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ASTHMA IN NEBRASKA

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DEFINITION OF TERMS USED IN THIS REPORT

BRFSS: Nebraska Behavioral Risk Factor Surveillance System

CDC: Centers for Disease Control and Prevention

CSTE: Council of State and Territorial Epidemiologists

DataScan: Software package purchased through the MEDSTAT Group by the Nebraska Medicaid program to analyze Medicaid and Medicaid Managed Care data

DataTrac: Proprietary software maintained by Blue Cross/Blue Shield of Nebraska for submitting claims data to the Nebraska Hospital Information System and third party payers

Encounter Data System: A mechanism for providers in a Managed Care Organization (MCO) to document the services they provide to health plan enrollees

ER: Emergency room

ICD-9-CM: International Classification of Diseases, Clinical Modification, 9th Revision, 1998

IP: Inpatient hospital discharge

MEDSTAT Group: A health information company the State of Nebraska's Medicaid program contracts with to provide Medicaid data

MMWR: Morbidity and Mortality Weekly Report, published by the Centers for Disease Control and Prevention

NAHHS: Nebraska Association of Hospitals and Health Systems

NHHSS: Nebraska Health and Human Services System

NHIS: Nebraska Hospital Information System – proprietary database maintained by the NAHHS

Primary Prevention: Health measures to protect individuals from becoming ill (i.e., immunizations)¹

Rural: Nebraska counties other than Lancaster, Douglas and Sarpy counties

Secondary prevention: Health measures directed to early detection of

disease (i.e., mammograms)¹

Surveillance: The ongoing scrutiny, generally using methods distinguished by their practicability, uniformity, and frequently their rapidity, rather than by complete accuracy. Its main purpose is to detect changes in trends or distribution to initiate investigative or control measures^{2,3}

Tertiary prevention: Health measures directed to prevent disability and death (i.e., medical treatment and rehabilitation)¹

Urban: Douglas, Lancaster and Sarpy counties

USDHHS: United States Department of Health and Human Services

EXECUTIVE SUMMARY

Asthma is a chronic inflammatory disease of the airways characterized by recurrent respiratory symptoms and variable airflow obstruction that is reversible spontaneously or with treatment.⁴

(Nebraska asthma mortality was the second highest in the nation during the 1990-1995 period.⁵)

In the US, asthma is one of the leading causes of school absenteeism and is also the leading work-related lung disease.⁶ A recent study estimated that the cost of asthma in 1996 was \$11 billion.⁶ In 1998, asthma affected 17 million US residents; of these, 112,100 were Nebraskans.⁷

Asthma has been identified as an important public health problem; however, no comprehensive surveillance system exists to determine asthma trends at the national, state or local level.⁸ It is now recognized that implementation of better state and local surveillance can increase understanding of this disease and contribute to more effective treatment and prevention strategies.⁵

The purpose of this first “Asthma In Nebraska” report is to assist the Nebraska Health and Human Services System in establishing the baseline for a statewide asthma surveillance system and provide state-specific data for policy makers and health care professionals.

Information from Nebraska death certificates, Nebraska hospital discharge records, Nebraska Medicaid claims and

Medicaid Managed Care encounter records and the Nebraska Behavioral Risk Factor Surveillance System was analyzed to produce this report. The results show that:

- Overall, Nebraska’s asthma mortality rate was higher than the US rate during the 1987-1998 period.
- From 1987 through 1998, the asthma mortality rate for those 65 and older was higher in Nebraska than in the US.
- From 1993-1995 to 1996-1998, Nebraska’s asthma mortality rate increased, while the US rate decreased.
- In Nebraska and the US, the highest asthma mortality rate occurred among those 65 years of age and older, among blacks, and among females.
- The 1996-1998 asthma mortality rates in Nebraska for all age groups were higher than the US baseline and the US 2010 target.⁹
- The 1998 Nebraska asthma ER visit and hospitalization rates were below the US baseline rates and the US 2010 objectives.

The results also show the following in Nebraska:

- In 1999, over 75,000 adults had asthma.
- The average annual asthma mortality rate during the 1996-1998 period

was highest among blacks, females, persons 65 and older, and persons who resided in urban communities.

- In 1998, the rate of emergency room visits for asthma was highest among females, children 5-14 years of age, and patients residing in urban communities.
- In 1998, the rate of hospitalizations for asthma was highest among females, children 0-4 years of age, and patients residing in rural communities.
- In 1999, the prevalence of self-reported asthma among Nebraska adults was highest for females and those 18-34 years of age.
- The number of emergency room visits peaked in May and October, while the number of Medicaid office visits peaked in April and November.

The US Department of Health and Human Services (USHSS)⁶ and the US Surgeon General¹⁰ support the establishment of asthma surveillance systems at national, state, and local levels.

The Nebraska Health and Human Services System is coordinating asthma prevention and control efforts with the American Lung Association of Omaha, the Lincoln Asthma Education Initiative, and other community-based organizations. A statewide asthma surveillance system is essential for designing, implementing and maintaining an asthma prevention and control program for the state.

INTRODUCTION

Purpose

The purpose of this first “Asthma In Nebraska” report is to assist the Nebraska Health and Human Services System in establishing the baseline for a statewide asthma surveillance system and provide state-specific data for policy makers, public health program administrators and health care professionals.

Public health impact of asthma

Asthma is a chronic inflammatory disease of the airways characterized by recurrent respiratory symptoms (e.g., wheezing, breathlessness, chest tightness, coughing) and variable airflow obstruction that is reversible spontaneously or with treatment.⁴

According to the most recent national asthma surveillance report released by the Centers for Disease Control and Prevention (CDC),⁵ the prevalence and death rates for asthma have increased throughout the United States. Asthma prevalence increased from 3.07 percent in 1980 to 5.38 percent during 1993-1994.⁵ It is estimated that in 1998, there were 17 million persons with asthma in the US, and 112,100 of those were Nebraskans.⁷ The national asthma mortality rate increased from 8.2 per million population during 1975-1978 to 17.9 per million during 1993-1995.⁵

During the 1990-1995 period, Nebraska had the second highest asthma mortality rate in the nation.⁵

Despite a better understanding of the functional changes caused by this disease in the human body, and advances

in its treatment, the prevalence, morbidity, and mortality of asthma all continue to rise.¹¹

According to the US Department of Health and Human Services, asthma affects Americans of all ages, races, and ethnic groups; however, low-income and minority populations have substantially higher death rates, hospital admissions, and emergency room visits for asthma.⁶

It is estimated that asthma affects 4.4 million children, and it is one of the leading causes of school absenteeism, accounting for over 10 million missed school days annually.⁶

Asthma is also the most common occupational lung disease in the US. Recent evidence suggests that, in some areas of the country, as much as 20 percent of adult-onset asthma may be work-related.⁶ A study conducted in 1998 estimated the cost of asthma to be over \$11 billion per year.⁶

Asthma is of interest to the public health community because it is a disease with recurrent exacerbation that may be prevented or ameliorated with appropriate interventions.¹²

Lack of surveillance systems for asthma

Although asthma has been identified as an important national public health problem, no comprehensive surveillance system exists to determine asthma trends at the national, state or local level.⁸ Surveillance information is essential to measure the public health impact of asthma, monitor the disease, and plan and assess prevention and control strategies.

