The burden of Asthma in Oregon

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The Burden of Asthma in Oregon: 2010

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http://public.health.oregon.gov/DiseasesConditions/ChronicDisease/Asthma/Pages/burdenrpt.aspx.

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Chapter 1

Executive Summary

Asthma is a chronic lung disease that causes shortness of breath, coughing, and wheezing. Asthma symptoms occur when a person is exposed to a trigger such as tobacco smoke, animal fur or feathers, cockroaches, mold or mildew, poor outdoor air quality, and pollen. Asthma symptoms are controllable with quality health care, correct medications at the proper dosages, and good self-management skills. By controlling their asthma, people with the disease can live healthy and productive lives.

This report summarizes data from the Oregon asthma surveillance system. The data indicate that people without college educations, with low incomes, adult women, and groups with high smoking rates suffer a higher burden of asthma than other populations. Key findings are presented below.

Who Has Asthma

- In Oregon approximately 10.2% of adults and 9.5% of children have asthma. This means that more than 300,000 adults and 83,000 children in Oregon have asthma.
- Oregon has a higher burden of asthma than the overall United States. In 2009 Oregon was among the top five states with the highest percentage of adults with asthma.
- Adult females (11.7%) are more likely to have asthma than adult males (8.6%).
- African Americans (15.5%), American Indian/ Alaska Natives (15.2%), and homosexual or bisexual individuals (16.0%) are especially hard hit by asthma. All of these groups are known to have high smoking rates.
- Oregonians without a college education, with lower income, or are on Medicaid or the Children's Health Insurance Program (CHIP), are more likely to have asthma than Oregonians with higher incomes and education levels and other forms of insurance.

Asthma Management and Quality of Life

- Most adults and children understand how to manage their asthma. For example, 64.8% of adults and 72.7% of adults say that their children know what to do during an asthma attack or episode and most adults and children have been shown how to use their inhaler (97.7% and 91.4%). However, few children (34.4%) and even fewer adults (23.8%) have an asthma action plan or have taken an asthma management course or class (14.3% and 6.6%).
- All people with asthma should get an annual influenza shot. In 2009, approximately half of all adults with asthma received an influenza shot.
- Of Oregonians with private health insurance, 17.5% are overusing their inhaled rescue medications, whereas in the Medicaid and CHIP population, 35.7% are overusing their inhaled rescue medications.
- More than a quarter of adults with asthma report missing at least one day of work or usual activities during the last 12 months due to their asthma and 27.7% report missing at least one night of sleep during the last 30 days because of their asthma.
- Oregonians with asthma are more likely to report being in fair to poor health than people without asthma.

Asthma Risk Factors

- Oregonians who currently smoke are more likely to have asthma (12.3%) than those who have never smoked (9.7%). Tobacco smoke is an asthma trigger. People with asthma should not smoke or be exposed to secondhand smoke. Those who do smoke should be offered tobacco cessation assistance.
- Oregonians with asthma are exposed to secondhand smoke (18.4%) about as often as those without asthma (15.8%).
- Extremely obese people are twice as likely to report having asthma (19.5%) as compared to healthy weight individuals (7.2%).
- Most of the counties with the highest outdoor levels of fine particles and ozone in the outdoor environment are in the urban western areas of the state. However, some notable exceptions are seen in the eastern counties bordering Idaho. High levels of fine particles and ozone decrease lung function, can trigger asthma attacks, and increase emergency department visits for asthma. People with asthma can protect themselves by monitoring outdoor air quality and staying indoors and limiting strenuous activities as much as possible. Current air quality information can be found at www.airnow.gov/.

Asthma Emergency Department or Urgent Care Visits

- The percentage of Oregonians with asthma who had an emergency department visit due to asthma was approximately 14.1% in 2007. This is lower than the 2001 estimate of 17.1%.
- Females are more likely to have an emergency department visit than males.
- People on Medicaid or CHIP are much more likely to have an emergency department visit than people not on Medicaid or CHIP.
- Less than 40% of people who had an emergency department visit for asthma had a follow-up visit with a medical professional within 30 days after the emergency department visit, an important indicator for quality of care for people with asthma.

Asthma Hospitalizations

- The rate of asthma hospitalizations is stable in Oregon and is less than half the U.S. rate.
- Children 0-4 years of age and females have the highest rates of asthma hospitalizations.
- There are strong seasonal trends in asthma hospitalizations, with peaks in fall and spring.

Asthma Mortality

- In 2007, there were 64 deaths attributed to asthma. Until 2005, total deaths and the rate of deaths due to asthma had been steadily decreasing in Oregon. However, starting in 2006 there was a sharp increase. The reason for this increase is unknown.
- Females consistently have a higher asthma death rate than males.
- Oregonians ages 65 or greater were significantly more likely to die from asthma than those ages 18 to 64. No Oregonians less than eighteen years of age died from asthma.
- African Americans and American Indian/ Alaska Natives die at a higher rate (each higher than 23 per million) from asthma than whites (17 per million) in Oregon.

Asthma in Medicaid and the Children's Health Insurance Population

- Members of the Oregon Health Plan, which is composed of Medicaid and SCHIP, have a higher burden of asthma than the general Oregon population. The Oregon Health Plan is intended to help ensure that medical care is affordable for those with low incomes.[1] People with lower incomes are more likely to live in substandard housing, smoke, and have higher disease morbidity.[2]

- Emergency department visits and overuse of rescue medications are high and seem to show no improvement over time.

Cost of Asthma

- The total cost of asthma hospitalizations in 2008 was more than $28 million. The total cost and the average cost of an asthma hospitalization has steadily increased over time.
- Females account for 69.7% of the cost of asthma hospitalizations in 2008.
- People 35 years old or older account for 78.3% of the cost of asthma hospitalization in 2008.
- The percentage of asthma hospitalization costs incurred by people who are unable to pay represents 1.9% of the total 2008 cost. The percentages for all payer groups are: Medicaid (21.9%); Medicare (37.4%); private insurance (26.9%); self-pay (9.4%); and any other payer (2.5%).

Meeting Healthy People 2010 Goals

- Oregon is making steady progress in meeting Healthy People 2010 targets. Oregon meets almost all of the targets for reducing deaths and hospitalizations resulting from asthma and is approaching the goals for persons with asthma receiving instructions on how to use their prescribed inhalers.
- Healthy People 2010 goals on other forms of patient education, such as formal education, asthma management plans, and receiving assistance with assessing and reducing exposure to risk factors at home, school, and work, are well below Healthy People 2010 targets.

Chapter 2

Introduction

What is Asthma?

Asthma is a chronic lung disease that makes breathing difficult during episodes of wheezing and breathlessness. These episodes are reversible, either spontaneously or with treatment. Asthma targets the tubes (airways) in the lungs, causing inflammation (swelling) and increased amounts of mucus production in the linings of the tubes that carry air to and from the lungs. In addition, the airways become extra sensitive and may react to things like cigarette smoke, cold air, dust, and pollen. When airways react, the muscles that surround the outside of the airways start to contract. As these muscles contract, they tighten and the tubes leading to the lungs become even smaller. These effects, which are usually temporary, can cause shortness of breath, coughing, wheezing, and other symptoms.

It is not known what causes asthma. However, certain things called "triggers" can cause asthma symptoms to increase. Not everyone with asthma has the same triggers. Common triggers include irritants such as tobacco smoke and allergens (things that cause allergic reactions). Exercise can trigger symptoms in some individuals.[3]

Much about asthma remains unknown and requires further study. Asthma cannot be cured, but it can be controlled. Quality health care, correct medications, good self-management skills, and policies reducing exposure to environmental triggers can help people with asthma live healthy and productive lives.

Asthma is a Public Health Priority

During the past 20 years, asthma has increased throughout the United States and ranks as one of the most common chronic diseases with an estimated 23 million persons of all ages having asthma in 2007.[4] Because of the seriousness of this disease, the U.S. Department of Health and Human Services developed guidelines to help state agencies establish asthma programs[5] and included asthma as a public health priority in the Healthy People 2010 national health plan.[6]

Asthma is a major burden to the quality of life of Oregonians and to Oregon's health care system. In Oregon in 2009, 10% of adults and 9% of children had asthma, suggesting that more than

Common Asthma Triggers

- Tobacco smoke and other smoke
- Animals with fur or feathers
- Dust mites and cockroaches
- Mold or mildew
- Pollen from trees, flowers, and plants
- Being physically active
- Air pollution
- Breathing cold air
- Strong smells and sprays
- Illnesses, such as influenza and colds

Summary of Healthy People 2010 Asthma Goals

- Reduce asthma deaths
- Reduce asthma hospitalizations
- Reduce asthma hospital emergency department visits
- Reduce activity limitations among people with asthma
- Reduce the number of school or work days missed due to asthma
- Increase the proportion of people with asthma who receive formal patient education
- Increase the proportion of people with asthma receiving appropriate asthma care

383,000 Oregonians had asthma. The burden of asthma is both economic and personal, affecting the state with direct costs (e.g., hospitalizations and emergency department visits) and indirect costs (e.g., missed school and work days and days of restricted activity) as well as quality of life for people with asthma and their families.

Starting in 1999, the Centers for Disease Control and Prevention (CDC) funded the Oregon Department of Human Services to address asthma from a public health perspective. The Oregon Asthma Program formed a broad partnership of stakeholders and produced the *Oregon Asthma Leadership Plan: A Statewide Call for Action 2006-2011*.[7] In this plan are the public health goals, objectives, and strategies to address the burden of asthma in Oregon.

In addition to the Oregon Asthma Leadership Plan, the Oregon Asthma Program developed with partners the *Guide to Improving Asthma Care in Oregon: Indicators for Quality Care in Health Systems (the Guide)*. The Guide suggests population-based indicators that health plans and systems should calculate to monitor the quality of medical care for people with asthma. The Oregon Asthma Program publishes findings from its asthma tracking system every other year in a Burden of Asthma Report. This document notes progress on the goals and objectives in the *Oregon Asthma Leadership Plan* and the indicators in the Guide and describes the burden of the disease in Oregon.

How to Use This Report

This report summarizes the findings of the Oregon asthma tracking system. It includes the most recent data available from a variety of sources. The intent of this report is to highlight the burden of asthma in Oregon and to assist stakeholders, policymakers, and other interested parties in their efforts to reduce this burden. This report does not include specific recommendations for developing state, county, school, worksite, or other organizational policy or environmental change recommendations that can help those with asthma avoid triggers and manage their disease. Those types of recommendations can be found in the *Oregon Asthma Leadership Plan: A Statewide Call for Action 2006-2011*[7] (www.oregon.gov/DHS/ph/asthma/plan/index.shtml) and in supplemental burden reports (www.oregon.gov/DHS/ph/asthma/burdenrpt.shtml).

The main body of this report presents information mostly as graphs, maps, and tables. The actual numbers that make up the graphs and maps can be found in Appendix B.

Throughout this report in both graphs and tables, confidence intervals are shown for both percentages and rates. Not all graphs or tables had the data necessary to calculate a confidence interval and therefore no confidence interval is displayed. A confidence interval (CI) indicates a measurement's precision. See the glossary for more information on confidence intervals.

Chapter 3

Who Has Asthma

Overview

To understand the burden of asthma in Oregon, the prevalence of the disease needs to be known. Prevalence is the percentage of a defined population with asthma at a given time. Adult asthma prevalence is monitored primarily by using the Behavioral Risk Factor Surveillance System (BRFSS), a national survey sponsored by the CDC.

The BRFSS survey uses the following questions to define asthma for adults:

- Have you ever been told by a doctor, nurse, or other health professional that you have asthma?
- Do you still have asthma?

To assess asthma prevalence in Oregon children, two sources of data are used. The first is the BRFSS survey described above by adult proxy (i.e., answered for the child by an adult). The adult proxy portion of the BRFSS uses the following questions to define asthma for children:

- Has a doctor, nurse, or other health professional ever said that the child has asthma?
- Does the child still have asthma?

The other survey used to assess asthma prevalence in Oregon children is the Oregon Healthy Teens (OHT) Survey of students in the eighth and 11th grades. The OHT survey uses the following questions to define asthma for children:

- Has a doctor or nurse ever told you that you have asthma?
- Do you still have asthma?

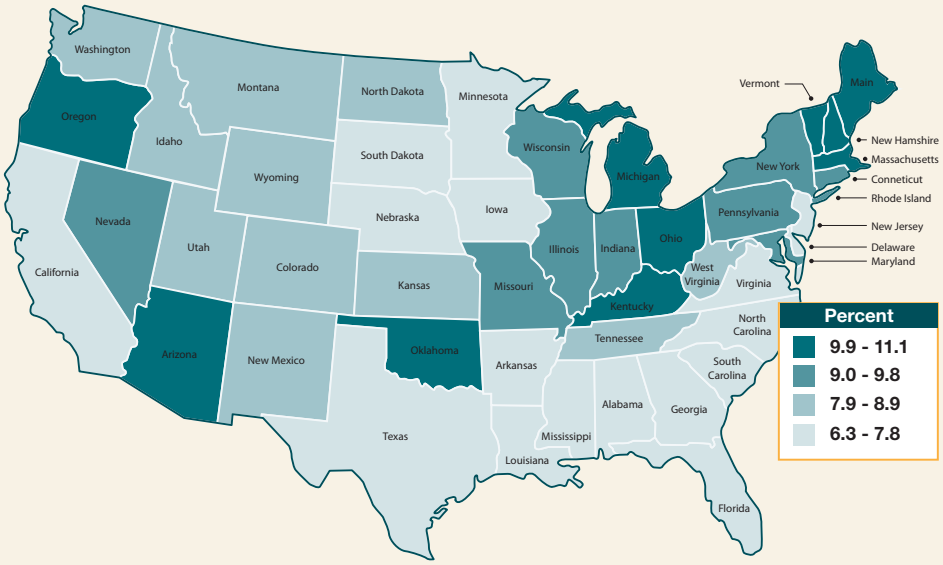
These questions create the two definitions of asthma used to understand the scope of the disease in Oregon.

1. **Lifetime asthma** is when the adult or child has ever been told by a doctor, nurse, or other health professional they (or their child) have asthma.
2. **Current asthma** is when the adult or child has ever been told they (or their child) have asthma AND they still have asthma at the time they responded to the survey.

For most of the analysis presented in this report, current asthma is used to describe the burden of asthma in Oregon.

Figure 3.1 – Adults with current asthma by state, 2009

Data Source: Behavioral Risk Factors Surveillance System.
Note: Contiguous U.S. only.



Key Findings

- From 2003 to 2007, Oregon ranked among the top 10 states with the highest percentage of adults with asthma in the nation. In 2009, Oregon ranked among the top five states with the highest percentage of adults with asthma in the nation. Ranking was determined using numbers from the national BRFSS website at apps.nccd.cdc.gov/brfss/.

Figure 3.2 – Adults with lifetime asthma

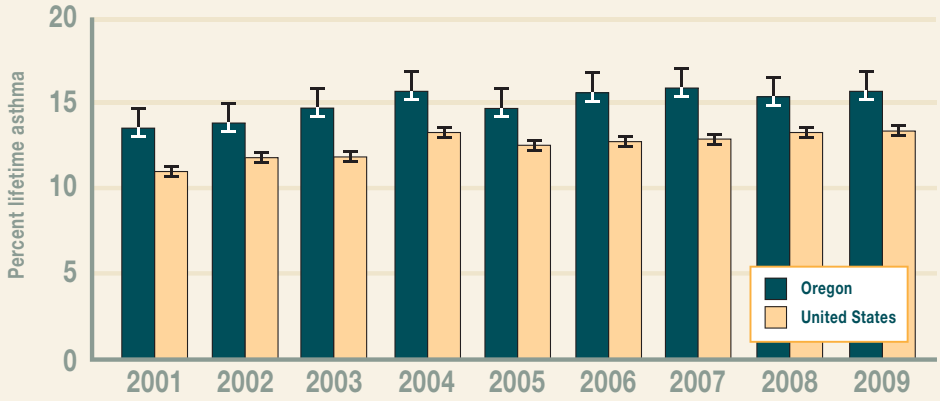
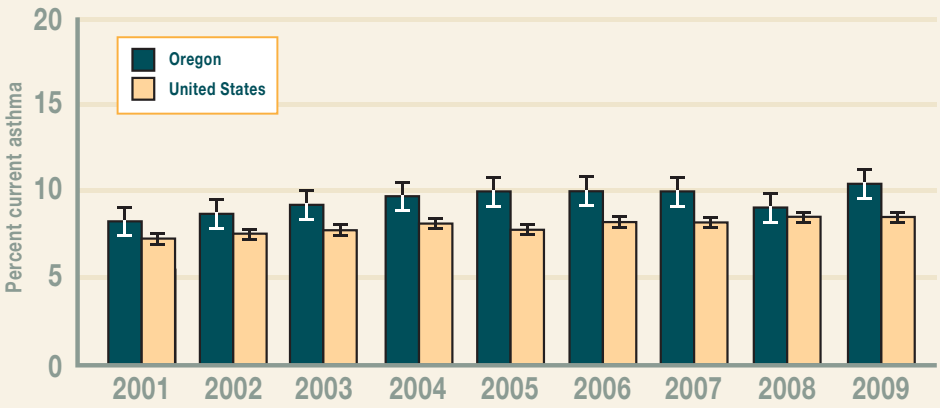


Figure 3.3 – Adults with current asthma

* Figures 3.2 and 3.3 - Data Source: Oregon Behavioral Risk Factor Surveillance System: National data from the Behavioral Risk Factor Surveillance System.
Note: National estimate excludes territories.



Key Findings

- Most adult Oregonians who currently have asthma were diagnosed as adults (57%).*
- The annual incidence of adult asthma (people diagnosed with asthma for the first time) is 4 new diagnoses out of 1,000 Oregonians.*
- In 2009, more than 460,000 Oregon adults were estimated as ever having asthma (lifetime) and almost 300,000 were estimated to have asthma (current).
- Oregon has a higher percentage for both lifetime and current asthma than the overall U.S. percentage in all age groups. The reason for Oregon's higher percentage is unknown.
- For the past 10 years, the percentage of Oregonians with current asthma has been slowly trending upward.

*Data Source: Behavioral Risk Factor Surveillance System, Adult Asthma Callback Surveys, 2006-2008.

Figure 3.4 – Adults with current asthma by gender

Data Source: Oregon Behavioral Risk Factor Surveillance System.

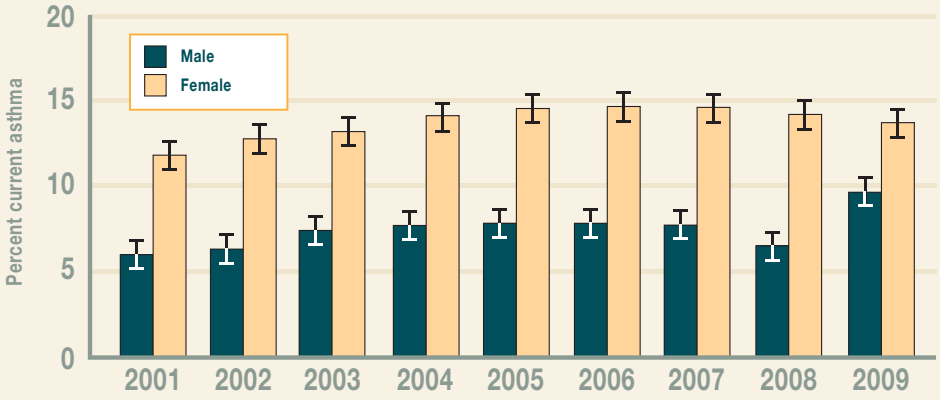
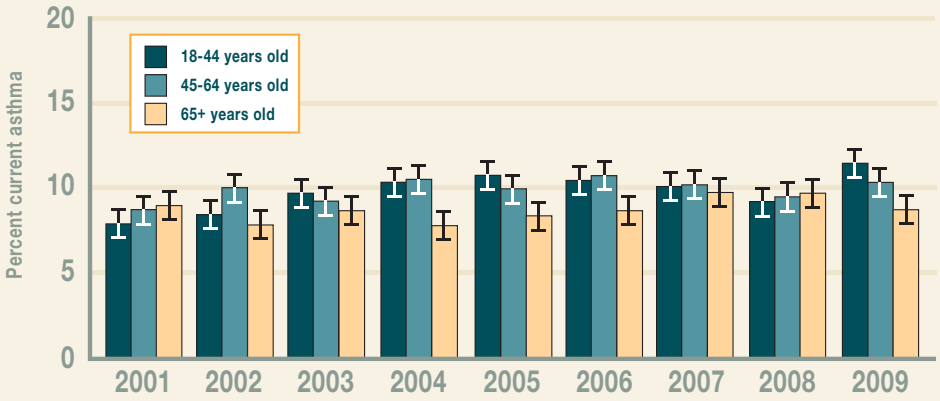


Figure 3.5 – Adults with current asthma by age

Data Source: Oregon Behavioral Risk Factor Surveillance System.



Key Findings

- The average age that adult men were first diagnosed with asthma is 17; for women it is 27.*
- Adult females are more likely to have asthma than adult males. This reflects similar national trends where females report approximately 40% higher asthma prevalence than males.[8] This trend is also seen in other states.[9] The reasons adult women have an increased risk of developing adult-onset asthma are not completely understood. However, studies indicate that physiological differences such as having generally smaller airways than men and different hormones as well as increased risk from obesity and socio-economic differences could all contribute to the differences between women and men.[10,11,12,13]
- In Oregon the difference in asthma between males and females appears to be decreasing.
- There is no consistent trend in the difference between age groups in the percentages of people with asthma.

*Data Source: Behavioral Risk Factor Surveillance System, Adult Asthma Callback Surveys, 2006-2008.

Figure 3.6 – Adults with current asthma by race and ethnicity (age–standardized), 2004-2005

Data Source: Oregon Behavioral Risk Factor Surveillance System, 2004-2005 Race-Oversample.

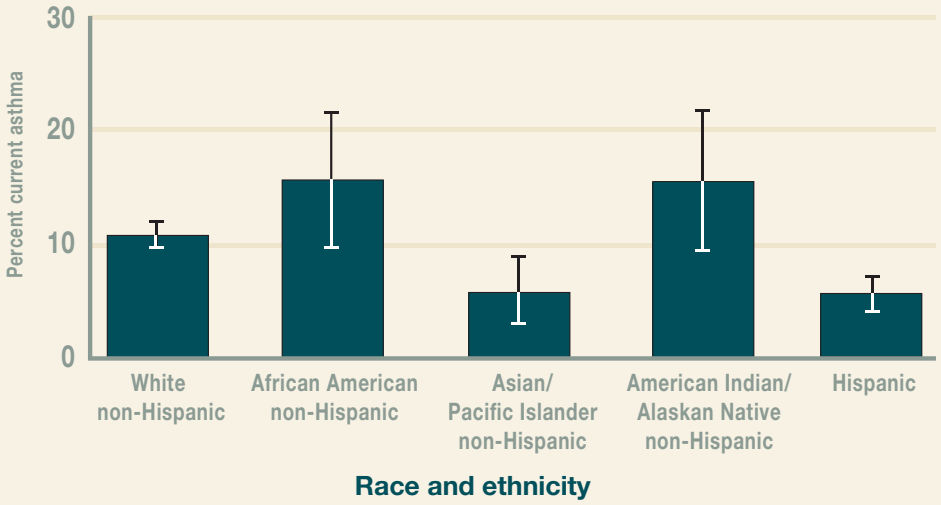
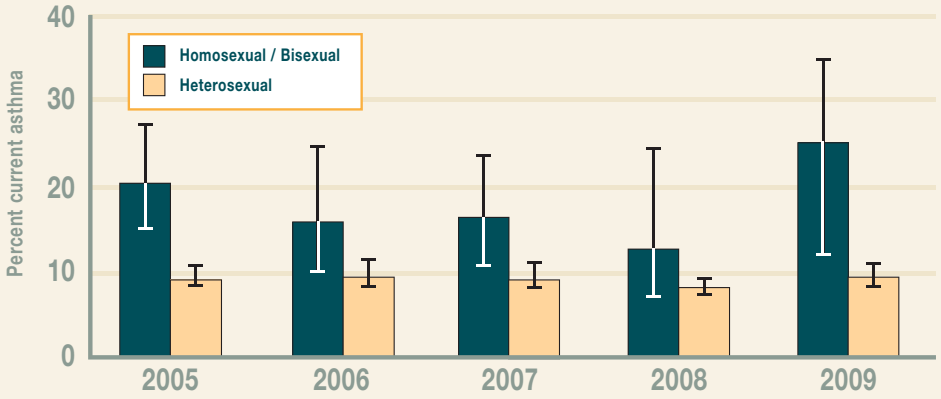


Figure 3.7 – Adults with current asthma by sexual orientation

Data Source: Oregon Behavioral Risk Factor Surveillance System.



Key Findings

- Non-Hispanic African American (15.5%) and American Indian/ Alaska Native (15.2%) persons report higher percentages of asthma than other racial and ethnic groups. Asthma differences in non-Hispanic African American and American Indian/Alaska Native persons are also seen in national data.[14] These differences may be the result of economic and social disparities. In addition, in Oregon 2004-2005, 30% and 38% of non-Hispanic African American and American Indian/ Alaska Native persons smoke, respectively.[15, 16] These are 58% and 100% higher than the general Oregon population.
- Homosexual or bisexual persons have consistently reported higher percentages of asthma than heterosexual persons. Because of the small sample size of persons self-reporting as homosexual or bisexual this information should be interpreted with caution. Those in same-sex relationships may be at high risk for asthma from a spectrum of risk factors including higher rates of smoking and minority stress.[17,18] Among lesbians, another risk factor is a higher rate of obesity than the general population.[17,18] In Oregon, 31% of homosexual or bisexual persons report that they smoke.[19] This is 55% higher than the overall Oregon population.[19]

Figure 3.8 – Adults with current asthma by education level, 2009

Data Source: Oregon Behavioral Risk Factor Surveillance System.

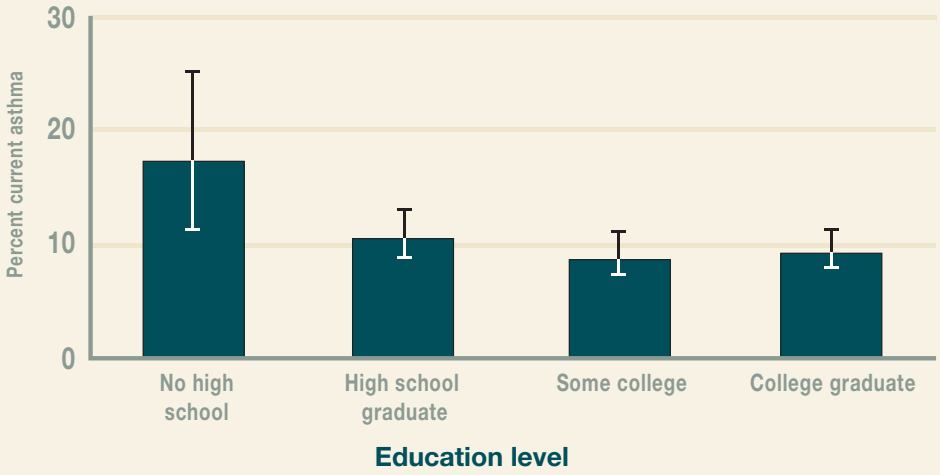
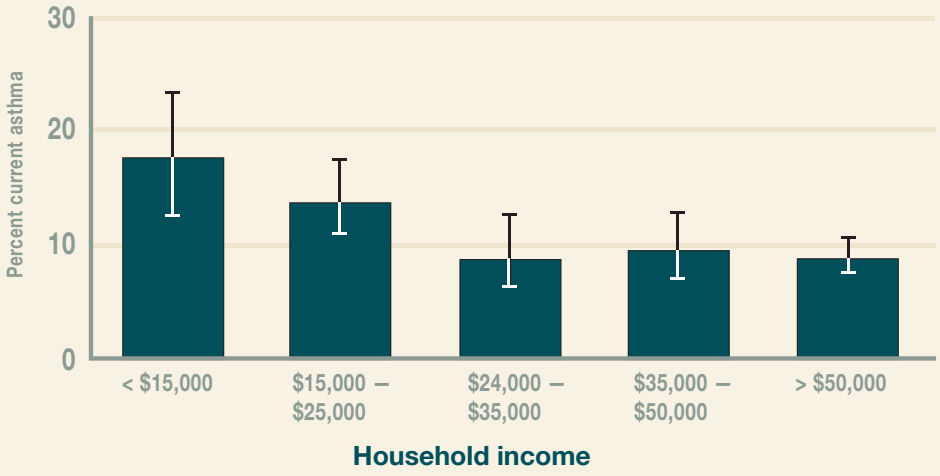


Figure 3.9 – Adults with current asthma by annual household income, 2009

Data Source: Oregon Behavioral Risk Factor Surveillance System.



Key Findings

- Those with no high school diploma are more likely to have asthma. In Oregon, tobacco use is higher among people with lower education levels, with college graduates having the lowest percentage of smokers.[20]
- There is a strong correlation between asthma and income level. Oregonians from a household with an annual income of less than $15,000 consistently report higher percentages of asthma than all other income levels. Nationally, a higher percentage of people below the federal poverty level report having asthma than those above the federal poverty level.[21]
- The percentage of smokers among people with an income of $15,000 or less is more than three times higher than those making greater than $50,000.[20]
- Lower income individuals also have greater exposure to asthma triggers such as mold, mildew, and cockroaches, due to substandard housing.[20]

Figure 3.10 – Adults with current asthma by current type of health insurance

Data Source: Oregon Behavioral Risk Factor Surveillance System
Note: Data on health insurance type was not collected in 2008.

