals for middle school rates were not available.

Source: Iowa Youth Tobacco Survey (IYTS), 2004

Chart 9

By Race: Caucasian and All Races Combined
Prevalence of Current Diagnosed Asthma
Rate per 100 Population
Iowa High School Youth



Source: Iowa Youth Risk Behavior Survey (YRBS), 2005

Estimated counts of youth by grade and race with current asthma were not able to be calcuated as enrollment counts by race and grade were not available by grade level.

Chart 7-9: Summary of child current asthma rates by race

Overall currrent child asthma prevalence rates were elevated for racial minorities compared to Caucasians. (YRBS, NSCH)

Although sample size was small and rate differences not statistically significant, diagnosed current asthma prevalence rates for African-American youth in middle and high schoool were twice that of Caucasian youth of the same grade level. (IYTS)

Chart 7: Rate of child current asthma for Caucasians vs. All Races: NSCH

Looking at NSCH data, the all-ages-combined race-specific rate of current asthma for Iowa children appears to be slightly higher for All Minority children (6%) than for Caucasian children (7%), although the difference failed to reach statistical significance. Due to small sample size, rates by specific racial minority subgroups could not be reliably calculated from NSCH data.

Chart 8: Rate of child current asthma by race, middle and high school students: IYTS

Looking at IYTS data, the prevalence rate of diagnosed current asthma for each high school-age racial minority group (Hispanic, African-American, uther race) exceeded the current prevalence rate for the high school-age Caucasians.

The same held true when middle school race-specific rates were compared. Current asthma prevalence rate for African-American youth in Iowa high schools was double that of Caucasian high school youth while. For African-American youth in middle school the current asthma prevalence rate was more than double that of Caucasian middle schoolers. None of the differences described reached statistical significance.

While rates were highest for racial minorities, more than 80% of current asthma cases in high school (18,000 of 21,000) and middle school students (12,000 of 14,500) occurred in Caucasian youth. (IYTS)

Chart 9: Rate of child current asthma for Caucasians vs. All Races by grade level: YRBS

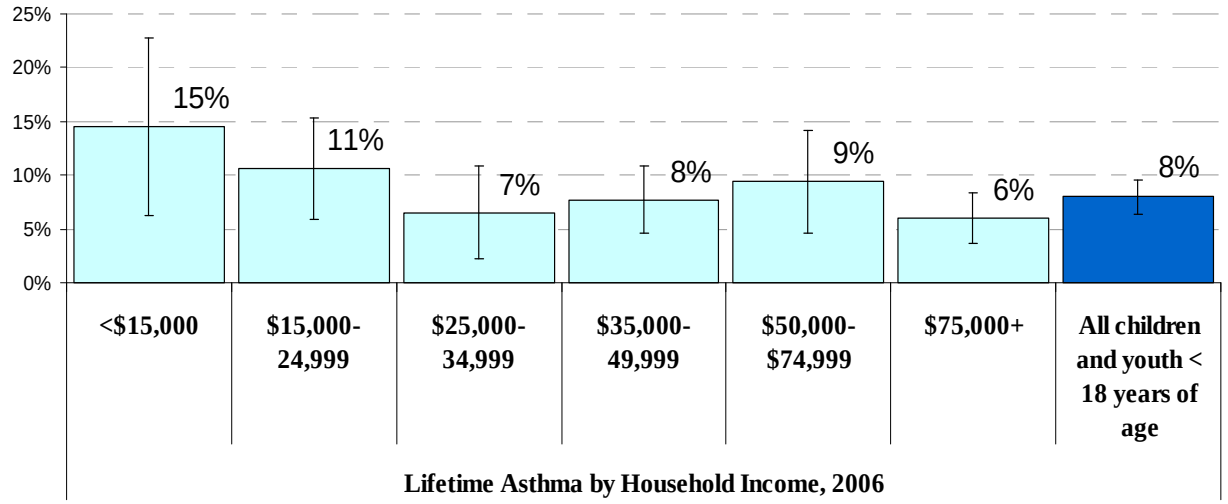
Based on YRBS data for Iowa high school students, racial minorities overall had current asthma prevalence rates consistenly, higher than the rates for Caucasain for all grade levels combined and for each grade level 9 through 10. (Chart 9)

As for the NSCH and IYTS, these differences were not statistically significant. Rates by specific racial minority subgroup could not be reliably calculated for the YRBS due to small sample size.

Charts 10 and 11

By Household Income
Percent and Number of *Adults with One or More Child in Household with Diagnosed Lifetime (Ever-had) Asthma*
Iowans 18 Years of Age and Older
2006 (Chart 10)
2005 (Chart 11)

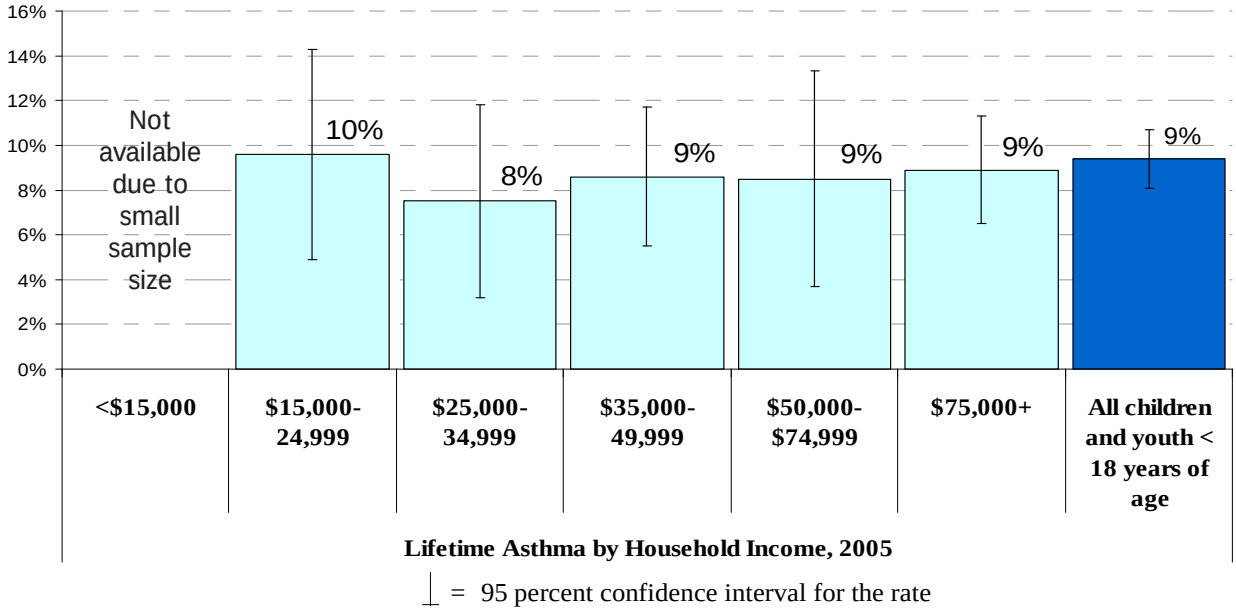
Chart 10



5,900	8,100	5,000	11,600	19,500	14,600	69,200
Estimated number of Iowa adults 18 years of age and older with one or more child living in the home who have ever had asthma by household income						

Note: Income was not reported by about 7 percent of adults who have children in the home who had ever had asthma.

Chart 11



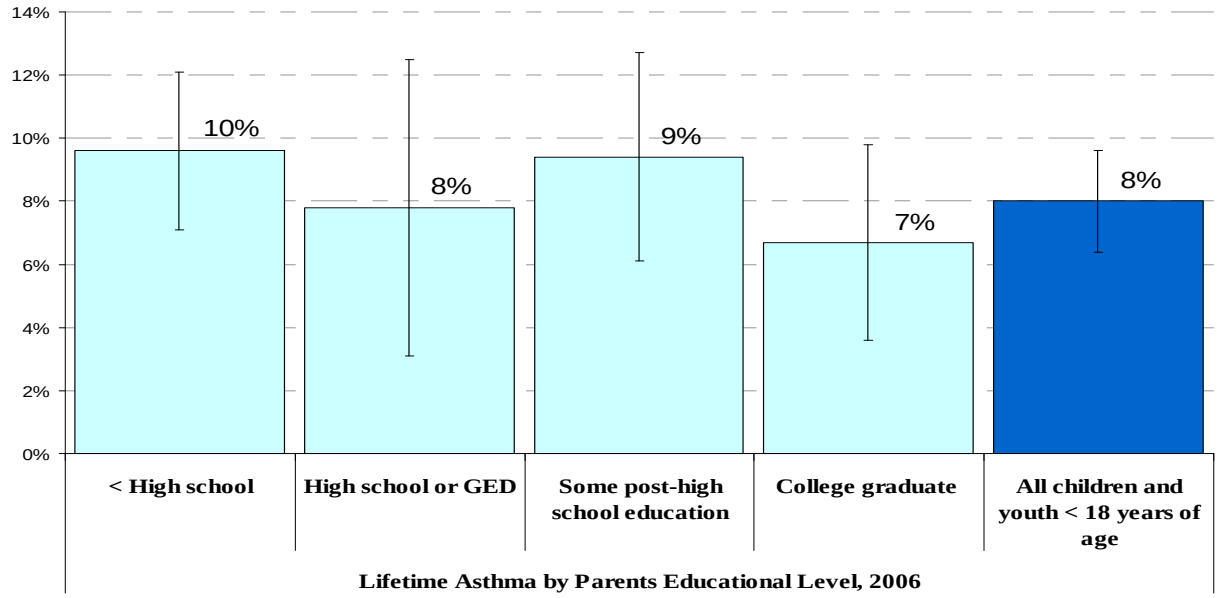
= 95 percent confidence interval for the rate

Source: Iowa Behavioral Risk Factor Surveillance System (BRFSS), 2005, 2006

Charts 12 and 13

By Parent/Guardian Highest *Level of Education*
Percent and Number of *Adults with One or More Child in Household with Diagnosed Lifetime (Ever-Had) Asthma*
Iowans 18 Years of Age and Older
2006 (Chart 12)
2005 (Chart 13)

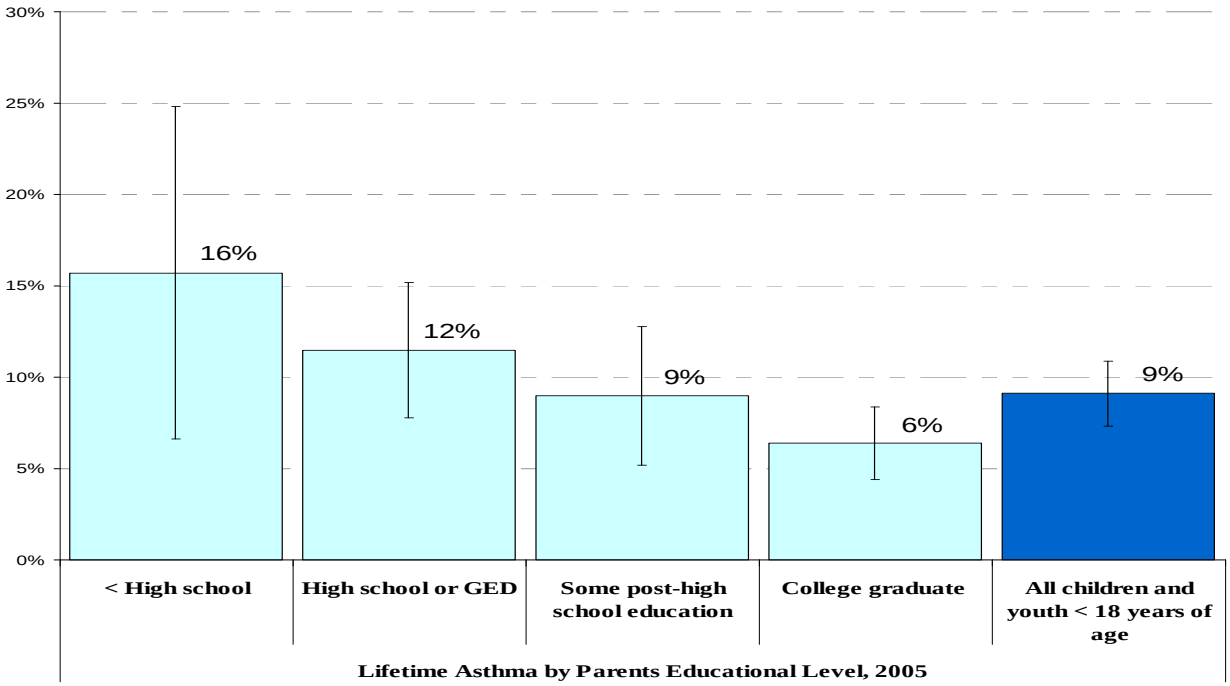
Chart 12



5,400	18,600	24,900	20,300	69,200

Estimated number of Iowa adults 18 years of age and older with one or more child 17 years of age and younger living in the home who has ever had asthma, by educational attainment of adult

Chart 13



Source: Iowa Behavioral Risk Factor Surveillance System (BRFSS), 2005, 2006

Charts 10 through 13: Rates of child current asthma by household income and parental educational status: BRFSS

A general trend was seen for adults living in households of the highest income and highest level of educational attainment to be least likely to have a child living at home who has ever had asthma.

Conversely, adults living in households of the lowest income and who had the lowest level of educational attainment were found to be most likely to have a child living at home who had ever had asthma.

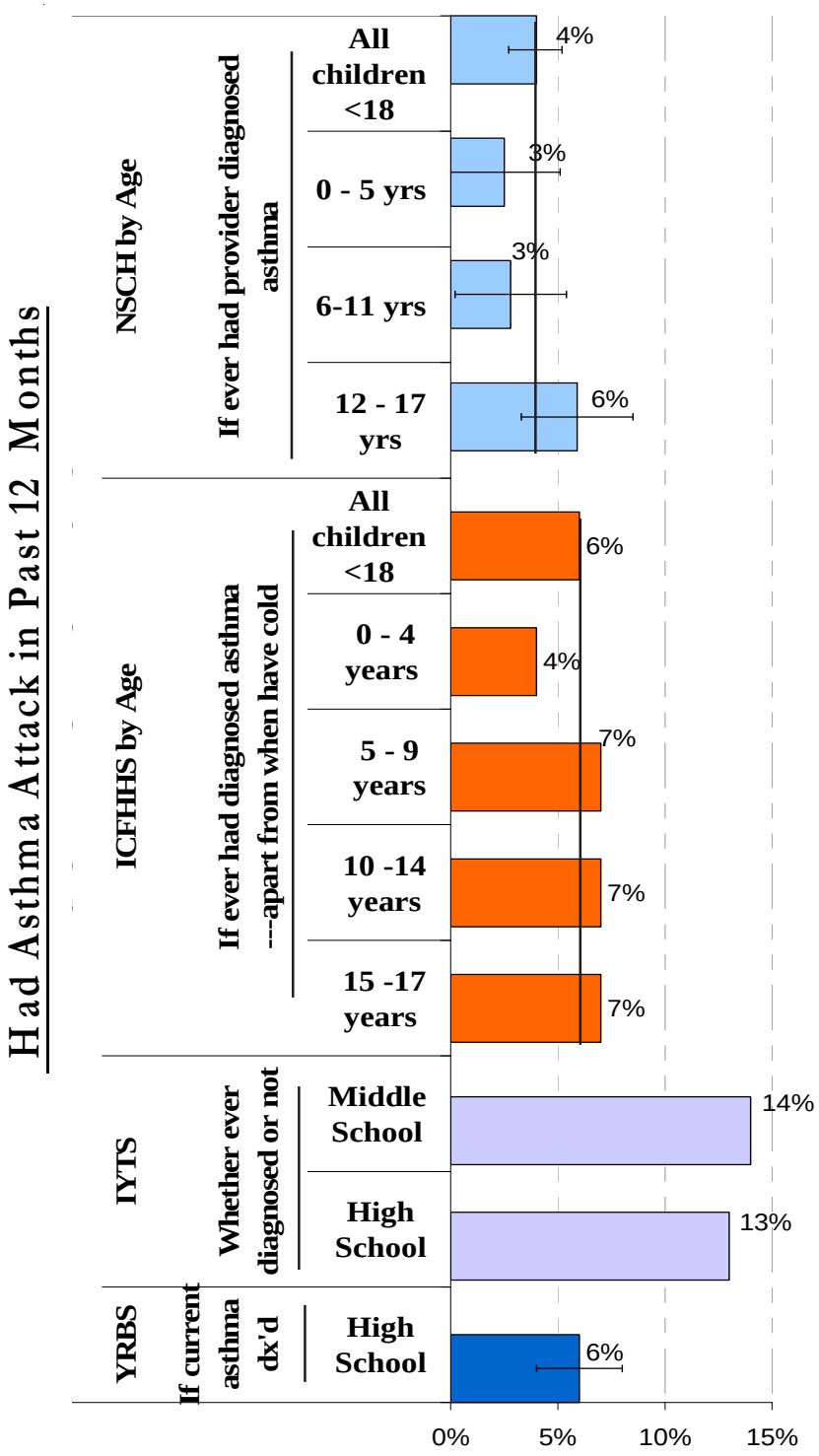
In 2006, adults with household incomes of less than $15,000 were 250% more likely to have a child living in the home who had ever had asthma than were adults whose household income was $75,000 or higher (15% vs. 6%).

In 2006, adults who had less than a high school education were 43% more likely to have a child living in the home who had ever had asthma than were whose adults who had a college degree (10% vs. 7%). In 2005, an even greater difference in the proportion of adults households with children living with them who have ever had asthma was seen between adults with less than an high school education and those with college degrees (16% vs. 6%, proportion with children who had ever had asthma was 2.7 times greater among adults in low income households).

The differences seen the between socioeconomic status of adults least and most likely to have children who ever had asthma in their homes failed to reach statistical significance due in part, at least, to the small sample size in some income and educational level subgroups. (BRFSS, Charts 10 through 13)

Chart 14

Percent of All *Children by Age and Grade Level who have had an Asthma Attack* during the Past 12 Months
(Asked of Parent with Children with: Diagnosed Lifetime Asthma (NSCH, ICFHHS), Asked of Youth with Diagnosed Current Asthma (YRBS) and of Youth with Diagnosed/ Undiagnosed Current Asthma (IYTS), Rate per 100 Population,
Iowa Children and Youth 0 - 17 Years of Age and Iowa Middle School and High School Students

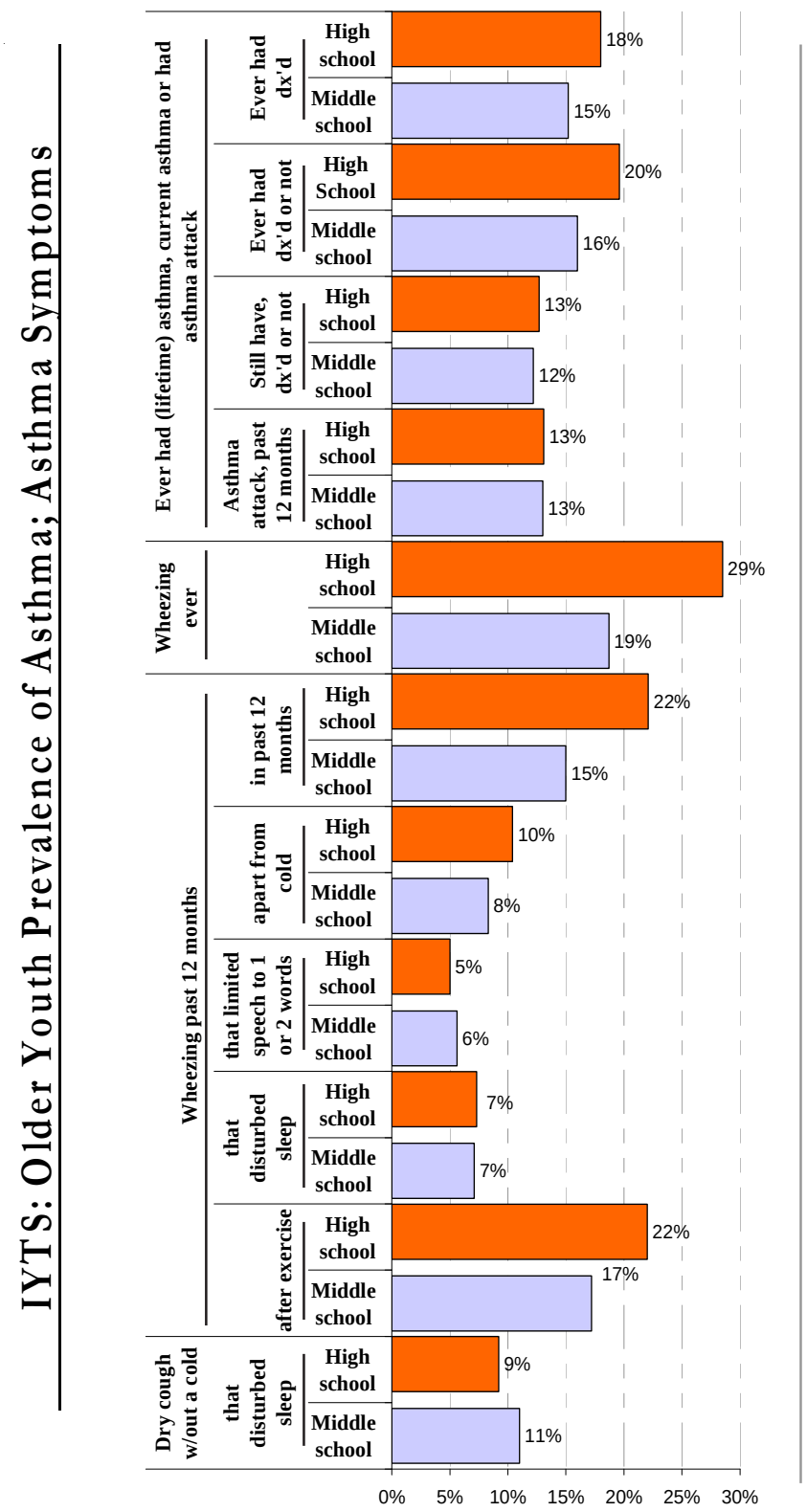


Sources: National Survey of Children's Health (NSCH, 2003-04)
Iowa Youth Risk Behavior Survey (IYRBS, 2005)
Iowa Youth Tobacco Survey (IYTS), 2004
Iowa Child and Family Household Health Survey (ICFHHS), 2005
Dx'd = diagnosed asthma

= 95 percent confidence interval for the rate

Chart 15

Percent of All *Childen with Diagnosed and Undiagnosed Asthma who have had an Asthma Attack, Wheezing or Dry Cough*
Rate per 100 Population
Iowa Middle and High School Youth



Source: Iowa Youth Tobacco Survey (IYTS), 2004

Chart 14: Percent of all children by age group and grade level who have had an asthma attack in past 12 months

The percent of all Iowa children (percents here use all children in an age group or grade-level as their denominator, not just those with ever-had or current asthma) who have had an asthma attack or episode were fairly consistent between three (NSCH, ICFHHS and the YRBS) and markedly higher for the fourth database (IYTS) from which data are provided in Chart 14.

The higher rates seen for middle and high school youth in the IYTS reflect, at least in part, differences in how and of whom questions were asked. The NSCH and the ICFHHS asked parents about asthma attacks and episodes if their children had ever had health care practitioner diagnosed asthma. The YRBS asked high school students who reported currently having diagnosed asthma about their asthma attacks.

The IYTS asked middle and high schools students about how many asthma attacks they had had in the past 12 months, regardless of whether they also reported currently or ever having had diagnosed with asthma.

Both the ICFHHS and NSCH, which ask about asthma attacks in the past 12 months in children 0 to17 years of age who have ever had diagnosed asthma, found children ages 0 to 4 years of age to have the lowest rate of asthma attacks (4% of those who had ever had asthma) among all ages groups.

For older children, the ICFHHS, NSCH, and YRBS, which asked about asthma attacks in those children that currently have diagnosed asthma (YRBS) or have ever had had diagnosed asthma (ICFHHS, NSCH), yielded similar asthma attack rates--between 6% and 7%.

The IYTS, administered only to middle and high school students, found the highest reported rates of asthma attacks among all of the four databases with asthma attack data for older Iowa youth: 135 of all middle school students and 14% of all high school students resported having an asthma attack in the past 12 months.

Charts 15: Percent of all children in middle and high school who have had asthma, asthma attack, or wheezing in past 12 months: IYTS

Of high school students: 20% reported ever having had asthma, (diagnosed or not-diagnosed), while 18% report ever having had diagnosed asthma. Thirteen percent reported still having asthma and that same percentage reported having had an asthma attack in the past 12 months.

Of high school students, 29% reported every having had any wheezing. During the past 12 months, high school students reported experiencing wheezing as follows:

- 22%: any wheezing in the past 12 months;
- 10%: wheezing apart from when they had a cold;
- 6%: wheezing so that speech was limited to one or two words;
- 7 %: wheezing that disturbed sleep;
- 22%: wheezing after exercise; and
- 9%: dry cough apart from when had cold or respiratory infection.

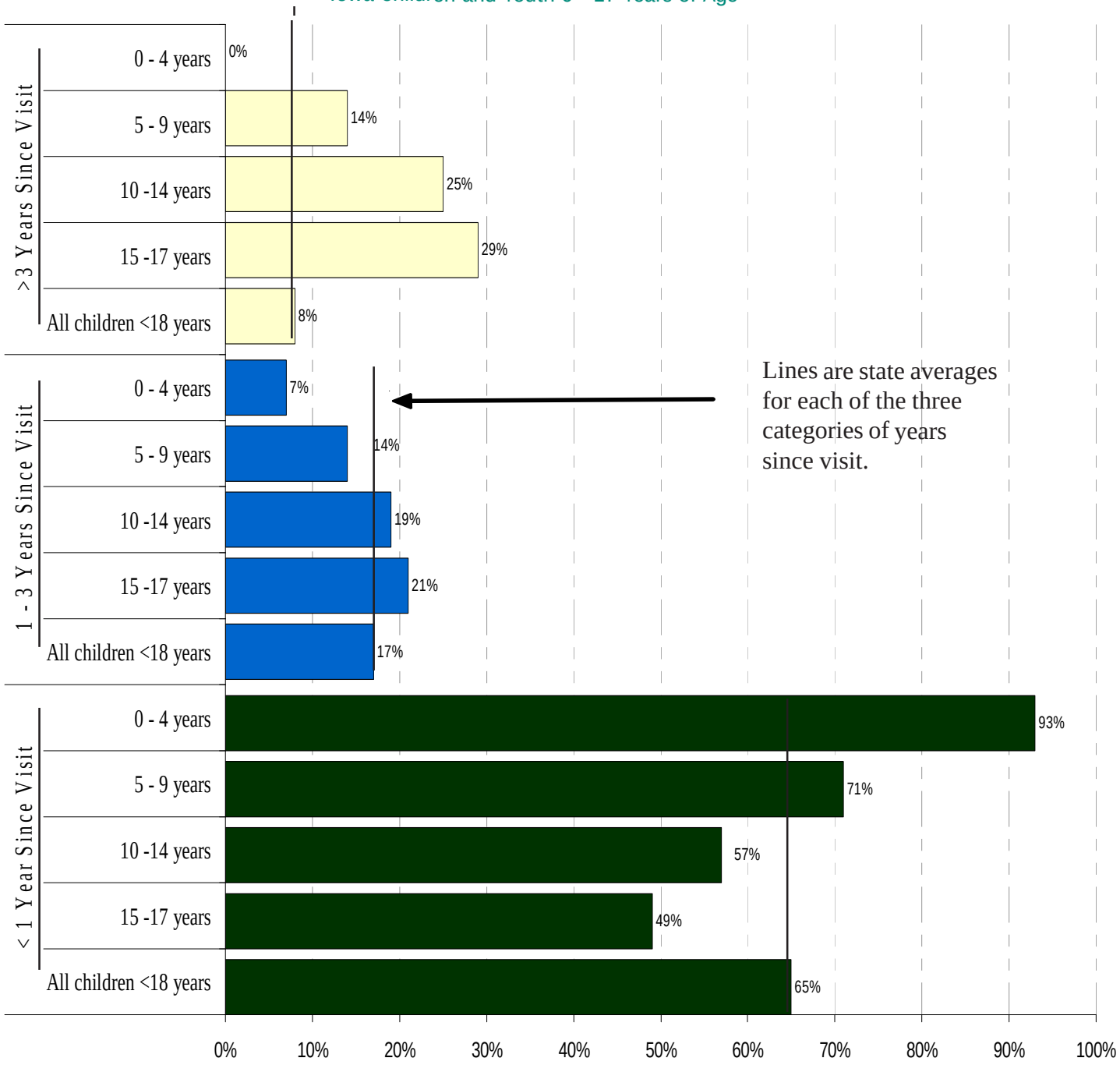
Of middle school students: 16% reported ever having had asthma, (diagnosed or not-diagnosed), while 15 percent report ever having had diagnosed asthma. Twelve percent reported still having asthma and 13% reported having had an asthma attack in the past 12 months.

Of middle school students, 19% reported every having had any wheezing. During the past 12 months, middle school students reported experiencing wheezing as follows:

- 15%: any wheezing in the past 12 months;
- 8%: wheezing apart from when they had a cold;
- 6%: wheezing so that speech was limited to one or two words;
- 7%: wheezing that dispturbed sleep;
- 17%: wheezing after exercise; and
- 11%: dry cough apart from when had cold or respiratory infection.

