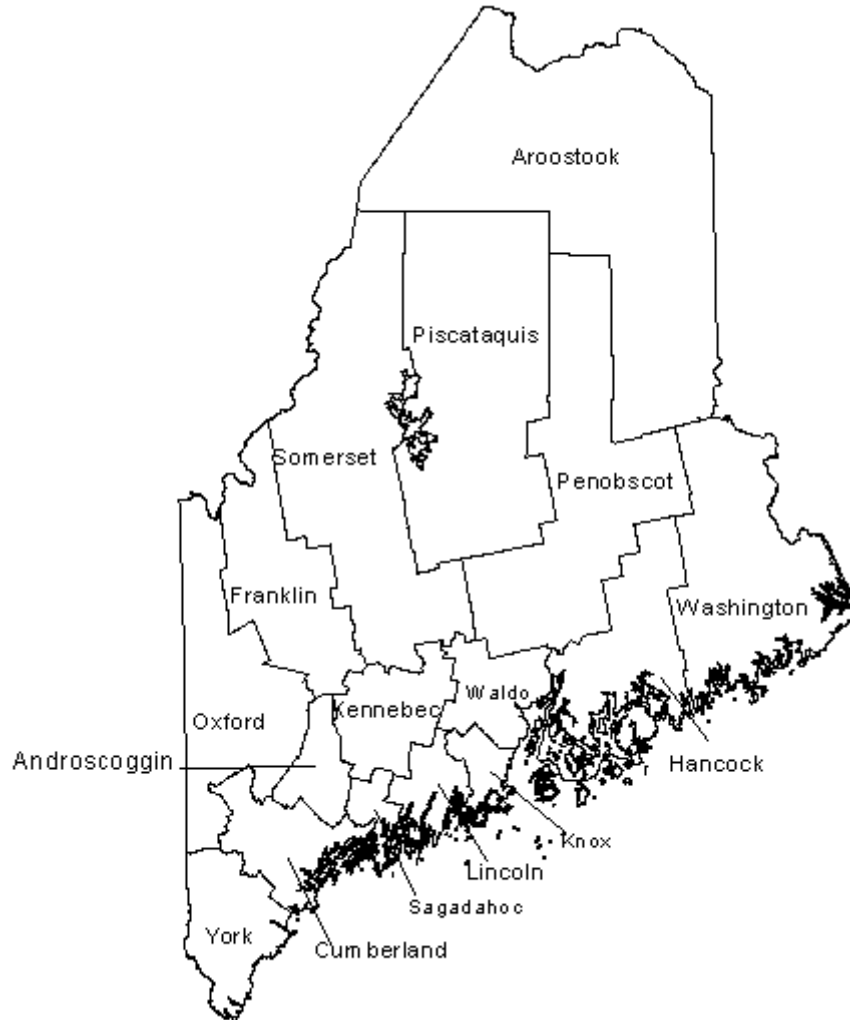


Asthma Status Report Maine 2002



Maine Bureau of Health
Divisions of Community and Family Health

November 25, 2002

Dear Colleague:

The Maine Bureau of Health is committed to addressing the public health problem of asthma in Maine. Our commitment builds upon a strong synergistic partnership between the Bureau of Health, the American Lung Association of Maine, and key stakeholders throughout the state (including a large integrated healthcare delivery system and managed care organizations).

The "Asthma Status Report, Maine 2002" begins the process of utilizing surveillance data to report on asthma morbidity, mortality, and management. In so doing, we will be able to see if any disparities in regard to asthma exist in Maine. This is the first step in not only describing the patterns of asthma in Maine, but to look for appropriate means to reduce or alleviate some of the difficulties associated with asthma.

This report is the first major document produced by the cooperative agreement "Addressing Asthma From A Public Health Perspective" funded by the Centers for Disease Control #U59/CCU117746-02.

I look forward to working together on this most important health issue that affects so many of Maine's citizens.

Sincerely,

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In organizing our report we reviewed samples of other reports.
For this report we relied heavily on the Connecticut Department of Public Health,
"Asthma in Connecticut" format and express our gratitude for
their willingness to share.

Maine Bureau of Health: Addressing Asthma

The Maine Bureau of Health has a mission to develop and deliver services to preserve, protect and promote the health and well being of the citizens of Maine. A number of health conditions, such as asthma, have an impact on the quality of life for Maine's citizens. Asthma cannot be cured but it can be controlled or managed. It is a complex disease that requires quality medical care as well as good patient self-management.

What is Maine Doing?

- Establishing an asthma surveillance system to track asthma deaths, illness, disabilities, impact of occupational and environmental factors on asthma, access to medical care and asthma management
- Administering a Child Health Survey at the Kindergarten and 5th Grade to gain critical information about indicators related to health as well as provide an opportunity for referral to needed services
- Developing educational materials for patients, parents, and the public to increase awareness and understanding of asthma
- Developing educational curricula for integration in the comprehensive school health education programs for elementary students
- Developing education programs for coaches and physical education teachers that focus on actions to take during an asthma attack and recognizing the signs and symptoms of an asthma attack
- Collaborate with existing programs to expand educational programs
- Promoting statewide utilization of the National Institutes of Health, National Heart, Lung, Blood Institutes Guidelines for the Diagnosis and Management of Asthma
- Collaborating with the Partnership for a Tobacco-Free Maine Program in an effort to inform the public about the effects of ETS on individuals with asthma
- Partnering with DEP, American Lung Association of Maine and Maine Indoor Air Quality Council to promote a healthy Indoor and **Outdoor Air Environment**

Key Findings

- Gender differences were found for current asthma prevalence and asthma mortality. The asthma prevalence rate was significantly higher for women (10.0%) than for men (8.6%). Women are more likely to have a reported death from asthma than males in Maine ($p < 0.01$).

- Overweight and obese adults were more likely to have current asthma and lifetime asthma than adults reporting a normal weight ($p < 0.05$).
- Self reported poor mental and physical health days were more common among persons with asthma ($p < 0.001$). In Maine, people with asthma did not report more physical limitations than people without asthma.
- Among adults, the MaineCare population reports a higher prevalence of asthma, a higher prevalence of persistent asthma based on insurance claims, and a higher rate of hospitalizations from asthma.
- A higher prevalence of self reported current asthma was found in those with an income $< \$25,000$.
- Since 1990, asthma hospitalization rates have been decreasing from (13.9 to 9.5 per 10,000).
- Women are 1.4 times as likely to be hospitalized for asthma than men.
- Children ages 0-4 have the highest rate of asthma hospitalizations. A statistically significant decrease was seen from 1990 to 2000 for this age group (37.6 to 25.2 per 10,000) ($p < 0.001$).
- Total asthma hospitalization rates are lower in the southern and western counties Maine.
- Emergency room visits with a diagnosis of asthma showed some seasonal variation. A decrease in the number of visits were seen in the summer months with a peak in the number of visits in the fall.
- Less than 75% of Maine's insured (MaineCare and commercial) population fills prescriptions for the indicated appropriate medications for persons with persistent asthma.

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Introduction

Asthma is one of the most common chronic diseases of childhood (NHLBI, 1997). The prevalence of self-reported asthma increased 75% in the United States from 1980-1994 (CDC, 1998). Alarming, the greatest portion of the overall increase in the prevalence of asthma has occurred in one of our most vulnerable populations, children.

Asthma is listed as one of the priorities for improving the health of Americans as issued by the federal government in Healthy People 2010 (HP2010). Eight objectives listed within the chapter of HP2010 devoted to asthma (Chapter 24) are listed below in Table 1. One of these objectives is the establishment of statewide asthma surveillance systems in at least 25 states. Consistent with this objective, Maine has completed several steps toward the development of a comprehensive surveillance system. This begins by identifying existing datasets, evaluating their validity and utility for surveillance and identifying gaps in the data collection process. The current effort addresses baseline information for deaths, prevalence, medical care and asthma management. Investigation of the causes of asthma and asthma attacks requires an understanding of prevalence rates, geographic patterns, and trends over time for medical care and management. This in turn will give us a baseline for addressing the other seven HP2010 objectives for asthma.

This surveillance system is part of a larger statewide Asthma Partnership Initiative funded through a cooperative agreement with the CDC No. U59/CCU117746-01 "Addressing Asthma From a Public Health Perspective."

Table 1.

HP2010 Asthma Objectives	
Section	Objective
24-1	Reduce asthma deaths
24-2	Reduce asthma hospitalizations
24-3	Reduce hospital emergency department visits for asthma
24-4	Reduce activity limitations among persons with asthma
24-5	Reduce number of school work days missed by persons with asthma
24-6	Increase proportion of persons with asthma who receive formal patient education, including information regarding community and self-help resources, as an essential part of the management of their condition
24-7	Increase the proportion of persons with asthma who receive appropriate asthma care according to the NAEPP guidelines

- 24-8 Establish in at least 25 States a statewide surveillance system for tracking asthma deaths, illness, disabilities, impact of occupational and environmental factors on asthma, access to medical care and asthma management

Asthma is known to differently affect people of different ages, genders, socioeconomic status, and geographic area of residence. These factors will be examined with regard to the prevalence and treatment of asthma in Maine. Maine results will be compared with national data when possible.

The purpose of surveillance is to monitor disease trends across time, geography, and relevant demographic characteristics. Using data from vital records, hospital discharge records, emergency department records, insurance claims, and survey data, this report describes the prevalence and burden of asthma for several segments of Maine's population, and examines variation in prevalence and burden by such factors as age, gender, socioeconomic status and geography. Where data was available and appropriate we also looked at associations between asthma morbidity and other health status indicators such as overweight and obesity.

Asthma Prevalence Estimates

Methods

Two sources of data were used to estimate asthma prevalence in this report; The Behavioral Risk Factor Surveillance System (BRFSS), and insurance claims data.

BRFSS:

The BRFSS is a statewide telephone survey conducted coordinated and supported by the Centers for Disease Control and Prevention (CDCP). Telephone interviews are conducted on randomly selected, non-institutionalized Maine adults age 18 and over. Questions to estimate current asthma and lifetime prevalence were included in 1999 and 2000 Maine BRFSS. For the 2000 BRFSS the New England states included questions to estimate asthma prevalence in children through funding provided by the CDCP.

