Benton County Community Health Assessment

2017-2021

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Partners and Acknowledgements

Benton County Public Health and the Regional Health Assessment team for Linn, Benton, and Lincoln counties would like to acknowledge and extend thanks to our numerous talented and dedicated community partners.

Chapter 1
Introduction and Overview

The 2017 Benton County Community Health Assessment (CHA) is the result of many dedicated hours of research, working in collaboration with community partners and agencies, leaders, and local residents across the county.

The World Health Organization defines health as a "state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."[1] Health is not just about individuals, but includes families, communities, and systems, and is a result of the interaction of complex networks of conditions and factors. Health starts long before illness occurs and is impacted by where and how we live, learn, work, play, worship and age.

The Benton County CHA incorporates this definition of health by describing a wide array of information about the conditions and factors affecting people's health across the county as well as indicators of health status.

Assessment Goals and Objectives

The Benton County CHA:

- Identifies and gathers health status indicators in order to determine the current health status of the community;
- describes areas for potential future health improvement while building upon ongoing community knowledge and efforts;
- identifies strengths and challenges facing the county in regard to health status;
- recognizes and highlights the need for more detailed local data; and
- is a collaborative process that incorporates a broad range of community voices.

CHA data informs:

- Community, organizational, and local coordinated care organization decision-making;
- the prioritization of health problems;
- reporting requirements and funding opportunities for community partners; and
- the development, implementation, and evaluation of a range of plans, policies, and interventions to improve community health.

Report Organization

The Benton County Community Health Assessment is presented in nine chapters:

Chapter 1: *Introduction and Overview*, which includes methodology and limitations.

Chapter 2: *Who We Are,* a description of the people of Benton County including population demographics as well as a look at how the community has changed over time.

Chapter 3: *Environmental Health*, which includes information about the physical spaces in which we live, work, and play.

Chapter 4: Social Determinant*s of Health,* which includes the social, economic, and community factors that influence health.

Chapter 5: *Access to Health Services*, an exploration of how we define and measure the ability of those in our community to get the health care they need.

Chapter 6: *Physical Health,* which covers a number of physical health-related outcomes, from chronic conditions to violence and injury throughout the life course.

Chapter 7: *Behavioral Health*, a look at the indicators and measurements of mental health and substance abuse throughout the community.

Chapter 8: *Health through an Equity Lens*, examining the disadvantages and barriers some populations face more than others regarding improving and maintaining their health status.

Chapter 9: *Conclusion—Meeting Challenges Together,* a discussion of how this data can be used to understand the health of Benton County and recognize opportunities for positive changes to improve the health of the entire community.

Collaboration and Partnerships

The Benton County Community Health Assessment was developed by the Linn, Benton, and Lincoln County Regional Health Assessment and Alignment (RHA) team, a partnership formed by Linn, Benton, and Lincoln counties and the local Coordinated Care Organization (CCO), InterCommunity Health Network (IHN-CCO). The four partners collaborate on a series of assessments with the understanding that a regional approach to population health data allows them to identify wider health trends and pool their resources to efficiently address the issues that their individual Community Health Assessments and group Regional Health Assessment (RHA) identify. The RHA engages a wide representation of key individuals in the community who shared their personal and professional knowledge while committing to help develop health improvement strategies suitable for the region.

Methodology

The Regional Health Assessment team reviewed county, regional, and state health assessments as well as current literature to better understand how best to conduct and design a community health assessment. The team also built on its experience from having previously produced a Regional Community Health Assessment for the region consisting of Linn, Benton, and Lincoln counties. Staff examined access indicators that have strong evidence for correlation with health status and outcomes. Data from secondary sources were identified through meeting

with community partners, and through preexisting publications (e.g. community health assessments and hospital community health needs assessments). In addition, data sources were identified through literature research to include data ranging from local, regional, state and national levels. A variety of community partners were involved throughout this process. Staff conducted both in-person and phone presentations and consultations with members of regional and county-level governmental, nonprofit, and health system organizations. In addition, members of state and local research communities were contacted.

A community Steering Committee was formed to guide the development of the Community Health Assessment. The Steering Committee is formed from Benton County's community Public Health Planning and Advisory Committee and additional further members with sector expertise who bring a broad perspective of our community and provide oversight of the production of a considerate and comprehensive Community Health Assessment. The Steering Committee provided input throughout the development of the CHA.

The full CHA development process has included:

- engaging county stakeholders and partners in the process of issue identification, data collection, data interpretation, editing, and dissemination of results;
- obtaining updated secondary data for the county;
- synthesizing existing data reports; identifying areas in which more information is needed, and including data from other sources which address these gaps;
- identifying health needs and assets that will inform additional local and regional planning processes, including county-level Community Health Improvement Plans, Public Health Division strategic planning, public health accreditation, and health care transformation initiatives, among others; and
- consulting state and national resources for guidance in the development of this community health assessment, including the following: Oregon Health Authority technical reports (e.g. health equity,[2] asthma,[3] chronic disease prevention[4]); the Centers for Disease Control and Prevention's data set directory of social determinants of health at the local level;[5] King County's Equity and Social Justice Annual Report;[6] and the Statewide Health Assessment of Minnesota.[7]

Limitations

While the Benton County CHA identifies many critical issues pertaining to community health, it is not inclusive of all health-related issues. As a result, it should not be considered a formal study or research document investigating the causes of each issue raised or providing a detailed analysis of the data. In many cases, data are not available at the regional or county level, nor are all data stratified by race/ethnicity, income, education level, zip code, etc.

Data that describe the many factors that contribute to health are not always readily available. In addition, conclusions, hypotheses, and interpretations of the interactions between the many

factors that contribute to health may not be included, in part because the underlying structures of these interactions are still not fully understood.

Gaps in Data

Recognizing and highlighting the need for more detailed local data was a key objective of this assessment. As mentioned above (and throughout the document) data for Benton County were often not available for particular demographics, such as age, income, education-level, race/ethnicity, or zip code. This greatly limited the ability to explore differences or disparities within particular sub-populations or geographies.

When race/ethnicity data are gathered, analysis may be further limited due to a lack of data stratification by more specific racial categories, such as U.S.-born versus foreign-born for the Latino population, or the many ethnicities and cultures represented in the category of Asian-Pacific Islander. There are limited data on populations that experience inequities and disparities in the region however, as highlighted in later chapters, and their needs and barriers to health and health care are likely to be greater than those of the population at large.

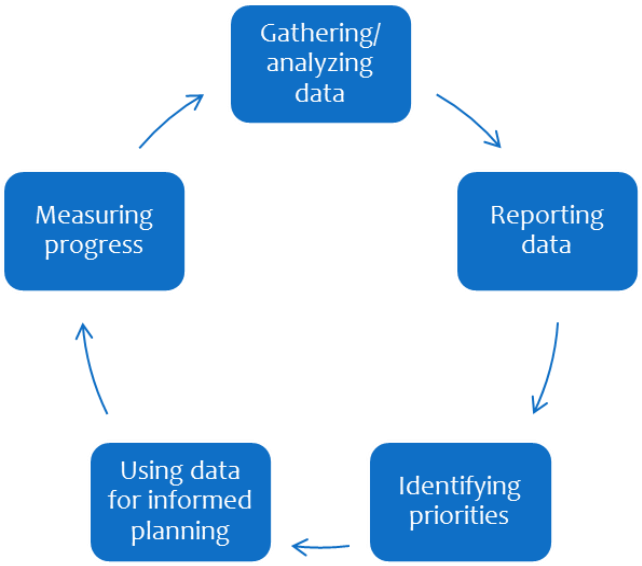
Throughout the document, national or Oregon state-wide data are provided to illustrate trends, especially among vulnerable populations, when county level or regional data are not available. It is important to note, however, that national or state-wide rates, trends, and patterns may not necessarily reflect the reality of particular communities, counties, or regional rates and trends. As regional partners continue to gather information to inform their practices and services, it is important to collect demographic data (i.e. zip codes, level of education, etc.) so that more accurate information can be used to inform future health improvement planning and other public health initiatives.

The Role of Public Health Data and the Cycle of Assessment

Health assessment is a cyclical, data-informed process. Many organizations in Linn, Benton and Lincoln counties conduct assessments of some kind on varying timelines and focused on diverse populations. The Regional Health Assessment team aims to streamline assessments and improve comparability of data used for health planning across Linn, Benton, and Lincoln counties. Each county public health department is required to produce their own health assessment for national accreditation, but have agreed to work with each other and the regional Coordinated Care Organization, InterCommunity Health Network, to identify areas to collaborate and efficiently share resources. Documents relating to the county public health accreditation process are called Community Health Assessments (CHA) and Community Health Improvement Plans (CHIP). This document is the Benton County Community Health Assessment.

Shown on the next page is a simplified ‘cycle of assessment,’ which helps to demonstrate the role that data (like the data included in this report) can play in the assessment process. Data can illustrate the health status and disparities within communities (needed for the CHA), and

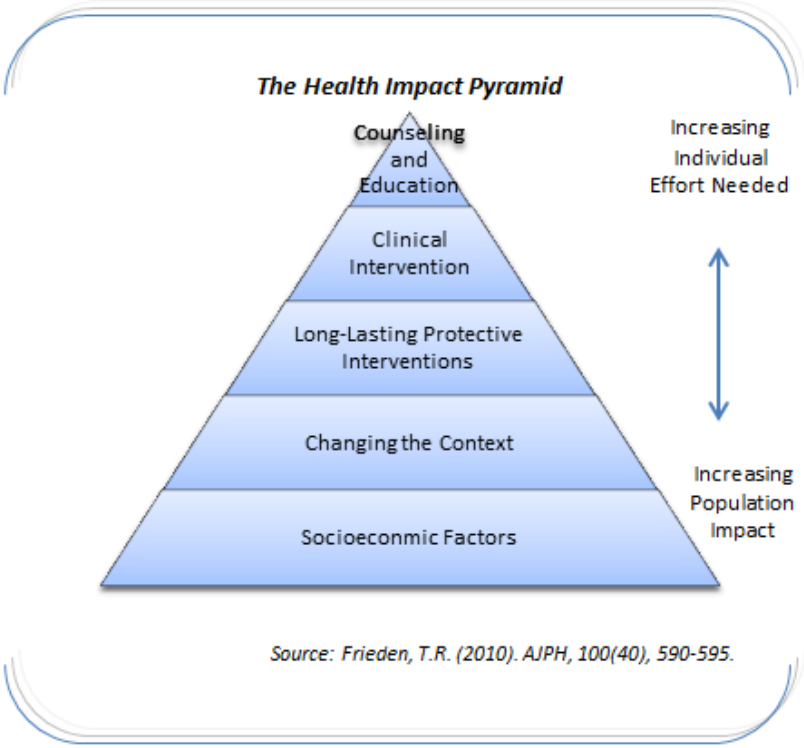
inform health priorities and measure progress (for the CHIP). In addition, data can be used to measure progress on projects and activities aimed at improving the health of the community.