Chart 16

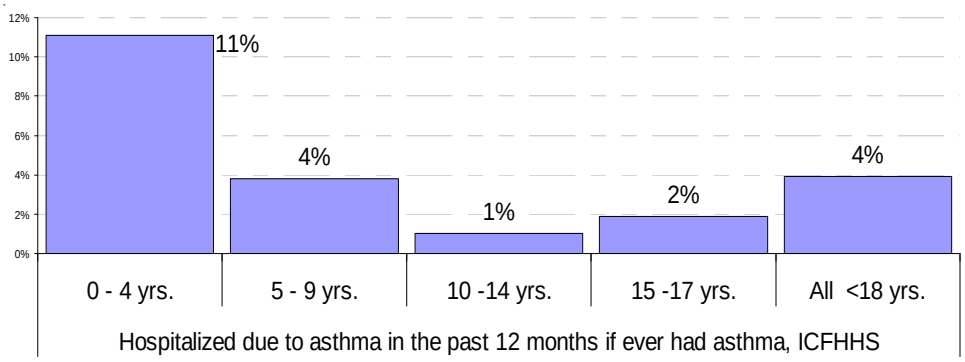
By Age
Of Children who Have Ever Had Diagnosed Asthma
Percent that Has Seen a Physician for Asthma
in the Past Year
in the Past One-Three Years, or
More than Three Years Ago
Iowa Children and Youth 0 - 17 Years of Age



Source: Iowa Child and Family Household Health Survey (ICFHHS), 2005

Chart 17

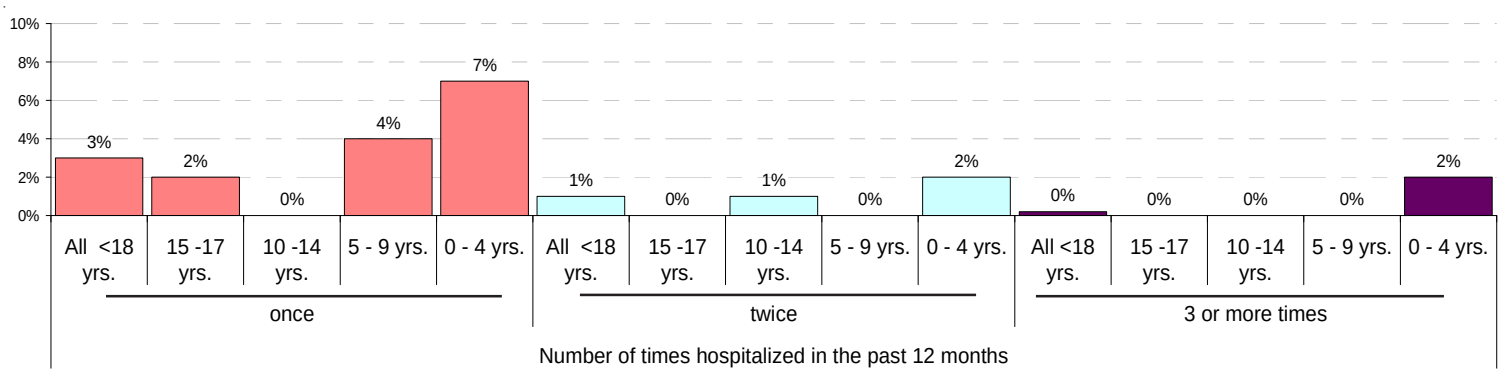
By Age
Of Children who Have Ever Had Diagnosed Asthma
Percent that was Hospitalized for Asthma in the Past 12 Months
Iowa Children and Youth 0 - 17 Years of Age



900-1,000	550-650	200-300	330-430	2,000-2,600
Number of Iowa children/youth hospitalized from or with asthma				

Chart 18

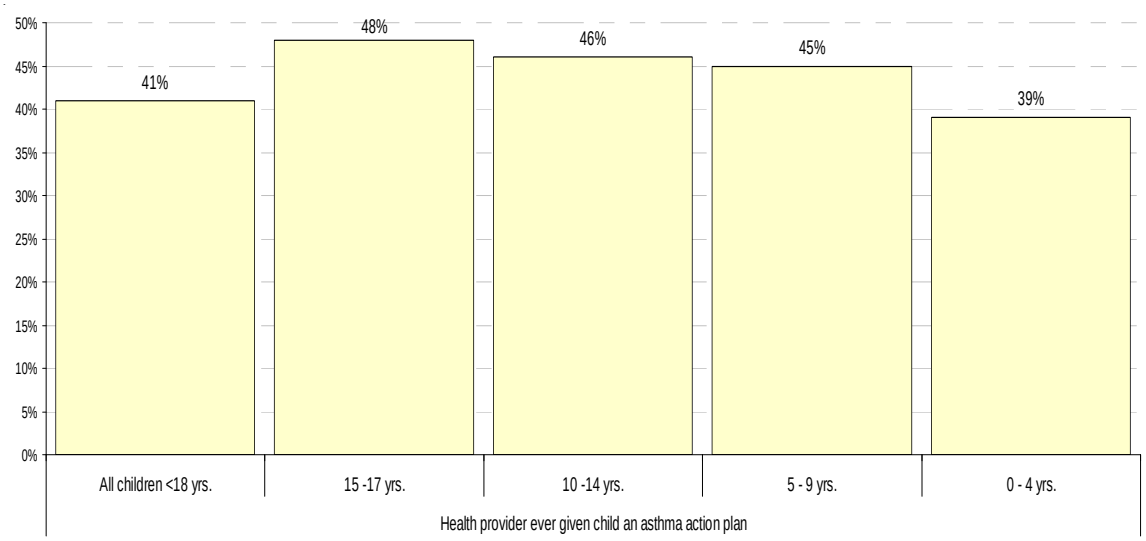
Percent of Children who Have Ever Had Diagnosed Asthma
that was Hospitalized for Asthma in the Past 12 Months
by Age and Frequency of Hospitalization
Iowa Children and Youth 0 - 17 Years of Age



Source: Iowa Child and Family Household Health Survey(ICFHHS), 2005

Chart 19

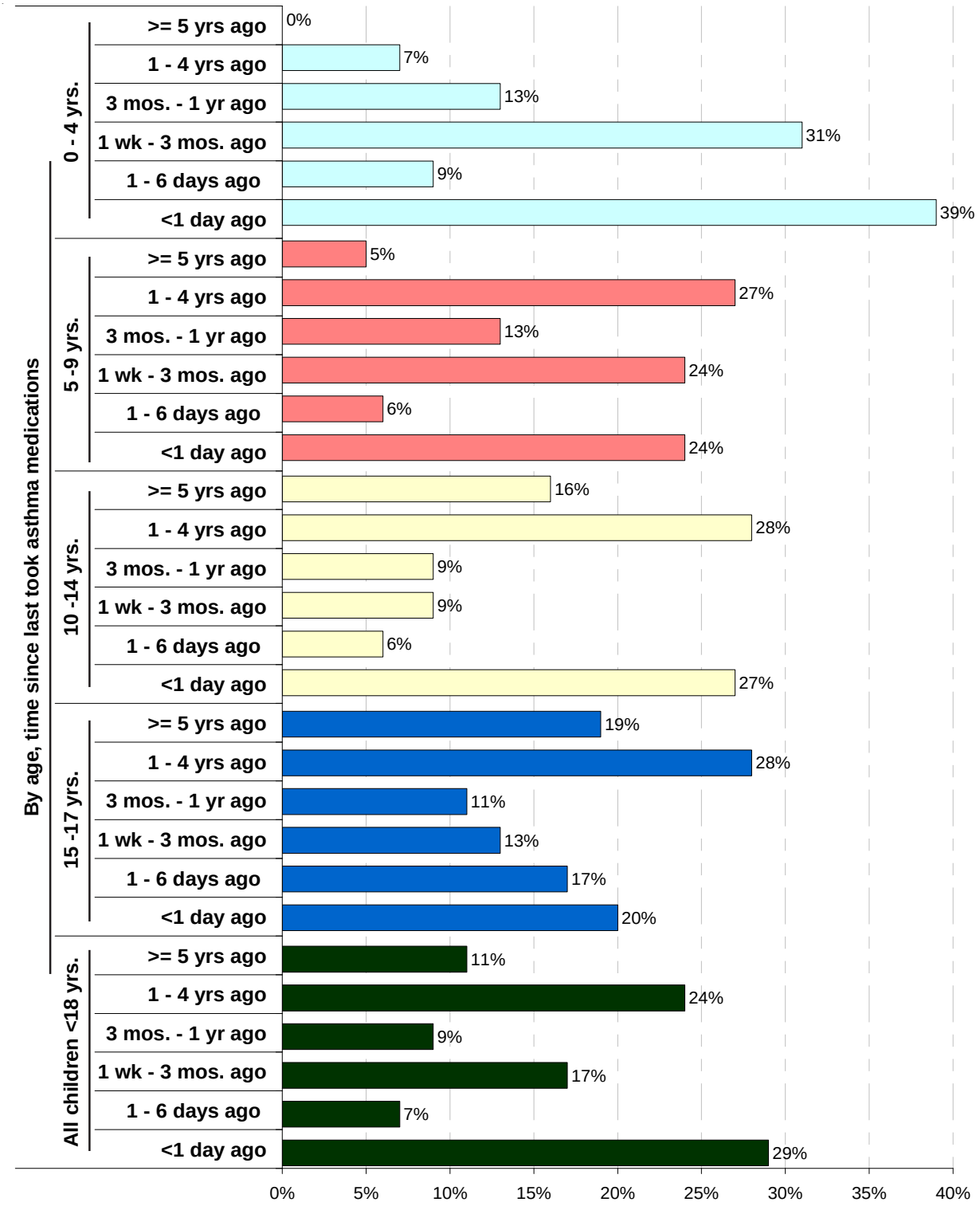
Percent of Children who Have Ever Had Diagnosed Asthma
that Was Ever Given an Asthma Action Plan by a Health Care Provider, by age
Iowa Children and Youth 0 - 17 Years of Age



Source: Iowa Child and Family Household Health Survey(ICFHHS), 2005

Chart 20

By Age
Percent of Children who Have Ever Had Diagnosed Asthma
by Time Since Last Took Asthma Medications
Iowa Children and Youth 0 - 17 Years of Age



Source: Iowa Child and Family Household Health Survey(ICFHHS), 2005

Chart 16: Years since last saw a physician for asthma care: ICFHHS

The youngest children were most likely to have seen a health care practitioner for asthma care within the past year. 93% of children less than 4 years of age had seen a health care practitioner for their asthma in the past year, while fewer than half of 15 to 17 year-olds had seen a practitioner for asthma care in the past year. Recently published NHLBI guidelines place a priority on asthma control through medical and environmental exposure management as key elements to reducing the burden on asthma in children of all ages.

Charts 17 and 18: Hospitalizations for asthma

Of children 4 years of age and younger who had ever had asthma, 11% had been hospitalized for asthma in the past 12 months, including 2% who were hospitalized three or more times.

Children in this younger age group were more than twice as likely to be hospitalized for asthma as were children 5 to 9 years of age and more than 5 times as likely to be hospitalized as were children 10 years of age and older.

Chart 19: Children who have ever had asthma and an asthma action plan (ICFHHS)

Overall, parents reported 41% of their children 0 to 17 years of age who have ever been diagnosed with asthma were ever given an asthma action plan.

The yougest children were the least likely to have ever had an asthma action plan (39%) and older children, predictably, were the most likely to have ever beeen given an action plan (48%).

Chart 20: Children who have ever had asthma: Time since last took medications (ICFHHS)

The yougest children were most likely to have taken asthma medications in the past six days: 48% of children less than 4 years of age who had ever had asthma had taken asthma medications in the past six days, while 30% of 5 to 9 year olds, 33% of 10 to14 year olds, and 36% of 15 to 17 year olds had taken medications within the past six days.

Chart 21

Percent of Students who are Current Cigarette *Smokers* (Smoked in the Past 30 Days)
Percent who have had at Least One *Asthma Attack* in the Past 12 Months
Percent with Diagnosed *Current and Lifetime Asthma* (Asthma Prevalence)
Rates per 100 Population
Iowa and U.S.
High School Youth

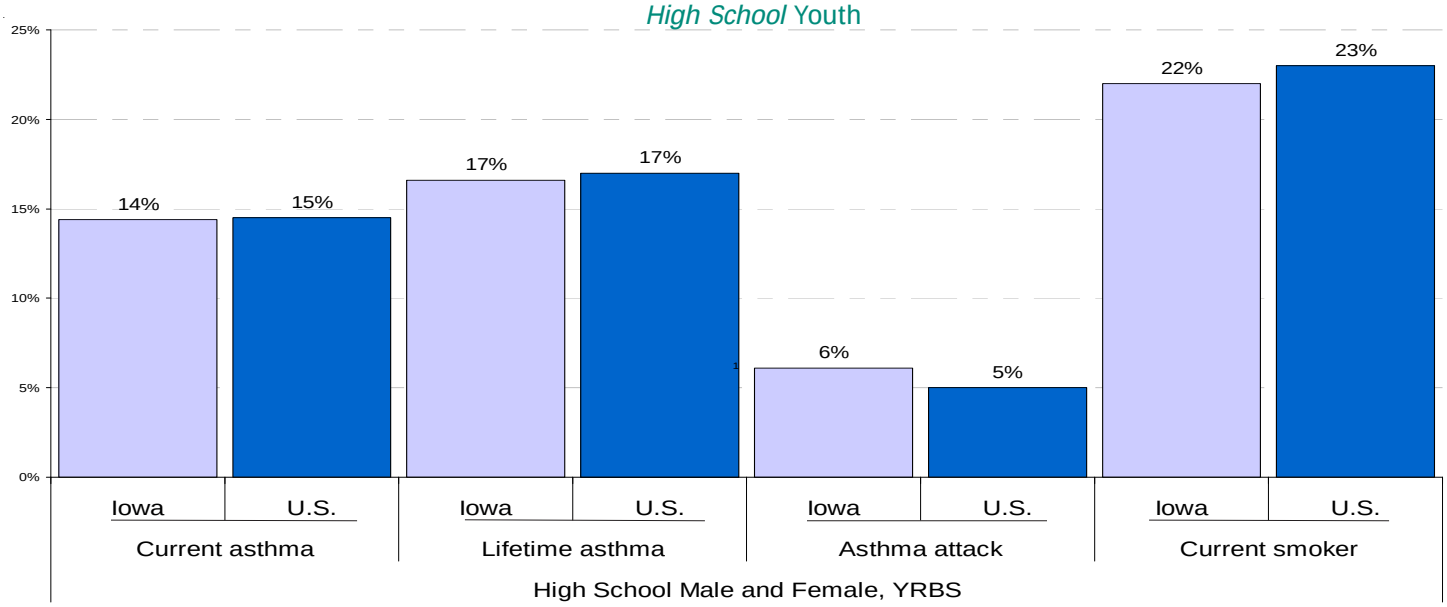
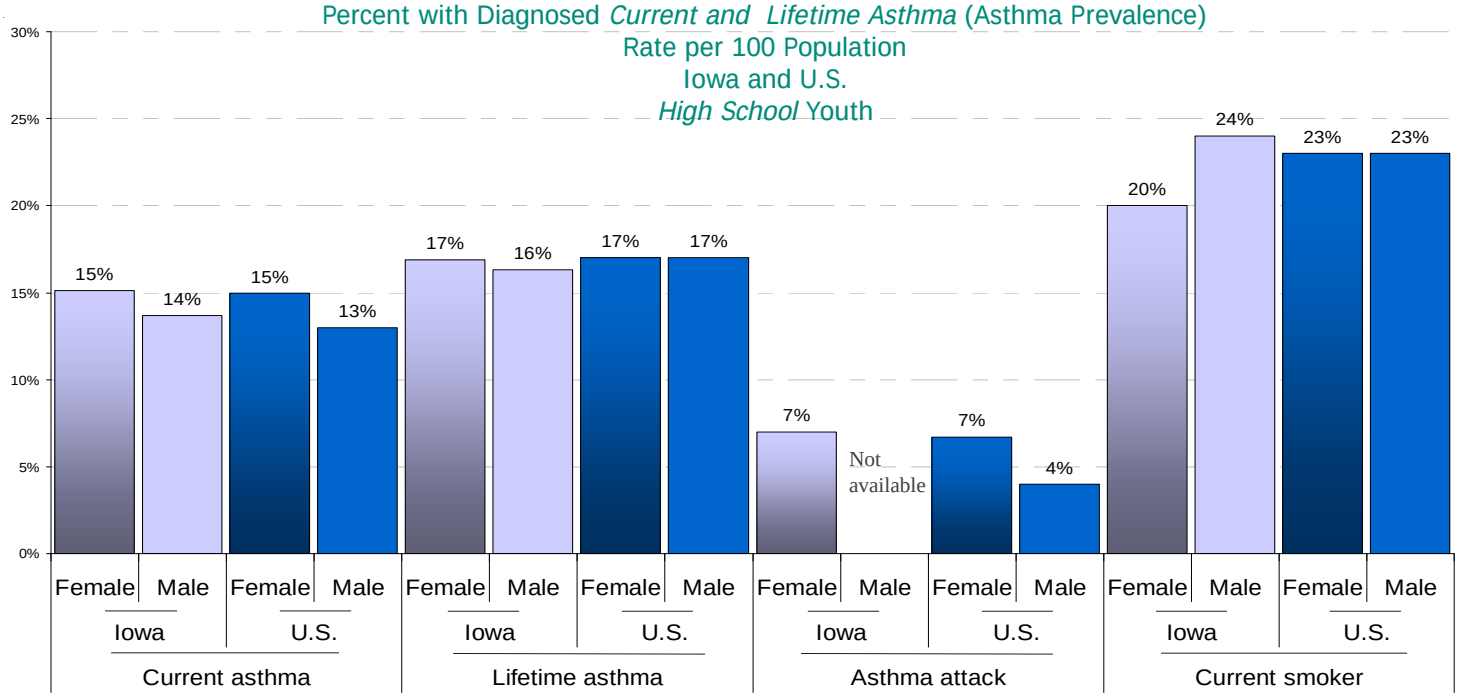


Chart 22

By Gender
Percent of Students who are *Current Cigarette Smokers* (Smoked in the Past 30 Days)
Percent who had at Least One *Asthma Attack* in the Past 12 Months
Percent with Diagnosed *Current and Lifetime Asthma* (Asthma Prevalence)
Rate per 100 Population
Iowa and U.S.
High School Youth



Source: Iowa Youth Risk Behavior Survey (IYRBS), 2005. None of the gender-specific and overall differences in asthma prevalence rates between Iowa and the U.S. seen in Charts 20 and 21 were statistically significant.

Chart 23

Among Students with Asthma and Among All Students
Percent who are Current Smokers (in Past 30 Days);
Daily Smokers; and,
Heavy Smokers (>20 Cigarettes/Day)
Smoking Rate per 100 Population
Iowa *Middle School* Youth

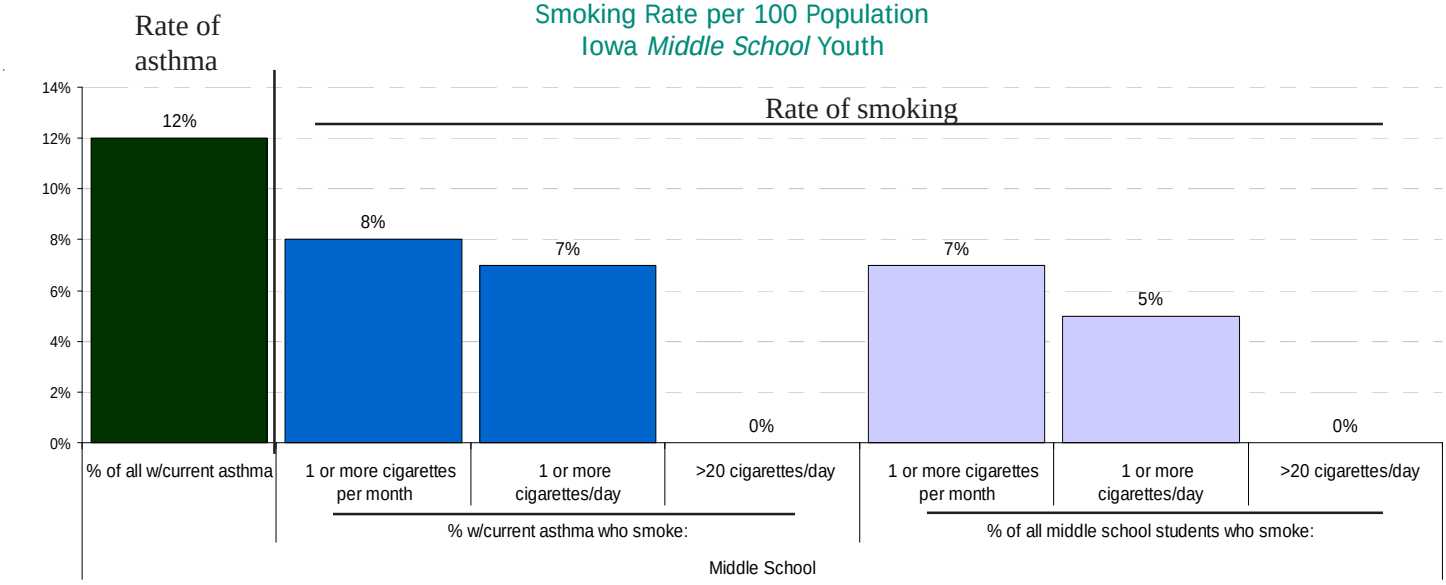
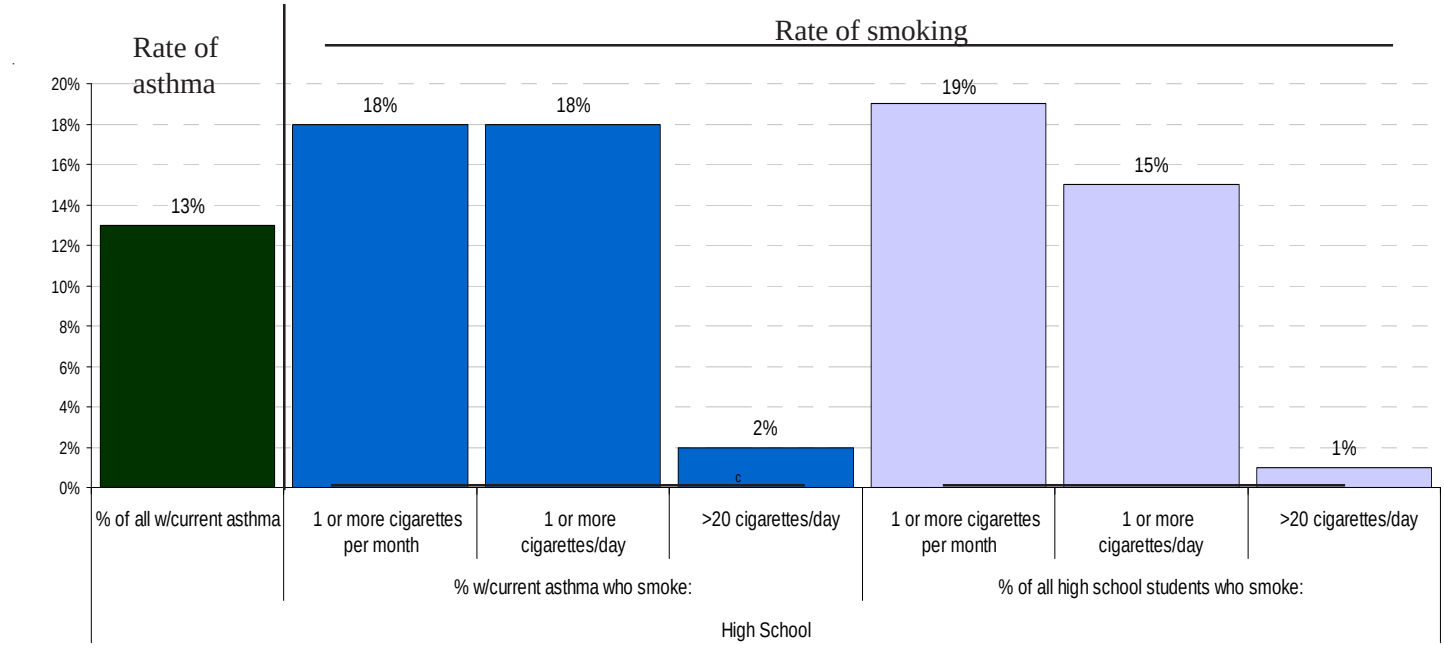


Chart 24

Among Students with Asthma and Among All Students
Percent who are Current Smokers (in Past 30 Days);
Daily Smokers; and,
Heavy Smokers (>20 Cigarettes/Day)
Smoking Rate per 100 Population
Iowa *High School* Youth



Source: Iowa Youth Tobacco Survey (IYTS), 2004

Chart 25

By Smoking Status/Amount Smoked
Percent of Students who have had an *Asthma Attack* in the Past 12 Months
Percent with *Current and Lifetime Asthma* (Diagnosed/Undiagnosed Asthma Prevalence)
Rate per 100 Population
Iowa *Middle School* Youth

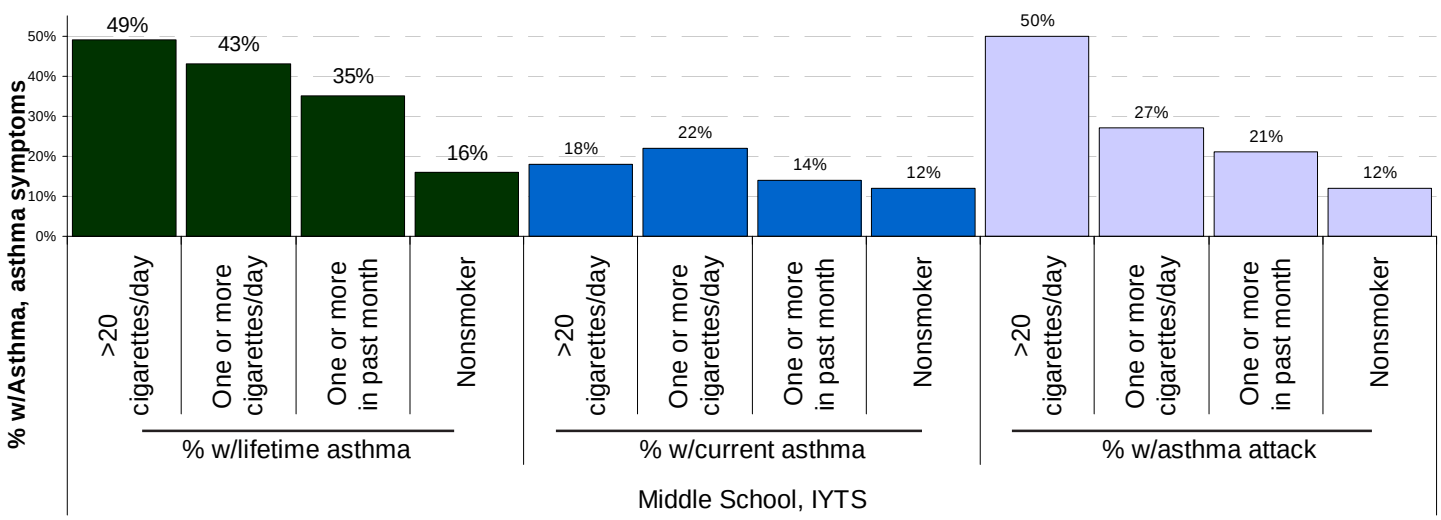
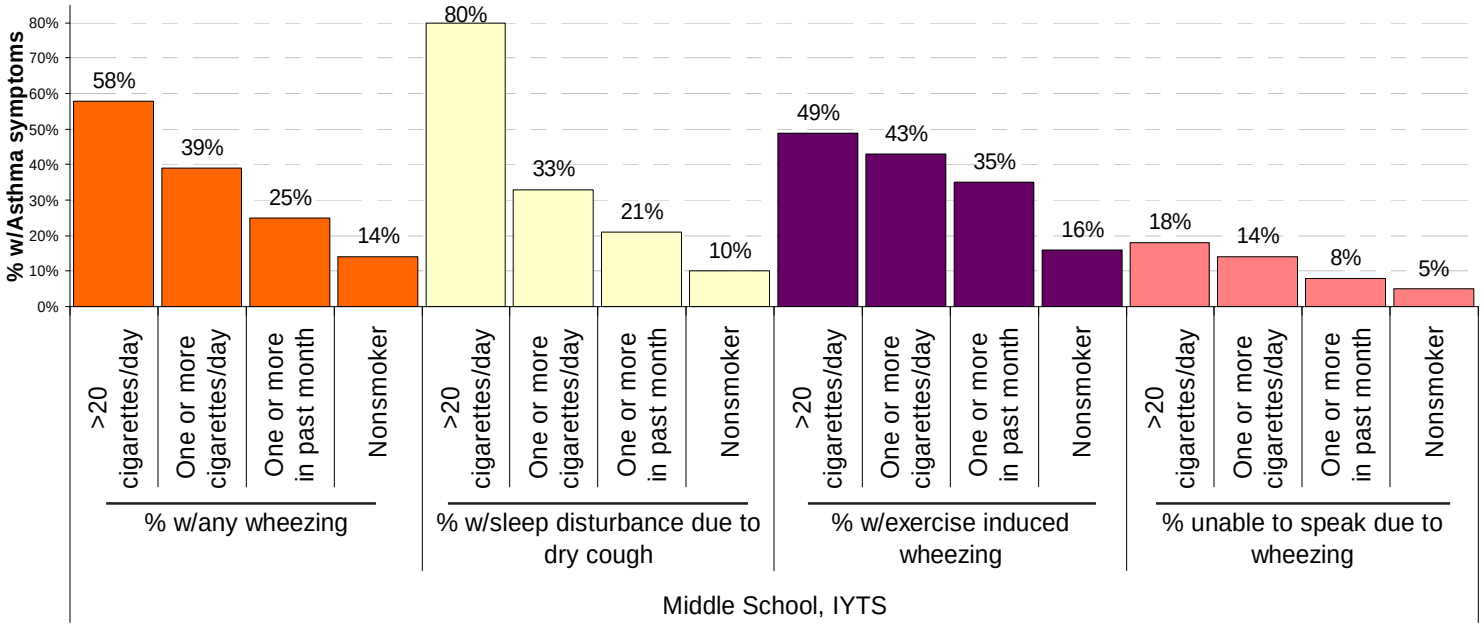


Chart 26

By Smoking Status/Amount Smoked
Percent of Students who in the Past 12 Months have had: *Any Wheezing, Wheezing after Exercise, Inability to Speak due to Wheezing and Dry Cough that Disturbed Sleep*
Rate per 100 Population
Iowa *Middle School* Youth



Source: Iowa Youth Tobacco Survey (IYTS), 2004
Confidence intervals not available for these rates.