In 1999 and 2000 there were 1,673 and 4,601 interviews completed in Maine respectively. In 2000, ten (10) out of sixteen (16) counties in Maine were over-sampled by 100%. These ten counties were over-sampled as part of a collaboration with Maine Health, a not-for profit healthcare organization. The estimates were weighted to reflect the statewide population. For prevalence, two years of data were combined to increase the stability of the estimates.

Current asthma for the adult population is defined as positive responses to the questions 'Have you ever been told by a doctor, nurse, or other health professional that you had asthma?' and 'Do you still have asthma?' Lifetime asthma prevalence is defined as a positive response to the first question. Reporting of child asthma is based on adult responses. The adult responder is asked how many of the children in the household age 17 and younger have ever been diagnosed with asthma. The adult responder is then asked 'How many of these children still have asthma?' and finally 'Does this child still have asthma?.' Unfortunately, there were considerable challenges to calculate weights for child asthma prevalence, thus delaying the information for inclusion within this report.

Overweight for the adult population is defined as 25.0 to 29.0 Body Mass Index (BMI). Obesity for the same population is defined as having a BMI of 30.0 or greater. The formula for calculating BMI is $\text{weight}/\text{height}^2$ (Willett, 1998). Weight and height measurements within the BRFSS are self-reported.

Survey data for adult-prevalence estimates were weighted. One aspect of the weighting is the expected response rate by age and sex of the respondent, in order to be representative of Maine's demographics. For example, if one in one hundred male residents between the ages of 18 and 24 were surveyed, then each male respondent within this age group was weighted to represent one hundred people. A more complex weighting scheme was employed to estimate child asthma prevalence, in which data were weighted to represent the age distribution of children in Maine. All survey data was analyzed using Statistical Analysis Systems (SAS) and Survey Data Analysis (SUDAAN) statistical software packages. Additional details regarding the design and analysis of BRFSS data are available at <http://www.cdc.gov/brfss/ti-techno.htm>.

Insurance claims:

The Bureau of Medical Services, a state agency, collects MaineCare recipient data. MaineCare recipients are persons formerly described as being either Medicaid, CubCare, or PrimeCare clients. To maintain confidentiality, the Maine Health Information Center (MHIC) provided anonymous summary data for the commercially insured population and MaineCare recipients in Maine. MHIC is an independent nonprofit health data research organization.

Commercial insurance data encompasses claims from the major Maine Insurers (i.e. Anthem, Cigna, and Aetna).

Prevalence estimates using insurance claims data are based on the Health Plan Employer Data and Information Set (HEDIS) algorithm for persistent asthma. HEDIS is a standard developed by a national program to ensure common methods of analyses for insurance claims data. In this report, MaineCare and commercial insurance claims were analyzed for age groups from 5 to 56 years using categories defined by HEDIS. Denominators were based on those insured with continuous enrollment for two consecutive years with a gap of no more than 45 days during each year of continuous

enrollment. To determine continuous enrollment for a MaineCare client for whom enrollment is verified monthly, the member may not have more than a one month gap in coverage during each measurement year. Persistent asthma is defined as having any of the following in the year prior to the measurement year (NCQA, 2001):

- at least four asthma medication dispensing events (i.e. asthma medication was dispensed on four occasions). (A dispensing event is defined as one prescription of an amount lasting 30 days or less. Two different prescriptions dispensed on the same day are counted as two different dispensing events).
Asthma medications are identified by National Drug Codes (NDC); OR
- at least one Emergency Department (ED) visit based on visit codes with asthma (ICD-9 code 493) as the principal diagnosis; OR
- at least one hospitalization based on the visit codes with asthma (ICD-9 code 493) as the principal diagnosis; OR
- at least four outpatient asthma visits based on the visit codes with asthma (ICD-9 code 493) as one of the listed diagnoses AND at least two asthma medication dispensing events.

Limitations

BRFSS:

While the BRFSS does provide representative state-level estimates, a few limitations are worth noting. First, the potential exists for selection bias since participation is voluntary and only persons with a telephone who are not institutionalized can participate. Notably, it is estimated that 98.0% of Maine households have at least one telephone, compared to 94.5% of households nationwide (US Census, 2000). Secondly, the information is based on self-report and the potential for response bias exists. Thirdly, the validity of childhood asthma estimates may vary since the participant questioned about the child's asthma may not be the child's caretaker. The BRFSS data for asthma prevalence are more stable for state level analysis and not appropriate for smaller geographic regions within the state at this time due to small numbers. Smaller geographic regions can be analyzed in future by combining five years of data. National data are not weighted, but are computed as an average of all state level prevalences.

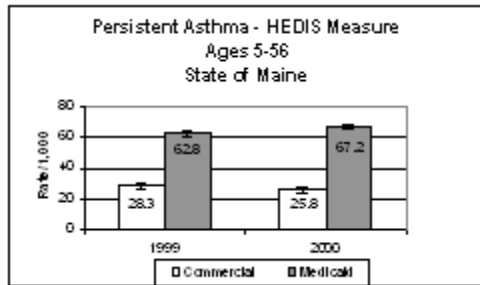
Insurance Claims:

The commercially insured population included in the analyses within this report represents about 25% of Maine's commercially insured population (personal communication, Brian Pearson). Therefore, the data may not be representative of Maine's population as a whole, but provides a good estimate.

The HEDIS algorithm for persistent asthma does not identify people with a clinical asthma diagnosis. Because it is based upon medication usage, it only identifies those with persistent and not mild or intermittent asthma. Therefore, we anticipate that the HEDIS algorithm will underestimate total asthma prevalence.

Asthma Prevalence Results

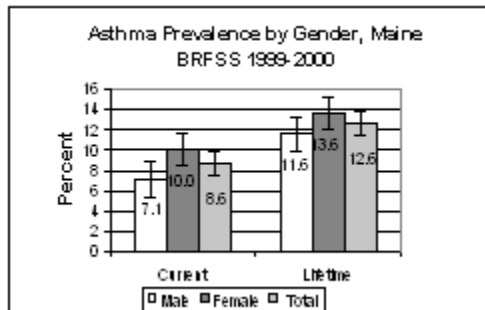
Figure 1.



*Data Source: Maine Health Information Center.

MaineCare clients have a statistically significant higher rate of persistent asthma than the commercially insured clients ($p < 0.01$) (Table 11).

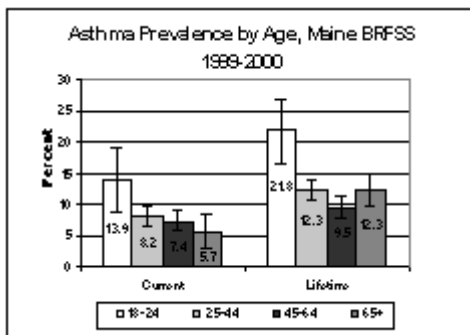
Figure 2.



*Data Source: Maine Bureau of Health

No gender differences were found for the prevalence of lifetime asthma. Females have statistically significant higher self-reported current asthma than males ($p < 0.01$) (Tables 2&3). No differences in asthma prevalence were seen based on Hispanic ethnicity (data not shown).

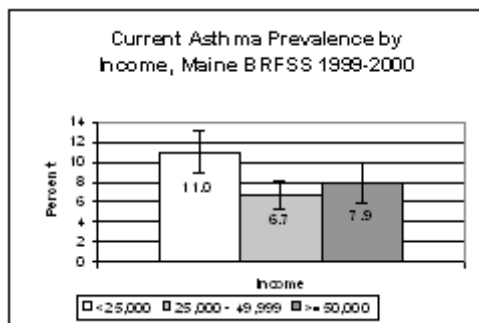
Figure 3.



*Data Source: Maine Bureau of Health

Respondents aged 18-24 appear to have higher reported prevalence of current asthma. However, this difference was not statistically significant ($p > 0.05$), possibly reflecting the small number in this age group. There was a statistically significant difference in reported prevalence of lifetime asthma for this same age group. ($p < 0.01$) (Table 2&3).

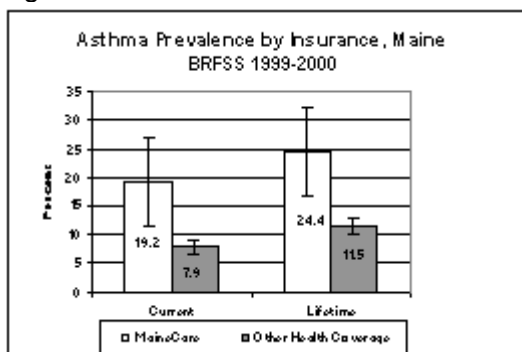
Figure 4.



*Data Source: Maine Bureau of Health

People reporting current asthma were statistically significantly more likely to have a household income <\$25,000 per year ($p<0.01$) (Table 2). No differences were found by level of education (data not shown).

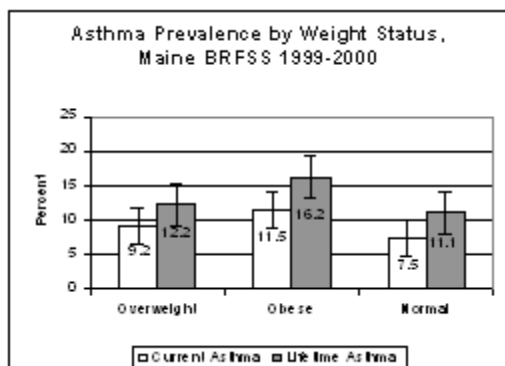
Figure 5.



*Data Source: Maine Bureau of Health

MaineCare recipients were 2.4 and 2.1 times as likely to report current and lifetime asthma respectively than persons with other health coverage ($p<0.01$) (Table 2&3).

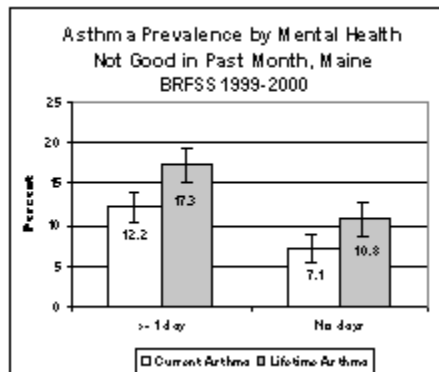
Figure 6.