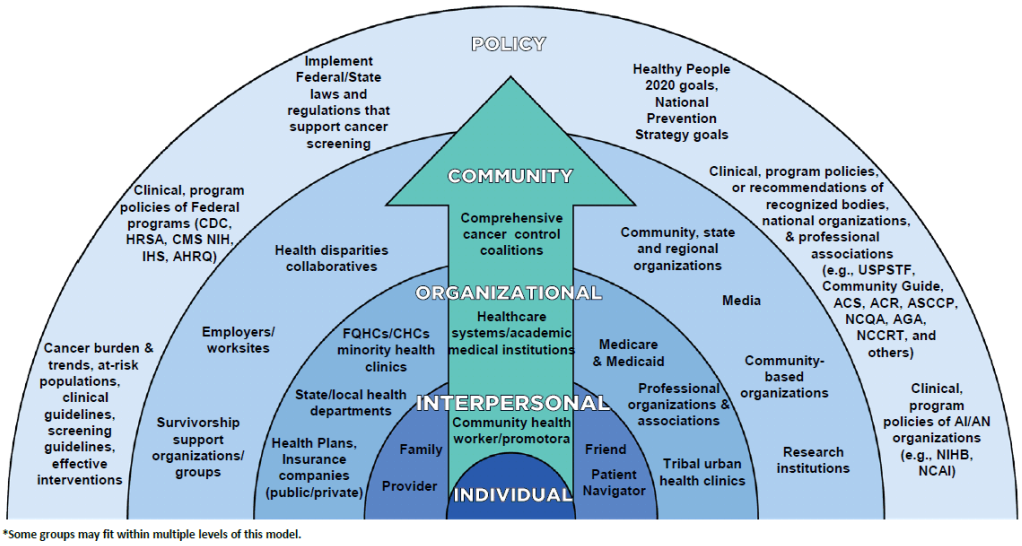
A Framework for Public Health Action: The Health Impact Pyramid

Health is made up of many conditions and factors. Worldwide, a growing body of research reveals how conditions, and social and economic opportunities determine health outcomes.[8]

The Health Impact Pyramid[9] framework, shown here, provides guidance for a comprehensive public health approach to community assessment and program development across multiple domains of behavioral influence. This model has been incorporated into the Benton CHA to inform this assessment process. In this 5-tier pyramid, efforts to address socioeconomic factors are at the base, followed by public health interventions that change the context for health (e.g., smoke-free laws, safe



parks, bike lanes), protective interventions with long-term benefits (e.g., immunization, smoking cessation) come next, followed by direct clinical care, and at the top, counseling and education. In general, public action and interventions represented by the base of the pyramid require less individual effort and have the greatest population impact overall.[10] A similar model, called the Ecological or Social Ecology model, is used in a variety of disciplines in order to better understand the larger forces that impact individuals.[11]



*Some groups may fit within multiple levels of this model.

The movement from an understanding of health focusing on the individual to one focused on communities and systems is also evident in the development of the U.S. Department of Health and Human Services *Healthy People.*[12] *Healthy People 2020* is the most recent national 10-year agenda for improving health of all Americans with the goal of providing a framework for national, state and local health initiatives.

The Health Impact Pyramid aligns with the factors that the U.S. Department of Health and Human Services cite as influencing the development of healthy communities:

> A healthy community is one that continuously creates and improves both its physical and social environments, helping people to support one another in aspects of daily life and to develop to their fullest potential. Healthy places are those designed and built to improve the quality of life for all people who live, work, worship, and play within their borders-where every person is free to make choices amid a variety of healthy, available, accessible, and affordable options.[13]

These factors inform the selection of indicators the RHA team used to describe the health of residents, the neighborhoods in which they live, and the issues that most impact their well-being.

How to Use This Document

Timeframes for Data

This report attempts to balance the importance of comparing data from common years with the goal of presenting the most recent data. Different data sources update and release data on independent timeframes. The U.S. Census Bureau is the main source of data for demographic and socioeconomic information used in this report. The most recent data available for county-level demographic and socioeconomic data is the Census Bureau's American Community Survey (ACS) 2011-2015 five-year aggregates. This aggregation combines data from the five years in order to produce more accurate estimates.

In an effort to compare data from common years, many statistics reported are from 2015, even if more recent data is available. These statistics reflect measures of health that have historically changed gradually, so differences between 2015 and the present are likely to be minor. However, some measures of health have changed greatly in the past several years, such as the implementation of the Affordable Care Act in 2014, which had huge impacts on insurance coverage rates and Medicaid membership. In this case, and for other rapidly changing measures, more contemporary data is reported in order to best reflect current health status and the current health system.

As with the ACS 2011-2015 5-year aggregates, many data sources aggregate statistics over a number of years to improve the reliability of the estimates. A common example of this is reporting the incidence (number of new cases) of cancer. For example, in the state of Oregon there were approximately 98,860 new cases of cancer in Oregon between 2008 and 2012. This statistic is reported as an incidence of 448 cases for every 100,000 people. This means that *each year*, for every 100,000 people in Oregon there were 448 cancer diagnoses. It does not mean that 448 cases per 100,000 people were diagnosed over the course of 5 years.

Regional and County-level Data

The Benton County CHA document is focused on the health status of Benton County. However, because of the partnership between Linn, Benton, and Lincoln counties and IHN-CCO, data that encompasses the three-county region is included to illustrate the larger context of which Benton County is a part. Important differences between counties exist and are often identified along with the regional totals. If county level data is not displayed, it is because the regional totals are approximately representative of all three counties, or county-specific data is not available.

For more information on time-trends, color-schemes and decisions around displaying regional and county-level data, please see the following 'Tables, Graphs, and Maps' section.

Oregon Health Plan data

The Oregon Health Plan (OHP) provides health care coverage to low-income Oregonians through programs overseen by Oregon Health Authority. Service to OHP members in the region is largely provided through the local coordinated care organization (CCO), InterCommunity Health Network-CCO (IHN-CCO). The Oregon Health Plan collects a large amount of health-related information about its members. It is a valuable resource for understanding the health of our community. Many topics in this Community Health Assessment have sections with Oregon Health Plan data. These data are for OHP members in Benton, Linn, and Lincoln Counties, since they are organized by CCO. Not all low-income community members have insurance through the Oregon Health Plan, and not all OHP members get their insurance through a CCO. These groups are not included in the data and therefore the data should not be interpreted as completely representative of under-resourced community members.

Benchmarking

Benchmarking is an important tool in many fields, including public health. Benchmarking makes a comparison between data (in this case health status data) and a standard for best practice. In other words, benchmarking involves comparing a particular health status in our region, and what is possible for that health status. Major organizations like *Healthy People 2020* dedicate significant resources to provide benchmarks for use by local health authorities. As stated on their website, *Healthy People* has established benchmarks and monitored progress over time in order to:

- encourage collaborations across communities and sectors;
- empower individuals toward making informed health decisions; and
- measure the impact of prevention activities.

Healthy People 2020 has also taken a lead in developing a shared set of overarching goals for public health practice, which are listed in the following text.[14]

***Healthy People 2020* Overarching Goals**

- Attain high-quality, longer lives free of preventable disease, disability, injury, and premature death.
- Achieve health equity, eliminate disparities, and improve the health of all groups.
- Create social and physical environments that promote good health for all.
- Promote quality of life, healthy development, and healthy behaviors across all life stages.

Tables, Graphs, and Maps

When exploring the Benton CHA document, a number of visuals are included to display data across Benton County, the Linn Benton Lincoln region, and the state. For consistency, color-coding has been used. Benton County has been assigned shades of blue; the Linn Benton Lincoln Region has been assigned shades of purple, and the state has been assigned shades of red.

When working with time-trends, multiple years are included only when data was comparable across time. However, comparisons are not always possible, as methods for data collection can undergo significant changes.

Some graphs and tables may not include certain geographies. As mentioned earlier, Benton County level data are not included when not available or when the regional data are similar to Benton County-specific data. Occasionally the regional total was not included, which meant it was not possible to aggregate the counties (usually because the data was age-adjusted at the county-level).

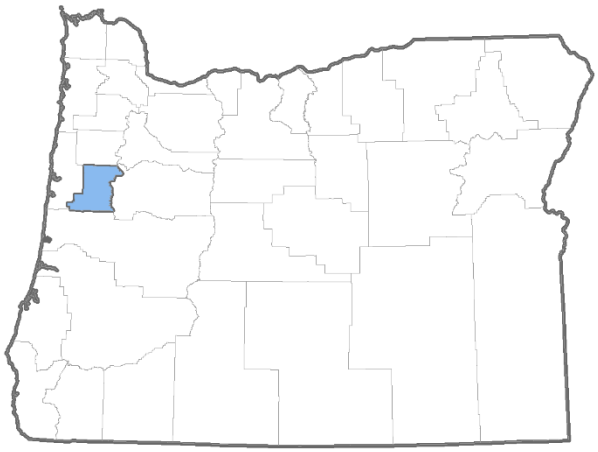
When creating all visuals, there were times that numbers were too small to be meaningful or were small enough to be identifiable. In these cases the data have been suppressed and it has been noted in the table or graph accordingly.

Correlation versus causation

Many health indicators are related to one another or to other group or individual characteristics. For example, diabetes and obesity are related, in that individuals with diabetes are more likely to be obese than the rest of the population, and vice versa. This is a statistical correlation. However, this alone does not imply that diabetes causes obesity, or that obesity causes diabetes. Throughout this document, many correlations are presented, because they are important for understanding which groups may have increased risk for poor health outcomes. Terms like “risk factor” and “association” indicate a correlation.

It is important from a public health standpoint not to assume causation without evidence, because that can lead to stigma against individuals or groups as well as a misunderstanding of the relationship between health indicators. When there is a clear causal link between two health indicators or other factors it is explicitly stated with supporting evidence.

Chapter 2
Who We Are



The history of Benton County begins with the Native American tribes that have lived in the region for thousands of years. Native Americans lived in the valleys and the hills, along rivers and oceans.

Contact with non-native groups began with trappers and explorers in late 18th century, then with pioneers and settlers who moved to the Oregon Territory during the mid-1800s. In 1855, the United States established a 1.3 million acre reservation in what is now Lincoln County. The U.S. government moved many of the coastal and Willamette Valley tribes to this reservation, which at the time included Yaquina Bay.

Over the next 150 years, the three counties incorporated, grew in population, and developed strong local industries. Oregon State Agricultural College, now Oregon State University, was designated as a land grant university in Benton County in 1868. The university is a major driver of economic and cultural activity in the region. In addition, Benton County is considered a regional health care hub and is home to agriculture and technology industries.

Health Equity

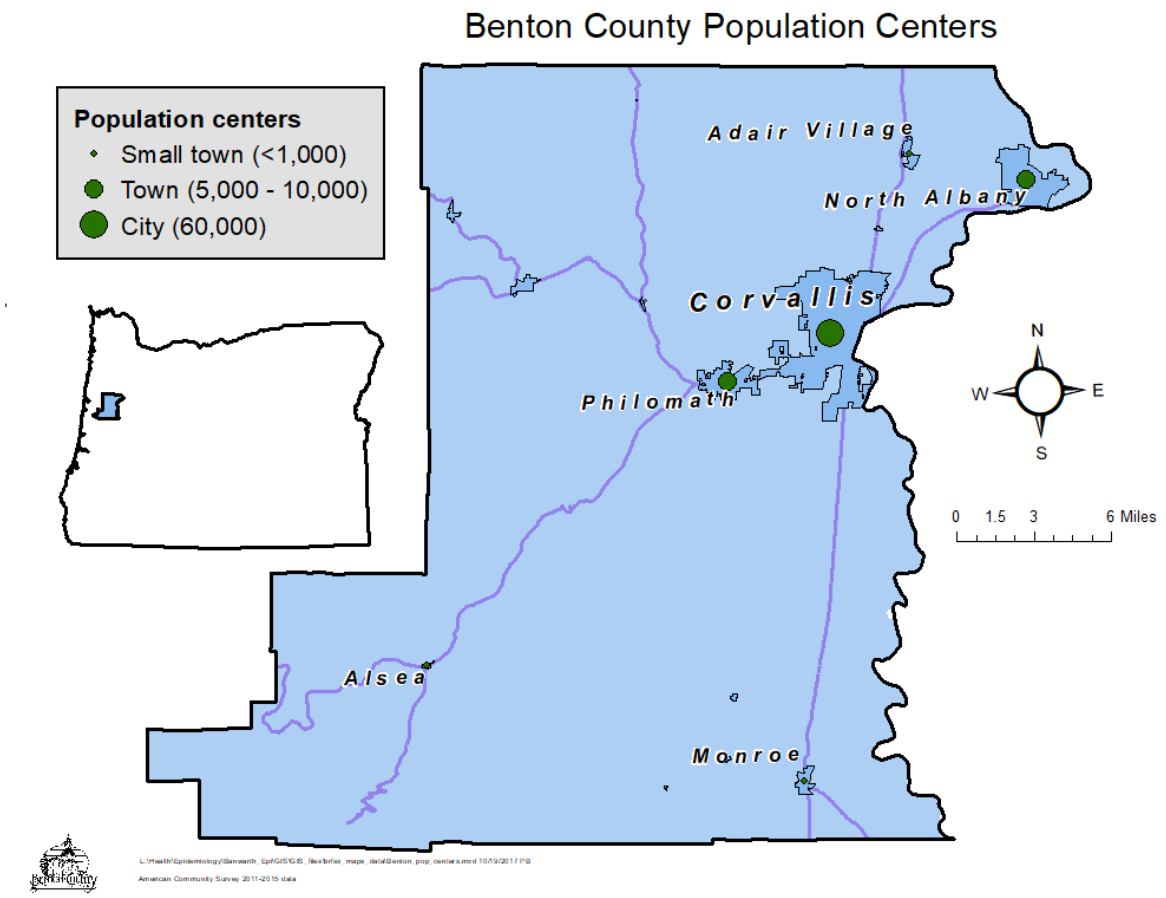
In discussing the health of our county, it is important to recognize that specific subpopulations may experience worse health outcomes than the general population. This chapter describes many of the sub-populations that will appear later in a health equity context. In order to understand the impact of these inequities, it is helpful to understand the variety of demographics that make up Benton County. In this chapter, these include: geographic distribution, age, disability status, race and ethnicity, veteran status, and other categories.