Implementation of better state and local surveillance for asthma can increase understanding of this disease and contribute to more effective treatment and prevention strategies.⁵ However, a survey conducted by the Council of State and Territorial Epidemiologists (CSTE) and CDC during March and April 1996 indicated that most states lack the funding and data necessary to develop asthma surveillance programs.⁸

Current activities

In 1997, the US Department of Health and Human Services convened a work-group to assess the most urgent needs and opportunities for tackling the growing problem of asthma.⁶

In 1998, the CDC initiated a program to coordinate asthma-related activities, including asthma surveillance throughout the United States. As part of this effort, each state was asked to designate an individual to serve as a state asthma contact. States were also encouraged to use existing surveillance systems i.e., deaths certificates, hospital discharge data, and data available from the Behavioral Risk Factor Surveillance System (BRFSS) and other surveys to assess asthma in their communities.

The Council of State and Territorial Epidemiologists recommends that.¹³

1. asthma mortality and hospital discharges be placed under nationwide surveillance as part of the National Public Health Surveillance System;

2. state mortality and hospital discharge data be used to monitor asthma deaths and hospitalizations; and
3. telephone surveys, such as BRFSS or school surveys, be used to monitor asthma prevalence.

Consistent with the national recommendations, in November 1998 the Nebraska Health and Human Services System assigned an individual as the state asthma contact. In June 1999, the NHHSS established an Asthma Team, which includes representatives from various NHHSS programs and from community organizations.¹⁴

Defining the incidence of, response to, and public health importance of asthma was one of the team's first responsibilities.

This first ever "Asthma in Nebraska" report is intended to assist NHHSS in establishing the baseline for a statewide asthma surveillance system.

METHODOLOGY

To prepare this report we used information from the following data sources: the NHHSS death certificates, the Nebraska Hospital Information System (ER and IP records), the Nebraska Medicaid claims and Medicaid Managed Care encounter data systems, and the Nebraska BRFSS.

Asthma deaths

We used death certificate files maintained by NHHSS to obtain information on asthma-related deaths. The death certificate files provide

records of all deaths that occur in Nebraska. All death records of Nebraska residents who died from asthma between 1987 through 1998 were included in this review.

Due to the relatively small number of deaths from asthma that occur in Nebraska each year, we grouped the number of deaths by three-year intervals. This grouping of death records also permitted us to compare our results with those included in the "Surveillance For Asthma—United States, 1960-1995" report.⁵

We defined an asthma death as any death certificate of a Nebraska resident who died during the 1987-1998 period, with an asthma diagnosis code (ICD-9 Code¹⁵ 493.0-493.9) listed as the underlying cause of death.

Emergency room visits (ER) and hospital inpatient (IP) discharges

Nebraska acute care hospitals report ER and IP information to the Nebraska Association of Hospitals and Health Systems (NAHHS). This information is reported by hospitals using the Uniform Billing Form (UB-92) and is transmitted electronically to the Nebraska Hospital Information System at NAHHS, using the DataTrac software.

The ER and IP information is acquired by NHHSS from NAHHS. That information includes date of admission, date of discharge, patient's age, gender and county of residence, and ICD-9-CM¹⁵ diagnosis codes. The information does not include patient identifiers.

To facilitate the analysis, we used an encrypted patient identifier to separate first from subsequent emergency room

visits and hospitalizations on an annual basis. This encrypted identifier was provided to us by the NHIS.

Previous analyses have shown that the number of records reported by acute care hospitals to the NHIS is lower than the number of records the same hospitals report to the NHHSS annually.

The NHHSS annual survey collects only the number of ER or IP records but does not include patients' demographics, diagnoses, treatments, or other related information, that can be used for disease surveillance purposes.

In 1998, ER and IP records reported to the NHIS represented 65% and 91%, respectively, of those reported to the NHHSS annual survey. We used information from the 1998 NHIS, ER, and IP files for this report.

We defined an asthma ER visit as an ER record of a Nebraska resident who was dismissed from a Nebraska acute care hospital emergency department during 1998 with an asthma diagnosis code (ICD-9-CM Codes: 493.0-493.99) as the first listed diagnosis.

We defined an asthma hospitalization (IP) as a hospital discharge record of a Nebraska resident discharged from a Nebraska acute care hospital during 1998 with an asthma diagnosis code (ICD-9-CM Codes: 493.0-493.99) as the first listed diagnosis.

Medicaid office visits

The Medicaid program is a partnership of federal and state government that funds approved health care and related services for individuals who meet eligibility requirements. Physicians and

other health care providers submit information to the state or to insurance companies contracting with the state. That information includes the primary reason for office visits, which is coded according the ICD-9-CM standardized coding system.

Information from 1997 to 2000 is maintained in the DataScan database, which is managed by the MEDSTAT Group and made available to the Nebraska Medicaid program.

We defined an asthma office visit as a face to face visit between an individual enrolled in the Nebraska Medicaid program and a primary care physician whose record had an asthma diagnosis code (ICD-9-CM Codes 493.0-493.99) as the first listed diagnosis.

In this report we looked at data for Medicaid clients enrolled in calendar year 1998. We included records of patients enrolled in the regular Nebraska Medicaid Program and patients enrolled in Medicaid Managed Care Programs.

Nebraska BRFSS

The BRFSS is a cross-sectional telephone survey of non-institutionalized adults 18 years of age and older. The survey is conducted in all 50 states, the District of Columbia, and Puerto Rico. Further details about the purpose, sampling methodology, and statistical analysis of the BRFSS have been published previously elsewhere.¹⁶

Nebraska has conducted the BRFSS annually since 1982. A sample of 2,825 randomly selected Nebraska residents 18 years of age and older was interviewed via telephone in 1999. We used information from the 1999 Nebraska

BRFSS for this report and defined self-reported asthma as a positive response to the following two BRFSS survey questions:

1. “Did a doctor ever tell you that you had asthma?” and (for those answering “yes” to the first question)
2. “Do you still have asthma?”*

Rates

We calculated rates for asthma deaths, ER visits, hospitalizations, and self-reported asthma using census estimates provided by the US Census Bureau. We age-adjusted the rates to both the 1970 and the 2000 US standard populations to facilitate comparisons to the CDC Asthma Surveillance Report⁵ and the Healthy People 2010 Objectives,⁹ respectively.