Chart 27

By Smoking Status/Amount Smoked
Percent of Students who have had an *Asthma Attack* in the Past 12 Months
Percent with *Current and Lifetime Asthma* (Diagnosed/Undiagnosed Asthma Prevalence)
Rate per 100 Population
Iowa *High School* Youth

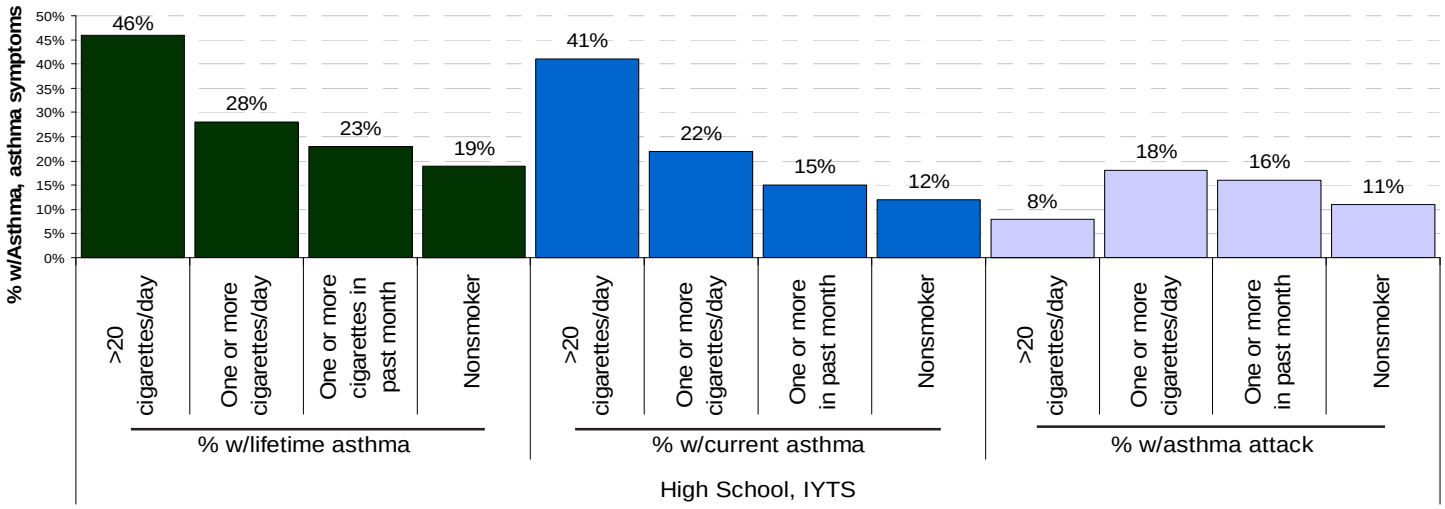
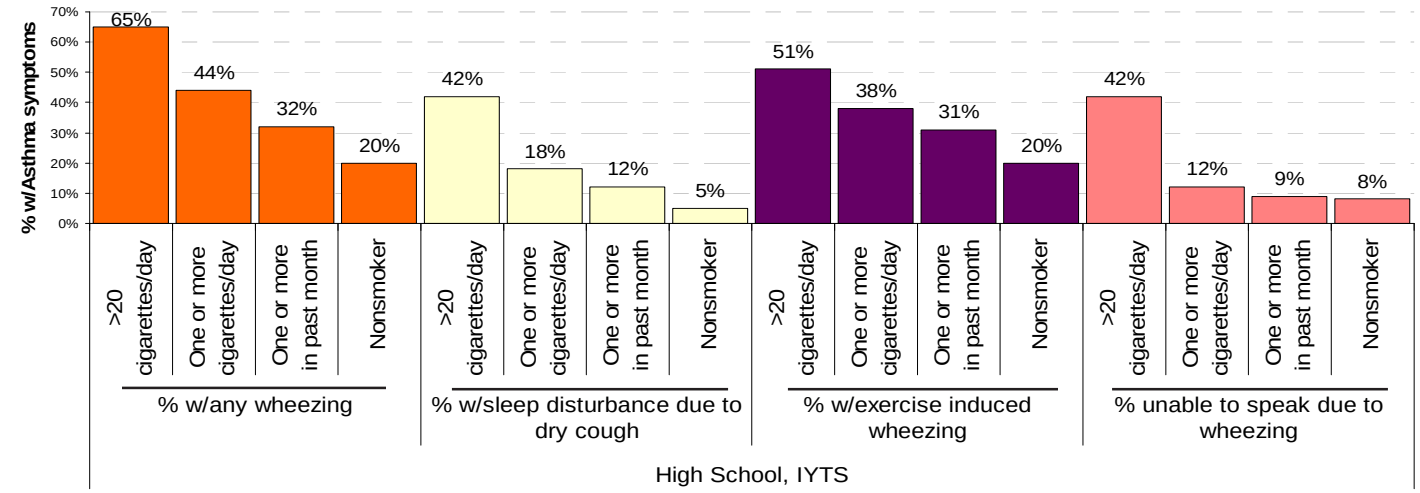


Chart 28

By Smoking Status/Amount Smoked
Percent of Students who in the Past 12 Months have had: *Any Wheezing, Wheezing after Exercise, Inability to Speak due to Wheezing and Dry Cough that Disturbed Sleep*
Rate per 100 Population
Iowa *High School* Youth



Source: Iowa Youth Tobacco Survey (IYTS), 2004
Confidence intervals not available for these rates.

Chart 21: Prevalence of asthma, cigarette smoking and asthma attacks among high school youth (YRBS)

The YRBS, which collects data only from high school students, found that 22% of Iowa high school students currently smoked cigarettes. This rate was slightly higher than that found for Iowa high school students by the IYTS in 2004 (19%). Nationally, between 23% (YRBS) and 22% (National Youth Tobacco Survey, 2004) were current cigarette smokers.

Through the YRBS, 14% of high school students reported that they currently have diagnosed asthma. (Through the IYTS, about the same percent, 13%, of Iowa high school students reported having current asthma (Chart 5).)

The Iowa rate of current asthma for high school students was slightly lower than the national rate (14% vs.15%, YRBS).

Of Iowa high school students, 6% reported having had an asthma attack in the past 12 months. Nationally 5% reported having had an asthma attack during the past 12 months.

Chart 22: Prevalence of asthma, cigarette smoking and asthma attacks among high school youth by gender (YRBS)

YRBS rates for Iowa high school students found that girls have slightly higher rates than boys of: current asthma (15% vs. 14%), lifetime asthma (17% vs. 16%) and asthma attacks (7% vs. est. 5%-6%).

While only 20% of Iowa high school girls smoked, 24% of Iowa high school boys smoked in 2005 Nationally, the YRBS current smoking prevalence rate for girls and boys was the same, 23%.

Chart 23: Prevalence of cigarette smoking among *middle school* youth with and without asthma (IYTS)

Middle school youth *with current asthma* were slightly more likely to be *current cigarette smokers* (8%) than were middle school youth overall (7%). This difference in rates was not statistically significant.

About 7% of middle school youth *with current asthma smoked cigarettes everyday*, while only 5% of all middle school youth overall smoked everyday.

Chart 24: Prevalence of cigarette smoking among *high school* youth with and without asthma (IYTS)

High school youth overall were much more likely to currently smoke (smoked in the past 30 days) and to smoke everyday then were middle school youth.

Among high school students, 19% were *current smokers* (smoked in the past month), while only 5% of middle school students were current smokers.

Among high school students, 15% *smoked everyday*, while only 5% of middle school students smoked every day.

Of high school students with asthma, 2% *smoked more than 20 cigarettes everyday*. Among high school students overall, only 1% smoked more than 20 cigarettes per day. Confidence intervals were not available for these IYTS rates.

The IYTS found that 13% of high school and 12% of middle school youth have current asthma.

Charts 25-28: By amount of cigarettes smoked, prevalence of asthma attacks, wheezing and lifetime and current asthma (IYTS)

Middle school youth who were current smokers (had smoked at least one cigarette in the past month), compared to their peers who were nonsmokers, had consistently higher rates of asthma and asthma-related symptoms:

- lifetime asthma (33% higher: 19% vs. 15%);
- current asthma (17% higher: 14% vs.12%);
- any asthma attack in the past 12 months (75% higher: 21% vs. 12%;
- wheezing at any time in the past 12 months (79% higher: 25% vs. 14%);
- wheezing after exercise in the past 12 months (119% higher: 35% vs. 16%);
- dry cough causing sleep disturbances in the past 12 months (110% higher: 21% vs. 10%); and
- inability to speak due to wheezing (60% higher: 8% vs. 5%).

Similarly elevated rates were seen for high school youth who were smokers (had smoked at least one cigarette in the past month), compared to their peers who were nonsmokers:

- current asthma (20% higher: 15% vs.12%);
- any asthma attack in the past 12 months (45% higher: 16% vs. 11%);
- wheezing at any time in the past 12 months (60% higher: 32% vs. 20%);
- wheezing after exercise in the past 12 months (55% higher: 31% vs. 20%);
- dry cough causing sleep disturbances in the past 12 months (140% higher: 12% vs. 5%); and
- inability to speak due to wheezing (13% higher: 9% vs. 8%).

An exception to this trend was lifetime asthma prevalence rates which were were 19% lower in high school current smokers (17% vs 21%).

In addition to current asthma and asthma-related symptoms being elevated in middle and high school youth who currently smoked, with few exceptions, the prevalence rate of asthma and asthma-related conditions was highest in middle and high school youth who smoked the most and increased as the number of cigarettes smoked increased. (Charts 25 to 28)

Those who reported smoking the most, that is twenty or more cigarettes per day, were between 800 percent and 50 percent more likely to report having asthma or asthma-related symptoms than were nonsmoking middle and high school youth.

(Confidence intervals were not available for these IYTS rates. There were two exceptions to this trend of current asthma prevalence rates increasing dramatically with increased rates of smoking. For middle school youth, current asthma prevalence rates were slightly higher in those who reported smoking at least one cigarette daily vs. those who smoked 20 cigarettes or more daily (22% vs. 18%) ; and for high school youth, the rate of having experiences an asthma atttack in the past 12 months was higher among youth who smoked one or more cigarettes per day vs. those who smoked 20 or more per day (8% vs. 18%). These exceptions may be a factor of small sample size.)

The Iowa Behavioral Risk Factor Surveillance System (BRFSS)

Established in 1988, the Iowa Behavioral Risk Factor Surveillance System (BRFSS) is a Center for Disease Control funded annual household interview survey in which adults in all 50 states self-report information about the burden of chronic diseases and risk factors. The Iowa Department of Public Health manages the BRFSS in Iowa. About 5,000 Iowa adults participate each year. Due to the small BRFSS sample size, in most instances, statewide, but not county or regional level, prevalence rates and counts can be computed annually.

In 1999, the Iowa BRFSS began to include questions covering adult asthma prevalence. In 2001, questions were first asked about childhood asthma. From 2001-2005 data about child asthma were obtained by asking adults who qualify for the BRFSS if there were any children in the household less than 18 years of age, and if so, one child less than 18 years of age is chosen about whom to ask questions about child asthma. In 2006, the CDC initiated the BRFSS adult and child asthma call-back surveys through which adults with asthma and adults with children with asthma are called again at a later date to obtain more indepth information on adult and child asthma.

Although a state may add its own questions, most questions in the BRFSS survey each year are nationally standardized. Standardized questions may be 'core' questions that each state must ask or optional questions. All child asthma questions are optional. The IDPH has included the optional child questions since 2001. Approximately 30 states included the optional childhood asthma questions in 2004, while 22 states included the optional childhood asthma questions in 2003, 25 states in 2002 and 8 states in 2001.

(The CDC BRFSS web site, which houses BRFSS questionnaires, datasets, reports and background on methodologies, is: http://www.cdc.gov/brfss/ .

The Iowa Youth Risk Behavior Survey (YRBS)

The Youth Risk Behavior Surveillance System (YRBSS), funded, designed and managed by the Centers for Disease Control and Prevention, is a system of national, state and local-level standardized surveys that provides data on the prevalence of youth high-risk behaviors. Behaviors measured are those that endanger not only teens but those which, if continued into adulthood, will endanger their health as adults.

The CDC funds the Iowa Department of Education to administer the Iowa YRBS. The Iowa and national YRBSs were first conducted in 1991 and have been carried out every two years since. Like the BRFSS, the YRBS is a sample survey. But unlike the BRFSS that targets adult behaviors, the Iowa YRBS targets behaviors of high school students.

Asthma questions were first asked in the 2005 Iowa YRBS. Other teen behaviors and illnesses monitored through the YRBS include: tobacco use, unhealthy dietary behaviors, physical activity, alcohol and drug use, sexual behaviors/sexually transmitted diseases, mental health, behaviors that contribute to unintentional injuries and experiences of violence.

The YRBS was designed to determine not only current prevalence of health risk behaviors and illnesses, but to: assess trends in health risk behaviors, examine related clusters of high risk behaviors; compare state and national data; and, monitor progress toward *Healthy People 2010* and other programs.

For more information about the YRBS, go to the Iowa Department of Education web site: http://www.iowa.gov/educate or the CDC YRBS web site: http://www.cdc.gov/HealthyYouth/yrbs/ .

The Iowa Child and Family Household Health Survey (ICFHHS)

The 2005 Iowa Child and Family Household Health Survey (ICFHHS), a household telephone sample survey of Iowa families with children age 17 years and younger, was the second comprehensive, statewide effort to evaluate the health status, access to health care, and social environment of Iowa children. The first ICFHHS was conducted in 2000. The ICFHHS is a collaboration between the Bureau of Family Health, Iowa Department of Public Health; the Iowa Public Policy Group; and, the Child Health Specialty Clincs at the University of Iowa. Funding for the 2005 survey was from the CDC and the Maternal and Child Health Bureau of the Health Resources Services Administration of the U.S. Department of Health and Human Services.

Goals of the ICFHSS are to assess the health of Iowa children and their family's social environment. Questions on childhood asthma were asked in the 2005, but not the 2000 ICFHHS. The survey covers: demographics, health status, health insurance coverage, health care access, child care, diet, exercise, emotional health, parenting stresses, gambling and tobacco use.

For more information go the ICFHSS web site: http://ppc.uiowa.edu/health/ICHHS/iowachild2005/ichhs2005.htm.

The Bureau of Family Health (BFH) of the IDPH provides resources for maternal and child health, family planning and other services. It promotes the development in Iowa communities of local health care systems that meet present and future health needs of Iowa children and families. Contact the Bureau through three toll free telephone lines:

- Healthy Families Line (1-800-369-2229)
- TEEN Line (1-800-443-8336)
- Provider services line (1-800-383-3826)

The Iowa Youth Tobacco Survey (IYTS)

The Iowa Youth Tobacco Survey, first conducted in 2000, is completed once every two years during even years. The IYTS covers tobacco use, second hand smoke exposure, access to tobacco, smoking cessation tobacco-related attitudes, tobacco marketing, and tobacco prevention exposure. Asthma quesions were included for the first time in 2004.

The primary purpose of the survey is to measure the effectiveness of tobacco-use prevention and cessation programs and policies within Iowa.

The IYTS is funded in part by the CDC, which provides guidance on its content and analysis. The Division of Tobacco Use Prevention and Control, Iowa Department of Public Health, administers the IYTS. In 2004, a stratified random sample of 61 middle and high schools were chosen to participate. From within those schools 3,700 youth, representative of all Iowa middle and high school students, completed the survey.

The Division of Tobacco Use Prevention and Control conducts not only the Iowa Youth but the biennial Iowa Adult Tobacco Survey. The mission of the Division is to establish a comprehsensive partnership among state government, local communities and the people of Iowa to foster a social and legal climate in which tobacco becomes undesireable and unacceptable.

For more information about the IYTS and the Division's efforts to prevent and reduce tobacco use and second-hand smoke exposure, phone 515/281-6225 or access the Division's web site: http://www.idph.state.ia.us/tobacco.

The National Survey of Children's Health (NSCH)

This survey, sponsored by the Maternal and Child Health Bureau of the Health Resources and Services Administration, U.S. Department of Health and Human Services, examined the physical and emotional health of children ages 0 to17 years of age. Special emphasis was placed on factors that may relate to the well-being of children, including medical homes, family interactions, parental health, school and after-school experiences, safe neighborhoods and asthma.

Data collection occurred between January 2003 and July 2004. More than 102,000 children were sampled, including more than 1,000 in Iowa.

An easy to use, interactive data query tool to view and compare tables and charts of state, national, and regional survey findings including profiles on key performance indicators is available on the web at: www.childhealthdata.org

The National Health Interview Survey (NHIS)

First conducted in 1957, the National Health Interview Survey (NHIS) is sponsored by the CDC and uses personal interviews in households using computer-assisted personal interviewing to complete more than 100,000 interviews in more than 40,000 households. Core questions have had a 91 to 96 percent response rates over the years. Information is obtained on illnesses (including asthma since 1980) , injuries, impairments, chronic conditions, utitlization of health services, health insurance and other health topics.

Child data for 0 to 17 year olds are reported by parents.

Designed to provide national and regional estimates, a 2006 publication of CDC, *The State of Childhood Asthma, United States, 1950-2005*, provided state-level asthma prevalence estimates from the NHIS databases for the first time.

For more information sabout the NHIS visit: www.cdc.gov/nchs/nhis.htm.

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Abbreviations/Acronyms

ACAAI	American College of Allergy, Asthma and Immunology
AAFA	Allergy and Asthma Foundation of America
ALA	American Lung Association
BRFSS	Behavioral Risk Factor Surveillance System
CADE	Center for Acute Disease Epidemiology, Iowa Department of Public Health
CDC	Centers for Disease Control and Prevention
CI	confidence interval
CMS	Center for Medicare and Medicaid Services (formerly HCFA), U.S. DHHS
DHHS	U.S. Department of Health and Human Services
Dx	diagnosis
IAC	Iowa Asthma Coalition
IBRFSS	Iowa Behavioral Risk Factor Survey
ICFHHS	Iowa Child and Family Household Health Survey
IDPH	Iowa Department of Public Health
IHA	Iowa Hospital Association
ISAAC	International Study of Asthma and Allergies in Childhood
IYRBS	Iowa Youth Risk Behavior Survey (also YRBS)
IYTS	Iowa Youth Tobacco Survey
MCH	Maternal and Child Health
NAEPP	National Asthma Education and Prevention Program
NCHS	National Center for Health Statistics
NHANES	National Health and Nutrition Examination Survey
NHIS	National Health Interview Survey
NHLBI	National Heart, Lung and Blood Institute
NIH	National Institutes of Health
NSCH	National Survey of Children's Health
Pts	patients
Rx	prescription
SAS	Statistical Analysis Software
SID	State Inpatient Database
SOD	State Outpatient Database
SUDAAN	SUrvey DAta ANalysis (analytic software for cluster sample survey and other data)
U of I	University of Iowa
USDHHS	United States Department of Health and Human Services
YRBS	Youth Risk Behavior Survey

Acronyms for Six Databases Used in this Report:

BRFSS or IBRFSS	Behavioral Risk Factor Survey or Iowa Behavioral Risk Factor Survey
ICFHHS	Iowa Child and Family Household Health Survey
IYTS	Iowa Youth Tobacco Survey
NHIS	National Health Interview Survey
NSCH	National Survey of Children's Health
YRBS or IYRBS	Youth Risk Behavior Survey or Iowa Youth Risk Behavior Survey

About the Iowa Asthma Control Program

The Iowa Asthma Control Program (IACP), administered by the Iowa Department of Public Health (IDPH) receives about $400,000 in CDC funding each year to plan for and administer asthma control programming across the state. This report is produced by the IDPH's Center for Health Statistics using IACP funding. Other current efforts of the IACP include: child care provider and school nurse training in asthma control in children, facilitating health care provider use of national asthma care guidelines and outreach to high-risk low-income women.

About the IDPH Center for Health Statistics

The Center for Health Statistics is the program responsible for housing and producing reports from state vital records, hospitals discharge databases and a number of chronic disease-related health surveys and registries. The Center for Health Statistics produces all surveillance reports for the Iowa Asthma Control Program.

About Other IDPH Programs Important to Asthma Control

Many other programs within the IDPH undertake efforts that are important to asthma control in children and youth. These programs are housed in the: the Division of Tobacco Use Prevention and Control Program, the Division of Environmental Health, and the Division of Health Promotion and Chronic Disease Prevention. Information about these divisions and their programs can be found on the IDPH web site: http://www.idph.state.ia.us.

About the Iowa Asthma Coalition, American Lung Association

The Iowa Asthma Coalition (IAC) is a partnership of organizations and people who care about the quality of life for people in Iowa with asthma. The Iowa Chapter of the American Lung Association staffs the Coalition. The mission of the Coalition is to: help Iowans

- Learn the signs of an asthma attack.
- Receive appropriate asthma treatment.
- Manage their asthma triggers/environment;
- Shape public policy.

Iowa Asthma Coalition, Surveillance Committee Members

The Surveillance Committe of the Iowa Asthma Coalition (IAC) provides review and recommendations on the contents and implementation of the *Asthma in Iowa* surveillance reports. Members of the committee include:

- Don Shepherd, Iowa BRFSS Program, IDPH.
- Gerilyn Quigley, Iowa Tobacco Use Prevention Control Program, IDPH
- Carol Hinton, Child Health Coordinator, IDPH
- Dawn Voss, Wellmark Blue Cross/Blue Shield
- Diane Ellis, Covering Kids and Families
- Kathy Morris, Nurse Practitioner
- Sara Peterson, Iowa Dept. of Education
- Alan Sisson, M.D.
- Simon Geletta, Des Moines University

Ad Hoc Members include: Andrea Hoffman, Iowa Asthma Control Program, IDPH; Jill Agan, American Lung Association; Joann Muldoon, Center for Health Statistics, IDPH.

Thanks to Suning Cao and Yumei Sun, and Kimberly Piper, IDPH and to Jeanne Moorman, CDC, for reviewing the draft of this report.

Where to Go for More Information on Asthma

For more information about the burden of asthma in Iowa or to review the other Asthma In Iowa surveillance reports and updates, visit or contact the Iowa Asthma Control Program staff:

IACP Web Site Address:
http://www.idph.state.ia.us/hpcdp/asthma.asp

Mail: Asthma Epidemiologist
Center for Health Statistics
IA Dept.of Public Health
5th Flr, Lucas Bldg, 321–E12th St.
Des Moines, IA 50319

Phone: (515) 242-5849
Fax: (515) 281- 4529
E-mail: Jmuldoon@idph.state.ia.us

For more information about IDPH Iowa Asthma Control Program services for children and adults, contact the IACP web site listed above or:

Phone: (515) 281-4779
E-mail: Ahoffman@idph.state.ia.us

For more information about the Iowa Asthma Coalition, contact the Iowa Chapter of the American Lung Association:

ALA Web Site Address:
http://www.lungia.org/asthma/
Phone: (515) 334-9507, ext. 224

Citation to Use

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Acknowledgement of CDC

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Asthma in Iowa

Adult and Child Inpatient Hospitalizations from Asthma

Iowa State Inpatient Database (SID): 1995-2006

Iowa Department of Public Health
2008

SID Charts and Tables in this Report

How Inpatient Data are Presented

In this report, asthma hospitailization rates and counts for the Iowa population and the differences between those rates and counts are presented by age, gender, race,county and year.

All data are taken from the Iowa State Inpatient Database (SID), which is described in more detail at the end of this report. The SID contains selected data elements for each inpatient discharged from non-Federal acute care Iowa hospitals. Long-term care mental health facilities are excluded. The SID does not include discharges of Iowans who are treated solely in out-of-state hospitals for their asthma, an estimated 4% to 8% of all hospitalizations. Counties near Omaha, Mayo Clinics in Rochester, Minnesota, Rock Island/Moline and Sioux Falls, South Dakota have rates of hospitalization that are underestimated. The SID and outpatient data sets also lack several basic demographic variables (income, education and ethnicity) and are missing data from the race field in about 20 percent of all admissions.

Another drawback to using the SID is that it contains few personal identifiers. Without personal identifiers, readmission of a person with asthma at either the same or a different hospital becomes hard to identify. As a result, estimating counts of people with asthma who were hospitalized, as opposed to counts of admissions for asthma, becomes difficult. Thus, those parts of the report describing hospitalizations are not measures of asthma prevalence but of overall inpatient services usage.

Between 1995 and 2006, the SID lists one *admitting* diagnosis and up to nine discharge diagnoses for each inpatient admission. Except where explicitly noted, all discharges counts and rates in this report are of discharges with a primary discharge diagnosis of asthma.

Why Asthma?

At the international, national and state levels asthma is recognized as a priority public health problem. Why?

- Asthma has doubled in prevalence since 1980. Nationally, nearly 20 million Americans now have asthma. Almost 200,000 Iowans have diagnosed asthma, including approximately 45,000 children. Twice that number of children may have undiagnosed asthma. It is one of the most common chronic conditions of childhood, one of the most common causes of activity limitations among children and youth and one of the most common causes of hospitalization in children less than 5 years of age. (Health, United States, 2007, Healthy People 2010)

- Asthma is expensive. The Asthma and Allergy Foundation of America (AAFA) estimates annual direct and indirect asthma costs at about $900 per person, meaning asthma costs Iowans $174,000,000 per year. About 30% ($52 million) of these costs are attributable to pediatric asthma, and 40% of that $52 million is attributable to direct health care costs to treat asthma in children. (AAFA, 2007)

- Poorly managed asthma is a leading cause of lost school days for children and lost work days for adults--and compose much of the indirect costs of asthma.

- The average child with asthma in the U.S. misses four days of school every year due to his/her asthma. The average parent misses two to three days of work every year due their child's asthma. Almost 40% of parents of children with asthma miss a least one day of work each year due to their child's asthma. (Asthma in America, 2007)

- Nearly two-thirds (62%) of children with asthma are limited by their asthma in participating in organized sports, outdoor activities, having pets, sleeping through the night, doing things with their family, doing well in school and participating in school activities.(Children and Asthma in America, 2007) ·

- Asthma hospitalizations are considered 'ambulatory care-sensitive'. As much as 40% of inpatient hospitalizations for asthma as well as a sizeable proportion of emergency room visits for asthma could be avoided with proper self and medical management in the physician's office setting.(Flores, 2003; Healthy Iowans 2010)

- Disparities exist in asthma prevalence and care. Minority children and children of low socioeconomic status are at increased risk of having asthma. National data show that children of low socioeconomic status with asthma are more likely to visit hospital inpatient and emergency departments than are children with asthma of higher socioeconomic status. (Healthy People 2010)

- For these reasons, a number of national and state plans have set goals to reduce asthma related-hospitalizations in children and youth. (Iowa Asthma Control Program Work Plan, 2006-2008, Healthy Iowans 2010, Iowa Asthma Coalition Strategic Plan, Healthy People 2010. Please visit the Iowa Asthma Control Program or the Iowa Asthma Coalition web site for more details. Web site addresses are given at the end of this report.)

Discussion of Inpatient Hospitalizations from Asthma, Asthma Prevalence and Asthma-Related Deaths in Iowa

Reports and factsheets detailing asthma prevalence and deaths from asthma in Iowa have been published and are posted on the Iowa Asthma Control Program web site (**http://www.idph.state.ia.us/hpcdp/asthma.asp).** Comparison of the findings from these publications, the current report and other national reports reveals:

- Unlike the decline seen in overall hospitalization rates from asthma in Iowa since 1999 (rates dropped from 9.5/10,000 in 2000 to 7.9/10,000 in 2006) , overall current asthma *prevalence* rates in Iowa appear to have remained steady (Iowa rate ranged from 6.3% to 7.2% between 1999 and 2007).

- National data from the Behavioral Risk Factor Surveillance System (BRFSS) indicate that national current asthma prevalence rates continued to increase slightly between 2000 and 2006, rising from 7.3% in 2000 to 8.5% in 2006. (In contrast, National Health Intervew Survey data show national asthma prevalence rates to have held steady between 2001 and 2004 (rates ranged from 6.9% to 7.3%). Between 2000 and 2006, BRFSS-derived Iowa current asthma prevalence rates consistently remained below national rates. (Iowa rates ranged from 6.4% to 7.2%.)

- Comparisons of Iowa and national hospitalization rates from asthma using the same data set are not possible. However, national rates from the National Hospital Discharge Survey (NHDS) are much higher than Iowa rates of hospitalization from asthma derived from the State Inpatient Database. Between 2000 and 2004, NHDS age-adjusted hospitalizaton rates from asthma ranged from 16.4/10,000 to 19.9/10,000 with no clear trend upward or downward. During this same time, Iowa State Inpatient Data show Iowa age-adjusted inpatient hospitalization rates from asthma varied from 10.1/10,000 to 7.9/10,000, with rates generally trending downward.

- Overall death rates from asthma have steadily declined both in Iowa and nationwide since the mid-1990s, when rates peaked at 2.4/100,000 in Iowa and 2.2/100,000 population nationwide. In 2005, Iowa age-adjusted rates of hospitalizations from asthma was 1.2/100,000 while the national rate was 1.3/100,000 population. In 2006, there were 35 deaths and 2,084 hospitalizations from asthma in Iowa.

Looking at state prevalence and hospitalization rates by sex, race and age:

- As for overall the rate of current asthma prevalence, the overall rate of hospitalization from asthma is higher for females than for males. However, as for prevalence rates, rates of hospitalization from asthma are higher for boys than girls but lower for men than for women. For all ages of men and women (those 18 years of age and older), prevalence and hospitalization rates for females exceed those of males.
- As for overall the rate of current asthma prevalence, the overall rate of hospitalization from asthma is higher for African-Americans than for Caucasians. However, as for prevalence rates, rates of hospitalization from asthma are higher for African-American boys than girls and lower for African-American men than for African-American women.

Summary of Findings: Inpatient Hospitalizations from Asthma in Iowa and Iowa Counties

- Hospitalization rates from asthma (asthma was the primary discharge diagnosis) trended downward for all age groups between 1995 and 2006 and declined the most for children and youth. The latter had their rates of hosptialization from asthma cut in half during those 12 years. (All rates and counts in this report are of discharges from asthma unless explicitly noted otherwise.)
- Asthma was the 41st leading cause of hospitalization in Iowa in 2006.
- About one percent of hospitalizations listed asthma as the primary discharge diagnosis while five percent of discharges in Iowa listed asthma as a primary or as secondary diagnosis.
- Asthma was among the top five leading causes of hospitalization for Iowans 1-4, 5-9 and 10-14 years of age in 2006. Among children and youth, exclusive of newborn admissions, asthma accounted for 3%-4% of primary discharge diagnoses while asthma was a primary or secondary diagnosis for 8%-9% of all inpatient discharges among Iowans 1-17 years of age.
- Overall, hospitalization rates from asthma in Iowa were higher among females than males, but rates varied greatly by gender, race and age. Overall rates for females were higher than males for all years 1995-2006 and two times that of males in 2006.
- Rates of hospitalization from asthma declined 41% for males and 29% for females between 1995 and 2006.
- Overall African-Americans in Iowa have a rate of hospitalization rate from asthma that is six times that of Caucasians. (Note: about 18% of discharges failed to identify race.)
- Overall, the elderly in Iowa currently have the highest age-specific rate of hospitalization from asthma with children and youth having the next highest rate.

