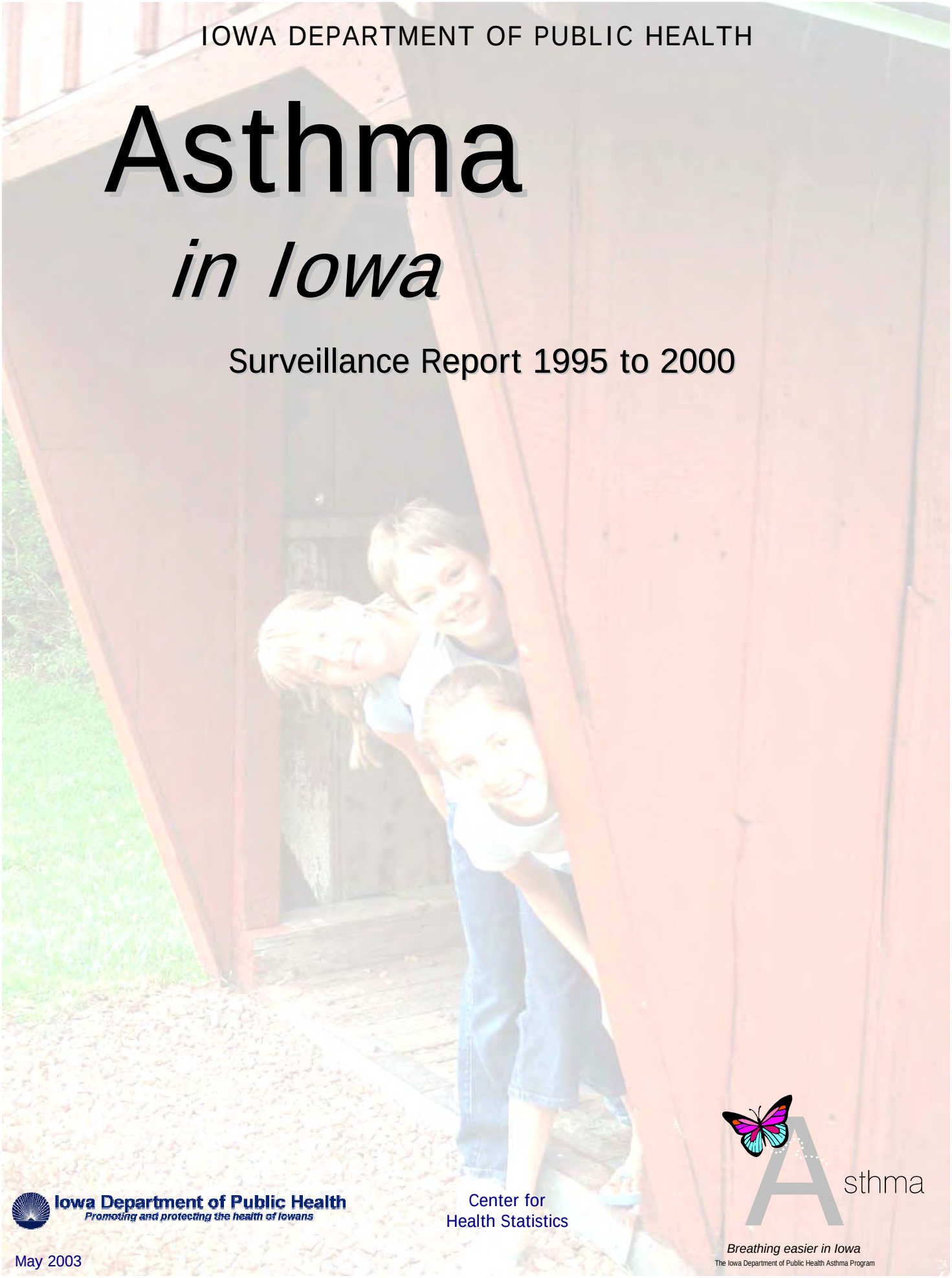
IOWA DEPARTMENT OF PUBLIC HEALTH

Asthma

in Iowa

Surveillance Report 1995 to 2000



Iowa Department of Public Health
Promoting and protecting the health of Iowans

Center for
Health Statistics

Asthma

Breathing easier in Iowa
The Iowa Department of Public Health Asthma Program

May 2003

Fields of Opportunities

STATE OF IOWA

THOMAS J. VILSACK
GOVERNOR

SALLY J. PEDERSON
LT. GOVERNOR

DEPARTMENT OF PUBLIC HEALTH
MARY MINCER HANSEN, RN, PhD
DIRECTOR

Dear Colleague:

It is with pleasure that we present the report, Asthma in Iowa Surveillance Report to the citizens of Iowa. This report responds to our increasing concern with the numbers of people with asthma growing rapidly over the past several years. This has been true not only in Iowa, but also across the nation.

Asthma is an important public health problem for Iowa and for our nation. It is one of the leading causes of school and work absenteeism in our country. Asthma also affects the economy of our nation with costs, including treatment, medications, and lost productivity, exceeding $12 billion each year.

There are approximately 200,000 Iowans affected by asthma. Of those 200,000 Iowans, approximately 40,000 to 50,000 are children.

The Iowa Department of Public Health, with assistance from the University of Iowa, has prepared the enclosed Asthma in Iowa Surveillance Report for the purpose of assisting the state in establishing the baseline for a statewide asthma surveillance system. In addition, the report provides state-specific data for policy makers, public health administrators, and health care professionals.

We hope the report will present itself as a useful tool in the statewide development, and subsequent implementation, of a state asthma action plan.

Cordially,

Mary Mincer Hansen

Mary Mincer Hansen, RN, PhD
Director

LUCAS STATE OFFICE BUILDING / 321 E. 12TH ST. / DES MOINES, IOWA 50319-0075
DEAF RELAY (HEARING OR SPEECH IMPAIRED) 1-800-735-2942 / INTERNET: HTTP://WWW.IDPH.STATE.IA.US/

DIRECTOR'S OFFICE
515-281-5605
FAX/515-281-4958

DIV. OF ADMINISTRATION
515-281-5604
FAX/515-281-4958

DIV. OF COMMUNITY HEALTH
515-281-6535
FAX/515-242-6384

DIV. OF HEALTH PROTECTION & ENVIRONMENTAL HEALTH
515-281-7726
FAX/515-281-4529

DIV. OF HEALTH PROMOTION, PREVENTION & ADDICTIVE BEHAVIORS
515-281-3641
FAX/515-281-4535

DIV. OF TOBACCO USE PREVENTION & CONTROL
515-281-6225
FAX/515-281-6475

Executive Summary: The Asthma Epidemic in Iowa

What is asthma?

Asthma is a complex and costly, but treatable, chronic respiratory disease for which rates are estimated to have doubled since 1980. An epidemic of asthma is now underway in Iowa and the nation.

Asthma is the most prevalent chronic condition of childhood and the fourth most prevalent chronic condition of adults. Even if rates were to stabilize, asthma would continue to be a profound public health problem.

Asthma in Iowa

About 200,000 Iowans have asthma, including:

- 40,000 to 50,000 children (6 to 6.5 percent of Iowans 17 years of age and younger).
- 152,000 adults (seven percent of adults 18 years of age and older).

Although we know little about how to prevent asthma from first developing, we do know how to lessen the severity and frequency of recurrent asthma attacks. Proper medical management, including routine office visits, appropriate medications, and patient self-management using individualized written self-management plans from one's health care provider, is key to successful asthma control.

Poorly managed asthma results in expensive and avoidable inpatient hospitalizations, emergency room visits and unscheduled physician office visits. Each year in Iowa, uncontrolled asthma results in:

- 12,000 hospitalizations;
- 40,000 to 50,000 emergency department visits; and,
- 35,000 to 45,000 unscheduled office visits.

Costs of asthma in Iowa

Direct and indirect costs of asthma in Iowa are estimated to be between $144 and $154 million per year, or about $759.00 per person with asthma. These costs largely could be avoided with proper medical and patient self-management.

With funding from the Centers for Disease Control and Prevention (CDC), the Iowa Department of Public Health (IDPH), along with the Iowa Asthma Task Force and the Iowa Asthma Coalition, is developing a long range strategic plan to address the asthma epidemic in Iowa. Contact the IDPH Asthma Program or its web site at: http://www.idph.state.ia.us/sa/hprom/asthma/default.htm for more information.

Table of Contents

Table of Contents, continued

Index: Figures, Tables and Maps by Asthma Risk Factor

Introduction: The Asthma Epidemic

Asthma in the U.S.

Two recently published national strategic plans for public health, *Healthy People 2010* and *Action Against Asthma* (USDHHS, 2000), note that asthma is a growing public health problem that is epidemic in scale. *Action Against Asthma* states that, 'With the number of people with asthma in the U.S. doubling between 1979 and 1984….even if…rates were to stabilize, asthma would continue to be a profound public health problem."

More than 15 million Americans now have asthma. It is the most prevalent chronic condition of childhood and the fourth most prevalent chronic condition of the U.S. population overall. *Healthy Peop*le *2010* notes that in the U.S., asthma is responsible each year for:

- 500,000 hospitalizations;
- 1.8 million emergency room visits;
- 5,000 deaths;
- 134 million days of restricted activity;
- more than 9 million physician office visits, including 3 million unscheduled visits; and
- $3.64 billion in direct medical expenditures (1990).

The report *Asthma in America* finds asthma-related health care costs to be even greater than those estimated in *Healthy People 2010*: Each year between six and nine percent of people with asthma are hospitalized (900,000 to 1,350,000 admissions); 23 percent visit emergency departments at least once (3.5 million visits); and 20 percent make unscheduled asthma-related clinic visits (3 million visits).

Asthma in Iowa

With asthma prevalence and medical care costs skyrocketing, managing asthma to lessen the burden it places on the health of people with asthma and on the health care system has become a priority, not only for the nation, but for Iowa.

Asthma-related direct health care costs are estimated to total $85,000,000 and indirect costs $64,000,000 for the state. (ACAAI, AAFA)

More than 12,000 asthma-related hospitalizations of Iowans occur each year. Most of these hospitalizations, as well as most asthma-related emergency room and unscheduled ambulatory care visits, and their attendant costs could be avoided with more effective medical provider care and patient self-management.

Healthy Iowans 2010, Iowa's counterpart to the national plan *Healthy People 2010*, lists asthma among its 23 public health priorities for the current decade. Devoting an entire chapter to asthma, this plan defines six goals to move the state toward curtailing the epidemic, including the establishment of:

- a statewide asthma coalition;
- additional asthma control programs in schools;
- additional programs in the outpatient setting;
- additional local regulations to ban open burning;
- interventions to educate Iowans about environmental asthma triggers; and

- a statewide asthma surveillance system.

This report, funded through a grant from the Centers for Disease Control and Prevention (CDC) represents the Iowa Department of Public Health's initial step toward establishing an Iowa asthma surveillance system.

Detailed Summary of Findings about the Asthma Epidemic in Iowa

Prevalence and Costs in Iowa

- Asthma is a complex and costly, but treatable, chronic respiratory disease for which rates are estimated to have doubled since 1980.
- About 200,000 Iowans now have asthma, including 40,000 to 50,000 children and an estimated 152,000 adults.
- Seven percent of the adult population and approximately 6 to 6.5 percent of children 17 years and younger are estimated to have asthma.
- Direct and indirect costs of asthma in Iowa are estimated to be between $144 and $154 million per year, or about $759 per person with asthma.

BRFSS (Non-Institutionalized Adults)

- Women are 35 to 40 percent more likely than men to have asthma. Young adults 18 to 34 years and those 55 years and older have rates 30 to 40 percent higher than middle-aged adults 35 to 54 years.
- Twenty-three percent of adults with asthma (39,500) smoke tobacco.
- Of adult smokers, eight percent (39,500) have asthma. Of former adult smokers, nine percent (44,000) have asthma.
- Thirty-three percent of adults with asthma (48,000) reside with someone who smokes inside the house.
- More than one-third (45,000) of adults with asthma are obese compared with about one-fifth of all Iowa adults.
- Thirty percent of adults with asthma do not exercise regularly, the same proportion of all adults in Iowa.
- Among adults, racial differences in asthma prevalence are small.
- Adults of low income (income less than $25,000) are about 250 percent more likely to report having asthma than are adults with household incomes of more than $75,000.
- Adults with less than a high school degree are more than twice as likely as those with a college degree to report currently having asthma, and are also significantly more likely to report having asthma when compared to other educational attainment classes.
- The rates of asthma for Iowa adults are lower than for adults in the U.S. In 2000, Iowa rates were lower for all comparable age, race, gender, income and educational groups with the exception of rates for those adults who have not completed high school. Iowa's rates are about 30 percent higher than the national rates for those with less than a high school education.
- Among Midwestern states, Iowa's asthma prevalence rates for gender, age, race, income and educational attainment generally fall in the middle range of rates.

Iowa Medicaid Population 1995 to 1997

- Medicaid claims data grossly understate asthma prevalence in the elderly Medicaid population by as much as 400 to 600 percent. This understatement is attributable to Medicare being the *primary* insurer for most elderly, resulting in few asthma-related claims being submitted for the elderly to Medicaid. Asthma prevalence among those 65 years and older in the Iowa Medicaid population was 1.4 percent in 1995 to 1997, while Iowa BRFSS data show prevalence in among those non-institutionalized Iowans 65 years and older in 1999 to 2000 was 7.4 percent. Because of this

understatement, rates for the Medicaid population given in this report largely focus on those 0 to 64 years of age.

- About 7.4 percent of those Iowans ages 0 to 64 years who are enrolled in the fee-for-service Medicaid option have asthma (1995 through 1997).
- Prevalence of asthma among children 17 years of age and younger in the Medicaid fee-for service population is about eight percent.
- Of Iowa children enrolled in Medicaid, boys are about 25 percent more likely than girls to have asthma (6.8 vs 8.6 percent).
- Of Iowa adults, ages 18 to 64 years (exclusive of those 65 years and older) enrolled in the Medicaid fee-for-service option, rates for women are more than double that for men (8.6 vs. 3.9 percent).
- Among Iowans 18 to 64 years of age enrolled in Medicaid, about seven percent have asthma, a proportion not significantly different from that for all Iowans in that age group (6.9 percent based on 1999 to 2000 BRFSS data). This is unexpected since the 1999 to 2000 BRFSS asthma prevalence rate for Iowa adults ages 18 years and older of low income (<$25,000) was 8.8 percent, well above the rate of seven percent for all non-institutionalized Iowans 18 years and older.

Prevalence Estimates for Iowa Children (Based on National Data)

- Roughly 47,000 Iowa children have asthma, including:
- 12,800 Iowa children less than four years of age (8.5 percent);
- 27,200 Iowa children ages 5 to 14 years of age; and
- 7,200 Iowa children ages 15 to 17 years of age.

Mortality in Iowa 1999 and 2000

- About 140 deaths each year are attributable to asthma.
- Of these deaths, more than half are in people ages 75 years and older.
- Females are about twice as likely as males to die from asthma.
- The rate of asthma-related deaths was about 3 to 4 times higher in African-Americans compared to Caucasians, although the numbers were small for the two years examined (134 deaths for Caucasians and 4.5 deaths for African-Americans per year).

Hospitalizations in Iowa 1995 through 2000

- About 12,000 asthma-related hospitalizations occur each year.
- Females had hospitalization rates more than 90 percent higher than males during 1998 to 2000.
- African-Americans are about three times more likely than Caucasians to be hospitalized for asthma.
- Caucasians account for about 75 percent of asthma-related hospitalizations. African-Americans account for about 5 percent. For 20 percent of hospitalizations, race was unknown.
- Persons more than 65 years of age and less than 4 years of age have the highest rates of hospitalization for asthma. (Persons more than 65 years have the highest rates of hospitalization overall and for most chronic conditions.)
- Differences exist in hospitalization rates by county population size, with rates steadily increasing with population size. On average, counties of more than 50,000 population had rates of hospitalization about 25 percent higher than counties of less than 10,000 population between 1998 and 2000. This finding is consistent with Iowa Medicaid prevalence data which also show asthma prevalence increasing as county size increases. (See Figures 4.6 to 4.11 and Tables 4.4 to 4.11.)

Background

What is asthma?

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.

The underlying conditions of asthma, inflammation and over-constriction of the airways, occur when the right combination of host and environmental stimuli are present. The right 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)

Diagnosis and Sequelae

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 percent 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.

The continuous nature of persistent asthma, makes it difficult to distinguish from chronic obstructive pulmonary disease (COPD, e.g., 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.

For many children and most adults, a diagnosis of asthma is for life: Even after many years without 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.

Types of Asthma

Researchers and clinicians typify asthma by its severity, frequency, causes, and age of onset.

Severity/Frequency Classifications

The *Guidelines for the Diagnosis and Management 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 percent of all cases of asthma can be classified as severe, about 20 percent as moderate, and 55 to 70 percent of cases as mild. (Asthma in America, NHLBI, 1996)

Cause and Age of Onset Asthma Classifications

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 the disease as child-onset or adult-onset asthma. Most child-onset asthma is extrinsic. Most adult-onset asthma is intrinsic.

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).

What causes asthma?

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:

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 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.

Among host risk factors, **atopy** is most strongly associated with developing asthma.

Environmental risk factors

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 percent of asthma is attributable to workplace exposures. (EPA, 2002) (See Appendix C for a detailed listing of known and suspected asthma risk factors.)

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)

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 have 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; 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 asthmatics.

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)

Data sources

Data sources

Five sources of data were used for this report, the:

- National and Iowa Behavioral Risk Factor Surveillance System (BRFSS);
- National Health Interview Survey (NHIS) and National Survey of Early Childhood Health (NSECH);

- Iowa Medicaid program subscriber data from the Medicaid Management Information System (MMIS);
- Iowa vital records death certificates; and
- Iowa State Inpatient Database (SID).

Each of the five databases is described in more detail in the sections of this report where their data are reported.

Rate Calculations

Data are given here as either counts or rates. Rates are the number of health events (e.g., cases of asthma, hospitalizations, deaths, or frequency of an asthma risk factor) in a population at a given point in time (or during a specific period of time) divided by the number of people in that population at that time.

The BRFSS and Medicaid-derived *prevalence* rates of asthma and asthma risk-factors given in this report are based on *counts of the number of people with asthma* (or an asthma risk factor) at the time they were interviewed for the BRFSS or enrolled in Medicaid, regardless of when their case was diagnosed in the last year or ten years ago. All asthma prevalence rates are expressed as the number of cases per 100 population.

Unlike the BRFSS and Medicaid rates in this report, death and inpatient hospitalization rates provided are of asthma-related *incidence* rates, rather than prevalence rates. They are based on the number of *new* asthma-related events (e.g., deaths, hospitalizations) occurring at some specified period of time (usually during a year or several years) and are expressed as number of deaths or hospitalizations occurring per 100,000 population during that time.

Denominators *for death and hospitalization* rates were derived from U.S. Bureau of the Census Iowa population estimates for 1995 through 1999 and actual census counts for 2000.

BRFSS-based prevalence estimates use a data-weighting methodology provided by the Centers for Disease Control and Prevention (CDC). CDC's methodology is used to generate both prevalence counts for the numerator and denominator from the BRFSS sample data. (See Appendix D)

For rates computed for the Medicaid population, Medicaid fee-for-service subscribers (those who are not enrolled in a health maintenance organization), comprise the numerators and denominators.

Case definitions that were used to determine when a prevalent condition, death or hospitalization was counted as an asthma-related event are listed in Appendix D for all data sets. All definitions used to count an asthma-related event (a death, hospitalization or asthma case) for the numerators of rates are nationally agreed-on asthma surveillance case definitions adopted by the Council for State and Territorial Epidemiologists (CSTE), with the exception of those definitions used to compute the Iowa Medicaid data numerators. The CSTE has not adopted standard surveillance case definitions for asthma prevalence derived from insurance databases.

Prevalence Estimates for Adults: BRFSS Data

Iowa Behavioral Risk Factor Surveillance System

Established in 1988, the Iowa Behavioral Risk Factor Surveillance System (BRFSS) is a CDC funded annual household-based phone 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.

All states participate in the BRFSS. In Iowa, about 3,600 households are surveyed annually. Due to the BRFSS's small sample size, only statewide (not county, regional or urban/rural) prevalence rates can be computed.

In certain years, optional questions are added to the basic BRFSS survey. In 1999, the Iowa BRFSS began to include optional questions that ask about asthma in adults. The BRFSS data are the first to be collected that allow estimates to be made of asthma prevalence in adults statewide.

This report uses data from the 1999 and 2000 Iowa BRFSS optional asthma questions to estimate average annual 'current' and 'ever had' asthma prevalence, as well as the prevalence of key risk factors for asthma in adults. Those adult Iowans classified in this report as currently having asthma are those who responded yes to these two questions in the BRFSS: "Have you ever had asthma?" and "Do you still have asthma?" (See Appendix D, Case Definitions, for a list of BRFSS questions asked to determine asthma and asthma risk-factor prevalence, as well as BRFSS sample weighting methods.)

In 2001, additional optional asthma-related questions were added which asked about children with asthma in the households where adults were interviewed. Iowa BRFSS asthma data on children will be available for release in early 2003. As with the 1999 BRFSS adult asthma questions, the year 2001 BRFSS questions on asthma in children provide the first data that allow asthma prevalence estimates to be made for the general population of Iowa children.

In 2001, the Iowa BRFSS also included additional optional questions about the symptoms of persons with asthma and their use of the health care system. As with the child prevalence estimates, these data will be analyzed in early 2003.

Other questions about certain asthma risk factors (e.g., tobacco use, exercise, obesity, insurance coverage, and use of health-care services) have been included in the annual BRFSS survey for many years and rates of these risk factors for Iowa adults with and without asthma are compared in this report.

How many adults have asthma?

About 200,000 Iowans are estimated to currently have asthma, including 152,000 adults (147,000 non-institutionalized and about 5,000 institutionalized adults) or seven percent of the Iowa adult population.

Ten percent of the Iowa adult population is estimated to ever have had asthma.

National data, which Iowa likely mirrors, show asthma prevalence rates to have more than doubled since 1980.

Charts of BRFSS Data

In this report, Figures 1.1 to 1.10 compare differences in Iowa adult asthma prevalence rates between the genders and between adults grouped by racial, income, education, insurance, smoking, exercise and obesity status.

Figures 1.11 and 1.12 compare rates of obesity, smoke exposure and regular exercise in Iowa adults with and without asthma. (In Figures 1.1 to 1.10, rates of asthma for adults with various risk factors are compared. In Figures 1.11 to 1.12, rates of risk factors are compared in adults with asthma vs. all adults.)

Tables of BRFSS Data

Additional information from the Iowa BRFSS is found in Tables 1.1 to 1.4 in Appendix E. Table 1.1 has historical estimates of asthma prevalence for the Iowa adult and total populations which are based on National Health Interview Survey (NHIS) national asthma prevalence rates for 1980 through 1998 and the Iowa BRFSS rates for 1999 and 2000.

Table 1.2 contains current and lifetime asthma prevalence estimates for Iowa. Table 1.3 provides asthma prevalence estimates by socioeconomic, smoking, exercise, obesity and insurance status. Table 1.3 provides the data graphed in Figures 1.1 to 1.12.

Table 1.4 compares year 2000 BRFSS Iowa prevalence to the U.S. and other Midwestern states.

Asthma Prevalence in Iowa Adults: Summary of 1999 to 2000 BRFSS Data in Tables and Figures

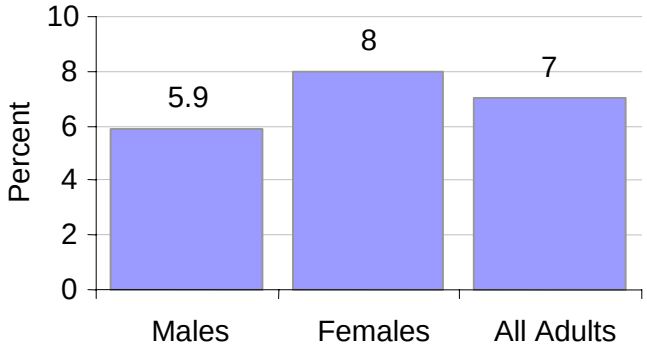
- Women are 35 to 40 percent more likely than men to have asthma. Young adults 18 to 34 years and those 55 years and older have rates 30 to 40 percent higher than middle-aged adults 35 to 54 years.
- Twenty-three percent of adults with asthma (39,500) smoke tobacco.
- Of adult smokers, eight percent (39,500) have asthma. Of former adult smokers, nine percent (44,000) have asthma.
- Thirty-three percent of adults with asthma (48,000) reside with someone who smokes inside the house.
- More than one-third (45,000) of adults with asthma are obese compared with about one-fifth of all Iowa adults.
- Thirty percent of adults with asthma do not exercise regularly, the same proportion of all adults in Iowa.
- Among adults, racial differences in asthma prevalence are small.
- Adults of low income (income less than $25,000) are about 250 percent more likely to report having asthma than are adults with household incomes of more than $75,000.
- Adults with less than a high school degree are more than twice as likely as those with a college degree to report currently having asthma, and are also significantly more likely to report having asthma when compared to other educational attainment classes.
- The rates of asthma for Iowa adults are lower than for adults in the U.S. In 2000, Iowa rates were lower for all comparable age, race, gender, income and educational

groups with the exception of rates for those adults who have not completed high school. Iowa's rates are about 30 percent higher than the national rates for those with less than a high school education.

- Among Midwestern states, Iowa's asthma prevalence rates for gender, age, race, income and educational attainment generally fall in the middle range of rates.

Figure 1.1 BRFSS

Adult Current Asthma Prevalence by *Gender*, Iowa, BRFSS, 1999 to 2000



The average annual prevalence rate of asthma among Iowa adults in 1999 to 2000 was 7 percent (n = 147,000).

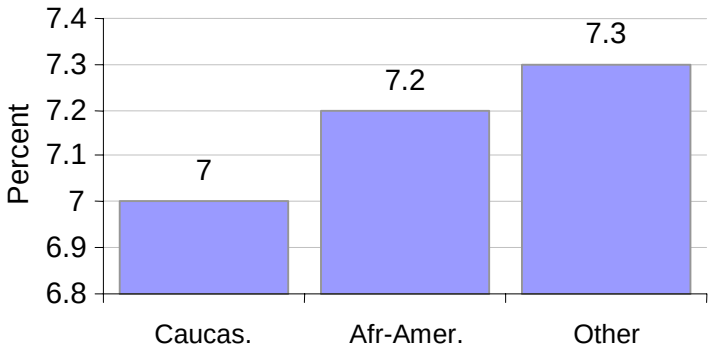
During these years, the prevalence rate for women (8/100) was more than 35 percent higher than for men (5.9/100) (n = 87,700 vs. 59,300). The rate difference between women and men was statistically significant and consistent with national data that also showed women at increased risk.

Interestingly for children, asthma prevalence rates are higher in boys than in girls nationally and Iowa Medicaid prevalence data similarly showed boys at greater risk than girls.

In all, 10 percent of Iowa adults reported ever having had asthma in 1999 to 2000. Of these, 70 percent reported they still had asthma (see Table 1.2, Appendix E).

Figure 1.2

Adult Current Asthma Prevalence by *Race*, Iowa, BRFSS, 1999 to 2000



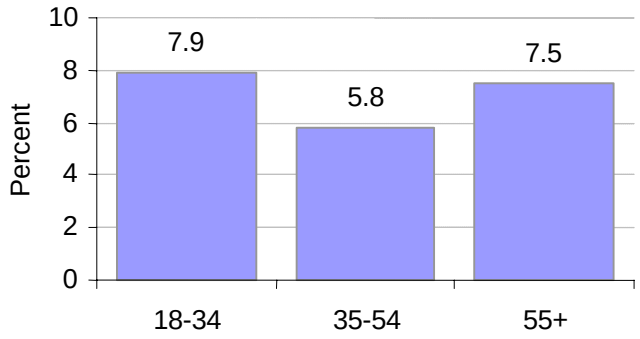
Differences in asthma prevalence rates for the three racial groups compared were not statistically significant, although, rates of asthma were slightly greater (3 to 4 percent) in African-Americans and other minorities than in Caucasians. Nationally in 2000, rates in African-Americans also were slightly higher than in Caucasians (8.5 vs. 7.1 percent).

An estimated 142,000 Caucasian adults, 2,000 African-American adults, and 3,100 adults of other races have asthma.

Small sample size prevents rates for other racial groups from being calculated reliably.

Figure 1.3 BRFSS

Adult Current Asthma Prevalence by *Age*, Iowa, BRFSS, 1999 to 2000



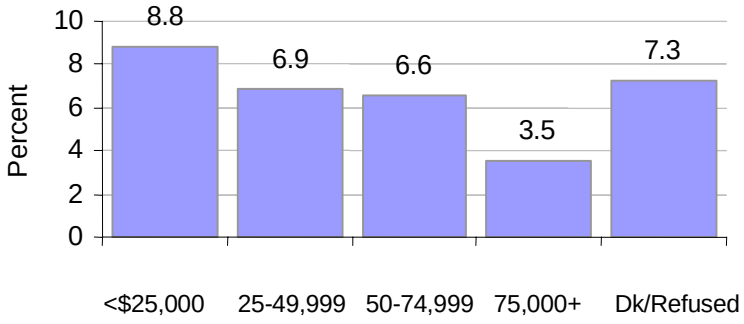
Although differences were not statistically significant, adults aged 18 to 34 years were almost 40 percent more likely, and, adults 55 years and over almost 30 percent more likely than middle-aged Iowans to report currently having asthma.

Among adults nationally in the year 2000, rates were also lowest for the middle-aged.

About 50,000 Iowans aged 18 to 34 years, about 45,000 aged 35 to 54 years, and about 52,000 aged 55 years and older had asthma.

Figure 1.4

Adult Current Asthma Prevalence by *Family Income*, Iowa, BRFSS, 1999 to 2000



Rates of asthma prevalence in Iowa adults increased as family income decreased.

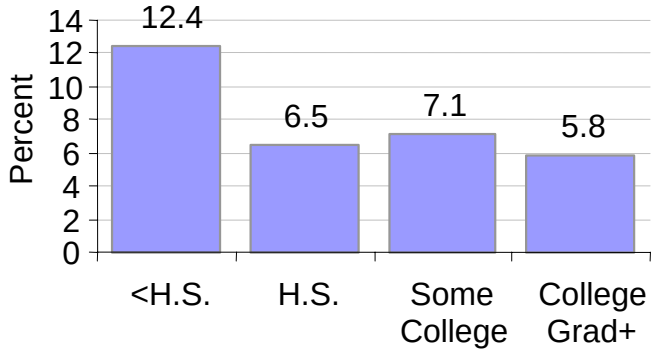
Those with incomes of less than $25,000 reported having asthma 2.5 times more often than did those with incomes greater than $75,000 (8.8 vs. 3.5 percent). Those with incomes of $25,000 to $49,999 had asthma twice as often as those with incomes of $75,000 or more.

Differences in rates between each of the three lowest income groups and the highest income group (income of more than $75,000) were statistically significant.

About 47,000 Iowans with incomes of less than $25,000 had asthma, while about 76,000 Iowans with incomes of $25,000 to $74,999 and 8,700 Iowans with incomes of $75,000 or more had asthma.

Figure 1.5 BRFSS

Adult Current Asthma Prevalence by *Educational Attainment,* Iowa, BRFSS, 1999 to 2000



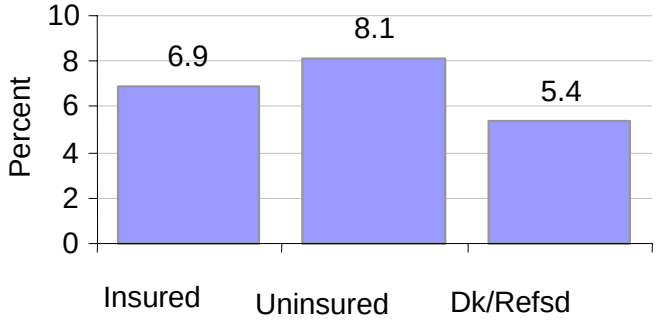
Rates of asthma prevalence in Iowa adults increased as educational attainment decreased.

Those with less than a high school education reported currently having asthma more than twice as often as those having college degrees (12.4 vs. 5.8 percent). They reported currently having asthma 75 percent more often than those with some college and 90 percent more often than those with high school degrees. Rate differences between those without high school degrees and other educational attainment groups were all statistically significant.

About 21,000 Iowa adults with less than a high school diploma have asthma, about 96,000 with a high school diploma/some college have asthma and 29,000 Iowans who are college graduates have asthma.

Figure 1.6

Adult Current Asthma Prevalence by *Insurance Status*, Iowa, BRFSS, 1999 to 2000

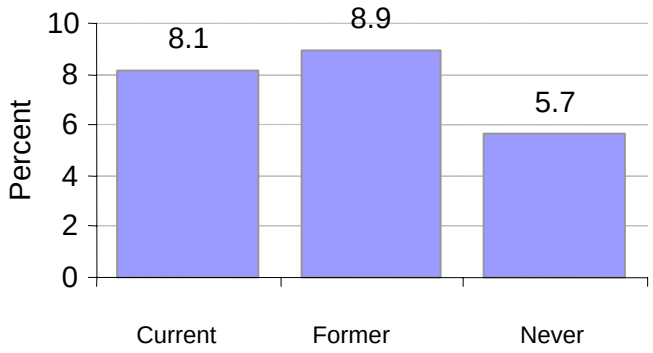


Differences in asthma prevalence rates between the uninsured and insured Iowa adult population were not statistically significant, although the uninsured were about 14 percent more likely than the insured to report currently having asthma (n = 15,000 vs. 132,000; 6.9 vs. 8.1 percent prevalence).

About 90 percent of Iowans between the ages of 25 and 64 years had at least some health insurance coverage. But, only about 75 to 80 percent of those 18 to 24 years of age had any health insurance. After age 65, virtually all Iowans were covered under Medicare.

Figure 1.7 BRFSS

Adult Current Asthma Prevalence by *Smoking Status*, Iowa BRFSS, 1999 to 2000



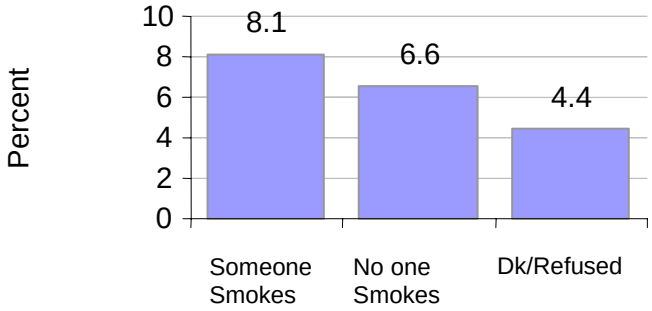
Both current and former smokers were more likely than those who had never smoked to have asthma. The difference in asthma prevalence rates between current and former smokers and those who never smoked were statistically significant. Former smokers were 57 percent more likely to have asthma and current smokers 42 percent more likely to have asthma than were those who had never smoked.

A little more than 8 percent (n = 39,500) of Iowa's 490,000 adult current smokers had asthma and 8.9 percent (n = 44,000) of Iowa's 502,000 former smokers reported currently having asthma.

About half of Iowa adults had never smoked. Of these, 5.7 percent or 63,000 reported currently having asthma.

Figure 1.8

Adult Current Asthma Prevalence by *Smoking Allowed in the Home Status*, Iowa, BRFSS, 1999 to 2000



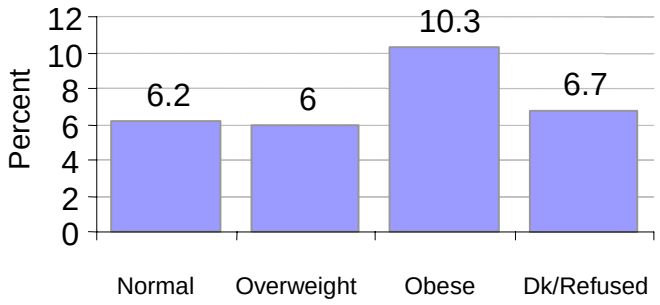
One BRFSS question asks whether anyone has smoked, including the respondent, in the respondent's home in the last 30 days.

While differences were not statistically significant, adults with smoking in their homes had a more than 20 percent increased risk of having asthma compared to adults in whose homes where there had not been smoking.

About 8 percent (n = 47,900 of 600,000) of adults who had someone smoking in their home had asthma while only 6.6 percent (n = 97,700 of 1.48 million) of those who did not have anyone smoking had asthma.