*Data Source: Maine Bureau of Health

Overweight and obese adults were more likely to have current asthma and lifetime asthma than normal weight adults. The association was statistically significant after adjusting for income, education, age, and smoking status ($p<0.05$) (Table 4&5).

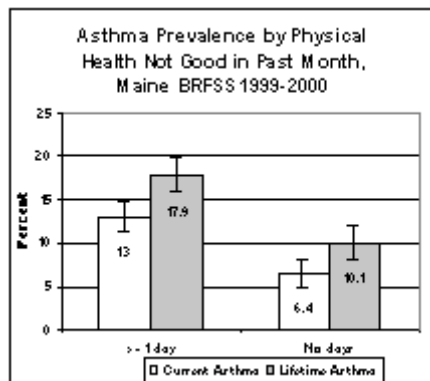
Figure 7.



*Data Source: Maine Bureau of Health

Persons with asthma were statistically significantly more likely to report having at least one day in the past month where their mental health was not good ($p < 0.001$). This was true for persons reporting current as well as lifetime asthma prevalence (Tables 2&3).

Figure 8.



*Data Source: Maine Bureau of Health

Persons with asthma were also statistically significantly more likely to report having at least one day in the past month where their physical health was not good ($p < 0.001$) (Tables 2&3). Even though people with asthma reported problems with mental and physical health, they did not report any significant differences in activity limitations compared to persons without asthma (data not shown).

There were no significant differences seen for persons with asthma who smoked compared to persons without asthma who smoked (data not shown).

Asthma Hospitalization and Emergency Department Visits

Methods

Asthma hospitalizations and Emergency Department visits are collected by the Maine Health Data Organization (MHDO), a state agency. Another state agency, the Bureau of Medical Services collects MaineCare recipient data. MaineCare recipients are persons formerly described as being either Medicaid, CubCare, or PrimeCare clients. To maintain confidentiality, the Maine Health Information Center (MHIC) provided anonymous summary data for the commercially insured population and MaineCare recipients in Maine. MHIC is an independent nonprofit health data research organization.

Hospital discharge data were analyzed for the years 1990 through 2000 for all hospitalizations. Hospitalization data for MaineCare clients were available only for the years 1998 through 2000. Asthma hospitalization is defined by a primary discharge diagnosis of asthma (ICD-9 Code 493.0-493.9).

Population data were based on 2000 inter-censal estimates for state, county, and hospital service areas. Inter-censal population data are estimated using both the 1990 and 2000 Census and were provided by the Office of Data Research and Vital Records, State of Maine. Hospitalizations were analyzed at the state, county and hospital service area (HSA). HSA's consist of a contiguous group of cities and towns that include one or more hospitals at which local residents have the plurality (greatest percentage) of their inpatient admissions (MDHS, 2002). Denominators used for MaineCare analyses were based on person-months.

Data were analyzed by year, age, and geographic location. Also examined was the number of individuals hospitalized and the total number of hospitalizations to provide the ratio of individual asthmatics to total (all) hospitalizations. Adjusted rates were computed using the direct method.

Trend analysis was done using logistic regression techniques. Departure from linearity and curvature were considered prior to determining the average annual percentage change.

Mapping segments were defined by using confidence intervals for asthma hospitalizations at the county level. If there were less than 100 events, we based confidence intervals on Poisson distribution. No rates were computed if five or fewer events were seen.

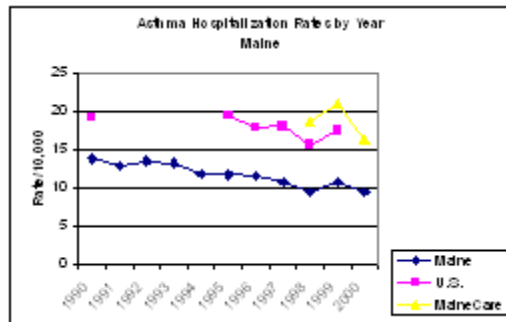
Limitations

Out of state hospitalizations for Maine residents are not included in the analysis. Although repeat hospitalizations were identified, their status as separate events or a continuation of current illness could not be determined. Hospitalizations by Hospital Service Area (HSA) should be interpreted with caution due to the small number of events at this geographic level. Data on race and ethnicity were either incomplete or too infrequent to be analyzed separately.

Emergency room visit data were obtained only for MaineCare and commercially insured persons. Data for emergency room visits for self-paying individuals was not available.

Asthma Hospitalization and Emergency Department Results

Figure 9.

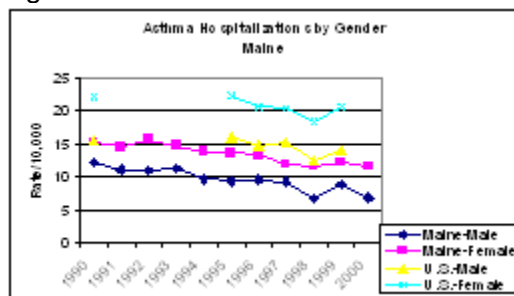


*Age-adjusted to 2000 U.S. Population.
Data Source: Maine Health Data Organization (MHDO).
National Hospital Discharge Survey.
Maine Health Information Center (MHIC).

From 1990 to 2000 the number of hospitalizations for asthma per year has decreased from 1,709 to 1,182 (average 1,455). The rate of asthma hospitalizations in Maine appears to be lower than the national rate.

MaineCare recipients in Maine are statistically significantly more likely to be hospitalized for asthma than other Maine residents ($p < 0.001$) (Tables 7&8).

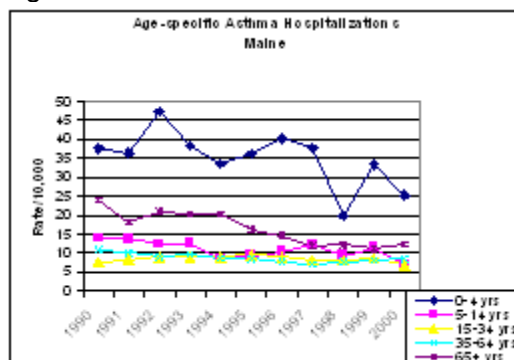
Figure 10.



*Age-adjusted to 2000 U.S. Population.
Data Source: Maine Health Data Organization (MHDO).
National Hospital Discharge Survey.
Maine Health Information Center (MHIC).

Females are more likely to be hospitalized for asthma than males in Maine and Nationally. In 1999, females in Maine were 1.4 times as likely to be hospitalized for asthma than males (Table 6). This pattern is also seen Nationally, where females are 1.5 times as likely to be hospitalized for asthma compared to males.

Figure 11.

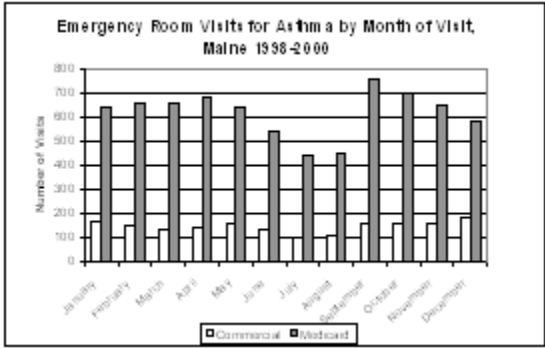


*Data Source: Maine Health Data Organization (MHDO).

There were no observable linear trends seen in asthma hospitalizations for 0-4, 15-34, or 35-64 age groups. Hospitalizations for asthma among children aged 5-14 decreased annually an average of 4.2% (95% CI 2.9-5.5) since 1990. For adults 65 years and above asthma hospitalizations have decreased annually an average of 8.6% (95% CI 7.1 – 10.0) per year since 1992 (Table 6).

Figure 12.