Looking at sex/age/race specific state hospitalization rates:

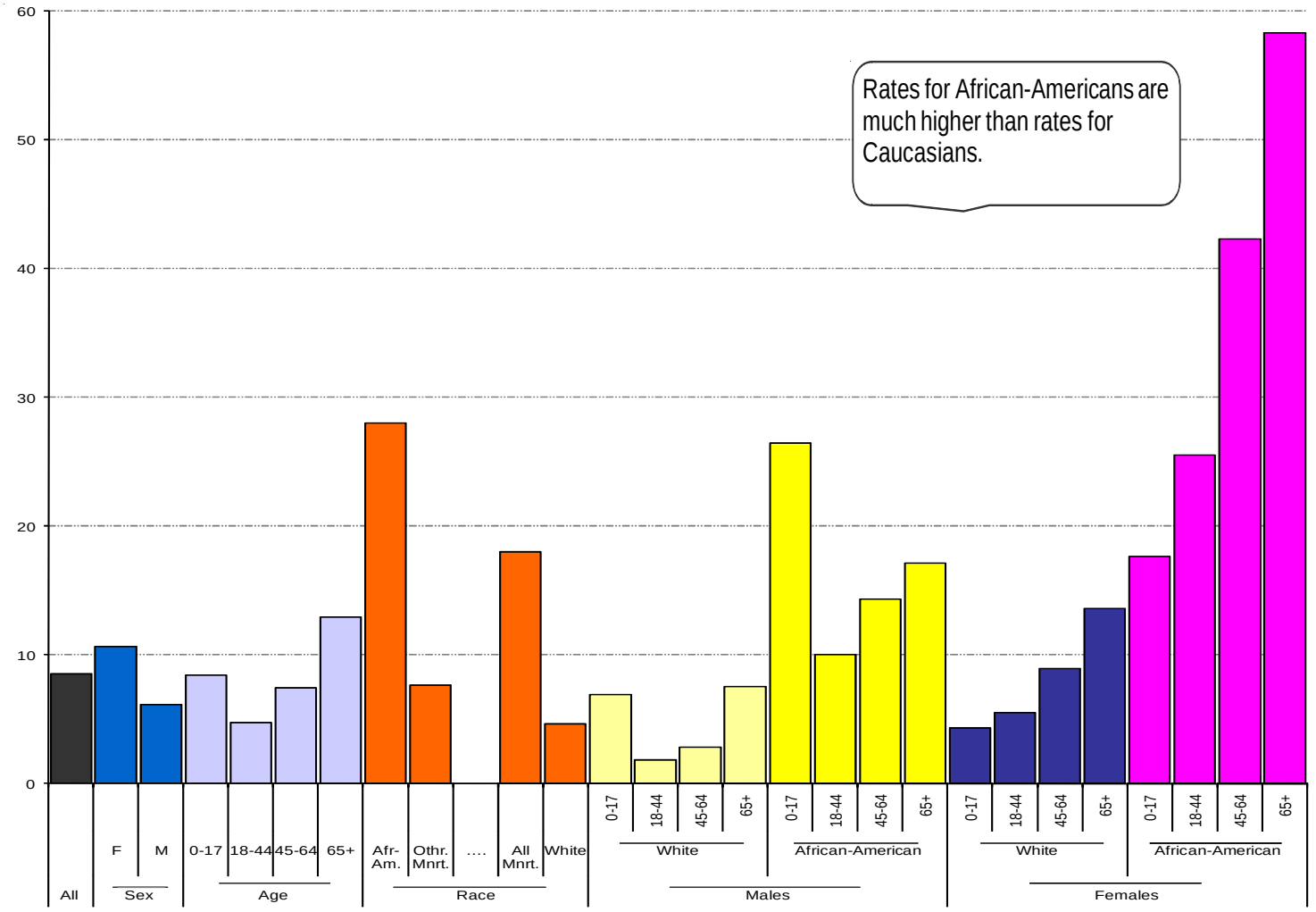
- For both Caucasian and African-American females, hospitalization rates increased steadily with age. The increase in rates with age was especially dramatic for African American females.
- African-American and Caucasian males broke this pattern, with rates being much higher among male children and youth than among middle-aged and young adults. As for females, rates among Caucasian and African-American men increased with age. Among men of both racial groups, rates were highest among the elderly and lowest in young adults.
- Rates of hospitalization among African-American male children and youth was very high compared to all other race/gender rates for children and youth.
- Asthma hospitalization rates for African-American females for all age groups exceeded the rates of all other race/gender groups except African-American male children.
- For all age groups, African-American males had higher rates of hospitalization from asthma than did Caucasian males. African-American males had rates 2-5 times that of same-age Caucasian males.

Looking at state hospitalization charges, counts of admissions and patient days:

- Total asthma inpatient charges approached $19,000,000 in 2006, a 33% increase over total charges in 1995. During those 12 years, the average charge per hospitalization from asthma doubled rising from $4,528 to $8,949. The average number of days that patients with asthma were hospitalized per admission (average length of stay) remained steady at just more than 3 days throughout the 12 year period.
- Total number of inpatient days due to asthma dropped almost 40% between 1995 and 2006, declining from 11,1166 to 6,944.

Chart 1

Summary of Rates of Hospitalization from Asthma by Age, Sex, Race and Race/Sex/Age, Rate per 10,000 Iowa, 2004-2006.



All Adults	Females	Males	0-17	18-34	45-64	65+	African-Amer.	Other Minority		All Minority	Caucasian	0-17	18-34	45-64	65+	0-17	18-34	45-64	65+	0-17	18-34	45-64	65+	0-17	18-34	45-64	65+	0-17	18-34	45-64	65+
8.5	10.6	6.1	8.4	4.7	7.4	12.9	28.0	7.6		18.0	4.6	6.9	1.8	2.8	7.5	26.4	10.0	14.3	17.1	4.3	5.5	8.9	13.6	17.6	25.5	42.3	58.3				

Average Annual Rate of Hospitalization from asthma per 10,000 population, Iowa , 2004-2006 (All rates are age-adjusted except age-specific and age/race specific rates.)

2,221	1,427	794	596	511	552	562	178	16		194	1635	234	91	100	132	43	18	9	3	140	274	323	341	27	39	25	14				

Average Annual Count of Hospitalizations from asthma, 2004-2006 (Race is missing for 393 (18%) of all discharges.)

Looking at county-level hospitalization rates from asthma:

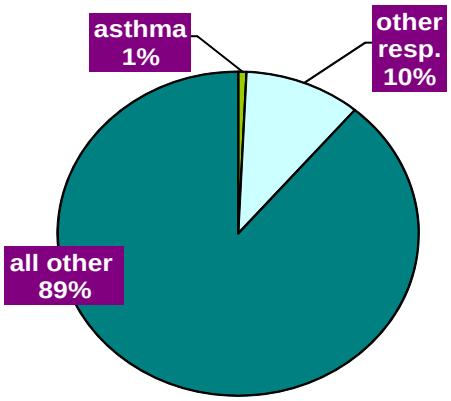
- Twenty counties have hospitalization rates that may indicate further examination of residents care and management is warranted. Those counties are:

  Adair, Adams, Black Hawk, Calhoun, Des Moines, Emmet, Floyd, Hamiliton, Hardin, Jefferson, Lee, Marion, Marshall, Mills, Monroe, Montgomery, Page, Pocahontas, Union and Webster.

  (Note: Rates of hospitalizations are understated for counties that border neighboring states with nearby regional medical centers, since the Iowa State Inpatient Database does not currently include hospitalizations of Iowa residents discharged from out-of-state hospitals. An estimated 4%-7% of Iowa resident discharges each year are estimated to be from hospitals outside the state.)

Chart 2

Percent Distribution of All Inpatient Discharges by Primary Diagnosis: Asthma and Other Diagnoses, 2004-06, Iowa Residents



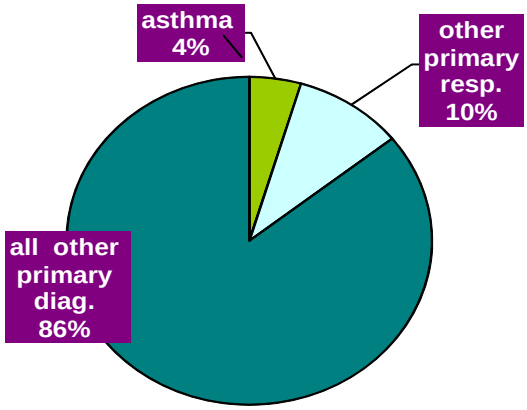
Average annual count/percent of hospitalizations by primary diagnosis, Iowa residents, 2004-06

Primary discharge diag.	count	% of discharges
asthma	2,221	1%
other respiratory	31,714	10%
all other	269,435	89%
total	303,371	100%

Note: Data exclude newborns.

Chart 3

Percent Distribution of Asthma-Related Discharges (where Asthma was a Primary or a Secondary Diagnosis) and Other Primary Discharge Diagnosis, 2004-06, Iowa Residents



Average annual count and percent of hospitalizations asthma as a primary or secondary diagnosis Iowa residents, 2004-06

Discharge diagnosis	count	%
asthma (primary or secondary)	13,843	5%
other primary respiratory	29,523	10%
all other primary diagnosis	260,005	86%
total	303,371	100%

Overall, asthma accounted for 1% of all primary discharge diagnoses and was a primary or a secondary diagnosis for 5% of all discharges.

Asthma was the primary discharge diagnosis for 3% of all discharges for 0-4 year olds, and for 4% of all 5-17 year olds. For older populations, who accounted for a greater proportion of discharges overall, asthma accounted for about 1% of all primary discharge diagnoses.

Asthma was the primary or a secondary diagnosis for 9% of all discharges of 0-4 year olds, and 8% of all 5-17 year olds. Asthma was a primary or secondary diagnosis for 5% of all 18-44 year olds, 7% of all 45-64 year olds, and 3% of all Iowans 65 years and older.

(See Table 2 at end of this report for more details about the ranking of asthma among leading causes of hospitalizations in Iowa. Counts of total discharges above and in Table 1 exclude newborns since newborns represent a unique classs of admisiions and skew counts for children, accounting for about 70% of all discharges of Iowans 0-17 years of age. If newborns were included, total average annual county of discharges during 2004-06 would be 340,229. Newborns excluded had Clinical Classification Software code 218 or ICD9 code V3-V39.)

Table 1
By Age, Average Annual Percent Distribution of Inpatient Discharges by Diagnosis: Asthma Primary and Asthma Primary or Secondary Diagnosis
Iowa, 2004-2006.

Age	Discharge Diagnosis	Primary Diagnosis (Dx)		Primary or Secondary Dx		Primary Diagnosis
0-4 years		count	%	count	%	rate/10,000
	asthma	308	3%	790	9%	16.2
	other respiratory diagnosis	3,028	34%		33%	159.1
	all other diagnoses	5,556	62%		58%	291.9
	total	8,893	100%		100%	467.3
5-17 years						
	asthma	288	4%	748	8%	5.5
	other respiratory diagnosis	769	11%			14.8
	all other diagnoses	6,093	85%			117.1
	total	7,151	100%		100%	137.5
18-44 years						
	asthma	510	1%	3,342	5%	4.7
	other respiratory diagnosis	2,051	3%		2%	19.1
	all other diagnoses	69,690	96%		93%	647.3
	total	72,252	100%		100%	671.1
45 - 64 years						
	asthma	552	1%	3,800	7%	7.4
	other respiratory diagnosis	5,684	9%		7%	76.3
	all other diagnoses	58,569	90%		86%	785.9
	total	64,805	100%		100%	869.5
65+ years						
	asthma	561	<1%	5,163	3%	12.9
	other respiratory diagnosis	20,182	13%		13%	464.2
	all other diagnoses	129,526	86%		84%	2,979.1
	total	150,270	100%		100%	3,456.2
All ages (unadjusted rate)		303,371		13,843		1,022.5

Data exclude newborns. Number of discharges for newborns = 36,859.

Chart 4

Percent Distribution of All Inpatient Charges by Primary Diagnosis: Asthma and Other Diagnoses, 2004-06, Iowa Residents

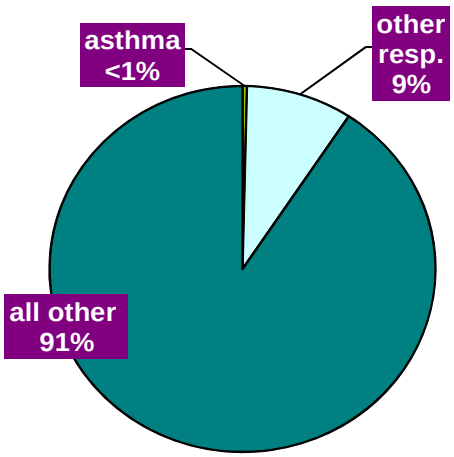
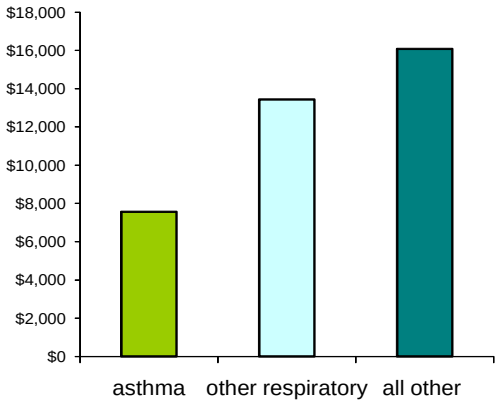


Chart 5

Average Annual Charge per Inpatient Stay, by Primary Discharge Diagnosis, Asthma and. Other Diagnoses, 2004-06, Iowa Residents



Average annual *total* charges and average charge per hospital stay, Iowa residents, 2004-06

primary diagnosis	charge per stay	total charges
asthma	$7,560	$17,450,000
other respiratory	$13,429	$425,886,000
all other	$16,077	$4,331,877,000
total	$15,740	$4,775,621,000

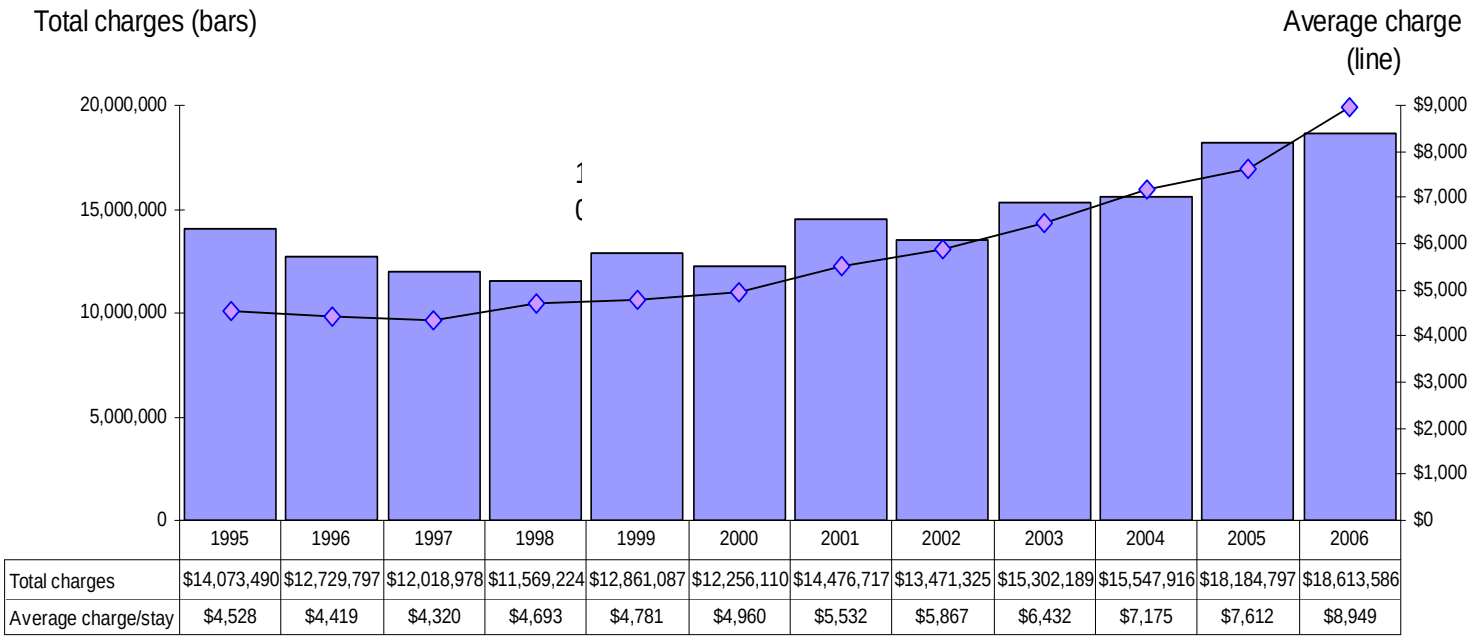
Data exclude newborns.
Number of discharges for newborns = 36,859/year.
Total inpatient charges for newborns exlcuded= $225,796,000

Overall, discharges for which asthma was the primary discharge diagnosis accounted for 1% of all inpatient charges (2004-06 average charge).

Between 2004-06, the average annual charge per discharge from asthma (primary diagnosis was asthma) was $7,600. This average charge for a hospitalization from asthma was only 56% of the average charge ($13,400) for a hospitalization from other respiratory conditions and less than half of the average charge ($16,100) for non-respiratory discharges.

Chart 6

Average Annual Charge per Inpatient Stay for Asthma, and Total Charges for All Asthma Stays, Stays with Asthma as the Primary Diagnosis, Iowa Residents
Iowa Residents, 1995-2006.



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Total charges	$14,073,490	$12,729,797	$12,018,978	$11,569,224	$12,861,087	$12,256,110	$14,476,717	$13,471,325	$15,302,189	$15,547,916	$18,184,797	$18,613,586
Average charge/stay	$4,528	$4,419	$4,320	$4,693	$4,781	$4,960	$5,532	$5,867	$6,432	$7,175	$7,612	$8,949

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Total # of inpatient days	11,166	9,577	8,931	8,024	8,447	7,455	8,229	7,356	7,560	6,984	7,712	6,944
Aver. # days/stay	3.6	3.3	3.2	3.3	3.1	3.0	3.1	3.2	3.2	3.2	3.2	3.3
Count of discharges	3,113	2,884	2,782	2,468	2,691	2,472	2,619	2,297	2,382	2,173	2,406	2,084

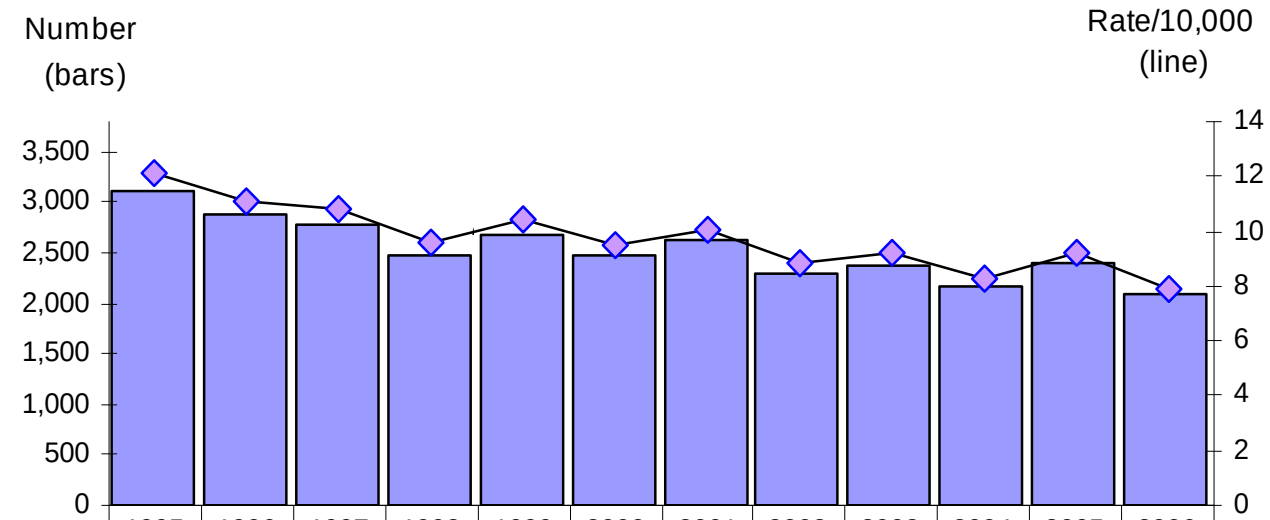
In 2006 the average inpatient charge for a patient with asthma as the primary diagnosis was $8,950, more than double the average charge of $4,500 in 1995.

Inpatient charges for discharges for which asthma was the primary diagnosis totaled $18,600,000 in 2006. Total charges for all discharges for which asthma was the primary discharge diagnosis increased by about one-third between 1995 and 2006.

The total count of discharges from asthma (asthma was the primary diagnosis) dropped 21% between 1995 and 2006, falling from 3,113 to 2,084. The average length of stay remained steady during the 12 years shown, and stood at 3.3 days per stay in 2006.

Chart 7

Number and Age-Adjusted Rate of Hospitalization from Asthma
Iowa Residents, 1995-2006.



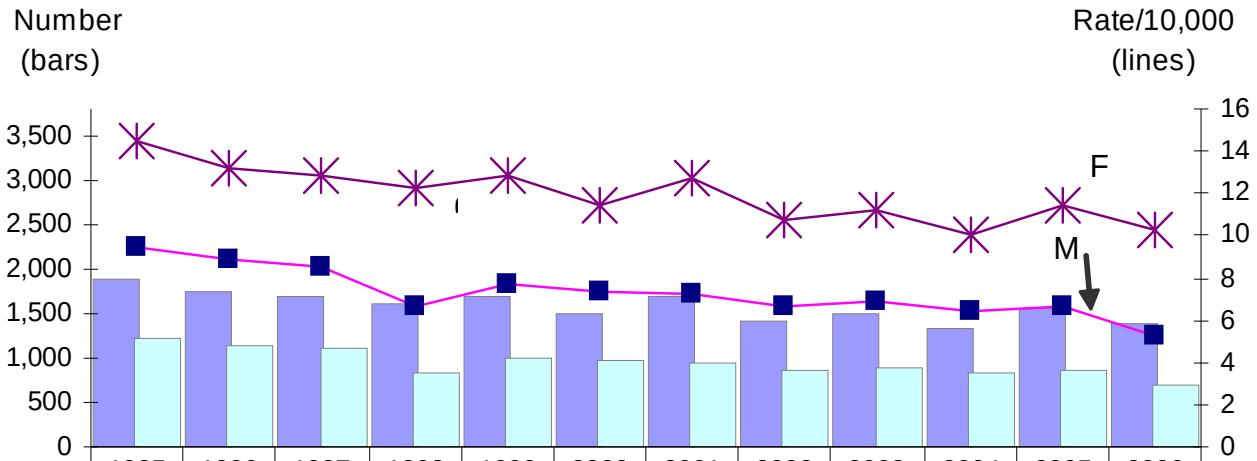
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Number	3,113	2,884	2,782	2,463	2,685	2,463	2,615	2,297	2,382	2,173	2406	2084
Rate	12.1	11.1	10.8	9.6	10.4	9.5	10.1	8.8	9.2	8.3	9.2	7.9

NOTE: Hospitalizations were counted as 'from asthma' if they were of Iowa residents admitted to an Iowa hospital and the primary discharge diagnosis was asthma (ICD-9 code 49300-49399). (Also see Table 1.)

Between 1995 and 2006, the overall rate of inpatient hospitalization from asthma in Iowa declined by 35% from an average annual age-adjusted rate 12.1/10,000 (1995) to 7.9/10,000. The average annual *number* of hospitalizations from asthma declined 33% from 3,113 to 2,084 between 1995 and 2006. A discharge *from asthma* means asthma was primary discharge diagnosis.

Chart 8

By Sex
Number and Age-Adjusted Rate of Hospitalization from Asthma
Iowa Residents, 1995-2006.



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
F Number	1,889	1,744	1,682	1,619	1,689	1,494	1,680	1,427	1,498	1,338	1,549	1,395
M Number	1,224	1,140	1,100	844	996	969	935	870	884	835	857	689
F Rate	14.5	13.2	12.9	12.3	12.9	11.4	12.7	10.7	11.2	10	11.5	10.3
M Rate	9.5	8.9	8.5	6.6	7.7	7.3	7.2	6.7	6.9	6.4	6.7	5.3

In Iowa for both males and females between 1995 and 2006, the frequency and the rate of inpatient hospitalizations from asthma steadily declined.

For males the rate of hospitalization from asthma declined by 41% from an average annual age-adjused rate of 9.5/10,000 (1995) to 5.3/10,000 (2006). During this time, the average annual number of hospitalizations from asthma among males declined 44% dropping from 1,224 to 689.

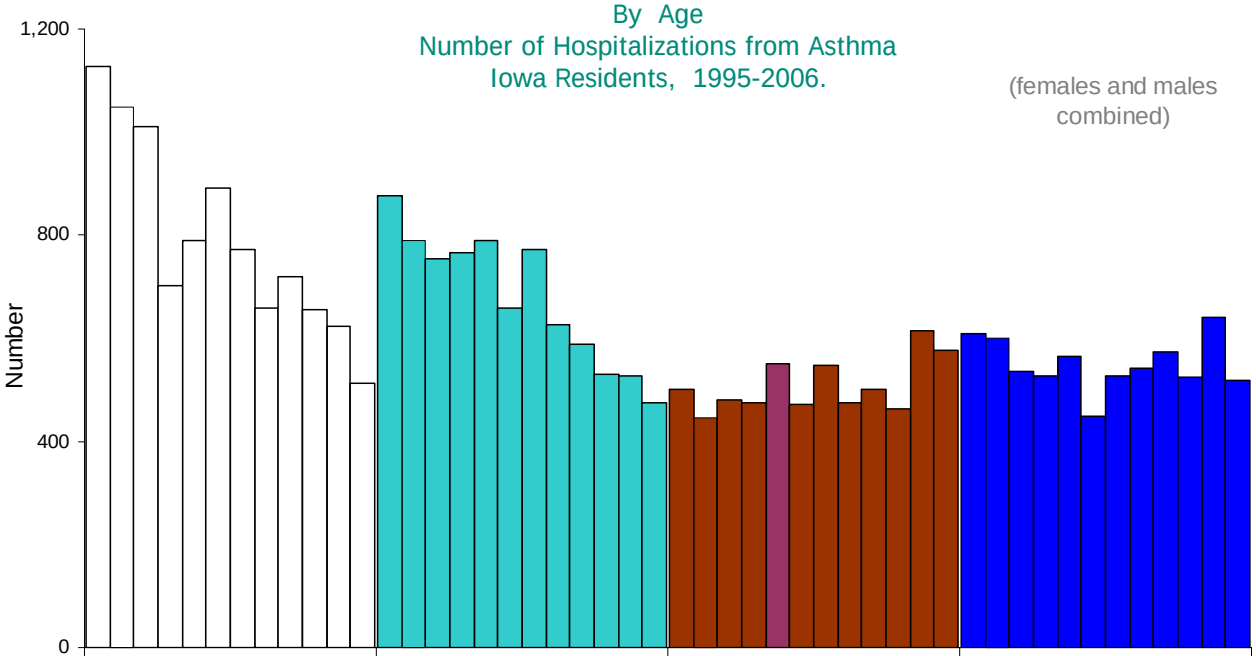
For females the rate of hospitalization from asthma declined by 29% from an average annual age-adjused rate of 13.5/10,000 (1995-97) to 10.6 /10,000 (2004-06) while the average annual number of hospitalizations from asthma among females declined 26% dropping from 1,889 to 1,395.

While the overall gender-specific rate of hospitalization from asthma was between 35% and 50% *higher in females than in males* for each year 1995-2006, these higher rates of hospitalization for females do not hold true across all age/gender groups. (See later charts).

Chart 9

By Age
Number of Hospitalizations from Asthma
Iowa Residents, 1995-2006.