Figure 1.9 BRFSS

Adult Current Asthma Prevalence by *Weight/Obesity Status*, Iowa, BRFSS, 1999 to 2000



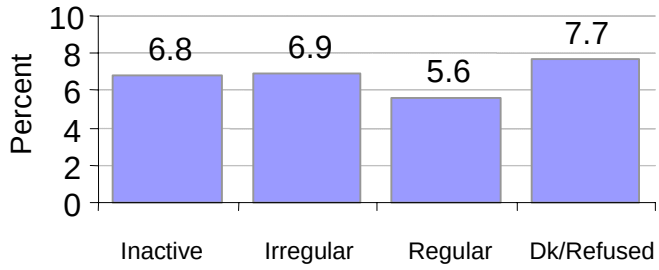
The obese were almost 70 percent more likely than those who were of normal weight or overweight to have asthma.

Among the obese, 10.3 percent (n = 45,200) had asthma. Among those of normal weight, 6.2 percent (n = 51,200) had asthma and among the overweight, 6 percent (n = 46,200) had asthma. The differences in rates between the obese and those of normal weight were statistically significant.

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

Figure 1.10

Adult Current Asthma Prevalence by Exercise Status, Iowa, BRFSS, 1999 to 2000

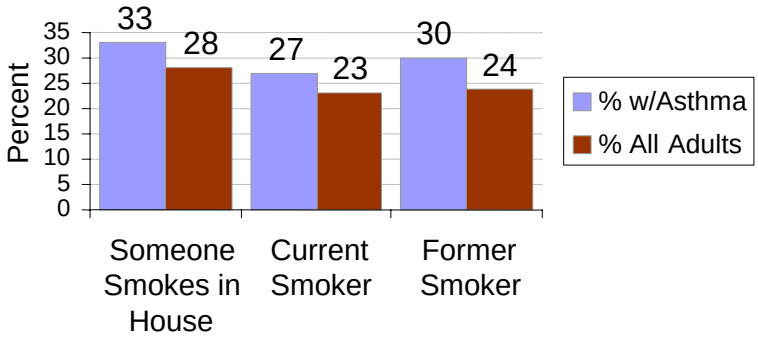


Those adults who exercised regularly were about 20 percent less likely to have asthma than those who did not exercise regularly, although the difference in rates was not statistically significant.

Of those who regularly exercised, 5.6 percent (n = 25,300) had asthma, of those who exercised irregularly or not at all, 6.8 to 6.9 percent (n = 42,000) had asthma.

Figure 1.11 BRFSS

Adult Smoking and Smoking Allowed in the Home Prevalence Rates, *Adults with Asthma* and *All Adults*, Iowa, BRFSS, 1999 to 2000

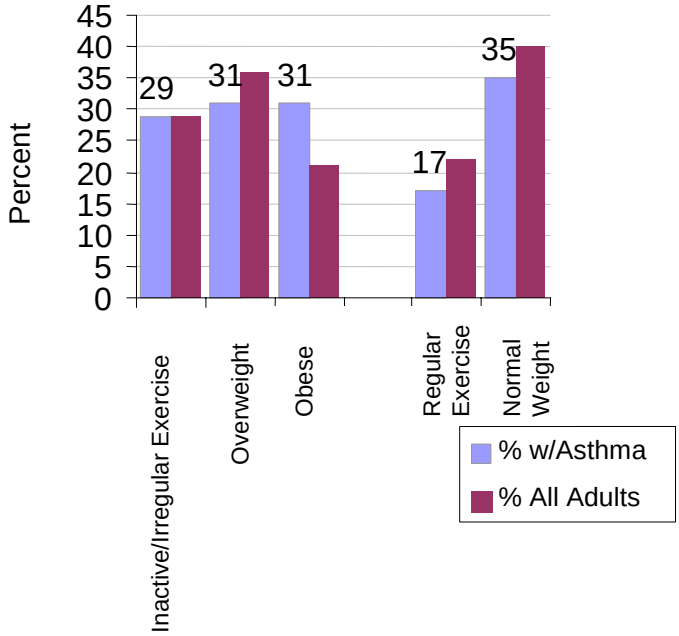


Iowa adults who had asthma were more likely than all Iowa adults to:

- Currently smoke;
- Have smoked in the past; and,
- Live in households where someone smoked.

Figure 1.12

Adult Exercise and Obesity Prevalence: *Adults with Asthma* and *All Adults*, Iowa, BRFSS, 1999 to 2000



Adults with asthma were slightly more likely to be overweight or obese than adults overall (62 percent (n = 91,300) vs. 57 percent (n = 1.2 million)). Adults with asthma were also slightly less likely to be of normal weight (35 vs. 40 percent; n = 51,200 vs. 834,5000) than were all adults.

Adults with asthma and all adults were equally likely not to exercise regularly (29 percent), while adults with asthma were a little less likely than the general population to exercise regularly (17 vs. 22 percent). Since about half of adults failed to answer BRFSS questions on exercise, the sum or exercisers vs. non-exercisers do not add to 100 percent.

Prevalence Estimates for Adults and Children: Medicaid Data

Iowa Medicaid Subscriber Database

Case Definitions

Several limitations exist in using insurance claims databases, such as Medicaid's, for public health surveillance. One limitation is that no nationally accepted definition of what constitutes a case of asthma for public health surveillance has been agreed upon for insurance claims databases, making state-to-state and state-to-nation comparisons difficult. (For data sets derived from death records, inpatient discharges and self-reported interview surveys (e.g., BRFSS), nationally agreed upon asthma surveillance case definitions have been adopted.)

Prevalence estimates for the Medicaid population in this report are based on Iowa Medicaid program subscriber claims records for the years 1995 through 1997 taken from the Medicaid Management Information System (MMIS). To be included in the count of persons having asthma for purposes of this report, subscribers must have:

- been enrolled in Medicaid for the entire calendar year for which cases are being tallied;
- not been enrolled in a Medicaid HMO program; and
- had at least one diagnosis code of 493.0-493.99 (ICD 9 code for asthma on at least one medical or institutional claim) during that year. Medicaid prevalence rates include persons with mild, intermittent, and persistent asthma.

The asthma case definition used here excludes from the denominator Medicaid subscribers who were enrolled for only part of one of each of the years studied. This was done as care received for asthma during that part of the year in which someone was not enrolled in Medicaid would not be documented in the Medicaid claims data. The absence of records for part of the year would lead to an underestimation of asthma prevalence in that group. In any given year, about 25 percent of Medicaid subscribers are not enrolled for the entire year. HMO Medicaid subscribers were excluded because their providers were reimbursed on a monthly capitation rate and not on individual medical claims, making it likely that asthma diagnoses would be underreported to Medicaid.

From looking at Medicaid data for the years 1995 through 1997, it appears that the case definition chosen does result in higher prevalence rates than if a more broadly inclusive denominator were used.

Other Limitations and Usefulness of Medicaid Data

The accuracy of the Medicaid claims data for 1995 through 1997 has not been independently verified by the IDPH or University of Iowa College of Public Health staff who provided the data to the IDPH, although the data can be presumed to have the same biases as other state's Medicaid claims data sets. One of these biases applies to all insurance claims data sets: They reflect subscriber utilization patterns and physician treatment practices as well as actual asthma prevalence in the subscriber population.

Another limitation of the Medicaid data is that they consistently understate asthma prevalence in those 65 years of age and older. Medicare is the primary insurer for most of Iowa's elderly and asthma-related claims are frequently sent to Medicare and not Medicaid for this population.

Nevertheless, Medicaid prevalence data provide the best picture currently available of the problem of asthma in some of Iowa's highest risk populations such as, children, the low-income and racial minorities.

How many adults have asthma in the Medicaid population?

Adult Medicaid subscribers (18 years and older) who met the inclusion criteria of our asthma case definition were estimated to have an asthma prevalence rate of 5.9 percent during 1995 to 1997. Of the estimated 152,000 Iowa adults who currently have asthma, about 3,700 would be from the Iowa Medicaid population meeting our asthma case definition. If all adult Medicaid subscribers were counted, the average annual count of adult Medicaid subscribers with asthma would be about 9,700. This latter count includes those who were enrolled at any time under any type of Medicaid coverage whether fee-for service or managed care.

How many children have asthma in the Medicaid Population?

Children 0 to 17 years of age who met the inclusion criteria of our asthma case definition were estimated to have an asthma prevalence rate of about 7.7 percent (n = 4,200 children per year) during the year 1995 to 1997. If all Medicaid subscribers were counted, the average annual count of Medicaid participants who were children with asthma would have been about 10,200 per year.

Estimates of Prevalence in All Iowa Children Based on National Rates

Estimates of the National Survey of Early Childhood Health (NSECH) place prevalence for children less than three years of age at 8.5 percent in 2000. The NSECH defined prevalence as having had asthma at any time in the last 12 months. (NSECH, 2002)

National Health Interview Survey national data for 1990 to 1992 for children ages 5 to 14 years put asthma prevalence in this age group at 6.6 percent and rates in the 0 to 17 year old age group at 5.5 percent. (NHIS, CDC, 1998)

Applying these national rates to Iowa, one can roughly estimate that 47,000 children age 0 to 17 years had asthma in Iowa in 2000.

Charts of Medicaid Data

Figures 2.1 to 2.14 compare average annual prevalence rates for Iowa adults and children by gender, race, and age for Medicaid fee-for-service subscribers.

Figure 2.15 presents national average annual prevalence rates from 1980 to 2000 for children from the National Health Interview Survey and the National Survey of Early Childhood Health.

Tables of Medicaid Data

Additional information on asthma in the Iowa Medicaid population and on national asthma prevalence rates in children can be found in Tables 2.1 to 2.4 of Appendix E.

All data used to construct Figures 2.1 to 2.14 are taken from the Medicaid data in Tables 2.2 through 2.4. Figure 2.15 is derived from Table 2.1.

Asthma Prevalence in Iowa Adults and Children: Summary of 1995 to 1997 Iowa Medicaid Fee-for-Service Subscriber Population Data in Tables and Figures

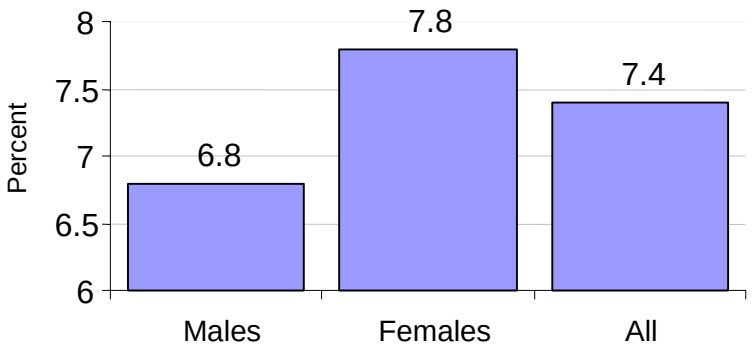
- Medicaid claims data grossly understate asthma prevalence in the elderly Medicaid population by as much as 400 to 600 percent. This understatement is attributable to Medicare being the primary insurer for most elderly, resulting in few asthma-related claims being submitted for the elderly to Medicaid. Asthma prevalence among those 65 years and older in the Iowa Medicaid population was 1.4 percent in 1995 to 1997, while Iowa BRFSS data show prevalence in among those non-institutionalized Iowans 65 years and older in 1999 to 2000 was 7.4 percent. Because of this understatement, rates for the Medicaid population given in this report largely focus on those 0 to 64 years of age.
- About 7.4 percent of those Iowans ages 0 to 64 years who are enrolled in the fee-for-service Medicaid option have asthma (1995 through 1997).
- Prevalence of asthma among children 17 years of age and younger in the Medicaid fee-for service population is about eight percent.
- Of Iowa children enrolled in Medicaid, boys are about 25 percent more likely than girls to have asthma (6.8 vs 8.6 percent).
- Of Iowa adults, ages 18 to 64 years (exclusive of those 65 years and older) enrolled in the Medicaid fee-for-service option, rates for women are more than double that for men (8.6 vs. 3.9 percent).
- Among Iowans 18 to 64 years of age enrolled in Medicaid, about seven percent have asthma, a proportion not significantly different from that for all Iowans in that age group (6.9 percent based on 1999 to 2000 BRFSS data). This is unexpected since the 1999 to 2000 BRFSS asthma prevalence rate for Iowa adults ages 18 years and older of low income (<$25,000) was 8.8 percent, well above the rate of seven percent for all non-institutionalized Iowans 18 years and older.

Asthma Prevalence in All Iowa Children: Estimates Based on National NHIS and NSECH Data

- Roughly 47,000 Iowa children have asthma, including:
- 12,800 Iowa children less than four years of age (8.5 percent);
- 27,200 Iowa children ages 5 to 14 years of age; and
- 7,200 Iowa children ages 15 to 17 years of age.

Figure 2.1 Medicaid

Current Asthma Prevalence by *Gender,* Iowa Medicaid Fee-for-Service Population Ages 0 to 64 Years, MMIS, 1995 to 1997



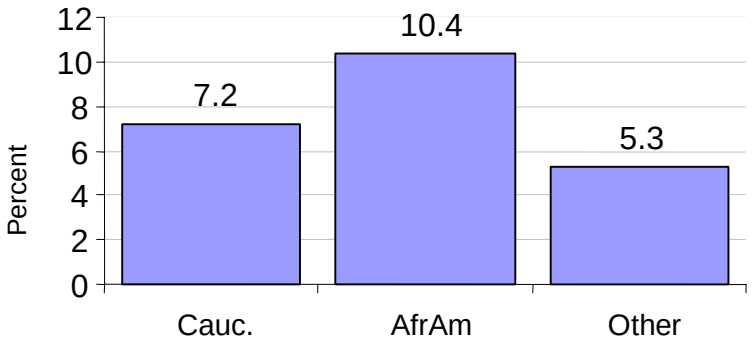
In 1995 to 1997, the average annual prevalence rate of asthma among Medicaid fee-for-service subscribers (e.g., non-HMO enrolled Medicaid subscribers) 0 to 64 years of age was 7.4 per 100 population. The rate of 7.8 per 100 (7.8 percent) for females in this age group was about 15 percent higher than that for males.

For all ages the prevalence rate was 6.2 per 100 population enrolled in the Medicaid fee-for-service option. (See Table 2.2)

Of the 7,533 average annual count of fee-for-service Medicaid subscribers ages 0 to 64 years with asthma between 1995 and 1997, 41 percent (n = 3,061) were male and 49 percent (n = 4,471) were female.

Figure 2.2

Current Asthma Prevalence by *Race*, Iowa Fee-for-Service Medicaid Population Ages 0 to 64 Years, MMIS, 1995 to 1997



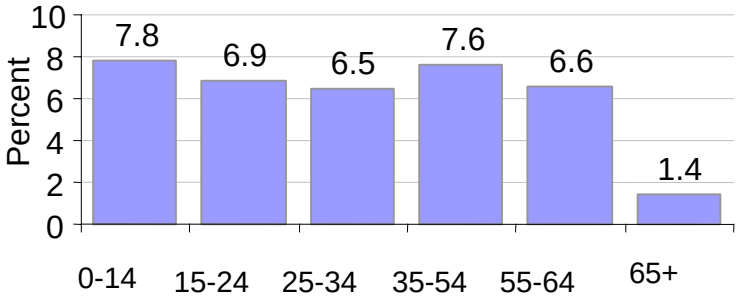
Among Medicaid fee-for-service subscribers ages 0 to 64 years, African-Americans had the highest asthma prevalence rates (10.4 percent). African Americans had rates more than 30 percent higher than Caucasians and almost double that of other racial minorities.

The rate for Caucasians (7.2 percent) was more than 35 percent higher than that for the group of other minorities (5.3 percent).

Of all of the 7,533 average annual number of fee-for-service Medicaid subscribers in 1995 to 1997 ages 0 to 64 years with asthma, 85 percent were Caucasian, 11 percent were African-American, and 3 percent were of other races.

Figure 2.3 Medicaid

Current Asthma Prevalence by *Age*, Iowa Medicaid Fee-for-Service Population, MMIS 1995 to 1997

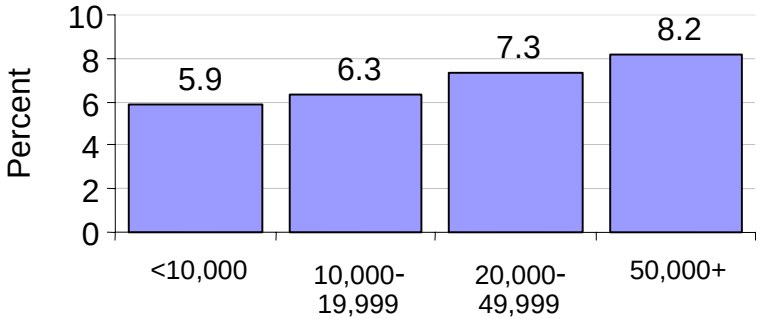


Asthma prevalence rates in the Medicaid fee-for-service population were highest for those Iowans who were younger than 15 years and who were between the ages of 35 and 54 years, although rate differences by age were not pronounced.

The Medicaid claims-based asthma prevalence rates in the 65 years and older population understate actual asthma prevalence by an estimated 400 to 600 percent, based on BRFSS asthma prevalence rates for this age group. This is due in large measure to Medicare being the primary insurer of most of the elderly. Elderly Medicaid subscribers submit claims for asthma care first to Medicare and only if need be to Medicaid.

Figure 2.4

Current Asthma Prevalence by *County Population* Size, Iowa Medicaid Fee-for-Service Population Ages 0 to 64 Years, MMIS, 1995 to 1997



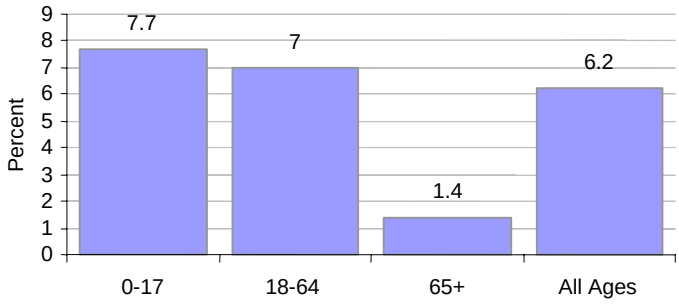
Asthma prevalence rates in the Medicaid fee-for-service population increased steadily as county population size increased.

For counties of 50,000 or more population, the rate of asthma was more than 25 percent higher than in counties of less than 10,000 population.

Forty-eight percent (n = 3,624) of asthma cases occurred in persons living in counties of 50,000 or more population, 27 percent (n = 2,034) in counties of 20,000 to 49,999, 20 percent in counties of 10,000 to 19,999 (n = 1,519), and 5 percent (n = 356) in counties of less than 10,000 population.

Figure 2.5 Medicaid

Adult vs. Youth Current Asthma Prevalence, Iowa Medicaid Fee-for-Service Population, MMIS, 1995 to 1997



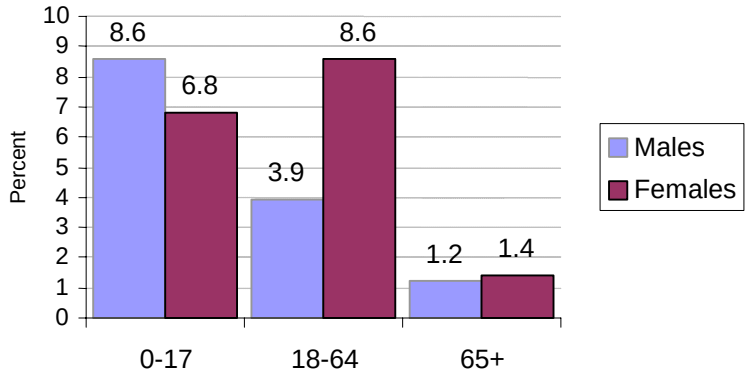
For children 0 to 17 years who were covered under the Medicaid fee-for-service option, the average annualized 1995 to 1997 asthma prevalence rate was 7.7 percent. This is 10 percent higher than the rate for adults 18 to 64 years.

Children ages 0 to 17 years accounted for 53 percent (n = 4,158) of the average annual number of cases between 1995 and 1997, while adults 18 to 64 years accounted for 43 percent (n = 3,707) of asthma cases in the Medicaid population.

Rates of asthma prevalence in the Medicaid population ages 18 to 64 years (7 percent) were slightly lower than those for the 1999 to 2000 BRFSS survey population of the same age (7.4 percent). This is unexpected, as for the BRFSS population, rates from 1999 through 2000 were much higher in Iowa adults of low income compared to other Iowa adults. BRFSS prevalence rates are self-reported while those given here for the Medicaid population are based on claims records. Rates for those 65 years and older in the Medicaid database reflect underreporting of about 400 to 600 percent due to concurrent Medicare coverage.

Figure 2.6

Adults vs. Youth Current Asthma Prevalence by _Gender_, Iowa Medicaid Fee-for-Service Population, MMIS 1995 to 1997



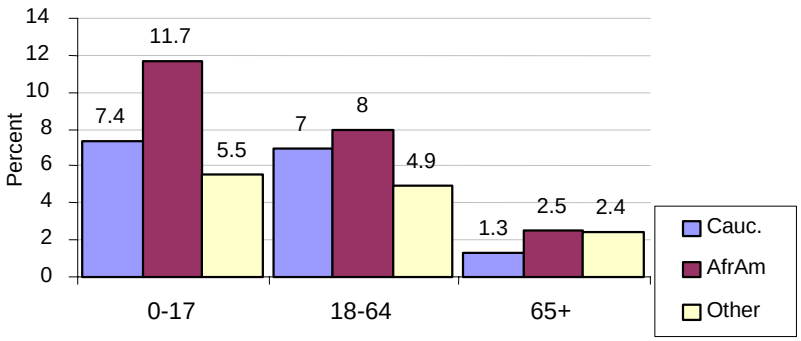
Among children ages 0 to 17 years, the asthma prevalence rate was 25 percent higher for boys than girls (8.6 vs. 6.8 percent).

Among adults ages 18 to 64 years, the asthma prevalence rate was 120 percent higher for women age 18 to 64 years than for men of that age (8.6 vs. 3.9 percent). Among adults more than 65 years of age for whom Medicaid underestimates prevalence, rates were comparable between the sexes.

BRFSS data for 1999 through 2000 show women (18 years and older) to have asthma prevalence rates 36 percent higher than men. (See Figure 1.1).

Those 0 to 17 years accounted for 53 percent and those 18 to 64 years for 43 percent of asthma cases in the Medicaid population.

Adult vs. Youth Current Asthma Prevalence by *Race*, Iowa Medicaid Fee-for-Service Population, MMIS, 1995 to 1997



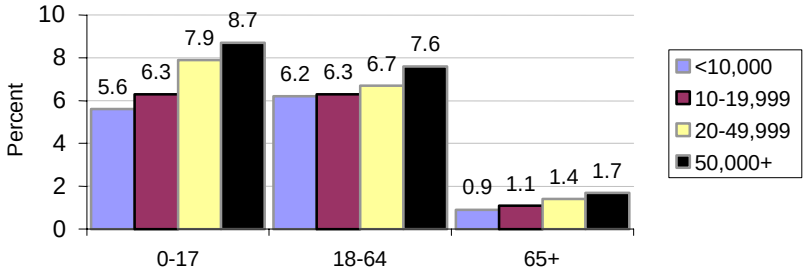
For children and adult age groups, rates of asthma were highest for African-Americans.

Rates for African-American children were especially elevated compared to children of other races. The asthma prevalence rate for African-American youth was 58 percent higher than for Caucasian youth (11.7 vs. 7.4 percent) and more than double the rate for youth of other racial minorities (11.7 vs. 5.6 percent).

Among Iowans 0 to 17 years of age, 81 percent of asthma cases occurred in Caucasians, 15 percent in African-Americans and 4 percent in other minorities. Among Iowans 18 to 64 years of age, 91 percent of cases were in Caucasians, 7 percent in African-Americans, and 3 percent other minorities.

Figure 2.8

Adults vs. Youth Current Asthma Prevalence by County Population Size, Iowa Medicaid Fee-for-Service Population, MMIS, 1995 to 1997

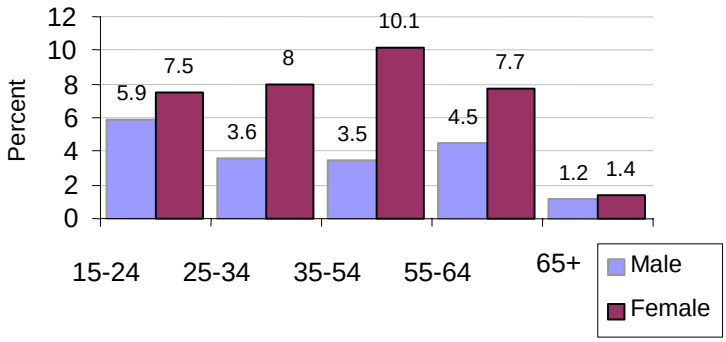


For both youth and adults, asthma prevalence rates in the Medicaid fee-for-service population increased steadily as county population size increased.

Differences in rates by county size were more pronounced for youth than for adults. Rates were more than 50 percent higher for the largest compared to the smallest sized counties among youth, but only about 23 percent higher for the largest counties vs. the smallest counties among those Iowans ages 18 to 64 years. About half of all cases occurred in counties of more than 50,000 population. Less than 5 percent of cases occurred in counties of less than 10,000. (See Table 2.4, Appendix E.)

Figure 2.9 Medicaid

Adult Current Asthma Prevalence, *Gender* and *Age-Specific* Rates, Iowa Medicaid Fee-for-Service Population, MMIS, 1995 to 1997



For all age groups combined, for each of the age-specific rates examined for those age 15 years and older, females had higher asthma prevalence rates than males.

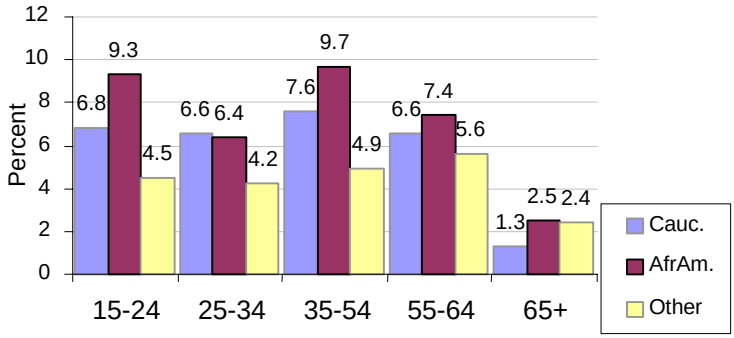
For males, rates were highest in childhood (Figure 2.12) after which rates declined steadily with age, with the exception of males age 55 to 64 years whose rates were 30 percent higher than males ages 35 to 54 years.

For females, the highest age-specific asthma prevalence rate was for those age 35 to 54 years (10.1 percent, n = 1,200). No consistent trend across age groups was seen for women.

Females accounted for 40 percent and males accounted for about 60 percent of cases in children ages 0 to 14 years. For each of the older age groups, between 67 and 83 percent of all cases were in females and a minority of cases were in males.

Figure 2.10

Adult Current Asthma Prevalence, *Race* and *Age-Specific* Rates, Iowa Medicaid Fee-for-Service Population, MMIS 1995 to 1997



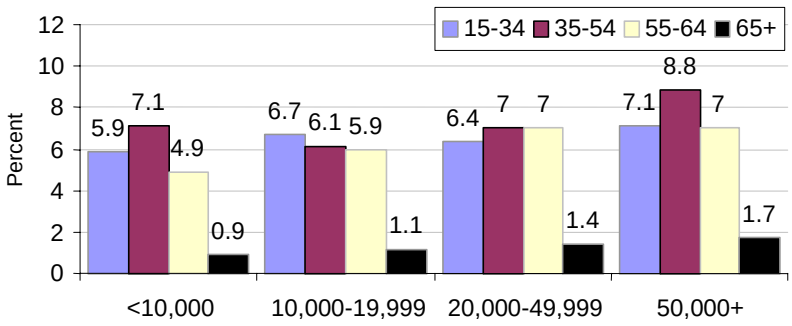
For all age groups, Medicaid fee-for-service population rates were lowest for those in the other racial minorities category.

For all age groups, except for the group of those age 25 to 34 years, rates were highest in African-Americans. Asthma prevalence rates were slightly higher for Caucasians than African-Americans in this age group.

Rates in the 65 years and older population are underestimated due to concurrent Medicare coverage.

Figure 2.11

Adult Current Asthma Prevalence, *County Population Size* and *Age*-Specific Rates, Iowa Medicaid Fee-for-Service Population, MMIS 1995 to 1997



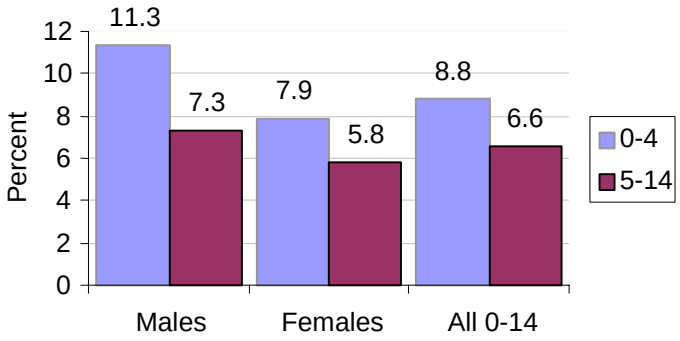
For adults, no consistent patterns were seen across age groups by county population size.

In counties of less than 10,000 and more than 50,000, rates were highest among 35 to 54 year olds. In counties of 10,000 to 19,999 population, rates were highest among those age 15 to 34 years, and in counties of 20,000 to 49,999 population, rates were the highest in those 35 to 54 years and in those 55 to 64 years of age.

Rates for those 65 years and older in the Medicaid database reflect underreporting of about 400 to 600 percent due to concurrent Medicare coverage.

Figure 2.12

***Childhood* Current Asthma Prevalence, *Gender* and *Age*-Specific Rates, Iowa Medicaid Fee-for-Service Population, MMIS 1995 to 1997**



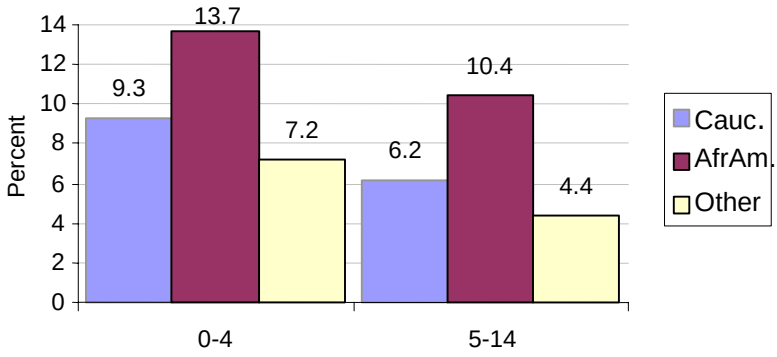
Asthma prevalence rates in the fee-for-service Medicaid population were higher in males than in females for both age groups of children.

Boys ages 0 to 4 years had rates 43 percent higher than girls of the same age (11.3 vs. 7.9 percent prevalence). Boys age 5 to 14 years had rates more than 25 percent higher than girls (7.3 vs. 5.8 percent).

Sixty percent of cases in children ages 0 to 14 years occurred in boys and 40 percent in girls (n = 2,200 vs. 1,500).

Figure 2.13 Medicaid

Childhood Current Asthma Prevalence, *Race* and *Age-Specific* Rates, Iowa Medicaid Fee-for-Service Population, MMIS, 1995 to 1997



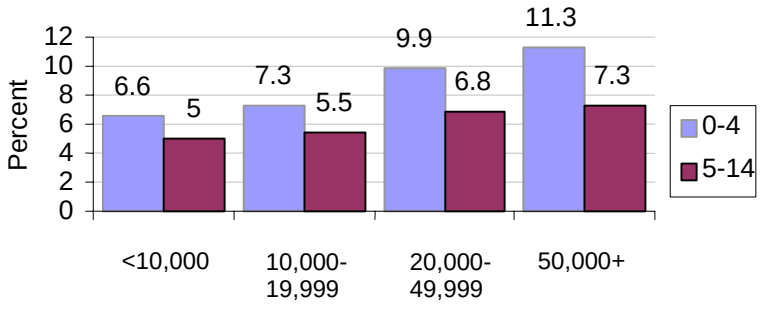
African-American children in Medicaid fee-for-service population within both the 0 to 4 and 5 to 14 year old age groups had rates of asthma much higher than those of Caucasian (about 50 to 70 percent higher) and other racial minority children (14 to 90 percent higher).

For both age groups, rates were lowest among children in the group of other racial minorities.

About 90 percent of the 3,374 cases in children age 0 to 14 years occurred in Caucasians, 17 percent in African-Americans and 3 percent in other minorities. Forty-three percent occurred in children 0 to 4 years and 53 percent in children age 5 to 14 years.

Figure 2.14

Childhood Current Asthma Prevalence, *County Population Size* and *Age-Specific* Rates, Iowa Medicaid Fee-for-Service Population, MMIS 1995 to 1997

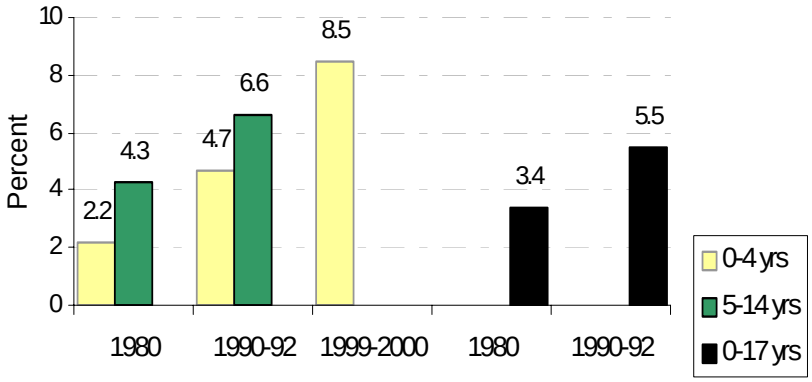


For both age groups of children, those 0 to 4 years and those 5 to 14 years, rates of asthma prevalence steadily increased as county population size increased. Rates for both age groups were highest in counties of 50,000 or more population and lowest in counties of less than 10,000 population.

Rates of asthma prevalence were higher in children 0 to 4 years than in children 5 to 14 years for all county population size categories.

Figure 2.15

Childhood Current Asthma Prevalence: Estimates of National Rates, National Health Interveiw Survey, National Survey of Early Childhood Health 1980-92, 1999-2000



Based on NHIS data of the estimated 190,000 Iowans living with asthma, between 43,000 and 47,000 are children.

Nationally, children less than 18 years of age experienced a more than 60 percent increase in asthma prevalence between 1980 and 1990 through 1992. Rates went from 3.38 to 5.45 per 100 children.

Among children 0 to 4 years of age during little more than a ten-year period, asthma prevalence increased more than 90 percent.

Mortality from and with Asthma: Iowa Death Certificates

Asthma Mortality

Counts of asthma-related deaths found in this report are taken from death certificates of Iowa residents in which asthma is listed as an underlying or contributing cause of death during 1999 and 2000.

Underlying cause of death is that condition which was most important in causing death. The national Council of State and Territorial Epidemiologists (CSTE) defines deaths from asthma as those for which asthma was listed as the underlying cause. Multiple contributing causes of death may be listed on the death certificate and CSTE defines deaths occurring in people with asthma as those in which asthma is listed as a contributing cause. While multiple contributing causes may be listed, only one underlying cause of death may be listed on a death certificate.

Someone who dies of an asthma episode and also has chronic bronchitis and emphysema, should have asthma listed as the underlying cause. Someone with asthma who dies of emphysema (not from an asthma episode) may have asthma listed as a contributing cause if the physician filling out the certificate feels asthma contributed to the death and is aware of the decedent's asthma.

Underreporting of asthma-related deaths is believed to occur frequently, especially among those with persistent asthma and a history of smoking.

How many Iowans die each year from or with asthma?

About 140 Iowans died each year from or with asthma during 1999 and 2000, for an average annual rate of 4.8 deaths per 100,000 population. For about 40 of these deaths asthma was the underlying cause, while for the remaining 100 deaths asthma was a contributing cause.

Charts of Mortality Data

Figures 3.1 to 3.3 present average annual rates of death from or with asthma per 100,000 population for 1999 and 2000 by gender, race and age.