Emergency room visits with a diagnosis of

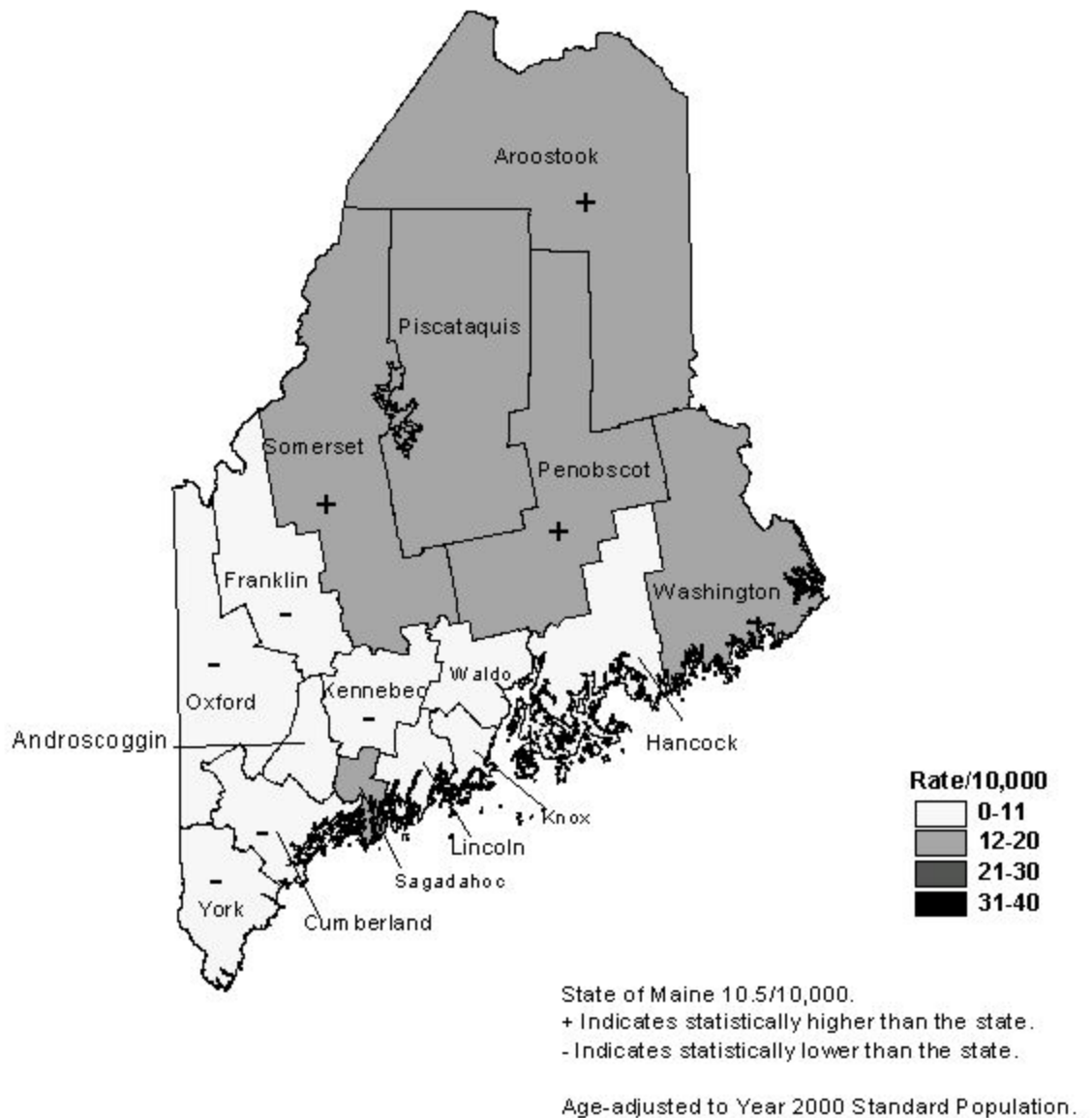


*Data Source: Maine Health Information Center.

asthma showed some seasonal variation in the MaineCare population. A decrease in the number of visits were seen in the summer months with a peak in the number of visits in the fall for both the commercially insured and MaineCare clients. This trend appears to be more subtle for the commercially insured population compared to the MaineCare population possibly in part due to the smaller number of commercially insured represented within the report.

Figure 13.

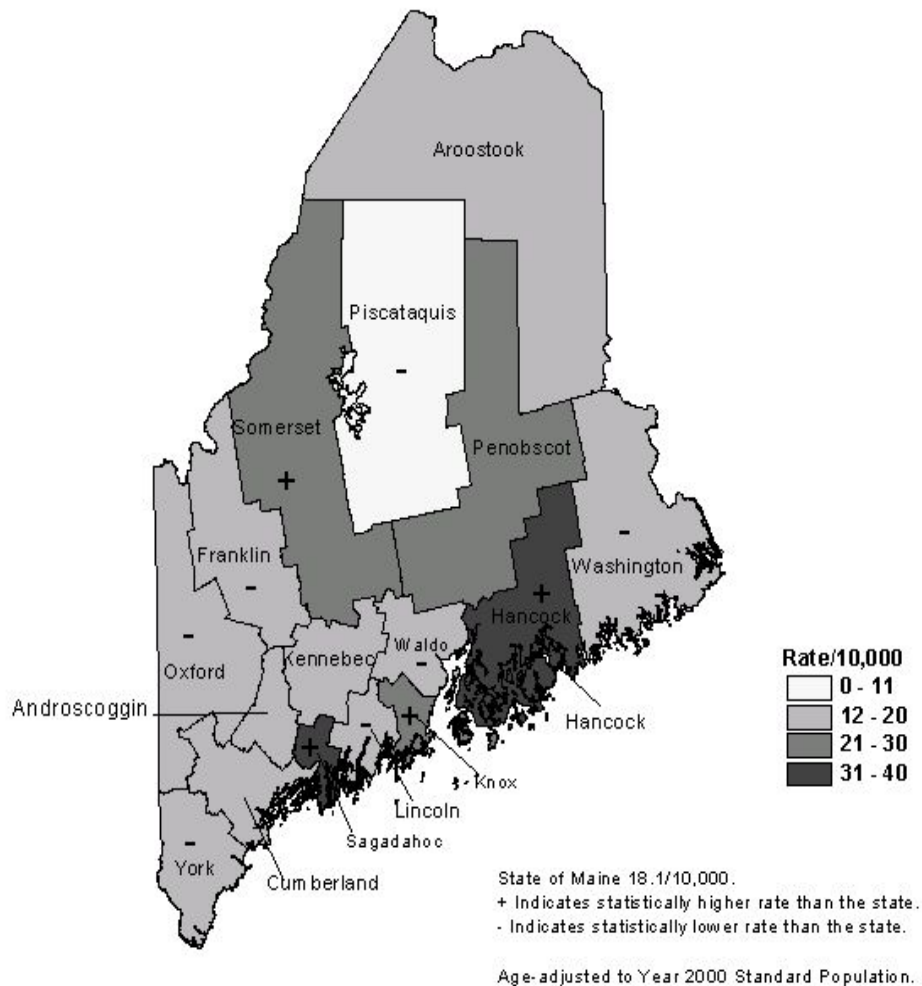
Average Annual Asthma Hospitalizations ICD-9 Code 493.0 - 493.9 Primary Diagnosis Maine 1996-2000



Total asthma hospitalization rates are lower in the southern and western counties of Maine. Northern tier counties, Aroostook, Somerset, and Penobscot counties all have statistically higher asthma hospitalization rates than the State (Table 7).

Figure 14.

Average Annual MaineCare Asthma Hospitalizations ICD-9 Code 493.0 - 493.9 Primary Diagnosis Maine 1998-2000



Hancock, Sagadahoc, Somerset, and Knox counties all had statistically significantly higher rates of asthma hospitalizations than the state average. There is no observable geographic pattern of asthma hospitalizations for the MaineCare population (Table 8).

As illustrated by the darker shading in Figure 14 compared to Figure 13, MaineCare recipients were hospitalized more often than other Maine residents. Interestingly, the disparities noted between counties for all Maine residents were not observed for MaineCare recipients. For each MaineCare recipient hospitalized for asthma there was an average of 1.2 asthma hospitalizations (Table 8).

Three HSA's indicate statistically significant higher rates of asthma hospitalizations than the State. Notably, the individual asthma hospitalizations are also higher suggesting that repeat hospitalizations by individuals did not drive these elevations (graphic not shown) (Table 10).

Asthma Management in Maine

Methods

Asthma management was described using insurance claims data for this report. Insurance status was analyzed by comparing commercial and MaineCare recipients.

Commercial insurance data come from the major Maine Insurers (i.e. Anthem, Cigna, and Aetna). MaineCare recipient data is collected by the Bureau of Medical Services. MaineCare recipients are persons formerly described as being either Medicaid, CubCare, or PrimeCare clients. To maintain confidentiality, the Maine Health Information Center (MHIC) analyzed data for this measure for the commercially insured population and MaineCare recipients in Maine.

Asthma management is measured by looking at appropriate use of medications for people with asthma. This measure was developed by the Health Plan Employer Data and Information Set (HEDIS) and managed by the National Committee for Quality Assurance (NCQA). Appropriate use of medication for people with asthma is a HEDIS measure that evaluates whether members with persistent asthma are being prescribed medications acceptable as primary therapy for long-term control of asthma.

The definition used for 'persistent' asthma is a rough approximation based on previous year's service and medication use rather than a clinical measure of severity (NCQA, 2001). The population reported on is 5 to 56 years of age unless stated otherwise. The measure is based on persons with continuous enrollment and no more than one gap in enrollment of 45 days during each year. The denominator refers to all persons with persistent asthma as described in the section on Asthma Prevalence. The numerator is defined as each member in the denominator who had at least one dispensed prescription for inhaled corticosteroids, nedocromil, cromolyn sodium, leukotriene modifiers, or methylxanthines in the measurement year.

Adjusted rates for county level Geographic Information System (GIS) mapping were computed using the indirect method. The standard used for adjustment is based on the total rate for the State of Maine in each insurance category (commercial or MaineCare). Observed to expected ratios were computed based on all age groups at the county level. Mapping segments were defined by equal intervals of adjusted rates at the county level.

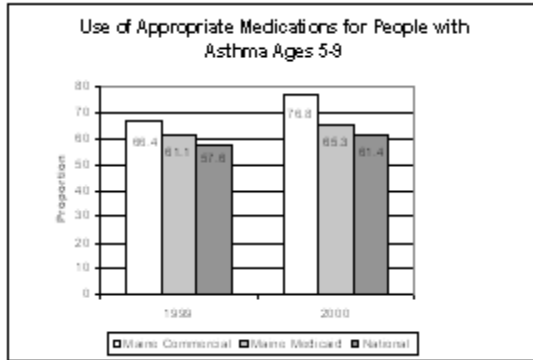
Limitations

The commercial claims data included in the analyses for this report represent an estimated 25% of the insured population of Maine (personal communication, Brian Pearson). Therefore, the data may not be representative of Maine's population as a whole, but provides a good estimate. The data included in this report does not include Medicare claims, so the majority of persons 65 years and older are not included.

Confidence intervals for national data were not available, therefore, confidence intervals were computed only for Maine data.

Asthma Management In Maine Results

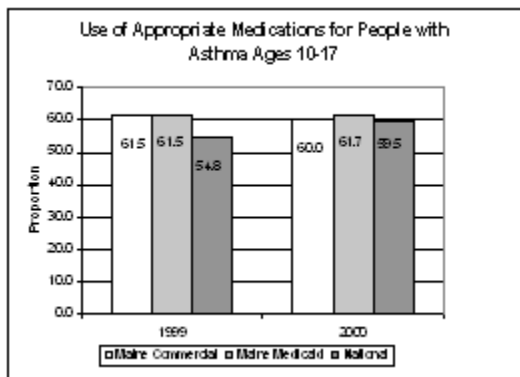
Figure 15:



The proportion of children 5-9 years of age receiving the appropriate medications for persistent asthma increased in all categories from 1999 to 2000. In 2000, the commercially insured population appears to have a greater proportion of their persistent asthma sufferers receiving appropriate medications compared to the MaineCare population or national estimates (Table 11).

*Data Source: Maine Health Information Center (MHIC).