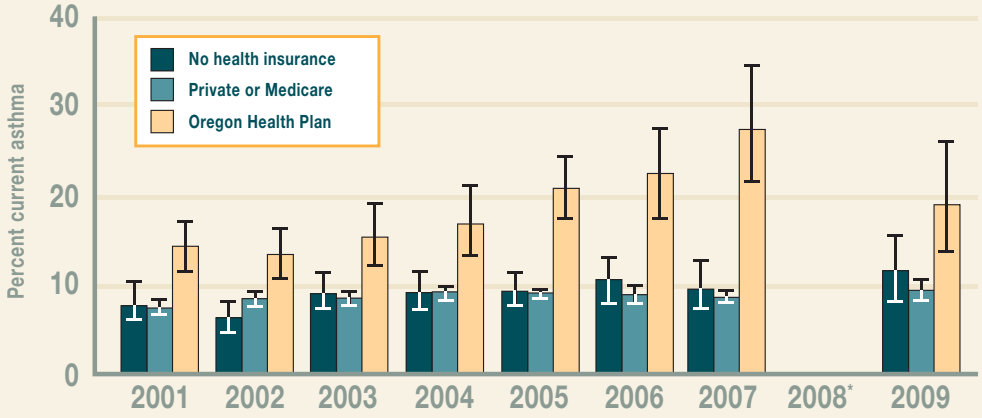
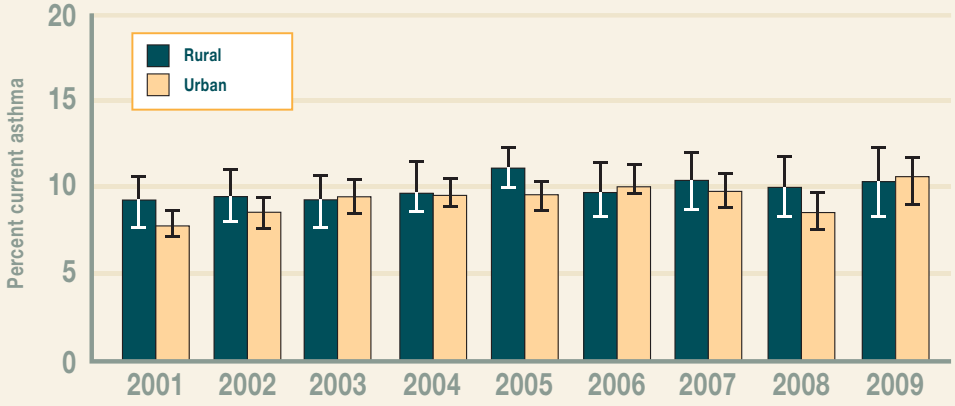


Figure 3.11 – Frequency of asthma symptoms in the past four weeks among adults with current asthma

Data Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008

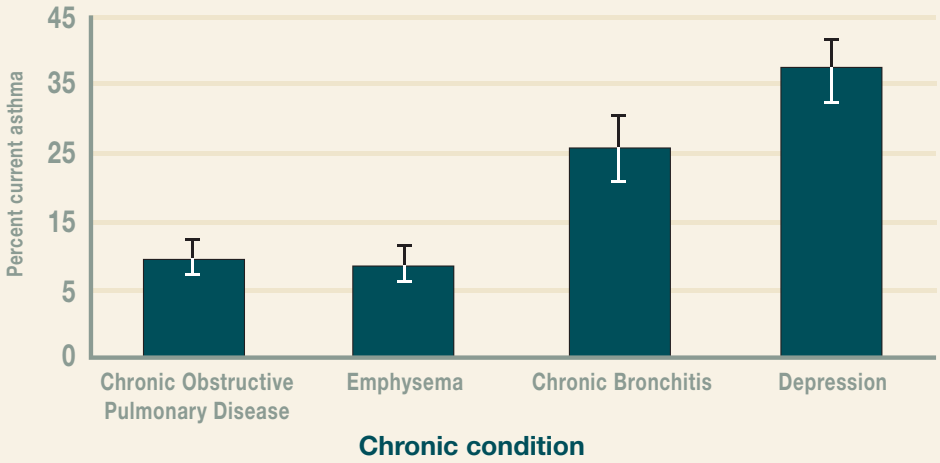


Key Findings

- Oregon Health Plan (OHP) members are almost twice as likely to report having asthma as people with no, private, or Medicare health insurance. Until 2009, the gap between health plan types in the percentage of asthma widened over time. In 2009 the gap narrowed, with an absolute difference of almost 10% between OHP members and people with private health insurance or Medicare in 2009.
- Adult OHP members are low-income, including pregnant women, other adults, seniors, and people with disabilities, and generally have no other health coverage. Adult OHP members are more than twice as likely to smoke as people with private insurance.[20] The Oregon Health Plan is intended to help ensure that medical care is affordable for those with a low income.[1] People with lower incomes are more likely to live in substandard housing, smoke, and have higher disease morbidity.[2]
- Rural and urban ZIP codes show no consistent difference in the percent of the population with asthma over time. In general, rural areas of Oregon have the same to slightly higher percentages of people with asthma compared to urban areas. Determination of a ZIP code as rural or urban used the rural-urban commuting area (RUCA) codes developed by the U.S. Department of Agriculture.[22]

Figure 3.12 – Adults with current asthma who report having other chronic conditions, 2006-2008

Data Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008

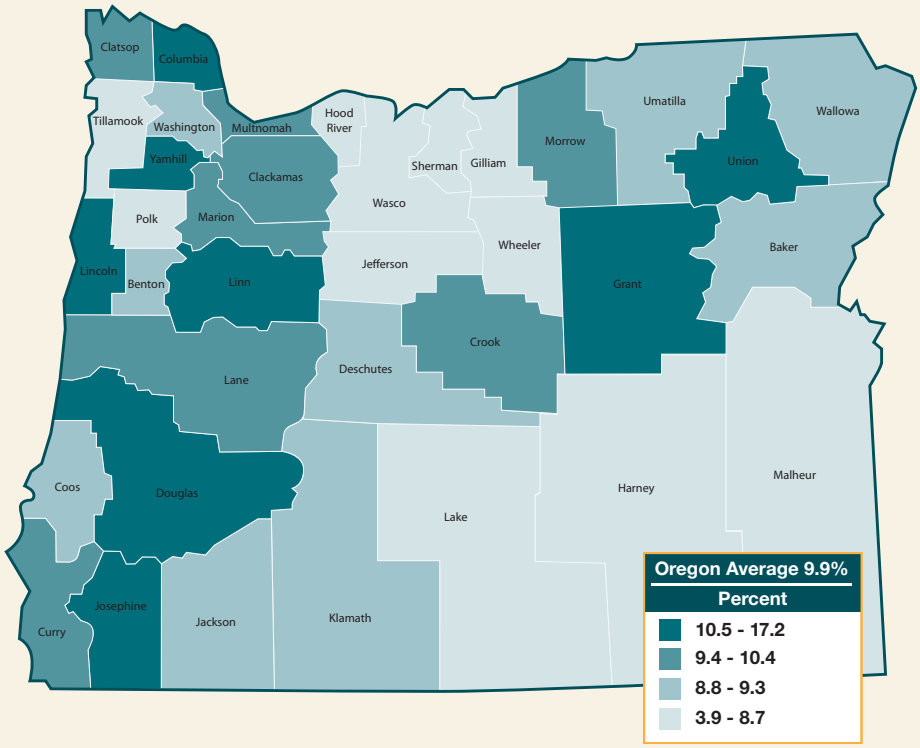


Key Findings

- Of the four questions on other health conditions asked on the Asthma Callback Survey, having ever been depressed is the most common medical condition reported by people with asthma.
- The most common other respiratory disease that people with asthma report having at some time during their life is chronic bronchitis.

Figure 3.13 – Adults with current asthma by county (age-standardized), 2004-2007

Data Source: Oregon Behavioral Risk Factor Surveillance System, 2004-2007



Key Findings

- Counties with asthma levels higher than the Oregon average tend to also be counties with high smoking rates (see Figure 5.4).

Figure 3.14 – Children (0-17 years of age) with current asthma by adult proxy

Data Source: Oregon Behavioral Risk Factor Surveillance System

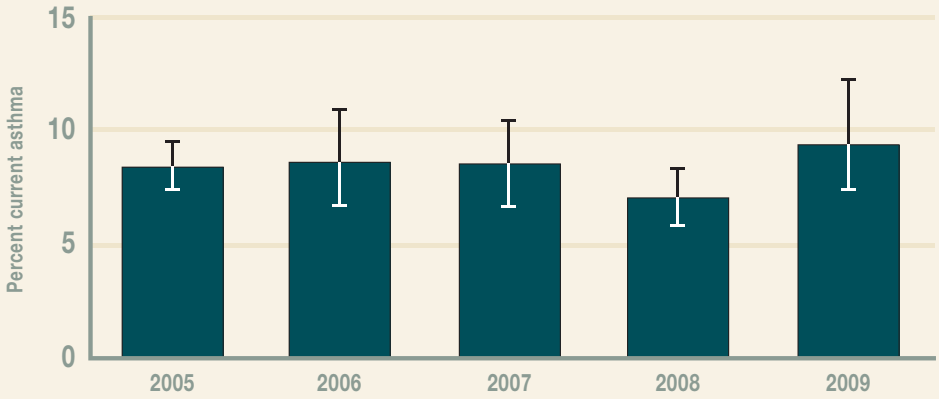


Figure 3.15 – Children (8th and 11th grade) with current asthma

Data Source: Oregon Healthy Teens Survey

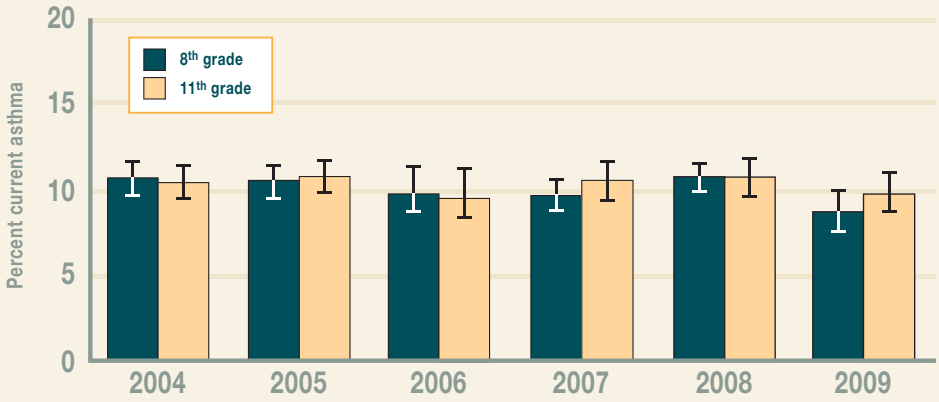
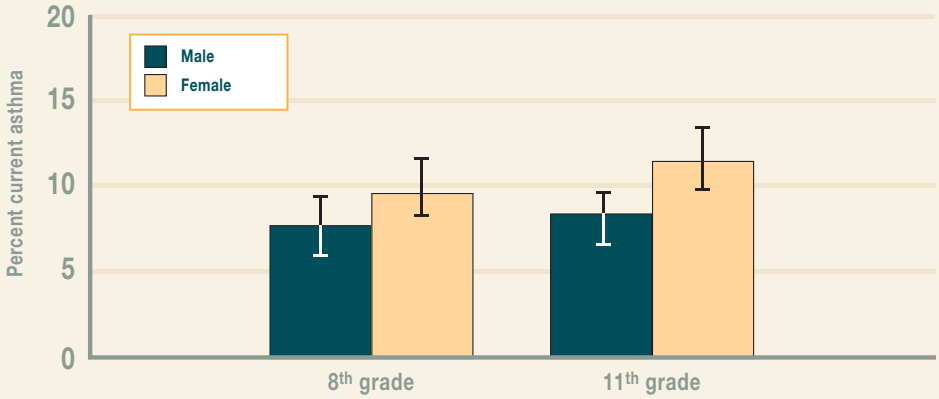


Figure 3.16 – Children (8th and 11th grade) with current asthma by gender, 2009

Data Source: Oregon Healthy Teens Survey



Key Findings

- In 2009, approximately 84,000 Oregon children had asthma.
- There has been little change over time in the percentage of children with asthma in Oregon.
- Generally, males are less likely to report having asthma than females in both eighth and 11th grades. The gap between boys and girls widens in the 11th grade, which is consistent with national data.[21]

Figure 3.17 – Children (8th grade) with current asthma by county, 2007-2008

Data Source: Oregon Healthy Teens Survey, 2007-2008

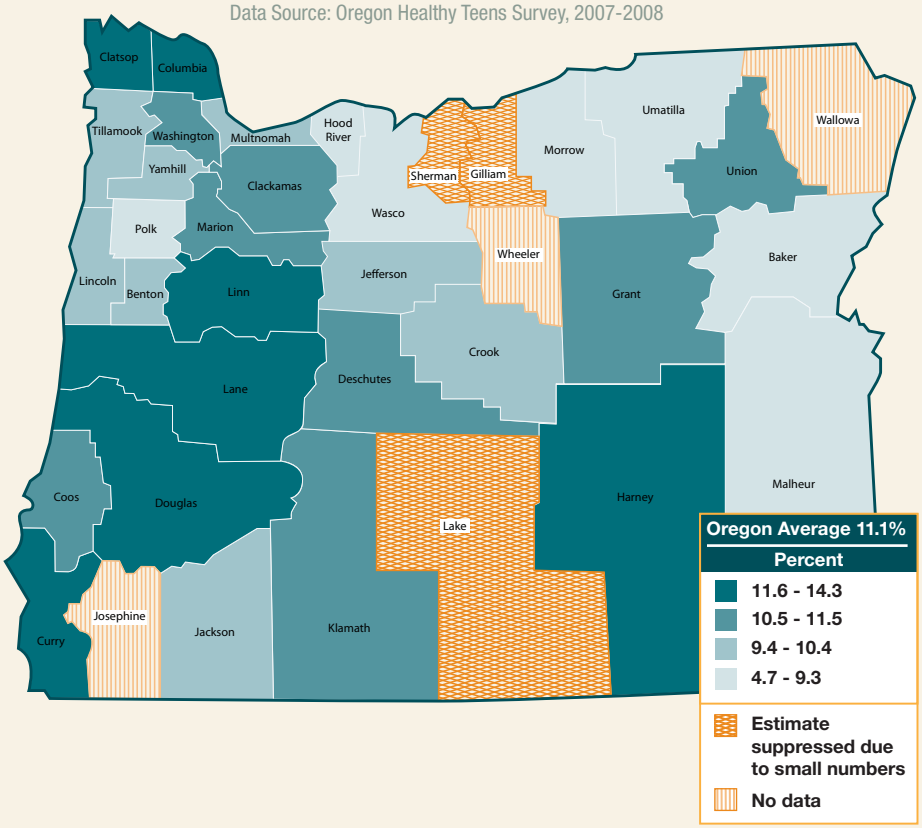
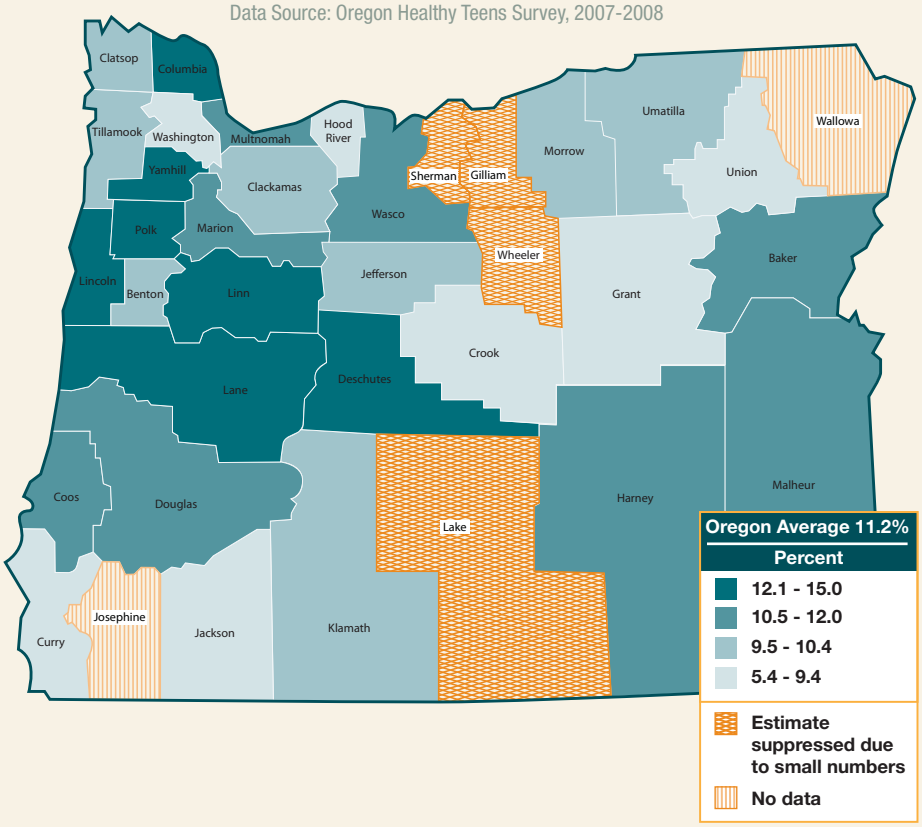


Figure 3.18 – Children (11th grade) with current asthma by county, 2007-2008

Data Source: Oregon Healthy Teens Survey, 2007-2008



Key Findings

- Only Columbia, Linn, and Lane counties have consistently higher asthma levels for both eighth and 11th graders.

Chapter 4

Asthma Management and Quality of Life

Overview

Asthma management refers primarily to the education, instruction, and medical or pharmacological care received by people with asthma. Asthma quality of life is the extent to which people have control of their asthma and asthma symptoms. Asthma quality of life can be gauged by information such as missing work or school, and inability to carry out usual activities that limit the quality of life of people with asthma.

Both asthma management and quality of life are monitored primarily by the Behavioral Risk Factor Surveillance System (BRFSS) and the BRFSS Asthma Callback Survey. The standard version of the BRFSS administered by all states only asks the lifetime and current asthma prevalence questions discussed in Chapter 3. The BRFSS Asthma Callback Survey is a follow-up survey administered to people who indicated on the BRFSS that they have asthma.

Asthma management is also monitored from data provided by health plans who participate in two statewide workgroups. The first workgroup is the Asthma Data Workgroup (ADWG). The ADWG is a voluntary partnership between the Oregon Asthma Program and several of Oregon's largest private and Medicaid health plans.

The second workgroup is the Division of Medical Assistance Programs (DMAP), Quality and Performance Improvement Workgroup (QPIWG). DMAP is a division of the Oregon Health Authority that administers state programs providing medical coverage to eligible low-income Oregonians through the Oregon Health Plan (OHP), which is a combination of Medicaid and the Children's Health Insurance Program (CHIP). The QPIWG is a workgroup convened by DMAP for all capitated health plans that serve OHP recipients in Oregon. Through this workgroup, OAP measures and reports asthma data consistently across all OHP managed health plans and OHP members not in managed health plans (fee-for-service). Almost all OHP members are in managed care or have health services paid for on a fee-for-service basis.

In 2008, data from these two workgroups represented almost 550,000 private and OHP insured Oregonians aged 4-55 years who were enrolled for at least six months in any of the participating health plans. This represents approximately 14% of the total Oregon population in that age range.

Figure 4.1 – Adults and children (children 0-17 years of age) with current asthma who received asthma information from a doctor or health care provider, 2006-2008

Data Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008

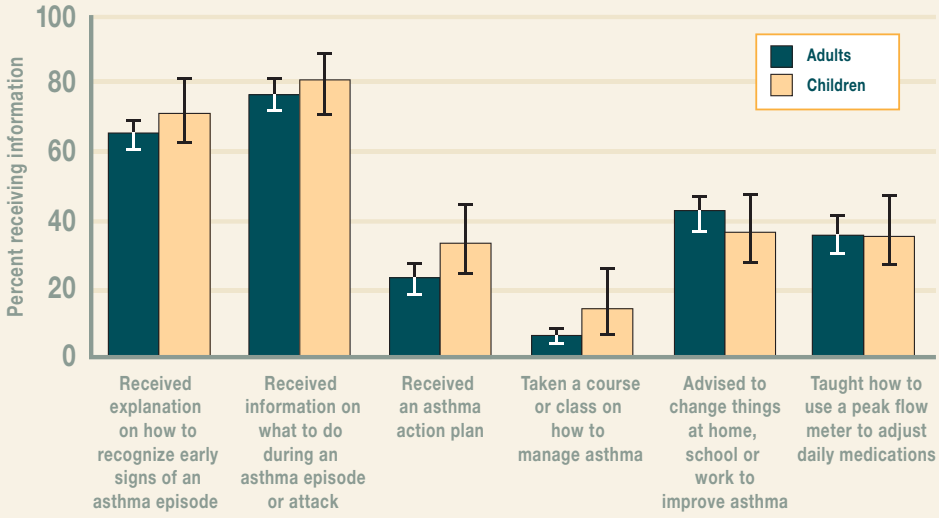
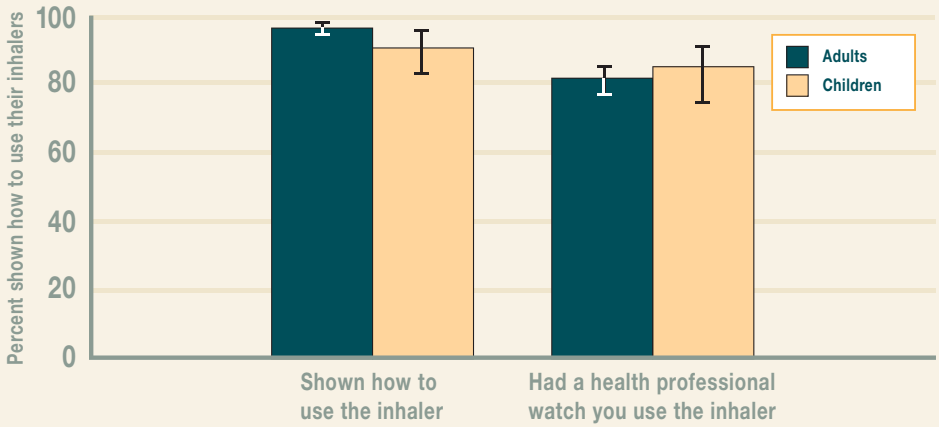


Figure 4.2 – Adults and children (0-17 years of age) with current asthma who have ever used a prescription inhaler for their asthma and received asthma medication information from a doctor or health care provider, 2006-2008

Data Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008



Key Findings

- The majority of people who ever had asthma have received training in recognizing early signs of an asthma episode and have received information on what to do during an asthma episode or attack. However, few people have received an asthma action plan or an asthma management class. An asthma action plan is a treatment plan and instructions provided by a health care provider. Having both an asthma action plan and completing an asthma management class are recommendations for quality care in *The Guide to Improving Asthma Care in Oregon*.[23]
- Children are generally more likely to have received training in asthma information than adults. This is especially true for those having received an asthma action plan.
- A high proportion of adults and children who have ever used a prescription inhaler for their asthma report they have received information and having been observed using their inhaler by a health professional to ensure proper use.

Figure 4.3 – Adults who received a seasonal influenza shot by current asthma status

Data Source: Behavioral Risk Factor Surveillance System

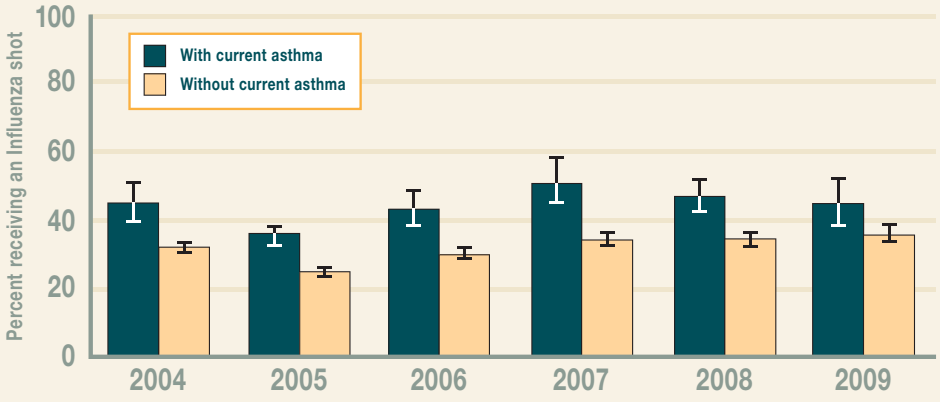


Figure 4.4 – People with persistent asthma who filled at least one prescription for a daily inhaled corticosteroid in the past year, by type of insurance (age-standardized)

Data Source: Asthma Data Workgroup and Quality and Performance Improvement Workgroup

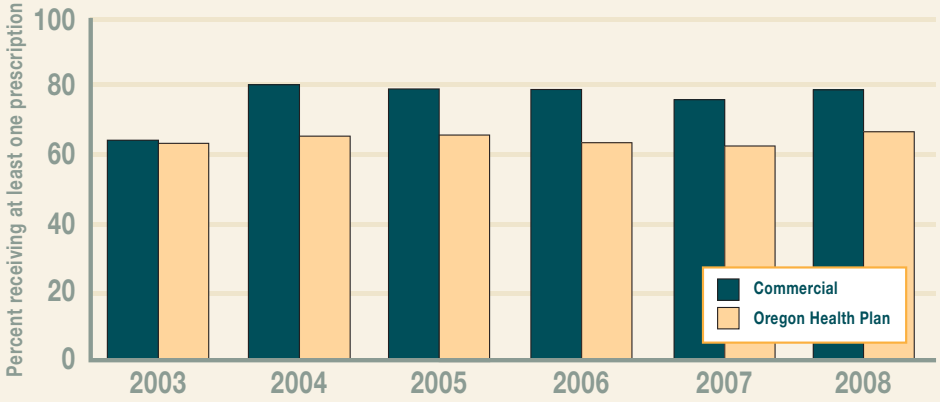
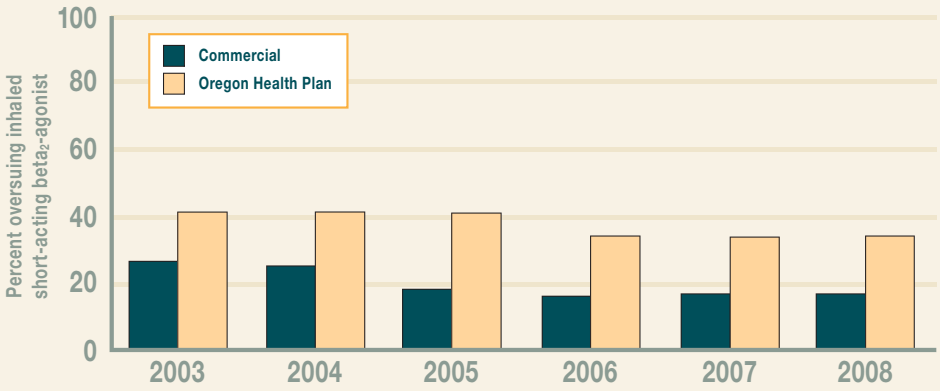


Figure 4.5 – People with persistent asthma who overuse inhaled short-acting beta$_2$-agonists by receiving more than six canisters in the past year, by type of insurance (age-standardized)

Data Source: Asthma Data Workgroup and Quality and Performance Improvement Workgroup



Key Findings

- From 2004 to 2009 the proportion of adults with asthma who have received a seasonal influenza shot was below or near 50%. Adults with asthma were more likely to have received a seasonal influenza shot than people without asthma. Receiving a seasonal influenza shot is a recommendation for quality care in *The Guide to Improving Asthma Care in Oregon*.[23]
- In general, around 70%-80% of people with persistent asthma (see glossary in Appendix D for definition of persistent asthma) with private insurance receive at least one canister of inhaled corticosteroid compared with 60%-66% among those on OHP. Inhaled corticosteroids are anti-inflammatory drugs that prevent asthma attacks on an ongoing basis.
- The trend in the overuse of inhaled short-acting beta$_2$-agonists shows a decrease among people with persistent asthma with private insurance. People on the Oregon Health Plan are almost twice as likely to overuse inhaled short-acting beta$_2$-agonists in 2008 as people with persistent asthma with private insurance. Inhaled short-acting beta$_2$-agonists quickly loosen the tightened muscles around swollen airways and are often called rescue medications.
- Increased use of daily-inhaled corticosteroids and decreased use of short-acting inhalers are recommendations for quality care in *The Guide to Improving Asthma Care in Oregon*.[23]

Figure 4.6 – Asthma follow-up visit with a medical practitioner within 30 days after an emergency department visit for asthma, by type of insurance (age-standardized)

Data Source: Data Workgroup and Quality and Performance Improvement Workgroup

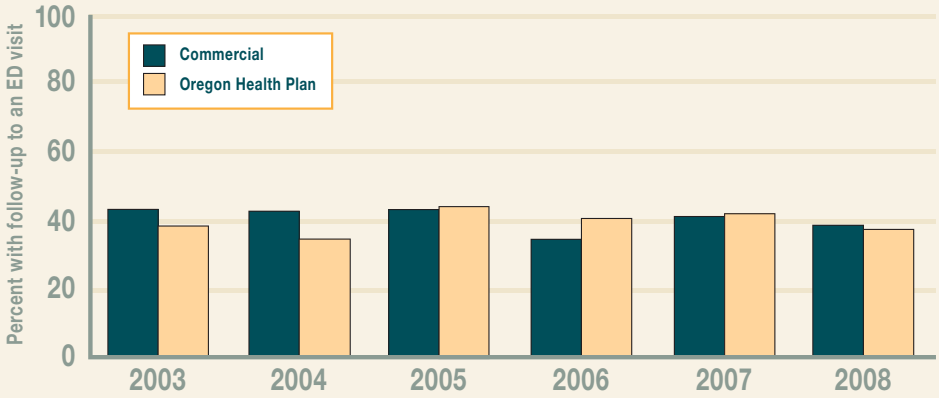
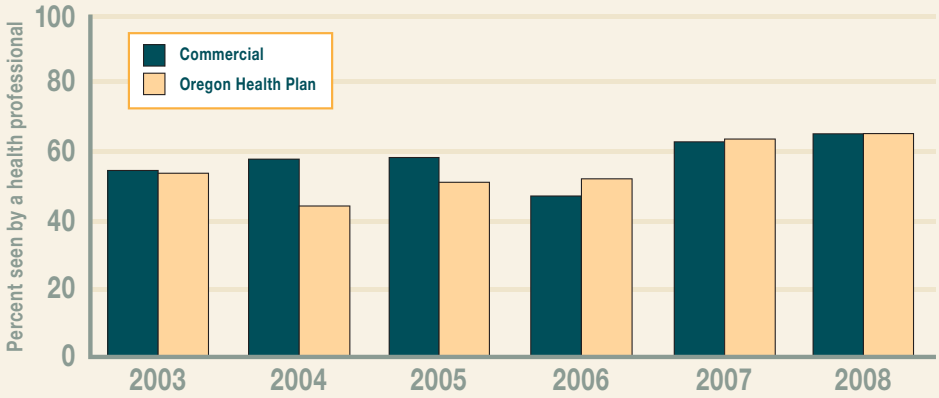


Figure 4.7 – People with asthma who have been seen by a health professional for asthma in the past year, by type of insurance (age-standardized)

Data Source: Asthma Data Workgroup and Quality and Performance Improvement Workgroup

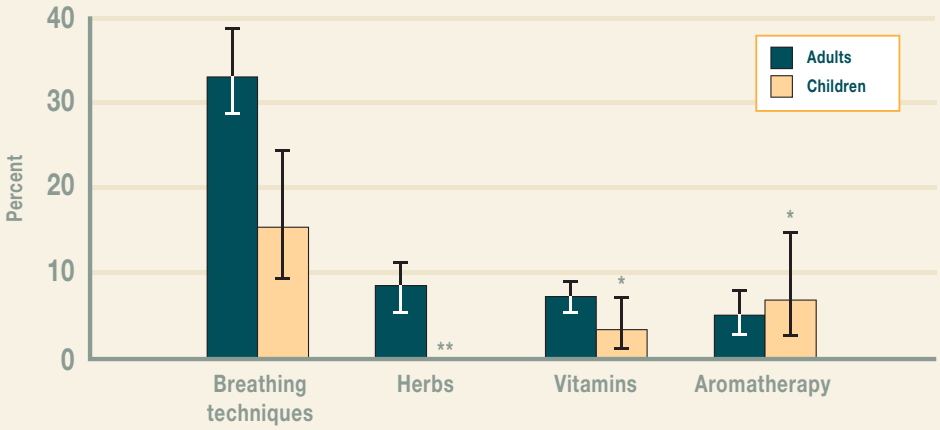


Key Findings

- Around 40% of people with asthma with either private insurance or OHP visited a health professional for asthma within 30 days of an emergency department (ED) visit. In addition, more than 60% of people with persistent asthma with either private insurance or OHP had been seen by a health professional for their asthma in the past year.
- Seeing a health professional within 30 days of an emergency department visit and seeing a health professional annually are both recommendations for quality care in *The Guide to Improving Asthma Care in Oregon*.[23]

Figure 4.8 – Adults and children (0-17 years of age) with current asthma who have used complementary and alternative methods to control their asthma

Data Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008
* This number may be statistically unreliable and should be interpreted with caution.
** This number is suppressed because it is statistically unreliable.