Tables of Mortality Data

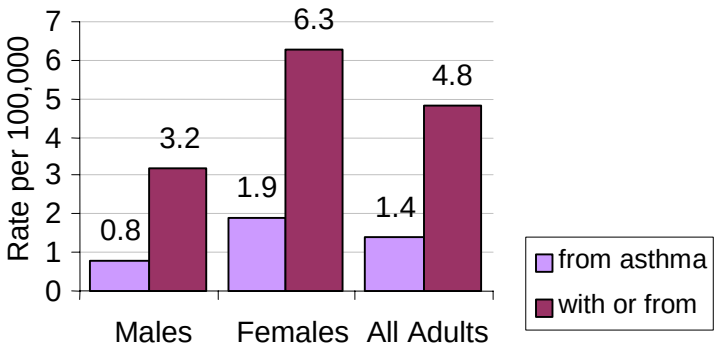
Additional details of asthma-related deaths in Iowa can be found in Table 3.1 of Appendix E. This table includes average annual counts and rates of deaths for which asthma was the underlying or a contributing cause of death for Iowans during 1999 and 2000. All data used to construct Figures 3.1 to 3.3 are taken from Table 3.1.

Asthma Deaths in Iowa Adults and Children: Summary of 1999 and 2000 Data in Tables and Figures

- About 140 deaths each year are attributable to asthma.
- Of these deaths, more than half are in people ages 75 years and older.
- Females are about twice as likely as males to die from asthma.
- The rate of asthma-related deaths was about 3 to 4 times higher in African-Americans compared to Caucasians, although the numbers were small for the two years examined (134 deaths for Caucasians and 4.5 deaths for African-Americans per year).

Figure 3.1 Deaths

Deaths from or with Asthma by *Gender*, Iowa, Iowa Vital Records, 1999 to 2000



Asthma-related deaths are rare. An average of 41 Iowans died annually from asthma (asthma was the underlying cause of death) while 98 others died with asthma (asthma contributed to but was not the underlying cause of death) from 1999 through 2000. In all, an average of 139 asthma-related deaths occurred each year from 1999 through 2000.

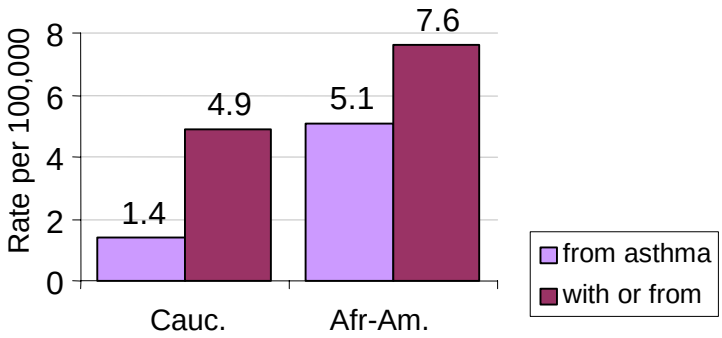
In 1999 through 2000, 0.5 percent of all Iowa deaths (5/1,000 deaths) were asthma related.

Females were about twice as likely as males to die from or with asthma during the years 1999 to 2000. On average, 93 women (6.3/100,000) and 46 men (3.2/100,000) died from or with asthma annually from 1999 through 2000.

About two-thirds of asthma related deaths occurred in females and about one-third in males.

Figure 3.2

Deaths from or with Asthma by *Race*, Iowa, Iowa Vital Records, 1999 to 2000



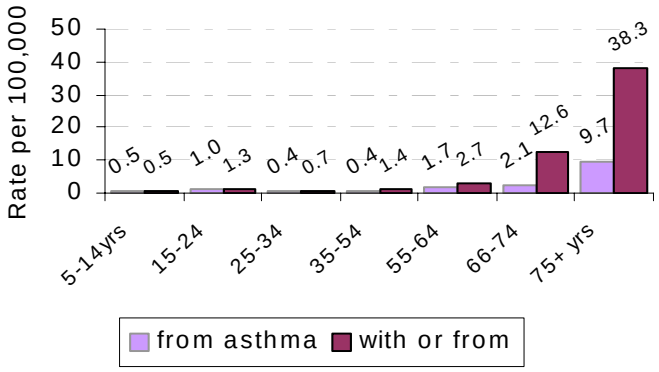
While 97 percent (n = 134/year) of asthma deaths occurred in persons who were Caucasian, and only 3 percent (n = 4.5/year) in African-Americans, the rate of deaths from or with asthma was 55 percent higher in African-Americans than in Caucasians.

The rate of asthma deaths from asthma was 350 percent higher in African-Americans, although the number of deaths was very small, three per year in African-Americans (rates: 1.4 vs. 5.1/100,000 population) and should be interpreted with caution.

(In the future, rates of death by race will need to be examined for a broader range of years to increase rate stability.)

BRFSS data show that the prevalence of asthma in adults varies little by race. Medicaid prevalence data show African-Americans to be at substantial increased risk compared to other racial groups.

Deaths from or with Asthma by *Age*, Iowa, Iowa Vital Records, 1999-2000



Predictably, those age 75 and older, who accounted for about 75 percent of all deaths, accounted for more than half (58 percent) of all asthma deaths from 1999 through 2000.

As for other common chronic diseases, the risk of death from/with asthma increased dramatically after age 55, going from 1.4 deaths/100,000 among those 35 to 54 years of age to 38.3 deaths/100,000 among those 75 and older.

Among those less than age 55, asthma death rates were highest in those age 14 to 24 and 35 to 54 years. An average per year of two Iowans age 14 or younger died from or with asthma between 1999 and 2000.

Hospitalizations for Adults and Children:

Inpatient Hospitalizations: Iowa State Inpatient Database (SID)

This section details inpatient hospitalizations using 1995 through 2000 data from the Iowa State Inpatient Database (SID). The SID contains selected data elements for each inpatient discharged from an Iowa hospital. Data are sent annually by all Iowa hospitals to the Iowa Hospital Association which then provides SID data to the Iowa Department of Public Health.

While the SID is a fairly complete database, it does not include Iowans who are treated solely in out-of-state hospitals for their asthma. Based on data provided by the Hospital Association, corrections were made to counts and rates for those Iowa counties which have persons leaving Iowa for neighboring states for hospital care. The SID also lacks several basic demographic variables (income, education, and ethnicity) and is missing data from the race field in about 20 percent of all admissions.

Another drawback to using the SID is that it contains no 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 equally difficult. Thus, those parts of the report describing hospitalizations are not measures of asthma prevalence but overall inpatient services usage.

The SID lists one *admitting* diagnosis and up to nine *discharge* diagnoses for each admission, all of which were used in this report to identify asthma-related hospitalizations. A hospitalization was counted as asthma-related if asthma was listed as the diagnosis of admission or one of the nine discharge diagnoses.

Race-specific rates were taken from the IDPH Iowa Health Indicator Tracking System online database, while other rates were computed by IDPH staff at the Center for Health Statistics with spreadsheets provided by the University of Iowa, College of Public Health.

Calculation of Rates and Confidence Intervals using SID Data

Crude age and sex-specific hospitalization discharge rates for SID data were produced by dividing the number of asthma-related hospitalizations in the three-year cohort of interest by the three-year average annual census count for that cohort and multiplying the result by 100,000. For age-adjusted rates, the direct method of age-adjustment was used with the 2000 U.S. population serving as the standard. The U.S. Bureau of the Census population counts and estimates provided the denominators for all hospitalization rates.

In Tables 4.4 to 4.8, where county-level counts and rates of hospitalizations are provided, county-specific rates are not shown if the rates would have been based on numerators of five or fewer average annual hospitalizations. This step was taken to control the wide variability from one time period to the next, often seen in rates based on small counts.

How many Iowans were hospitalized with asthma?

About 12,000 asthma-related hospitalizations occurred each year in Iowa during 1998 to 2000 or 418 hospitalizations per 100,000 population.

Charts of Hospitalizations

Figures 4.1 to 4.5 compare statewide average annual hospitalization rates for adults and children by gender, race, and age for the 1995 to 1997 and 1998 to 2000 periods.

Figures 4.6 to 4.11 compare county-specific average annual hospitalization rates by magnitude of county rate and by county population size for the same two periods.

Tables of Hospitalization Data

Tables 4.1 to 4. 11 in Appendix E have additional state and county-level estimates of asthma-related hospitalizations in Iowa. These tables contain statewide average annual asthma hospitalization counts and rates for Iowa by gender, age, and race for 1995 to 1997 and 1998 to 2000.

All state-level rates found in Figures 4.1 to 4.5 are taken from Tables 4.1 to 4.3.

The county-specific hospitalization rates seen in Figures 4.6 to 4.11 are taken from Tables 4.4 to 4.9 in Appendix E. These six tables contain counts and rates by age and gender for the 1995 through 1997 and 1998 through 2000 periods. Tables 4.10 and 4.11 provide hospitalization rates for groups of counties aggregated by county population size.

Maps of Hospitalizations by County

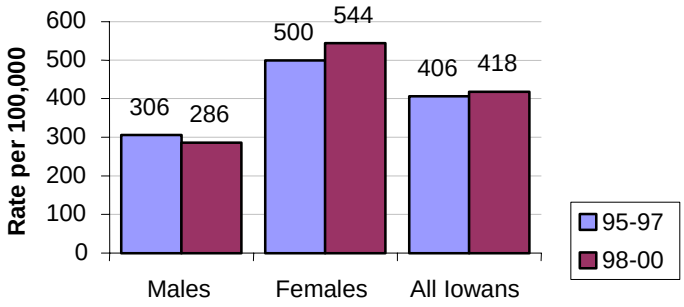
Maps 1 to 10, found in Appendix F, show which counties are in the highest and lowest quartiles of the distributions of county-specific asthma hospitalization rates. Overall and gender and age-specific rates are compared. These maps allow one to readily compare hospitalizations overall and by age and gender across counties.

Asthma Prevalence in Iowa Adults: Summary of 1995 to 2000 Hospitalization Data from State Inpatient Database in Tables and Figures

- About 12,000 asthma-related hospitalizations occur each year.
- Females had hospitalization rates more than 90 percent higher than males during 1998 to 2000.
- African-Americans are about three times more likely than Caucasians to be hospitalized for asthma.
- Caucasians account for about 75 percent of asthma-related hospitalizations. African-Americans account for about 5 percent. For 20 percent of hospitalizations, race was unknown.
- Persons more than 65 years of age and less than 4 years of age have the highest rates of hospitalization for asthma. (Persons more than 65 years have the highest rates of hospitalization overall and for most chronic conditions.)
- Differences exist in hospitalization rates by county population size, with rates steadily increasing with population size. On average, counties of more than 50,000 population had rates of hospitalization about 25 percent higher than counties of less than 10,000 population between 1998 and 2000. This finding is consistent with Iowa Medicaid prevalence data which also show asthma prevalence increasing as county size increases. (See Figures 4.6 to 4.11 and Tables 4.4 to 4.11.)

Figure 4.1 Hospitalizations

Hospitalization Rates from/with Asthma by *Gender*, 1995 to 1997, 1998 to 2000, State Inpatient Database (SID)



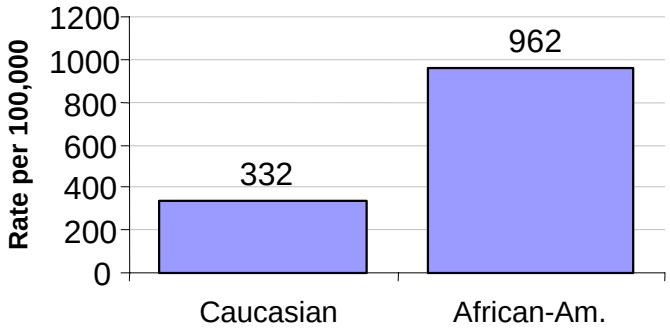
For Iowans from 1998 through 2000, there were about 12,100 asthma-related hospitalizations and from 1995 through 1997, about 11,600 asthma-related hospitalizations annually.

For both time periods 1995 through 1997 and 1998 through 2000, the average annual hospital prevalence rate for asthma was substantially higher in females than males. The rate was more than 60 percent higher for females from 1995 through 1997 and almost double that for males from 1999 through 2000. (BRFSS adult data for 1999 through 2000 show women to have a rate of asthma prevalence about 36 percent higher than men).

Rates of hospitalization decreased slightly for men while increasing slightly for women during the two time periods. About two-thirds of all asthma-related hospitalizations were for females and one-third for males during each of the two time periods.

Figure 4.2

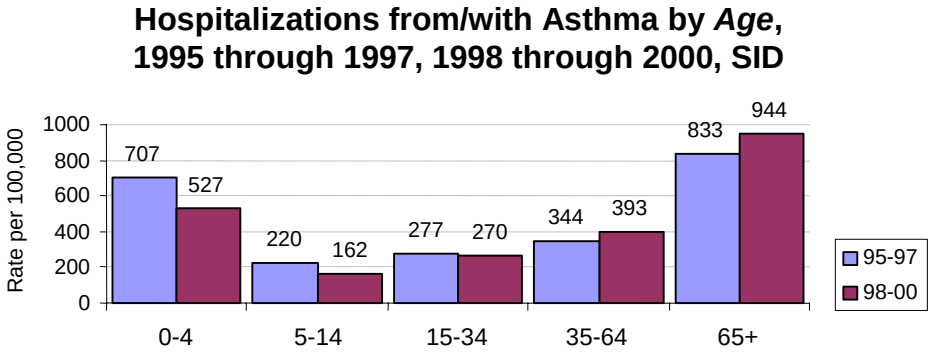
Hospitalizations from/with Asthma by *Race*, 1994 to 1997, 1998 to 2000, State Inpatient Database (SID)



Only 1999 hospitalization data were available by race. African-Americans had rates of hospitalization that year almost three times (about 200 percent greater) that of Caucasians. About 75 percent of asthma-related hospitalizations that year were for Caucasians (n = 9,000) and about 5 percent (n = 540) were for African-Americans. For 20 percent of hospitalizations, race was unknown.

BRFSS rates of adult asthma prevalence for 1999 to 2000 show adult asthma prevalence rates to be similar for the two races, while rates for the Medicaid population show rates for African-Americans to be about 65 percent higher than for Caucasians.

Figure 4.3 Hospitalizations

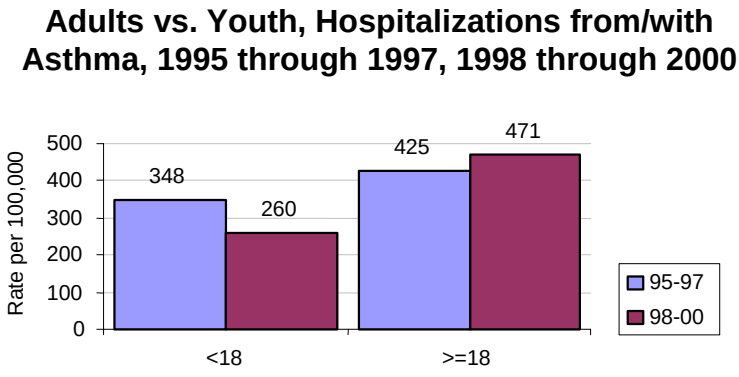


Rates of hospitalization for many chronic conditions are highest in the elderly and asthma is no exception. Hospitalization rates for the elderly increased by 13 percent between the two periods 1995 through 1997 and 1998 through 2000 to 944/100,000 in the elderly.

For both time periods, hospitalization rates were next highest in the very young (those less than five years of age), even though their hospitalization rate decreased by more than one-third between the two time periods.

From 1998 through 2000, those 65 years and older accounted for about one-third; those less than 15 years of age for about 14 percent; those 15 to 34 years for about 17 percent; and those 35 to 64 years for about 35 percent of the average annual count of hospitalizations for asthma.

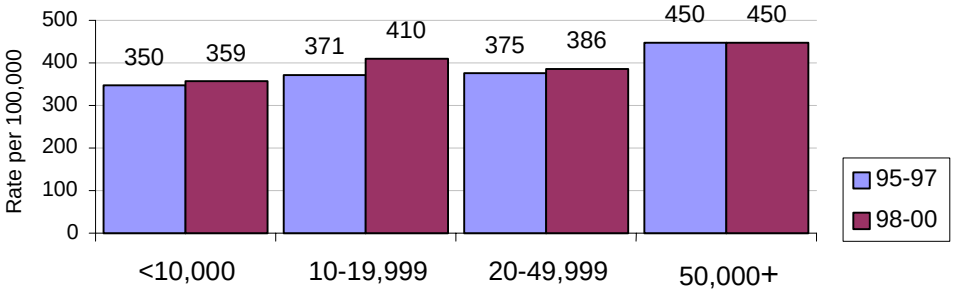
Figure 4.4



Largely attributable to the high rate of asthma-related hospitalizations in the elderly, hospitalization rates were substantially higher for adults compared to children during both 1995 through 1997 and 1998 through 2000. In 1998 through 2000, rates were more than 80 percent higher in adults than children.

Rates of hospitalization decreased for children, but increased for adults between the two time periods. Rates for children were about 25 percent lower from 1998 through 2000 than from 1995 through 1997, while rates in adults increased about 10 percent.

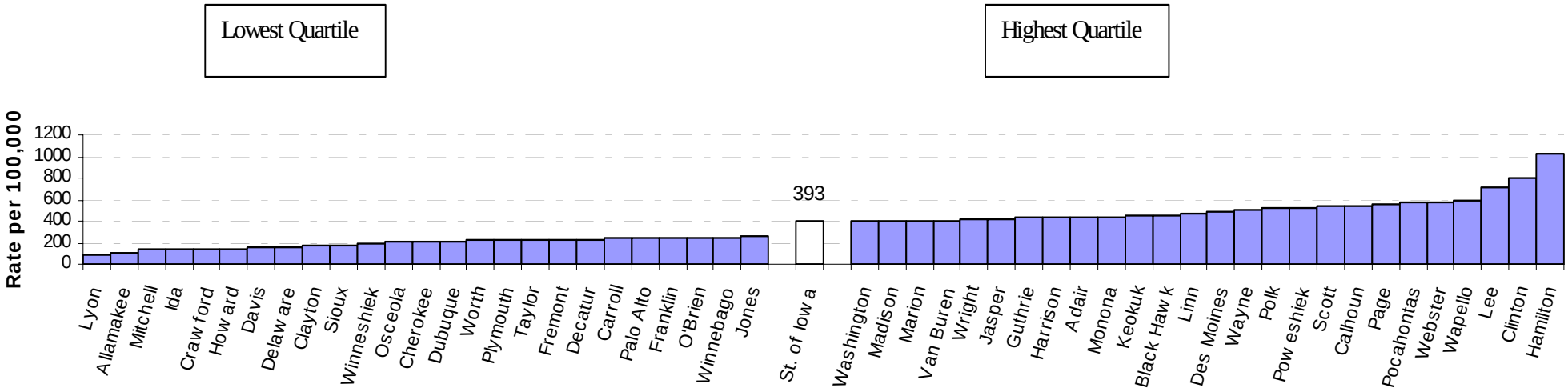
Hospitalizations from/with Asthma by *County Population Size*, 1995 through 1997, 1998 through 2000



For both 1995 through 1997 and 1998 through 2000, asthma hospitalization rates were lowest in counties of less than 10,000 population and highest in counties with 50,000 or greater population. For both periods, rates were about 25 percent higher in counties of 50,000 or more population than in counties with less than 10,000 population.

Figure 4.6 Hospitalizations: Age-Adjusted County Rates

***Counties in Lowest and Highest Quartiles* of Distribution of Average Annual Age-Adjusted Rates, Hospitalizations from/with Asthma, 1995 to 1997, State Inpatient Database (SID)**

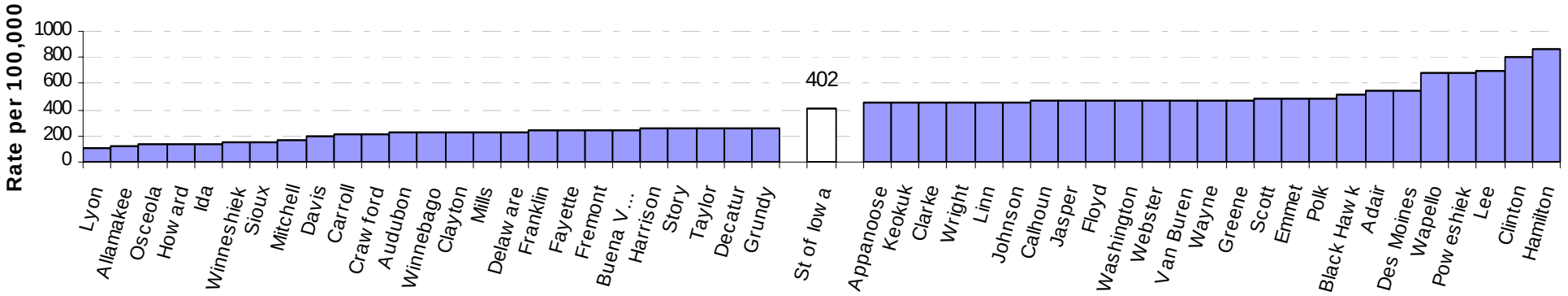


Counties in 1995 to 1997 with average annual age-adjusted asthma-related hospitalization rates at least one and a half times the state rate were: **Hamilton** (1,029/100,000), **Clinton** ((803/100,000), and **Lee** (717/100,000). All counties with rates in the highest quartile had rates above the state rate of 393/100,0000 population. Rates for counties in the highest quartile ranged from 397/100,000 (Washington County) to 1,029/100,000 (Hamilton County).

All counties in 1995 to 1997 with age-adjusted rates in the lowest quartile of the distribution of these rates had rates at least one and a half times lower than the state rate. Rates for counties in the lowest quartile ranged from 81/100,000 (Lyon County) to 256/100,000 (Jones County).

Figure 4.7 Hospitalizations: Age-Adjusted County Rates

***Counties in Lowest and Highest Quartiles* of Distribution of Average Annual Age-Adjusted Rates, Hospitalizations from/with Asthma, 1998 to 2000, State Inpatient Database (SID)**



Counties in 1998 to 2000 with age-adjusted asthma-related hospitalization rates at least one and a half times the state rate were: **Hamilton** (867/100,000), **Clinton** (799/100,000), **Lee** (693/100,000), **Poweshiek** (682/100,000), and **Wapello** (678/100,000). All counties with rates in the highest quartile had rates above the state rate of 402/100,0000 population. Rates for counties in the highest quartile ranged from 447/100,000 (Appanoose County) to 867/100,000 (Hamilton County).

Counties with rates at least one and a half times the state rate for both the 1995 to 1997 and 1998 to 2000 periods were: **Hamilton, Clinton,** and **Lee**. Counties with rates in the highest decile (top 10 percent) for both time periods were: **Hamilton, Lee, Clinton, Wapello,** and **Poweshiek**. Counties with rates not in the highest decile, but otherwise in the highest quartile for both time periods (1995-1997 and 1998-2000) were: **Adair, Black Hawk, Calhoun, Des Moines, Emmet, Jasper, Keokuk, Linn, Polk, Scott, Van Buren, Washington, Webster,** and **Wright**.

All counties in 1998 to 2000 with average annual age-adjusted rates in the lowest quartile of the distribution had rates at least one and a half times lower than the state rate (402/100,000). Rates for counties in the lowest quartile ranged from 99/100,000 (Lyon County) to 260/100,000 (Grundy County).

Figure 4.8 Hospitalizations: Counties with 50,000 or More Population

Counties with 50,000 or Greater Population **(2000 Census), Average Annual Age-Adjusted Hospitalization Rates from/with Asthma, 1998 to 2000, State Inpatient Database (SID)**

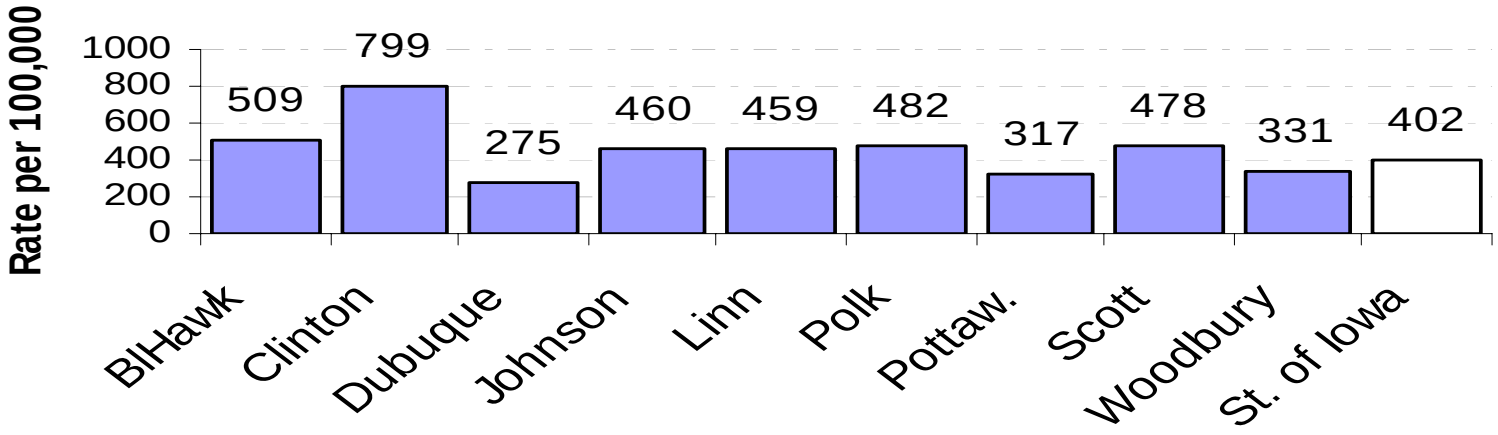


Figure 4.9 **Hospitalizations: Counties with Less than 10,000 Population**

Counties with Less Than 10,000 Population **(2000 Census), Average Annual Age-Adjusted Hospitalization Rates from/with Asthma, 1998 to 2000, State Inpatient Database (SID)**

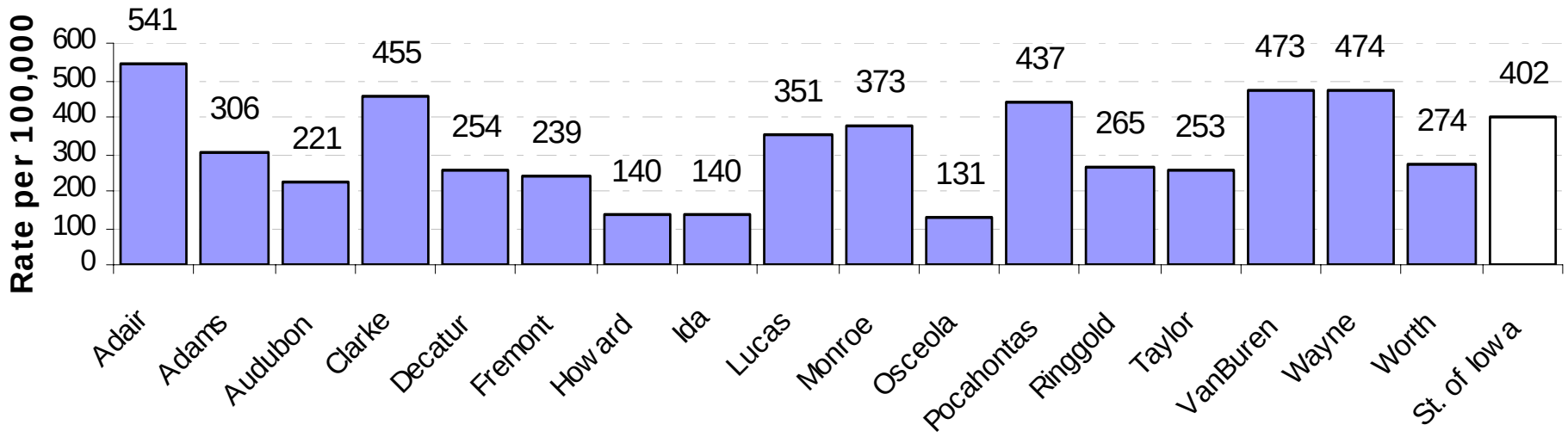


Figure 4.10 Hospitalizations: 10,000 to 19,999 Population

Counties with 10,000 to 19,999 Population (2000 Census), Average Annual Age-Adjusted Hospitalization Rates from/with Asthma, 1998 to 2000, State Inpatient Database (SID)

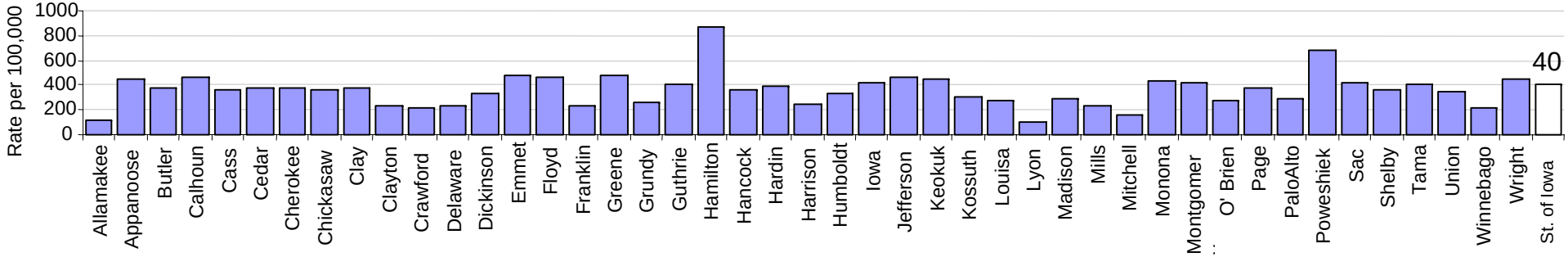
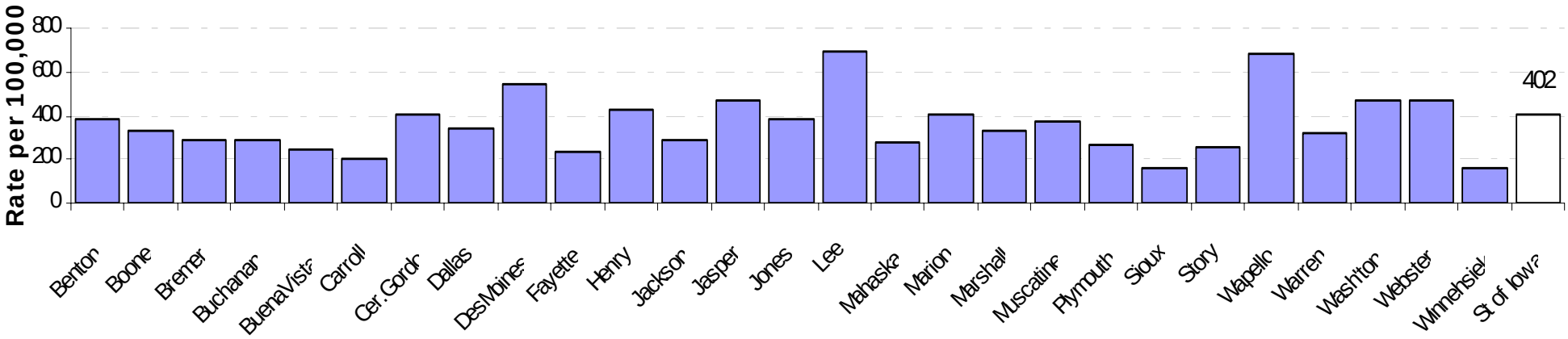


Figure 4.11 Hospitalizations: Counties with 20,000 to 49,999 Population

Counties with 20,000 to 49,999 Population (2000 Census), Average Annual Age-Adjusted Hospitalization Rates from/with Asthma, 1998 to 2000, State Inpatient Database (SID)



Direct and Indirect Costs of Asthma in Iowa

Allergy and Asthma Association of American Estimates of National and Iowa Direct and Indirect Costs of Asthma

A number of studies have estimated the direct and indirect costs of asthma. In March 2002, the Asthma and Allergy Foundation of American (AAFA) published Cost of Asthma, which estimates nationwide and state-specific costs of asthma in the U.S. The AAFA study's methodology, whose estimate of $759 per person with asthma per year lays somewhere in the mid-range of those published in the various other studies, was adopted for use in this report. The AAFA average cost per person with asthma was applied to Iowa BRFSS prevalence rates to derive the estimated costs of asthma in Iowa.

Direct costs are comprised of hospital inpatient and outpatient, emergency department, physician care and medications costs. Indirect costs are based on estimates of time lost from school or work, and premature deaths related to asthma.

The AAFA report assumes uniform utilization of health care resources and time lost from work across all states.

The AAFA report found that the average annual direct and indirect costs of asthma in the U.S. are $10.7 billion. About 57 percent of the cost of asthma is estimated to be from direct medical treatment and 43 percent form indirect costs related to lost work or school days and premature deaths.

Asthma in America estimates that nationally six to nine percent of people with asthma are hospitalized each year (900,000 - 1,350,000), 23 percent (3.5 million) visit the emergency department at least once; and, 20 percent (3 million) have made an unscheduled asthma-related clinic visit in the last year. Thirty-two percent of people with asthma report having lost a work or school day attributable to their disease, including 49 percent of children with asthma (4.8 million). In rough terms since Iowa has one percent of the U.S. population, about one percent of these amounts may be attributable to Iowans.

What is the cost of asthma in Iowa?

Based on an average of $759 per person with asthma, costs of asthma in Iowa are estimated below:

Age Group	Annual Costs of Asthma in Iowa		
	Direct	Indirect	Total
Adults: >=18	$65,759,000	$49,608,00	$115,367,000
Children: <18	19,468,000		34,155,000
All Iowans	$85,227,000.0	$64,295,00	$149,522,000

Future of Asthma Surveillance: Planning for an Iowa Surveillance System

During 2003, the Iowa Department of Public Health, in conjunction with the Iowa Asthma Task Force will oversee the development of a strategic plan for asthma interventions and surveillance in the state. This plan will describe how an ongoing asthma surveillance system for Iowa might work, including identification of specific:

- Audiences for surveillance data (state, local, public, private policy makers, administrators and funders, health care practitioners, persons with asthma, their families and the general public, among others.);
- Sources of data (those sources used here, i.e., vital records, hospital discharge data, BRFSS, and Medicaid databases, as well as other sources, including environmental air quality data, Iowa Youth Tobacco Survey, Iowa Youth Risk Behavior Survey, Iowa Youth Survey, National Asthma Survey, emergency room surveillance as part of any respiratory syndromic surveillance system established for bioterrorism, workers compensation claims, etc.);
- Analyses to be completed (those analyses provided here as well as more detailed analyses of:
  - BRFSS (further examination of causes of socioeconomic disparities and sub-populations with risk factors);
  - Death certificates (for COPD and other smoking-related and occupationally-related respiratory conditions);
  - Medicaid and other databases for estimates of unscheduled outpatient provider visits, hospitalizations, prescription drug use, frequency of attacks, etc.);
  - State Inpatient Database (further analyses of seasonal variability in admissions, total asthma-related charges and source of payment, including analyses of worker compensation-related claims);
- Timeframes (timeframes for frequency of analyses and the dissemination of these analyses.); and,
- Funding sources (state, national, local, etc.)

By the end of 2003, this long-range plan for asthma interventions and surveillance should be available on the IDPH asthma web site (address provided on the inside back cover of this report).

References

American College of Asthma, Allergies and Immunology (ACAAI), *The Role of the Allergist in Cost-Effective Treatment of Asthma*, Web site: www://allergy.mcg.edu/roleAll.html, 2002

American College of Asthma, Allergies and Immunology (ACAAI), Allergy Glossary, Web site: www://allergy.mcg.edu/glossary/index.html, 2002.

Asthma and Allergy Foundation of America (AAFA), *Cost of Asthma*, Web site: http://www.aafa.org/temp/display/cfm?id=67&sub=145 , March 2002.

Brownson, RC, Remington PW, Davis JR (Eds), *Chronic Disease Epidemiology and Control*, 2nd Edition, WDC, American Public Health Association, 1998.

Centers for Disease Control and Prevention, *National Survey of Early Childhood Health, NSECH Public Use File*, NCHS Fact Sheet, Web site: http://cdc/gov/nchs/about/major/slaits/nsech.htm. , October 2, 2002.

Centers for Disease Control and Prevention, *New Asthma Estimates: Tracking Prevalence, Health Care and Mortality*, NCHS Fact Sheet, CDC Web site: http://cdc/gov/nchs/products/pubs/pubd/hestats/asthma/asthma.htm. , October 5, 2001.

Centers for Disease Control and Prevention, *Surveillance for Asthma, United States*, 1960-1995, MMWR Surveillance Summaries, vol. 47/SS-1, 1-28, April 24, 1998.