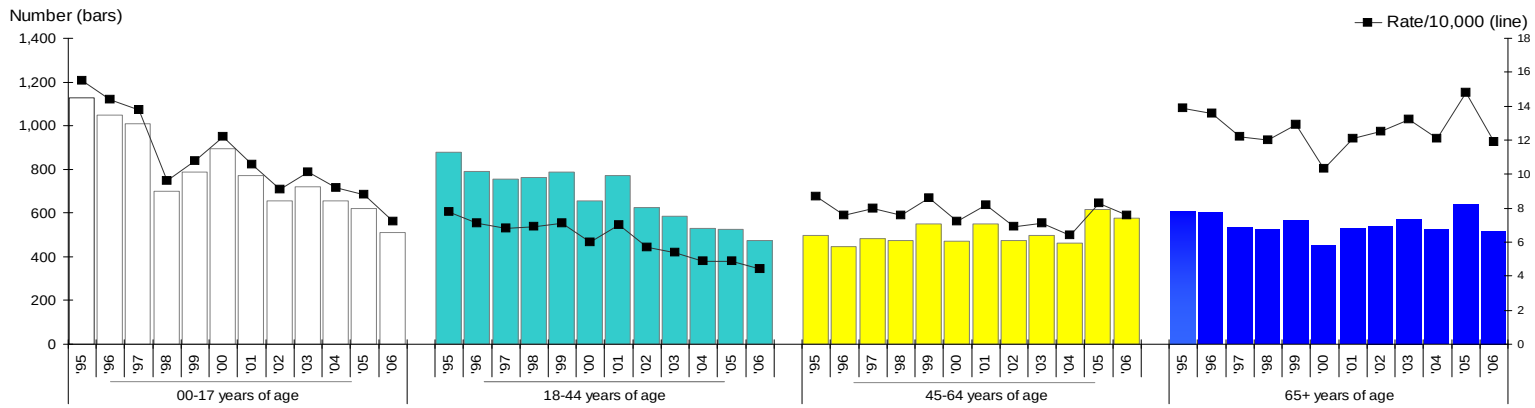
(females and males combined)



	00-17 years	18-44 years	45-64 years	65+ years
1995	1,126	878	500	609
1996	1,048	790	446	600
1997	1010	755	482	535
1998	701	765	475	527
1999	788	788	550	565
2000	892	658	472	450
2001	771	771	549	528
2002	657	625	474	541
2003	720	587	500	575
2004	655	529	464	525
2005	622	527	615	642
2006	512	476	578	518

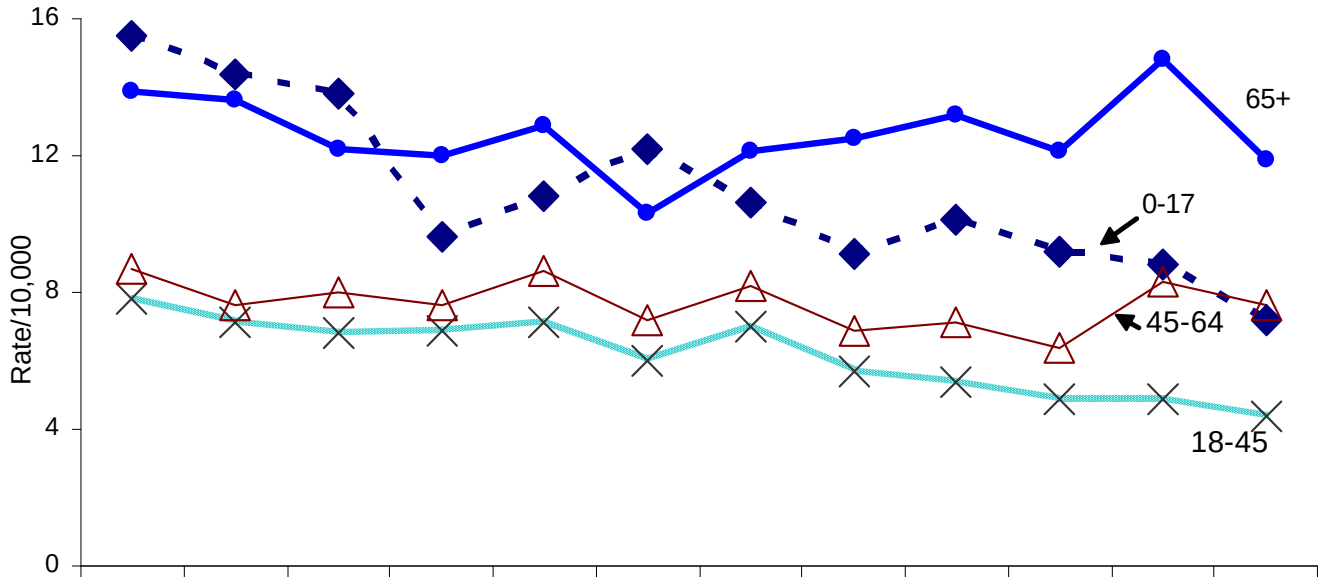
Chart 10

By Age, Rate and Number of Hospitalizations from Asthma
Iowa Residents, (rate/10,000) 1995-2006



Rate	16	14	14	10	11	12	11	9	10	9	9	7		8	7	7	7	7	6	7	6	5	5	5	4		9	8	8	8	9	7	8	7	7	6	8	8		14	14	12	12	13	10	12	13	13	12	15	12

Chart 11
By Year and Age
Rate of Hospitalization from Asthma
Iowa Residents, 1995-2006.



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
00-17	15.5	14.4	13.8	9.6	10.8	12.2	10.6	9.1	10.1	9.2	8.8	7.2
18-44	7.8	7.1	6.8	6.9	7.1	6	7	5.7	5.4	4.9	4.9	4.4
45-64	8.7	7.6	8	7.6	8.6	7.2	8.2	6.9	7.1	6.4	8.3	7.6
65+	13.9	13.6	12.2	12	12.9	10.3	12.1	12.5	13.2	12.1	14.8	11.9

Between 1995 and 2006, the frequency and rate of inpatient hospitalizations from asthma for Iowans less than 45 years of age declined significantly; while for Iowans age 45 and older, the decline in the frequency and rate of hospitalizations was modest or nonexistent.

For 0-17 year olds and 18-44 year olds, the rate of hospitalization from asthma declined about 52% from 12.6/10,000 for 0-17 years olds in 1995 to 5.9/10,000 in 2006. Among 18-44 year olds rates declined 43% from 11.7/10,000 to 6.7/10,000.

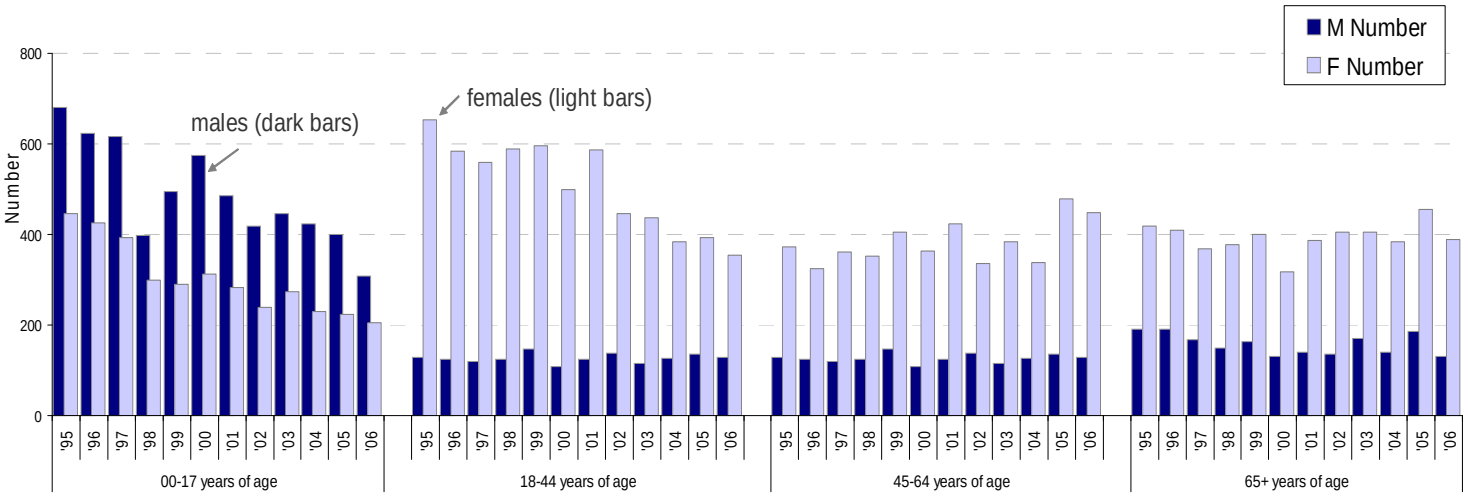
Among the middle-aged (45-64 years) there was no decline in the number of hospitalizations. Among the elderly there was no consistent trend of increase or decrease in the rate of hospitalization.

Hospitalization rates in the past few years have been highest in the elderly (11.9/10,000 in 2006) and lowest among those 18-44 years of age (4.4/10,000 in 2006).

A discharge is counted as *from asthma* if asthma was listed as the primary discharge diagnosis.

Chart 12

By Year, Sex and Age, Rate of Hospitalization from Asthma
Iowa Residents, 1995-2006.



00-17 years of age

	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
M	681	622	616	397	494	574	484	418	447	424	400	307
F	445	426	394	300	289	312	283	239	273	231	222	205

18-44 years of age

'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
128	123	120	123	146	108	125	138	116	126	136	129
653	585	558	589	595	500	586	447	436	384	392	353

45-64 years of age

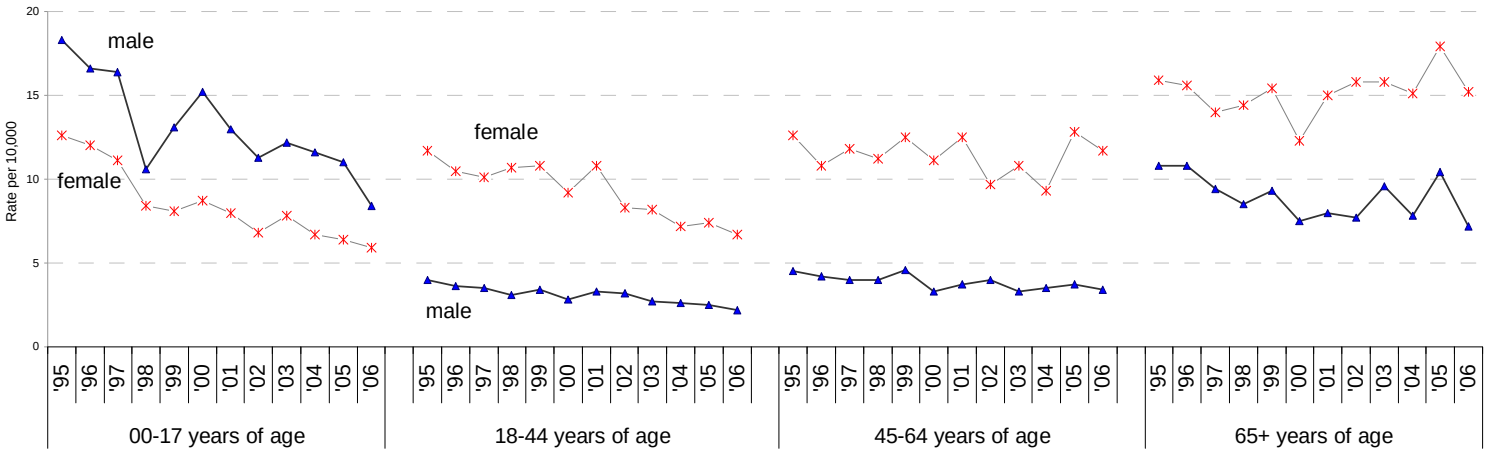
	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
M	128	123	120	123	146	108	125	138	116	126	136	129
F	372	323	362	352	404	364	424	336	384	338	479	449

65+ years of age

'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
190	190	167	149	164	132	141	136	170	140	186	130
419	410	368	378	401	318	387	405	405	385	456	388

Chart 13

By Year, Sex and Age, Rate of Hospitalization from Asthma
Iowa Residents, 1995-2006.



00-17 years of age

	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
M Rate	18.3	16.6	16.4	10.6	13.1	15.2	13	11.3	12.2	11.6	11	8.4
F Rate	12.6	12	11.1	8.4	8.1	8.7	8	6.8	7.8	6.7	6.4	5.9

18-44 years of age

'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
4	3.6	3.5	3.1	3.4	2.8	3.3	3.2	2.7	2.6	2.5	2.2
11.7	10.5	10.1	10.7	10.8	9.2	10.8	8.3	8.2	7.2	7.4	6.7

45-64 years of age

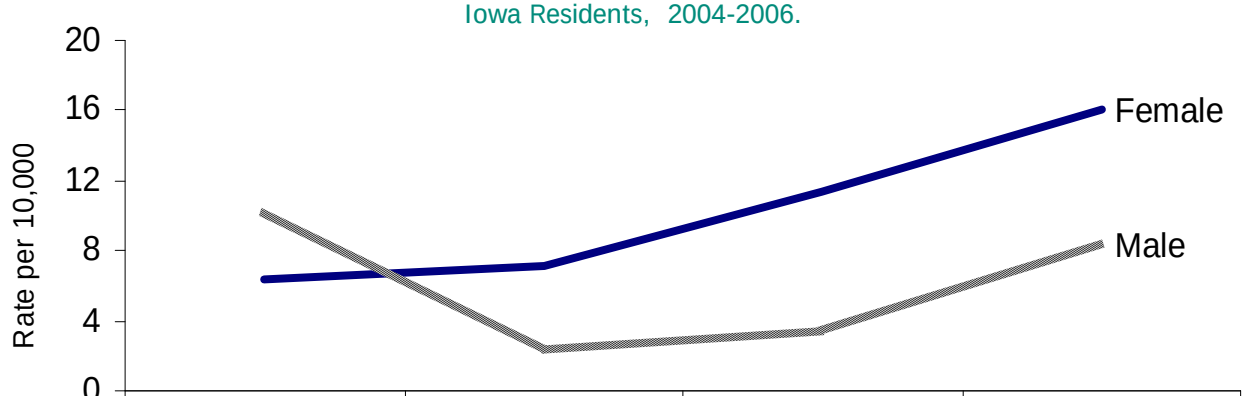
	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
M Rate	4.5	4.2	4	4	4.6	3.3	3.7	4	3.3	3.5	3.7	3.4
F Rate	12.6	10.8	11.8	11.2	12.5	11.1	12.5	9.7	10.8	9.3	12.8	11.7

65+ years of age

'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
10.8	10.8	9.4	8.5	9.3	7.5	8	7.7	9.6	7.8	10.4	7.2
15.9	15.6	14	14.4	15.4	12.3	15	15.8	15.8	15.1	17.9	15.2

Chart 14

By Sex and Age, Average Annual Rate of Hospitalization from Asthma per 10,000 Population
Iowa Residents, 2004-2006.



	00-17	18-44	45-64	65+
F Rate	6.3	7.1	11.3	16.1
M Rate	10.3	2.4	3.5	8.5

Between 1995 and 2006, the overall decline in the frequency of inpatient hospitalizations from asthma for both males and females was primarily attributable to significant declines in the number of hospitalizations among those 0-17 and 18-44 years of age.

For women and men ages 45 and older, frequencies either increased slightly (women 44 and older), remained stable (men 45-64 years of age) or declined more modestly (men 65 years and older).

Except among children and youth, the average annual rate of inpatient admissions from asthma among females exceeded that rate for men across all years.

Among females, children and youth 17 years and younger account for fewer cases (15% of all 1,395 admissions) than any other age group , while among male children and youth account for almost half of all male asthma admissions (44% of all 689 admissions) in 2004-06.

Chart 15

By Year, Sex and Age, Number of Hospitalizations from Asthma
Iowa Residents, 1995-2006.

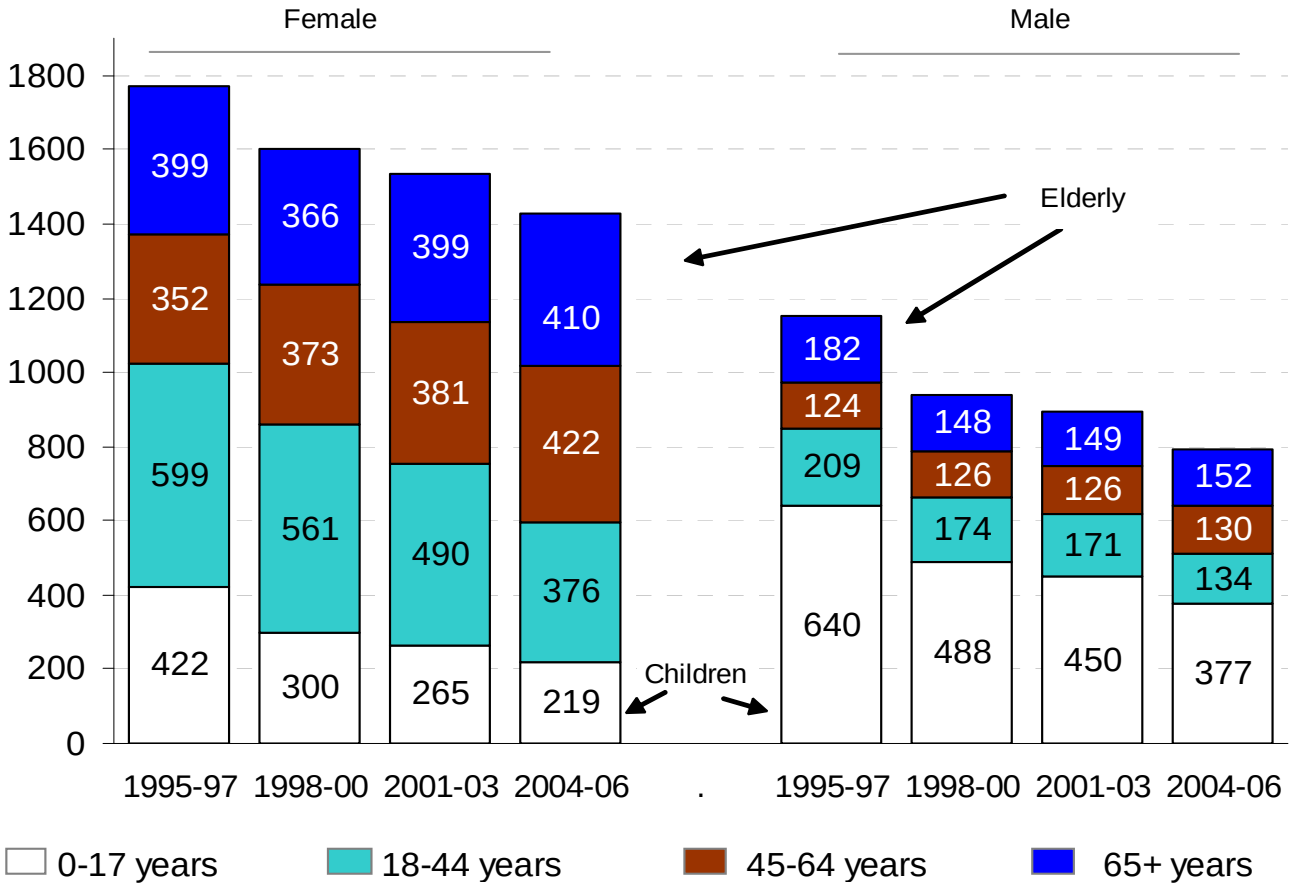
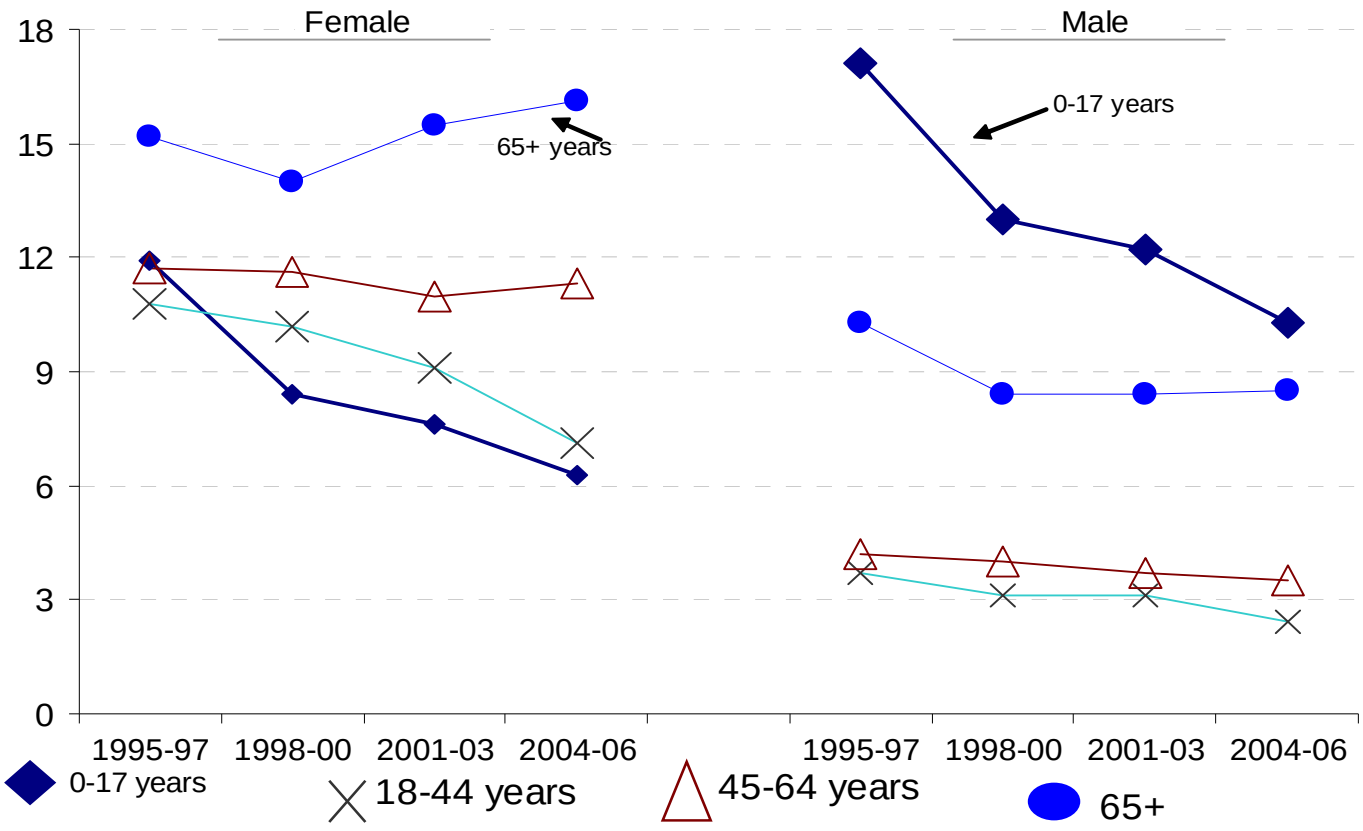


Chart 16

By Year, Sex and Age, Average Annual Rate of Hospitalization from Asthma per 10,000 Population
Iowa Residents, 1995--2006.

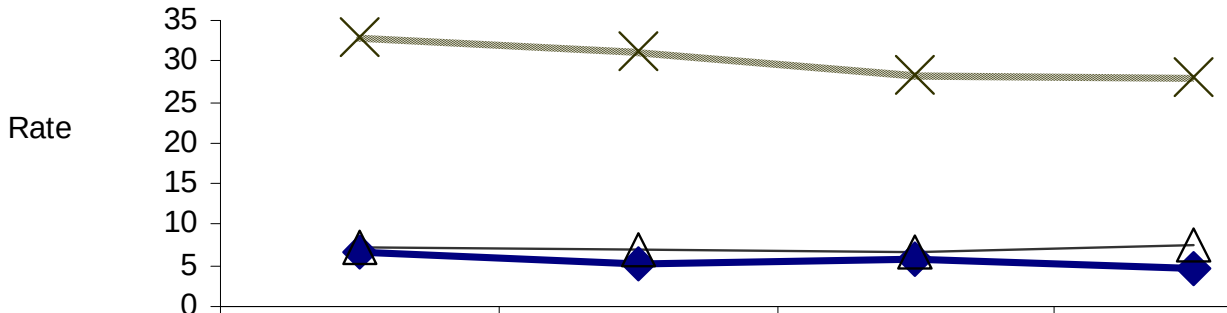


	Female				Male			
Age	**1995-97**	**1998-00**	**2001-03**	**2004-06**	**1995-97**	**1998-00**	**2001-03**	**2004-06**
00_17	11.9	8.4	7.6	6.3	17.1	13	12.2	10.3
18_44	10.8	10.2	9.1	7.1	3.7	3.1	3.1	2.4
45_64	11.7	11.6	11	11.3	4.2	4	3.7	3.5
65 plus	15.2	14	15.5	16.1	10.3	8.4	8.4	8.5

Between 1995-97 and 2004-06, declines in the rates of hospitalization from asthma were seen for all age/sex groups except for females 65 and older. The greatest decline in rates for both females and males was among children and youth and those 18-44 years of age. Females 65 and older now have the highest rate of hospitalization from asthma, followed by females 45-64 years of age and males 0-17 years of age.

Chart 17

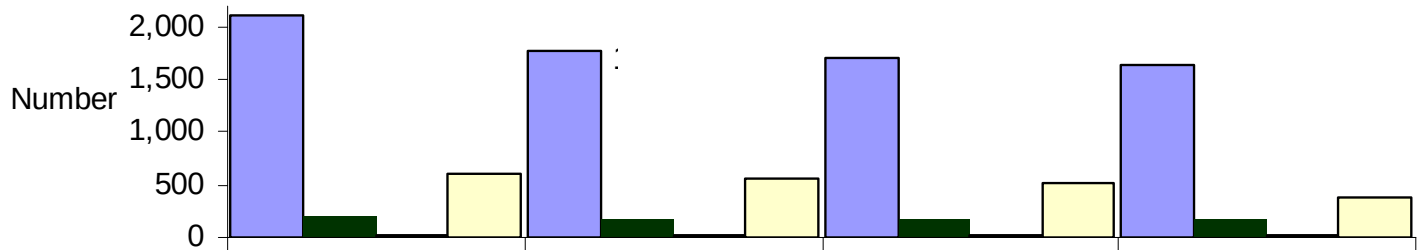
By Year and Race
Rate of Hospitalization from Asthma
Iowa Residents, 1995-2006.



	1995-97	1998-2000	2001-03	2004-06
Caucasian	6.7	5.2	5.9	4.6
African-Amer	32.9	31.2	28.4	28.0
Other Minor.	7.1	6.9	6.5	7.6

Chart 18

By Year and Race
Number of Hospitalizations from Asthma
Iowa Residents, 1995-2006.



	1995-97	1998-2000	2001-03	2004-06
Caucasian	2,120	1,772	1,714	1,635
African-Amer	192	189	188	178
Other Minor.	16	12	18	16
Unkn	598	571	513	393

Between 1995 and 2006, the rate of inpatient hospitalization from asthma for Caucasian Iowans declined 31% and for African-Americans 15%. For the group of Other Minorities, the rate of hospitalization failed to trend up or down.

While the rate of hospitalization from asthma decreased 15% for African-Americans between 1995-97 and 2004-06, their rates of hospitalization remained much higher than the rate of hospitalization from asthma of both Caucasians and Other Minorities. During 2004-06, the rate of 28/10,000 for African-Americans was 5 times that of 4.6./10,000 for Caucasians and more than 2.5 times the rate of 7.6/10,000 for Other Minorities.

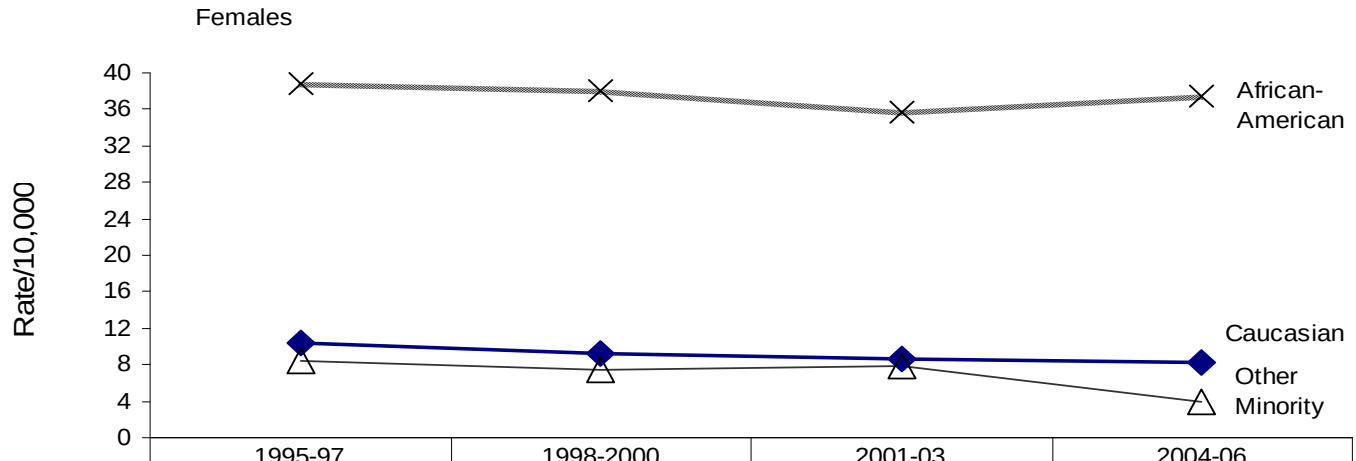
For the four time periods shown, the race of the patient was unknown for between 18% and 22% of all hospitalizations from asthma.

B**etween 1995 and 2006, the frequency of inpatient hospitalizations from asthma for Caucasian Iowans declined 23% dropping from 2,120 during 1995-97 to 1,635 during 2004-06. For African-Americans, the hospitalization rate from asthma declined just 7% dropping from 192 between 1995-97 to 178 between 2004-06.** For the group of Other Minorities, the frequency of hospitalization failed to trend up or down (and numbers were very small--only 12-18 hospitalizations per year (annualized over 3 years).

Among those discharges for which race was known, in 2004-06, 89% of discharges were of Caucasians, and 10% were of African-Americans.

Chart 19

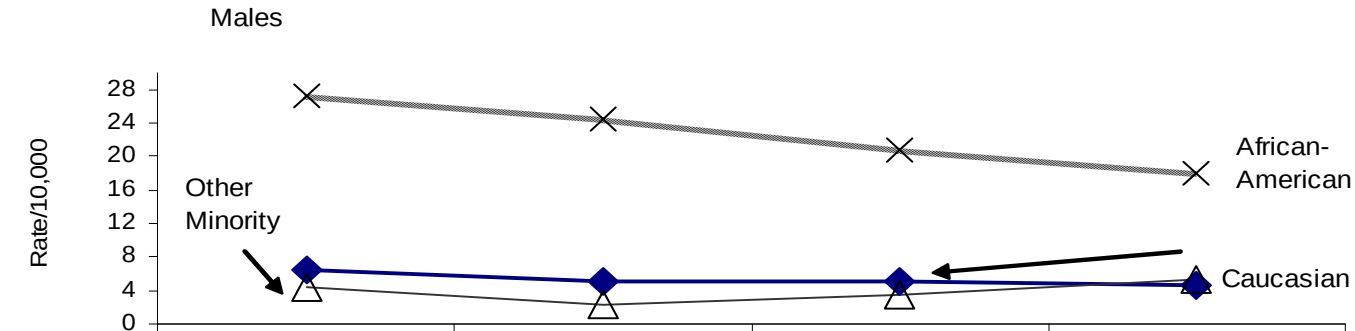
For Females, by Year and Race
Rate of Hospitalization from Asthma
Iowa Residents, 1995-2006.



	1995-97	1998-2000	2001-03	2004-06
Caucasian_F	10.3	9.1	8.6	8.3
African-Amer._F	38.8	38.1	35.8	37.4
Other Minority_F	8.5	7.5	7.8	4.0

Chart 20

For Males, by Year and Race
Rate of Hospitalization from Asthma
Iowa Residents, 1995-2006.



	1995-97	1998-2000	2001-03	2004-06
Caucasian _M	6.6	5.0	5.0	4.6
African-Amer._M	27.3	24.5	20.9	18.1
Other Minority_M.	4.5	2.3	3.4	5.3

Between 1995 and 2006, the rate of inpatient hospitalizations from asthma for Caucasian females declined 19% and for African-American females 4%. For the group of Other Minorities, the rate of hospitalization dropped by more than half (but the average annual count was only about 10 hospitaliztions).