Key Findings

- To investigate other methods of asthma control, questions on complementary and alternative methods for asthma control were asked. Complementary and alternative methods of asthma control include employing the following: herbs, vitamins, acupuncture, acupressure, aromatherapy, homeopathy, reflexology, yoga, breathing techniques, and naturopathy. Only the four estimates with the highest adult percentages are shown in Figure 4.8.
- Breathing techniques were the most common complementary and alternative method mentioned for controlling asthma in both adults and children.

Figure 4.9 – Adults with current asthma, by sex, who missed one or more days of work or other daily activities because of asthma in the past three months, 2006-2008

Data Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008

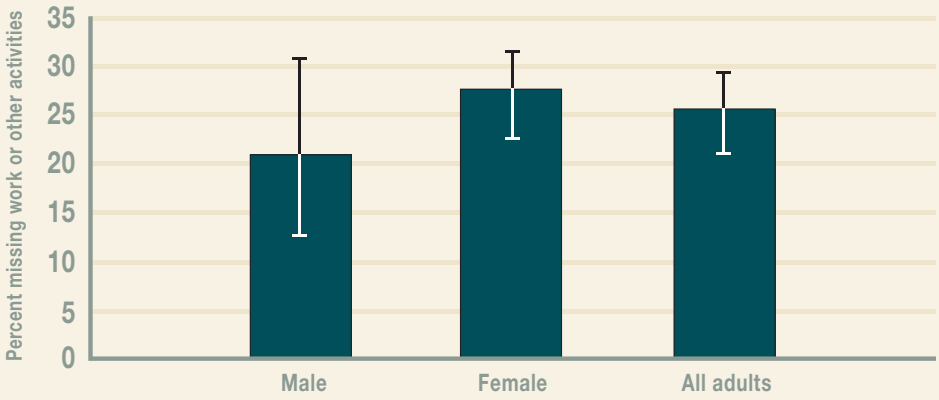


Figure 4.10 – Adults with current asthma, by household income, who missed one or more days of work or daily activities because of asthma in the past three months, 2006-2008

Data Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008

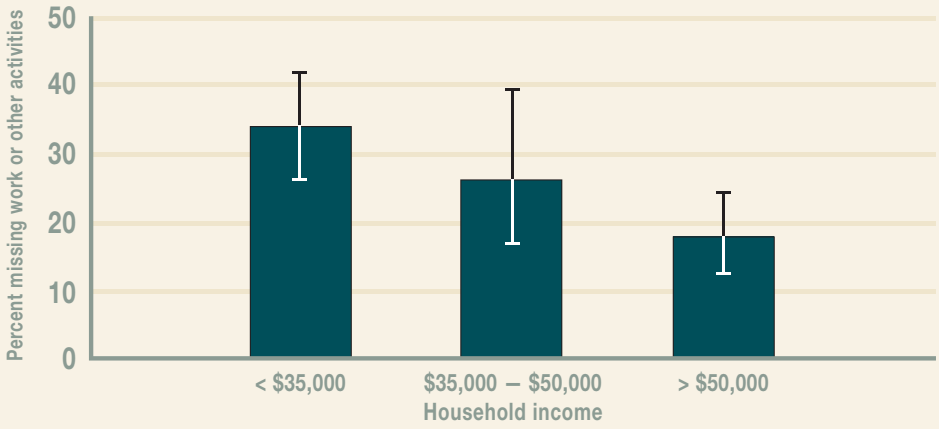
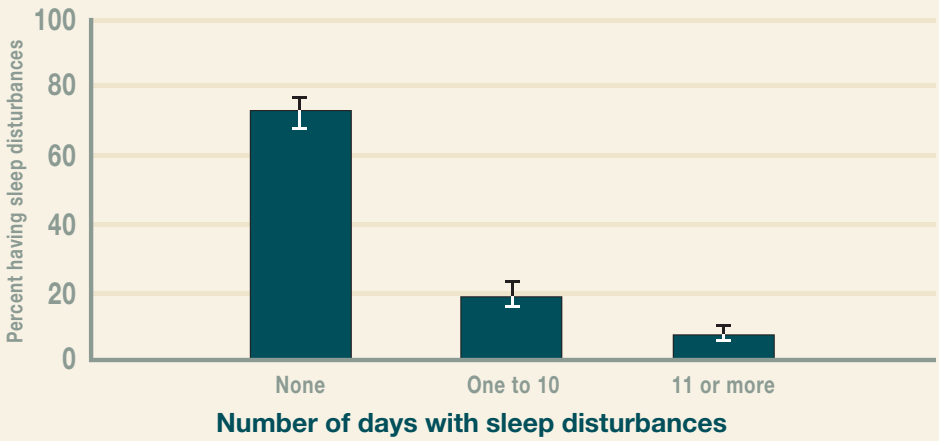


Figure 4.11 – Sleep disturbances due to asthma in the last 30 days among adults with current asthma, 2006-2008

Data Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008



Key Findings

- More than one in four adults with asthma report having missed work or other activities due to their asthma, with females more likely to do so than males. Missing work or other daily activities decreases the quality of life and productivity of people with asthma.
- Lower-income individuals are also more likely to report missing work or daily activities. Because of the large confidence intervals, caution should be used in interpreting this result.
- Almost 30% report having one or more nights when their asthma symptoms made it difficult to stay asleep.

Figure 4.12 – Frequency of asthma symptoms in the past four weeks among adults with current asthma , 2006-2008

Data Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008

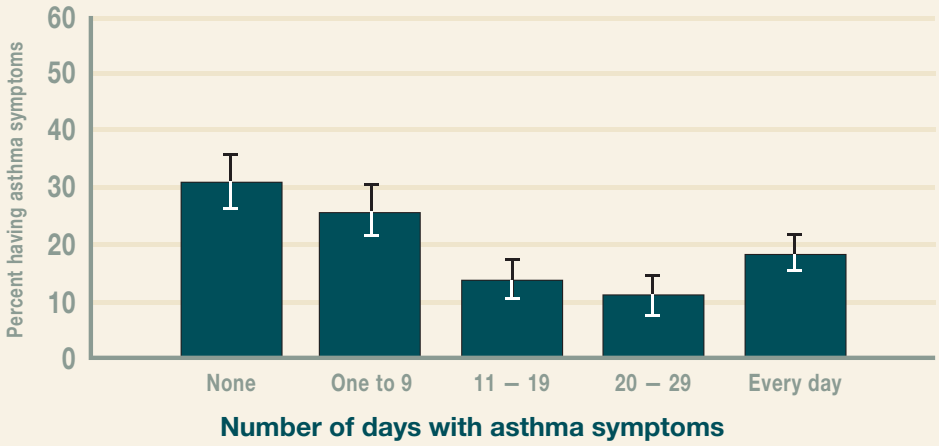
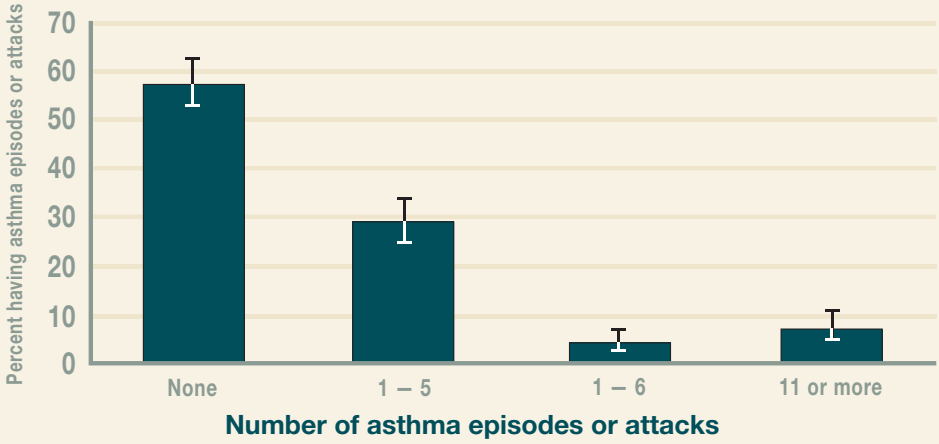


Figure 4.13 – Frequency of asthma episodes or attacks in the past three months among adults with current asthma, 2006-2008

Date Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008

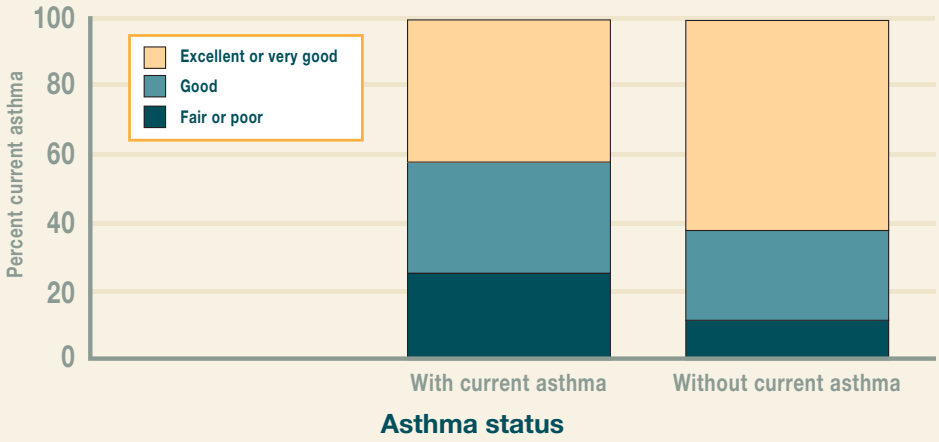


Key Findings

- More than 18% of adults with asthma report having asthma symptoms every day.
- More than 40% of adults with asthma report having at least one asthma episode or attack in the last three months with most having between one to five episodes or attacks.

Figure 4.14 – Perceived health among adults with or without current asthma, 2009

Data Source: Oregon Behavioral Risk Factor Surveillance System



Key Findings

- Adults with asthma are less likely than people without asthma to report being in excellent or very good health. Conversely, adults with asthma are more than twice as likely to report being in fair or poor health than those without asthma.

Chapter 5

Asthma Risk Factors

Overview

Risk factors are external circumstances or personal health behaviors that increase the chance that individuals will experience asthma episodes or exacerbations. Because asthma is a complex disease involving many risk factors, no one risk factor can explain asthma in the Oregon population. Risk factors are unique to each individual and can include family history, smoking or exposure to secondhand smoke, obesity, substandard housing that exposes an individual to irritants such as mold and cockroaches, exposure to allergens, and air quality. In addition to these risk factors, lack of medical insurance or assistance makes it difficult for people with asthma to afford the medications and care necessary to control their disease.

Because of the complexity of risk factors among people with asthma, it is difficult to gather comprehensive information to adequately characterize asthma risk factors in Oregon. In this report, reporting of asthma risk factors is limited to smoking, obesity, indoor environmental asthma risk factors and actions taken by people with asthma to reduce these risk factors, air quality, and the lack of medical insurance.

Risk factors for asthma were primarily monitored through the Behavioral Risk Factor Surveillance System (BRFSS) and the companion Asthma Callback Survey to the BRFSS. The risk factors from the BRFSS included smoking, secondhand smoke exposure, and obesity as measured by the Body Mass Index (BMI). BMI is a calculation that uses height and weight to determine obesity. Indoor asthma risk factors and actions taken by people with asthma to reduce these risk factors were monitored using the Asthma Callback Survey.

Air quality data were obtained from the Environmental Public Health Tracking Program (EPHT). EPHT data are available online at ephtracking.cdc.gov/showHome.action.

Finally, the U.S. Census Bureau Small Area Health Insurance Estimates (SAHIE) data were used to show the level of health insurance in Oregon. SAHIE data are available online at www.census.gov/hhes/www/sahie/index.html.

Figure 5.1 – Adults with current asthma by smoking status

Data Source: Oregon Behavioral Risk Factor Surveillance System

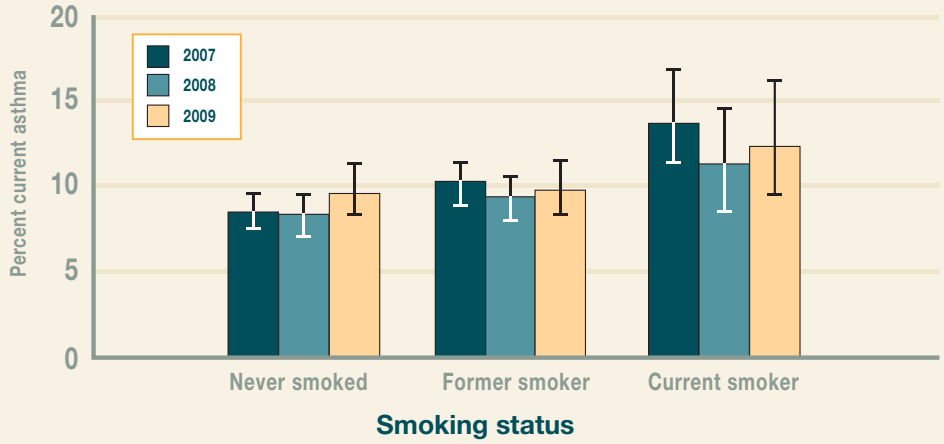
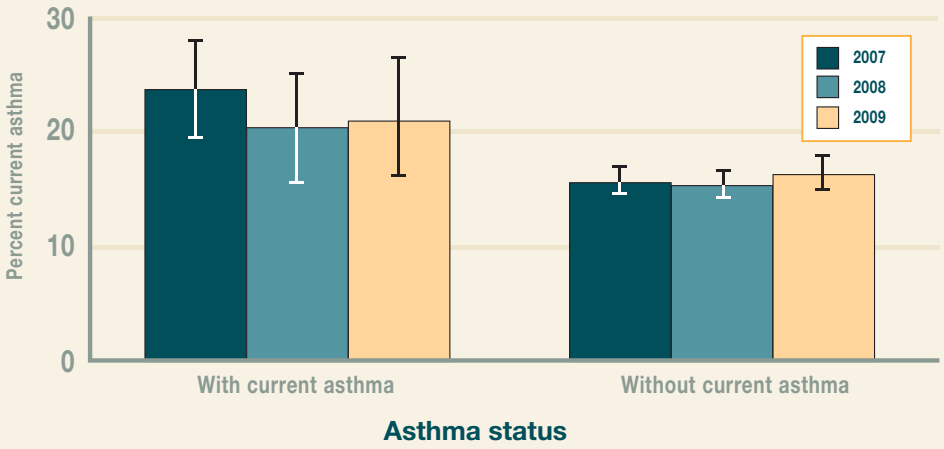


Figure 5.2 – Current smokers among adults with or without current asthma

Data Source: Oregon Behavioral Risk Factor Surveillance System

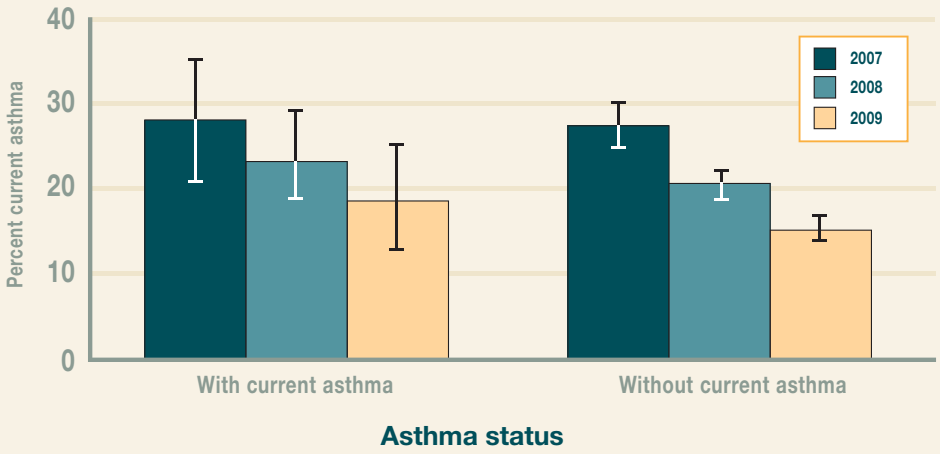


Key Findings

- People who currently smoke are more likely to have current asthma (12%) than people who have never smoked (10%).
- People with asthma (21%) are more likely to be smokers than those without asthma (16%).

Figure 5.3 – Exposure to secondhand smoke in a typical week among adults with or without current asthma (excluding current smokers)

Data Source: Oregon Behavioral Risk Factor Surveillance System

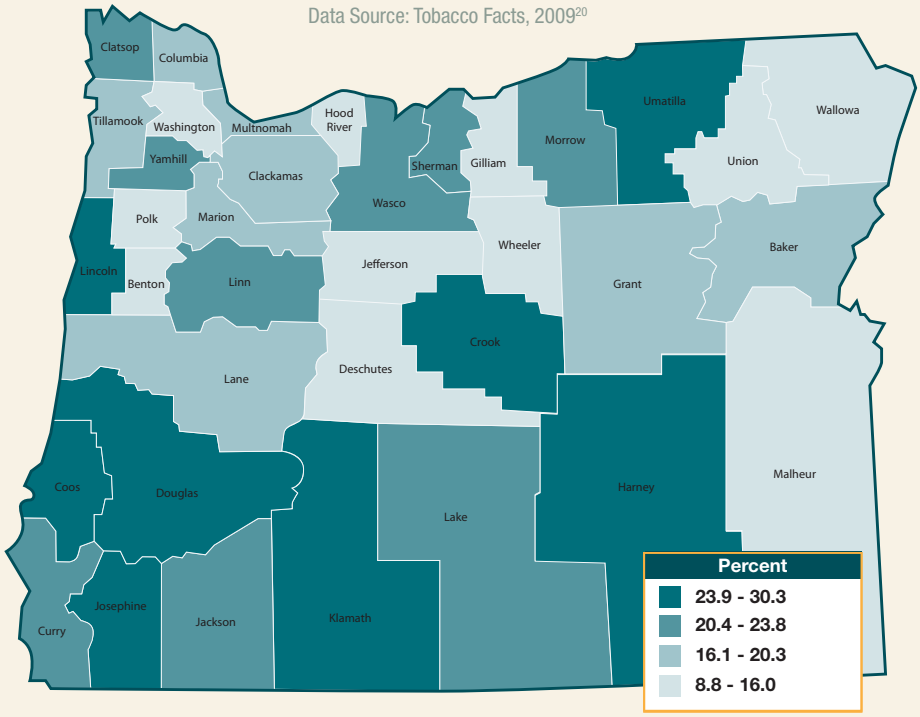


Key Findings

- The percentages of people with and without asthma exposed to secondhand smoke are nearly identical. The trend over time indicates decreasing exposure to secondhand smoke in people with and without asthma. Oregon's Indoor Clean Air Act, which expanded the statewide smokefree law to prohibit smoking in bars, bar areas of restaurants, and bowling alleys, was enacted in January 2009.

Figure 5.4 – Adult cigarette use by county, 2004-2007 (age-standardized)

Data Source: Tobacco Facts, 2009[20]



Key Findings

- In general, the coastal counties of Oregon and parts of southern Oregon have the highest percentages of people who smoke. The statewide smoking rate is 18.7%.[20]

Figure 5.5 – Adults with current asthma by Body Mass Index, 2009

Data Source: Oregon Behavioral Risk Factor Surveillance System

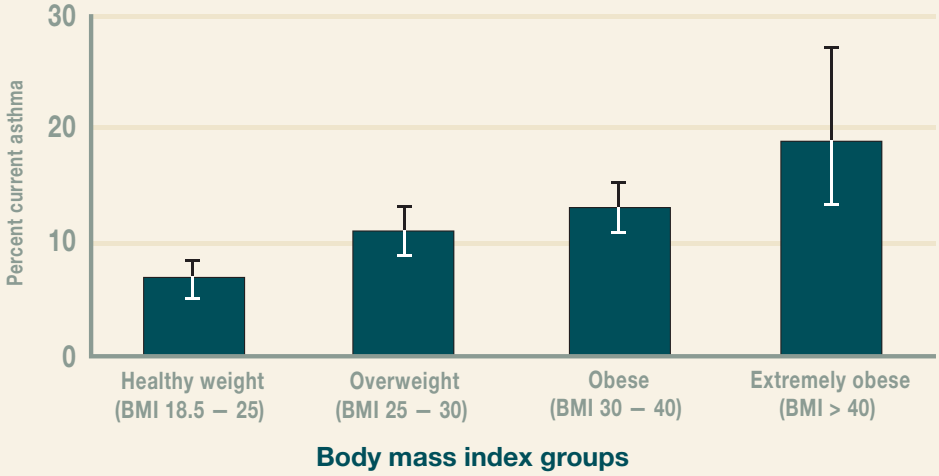
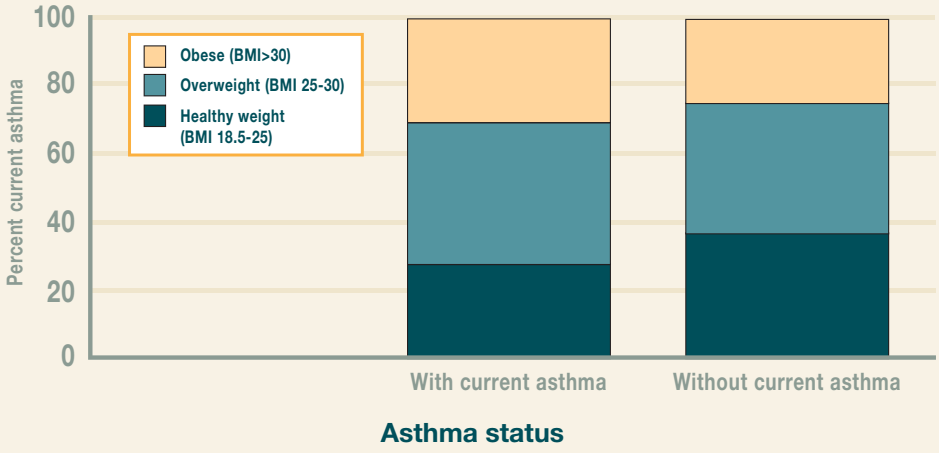


Figure 5.6 – Body Mass Index among adults with or without current asthma, 2009

Data Source: Oregon Behavioral Risk Factor Surveillance System

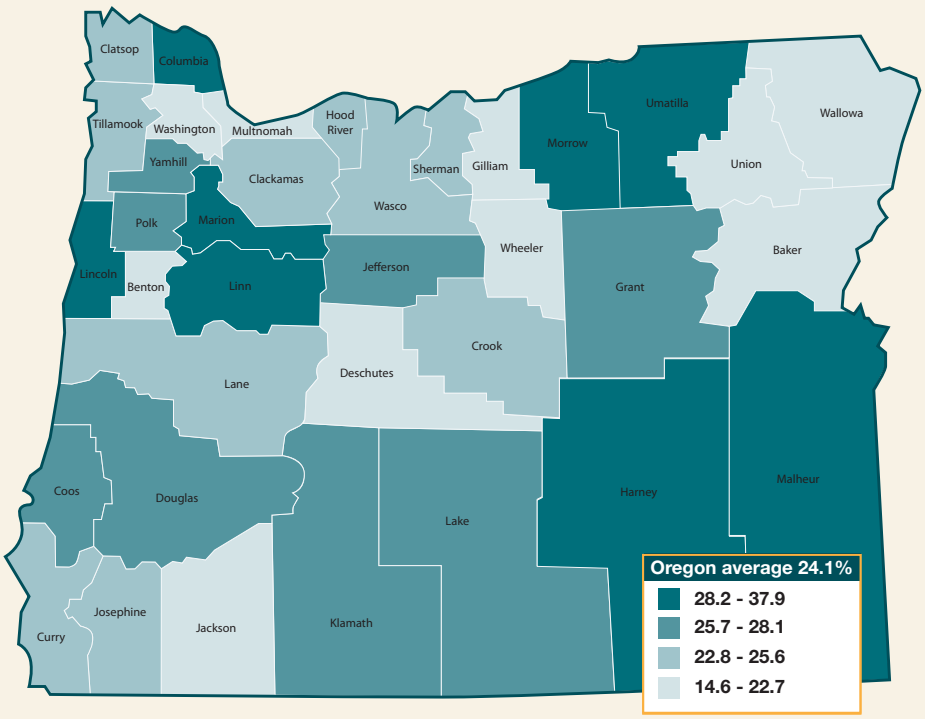


Key Findings

- Obesity is reported to be an important asthma risk factor.[24] Obesity is associated with increased prevalence and incidence of asthma, as well as worsened asthma control.[25] Investigators have shown that people who are obese have decreased lung function[26] and obese individuals with asthma do not respond as well to asthma medications.[27] Other factors related to asthma and obesity may include obesity-caused low-grade systemic inflammation, obesity-related changes in hormones, and increased problems such as gasteroesophageal reflux, and sleep-disordered breathing.[25]
- In Oregon, extremely obese people are more likely to have asthma as healthy weight people. Almost 34% of people with asthma are obese, which is higher than the 24% among people who do not have asthma.

Figure 5.7 – Adult obesity by county, 2004-2007

Data Source: Oregon Behavioral Risk Factor Surveillance System



Key Findings

- There is no regional pattern among counties with high percentages of adult obesity.

Indoor Risk Factors and Actions Taken to Reduce Risk Factors

Figure 5.8 – Indoor risk factors and actions taken to reduce indoor risk factors for adults and children (ages 0-17) with asthma, 2006-2008

Data Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008
*This number may be statistically unreliable and should be interpreted with caution.
**This number is suppressed because it is statistically unreliable.

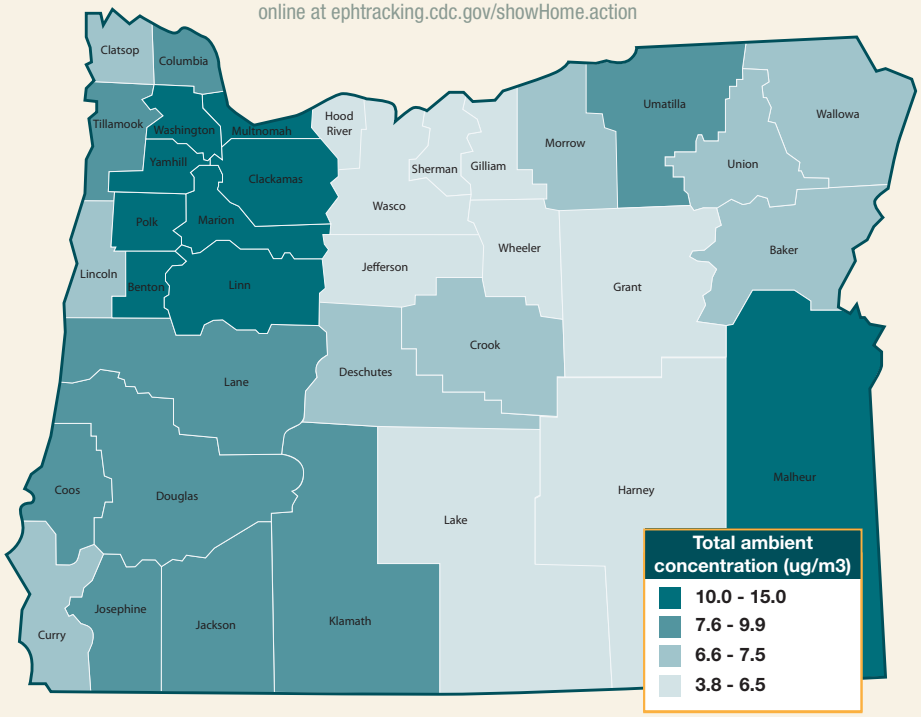
	Adult		Child	
	%	CI	%	CI
Indoor Risk Factors				
Have carpeting or rugs in bedroom	82.1	77.6-85.8	78.7	69.6-85.6
Have pets inside home	70.1	65.7-74.3	76.2	66.5-83.9
Use wood burning fireplace or stove	28.0	24.2-32.2	25.8	18.3-35.1
Use gas for cooking	19.7	16.0-23.9	15.3	9.3-24.1
Seen or smelled mold inside home in past 30 days	15.6	11.9-20.2	16.0	9.6-25.4
Smoked inside home in past week	11.3	8.7-14.5	**	**
Seen mice or rats in home in past 30 days	6.2	4.4-8.5	3.6*	1.5-8.1*
Have gas fireplace or unvented gas stove	1.6	1.0-2.7	**	**
Seen cockroaches in home in past 30 days	0.4*	0.2-1.0*	**	**
Actions to Reduce Risk Factors				
Regularly used exhaust fan in bathroom	73.3	68.5-77.7	70.3	60.6-78.5
Regularly used exhaust fan in kitchen	68.2	63.5-72.6	71.9	61.9-80.1
Regularly used air cleaner or purifier	26.6	22.8-30.9	31.3	22.7-41.4
Use mattress cover that controls allergens	24.9	21.3-28.9	25.0	17.8-33.9
Use pillow cover that controls allergens	22.5	19.4-26.0	23.1	16.2-32.0
Pets not allowed in bedroom	21.7	72.8-82.9	39.3	48.1-71.9
Regularly used dehumidifier	7.6	5.8-9.9	11.9	6.8-20.1

Key Findings

- Most people with asthma live in an indoor environment where there is carpeting or rugs in the bedroom and pets inside the home. In addition, many use wood burning fireplaces or stoves, cook with gas, or have seen or smelled mold inside the home. All these can be indoor environmental asthma triggers.
- Most people with asthma report using exhaust fans in the bathroom and kitchen. Using exhaust fans helps in lowering humidity levels. High humidity can promote growth of biological agents (such as mold).
- Children with asthma are more likely to not have pets allowed in the bedroom than adults with asthma.