Centers for Disease Control and Prevention, *Surveillance for Asthma, United States*, 1980-1999, MMWR Surveillance Summaries, vol. 51/SS-1, March 29, 2002.

Centers for Disease Control and Prevention, *A Public Health Response to Asthma Satellite Broadcast*, Handouts, May 17, 2001.

Connecticut Department of Public Health, *Asthma in Connecticut*, May, 2001.

Council of State and Territorial Epidemiologists (CSTE), *Asthma Surveillance and Case Definitions: Position State 1998-EH/CD 1*, Web site: http://cste.org/ps/1998/1998-eh-ed-01.htm, 1998.

CDC Web site: http://www.cdc.gov/nceh/airpollution/asthma, 2002.

Global Initiative for Asthma (GINA), *Strategies for Asthma Management and Prevention*, NIH, NHLBI, No. 02-3659, 2002.

Iowa Department of Public Health, *Healthy Iowans 2010: Iowa's Health Agenda for the New Millennium*, Des Moines, IA, January 2000.

Iowa Department of Public Health, Behavioral Risk Factor Surveillance System, unpublished data for 1999-2000, 2002.

Iowa Health Indicator Tracking System (IHITS), 1999 Asthma Hospitalization Rates, Iowa Dept. of Public Health Web site: www.idph.state.ia.us, 2002.

Iowa Department of Public Health, Iowa Vital Records, unpublished death certificate data for 1999-2000.

Mausner, Judith, and Bahn, Anita, *Epidemiology: An Introductory Text*, W.B. Saunders Co., Philadelphia, PA, 1974.

Mayo Clinic, *What is Asthma, Adult-Onset Asthma*, Mayoclinic.com, 2000.

National Heart Lung and Blood Institute (NHLBI), *National Education and Prevention Task Force on the Cost Effectiveness of Quality of Care and Financing of Asthma*, USDHHS, NIH, Publication No. 55-807, September 1996.

National Heart Lung and Blood Institute (NHLBI), *NIH Guidelines for the Diagnosis and Management of Asthma: Expert Report 2, Clinical Practice Guidelines,* USDHHS, NIH, Publication No. 98-4051, July 1997.

National Institute for Allergies and Infectious Diseases (NIAID*), Asthma Researchers Present New Results, New Perspectives on the Disease*, USDHHS, NIH, Web site: http://www/niadi.nih.gov.script/search/newsroom/query.idq August 31, 2001.

National Institute for Allergies and Infectious Diseases (NIAID), *Focus on Asthma*, USDHHS, NIH, NIAID Web site: http://www/niadi.nih.gov.newsroom/focuson/asthma01/basics.htm., February 27, 2002.

Pearce, N, Beasley, R, Burgess, C, and Crane, J, *Asthma Epidemiology: Principles and Methods,* Oxford University Press, New York, 1998.

Ryu, JH, Scanlon, PD, *Obstructive Lung Disease: COPD, Asthma, and Many Imitators*, Mayo Clinical Proc., vol. 76, pp. 1144 to 1153, 2001.

Schulman, Ronca, and Bucuvalas, Inc., *Asthma in America: Executive Summary,* Washington D.C., October 1998.

Stedman's Medical Dictionary, Houghton Mifflin Co., Boston, 1995.

Thacker, SB, and Stroup, DF, *Future Directions for Comprehensive Public Health Surveillance and Health Information Systems in the United States*, American Journal of Epidemiology, vol. 140, 1994, pp. 383-397.

U.S. Bureau of the Census, *Population Estimates by Age, Sex, Race, and Hispanic Origin: 1990-1999-Iowa*, 2000, Web site http://eire/census.gov/popest/archives/county/co_casrh.php.

U.S. Bureau of the Census, *Population Estimates (Revised) for Iowan and its Counties: 1990-1999:*, 4/2002, State Library of Iowa, State Data Center, Web site: http://www.silo.lib.ia.us/specialized_services/datacenter/data_tables/CountyAll/coestpop 19901999revised.PDF

U.S. Bureau of the Census, *Census 2000 Summary File2 (SF 2) 100 Percent Data: Iowa*, 2000 Census, Web site: http://factfinder.census.gov , 2002.

U.S. Department of Health and Human Services, *Healthy People 2010: Understanding and Improving Health*, 2nd Edition, Washington, D.C., USGPO, November 2000.

U.S. Environmental Protection Agency, National Center for Environmental Assessment, *Respiratory Effects of Passive Smoke*, Web site: http://cfpub.epa.gov/ncea/cfm/ets/etsindex.cfm, June 30, 2002.

University of Iowa, College of Public Health, State Inpatient Database and Iowa Medicaid data, unpublished asthma-related services utilization counts and rates, March 2002.

Abbreviations

AAAAI	American Academy of Allergy, Asthma and Immunology
AAFA	Asthma and Allergy Foundation of America
ACAAI	American College of Asthma, Allergy and Immunology
ASTCDPD	Association of State and Territorial Chronic Disease Program Directors
ASTHO	Association of State and Territorial Health Officials
BRFSS	Behavioral Risk Factor Surveillance System
CD	Chronic Disease
CDI	Chronic Disease Indicator
CDC	Centers for Disease Control and Prevention
COPD	Chronic Obstructive Pulmonary Disease
CPS	Current Population Survey
CSTE	Council of State and Territorial Epidemiologists
DHS or IDHS	Iowa Department of Health and Human Services
DHHS	Department of Health and Human Services
GINA	Global Initiative for Asthma
IDHS	Iowa Department of Human Services
IDPH	Iowa Department of Public Health
IYS	Iowa Youth Survey
IYTS	Iowa Youth Tobacco Survey
MMIS	Medicaid Management Information System
NIAID	National Institute for Allergies and Infectious Diseases, U.S. Dept. Health and Human Services
NAACCR	North American Association of Central Cancer Registries
NCHS	National Center for Health Statistics
NCCDPHP	National Center for Chronic Disease Prevention and Health Promotion
NHIS	National Health Interview Survey
NHLBI	National Heart, Lung and Blood Institute
NIH	National Institute of Health
NCEH	National Center for Environmental Health
NPHSS	National Public Health Surveillance System
NRC	National Research Council
NSECH	National Survey of Early Childhood Health
SID	State Inpatient Database
STEPPS	State-based Epidemiology for Public Health Program Support
YRBSS	Youth Risk Behavior Surveillance System

Glossary

Airflow obstruction: Measured through spirometry, it is a ratio of less than 65-70 percent of forced expiratory volume in one second (FEV_1) to forced vital capacity (FVC). Airway obstruction is usually caused by asthma or chronic obstructive pulmonary disease, although other less common diseases such as bronchiectasis, upper airway lesions, and some interstitial lung diseases may also cause airflow obstruction. Airflow obstruction in people with asthma is reversible and caused by airway inflammation and hyperresponsiveness. (Ryu and Scanlon, 2001)

Airway hyperactivity or hyperresponsiveness: Excessive constriction of smooth muscles of the bronchial tubes due to inhalation of irritants and allergens. In asthma, hyperresponsiveness is typically reversible.

Allergy: An inappropriate or exaggerated reaction of the immune system to substances that, in most people, cause no symptoms. Skin, respiratory and gastrointestinal system allergic diseases are most common. (ACAAI Glossary)

Asthma: A disease characterized by airway constriction, mucus secretion, and chronic inflammation resulting in reduced airway flow and wheezing, coughing, chest tightness and difficulty breathing. (Healthy People 2010)

A chronic, inflammatory lung disease characterized by recurrent breathing problems. People with asthma have acute episodes when the air passages in their lungs become narrower. Episodes may be triggered by allergens, irritants, cold air, infections or other important triggers. (ACAAI Glossary)

A chronic inflammatory disorder of the airways in which many cells and cellular elements play a role, in particular, mast cells, eosinophils, T lymphocytes, macrophages, neutrophils, and epithelial cells. In susceptible individuals, chronic inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness and coughing, particularly at night or in the early morning. "These episodes are usually associated with widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment. The inflammation also causes an increase in bronchial hyperresponsiveness to a variety of stimuli."(NHLBI, 1997)

Asthma management: A comprehensive approach to achieving and maintaining control of asthma. It includes patient education to develop a partnership in management, assessing and monitoring severity, avoiding or controlling asthma triggers, establishing plans for medication and management of exacerbations and regular follow-up care.

Atopy: The propensity, usually genetic, for developing IgE-mediated responses to common environmental allergens.

Behavioral Risk Factor Surveillance System: The BRFSS is a CDC-sponsored, state-based, nationwide chronic disease surveillance system based on phone interviews in which adults' self-report health status and disease risk factors.

Bronchitis: Inflammation of the bronchi (lung airways) that produces a persistent cough and excessive sputum. Chronic bronchitis is most common in smokers and those exposed to outdoor air pollution.

Bronchodilator: Drugs than may be inhaled or taken orally that relax the bronchial smooth muscles. Inhaled bronchodilators can relieve symptoms in a few minutes if the cause of symptoms is hyperactivity of the smooth muscles of the airways. (John Hopkins web site)

Causal factors: Risk factors that sensitize the airways and cause the onset of asthma. The most important of these factors are allergens and chemical sensitizers. (CDC web site)

Contributing factors: Risk factors that either augment the likelihood of asthma developing upon exposure to them, or may even increase susceptibility to asthma. These factors include: smoking, viral infections, small size at birth, and environmental pollutants. (CDC web site)

Chronic bronchitis: Respiratory condition characterized by the presence of a chronic productive cough for three months in each of two successive years in a patient in whom other causes of chronic cough have been excluded. (Ryu and Scanlon, 2001)

Chronic disease: A disease that has a prolonged course, that does not resolve spontaneously, and for which a complete cure is rarely achieved (McKenna, 1998)

Chronic diseases are characterized by uncertain etiology, multiple risk factors, long latency periods, prolonged course of illness, noncontagious origin, functional impairment or disability, and incurability. (Brownson, 1993)

Chronic obstructive pulmonary disease: A disease state characterized by the presence of airflow obstruction due to chronic bronchitis or emphysema. Airflow obstruction is generally progressive, and irreversible and can be accompanied by airway hyperactivity. Clinical manifestations of COPD include dyspnea, wheeze, cough, and sputum production. (Ryu and Scanlon, 2001)

Corticosteriod: Any of the steroid hormones produced by the adrenal cortex or their synthetic equivalents. Corticosteroids are anti-inflammatory drugs used to treat asthma, allergic rhinitis, eczema, and rheumatoid arthritis. Corticosteroids are maintenance medications that provide control of airway inflammation, that characterizes nearly all asthma, and are of little help in the immediate management of an asthma attack.

Emphysema: The abnormal, permanent enlargement of the airspaces distal to the terminal bronchioles, accompanied by the destruction of their walls, without obvious fibrosis. Detectable airflow obstruction may not be present in the early stages. In smokers, chronic bronchitis, emphysema, and airflow obstruction usually occur together. (Ryu and Scanlon, 2001)

Environmental control: Removal of risk factors from the environment.

Exacerbation: Any worsening of asthma. Onset can be acute and sudden, or gradual over several days. A correlation between symptoms and peak flow is not necessarily found. Exacerbation replaces the word attack or episode. (CDC web site)

Epidemiology: Is the study of the distribution and determinants of diseases and injuries in human populations. (Mausner and Bahn)

Health Status: A description of the health of people in a population using information representative of most people living in the population. Health status can be measured by: birth and death rates, life expectancy, quality of life, morbidity from a disease, risk factors, use of health care services, access to health personnel and facilities, financing of health care, insurance coverage, etc. Health status indicators must be viewed for various subpopulations-age, race, gender, etc., to determine health status disparities. (Healthy People 2010)

Indicator: A construct of public heath surveillance that defines a measure of health (e.g., the occurrence of a disease or other health-related event) or a factor associated with health (e.g., health status or other risk factor) among a specified population. The term "indicator" has been alternatively used to describe or evaluate public health programs and services.

MMIS (Medicaid Management Information System): The database in which Medicaid fee-for-service and managed care subscriber claims records are kept.

MSA (Metropolitan Statistical Area): A metropolitan statistical area is defined by the U.S. Office of Management and Budget as any county with a core city of 50,000 or more population *or* an urbanized area as designated by the US Bureau of the Census of at least 50,000 population with a total metropolitan population of as least 100,000. In Iowa, MSAs are single counties or groups of contiguous urbanized counties with a core city of 50,000 or more population. As of 2002, 11 Iowa counties were parts of eight MSAs: Polk, Dallas, Warren, Black Hawk, Bremer, Linn, Dubuque, Pottawattamie, Scott, Johnson, and Woodbury counties.

PEF (peak expiratory flow) home monitoring: A spirometric measurement done at home. Home monitoring of PEF on a regular basis with a portable peak flow meter is especially useful to patients over five years of age with moderate persistent to severe persistent asthma. (CDC web site)

Performance measure: A quantitative indicator [measure] that can be used to track progress toward an objective. (Panel on Performance Measures, 1997)

Prevention: Public health efforts to intervene before disease onset or early in the course of a disease. Primary prevention is directed to susceptible people before they develop chronic disease in order to reduce incidence. The causes of a disease must be known before primary prevention is feasible. Secondary prevention is directed toward those with diseases who are asymptomatic. Secondary prevention generally does not reduce incidence but instead detects the condition at a more treatable stage. Tertiary prevention is geared toward preventing disability, a quantitative indicator [measure] that can be used to track progress toward an objective. (Brownson, 1993)

Spirometry: Use of a spirometer to measure the volume of air entering and leaving the lungs. The spirometric measurement of forced expiratory volume in one second (FEV_1) over the maximum volume of inhaled air able to be inhaled or forced vital capacity (FVC) is commonly used to measure the amount of airway obstruction in asthmatics. (Stedman's Medical Dictionary, 1995)

Standardization: An analytic process that attempts to remove the effect of differences in a confounding variable (e.g., age) from a rate; sometimes called adjustment. (Thacker, 1988)

Surveillance: The ongoing, systematic collection, analysis, and interpretation of outcome-specific data for use in planning, implementation, and evaluation of public health practice. (Thacker, 1988)

Public health surveillance must be closely linked with dissemination of these data to the appropriate audience and the application of the surveillance findings to disease prevention and control. (Brownson, 1993)

An epidemiological surveillance system that monitors trends in a disease is an essential part of public health prevention and control of that disease. Surveillance systems must include mortality and prevalence data on the disease and its risk factors, as well as measures of functional status and disability. Chronic disease control cannot be effectively pursued without valid measures of incidence and prevalence, related impairments, costs and effectiveness of control measures. (Brownson, 1993)

Risk factor: An agent that, when present, increase the probability of a disorder being expressed. There are two types of risk factors: causal (involved in developing asthma) and contributing (involved in exacerbations). (CDC web site)

Surveillance system: The functional capacity for collection and analysis of surveillance data, and the timely dissemination of these data to persons who can undertake effective prevention and control activities. (Thacker, 1994)

Trigger: A risk factor that causes exacerbations of asthma; a stimulus that causes an increase in asthma symptoms and/or airflow limitation. (CDC web site)

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

Definitions of Public Health Surveillance and of Asthma Cases Included in Data of this Report

Public health surveillance is the systematic and ongoing collection, analysis, interpretation, and timely dissemination of health-related data that are essential to the planning, implementation and evaluation of public health. The ultimate purpose of asthma surveillance is to provide for the most acceptable, effective, and efficient prevention and control programs possible.

At the national level, the Council of State and Territorial Epidemiologists (CSTE) and the CDC have peer-reviewed and published jointly a number of asthma (and other chronic disease) surveillance case definitions for those measures most commonly employed in chronic disease surveillance. Their case definitions used in this report include:

- Asthma prevalence (people self-reporting current asthma or reporting asthma symptoms within some specified period of time or reporting ever having had asthma)

- Hospitalizations from asthma (inpatient admissions in which asthma is the primary admission or discharge diagnosis)

- Hospitalizations with asthma (inpatient admissions in which asthma was a secondary discharge diagnosis)

- Deaths from or with asthma (deaths in which asthma was the underlying (primary) or a contributing (secondary) cause)

Application of the CSTE/CDC case definitions means public health departments can rely on data sets common to all or most states including vital records, hospital discharge databases (SIDs), and the CDC-funded Behavioral Risk Factor Surveillance System.

Conference of State and Territorial Epidemiologists' (CSTE) Surveillance Case Definitions for Asthma

Confirmed asthma diagnosis:

Clinical/Laboratory Confirmed Case:
Records showing any of the following three clinical symptoms at least three times during the past year and at least one of the laboratory criteria:

Clinical criteria:
- Wheezing for two or more days;
- Chronic cough that responds to bronchodilation and persists three to six weeks in the absence of allergic rhinitis or sinusitis; or,
- Nocturnal awakening with dyspnea, cough, or wheezing in the absence of other medical conditions known to have caused these symptoms

Laboratory criteria:
- FEV_1, FVC demonstrating a 12 percent increment after the patient inhales;
- Twenty percent decrease in FEV_1 after a challenge by histamine, methacholine, exercise, or cold air; or,
- Twenty percent diurnal variation in peak expiratory flow over one to two weeks.

Probable asthma diagnosis:

Hospital discharge record: listing asthma as the primary diagnosis (hospitalization from asthma) (ICD-9 code 493.0 to 493.9 or ICD-10 code J45-J46);

Death certificate: listing asthma as the underlying cause of death (death from asthma) (ICD-9 code 493.0 to 493.9 or ICD-10 code J45-J46); or,

Prevalence classification: a positive response to the questions,
**"Did a doctor or other health professional ever tell you (or any household member) that you (they) had asthma?"
and
**"Do you (or the household member) still have asthma?"
or
"Have you (or any household member) taken prescription drugs for asthma (such as albuterol, inhaled steroids, cromolyn, theophyllilne, etc.) during the past year?"
or
"Have you had a wheezing episode in the past year?"

Clinical/Laboratory records: listing any one of the following criteria:
- In the absence of supporting laboratory criteria, presence of any of the clinical symptoms previously listed under confirmed diagnosis which have been reversed by the physician treatment with asthma medications and have occurred at least three times during the past year;
- In the absence of supporting clinical criteria, met at least one of the laboratory criteria during the past year; or
- In the absence of supporting laboratory or clinical criteria, taken medications in the past year that was prescribed by a physician for asthma.

Possible asthma diagnosis:

Hospital or medical record: listing asthma as a secondary diagnosis (hospitalization with asthma) (ICD-9 code 493.0 to 493.9 or ICD-10 code J45-J46);

Death certificate: listing asthma as a contributing cause of death (deaths with asthma) (ICD-9 code 493.0 to 493.9 or ICD-10 code J45-J46);
ICD-9 code 466 (acute bronchitis, bronchiolitis in children <12 years); or,
ICD-9 code 491.20 or 491.21 (chronic bronchitis in children <12 years).

Prevalence classification: a positive response to the question,
"Have you (or any household member) used over-the-counter medications for asthma during the past year?"
or
"Have you (or any household member) experienced episodes of wheezing during the past year?"

Clinical/Laboratory records: listing any one of the following criteria:
- Shortness of breath
- Wheezing or chronic cough in absence of obvious respiratory infection
- Increased nasal secretion, mucosal swelling, nasal polyps or chronic sinusitis
- Hyper expansion of the thorax
- Sounds of wheezing during normal breathing
- Prolonged phase of forced exhalation
- Chest X-ray showing hyper-expansion
- FEV_1 less than 80 percent of predicted value
- (Note: this clinical definition of possible asthma is not as useful with young children as it is with adults. And, in both adults and children other causes of airway obstruction leading to wheezing exist, such as COPD, congestive heart failure, pulmonary embolism, pulmonary infiltration with eosinophilia, vocal cord dysfunction, gastroesophageal reflux, sinusitis, foreign body in small airway, etc.)

*** Worded similarly to BRFSS questions used for BRFSS prevalence data in this report. BRFSS questions which provided prevalence data are provided below.*

BRFSS Asthma and Asthma-Related Questions

Questions Used to Gather Data in this Report:

Asthma prevalence questions: (1999 and 2000 questionnaire)
- Did a doctor ever tell you that you had asthma?
- Do you still have asthma?

Tobacco-Related (1999 and 2000 questionnaire):
- Have you smoked at least 100 cigarettes in your entire lifetime?
- About how long has it been since you last smoked cigarettes regularly, that is daily?
- Do you now smoke everyday, some days or not at all?
- On average, how many cigarettes a day do you now smoke?

- In the past 30 days, has anyone, including yourself, smoked cigarettes, cigars, or pipes anywhere inside your home?

Insurance Coverage (1999 and 2000 questionnaire):
- Do you have any kind of health insurance coverage, including health insurance, prepaid plans, such as HMOs or government plans such as Medicare?

Weight (1999 and 2000 questionnaire):
- Obesity status is computed from questions about current height and weight.

Exercise (1999 and 2000 questionnaire):
- The next few questions are about exercise, recreation, or physical activities other than your regular job duties. During the past month, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?
- How far did you usually walk/run/jog/swim?
- And when you took part in this activity, for how many minutes or hours did you usually keep at it?

Other BRFSS Questions Related to Asthma to be Analyzed in Future Reports:

2001 Questionnaire Optional Questions
- Have you ever been told by a doctor, nurse, or other health care professional that you had asthma? (This is a core question, not optional as of 2001)
- How old were you when you were first told by a doctor, nurse or other health professional that you had asthma?
- During the past 12 months, have you had an episode of asthma or an asthma attack?
- During the past 12 months, how many times did you visit an emergency room or urgent care center because of your asthma?
- During the past 12 months, how many times did you see a doctor, nurse, or other health professional for urgent treatment of worsening asthma symptoms?
- During the past 12 months, how many times did you see a doctor, nurse, or other health professional for a routine checkup for your asthma?
- During the past 12 months, how many days were you unable to work or carry out your usual activities because of your asthma?
- Symptoms of asthma include cough, wheezing, shortness of breath, chest tightness, and phlegm production when you don't have a cold or respiratory infection. During the past 30 days, how often did you have any symptoms of asthma?
- During the past 30 days, how many days did symptoms of asthma make it difficult for you to stay asleep?
- During the past 30 days, how often did you take asthma medication that was prescribed or given to you by a doctor? This includes using an inhaler
- Earlier you said there were children ages 17 or younger living in your household. How many of these children have ever been diagnosed with asthma?
- Does this child/How many of these children still have asthma?

Many other questions in the BRFSS survey relate to asthma as well. Questions are asked regarding service usage and disabilities/activity limitations. These questions, including information about what core and optional questions were included in the Iowa BRFSS, are available on the CDC web site: http://apps.nccd.cdc.gov/BRFSSQuest.

BRFSS Weighting Formula and Methodology for Iowa BRFSS Sample Data (Source: CDC BRFSS Web site)

Weighting Formula: FINALWT=GEOWT*DENWT*(1/NPH)*NAD*CSA*POSTSTRAT

The computational formula above is intended to reflect all the possible factors that could be taken into account in weighting a state's data. Where a factor does not apply its value is set to one.

FINALWT is the final weight assigned to each respondent.

GEOWT accounts for differences in the basic probability of selection among strata (subsets of area code/prefix combinations) intended to correspond as closely as possible to specified geographic regions of a state. It is the inverse of the ratio of the estimated sampling fraction of each stratum to the stratum with the largest estimated sampling fraction. The sampling fraction for a DSS sample (Iowa's is a DSS sample) is the number of sample records used divided by the number of sample records selected from, by stratum. There is almost never a complete correspondence between strata, which are defined by subsets of area code/prefix combinations, and regions, which are defined by the boundaries of government entities.

For DSS states, the numerator, the number of sample records used in a stratum, is determined in one of two ways. The number of sample records used is the sum of the number of records actually called and the number of records pre-screened (by being identified by the sample provider as a non-working or business number) that would have been called had they not been pre-screened. If a state has sent to us all the sample records used in a stratum (a goal toward which we are working), then the numerator is simply the total number of records in its data file. If a state has not sent to us all the sample records used in a stratum, then we obtain the number of sample records used (or an estimate thereof) from the state. The denominator of the sampling fraction for a stratum in a state with a DSS design is the size of the sampling frame for the stratum, the number of telephone numbers from which the sample was selected. The size of the sampling fraction is obtained from the sample provider.

DENWT accounts for differences in the basic probability of selection between telephone numbers from a stratum that is presumed to contain many households (a high density stratum) and telephone numbers from a stratum that is presumed to contain few households (a low density stratum). It is the inverse of the ratio of the sampling fraction of the low density stratum to the high density stratum. In the BRFSS, stratification by presumed household density is usually found in a design in which telephone numbers from hundred blocks (sets of telephone numbers with identical first eight digits and all possible final two digits) with one or more listed residential numbers (one-plus blocks) are sampled at a higher rate than telephone numbers from hundred blocks with no listed residential numbers (zero blocks).

1/NPH is the inverse of the number of residential telephone numbers in the respondent's household.

NAD is the number of adults in the respondent's household.

CSA is the ratio of the expected cluster size to the actual cluster size.

POSTSTRAT is the number of people in an age-by-sex or age-by-race-by-sex category in the population of a region or a state divided by the sum of the products of the preceding weights for the respondents in that same age-by-sex or age-by-race-by-sex category. It adjusts for non-coverage and non-response and, before 1995, also adjusts for different probabilities of selection by region, where applicable.

Calculated Variables on the 1999 and 2000 Behavioral Risk Factor Surveillance System Data Files

(Source: CDC BRFSS Web site)

Certain BRFSS variables are calculated from questionnaire variables. Among those calculated variables, the following were used in this report:

Overweight & Obesity

Body Mass Index- three levels
Body mass is computed as weight in kilograms divided by height in meters squared, (weight/height**2).

1	Normal weight:	Respondents with a body mass index less than 25.0.
2	Overweight:	Respondents with a body mass index equal to or greater than 25.0 but less than 30.0.
3	Obese:	Respondents with a body mass index equal to or greater than 30.0.
9	NA/Refused:	Respondents who “don’t know” or “refused” to answer the height or weight questions prohibiting calculation of body mass index.

Tobacco Consumption

Smoking Status

1	Current Smoker (every day):	Respondents who have smoked at least 100 cigarettes in their lifetime and now smoke every day.
2	Current Smoker (some days):	Respondents who have smoked at least 100 cigarettes in their lifetime and now smoke some days.
3	Former Smoker:	Respondents who have smoked at least 100 cigarettes in their lifetime and currently do not smoke.
4	Never Smoked:	Respondents who have not smoked at least 100 cigarettes in their lifetime.
9	NA/Refused:	Respondents who report they “don’t know” if they have smoked at least 100 cigarettes in their lifetime or “refused” to answer the question, or those who have smoked 100 cigarettes in their lifetime but refused to answer whether they smoke now.

Physical Inactivity/Activity

Physical Activity - 4 levels

1	Physical Inactive:	Respondents reporting no physical activity (formerly labeled Sedentary from 1984 to 1991).
2	Irregular Activity:	Any physical activity or pair of activities done for less than 20 minutes or less than three times per week.
3	Regular Activity:	Any physical activity or pair of activities done for 20 or more minutes, three or more times per week, less than 50% of capacity.
4	Regular and Vigorous Activity:	Any physical activity or pair of activities that requires rhythmic contraction of large muscle groups at 50% functional capacity for 20 or more minutes, three or more times per week.
9	NA/Refused:	Respondents who report they "don't know" if they have participated in any physical activity during the past month or those who "refused" to answer the physical activity questions.

Demographics

RACE (Race/Ethnicity)

Beginning in 1995, respondents reporting Asian/Pacific Islander and American Indian/Alaska Native race who also state Hispanic are coded as Hispanic. The race question and the Hispanic question are used to create the new race variable. The new race variable includes Hispanic categories.

White Non-Hispanic:	Respondents who report they are white but not of Hispanic origin. 02=if race=1 and Hispanic origin = 2, 7, or 9.
Black Non-Hispanic:	Respondents who report they are black but not of Hispanic origin. 01=if race=2 and Hispanic origin = 2, 7, or 9.
White Hispanic:	Respondents who report they are white and of Hispanic origin. 03=if race=1 and Hispanic origin = 1.
Black Hispanic:	Respondents who report they are black and of Hispanic origin. 04=if race=2 and Hispanic origin = 1.
Other Hispanic:	Respondents who report they are of other race, as well as those respondents who "don't know" their race or "refused" to give their race and are also of Hispanic origin. 05 = if race = 6, 7, 8, or 9, missing and Hispanic origin = 1.
Asian or Pacific Islander:	Respondents who report they are Asian or Pacific Islander and not

	of Hispanic origin. 06 = if race = 3 and Hispanic origin = 2, 7, or 9.
American Indian, Alaska Native:	Respondents who report they are American Indian or Alaska Native and not of Hispanic origin. 07=if race=4 and Hispanic origin = 2, 7, or 9.
Other:	Respondents who report they are of some other race group not listed in the question responses and are not of Hispanic origin. 08 = if race = 5 and Hispanic = 2, 7 or 9.
Don't Know/Not sure:	Respondents who "don't know" their race and "don't know" if they are of Hispanic origin. 77 = if race = 7 or race value is missing and Hispanic = 2, 7, or 9 or Hispanic value is missing.
Refused:	Respondents who "refused" to give their race are not of Hispanic origin or "don't know" if they are of Hispanic origin or "refused" to give the information. 99 = if race = 9 and Hispanic = 2, 7, or 9 or Hispanic value is missing.

Medicaid Population Selection Criteria for Inclusion in Medicaid Asthma Prevalence Rates:

Denominator:	Excluded:	Anyone with eligibility gaps during the calendar year of interest. In other words, one had to have been enrolled for all 12 months of one of the calendar years 1995, 1996 or 1997 to be included in the denominator for that year.
	Included:	Anyone with a 12-month span of continuous eligibility during the calendar year for which subscribers were being counted.
Numerator:	Included:	Anyone with a 493 code and who was enrolled during the year(s) covered by the rate and included in the denominator for that rate.

Tables 1.1 to 2.4 Asthma Prevalence in Adults and Children

Table 1.1 BRFSS/NHIS: Adults

Adult and Total Population Average Annual Current Asthma Prevalence Estimates, Numbers and Rates per 100 Population, Based on National Rates and Iowa BRFSS Rates, BRFSS, NHIS, 1980 to 2000

Prevalence	Adults (>=18 yrs)						Total U.S. population		
	U.S. Rates			Iowa BRFSS					
	1980	1984-1986	1990-1992	1999 – 2000 BRFSS rates			1980	1990-1992	1998
				BRFSS Survey Adult Pop.[2]	Non BRFSS Adult Pop.[1]	Total Adult			
Estimated # of Cases in Iowa based on this rate	59,000	76,217	93,855	146,930	5,300	152,200	89,460	130,100	190,100
Rate per 100	2.8-3.1	3.5-3.9	4.5-5.0	7.0			3.7	4.7	6.6
Source of Estimate	CDC, NHIS national rates			IA BRFSS, Iowa rates,			CDC, NHIS National rates		

[1] Non-BRFSS population average annual population count for 1999-2000 estimated to be 75,440. 2,185,842 average annual 1999 to 2000 count of Iowans >=18 years; 2,110,402 Iowans 18+ included in BRFSS sample = 75,440. 75,440*.07 (BRFSS asthma prevalence rate = 5,280 institutionalized adults with asthma).

[2] Non-institutionalized adult population ages 18 years and older.

Table 1.2

Average Annual Adult Ever Had and Current Asthma Prevalence Numbers and Rates per 100 Population >= 18 years, Iowa, BRFSS, 1999 to 2000

	Ever had	Currently have	Ratio of currently have to ever have
Number of Cases	211,228	146,930	.70
Rate per 100	10.0	7.0	
Source of Estimate	IA BRFSS, Iowa rates		

Table 1.3 BRFSS

Average Annual Adult Asthma Current Prevalence Counts and Rates per 100 Population >=18 years, by Gender, Age, Race, and Income, Insurance, Smoking, Exercise and Weight Status, Iowa, BRFSS, 1999 to 2000

Sex	Number and Percent Adults w/Asthma				% of Adults	
	#	(range)	Rate (%)	(Rate range)	w/Asthma	All adults
Male	59,264	(49,000 - 69,000)	5.9	(4.9 - 6.9)	40	48
Female	87,666	(76,000 - 99,000)	8.0	(7.0 - 8.9)	60	52
Total	146,930	(132,000-162,000)	7.0	(6.3 - 7.7)	100	100
Age						
18 - 34	50,390	(40,000 - 60,000)	7.9	(6.4 - 9.4)	34	30
35 - 54	44,695	(37,000 - 52,000)	5.8	(4.8 - 6.7)	30	37
55+	51,845	(43,000 - 61,000)	7.5	(6.3 - 8.8)	35	33
Total	146,930				100	100
Age-Different Groupings						
18 - 24	21,275	(17,600 - 24,900)	7.7	(5.2 - 10.1)	14	13
25 - 34	29,115	(25.600 - 32,600)	8.1	(6.0 - 9.7)	20	17
35 - 44	21,985	(19,300 - 24,700)	5.4	(4.1 - 6.6)	15	20
45 - 64	42,218	(38,500 - 46,000)	6.7	(5.7 - 8.1)	29	29
65+	32,337	(28,700 - 35,900)	7.4	(5.9 - 9.0)	22	21
Total	146,929				100	100
18 - 64	114,593	(NA)	6.9	(NA)	78	79
Race/Ethnicity						
Caucasian	141,949	(127,000-157,000)	7.0	(6.3 - 7.7)	97	96
African-Am.	1,929	(400 - 3,500)	7.2	(1.6 - 12.9)	1	1
Other	3052	(700 - 5,400)	7.3	(1.8 - 12.9)	2	2
Unkn	0					1
Total	146,930				100	100
Family Income						
<25,000	47,457	(39,268 - 55,646)	8.8	(7.3 - 10.3)	32	26
25,000 - 49,999	51,687	(43,000 - 61,000)	6.9	(5.8 - 8.1)	35	36
50,000 - 74,999	24,428	(18,000 - 30,000)	6.6	(5.1 - 8.2)	17	17
75,000+	8,654	(5,000 - 12,000)	3.5	(2.0 - 5.0)	6	12
DK/Refsd	14,705	(9,900 - 20,000)	7.3	(4.6 - 10.1)	10	10
Total	146,930				100	100

Table 1.3, continued **BRFSS**

Education	Number and Percent Adults w/ Asthma				Percent of All Adults	
	#	(range)	%	(Rate range)	w/Asthma	All adults
<H.S.	21,318	(15,000 - 28,000)	12.4	(9.0 - 15.9)	14	8
H.S.	51,131	(43,000 - 59,000)	6.5	(5.5 - 7.5)	35	38
Some College	45,193	(36,000 - 54,000)	7.1	(5.8 - 8.5)	31	30
College Grad.	29,287	(22,000 - 36,000)	5.8	(4.5 - 7.1)	20	24
Total	146,930				100	100
Insurance						
Insured	131,979	(118,100-145,900)	6.9	(6.2 - 7.6)	90	91
Uninsured	14,759	(9,300 - 20,200)	8.1	(5.2 - 11.0)	10	9
DK/Refused	192	(0 - 384)	5.4	(0 - 16.0)	<1	<1
	146,930				100	100
Smoking Status						
Current	39,525	(35,600 - 43,400)	8.1	(6.9 - 9.6)	27	23
Former	44,444	(40,500 - 48,400)	8.9	(7.4 - 10.4)	30	24
Never	62,960	(57,600 - 68,400)	5.7	(4.7 - 6.6)	43	53
	146,930				100	100
Someone Smokes in Home						
Yes	47,938	(39,900 - 56,000)	8.1	(6.7 - 9.3)	33	28
No	97,696	(104,000-110,300)	6.6	(5.8 - 7.4)	66	70
DK/Refused	1,295	(100 - 2,500)	4.4	(0.4 - 12.3)	1	1
	146,930				100	100
Exercise						
Inactive	19,822	(14,800 - 24,800)	6.8	(5.1 - 8.5)	14	14
Irregular	22,346	(16,300 - 28,400)	6.9	(5.1 - 8.7)	15	15
Regular	25,302	(22,200 - 31,500)	5.6	(4.3 - 6.9)	17	22
DK/Refused	79,459	(68,400 - 90,600)	7.7	(6.5 - 8.7)	54	49
	146,930				100	100
Weight						
Normal	51,156	(42,100 - 60,200)	6.2	(5.1 - 7.2)	35	40
Overweight	46,188	(38,000 - 54,300)	6.0	(5.0 - 7.1)	31	36
Obese	45,196	(36,400 - 54,000)	10.3	(8.4 - 12.2)	31	21
DK/Refused	4,389	(2,100 - 6,700)	6.7	(3.3 - 10.1)	3	3
	146,930				100	100

Table 1.4 BRFSS

Adult Current Asthma Prevalence Numbers and Rates per 100 Population >=18 years, by *Age*, *Sex*, *Race*, and *Educational Attainment*, Iowa, U.S., Midwestern States, CDC Published State-Specific BRFSS data, 2000

Risk Factor	Civil Division					
Sex	Iowa	U.S.	Range in Other Midwestern States (NE, KS, MO, MN, IL, SD)			
			Low		High	
Male	5.7	5.1	4.2	(NE)	6.0	(KS)
Female	6.9	9.1*	4.6	(SD)	10.2	(IL)
Total	6.3	7.2	5.6	(SD)	7.9	(IL)
Age						
18 - 24	6.6	9.0	5.7	(SD)	11.8	(KS)
25 - 34	7.6	6.9	5.1	(MN)	8.1	(IL)
35 - 44	6.0	6.8	4.5	(SD)	7.8	(KS)
45 - 54	6.4	7.1	5.0	(SD)	7.3	(KS)
55 - 64	5.2	7.5	6.2	(IL)	9.1	(MN)
65+	6.1	6.6	5.4	(MO)	8.9	(IL)
Race/Ethnicity						
Caucasian	6.4	7.1*	5.4	(SD)	7.9	(KS)
African-Am.	8.2	8.5	5.4	(MN)	10.9	(NE)
Other	4.4	5.8	5.4	(KS)	8.8	(MN)
Hispanic	5.5	5.2	5.4	(KS)	9.0	(SD)
Household Income						
<15,000	7.6	9.9	8.4	(SD)	15.8	(MN)
15 - 24,999	7.0	8.1	7.0	(SD)	9.7	(KS)
25 - 49,999	7.0	7.1	4.5	(SD)	7.8	(NE)
50 - 74,999	6.3	6.3	3.8	(NE)	8.2	(KS)
75,000+	2.9	5.9*	4.7	(IL)	7.4	(MO)
Education						
<High school	10.1	7.9	5.5	(SD)	13.7	(MO)
High school	6.9	7.3	4.8	(NE)	7.7	(IL)
Some college	6.4	7.5	7.0	(MO)	9.2	(KS)
College graduate	4.3	6.5*	4.4	(SD)	7.3	(IL)

*US rate is statistically significantly higher than Iowa rate

= Iowa rate is in the lowest quintile of states nationally

Table 2.1 **NHIS, NSECH**

Childhood Current Asthma Prevalence Estimates for Iowa Based on National Rates per 100 Population: <4, <14 years and <=17 years, U.S. National Health Interview Survey (NHIS) and National Survey of Early Childhood Health (NSECH), 1980 to 2000

Prevalence	Children aged <= 14								Children <=17		
	<4 years				5 - 14 years			0 - 14 years			
	1980	1990-1992	1993-1995	2000[1]	1980	1990-1992	1993-1995	1999-2000	1980	1990-1992	1999-2000
Number	4,900	8,900	9.600	12,800	18,900	27,276[2]	NA	NA	29,800	39,350[3]	NA
Rate per 100	*2.22*	*4.65*	*6.5*	*8.5*	*4.28*	*6.59*			*3.38*	*5.45*	
Source of Estimate	CDC, NHIS national rates										

[1] This based on rate is for children less than 3 yrs. in 2000. Rate is from the National Survey of Early Childhood Health (NSECH) and is of asthma prevalence at any time *in the last 12 months* as reported by parents. (# of children in Iowa <4 in 2000 = 150,321*.085) = 12,772 children <=4 with asthma. # of children <3 with asthma: *112,488*.085 = 9,561). For adults Iowa rates are lower than the national rates, so this estimate may overstate the count of asthma in Iowa children < 4 years of age. NHIS questions also ask for prevalence during the last 12 mos. (12 month period prevalence). This 12 month period prevalence rate is slightly different from the BRFSS which asks if one has been told by a health care provider that one has asthma, and, if so, does one still have asthma.