Population Overview

Benton County is home to approximately 92,000 residents.[15] Approximately 61,000 residents (66 percent) live in Corvallis, the county seat and most populous city in the county, and around 19 percent of Benton County residents live in rural areas.[16] Rural geography often isolates families through their limited daily interactions with other residents. Isolation is increased by limited public transportation options as well as the variable cost of gasoline.

Map 2.1 shows the distribution of population centers in the county. The county seat of Corvallis is the largest city in Benton County. Additional major population centers include Philomath and North Albany.

Map 2.1: Population centers in Benton County, 2016



Source: Portland State University 2015 population estimates

In 2015, there were 33,840 households in Benton County.[17] Household distribution follows roughly the same pattern as overall population distribution across the county. The average household size is 2.4 people.[18] 46 percent of households consist of married couple family households. Among persons 15 years of age and older, 44.2 percent are currently married, a proportion about 5 percent lower than the Oregon proportion.[19]

Non-family households made up 44 percent of all homes in Benton County. Most non-family households are composed of people living alone, but some are people living in households in which no one is related to the head of household.[20] Benton County has 7 percent more non-family households than the proportion of non-family households for the entire state. This is because of the sizeable student population attending Oregon State University in Corvallis.

Twenty-four percent of all households in Benton County have one or more people under the age of 18, below the Oregon average of 29 percent. Approximately 10 percent of households are individuals 65 years or older who live alone. [21]

Student Population

There are two institutions of higher learning in the county: Oregon State University (OSU) and Linn-Benton Community College (LBCC). Oregon State University (OSU) is located in Corvallis, with 29,375 students enrolled as of Winter Term 2017, an increase of 3.3% from Winter Term 2016.[22] Linn-Benton Community College (LBCC) is based in neighboring Linn County, and maintains a campus in Corvallis. LBCC had 19,484 students enrolled in the 2015-2016 school year.[23] Just under one third of LBCC students are enrolled in Benton County, with the other two thirds attending Linn County campuses. Considering dual enrollment with OSU and LBCC student populations, these figures may be subject to a small portion of double counting.

Veterans

The 2011-2015 American Community Survey (ACS) report the veteran population in Benton County at 5,329.[24] Veterans are defined as people who have previously served on active duty in the U.S. Army, Navy, Air Force, Marine Corps, Coast Guard, or who served in the U.S. Merchant Marine during World War II.[25] This equates to veterans composing approximately 6 percent of the civilian population ages 18 years and older in Benton County. As this population ages, the number of individuals with veteran status is expected to decrease over time.

Demographics: Population by Age and Sex

Based on 2015 U.S. Census data, the percentage of males and females in the county is approximately equal in most age groups.[26] Within the county, children under 18 years of age constitute 17 percent of the population and adults 65 years and older constitute 14 percent of the population. The median age is 33 years old, lower than the Oregon median age of 39 years.[27] From 2010 to 2016 the population of Benton County grew 6.5 percent, from 85,735 to 91,320.[28]

Benton County's population demographics are strongly influenced by the Oregon State University student population. The population pyramid shown below displays this influence as outliers in the 20-24 year old age group. There is another slight increase between the ages of 55 and 64 years old as well.

Figure 2.1: Benton County population by age group, 2011-2015

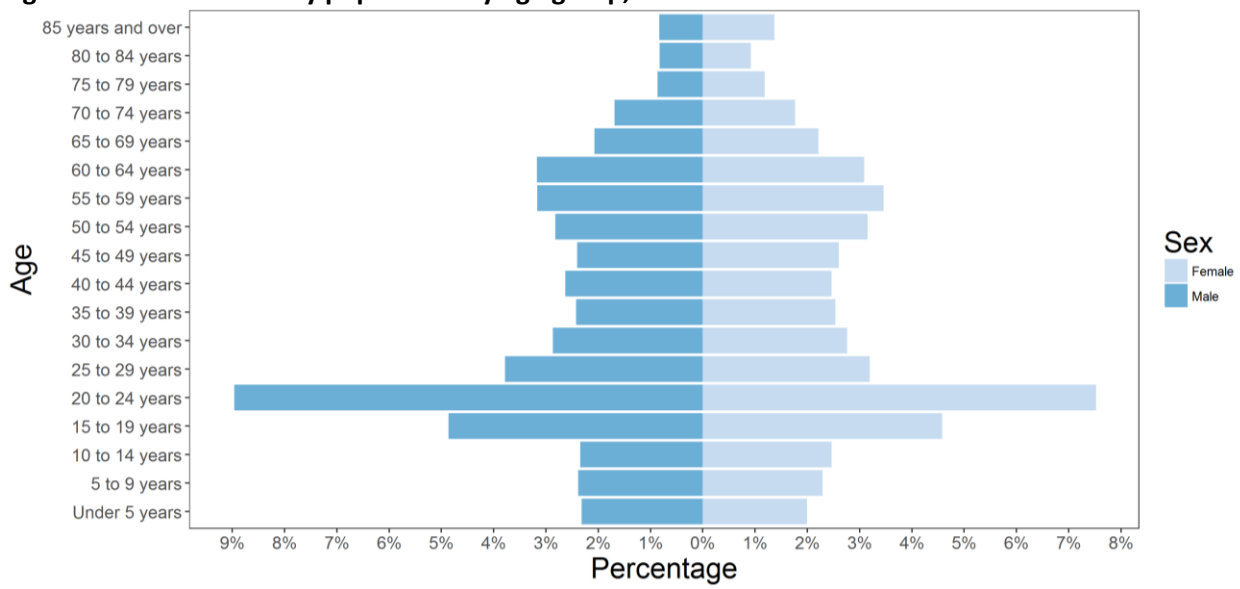


Figure notes: The population of Benton County, as recorded in this ACS data, is approximately 86,000. The large percent of residents age 20-24 is due to Oregon State University students.
Source: U.S. Census Bureau, American Community Survey 5-year estimates

This population pyramid for Oregon shows a much more typical distribution, providing a contrast to the age distribution of Benton County residents.

Figure 2.2: Oregon population pyramid, 2011-2015

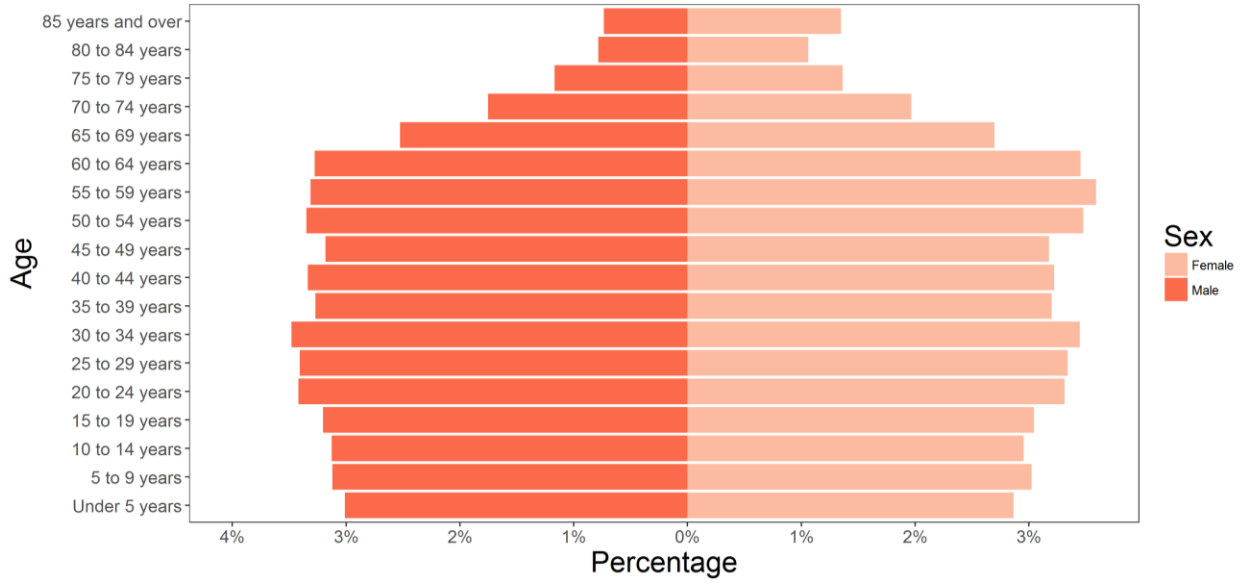


Figure notes: Oregon's population pyramid displays a more classic shape for an aging society, with roughly equal percentages of individuals between 0 and 65 years old. Oregon's 2015 population, as recorded by this ACS data, is approximately 3,900,000.
Source: U.S. Census Bureau, American Community Survey 5-year estimates

Growing Diversity

Native and Foreign Born

In 2015, 89 percent of the people living in Benton County were native residents of the United States. Nearly 43 percent of these residents were born in Oregon. Approximately 10 percent of the people living in Benton County are foreign born. Of the foreign born population, 33 percent are naturalized U.S. citizens. Twenty-six percent of foreign born residents entered the country after the year 2009.[29] Oregon State University has a large international student population, which likely contributes to this figure.

Race/Ethnicity

With an increasingly global view of health and a stronger understanding of research outlining the social constructs of race and ethnicity, a culturally sensitive definition of race should be considered. Mandated in 1997 by the Office of Management and Budget, data presented by the U.S. Census Bureau and the American Community Survey follow the U.S. Office of Management and Budget updated guidelines for race and ethnicity reporting. This update provided for the inclusion of individuals to self-identify as two or more races in the 2000 Census. It came after recognition and advocacy of race as a social construct and to include missed populations who identified with more than one racial category.[30] The inclusion of individuals to self-identify as two or more races has been adopted almost universally across other agencies collecting and reporting demographic data. It is important to examine the data by race and ethnicity where possible due to disparities and inequities experienced by these populations. Without understanding the populations impacted by these health disparities, health authorities would be limited in their ability to address the specific issues creating the disparities.