Figure 5.9 – Modeled Ambient Levels of Fine Particulate Matter, 2006

Data Source: Environmental Public Health Tracking, data available online at ephtracking.cdc.gov/showHome.action



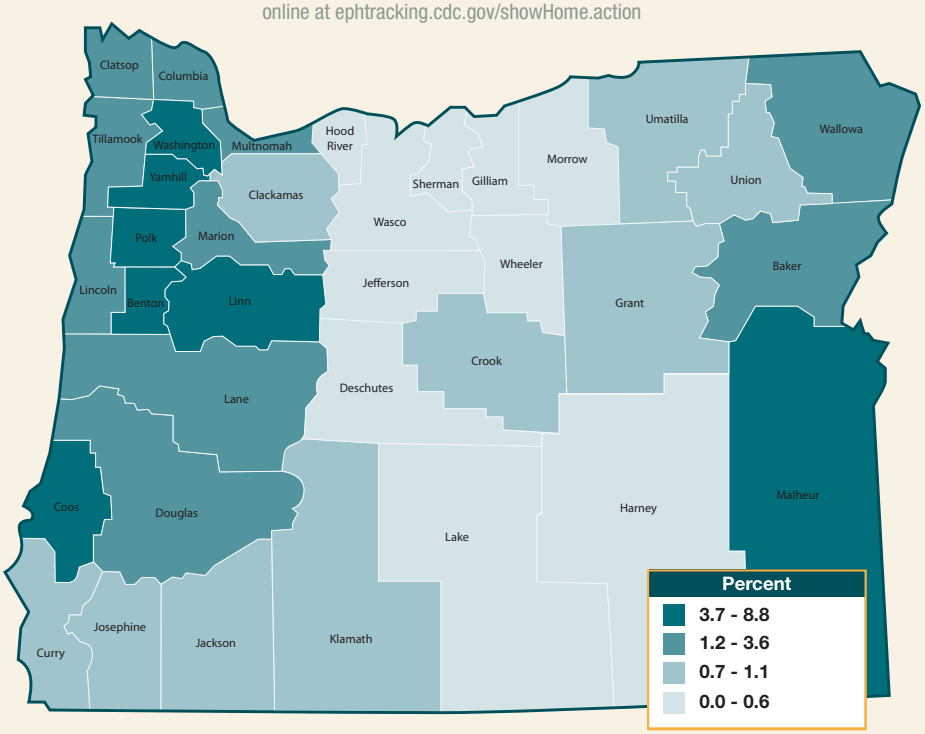
Key Findings

Fine Particulate Matter

- The majority of the counties with high levels of fine particulate matter in Oregon were all in the highly urban non-coastal northwest. This area (which includes Benton, Clackamas, Linn, Marion, Multnomah, Polk, Washington, and Yamhill counties) composes 60% of Oregon's population. In eastern Oregon, Malheur County stands out as having a high level of particulate matter.
- High levels of fine particles decrease lung function, can trigger asthma attacks, and increase emergency department visits for asthma.

Figure 5.10 – Percentage of Modeled Days with Fine Particulate Matter higher than the National Air Quality Standard, 2006

Data Source: Environmental Public Health Tracking, data available online at ephtracking.cdc.gov/showHome.action



Note: Fine particulate matter is particles such as smoke and haze that are 2.5 micrometers in diameter and smaller. Data include both direct measurements from air monitors and from modeled air quality. Modeled data may introduce additional error that could make the estimates in some counties unstable. For information on the national ambient air quality standard see *www.epa.gov/air/criteria.html.*

Key Findings

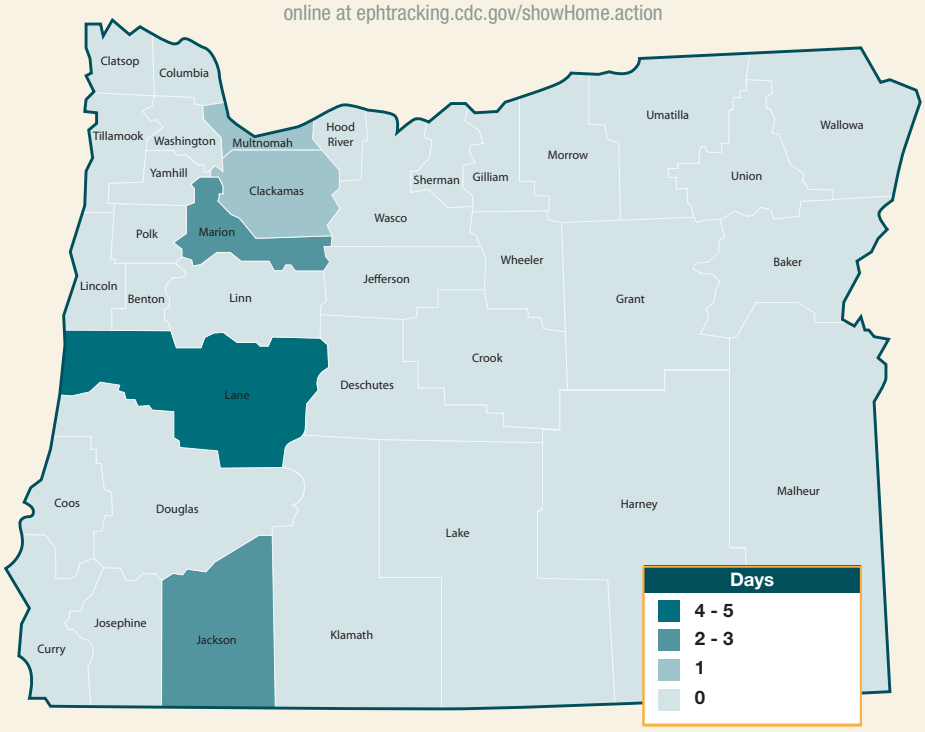
Percentages of Days with Fine Particulate Matter higher than the National Air Quality Standard

- Western and the eastern border counties of Oregon have the highest percentages of days with fine particulate matter higher than the National Ambient Air Quality Standard (NAAQS). It is relatively uncommon for particulate matter concentrations to exceed the NAAQS in most Oregon counties, so this measure captures the occurrence of only extreme events. It is possible that a few days with high particulate concentrations skew the value for the entire year.

Data (Continued)

Figure 5.11 – Modeled Days with Ozone higher than the National Air Quality Standard, 2006

Data Source: Environmental Public Health Tracking, data available online at ephtracking.cdc.gov/showHome.action



Key Findings

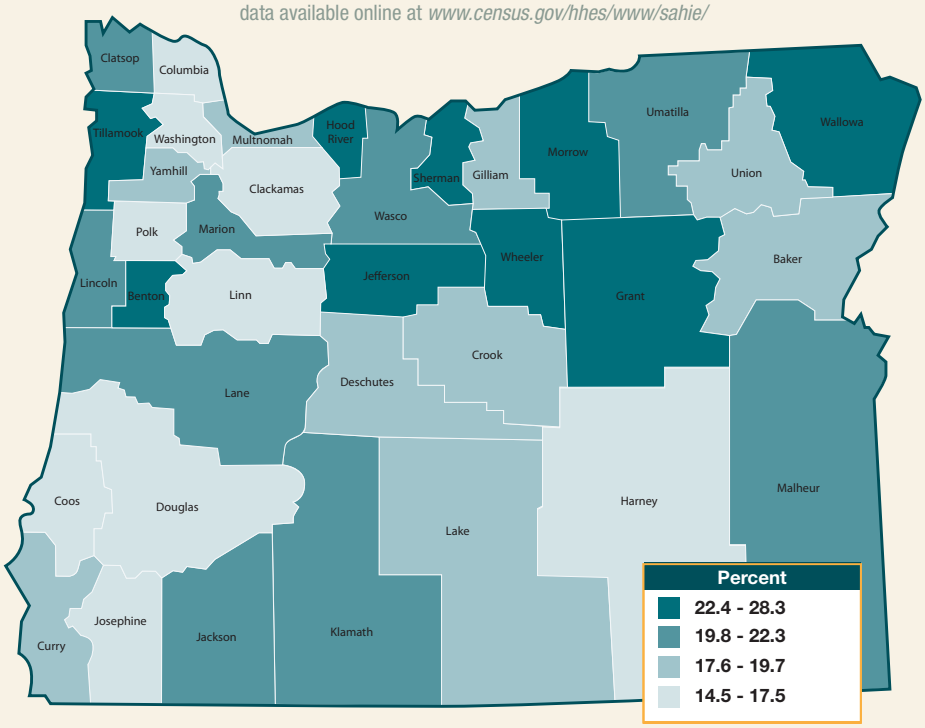
Days with Ozone higher than the National Air Quality Standard

- In 2006, only five counties exceeded the National Air Quality Standard (NAQS) for ozone.
- High levels of ozone decrease lung function, can trigger asthma attacks, and increase emergency department visits for asthma.

Data Uninsured

Figure 5.12 – People aged 64 and younger without health insurance by county, 2007

Data Source: U.S. Census Bureau Small Area Health Insurance Estimates, data available online at *www.census.gov/hhes/www/sahie/*



Key Findings

- Oregonians without health insurance may be more likely to have no access to medications to control their asthma or obtain asthma management training.
- In general, eastern Oregon counties have the highest percentage of uninsured in Oregon. However, areas of western and coastal Oregon also had high levels of the uninsured.

Chapter 6

Asthma Emergency Department or Urgent Care Visits

Overview

Asthma is one of the leading causes of visits to emergency departments (ED) and urgent care centers. Nationally, asthma is among the top 20 leading diagnostic reasons for an ED visit; approximately 1.75 million of the more than 110 million ED visits have a primary diagnosis of asthma.[28] In 2003, antiasthmatic drugs were among the 20 most frequent drug classes ordered, supplied, or administered during ED visits in the U.S.[28]

The percentage of Oregonians with asthma who visited an ED or an urgent care center for asthma in the past year is assessed through the Behavioral Risk Factor Surveillance System (BRFSS) and starting in 2009, from the companion Asthma Callback Survey to the BRFSS. The question in the BRFSS asks:

- During the past 12 months, how many times did you visit an emergency room or urgent care center because of your asthma?

ED visits are also monitored from data provided by health plans in two workgroups. The first workgroup is the Asthma Data Workgroup (ADWG). The ADWG is a voluntary partnership between the Oregon Asthma Program and several of Oregon's largest private and Medicaid health plans. From this collaborative, summary data are provided by each participating plan, including information on ED visits and follow up within one month of an ED visit by a primary care provider or an asthma specialist. Follow up to an ED visit provides a measure of people with asthma receiving appropriate guidance from a trained professional to manage their asthma and reduce the possibility of another ED visit.

The second workgroup is the Division of Medical Assistance Programs (DMAP) Quality and Performance Improvement Workgroup (QPIWG). DMAP is a division of the Oregon Health Authority that administers state programs providing medical coverage to low-income Oregonians through the Oregon Health Plan (OHP), which is a combination of Medicaid and the Children's Health Insurance Program (CHIP). The QPIWG is a workgroup convened by DMAP for all health plans that serve Oregon Health Plan (OHP) recipients in Oregon. Through this workgroup, asthma data are measured and reported consistently across all OHP managed health plan and OHP fee-for-service clients. Almost all OHP members are in managed care or have their health care services paid for on a fee-for-service basis.

In 2008, data from these two workgroups represent almost 550,000 insured Oregonians aged 4-55 years who were enrolled for at least six months in any participating health plans. This represents approximately 15% of the total Oregon population.

Asthma Emergency Department or Urgent Care Visits

Figure 6.1 – Adults with current asthma with one or more emergency department or urgent care visits in the past 12 months

Data Source: Oregon Behavioral Risk Factor Surveillance System

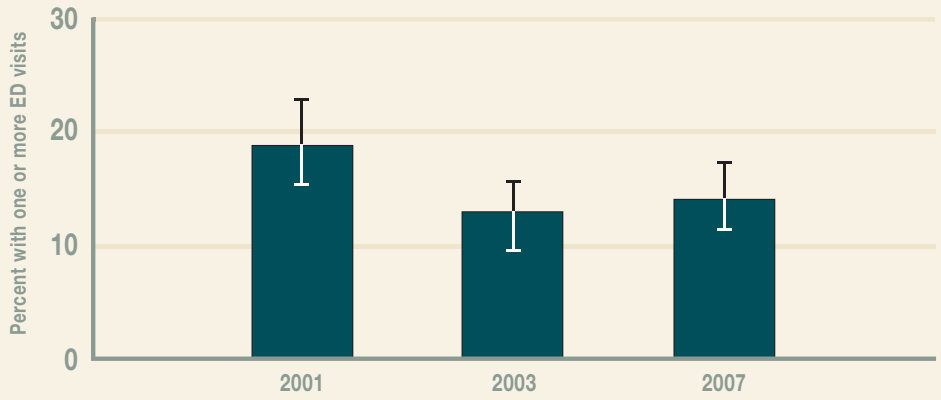
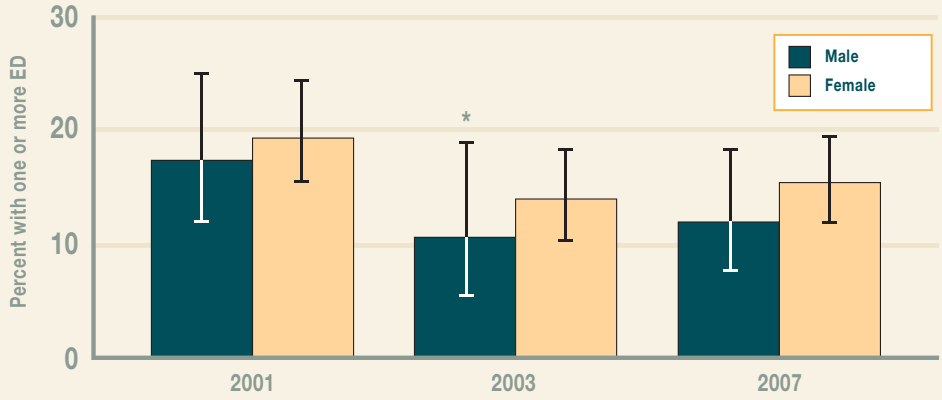


Figure 6.2 – Adults with current asthma by gender with one or more emergency department or urgent care visits in the past 12 months

Data Source: Oregon Behavioral Risk Factor Surveillance System
*This number may be statistically unreliable and should be interpreted with caution.



Key Findings

- Overall, the percentage of ED or urgent care visits has declined in Oregon between 2001 and 2007.
- Females with asthma are more likely than males to have an ED or urgent care visit. This trend is also seen in national data.[29]

Figure 6.3 – Adults with current asthma by type of insurance with one or more emergency department or urgent care visits in the past 12 months

Data Source: Oregon Behavioral Risk Factor Surveillance System.
* This number may be statistically unreliable and should be interpreted with caution.

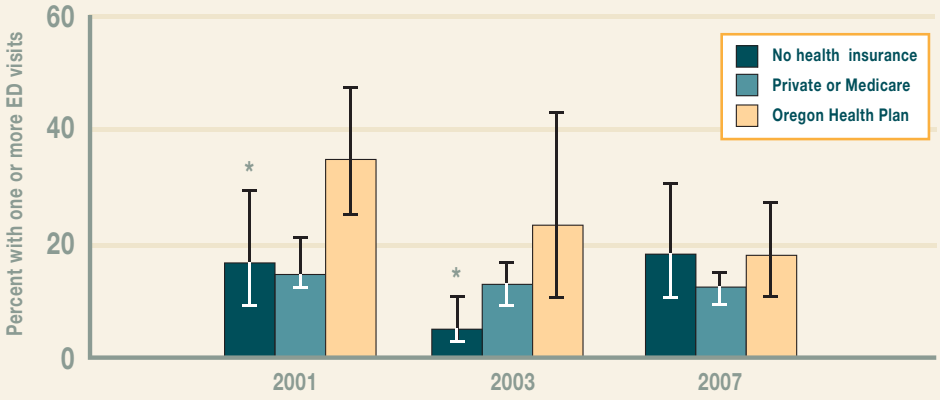
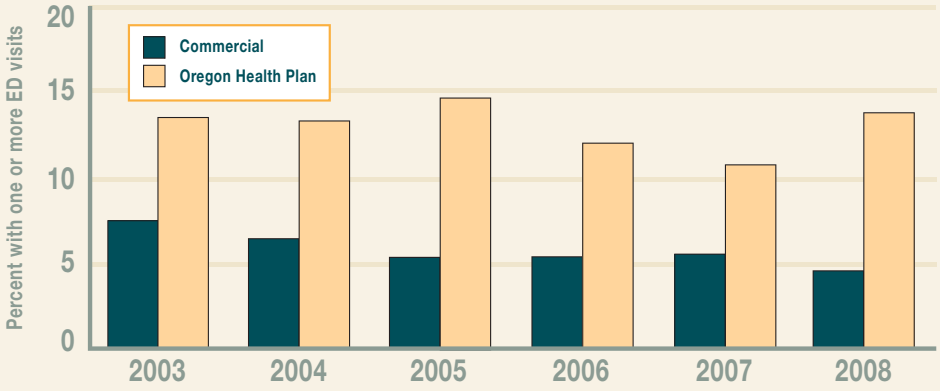


Figure 6.4 – People with asthma who had one or more emergency department visits for asthma in the past year, by type of insurance (age-standardized)

Data Source: Asthma Data Workgroup and Quality and Performance Improvement Workgroup.

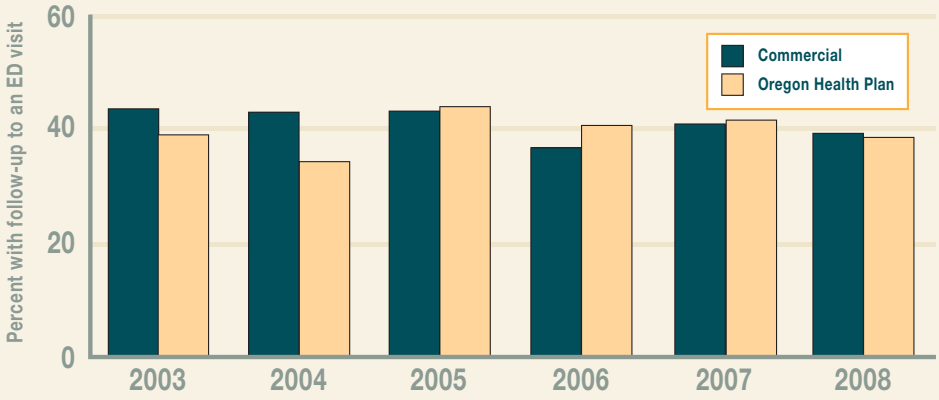


Key Findings

- In 200, people on OHP were twice as likely to report one or more ED or urgent care visits for asthma as people with no health insurance or people on private insurance or Medicare. It is currently unknown why reported ED visits have decreased among people on OHP between 2001 and 2007.
- In general, the trend among people with asthma who had an ED visit for asthma is stable in the OHP managed care population and decreasing in the private health plan population.
- OHP members are twice as likely to have an ED visit as people with private health insurance.

Figure 6.5 – Asthma follow-up visit with a medical practitioner within 30 days after an emergency department visit for asthma, by type of insurance (age-standardized)

Data Source: Asthma Data Workgroup and Quality and Performance Improvement Workgroup.



Key Findings

- Follow up to an ED visit has not changed significantly since 2003. About 40% of people with asthma have a follow-up visit with a primary care doctor or asthma specialist within 30 days of the ED visit. Seeing a health professional within 30 days after an ED visit is a recommendation for quality care in *The Guide to Improving Asthma Care in Oregon*.[23]

Chapter 7

Asthma Hospitalizations

Overview

Like emergency department visits, hospitalizations for asthma are an important measure of health care use by people with asthma. Nationally, almost 500,000 people were hospitalized for asthma in 2004.[30] This is a rate of 17.0 per 10,000 U.S. residents.

The rate of asthma hospitalizations per 10,000 Oregon residents is monitored through the Oregon Hospital Discharge Index dataset, which is provided by the Oregon Association of Hospitals and Health Systems. The Hospital Discharge Index provides information on hospital discharges from all general hospitals in Oregon except two U.S. Veterans Administration hospitals.

This dataset includes information on the dates of admission and discharge, principal and additional diagnosis, procedure codes, financial charges, primary payer, and limited patient demographic information. Expanded demographics were collected starting in January 2008 for race and ethnicity. However, this new demographic information is currently undergoing quality checks and requires refinement. Therefore, this information was not available for publication in this report.

An asthma hospitalization is defined as having a primary diagnosis with an International Classification Disease 9th Revision Clinical Modification (ICD-9-CM) code of 493. People who are not Oregon residents are excluded from analysis. Hospitalization rates are age-standardized to the U.S. 2000 standard population where noted.

Figure 7.1 – Annual age-standardized Oregon asthma hospital discharge rates per 10,000 residents

Data Source: Oregon Hospital Discharge Index

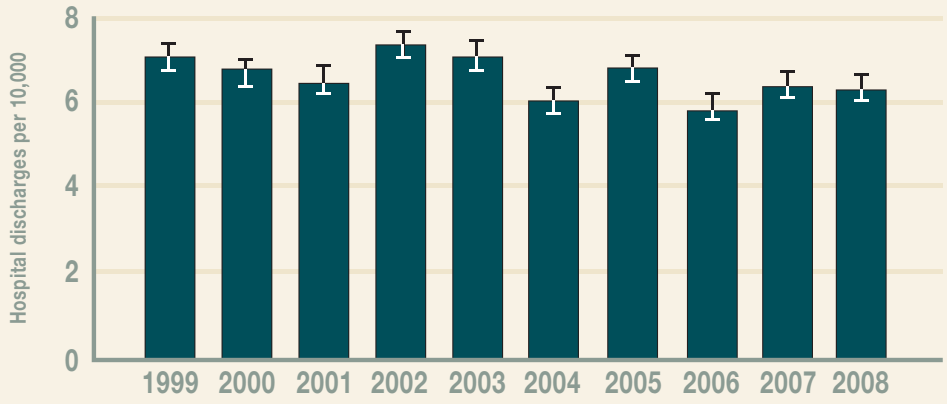


Figure 7.2 – Annual unstandardized U.S. asthma hospital discharge rates per 10,000 residents

Data Source: National Hospital Discharge Survey and National Survey of Ambulatory Surgery Reports.

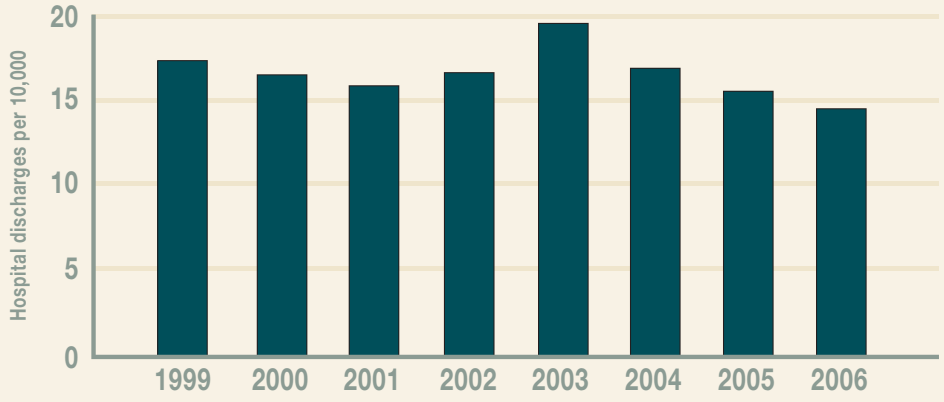
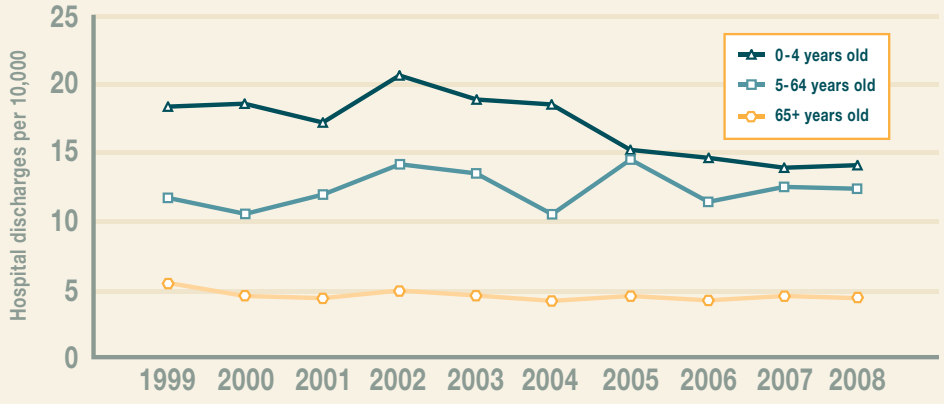


Figure 7.3 – Asthma hospital discharge rates per 10,000 residents by age groups

Data Source: Oregon Hospital Discharge Index.



Key Findings

- The overall trend in Oregon's asthma hospitalizations is stable.
- Oregon's hospitalization rate has been consistently half that of the nation. The reason for this difference is unknown. National hospital discharges can be found at the National Center for Health Statistics, National Hospital Discharge and Ambulatory Surgery Data website at www.cdc.gov/nchs/nhds.htm.
- The annual rate of hospitalizations is highest in the 0-4 age group followed by ages 65 or older. However, in 2009 Oregon is ranked best in the nation by The Commonwealth Fund for avoidable asthma hospitalizations among children.[31]

Figure 7.4 – Age-adjusted asthma hospital discharge rates per 10,000 residents by gender

Data Source: Oregon Hospital Discharge Index.

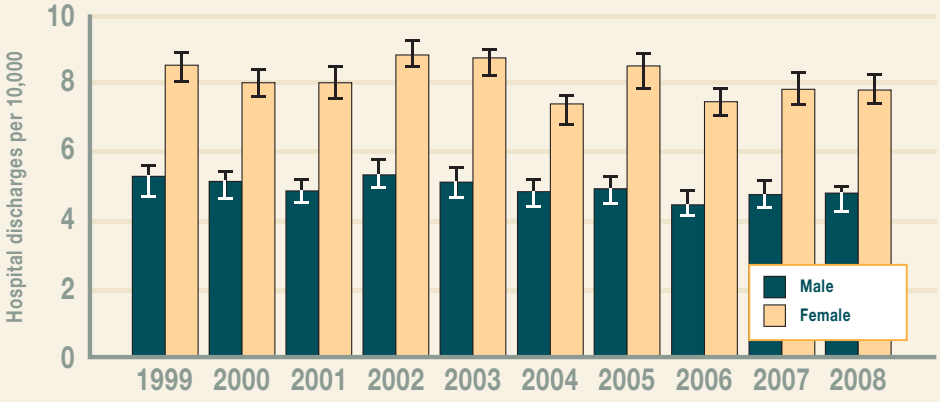


Figure 7.5 – Asthma hospital discharge rates per 10,000 by gender and age group, 2008

Data Source: Oregon Hospital Discharge Index.

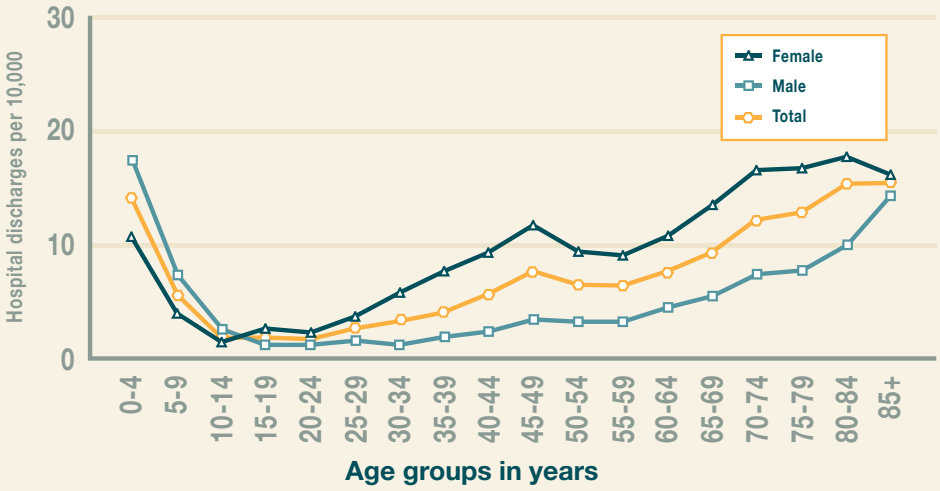


Figure 7.6 – Asthma hospital discharges by month, 2008

Data Source: Oregon Hospital Discharge Index.

Key Findings

- Females consistently have higher hospitalization rates than do males. As noted in Chapter 3, adult females are more likely to have asthma than adult males. The reason adult women have an increased risk of developing adult-onset asthma are not completely understood. However, physiological differences such as generally having smaller airways than men, different hormones, increased risk from obesity and socio-economic differences have all been reported.[10,11,12,13]
- Asthma hospitalizations are higher for males ages 0 to 14 years. After age 14, the rate of asthma hospitalizations is higher for females. The 15-19 age group has the lowest asthma hospitalization rate, with the very young or persons aged 80 or older with the highest rates. These trends are similar to national trends.[30]
- Monthly trends in asthma hospitalizations in Oregon are similar to trends reported in national studies.[32] Asthma hospitalizations increase in the fall with a peak in the early spring. The period with the fewest asthma hospitalizations is summer. Large fall and spring peaks may be related to exposure to allergens, changes in temperature, and increased respiratory infections related to children going back to school.[32]

Figure 7.7 – Primary diagnosis groups where asthma was the second diagnosis, 2008

Data Source: Oregon Hospital Discharge Index

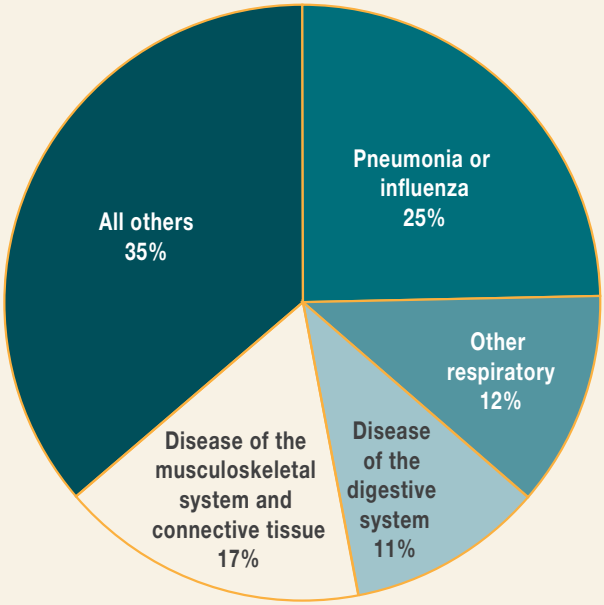
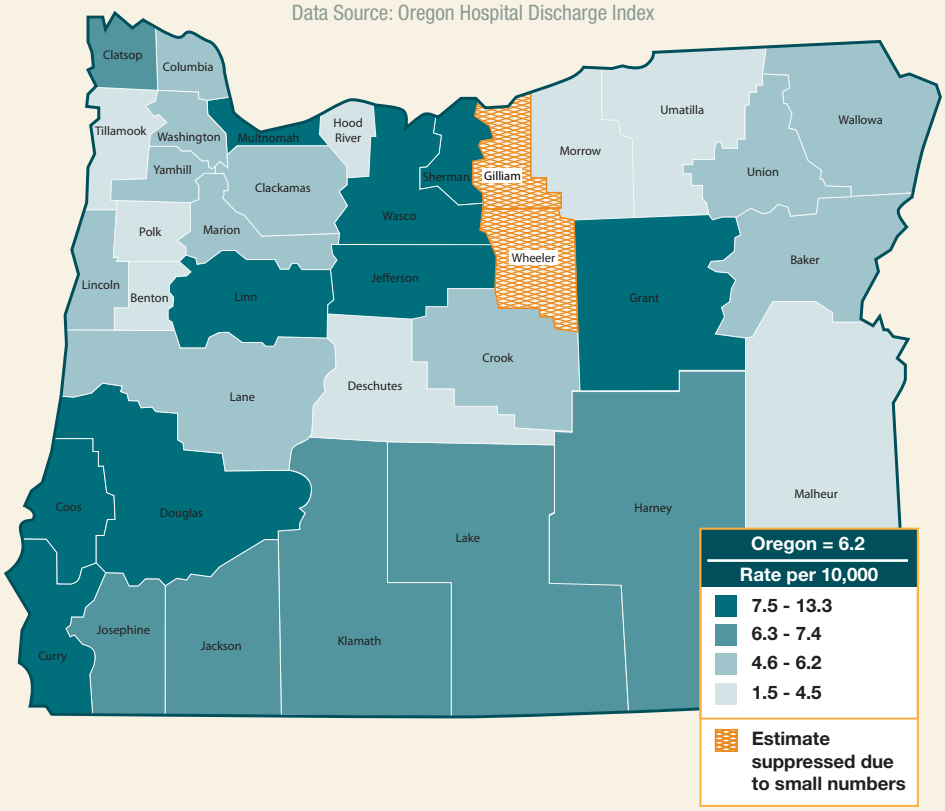


Figure 7.8 – Asthma hospital discharge rates per 10,000 residents by county (age-standardized), 2006-2008

Data Source: Oregon Hospital Discharge Index



Key Findings

- One out of four hospitalizations with asthma as the second diagnosis had a primary diagnosis of pneumonia or influenza. Of those who were hospitalized with a primary diagnosis for diseases of the musculoskeletal system and connective tissue and had a secondary diagnosis of asthma, approximately 70% were age 50 or older than 50. Overall, individuals over 50 make up 48% of all hospitalizations with a secondary diagnosis of asthma.
- The highest hospitalization rates are in southern and north-central Oregon. These are also areas with high smoking rates as shown previously in Figure 5.4.