[2] The count is derived by applying NHIS national 1990 to 1992 rate to Iowa's average annual 1990-1992 population Census estimate for children 5 to 14 years of age: 413,903 * 6.59 = 27,276 cases of asthma.

[3] The count is applied by applying 1990 to 1992 rate to Iowa's average annual 1990-1992 population Census estimate for children 0 to 17 years of age: 722,0253 * 5.45 = 27,276 cases of asthma.

Estimate of current asthma prevalence in children 0 to 17 years in 2000: 12,800 + (.0659* population 5 to 14 in 2000 (n = 413,150) = 27,226) + (population 15 to 17 in 2000 (n = 132,075) *.0545 = 7,198) = 47,222 rough estimate

Table 2.2 Medicaid: by Gender & Age

Average Annual Asthma Prevalence Numbers and Rates per 100 Population, by *Gender* and *Age*, Iowa Medicaid Fee-for-Service Population* 1995 to 1997

Age in years	Male		Female		Total		Percent			
	#	Rate	#	Rate	#	Rate	Enrolled w/Asthma by Gender and Age			of All Enrolled n = 126,667
							Male	Female	Male & Female	
0 - 4	1,075	11.3	704	7.9	1,779	9.6	60%	40%	23%	1.4%
5 - 14	1,144	7.3	822	5.8	1,966	6.6	58	42	25	1.6
15 - 24	328	5.9	673	7.5	1,000	6.9	33	67	13	<1
25 - 34	161	3.6	738	8.0	899	6.5	18	82	11	<1
35 - 54	251	3.5	1,216	10.1	1,466	7.6	17	83	19	1.2
55 - 64	103	4.5	320	7.7	422	6.6	24	76	5	<1
65+	66	1.2	266	1.4	332	1.4	20	80	4	<1
Total	3,127	6.2	4,738	6.2	7,865	6.2	40%	60%	100%	6.2%
0 - 17	2,409	8.6	1,749	6.8	4,158	7.7	58%	42%	53%	3.3%
18+	718	3.2	2.988	5.9	3,707	5.1	9	91	47	2.9
									100%	6.2%
0 - 14	2,219	8.8	1,526	6.6	3,745	7.8	59%	41%	100%	3%
18 - 64	652	3.9	2,722	8.6	3,375	7.0	19%	81%	100%	2.7%
0 - 64	3,061	6.8	4,471	7.8	7,533	7.4	41%	59%	100%	5.9%

* The average annual number of Medicaid subscribers meeting the inclusion criteria used to calculate prevalence in the Medicaid population was 126,667. Medicaid subscribers who did not meet inclusion criteria because they were enrolled in a managed care plan or because they were not enrolled for the full 12 months of the year numbered 194,138. (These were excluded from out calculations as asthma diagnoses not completely documented in the database used). If the same prevalence rate in the population of excluded Medicaid subscribers holds for those who were included, 6,025 more adults 18 years and older and 7,176 more children 17 years and younger who were enrolled in Medicaid at some point in one of the years 1995 to 1997 also had asthma. The average annual count of Medicaid subscribers who did not meet our inclusion criteria was 194,138: 88,608 adults 18 years and older and 105,530 children 17 years and younger.

Table 2.3 Medicaid: by Race and Age

Average Annual Asthma Prevalence Numbers and Rates per 100 Population, by *County Size* and *Age*, Iowa Medicaid Fee-for-Service Population, 1995 to 1997

Age	Race							
	Cau-casian	African American	Other	Total	Cau-casian	African-American	Other	Total
	Number Enrolled with Asthma				Asthma Prevalence Rate (Percent)			
0 - 4	1,451	251	78	1,779	9.3	13.7	7.2	9.6
5 - 14	1,591	314	61	1,966	6.2	10.4	4.4	6.6
15 - 24	864	111	25	1,000	6.8	9.3	4.5	6.9
25 - 34	831	52	16	899	6.6	6.4	4.2	6.5
35 - 54	1,325	112	30	1,466	7.6	9.7	4.9	7.6
55 - 64	377	25	20	422	6.6	7.4	5.6	6.6
65 +	296	12	24	332	1.3	2.5	2.4	1.4
Total	6,735	878	251	7,865	6.0	9.9	4.7	6.2
0 - 17	3,379	631	148	4,158	7.4	11.7	5.5	7.7
18+	3,356	247	103	3,707	5.0	7.2	3.9	5.1
0 - 14	3,042	565	139	3,745	7.4	11.7	5.6	7.8
18 - 64	3,060	235	79	3,375	7.0	8.0	4.9	7.0
0 - 64	6,439	866	227	7,533	7.2	10.4	5.3	7.4
	Percent							
w/Asthma	86	10	3	100	(number of all w/asthma = 7,865)			
All Enrolled	89	7	4	100	(number of all enrolled = 126,667)			

Table 2.4 Medicaid: by County Size

Average Annual Asthma Prevalence Numbers and Rates per 100 Population, by *County Size* and *Age*, Iowa Medicaid Fee-for-Service Population, 1995 to 1997

Age	County Size									
	<10,000	10,000-19,999	20,000-49,999	50,000 plus	Total	<10,000	10,000-19,999	20,000-49,999	50,000 plus	Total
	Number Enrolled with Asthma					Asthma Prevalence Rate				
0 - 4	72	323	512	872	1,779	6.6	7.3	9.9	11.33	9.6
5 - 14	95	385	548	937	1,966	5.0	5.5	6.8	7.3	6.6
15 - 24	51	221	261	468	1,000	6.4	6.7	6.5	7.3	6.9
25 - 34	38	211	242	408	899	5.3	6.6	6.3	6.8	6.5
35 - 54	78	282	356	750	1,466	7.1	6.1	7.0	8.8	7.6
55 - 64	23	96	115	188	422	4.9	5.9	7.0	7.0	6.6
65 +	20	92	88	132	332	0.9	1.1	1.4	1.7	1.4
Total	377	1,611	2,122	3,756	7,865	4.6	5.0	6.2	7.2	6.2
0 - 17	187	799	1,157	2,015	4,158	5.6	6.3	7.9	8.7	7.7
18+	189	812	965	1,741	3,707	3.9	4.2	5.0	6.0	5.1
Total					7,865					
0 - 14	166	709	1,061	1,809	3,745	5.6	6.2	8.0	8.8	7.8
18 - 64	169	720	877	1,609	3,374	6.2	6.3	6.7	7.6	7.0
0 - 64	356	1,519	2,034	3,624	7,533	5.9	6.3	7.3	8.2	7.4
	Percent									
w/Asthma	5	20	27	48	100	(number enrolled with asthma = 7,865)				
All Enrolled	7	25	27	41	100	(number enrolled, all = 126,667)				

Tables 3.1 Asthma Deaths

Deaths from and from or with Asthma, Average Annual Number and Rate per 100,000 Population, by *Gender*, *Race*, and *Age*, Iowa, Iowa Vital Records, 1999 to 2000

Mortality from asthma				Mortality from or with asthma			
Sex	**#**	**Rate**	**(%)**	**Sex**	**#**	**Rate**	**(%)**
Male	12.0	0.8	30	Male	45.5	3.2	33
Female	28.5	1.9	70	Female	93.0	6.3	67
Total	40.5	1.4	100	Total	138.5	4.8	100
Race				**Race**			
Caucasian	37.5	1.4	93	Caucasian	134.0	4.9	97
African-Am.	3.0	5.1	7	African-Am.	4.5	7.6	3
Total	40.5		100	Total	138.5		100
Age				**Age**			
<4	0			<4	0		
5 - 14	2.0	0.5	5	5-14	2.0	0.5	1
14 - 24	4.0	1.0	9	14-24	4.5	1.3	3
25 - 34	1.5	0.4	4	25-34	2.5	0.7	2
35 - 54	3.5	0.4	9	35-54	11.5	1.4	8
55 - 64	4.5	1.7	11	55-64	11.0	2.7	8
65 - 74	4.5	2.1	11	65-74	26.5	12.6	19
75+	20.5	9.7	51	75+	80.5	38.3	58
Total	40.5		100	Total	138.5		100

Tables 4.1 to 4.9: Asthma-Related Hospitalizations

Tables 4.1 and 4.2 — Hospitalizations

Hospitalizations from or with Asthma: Average Annual Number and Rate per 100,000 Population, by *Gender* and *Age*, Iowa, State Inpatient Database (SID), 1995 to 1997

Age	Female		Male		Total Asthma-Related		Other Total Rates		Percent of Hospitalizations	
	#	(Rate)	#	(Rate)	#	(Crude Rate)*	Crude**	Adjusted	Asthma-Related	All Hospitalizations
<=4	NA	NA	NA	NA	1,296	(707)	NA	NA	11.2	NA
5 - 14					892	(220)			7.7	
15 - 34					2,184	(277)			18.9	
35 - 64					3,573	(344)			30.9	
65+					3,611	(833)			31.2	
Unkn										
Total	7,312	(500)	4,243	(306)	11,555	(406)	(401)	(393)	100	
<18	1,017	(289)	1,489	(404)	2,506	(348)			21.7	
>=18	6,294	(566)	2,753	(271)	9,048	(425)			78.3	

Hospitalizations from or with Asthma: Average Annual Number and Rate per 100,000 Population, by *Gender* and *Age*, Iowa, SID, 1998 to 2000

Age	Female		Male		Total Asthma-Related		Other Total Rates		Percent of Hospitalizations		
	#	(Rate)	#	(Rate)	#	(Crude Rate)[1]	Crude[2]	Adjusted	% of all asthma –related in this age group	% of all for all causes in this age	% of all in this age group that are asthma-related
<=4	NA	NA	NA	NA	972	(527)	NA	NA	8.1	13	2
5 - 14					660	(162)			5.6	2	10
15 - 34					2,110	(270)			17.5	18	3
35 - 64					4,251	(393)			35.2	27	5
65+					4,076	(944)			33.8	41	3
Unkn											
Total	8,030	(544)	4,026	(286)	12,069	(418)	(401)	(393)	100	100	3.4
number									12,069	356,068	12,069/356,068
<18	762	(215)	1,114	(300)	1,885	(260)			15.4		
>=18	7,268	(647)	2,912	(281)	10,183	(471)			84.6		

[1] These crude rates are based on Bureau of the Census estimates issued 8/2000, which are age and gender specific.

[2] These crude rates are based on Bureau of the Census estimates issued 5/2002, which are not age or gender specific, but which are probably more accurate as they reflect the 2000 Census counts.

Table 4.3 Hospitalizations: by Race

Hospitalizations from or with Asthma, Number and Rate per 100,000 Population, by *Gender* and *Race*, Iowa, SID, 1999

Race	Hospitalizations # and Rate per 100,000								% of Total Pop.
	Female		Male		Unkn Gender	Total #	Rate	%	
	#	(Rate)	#	(Rate)	#				
Caucasian	NA	NA	NA	NA	NA	8,999	332	75	94.4
African-American						536	963	4.5	1.9
Native Am./Asian Other						30	NA	<1	3.6
Unknown						2,452	NA	20.4	
Total	7,989	(542.7)	4,042	(289.3)	11	12,042	420	100	100

Table 4.4 Hospitalizations: Adjusted and Crude Rates

Hospitalizations from or with Asthma
Average Annual Number, and Crude and Age-Adjusted Rates per 100,000 Population
Iowa and Iowa Counties, State Inpatient Database (SID), 1995 to 1997, 1998 to 2000

(Counties in lowest/highest quartile of rate distribution in each column are highlighted. See end of table for upper and lower limits of ranges of rates in each quartile.)

Lowest Quartile: **Highest Quartile:**

Civil Division	#		Crude Rate*		Adjusted Rate**	
	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	11,555	12,069	401	414	393	402
Adair	51	61	606	728	437	541
Adams	15	15	331	340	316	306
Allamakee	17	18	120	126	111	119
Appanoose	41	69	299	503	288	447
Audubon	28	19	404	275	370	221
Benton	75	101	310	413	283	379
Black Hawk	557	639	438	502	450	509
Boone	92	94	359	362	337	336
Bremer	74	74	318	318	285	290
Buchanan	71	62	335	294	329	287
Buena Vista	67	56	327	276	284	247
Butler	61	68	393	439	330	374
Calhoun	72	61	627	537	536	463
Carroll	59	51	272	234	237	207
Cass	48	62	319	418	294	369
Cedar	65	72	363	402	344	380
Cerro Gordo	191	208	405	441	390	410
Cherokee	32	57	235	425	204	373
Chickasaw	46	54	349	407	318	362
Clarke	32	44	375	499	346	455
Clay	58	74	331	420	310	374
Clayton	37	50	194	262	169	225
Clinton	406	402	798	793	803	799
Crawford	25	41	148	241	139	219
Dallas	115	129	326	351	333	340
Davis	14	17	165	205	152	200
Decatur	20	21	241	252	232	254
Delaware	32	46	173	250	161	235
Des Moines	211	233	493	546	492	545
Dickinson	66	61	419	381	380	339
Dubuque	194	253	218	285	213	275

*Crude rates in Table 4.4 differ slightly from rates in Tables 4.5 to 4.11 as Census estimates for counties released 4/02 were used in Table 4.4. Other tables relied on Census estimates of 8/00 since the 4/02 estimates are not age and gender specific.

**Adjusted to U.S. 2000 population.

Table 4.4 cont. **Hospitalizations: Adjusted and Crude Rates**

Hospitalizations from or with Asthma

Lowest Quartile: **Highest Quartile:**

Civil Division	#		Crude Rate		Adjusted Rate	
	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	11,555	12,069	401	414	393	402
Emmet	40	58	351	516	335	481
Fayette	69	57	312	255	289	239
Floyd	52	88	307	519	291	466
Franklin	31	30	282	277	238	235
Fremont	22	22	272	270	229	239
Greene	44	54	430	521	388	477
Grundy	36	38	292	310	265	260
Guthrie	58	59	514	525	430	406
Hamilton	185	157	1126	961	1,029	867
Hancock	45	49	374	405	326	360
Hardin	66	86	347	454	298	386
Harrison	68	44	445	286	431	250
Henry	66	90	328	447	318	423
Howard	16	16	161	157	140	140
Humboldt	44	35	420	331	382	329
Ida	13	15	160	187	137	140
Iowa	66	72	431	467	384	414
Jackson	65	64	324	317	311	292
Jasper	156	183	437	505	419	465
Jefferson	55	70	330	425	319	422
Johnson	357	437	339	410	390	460
Jones	54	80	264	390	256	383
Keokuk	54	56	466	486	448	449
Kossuth	65	65	365	369	324	303
Lee	288	278	741	718	717	693
Linn	832	859	453	463	463	459
Louisa	40	34	333	281	329	278
Lucas	32	34	340	360	329	351
Lyon	11	14	94	117	81	99
Madison	58	42	428	309	400	283
Mahaska	84	66	381	300	357	281
Marion	130	137	416	435	405	409
Marshall	127	137	325	349	306	330
Mills	40	35	291	246	283	232
Mitchell	16	21	146	192	131	164
Monona	42	55	413	549	438	438

Table 4.4 cont. **Hospitalizations: Adjusted and Crude Rates**

Hospitalizations from or with Asthma

	Lowest Quartile:			Highest Quartile:		
Civil Division	#		Crude Rate		Adjusted Rate	
	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	11,555	12,069	401	414	393	402
Monroe	29	35	360	435	320	373
Montgomery	49	56	408	468	364	414
Muscatine	125	155	302	374	301	372
O'Brien	43	47	274	306	240	269
Osceola	16	10	224	140	204	131
Page	113	76	660	438	553	379
Palo Alto	26	35	258	338	237	287
Plymouth	59	74	240	299	222	272
Pocahontas	64	44	716	495	566	437
Polk	1800	1,740	503	482	514	482
Pottawattamie	311	280	366	327	363	317
Poweshiek	110	142	578	750	523	682
Ringgold	16	16	302	288	273	265
Sac	48	59	404	493	335	415
Scott	833	754	531	479	532	478
Shelby	54	55	410	415	341	363
Sioux	59	53	190	168	176	159
Story	181	165	235	212	266	251
Tama	55	84	306	467	274	413
Taylor	17	21	246	303	226	253
Union	41	48	334	385	312	344
Van Buren	35	42	454	548	407	473
Wapello	226	269	628	747	589	678
Warren	127	125	326	317	331	317
Washington	87	102	427	499	397	467
Wayne	41	38	588	559	505	474
Webster	230	188	583	477	578	472
Winnebago	34	31	289	260	250	223
Winneshiek	42	35	198	167	185	157
Woodbury	295	341	284	329	283	331
Worth	21	26	268	323	218	274
Wright	65	74	444	505	411	456
Lowest Quartile Lower/Upper Limit:			(94-283)	(117-287)	(81-260)	(99-262)
Highest Quartile Lower/Upper Limit:			(428-1,126)	(480-961)	(394-1,029)	(443-867)

Table 4.5 Hospitalizations: Male and Female

Hospitalizations from or with Asthma, Average Annual Number and Rate per 100,000 Population, by Age (0 to 17, 18+ Years) Iowa and Iowa Counties, State Inpatient Database, 1995 to 1997, 1998 to 2000

(Counties in lowest/highest quartile of the rate distribution in each column are highlighted. See end of table for upper and lower limits of ranges of rates in each quartile. County-specific rates are not given where the average annual count of hospitalizations was less than or equal to five, due to the instability of these rates.)

Lowest Quartile: **Highest Quartile:**

Hospitalizations: Females and Males

Civil Division	Number						Rate					
	0-17 years		>=18 years		All Ages		0-17 years		>=18 years		All Ages	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	2,506	1,885	9,048	10,183	11,555	12,069	348	260	425	471	406	418
Adair	2	2	48	58	51	61			778	945	616	745
Adams	2	3	13	12	15	15			369	362	337	347
Allamakee	5	5	13	13	17	18		146	122	122	123	129
Appanoose	3	6	38	63	41	69		173	368	615	302	508
Audubon	7	2	21	17	28	19	429		402	336	408	279
Benton	7	13	68	89	75	101	101	185	378	476	304	397
Black Hawk	151	104	406	536	557	639	489	346	445	576	457	520
Boone	17	12	75	82	92	94	273	188	383	412	357	357
Bremer	11	8	63	66	74	74	184	146	363	372	318	317
Buchanan	10	11	60	51	71	62	166	180	403	340	334	293
Buena Vista	8	9	59	47	67	56	158	185	401	320	338	285
Butler	8	7	53	61	61	68	195	184	452	523	388	439
Calhoun	14	6	58	55	72	61	509	216	659	640	624	541
Carroll	9	6	50	44	59	51	142	107	325	285	273	235
Cass	8	7	39	55	48	62	230	198	351	498	321	426
Cedar	10	11	55	61	65	72	222	249	414	452	365	400
Cerro Gordo	33	25	158	183	191	208	298	225	447	522	411	451
Cherokee	3	7	29	49	32	57		225	285	501	235	433
Chickasaw	13	10	33	44	46	54	362	294	339	446	345	406
Clarke	6	8	26	36	32	44	287	359	428	559	393	508
Clay	9	6	49	68	58	74	195	145	381	522	332	426
Clayton	4	4	33	46	37	50			238	333	195	266
Clinton	196	161	210	241	406	402	1,521	1,266	560	649	805	806
Crawford	6	7	19	33	25	41	136	162	156	273	151	244
Dallas	24	14	92	115	115	129	255	132	363	412	334	335
Davis	4	3	10	14	14	17			155	224	166	204
Decatur	5	4	16	17	20	21			253	266	247	253
Delaware	4	6	28	40	32	46		106	212	307	172	249
Des Moines	53	45	158	188	211	233	505	439	496	591	498	554
Dickinson	8	9	59	52	66	61	221	241	477	412	420	375
Dubuque	29	30	166	223	194	253	123	131	255	341	220	287

Table 4.5 cont. Hospitalizations: Male and Female

Lowest Quartile: **Highest Quartile:**

Hospitalizations: Females and Males

Civil Division	Number						Rate					
	0-17 years		>=18 years		All Ages		0-17 years		>=18 years		All Ages	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	2,506	1,885	9,048	10,183	11,555	12,069	348	260	425	471	406	418
Emmet	10	7	30	51	40	58	**345**	**275**	**366**	**626**	**360**	**538**
Fayette	20	10	49	47	69	57	**363**	**182**	**300**	**286**	**316**	**260**
Floyd	8	12	44	76	52	88	**206**	**295**	**352**	**613**	**316**	**535**
Franklin	3	3	28	27	31	30			**338**	**335**	**282**	**281**
Fremont	3	4	19	18	22	22			**320**	**306**	**278**	**277**
Greene	9	9	35	45	44	54	**399**	**384**	**455**	**581**	**442**	**533**
Grundy	6	2	30	36	36	38	**201**		**322**	**386**	**293**	**310**
Guthrie	9	5	49	54	58	59	**347**		**558**	**619**	**508**	**517**
Hamilton	31	17	153	140	185	157	**804**	**430**	**1,255**	**1,154**	**1,146**	**976**
Hancock	5	4	40	45	45	49			**454**	**504**	**375**	**406**
Hardin	10	10	56	76	66	86	**226**	**220**	**396**	**545**	**355**	**467**
Harrison	9	8	60	37	68	44	**217**	**194**	**532**	**321**	**450**	**288**
Henry	14	10	52	80	66	90	**288**	**202**	**345**	**525**	**331**	**446**
Howard	2	2	14	14	16	16			**198**	**189**	**164**	**161**
Humboldt	12	13	32	21	44	35	**495**	**531**	**402**	**273**	**424**	**336**
Ida	1	1	12	14	13	15			**206**	**244**	**161**	**190**
Iowa	10	7	56	65	66	72	**264**	**170**	**486**	**559**	**431**	**461**
Jackson	18	10	47	54	65	64	**343**	**183**	**318**	**364**	**325**	**317**
Jasper [1]	25	21	129	160	156	183	**296**	**243**	**479**	**572**	**440**	**497**
Jefferson	9	9	46	62	55	70	**215**	**216**	**357**	**487**	**323**	**422**
Johnson	71	57	286	380	357	437	**312**	**249**	**364**	**459**	**352**	**413**
Jones	12	8	42	72	54	80	**248**	**170**	**273**	**470**	**267**	**397**
Keokuk	10	5	44	51	54	56	**345**		**504**	**598**	**464**	**488**
Kossuth	9	8	56	57	65	65	**181**	**176**	**422**	**436**	**359**	**369**
Lee	62	55	226	223	288	278	**652**	**589**	**771**	**769**	**742**	**725**
Linn	175	121	657	738	832	859	**394**	**262**	**484**	**526**	**462**	**460**
Louisa	11	5	29	29	40	34	**340**	**166**	**335**	**325**	**337**	**283**
Lucas	5	6	26	28	32	34	**250**	**256**	**380**	**400**	**350**	**365**
Lyon	1	1	10	13	11	14			**118**	**149**	**93**	**116**
Madison	11	2	47	40	58	42	**292**		**473**	**388**	**424**	**300**
Mahaska	15	8	69	58	84	66	**262**	**147**	**428**	**353**	**385**	**301**
Marion	22	17	108	120	130	137	**273**	**207**	**468**	**509**	**418**	**432**
Marshall	23	25	104	112	127	137	**246**	**259**	**354**	**381**	**328**	**351**
Mills	4	4	36	30	40	35			**351**	**282**	**287**	**238**
Mitchell	2	4	14	17	16	21			**168**	**207**	**144**	**191**
Monona	11	9	31	46	42	55	**468**	**400**	**396**	**595**	**413**	**550**

* Totals not correct because of inconsistent data from data source

Table 4.5 cont. Hospitalizations: Male and Female

Lowest Quartile: **Highest Quartile:**

Hospitalizations: Females and Males

Civil Division	Number						Rate					
	0-17 years		>=18 years		All Ages		0-17 years		>=18 years		All Ages	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	2,506	1,885	9,048	10,183	11,555	12,069	348	260	425	471	406	418
Monroe	2	3	27	32	29	35			**443**	**536**	**362**	**440**
Montgomery	9	4	39	52	49	56	**332**		**434**	**580**	**410**	**472**
Muscatine	25	20	100	135	125	155	**224**	**176**	**334**	**448**	**304**	**374**
O'Brien	7	7	35	40	43	47	**189**	**195**	**314**	**359**	**282**	**318**
Osceola	1	1	15	9	16	10			**281**	**168**	**227**	**144**
Page	8	5	105	71	113	76	**203**		**800**	**541**	**661**	**444**
Palo Alto	5	6	21	29	26	35	**195**	**232**	**285**	**382**	**262**	**345**
Plymouth	9	9	50	65	59	74	**130**	**129**	**283**	**363**	**240**	**298**
Pocahontas	7	10	57	34	64	44	**320**	**479**	**846**	**511**	**718**	**503**
Polk	464	273	1,336	1,468	1,800	1,740	**532**	**298**	**501**	**534**	**509**	**475**
Pottawattamie	58	32	253	248	311	280	**261**	**143**	**406**	**387**	**368**	**323**
Poweshiek	19	15	91	127	110	142	**400**	**335**	**638**	**890**	**579**	**757**
Ringgold	2	2	14	14	16	16			**344**	**336**	**305**	**290**
Sac	7	6	41	52	48	59	**231**	**218**	**462**	**593**	**403**	**500**
Scott	216	169	617	585	833	754	**508**	**397**	**538**	**503**	**530**	**475**
Shelby	5	5	49	51	54	55	**161**		**505**	**525**	**417**	**426**
Sioux	11	6	49	47	59	53	**114**	**65**	**223**	**209**	**191**	**168**
Story	28	18	153	147	181	165	**163**	**107**	**267**	**245**	**243**	**215**
Tama	8	12	46	72	55	84	**193**	**266**	**349**	**538**	**310**	**469**
Taylor	2	2	15	19	17	21			**279**	**363**	**243**	**303**
Union	7	7	35	41	41	48	**210**	**217**	**371**	**436**	**330**	**382**
Van Buren	4	4	31	39	35	42			**537**	**655**	**450**	**539**
Wapello	41	22	185	247	226	269	**489**	**263**	**682**	**904**	**636**	**754**
Warren	36	18	92	107	127	125	**331**	**164**	**321**	**363**	**324**	**309**
Washington	15	14	72	88	87	102	**289**	**266**	**466**	**564**	**420**	**488**
Wayne	5	2	36	37	41	38			**679**	**713**	**599**	**578**
Webster	76	61	154	127	230	188	**776**	**625**	**529**	**430**	**591**	**479**
Winnebago	4	4	31	27	34	31			**344**	**301**	**285**	**259**
Winneshiek	7	6	35	29	42	35	**126**	**123**	**225**	**183**	**200**	**168**
Woodbury	77	81	218	260	295	341	**272**	**289**	**295**	**351**	**289**	**334**
Worth	3	3	19	22	21	26			**314**	**379**	**273**	**330**
Wright	14	7	51	66	65	74	**421**	**220**	**466**	**616**	**456**	**523**
			Lowest quartile upper/lower				(31-154)	(33-136)	(118-319)	(112-336)	(93-284)	(116-292)
[1]Counts do not add correctly as data are inconsistent from data source.			Highest quartile upper/lower				(331-1,520)	(252-1,266)	(467-1,255)	(552-1,153)	(424-1,146)	(477-976)

Table 4.6 Hospitalizations: Female

Hospitalizations from or with Asthma, Females
Average Annual Number and Rate per 100,000 Population, by Age
(0 to 17, 18+ Years) Iowa and Iowa Counties, State Inpatient Database, 1995 to 1997, 1998 to 2000

(Counties in lowest/highest quartile of the rate distribution in each column are highlighted. See end of table for upper and lower limits of ranges of rates in each quartile. County-specific rates are not given where the average annual count of hospitalizations was less than or equal to five, due to the instability of these rates.)