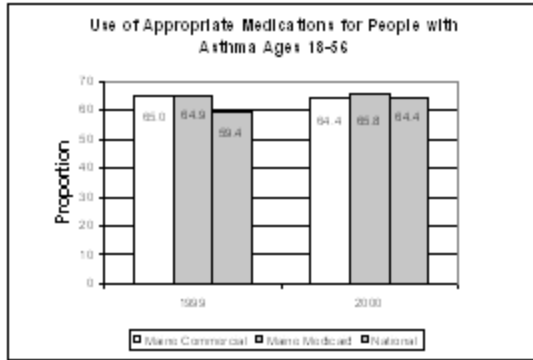
Figure 16:



The proportion of adolescents 10-17 years of age receiving appropriate medications for persistent asthma in Maine did not increase from 1999 to 2000 compared to the national estimates for this age group. In 1999, Maine does, however, have a greater proportion of persistent asthma sufferers receiving appropriate medications compared to national estimates (Table 11).

*Data Source: Maine Health Information Center (MHIC).

Figure 17.

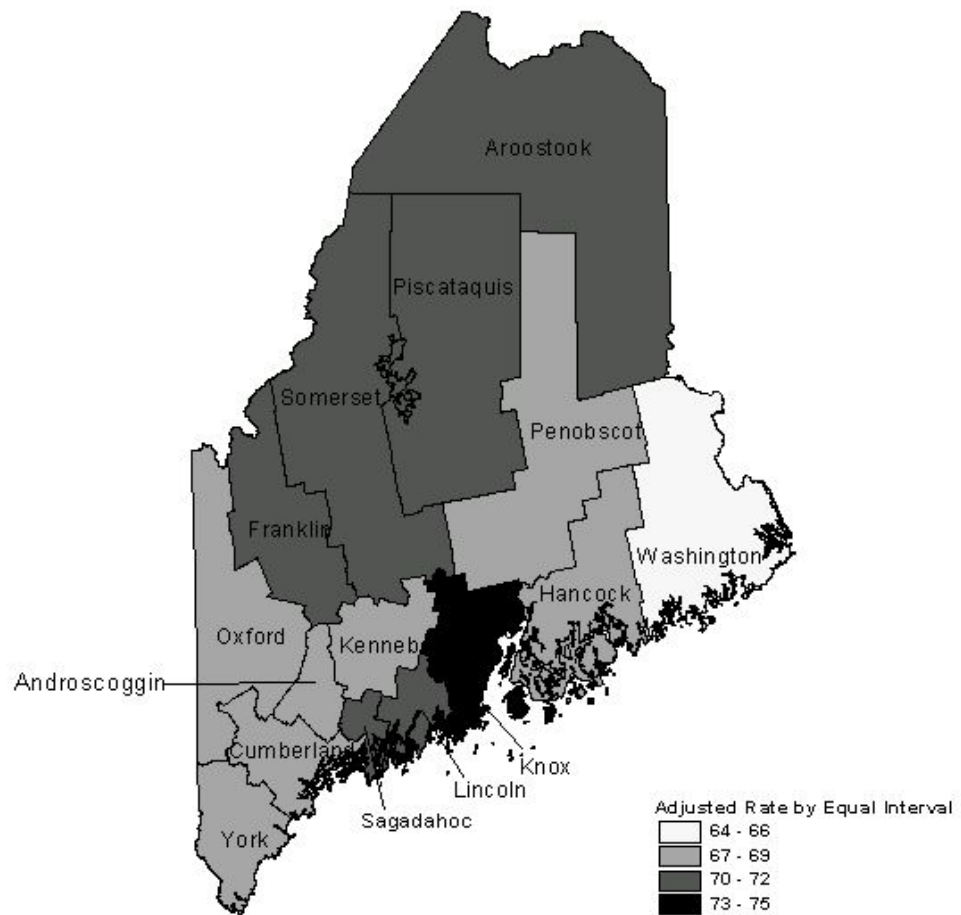


No change has been seen in Maine's 18-56 year old population receiving appropriate medications for asthma between 1999 and 2000. Nationally, there was an increase seen for this age group from 1999 to 2000. There is no real difference seen for appropriate use of medications for this age group in 2000 between Maine's insured population and national estimates (Table 11).

*Data Source: Maine Health Information Center (MHIC).

Figure 18.

**HEDIS Measure: Appropriate Medications for People with Asthma
Age Adjusted Rates by County
MaineCare 2000**



*Indirect method of age-adjustment.

No observable geographic pattern
seen in relation to appropriate medication
use for people with asthma in Maine (Table 12).

Asthma Mortality

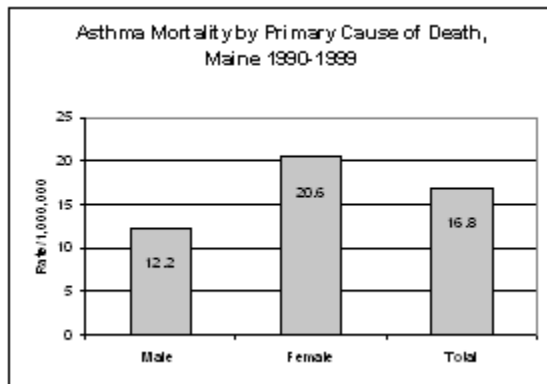
Methods

In Maine the Office of Data, Research and Vital Statistics collects the mortality data for deaths occurring within the state and among Maine residents. For this report mortality data is reported on Maine residents having a primary cause of death listed as Asthma (1990 to 1998 ICD-9 Code 493, 1999 ICD-10 Code J45-J46). The mortality and population data were collected from the Centers for Disease Control, WONDER web site; <http://wonder.cdc.gov/>. Data were aggregated for ten years due to the small number of deaths occurring each year with a primary cause of death due to asthma. Population estimates are based on Year 2000 intercensal estimates. Age adjustment based on the direct method using Year 2000 population standard.

Limitations

Trend analysis is not possible due to the small number of asthma deaths each year in Maine. Therefore, the report cannot reliably describe any temporal pattern in asthma deaths. The comparability ratio for asthma from ICD-9 to ICD-10 is 0.89, meaning that 89% of the deaths classified as being caused by asthma under ICD-9 coding would be classified as asthma deaths under ICD-10 coding (CDC,2002). Asthma deaths for 1990-1998 using ICD-9 coding might over represent data compared to ICD-10 coding conversion for mortality in 1999 (CDC,2001).

Figure 19.



Gender differences are found for asthma mortality. Females are more likely to have a reported death from asthma than males in Maine ($p < 0.01$) (Table 13). In 1999, nationally the asthma death rate for females was 20.4 compared to 13.1 for males (CDC, 2002). Total asthma mortality in Maine was comparable to the 1999 national asthma mortality of 17.2/1,000,000.

*Data Source: CDC Wonder.
Age-adjusted to Year 2000 Standard.

Discussion

The information in this “Asthma Status Report, Maine 2002” is the most comprehensive picture of asthma in Maine to this date. We hope to use this report as a stepping stone for exploration of other types of asthma data not currently available for reporting.

Gender differences were found for current asthma in the adult population as reported from the BRFSS. Women had higher self-reported rates of asthma prevalence than men in Maine. This is not an unexpected finding given that nationally, adult women report a higher prevalence of asthma than men. Females are also more likely to die from asthma than males. Childhood gender differences of reported asthma in Maine are not available at this time. Nationally boys are reported to have a higher prevalence of asthma from 0-17 years of age (Public Health Advisory Board, 2002). Such gender differences in pediatric asthma are also anticipated for Maine.

When regression analysis was performed controlling for other known risk factors associated with asthma, obesity was found to be associated with asthma. Our findings associating obesity/overweight with asthma point to the importance of a comprehensive approach to health promotion and treatment, one that acknowledges that many Maine residents may have multiple health issues at once.

Self-reported poor mental and physical health days were more common among persons with asthma. Interestingly, in Maine, people with asthma did not report more physical limitations than people without asthma. This is inconsistent with national data that suggests that physical limitations are greater for people with asthma. Multivariate analysis should be used to further investigate this apparent inconsistency.

Among adults, the MaineCare population appears to suffer from a greater burden of asthma than their privately insured counterparts. We observed a higher self-reported prevalence of asthma in the MaineCare population, a higher prevalence of persistent asthma based on insurance claims, and a higher rate of hospitalizations from asthma. We also found a higher prevalence of self-reported current asthma in those with an income less than \$25,000 per year. Despite the higher burden in the MaineCare population, similar rates of prescriptions filled were observed among those with persistent asthma in both insurance groups. While insurance claims for the commercially insured population in Maine may not be entirely representative, the contrast between commercial and MaineCare insurance claims are consistent with the findings from other data sources.

Asthma hospitalizations are considered an ambulatory care sensitive condition. In other words, hospitalizations and emergency department visits for asthma are considered entirely preventable events and therefore reflect poor management of asthma (Akinbami, Schoendorf, 2002). Thus, we would expect relatively few asthma hospitalizations or emergency department visits for asthma. In Maine the asthma hospitalization rates reflect national patterns. For instance, total asthma hospitalizations have been decreasing since 1990 and women are more likely to be hospitalized for

asthma than men (CDC, 2002). There were only two age-specific categories showing a linear decline in asthma hospitalizations over time, children 5-14 years and adults 65+ years. This is not consistent with the BRFSS prevalence estimates which are higher in the 18-24 age group. The older age group asthma hospitalizations are declining at twice the rate as the younger age group. The data shows children 0-4 years of age continue to have the highest rate of asthma hospitalizations. While there is no linear decline in asthma hospitalizations seen for this age group, there has been a statistically significant drop in asthma hospitalizations for this age group in 2000 compared to 1990 ($p < 0.001$).

One explanation for the discrepancy between asthma prevalence and hospitalizations for the younger age group could be that physicians are perhaps more reluctant to diagnose asthma in infants and young children. This is due in part to the susceptibility of these children to respiratory infections that may become serious and manifest themselves in ways that resemble asthma. When such a child becomes sick enough to be hospitalized, the physician may, at that point, make the asthma diagnosis. Also, physicians are cautious about the diagnosis at an early age because of the potential for psychosocial challenges associated with a chronic illness.

When we observe a higher hospitalization rate for asthma in this very population, it reflects the greater severity of respiratory infections that may be difficult to differentiate from underlying asthma. This is probably a factor in why this population has the higher hospitalization rate.