Chapter 8

Asthma Mortality

Overview

Compared to emergency department visits and hospitalizations, there are very few deaths due to asthma. Even though asthma is a chronic disease, with proper management people with asthma can lead healthy, active lives with few limitations in their activities and without experiencing life-threatening episodes. Unfortunately, in 2006 more than 3,500 people died as a result of asthma in the U.S.[33]

Asthma mortality is monitored through Oregon's Death Certificate Statistical File, which contains information about all deaths occurring in Oregon and deaths occurring out-of-state among Oregon residents. An asthma death is defined as having asthma listed as the underlying (principal) cause of death. When possible, the mortality rates in this chapter have been age-standardized to the U.S. 2000 standard population. For comparability, state and national rates may be obtained from the Centers for Disease Control and Prevention (CDC) WONDER (Wide-ranging Online Data for Epidemiologic Research) data system at *wonder.cdc.gov*.

Figure 8.1 – Annual asthma deaths in Oregon

Data Source: Oregon Death Certificates.

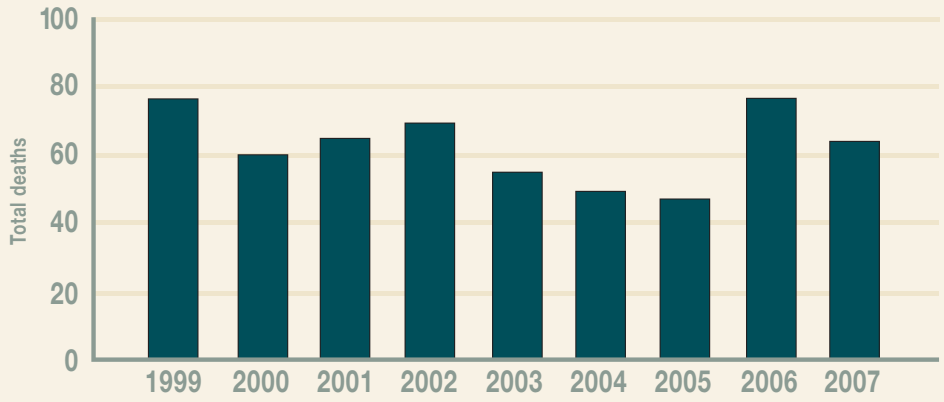


Figure 8.2 – Oregon and U.S. asthma death rates per million residents (age-standardized)

Data Source: Oregon Death Certificates; National Data from the CDC WONDER data system
Note: National data for asthma deaths not available for 2007.

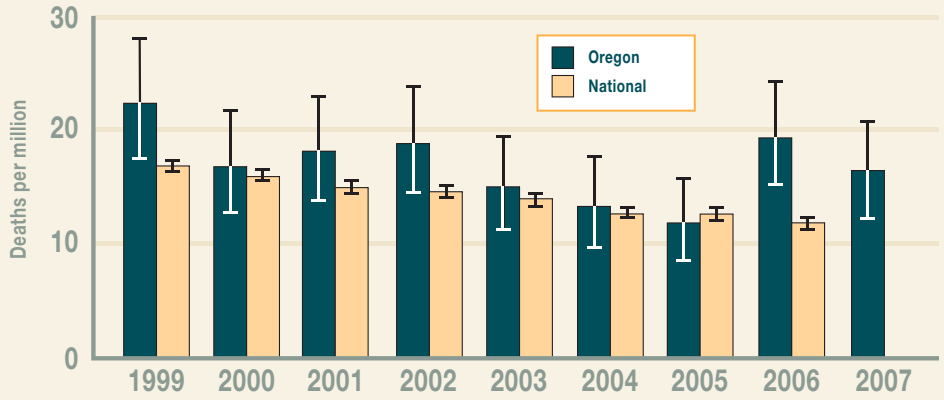
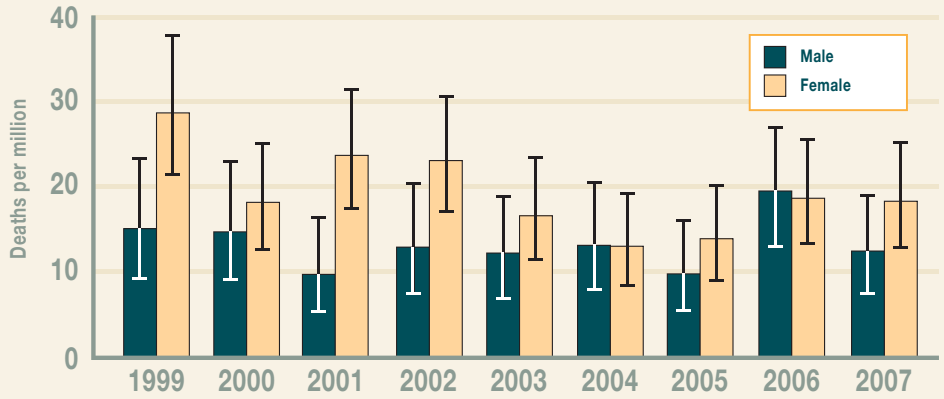


Figure 8.3 – Asthma death rate per million residents by gender (age-standardized)

Data Source: Oregon Death Certificates.



Key Findings

- Deaths due to asthma in Oregon have consistently decreased since 1999. However, in 2006 there was a spike of asthma-related deaths. It is unknown what caused this spike.
- Oregon death rates have consistently been higher than the national rates. Prior to 2006, the difference between the Oregon and national rate has narrowed over time and in 2005 the national asthma death rate was slightly higher than Oregon's rate.
- Females are consistently more likely to die from asthma than males in Oregon. This is similar to national asthma mortality trends.[34]

Figure 8.4 – Asthma death rate per million residents by age groups, 2007

Data Source: Oregon Death Certificates.

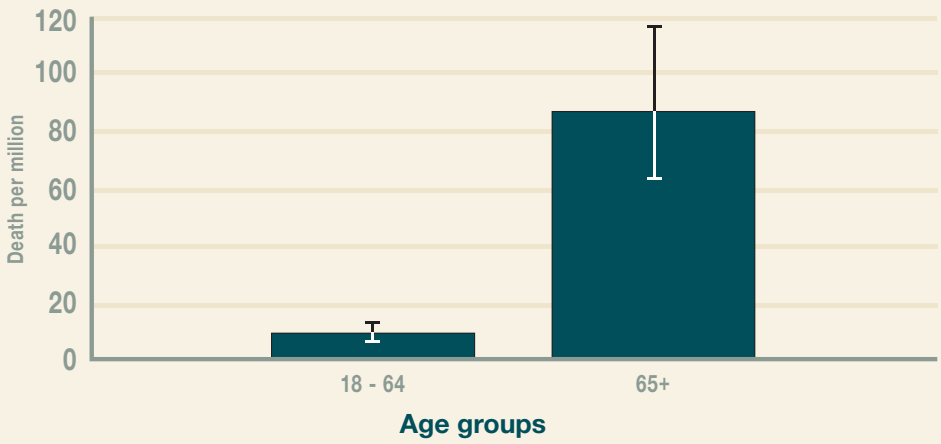
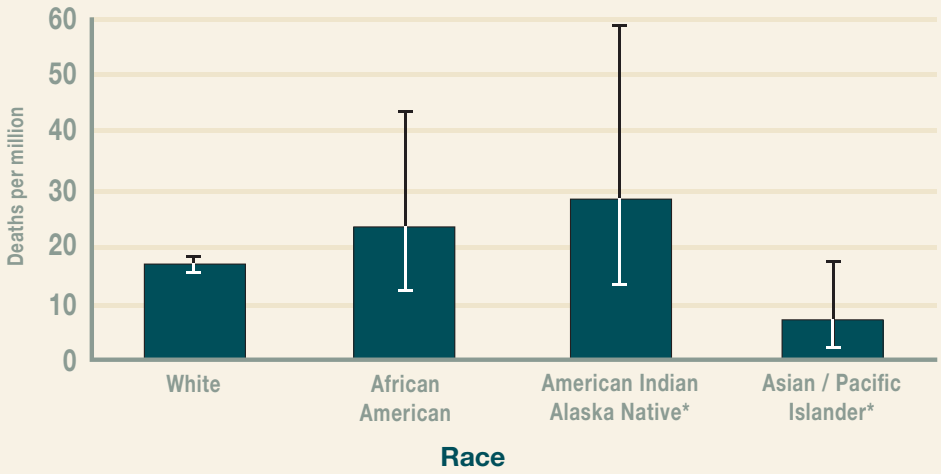


Figure 8.5 – Asthma death rate per million residents by race (age-standardized), 1998-2007

Data Source: Oregon Death Certificates.
* Rates may be unreliable due to small numbers.



Key Findings

- Oregonians ages 65 or greater were significantly more likely to die from asthma than those aged 18 to 64. No Oregonians less than 18 years of age died from asthma.
- In Oregon, African American and American Indian/Alaska Native individuals have a higher mortality rate than whites. Because of the small number of deaths among nonwhites, rates should be viewed with caution. This is true even though 10 years of Oregon deaths were combined. However, asthma deaths in the U.S. show that African Americans have a higher death rate than whites (more than 18 per 1,000,000 higher in 2001).[34] Nationally, African American females suffer the highest death rate from asthma.[34]

Chapter 9

Asthma in the Medicaid and the Children's Health Insurance programs

Overview

The Oregon Health Plan (OHP) is the Oregon health care program for eligible low- income residents of Oregon. It is funded by a combination of Medicaid and State Children's Health Insurance Program (SCHIP) funds, both of which are a combination of federal and state funds. OHP is made up of two benefit groups, Plus and Standard. Plus is the traditional Medicaid or SCHIP coverage offered to children and adults. Standard is offered to certain low-income adults who are not eligible for traditional Medicaid coverage and does not include coverage for children. The Oregon Health Plan is intended to help ensure that medical care is affordable for those with a low income.[1] People with lower incomes are more likely to live in substandard housing, smoke, and have higher disease morbidity.[2] In addition, OHP members are more than twice as likely to smoke as people with private insurance.

This section includes findings from the Oregon Medicaid Health Risk and Health Status Survey (HRHSS), analysis of medical claims data gathered by the Division of Medical Assistance (DMAP) Programs Quality and Performance Improvement Workgroup (QPIWG), and county-level information on children and adults using data provided by DMAP.

The HRHSS was conducted in 2004 by DMAP to measure the health risk and health status of adult OHP clients. This telephone survey, conducted in English and Spanish from August through October 2004, was designed to assess health risk behaviors, clinical preventive health practices, and health care access, mainly related to chronic diseases. The eligible population included adults aged 18 or older who were enrolled in OHP for at least 137 days during the period from July 1, 2003 – June 30, 2004. Continuous enrollment was not required.

The second source of OHP-related asthma data comes from the QPIWG using claims encounters, which includes medical visits and pharmacy dispensings. Through this workgroup, the Oregon Asthma Program (OAP) measures and reports asthma data consistently across all OHP managed health plans and OHP members not in managed health plans (fee-for-service). Almost all OHP members are in managed care or have health services paid for on a fee-for-service basis. OAP measures and compares five asthma indicators across all OHP clients in Oregon. The indicators are derived from medical and pharmacy claims for Oregonians served by OHP who are between the ages of 4-55 years and who have at least six months of continuous enrollment.

Finally, data on children aged 0-17 and adults aged 18 and older were provided by DMAP for the years 2004 through 2006 to look at medical and pharmacy claims by county. County of residence was determined by the home address of the OHP member and not the facility from which services were received. Three primary measures were calculated at the county level: emergency department (ED) visit rates, hospitalization rates and rates for a low medication ratio. These measures were chosen because each one is indicative of asthma that is either out of control or not optimally controlled.

Rates were calculated as an average rate for all years combined. The numerators for the ED visits and hospitalization rates were the total number of ED visits and the total number of hospitalizations for asthma by children or adults with asthma. The numerators for the medication ratio rates were the total number of OHP children or adult recipients in each county who had a medication ratio less than 0.33.[35, 36]

The medication ratio is a measure between 0 and 1 and measures the extent to which patients with persistent asthma take controller medications (inhaled corticosteroids) compared to their total controller medication and rescue (inhaled short-acting beta2-agonists) medication use.[35] People with higher medication ratios are less likely to have ED visits or hospitalizations for asthma and are more likely to have better scores for asthma quality of life, asthma control and asthma symptom severity.[35, 36]

The denominators were created similar to the numerator. The ED visit rates and hospitalization rates denominators were the number of children or adults on OHP who had asthma. The denominator for the medication ratio rate was the number of children or adults on OHP who had persistent asthma and had received two or more dispensings of short-acting $beta_2$-agonists.

Figure 9.1 – Adults with current asthma among Oregon Health Plan recipients by gender, 2004

Data Source: Oregon Medicaid Health Risk and Health Status Survey.

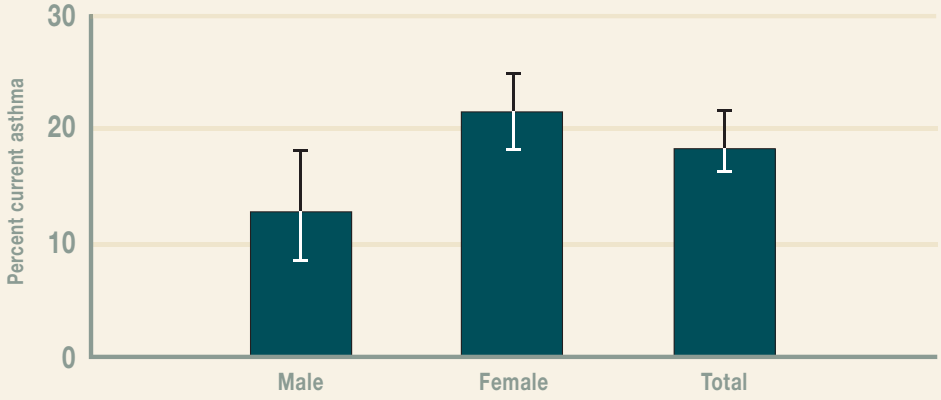


Figure 9.2 – Adults with current asthma among Oregon Health Plan recipients by age group, 2004

Data Source: Oregon Medicaid Health Risk and Health Status Survey.

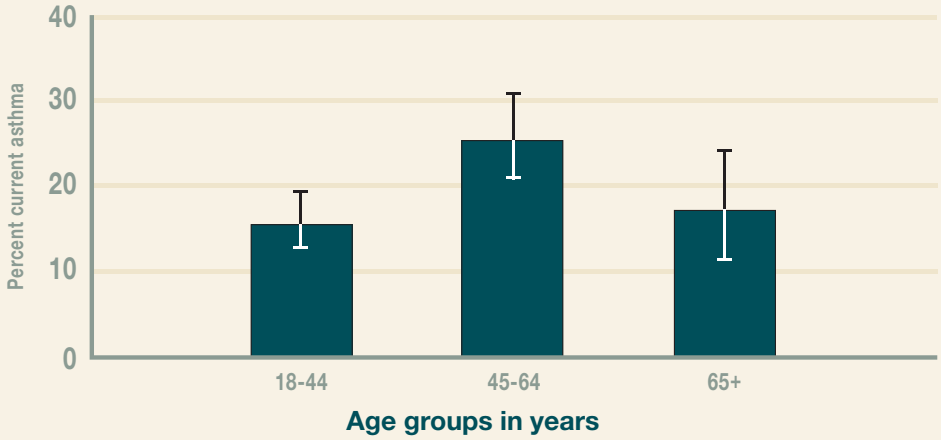
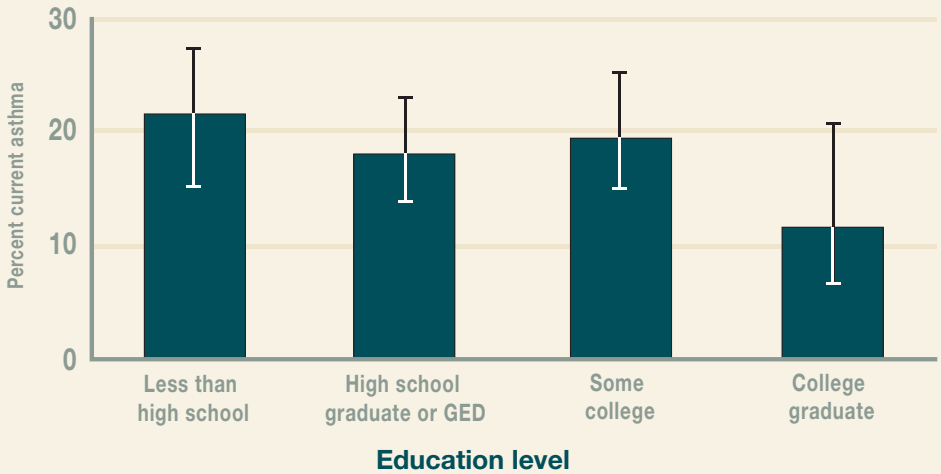


Figure 9.3 – Adults with current asthma among Oregon Health Plan recipients by education level, 2004

Data Source: Oregon Medicaid Health Risk and Health Status Survey.



Key Findings

- As with the percentages for the Oregon general population shown in Chapter 3, a lower percent of males and people with college degrees have asthma than do females and people with lower education levels.

Figure 9.4 – People with asthma who had one or more emergency department visits for asthma in the past year by Oregon Health Plan recipients (age-standardized and age-specific)

Data Source: Quality and Performance Improvement Workgroup.

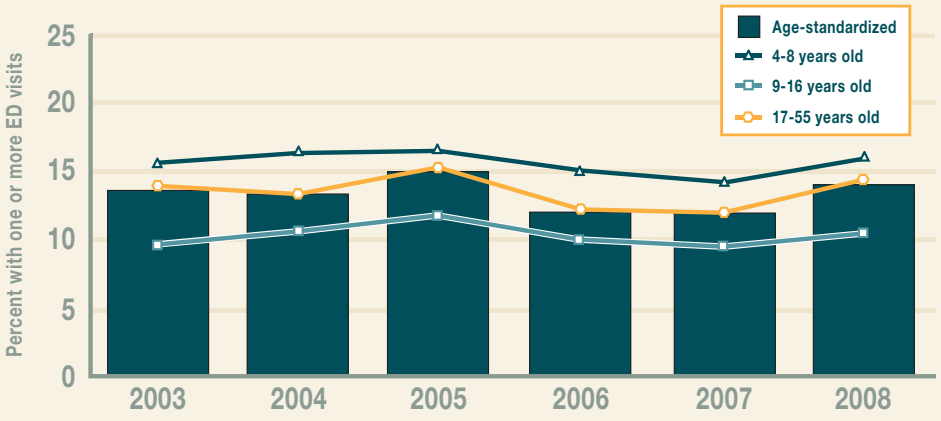
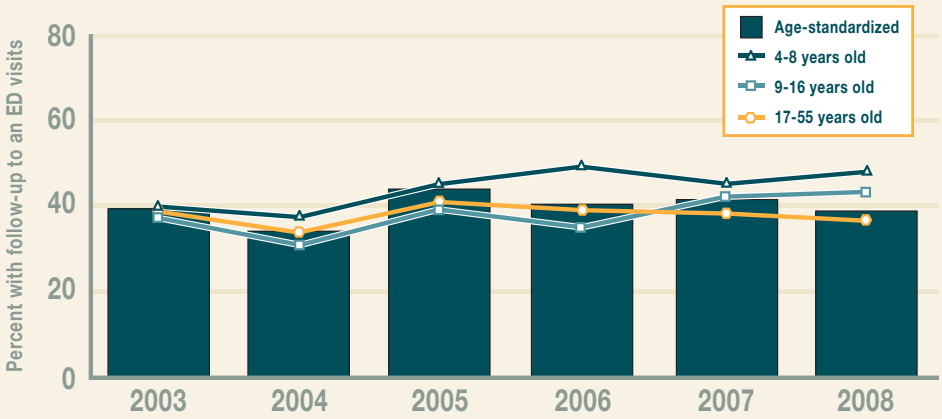


Figure 9.5 – Follow-up visit with a medical practitioner within 30 days after an emergency department visit for asthma among Oregon Health Plan recipients with asthma in the past year (age-standardized and age-specific)

Data Source: Quality and Performance Improvement Workgroup.



Key Findings

- OHP recipients 4-8 years of age have the highest ED use, whereas recipients 9-16 years of age have the lowest ED use.
- Follow up to an ED visit is stable and there is little difference between age groups. Seeing a health professional within 30 days after an ED visit is a recommendation for quality care in *The Guide to Improving Asthma Care in Oregon*.[23]

Figure 9.6 – Asthma symptoms in past four weeks among adult Oregon Health Plan recipients with current asthma, 2004

Data Source: Oregon Medicaid Health Risk and Health Status Survey.

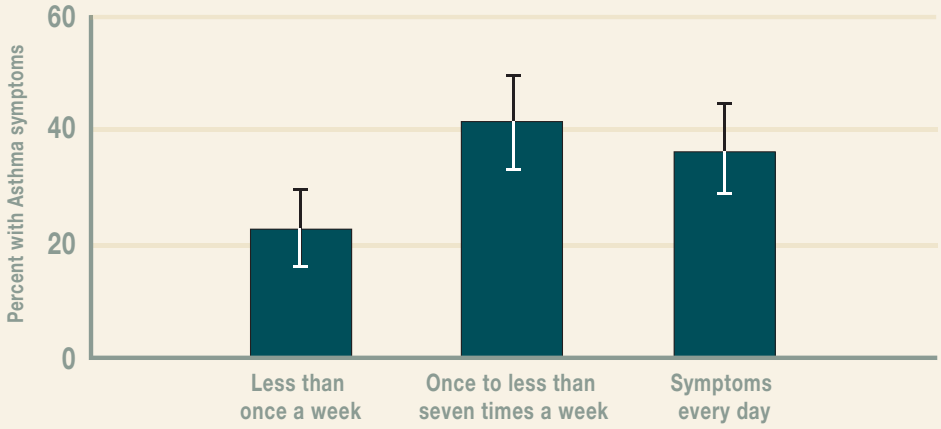
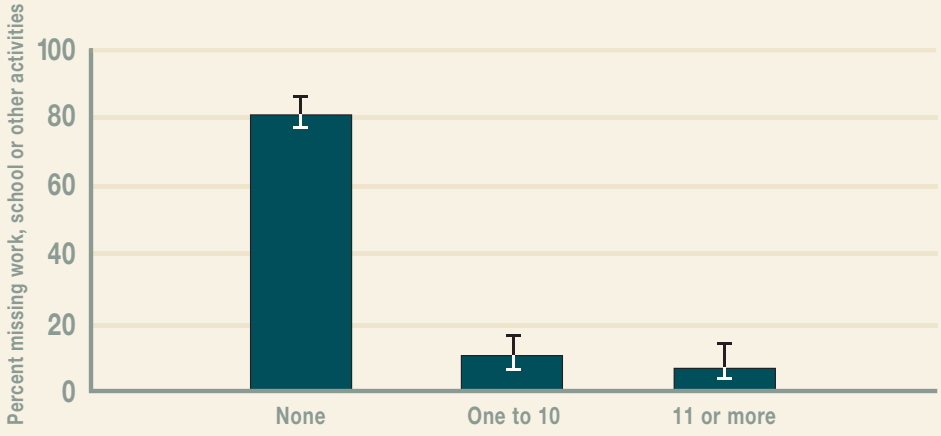


Figure 9.7 – Number of days of work or other daily activities missed in the last three months because of asthma among adult Oregon Health Plan recipients with current asthma, 2004

Data Source: Oregon Medicaid Health Risk and Health Status Survey.



Key Findings

- More than 36% of OHP recipients have symptoms every day.
- Almost 20% of OHP recipients missed one or more days of work or other daily activities in the last three months.

Figure 9.8 – Perceived health among adult Oregon Health Plan recipients with or without current asthma, 2004

Data Source: Oregon Medicaid Health Risk and Health Status Survey.

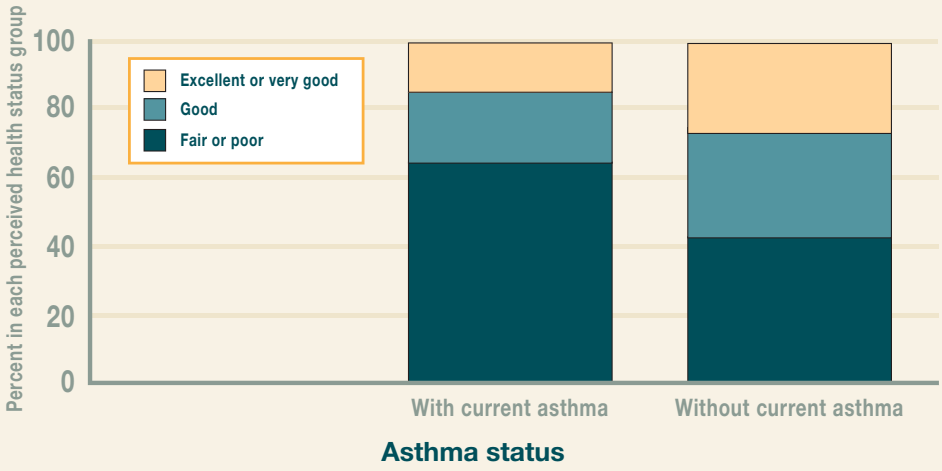
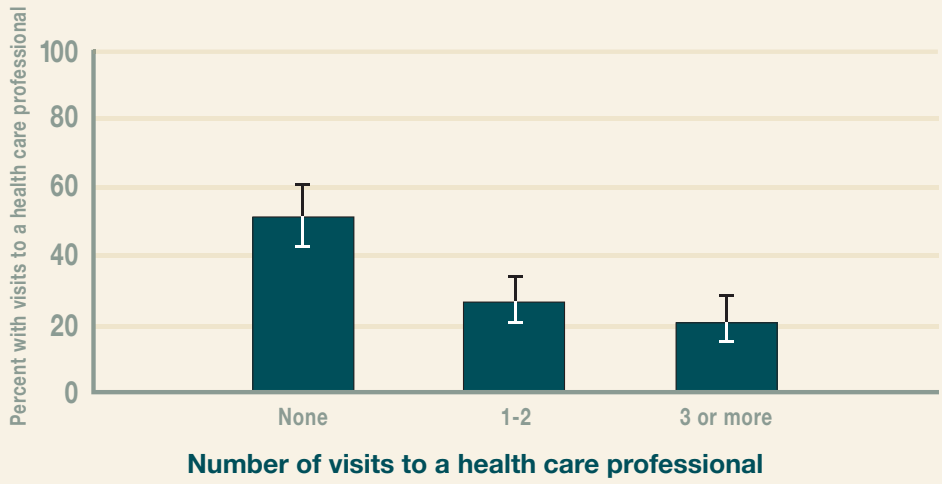


Figure 9.9 – Visits to a health care professional in the past 12 months for routine treatment of asthma among adult Oregon Health Plan recipients with current asthma, 2004

Data Source: Oregon Medicaid Health Risk and Health Status Survey.

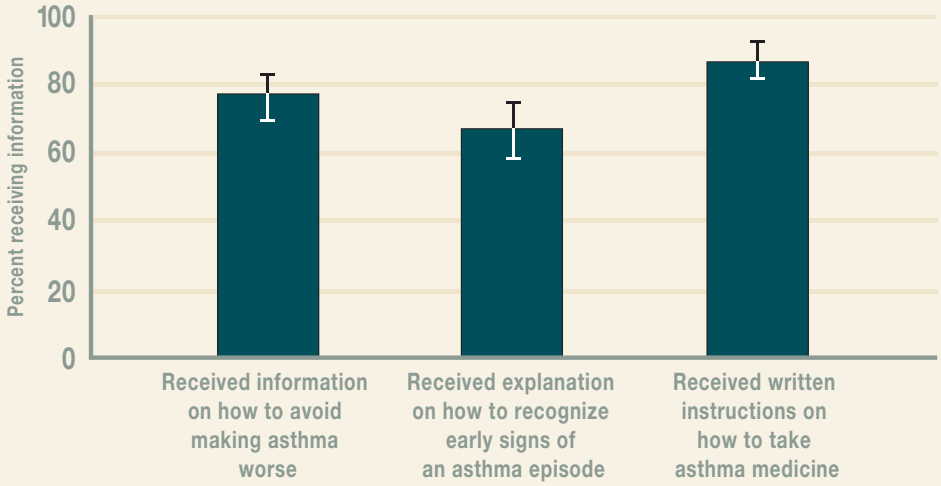


Key Findings

- Adults with asthma are almost half as likely as people without asthma to report being in excellent or very good health. Conversely, adults with asthma are more likely to report being in fair or poor health than those without asthma. Compared to the perceived health status in Figure 4.14 in Chapter 4 of the general Oregon population, people on OHP are more likely to perceive their health status as fair or poor.
- Less than half of adult OHP recipients with asthma receive routine treatment for their asthma.