Lowest Quartile: **Highest Quartile:**

Hospitalizations: Females

Civil Division	Number						Rate					
	0-17 years		>=18 years		All Ages		0-17 years		>=18 years		All Ages	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	1,017	762	6,294	7,268	7,312	8,030	289	215	566	647	500	544
Adair	0	1	26	30	27	30			**809**	**917**	**632**	**726**
Adams	2	1	5	10	6	11				**565**	**280**	**474**
Allamakee	2	2	7	9	9	12			**131**	**173**	**122**	**162**
Appanoose	1	3	27	50	28	53			**503**	**918**	**401**	**754**
Audubon	3	1	13	11	16	12			**472**	**404**	**459**	**330**
Benton	3	4	46	52	48	56			**490**	**546**	**386**	**435**
Black Hawk	63	48	287	394	351	442	**418**	**327**	**591**	**797**	**550**	**690**
Boone	7	5	57	63	65	68	**238**	**171**	**553**	**602**	**481**	**503**
Bremer	4	5	41	47	45	52			**449**	**511**	**378**	**431**
Buchanan	5	5	38	33	43	38			**496**	**431**	**400**	**355**
Buena Vista	2	2	37	29	39	30			**483**	**378**	**384**	**302**
Butler	5	1	30	39	34	40			**484**	**640**	**429**	**504**
Calhoun	3	3	40	37	43	41			**890**	**845**	**738**	**714**
Carroll	4	2	31	26	34	28			**375**	**318**	**308**	**256**
Cass	3	4	25	41	29	45			**421**	**693**	**370**	**598**
Cedar	5	7	38	48	43	54		**296**	**556**	**687**	**473**	**591**
Cerro Gordo	17	13	115	141	132	153	**319**	**237**	**604**	**749**	**541**	**635**
Cherokee	0	1	17	30	17	31			**315**	**582**	**244**	**465**
Chickasaw	5	4	22	29	27	33			**437**	**579**	**396**	**495**
Clarke	4	4	18	26	21	30			**535**	**788**	**499**	**685**
Clay	4	2	35	47	39	49			**509**	**690**	**423**	**547**
Clayton	2	1	22	32	23	33			**306**	**453**	**245**	**349**
Clinton	79	58	154	172	234	230	**1,246**	**921**	**779**	**880**	**893**	**890**
Crawford	2	3	16	24	18	26			**253**	**379**	**216**	**314**
Dallas	12	5	68	79	80	83	**278**		**517**	**543**	**456**	**427**
Davis	1	0	5	9	6	9			**165**	**268**	**147**	**208**
Decatur	1	1	13	14	15	15			**415**	**412**	**347**	**348**
Delaware	2	3	22	29	23	31			**323**	**426**	**250**	**335**
Des Moines	27	15	108	142	136	158	**533**	**307**	**639**	**843**	**615**	**720**
Dickinson	2	4	39	44	41	48			**599**	**658**	**498**	**566**
Dubuque	10	11	115	155	125	166	**88**	**99**	**337**	**452**	**275**	**366**

Table 4.6, cont. **Hospitalizations: Female**

Hospitalizations from or with Asthma

Lowest Quartile: **Highest Quartile:**

Hospitalizations: Females

Civil Division	Number						Rate					
	0-17 years		>=18 years		All Ages		0-17 years		>=18 years		All Ages	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	1,017	762	6,294	7,268	7,312	8,030	289	215	566	647	500	544
Emmet	6	2	20	35	25	38	**399**		**454**	**833**	**441**	**676**
Fayette	8	4	33	32	40	37	**279**		**385**	**385**	**359**	**331**
Floyd	3	3	35	62	38	65			**524**	**939**	**439**	**753**
Franklin	0	1	18	18	19	19			**422**	**423**	**330**	**349**
Fremont	2	1	12	12	14	13			**391**	**398**	**338**	**328**
Greene	3	4	15	32	18	36			**370**	**794**	**352**	**688**
Grundy	2	1	19	27	21	27			**385**	**547**	**333**	**433**
Guthrie	4	1	32	31	36	32			**708**	**686**	**615**	**548**
Hamilton	13	9	106	94	119	103	**663**	**450**	**1,664**	**1,495**	**1,433**	**1,251**
Hancock	1	2	25	31	26	32			**549**	**669**	**427**	**526**
Hardin	3	5	35	50	38	55			**473**	**678**	**398**	**577**
Harrison	2	3	38	33	40	37			**640**	**559**	**515**	**462**
Henry	5	6	36	60	42	66	**224**	**233**	**492**	**802**	**427**	**662**
Howard	0	0	9	11	9	11	**0**	**0**	**240**	**287**	**181**	**215**
Humboldt	5	4	25	16	31	20	**438**		**617**	**403**	**576**	**385**
Ida	1	0	5	6	6	7			**169**	**205**	**144**	**164**
Iowa	2	3	36	41	38	44			**608**	**683**	**483**	**553**
Jackson	8	3	33	36	41	39	**313**		**427**	**467**	**399**	**384**
Jasper [1]	10	9	87	111	98	120	**234**	**212**	**628**	**787**	**542**	**657**
Jefferson	3	2	36	42	39	44			**536**	**644**	**451**	**521**
Johnson	33	34	194	261	227	295	**290**	**302**	**489**	**623**	**445**	**555**
Jones	8	4	27	51	34	55	**319**		**364**	**699**	**353**	**564**
Keokuk	4	2	26	33	29	35			**567**	**741**	**496**	**593**
Kossuth	5	4	35	39	41	43	**233**		**510**	**579**	**441**	**482**
Lee	23	20	165	161	188	180	**490**	**429**	**1,097**	**1,086**	**955**	**932**
Linn	67	50	452	544	518	594	**310**	**221**	**637**	**746**	**561**	**622**
Louisa	6	2	18	20	24	22	**400**		**401**	**443**	**401**	**362**
Lucas	3	2	20	18	24	20			**552**	**495**	**501**	**418**
Lyon	1	1	7	7	8	7			**163**	**150**	**138**	**119**
Madison	5	1	29	26	34	27			**564**	**498**	**487**	**385**
Mahaska	6	4	42	43	48	47	**209**		**498**	**504**	**428**	**419**
Marion	12	7	83	78	95	85	**324**	**181**	**703**	**647**	**611**	**534**
Marshall	10	8	78	82	88	90	**212**	**173**	**514**	**541**	**444**	**455**
Mills	1	1	27	24	29	25			**512**	**438**	**402**	**345**
Mitchell	0	3	11	14	11	17			**245**	**326**	**193**	**295**
Monona	4	5	19	30	23	35		**464**	**471**	**736**	**436**	**676**

Table 4.6, cont. **Hospitalizations: Female**

Hospitalizations from or with Asthma

Lowest Quartile: **Highest Quartile:**

Hospitalizations: Females

Civil Division	Number						Rate					
	0-17 years		>=18 years		All Ages		0-17 years		>=18 years		All Ages	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	4	4	14	14	19	18	272	241	336	340	319	314
Monroe	1	1	19	23	20	24			**583**	**718**	**470**	**573**
Montgomery	5	2	30	41	35	43			**623**	**860**	**563**	**704**
Muscatine	8	7	65	93	73	100	**155**	**123**	**421**	**600**	**351**	**476**
O'Brien	4	5	19	25	23	30			**318**	**428**	**289**	**389**
Osceola	0	1	10	5	10	6			**369**		**286**	**159**
Page	3	1	69	50	72	51			**1,042**	**766**	**847**	**607**
Palo Alto	3	4	12	16	15	20			**304**	**404**	**284**	**384**
Plymouth	2	5	29	40	31	44			**320**	**432**	**248**	**354**
Pocahontas	3	6	37	27	40	33		**587**	**1,022**	**771**	**860**	**729**
Polk	174	102	974	1,051	1,148	1,153	**408**	**227**	**687**	**723**	**622**	**606**
Pottawattamie	26	15	191	193	217	208	**238**	**138**	**579**	**571**	**495**	**464**
Poweshiek	8	6	67	87	76	92	**365**	**259**	**896**	**1,150**	**772**	**950**
Ringgold	1	1	9	9	10	10			**404**	**422**	**345**	**368**
Sac	3	3	27	38	30	41			**577**	**825**	**485**	**679**
Scott	98	69	463	450	561	519	**471**	**331**	**771**	**741**	**694**	**636**
Shelby	3	1	32	34	35	35			**632**	**678**	**520**	**524**
Sioux	1	2	38	33	39	35			**336**	**282**	**244**	**215**
Story	13	7	106	106	119	112	**161**	**85**	**378**	**359**	**329**	**301**
Tama	3	3	31	48	34	51			**448**	**686**	**373**	**557**
Taylor	1	2	11	13	12	15			**385**	**476**	**321**	**419**
Union	1	4	27	31	28	34			**534**	**613**	**420**	**525**
Van Buren	1	2	23	30	24	32			**761**	**1,002**	**612**	**819**
Wapello	17	9	123	162	140	171	**413**	**221**	**853**	**1,126**	**757**	**928**
Warren	13	7	61	79	74	86	**250**	**131**	**409**	**515**	**368**	**417**
Washington	4	6	44	65	48	71		**228**	**541**	**801**	**450**	**661**
Wayne	2	1	24	24	26	24			**874**	**873**	**728**	**701**
Webster	33	27	101	98	134	126	**678**	**574**	**653**	**640**	**659**	**624**
Winnebago	1	1	18	17	19	18			**384**	**370**	**309**	**294**
Winneshiek	4	2	26	19	30	21			**329**	**230**	**282**	**195**
Woodbury	26	31	156	196	182	227	**188**	**225**	**403**	**508**	**347**	**434**
Worth	1	2	12	13	13	15			**396**	**436**	**332**	**379**
Wright	7	2	33	49	41	51	**443**		**577**	**872**	**547**	**704**
[1]Counts do not add correctly as data are inconsistent from data source.			Lowest quartile upper/lower limit:				(0-111)	(0-99)	(131-385)	(150-431)	(122-333)	(119-362)
			Highest quartile upper/lower limit:				(298-1,246)	(228-921)	(599-1,663)	(746-1,495)	(515-1,433)	(635-1,251)

Table 4.7 Hospitalizations: Male

Hospitalizations from or with Asthma, Males Average Annual Number and Rate per 100,000 Population, by Age (0 to 17, 18+ Years) Iowa and Iowa Counties, Lowest and Highest Quartile, State Inpatient Database, 1995 to 1997, 1998 to 2000

(Counties in lowest/highest quartile of the rate distribution in each column are highlighted. See end of table for upper and lower limits of ranges of rates in each quartile. County-specific rates are not given where the average annual count of hospitalizations was less than or equal to five, due to the instability of rates based on small numbers.)

Lowest Quartile: **Highest Quartile:**

Hospitalizations: Males

Civil Division	Number						Rate					
	0-17 years		>=18 years		All Ages		0-17 years		>=18 years		All Ages	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	1,489	1,114	2,753	2,912	4,243	4,026	404	300	271	281	306	286
Adair	2	1	22	29	24	30			**744**	**975**	**599**	**766**
Adams	1	2	8	2	9	5			**486**		**395**	
Allamakee	3	3	6	4	9	7			**111**		**125**	**94**
Appanoose	2	2	10	13	13	16			**215**	**275**	**195**	**241**
Audubon	4	1	8	6	12	7			**324**	**260**	**353**	**224**
Benton	4	9	23	36	27	45		**253**	**259**	**401**	**219**	**359**
Black Hawk	88	56	119	141	207	197	**558**	**364**	**279**	**325**	**354**	**335**
Boone	10	7	18	19	28	26	**308**	**205**	**194**	**201**	**223**	**202**
Bremer	6	4	23	19	29	22	**216**		**269**	**221**	**256**	**196**
Buchanan	6	6	22	18	28	24	**178**	**200**	**303**	**243**	**265**	**230**
Buena Vista	6	8	22	18	28	26	**232**	**297**	**312**	**257**	**290**	**268**
Butler	3	6	24	22	27	28		**304**	**417**	**397**	**345**	**372**
Calhoun	11	2	18	18	29	20	**793**		**414**	**425**	**507**	**365**
Carroll	5	4	20	18	25	22			**268**	**248**	**236**	**214**
Cass	5	2	14	15	19	17			**271**	**279**	**268**	**241**
Cedar	5	5	17	13	22	18			**263**	**203**	**252**	**203**
Cerro Gordo	16	12	43	42	59	54	**279**	**213**	**263**	**260**	**267**	**248**
Cherokee	3	6	12	19	15	25		**361**	**251**	**412**	**226**	**399**
Chickasaw	8	6	11	15	20	21	**440**	**342**	**237**	**306**	**294**	**316**
Clarke	2	4	9	9	11	13			**308**	**307**	**277**	**319**
Clay	5	4	14	20	20	25	**230**		**234**	**333**	**233**	**295**
Clayton	2	3	11	14	13	17			**168**	**207**	**144**	**181**
Clinton	116	103	56	69	173	172	**1,790**	**1,602**	**316**	**393**	**711**	**715**
Crawford	4	4	3	10	7	14				**164**	**83**	**173**
Dallas	11	9	24	37	35	46	**233**	**169**	**198**	**271**	**208**	**241**
Davis	3	3	4	5	8	8				**177**	**185**	**199**
Decatur	3	3	2	3	6	6					**142**	**154**
Delaware	2	3	6	12	8	15			**94**	**182**	**92**	**161**
Des Moines	25	30	50	46	75	76	**479**	**565**	**333**	**307**	**371**	**374**
Dickinson	6	5	20	9	26	13	**317**		**342**	**143**	**336**	**170**
Dubuque	19	19	51	68	69	87	**156**	**162**	**164**	**218**	**162**	**203**

Table 4.7, cont. **Hospitalizations: Male**

Hospitalizations from or with Asthma

Lowest Quartile: **Highest Quartile:**

Hospitalizations: Males

Civil Division	Number						Rate					
	0-17 years		>=18 years		All Ages		0-17 years		>=18 years		All Ages	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	1,489	1,114	2,753	2,912	4,243	4,026	404	300	271	281	306	286
Emmet	4	5	10	15	15	20		369	266	398	273	391
Fayette	13	6	16	14	29	20	444	202	208	182	270	187
Floyd	5	9	9	15	14	24		442	159	250	182	299
Franklin	3	2	10	9	12	11			245	239	232	210
Fremont	1	3	7	6	8	8			239	204	212	222
Greene	6	6	20	12	26	18	503	450	552	339	540	368
Grundy	4	1	11	9	15	11			252	209	250	180
Guthrie	5	4	16	23	22	27	395		393	546	394	483
Hamilton	19	8	47	46	66	54	941	411	810	786	843	689
Hancock	4	3	15	14	19	17			352	327	321	282
Hardin	7	5	21	26	28	32	309	222	310	397	309	351
Harrison	6	5	22	3	28	8	304		411		381	104
Henry	9	4	15	20	24	24	350		202	258	238	237
Howard	2	2	5	3	7	5			152		147	
Humboldt	7	9	6	5	13	14	549	725	168		264	285
Ida	0	0	7	8	7	8	0		248	288	178	218
Iowa	8	4	20	24	28	28	437		354	426	375	364
Jackson	10	6	14	18	25	25	371	231	201	254	249	248
Jasper	16	12	42	49	59	61	354	256	321	351	335	332
Jefferson	5	6	10	20	16	26	264	318	166	319	190	319
Johnson	38	23	92	120	131	143	334	198	236	292	258	271
Jones	5	5	15	21	20	25			191	260	188	242
Keokuk	6	3	18	18	24	21	418		436	442	431	378
Kossuth	3	4	21	18	24	21			327	282	273	250
Lee	40	36	61	62	100	97	802	741	426	437	523	514
Linn	108	71	206	193	314	265	474	301	317	287	358	291
Louisa	5	3	12	9	16	12			268	206	273	204
Lucas	2	4	6	10	8	14			185	293	185	308
Lyon	0	1	3	6	3	7	0			149		113
Madison	6	1	18	13	24	15	319		375	270	359	213
Mahaska	9	4	27	15	36	19	312		352	193	341	178
Marion	9	10	25	42	35	52	226	231	224	364	224	329
Marshall	13	16	26	30	39	46	278	334	183	209	207	241
Mills	3	3	9	6	12	9			180	117	170	129
Mitchell	2	1	3	3	5	4						
Monona	7	4	11	16	19	20	621		311	438	387	414

Table 4.7 cont. Hospitalizations: Male

Hospitalizations from or with Asthma

Lowest Quartile: **Highest Quartile:**

Hospitalizations: Males

Civil Division	Number						Rate					
	0-17 years		>=18 years		All Ages		0-17 years		>=18 years		All Ages	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	1,489	1,114	2,753	2,912	4,243	4,026	404	300	271	281	306	286
Monroe	1	2	8	10	10	12			288	336	246	300
Montgomery	5	1	9	11	14	12			215	260	240	217
Muscatine	17	13	35	42	51	55	290	226	242	287	255	270
O'Brien	4	3	16	15	20	17			309	282	275	242
Osceola	1	1	5	4	6	4					165	
Page	5	3	36	22	41	25			556	323	476	287
Palo Alto	2	2	9	13	12	15			263	359	238	303
Plymouth	7	4	21	25	28	29	204		243	290	232	240
Pocahontas	4	4	21	7	25	11			648	223	567	266
Polk	289	171	362	416	651	587	651	365	290	322	385	333
Pottawattamie	32	17	62	55	94	73	282	149	211	182	231	173
Poweshiek	10	2	24	38	34	40	433		351	564	373	446
Ringgold	1	1	5	5	7	5			276		262	206
Sac	4	4	14	14	19	18			336	340	319	314
Scott	118	100	155	135	272	235	543	460	282	243	356	304
Shelby	3	4	17	17	20	21			366	361	310	324
Sioux	10	4	11	14	20	18	210		101	131	135	118
Story	15	11	48	42	62	53	164	128	161	135	162	133
Tama	6	9	15	24	21	33	252	380	240	376	243	377
Taylor	1	0	4	6	5	6		0		238	157	177
Union	6	3	8	10	14	13	358		184	235	231	224
Van Buren	3	2	8	8	11	10			296	290	285	256
Wapello	24	13	62	85	86	98	559	302	487	656	505	568
Warren	23	11	31	28	53	39	408	196	224	198	277	197
Washington	11	8	28	22	39	31	403	303	383	303	389	303
Wayne	3	1	11	13	15	14			460	534	457	443
Webster	43	34	53	29	96	63	870	674	388	204	517	326
Winnebago	2	3	13	10	15	13			300	227	260	222
Winneshiek	3	4	9	10	12	15			117	133	114	141
Woodbury	51	50	62	63	113	113	352	343	176	178	227	226
Worth	2	2	6	9	8	11			223	317	210	280
Wright	7	5	18	17	24	22	399	315	343	333	356	329
[1]Counts do not add correctly as data are inconsistent from data source.			Lowest quartile upper/lower limit:				(0-168)	(0-149)	(53-196)	(58-204)	(48-211)	(81-203)
			Highest quartile upper/lower limit:				(383-1,790)	(303-1,602)	(335-810)	(355-975)	(355-843)	(327-766)

Table 4.8 — Hospitalizations: by Age

Hospitalizations from or with Asthma, Average Annual Rate per 100,000 population, by Age and Gender, Iowa, and Iowa Counties, State Inpatient Database (SID), 1995 to 1997, 1998 to 2000

(Counties in lowest/highest quartile of rate distributions in each column are highlighted. See end of table for ranges of rates in each quartile. County-specific rates are not given where the average annual count of hospitalizations was less than or equal to five, due to the instability of rates relying on small numbers. (Table 4.9 has *counts* of hospitalizations for all cells))

Lowest Quartile: Highest Quartile:

Civil Division	Age-Specific Hospitalization Rates												Gender-Specific Rates			
	0-4 yrs		5-14 yrs		15-34 yrs		35-64 yrs		65+ yrs		All Ages		Male		Female	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	707	527	220	162	277	270	344	393	833	944	406	418	306	286	500	544
Adair							296	430	2,014	2,354	616	745	599	766	632	726
Adams								312	581	615	337	347	395		280	474
Allamakee									273	223	123	129	125	94	122	162
Appanoose					339	275	308	500	470	1,110	302	508	195	241	401	754
Audubon							321	277	638	602	408	279	353	224	459	330
Benton					165	274	246	363	934	1,019	304	397	219	359	386	435
Black Hawk	865	540	374	262	296	375	343	488	990	1,147	457	520	354	335	550	690
Boone	333	437	204		268	189	318	402	707	695	357	357	223	202	481	503
Bremer					127	144	170	259	1,110	931	318	317	256	196	378	431
Buchanan		401			248	252	366	234	672	747	334	293	265	230	400	355
Buena Vista					124	103	180	174	1,122	918	338	285	290	268	384	302
Butler		729			201	208	272	323	956	1,112	388	439	345	372	429	504
Calhoun	1,092		334		294	375	448	383	1,289	1,230	624	541	507	365	738	714
Carroll	339				116	159	191	153	805	660	273	235	236	214	308	256
Cass			259		254	222	253	396	581	900	321	426	268	241	370	598
Cedar					262	360	330	326	765	891	365	400	252	203	473	591
Cerro Gordo	564	368	203	202	342	240	354	429	734	1,006	411	451	267	248	541	635
Cherokee							199	377	566	988	235	433	226	399	244	465
Chickasaw	1,023						217	282	794	1,069	345	406	294	316	396	495
Clarke						275	268	343	975	1,330	393	508	277	319	499	685
Clay					244	253	282	303	728	1,275	332	426	233	295	423	547
Clayton							166	212	566	827	195	266	144	181	245	349
Clinton	4,954	4,027	358	386	396	434	478	558	966	1,073	805	806	711	715	893	890
Crawford					153	135		165	354	689	151	244	83	173	216	314
Dallas	509	263	115	88	282	160	246	290	871	1,239	334	335	208	241	456	427
Davis								166	360		166	204	185	199	147	208

Table 4.8 cont. **Hospitalizations: by Age**

Lowest Quartile: **Highest Quartile:**

Civil Division	Age-Specific Hospitalization Rates												Gender-Specific Rates			
	0-4 yrs		5-14 yrs		15-34 yrs		35-64 yrs		65+ yrs		All Ages		Male		Female	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	707	527	220	162	277	270	344	393	833	944	406	418	306	286	500	544
Decatur							197	302	458	342	247	253	142	154	347	348
Delaware						140	130	211	595	796	172	249	92	161	250	335
Des Moines	846	658	348	329	397	542	510	551	625	728	498	554	371	374	615	720
Dickinson					356	287	336	324	819	710	420	375	336	170	498	566
Dubuque	171	177	99	102	139	195	204	267	562	735	220	287	162	203	275	366
Emmet					205	238	302	522	645	1,174	360	538	273	391	441	676
Fayette	769		189		173	146	203	223	668	537	316	260	270	187	359	331
Floyd				328	189	239	305	450	569	1,242	316	535	182	299	439	753
Franklin							233	217	736	731	282	281	232	210	330	349
Fremont							192	187	759	666	278	277	212	222	338	328
Greene	1,016			353	272	242	263	518	897	909	442	533	540	368	352	688
Grundy					253	201	203	189	643	918	293	310	250	180	333	433
Guthrie	895						291	315	1,344	1,614	508	517	394	483	615	548
Hamilton	2,124	943	281		752	539	739	854	2,818	2,449	1,146	976	843	689	1,433	1,251
Hancock						231	287	346	1,041	1,090	375	406	321	282	427	526
Hardin	523				183	221	215	335	877	1,180	355	467	309	351	398	577
Harrison			239		425	152	452	160	756	919	450	288	381	104	515	462
Henry	607				248	306	252	411	722	1,158	331	446	238	237	427	662
Howard									389	373	164	161	147		181	215
Humboldt	1,531	1,689			254		218	220	837	469	424	336	264	285	576	385
Ida	0						189		372	611	161	190	178	218	144	164
Iowa					207	288	315	363	1,141	1,266	431	461	375	364	483	553
Jackson	1,049	559			202	141	239	290	614	748	325	317	249	248	399	384
Jasper	825	627	136	141	250	307	434	424	864	1,239	440	497	335	332	542	657
Jefferson					291	479	214	381	896	741	323	422	190	319	451	521

Table 4.8 cont. **Hospitalizations: by Age**

Lowest Quartile: **Highest Quartile:**

Civil Division	Age-Specific Hospitalization Rates												Gender-Specific Rates			
	0-4 yrs		5-14 yrs		15-34 yrs		35-64 yrs		65+ yrs		All Ages		Male		Female	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	707	527	220	162	277	270	344	393	833	944	406	418	306	286	500	544
Johnson	405	226	321	255	258	312	364	461	844	1,160	352	413	258	271	445	555
Jones					249	362	218	419	532	676	267	397	188	242	353	564
Keokuk	824				396	336	437	532	672	894	464	488	431	378	496	593
Kossuth			189		133		397	224	716	1,105	359	369	273	250	441	482
Lee	1,216	1,087	474	446	470	454	726	678	1,258	1,353	742	725	523	514	955	932
Linn	622	498	327	167	339	365	415	453	961	1,006	462	460	358	291	561	622
Louisa					272	245	274	258	649	540	337	283	273	204	401	362
Lucas						382	377	338	505	524	350	365	185	308	501	418
Lyon		0	0						311	353	93	116		113	138	119
Madison	814				224	191	341	284	1,094	859	424	300	359	213	487	385
Mahaska	548		199		199	193	318	285	912	696	385	301	341	178	428	419
Marion	453	495	186	125	297	246	445	424	761	1,019	418	432	224	329	611	534
Marshall	417	656	156	124	257	198	233	315	753	737	328	351	207	241	444	455
Mills					217		234	277	875	553	287	238	170	129	402	345
Mitchell							176	173	252	383	144	191			193	295
Monona	1,045	997					243	254	716	1,384	413	550	387	414	436	676
Monroe							346	344	856	1,198	362	440	246	300	470	573
Montgomery			338				377	572	773	945	410	472	240	217	563	704
Muscatine	455	208	132	150	290	346	230	346	655	859	304	374	255	270	351	476
O'Brien					169		165	230	694	741	282	318	275	242	289	389
Osceola	0					0	295	208	495		227	144	165		286	159
Page					392	259	479	371	1,770	1,111	661	444	476	287	847	607
Palo Alto					238			236	539	860	262	345	238	303	284	384
Plymouth					139	148	193	224	649	926	240	298	232	240	248	354

Table 4.8 cont. **Hospitalizations: by Age**

Lowest Quartile: **Highest Quartile:**

Civil Division	Age-Specific Hospitalization Rates												Gender-Specific Rates			
	0-4 yrs		5-14 yrs		15-34 yrs		35-64 yrs		65+ yrs		All Ages		Male		Female	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	707	527	220	162	277	270	344	393	833	944	406	418	306	286	500	544
Pocahontas		1.189					616	414	1.779	931	718	503	567	266	860	729
Polk	1.022	622	336	176	360	287	471	520	921	1.090	509	475	385	333	622	606
Pottawattamie	398	154	200	113	270	207	395	398	648	647	368	323	231	173	495	464
Poweshiek	532	641	357	245	368	435	375	613	1.520	1.985	579	757	373	446	772	950
Ringgold								262	528	461	305	290	262	206	345	368
Sac					210		252	472	962	1.112	403	500	319	314	485	679
Scott	1.043	776	278	225	469	439	463	426	905	859	530	475	356	304	694	636
Shelby					235	221	245	387	1.145	1,016	417	426	310	324	520	524
Sioux	302				70	64	102	134	707	586	191	168	135	118	244	215
Story	294	167	145	90	149	73	249	271	705	828	243	215	162	133	329	301
Tama		532			164	236	243	385	739	1.112	310	469	243	377	373	557
Taylor								215	440	740	243	303	157	177	321	419
Union					236	242	292	275	641	930	330	382	231	224	420	525
Van Buren					346		396	576	927	1,186	450	539	285	256	612	819
Wapello	932	421	339	185	433	447	502	740	1.312	1.732	636	754	505	568	757	928
Warren	685	338	198	114	215	211	279	259	711	960	324	309	277	197	368	417
Washington			294	261	347	507	367	414	799	887	420	488	389	303	450	661
Wayne				0	382		472	538	1.141	1.215	599	578	457	443	728	701
Webster	2.001	1.578	380	282	437	368	452	386	733	585	591	479	517	326	659	624
Winnebago					271		156	196	702	686	285	259	260	222	309	294
Winneshiek					166	90	120	89	519	515	200	168	114	141	282	195
Woodbury	549	588	167	159	174	231	249	350	621	559	289	334	227	226	347	434
Worth								210	833	953	273	330	210	280	332	379
Wright		791	350	0	247	246	412	543	780	1,015	456	523	356	329	547	704
Lowest Quartile Lower/Upper Limit:	(0-280)	(0-222)	(0-95)	(0-84)	(37-159)	(0-142)	53-203)	(89-227)	(252-623)	(223-688)	(93-284)	(116-289)	(48-211)	(81-202)	(122-335)	(119-364)
Highest Quartile Lower/Upper Limit:	(618-4,954)	(548-4,027)	(217-474)	(183-446)	(291-752)	(281-542)	(366-739)	(421-854)	(916-2,818)	(1,112-2,449)	(424-1,146)	(477-976)	(355-843)	(327-766)	(518-1,433)	(636-1,251)

Table 4.9

Hospitalizations: by Age

Hospitalizations from or with Asthma, Average Annual Count, by Age and Gender, Iowa and Iowa Counties, State Inpatient Database (SID), 1995 to 1997, 1998 to 2000

Civil Division	Age-Specific Hospitalization Counts												Gender-Specific Counts			
	0-4 yrs		5-14 yrs		15-34 yrs		35-64 yrs		65+ yrs		All Ages		Male		Female	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	***1,296***	***972***	***892***	***660***	***2,184***	***2,110***	***3,573***	***4,251***	***3,611***	***4,076***	***11,555***	***12,069***	***4,243***	***4,026***	***7,312***	***8,030***
Adair	1.4	0.7	0.7	0.7	2.9	4.0	8.7	13.0	36.8	42.2	50.5	60.6	23.8	30.3	26.7	30.3
Adams	1.7	1.3	0.3	1.3	4.3	1.3	3.0	5.3	5.7	6.0	15.0	15.3	8.7	4.7	6.3	10.7
Allamakee	2.7	1.3	1.0	3.7	2.7	2.3	3.7	5.0	7.3	6.0	17.3	18.3	8.7	6.7	8.7	11.7
Appanoose	1.3	3.0	0.7	2.0	11.0	8.7	15.0	25.3	13.0	30.0	41.0	69.0	12.7	15.7	28.3	53.3
Audubon	2.0	0.7	4.0	1.0	3.7	0.7	8.0	7.0	10.3	9.7	28.0	19.0	11.7	7.3	16.3	11.7
Benton	4.0	4.7	2.7	5.0	10.3	17.0	22.3	35.3	35.7	39.3	75.0	101.3	26.7	45.3	48.3	56.0
Black Hawk	64.0	40.0	64.7	43.7	105.7	137.0	152.0	220.0	171.0	198.7	557.3	639.3	206.7	197.0	350.7	442.3
Boone	5.3	7.0	7.3	3.3	17.0	12.0	31.7	41.7	31.0	29.7	92.3	93.7	27.7	25.7	64.7	68.0
Bremer	4.7	4.3	5.0	2.7	8.0	9.0	14.7	23.0	41.7	35.0	74.0	74.0	29.0	22.3	45.0	51.7
Buchanan	4.3	6.0	4.3	1.7	13.0	13.0	27.7	18.3	21.3	23.0	70.7	62.0	27.7	24.0	43.0	38.0
Buena Vista	4.7	3.0	3.0	4.0	7.0	5.7	11.7	11.7	40.7	32.0	67.0	56.3	28.0	26.0	39.0	30.3
Butler	4.3	6.3	3.0	0.7	7.0	7.0	15.7	19.0	31.0	35.0	61.0	68.0	26.7	28.3	34.3	39.7
Calhoun	7.0	4.7	5.3	0.7	7.3	9.0	18.7	16.3	33.3	30.3	71.7	61.0	28.7	20.3	43.0	40.7
Carroll	5.3	2.0	2.0	3.0	6.0	8.0	14.0	11.7	31.7	26.0	59.0	50.7	24.7	22.3	34.3	28.3
Cass	2.1	2.1	5.5	3.8	8.3	6.9	13.8	22.1	18.0	27.3	47.7	62.3	19.0	17.0	28.7	45.3
Cedar	4.3	4.0	4.0	3.3	11.0	15.0	22.3	23.3	23.3	26.7	65.0	72.3	22.0	18.0	43.0	54.3
Cerro Gordo	16.3	10.3	12.7	12.3	41.3	27.7	60.0	74.7	60.7	82.7	191.0	207.7	58.7	54.3	132.3	153.3
Cherokee	1.7	4.3	1.3	2.3	3.7	5.0	10.0	19.0	15.0	26.0	31.7	56.7	14.7	25.3	17.0	31.3
Chickasaw	8.7	5.0	3.3	4.7	5.0	5.0	10.7	14.3	18.7	25.0	46.3	54.0	19.7	21.0	26.7	33.0
Clarke	3.1	3.9	1.9	2.7	3.9	5.4	8.2	11.3	15.2	20.2	32.3	43.6	10.9	13.2	21.4	30.3
Clay	3.2	1.8	4.6	3.2	10.3	10.3	18.1	19.9	22.1	38.8	58.3	74.0	19.6	24.5	38.8	49.4
Clayton	1.7	1.7	1.3	1.3	3.0	3.7	11.3	15.0	19.3	28.0	36.7	49.7	13.3	16.7	23.3	33.0
Clinton	160.2	127.8	26.3	27.8	50.9	53.4	90.1	107.5	78.7	85.4	406.2	401.9	172.7	172.3	233.5	229.6
Crawford	1.6	3.2	3.5	2.0	6.3	5.5	3.2	10.2	10.2	19.7	24.8	40.6	6.7	14.2	18.1	26.4
Dallas	11.7	7.3	6.3	5.3	24.7	15.7	33.0	44.7	39.7	56.3	115.3	129.3	35.3	46.0	80.0	83.3
Davis	2.0	2.3	1.3	1.0	1.7	4.3	3.7	5.3	5.3	4.3	14.0	17.3	7.7	8.3	6.3	9.0

Table 4.9 cont. **Counts of Hospitalizations: by Age**

Civil Division	Age-Specific Hospitalization Counts												Gender-Specific Counts			
	0-4 yrs		5-14 yrs		15-34 yrs		35-64 yrs		65+ yrs		All Ages		Male		Female	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	20
Decatur	2.0	2.7	1.7	1.7	4.0	3.0	5.3	8.7	7.3	5.3	20.3	21.3	5.7	6.3	14.7	15.0
Delaware	1.3	0.7	2.3	2.7	3.3	6.3	8.3	14.3	16.3	22.0	31.7	46.0	8.3	14.7	23.3	31.3
Des Moines	21.7	16.9	21.0	19.3	41.6	55.4	82.9	91.2	43.7	50.6	210.9	233.2	75.3	75.7	135.5	157.6
Dickinson	3.5	4.3	3.0	1.7	11.7	9.5	21.2	21.7	26.9	23.8	66.3	61.1	25.6	13.4	40.7	47.7
Dubuque	9.7	10.0	13.0	13.0	34.7	47.0	65.0	87.7	72.0	95.7	194.3	253.3	69.3	87.0	125.0	166.3
Emmet	3.5	4.7	4.7	1.6	5.5	6.3	11.8	20.5	14.2	25.2	39.8	58.3	14.6	20.5	25.2	37.8
Fayette	10.7	5.0	6.0	4.3	9.3	7.7	16.0	18.0	27.3	21.7	69.3	56.7	29.0	20.0	40.3	36.7
Floyd	4.3	3.7	3.3	7.7	7.0	8.7	19.0	28.7	18.7	39.7	52.3	88.3	14.3	23.7	38.0	64.7
Franklin	2.0	1.0	0.7	2.0	2.7	2.7	9.7	9.0	16.0	15.7	31.0	30.3	12.3	11.0	18.7	19.3
Fremont	1.3	0.7	0.7	2.3	2.0	2.7	5.7	5.7	12.3	10.3	22.0	21.7	8.0	8.3	14.0	13.3
Greene	5.8	4.0	2.9	5.1	5.8	5.1	9.7	19.9	20.2	20.2	44.4	54.2	26.0	18.1	18.4	36.1
Grundy	2.6	1.1	1.5	0.7	6.7	5.2	9.6	9.3	15.6	21.8	35.9	38.1	14.8	10.7	21.1	27.4
Guthrie	5.3	2.0	3.7	3.0	5.0	3.0	13.0	14.7	31.0	36.7	58.0	59.3	21.7	27.0	36.3	32.3
Hamilton	20.7	9.3	6.3	3.3	28.7	20.0	45.0	53.3	84.0	71.3	184.7	157.3	66.0	54.3	118.7	103.0
Hancock	3.3	1.7	1.7	1.7	4.7	6.3	12.3	15.7	23.3	23.7	45.3	49.0	19.0	16.7	26.3	32.3
Hardin	5.3	4.6	3.5	3.2	8.1	9.5	14.4	22.8	35.0	46.2	66.2	86.1	28.0	31.5	38.2	54.6
Harrison	1.6	3.9	5.4	0.8	15.6	5.4	24.9	9.3	21.0	24.9	68.4	44.3	28.0	7.8	40.4	36.6
Henry	7.3	4.3	4.0	2.3	13.7	16.7	18.3	31.7	22.3	35.0	65.7	90.0	24.0	24.3	41.7	65.7
Howard	0.7	1.0	1.0	0.7	2.0	1.7	4.3	5.0	8.0	7.3	16.0	15.7	7.0	5.0	9.0	10.7
Humboldt	9.3	10.0	2.0	2.0	5.7	4.0	8.3	8.7	18.7	10.0	44.0	34.7	13.3	14.3	30.7	20.3
Ida	0.0	0.3	0.7	0.3	0.7	0.7	5.3	3.3	6.3	10.3	13.0	15.0	7.0	8.3	6.0	6.7
Iowa	5.0	4.0	4.7	1.7	7.7	10.3	18.0	22.0	30.7	34.0	66.0	72.0	28.0	27.7	38.0	44.3
Jackson	13.7	7.0	3.3	2.3	10.0	6.7	17.7	22.3	20.7	25.7	65.3	64.0	24.7	24.7	40.7	39.3
Jasper	17.0	13.5	6.7	7.1	22.0	28.0	59.9	62.1	50.4	72.4	156.1	183.0	58.5	61.4	97.5	120.2
Jefferson	3.6	2.9	3.2	4.6	11.4	18.2	15.7	28.2	20.7	16.4	54.6	70.3	15.7	26.1	38.9	44.3

Table 4.9 cont. **Counts of Hospitalizations: by Age**

Civil Division	Age-Specific Hospitalization												Gender-Specific			
	0-4 yrs		5-14 yrs		15-34 yrs		35-64 yrs		65+ yrs		All Ages		Male		Female	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	0	0	0	*0*	0	0	0	0	0	0	0	0	0	0	36	19
Johnson	25.0	14.3	34.7	29.0	117.3	144.0	113.3	155.3	67.0	94.7	357.3	437.3	130.7	142.7	226.7	294.7
Jones	2.7	2.0	4.3	5.0	13.7	18.7	16.3	32.7	17.3	21.7	54.3	80.0	20.0	25.3	34.3	54.7
Keokuk	5.7	2.0	3.7	2.3	10.7	8.7	18.0	22.3	15.7	20.3	53.7	55.7	24.3	21.0	29.3	34.7
Kossuth	3.2	3.7	5.3	3.7	5.3	4.8	26.1	14.9	24.5	37.3	64.5	64.5	24.0	21.3	40.5	43.2
Lee	28.8	25.0	26.4	24.0	46.2	42.1	107.2	102.7	79.4	83.9	287.9	277.6	100.3	97.2	187.6	180.4
Linn	72.7	61.5	79.4	42.3	180.2	195.0	285.3	327.9	214.6	231.9	832.2	858.5	313.7	264.7	518.5	593.9
Louisa	4.0	2.0	4.0	3.3	8.7	7.7	12.0	11.7	11.3	9.3	40.0	34.0	16.3	12.3	23.7	21.7
Lucas	1.7	0.7	3.0	3.7	4.7	7.7	13.0	12.0	9.3	9.7	31.7	33.7	8.0	13.7	23.7	20.0
Lyon	0.6	0.0	0.0	1.1	1.7	1.1	2.2	3.9	6.7	7.8	11.1	13.9	2.8	6.7	8.3	7.2
Madison	7.0	1.7	2.3	0.3	7.3	6.3	17.7	15.7	23.3	18.0	57.7	42.0	24.0	14.7	33.7	27.3
Mahaska	8.0	3.3	6.3	3.7	11.3	11.0	24.7	23.0	33.7	25.3	84.0	66.3	36.3	19.3	47.7	47.0
Marion	8.7	9.7	8.3	5.7	25.0	20.7	50.0	50.0	38.0	50.7	130.0	136.7	34.7	51.7	95.3	85.0
Marshall	9.7	15.7	8.3	6.7	24.3	18.7	35.0	48.3	49.7	47.3	127.0	136.7	39.3	46.3	87.7	89.7
Mills	2.0	2.0	1.2	2.0	7.7	3.7	13.0	16.7	16.3	10.2	40.3	34.6	11.8	9.4	28.5	25.3
Mitchell	0.7	1.7	0.3	2.3	2.0	1.0	7.0	7.0	6.0	9.0	16.0	21.0	5.0	4.3	11.0	16.7
Monona	5.7	5.3	5.0	3.0	5.0	5.0	9.0	9.7	17.0	32.3	41.7	55.3	18.7	20.0	23.0	35.3
Monroe	1.0	1.7	0.7	1.0	4.0	3.7	10.3	10.3	13.3	18.7	29.3	35.3	9.7	11.7	19.7	23.7
Montgomery	3.1	2.1	5.6	1.0	4.2	4.5	16.3	25.4	19.5	22.6	48.7	55.6	13.6	12.2	35.1	43.5
Muscatine	13.0	6.0	8.5	9.5	33.1	38.4	34.2	53.6	35.9	47.2	124.7	154.7	51.4	55.0	73.3	99.7
O'Brien	3.3	2.9	2.9	4.0	5.8	4.7	8.7	12.4	21.8	23.3	42.5	47.3	20.0	17.5	22.5	29.8
Osceola	0.0	1.0	1.0	0.3	1.0	0.0	7.3	5.3	6.7	3.3	16.0	10.0	5.7	4.3	10.3	5.7
Page	3.1	1.5	2.7	2.3	16.2	10.8	30.1	23.9	61.0	37.4	113.1	76.0	40.9	25.1	72.2	51.0
Palo Alto	3.9	3.1	0.8	2.3	5.4	2.3	4.7	8.6	11.7	18.3	26.5	34.6	11.7	14.8	14.8	19.8
Plymouth	4.0	5.0	3.7	2.7	8.3	8.7	17.0	20.7	26.0	36.7	59.0	73.7	28.0	29.3	31.0	44.3