U.S. Office of Management and Budget defines race and ethnicity categories accordingly:

American Indian or Alaska Native – people having origins in any of the original peoples of North or South America (including Central America), and who maintain a tribal affiliation or community attachment.
Asian – people having origins in any of the original peoples of the Far East, Southeast Asia or the Indian subcontinent.
Black or African-American – people having origins in the black racial groups in Africa.
Hispanic or Latino – a person of Cuban, Mexican, Puerto Rican, South or Central America, or other Spanish culture or origin, regardless of race.
Multiracial – people having origins in two or more of the federally designated racial categories.
Native Hawaiian or Other Pacific Islander – people having origins in any of the original people of Hawaii, Guam, Samoa, or other Pacific Islands.
White – people having origins in Europe, the Middle East, or North Africa.[31]

In this report, the non-Hispanic categories are used for races, so, for example, the category denoted White includes white, non-Hispanic individuals.

Throughout this report, race or ethnicity will be reported in alphabetical order, as shown above.

White, not Hispanic or Latino individuals comprise 82% of the population of Benton County, as shown in Figure 2.3. The largest non-white populations in Benton County are Hispanic or Latino (6.9 percent) and Asian (6.2 percent).[32] The Hispanic or Latino population increased by 64 percent from 2000 to 2015.[33,34] Benton County is marginally less diverse than the state of Oregon, which has fewer White, not Hispanic or Latino individuals (77 percent). [35]

Figure 2.3: Population by Race and Ethnicity in Benton County, 2011-2015

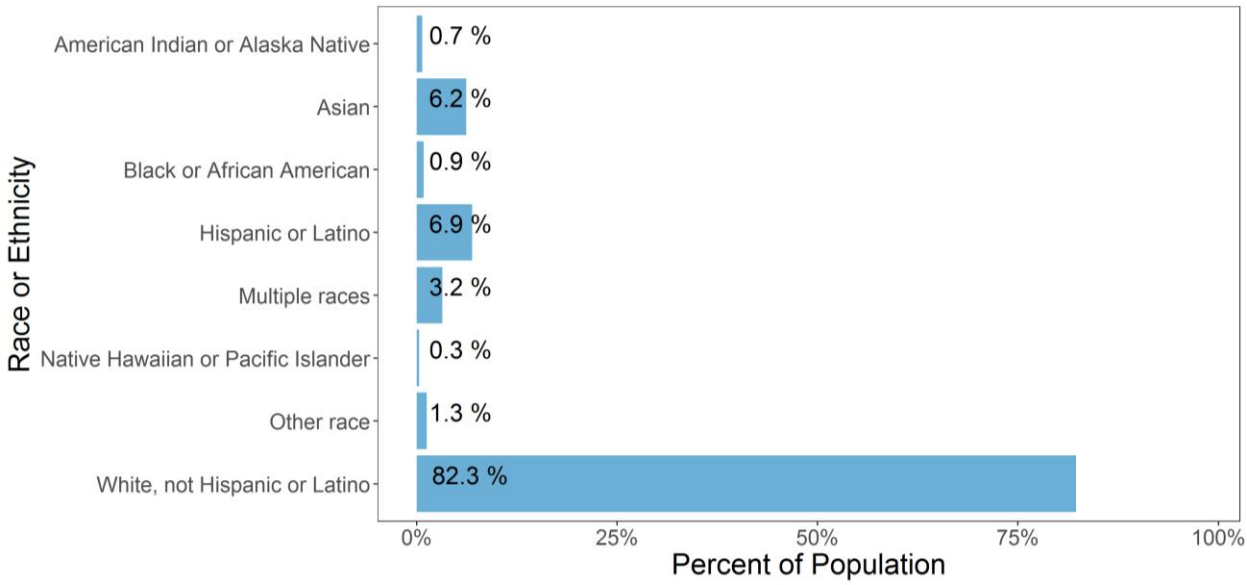


Figure notes: The population of Benton County, as recorded in this ACS data, is approximately 86,000. Percentages reflect some double counting of Hispanic/Latino populations, which include individuals who identify both as Hispanic Latino and as a race other than White.
Source: U.S. Census Bureau, American Community Survey 5-year estimates

Native American Population

The Confederated Tribes of Siletz Indians are an important presence in the area and possess a rich history. The Confederated Tribes of the Siletz Indians is headquartered in Siletz, Lincoln County. The Tribe lists 5,001 members in its registry. This includes 720 members residing in Siletz, with an additional 444 members elsewhere in Lincoln County. Beyond Lincoln County, 174 members live in Linn and Benton counties, and approximately 2,000 additional members live throughout Oregon.[36] The Tribe maintains a Federal Tribal Community Health Clinic and a USDA Food distribution center in Siletz. The Tribe also owns and operates the Chinook Winds Casino Resort in Lincoln City.

Now a federally recognized confederation of 27 bands, the Siletz tribes originated from the area spanning from Northern California to Southern Washington. The Tribe's population was concentrated along the coastal areas of Lincoln, Tillamook, and Lane counties. Termination was imposed upon the Siletz by the United States government in 1955. In November of 1977, they were the first tribe in the state of Oregon and second in the United States to be fully restored to federal recognition. In 1992, the Siletz tribe achieved self-governance. Self-governance allowed for direct agreements to be made with the US Government, ensuring control and accountability over tribal programs and funding, including provision of health services.[37]

The Siletz tribe occupies and manages a 3,666 acre reservation located in Lincoln County, including valuable resources of water, timber and fish. Geographically, this reservation is contiguous with the city of Siletz on its east side and lies to the north and southeast of the city as well.[38]

Other Native American residents of the region include members of the Confederated Tribes of Grande Ronde, which is headquartered in Polk County, north of Benton County and east of Lincoln County. Members of other Native American tribes based in Oregon and the United States also live in the region.

K-12 Population

During the 2015-2016 school year, the five public school districts with schools Benton County served 7,281 students. These students include kindergarten through 12th grade in 52 public schools. An additional 1,153 students attended private schools.[39]

Table 2.1, below, presents racial and ethnic diversity in Benton County public schools, grouped by school district. These data do not include private school students. The category names are displayed as presented to students.

[Table 2.1 is displayed on the following page]

Table 2.1: Benton County School Districts and County Total, student demographics by race/ethnicity, 2015-2016

School district	Number of students	American Indian/Alaskan Native	Asian Pacific Islander	Black	Hispanic/Latino	Multi-Ethnic	White
Corvallis	6,692	0.75 %	7 %	1.2 %	15 %	7 %	69 %
Philomath	1592	1.3 %	1 %	*	8 %	4 %	85 %
Monroe	447	*	*	*	17 %	2 %	79 %
Alsea	146	*	*	*	7 %	*	89 %
North Albany schools	1,106	*	*	*	14 %	2 %	76 %
Benton County total	7,281	0.76 %	4.8 %	1.0 %	14 %	6 %	73 %

Table note: * represents data that have been suppressed due to small numbers.
Source: Oregon Department of Education, Student Ethnicity statistics

The K-12 population shows significantly higher racial and ethnic diversity than the regional population as a whole, particularly for Hispanic/Latino and Multi-ethnic populations (Figure 2.4). The Oregon Department of Education uses a different racial/ethnic classification system than the U.S. Census Bureau; in particular, it aggregates Asian and Hawaiian or Pacific Islander into one group, and does not include a category for "Other race".

Figure 2.4: Race/Ethnicity of total population versus regional public school K-12 population

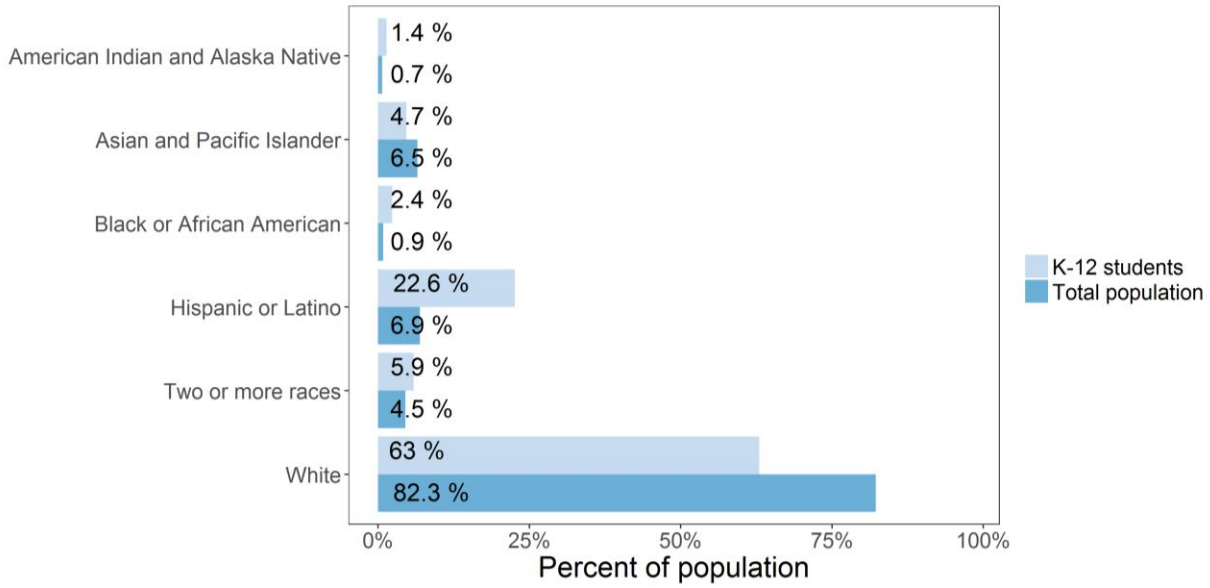


Figure notes: Race and ethnicity categories from ACS data have been adjusted to correspond to ODE race and ethnicity categories. The population of Benton County, as recorded in this ACS data, is approximately 86,000. The population of Benton County K-12 students is approximately 8,900.
Sources: Oregon Department of Education, Student Ethnicity statistics, academic year 2016-2017
U.S. Census Bureau, American Community Survey 5-year estimates, 2011-2015

Language Spoken at Home

2011-2015 U.S. Census data for the county reports that 13.2 percent of residents who are at least 5 years old spoke a language other than English at home (Table 2.2). Of those speaking a language other than English at home, 44 percent spoke Spanish, 31 percent spoke an Asian or Pacific Islander language, and 25 percent spoke some other language. Across the county, 30 percent of the population who spoke a language other than English at home reported that they did not speak English "very well". In comparison with the county, 15 percent of Oregon residents at least 5 years old speak a language other than English in the home, and of those residents, 40 percent reported that they did not speak English "very well".[40]

Table 2.2: Percentage of the population 5 years of age and over who speak English, Spanish, or another language; Benton County, the Linn-Benton-Lincoln (LBL) Region, and Oregon 2011-2015

	Benton County	LBL Region	Oregon
Percent who speak a language other than English at home	13.2 %	9.4 %	15.1 %
Spanish	5.7 %	5.6 %	9.0 %
Other languages	7.4 %	3.8 %	6.1 %
Does not speak English very well	3.9 %	2.8 %	6.1 %

Source: U.S. Census Bureau, American Community Survey 5-year estimates, 2011-2015

People with disabilities

Disability itself is not an indicator of poor health—rather, disability can (and often does) become a barrier to employment, adequate housing, social inclusion, transportation, access to health care, and other essential components of a healthy life.

Understanding and measuring disability is a very complex task. The complexity comes from the fact that the definition of "disability" includes a number of populations, and because the definition is still being discussed and further developed.

Definitions of disabilities from a source such as the World Health Organization (WHO) can help shed light on the particular health issues facing these populations, but it must be noted that this definition is not the same as that used to gather many types of data. According to the World Health Organization,

> Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions. An impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations.