Figure 9.10 – Adult Oregon Health Plan recipients with asthma who report receiving asthma information from their health care provider, 2004

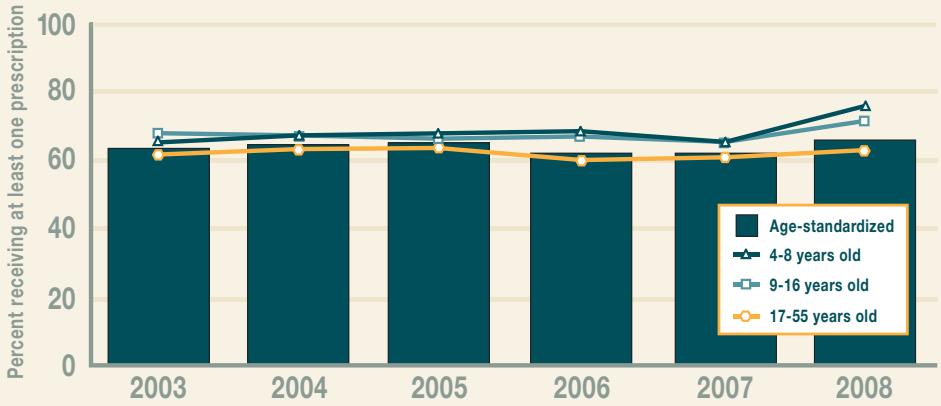
Data Source: Oregon Medicaid Health Risk and Health Status Survey.



Number of days with asthma symptoms

Figure 9.11 – Oregon Health Plan recipients with persistent asthma who received at least one inhaled corticosteroid dispensing in the past year (age-standardized and age-specific)

Data Source: Quality and Performance Improvement Workgroup.
Note: From 2003-2005 this measure examined any anti-inflammatory asthma medication. In 2005, the measure changed to a daily-inhaled corticosteroid.



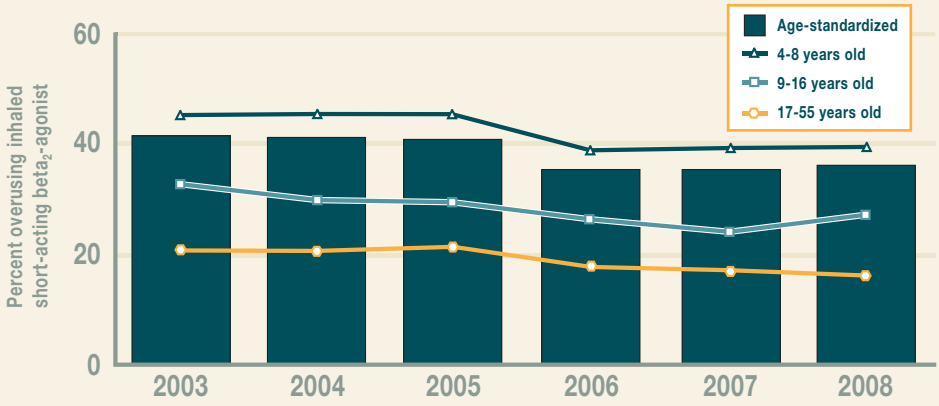
Number of days of work, school, or other activities missed

Key Findings

- Most adults on OHP receive information on how to control their asthma.
- The percent of OHP recipients who receive at least one inhaled corticosteroid in a year has remained relatively stable with no difference between age groups. The percent of OHP recipients who have received at least one inhaled corticosteroid is consistently lower over time than the percent among people with private insurance (see Figure 4.4).
- Increased use of daily-inhaled corticosteroids and decreased overuse of short-acting inhalers are recommendations for quality care in *The Guide to Improving Asthma Care in Oregon*.[3]

Figure 9.12 – People with persistent asthma who overused inhaled short-acting beta$_2$-agonists by receiving more than six canisters among Oregon Health Plan recipients in the past year (age-standardized and age-specific

Data Source: Quality and Performance Improvement Workgroup.



Key Findings

- Overuse of short-acting inhalers had been stable since 2001. Overuse dropped starting in 2006 and has remained lower than pre-2006 levels. Older individuals are more likely to overuse short-acting inhalers than the younger age group. The percent of OHP recipients who overuse short-acting inhalers is consistently higher over time than the percent among people with private insurance (see Figure 4.5).
- Increased use of daily-inhaled corticosteroids and decreased overuse of short-acting inhalers are recommendations for quality care in *The Guide to Improving Asthma Care in Oregon*.[23]

Figure 9.13 – Current asthma by smoking status among adult Oregon Health Plan recipients, 2004

Data Source: Oregon Medicaid Health Risk and Health Status Survey.

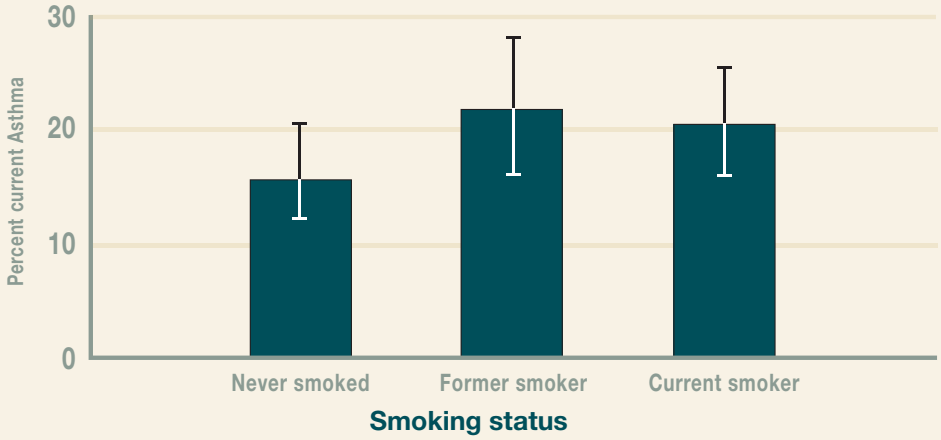


Figure 9.14 – Adult Oregon Health Plan recipients who currently smoke by current asthma status, 2004

Data Source: Oregon Medicaid Health Risk and Health Status Survey.

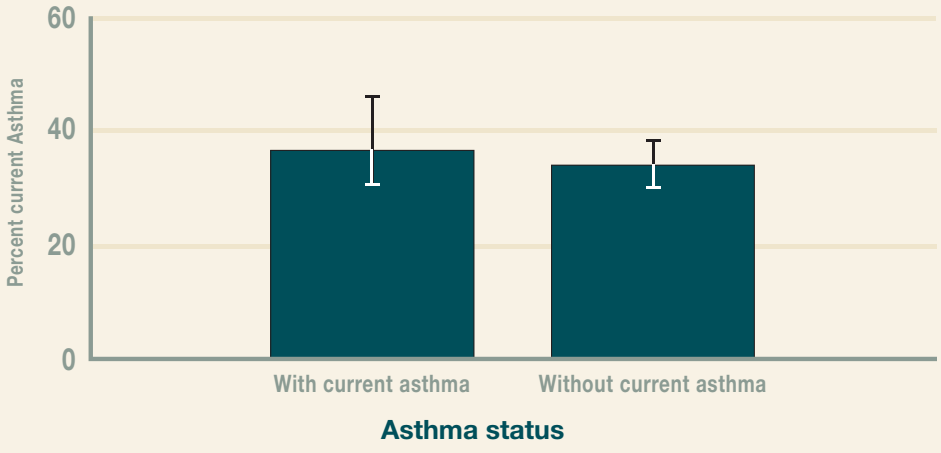


Figure 9.15 – Current asthma among adult Oregon Health Plan recipients by secondhand smoke exposure in a typical week (excludes current smokers), 2004

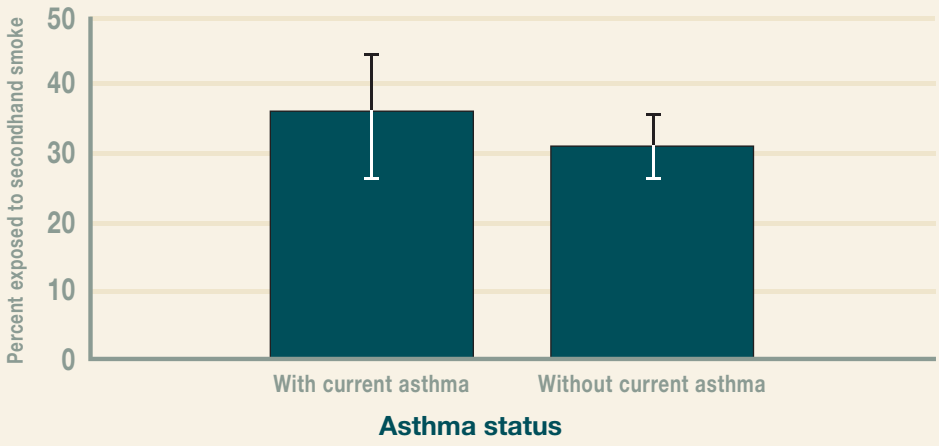
Data Source: Oregon Medicaid Health Risk and Health Status Survey.

Key Findings

- The percentage of people with asthma is higher in both former and current smokers than among people who have never smoked.
- The percentage of current smokers who have asthma is slightly higher than the percent of current smokers without asthma.
- People with asthma who are not current smokers are more likely to report some exposure rather than no exposure to secondhand smoke.

Figure 9.16 – Adult Oregon Health Plan recipients with secondhand smoke exposure in a typical week (excludes current smokers) by current asthma status, 2004

Data Source: Oregon Medicaid Health Risk and Health Status Survey.



Key Findings

- Non-smoking people with asthma are exposed to secondhand smoke at a higher rate among OHP recipients than people without asthma. People with asthma should avoid secondhand smoke.

Figure 9.17 – Asthma emergency department visits per 100 children (0-17 years of age) with asthma on the Oregon Health Plan, 2004-2006

Data Source: Division of Medical Assistance Programs.

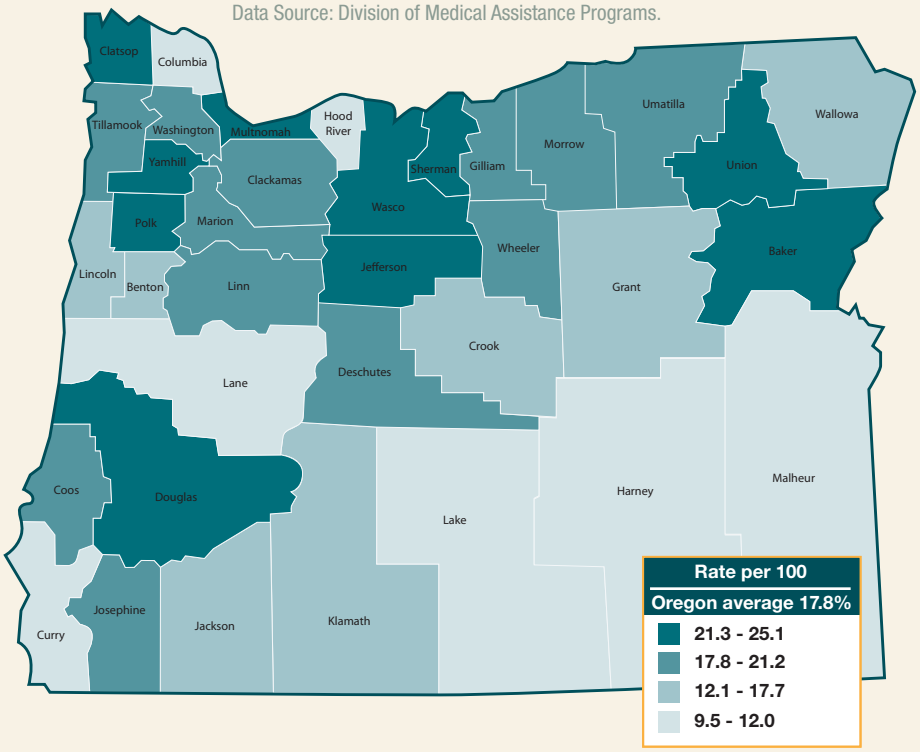
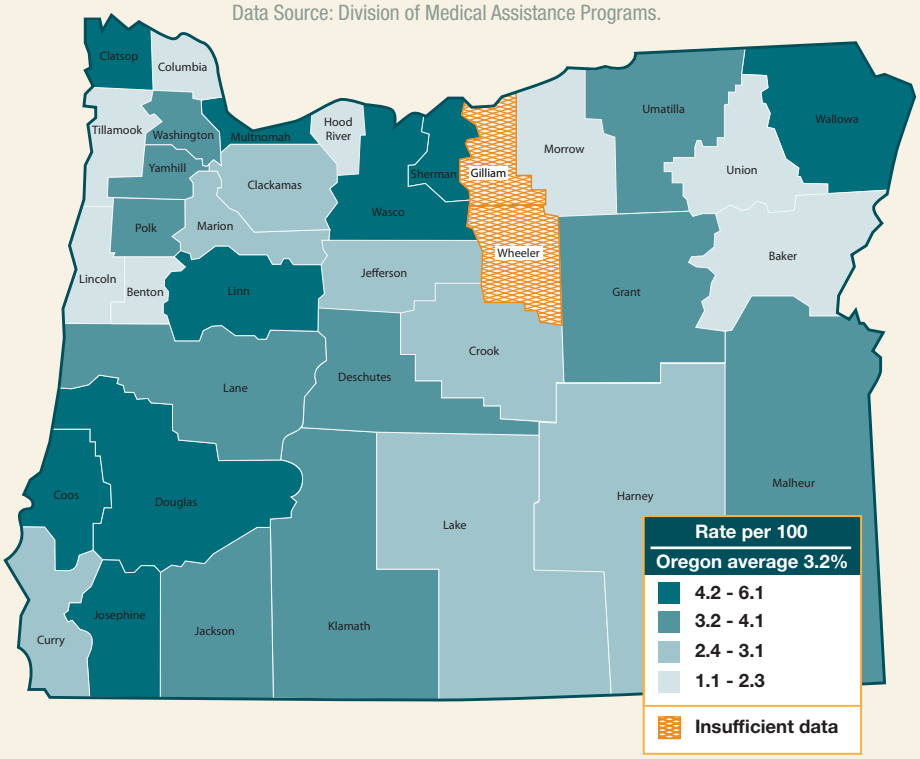


Figure 9.18 – Asthma hospitalizations per 100 children (0-17 years of age) with asthma on the Oregon Health Plan, 2004-2006

Data Source: Division of Medical Assistance Programs.



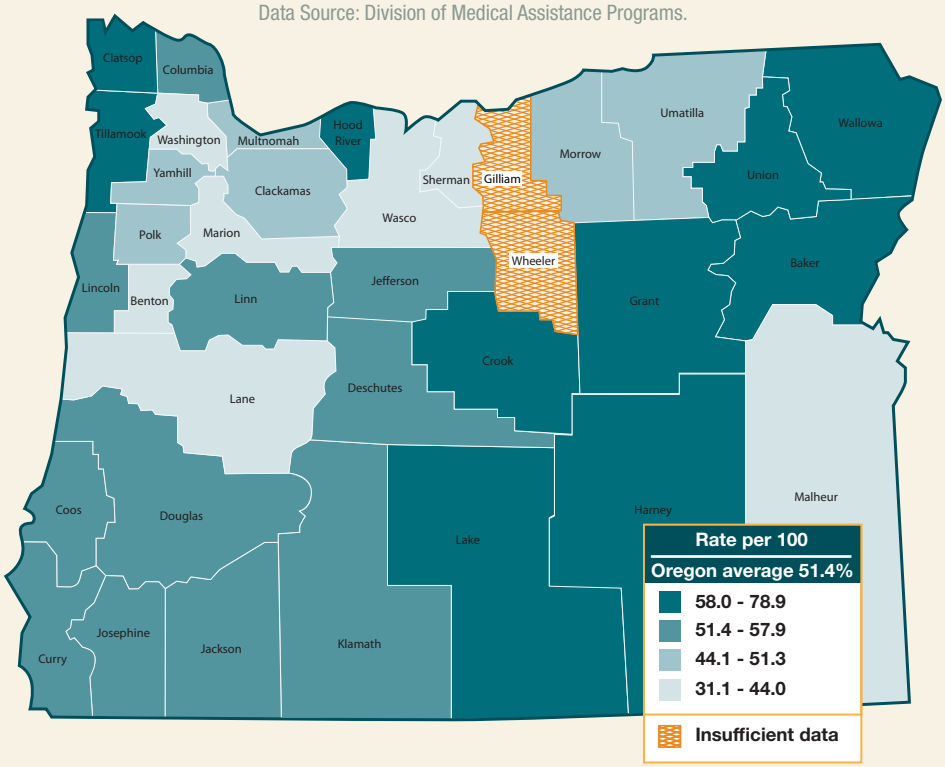
Key Findings

- On all maps, darker shading indicates poor asthma control.
- It is difficult to generalize the trends in Figures 9.17-9.19. There seems to be a strong grouping of counties with poor medication ratios in eastern Oregon, whereas there seems to be a grouping of counties with high hospitalization rates in southwest Oregon. Overall, only Clatsop County has poor rates in all measures.

- On all maps, darker shading indicates poor asthma control.
- It is difficult to generalize the trends in Figures 9.17-9.19. There seems to be a strong grouping of counties with poor medication ratios in eastern Oregon, whereas there seems to be a grouping of counties with high hospitalization rates in southwest Oregon. Overall, only Clatsop County has poor rates in all measures.

Figure 9.19 – Low asthma medication ratios per 100 children (0-17 years of age) with persistent asthma on the Oregon Health Plan, 2004-2006

Data Source: Division of Medical Assistance Programs.



Key Findings

- The reasons for the patterns seen in these graphs are difficult to determine. The rural setting and access to care may play a key role. However, several rural counties do not exhibit asthma control problems. Therefore, other factors are likely contributing factors such as, but not limited to, smoking, and secondhand smoke exposure.

Figure 9.20 – Asthma emergency department visits per 100 adults (18 years old and older) with asthma on the Oregon Health Plan, 2004-2006

Data Source: Division of Medical Assistance Programs.

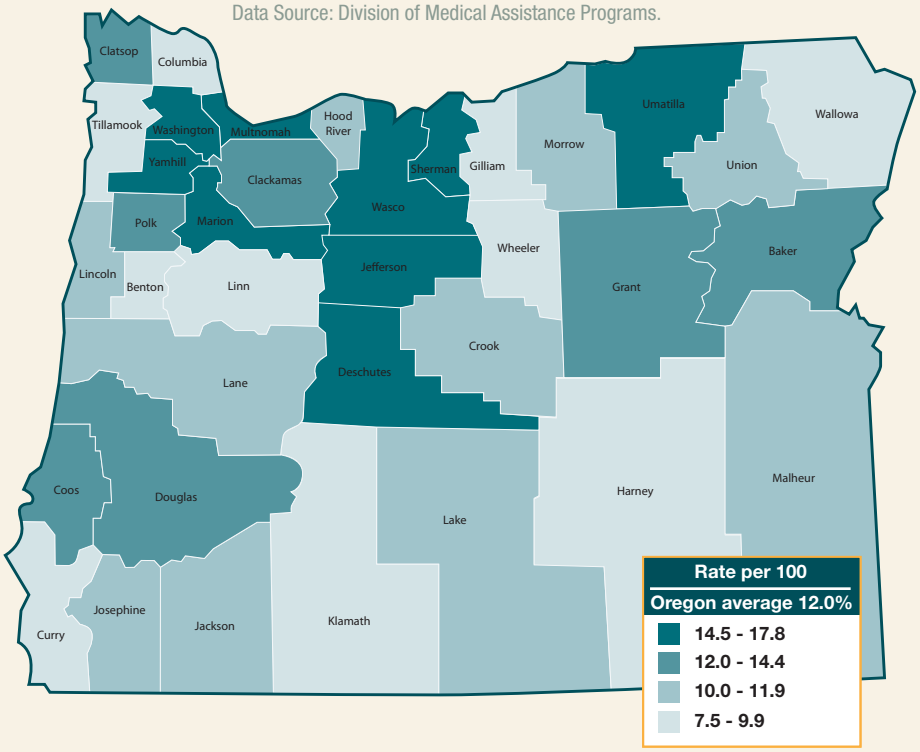
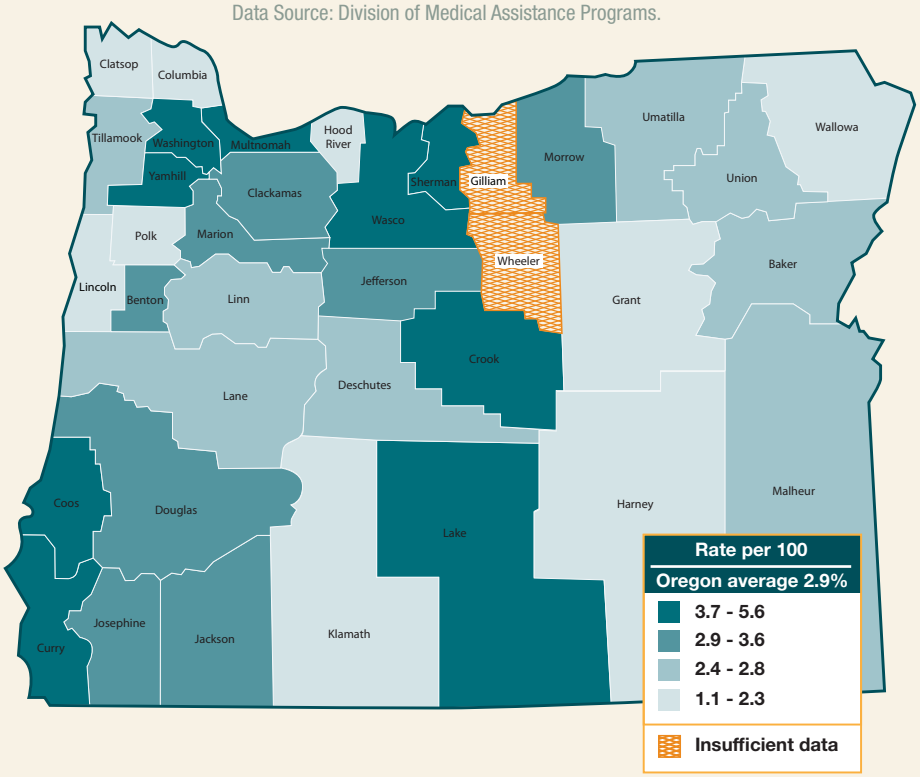


Figure 9.21 – Asthma hospitalizations per 100 adults (18 years old and older) with asthma on the Oregon Health Plan, 2004-2006

Data Source: Division of Medical Assistance Programs.

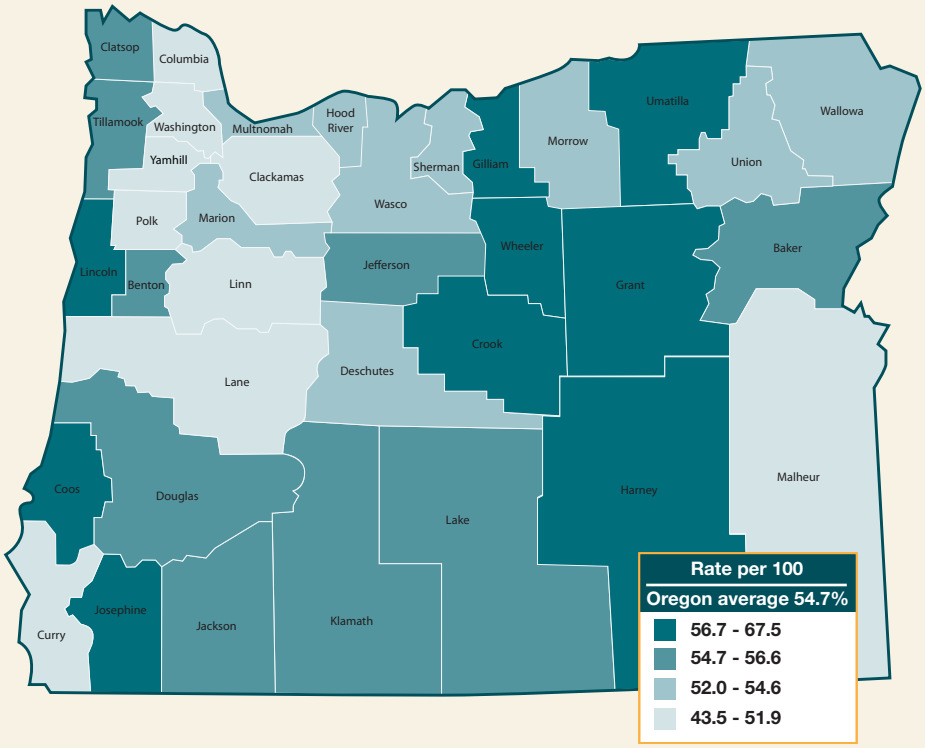


Key Findings

- As in the childhood asthma maps, darker shading indicates poor asthma control.
- Again, it is difficult to generalize the trends in each of Figures 9.20-9.22. In these maps, there seemed to be a strong grouping of counties with poor medication ratios in eastern Oregon and a grouping of counties with high hospitalization rates in southwest Oregon.

Figure 9.22 – Low asthma medication ratios per 100 adults (18 years old and older) with persistent asthma on the Oregon Health Plan, 2004-2006

Data Source: Division of Medical Assistance Programs.



Key Findings

Chapter 10

Cost of Asthma

Overview

Asthma creates a significant economic burden at the national, state and community level. The National Institutes of Health, National Heart, Lung, and Blood Institute (NHLBI) projects the total national asthma costs in 2010 at more than 20 billion dollars.[37] In Oregon, the Asthma and Allergy Foundation of America (AAFA) estimated the total of the direct and indirect costs of asthma in 1998 at more than $125 million, of which $71 million was in direct costs (direct costs include hospitalizations, doctor visits and medications) and $54 million in indirect costs (indirect costs include the value of time lost from school and work).[38] Adjusted for inflation to 2009 dollars using the Medical Care Consumer Price Index (www.bls.gov/cpi/), this equates to approximately $93 million in direct costs and $71 million in indirect costs.

To measure the direct cost of asthma in Oregon, the Oregon Asthma Program used the total costs of hospitalizations in the Oregon Hospital Discharge Index with a primary diagnosis of asthma. Cost information is missing from one Oregon hospital. Other direct costs of asthma can include, but are not limited to, outpatient visits, ED visits, and medications. However, this information is currently not available for Oregon.

The Oregon Asthma Program also investigated cost barriers to asthma medical care. The Behavioral Risk Factor Surveillance System (BRFSS) Asthma Callback Survey has information specific to Oregonians (or their children) who report experiencing financial barriers to seeking primary or specialist care or purchasing medications for their asthma.

Figure 10.1 – Total cost of asthma hospitalizations (unstandardized and standardized*)

Data Source: Oregon Hospital Discharge Index.

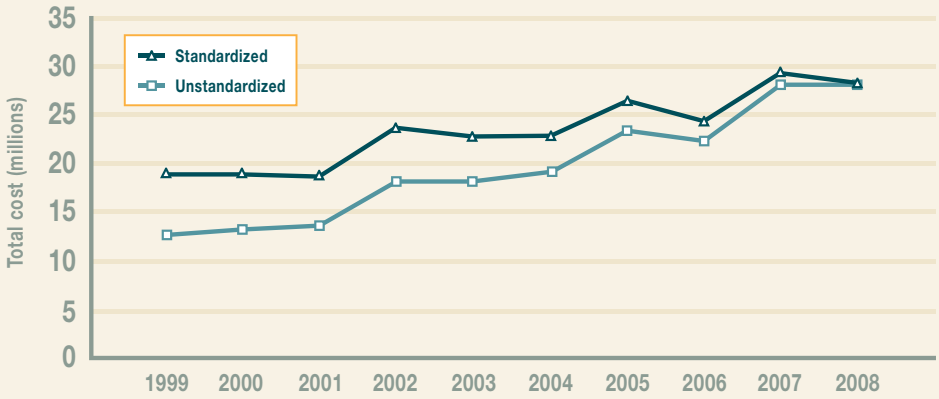
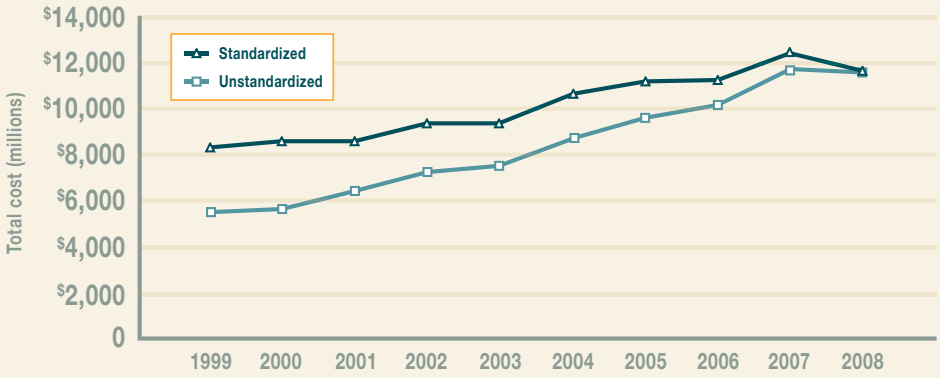


Figure 10.2 – Average cost of one asthma hospitalization (unstandardized and standardized*)

Data Source: Oregon Hospital Discharge Index.
*Cost standardized using the 2008 Consumer Price Index for medical care in the urban west.



Key Findings

- The standardized costs show what past costs would be if adjusted to current monetary value. The trend for total unstandardized cost for asthma hospitalizations is steadily increasing. Even when costs are standardized, the overall trend in total cost for all asthma hospitalizations is increasing over time.
- In addition to the total cost, the average cost of a hospital visit for asthma has steadily increased and costs almost $12,000 per visit. Like total costs for all hospitalizations, the standardized cost shows that the average cost of an asthma hospitalization is increasing faster than inflation.