Table 4.9 cont. **Counts of Hospitalizations: by Age**

Civil Division	Age-Specific Hospitalization Counts												Gender-Specific Counts			
	0-4 yrs		5-14 yrs		15-34 yrs		35-64 yrs		65+ yrs		All Ages		Male		Female	
	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00	95-97	98-00
Iowa	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***96***	***63***
Pocahontas	5.0	6.0	1.7	4.3	2.0	2.0	20.3	14.0	35.3	17.7	64.3	44.0	24.7	11.3	39.7	32.7
Polk	254.8	163.5	158.8	87.3	393.1	313.2	622.7	729.4	370.6	446.8	1,799.8	1,740.1	651.2	587.1	1,148.3	1,153.0
Pottawattamie	23.4	9.1	24.8	14.3	62.0	47.7	124.5	132.6	76.3	76.8	311.0	280.5	94.0	72.5	217.0	208.0
Poweshiek	5.7	6.7	9.0	6.0	19.7	22.3	25.0	42.0	50.3	65.0	109.7	142.0	34.0	40.3	75.7	92.3
Ringgold	0.3	1.0	1.3	0.7	3.3	2.7	4.3	5.3	7.0	6.0	16.3	15.7	6.7	5.3	9.7	10.3
Sac	4.0	3.3	3.0	3.0	5.3	3.3	10.7	20.3	25.3	28.7	48.3	58.7	18.7	18.0	29.7	40.7
Scott	117.5	87.0	66.8	53.9	210.9	193.7	271.7	260.2	166.0	159.2	832.9	753.9	272.0	235.4	560.9	518.5
Shelby	2.3	1.5	2.7	1.9	6.9	6.1	11.4	18.7	31.2	27.1	54.5	55.2	19.8	20.6	34.7	34.7
Sioux	6.7	3.2	3.2	2.4	6.3	5.9	10.2	13.8	33.1	27.6	59.5	52.8	20.5	18.1	39.0	34.7
Story	12.3	7.0	11.7	7.3	49.3	24.7	53.7	61.3	54.0	64.7	181.0	165.0	62.3	52.7	118.7	112.3
Tama	4.6	6.0	2.5	4.6	6.7	9.6	15.9	25.8	25.1	37.9	54.9	83.9	20.9	32.9	34.0	51.0
Taylor	1.0	0.3	1.0	0.7	4.3	3.3	4.0	5.7	7.0	11.3	17.3	21.3	5.3	6.0	12.0	15.3
Union	4.7	3.0	1.3	3.3	7.3	7.3	13.3	13.0	14.7	21.0	41.3	47.7	13.7	13.3	27.7	34.3
Van Buren	1.7	1.7	1.7	1.3	6.0	4.0	11.3	17.3	14.3	18.0	35.0	42.3	11.0	10.0	24.0	32.3
Wapello	19.9	8.9	15.7	8.6	38.7	39.4	67.4	101.3	84.6	110.6	226.3	268.7	86.3	97.6	140.0	171.2
Warren	17.7	9.0	12.0	7.0	23.7	23.0	42.7	41.7	31.3	44.7	127.3	125.3	53.3	39.0	74.0	86.3
Washington	3.7	4.0	9.0	8.0	17.7	25.0	27.3	32.3	29.3	32.7	87.0	102.0	39.0	30.7	48.0	71.3
Wayne	1.5	1.1	3.0	0.0	5.3	4.6	11.4	13.3	19.4	19.4	40.8	38.5	14.9	14.1	25.9	24.4
Webster	51.7	40.0	21.0	15.3	42.7	37.0	63.7	56.0	51.3	40.0	230.3	188.3	96.3	62.7	134.0	125.7
Winnebago	0.8	1.9	2.3	1.6	8.2	3.1	6.6	8.6	16.3	15.6	34.2	30.7	15.2	12.8	19.1	17.9
Winneshiek	3.5	3.5	1.8	2.5	11.3	6.0	8.1	6.4	17.0	17.0	41.8	35.4	11.7	14.5	30.1	20.9
Woodbury	40.4	44.5	26.8	25.1	49.5	65.5	89.6	128.9	88.6	77.4	294.9	341.4	112.7	112.7	182.2	227.4
Worth	0.3	1.7	2.3	1.3	1.7	2.0	4.0	6.3	13.0	14.3	21.3	25.7	8.0	10.7	13.3	15.0
Wright	4.7	6.7	6.7	0.0	7.7	7.3	21.7	29.0	24.3	30.7	65.0	73.7	24.3	22.3	40.7	51.3

Tables 4.10 and 4.11 Hospitalizations: by County Size

Average Annual Asthma Prevalence Numbers and Rates per 100 Population, by County Population Size and Age, State Inpatient Database (SID), 1995 to 1997

Age	County Size									
	<10,000	10,000-19,999	20,000-49,999	50,000 plus	Total	<10,000	10,000-19,999	20,000-49,999	50,000 plus	Total
	Number					Hospitalization Rate				
Total	483	2,354	3,131	5,586	11,555	350	371	375	450	406
0-17	63	377	630	1,435	2,506	186	236	296	457	347
18+	420	1,977	2,500	4,151	9,048	403	416	402	448	425
Total					**11,555**					
# Counties	9	27	45	18	99					
Iowans	Percent									
w/Asthma	4	20	27	48	100	(number (n) of all w/asthma = 11,555)				
All	5	22	29	44	100	(n all population = 2,847,910 (average annual))				

Average Annual Asthma Prevalence Numbers and Rates per 100 Population, by County Population Size and Age, Iowa, State Inpatient Database (SID), 1998 to 2000

Age	County Size									
	<10,000	10,000-19,999	20,000-49,999	50,000 plus	Total	<10,000	10,000-19,999	20,000-49,999	50,000 plus	Total
	Number					Hospitalization Rate				
Total	496	2,601	3,265	5,706	12,069	359	410	386	450	418
0-17	62	314	481	1,027	1,885	181	198	226	321	260
18+	434	2,287	2,782	4,679	10,183	418	481	440	493	471
Total					**12,069**					
Iowans	Percent									
w/Asthma	4	22	27	47	100	(number (n) of all w/asthma = 12,069)				
All I	5	22	29	44	100	(n all population = 2,885,587 (average annual))				

Counties with more than 50,000 population (2000 Census, n = 9): Black Hawk, Clinton, Dubuque, Linn, Johnson, Polk, Pottawattamie, Scott, Woodbury

Counties with 20,000 - 49,999 population (2000 Census, n = 27): Benton, Boone, Bremer, Buchanan,Buena Vista,Carroll, Cerro Gordo,Dallas.Des Moines. Fayette, Henry, Jackson, Jasper, Jones, Lee, Mahaska, Marion, Marshall, Muscatine, Plymouth, Sioux, Story, Wapello, Warren, Washington, Webster, Winneshiek

Counties with 10,000 - 19,999 population (2000 Census, n = 45): Allamakee, Appanoose, Butler, Calhoun, Cass, Cedar, Cherokee, Chickasaw, Clay, Clayton, Crawford, Delaware, Dickinson, Emmet, Floyd, Franklin, Greene, Grundy, Guthrie, Hamilton, Hancock, Hardin, Harrison, Humboldt, Iowa, Jefferson, Keokuk, Kossuth, Louisa, Lyon, Madison, Mills, Mitchell, Monona, Montgomery, O'Brien, Page, Palo Alto, Poweshiek, Sac, Shelby, Tama, Union, Winnebago, Wright

Counties with <10,000 population (2000 Census, n = 18): Adair, Adams, Audubon, Clarke, Davis, Decatur, Fremont, Howard, Ida, Lucas, Monroe, Osceola, Pocahontas, Ringgold, Taylor, Van Buren, Wayne, Worth

Tables 5.1 Census Counts: April 2002, by County Used in Tables 4.1, 4.2, 4.4

	Count	Estimates					Count
	1990	7/1/95	7/1/96	7/1/97	7/1/98	7/1/99	2000
State of Iowa	2,776,831	2,867,373	2,880,000	2,891,119	2,902,872	2,917,634	2,926,324
Adair	8,409	8,366	8,363	8,310	8,305	8,298	8243
Adams	4,866	4,578	4,534	4,503	4,493	4,498	4,482
Allamakee	13,855	14,484	14,468	14,487	14,611	14,651	14,675
Appanoose	13,743	13,723	13,752	13,677	13,761	13,709	13,721
Audubon	7,334	6,954	6,920	6,916	6,893	6,896	6,830
Benton	22,429	23,962	24,249	24,453	24,823	25,214	25,308
Black Hawk	123,798	126,936	127,392	127,275	127,743	127,786	128,012
Boone	25,186	25,456	25,742	26,023	25,930	26,164	26,224
Bremer	22,813	23,183	23,301	23,292	23,322	23,398	23,325
Buchanan	20,844	21,141	21,126	21,084	21,088	21,158	21,093
Buena Vista	19,965	20,500	20,506	20,427	20,301	20,508	20,411
Butler	15,731	15,573	15,531	15,501	15,406	15,286	15,305
Calhoun	11,508	11,473	11,426	11,377	11,296	11,190	11,115
Carroll	21,423	21,651	21,651	21,705	21,703	21,631	21,421
Cass	15,128	15,043	15,005	14,886	14,794	14,649	14,684
Cedar	17,444	17,742	17,860	18,102	18,057	18,178	18,187
Cerro Gordo	46,733	47,196	47,080	47,091	46,950	46,637	46,447
Cherokee	14,098	13,635	13,450	13,381	13,204	13,096	13,035
Chickasaw	13,295	13,297	13,270	13,272	13,237	13,209	13,095
Clarke	8,287	8,486	8,663	8,701	8,841	8,908	9,133
Clay	17,585	17,577	17,601	17,662	17,550	17,339	17,372
Clayton	19,054	18,871	18,930	18,952	18,900	18,825	18,678
Clinton	51,040	51,270	50,793	50,635	50,553	50,346	50,149
Crawford	16,775	16,761	16,775	16,864	16,901	16,911	16,942
Dallas	29,755	34,050	35,380	36,862	38,152	39,691	40,750
Davis	8,312	8,512	8,428	8,496	8,484	8,518	8,541
Decatur	8,338	8,468	8,459	8,416	8,538	8,646	8,689
Delaware	18,035	18,347	18,324	18,380	18,487	18,444	18,404
Des Moines	42,614	42,936	42,825	42,620	42,621	42,515	42,351
Dickinson	14,909	15,601	15,783	16,076	16,236	16,333	16,424
Dubuque	86,403	88,938	89,097	88,996	88,775	88,934	89,143

Tables 5.1 cont. **Census Counts: April 2002, by County**

	Count 1990	Estimates					Count 2000
		7/1/95	7/1/96	7/1/97	7/1/98	7/1/99	
State of Iowa	2,776,831	2,867,373	2,880,000	2,891,119	2,902,872	2,917,634	2926324
Emmet	11,569	11,403	11,338	11,303	11,247	11,103	11,027
Fayette	21,843	22,211	22,275	22,261	22,179	22,011	22,008
Floyd	17,058	17,001	17,028	17,059	16,987	16,959	16,900
Franklin	11,364	11,016	11,030	10,921	10,875	10,780	10,704
Fremont	8,226	8,172	8,077	7,989	7,993	7,997	8,010
Greene	10,045	10,226	10,333	10,402	10,442	10,394	10366
Grundy	12,029	12,244	12,317	12,335	12,277	12,332	12369
Guthrie	10,935	11,241	11,268	11,321	11,321	11,403	11353
Hamilton	16,071	16,468	16,356	16,371	16,405	16,387	16438
Hancock	12,638	12,148	12,158	12,043	12,085	12,091	12100
Hardin	19,094	19,103	19,062	18,981	18,912	18,784	18812
Harrison	14,730	15,231	15,400	15,498	15,569	15,510	15666
Henry	19,226	20,001	20,025	20,033	20,285	20,351	20336
Howard	9,809	9,944	9,980	9,966	9,999	9,950	9932
Humboldt	10,756	10,457	10,475	10,473	10,462	10,414	10381
Ida	8,365	8,206	8,092	8,024	7,928	7,914	7837
Iowa	14,630	15,136	15,332	15,423	15,463	15,570	15671
Jackson	19,950	20,196	20,199	20,155	20,225	20,217	20296
Jasper	34,795	35,406	35,715	36,087	36,898	37,096	37213
Jefferson	16,310	16,468	16,517	16,628	16,553	16,282	16181
Johnson	96,119	104,488	105,355	106,538	107,819	109,814	111006
Jones	19,444	20,521	20,522	20,587	20,369	20,220	20221
Keokuk	11,624	11,597	11,486	11,444	11,406	11,317	11400
Kossuth	18,591	17,836	17,645	17,552	17,321	17,258	17163
Lee	38,687	39,107	38,781	38,720	38,544	38,281	38052
Linn	168,767	181,874	183,167	185,450	187,210	189,931	191701
Louisa	11,592	11,939	12,087	12,050	12,114	12,174	12183
Lucas	9,070	9,234	9,277	9,395	9,422	9,461	9422
Lyon	11,952	11,724	11,797	11,811	11,863	11,812	11763
Madison	12,483	13,340	13,480	13,585	13,702	13,898	14019
Mahaska	21,532	22,055	22,031	22,126	22,266	22,400	22335
Marion	30,001	31,143	31,280	31,317	31,601	31,879	32052
Marshall	38,276	39,051	39,103	39,242	39,238	39,313	39311
Mills	13,202	13,663	13,819	14,145	14,265	14,478	14547
Mitchell	10,928	10,971	10,957	10,941	10,863	10,895	10874
Monona	10,034	10,059	10,069	10,121	10,047	10,056	10020

Tables 5.1 cont. **Census Counts: April 2002, by County**

	Count 1990	Estimates					Count 2000
		7/1/95	7/1/96	7/1/97	7/1/98	7/1/99	
State of Iowa	2,776,831	2,867,373	2,880,000	2,891,119	2,902,872	2,917,634	2926324
Monroe	8,114	8,203	8,129	8,132	8,080	8,061	8016
Montgomery	12,076	11,947	11,917	11,889	11,890	11,767	11771
Muscatine	39,907	41,440	41,274	41,280	41,417	41,587	41722
O'Brien	15,444	15,647	15,456	15,498	15,457	15,200	15102
Osceola	7,267	7,138	7,156	7,167	7,087	7,049	7003
Page	16,870	16,729	17,344	17,374	17,330	17,112	16976
Palo Alto	10,669	10,260	10,261	10,254	10,245	10,137	10147
Plymouth	23,388	24,339	24,739	24,691	24,578	24,774	24849
Pocahontas	9,525	9,133	8,970	8,864	8,859	8,808	8662
Polk	327,140	354,096	357,986	360,985	365,086	370,592	374601
Pottawattamie	82,628	83,973	84,992	85,677	86,609	87,153	87704
Poweshiek	19,033	18,925	19,004	18,989	18,814	18,797	18815
Ringgold	5,420	5,382	5,418	5,447	5,441	5,449	5469
Sac	12,324	12,003	11,968	11,882	11,852	11,686	11529
Scott	150,973	156,271	156,751	157,228	157,754	158,765	158668
Shelby	13,230	13,232	13,311	13,353	13,256	13,179	13173
Sioux	29,903	31,347	31,196	31,473	31,649	31,669	31589
Story	74,252	76,265	76,937	77,833	78,221	79,372	79981
Tama	17,419	17,951	17,885	17,950	18,070	18,121	18103
Taylor	7,114	7,069	7,069	7,016	7,029	6,905	6958
Union	12,750	12,325	12,459	12,345	12,349	12,397	12309
Van Buren	7,676	7,701	7,669	7,736	7,774	7,784	7809
Wapello	35,696	35,990	36,052	35,980	35,948	36,042	36051
Warren	36,033	38,645	39,180	39,510	39,911	40,340	40671
Washington	19,612	20,245	20,349	20,512	20,506	20,578	20670
Wayne	7,067	6,939	6,936	6,910	6,821	6,738	6730
Webster	40,342	39,698	39,461	39,268	39,652	40,255	40235
Winnebago	12,122	11,804	11,829	11,876	11,741	11,660	11723
Winneshiek	20,847	21,114	21,128	21,064	21,251	21,289	21310
Woodbury	98,276	103,346	103,994	103,728	103,653	103,801	103877
Worth	7,991	7,952	8,001	7,929	7,926	7,890	7909
Wright	14,269	14,674	14,662	14,560	14,506	14,379	14334

U.S. Bureau of the Census, *Population Estimates (Revised) for Iowa and its Counties: 1990-1999:*, 4/2002, State Library of Iowa, State Data Center Web site http://www.silo.lib.ia.us/specialized_services/datacenter/data_tables/CountyAll/coestpop19901999revised.PDF

Tables 5.2 Census Counts by County: Used in Tables 4.3, 4.5, 4.11, August 2000

	Count	Estimates					Count
	1990	7/1/95	7/1/96	7/1/97	7/1/98	7/1/99	2000
State of Iowa	2,776,831	2,840,860	2,848,473	2,854,396	2,861,025	2,869,413	2,926,324
Adair	8,409	8,246	8,221	8,146	8,103	8,066	8,243
Adams	4,866	4,507	4,450	4,407	4,386	4,405	4,482
Allamakee	13,855	14,134	14,053	14,006	14,052	14,068	14,675
Appanoose	13,743	13,598	13,604	13,509	13,568	13,446	13,721
Audubon	7,334	6,894	6,847	6,829	6,806	6,802	6,830
Benton	22,429	24,340	24,708	24,986	25,399	25,798	25,308
Black Hawk	123,798	122,634	122,262	121,350	120,918	119,959	128,012
Boone	25,186	25,565	25,877	26,179	26,113	26,300	26,224
Bremer	22,813	23,189	23,314	23,302	23,343	23,440	23,325
Buchanan	20,844	21,195	21,192	21,162	21,152	21,160	21,093
Buena Vista	19,965	19,930	19,826	19,637	19,412	19,404	20,411
Butler	15,731	15,735	15,724	15,723	15,631	15,499	15,305
Calhoun	11,508	11,523	11,488	11,448	11,373	11,319	11,115
Carroll	21,423	21,593	21,583	21,624	21,616	21,518	21,421
Cass	15,128	14,942	14,884	14,745	14,642	14,512	14,684
Cedar	17,444	17,662	17,764	17,990	17,957	18,056	18,187
Cerro Gordo	46,733	46,627	46,411	46,314	46,073	45,669	46,447
Cherokee	14,098	13,621	13,431	13,363	13,190	13,060	13,035
Chickasaw	13,295	13,408	13,403	13,427	13,425	13,423	13,095
Clarke	8,287	8,150	8,255	8,229	8,303	8,273	9,133
Clay	17,585	17,529	17,549	17,594	17,474	17,245	17,372
Clayton	19,054	18,754	18,790	18,792	18,711	18,582	18,678
Clinton	51,040	50,877	50,327	50,100	49,924	49,612	50,149
Crawford	16,775	16,469	16,429	16,467	16,462	16,427	16,942
Dallas	29,755	33,320	34,484	35,783	36,865	38,210	40,750
Davis	8,312	8,484	8,398	8,460	8,462	8,517	8,541
Decatur	8,338	8,270	8,227	8,151	8,241	8,319	8,689
Delaware	18,035	18,394	18,380	18,444	18,541	18,482	18,404
Des Moines	42,614	42,547	42,360	42,096	42,069	41,955	42,351
Dickinson	14,909	15,582	15,755	16,048	16,209	16,285	16,424
Dubuque	86,403	88,352	88,390	88,186	87,879	88,112	89,143

Tables 5.2 cont. Census Counts: August 2000, by County

	Count 1990	Estimates					Count 2000
		7/1/95	7/1/96	7/1/97	7/1/98	7/1/99	
State of Iowa	2,776,831	2,867,373	2,880,000	2,891,119	2,902,872	2,917,634	2,926,324
Emmet	11,569	11,152	11,040	10,959	10,850	10,638	11,027
Fayette	21,843	21,955	21,972	21,909	21,794	21,566	22,008
Floyd	17,058	16,592	16,542	16,494	16,369	16,256	16,900
Franklin	11,364	11,002	11,016	10,909	10,865	10,781	10,704
Fremont	8,226	8,039	7,920	7,806	7,771	7,706	8,010
Greene	10,045	10,000	10,061	10,083	10,075	10,020	10,366
Grundy	12,029	12,218	12,287	12,297	12,234	12,284	12,369
Guthrie	10,935	11,350	11,399	11,474	11,506	11,591	11,353
Hamilton	16,071	16,225	16,066	16,040	16,010	15,905	16,438
Hancock	12,638	12,123	12,131	12,010	12,044	12,037	12,100
Hardin	19,094	18,745	18,641	18,492	18,350	18,159	18,812
Harrison	14,730	15,084	15,223	15,288	15,336	15,216	15,666
Henry	19,226	19,852	19,842	19,824	20,038	20,139	20,336
Howard	9,809	9,747	9,745	9,694	9,680	9,574	9,932
Humboldt	10,756	10,376	10,380	10,362	10,327	10,224	10,381
Ida	8,365	8,197	8,084	8,016	7,917	7,930	7,837
Iowa	14,630	15,160	15,361	15,454	15,513	15,667	15,671
Jackson	19,950	20,143	20,137	20,080	20,139	20,157	20,296
Jasper	34,795	35,189	35,458	35,781	36,541	36,659	37,213
Jefferson	16,310	16,775	16,883	17,063	17,043	16,762	16,181
Johnson	96,119	101,157	101,415	101,921	102,556	103,813	111,006
Jones	19,444	20,350	20,322	20,353	20,138	20,075	20,221
Keokuk	11,624	11,637	11,534	11,496	11,469	11,340	11,400
Kossuth	18,591	18,094	17,953	17,907	17,721	17,630	17,163
Lee	38,687	39,064	38,736	38,665	38,488	38,309	38,052
Linn	168,767	179,080	179,829	181,542	182,779	184,891	191,701
Louisa	11,592	11,820	11,944	11,894	11,935	11,945	12,183
Lucas	9,070	9,026	9,029	9,110	9,098	9,131	9,422
Lyon	11,952	11,835	11,931	11,968	12,036	12,030	11,763
Madison	12,483	13,448	13,611	13,740	13,888	14,105	14,019
Mahaska	21,532	21,827	21,760	21,812	21,899	21,954	22,335
Marion	30,001	30,994	31,103	31,114	31,327	31,529	32,052
Marshall	38,276	38,714	38,708	38,776	38,740	38,782	39,311
Mills	13,202	13,801	13,986	14,342	14,481	14,705	14,547
Mitchell	10,928	11,074	11,077	11,081	11,033	11,106	10,874
Monona	10,034	10,071	10,085	10,138	10,068	10,089	10,020

Tables 5.2 cont. **Census Counts: August 2000, by County**

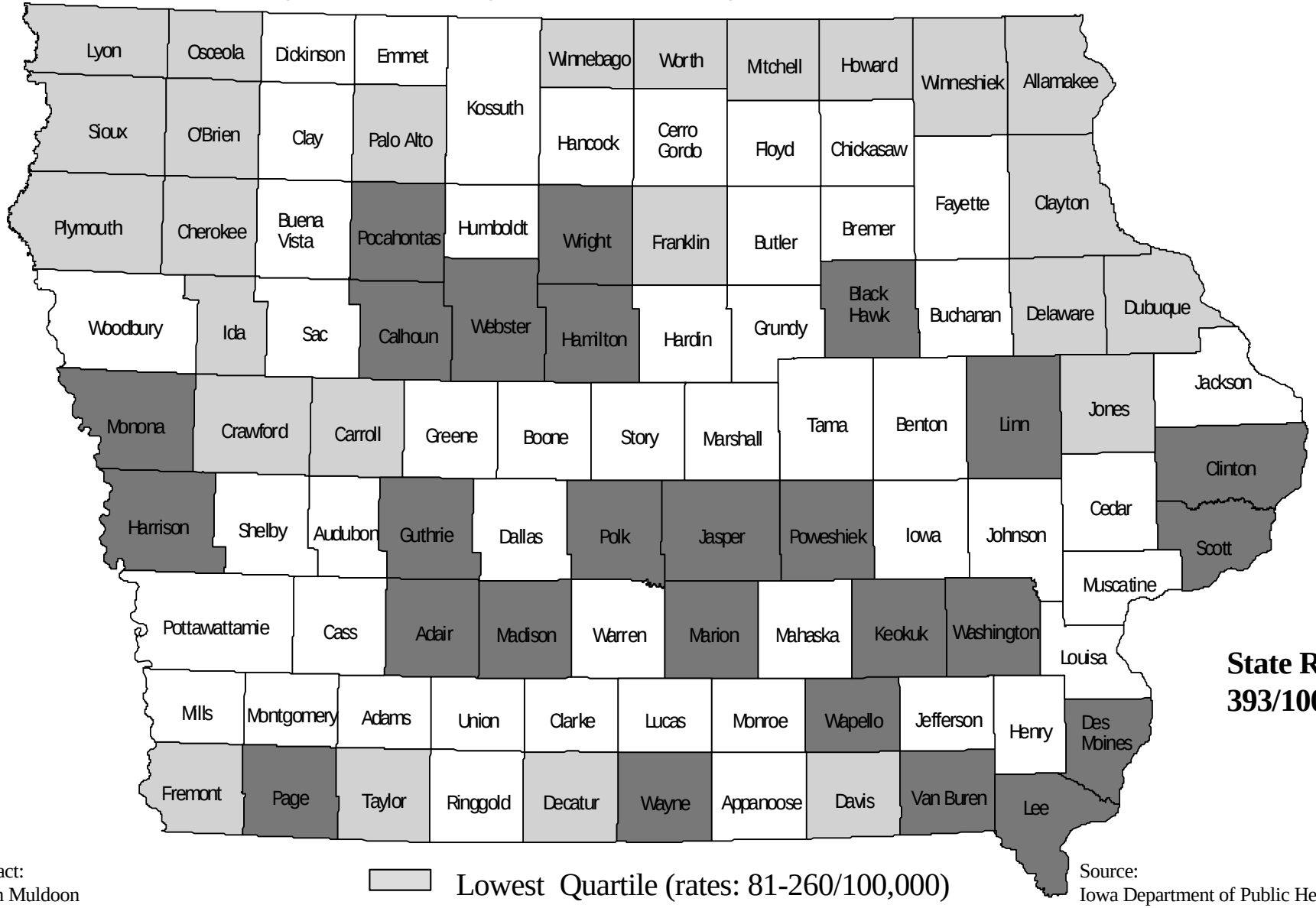
	Count 1990	Estimates					Count 2000
		7/1/95	7/1/96	7/1/97	7/1/98	7/1/99	
State of Iowa	**2,776,831**	**2,867,373**	**2,880,000**	**2,891,119**	**2,902,872**	**2,917,634**	**2926324**
Monroe	8,114	8,170	8,086	8,082	8,033	8,017	8,016
Montgomery	12,076	11,920	11,883	11,849	11,850	11,707	11,771
Muscatine	39,907	41,167	40,954	40,900	40,991	41,195	41,722
O'Brien	15,444	15,262	15,009	14,982	14,887	14,621	15,102
Osceola	7,267	7,055	7,056	7,052	6,956	6,914	7,003
Page	16,870	16,695	17,301	17,326	17,271	17,139	16,976
Palo Alto	10,669	10,134	10,111	10,081	10,059	9,917	10,147
Plymouth	23,388	24,340	24,741	24,692	24,609	24,819	24,849
Pocahontas	9,525	9,110	8,947	8,833	8,815	8,774	8,662
Polk	327,140	350,699	353,943	356,245	359,713	364,672	374,601
Pottawattamie	82,628	83,722	84,690	85,319	86,190	86,425	87,704
Poweshiek	19,033	18,886	18,958	18,934	18,759	18,693	18,815
Ringgold	5,420	5,326	5,348	5,366	5,358	5,361	5,469
Sac	12,324	12,027	11,996	11,916	11,893	11,761	11,529
Scott	150,973	156,658	157,213	157,746	158,333	159,458	158,668
Shelby	13,230	13,032	13,071	13,073	12,934	12,781	13,173
Sioux	29,903	31,223	31,043	31,292	31,425	31,355	31,589
Story	74,252	74,184	74,435	74,922	74,875	75,373	79,981
Tama	17,419	17,756	17,652	17,681	17,766	17,788	18,103
Taylor	7,114	7,145	7,161	7,121	7,149	7,025	6,958
Union	12,750	12,437	12,594	12,499	12,522	12,611	12,309
Van Buren	7,676	7,765	7,744	7,824	7,862	7,873	7,809
Wapello	35,696	35,632	35,626	35,483	35,387	35,458	36,051
Warren	36,033	38,840	39,417	39,784	40,209	40,614	40,671
Washington	19,612	20,515	20,668	20,886	20,938	21,147	20,670
Wayne	7,067	6,840	6,819	6,775	6,677	6,581	6,730
Webster	40,342	39,269	38,957	38,690	38,975	38,832	40,235
Winnebago	12,122	11,936	11,989	12,056	11,942	11,971	11,723
Winneshiek	20,847	20,933	20,923	20,827	20,962	20,917	21,310
Woodbury	98,276	101,997	102,385	101,862	101,547	101,437	103,877
Worth	7,991	7,837	7,864	7,772	7,742	7,657	7,909
Wright	14,269	14,361	14,292	14,135	14,039	13,892	14,334

U.S. Bureau of the Census, *Population Estimates by Age, Sex, Race, and Hispanic Origin: 1990-1999-Iowa*, 2000, Census Web site http://eire/census.gov/popest/archives/county/co_casrh.php.

U.S. Bureau of the Census, *Census 2000 Summary File 2 (SF 2) 100 Percent Data: Iowa*, 2000 Census, Census Web site: http://factfinder.census.gov, 2002.

Map 1: Asthma-Related Hospitalizations: *All Iowans*, 1995-97

Iowa Counties in Lowest and Highest Quartiles of Distribution of Age-Adjusted Average Annual Hospitalization Rates per 100,000, State Inpatient Database



State Rate: 393/100,000

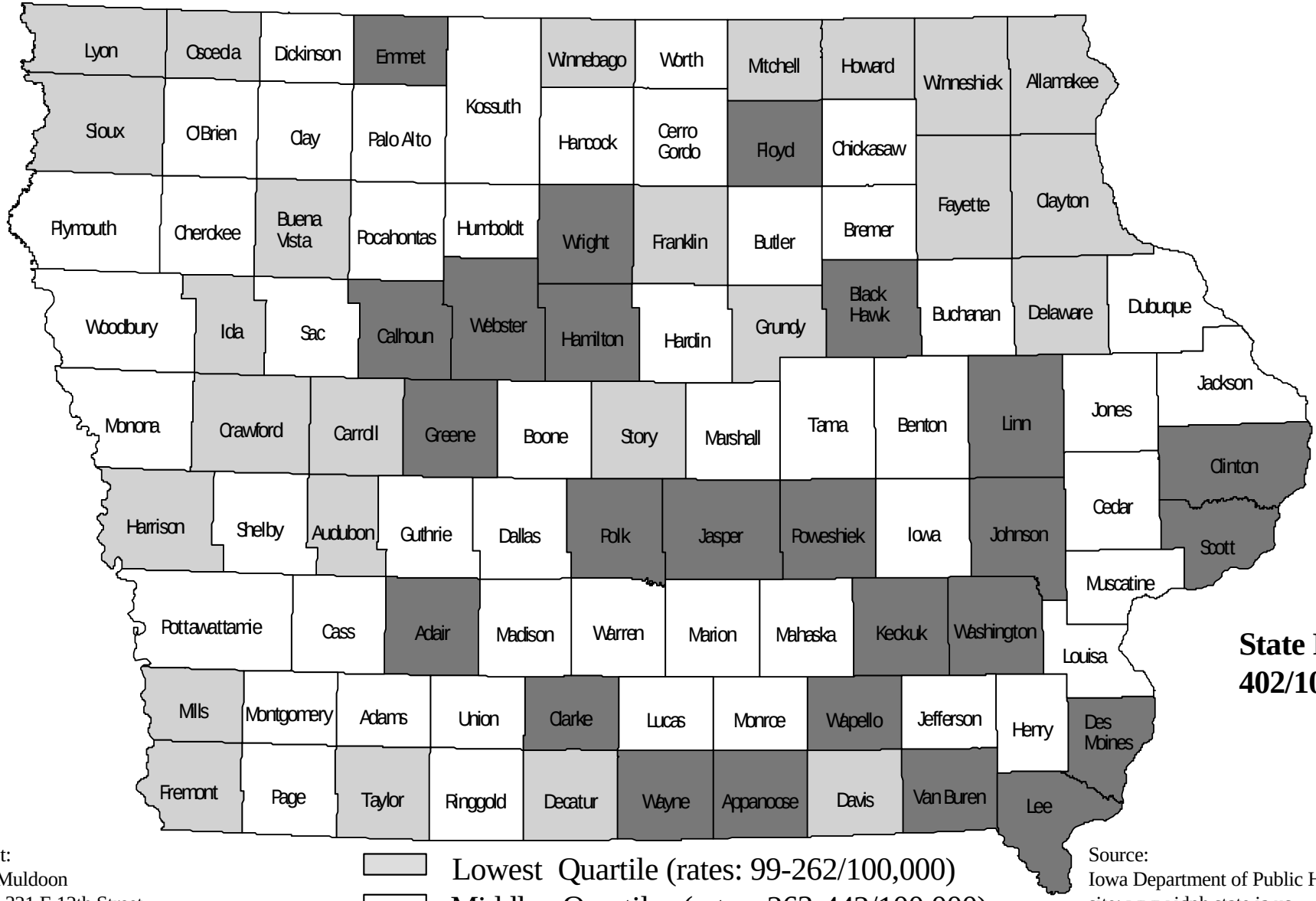
Lowest Quartile (rates: 81-260/100,000)
Middle Quartiles (rates: 261-393/100,000)
Highest Quartile (rates: 394-1,029/100,000)

Contact:
Joann Muldoon
IDPH, 321 E 12th Street
Des Moines, IA 50319
Email: Jmuldoon@idph.state.ia.us

Source:
Iowa Department of Public Health Web site: www.idph.state.ia.us

Map 2: Asthma-Related Hospitalizations: *All Iowans*, 1998-2000

Iowa Counties in Lowest and Highest Quartiles of Distribution of Age-Adjusted Average Annual Hospitalization Rates per 100,000, State Inpatient Database