> Disability is thus not just a health problem. It is a complex phenomenon, reflecting the interaction between features of a person's body and features of the society in which he or she lives. Overcoming the difficulties faced by people with disabilities requires interventions to remove environmental and social barriers.[41]

Mental illness that substantially limits one or more major life activities is also included in many definitions of disability.[42] This is particularly worth noting, as institutionalized populations generally experience a greater prevalence and severity of mental illness than the broader population. However, these populations are not captured in much of the data collected around disability.[43]

From 2011 to 2015, among the civilian non-institutionalized population, approximately 10 percent reported a disability in Benton County,[44] where *disability* is "defined by a person's risk of participation limitation when he or she has a functional limitation or impairment."[45] Disability encompasses many different conditions; for instance, the most common disability in Benton County among those aged 5-64 is cognitive difficulty, with ambulatory difficulty ranking the highest for the 65 and older population. The prevalence of disability increases with age, from 0.2 percent of people under 5 years of age, up to 7.5 percent of people between 18 and 64 years of age, and 31 percent of those 65 and over.

Figure 2.5: Disability rates in Benton County and the LBL Region, all ages, 2011-2015

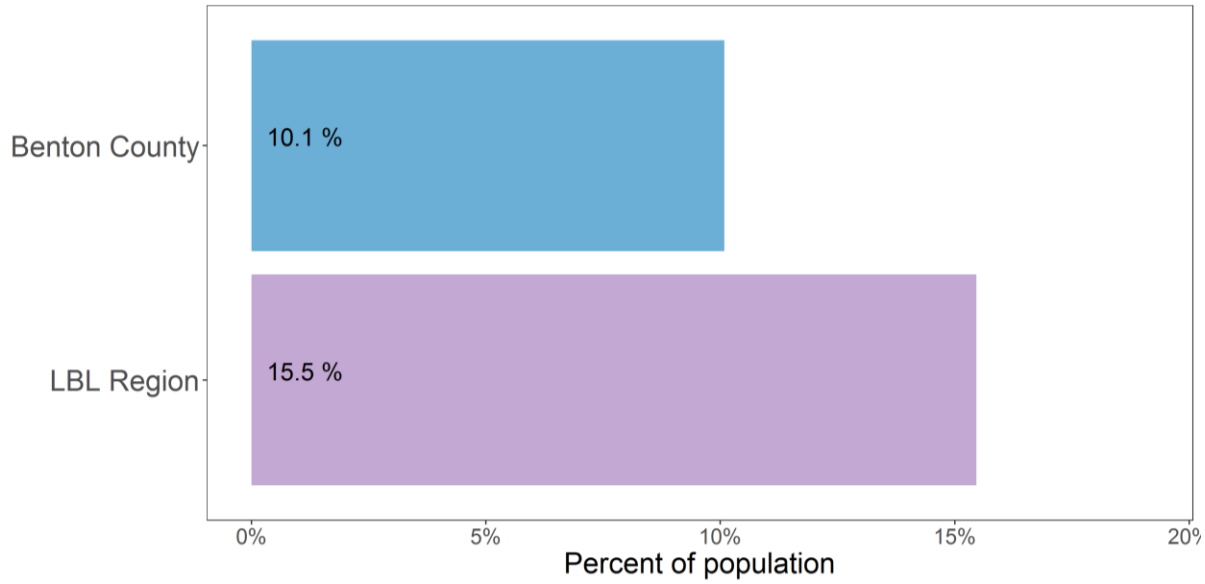


Figure notes: The population of Benton County, as recorded in this ACS data, is approximately 86,000. The population of the LBL Region is approximately 252,000. These disability rates are not age adjusted.
Source: U.S. Census Bureau, American Community Survey 5-year estimates

The American Community Survey (ACS) is generally a reliable source for demographic data, but there are some concerns with its accuracy regarding disability rates. The Behavior Risk Factors Surveillance System (BRFSS) is another national survey that asks about disability. BRFSS data indicates that approximately 28% of Benton County residents report a disability, compared to

only 10% in ACS data, and 34% of LBL Region residents report a disability, compared to 16% in ACS data.[46] One difference is that BRFSS data only includes individuals age 18 and older, while this ACS data includes all ages. But this only accounts for about 2 percentage points of the difference between the ACS data and the BRFSS data.

Older adults

Among those living in Benton County, 14 percent are 65 years of age and over, compared with 15 percent in Oregon overall.[47] A number of health issues, needs, and concerns are associated with an aging population.

Ninety-four percent of adults in Benton County who are over 65 years of age are white and non-Hispanic.[48] Of older adult households, 19.8 percent are renters and 46 percent of households have only one resident. This population faces higher rates of disability than other age groups, with a rate of 31 percent. Civilian veterans make up 26 percent of this group, and 47.9 percent of adults aged 65 or older in Benton County hold a bachelor's degree or higher, well above the Oregon average of 27.8 percent.

University and College Students

Oregon State University is the largest educational institution in Oregon. 25,327 undergraduate students enrolled in 2016, along with approximately 5,000 graduate and professional students. 6,700 students are non-White or Hispanic/Latino (approximately 22%), 3,300 are international students (11%), and 5,800 are first generation undergraduate college students (24%). Twenty percent of undergraduate students are older than the age of 25.

80 percent of OSU undergraduates have at least one course on campus. This equates to 20,000 students. All of these students spend significant time in Benton County and contribute to our communities in a variety of ways, whether living in Benton County, visiting businesses, using parks and trails, and other ways. The majority of graduate and professional students also attend the Corvallis campus of OSU.[49]

Linn Benton Community College (LBCC) is headquartered in Albany, with a large satellite campus, Benton Center, in Corvallis. 19,484 students enrolled for courses in 2016, with 5,687 of them taking courses at Benton Center. About 2,700 LBCC students are dually enrolled at Oregon State University. Approximately one third of LBCC students live in Benton County.

Family structure

There are 33,840 households in Benton County, with an average household size of 2.6 people. The Census defines a family as a household consisting of two or more people, at least two of whom are related by birth, marriage, or adoption. Close to half of Benton County households are formed by married couple families. This is similar to the state average. About 30 percent of

households are held by individuals living along, which is also similar to the state average. However, 16% of Benton County households with more than one person are non-family groups compared to 9% in Oregon. This category includes two or more unrelated individuals living in the same household. This high percentage is likely due to college students sharing apartments and houses.

A little under 10% of households in Benton County are single-parent households, with the majority of those (7% of all households) headed by women. See Figure 2.6.

The American Community Survey does not track same-sex partnerships at this time, but does include married same-sex couples in the "married couple family" category.

Figure 2.6: Composition of households in Benton County, 2011-2015

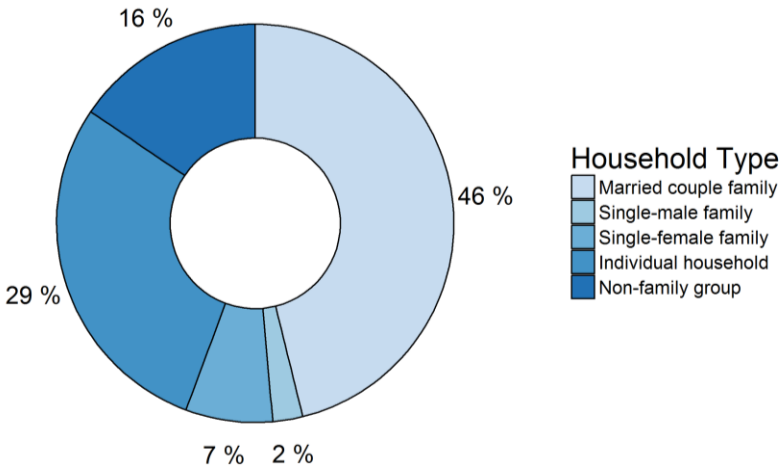


Figure notes: There are approximately 34,000 households in Benton County. The Census defines a family as at least two people in a household related by birth, marriage, or adoption.
Source: U.S. Census Bureau, American Community Survey 5-year estimates, 2011-2015

Approximately 8,130 households in Benton County have children under the age of 18, 24 percent of all households in Benton County. Three out of four households with children are headed by a married couple, 18 percent are headed by a single female, and 5 percent are headed by a single male. See Figure 2.7.

[Figure 2.7 is displayed on the following page]

Figure 2.7: Composition of families with children in Benton County, 2011-2015

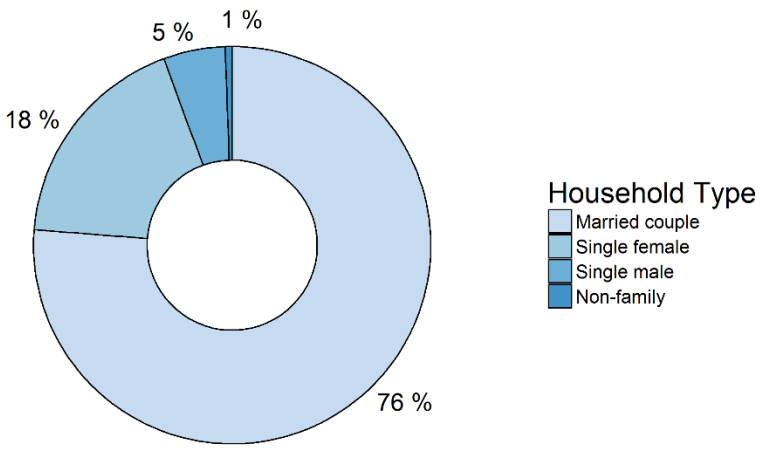


Figure notes: There are approximately 14,700 households with children in Benton County.
Source: U.S. Census Bureau, American Community Survey 5-year estimates, 2011-2015

In addition to individuals in households, 5,250 Benton County residents live in group quarters, which include dorms, fraternities, nursing homes, and other institutional housing.

The League of Women Voters has estimated that in 2016, approximately 850 residents of Benton County experienced homelessness, or approximately 1 percent of the county population.[50] Further detail on homelessness is given in Chapter 4.

Veterans

The American Community Survey estimates that approximately 7 percent of Benton County residents over the age of 18 are veterans of the U.S. military. This is a much smaller percentage than in the rest of the LBL region (see Figure 2.8).

[Figure 2.8 is displayed on the following page]

Figure 2.8. Percent of population with veteran status, 2011-2015

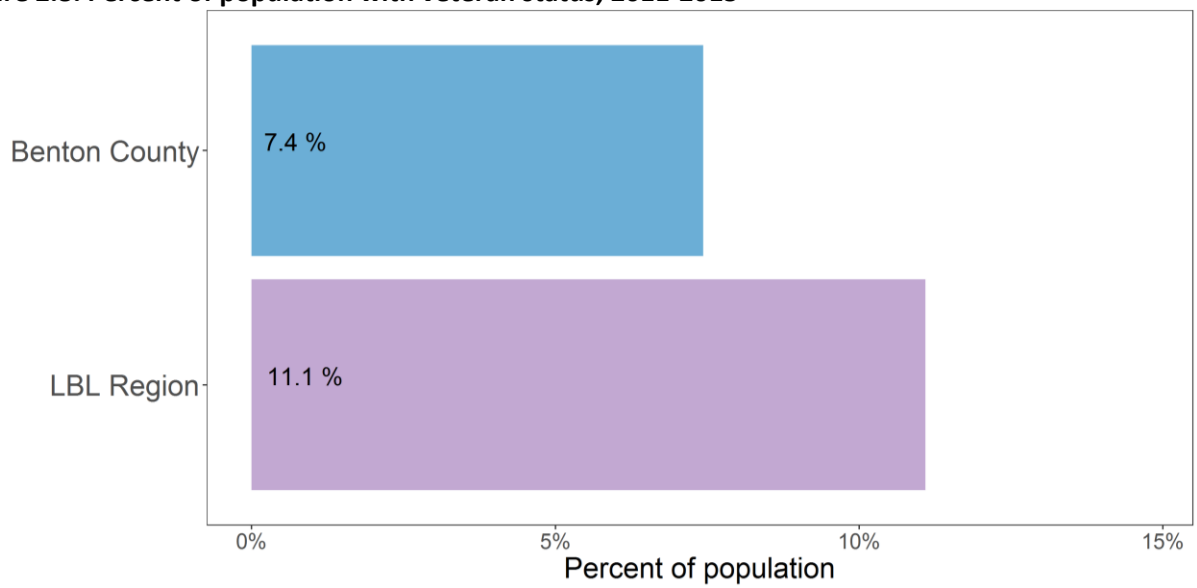


Figure notes: There are approximately 5,300 veterans in Benton County.
Source: U.S. Census Bureau, American Community Survey 5-year estimates, 2011-2015

Lesbian, Gay, Bisexual, and Transgender (LGBT) populations

Local data is limited on the population of LGBT residents of Benton County. Recent estimates suggest that approximately 5 percent of Oregonians are LGBT, translating to about 4,500 residents of Benton County.[51]

Local Data

The following are descriptions of local data collected by Benton County Health Department and partners are taken in part or in full from existing documents. Sources are cited at the bottom of each section.