Figure 10.3 – Total cost of asthma hospitalizations by gender, 2008

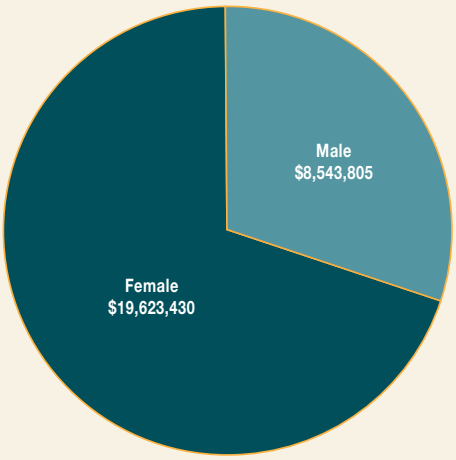


Figure 10.4 – Total cost of asthma hospitalizations by age group, 2008

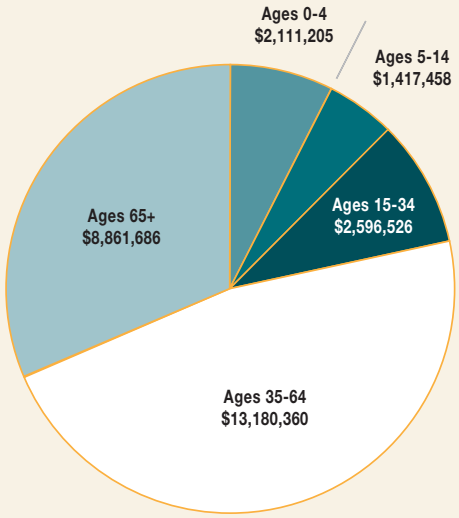
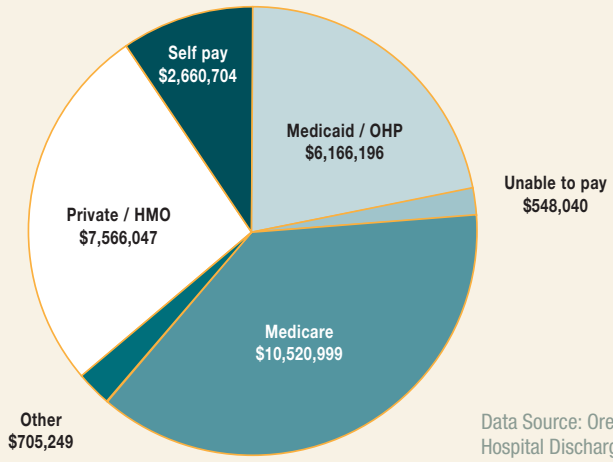


Figure 10.5 – Total cost of asthma hospitalizations by payer, 2008



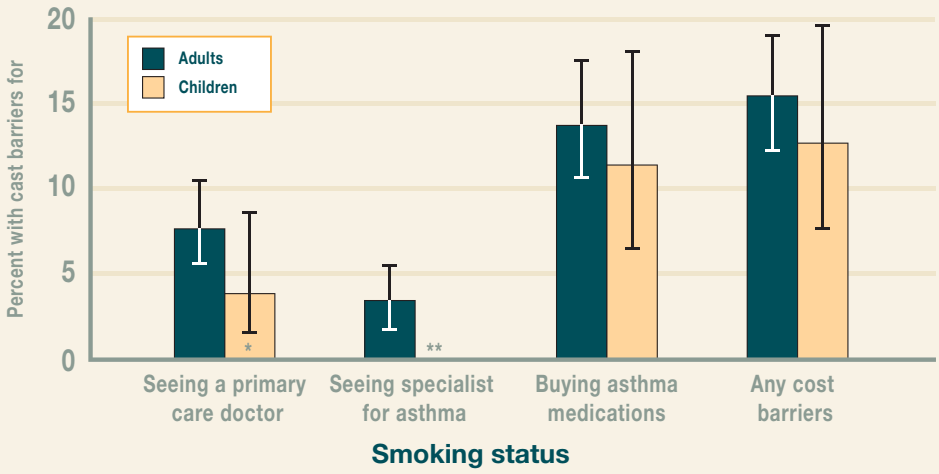
Data Source: Oregon Hospital Discharge Index

Key Findings

- Females account for almost 70% of the total cost of asthma hospitalizations.
- The bulk (78%) of the cost of asthma hospitalizations is for people 35 years of age or older. Children 14 years of age and younger represent only 13% of the cost of asthma hospitalizations.
- Medicare is the primary payer for more than $10 million (37%) of the total cost of asthma hospitalizations. People unable to pay for their hospitalizations make up only a small proportion of the costs.

Figure 10.6 – Asthma care cost barriers encountered by adults and children

Data Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008.
*This number may be statistically unreliable and should be interpreted with caution.
**This number is suppressed because it is statistically unreliable.



Key Findings

- The most common cost barrier was purchase of asthma medications.
- Children experience fewer cost barriers than adults. However, because of the small number of people surveyed who had children with asthma, the data should be interpreted with caution.

Chapter 11

Meeting Healthy People 2010 Goals

Overview

The *Healthy People 2010* initiative is a framework for national health objectives designed to identify preventable threats to the health of the nation and to establish goals to reduce these threats. It builds on initiatives starting from the Surgeon General's 1979 health report and Healthy People 2000 and sets public health priorities and goals (targets) that can be used by communities and states to gauge their progress toward these goals.

Healthy People 2010 is guided by the goals of increasing the quality and years of healthy life and eliminating health disparities. Supporting these goals are 28 focus areas with objectives that were set to be achieved by 2010. Eight objectives for reducing the burden of asthma and increasing the management of the disease were included in *Healthy People 2010*. For more information about *Healthy People 2010* see www.healthypeople.gov/default.htm.

Healthy People 2020 was under development at the time of publication of this report; the specific asthma objectives listed for public comment include: reduce hospitalizations for asthma, reduce hospital emergency department visits for asthma, and reduce activity limitations among person with current asthma. For more information about Healthy People 2020 see www.healthypeople.gov/hp2020/default.asp.

Table 11.1 – HP2010 objective 24-1

Data Source: Oregon Death Certificates.
*This number may be statistically unreliable and should be interpreted with caution.

Reduce asthma deaths: Numbers represent deaths due to asthma per 1,000,000 people.				
Age Group	**U.S. 2005**	**Oregon 1999-2001**	**Oregon 2004-2006**	**Healthy People 2004-2006**
0-4	2.0	0.0	0.3*	1.0
5-14	2.4	0.7	0.0	1.0
15-34	4.1	2.5	2.7*	2.0
35-64	12.7	14.0	14.0	9.0
65 and older	52.3	104.9	74.3	60.0

Table 11.2 – HP2010 objective 24-2

Data Source: Oregon Hospital Discharge Index.

Reduce hospitalizations for asthma: Numbers represent the hospitalizations for asthma per 10,000 people.				
Age Group	**U.S. 1998**	**Oregon 1998**	**Oregon 2008**	**Healthy People 2004-2006**
0-4	45.6	19.8	14.1	25.0
5-64	12.5	5.3	4.7	7.7
65 and older	17.7	11.8	12.5	11.0

Key Findings

- Deaths due to asthma are decreasing in Oregon and are approaching or below the Healthy People 2010 targets. However, Oregon asthma death rates still are higher than the U.S. rates for the age groups 35 years old and older.
- Hospitalizations due to asthma are also decreasing and below Healthy People 2010 targets except among people 65 and older.

Table 11.3 – HP 2010 objective 24-7

Data Source: Oregon Behavioral Risk Factor Surveillance System, Asthma Callback Surveys, 2006-2008.

Increase the proportion of persons with asthma who receive appropriate asthma care according to the National Asthma Education and Prevention Program guidelines	Oregon 2006-2008 (%)	Healthy People 2010 Goal (%)
24-7a: Persons with asthma who receive written asthma management plans from their health care provider (current asthma)		
Children 0-17	34	38
Adult 18 or older	24	38
24-7b: Persons with asthma with prescribed inhalers who receive instructions on how to use them properly (current asthma)		
Children 0-17	91.4	98.8
Adult 18 or older	97.7	98.8
24-7f: Persons with asthma who receive assistance with assessing and reducing exposure to environmental risk factors in their home, school, and work environment (current asthma)		
Children 0-17	37	50
Adult 18 or older	43	50

Key Findings

- The original Healthy People 2010 objectives did not include targets for objective 24-7. However, targets were added in the midcourse review of Healthy People 2010. Oregon met none of the targets for these objectives. However, Oregon was only approximately a percentage point away from meeting the goal for adults with asthma with prescribed inhalers who receive instructions on how to use them properly.

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Appendix A

Figures

Appendix A (Continued)

Appendix A (Continued)

Appendix A (Continued)

Appendix A (Continued)

Tables

Appendix B: Data tables

Data table for figure 3.2 – Adults with lifetime asthma

Year	Oregon %	Oregon CI	U.S. %	U.S. CI
2001	13.5	12.7-14.5	11.0	10.8-11.2
2002	13.9	13.0-14.9	11.8	11.6-12.0
2003	14.9	14.0-15.8	11.9	11.6-12.1
2004	15.8	14.9-16.8	13.3	13.1-13.6
2005	14.8	14.1-15.5	12.5	12.3-12.7
2006	15.6	14.6-16.8	12.8	12.5-13.0
2007	16.0	15.0-17.0	12.9	12.7-13.2
2008	15.3	14.1-16.6	13.3	13.1-13.5
2009	15.8	14.6-17.1	13.4	13.2-13.6

Data table for figure 3.3 – Adults with current asthma

Year	Oregon %	Oregon CI	U.S. %	U.S. CI
2001	8.2	7.5-9.0	7.2	7.0-7.4
2002	8.7	8.0-9.4	7.5	7.3-7.7
2003	9.2	8.5-10.0	7.7	7.5-7.9
2004	9.7	9.0-10.5	8.1	7.9-8.3
2005	9.9	9.3-10.5	7.9	7.7-8.0
2006	10.0	9.1-10.9	8.2	8.0-8.4
2007	9. 9	9.1-10.7	8.2	8.1-8.4
2008	9.0	8.1-10.0	8.5	8.3-8.7
2009	10.2	9.1-11.3	8.5	8.3-8.6

Data table for figure 3.4 – Adults with current asthma by gender

Year	Male %	Male CI	Female %	Female CI
2001	6.0	5.1-7.0	10.4	9.3-11.5
2002	6.2	5.3-7.2	11.1	10.0-12.2
2003	7.0	6.0-8.1	11.4	10.3-12.5
2004	7.3	6.2-8.5	12.1	11.1-13.2
2005	7.4	6.6-8.2	12.4	11.5-13.2
2006	7.4	6.2-8.7	12.5	11.3-13.8
2007	7.3	6.2-8.5	12.4	11.3-13.6
2008	6.0	4.9-7.3	11.9	10.6-13.4
2009	8.6	7.1-10.4	11.7	10.4-13.2

Data table for figure 3.5 – Adults with current asthma by age

Year	18-44 %	18-44 CI	45-64 %	45-64 CI	65+ %	65+ CI
2001	7.8	6.9-8.9	8.5	7.3-9.8	8.8	7.1-10.8
2002	8.2	7.1-9.3	10.0	8.8-11.4	7.3	6.0-8.9
2003	9.7	8.6-11.0	8.8	7.7-10.0	8.6	7.2-10.2
2004	10.1	9.0-11.5	10.4	9.2-11.6	7.2	6-8.6.0
2005	10.6	9.7-11.6	9.7	8.9-10.6	8.2	7.3-9.2
2006	10.1	8.7-11.8	10.6	9.4-11.9	8.5	7.2-10.0
2007	10.0	8.6-11.5	10.0	9.0-11.0	9.6	8.5-10.8
2008	8.8	7.2-10.6	9.1	8.1-10.3	9.5	8.2-11.1
2009	11.0	9.1-13.2	10.1	8.9-11.5	8.2	7.0-9.5

Data table for figure 3.6 – Adults with current asthma by race and ethnicity (age-standardized) 2004-2005

Race/Ethnicity	%	CI
White, non-Hispanic	10.2	9.7-10.8
African American, non-Hispanic	15.5	10.8-21.8
Asian/Pacific Islander, non-Hispanic	5.9	3.7-9.1
American Indian/Alaska Native, non-Hispanic	15.2	10.9-21.0
Hispanic	5.4	4.0-7.1

Data table for figure 3.7 – Adults with current asthma by gender

Year	Homosexual/ Bisexual %	Homosexual/ Bisexual CI	Heterosexual %	Heterosexual CI
2005	20.1	15.1-26.3	9.7	9.2-10.4
2006	15.7	10.1-23.6	9.9	9.0-10.9
2007	16.0	10.5-23.7	9.7	8.9-10.6
2008	13.6	7.3-24.0	8.8	7.9-9.8
2009	21.2	12.5-33.6	9.9	8.8-11.1

Data table for figure 3.8 – Adults with current asthma by education level, 2009

Education Level	%	CI
No high school diploma	17.1	11.4-24.9
High school graduate	10.5	8.6-12.9
Some college	9.0	7.3-11.1
College graduate	9.7	8.3-11.4

Data table for figure 3.9 – Adults with current asthma by annual household income, 2009

Annual Household Income	%	CI
< $15,000	17.3	12.6-23.3
$15,000-$25,000	13.7	10.9-17.2
$24,000-35,000	8.8	6.0-12.7
$35,000-$50,000	9.4	6.8-12.7
> $50,000	8.8	7.4-10.6

Data table for figure 3.10 – Adults with current asthma by current type of health insurance

Year	No Health Insurance %	No Health Insurance CI	Private or Medicare %	Private or Medicare CI	Oregon Health Plan %	Oregon Health Plan CI
2001	7.9	6.1-10.1	7.6	6.9-8.5	14.3	11.4-17.8
2002	6.3	4.9-8.1	8.6	7.8-9.5	13.4	10.7-16.5
2003	9.1	7.4-11.2	8.6	7.8-9.5	15.4	12.0-19.5
2004	9.1	7.4-11.3	9.2	8.4-10.0	17.1	13.2-21.9
2005	9.4	7.9-11.1	9.2	8.6-9.8	20.7	17.6-24.1
2006	10.3	8.0-13.0	9.0	8.1-10.0	22.1	17.6-27.4
2007	9.7	7.4-12.6	8.9	8.2-9.7	27.7	21.5-34.8
2008	*	*	*	*	*	*
2009	11.4	8.2-15.6	9.4	8.3-10.5	19.3	13.9-26.1

Note: Data on health insurance type was not collected in 2008.

Data table for figure 3.11 – Adults with current asthma by urban and rural residence

Year	Rural %	Rural CI	Urban %	Urban CI
2001	9.2	7.9-10.7	7.9	7.1-8.8
2002	9.4	8.0-11.0	8.5	7.6-9.4
2003	9.2	7.9-10.6	9.3	8.4-10.3
2004	9.7	8.6-11.6	9.6	8.8-10.5
2005	11.0	10.0-12.2	9.5	8.8-10.2
2006	9.8	8.3-11.5	10.0	9.6-11.2
2007	10.4	8.9-12.0	9.8	8.8-10.8
2008	10.0	8.3-11.9	8.5	7.5-9.6
2009	10.1	8.3-12.2	10.3	9.1-11.7

Data table for figure 3.12 – Adults with current asthma who report having other chronic conditions

Chronic Conditions	%	CI
Chronic Obstructive pulmonary Disease	9.4	7.2-12.3
Emphysema	8.6	6.2-11.7
Chronic Bronchitis	25.5	21.5-29.9
Depressed	37.1	32.6-41.8

Data table for figure 3.13 – Adults with current asthma by county (age-standardized), 2004-2007

County	%	CI
Baker	9.1	5.3-15.2
Benton	9.1	7.3-11.2
Clackamas	10.4	9.2-11.8
Clatsop	10	7.2-13.8
Columbia	11	8.3-14.3
Coos	9.3	7.1-12.2
Crook	10.2	6.1-16.8
Curry	9.9	6.5-14.6
Deschutes	9	7.4-11.0
Douglas	12.8	10.5-15.5
Gilliam/Wheeler	**	**
Grant	17.2	9.0-30.4
Harney	8	4.2-14.6
Hood River	5.9	2.9-11.5
Jackson	9.2	7.9-10.8
Jefferson	7	4.1-11.9
Josephine	12.4	8.9-16.9
Klamath	8.8	6.6-11.6
Lake	6.4	2.6-15.0
Lane	10	9.0-11.3
Lincoln	12.1	9.0-16.1
Linn	11.5	9.4-14.0
Malheur	6.9	4.3-10.9
Marion	10	8.7-11.6
Morrow	10	5.1-18.5
Multnomah	9.9	9.0-10.8
Polk	8.7	6.6-11.4
Tillamook	7.8	5.0-12.1
Umatilla	9	6.9-11.6
Union	10.9	7.6-15.3
Wallowa	8.8	4.4-16.9
Wasco/Sherman	7.9	4.2-12.3
Washington	9.2	8.2-10.3
Yamhill	11.2	8.6-14.5
Oregon	**9.9**	**9.5-10.2**

** Data suppressed due to small numbers

Data table for figure 3.14 – Children (0-17 years of age) with current asthma by adult proxy

Year	%	CI
2005	8.4	7.4-9.6
2006	8.7	6.9-10.9
2007	8.3	6.7-10.3
2008	7.1	5.9-8.4
2009	9.5	7.4-12.1

Data table for figure 3.15 – Children (8th and 11th grade) with current asthma

Year	8th Grade %	8th Grade CI	11th Grade %	11th Grade CI
2004	10.7	9.9-11.5	10.4	9.6-11.4
2005	10.5	9.7-11.3	10.8	10.0-11.6
2006	10.0	8.8-11.3	9.7	8.4-11.2
2007	9.7	8.9-10.5	10.5	9.5-11.6
2008	10.7	10.0-11.5	10.7	9.8-11.7
2009	8.7	7.6-10.0	9.9	8.8-11.0

Data table for figure 3.16 – Children (8th and 11th grade) with current asthma by gender, 2009

Year	8th Grade %	8th Grade CI	11th Grade %	11th Grade CI
Male	7.6	6.1-9.4	8.2	6.9-9.8
Female	9.8	8.1-11.7	11.4	9.9-13.2

Data table for figure 3.17 – Children (8th grade) with current asthma by county, 2007-2008

County	%	CI
Baker	9.1	6.0-13.4
Benton	10.4	8.2-13.0
Clackamas	11.5	10.4-12.7
Clatsop	12.3	8.9-16.7
Columbia	14.1	10.6-18.7
Coos	10.6	8.2-13.5
Crook	9.5	6.9-12.9
Curry	11.6	8.2-16.2
Deschutes	10.5	9.1-12.3
Douglas	12.3	10.5-14.3
Gilliam	*	*
Grant	11.5	7.0-18.3
Harney	12.1	7.4-19.1
Hood River	4.7	3.1-7.2
Jackson	9.7	7.8-11.9
Jefferson	10.4	7.7-13.8
Josephine	**	**
Klamath	10.8	7.6-15.2
Lake	*	*
Lane	14.3	13.1-15.5
Lincoln	9.5	6.9-13.0
Linn	12.8	11.1-14.7
Malheur	7.2	5.2-9.9
Marion	11.0	9.3-12.9
Morrow	9.3	6.1-13.9
Multnomah	9.9	9.1-10.8
Polk	9.2	6.4-13.0
Sherman	*	*
Tillamook	10.3	7.1-14.8
Umatilla	8.5	6.9-10.4
Union	11.1	7.9-15.4
Wallowa	**	**
Wasco	7.48	5.1-10.9
Washington	10.5	9.0-12.2
Wheeler	**	**
Yamhill	10.1	8.3-12.2
Oregon	**11.1**	**10.5-11.7**

*This number is suppressed because it is statistically unreliable.
**No data.

Data table for figure 3.18 – Children (11th grade) with current asthma by county, 2007-2008

County	%	CI
Baker	12.0	8.2-17.1
Benton	10.4	8.5-12.6
Clackamas	10.1	9.0-11.4
Clatsop	9.5	6.7-13.3
Columbia	14.4	10.6-19.2
Coos	11.8	8.9-15.4
Crook	8.7	5.3-14.0
Curry	9.3	6.5-13.3
Deschutes	13.1	10.2-16.8
Douglas	11.6	9.5-14.2
Gilliam	*	*
Grant	5.4	2.4-11.6
Harney	11.8	6.4-20.5
Hood River	8.1	5.7-11.3
Jackson	8.3	6.4-10.7
Jefferson	9.6	6.7-13.4
Josephine	**	**
Klamath	10.1	7.8-13.1
Lake	*	*
Lane	14.5	12.9-16.2
Lincoln	12.5	9.5-16.2
Linn	12.6	10.7-14.9
Malheur	10.9	8.1-14.5
Marion	10.9	9.1-12.9
Morrow	10.0	6.6-14.9
Multnomah	10.7	9.6-12.0
Polk	15.0	8.9-24.1
Sherman	**	**
Tillamook	9.8	6.2-15.1
Umatilla	10.0	8.0-12.4
Union	8.9	5.8-13.2
Wallowa	**	**
Wasco	11.1	8.0-15.2
Washington	9.4	7.8-11.4
Wheeler	*	*
Yamhill	12.2	10.1-14.6
Oregon	**11.2**	**8.0-15.2**

*This number is suppressed because it is statistically unreliable.
**No data.

Data table for figure 4.1 – Adults and children (0-17 years of age) with current asthma who received asthma information from a doctor or health care provider

Asthma Information Received	Adults %	Adults CI	Children %	Children CI
Received Explanation on how to Recognize Early Signs of an Asthma Episode	64.8	60.1-69.2	72.7	62.6-81.0
Received Information on what to do During an Asthma Episode or Attack	76.6	72.2-80.5	81.4	71.5-88.4
Received an Asthma Action Plan	23.8	20.0-28.0	34.4	24.5-46.0
Taken a Course or Class on How to Manage Asthma	6.6	4.9-8.8	14.3	7.2-26.2
Advised to Change Things at Home, School or Work to Improve Asthma	42.8	37.9-47.8	37.1	28.0-47.1
Taught How to Use a Peak Flow Meter to Adjust Daily Medications	36.2	31.6-41	36.5	27.1-47.1

Data table for figure 4.2 – Adults and children (0-17 years of age) with current asthma who have ever used a prescription inhaler for their asthma and received asthma medication information from a doctor or health care provider

Asthma Information Received	Adults %	Adults CI	Children %	Children CI
Shown how to use the Inhaler	97.7	96.5-98.5	91.4	83.6-95.7
Had a Health Professional Watch you use the Inhaler	81.7	77.8-85.0	85.3	76.2-91.3

Data table for figure 4.3 – Adults who received an influenza shot by current asthma status

Year	With Current Asthma %	With Current Asthma CI	Without Current Asthma %	Without Current Asthma CI
2004	45.3	40.0-50.7	32.1	30.6-33.7
2005	36.5	33.4-39.8	25.1	24.2-26.0
2006	43.4	38.1-48.9	30.6	29.0-32.2
2007	51.4	45.1-57.6	35.2	33.5-37.0
2008	47.1	41.9-52.3	35.4	33.9-37.0
2009	44.5	38.3-50.9	36.6	34.4-38.7

Data table for figure 4.4 – People with persistent asthma who filled at least one prescription for a daily inhaled corticosteroid in the past year, by type of insurance (age-standardized)

Year	Commercial %	Oregon Health Plan %
2001	68.8	59.1
2002	70.4	64.7
2003	64.2	63.9
2004	80.1	64.6
2005	78.9	65.7
2006	78.6	62.6
2007	76.2	62.8
2008	79.5	66.0

Data table for figure 4.5 – People with persistent asthma who overuse inhaled short-acting beta2-agonists by receiving more than six canisters in the past year, by type of insurance (age-standardized)

Year	Commercial %	Oregon Health Plan %
2001	29.5	41.8
2002	27.3	39.8
2003	26.9	41.5
2004	25.8	41.3
2005	18.4	41.2
2006	16.6	35.3
2007	16.9	35.3
2008	17.5	35.7

Data table for figure 4.6 – Asthma follow-up visit with a medical practitioner within 30 days after an emergency department visit for asthma, by type of insurance (age-standardized)

Year	Commercial %	Oregon Health Plan %
2001	41.3	36.6
2002	40.2	37.5
2003	43.6	39.5
2004	42.6	34.3
2005	43.1	43.9
2006	37.5	34.5
2007	40.9	41.2
2008	39.9	38.9

Data table for figure 4.7 – People with asthma who have been seen by a health professional for asthma in the past year, by type of insurance (age-standardized)

Year	Commercial %	Oregon Health Plan %
2001	59.1	57.7
2002	58.8	57.7
2003	55.2	55.3
2004	58.4	44.2
2005	58.7	51.6
2006	47.2	54.4
2007	62.2	63.9
2008	64.6	64.7

Data table for figure 4.8 – Adults and children (0-17 years of age) with current asthma who have used complimentary and alternative methods to control their asthma

Asthma Information Received	Adults %	Adults CI	Children %	Children CI
Breathing Techniques	33.6	28.9-38.6	15.4	9.4-24.1
Herbs	8.1	5.6-11.5	**	**
Vitamins	6.9	5.1-9.3	3.5*	1.6-7.8*
Aromatherapy	4.8	2.9-7.9	6.4*	2.5-15.4*

*This number may be statistically unreliable and should be interpreted with caution.
**This number is suppressed because it is statistically unreliable.

Data table for figure 4.9 – Adults with current asthma, by sex, who missed one or more days of work or other daily activities because of asthma in the past three months

Gender	%	CI
Male	21.2	14.0-30.9
Female	27.8	23.3-32.9
All Adults	25.4	21.4-30.0

Data table for figure 4.10 – Adults with current asthma, by household income, who missed on or more days of work or other daily activities because of asthma in the past three months

Household Income	%	CI
< $35,000	33.6	26.3-41.9
$35,000-$50,000	26.8	17.1-39.4
> $50,000	18.0	12.7-24.7

Data table for figure 4.11 – Sleep disturbances due to asthma in the last 30 days among adults with current asthma

Number of Day	%	CI
None	72.2	67.7-76.4
One to 10	19.9	16.1-23.4
11 or More	7.8	6.1-10.0

Data table for figure 4.12 – Frequency of asthma symptoms in the past four weeks among adults with current asthma

Number of Day	%	CI
None	30.9	26.4-35.8
One to Nine	25.7	21.7-30.2
10 to 19	13.8	10.6-17.7
20 - 29	11.1	7.8-15.5
Every Day	18.5	15.7-21.7

Data table for figure 4.13 – Frequency of asthma episodes or attacks in the past three months among adults with current asthma

Number of Day	%	CI
None	57.9	52.9-62.7
One to Five	29.4	25.1-34.1
Six to 10	4.8	2.8-8.0
11 or More	7.9	5.7-10.9

Data table for figure 4.14 – Perceived health among adults with or without current asthma, 2009

Asthma Status	% Excellent or Very Good	% Good	% Fair or Poor
With Current Asthma	45.1	29.9	24.9
Without Current Asthma	59.3	29.2	11.5

Data table for figure 5.1 – Adults with current asthma by smoking status

Smoking Status	2007 %	2007 CI	2008 %	2008 CI	2009 %	2009 CI
Never Smoked	8.5	7.6-9.5	8.2	7.1-9.5	9.7	8.3-11.3
Former Smoker	10.2	9.0-11.6	9.4	8.0-10.9	9.8	8.3-11.6
Current Smoker	14.0	11.4-17.0	11.4	8.9-14.4	12.3	9.7-16.3

Data table for figure 5.2 – Current smokers among adults with or without current asthma

Asthma Status	2007 %	2007 CI	2008 %	2008 CI	2009 %	2009 CI
With Current Asthma	23.6	19.6-28.1	20.2	16.0-25.1	21.0	16.3-26.5
Without Current Asthma	15.9	14.9-17.0	15.5	14.3-16.9	16.5	15.0-18.0

Data table for figure 5.3 – Exposure to secondhand smoke in a typical week among adults with or without current asthma

Asthma Status	2007 %	2007 CI	2008 %	2008 CI	2009 %	2009 CI
With Current Asthma	28.1	21.7-35.5	23.6	18.8-29.1	18.4	13.1-25.1
Without Current Asthma	27.7	25.1-30.3	20.4	18.8-22.1	15.8	14.2-17.5

Data table for figure 5.5 – Adults with current asthma by Body Mass Index, 2009

Body Mass Index Categories	%	CI
Healthy Weight (BMI 18.5-25)	7.2	5.8-9.0
Overweight (BMI 25-30)	10.7	8.8-13.0
Obese (BMI 30-40)	13.0	10.8-15.5
Extremely Obese (BMI>40)	19.5	13.3-27.7

Data table for figure 5.6 – Body Mass Index among adults with or without current asthma, 2009

Asthma Status	Healthy Weight (BMI 18.5-25)	Overweight (BMI 25-30)	Obese (BMI >30)
With Current Asthma	27.4	39.0	33.5
Without Current Asthma	39.8	36.7	23.5

Data table for figure 5.7 – Adult obesity by county, 2004-2007

County	%	CI
Baker	21.1	16.4-26.9
Benton	19.5	16.9-22.4
Clackamas	23.0	21.2-24.8
Clatsop	24.8	20.5-29.7
Columbia	32.3	27.9-37.1
Coos	27.8	23.8-32.3
Crook	23.6	17.6-31.0
Curry	24.4	18.3-31.8
Deschutes	18.3	16.0-20.9
Douglas	28.1	25.0-31.5
Gilliam/Wheeler	19.1*	9.4-34.8
Grant	27.9	19.1-38.8
Harney	35.2	23.1-49.6
Hood River	24.4	18.1-31.9
Jackson	20.7	18.7-22.8
Jefferson	28.1	21.0-36.5
Josephine	23.8	20.4-27.5
Klamath	28.0	24.3-32.0
Lake	26.5	17.8-37.5
Lane	25.3	23.7-27.0
Lincoln	28.6	24.0-33.8
Linn	30.9	27.7-34.3
Malheur	35.4	29.4-41.9
Marion	28.3	26.2-30.5
Morrow	37.9	27.8-49.1
Multnomah	20.6	19.5-21.8
Polk	27.8	23.7-32.3
Tillamook	24.1	18.2-31.2
Umatilla	32.8	29.0-36.8
Union	22.1	17.3-27.8
Wallowa	14.6	9.4-21.8
Wasco/Sherman	25.6	20.4-31.5
Washington	22.7	21.3-24.3
Yamhill	28.1	24.4-32.1
Oregon	**24.1**	**23.6-24.6**

*This number may be statistically unreliable and should be interpreted with caution.

Data table for figure 6.1 – Adults with current asthma with one or more emergency department or urgent care visits in the past 12 months

Year	%	CI
2001	19.0	15.7-22.9
2003	12.9	9.8-16.8
2007	14.1	11.5-17.2

Data table for figure 6.2 – Adults with current asthma by gender with one or more emergency department or urgent care visits in the past 12 months

Year	Male %	Male CI	Female %	Female CI
2001	17.7	12.1-25.1	19.7	15.8-24.3
2003	10.7*	5.8-19.0	14.1	10.5-18.7
2007	11.9	7.6-18.0	15.4	12.3-19.1

*This number may be statistically unreliable and should be interpreted with caution.

Data table for figure 6.3 – Adults with current asthma by type of insurance with one or more emergency department or urgent care visits in the past 12 months

Year	No Health Insurance %	No Health Insurance CI	Private or Medicare %	Private or Medicare CI	Oregon Health Plan %	Oregon Health Plan CI
2001	17.7*	9.9-29.6	15.9	12.4-20.1	35.3	24.5-47.8
2003	5.1*	2.1-11.8	13.1	9.7-17.5	23.6	11.8-41.6
2007	18.7	10.6-31.1	12.3	9.6-15.7	18.2	11.4-27.8

*This number may be statistically unreliable and should be interpreted with caution.