To determine the rates of office visits for individuals enrolled in Medicaid, we selected as the numerator all office visits for which asthma (ICD-9-CM code 493.0-493.99) was identified as the primary reason for the visit during calendar year 1998. Then, from the Nebraska Medicaid Management Information System, we used the number of individuals enrolled in Medicaid on July 1, 1998 as the denominator.

RESULTS

Deaths

During the 12 year period of this study, 1,279 Nebraska residents died from asthma or asthma-related causes. Of

* Note that this methodology is different from that used by the authors of the “Forecasted State-Specific Estimates of Self-Reported Asthma Prevalence – United States, 1998.”⁷

these, 623 deaths (49%) were caused directly by asthma (asthma was listed as the primary cause of death on the death certificate). These 623 asthma deaths represented 0.46% of all 135,316 Nebraska deaths that occurred during the 12 year period. We examined these 623 asthma death records further, and the results are shown in Table 1.

From 1987 through 1998, Nebraska observed an overall increase of 14% in the number of asthma deaths, from 148 or 24.1 per million population during 1987-1989 to 169 or 27.2 per million population during 1996-1998. In Nebraska, asthma claimed an average of 52 deaths each year during that twelve-year period (Table 1).

Seventy percent or 436 of the 623 asthma deaths occurred among persons 65 and older. The average asthma mortality rate per million population during the 1996-1998 period was highest among blacks (118.3), females (28.9), persons 65 and older (161.4), persons who resided in urban communities (29.9), and persons who resided in the Eastern NHHSS Service Area (34.3). See Table 1 and Map 1.

Emergency room visits

The number of records for ER visits (including records with asthma as the first listed diagnosis) reported by acute care hospitals to the NHIS in 1998 represented 65% of all ER visit records reported by the same hospitals to the NHHSS annual survey that year (see Methodology section). Based on this finding, we estimated that the number of ER visits for asthma in Table 2A (3,801), represents about 65% of the actual number of ER visits for asthma that occurred in 1998. Of these 3,801

ER asthma records, 1,626 (43%) corresponded to males and 2,175 (57%) corresponded to females.

The following groups had the highest rates of ER visits for asthma per 10,000 population: females (27.8); patients 5-14 years of age (35.4); patients residing in the Eastern NHHSS Service Area (29.3), and patients residing in urban communities (28.0). See Table 2A and Map 2.

Inpatient discharges

The number of inpatient discharge records (including records with asthma listed as the first discharge diagnosis) reported by acute care hospitals to the NHIS in 1998 represented 91% of all inpatient discharge records reported by the same hospitals to the NHHSS annual survey that year (see Methodology section).

Again, based on this finding, we estimated that the number of asthma inpatient discharges in Table 3A (1,328) represents about 91% of the actual number of asthma inpatient discharges that occurred in Nebraska in 1998. Of these 1,328 asthma inpatient discharges, 468 (35%) were males and 860 (65%) were females.

The highest hospitalization rates per 10,000 population were observed among females (9.9); children 0-4 years of age (13.6); patients residing in the Southwest NHHSS Service Area (9.0); and patients residing in rural communities (8.2). See Table 3A and Map 3.

Office visits for Medicaid-enrolled individuals

The number and rate of office visits for asthma per 1,000 individuals enrolled in

the Nebraska Medicaid Program is shown in Table 4A. In calendar year 1998, the total number of office visits for asthma for this segment of the Nebraska population was 21,515. Males accounted for 9,510 (44%) and females accounted for 12,005 (56%) of all asthma office visits. Females and those 35-64 years of age had the highest office visit rates (49.5 and 173.2, respectively).

Self-reported asthma among adults

According to the Nebraska BRFSS, the highest prevalence rate of self-reported asthma per 1,000 population occurred among females (74.2), those 18-34 years of age (67.1), and in the Northern NHHSS Service Area (69.3) See Table 5.

The overall prevalence of self-reported asthma among adult Nebraskans was 62.4.

Seasonal variation

Figures 1A and 1B show the seasonal variation of asthma in the state during 1998, in terms of the number of Medicaid office visits, emergency room visits, and inpatient discharges.

Medicaid office visits for asthma reached a peak in November, and the final three months (October, November and December) were higher than the remaining months of the year. A second peak was observed in March and April.

Although emergency room visits were also relatively more frequent late in the year, reaching a peak in October, there was a considerable increase during April, May and June. Inpatient discharges were higher in January and February.

Counting individuals with asthma

Individuals visiting the ER

The results show that 3,154 individuals were treated for asthma in the ER of Nebraska acute care hospitals in 1998 (see Table 2B and Methodology section). Of these, 1,364 (43%) were males and 1,790 (57%) were females.

Table 2B also shows that the rate of individuals treated in the ER for asthma per 10,000 population was higher for females (23.0) and for those in the 5-14 age group (30.9).

The overall rate of individuals seen for asthma in the ER was 20.5 per 10,000 population (Table 2B).

The average number of visits to the ER per patient was about the same for both females (1.22) and males (1.19). The highest average occurred among the 15-34 year group (1.26). The overall average number of ER visits was 1.21 per patient (Table 2C).

Individuals discharged from a hospital

The results also show that 1,187 asthma patients were discharged from Nebraska acute care hospitals in 1998 (see Table 3B and Methodology section). Of these, 430 (36%) were males and 757 (64%) were females. The rate of individuals discharged with asthma as the first listed diagnosis per 10,000 population was highest for females (8.8) and children 0-4 years of age (12.7); the 15-34 age group had the lowest discharge rate (4.7). The overall discharge rate was 7.1 per 10,000 population (Table 3B).

The average number of asthma discharges per patient was highest for females (1.14) and for the 35-64 age group (1.19). The overall average number of asthma discharges was 1.12 discharges per patient (Table 3C).

Medicaid-enrollees' office visits

There were 8,204 individuals enrolled in the Nebraska Medicaid program with at least one office visit for asthma in 1998. They accounted for 21,515 office visits, yielding an average of 2.62 office visits per individual (Tables 4A, 4B and 4C).

In this segment of the Nebraska population, asthma also affected more females (4,595 or 56%) than males (3,609 or 44%). The highest rate of asthma patients per 1,000 Medicaid-enrollees was seen in the 5-14 age group (62.2). See Table 4B.

The average number of office visits per enrollee was about the same for males and females (2.64 vs. 2.61). See Table 4C.

The highest average number of office visits per enrollee occurred in the 35-64 age group (3.07). The overall average number of office visits per individual was 2.62. See Table 4C.