South Benton County Agricultural Workers

Benton County Health Department conducted an assessment in 2016 of farms in the Monroe area to better understand the characteristics of agricultural workers in southern Benton County. Between 10 and 20 farms with a total of approximately 200 agricultural workers were surveyed, including tree, seed, fruit, and vegetable farms. Benton County Health Department spoke with growers, owners, employees, contractors, and the farmworkers themselves.

Half of the farms employed fewer than 25 employees or agricultural workers. An additional one quarter employed between 25 and 100 employees or agricultural workers, and the remaining farms employed over 100 employees or agricultural workers.

Ninety percent of the employees and agricultural workers are Latino. Half of them are classified as migrant workers, meaning that their principal employment is in agriculture, they move away from their home base for an extended period of time, they often return to the same location for multiple years, and sometimes a whole family travels together. 38% of the workers are classified as seasonal, meaning that they follow crops in one area, often centered around a home base. Usually a couple of adults from a household work as seasonal employees, moving around to work but coming home frequently.

Ten percent of the agricultural workers usually do not know where they will move next. These workers are generally foreign born, young, single men working in the United States and sending money home.

Immigration is a critically important issue for farmworkers. An estimated 15 to 20 percent of agricultural workers have authorized immigration status, while the remainder do not.[52]

Conclusion

In order to understand the health of the county, it is vital to understand the people who live here. Differences in age, race or ethnicity, and geography all influence health. The people of Benton County are growing more diverse and represent many different groups, such as students, Hispanics and Latinos, and retirees. The history of the region has shaped the residents of the county into its makeup today. In exploring the many determinants of health, it is evident that the people of Benton County are deeply connected with the environments in which they live. The next chapter explores these environments and the effects they have on the health of the region.

Chapter 3
Environmental Health

Human beings interact with their physical environment in everything they do. Some of these interactions have the potential to improve health, while others can negatively impact it. The natural environment is made up of the interactions of air, water, open spaces, and weather or geologic activity. The human-made environment consists of homes, communities, and infrastructure. These two environments are closely linked in their effects on human health. Humans benefit from clean water and air, places to exercise and enjoy the outdoors, safe living and working spaces, and opportunities to engage in healthy behaviors such as active commuting and consuming healthy food. However, when an environment lacks these characteristics, the complex interactions of health and environment can worsen health issues. Poor air quality can raise the risk of asthma, heart attack, or stroke;[53] the design of communities can limit opportunities for recreation or access to quality food;[54] and infrequent but intense natural disasters can disproportionately affect vulnerable populations.

Benton County has an active population that values open spaces for recreation, clean air, and clean water. At the same time the county faces many food access and transportation issues. An understanding of the natural and human-made environments forms a foundation for an analysis of the health of our county.

Natural Environment

The natural environment changes slowly and usually impacts health through long-term, cumulative effects. As a result, many of the data described in this section use longer time frames than elsewhere in this report. Even though longer time frames are needed to examine the trends in this data, individuals can have an impact on their local environment (and therefore their own and their community's health) by either preventing future problems or contributing to them. Examples include global climate change or natural disasters. What can be controlled are the systems and practices put in place to react and adapt to the natural environment in order to improve health.

Terrain and Natural Resources

Benton County is the fourth-smallest county in Oregon, covering 675 square miles and spanning from the Willamette Valley and River up into the Oregon Coast Range. [55,56] It share borders with Polk County to the north, Linn County to the east, Lane County to the south, and Lincoln County to the west. Primary land cover types include mixed Douglas-fir coniferous forests, oak savannahs, agricultural land, and coastal temperate rainforests. Lumber and wood products play a historically large role in Benton County's economy, and researchers at Oregon State

University, based in the county seat of Corvallis, contribute a considerable amount to the nation's forestry and agricultural research. [57]

Located in the mid-Willamette Valley, Benton County's rich agricultural and forest land, mountains, valleys, rivers and wetlands are highly prized economically, culturally, recreationally, environmentally and aesthetically. The western side of Benton County climbs into the Siuslaw National Forest and Oregon Coast Range, where the highest point in Benton County, Mary's Peak (4,097 feet), is located. The eastern side of the county slopes down into the Willamette River, which serves as the border with Linn County.

Annual Weather Patterns

Benton County is sheltered by the Oregon Coast Range from the heavy rainfall experienced by its western neighbor, coastal Lincoln County. It experiences seasonal variation, with hot, dry summers, and cold, wet winters. On average, 44 inches of rain fall per year in the valley and 75 inches in the mountains, some of which falls as snow or ice. Most of the county's annual precipitation occurs from October to March. Temperatures frequently dip below freezing from November through April in the lower elevations, while highs above 90 degrees Fahrenheit are common in July and August.[58,59,60]

Recreation and Outdoor Spaces

Benton County has a variety of recreational assets and outdoor spaces.* While geographically small, it is home to rivers, waterfalls, forests, and mountains.

Benton County's open spaces stretch from the highest peak in the Coast Range (Mary's Peak) to the Willamette River. Mary's Peak (4,097 feet) is situated in the Siuslaw National Forest. It hosts many hiking trails, which are also open to mountain bikes and horses. Mary's Peak is also the source of the Rock Creek Watershed, which provides much of the drinking water to Corvallis, and Mary's River, which is the source of Philomath's drinking water. Near Alsea, the Alsea Falls Recreation Site (managed by the Bureau of Land Management), is a popular hiking and day-use area. Recently a network of mountain biking trails was constructed for novice and experienced mountain bikers within the Alsea Falls Recreation Site. The most popular large recreation site in Benton County is the McDonald-Dunn Research Forest, which is owned and managed by Oregon State University. It runs along a ridge of the Coast Range that extends along the northern edge of Corvallis. The 11,250-acre forest has 175,000 visits per year and hosts cross-country races in the spring and fall.[61] South of Corvallis, the Finley National Wildlife Refuge was established in 1964 to provide overwintering habitat for dusky Canada geese. The 5,325-acre refuge hosts some of the last wet prairies in the Willamette Valley, 12 miles of hiking trails, camas meadows, and a herd of Roosevelt Elk.[62]

* Maps of county, city, state, national, and university lands can be found at: https://www.co.benton.or.us/parks/page/county-trail-maps; http://www.corvallisoregon.gov/indez.aspx?page=261; and http://cf.forestry.oregonstate.edu/forests

Forming the border of Benton and Linn counties, the Willamette River is a major recreation site, used by boaters, paddlers, and people who fish. The Willamette River Trail maintains a network of 11 campsites and 7 boat ramps between Harrisburg and Albany. However, the Willamette River also has a history of contamination from agricultural runoff, storm water drainage, and industrial byproducts. This contamination has limited the healthy use of the river, but efforts are continuing to clean up the river and restore it to health.[63]

Recreational Access

Access to recreational facilities and opportunities demonstrates the intersection of natural and human-made environments. Research demonstrates a strong relationship between access to recreational facilities and physical activity and mental health and wellbeing among adults and children. Studies have shown that proximity to places with recreational opportunities is associated with higher physical activity and lower obesity levels.[64] Public recreation areas include parks, schools, public forests and trails, beaches, and waterfronts. The county's rural areas are largely accessible to residents.

Recreational opportunities that include walking and bicycling are efficient, low-cost, and available to many. By walking and bicycling, residents can help develop and maintain livable communities, make neighborhoods safer and friendlier, save on motorized transportation costs, and reduce transportation-related environmental impacts, auto emissions, and noise. They can also create transportation system flexibility by providing alternative mobility options, particularly in combination with transit systems. Furthermore, creating walkable and bikeable communities can lead to healthier lifestyles. In Benton County, 45 percent of residents live within one half mile of a public recreation area, ranked 8th among Oregon counties.[65]

The City of Corvallis Parks and Recreation Department manages 1,200 acres of public natural areas and 600 acres of developed parks, all of which are free to the public. Many parks have sports facilities such as soccer fields and baseball diamonds. Overall there are 20 miles of trails in city natural areas and parks. The department has set a standard of 0.54 miles of trail per 100,000 people; it currently has 0.36 miles per 100,000 people, a deficit of 10 miles of trail.[66]

Water Quality

The quality of water sources has a significant impact on population health. Drinking water, recreation, manufacturing processes, and irrigation all rely on clean, safe water.

Water quality in the Benton County is considered to be good overall. Water quality problems may include issues around sedimentation due to soil erosion, warm water temperatures occurring as a result of low summer flows, and over-use by private and municipal water systems. Potential sources of contamination in watersheds can be mitigated by proper and effective management practices. Benton County derives its drinking water from watersheds that flow

east from the Coast Range to the Willamette River and from the Willamette River itself. Each watershed falls under a specific public water system depending on its location in their respective county.

The Oregon Department of Environmental Quality (DEQ) maintains monitoring stations at many locations along major Oregon rivers, including waterways that provide water to communities in Benton County. The quality of the water sources in Benton County is variable, with annual trends improving over time (Table 3.1).

Table 3.1: Water quality in major regional rivers, 2005-2014 averages and trends

River	Sample site	Water quality	2005-2014 Trend
Willamette River	Corvallis	Excellent	Improving
Mary's River	Corvallis	Good	Improving
Muddy Creek	South of Corvallis	Poor	N/A
Long Tom River	Monroe	Fair	Improving

Source: Oregon Department of Environmental Quality, Water Quality

Other major water sources that are not tracked by the Oregon Department of Environmental Quality are the Alsea River, which serves the community of Alsea, and the Luckiamute River, which serves northwest Benton County.

Fluoridated Water

Water fluoridation is the controlled addition of a fluoride compound to a public water supply, intended to prevent tooth decay. Community water fluoridation is an evidence-based practice recommended by the Community Preventive Services Task Force based on strong evidence of effectiveness in reducing dental cavities across populations.[67] It is an effective, affordable, and safe way to protect children from tooth decay and is recognized as one of the 10 greatest public health achievements of the 20th century.[68] Water fluoridation complements, but does not replace, other efforts to improve oral health. Water fluoridation is a valuable tool in addressing oral health disparities, since everyone who can access public water benefits from it, regardless of age, income level, or race or ethnicity. As of 2014, Oregon was ranked very low in the United States (48th out of the 50 states) for the percentage of people receiving fluoridated water. About 74 percent of the U.S. population served by community water systems received fluoridated water, while about 23 percent of Oregon's public water supplies are fluoridated.[69] This low state fluoridation rate is a direct consequence of some of Oregon's most densely populated regions lacking fluoridation, including Portland and Eugene. In Benton County, about two thirds of residents are served by public water systems that fluoridate water, most of whom live in Corvallis, Philomath, North Albany, or Adair Village.[70]

Annual Snowpack and Summer Water Flows

Annual Cascade snowpack is measured in a number of places the Cascade mountain range just east of Benton County. Snowpack levels are reported as snow water equivalent – the inches of water that could be melted out of the column of snow. The April 1st snowpack is typically an indicator of water supplies and quality for the summer in Benton County. There is no evidence of a significant trend in snowpack between 1979 and 2015, but the large year-to-year variability causes uncertainty and hardship for the agriculture, fishery, and forestry industries. There have been years in which the snowpack at various monitoring stations in the Willamette Basin was well below the 30-year median. Recently, the Willamette Basin April 1st, 2015, snowpack was the smallest recorded, at only 8 percent of the 30-year median snowpack. In contrast, the April 1st, 2017, snowpack measured at 134 percent of the 30-year median.[71]

As the effects of climate change manifest, snowpack in higher elevations of the Cascade Range is expected to be smaller and to disappear more quickly in summer. This will have the effect of reducing summer water flows and increasing the temperature of snow-melt fed rivers, such as the Santiam and Willamette river systems. Since the winter snowpack largely determines how much water is available from May through October in the Willamette Valley each year, reduced flows and higher temperatures put increased pressure on fish stocks and agriculture. This results in losses in biodiversity and more challenging conditions for farmers. Additional impacts of climate change are discussed in more detail later in this chapter.