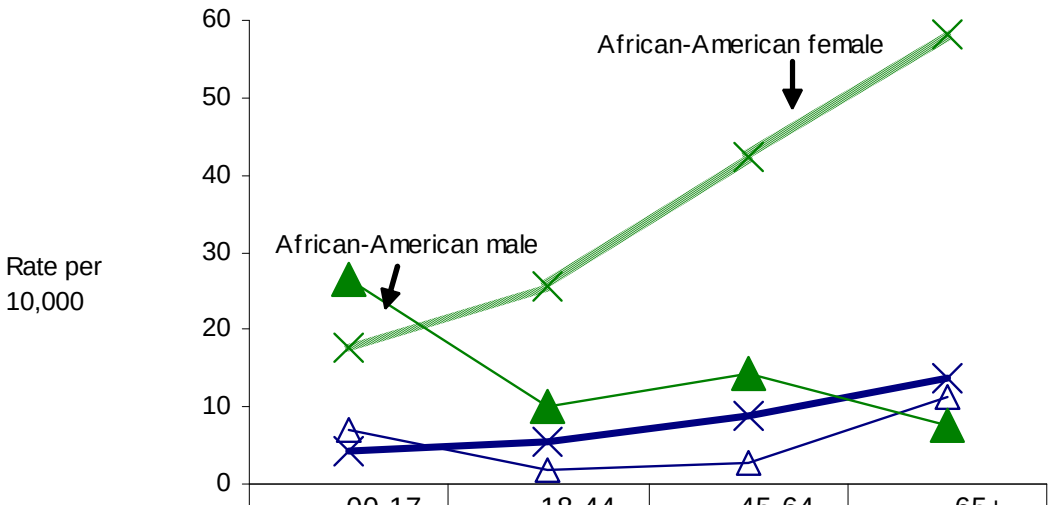
While rates decreased 7% for African-American females, this rate of decline was much less than for Caucasian females and the rate of hospitalization from asthma in African-American females was 3.5 times that of Caucasian females in 2004-06.

Between 1995 and 2006, the rate of inpatient hospitalization from asthma for Caucasian males declined 30% and for African-Americans males 34%. For the group of Other Minorities, the rate of hospitalization did not trend up or down.

While the rate decreased 34% for African-American males, this rate of hospitalization from asthma in African-American males was four times that of Caucasian males in 2004-06.

Chart 21

By Year, Race, Gender, and Age
Rate of Hospitalization from Asthma
Iowa Residents, 2004-06 Average Annual Rate per 10,000



	00-17	18-44	45-64	65+
Caucasian_F	4.3	5.5	8.9	13.6
African-Amer._F	17.6	25.5	42.3	58.3
Caucasian _M	6.9	1.8	2.8	11.2
African-Amer._M	26.4	10.0	14.3	7.5

African-American and Caucasian Males:

Among children and youth ages 17 years and younger, African-American males have rates higher than all other gender-race groups shown. Among children and youth, African-American males have rates of hospitalization from asthma 3-4 times that of Caucasian males (26.4/10,000 vs. 6.9/10,000) and 6 times that rate (4.3/10,000) of Caucasian females and 1.5 times that of African-American female children and youth (17.6/10,000).

Hospitalization rates from asthma among African-American males, as for Caucausian males, drop significantly during early adulthood and middle age vis-a -vis their rates during childhood. While African-American males have rates of hospitalization from asthma higher than all other gender-race groups in childhood, their rates are lower than all other race gender groups among those 65 years and older. Because of the precipitous upward climb in rates for African-American women as they age, rates in African-American males 65 years and older is only about one-eighth of the rate of African-American women ages 65 years and older (7.5/10,000 vs. 58.3/10,000).

Among Caucasian males, rates peak twice, during childhood (6.9/10,000) and old age (11.2/10,000), with rates among young adults (1.8/10,000) and middle-aged adults (2.8/10,000) being about 2-4 times lower than those of children and the elderly .

African-American and Caucasian Females:

Among children and youth, African-American females had hospitalization rates more than four times that of Caucasian females (17.5/10,000 vs. 4.3/ 10,000) and more than double that of Caucasian male children and youth. The rate of hospitalization in African-American male youth, higher than any other race/gender group was 1.5 times greater than the rate among female African-American children and youth.

Among both African-American and Caucasian females, rates increasesd with age with rates being about 3-fold greater in same-race women age 65 and older as they were among children and youth of the same race For African-American women, this 3-fold increase meant that rates rose from 17.6/10,000 among children and youth to 58.3/10,000 among those 65 years of age and older. The average annual hospitalization rate from asthma among Caucasian women ages 65 and older was only 13.6/10,000 during 2004-06.

Table 2, Leading Causes of Hospitalization

Ranked by Age and Count

Iowa, 2006

Rank	<1 year		1-17		18-44		45-64		65-84		85+		All Ages	
1	Liveborn	39,968	Pneumonia (except by TB and sexually trans. disease)	1,176	Trauma to perineum and vulva	9,021	Coronary atherosclerosis	4,185	Rehabilitation care, fitting of prostheses, etc.	7,906	Pneumonia (except by TB and sexually trans. disease)	3,746	Liveborn	39,968
2	Acute bronchitis	872	Fluid and electrolyte disorders	645	Other complications of birth affecting mother	6,179	Osteoarthritis	4,123	Pneumonia (except by TB and sexually trans. disease)	6,735	Rehabilitation care, fitting of prostheses, etc.	3,368	Pneumonia (except by TB and sexually trans. disease)	15,628
3	Other perinatal conditions	655	Appendicitis and other appendiceal conditions	582	Previous C-section	4,630	Pneumonia (except by TB and sexually trans. disease)	2,518	Osteoarthritis	6,625	Congestive heart failure, non-hypertensive	3,255	Rehabilitation care, fitting of prostheses, etc.	13,753
4	Pneumonia (except by TB and sexually trans. disease)	569	Asthma	491	Other complications of pregnancy	3,551	Nonspecific chest pain	2,455	Coronary atherosclerosis	6,436	Fracture of neck of femur (hip)	1,847	Coronary atherosclerosis	11,770
5	Hemolytic jaundice/ perinatal jaundice	364	Intestinal infection	395	Normal pregnancy and/or delivery	3,245	Acute myocardial infarction	2,300	Congestive heart failure, non-hypertensive	5,202	Cardiac dysrhythmias	1,355	Osteoarthritis	11,558
6	Fluid and electrolyte disorders	231	Acute bronchitis	322	Umbilical cord complication	2,326	Spondylosis, intervertebral disc disorders, back problems	1,980	Cardiac dysrhythmias	4,221	Acute cerebrovascular disease	1,348	Congestive heart failure, non-hypertensive	10,200
7	Intestinal infection	193	Epilepsy, convulsions	299	Fetal distress and abnormal forces of labor	2,107	Rehabilitation care, fitting of prostheses, etc.	1,931	Chronic Obstructive Pulmonary Disease	3,610	Urinary tract infections	1,288	Trauma to perineum and vulva	9,263
8	Digestive congenital anomalies	152	Skin and sub-cutaneous tissue infect'ns	295	Prolonged pregnancy	1,884	Cardiac dysrhythmias	1,728	Acute myocardial infarction	2,963	Acute myocardial infarction	1,140	Cardiac dysrhythmias	7,708
9	Short gestation, low birth weight, fetal growth retardation	152	Urinary tract infections	278	Hypertension complicating pregnancy, childbirth	1,689	Chronic Obstructive Pulmonary Disease	1,536	Acute cerebrovascular disease	2,656	Fluid and electrolyte disorders	1,138	Acute myocardial infarction	6,784
10	Respiratory distress syndrome	132	Maintenance chemo-therapy radiotherapy	268	Malposition, mal-presentation	1,625	Skin and subcutaneous tissue infect'ns	1,532	Spondylosis, intervertebral disc disorders, back problems	2,481	Other aftercare	1,112	Other complications of birth affecting mother	6,437
11	Viral infections	129	Other complications of birth affecting mother	249	Early or threatened labor	1,624	Complication of device, implant or graft	1,502	Septicemia (except in labor)	2,478	Gastro-intestinal hemorrhage	962	Spondylosis, intervertebral disc disorders, back problems	6,095
12	Cardiac and circulatory congenital anomalies	125	Fracture of lower limb	247	Spondylosis, intervertebral disc disorders, back problems	1,167	Complications of surgical procedures or medical care	1,468	Complication of device, implant or graft	2,351	Septicemia (except in labor)	935	Chronic Obstructive Pulmonary Disease	6,062
13	Fever of unknown origin	125	Trauma to perineum and vulva	237	Biliary tract disease	1,147	Congestive heart failure, non-hypertensive	1,458	Fluid and electrolyte disorders	2,231	Other fractures	766	Nonspecific chest pain	5,769
14	Other upper respiratory infections	108	Noninfectious gastro-enteritis	205	Polyhydramnios and other problems of amniotic cavity	1,116	Diabetes mellitus with complications	1,241	Other aftercare	2,212	Coronary athero-sclerosis	756	Fluid and electrolyte disorders	5,666
15	Septicemia (except in labor)	90	Poisoning by other medications and drugs	193	Skin and subcutaneous tissue infections	1,059	Septicemia (except in labor)	1,224	Nonspecific chest pain	2,072	Chronic Obstructive Pulmonary Disease	720	Acute cerebrovascular disease	5,241
27	Asthma	38												
34							Asthma	599						
35					Asthma	502								
41													Asthma	2,173
61									Asthma	413				
64											Asthma	129		
83					COPD	154								
90			COPD	29										
All Discharges-HCUP.net		45,195	*	12,155		78,040		72,430		117,455		41,368		366,662
All Discharges-IDPH SID		43,065		11,439		73,773		67,376		109,695		39,724		345,072
% Iowa SID of national SID		95%		94%		95%		93%		93%		96%		94%

Using the clinical classification software coding scheme of the Agency for Healthcare Quality and Research (AHRQ) and that agency's online database, in 2006 for Iowa residents, asthma was found to be: the 27th leading cause of hospitalization for infants, the 4th leading cause for 1-17 year olds, the 35th leading cause for 18-44 year olds, the 34th leading cause for 45-64 years olds, the 61st leading cause for 65-84 year olds and the 64th leading cause of hospitalization for those Iowans 85 years of age and older.

When 1-17 years olds were further broken out, asthma ranked last the fifth leading cause of hospitalization for 1-4 years olds, the second leading cause for 5-9 year olds, the 4th leading cause for 10-15 year olds and the 23rd leading cause for 15-17 year olds.

Overall asthma was the 41st leading cause of hospitalization among Iowans in 2006.

Note:

Developed by the Agency for Healthcare Research and Quality (AHRQ), the Clinical Classifications Software (CCS) is the coding system used to categorizes inpatient discharges in Table 2. CCS is a tool for clustering patient diagnoses and procedures into a manageable number of clinically meaningful categories. CCS offers the ability to group conditions and procedures without having to sort through thousands of codes making it easier to quickly understand patterns of diagnoses so that health plans, policy makers, and researchers can analyze costs, utilization, and outcomes associated with particular illnesses and procedures.

CCS collapses diagnosis and procedure codes from the International Classification of Diseases, 9th Revision, Clinical Modification (IDC-9-CM), which contains more than 13,600 diagnosis codes and 3,700 procedure codes. Without the CCS tool, the large number of ICD-9-CM codes makes statistical analysis and reporting difficult and time-consuming. (Source of description of CCS: AHRQ web site)

Used in Table 2, AHRQ's State Inpatient Database for Iowa residents has overall 4-6% more records each year of Iowa resident discharges than does the State Inpatient Database used by the Iowa Department of Public Health as the source for most of the tables and charts in this report. (The AHRQ inpatient database had 4% more total discharges from asthma among Iowa residents for 2006 than did the inpatient database available to the IDPH (2,084 vs. 2,173 asthma discharges).This is believed to be largely because AHRQ has access to data of Iowa residents hospitalized outside of Iowa, since it collects inpatient sets from other states and these out-of-state datasets have records of Iowans admitted in those states.) However, the AHRQ online database has limited ability to combine years and age groups and has no county-level data, making it less than ideal for use in most of this report.

Rate and Number of Hospitalizations from Asthma by Race, Gender and Age
Iowa, 1995-2006

Trends	Compared to Subgroup	Sub-Group	Age-Adjusted Rate/10,000		Number of Inpatient Stays		Percent of Stays		Crude (Unadjusted) Rate		Adjusted Rate --Trends			
			1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-97	1998-00	2001-03	2004-06
		All Iowans	**10.8**	**9.2**	**2,788**	**2,389**	**100%**	**100%**	**9.6**	**8.1**	**11.3**	**9.8**	**9.4**	**8.5**
		Race												
↓		**Caucasian**	8.1	6.8	2,005	1,680	72%	70%	7.2	6.0	6.7	5.2	5.9	4.6
↓		**All Minorities****	**21.9****	**18.7****	201	204	7%	9%	**19.2****	**15.8****	**22.7****	**20.7****	**18.8****	**18.0****
		Race Unkn			582	504	**21%**	**21%**						
							100%	100%						
		Specific Minorities												
↓		**African-Amer.****	32.3	**27.9****	187	186	7%	8%	**30.5****	**25****	**32.9****	**31.2****	**28.4****	**28.0****
↓		**All Other Minor.**	6.1	5.9	14	18	0%	1%	3.2	3.3	7.1	6.9	6.5	7.6
		Gender												
↓		**Male**	8.2	6.9	1,061	899	38%	38%	7.5	6.2	8.9	7.2	6.9	6.1
↓		**Female***	13.1	11.2*	1,725	1,488	62%	62%	**11.7***	**10***	**13.5***	**12.5***	**11.6***	**10.6***
							100%	100%						
		Age in Years	(None of age-specific rates are age-adjusted)						(Unadjusted age-specific rate)					
↓		**0-17**			935	739	34%	31%	12.8	10.2	14.6	10.8	9.9	8.4
↓		**18-44**			795	634	29%	27%	7.1	5.8	7.2	6.6	6.1	4.7
↔		**45-64**			491	492	18%	21%	8.1	7.1	8	7.8	7.4	7.4
↑↓		**65 +**			567	524	20%	22%	12.9	12.1	13.2	11.8	12.6	12.9
							100%	100%						
		Gender-Age	(Age-gender specific rates are not age-adjusted)						(Unadjusted age-specific rate)					
		Males												
↓		**0-17**			562	469	53%	52%	15	12.7	17.1	13	12.2	10.3
↓		**18-44**			199	163	19%	18%	3.5	2.9	3.7	3.1	3.1	2.4
↔		**45-64**			128	123	12%	14%	4.3	3.6	4.2	4	3.7	3.5
↓		**65 +**			172	144	16%	16%	9.7	8.1	10.3	8.4	8.4	8.5
							100%	100%						
		Females												
↓		**0-17**			371	268	22%	18%	10.4	7.6	11.9	8.4	7.6	6.3
↓		**18-44**			596	471	35%	32%	10.8	8.7	10.8	10.2	9.1	7.1
↔		**45-64**			363	369	21%	25%	11.8	10.6	11.7	11.6	11	11.3
↑↓		**65 +**			395	380	23%	26%	15.1	14.8	15.2	14	15.5	16.1
							100%	100%						

African-Americans are consistently hospitalized at rates 4-6x greater than are Caucasians.

Females have rates more than 1.5x that of males.

Rates have declined most substantially for persons <44 years of age. Rates are now highest in the elderly.

Boys <17 years of age have rates higher than any other age-gender group, except middle-aged and older women.

Rates in *females* older than 17 are consistently higher than rates in same-age males.

**Subgroups with rates more than double the rate of other(s)s in their subgroup.

* Subgroups with rates that are between 1.5 and 2 times the rate of other(s) in their subgroup.

Notes:

Discharges are of Iowa residents seen in Iowa hospitals who had asthma listed as their primary discharge diagnosis (a hospitalization from asthma). Adjusted rates are computed by weighting age-specific rates to the distribution of the US population then summing those weighted rates. The age distribution chosen (0-17,18-44, 45-64,65+ was one used in Healthy People 2010 to adjust National Hospital Discharge Survey data. (See HP2010 Statistical Notes, Number 20, 1/2001--age distribution #20) Age-adjustment eliminates differences in rates due solely to one subgroup being older or younger than another. e.g, (Caucasians being older overall than African-Americans).

Crude (not age-adjusted) rates and are computed by simply summing discharges in a subgroup and dividing by the state population in that subgroup.

Data Sources: Iowa State Inpatient Database, Iowa Department of Public Health, Center for Health Statistics
US Bureau of the Census, Intracensus estimates for 1995-2006, published 2007.

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Identification of Counties that Have at Least One Hospitalization Rate from Asthma that is Two Times or More the State Rate, (State Age-Specific and Overall Age-Adjusted Rate per 10,000)
Iowa, 1995-99, 2000-04

	County of Residence**	Quartile that rate falls in (*H*=highest, L=lowest blank=middle two quartiles)										Average # of inpatient visits -- all ages		
		1995-99					2000-04							
		0-17	18-44	45-64	65+	All Ages	0-17	18-44	45-64	65+	All Ages	Trend	1995-99	2000-04
	Adair			*H**	*H**	*H*			*H*			↓	15	6
	Adams		*H*		*H*	*H*	*H*	L	*H**	*H*	*H*	⇄	5	6
	Black Hawk	*H*	*H*	*H*	*H**	*H*	*H*	*H*	*H*	*H*	*H*	↓	177	150
	Calhoun	*H*	*H**		*H*	*H*	*H*	*H*	L			↓	20	8
	Des Moines	*H*	*H**	*H*		*H*	*H*	*H*	*H*		*H*	↓	71	51
	Emmet			*H*						*H**	*H*	⇄	9	11
	Black Hawk	*H*	*H*	*H*	*H**	*H*	*H*	*H*	*H*	*H*	*H*	↓	177	150
	Floyd		*H*		*H*	*H*	*H*	*H**	*H**	*H*	*H*	↑	19	27
	Hamilton	*H*	*H**	*H**	*H**	*H**	*H**	*H**	*H**	*H**	*H**	↓	43	36
	Hardin									*H**	*H*	↑	14	20
	Jefferson	L		L	L	L	L	*H**	L	L		⇄	9	10
	Lee	*H**	*H**	*H**	*H**	*H**	*H**	*H*	*H*	*H**	*H**	↓	86	64
	Marion		*H*	*H**	*H*	*H*			*H*	*H*		↓	41	28
	Marshall		L	L			*H**				*H*	↑	24	42
	Mills	L		L	*H**		*H*	*H*			*H*	↑	9	13
	Monroe	L		*H*	*H**	*H*	L			*H*		↓	9	5
	Montgomery		*H**	*H**	*H**	*H*	L	*H**	*H**	*H**	*H**	⇄	23	23
	Page		*H*	*H**	*H**	*H*	*H*			*H*	*H*	↓	32	17
	Pocahontas	*H*	L	*H**	*H**	*H*				*H*		↓	16	7
	Union		*H*					*H**			*H*	↑	12	18
	Webster	*H**	*H*	*H*		*H*	*H**	*H*	*H*	*H*	*H*	⇄	62	64

H = county year/age group rate is in the top 25% of the distribution of county rates for this year/age group.

*H** = county year/age group rate is in the top 25% of county rates and two or more times the state rate for that year/age group.

** At least one rate for this county is not favorable relative to other counties and the state. All counties in this table have at least one rate that is two or more times the state rate for that year/age group.

Table 5

Identification of All Counties by How their Age-Specific and Age-Adjusted Rates of Hospitalization from Asthma Compare to State and Other Counties' Rates, 1995-99, 2000-04

County of Residence**	Quartile that rate falls in (*H* =highest, L=lowest blank=middle two quartiles) 1995-99					2000-04					Average # of inpatient visits - - all ages		
	0-17	18-44	45-64	65+	All Ages	0-17	18-44	45-64	65+	All Ages	Trend	95-99	00-04
Adair			*H**	*H**	*H*			*H*			↓	15	6
Adams		*H*		*H*	*H*	*H*	L	*H**	*H*	*H*	=	5	6
Allamakee	L	L	L	L	L				L	L	=	6	7
Appanoose	L		*H*					*H*	*H*	*H*	↑	11	14
Audubon		L	*H*		*H*		L				↓	7	4
Benton											=	18	18
Black Hawk	*H*	*H*	*H*	*H**	*H*	*H*	*H*	*H*	*H*	*H*	↓	177	150
Boone	*H*						*H*	*H*			=	23	22
Bremer				*H*		L					↓	19	14
Buchanan							*H*	*H*		*H*	↑	15	20
Buena Vista	L		L	*H*							=	13	13
Butler						L	L		*H*		↓	13	10
Calhoun	*H*	*H**		*H*	*H*	*H*	*H*	L			↓	20	8
Carroll						L	L	L	L	L	↓	14	6
Cass		*H*	*H*	*H*	*H*	*H*					↓	18	12
Cedar									*H*		=	15	14
Cerro Gordo	*H*					*H*					↓	46	37
Cherokee	L	L		L	L						↑	6	10
Chickasaw						*H*		*H*		*H*	=	10	12
Clarke								L		L	=	7	5
Clay				L		L	*H*	*H*			↑	10	14
Clayton	L	L	L	L	L	L	L	L		L	=	7	8
Clinton	*H*	*H*			*H*	*H*	*H*	*H*		*H*	=	54	52
Crawford	L	L	L	L	L			L			↑	6	11
Dallas							L	L		L	↓	29	17
Davis		L			L	L		L	L	L	=	4	4
Decatur				L			L	L	L	L	=	5	4
Delaware	L	L	L	L	L	L	L	*H*	L	L	↑	5	9
Des Moines	*H*	*H**	*H*		*H*	*H*	*H*	*H*		*H*	↓	71	51
Dickinson	L	*H*							L		↓	13	9
Dubuque	L	L			L		L		*H*		↑	44	55
Emmet			*H*						*H**	*H*	=	9	11
Fayette	*H*			*H*					L		↓	21	15
Floyd		*H*		*H*	*H*	*H*	*H**	*H**	*H*	*H*	↑	19	27
Franklin	L	L	L		L	L					↑	4	7
Fremont	L		*H*	*H*		L	*H*				=	8	6
Greene			*H*	L				*H*			↓	10	7
Grundy	L				L		L	L	L	L	=	6	5
Guthrie	*H*			*H*	*H*			L	L		↓	12	7
Hamilton	*H*	*H**	*H**	*H**	*H**	*H**	*H**	*H**	*H**	*H**	↓	43	36
Hancock		L	L	L	L		L				=	5	7
Hardin									*H**	*H*	↑	14	20
Harrison	L		L	L	L	L				L	=	7	8
Henry	*H*					L	H				↓	20	14
Howard	L	L	L	L	L	L	L	L	L	L	=	2	0
Humboldt	*H*		L	*H*	*H*	*H*					↓	12	9
Ida	L	L	L	L	L	L			L	L	=	1	3
Iowa		*H*							L		↓	13	9
Jackson				L	L		L			L	=	11	10
Jasper	*H*		*H*								↓	37	29
Jefferson	L		L	L	L	L	*H**	L	L		=	9	10
Johnson	*H*										↓	86	62
Jones							*H*	*H*	L	*H*	=	17	18
Keokuk	*H*	*H*	L								↓	10	7
Kossuth	L	L		L	L		L	L	L	L	=	7	7
Lee	*H**	*H**	*H**	*H**	*H**	*H**	*H*	*H*	*H**	*H**	↓	86	64
Linn	*H*	*H*	*H*	*H*	*H*	*H*					↓	206	164
Louisa			*H*		*H*				L		↓	13	7
Lucas		*H*	L	L		*H*		L	L		=	7	7
Lyon	L	L	L	L	L	L	L	L	*H*	L	↑	2	5
Madison			L			L		L	L	L	↓	10	6
Mahaska						L				L	↓	17	10
Marion		*H*	*H**	*H*	*H*			*H*	*H*		↓	41	28
Marshall		L	L			*H**				*H*	↑	24	42
Mills	L		L	*H**		*H*	*H*			*H*	↑	9	13
Mitchell	L	L	L	L	L	*H*	L	L			↑	3	7
Monona			L	L	L			L	*H*		↑	6	9
Monroe	L		*H*	*H**	*H*	L			*H*		↓	9	5
Montgomery		*H**	*H**	*H**	*H*	L	*H**	*H**	*H**	*H**	=	23	23
Muscatine		*H*									↓	34	24
O'Brien							L				=	10	10
Osceola	L	*H*		L		L	L		L	L	=	4	2
Page		*H*	*H**	*H**	*H*	*H*			*H*	*H*	↓	32	17
Palo Alto		L	L	L	L	L		L		L	=	4	5
Plymouth		L			L						↑	11	18
Pocahontas	*H*	L	*H**	*H**	*H*				*H*		↓	16	7
Polk	*H*	*H*	*H*		*H*	*H*				*H*	↓	477	353
Pottawattamie									L		↓	66	49
Poweshiek	*H*			*H*		*H*		*H*	*H*	*H*	↑	19	23
Ringgold		L					L	L	L	L	=	4	2
Sac				*H*				L			↓	12	8
Scott	*H*	*H*			*H*	*H*	*H*	*H*		*H*	↓	170	165
Shelby	L					L	*H*	*H*		*H*	↑	9	12
Sioux	L	L	L		L		L	L		L	↑	11	15
Story		L			L		L		L	L	↓	38	32
Tama		L				*H*	L		*H*		↑	12	16
Taylor			L	L	L		H				=	3	5
Union		*H*					*H**			*H*	↑	12	18
Van Buren									*H*		=	6	7
Wapello	*H*	*H*	*H*		*H*	L	*H*	*H*	*H*		↓	43	33
Warren											↓	29	25
Washington	*H*	*H*									↓	21	13
Wayne			*H*		*H*				*H*	*H*	=	6	7
Webster	*H**	*H*	*H*		*H*	*H**	*H*	*H*	*H*	*H*	=	62	64
Winnebago	L	L	L	L	L		L	L	L	L	↑	3	6
Winneshiek			L			L	L	L		L	↓	16	7
Woodbury	*H*		*H*	L			*H*	*H*			↓	93	90
Worth		L		*H*		L	L	L	L	L	↓	7	2
Wright				L			*H*		L		=	10	10.0

H * = county year/age group rate is two or more times the state rate for that year/age group.

**A county's line is highlighted if at least one of its year/age group rates is two or more times greater than the state rate for that group.

County rates are *generally favorable* compared to the state average: no rate for this county is in the top 25% of county rates for any of the age/year groups seen.

Some county rates are *not* favorable compared to other counties--rate of at least one age/year grouping is in the top 25% of rates.

At least one rate for this county is *not* favorable compared to the state average--at least one rate from county *is in the top 25% of rates and is also more than twice the state rate* for that age/year group.