Self-reported asthma

Based on the 1999 Nebraska BRFSS, over 75,000 Nebraska adults had asthma that year (Table 5). This number represented 6 percent of the 1999 Nebraska adult population. Of these persons with asthma, 28,943 (38%) were males and 46,938 (62%) were females.

Comparing Nebraska and national results for asthma mortality

Nebraska's mortality rate for asthma was higher than the national rate during the twelve years included in this study (Table 6).

While the national asthma mortality rate remained almost unchanged during those years, Nebraska's rate increased from 24.1 per million population in 1987-1989 to 27.2 per million population in 1996-1998.

The results also show that both the US and Nebraska asthma mortality rates were higher among blacks, females, and persons 65 years of age and older. (Table 6 and Figure 2).

Comparing Nebraska and National 2010 Baselines/Targets*

Asthma mortality

Table 7A shows that for any given age group, Nebraska baselines for asthma mortality rates (1996-1998 period) were above the US 1998 baseline and above the National Year 2010 target.⁹

Emergency room visits

Nebraska's ER visit rates for 1998 were below the 1997 US baseline and below the US 2010 target. (Table 7B).

Inpatient discharges

Nebraska's hospital discharge rates for 1998 were below the 1997 US baseline. Except for the 65 and older group, the

* The comparison of asthma ER visits and IP discharges should be interpreted with caution due to under-reporting—see Methodology section.

Nebraska hospital discharge rates were also below the US 2010 target (Table 7C).

DISCUSSION

The impact of asthma

Nebraska's asthma mortality rate is the second highest in the nation,⁵ and from 1993-1995 to 1996-1998, Nebraska's rate increased while the US rate decreased (Table 6 and Figure 2). The results from this study have confirmed the CDC's findings regarding asthma mortality in Nebraska.

The highest number of deaths from asthma and the highest asthma mortality rates in Nebraska and the US occurred among persons 65 years of age and older (Tables 1 and 6).

Concerns have been expressed by some members of the public health community regarding the diagnosis of asthma as the underlying cause of death in the death certificate of children under 5 years of age or persons 35 years and older. Some authors think that, for children under 5 years of age, asthma may not be easily distinguished from bronchiolitis and bronchitis, which can lead to airway obstruction and wheezing.¹⁷ Some of the asthma deaths among those 35 years of age and older may in fact be due to chronic obstructive pulmonary disease, particularly among older persons.⁵

However, a recent study¹⁸ concluded that, at least in the US, death certificate diagnosis of asthma as the underlying cause of death has low sensitivity but a high specificity. These findings may suggest that increases in mortality due to asthma are not likely to be caused by

false-positive diagnoses of asthma and that there may be instead an under-estimation of actual asthma-related mortality.¹⁹

During the twelve-year period of this review, both in Nebraska and the US, the asthma mortality rate increased with age, and proportionally, more blacks than any other identified race or ethnic group died from asthma.

Both in Nebraska and the US, females were disproportionately affected by asthma. More females than males have asthma, visited the doctor's office for asthma, were seen in the emergency room for asthma, were admitted to the hospital due to asthma, and died from asthma.

Further results show that Nebraska's ER visit and hospitalization rates for asthma are considerably below the national asthma baselines and the national asthma objectives for the year 2010.

Even with the under-reporting of ER and IP records in 1998, these results can be used for planning strategies to significantly impact the burden of asthma in Nebraska, e.g., by identifying geographic areas in the state with high rates of ER visits and/or hospitalizations for asthma.

Seasonal variations

It is interesting that the number of emergency room visits and the number of Medicaid office visits varied throughout the year, along with the climate (Figures 1A and 1B). Changes in climate are important because they are directly related to the amount of allergens present in the environment. Environmental factors are important in

the onset and persistence of asthma.^{19, 20} For example, a damp and warm climate is favorable to mite and mold growth.¹⁹ Further investigation of these seasonal variations could lead to the identification of both indoor and outdoor specific risk factors for individuals who have asthma.

Geographic distribution

In 1998, the Eastern NHHSS Service Area had the highest asthma mortality rate (Map 1) and the highest ER visit rate (Map 2). However, the highest hospitalization rate occurred in the Southwest NHHSS Service Area (Map 3), and the highest prevalence rate of self-reported asthma occurred in the Northern NHHSS Service Area (Table 5).

All these findings are important because asthma is a multi-factorial disease that has been associated with familial, infectious, allergenic, socioeconomic, psychosocial, and environmental factors. These results can help in planning and implementing public health interventions aimed at preventing disability and premature death from asthma.

About the data sources

Death certificates are among the most reliable sources of information available to study mortality trends.²¹ However even this source has limitations. For example, the death certificate records used for this report were often missing information on occupation and tobacco use.

As discussed in the Methodology section, the information reported by participating hospitals to the NHIS represented 91% of all inpatient records and 65% of all ER records reported by the same hospitals to the NHHSS annual survey in 1998.

Improvement in the reporting of hospital discharge records along with the inclusion of

additional data elements i.e., race and ethnicity, would help advance understanding the burden of asthma in Nebraska. It would also assist in the design, implementation and evaluation of effective intervention strategies.

We used Medicaid program information for this report knowing that Medicaid program enrollees do not necessarily represent the Nebraska population. However, the results can help establish a baseline and perhaps be used for comparison purposes with Medicaid programs in other states, although eligibility requirements and participation levels may vary widely among states.

The BRFSS is a useful tool for estimating the prevalence of important risk factors and diseases in the adult population. However, it excludes children. It is necessary to include children in surveys to complete the assessment of asthma prevalence in Nebraska.

An asthma surveillance system

One of the Healthy People 2010 objectives (Objective 24-8) reads: “Establish in at least 15 states a surveillance system for tracking asthma death, illness, disability, impact of occupational and environmental factors on asthma, access to medical care, and asthma management.”⁹

Information from death certificates permitted us to identify the trends in asthma mortality in Nebraska during the 1987-1998 period.

Due to limitations in the amount of information available from NHIS, BRFSS and Medicaid files, we did not highlight trends using these data sources. However, using information from the 1998 NHIS, 1998 Medicaid, and 1999 BRFSS files, we were able to establish a starting point from

which a statewide asthma surveillance system can be developed.

The establishment and maintenance of a statewide asthma surveillance system can assist public health program administrators and policymakers to monitor asthma trends, identify priority areas for intervention, evaluate the effectiveness of those interventions, and make necessary adjustments.

Disease surveillance is an essential component of public health assessment. It is one of the core elements of public health.

Action against asthma in the US

The US Department of Health and Human Services⁶ has established the following four priority areas for investment to address the asthma problem.

- Determine the causes of asthma and develop interventions to prevent its onset.
- Reduce the burden for people living with asthma.
- Eliminate the disproportionate burden of asthma in minority populations and those living in poverty.
- Track the disease and assess the effectiveness of asthma intervention programs.