The rate of asthma hospitalizations appears to show some geographic disparity. The most densely populated southern and coastal counties in Maine have lower asthma hospitalization rates except for Sagadahoc County. One possible explanation for the geographic pattern might be the southern and coastal regions of Maine are more densely populated therefore more primary care would be available to persons residing in this area, eliminating the need for hospitalizations due to asthma. Increases noted in three HSA's were not driven by repeat hospitalizations of individuals. However, given that we performed multiple statistical tests it would be important to confirm these increases in subsequent years. While geographic disparities are of concern, the fact that disparities were not noted generally for the MaineCare population makes the pattern difficult to interpret. This might be in part due to smaller numbers for the MaineCare population and fewer years of data to analyze.

The MaineCare population appears to have a greater risk for both asthma prevalence and hospitalizations from asthma at the State and county specific geographic areas. Since we were not able to see any geographic pattern to MaineCare asthma hospitalizations, access to primary care might be driven by location and inability or barriers to gain a primary care provider willing to take MaineCare recipients. We do know that people with low incomes forego doctor's visits because of cost and other cultural barriers.

Emergency Room visit data by payor source were not available. We were able to look for seasonal trends in emergency room visits. The summer months appear to have the

lowest number of visits for both the MaineCare and commercially insured populations. In September we see a dramatic increase in the number of emergency room visits for asthma with gradual decreases through December.

Less than 75% of Maine's insured (MaineCare and commercial) population fills prescriptions for the indicated appropriate medications for persons with persistent asthma. Moreover, just because people fill prescriptions for medications doesn't mean that they use them properly. This limitation to the HEDIS data might be worth exploring. We do not see differences in appropriate use of medications for asthma by age group or insurance status, except for children ages 5-9. For children in this age group, there was an increase in medication use in the commercially insured group from 1999 to 2000, and commercially insured 5-9 year olds currently use medications for asthma at a higher rate than MaineCare children.

Conclusions

We know that Maine's low income residents are disproportionately burdened by asthma. Therefore, any interventions to promote improved detection and treatment should be sensitive to the cultural needs of this group.

Further explorations are also needed to explain why MaineCare recipients are hospitalized more but do not use more medications than the commercially insured population.

Additionally, we need to determine whether the high rate of hospitalizations for 0-4 year olds in Maine are an artifact of greater severity of respiratory infection or a real finding.

Overall improvement in the proportion of persons receiving appropriate medications for asthma is needed, possibly driven through provider/client education using the NAEPP guidelines for treatment of asthma.

Females must also be a priority group in regard to treatment of asthma. We will investigate the possibility of obtaining HEDIS data based on gender to see if there are differences between men and women in the appropriate use of medications for asthma.

Data regarding prevalence of asthma among children in Maine is greatly needed. This gap will be addressed through the "Maine Child Health Survey" in kindergarten and fifth grade children.

Lastly, more detailed information regarding environmental triggers of asthma in Maine is needed. Several actions to address this need are underway. First, more detailed information is being collected for children in regard to environmental triggers, access to care issues, and barriers to inhaler use in school through the "Maine Child Health Survey". The "Maine Child Health Survey" has been completed statewide in the Kindergarten population and will be piloted in the fifth grade winter/spring 2003 school

year. Secondly, the Bureau of Health received a planning grant from the Centers for Disease Control, Centers for Environmental Health, in 2002 called "The Environmental Public Health Tracking Project". The grant is for planning and implementation of a comprehensive surveillance tracking system to gather environmental data and health outcome data together to discover and track environmental factors in relation to health.

Appendix: Supplemental Tables

Table 2.
Adult Asthma Prevalence, Maine BRFSS 1999-2000

Respondents Reporting Current Asthma							
Category	Number	%	95% CI		Number	%	95% CI
	r				r		
Sex:				Education:			
Male	166	7.1	5.6 – 8.5	< = High School	266	9.1	8.3 – 9.9
Female	376	10.0	8.5 – 11.5	Any College	276	8.1	7.4 – 8.8
Total	542	8.6	7.6 – 9.6	P-value	0.3585		
P-value	0.0051			Weight:			
Age:				Overweight	143	9.2	8.0 – 10.4
18-24	54	13.9	9.2 – 18.6	Obese	100	11.5	7.9 – 15.0
25-44	210	8.2	6.7 – 9.7	P-value	0.1348		
45-64	182	7.4	5.8 – 8.9	Smoking:			
65+	96	7.9	5.7 – 10.2	Don't smoke	134	9.5	7.2 – 11.8
P-value	0.0831			Smoke	405	8.3	7.2 – 9.5
Ethnicity:				P-value	0.3694		
Hispanic	#	10.4	3.1 – 17.6	Mental Health Days:			
Non-hispanic	527	8.6	7.5 – 9.6	>= 1 day	206	12.2	9.8 – 14.6
P-value	0.6286			None	323	7.1	6.0 – 8.2
Income:				P-value	0.0002		
<\$25,000	224	11.0	8.9 – 13.2	Physical Health Days:			
\$25,000-\$49,999	156	6.7	5.2 – 8.2	>= 1 day	274	13.0	10.9 – 15.2
>=\$50,000	103	7.9	5.9 – 9.8	None	257	6.4	5.3 – 7.6

P-value	0.0052			P-value	<0.0001		
Insurance:				Ltd. Physical Activity:			
MaineCare ^{e^}	47	19.2	11.8-26.5	>= 1 day	177	12.4	9.9 – 15.0
Other Health Insurance	341	7.9	6.7 – 9.1	None	167	11.2	8.8 – 13.6
P-value	0.0037			P-value	0.4798		

*Data Source: Maine Bureau of Health.

Number reported is unweighted.

P-value Cochran Mantel-Haenszel Test.

indicates data suppression: < 20 in numerator or < 50 in denominator.

^ asked as Medicaid and Medical Assistance.

Table 3.
Adult Asthma Prevalence, Maine BRFSS 1999-2000

Respondents Reporting Lifetime Asthma							
Category	Number	%	95% CI		Number	%	95% CI
Sex:				Education:			
Male	269	11.6	9.7 – 13.4	< = High School	364	13.3	12.3 – 14.3
Female	496	13.6	11.9 – 15.2	Any College	400	12.0	11.2 – 12.9
Total	765	12.6	11.3 – 13.9	P-value	0.3360		
P-value	0.1204			Weight:			
Age:				Overweight	199	12.2	9.6 – 14.8
18-24	82	21.8	16.1 – 27.6	Obese	136	16.0	12.0 – 20.4
25-44	305	12.3	10.4 – 14.1	P-value	0.1348		
45-64	243	9.5	7.8 – 11.2	Smoking:			
65+	135	12.3	9.4 – 15.3	Don't smoke	188	14.0	11.3 – 16.7
P-value	0.0004			Smoke	574	12.2	10.7 – 13.6
Ethnicity:				P-value	0.3694		
Hispanic	23	14.4	6.1 – 22.7	Mental Health Days:			
Non-hispanic	742	12.6	11.3 – 13.9	>= 1 day	280	17.3	14.5 – 20.1
P-value	0.6721			None	470	10.8	9.4 – 12.2
Income:				P-value	0.0001		
<\$25,000	286	14.9	12.4 – 17.4	Physical Health Days:			
\$25,000-\$49,999	225	10.3	8.4 – 12.2	>= 1 day	362	17.9	15.3 – 20.4
>=\$50,000	168	11.9	9.5 – 14.3	None	389	10.1	8.7 – 11.5

P-value	0.1634			P-value	<0.0001		
Insurance:				Ltd. Physical Activity:			
MaineCare ^{e^}	59	24.4	16.3 – 32.4	>= 1 day	225	17.3	14.2 – 20.5
Other Health Insurance	476	11.5	10.0 – 12.9	None	244	16.3	13.5 – 19.2
P-value	0.0024			P-value	0.64		

*Data Source: Maine Bureau of Health.

Number reported is unweighted.

P-value Cochran Mantel-Haenszel Test.

indicates data suppression: < 20 in numerator or < 50 in denominator.

^ asked as Medicaid and Medical Assistance.

Table 4.

Adult Asthma, Maine 1999-2000 – Logistic Regression Model

Current Asthma – Dependent Variable			
Independent Variable	Odds Ratio	95% Confidence Interval	P-value
Income			
\$25,000 or more	0.68	0.50 – 0.92	0.01
< \$25,000*	--	--	--
Education			
HS diploma or GED	0.88	0.55 – 1.41	0.60
Less than HS diploma*	--	--	--
Age			
18-24 years	1.70	1.06 – 2.73	0.03
25 and older*	--	--	--
Weight			
Overweight (BMI 25.0-29.9)	1.45	1.04 – 2.02	0.03
Obese (BMI≥30.0)	1.54	1.08 – 2.21	0.02
Neither (BMI<25.0)*	--	--	--
Smoking status			
Current smoker	1.06	0.74 – 1.50	0.76
Former smoker	0.88	0.64 – 1.22	0.45
Never smoked*	--	--	--

*Referent group.

Data source: Maine Bureau of Health.

Data analysis: Muskie School of Public Service, USM.

Table 5.

Adult Asthma, Maine 1999-2000 – Logistic Regression Model

Lifetime Asthma – Dependent Variable			
Independent Variable	Odds Ratio	95% Confidence Interval	P-value
Income			
\$25,000 or more	0.78	0.59 – 1.03	0.08
< \$25,000*	--	--	--
Education			
HS diploma or GED	0.90	0.59 – 1.37	0.63
Less than HS diploma*	--	--	--
Age			
18-24 years	1.90	1.24 – 2.91	<0.01
25 and older*	--	--	--
Weight			
Overweight (BMI 25.0-29.9)	1.19	0.90 – 1.59	0.22
Obese (BMI≥30.0)	1.33	0.97 – 1.82	0.08
Neither (BMI<25.0)*	--	--	--
Smoking status			
Current smoker	1.12	0.83 – 1.53	0.45
Former smoker	0.95	0.71 – 1.27	0.74
Never smoked*	--	--	--

*Referent group.

Data source: Maine Bureau of Health.

Data analysis: Muskie School of Public Service, USM.