Data table for figure 6.4 – People with asthma who had one or more emergency department visits for asthma in the past year, by type of insurance (age-standardized)

Year	Commercial %	Oregon Health Plan %
2003	7.4	13.5
2004	6.5	13.3
2005	5.2	14.9
2006	5.2	12.1
2007	5.4	12.3
2008	4.4	13.6

Data table for figure 6.5 – Asthma follow-up visit with a medical practitioner within 30 days after an emergency department visits for asthma, by type of insurance (age-standardized)

Year	Commercial %	Oregon Health Plan %
2003	43.6	39.5
2004	42.6	34.3
2005	43.1	43.9
2006	37.5	34.5
2007	40.9	41.2
2008	39.9	38.9

Data table for figure 7.1 – Annual age-standardized Oregon asthma hospital discharge rates per 10,000 residents

Year	%	CI
1999	6.9	6.6-7.2
2000	6.7	6.4-6.9
2001	6.5	6.2-6.8
2002	7.23	7.0-7.5
2003	7.0	6.7-7.2
2004	6.1	5.8-6.3
2005	6.7	6.5-7.0
2006	6.0	5.7-6.2
2007	6.4	6.1-6.7
2008	6.3	6.0-6.5

Data table for figure 7.2 – Annual unstandardized U.S. asthma hospital discharge rates per 10,000 residents

Year	%
1999	17.4
2000	16.7
2001	16.0
2002	16.8
2003	19.8
2004	17.0
2005	16.6
2006	14.9

Data table for figure 7.3 – Annual asthma hospital discharge rates per 10,000 residents by age groups

Year	0-4 Years Old %	5-64 Years Old %	65+ Years Old %
1999	18.2	5.2	11.9
2000	18.6	5.0	10.9
2001	17.2	4.7	12.0
2002	20.5	5.0	14.3
2003	18.7	4.9	13.7
2004	18.4	4. 3	10.9
2005	15.1	4.8	14.6
2006	14.7	4.4	11.6
2007	14.0	4.8	12.7
2008	14.0	4.7	12.5

Data table for figure 7.4 – Age-adjusted asthma hospital discharge rates per 10,000 residents by gender

Year	Male %	Male CI	Female %	Female CI
1999	5.2	4.9-5.6	8.5	8.0-8.9
2000	5.1	4.8-5.5	8.1	7.6-8.5
2001	4.8	4.5-5.2	8.0	7.6-8.4
2002	5.4	5.1-5.8	8.9	8.4-9.3
2003	5.2	4.8-5.5	8.6	8.2-9.0
2004	4.8	4.5-5.2	7.1	6.8-7.5
2005	4.9	4.6-5.2	8.4	8.0-8.8
2006	4.4	4.1-4.7	7.4	7.0-7.8
2007	4.8	4.5-5.1	7.9	7.5-8.3
2008	4.7	4.3-5.0	7.8	7.4-8.2

Data table for figure 7.5 – Asthma hospital discharge rates per 10,000 by gender and age group, 2008

Age Groups	Male %	Female %	Total %
0-4	10.8	17.3	14.1
5-9	4.1	7.5	5.9
10-14	1.3	2.9	2.1
15-19	2.9	1.2	2.0
20-24	2.4	1.3	1.9
25-29	3.8	1.8	2.8
30-34	5.9	1.1	3.4
35-39	6.5	2.0	4.2
40-44	9.4	2.4	5.8
45-49	11.6	4.0	7.8
50-54	9.3	3.7	6.5
55-59	9.3	3.7	6.5
60-64	10.7	4.7	7.8
65-69	13.4	5.7	9.7
70-74	16.6	7.8	12.4
75-79	16.8	8.0	12.9
80-84	17.6	10.1	14.5
85+	16.2	14.8	15.7

Data table for figure 7.6 – Asthma hospital discharges by month, 2008

Month	Discharges
January	219
February	271
March	253
April	205
May	189
June	188
July	119
August	128
September	210
October	213
November	196
December	191

Data table for figure 7.8 – Asthma hospital discharge rates per 10,000 residents by county (age-standardized), 2006-2008

County	%	CI
Baker	4.6	2.8-6.5
Benton	3.9	3.0-4.8
Clackamas	4.8	4.4-5.2
Clatsop	6.4	4.9-7.9
Columbia	5.4	4.2-6.6
Coos	13.3	11.7-15
Crook	4.6	3.1-6.1
Curry	9.1	7.0-11.3
Deschutes	4.3	3.7-4.9
Douglas	8.2	7.2-9.2
Gilliam/Wheeler	7.7	3.9-11.6
Grant	6.3	3.0-9.7
Harney	3.4	2.0-4.8
Hood River	6.9	6.3-7.6
Jackson	8.7	6.5-10.9
Jefferson	6.6	5.6-7.6
Josephine	7.0	5.9-8.2
Klamath	7.4	4.0-10.8
Lake	5.7	5.2-6.2
Lane	5.4	4.1-6.6
Lincoln	8.0	7.0-9.0
Linn	2.9	1.8-3.9
Malheur	5.3	4.8-5.8
Marion	1.5	0.2-2.8
Morrow	8.3	7.9-8.7
Multnomah	4.5	3.5-5.4
Polk	3.7	2.3-5.1
Tillamook	3.2	2.5-4.0
Umatilla	5.7	4.0-7.4
Union	5.3	2.7-7.8
Wallowa	4.9	4.5-5.3
Wasco/Sherman	6.0	5.1-6.9
Washington	2.4	0.0-4.9
Yamhill	12.6	10.2-15
Oregon	**6.2**	**6.1-6.4**

Data table for figure 8.1 – Annual asthma deaths in Oregon

Year	Number of Deaths
1999	78
2000	60
2001	65
2002	69
2003	55
2004	49
2005	47
2006	77
2007	64

Data table for figure 8.2 – Oregon and U.S. asthma death rates per million residents (age-standardized)

Year	Oregon Rate	Oregon CI	U.S. Rate	U.S. CI
1999	22.5	17.8-28.1	16.9	16.5-17.4
2000	16.9	12.9-21.8	16.1	15.7-16.6
2001	18.0	13.9-23.0	15.0	14.6-15.5
2002	18.9	14.7-23.9	14.7	14.3-15.2
2003	15.0	11.3-19.5	13.9	13.5-14.4
2004	13.3	9.9-17.7	12.8	12.4-13.2
2005	11.8	8.7-15.8	12.7	12.3-13.1
2006	19.40	15.3-24.4	11.7	11.3-12.1
2007	16.2	12.4-20.8	No Data	No Data

Data table for figure 8.3 – Asthma death rate per million residents by gender (age-standardized)

Year	Male Rate	Male CI	Female Rate	Female CI
1999	15.2	9.5-23.5	29.0	21.8-37.8
2000	14.9	9.3-23.0	18.2	12.8-25.2
2001	9.7	5.4-16.5	23.8	17.6-31.6
2002	13.0	7.8-20.7	23.2	17.2-30.9
2003	12.1	7.3-19.1	16.8	11.7-23.7
2004	13.2	8.1-20.6	13.2	8.7-19.4
2005	10.0	5.8-16.2	13.9	9.3-20.3
2006	19.3	13.2-27.2	18.9	13.6-25.8
2007	12.6	7.8-19.2	18.5	13.2-25.4

Data table for figure 8.4 – Asthma death rate per million residents by age groups, 2007

Age Group	Rate	CI
18-64	9.6	6.1-14.4
65+	87.9	63.1-119.3

Data table for figure 8.5 – Asthma death rate per million residents by race (age-standardized)

Year	Rate	CI
White	17.0	15.7-18.4
African American	23.8	12.7-43.4
American Indian/Alaska Native	28.9*	13.4-59.1
Asian/Pacific Islander	7.5*	2.8-17.8

*This number may be statistically unreliable and should be interpreted with caution.

Data table for figure 9.1 – Adults with current asthma among Oregon Health Plan recipients by gender, 2004

Year	Rate	CI
Male	12.8	9.0-18.0
Female	21.4	18.1-25.0
Total	18.8	16.1-21.6

Data table for figure 9.2 – Adults with current asthma among Oregon Health Plan recipients by age group, 2004

Age Groups	%	CI
18-44	15.9	12.6-19.9
45-64	25.2	20.4-30.6
65+	17.2	12.0-24.1

Data table for figure 9.3 – Adults with current asthma among Oregon Health Plan recipients by education level, 2004

Education Level	%	CI
Less than High School	20.9	15.4-27.7
High School Graduate or GED	18.0	14.0-22.9
Some College	19.8	15.2-25.4
College Graduate	11.8	6.6-20.4

Data table for figure 9.4 – People with asthma who had one or more emergency department visits for asthma in the past year by Oregon Health Plan recipients (age-standardized and age-specific)

Year	Age-standardized %	4-8 Year Old %	9-16 Year Old %	17-55 Year Old %
2003	13.5	15.3	9.6	14.1
2004	13.3	16.5	10.7	13.4
2005	14.9	16.7	11.7	15.3
2006	12.0	14.9	10.0	12.1
2007	11.9	14.2	9.4	12.2
2008	13.6	15.8	10.4	14.4

Data table for figure 9.5 – Follow-up with a medical practitioner within 30 days after an emergency department visit for asthma among Oregon Health Plan recipients with asthma in the past year (age-standardized and age-specific)

Year	Age-standardized %	4-8 Year Old %	9-16 Year Old %	17-55 Year Old %
2003	39.5	39.1	38.0	39.8
2004	34.3	37.8	31.1	34.5
2005	43.9	41.0	38.9	45.3
2006	40.2	49.7	36.7	39.7
2007	41.2	44.5	43.0	40.4
2008	38.9	47.7	43.2	37.1

Data table for figure 9.6 – Asthma symptoms in the past four weeks among adult Oregon Health Plan recipients with current asthma, 2004

Asthma Symptoms	%	CI
Less than Once a Week	22.4	16.3-30.0
Once to Less Than Seven Times a Week	41.5	33.6-49.8
Symptoms Every Day	36.1	28.6-44.5

Data table for figure 9.7 – Number of days of work or other daily activities missed in the last three months because of asthma among adult Oregon Health Plan recipients with current asthma, 2004

Number of Days	%	CI
None	80.4	72.7-86.2
One to 10	11.9	7.6-18.2
11 or More	7.7	4.0-14.3

Data table for figure 9.8 – Perceived health among adult Oregon Health Plan recipients with or without current asthma, 2004

Asthma Status	% Excellent or Very Good	% Good	% Fair or Poor
With Current Asthma	14.7	20.9	64.5
Without Current Asthma	26.7	30.7	42.6

Data table for figure 9.9 – Visits to a health care professional in the past 12 months for routine treatment of asthma among Oregon Health Plan recipients with current asthma, 2004

Number of Visits	%	CI
None	51.8	43.4-60.0
1-2	27.5	20.8-34.4
3 or More	20.7	14.7-28.3

Data table for figure 9.10 – Adult Oregon Health Plan recipients with asthma who report receiving asthma information from their health care provider, 2004

Information Received	%	CI
Received Information on how to Avoid Making Asthma Worse	77.3	69.4-83.6
Received Explanation on how to Recognize Early Signs of an Asthma Episode	67.1	58.9-74.4
Received Written Instructions on how to Take Asthma Medicine	88.0	81.6-92.3

Data table for figure 9.11 – Oregon Health Plan recipients with persistent asthma who received at least one inhaled corticosteroid dispensing in the past year (age-standardized and age-specific)

Year	Age-standardized %	4-8 Year Old %	9-16 Year Old %	17-55 Year Old %
2003	63.9	66.0	67.6	62.9
2004	64.6	67.9	67.1	63.7
2005	65.7	66.9	66.4	65.4
2006	62.6	68.4	67.4	60.9
2007	62.8	65.7	65.8	61.9
2008	66.0	76.1	72.1	63.5

Data table for figure 9.12 – People with persistent asthma who overuse inhaled short-acting beta2-agonists by receiving more than six canisters among Oregon Health Plan recipients in the past (age-standardized and age-specific)

Year	Age-standardized %	4-8 Year Old %	9-16 Year Old %	17-55 Year Old %
2003	41.5	20.6	33.1	45.7
2004	41.3	20.9	30.0	46.1
2005	41.2	21.5	29.7	45.8
2006	35.3	17.8	26.8	39.1
2007	35.3	16.9	24.4	39.7
2008	35.7	16.1	27.4	39.7

Data table for figure 9.13 – Current asthma by smoking status among adult Oregon Health Plan recipients, 2004

Smoker Status	%	CI
Never Smoked	16.0	12.3-20.5
Former Smoker	21.7	16.2-28.3
Current Smoker	20.4	16.1-25.6

Data table for figure 9.14 –Adult Oregon Health Plan recipients who currently smoke by current asthma status, 2004

Asthma Status	%	CI
With Current Asthma	38.0	30.5-46.1
Without Current Asthma	34.5	31.0-38.2

Data table for figure 9.15 –Current asthma among adult Oregon Health Plan recipients by secondhand smoke exposure in a typical week (excludes current smokers), 2004

Secondhand Smoke Exposure Status	%	CI
No Exposure	17.2	13.4-21.8
Some Exposure	20.9	15.1-28.0

Data table for figure 9.16 –Adult Oregon Health Plan recipients with secondhand smoke exposure in a typical week (excludes current smokers) by current asthma status, 2004

Asthma Status	%	CI
With Current Asthma	36.1	26.7-46.8
Without Current Asthma	30.9	26.6-35.6

Data table for figures 9.17.-9.19 – Asthma emergency department visits and hospitalizations per 100 children with asthma, and low medication ratios per 100 children with persistent asthma. Children are those ages 0-17 on the Oregon Health Plan, 2004-2006

County	Emergency Department Visits	Hospitalizations	Low Medication Ratios
Baker	24.5	1.1	59.2
Benton	14.6	1.4	43.8
Clackamas	19.8	2.6	47.3
Clatsop	22.2	5.5	63.9
Columbia	11.7	2.3	57.5
Coos	21.1	5.7	51.4
Crook	12.1	2.6	61.6
Curry	11.6	2.9	54.9
Deschutes	18.9	3.6	52.5
Douglas	21.3	4.3	52.1
Gilliam/Wheeler	**	**	**
Grant	16.7	3.8	78.9
Harney	11.9	2.5	64.7
Hood River	11.9	1.9	58.2
Jackson	12.4	3.6	52.2
Jefferson	21.8	3.0	57.7
Josephine	20.7	4.2	53.7
Klamath	12.7	3.7	56.5
Lake	9.5	2.4	58.3
Lane	10.4	3.6	31.1
Lincoln	15.9	2.2	52.9
Linn	17.8	5.0	53.7
Malheur	10.2	3.1	42.1
Marion	21.1	2.6	43.7
Morrow	20.1	1.4	46.3
Multnomah	24.7	4.2	47.5
Polk	22.6	3.9	47.1
Tillamook	24.1	4.8	36.0
Umatilla	18.1	1.4	58.7
Union	20.5	4.1	49.3
Wallowa	25.1	2.2	65.9
Wasco/Sherman	16.7	6.1	61.8
Washington	20.2	3.7	41.7
Yamhill	24.6	4.0	44.5
Oregon	**19.0**	**3.5**	**45.7**

**This number is suppressed because it is statistically unreliable.

Data table for figures 9.20.-9.22 – Asthma emergency department visits and hospitalizations per 100 adults with asthma, and low medication ratios per 100 adults with persistent asthma. Adults are those ages 18 years and older on the Oregon Health Plan, 2004-2006

County	Emergency Department Visits	Hospitalizations	Low Medication Ratios
Baker	13.3	2.6	56.1
Benton	8.2	3.1	55.1
Clackamas	14.4	3.0	50.7
Clatsop	13.6	2.2	55.9
Columbia	8.9	2.2	48.5
Coos	12.4	5.0	56.7
Crook	10.9	3.6	66.1
Curry	7.7	5.6	43.5
Deschutes	14.8	2.8	54.1
Douglas	12.5	3.3	56.5
Gilliam/Wheeler	**	**	**
Grant	12.6	1.6	57.1
Harney	8.0	1.7	60.6
Hood River	11.2	1.1	53.3
Jackson	10.8	3.4	55.0
Jefferson	17.8	3.3	56.3
Josephine	10.1	3.6	63.6
Klamath	7.9	2.2	56.6
Lake	11.2	4.0	55.6
Lane	11.0	2.5	50.3
Lincoln	11.6	2.3	57.1
Linn	9.9	2.3	51.9
Malheur	10.0	2.5	48.1
Marion	15.7	3.5	53.3
Morrow	11.3	3.6	54.4
Multnomah	16.0	4.1	52.2
Polk	13.6	2.0	47.2
Tillamook	17.5	4.4	54.2
Umatilla	9.8	2.3	55.2
Union	15.1	2.5	60.7
Wallowa	11.0	2.3	54.6
Wasco/Sherman	8.6	2.0	53.5
Washington	15.4	4.0	47.4
Yamhill	16.4	5.0	50.9
Oregon	**13.7**	**3.5**	**52.4**

**This number is suppressed because it is statistically unreliable.

Data table for figure 10.1 – Total cost of asthma hospitalizations (unstandardized and standardized).

Year	Unstandardized (Million $)	Standardized (Million $)
1999	12.9	19.1
2000	13.5	19.2
2001	13.9	18.6
2002	18.3	23.6
2003	18.4	22.8
2004	19.3	23.0
2005	23.4	26.8
2006	22.3	24.4
2007	28.2	29.4
2008	28.2	28.2

Data table for figure 10.2 – Average cost of one asthma hospitalization (unstandardized and standardized).

Year	Unstandardized (S)	Standardized ($)
1999	5,600	8,300
2000	5,900	8,400
2001	6,200	8,400
2002	7,200	9,300
2003	7,500	9,300
2004	9,000	10,600
2005	9,600	11,000
2006	10,100	11,100
2007	11,800	12,300
2008	11,800	11,800

Data table for figure 10.6 – Asthma care cost barriers encountered by adults and children

Type of Cost Barrier	Adults %	Adults CI	Children %	Children CI
Seeing a Primary Care Doctor	7.7	5.6-10.5	3.8*	1.6-8.6*
Seeing Specialist for Asthma	3.1	1.7-5.5	**	**
Buying Asthma Medications	13.8	10.8-17.4	11.3	6.8-18.2
Any Cost Barriers	15.3	12.2-19.0	12.8	7.9-19.9

*This number may be statistically unreliable and should be interpreted with caution.
**This number is suppressed because it is statistically unreliable.

Appendix C: Data source descriptions and limitations

The data sources used in this report are listed below. Each data source is described, and the limitations for each source are also provided.

Asthma Data Workgroup (ADWG)

Description: The ADWG is a collaboration between the Oregon Asthma Program (OAP) and Oregon's private and Medicaid health plans and health systems. ADWG has developed methods to measure and report asthma data consistently across plans. Currently, health plans report data in summary form to the OAP each year. The OAP analyzes the data and reports the aggregate results back to the ADWG; results are also reported via presentations and publications. The data are derived from the medical and pharmacy claims records of insured Oregonians who are 4-55 years old and have at least six months of continuous enrollment in a participating health plan. In 2008, more than 550,000 insured Oregonians met these criteria.

Limitations: The data are limited by age (4-55 years), by the number of health plans that participate and by insurance status (insured people with six months or more of continuous coverage). As such, the data are not necessarily representative of all Oregonians or of all insured Oregonians.

Behavioral Risk Factor Surveillance System (BRFSS)

Annual Survey
Race/Ethnicity Oversample
County Combined Dataset

Description: The BRFSS is a random-digit dialed telephone survey that is conducted year-round among Oregon adults aged 18 years or older. Asthma prevalence questions are included every year, and Oregon-specific supplemental asthma questions are included most years. Child prevalence is obtained by adult proxy to the six-question random child selection module and the two-question child prevalence module, which have been asked every year since 2002.

Every few years, Oregon conducts additional BRFSS surveys among under-represented races and ethnicities. The results of these surveys are combined with statewide BRFSS data to provide more stable estimates for asthma prevalence, other chronic diseases, and related risk factors among these groups of Oregonians. The most recent race/ethnicity oversamples were conducted in 2004-2005. In addition, BRFSS surveys from 2002-2005 were aggregated to produce more reliable county-level asthma prevalence estimates.

Limitations: BRFSS estimates pertain only to the adult population age 18 years or older living in households. Respondents are identified through telephone-based methods. The survey started collecting data for cell phones in 2009. Cell-phone data were not available for analysis in this report. According to a recent publication from the National Center for Health Statistics, in 2009 approximately 17.7% of households in Oregon were wireless-only. No direct method of compensating for non-telephone coverage is used by the BRFSS. Post-stratification weights are used to partially correct for any bias caused by non-telephone coverage. These weights adjust for differences in probability of selection and non-response, as well as non-telephone coverage, and must be used for deriving representative population-based estimates of prevalence.

Results obtained through BRFSS surveys are also limited in that they represent self-reported responses. Not all questions in the BRFSS have been validated.

BRFSS Asthma Callback

Description: Oregon was one of three states to implement the BRFSS asthma callback in 2005. The callback is a follow-up survey administered to people who indicated on the BRFSS that they currently have asthma or had asthma in their lifetime. Through the callback, the Oregon Asthma Program collects detailed information on topics such as health care utilization, knowledge of asthma, asthma management, asthma medications, environmental factors, costs of asthma care, work-related asthma, co-morbid conditions, and complementary and alternative medicines.

Limitations: The Adult Asthma Callback has many of the same limitations described for the telephone-based BRFSS. Not all people with asthma from the standard BRFSS are reached. This may lead to differences between the original BRFSS respondents and those respondents who also complete the asthma callback.

Oregon death certificates and national CDC WONDER data

Description: Asthma mortality is monitored through Oregon's Death Certificate Statistical File, which contains information about all deaths occurring in Oregon and deaths occurring out-of-state among Oregon residents.

Asthma must be listed as the underlying (principal) cause of death in order to be considered an asthma death. When appropriate, mortality rates presented in this report have been age-adjusted to the U.S. 2000 standard population. For comparability, state and national age-adjusted rates may be obtained from the Centers for Disease Control and Prevention (CDC) WONDER (Wide-ranging Online Data for Epidemiologic Research) data system at http://wonder.cdc.gov.

Limitations: One limitation to this data set is the relatively small number of asthma deaths that occur each year. Given these small numbers, the mortality rate for any given year may not provide a stable estimate and analyses for subpopulations are not possible.

A second limitation is that the accuracy of these data naturally depends on the accuracy with which the provider completes the death certificate and codes the underlying cause of death.

Division of Medical Assistance Programs-Quality and Performance Improvement Workgroup (DMAP-QPIWG)

Description: Our unique relationship with the DMAP-QPIWG enables the Oregon Asthma Program to measure five asthma indicators for all Medicaid/CHIP clients in the state, which makes Oregon the only state to have access to asthma data for the entire state Medicaid/CHIP population. The indicators are the same as those measured by the ADWG and are calculated using medical and pharmacy claims for Oregonians served by Medicaid/CHIP who are 4-55 years old and have at least six months of continuous enrollment. Medicaid/CHIP data include data from all managed care plans and includes fee-for-service information as well.

Limitations: The data are limited to Medicaid/CHIP members only and are further limited by age (4-55 years) and by insurance status (insured people with at least six months of continuous coverage). All health plans providing Medicaid/SHIP services started providing data in 2003. Prior to 2003 only volunteer plans provided data.

Hospital Discharge Index

Description: The Hospital Discharge Index provides information on hospital discharges from all acute care hospitals in Oregon except the two Veterans Administration hospitals. The dataset includes admit and discharge dates, diagnosis and procedural codes, financial charges, primary payer, and limited patient demographic information (e.g., gender). Identifiers for calculating rates based on hospital usage by unique individuals were not available for this report.

Limitations: In this dataset, an asthma hospitalization is defined as having a primary diagnosis with an International Classification Disease 9th Revision Clinical Modification (ICD-9-CM) code of 493. When possible, hospitalization rates presented for this dataset have been age-adjusted to the U.S. 2000 standard population.

Prior to 2008, the Hospital Discharge Index does not include identifying information that would allow us to ascertain when a single person has multiple hospitalizations; therefore, the calculated rate is the number of hospitalizations per capita rather than number of different people hospitalized per capita. In addition, prior to 2008, the dataset does not include information on race or ethnicity.

Starting in 2008, the data necessary for investigating repeat hospitalizations for asthma and for exploring asthma hospitalizations by race and ethnicity are included in the Hospital Discharge Index. Because 2008 is the first year of these new data being available, issues of data quality are being resolved and therefore analysis was not included in this report.

Oregon Medicaid Health Risk and Health Status Survey (HRHSS)

Description: The HRHSS was conducted in 2004 by the Oregon Department of Human Services Division of Medical Assistance Programs to measure the health risk and health status of adult Oregon Health Plan (OHP) clients. This telephone survey was conducted in English and Spanish from August–October 2004, and the survey was designed to assess health-risk behaviors, clinical preventive health practices and health care access, mainly related to chronic diseases. The eligible population included adults aged 18 or older who were enrolled in the Oregon Health Plan (OHP) for at least 137 days during the period of July 1, 2003, through June 30, 2004. Continuous enrollment was not required. The sample was random and stratified by six race/ethnicity categories (white, African American, Hispanic, Native American, Asian and other). A total of 11,921 adult enrollees were eligible to be surveyed and 2,995 completed the survey.

Limitations: As a random sample, these results should be interpreted as estimates of behaviors and practices with inherent variability rather than as precise prevalence percentages. In addition, the HRHSS has many of the same limitations described above for the telephone-based BRFSS.

Oregon Healthy Teens (OHT) Survey

Description: Since 2000, the Youth Risk Behavior Survey (developed by the CDC) and the Oregon Public School Drug Use Survey have been combined for Oregon into a single annual survey called Oregon Healthy Teens (OHT) Survey. The sample size varies between 1,600 to 32,000 per year, and the final data are weighted to more accurately represent

Oregon eighth and 11th graders. In addition to assessing other topics such as tobacco and alcohol use, HIV knowledge and attitudes, eating behaviors, nutrition, and exercise, the questionnaire also provides an estimate of lifetime and current asthma prevalence among Oregon students in eighth or 11th grade. The OHT may also assess frequency of asthma symptoms, asthma episodes, or missing school due to asthma.

Limitations: One limitation is that participation by school systems in the OHT is voluntary. However, participation rates have been high thus far and recent sample sizes have been ~25,000 per year.

Another limitation is that the OHT questionnaire is not currently available in non-English versions except for a Spanish booklet that can be used as a reference when filling out the English version of the survey.

A third limitation is that 3% of surveys were eliminated due to combinations of "dubious" answers and another 5% were eliminated because the student did not fill out the grade or gender information.

Appendix D: Glossary

Age-standardization – A method to standardize populations with different age distributions. Age-standardization enables the comparison of different areas and times regardless of changes in the overall population age structure from place-to-place and time-to-time.

Asthma (as defined from claims data, such as from the Oregon Health Plan) – People are identified as having asthma if they met any of the following criteria during the period January 1 through December 31 of each year: (1) hospitalization for asthma; (2) ED visit for asthma; (3) three or more asthma medication dispensings (as long as not all dispensings are for leukotriene modifiers); or (4) two or more outpatient visits (admitted to a hospital or clinic for treatment that does not require an overnight stay) with asthma listed as any of the diagnoses.

Body Mass Index (BMI) – BMI is a mathematical method to determine obesity by dividing a person's metric weight by the square of the person's metric height.

Confidence interval (CI) – An indication of a measurement's precision with a narrow confidence interval indicating high precision and a wide confidence interval indicating low precision. For example, a CI can be used to describe how reliable survey results are. Confidence intervals can also be used to determine if the difference between two percentages or rates are statistically significantly different from each other. If the confidence intervals between two populations overlap then it is likely that they are not significantly different from each other. If they do not overlap, they are likely to be significantly different from each other. Caution should be used when interpreting statistical significance in this way because using confidence intervals is a conservative test for statistical significance. That means that differences between two rates may be statistically significant even though the confidence intervals for those two rates overlap.

Cost standardized – A method to standardize economic costs using the Consumer Price Index (CPI). CPI is a measure of the average change in prices over time. For this report we used a CPI specific for medical costs.

Current asthma – When a survey respondent reports that they have ever been told they have asthma by a doctor, nurse or other health professional and they currently have asthma.

Disease burden – The burden of a disease is the effect of a health problem in an area measured by financial cost, mortality, morbidity, or other indicators.

Extremely obese – Weight category where BMI is 40 and greater.

Healthy weight – Weight category where BMI is between 18.5 and 25.

Hospital discharge – A patient who stays overnight at a hospital and then either returns home or is transferred to another facility is referred to as a discharge.

Inhaled corticosteroid – Inhaled corticosteroids are anti-inflammatory drugs taken on a daily, ongoing basis to prevent asthma attacks.

Inhaled short-acting beta$_2$-agonist – Inhaled short-acting beta$_2$-agonists are medications that quickly loosen the tightened muscles around swollen airways and are often called rescue medications.

Lifetime asthma – When a survey respondent reports that he or she has ever been told he or she has asthma by a doctor, nurse or other health professional.

Obese – Weight category where BMI is between 30 and 40.

Outpatient – An outpatient visit is one in which a person visits a hospital, clinic, or other facility for diagnosis or treatment but is not hospitalized.

Overweight – Weight category where BMI is between 25 and 30.

Persistent asthma (as defined from claims data, such as from the Oregon Health Plan) – People are identified as having persistent asthma during the period January 1 through December 31 of each year: (1) hospitalization for asthma; (2) ED visit for asthma; (3) four or more asthma medication dispensings (as long as not all dispensings are for leukotriene modifiers); or (4) four or more outpatient visits with asthma listed as any of the diagnoses.

Prevalence – The percentage of a defined population with a disease at a given time.

Rate – Rates are a fraction calculated by dividing the number of people affected by a problem by the number of people at risk of experiencing the problem. Rates are generally expressed in relation to a specific time period and multiplied so that the rate is not expressed as a fraction. For example, the fraction 0.08 would be expressed as 80 per 1,000 people.

Appendix E: Reliability and Suppression Guidelines

In this report, some numbers include a warning that they are potentially unreliable or they are unreliable and suppressed (not shown). In general, reliability refers to the stability of a number being reported.

The guidelines used to gauge reliability differ depending on the type of data used. Some data sources include all events under study (such as a births, deaths, or hospitalizations). These will be referred to as "full count." Other data sources are from surveys of randomly selected individuals, adjusted to represent the full population. These will be referred to as "survey." The text below briefly describes the methods used to determine if the information in this report includes a warning for reliability or is suppressed.

Full Count

Determine the number of events (n).

- n >=12: Report the estimate.
- n>=5 and n <12: Report the estimate and include a warning regarding reliability.
- n <5: Do not report the estimate and state that it is suppressed.

Survey

Determine the total number of persons surveyed (x) for a particular question and calculate the standard error (SE) for the reported number. Use the SE to calculate a statistic call the relative standard error (RSE). RSE is a measure of the variability of an estimate compared with the estimate itself.

1. Determine if the estimate is being calculated on a full population (i.e., everyone) or a subpopulation (i.e., a smaller group of all people surveyed who share a common trait such as their race, county, or medical condition).
2. If the full population, determine if the denominator is >= 50. If yes, proceed; if not, suppress.
3. If a subpopulation, determine if the denominator is >= 20. If yes, proceed; if not, suppress.
4. Apply the following logic to each RSE
   - RSE < 30%: Report the estimate.
   - RSE >= 30% and RSE <50%: Report the estimate, and include a warning regarding reliability.
5. RSE >= 50%: Do not report the estimate and state that it is suppressed.

Oregon Health Authority

PUBLIC HEALTH DIVISION
Office of Disease Prevention and Epidemiology

THE BURDEN OF ASTHMA IN OREGON

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