Multiple efforts are underway in the US in each of these four priority areas. Important research activities are being conducted in the fields of prevention (primary, secondary and tertiary), genetics, and the environment. Priority is being given to investigating the reasons why asthma is so prevalent among minority populations and among those living in poverty.

Along with other strategies to reduce the burden for people living with asthma, the US Department of Health and Human Services recommends the widespread use of the National Heart, Lung and Blood Institute's Guidelines for the Diagnosis and Management of Asthma.⁶

The USDHHS also believes that surveillance is critical to research and public health practice, and recommends the establishment of coordinated and systematic local, state and national systems for asthma surveillance.⁶ Along these lines, the US Surgeon General has declared that the tracking and monitoring of asthma (i.e., surveillance) has to be the first step in the fight against asthma.¹⁰

The CDC recommends statewide coordination and establishment of asthma coalitions at the state level.⁵ Asthma coalitions with statewide representation can assist state health departments in the formulation and implementation of a statewide action plan for asthma prevention and control. The USDHHS recommends⁶ that such action plans include the promotion of current knowledge to diagnose and manage asthma.

Action against asthma in Nebraska

As mentioned in the Introduction section of this report, NHHSS effort includes the creation of the NHHSS Asthma Team.¹⁴ The American Lung Association of Nebraska, the Lincoln Community Asthma Education Initiative and other community-based organizations interested in asthma control and prevention are members of the NHHSS Asthma Team. This team has requested funds from governmental and

private organizations to support asthma control and prevention activities in various communities in Nebraska. Both Lincoln and Omaha have community asthma coalitions to address the problem of asthma-related illnesses.

A statewide initiative is now needed to coordinate strategies to fight asthma in all Nebraska communities.

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APPENDIX (Tables, figures and maps)

Table 1. Number and rate* of asthma deaths by race, sex, age group, service area, and county type. Nebraska. 1987-1998. N = 623.

Category	1987--1989		1990--1992		1993--1995		1996--1998	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Race**								
White	137	22.6	143	23.3	139	22.7	146	23.8
Black	11	69.9	7	45.3	14	82.3	21	118.3
Other	0	0.0	2	25.4	1	8.7	2	22.5
Sex**								
Male	64	24.1	62	23.4	61	22.4	66	24.7
Female	84	24.5	90	25.5	93	27.2	103	28.9
Age group (yrs)								
0--4	1	2.8	0	0.0	0	0.0	1	2.9
5--14	1	1.3	2	2.7	1	1.3	6	8.0
15--34	10	7.0	12	8.5	13	9.4	13	9.4
35--64	29	18.4	22	13.9	38	22.5	38	21.0
65 and up	107	158.9	116	172.2	102	149.1	111	161.4
Service Area**								
Central	10	10.6	23	24.4	16	15.7	24	26.7
Eastern	51	30.6	45	27.0	51	28.6	62	34.3
Northern	36	29.7	33	27.2	24	20.2	33	26.9
Southeast	29	17.8	30	18.4	44	36.4	34	20.3
Southwest	12	29.9	12	29.9	11	21.3	11	22.7
Western	10	24.6	9	22.1	8	22.7	5	12.1
County Type**								
Rural	90	23.3	97	25.1	92	22.8	92	24.0
Urban	58	23.3	55	22.1	62	24.6	77	29.9
TOTAL**	148	24.1	152	24.4	154	24.9	169	27.2

Source: Death certificate, Nebraska Health and Human Services System

*Rates per million population annually

**Rates are age-adjusted to the 1970 US standard population

Table 2A. Number and rate* of emergency room visits for asthma by sex, age group, service area, and county type. Nebraska. 1998.

Category	Number	Rate
Sex**		
Male	1626	22.6
Female	2175	27.8
Age group (yrs)		
0—4	371	32.6
5—14	883	35.4
15—34	1308	28.3
35—64	972	16.2
65 and up	267	11.6
Service Area** ***		
Central	379	18.1
Eastern	1647	29.3
Northern	417	16.4
Southeast	987	24.5
Southwest	180	18.3
Western	183	19.4
County Type** ***		
Rural	1525	19.0
Urban	2268	28.0
TOTAL**	3801	24.6

Source: Nebraska Association of Hospitals and Health Systems

*Rates per 10,000 population

**Rates are age adjusted to the 1970 US standard population

***Excludes 8 records for which place of residence was not identified

Table 2B. Number and rate* of individuals seen for asthma in emergency rooms by sex and age group. Nebraska. 1998.

Category	Number	Rate
Sex**		
Male	1364	19.1
Female	1790	23.0
Age group (yrs)		
0--4	343	30.1
5--14	770	30.9
15--34	1037	22.4
35--64	784	13.0
65 and up	220	9.6
TOTAL**	3154	20.5

Source: Nebraska Association of Hospitals and Health Systems

*Rates per 10,000 population

**Rates are age adjusted to the 1970 US standard population

Table 2C. Average number of ER visits for asthma per individual seen at least once, by sex and age groups. Nebraska. 1998.

Category	Average number Of visits
Sex	
Male	1.19
Female	1.22
Age group (yrs)	
0--4	1.08
5--14	1.15
15--34	1.26
35--64	1.24
65 and up	1.21
TOTAL	1.21

Source: Nebraska Association of Hospitals and Health System

Table 3A. Number and rate* of asthma in-patient discharges by sex, age group, service area, and county type. Nebraska. 1998.

Category	Number	Rate
Sex**		
Male	468	6.3
Female	860	9.9
Age group (yrs)		
0—4	155	13.6
5—14	214	8.6
15—34	237	5.1
35—64	414	6.9
65 and up	308	13.4
Service Area** ***		
Central	168	7.0
Eastern	501	8.7
Northern	216	6.9
Southeast	249	5.8
Southwest	101	9.0
Western	89	8.6
County Type** ***		
Rural	676	8.2
Urban	648	7.4
TOTAL**	1328	7.9

Source: Nebraska Association of Hospitals and Health Systems

*Rates per 10,000 population

**Rates are age adjusted to the 1970 US standard population

***Excludes 4 records for which place of residence was not identified

Table 3B. Number and rate* of individuals discharged from hospitals for asthma by sex and age group. Nebraska. 1998.

Category	Number	Rate
Sex**		
Male	430	5.9
Female	757	8.8
Age group (yrs)		
0--4	145	12.7
5--14	195	7.8
15--34	218	4.7
35--64	349	5.8
65 and up	280	12.2
TOTAL**	1187	7.1

Source: Nebraska Association of Hospitals and Health Systems

*Rates per 10,000 population

**Rates are age adjusted to the 1970 US standard population

Table 3C. Average number of hospital discharges for asthma per individual discharged at least once by sex and age group. Nebraska. 1998

Category	Average number of discharges
Sex	
Male	1.09
Female	1.14
Age group (yrs)	
0--4	1.07
5--14	1.10
15--34	1.09
35--64	1.19
65 and up	1.10
TOTAL	1.12

Source: Nebraska Association of Hospitals and Health Systems

Table 4A. Number and rate* of office visits for asthma among Medicaid enrollees, by sex and age group. Nebraska. 1998.