Table 6

By County, Age and Year, Average Annual Age-Specific Rate of Hospitalization from Asthma and Quartile Rank of County Rates, Iowa, 1995-2004

County of Residence**	Rate/10,000 population by age (* = rate more than 2X state rate)										Quartile into which rate falls (***H*** =rate in highest quartile, L=rate in lowest quartile blank cell = rate falls in middle two quartiles)										Average number of inpatient visits -- all ages	
	0-17		18-44		45-64		65+		All Ages		0-17		18-44		45-64		65+		All Ages			
	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04
Adair	7	6.6	4.5	4.8	**15.4***	8.2	**51.4***	9	17	7.6					***H***		***H***		L		15	6
Adams	9.4	11.8	11.3	3	7.6	**31.3***	18.2	14.8	12.4	16.1			***H***			***H***			***H***	***H***	5	6
Allamakee	5.4	6.1	2.9	3.8	1.8	5	5.8	6.1	4.1	5.6	L		L		L		L	L			6	7
Appanoose	3.6	7.7	5.2	6.8	12.5	10.8	11.5	19.2	8.8	11.2	L					***H***		***H***			11	14
Audubon	12.4	9.8	3	2.2	19.5	3.7	7.3	9.2	11.5	6.1			L	L	***H***				L		7	4
Benton	7.1	9.6	4.2	5.7	8	4.8	14.6	8.2	8.4	7.6											18	18
Black Hawk	22.2	18.6	6.9	7.5	9.8	8.6	**26.9***	18.6	16	13.6	***H***	***H***					***H***			***H***	177	150
Boone	13.1	9.5	7	7.3	8.1	8.4	7.7	9.5	10	9.5									***H***		23	22
Bremer	7	4.8	4.6	3.6	7.2	5.5	18.8	12.7	9	6.5		L							***H***		19	14
Buchanan	6.2	10	5.9	8.4	8.5	9.3	9	13	8.1	11											15	20
Buena Vista	5.9	9.8	4.4	3.3	2.5	3.6	15.7	12.8	6.7	7.1	L				L						13	13
Butler	7.8	5.1	6	2.1	6.9	5.1	14.6	18	9	6.8				L							13	10
Calhoun	14.3	11	**26.6***	8.3	7.1	2.2	19.5	9.2	19.9	8.5			***H***			L					20	8
Carroll	6.4	3	4.1	1.7	4.6	3.3	13.3	4.5	7	3.2		L		L		L		L			14	6
Cass	7.8	12.1	10.4	4	10.2	6	23	12.6	13.2	8.7							***H***				18	12
Cedar	10.8	7.7	4.4	5.4	9	4.8	11.3	16.4	9.2	8.4									***H***		15	14
Cerro Gordo	14.5	12.1	7.1	6.3	7.6	5.3	11.9	10.2	10.9	9											46	37
Cherokee	3.6	8.7	2.4	4.2	9.1	7.9	5.2	11.5	5.5	8.3	L		L				L				6	10
Chickasaw	11.9	12.3	5.4	5.3	4.1	8.8	10.2	13.9	8.2	10.3									L		10	12
Clarke	9.7	10.1	6.1	3.2	7.5	0.9	9.9	7.8	8.9	5.5						L					7	5
Clay	7.6	3.4	4.1	7.9	5.9	9.6	6.4	11.6	6.5	9		L					L				10	14
Clayton	2.8	4.5	3.2	0.7	1.9	3.4	6.9	11.1	3.8	4.3	L	L	L	L	L	L	L				7	8
Clinton	13.9	13.9	9.7	9.7	7.7	9.3	12	8	11.9	11.7				***H***							54	52
Crawford	5.3	9.1	2.5	4.6	1.1	3	4.6	11.2	3.5	7	L		L		L	L	L				6	11
Dallas	8.2	5.3	6.1	2.2	8.7	2.8	11.3	7.9	9.1	4.4				L		L					29	17
Davis	7	2.6	1.4	6.4	4.3	1	7.9	6.8	5	4.7		L	L			L		L			4	4
Decatur	8.1	9.4	5	1.2	5.8	2.1	6.3	6.6	6.9	4.7				L		L	L	L			5	4
Delaware	3.3	4.8	2.8	1.6	1.6	9.4	3.6	6.4	3.1	5.8	L	L	L	L	L		L	L	L		5	9
Des Moines	23.2	20.3	**16.2***	9	13.4	9.4	11.9	11.8	18.6	13.7	***H***	***H***	***H***	***H***	***H***					***H***	71	51
Dickinson	5.6	6.9	7.9	4	7.5	5.3	11.4	7.6	8.8	6.3	L							L	***H***		13	9
Dubuque	6	5.8	3.2	2.4	4.4	5	8.3	17.3	5.5	6.9			L	L					L		44	55
Emmet	8	5.5	5.1	6.6	12.3	6.2	8.2	**27***	9.2	10.6								***H***			9	11
Fayette	12.8	9.3	5.3	6.7	6.7	4.7	15.6	7.7	10.1	7.8								L	L		21	15
Floyd	12.1	15.8	8.1	**12.3***	8.7	**19.2***	16.7	18.7	11.8	18		***H***		***H***		***H***		***H***		***H***	19	27
Franklin	3	4.8	1.7	3.6	2.4	7.4	9.8	14.1	3.9	7.3	L	L	L		L						4	7
Fremont	3.9	4.2	4.8	8.6	9.7	6.9	23.2	12.8	9.8	8.8	L	L		***H***			***H***				8	6
Greene	12.3	8	6.8	3.9	12.5	9.9	6.9	8.2	10.9	8							L		L		10	7
Grundy	2.6	7.4	4	2.1	5.7	0.6	8.3	6	5.4	4	L			L		L		L	***H***		6	5
Guthrie	13.4	10	7.8	6.7	7.4	2.7	16.1	5.3	11.6	7						L		L			12	7
Hamilton	23.1	15.4	**22.8***	**16.4***	**23.7***	**25.4***	**40.1***	**37.4***	**29.1***	**24.6***	***H***		***H***	***H***	***H***	***H***	***H***	***H***	***H***	***H***	43	36
Hancock	6.2	7.4	3	2.7	2.3	6.6	5.4	10.2	4.4	6.7			L	L	L		L				5	7
Hardin	10.2	10	4.2	4.5	3.9	5.4	13.4	**29***	7.8	10.9								***H***	L		14	20
Harrison	2.5	3	6.8	5.3	2.4	4.3	5.7	8.8	5.1	5.7	L	L			L		L		***H***		7	8
Henry	12.9	5	6.3	7	9.5	6.2	14.4	12.2	11.2	8.1		L									20	14
Howard	3.8	0	0.6	0	2	1.8	1.9	0	2.1	0.5	L	L	L	L	L	L	L	L			2	0
Humboldt	18.4	15	7.8	5.1	3.5	8	16.1	8.5	11.7	9.7	***H***				L						12	9
Ida	1	1.1	1.6	4.5	1.2	4.3	3.5	7.2	1.8	4.6	L	L	L		L		L	L	L		1	3
Iowa	8	7.4	7.8	3.7	5.5	6.4	12.6	7.4	9	6.6								L	L		13	9
Jackson	8.2	6.7	4.3	2.4	4.9	3.6	4.1	7.9	6	5.1				L			L				11	10
Jasper	14.8	9.5	7.2	5.2	9.6	6.8	11.1	11.4	11.5	8.5									L		37	29
Jefferson	4.4	3.8	7.2	**14.2***	3.8	2	5.1	2.7	6.1	7.8	L	L		***H***	L	L	L	L			9	10
Johnson	17.2	8.9	4.7	3.1	5.1	5.6	15.2	12.1	10.5	7.3	***H***										86	62
Jones	10.1	7.7	6.9	8.5	6.3	12.2	10.6	7.5	9.1	10.4						***H***		L			17	18
Keokuk	12.9	6.4	8.4	3.3	3.4	5.3	10.4	11.7	9.5	6.5					L						10	7
Kossuth	4.3	5.9	2.5	2.4	4.1	2.3	4.6	7	4.1	4.4	L		L	L		L	L	L			7	7

County of Residence**	Rate/10,000 population by age (* = rate more than 2X state rate)										Quartile into which rate falls (*H* =rate in highest quartile, L=rate in lowest quartile blank cell = rate falls in middle two quartiles)										Average number of inpatient visits -- all ages	
	0-17		18-44		45-64		65+		All Ages		0-17		18-44		45-64		65+		All Ages			
	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04
Lee	**31.1***	**25.2***	**16.6***	8.2	**15.5***	13.9	**30.5***	**29.8***	**24.6***	**19.1***	***H***	***H***	***H***		***H***	***H***	***H***	***H***	L	***H***	86	64
Linn	15	12.5	8	6.8	10	6.5	15.5	8.7	12.8	9.4											206	164
Louisa	11.5	9.1	7.6	5.5	13.4	3.6	11.4	5.8	12	6.6					***H***			L	L		13	7
Lucas	9.4	18.6	11.2	5.2	1.9	1.8	4.3	5.6	8.3	8.4		***H***	***H***		L	L	L	L	L		7	7
Lyon	1.8	2.5	1	1.6	1.7	0.8	1.8	15	1.7	4.1	L	L	L	L	L	L	L				2	5
Madison	8.6	2.6	5.9	3.6	1.3	3.4	14.9	7.8	7.5	4.5		L			L	L					10	6
Mahaska	8.7	4.7	6.6	3.7	4.4	3.5	12.4	7.9	8.3	5.1		L									17	10
Marion	10.5	9.3	12.6	3.4	**15.8***	9.8	15.3	17.5	15.1	9.7			***H***		***H***				L		41	28
Marshall	8.7	**24***	3.5	4.2	3.1	6.4	11.2	9.7	6.5	11.5		***H***	L		L				***H***		24	42
Mills	4.7	11.4	6.6	7	3	8.1	**17.3***	10.9	7.8	10.1	L				L				L		9	13
Mitchell	4.2	12.8	1.2	1.9	3.5	2.4	3.3	9.6	3.2	6.4	L		L	L	L	L	L				3	7
Monona	11	9.1	4	6.9	3.5	3.3	4.1	17.3	6.2	9.1					L	L	L				6	9
Monroe	4.8	2.1	4.5	4	11.1	5.3	**30.5***	17.2	11.6	6.6	L	L					***H***				9	5
Montgomery	11.5	4.3	**15.5***	**12.5***	**22.9***	**32.9***	**31.9***	**34.3***	21.5	**21.8***		L	***H***	***H***	***H***	***H***	***H***	***H***		***H***	23	23
Muscatine	10.7	7.4	8.2	4.2	4.5	4.7	8.9	8.2	8.9	6.4											34	24
O'Brien	7.1	10.8	4	2.2	5.5	5.2	9.2	11.3	6.7	7.1				L					L		10	10
Osceola	3.2	4.6	10.9	1.8	5.4	4.9	1.5	1.5	7.1	3.7	L	L	***H***	L			L	L	L		4	2
Page	9.9	13.9	11.5	6.2	**20.5***	8	**39.4***	15.1	20	11			***H***		***H***		***H***				32	17
Palo Alto	7.9	4.4	2.4	3.7	1.8	2.6	3.7	9.4	4.2	5		L	L		L	L	L		L		4	5
Plymouth	6.6	6.5	1.2	6.3	5.1	7.4	7.9	9.2	5	8			L								11	18
Pocahontas	22.8	5.9	0.8	4.3	**26.2***	4.6	**27.5***	19.3	18.7	8	***H***		L		***H***		***H***	***H***			16	7
Polk	18.8	12.2	10.6	7	11.4	8.2	13.5	11.9	14.9	10.5	***H***										477	353
Pottawattamie	8.3	5.9	6.3	4.5	7.6	5.9	10.3	6.8	8.7	6.3								L			66	49
Poweshiek	13.8	17.9	5.9	6.8	6.5	9.9	19	19.2	11.1	13.6		***H***						***H***		***H***	19	23
Ringgold	10.9	9.6	3.8	1.3	6.5	1.5	7.5	4.8	7.6	4.3				L		L		L			4	2
Sac	10.9	7.7	6.5	5.5	8.5	2.9	16.4	11.8	10.8	7.1						L			***H***		12	8
Scott	17.6	11.5	7.9	8.5	7.7	10.5	10.6	13.3	11.9	11.8	***H***					***H***					170	165
Shelby	5.7	4.3	6.7	10.7	4.9	13.5	8.8	9.8	7.1	11.2	L	L		***H***		***H***					9	12
Sioux	4.3	6.7	1.5	1.9	3.8	3.1	7.6	9.6	4.1	5.1	L		L	L		L					11	15
Story	6.4	6.8	3.3	2	5	5.1	10.8	7.1	6.3	5.3			L	L				L			38	32
Tama	8	15.7	3.1	2.5	4.6	4.7	13.4	14.5	7	8.9		***H***	L	L					L		12	16
Taylor	7.1	6.2	4.6	7.7	1.3	3.6	6.2	13.4	5.1	8.1					L		L		L		3	5
Union	10.1	11	10.2	**24.1***	7.3	7.2	9.3	12.4	10.5	16.9				***H***						***H***	12	18
Van Buren	8.3	9.7	6.5	5.7	8.9	6.1	7.9	16.2	8.8	9.4									L		6	7
Wapello	14.2	4.1	9.6	7.3	10.8	9.8	14.8	18.4	13.3	10.1		L									43	33
Warren	10.7	8.2	4.8	3.2	7.2	6.9	8.7	8	8.3	6.8											29	25
Washington	12.8	5.9	8.4	5.6	6.6	4.9	13.4	9.3	11	6.8											21	13
Wayne	8.7	16.8	5.8	4.1	11.9	5	11.9	15.5	10.2	10.1		***H***									6	7
Webster	**32.3***	**25***	10.2	**12.2***	9.9	10.5	9.6	18.6	17.1	17.7	***H***	***H***		***H***		***H***		***H***		***H***	62	64
Winnebago	4.9	8.1	1.5	2.1	0.8	3.4	3.5	7.4	2.7	5.3	L		L	L	L		L	L			3	6
Winneshiek	9.9	3	6.4	0.7	2	1.7	13.8	11.4	8.1	3.5		L		L	L	L					16	7
Woodbury	13.5	8.2	6.3	8.5	9.5	8.9	7.1	10.2	10.1	10									L		93	90
Worth	11.4	4.4	1.5	2.4	9	1	17.6	4	9.2	3.1		L	L	L		L		L			7	2
Wright	11.8	8.4	6.1	7.5	5.6	5.2	5	7.6	8	8							L	L	L		10	10
State of Iowa																					**2,788**	**2,389**
rate (mean)	**12.8**	**10.2**	**7.1**	**5.8**	**8.1**	**7.1**	**12.9**	**12.1**	**10.8**	**9.2**												
median rate	**8.7**	**8**	**5.9**	**4.6**	**6.6**	**5.3**	**10.7**	**10.2**	**8.1**	**7.8**												
range of rates	**(1 - 32.3)**	**(0 - 25.2)**	**(0.6 - 26.6)**	**(0 - 24.1)**	**(0.8 - 26.2)**	**(0.6 - 32.9)**	**(1.5 - 51.4)**	**(0 - 37.4)**	**(1.7- 29.1)**	**(0.5 - 24.6)**												

* = county year/age group rate is two or more times the state rate for that year/age group.

**A county's line is highlighted if at least one of its year/age group rates is two or more times greater than the state rate for that year/age group.

Table 7

Counties Ranked by Rate of Hospitalization from Asthma
Age-Adjusted and Crude Rates per 10,000 Population
and Number of Hospitalizations from Asthma
All Ages, Iowa, 1995-99, 2000-04

2000-04 Quartile (risk classification)	County of Residence	Age-Adjusted Asthma Inpatient Hospitalization Rate: Rate Rank (1=highest, 99=lowest rate) 1995-99	Rate Rank 2000-04	Quartile (1=highest rate) 1995-99	Quartile 2000-04	Rate/10,000 1995-99	Rate/10,000 2000-04	Crude Rate/10,000 1995-99	Crude Rate/10,000 2000-04	Number of Inpatient Stays 1995-99	Number of Inpatient Stays 2000-04	% of all 2000-04 asthma stays1
Highest Rates	**Hamilton**	9	1	1	1	**29.1***	**24.6***	26.2	22.1	43	36	2%
	Montgomery	16	2	1	1	21.5	**21.8***	19.5	19.9	23	23	1%
	Lee	90	3	1	1	**24.6***	**19.1***	22.2	17.3	86	64	3%
	Floyd	51	4	1	1	11.8	18	10.9	16.1	19	27	1%
	Webster	24	5	1	1	17.1	17.7	15.6	16	62	64	3%
	Union	54	6	2	1	10.5	16.9	9.4	14.7	12	18	1%
	Adams	10	7	1	1	12.4	16.1	11.5	14.6	5	6	0%
	Des Moines	37	8	1	1	18.6	13.7	16.6	12.3	71	51	2%
	Poweshiek	45	9	2	1	11.1	13.6	10.2	12.2	19	23	1%
	Black Hawk	60	10	1	1	16	13.6	13.9	11.9	177	150	6%
	Scott	71	11	1	1	11.9	11.8	10.8	10.3	170	165	7%
	Clinton	46	12	1	1	11.9	11.7	10.7	10.4	54	52	2%
	Marshall	5	13	3	1	6.5	11.5	6	10.6	24	42	2%
	Appanoose	69	14	3	1	8.8	11.2	7.7	10.4	11	14	1%
	Shelby	14	15	3	1	7.1	11.2	6.5	9.6	9	12	1%
	Page	42	16	1	1	20	11	18.7	10.1	32	17	1%
	Buchanan	29	17	3	1	8.1	11	7	9.7	15	20	1%
	Hardin	80	18	3	1	7.8	10.9	7.6	11.1	14	20	1%
	Emmet	58	19	2	1	9.2	10.6	8	10.2	9	11	0%
	Polk	49	20	1	1	14.9	10.5	13.2	9.2	477	353	15%
	Jones	73	21	2	1	9.1	10.4	8.1	9.1	17	18	1%
	Chickasaw	92	22	3	1	8.2	10.3	7.7	9.5	10	12	1%
	Wayne	18	23	2	1	10.2	10.1	9.3	9.9	6	7	0%
	Mills	93	24	3	1	7.8	10.1	6.7	9	9	13	1%
Higher than Median Rate	Wapello	43	25	1	2	13.3	10.1	11.9	9.1	43	33	1%
	Woodbury	85	26	2	2	10.1	10	9	8.7	93	90	4%
	Humboldt	70	27	1	2	11.7	9.7	11.3	8.8	12	9	0%
	Marion	95	28	1	2	15.1	9.7	13.2	8.6	41	28	1%
	Boone	7	29	2	2	10	9.5	8.9	8.5	23	22	1%
	Linn	50	30	1	2	12.8	9.4	11.1	8.4	206	164	7%
	Van Buren	79	31	3	2	8.8	9.4	7.8	8.8	6	7	0%
	Monona	41	32	4	2	6.2	9.1	5.6	9	6	9	0%
	Cerro Gordo	35	33	2	2	10.9	9	9.8	8.1	46	37	2%
	Clay	20	34	3	2	6.5	9	5.8	7.9	10	14	1%
	Tama	91	35	3	2	7	8.9	6.7	8.7	12	16	1%
	Fremont	38	36	2	2	9.8	8.8	9.4	7.9	8	6	0%
	Cass	30	37	1	2	13.2	8.7	12.4	8.2	18	12	0%
	Jasper	81	38	2	2	11.5	8.5	10.3	7.6	37	29	1%
	Calhoun	22	39	1	2	19.9	8.5	17.8	7.6	20	8	0%
	Cedar	1	40	2	2	9.2	8.4	8.2	7.6	15	14	1%
	Lucas	86	41	3	2	8.3	8.4	7.3	7.8	7	7	0%
	Cherokee	62	42	4	2	5.5	8.3	4.8	7.7	6	10	0%
	Taylor	83	43	4	2	5.1	8.1	4.8	7.6	3	5	0%
	Henry	26	44	2	2	11.2	8.1	9.8	7.1	20	14	1%
	Wright	97	45	3	2	8	8	7.1	7.2	10	10	0%
	Plymouth	21	46	4	2	5	8	4.6	7.1	11	18	1%
	Greene	98	47	2	2	10.9	8	9.5	7.3	10	7	0%
	Pocahontas	47	48	1	2	18.7	8	18.1	8.1	16	7	0%
	Fayette	78	49	2	2	10.1	7.8	9.5	7	21	15	1%

rate > than 2x state rate

Iowa mean rate for all ages is 9.2

Iowa median rate is 7.8

***Counties with rates more than double the state adjusted rate of 9.2 (2000-04) and 10.8 (1995-99).** [1]0% = less than 1%

Rates are age-adjusted using the US 2000 population and age distribution #20 used in Healthy People 2010 to age-adjust National Hospital Discharge Survey data. (HP2010 Statistical Notes, Number 20, 1/2001) Age-adjustment eliminates differences in rates due solely to one county's population being older or younger than another county.

2000-04 Quartile (risk classification)	County of Residence	Age-Adjusted Asthma Inpatient Hospitalization Rate: Rate Rank (1=highest, 99=lowest rate) 1995-99	Rate Rank 2000-04	Quartile (1=highest rate) 1995-99	Quartile 2000-04	Rate/10,000 1995-99	Rate/10,000 2000-04	Crude Rate/10,000 1995-99	Crude Rate/10,000 2000-04	Number of Inpatient Stays 1995-99	Number of Inpatient Stays 2000-04	% of all 2000-04 asthma stays1
Lower than Median Rate	Jefferson	25	50	4	3	6.1	7.8	5.3	6.4	9	10	0%
	Adair	77	51	1	3	17	7.6	18	7	15	6	0%
	Benton	33	52	3	3	8.4	7.6	7.4	6.9	18	18	1%
	Franklin	44	53	4	3	3.9	7.3	3.8	6.9	4	7	0%
	Johnson	39	54	2	3	10.5	7.3	8.1	5.4	86	62	3%
	O'Brien	88	55	3	3	6.7	7.1	6.2	6.9	10	10	0%
	Sac	2	56	2	3	10.8	7.1	10.3	6.8	12	8	0%
	Buena Vista	15	57	3	3	6.7	7.1	6.5	6.5	13	13	1%
	Crawford	17	58	4	3	3.5	7	3.3	6.5	6	11	0%
	Guthrie	57	59	1	3	11.6	7	10.8	6.1	12	7	0%
	Dubuque	99	60	4	3	5.5	6.9	4.9	6.1	44	55	2%
	Washington	65	61	2	3	11	6.8	10.1	6.2	21	13	1%
	Warren	55	62	3	3	8.3	6.8	7.4	6	29	25	1%
	Butler	11	63	2	3	9	6.8	8.4	6.8	13	10	0%
	Hancock	74	64	4	3	4.4	6.7	4.1	6.2	5	7	0%
	Monroe	63	65	1	3	11.6	6.6	11.1	6.3	9	5	0%
	Louisa	94	66	1	3	12	6.6	10.4	6.1	13	7	0%
	Iowa	76	67	2	3	9	6.6	8.2	5.9	13	9	0%
	Keokuk	23	68	2	3	9.5	6.5	8.9	6.2	10	7	0%
	Bremer	3	69	2	3	9	6.5	8.1	5.8	19	14	1%
	Muscatine	48	70	2	3	8.9	6.4	8.2	5.7	34	24	1%
	Mitchell	72	71	4	3	3.2	6.4	2.9	6.4	3	7	0%
	Pottawattamie	67	72	3	3	8.7	6.3	7.7	5.5	66	49	2%
	Dickinson	4	73	3	3	8.8	6.3	8	5.7	13	9	0%
	Audubon	87	74	1	3	11.5	6.1	10.1	6.1	7	4	0%
Lowest Rates	Delaware	84	75	4	4	3.1	5.8	2.8	5	5	9	0%
	Harrison	6	76	4	4	5.1	5.7	4.5	5.1	7	8	0%
	Allamakee	12	77	4	4	4.1	5.6	3.9	5.1	6	7	0%
	Clarke	53	78	2	4	8.9	5.5	8	5.2	7	5	0%
	Story	27	79	4	4	6.3	5.3	4.9	4	38	32	1%
	Winnebago	64	80	4	4	2.7	5.3	2.5	4.9	3	6	0%
	Jackson	31	81	4	4	6	5.1	5.4	4.7	11	10	0%
	Mahaska	19	82	3	4	8.3	5.1	7.7	4.6	17	10	0%
	Sioux	66	83	4	4	4.1	5.1	3.6	4.6	11	15	1%
	Palo Alto	89	84	4	4	4.2	5	3.9	4.8	4	5	0%
	Davis	75	85	4	4	5	4.7	4.7	4.2	4	4	0%
	Decatur	68	86	3	4	6.9	4.7	6.1	4.2	5	4	0%
	Ida	82	87	4	4	1.8	4.6	1.7	4.2	1	3	0%
	Madison	32	88	3	4	7.5	4.5	7.1	3.9	10	6	0%
	Dallas	52	89	2	4	9.1	4.4	7.9	3.7	29	17	1%
	Kossuth	13	90	4	4	4.1	4.4	3.8	4.2	7	7	0%
	Clayton	56	91	4	4	3.8	4.3	3.5	4.2	7	8	0%
	Ringgold	28	92	3	4	7.6	4.3	7	4.1	4	2	0%
	Lyon	34	93	4	4	1.7	4.1	1.5	4.1	2	5	0%
	Grundy	8	94	4	4	5.4	4	4.9	3.7	6	5	0%
	Osceola	96	95	3	4	7.1	3.7	5.9	3.2	4	2	0%
	Winneshiek	59	96	3	4	8.1	3.5	7.6	3.1	16	7	0%
	Carroll	36	97	3	4	7	3.2	6.6	2.9	14	6	0%
	Worth	40	98	2	4	9.2	3.1	8.8	2.8	7	2	0%
	Howard	61	99	4	4	2.1	0.5	2	0.4	2	0.4	0%
	County unkn									2	0	
	State of Iowa					**10.8**	**9.2**	**9.6**	**8.1**	**2,788**	**2,389**	**100%**
	State median					**8.1**	**7.8**	**7.4**	**6.7**			
	Range of rates					**(1.7-29.1)**	**(0.5 - 24.6)**	**(1.5- 26.2)**	**(0.4-22.1)**			

Median=rate above and below which half of all rates fall. Mean=state crude rate=the sum of all counties' discharges/# of counties (99)
Denominators for all rates rely on bridged-race Census estimates for the years 1995-2006 (2007
Discharges from asthma = asthma was the primary discharged diagnosis (ICD-9 Code = 49300-49399).
Data Sources: IA State Inpatient Database, IA Dpt. of Public Health, Intracensus population estimates, US Census, 2007.

About the Iowa State Inpatient Database

Under *Iowa Administrative Code*, hospitals are specifically required to report *inpatient, outpatient and ambulatory care* information to the Iowa Hospital Association which in turn is to provide these data to the Iowa Department of Public Health (IDPH). The IDPH has received data from the IHA from its State Inpatient Database (SID) since 1994.

The SID contains selected data elements for each inpatient discharged from non-Federal acute care Iowa hospitals. Long-term care mental health facilities are excluded.. The SID does not include discharges of Iowans who are treated solely in out-of-state hospitals for their asthma, an estimated 4% to 8% of all hospitalizations. Counties near Omaha, Mayo Clinics in Rochester, Minnesota, Rock Island/Moline and Sioux Falls, South Dakota have rates of hospitalization that are underestimated. The SID and outpatient data sets also lack several basic demographic variables (income, education and ethnicity) and are missing data from the race field in about 20 percent of all admissions.

Another drawback to using the SID is that it contains few personal identifiers. Without personal identifiers, readmission of a person with asthma at either the same or a different hospital becomes hard to identify. As a result, estimating counts of people with asthma who were hospitalized, as opposed to counts of admissions for asthma, becomes difficult. Thus, those parts of the report describing hospitalizations are not measures of asthma prevalence but of overall inpatient services usage.

Between 1995 and 2006, the SID lists one *admitting* diagnosis and up to nine discharge diagnoses for each inpatient admission. Except where explicitly noted, all discharges counts and rates in this report are of discharges with a primary discharge diagnosis of asthma.

About the Iowa Asthma Control Program

The Iowa Asthma Control Program (IACP), administered by the Iowa Department of Public Health (IDPH) receives about $400,000 in CDC funding each year to plan for and administer asthma control programming across the state. This report is produced by the IDPH's Center for Health Statistics using IACP funding. Other current efforts of the IACP include: child care provider training, school health staff training, monitoring of local open burning ordinances, and staffing of the statewide Iowa Asthma Coalition. Reports on the prevalence of asthma in Iowa adults and children as well as on asthma-related deaths are posted on the IACP web site.

Iowa asthma surveillance committee members include:

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Andrea Hoffman, Iowa Asthma Control Program, IDPH

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For more information about the burden of asthma in Iowa or to review the full Asthma In Iowa report, its updates or newsletters published by the IACP, contact us at the IACP :

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Citation:

Muldoon, J, *Asthma in Iowa Surveillance Report: Adult and Child Inpatient Hospitalization from Asthma ,Iowa State Inpatient Database, 1995-2006*, Center for Health Statistics, IDPH, 2008.

Asthma in Iowa

Adult & Child Asthma-Related Deaths

Iowa Death Records: 1979-2007

Iowa Department of Public Health
2009

In this report on asthma mortality:

Summary of Findings

While asthma accounted for less than 1% of all deaths for all years 1979-2007 (an average of 44/year between 2000-05, 42 in 2007) for those Iowans ages 5 to 34 years, asthma was a leading cause of death.

Asthma was the 17th leading cause of years of potential life in lost in Iowa between 2000-05, just behind HIV and aortic aneurysm.

The annual count of deaths from asthma in Iowa peaked in the mid-1990's (76/year) and has steadily declined in recent years (42/year during 2003-05.)

Overall age-adjusted rates of death from asthma in Iowa and nationally have trended downward since the mid-1990's.

Counts of deaths have been higher for females than males for all years since 1979. (26 deaths in females vs. 16 in males during 2003-05; 23 female vs. 19 males in 2007) Females now account for about 60% of all asthma deaths.

About 8% (1/year) of all asthma deaths among males occurred in children and youth, while about 3% (1/year)of asthma deaths in females occurred among children and youth.

Person who die from asthma are younger than the average Iowan who dies. Among women 42% of asthma deaths occurred among those age 74 and younger, among men, 62% of all asthma deaths occurred among those age 74 and younger.

Of all deaths among Iowa females, only 27% occurred among those age 74 and younger, while among men, 43% of deaths occurred among those age 74 and younger during 2003-05.

Age-adjusted rates of death among females declined between 1999 and 2005, while rates for men held steady.

Age-adjusted rates of death from asthma closely mirrored national rates of death from asthma for all years 1979-2005.

For additional information about asthma prevalence in children and adults and asthma-related hospitalizations in Iowa, please look up reports covering these topics on the Iowa Asthma Control Program web site: http://www.idph.state.ia.us/hpcdp/asthma.asp

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Ranking of Leading Causes of Death by Age, Iowa, 2000-2005

Average annual count by age

Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65-84	85+	All Ages
1	Congenital Anomaly 51	Unintent. Injury 14	Unintent. Injury 16	Unintent. Injury 15	Unintent. Injury 140	Unintent. Injury 90	Malignant Neoplasm 137	Malignant Neoplasm 474	Malignant Neoplasm 927	Malignant Neoplasm 3,664	Heart Disease 3,438	Heart Disease 7,928
2	SIDS 28	Congenital Anomaly 4	Malignant Neoplasm 6	Malignant Neoplasm 6	Suicide 54	Suicide 51	Heart Disease 119	Heart Disease 337	Heart Disease 584	Heart Disease 3,411	Malignant Neoplasm 1,160	Malignant Neoplasm 6,431
3	Short Gestation 25	Homicide 3	Congenital Anomaly 2	Suicide 3	Malignant Neoplasm 19	Malignant Neoplasm 33	Unintent. Injury 115	Unintent. Injury 120	Chronic Lower Resp. (asthma=4) 125	Chronic Lower Resp. (asthma=14) 988	Stroke 1,065	Stroke 2,096
4	Maternal Preg. Complic. 16	Malignant Neoplasm 3	Homicide 2	Congenital Anomaly 2	Homicide 11	Heart Disease 22	Suicide 66	Suicide 68	Unintent. Injury 84	Stroke 883	Alzheimer's Disease 592	Chronic Lower Resp. (asthma=44) 1,595
5	Placenta Cord Membrane 11	Perinatal Period 1	Benign Neoplasm 0.8	Heart Disease 2	Heart Disease 10	Homicide 9	Liver Disease 18	Liver Disease. 46	Stroke 77	Diabetes 364	Influenza/ Pneumonia 556	Unintent. Injury 1,115
6	Unintent. Injury 6	Influenza/ Pneumonia 1	Chronic Lower Resp. (asthma =1) 0.8	Chronic Lower Resp. (asthma =1) 1	Congenital Anomaly 4	Diabetes 5	Stroke 18	Stroke 44	Diabetes 76	Alzheimer's Disease 311	Chronic Lower Resp. (asthma=13) 432	Influenza/ Pneumonia 929
7	Respiratory Diseases 5	Heart Disease 1	Heart Disease 0.8	Influenza/ Pneumonia 1	Influenza/ Pneumonia 3	Influenza/ Pneumonia 5	Diabetes 14	Diabetes 37	Liver Disease 45	Influenza/ Pneumonia 310	Unintent. Injury 247	Alzheimer's Disease 911
8	Bacterial Sepsis 5	Stroke 1	Stroke 0.7	Septicemia 0.8	Chronic Lower Resp. (asthma = 3) 3	Stroke 4	Homicide 13	Chronic Lower Resp. (asthma=5) 35	Suicide 32	Unintent. Injury 269	Diabetes 207	Diabetes 705
9	Neonatal Hemorrhage 4	Eight Tiered* 0	Influenza/ Pneumonia 0.5	Diabetes 0.5	Diabetes 2	Congenital Anomaly 3	HIV 9	Influenza/ Pneumonia 18	Influenza/ Pneumonia 27	Parkinson's Disease 144	Athero-sclerosis- 174	Suicide 323
10	Atelectasis 4	Eight Tiered* 0	Perinatal Period 0.5	Influenza/ Pneumonia 0.5	Stroke 2	HIV 3	Chronic Lower Resp. (asthma=2) 8	Septicemia 15	Septicemia 20	Aortic Aneurysm 122	Pneumonitis 139	Athero-sclerosis 275
11	Intrauterin. Hypoxia 4	Eight Tiered* 0	Septicemia 0.3	Anemias 0.3	Meningo-coccal Infection 2	Chronic Lower Resp. (asthma=2) 2	Influenza/ Pneumonia 8	Viral Hepatitis 12	Nephritis 17	Septicemia 118	Hyper-tension 127	Nephritis 259
12	Circulatory System Dis. 4	Eight Tiered* 0.2	Suicide 0.3	Stroke 0.3	Benign Neoplasm 0.7	Complct'd Pregnancy 1	Congenital Anomaly 6	Congenital Anomaly 10	Aortic Aneurysm 15	Nephritis 117	Nephritis 112	Pneumonitis 257
13	Homicide 3	Eight Tiered* 0.2	Acute Bronchitis 0.2	Four tiered* 0.2	Complct'd Pregnancy 0.7	Pneumonitis 1	Septicemia 4	Homicide 7	Benign Neoplasm 9	Pneumonitis 101	Parkinson's Disease 87	Parkinson's Disease 234
14	Septicemia 2	Eight Tiered* 0.2	Dis. Of Appendix 0.2	Four tiered* 0.2	Meningitis 0.7	Three Tiered* 1	Nephritis 4	Nephritis 7	Congenital Anomaly 9	Athero-sclerosis- 91	Septicemia 71	Septicemia 234
15	Interstitial Emphy-sema 2	Eight Tiered* 0.2	Meningitis 0.2	Four tiered* 0.2	Septicemia 0.7	Three Tiered* 1	Viral Hepatitis 4	HIV 6	Athero-sclerosis 7	Benign Neoplasm 85	Benign Neoplasm 65	Hyper-tension 218
Total of above	170	30	30	34	251	232	541	1,235	2,053	10,979	8,470	23,507
Above as % of all deaths	80%	73%	87%	87%	89%	86%	85%	87%	89%	88%	85%	83%
Count all Deaths	213	41	35	38	282	270	637	1,421	2,299	12,510	10,021	27,767

* For 1-4 year olds, the eight causes of death that tied for 9th leading cause of death were: benign neoplasms, chronic lower respiratory disease, diseases of the appendix, liver disease, meningitis, nutritional deficiencies, peptic ulcer and septicemia

For 10-14 year olds, the four causes of death that tied for the 13th leading cause of death were: acute bronchitis, Alzheimer's disease, meningitis and conditions of the perinatal period.