Air Quality

Air quality has a direct impact on the health of individuals. According to the Environmental Protection Agency (EPA), small particles (less than 10 micrometers in diameter) can be inhaled deeply into the lungs and may even penetrate into the bloodstream. Exposure to particle pollution has been linked to many serious health problems, including:

- Premature death in people with heart or lung disease,
- Nonfatal heart attacks,
- Irregular heartbeat,
- Aggravated asthma,
- Decreased lung function, and
- Increased respiratory symptoms.[72]

Sensitive groups, including infants, the elderly, and individuals with preexisting conditions, are at heightened risk of complications from breathing particulate matter. Furthermore, unhealthy air days can prevent individuals from participating in other healthful activities such as exercise or enjoying the outdoors. The EPA conducts a National Air Toxics Assessment every three years that evaluates 178 high priority toxic air pollutants to help provide a better understanding of the air quality in Oregon.[73] The Oregon Department of Environmental Quality then prioritizes areas of Oregon to determine air toxics reduction strategies, if needed. Benton County is not a priority area in Oregon, presumably due to the low levels of toxic air pollutants.

Benton County generally enjoys clean and healthy air. The Oregon Department of Environmental Quality records a qualitative measure of air quality each day at multiple locations throughout the state, one of which is in Corvallis. The qualitative measure is based on the level of fine particulate matter ($PM_{2.5}$; particulate matter less than 2.5 micrometers in diameter) and ozone levels in the air. The measure has six levels ranging from Good to Hazardous.* Between 2007 and 2015, Corvallis averaged 336 days of Good air quality each year. Most of the remaining days were of Moderate air quality, with at most a few Unhealthy days in any given year.[74] However, different areas can experience good or poor air quality due to local factors such as topography or local pollution.

Between 2002 and 2011, the level of fine particulate matter ($PM_{2.5}$) measured in the air in Benton County averaged 9.81 micrograms per cubic meters ($\mu g/m^3$). This is well below the national standard of 12 $\mu g/m^3$. Furthermore, between 2002 and 2011 the Benton County averaged less than 2.5 days per year with $PM_{2.5}$ levels above the 12 $\mu g/m^3$ standard.[75]

Contributors to poor air quality include wildfires, temperature inversion events that trap polluted air, and seasonal pollen. The main driver of poor quality air in the region are wildland fires, which can increase the level of fine particulate matter levels on smoky days. However, the available data does not specify on which days the fine particulate matter levels spiked, so it is not possible to determine the differential effect of summer versus winter on air quality. The worst wildfire season between 2001 and 2014 was in 2007. During that wildfire season, Benton County averaged 10.7 $\mu g/m^3$ over the course of the year.[76] In addition to smoke from summer wildfires, the Willamette Valley can experience high levels of particulate matter in the winter when an inversion of cold air traps exhaust and other pollutants close to the ground.

Seasonal allergies caused by pollen also have a major health impact in the Willamette Valley and the surrounding foothills. A combination of wet springs, warm summers, and large acreage devoted to grass cultivation causes the Willamette Valley to routinely have the highest seasonal pollen counts in the United States. Based on 2015 data, pollen counts begin to rise strongly in May, peaking in late June or early July before slowly tapering off for the rest of the year.[77] However, day-to-day weather patterns can affect both pollen counts and the impact they have on allergy sufferers.

Natural Hazards

Benton County is generally considered to be at low risk of frequent natural disasters. Unlike many communities in the United States, Benton County is not at risk from tornados, hurricanes, or other major storms. Nevertheless, localized flooding and ice or snowstorms are an annual occurrence in some parts of the region, and there are risks from wildfire, major flooding, drought, and earthquakes.

* The full list is Good, Moderate, Unhealthy for Sensitive Groups, Unhealthy, Very Unhealthy, and Hazardous.

The risk of a natural hazard depends both on the characteristics of the hazard, such as magnitude, duration, probability of occurrence and geographic extent, and also on the systems that are vulnerable to the disaster. These can include individuals, infrastructure, community assets, and also the ability and resources available to respond to the hazard.[78] Many of the social and demographic factors that put people at risk for health issues also make them more vulnerable to natural disasters, including age, income, race or ethnicity, and access to health care.

The major natural hazard in the region is flooding. The eastern slopes of the Coast Range in Benton County do not receive as much precipitation as the coastal Lincoln County side does. However, localized flooding of the Mary's River and other tributaries of the Willamette is common every couple of years. Winter flood events in the region, while rare, can lead to the Willamette River itself causing flood damage in urban and rural areas along waterways in Benton County.

Other natural hazards include winter storms, wildfires, and earthquakes. Ice storms and landslides are frequent in Benton County during the winter and can lead to temporary power outages in urban and rural areas.

Earthquake and Tsunami Hazards

One of the most high-profile natural hazards, whose notoriety has grown recently, is the potential for a Cascadia Subduction Zone earthquake occurring off the Oregon coast. Geologists estimate a 7 to 12 percent chance of a magnitude 9.0 earthquake within the next 50 years (before 2065).[79] The last Cascadia Subduction Zone earthquake occurred in the early 1700s. Although the impact of such an event would likely be larger than any other natural disaster in the written history of the West Coast, the rarity of the event itself makes it difficult for communities and individuals to internalize its potential for destruction.

Much of the health and service infrastructure in Benton County is located on liquefaction zones (where the ground would behave like a liquid during a major earthquake) or are not constructed to withstand a large earthquake. Furthermore, houses built before 1993 were not required to meet seismic standards such as securing the frame to the foundation.[80] This means as many as 68 percent of houses in Benton County could be at risk of collapse from a large magnitude earthquake.

While it remains difficult to address the potential destruction of the Cascadia Earthquake, individuals and communities are still able to prepare for lesser disasters, including earthquakes. This can include anything from ensuring that infrastructure is strong enough to withstand a lesser disaster, to storing survival supplies at home for use during an emergency.

Climate Change

Climate change is a worldwide phenomenon with global causes and many potential regional and local effects. [81] The effects of rising temperatures will be felt locally in:

- Rising sea levels, leading to eroding beaches and more damaging storm surges;
- warmer, dryer summers, creating a higher risk for heat-related illness;
- decreased winter and summer snowpack leading to more potential for drought and groundwater stress;
- greater variability in weather, as storms are predicted to be more intense and less predictable;
- greater risk of larger, more intense, and more frequent wildfires;
- higher prices for goods dependent on climates affected by global climate change;
- changes in how and what agricultural goods are produced in the region;
- effects on recreational activities dependent on the current climate, including fishing, skiing, and summer outdoor activities; and
- potential increase in human and agricultural diseases associated with vectors [e.g. insects] and organisms that benefit from a warmer climate.[82]

Many of the environmental indicators already discussed have been linked with climate change, both theoretically and through modeling. These include wildfires, air quality, ocean temperatures, and winter snowpack.[83] However, the variability of annual weather and the complexity of the interactions that influence climate change effects make it difficult to demonstrate these links without many years of observable data. As a result, this report emphasizes the acute effects of these indicators rather than their long term trends.

One of the few indicators of global warming for which there is a long record of local data is air temperature. Seasonal temperatures have shown long-term upward trends both globally and locally for as long as data has been recorded. [84] The National Oceanic and Atmospheric Administration maintains monitoring stations at many locations in the region that track temperatures and record daily maximum temperatures. Daily maximum temperatures above 90 degrees Fahrenheit constitute extreme heat from a health standpoint. Extreme heat can have a number of harmful effects on health. Heat-related illnesses tend to strike those whose health is already fragile, such as infants, elderly, and the infirm.

On average, there are eleven above-90 degree days at the Hyslop Field Station northeast of Corvallis, and the long term trend in temperatures has been rising in Benton County. Between 1940 and 2016, the number of days above the 90th temperature percentile (89 degrees F) rose at a rate of about 1 day every 10 years at Hyslop Field Station. This represents an increase of about 8 more days of extreme heat in 2016 than in 1940. This trend is statistically significant, notwithstanding fluctuations from year to year. Figure 3.4 illustrates this progression. These trend is expected to continue as global warming accelerates in the 21st century.[85]

Figure 3.1: Days with extreme heat, May – September, for the period of 1940 – 2016. Hyslop Field Station (between Corvallis and North Albany)

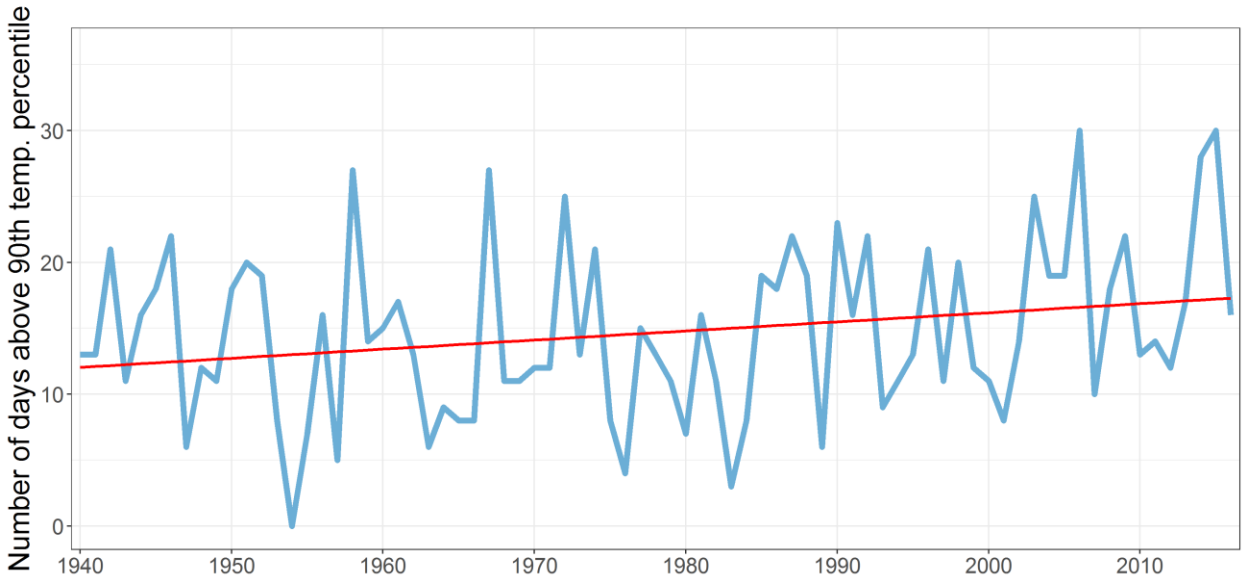


Figure notes: Extreme heat is defined as a maximum temperature higher than 90% of recorded May-September maximum temperatures for that station between 1940 and 2016. The 90th percentile for Hyslop Field Station is 89 degrees F.