Table 6.

Asthma Hospitalization Rate/10,000
Asthma ICD-9 Code 493.0 – 493.9 Primary Diagnoses
Maine, 1990 – 2000

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Sex *											
Male	12.3	11.1	11.0	11.4	9.7	9.4	9.6	9.3	6.8	8.9	6.9
Female	15.3	14.6	15.7	14.8	13.9	13.6	13.3	11.9	11.6	12.3	11.6
Age Group											
0-4	37.6	36.4	47.3	38.4 (2.2)	33.6	36.2	40.3	37.8	19.8	33.4	25.2
5-14	(2.1)	(2.1)	(2.4)	12.6 (0.9)	(2.1)	(2.2)	(2.4)	(2.3)	(1.7)	(2.2)	(1.9)
15-34	13.9	13.7	12.4	9.0 (0.5)	8.7	9.4	10.4	12.1	9.3	11.4	7.1
35-64	(0.9)	(0.9)	(0.8)	9.7 (0.5)	(0.7)	(0.7)	(0.8)	(0.8)	(0.7)	(0.8)	(0.6)
65+	7.5	8.2	8.9	20.3 (1.1)	8.9	9.5	9.0	8.1	8.1	8.7	6.9
Total*	(0.2)	(0.5)	(0.5)	13.3 (0.3)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
	11.0	10.1	8.9		8.7	8.4	7.8	7.1	7.8	8.1	8.5
	(0.5)	(0.5)	(0.5)		(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)
	24.0	18.1	21.0		20.3	16.2	14.7	12.0	12.1	11.1	12.4
	(1.2)	(1.1)	(1.1)		(1.1)	(1.0)	(0.9)	(0.8)	(0.8)	(0.8)	(0.8)
	13.9	13.0	13.6		11.9	11.8	11.6	10.9	9.5	10.9	9.5
	(0.3)	(0.3)	(0.3)		(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)

*Age-adjusted to 2000 U.S. population.
 (Standard Error).

Table 7.

Average Annual Hospitalization Rate/10,000

Asthma ICD-9 Code 493.0 - 493.9 Primary Diagnoses

Maine 1996-2000

All Hospitalizations

County	Total Population	Discharges	Crude Rate	Age-adjusted Rate	95% Confidence Interval	
					LCL	UCL
Androscoggin	515133	538	10.4	10.8	9.9	11.7
Aroostook	378158	582	15.4	16.2	14.9	17.5
Cumberland	1299400	1178	9.1	9.3	8.8	9.8
Franklin	146778	102	7.0	7.3	5.9	8.7
Hancock	252904	298	11.8	11.7	10.4	13.0
Kennebec	583080	538	9.2	9.4	8.6	10.2
Knox	193833	181	9.3	9.6	8.2	11.0
Lincoln	163668	164	10.0	10.1	8.6	11.6
Oxford	271664	190	7.0	7.1	6.1	8.1
Penobscot	724651	927	12.8	13.3	12.5	14.1
Piscataquis	88547	105	11.9	12.3	10.0	14.6
Sagadahoc	175343	206	11.8	12.0	10.4	13.6
Somerset	255524	315	12.3	12.4	11.0	13.8
Waldo	179151	190	10.6	10.8	9.3	12.3
Washington	173026	214	12.4	12.3	10.6	14.0
York	901811	720	8.0	8.1	7.5	8.7
State of Maine	6302671	6448	10.2	10.5	10.2	10.8

Data Source: MHDO & ODRVS, State of Maine.

Population estimates are based on Year 2000 Census.

Age-adjusted to Year 2000 Standard.

LCL = Lower Confidence Limit

UCL = Upper Confidence Limit.

Table 6.

Asthma Hospitalization Rate/10,000
Asthma ICD-9 Code 493.0 – 493.9 Primary Diagnoses
Maine, 1990 – 2000

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Sex *											
Male	12.3	11.1	11.0	11.4	9.7	9.4	9.6	9.3	6.8	8.9	6.9
Female	15.3	14.6	15.7	14.8	13.9	13.6	13.3	11.9	11.6	12.3	11.6
Age Group											
0-4	37.6	36.4	47.3 (2.4)	38.4 (2.2)	33.6	36.2	40.3	37.8	19.8	33.4	25.2
5-14	(2.1)	(2.1)	12.4 (0.8)	12.6 (0.9)	(2.1)	(2.2)	(2.4)	(2.3)	(1.7)	(2.2)	(1.9)
15-34	13.9	13.7	8.9 (0.5)	9.0 (0.5)	8.7	9.4	10.4	12.1	9.3	11.4	7.1
35-64	(0.9)	(0.9)	8.9 (0.5)	9.7 (0.5)	(0.7)	(0.7)	(0.8)	(0.8)	(0.7)	(0.8)	(0.6)
65+	7.5	8.2	21.0 (1.1)	20.3 (1.1)	8.9	9.5	9.0	8.1	8.1	8.7	6.9
Total*	(0.2)	(0.5)	13.6 (0.3)	13.3 (0.3)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
	11.0	10.1			8.7	8.4	7.8	7.1	7.8	8.1	8.5
	(0.5)	(0.5)			(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)
	24.0	18.1			20.3	16.2	14.7	12.0	12.1	11.1	12.4
	(1.2)	(1.1)			(1.1)	(1.0)	(0.9)	(0.8)	(0.8)	(0.8)	(0.8)
	13.9	13.0			11.9	11.8	11.6	10.9	9.5	10.9	9.5
	(0.3)	(0.3)			(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)

*Age-adjusted to 2000 U.S. population.
 (Standard Error).

Table 7.

Average Annual Hospitalization Rate/10,000
Asthma ICD-9 Code 493.0 - 493.9 Primary Diagnoses
Maine 1996-2000
All Hospitalizations

County	Total Population	Discharges	Crude Rate	Age-adjusted Rate	95% Confidence Interval	
					LCL	UCL
Androscoggin	515133	538	10.4	10.8	9.9	11.7
Aroostook	378158	582	15.4	16.2	14.9	17.5
Cumberland	1299400	1178	9.1	9.3	8.8	9.8
Franklin	146778	102	7.0	7.3	5.9	8.7
Hancock	252904	298	11.8	11.7	10.4	13.0
Kennebec	583080	538	9.2	9.4	8.6	10.2
Knox	193833	181	9.3	9.6	8.2	11.0
Lincoln	163668	164	10.0	10.1	8.6	11.6
Oxford	271664	190	7.0	7.1	6.1	8.1
Penobscot	724651	927	12.8	13.3	12.5	14.1
Piscataquis	88547	105	11.9	12.3	10.0	14.6
Sagadahoc	175343	206	11.8	12.0	10.4	13.6
Somerset	255524	315	12.3	12.4	11.0	13.8
Waldo	179151	190	10.6	10.8	9.3	12.3
Washington	173026	214	12.4	12.3	10.6	14.0
York	901811	720	8.0	8.1	7.5	8.7
State of Maine	6302671	6448	10.2	10.5	10.2	10.8

Data Source: MHDO & ODRVS, State of Maine.

Population estimates are based on Year 2000 Census.

Age-adjusted to Year 2000 Standard.

LCL = Lower Confidence Limit

UCL = Upper Confidence Limit.

Table 8.

**Average Annual MaineCare Hospitalization Rate/10,000
Asthma ICD-9 Code 493.0 - 493.9 Primary Diagnoses
Maine 1998-2000**

All Hospitalizations

Recipients Hospitalized

County	Total Members	All Hospitalizations				Recipients Hospitalized				
		Discharges	Crude Rate	Age-adjusted Rate	95% Confidence Limits LCL UCL	Discharges	Crude Rate	Age-adjusted Rate	95% Confidence Limits LCL UCL	Average Hospitalizations per Recipient
Androscoggin*	48048	80	16.7	14.0	11.1 17.4	72	15.0	12.6	9.9 15.9	1.1
Aroostook*	44656	89	19.9	18.9	15.2 23.3	77	17.2	16.0	12.6 20.0	1.2
Cumberland	79040	159	20.1	18.7	15.7 21.7	123	15.6	14.4	11.7 17.1	1.3
Franklin*	13806	21	15.2	14.5	9.0 22.2	15	10.9	11.2	6.3 18.5	1.4
Hancock*	17138	48	28.0	38.2	28.2 50.7	30	17.5	21.7	14.6 31.0	1.6
Kennebec*	50566	92	18.2	18.6	15.0 22.8	69	13.6	13.8	10.7 17.5	1.3
Knox*	14707	30	20.4	21.8	14.7 31.1	23	15.6	15.3	9.7 23.0	1.3
Lincoln*	11126	16	14.4	15.3	8.8 24.9	14	12.6	12.2	6.7 20.5	1.1
Oxford*	25827	33	12.8	14.6	10.1 20.5	28	10.8	11.8	7.8 17.1	1.2
Penobscot	67193	152	22.6	22.5	18.9 26.1	124	18.5	17.9	14.7 21.1	1.2
Piscataquis*	9080	7	7.7	6.7	2.7 13.8	7	7.7	6.7	2.7 13.8	1.0
Sagadahoc*	10152	34	33.5	33.6	23.3 47.0	24	23.6	19.8	12.7 29.5	1.4
Somerset*	30264	64	21.1	21.5	16.5 27.5	59	19.5	19.9	15.2 25.7	1.1
Waldo*	17643	26	14.7	17.3	11.3 25.4	23	13.0	14.9	9.5 22.4	1.1
Washington*	22925	38	16.6	15.6	11.0 21.4	34	14.8	14.2	9.8 19.8	1.1
York*	56168	77	13.7	12.8	10.1 16.0	68	12.1	11.4	8.9 14.5	1.1
Other*	8615	**	**	**	** **	**	**	**	** **	**
State of Maine*	526954	970	18.4	18.1	16.9 19.3	794	15.1	14.4	13.4 15.4	1.2

*Confidence Interval based on Poisson distribution.

**Indicates 5 or fewer events, no rate computed.

Age-adjusted to Year 2000 Standard. MaineCare formerly known as Medicaid and/or CubCare.

LCL= Lower Confidence Limit. UCL=Upper Confidence Limit.

Data source: Maine Health Information Center (MHIC).