Category	Number	Rate
Sex**		
Male	9510	38.1
Female	12005	49.5
Age group (yrs)		
0--4	5069	144.2
5--14	7261	165.6
15--34	4470	120.8
35--64	3950	173.2
65 and up	765	42.7
TOTAL**	21515	46.9

Source: Nebraska Medicaid Program

*Rates per 1,000 enrollees

**Rates are age adjusted to the 1970 US standard population

Table 4B. Number and rate* of Medicaid enrollees with at least one office visit for asthma, by sex and age group. Nebraska. 1998.

Category	Number	Rate
Sex**		
Male	3609	14.3
Female	4595	18.2
Age group (yrs)		
0--4	2058	58.5
5--14	2729	62.2
15--34	1845	49.8
35--64	1288	56.5
65 and up	284	17.3
TOTAL**	8204	17.3

Source: Nebraska Medicaid Program

*Rates per 1,000 enrollees

**Rates are age adjusted to the 1970 US standard population

Table 4C. Average number of office visits for asthma per individual in Medicaid seen at least once, by sex and age group. Nebraska. 1998.

Category	Average number of visits
Sex	
Male	2.64
Female	2.61
Age group (yrs)	
0--4	2.46
5--14	2.66
15--34	2.42
35--64	3.07
65 and up	2.69
TOTAL	2.62

Source: Nebraska Medicaid Program

Table 5. Estimated number and rate* of adults with self-reported asthma, by sex, age group, and service area. Nebraska. 1999.

Category	Number	Rate*
Race		
White	67038	58.2
Black	2176	49.8
Other &	6677	
Sex**		
Male	28943	49.5
Female	46938	74.2
Age group (yrs)		
0--4	n/a	n/a
5--17	n/a	n/a
18--34	25485	67.1
35--64	37090	60.6
65 and up	13306	58.0
Service Area**		
Central	8407	53.1
Eastern	22394	63.4
Northern	13351	69.3
Southeast	23786	66.8
Southwest	4391	52.3
Western	3552	46.3
County Type		
Rural	n/a	
Urban	n/a	
TOTAL**	75881	62.4

Source: Nebraska BRFSS

*Rates per 1,000 population

**Rates are age adjusted to the 1970 US standard population

Table 6. Comparison of US and Nebraska average annual death rates* for asthma by race, sex, and age group. 1987--1998.

Category	1987--1989		1990--1992		1993--1995		1996--1998	
	US	NE	US	NE	US	NE	US	NE
Race**								
White	14.2	22.6	14.6	23.3	15.1	22.7	13.9	23.8
Black	36.1	69.9	35.6	45.3	38.5	82.3	40.1	118.3
Other	17.6	0.0	18.7	25.4	17.7	8.7	22.0	22.5
Sex**								
Male	14.7	24.1	14.8	23.4	15.1	22.4	14.6	24.7
Female	18.2	24.5	18.9	25.5	20.0	27.2	19.1	28.9
Age group (yrs)								
0--4	1.5	2.8	2.1	0.0	1.8	0.0	2.0	2.9
5--14	2.9	1.3	3.0	2.7	3.7	1.3	3.4	8.0
15--34	4.9	7.0	5.3	8.5	6.3	9.4	8.8	9.4
35--64	19.0	18.4	18.5	13.9	19.6	22.5	18.9	21.0
65 and up	85.0	158.9	89.0	172.2	89.8	149.1	87.0	161.4
TOTAL**	16.6	24.1	17.1	24.4	17.9	24.9	17.2	27.2

Source: Nebraska Health and Human Services System and CDC report 5

*Rates per million population

**Rates are age-adjusted to the 1970 US standard population

Table 7A. Comparison of US and Nebraska baselines and US 2010 target asthma mortality rates* by age group.

Age group (years)	1998 US Baseline	1996--98 NE Baseline	2010 US Target
0--4	1.7	2.9	1
5--14	3.2	8.0	1
15--34	5.9	9.4	3
35--64	17.0	21.0	9
65 and up	87.5	161.4	60

Source: Healthy People 2010; Nebraska Healthy People 2010

*Rates per million population

Table 7B. Comparison of US and Nebraska baselines and US 2010 target asthma emergency room visit rates* by age group.

Age group (years)	1997 US Baseline	1998*** NE Baseline	2010 US Target
0--4	150.0	32.6	80
5--64**	71.1	23.8	50
65 and up	29.5	11.6	15

Source: Healthy People 2010; Nebraska Healthy People 2010

*Rates per 10,000 population

**Rates are age-adjusted to the 2000 US standard population

***65% reporting

Table 7C. Comparison of US and Nebraska baselines and US 2010 target asthma hospitalization rates* by age group.

Age Group (years)	1997 US Baseline	1998*** NE Baseline	2010 US Target
0--4	60.9	13.6	25
5--64**	13.8	6.6	8
65 and up	19.3	13.4	10

Source: Healthy People 2010; Nebraska Healthy People 2010

*Rates per 10,000 population

**Rates are age-adjusted to the 2000 US standard population

***91% reporting

Fig. 1A. Number of Medicaid office visits for asthma by month, Nebraska, 1998.

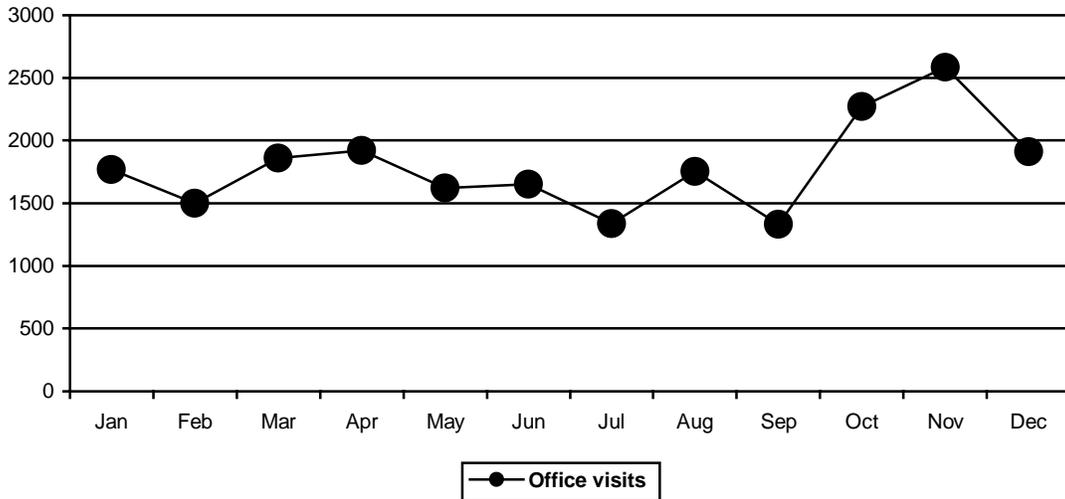


Fig. 1B. Number of emergency room visits and inpatient discharges for asthma by month, Nebraska, 1998.