For 25-34 year olds, the three causes that tied for the 14th leading cause of death were: hypertension, liver disease and septicemia.

All average annual counts >1 rounded to nearest whole number. Source: CDC WISQARS website: http://www.cdc.gov/ncipc/wisqars/default.htm

Asthma a leading cause of death for many younger Iowans:

Overall, asthma accounted for less than 1% of all deaths among Iowa residents between 2000-05 (n=44 asthma deaths/27,767 total deaths per year). Despite there being only 44 deaths from asthma per year in Iowa, for four age groups asthma was among the top 15 leading causes of death. Those age groups were: 5-9, 10-14, 15-24 and 15-34 year olds.
All chronic lower respiratory deaths in these four age groups were attributable to asthma. (Within each of these age groups, asthma accounted for between 1% and 3% of all deaths (1-3 deaths per year)).

While most asthma deaths (60%) occurred among Iowans 65 years and older, in these older groups, asthma was only a small fraction of deaths from all chronic lower respiratory disease, the latter of which continued to rank among the leading causes of death. In middle-aged and older Iowans, emphysema overshadowed asthma as the illness responsible for most chronic lower respiratory disease deaths.

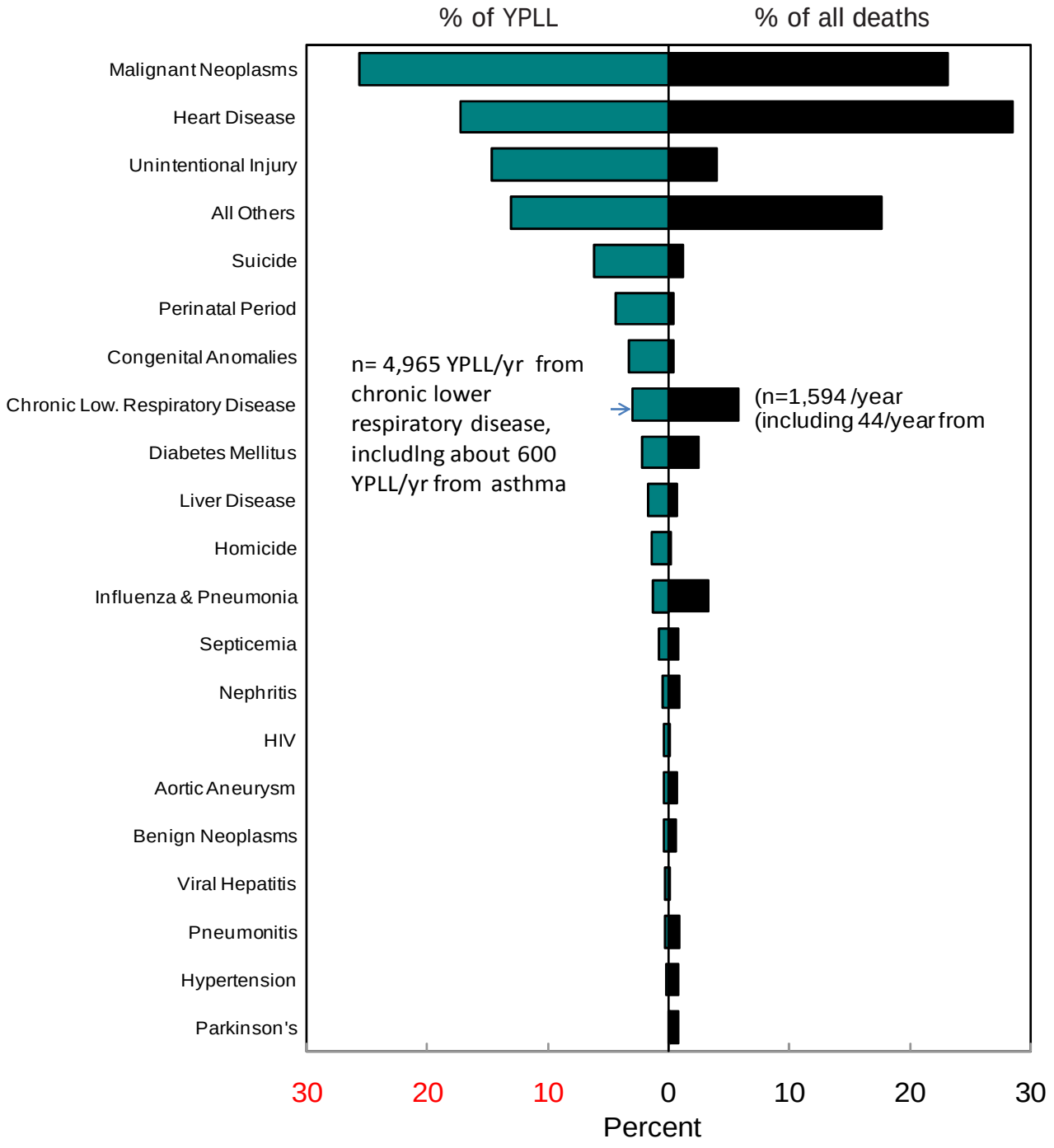
Note:
The National Center for Health Statistics of the Centers for Disease Control (CDC) has established a list of about 50 leading causes of death that it uses in many of its publications on leading causes of death. Those 50 leading causes of death are the basis for the groupings seen in the table on the opposite page.

The 50 groupings are defined based on clusters of International Classification of Disease (ICD) codes. ICD codes are used worldwide to code causes of death and illness.

Chronic lower respiratory diease (CLRD) is one of those 50 groupings. Asthma is included within the group of CLRDs. Also included in the group is emphysema, a CLRD that is much more common than asthma among adults ages 35 years and older and, like asthma, closely linked to smoking.

The count of asthma deaths is broken out from count of deaths from all CLRDs in the table on the opposite page.

Average Annual Percent Distribution of: Years of Potential Life Lost (YPLL) before Age 75 Years and Lead Causes of Death for All Ages, Iowa, 2000-05



Source: CDC WISQARS web site: http://www.cdc.gov/ncipc/wisqars/

During 2000-05, chronic lower respiratory disease was the 7th leading cause of years of potential life lost (YPLL) in Iowa. In all, about 4% (4,960 YPLL/year) of all 164,900 YPLLs/year in Iowa between 2000-05 were attributable to chronic lower respiratory disease.

Asthma accounted only for about 600 of these 4,960 YPLLs from chronic lower respiratory disease (12% of YPLLs from chronic lower respiratory disease) and for less than 1% of the 164,900 YPLLs from all causes.

If asthma were broken out from all chronic lower respiratory diseases, asthma is estimated to have ranked as the 17th leading cause of YPLL in Iowa during 2000-05, right after HIV, aortic aneurysms, and benign neoplasms.

20 Leading Causes of YPLL	2000-05 Average Annual		
	before age 75, number 2000-05		number deaths/year all ages
	YPLL	deaths	
Malignant Neoplasms	42,248	3,235	6,431
Heart Disease	28,500	2,164	7,928
Unintentional Injury	24,223	689	1,115
Suicide	10,143	294	323
Perinatal Period	7,288	98	98
Congenital Anomalies	5,387	97	108
Chronic Low. Respiratory Disease*	4,965	530	1,595
Cerebrovascular	4,332	367	2,096
Diabetes Mellitus	3,538	265	705
Liver Disease	2,793	157	205
Homicide	2,301	52	54
Influenza & Pneumonia	2,069	134	929
Septicemia	1,373	85	234
Nephritis	815	64	259
HIV	686	22	22
Aortic Aneurysm	685	65	207
Benign Neoplasms	647	45	169
Viral Hepatitis	575	26	32
Pneumonitis	514	40	257
Hypertension	359	31	218
All Others	21,455	1,125	4,787
All Causes	164,895	9,583	27,767
Among 20 Leading Causes of Death -All ages			
Parkinson's Disease			234
Alzheimer's Disease			911
Atherosclerosis			275

* Asthma = ~600 YPLL/Year, 23 deaths/yr before age 75, 44 deaths all ages/yr

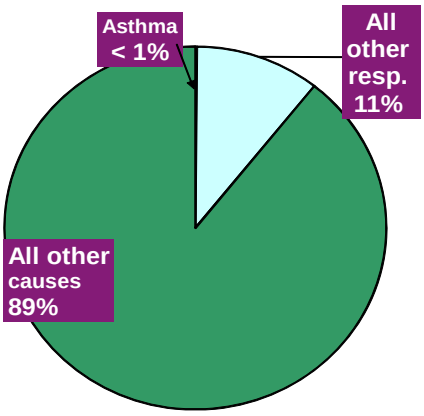
Note:
Years of potential life lost (YPLL) weights deaths so that the younger a person is at death, the greater weight given to his or her death.
Years of potential life lost (YPLL) is calculated by substracting the age at death for a person from a statndard 'expected' age of death and then summing the YPLLs for all persons for each cause of death. (Age 75 was the standard age used in the table and chart opposite. That is, anyone who died before age 75 was considered to have had a premature death. Other standard ages could have been used. Age 65 is frequently used but so could other ages 60, 70, 80 or 85.)

For example, if a total of three Iowans died from asthma who were ages 2, 37 and 74, the YPLL for asthma would be: (75-2 years) + (75-37 years) + (75-74 years) = 73+38+1 = 117 years of potential life lost. The death of the 2 year old counts as 73 YPLL, while the death of the 74 year old counts as only 1 year of potential life lost.

YPLL for asthma were extrapolated from Iowa age-group death counts from asthma for the years 2000-05 available from the CDC Wonder website, compressed mortality data.

All Iowa deaths by cause	2003-05 average	
	Count	%
Asthma	42	<1%
All other respiratory	3,089	11%
All non-respiratory	26,135	89%
All causes	29,266	100%

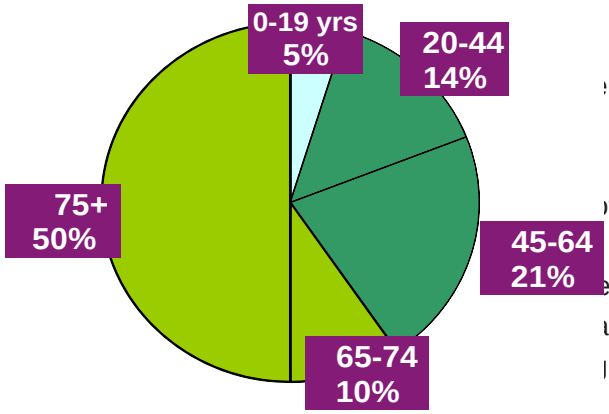
By Cause, Percent of All Iowa All Deaths, 2003-05



ma was listed as the
ary cause of death for
r than 1% of all Iowa
ent deaths during 2003-

Iowa asthma deaths	2003-05 average	
	Count	%
Age		
0-19 yrs	2	5%
20-44	6	13%
45-64	9	22%
65-74	4	9%
75+	21	50%
Gender		
Female	26	61%
Male	16	39%
Total deaths	42	100%

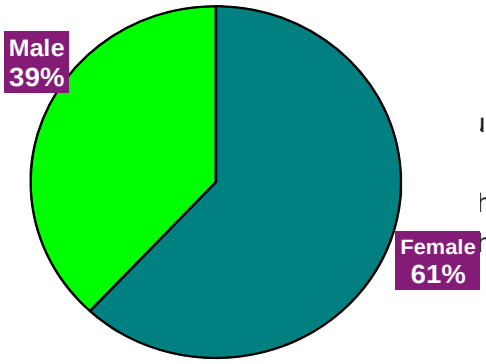
Iowa Asthma Deaths by Age, 2003-05



rcent of asthma
(n=2) occurred
those less than 20
f age.

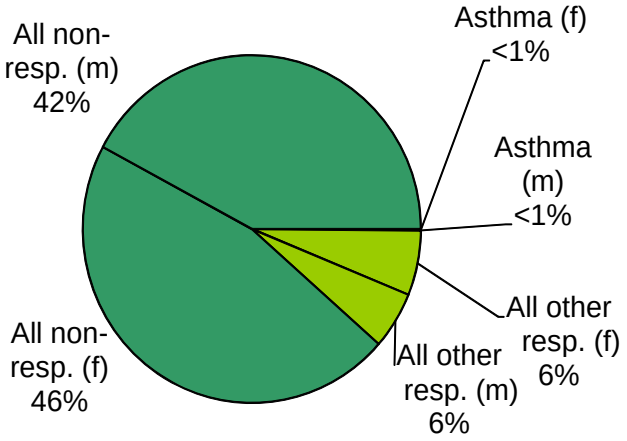
small numbers,
was among the 10
causes of death for
groups 5-24 years
(See page 3)

Iowa Asthma Deaths by Gender, 2003-05



t 60% of Iowa deaths
asthma (26/42
hs per year) were
hs of females.

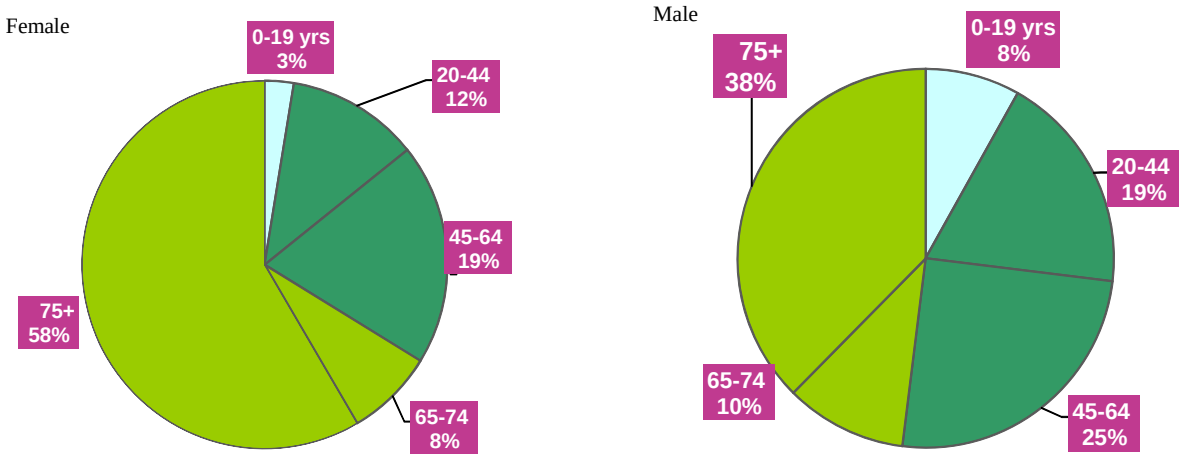
By Sex and Cause, Percent of All Iowa Deaths, 2003-05



Deaths from asthma (asthma was primary cause of death) accounted for fewer than 1% of all deaths among both males and females.

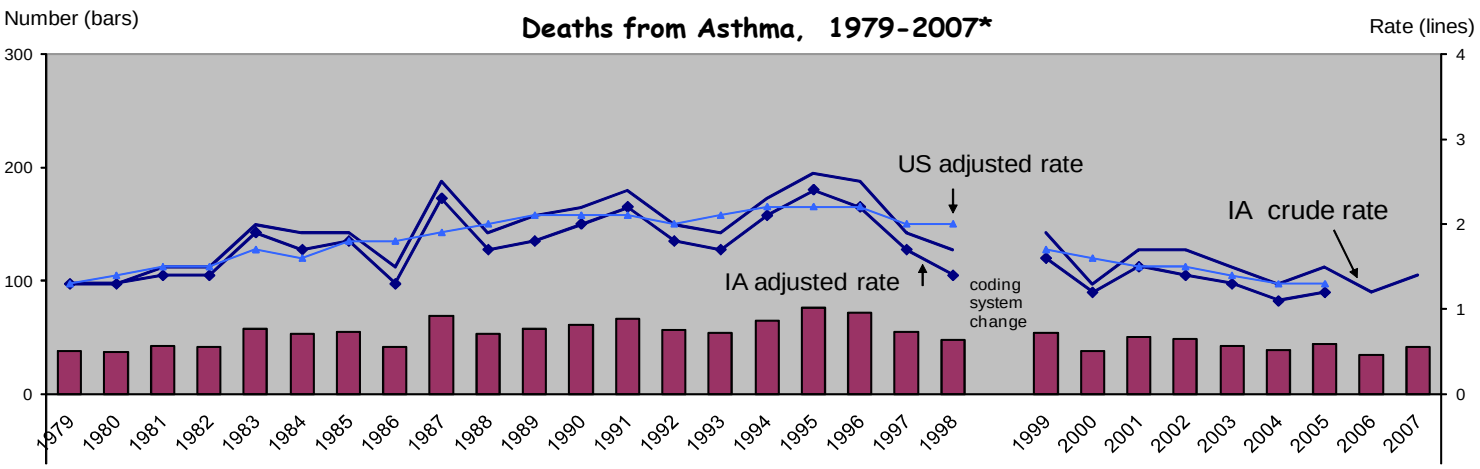
Iowa deaths by cause	2003-05 average					
	Count		% by gender		% of all deaths	
	female (f)	male (m)	f	m	f	m
Asthma	26	16	0.2%	0.1%	<1%	<1%
All other respiratory	1,662	1,478	11%	11%	6%	5%
All non-respiratory	12,805	11,655	89%	89%	47%	42%
All causes	14,443	13,147	100%	100%	53%	47%

Iowa Asthma Deaths by Sex and Age, 2003-05



Males and females die in equal numbers froms asthma through age 74. The greater number of deaths in females after age 74 is at least in part due to there being more females than males of that age in the Iowa population. Among males, 8% of deaths from asthma occurred among children and youth while among females, 3% of deaths from asthma occurred among the young.

Iowa deaths from asthma by age	2003-05 average			
	Count		Percent	
	f	m	f	m
0-19 yrs	1	1	3%	8%
20-44	3	3	12%	19%
45-64	5	4	19%	25%
65-74	2	2	8%	10%
75+	15	6	58%	38%
Total	26	16	100%	100%



Year	Deaths from Asthma, Iowa			U.S. adjusted rate
	count	crude rate	adjusted rate	
1979	38	1.3	1.3	1.3
1980	37	1.3	1.3	1.4
1981	43	1.5	1.4	1.5
1982	42	1.5	1.4	1.5
1983	58	2	1.9	1.7
1984	53	1.9	1.7	1.6
1985	55	1.9	1.8	1.8
1986	42	1.5	1.3	1.8
1987	69	2.5	2.3	1.9
1988	53	1.9	1.7	2
1989	58	2.1	1.8	2.1
1990	61	2.2	2	2.1
1991	67	2.4	2.2	2.1
1992	57	2	1.8	2
1993	54	1.9	1.7	2.1
1994	65	2.3	2.1	2.2
1995	76	2.6	2.4	2.2
1996	72	2.5	2.2	2.2
1997	55	1.9	1.7	2
1998	48	1.7	1.4	2
1999	54	1.9	1.6	1.7
2000	38	1.3	1.2	1.6
2001	51	1.7	1.5	1.5
2002	49	1.7	1.4	1.5
2003	43	1.5	1.3	1.4
2004	39	1.3	1.1	1.3
2005	44	1.5	1.2	1.3
2006	35	1.2		
2007	42	1.4		

(Note: Cause of death coding system changed from ICD9 to ICD10 in 1999.)

Trends in counts of death: For each year 1979 through 2007, asthma was listed as the primary cause of death for fewer than 80 Iowans —less than 1% of all deaths. The count of deaths from asthma peaked during the mid-1990s (peak year 1995, n=76 deaths) and has now dropped back to the levels last seen 30 years ago.

Trends in crude rates: Like counts of deaths, the annual crude rate of death from asthma in Iowa peaked during the mid-1990s, rising to 2.6/100,000 in 1995 from a rate of 1.3/100,000 in 1979. By 2007, the Iowa crude rate had dropped back to 1.4/100,000.

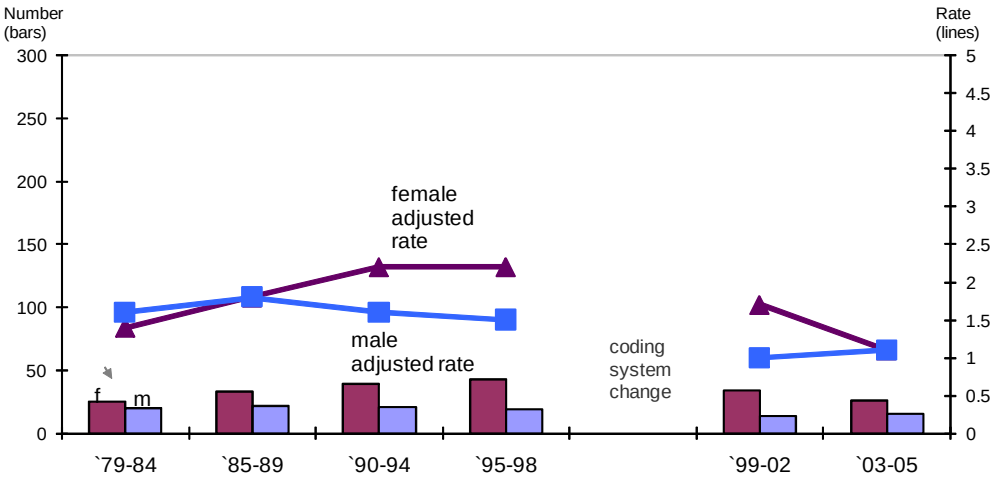
National crude death rates from asthma show similar trends with rates peaking at 2.1//100,000 in 1996 and dropping to 1.5/100,000 in 2005. (National data after 2005 were not available at the time this report was written.)

Trends in age-adjusted rates: The Iowa age-adjusted rate of death from asthma also peaked in the mid 1990's and closely mirrored the national age-adjusted rate for all years 1979-2005. This means that overall differences between the Iowa and national rates of death from asthma can most likely be attributed to differences in the age distribution between Iowa and US populations.

*Iowa resident deaths from asthma, 1979-2006. All rates are per 100,000 population. Only the underlying or primary cause of death is included in counts/rates. Cause of death coding system changed from ICD9 to ICD10 in 1999. ICD9 codes used from 1979-98: 493; ICD10 codes used from 1999 forward: J45, J46.

Note: Age-adjusted rates are the sum of age-specific rates that have been weighted using the age-distribution in some standard population. The U.S. 2000 population was the standard population used here. Age-adjusting to the same standard population eliminates any difference in two populations' crude rates that is attributable primarily to one population being older or younger than another. When age-adjusted rates differ between two populations, something other than age accounts for the difference.

By Sex, Iowa Deaths from Asthma
Age-Adjusted Rates and Counts, 1979-2005**



Counts of deaths for females were higher than counts of deaths for males for all years 1979 forward. (n=26/year for females and 16/ year for males during 2003-05.)

Age-adjusted rates of death among females were slightly higher than the age-adjusted rates for males for the periods 1990-94, 1995-99 and 1999-2002.

Death rates peaked in the 1990s for both females and males.

Year	Iowa						U.S. Adjusted rate	
	Count		Crude rate		Adjusted rate			
	female (f)	male (m)	f	m	f	m	f	m
`79-84	25	20	1.7	1.4	1.4	1.6	1.5	1.5
`85-89	33	22	2.3	1.7	1.8	1.8	2.1	1.8
`90-94	40	21	2.7	1.5	2.2	1.6	2.3	1.8
`95-98	44	19	2.9	1.4	2.2	1.5	2.4	1.8
`99-02	34	14	2.3	1	1.7	1	1.8	1.3
`03-05	26	16	1.7	1.2	1.1	1.1	1.5	1
1999	37	17	2.5	1.2 *	1.7	1.2 *	2	1.3
2000	25	13	1.7	0.9 *	1.3	0.9 *	1.8	1.3
2001	36	15	2.4	1 *	1.6	1 *	1.7	1.2
2002	37	12	2.5	0.8 *	1.9	0.8 *	1.7	1.2
2003	27	16	1.8	1.1 *	1.3	1.1 *	1.6	1.1
2004	24	15	1.6	1 *	1	1 *	1.4	1
2005	26	18	1.7	1.2 *	1.1	1.2 *	1.5	1
2006	25	10	1.7	0.7 *				
2007	23	19	1.6	1.3 *				

*This rate for males is unreliable due to the small number of deaths.

For all years shown, among both males and femlaes, only slight differences were found between the Iowa and U.S. adjusted rates of death from asthma.

** Iowa resident deaths from asthma, 1979-2006. All rates are per 100,000 population. Only the underlying or primary cause of death is included in counts/rates. Cause of death coding system changed from ICD9 to ICD10 in 1999. ICD9 codes used from 1979-98: 493; ICD10 codes used from 1999 forward: J45, J46.

About Iowa Mortality Data

Data in this report came from two Center for Disease Control and Prevention (CDC) online web-based data systems of national and state mortality data: WISQARS (Web-Based Injury Query and Reporting System: (http://www.cdc.gov/NCIPC/WISQARS/) and CDC Wonder (http://wonder.cdc.gov/mortSQL.html) and from the Iowa Department of Public Health, Center for Health Statistics.

WISQARS provides national and state-counts and percents for the level leading causes of death and for the leading causes of years of potential life lost. Data by race, gender, ethnicity and year were available from that site. Mortality data are compiled by the National Center for Health Statistics (NCHS), a branch of CDC. Annually all states, including Iowa, send their state's mortality data from the past year to the NCHS.

The WISQARS years of potential life lost (YPLL) function measures premature mortality (early death). YPLL, as used in this report, provides insight into the impact of causes of death that particularly affect persons younger than age 75 years of age. Deaths of children, youth, the middle aged and those in early old age are given weight based on the age of the decedent while deaths among those above the standard age (age75 in this report) are not counted. In this report, the YPLL of a person for a given cause (YPLL-75) was computed through two steps. First, each deceased person's age at death was subtracted from 75. Next, the results — the "years lost"— for all people dying from a particular cause of death was summed. WISQARS allows one to choose a standard age from age of 65 up to 85. The IDPH uses age 75 for this report.

CDC WONDER, the second web-based mortality data system used in this report, houses data for the years 1979-2005 at the time of this report's publication. The number of deaths, crude death rates and age-adjusted death rates can be obtained by place of residence (total U.S., state, county, metropolity district), age group, race (white, black, and other), gender, year of death, for the underlying (primary) cause-of-death (4-digit ICD code or group of codes). Confidentiality restrictions were applied and some data, particularly small county numbers and rates, may be suppressed due to their small nuimber.

About the Iowa Asthma Control Program

The Iowa Asthma Control Program (IACP), administered by the Iowa Department of Public Health (IDPH) receives about $400,000 in CDC funding each year to plan for and administer asthma control programming across the state. This report is produced by the IDPH's Center for Health Statistics using IACP funding. Other current efforts of the IACP include: child care provider training, school health staff training, monitoring of local open burning ordinances, and staffing of the statewide Iowa Asthma Coalition.

Reports on the prevalence of asthma in Iowa adults and children as well as a factsheet on deaths from asthma in Iowa are posted on the IACP website listed below.

Iowa asthma surveillance committee members include:

Sarah Peterson, Iowa Dept. of Education

Simeon Geletta, Ph.D, Des Moines University

Alan Sisson, M.D,

Andrea Hoffman, Iowa Asthma Control Program, IDPH

Kathy Leinenkugel, Occupational Epidemiology, IDPH

Marnell Kretschmer, Immunization Program IDPH

Maggie O'Rourke, Tobacco Control Program, IDPH

For more information about the burden of asthma in Iowa or to review other reports on asthma in Iowa, contact the IACP at:

Web site address:

http://www.idph.state.ia.us/hpcdp/asthma.asp

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Citation:

Muldoon, J, *Asthma in Iowa Surveillance Report : Deaths from Asthma, Iowa Adult and Children: 1979-2007* , Center for Health Statistics, IDPH, 2009.