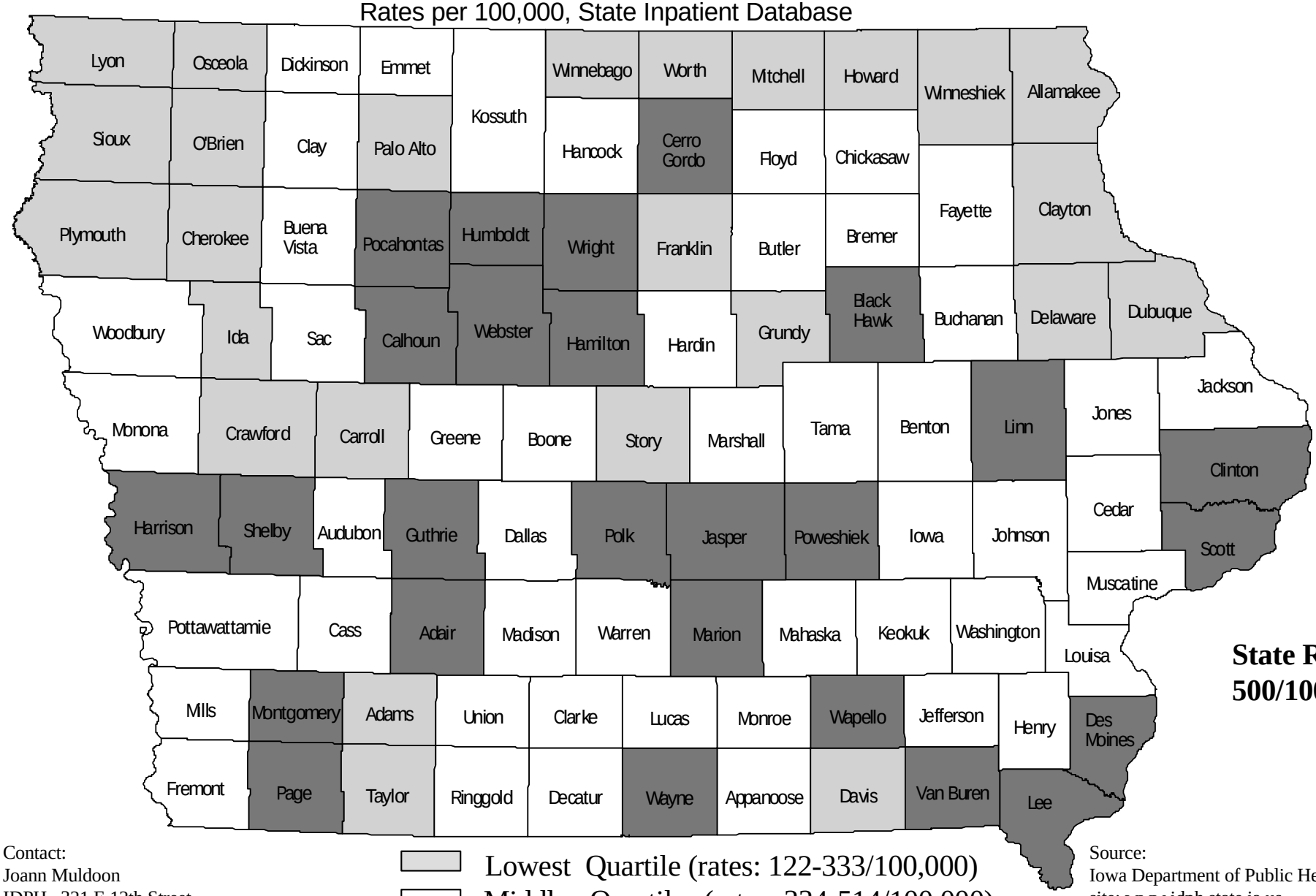
State Rate: 402/100,000

Contact:
Joann Muldoon
IDPH, 321 E 12th Street
Des Moines, IA 50319
Email: Jmuldoon@idph.state.ia.us

Source:
Iowa Department of Public Health Web site: www.idph.state.ia.us

Map 3: Asthma-Related Hospitalizations: *Females*, 1995-97

Iowa Counties in Lowest and Highest Quartiles of Distribution of Average Annual Hospitalization Rates per 100,000, State Inpatient Database



State Rate: 500/100,000

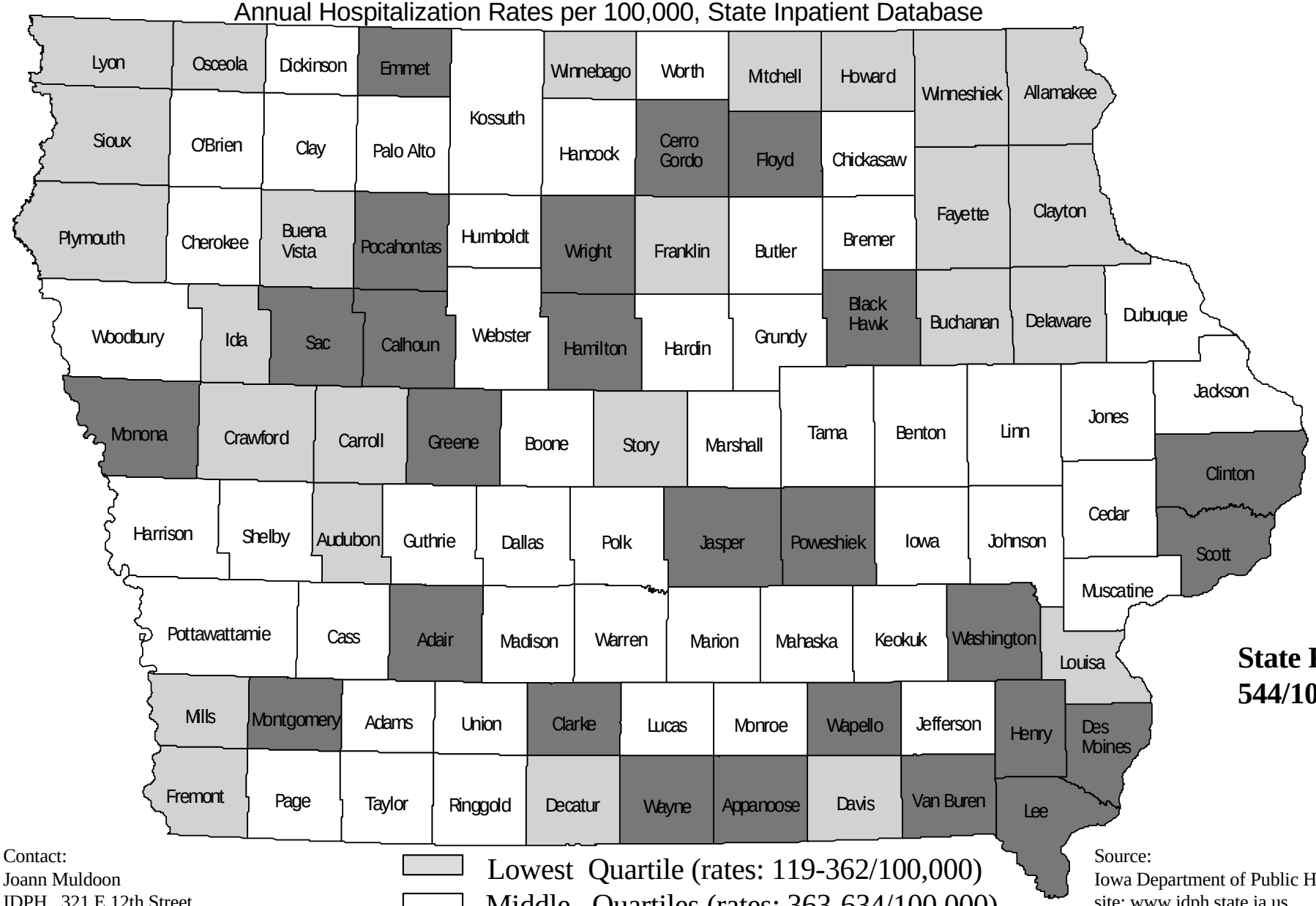
Lowest Quartile (rates: 122-333/100,000)
Middle Quartiles (rates: 334-514/100,000)
Highest Quartile (rates: 515-1,433/100,000)

Contact:
Joann Muldoon
IDPH, 321 E 12th Street
Des Moines, IA 50319
Email: Jmuldoon@idph.state.ia.us

Source:
Iowa Department of Public Health Web site: www.idph.state.ia.us

Map 4: Asthma-Related Hospitalizations: *Females*, 1998-2000

Iowa Counties in Lowest and Highest Quartiles of Distribution of (Non-Age-Adjusted) Average Annual Hospitalization Rates per 100,000, State Inpatient Database



State Rate: 544/100,000

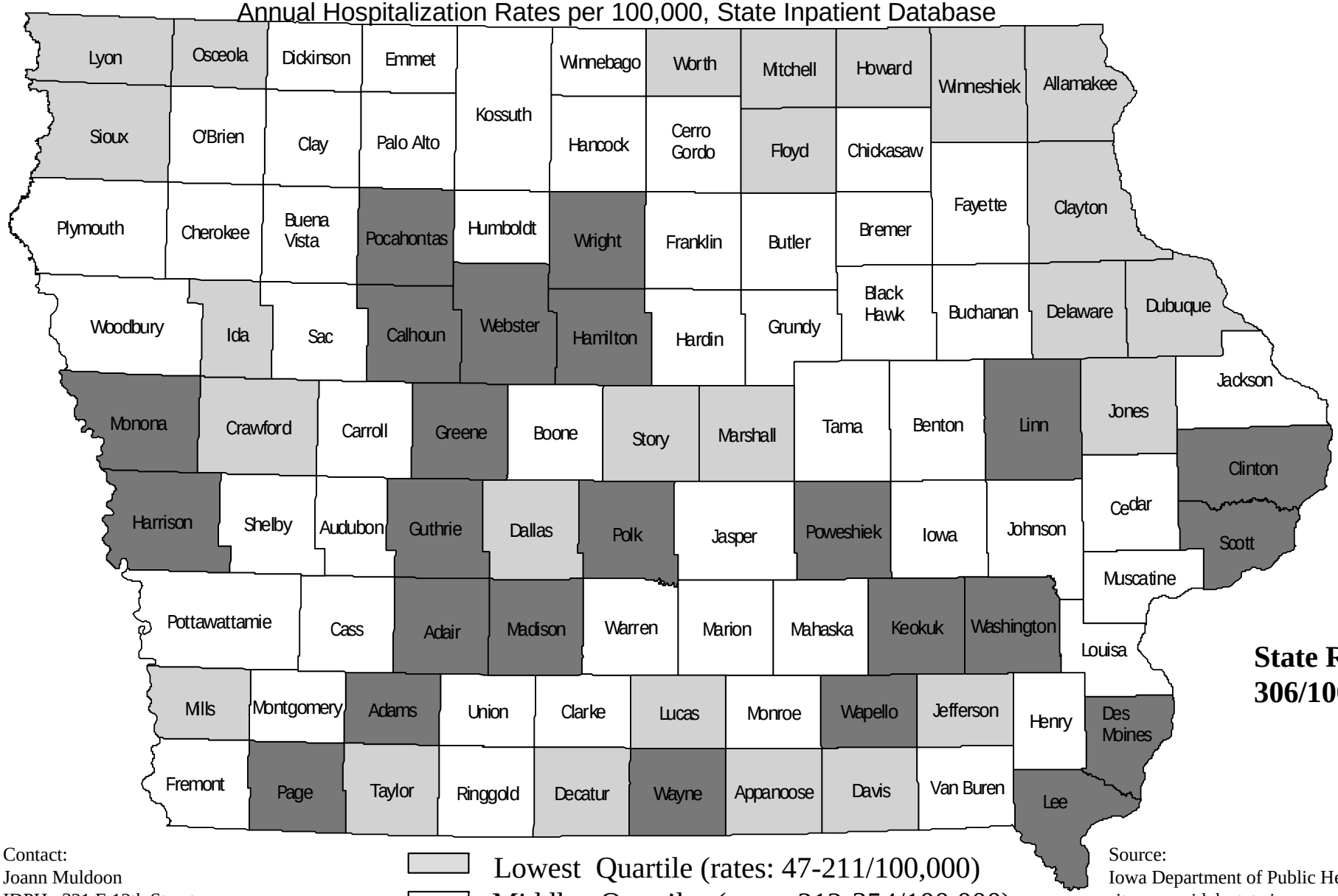
Lowest Quartile (rates: 119-362/100,000)
Middle Quartiles (rates: 363-634/100,000)
Highest Quartile (rates: 635-1,251/100,000)

Contact:
Joann Muldoon
IDPH, 321 E 12th Street
Des Moines, IA 50319
Email: Jmuldoon@idph.state.ia.us

Source:
Iowa Department of Public Health Web site: www.idph.state.ia.us

Map 5: Asthma-Related Hospitalizations: M*ales*, 1995-97

Iowa Counties in Lowest and Highest Quartiles of Distribution of (Non-Age-Adjusted)Average Annual Hospitalization Rates per 100,000, State Inpatient Database



State Rate: 306/100,000

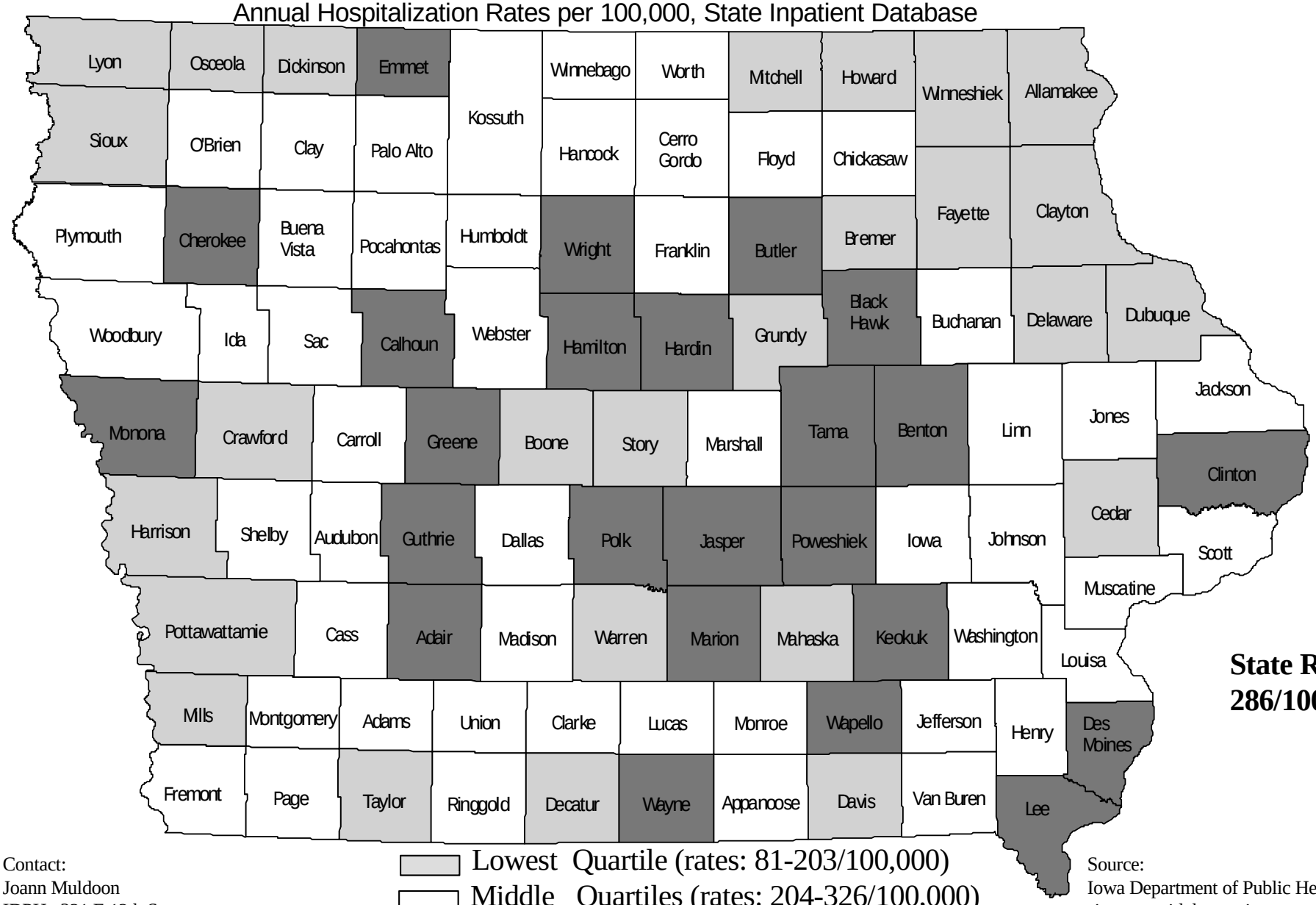
Lowest Quartile (rates: 47-211/100,000)
Middle Quartiles (rates: 212-354/100,000)
Highest Quartile (rates: 355-8431/100,000)

Contact:
Joann Muldoon
IDPH, 321 E 12th Street
Des Moines, IA 50319
Email: Jmuldoon@idph.state.ia.us

Source:
Iowa Department of Public Health Web site: www.idph.state.ia.us

Map 6: Asthma-Related Hospitalizations: *Males*, 1998-2000

Iowa Counties in Lowest and Highest Quartiles of Distribution of Non-Age-Adjusted) Average Annual Hospitalization Rates per 100,000, State Inpatient Database



State Rate: 286/100,000

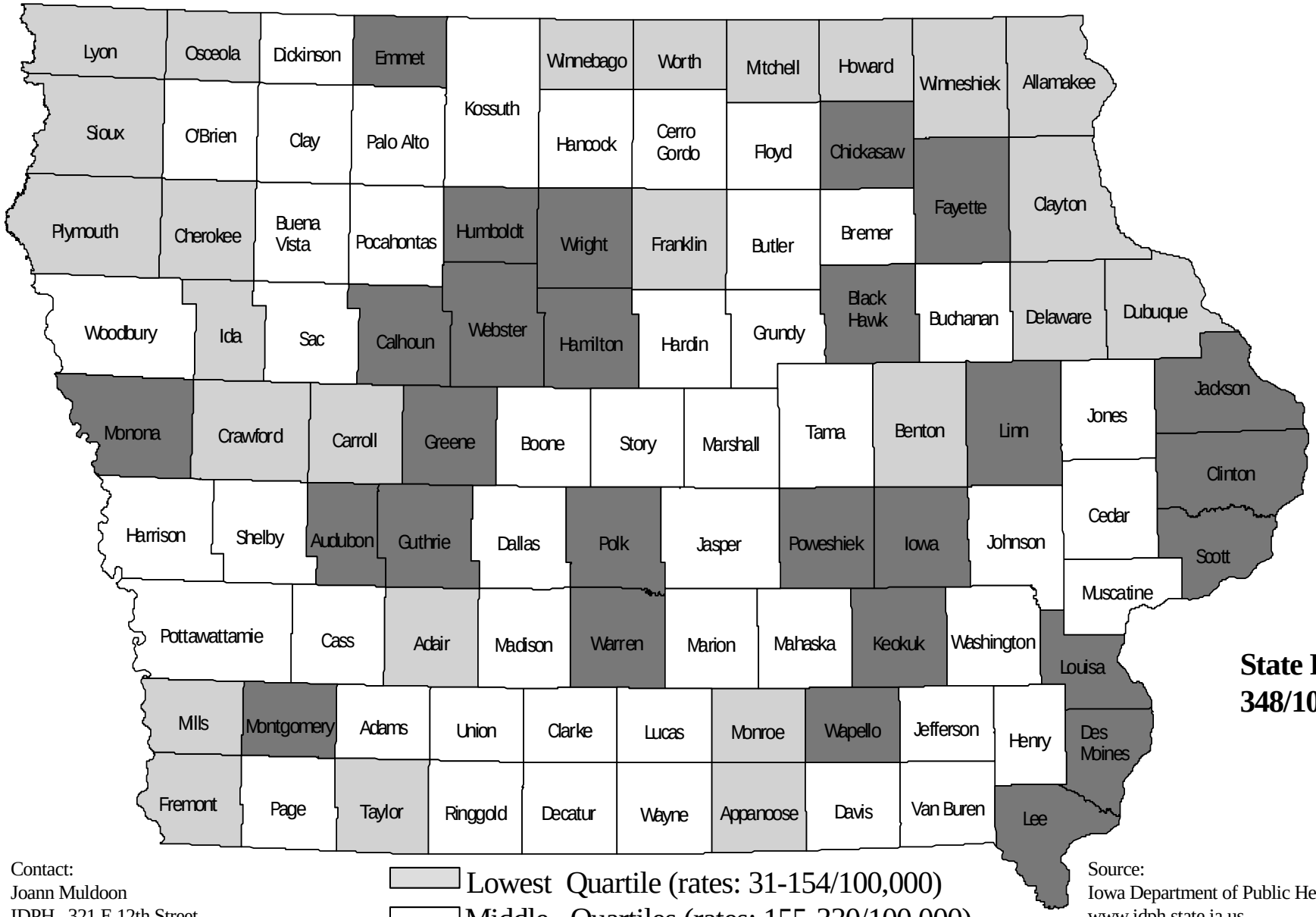
Lowest Quartile (rates: 81-203/100,000)
Middle Quartiles (rates: 204-326/100,000)
Highest Quartile (rates: 327-766/100,000)

Contact:
Joann Muldoon
IDPH, 321 E 12th Street
Des Moines, IA 50319
Email: Jmuldoon@idph.state.ia.us

Source:
Iowa Department of Public Health Web site: www.idph.state.ia.us

Map 7: Asthma-Related Hospitalizations: Iowans 17 and Younger, 1995-97

Iowa Counties in Lowest and Highest Quartiles of Distribution of (Non-Age-Adjusted) Average Annual Hospitalization Rates per 100,000, State Inpatient Database



State Rate: 348/100,000

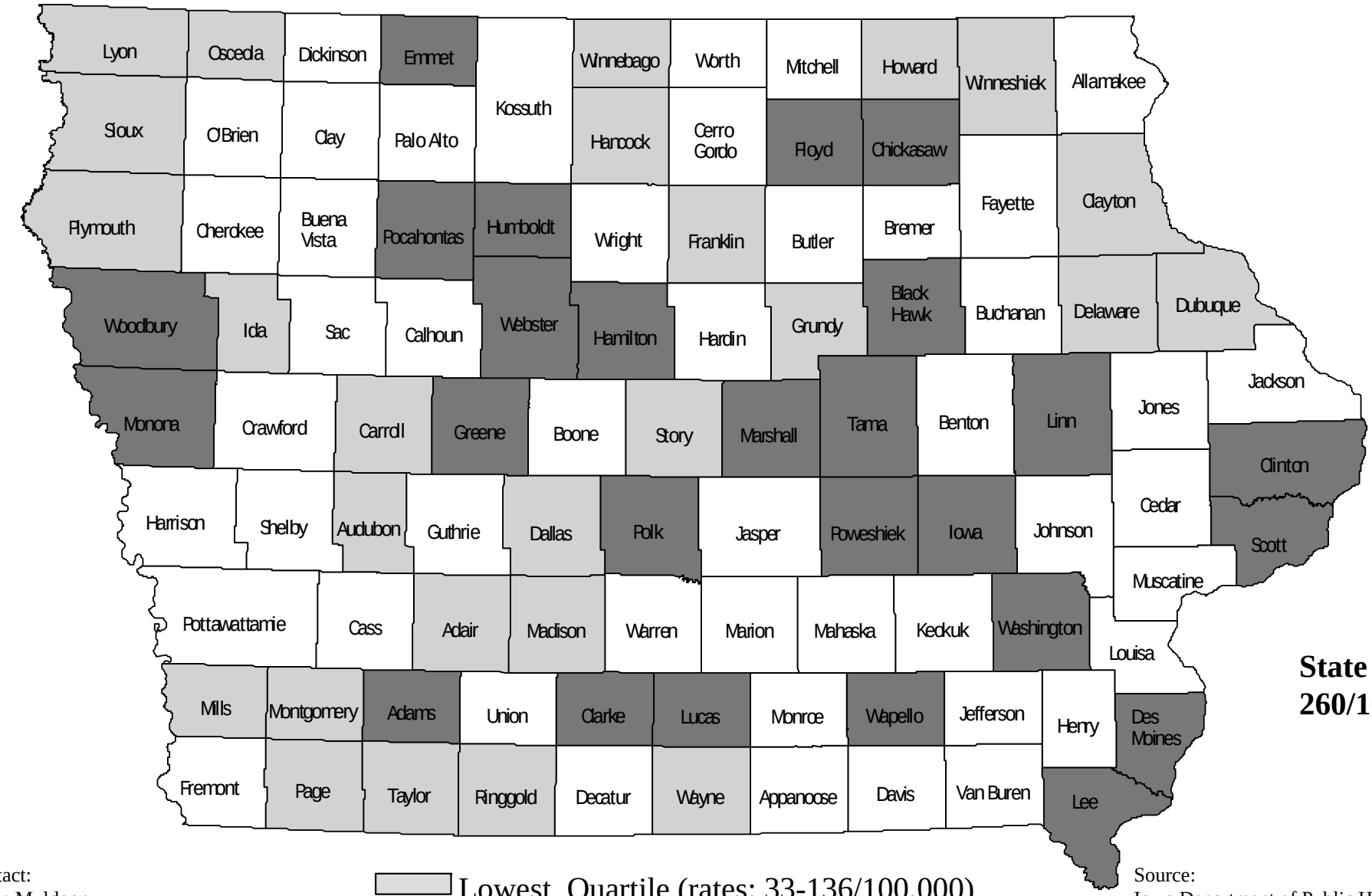
Lowest Quartile (rates: 31-154/100,000)
Middle Quartiles (rates: 155-330/100,000)
Highest Quartile (rates: 331-1,520/100,000)

Contact:
Joann Muldoon
IDPH, 321 E 12th Street
Des Moines, IA 50319
Email: Jmuldoon@idph.state.ia.us

Source:
Iowa Department of Public Health Web site:
www.idph.state.ia.us

Map 8: Asthma-Related Hospitalizations: Iowans 17 and Younger, 1998-2000

Iowa Counties in Lowest and Highest Quartiles of Distribution of Average Annual Hospitalization Rates per 100,000, State Inpatient Database



State Rate: 260/100,000

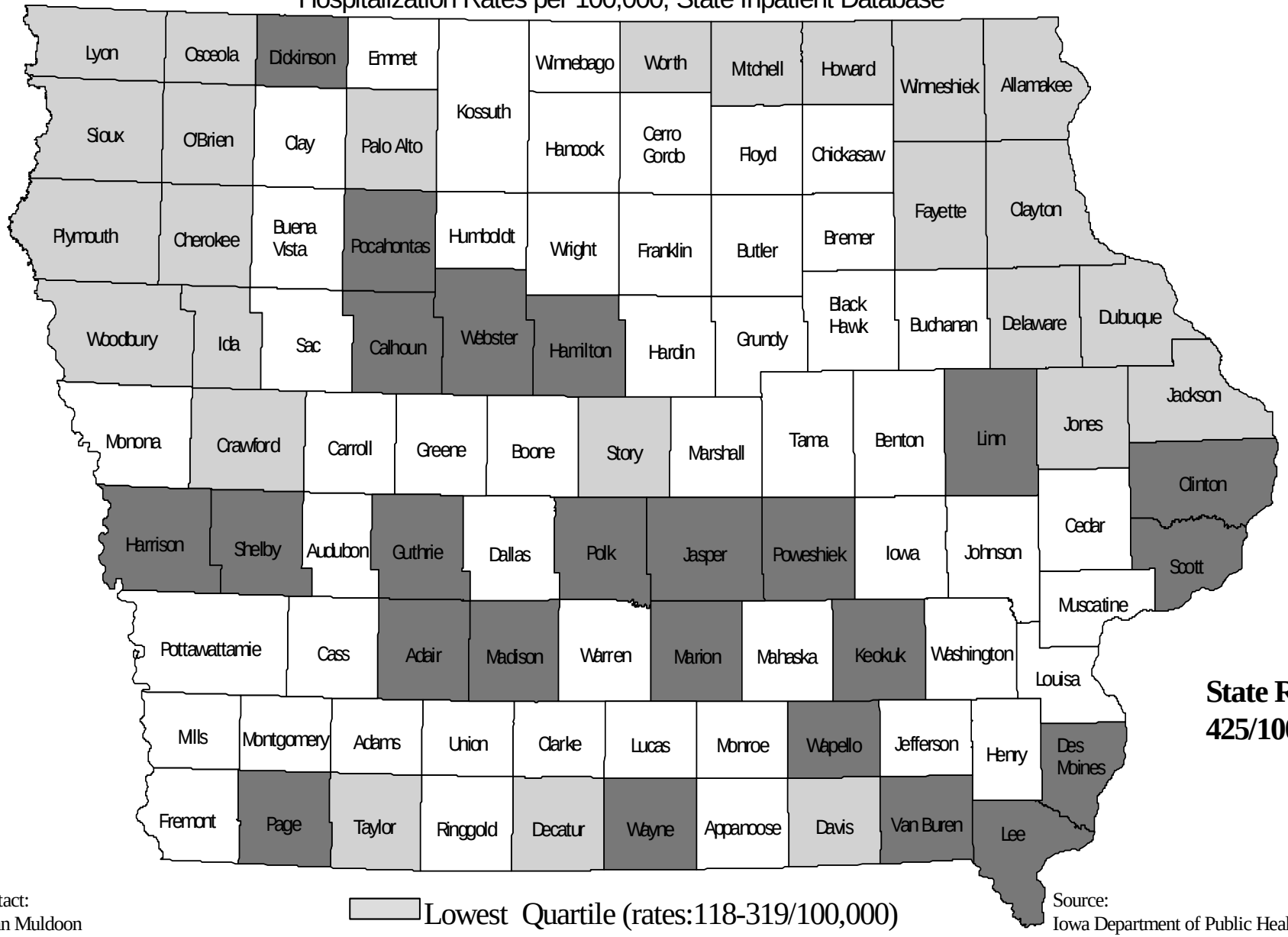
Lowest Quartile (rates: 33-136/100,000)
Middle Quartiles (rates: 137-251/100,000)
Highest Quartile (rates: 252-1,,266/100,000)

Contact:
Joann Muldoon
IDPH, 321 E 12th Street
Des Moines, IA 50319
Email: Jmuldoon@idph.state.ia.us

Source:
Iowa Department of Public Health Web site:
www.idph.state.ia.us

Map 9: Asthma-Related Hospitalizations: Iowans 18 and Older, 1995-97

Iowa Counties in Lowest and Highest Quartiles of Distribution of (Non-Age-Adjusted) Average Annual Hospitalization Rates per 100,000, State Inpatient Database



State Rate: 425/100,000

Lowest Quartile (rates:118-319/100,000)

Middle Quartiles (rates: 320-466/100,000)

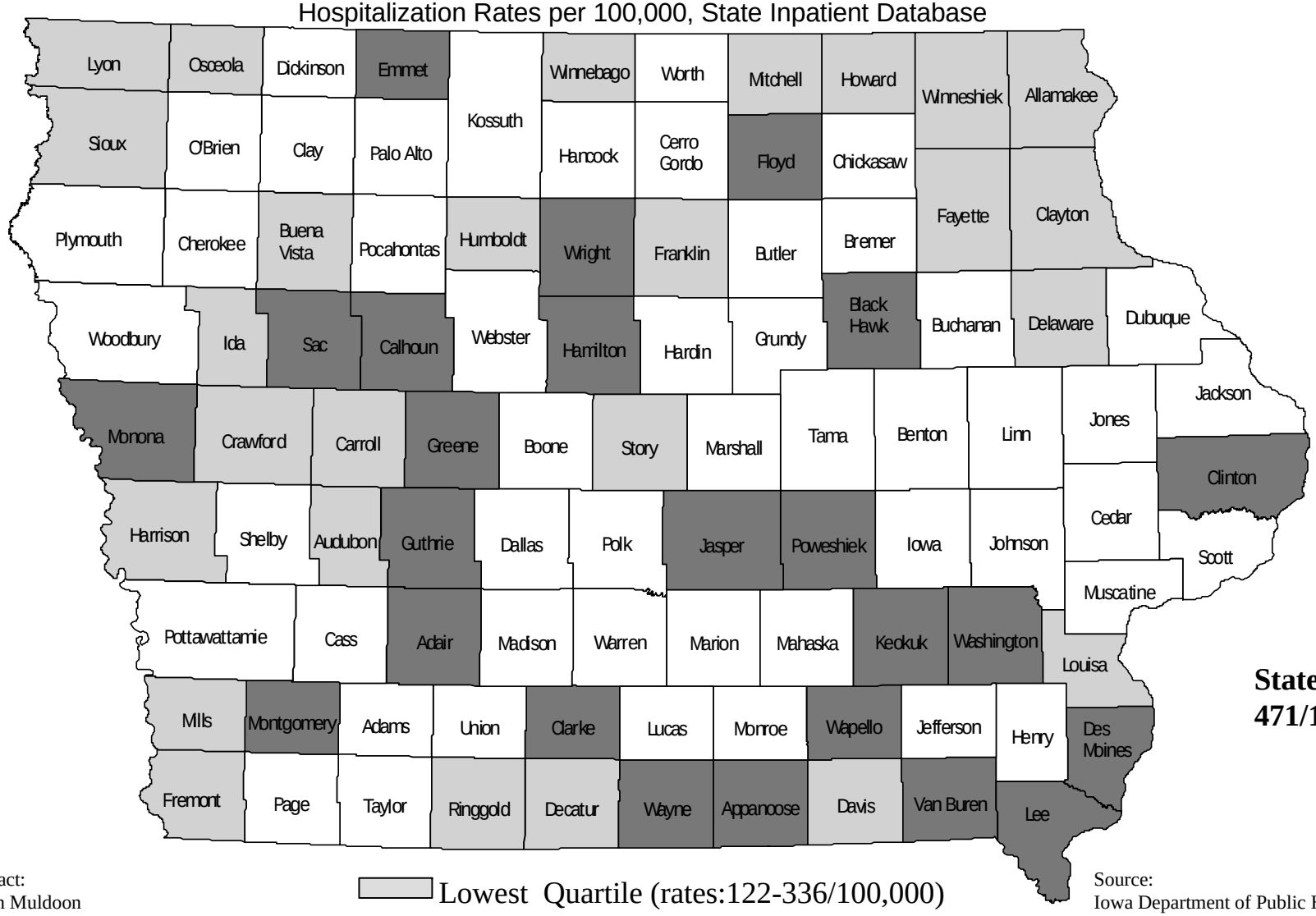
Highest Quartile (rates: 467-1,255/100,000)

Contact:
Joann Muldoon
IDPH, 321 E 12th Street
Des Moines, IA 50319
Email: Jmuldoon@idph.state.ia.us

Source:
Iowa Department of Public Health Web site:
www.idph.state.ia.us

Map 10: Asthma-Related Hospitalizations: Iowans 18 and Older, 1998-2000

Iowa Counties in Lowest and Highest Quartiles of Distribution of (Non-Age-Adjusted) Average Annual Hospitalization Rates per 100,000, State Inpatient Database



State Rate: 471/100,000

Lowest Quartile (rates:122-336/100,000)
Middle Quartiles (rates: 337-551/100,000)
Highest Quartile (rates: 552-1,154/100,000)

Contact:
Joann Muldoon
IDPH, 321 E 12th Street
Des Moines, IA 50319
Email: Jmuldoon@idph.state.ia.us

Source:
Iowa Department of Public Health Web site:
www.idph.state.ia.us

Index of Figures

Figures, cont.

page

Medicaid and NHIS Data

Adults vs Youth

Childhood

Figures, cont.

page

Index of Tables

page

Index of Maps (Hospitalization Data Only)

page

Hospitalizations from and with Asthma by County

This report may be updated periodically. The latest version may be downloaded from the IDPH Asthma Control Program web site:

http://www.idph.state.ia.us/hpcdp/asthma_content/default.htm

Contacts for Asthma Control Programs of the Iowa Department of Public Health:

Andrea Hoffman, Program Coordinator
Iowa Asthma Control Program
Phone: 515/281-6283 e-mail: AHoffman@IDPH.state.ia.us

Jill Myers-Geadelmann, Chief
Bureau of Chronic Disease Prevention and Management
Phone: 515/281-6067 e-mail: jgeadelm@IDPH.state.ia.us

Joann Muldoon, Epidemiologist
Bureau of Vital Records and Health Statistics
Phone: 515/242-5849 e-mail: Jmuldoon@IDPH.state.ia.us

This report was prepared by the Bureau of Vital Records and Health Statistics of the IDPH:

Lead Author
Joann Muldoon, M.S., M.A.

Staff of the Center for Health Statistics:
Jill France, Chief
Xia Chen, D.D.S., M.S.
Joann Muldoon, M.S., M.A.
Suning Cao
Don Shepherd, Ph.D.
Yumei Sun, Ph.D.
Deb Roeder

Cooperating Staff at the University of Iowa:
Betsy Chrischilles, Ph.D, College of Pubic Health
Kara Wright, M.S. College of Public Health
Kirk Phillips, M.S.W., College of Public Health
Lar Fuortes, M.D., M.S., College of Public Health

This document provided by the Iowa Department of Public Health and funded through Cooperative Agreement #U59/CCU717730-03 with the Centers for Disease Control and Prevention (CDC). Its contents are soley the responsibility of the authors and do not necessarily represent the official views of the CDC.

Iowa Department of Public Health

Promoting and protecting the health of Iowans

Breathing easier in Iowa

The Iowa Asthma Control Program