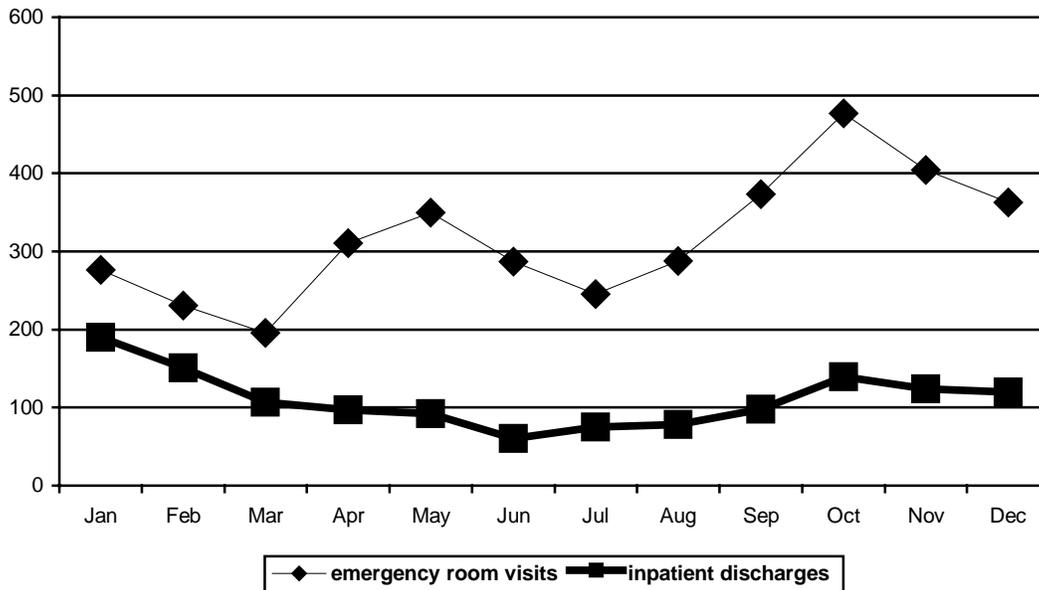
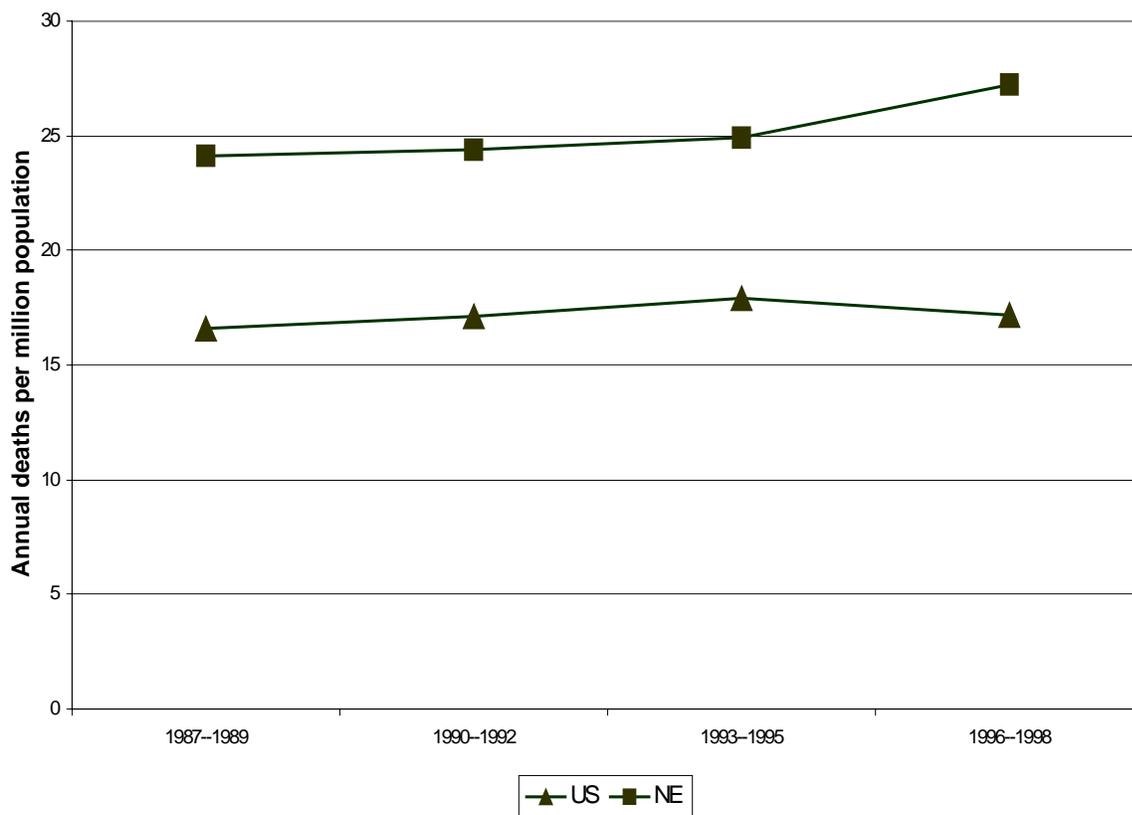
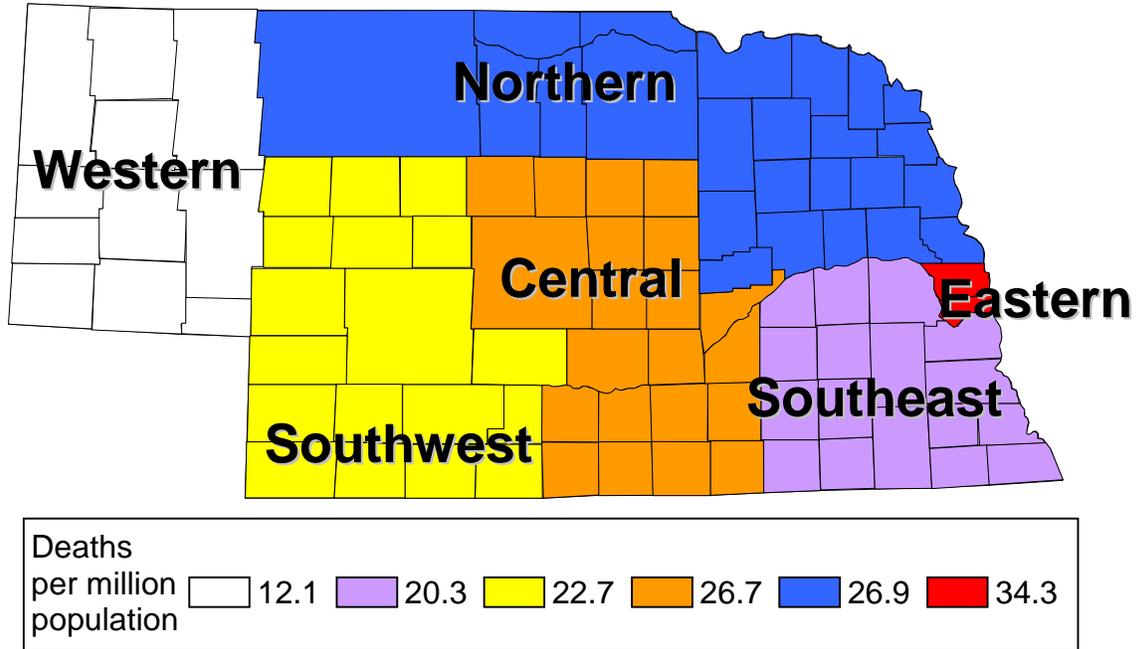