Table 9.

Average Annual Hospitalization Rate/10,000

Asthma ICD-9 Code 493.0 - 493.9 Primary Diagnoses, Maine 1996-2000

HSA #	HSA Name	Total Population	Discharges	Crude Rate	Age-Adjusted Rate	95% Confidence Limits	
						LCL	UCL
1	Portland	1191467	1110	9.3	9.5	8.9	10.1
2	Bangor	614818	759	12.3	12.8	11.9	13.7
3	Lewiston	559246	565	10.1	10.3	9.5	11.1
4	Augusta	352846	316	9	9.3	8.3	10.3
5	Waterville	334387	328	9.8	9.9	8.8	11
6	Biddeford	339656	294	8.7	8.8	7.8	9.8
7	Rockland	231608	204	8.8	9	7.8	10.2
8	Brunswick	239548	191	8	8	6.9	9.1
9	Farmington	175628	127	7.2	7.5	6.2	8.8
10	Skowhegan	153462	153	10	9.9	8.3	11.5
11	Presque Isle	110387	124	11.2	11.3	9.3	13.3
12	Rumford*	80190	86	10.7	10.6	8.5	12.7
13	Bath	108671	138	12.7	13	11	15
14	Sanford	143179	124	8.7	8.6	7.1	10.1
15	Dover-Foxcroft	107237	122	11.4	11.7	9.7	13.7
16	Houlton	88407	149	16.9	17.1	14.4	19.8
17	Caribou	72341	183	25.3	27.5	23.7	31.3
18	Fort Kent*	76025	75	9.9	9.9	7.8	12.4
19	Machias*	73987	98	13.2	13.3	10.8	16.2
20	Fort Fairfield*	32155	67	20.8	23.2	18	29.5
21	Calais*	71504	87	12.2	11.8	9.5	14.6
22	Ellsworth	115985	130	11.2	11.3	9.4	13.2
23	Pittsfield	84859	159	18.7	18.9	16	21.8
24	Millinocket*	57404	70	12.2	12.7	9.9	16
25	Belfast	96419	125	13	13.3	11	15.6
26	Norway*	114234	70	6.1	6.3	4.9	8
27	Lincoln*	69853	84	12	12.4	9.9	15.4
28	York	188775	125	6.6	6.7	5.5	7.9
29	Bridgton*	95756	68	7.1	7.2	5.6	9.1
30	Blue Hill*	59576	44	7.4	7.7	5.6	10.3
31	Bar Harbor*	54070	99	18.3	17.4	14.1	21.2
32	Damariscotta*	56098	80	14.3	14.2	11.3	17.7
33	Greenville*	16663	22	13.2	12.4	7.8	18.8
34	Boothbay*	29566	20	6.8	6.3	3.9	9.7
98	Berwicks/Border Towns*	109818	52	4.7	4.5	3.4	5.9
	State of Maine	6302671	6448	10.2	10.5	10.2	10.8

*Confidence Interval based on Poisson distribution.

LCL = Lower Confidence Limit.

Population estimates are based on Year 2000 Census.

UCL = Upper Confidence Limit.

Data source: Maine Health Information Center (MHIC) & Office of Data Research & Vital Statistics (ODRVS).

Table 10.

**Average Annual MaineCare Hospitalization Rate/10,000
Asthma ICD-9 Code 493.0 - 493.9 Primary Diagnoses, Maine 1998-2000**

			All Hospitalizations					Recipients Hospitalized				
HSA #	HSA Name	Total Members	Discharges	Crude Rate	Age-Adjusted Rate	95% Confidence Limits		Discharges	Crude Rate	Age-adjusted Rate	95% Confidence Limits	
						LCL	UCL				LCL	UCL
1	Portland	74655	150	20.1	17.3	14.3	20.3	120	16.1	14	11.3	16.7
2	Bangor	52321	121	23.1	23.4^	19.2	27.6	99	18.9	18.4^	15	22.4
3	Lewiston	49726	79*	15.9	13.5^	10.7	16.8	71	14.3	12.2	9.5	15.4
4	Augusta	31089	65*	20.9	21.4	16.5	27.3	48	15.4	15.5	11.4	20.6
5	Waterville	30423	47*	15.4	16.4	12.1	21.8	40	13.1	14.1	10.1	19.2
6	Biddeford	22086	35*	15.8	16.9	11.8	23.5	30	13.6	14.4	9.7	20.6
7	Rockland	18465	34*	18.4	18.6	12.9	26	27	14.6	13.4	8.8	19.5
8	Brunswick	10924	11*	10.1	10.8	5.4	19.3	7	6.4	6.2	2.5	12.8
9	Farmington	17380	27*	15.5	14.4	9.5	21	20	11.5	11.2	6.8	17.3
10	Skowhegan	19380	33*	17	19	13.1	26.7	31	16	17.9	12.2	25.4
11	Presque Isle	11429	21*	18.4	17.3	10.7	26.5	15	13.1	11.4	6.4	18.8
12	Rumford	8060	10*	12.4	11.5	5.5	21.2	9	11.2	9.5	4.3	18
13	Bath	7175	33*	46	47.4^	32.6	66.6	23	32.1	28.1^	17.8	42.2
14	Sanford	14724	24*	16.3	13.8	8.8	20.5	21	14.3	12.6	7.8	19.3
15	Dover-Foxcroft	12500	24*	19.2	19.7	12.6	29.3	20	16	15.6	9.5	24.1
16	Houlton	11772	23*	19.5	17.6	11.2	26.4	21	17.8	16.4	10.2	25.1
17	Caribou	10422	28*	26.9	25	16.6	36.1	24	23	20.8	13.3	30.9
18	Fort Kent	7679	8*	10.4	12.8	5.5	25.2	7	9.1	10.8	4.3	22.3
19	Machias	9802	16*	16.3	13.9	7.8	22.9	15	15.3	12.6	7.1	20.8
20	Fort Fairfield	4006	13*	32.5	26.1	13.9	44.6	13	32.5	26.1	13.9	44.6
21	Calais	9104	11*	12.1	13.9	6.9	24.9	10	11	13.2	6.3	24.3
22	Ellsworth	10594	38*	35.9	46.1^	32.6	63.3	23	21.7	25.9^	16.4	38.9
23	Pittsfield	9932	30*	30.2	25.6	17.3	36.5	28	28.2	24.4	16.2	35.3
24	Millinocket	5262	**	**	**	**	**	**	**	**	**	**
25	Belfast	9425	13*	13.8	16.8	8.9	28.6	11	11.7	13.5	6.7	24.2
26	Norway	11586	15*	12.9	17	9.5	28	12	10.4	13.1	6.8	22.9
27	Lincoln	7991	17*	21.3	22	12.8	35.2	12	15	16.3	8.4	28.5
28	York	5679	**	**	**	**	**	**	**	**	**	**
29	Bridgton	7246	15*	20.7	27.7	15.5	45.7	12	16.6	21	10.9	36.7
30	Blue Hill	4049	**	**	**	**	**	**	**	**	**	**
31	Bar Harbor	2406	**	**	**	**	**	**	**	**	**	**
32	Damariscotta	3090	**	**	**	**	**	**	**	**	**	**
33	Greenville	1135	**	**	**	**	**	**	**	**	**	**
34	Boothbay	1426	0					0				
100	Other	8615	**	**	**	**	**	**	**	**	**	**
98	Berwicks/Border Towns*	5401	**	**	**	**	**	**	**	**	**	**
	State of Maine	526954	970	18.4	18.1	16.9	19.3	794	15.1	14.4	13.4	15.4

*Confidence Interval based on Poisson distribution.

**Indicates 5 or fewer events.

^ Indicates statistically different than state rate.

Data source: Maine Health Information Center (MHIC).

LCL = Lower Confidence Limit.

UCL = Upper Confidence Limit.

Table 11.

Maine

HEDIS Measure: Appropriate Medications for People with Asthma

Commercial Insured and MaineCare Rates by Age Category

1999-2000

Payer	Age Category	1999				2000					
		Total Population	# Asthmatics	Rate/1,000	# w/Controller	HEDIS %	Total Population	# Asthmatics	Rate/1,000	# w/Controller	HEDIS %
Commercial	5-9	3836	107	27.9	71	66.4	3433	99	28.8	76	76.8
	10-17	7487	239	31.9	147	61.5	7141	180	25.2	108	60
	18-56	32660	900	27.6	585	65.0	33212	852	25.7	549	64.4
	Total	43983	1246	28.3	803	64.5	43786	1131	25.8	733	64.8
Medicaid	5-9	14739	706	47.9	431	61.1	14914	738	49.5	482	65.3
	10-17	21623	1059	49.0	651	61.5	23723	1264	53.3	780	61.7
	18-56	42270	3176	75.1	2062	64.9	43347	3506	80.9	2308	65.8
	Total	78632	4941	62.8	3144	63.6	81984	5508	67.2	3570	64.8

*Data source: Maine Health Information Center (MHIC).

Table 12.

HEDIS Measure: Appropriate Medications for People with Asthma
MaineCare, Maine 2000

County	# Asthmati cs	# w/Control ler	Expect ed	O/E Ratio	Percent	Adjusted Percent
Androscog gin	916 1162	636 838	641 821	0.99 1.02	69.4 72.1	68.5 70.5
Aroostook	1313	913	917	1.00	69.5	68.8
Cumberla nd	232 286	163 201	162 200	1.01 1.00	70.3 70.3	69.5 69.3
Franklin	910	617	635	0.97	67.8	67.1
Hancock	246	187	172	1.09	76.0	75.1
Kennebec	191	139	134	1.04	72.8	71.7
Knox	423	291	292	1.00	68.8	68.8
Lincoln	1497	1012	1030	0.99	67.6	67.8
Oxford	181	134	129	1.04	74.0	71.8
Penobscot	204	148	142	1.04	72.6	71.8
Piscataqui s	635 312	461 238	445 219	1.04 1.09	72.6 76.3	71.5 74.9
Sagadah o	410	268	292	0.92	65.4	63.5
York	839	573	588	0.98	68.3	67.3
Somerset						
Waldo						
Washingto n						

*Data Source: Maine Health Information Center (MHIC).

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