Fig 2. Comparison of US and Nebraska average annual death rates for asthma, 1987–1998.

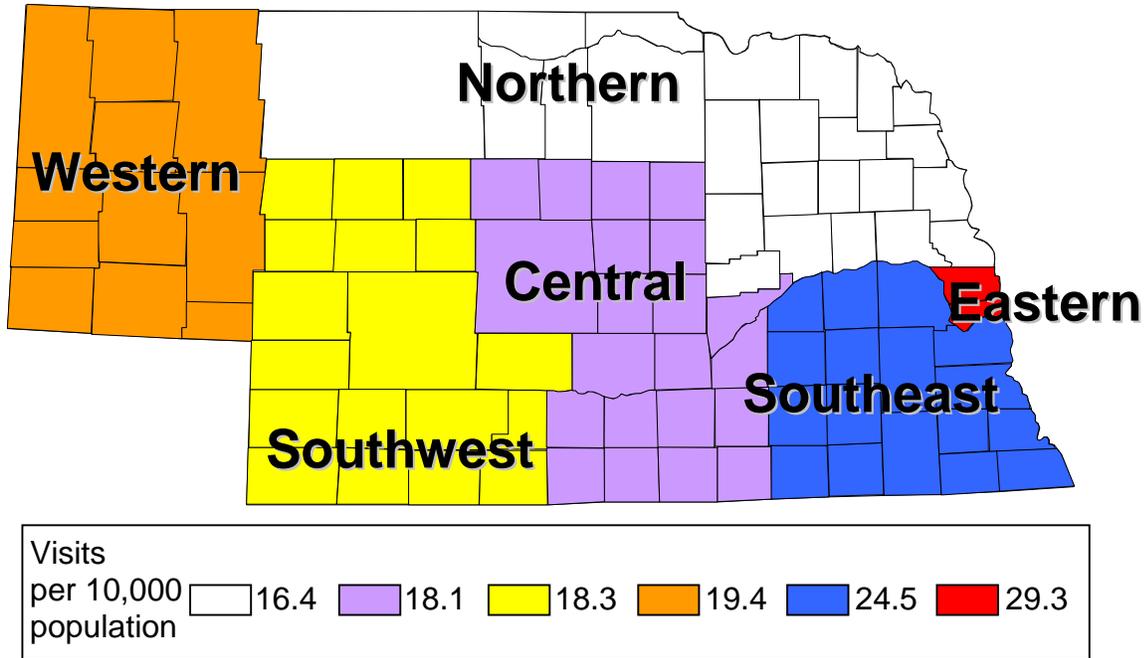


Map 1
**Asthma Death Rates,* by NHHSS Service Areas,
 Nebraska, 1996-1998.**



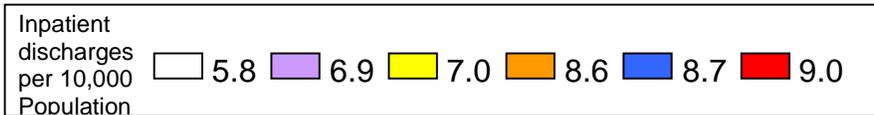
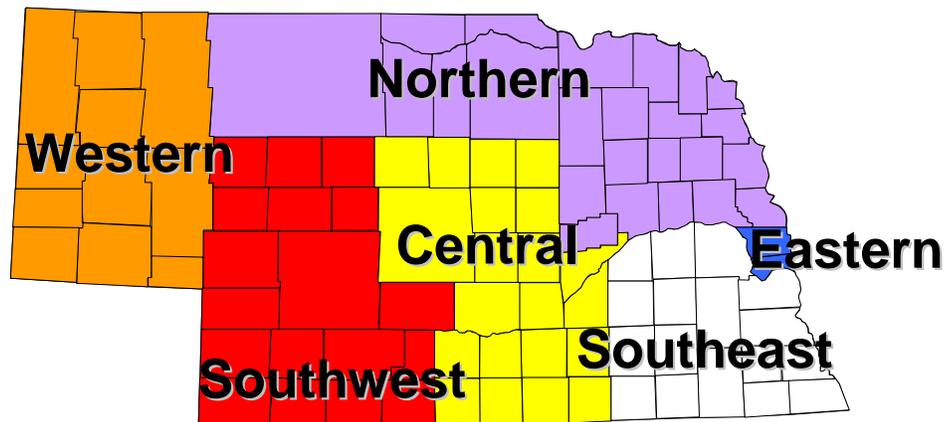
Nebraska Asthma Death Rate, during 1996-1998 = 27.2 per million population.
 *Age adjusted to 1970 US Standard Population.

Map 2
**Asthma ER Visit Rates,* by NHHSS Service Areas,
 Nebraska, 1998.**



Nebraska Asthma ER Visit Rate, in 1998 = 24.6 visits per 10,000 population.
 *Age adjusted to 1970 US Standard Population.

Map 3
**Asthma Hospital Inpatient Discharge Rates,* by NHHSS
 Service Areas, Nebraska, 1998.**



Nebraska Asthma Hospital Discharge Rate, in 1998 = 7.9 Discharges per 10,000 population.

*Age adjusted to 1970 US Standard Population.

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