Source: NOAA, Climate Data Online

Human-made Environment

Human-made (or built) environments contribute to health in a variety of ways. People need schools, workplaces, and homes that do not expose them to physical or chemical hazards and places to walk and recreate outdoors that are clean, safe, and free of debris. They also need access to quality and affordable food and transportation options, as well as the confidence that their local communities have not been contaminated with human-made pollutants.[86]

Healthy Homes

Indoor environmental quality, as defined by the Centers for Disease Control and Prevention, is the quality of a building's environment in relation to the health and well-being of those who occupy the space within it. Key factors that influence a structure's indoor environmental quality include dampness and mold in buildings, building ventilation, construction and renovation, chemicals and odors, indoor temperatures, and relative humidity.[87] Buildings in the region are often exposed to winter storms with winds in excess of 30 mph and heavy rainfall, with 24 hour accumulations of greater than three inches. This combination often results in moisture entering buildings, creating conditions for the growth of mold. Examining the health effects of specific contaminants in buildings is very complex, but research has shown that some respiratory symptoms and illnesses can be associated with damp buildings.[88]

Housing Characteristics

The age of a house can predict many other factors that affect the health of the occupants, including exposure to lead, asbestos, or other hazardous materials, mold or pest infestations, and weather resistance and temperature stability. Fifty-nine percent of the housing units in Benton County were built before 1979, the year when lead paint was banned from use in homes (Figure 3.7).

Figure 3.2: Construction year of housing stock in Benton County for houses built before 2015

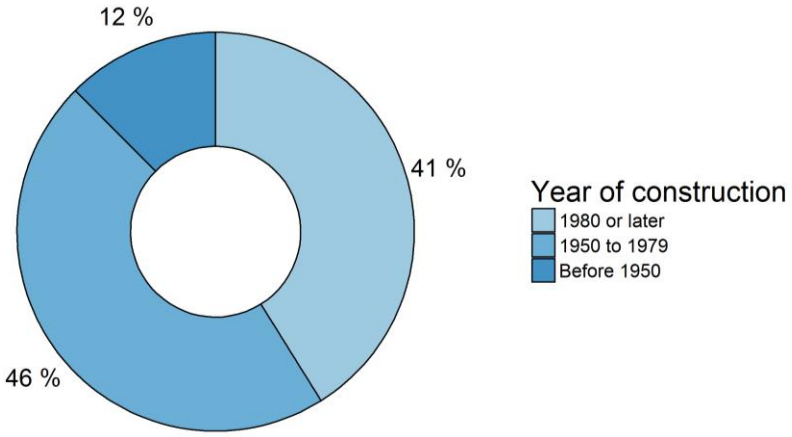


Figure notes: There are approximately 38,000 housing units in Benton County.
Source: U.S. Census Bureau American Community Survey

Lead Screening

Lead poisoning is a significant health concern. Laws and regulations are in place to help protect people; however, lead poisoning still threatens many Oregonians, especially children. The Centers for Disease Control and Prevention reports that "even low levels of lead in blood have been shown to affect IQ, ability to pay attention, and academic achievement."[89] Blood levels between 1 and 9.9 micrograms per deciliter (µg/dl) are of medical concern; concentrations of ten µg/dl or above are considered lead poisoning.

Although leaded paint and gasoline can no longer be legally sold in the United States, many children are still exposed to dangerous amounts of lead. Lead paint dust is the most common way children are exposed, and it is common inside and outside homes built before 1978.[90] Ordinary household repair and maintenance activities can stir up lead-contaminated dust. People can also get lead in their bodies by eating foods contaminated with lead from exposure to soil or lead paint chips.

Oregon has a relatively low overall prevalence of lead poisoning compared to other states, and prevalence rates have declined through the years. This decline is consistent with national trends. In Oregon an estimated 1,000-2,000 children have blood lead levels equal to or greater

than ten µg/dl.[91] This gives a rate of 1.16 – 2.32 children per 1,000 children. In 2016, there were a total of 5 reported cases of lead poisoning in Benton County (blood levels equal to or greater than ten µg/dl), four of which were children under the age of six.[92]

Radon

Radon is a gaseous radioactive element that occurs from the natural breakdown of uranium in the soil and rocks. It is colorless, odorless, and tasteless. In indoor settings, radon poses a risk by emitting atomic particles that can enter the lungs and alter the DNA, increasing a person's lung cancer risk. Radon is the second leading cause of lung cancer in the nation and, according to the Environmental Protection Agency, is classified as a Class A carcinogen. Radon levels in homes are measured by the Oregon Public Health Division. Radon levels of four picocuries of radon per liter (pCi/L) of indoor air are considered dangerous to health.[93] Radon is found in varying concentrations throughout the United States with moderate levels found in Oregon, generally under the four pCi/L level. When the annual average concentration in a home exceeds four pCi/L, it is recommended that measures be taken to lower the concentration to below the four pCi/L level.[94]

Three of seven zip codes (North and South Corvallis and Philomath) in Benton County have had homes tested for radon, a total of 393 houses, according to state data. The average pCi/L level in these homes is 2.3 pCi/L, leading to a determination of moderate risk in this part of Benton County.[95]

Tobacco-free Spaces

Tobacco use is still the leading preventable cause of death and disability in Linn County. Statistics on tobacco related diseases and deaths are discussed in Chapter 6: The Health of Our Bodies.

As stated in Oregon's Tobacco Prevention and Education Program (TPEP) report, tobacco use is a major risk factor for developing heart disease, diabetes, arthritis, asthma, and many cancers. Secondhand smoking, or exposure to a smoker's exhaled smoke, has also led to significant chronic disease and death. In light of this, the county and the state have taken steps to reduce exposure to tobacco and cigarette smoke in public places. Promoting smoke-free environments is a proven strategy to reduce tobacco use and exposure to secondhand smoke.[i]

The Oregon Indoor Clean Air Act prohibits smoking and other tobacco products in most workplaces, schools, bars, and other indoor public spaces.[ii] It was recently expanded to inhalant delivery systems such as e-cigarettes and vaping equipment.

Currently, Oregon law prohibits smoking and other tobacco products in most workplaces, schools, bars, and other indoor public spaces. County property in Benton County is 100 percent tobacco free. This includes both structures and open spaces. The City of Corvallis has banned

smoking at city parks. Many governmental bodies are expanding smoke- or tobacco-free policies to explicitly include e-cigarettes. [96]

Within the county, a number of non-governmental entities also restrict or ban tobacco on their properties. Oregon State University is 100 percent tobacco free and smoking is not allowed in OSU research forests. Linn-Benton Community College restricts tobacco use to designated smoking areas. Samaritan Health Services, the Corvallis Clinic, and other health providers ban tobacco products, as does Willamette Neighborhood Housing Services and other low-income housing services. Linn-Benton Housing Authority is smoke free at most of its units, with restrictions in place on the few that permit smoking.[97,98,99]

Transportation

Transportation links people and places, making it possible to get to work, to school, to recreational opportunities, and to the grocery store. Transportation includes more than roads, walkways, or bridges. It also encompasses public transit systems, policies that dictate the location and construction of roads, and guidelines for accommodating different kinds of users. Guidelines are important for providing avenues for physical activity, and for reducing the potential of driver, cyclist, and pedestrian injury.

Access to Public Transportation

Access to public transportation is an important public good. Not only does taking public transportation provide additional opportunities for exercise, but the presence of public transportation also makes it easier for individuals and families without private transportation to access goods and services vital to maintaining health. These include grocery stores, health and dental care, and recreation facilities. In Oregon, counties with large metropolitan areas relative to county population size tend to have more public transportation options. Approximately 50 percent of Benton County residents live within one quarter of a mile from a bus stop. Most of those residents live in Corvallis and Philomath. This is the second highest percentage in the state, following only Multnomah County (comprised largely of Portland).[100] Although distance to a public transportation route is one measure of the strength of a public transportation system, additional factors impact the strength of public transport, including frequency and hours of operation, direct routes, and connections to other routes.

People of color, people experiencing poverty, people with disabilities, and people who experience language barriers are more likely to depend on public transit. However, they often live in areas with poor transit service, fewer destinations, and poor connectivity. These unfair burdens increase transportation costs and stress, and limit access to economic and educational opportunities, housing, healthy foods, and physical activity. Vulnerable populations often have unsafe transportation conditions, including limited safe crossings, areas with high-speed traffic, and poor sidewalk and bicycle infrastructure.

Active Commuting

There is a strong correlation between access to public transportation and using active transportation (which includes public transportation, cycling, and walking) to commute to work. Among Oregon counties with public transit systems, an increase of five percent of the population within one quarter mile of a bus station is associated with a one percent increase in the percent of the working population that commutes by active transportation.[101] This trend is reflected in regional statistics as well. Approximately 18 percent of Benton County residents commute using bus, bicycle, or foot travel, compared to 10 percent of all Oregonians.[102] Furthermore, 16 percent of active commuters in Benton County bicycle or walk to work, while only six percent of state-wide commuters bicycle or walk.

Corvallis is a nexus of bicycle and pedestrian commuting, given its network of bike lanes and its relatively compact footprint. Reviewing bicycle and pedestrian safety in Corvallis is useful for understanding road safety in Benton County as a whole. Corvallis Right of Way, a nonprofit group, tracks the number of collisions between motor vehicles and bicycles, and between motor vehicles and pedestrians, based on police reports. Between May 2011 and June 2015, there were 226 collisions between motor vehicles and cyclists, a rate of 56 collisions per year. 77 percent of the collisions were determined to be the fault of motorists, and 23 were determined to be the fault of cyclists. The most common reason for collisions was failure on the part of the motorist to yield to the cyclist.[103] A recent analysis of bicycle collision data was conducted in Davis, California, and provides a useful comparison.* An average of 64 collisions occurred each year between 2009 and 2012. This study did not assign responsibility for collisions, but the causes (turn yielding, lane changes, etc.), were similar in proportion to the Corvallis data.[104]

During the same time period, there were 73 collisions between motor vehicles and pedestrians, with the motorist found at fault in 89 percent of them. The most common cause was again failure on the part of the motorist to yield.[105]

Commuting Patterns

Most workers in the region drive to work. Among Benton County residents, 65 percent of the workforce drives to work alone, with an additional eight percent carpooling.[106]

Commuting to jobs outside of one's city of residence is common for many Benton County residents. Approximately 19 percent of county residents who work report driving for 30 minutes or more to work, compared to 30 percent statewide.[107] A longer commute is associated with negative health effects in a number of ways. Longer commutes have been associated with greater levels of stress. Car commuting has also been linked with physical ailments such as lower back pain, increased likelihood of obesity, and less time for recreation,

* Davis, California is a college town of 65,000 people with an active bicycle community.

relaxation, or sleep. Working outside one's city of residence can also make it more difficult to access medical care, either for the worker or his or her family.

Workers in the county average a 10-20 minute commute, however the travel time varies greatly between cities. Smaller cities generally have a larger proportion of workers who travel long distances for work. Adair Village, Monroe, and Philomath are smaller communities approximately 10-15 minutes away from their closest metropolitan areas and all have correspondingly higher rates of long-distance commuting. Corvallis has a lower proportion of workers (approximately 15%) who commute for more than 30 minutes each way than the rest of the county.[108]

The location where residents work compared to where they live also influences transportation choices. Workers who must travel outside of the county may find that public transportation and ride sharing is not an option due to distance, time and availability. Twenty-three percent of Benton County workers work outside Benton County.

Public transit

In 2009, the city bus service operated by Corvallis Transit System recorded slightly more than 650,000 rides. By 2015, this had increased to close to 1.2 million rides. As of 2015, there were 18 rides for each resident of Corvallis. This significant increase in ridership included periods of time both before and after the bus became free to ride (fareless) in February 2011. Ridership by individuals with disabilities (ADA ridership) has increased from 6,000 rides per year in 2009 to 8,000 rides over the same period. This is 1.3 rides for each resident with a disability.

In addition to the main city bus, Corvallis Transit System operates express routes between Corvallis and Albany, along Highway 99, and between Corvallis and Lincoln County. Ridership in 2015 totaled approximately 9,400 rides.[109]

Benton County Special Transportation Fund provided over 75,000 trips for adults age 60 and older and individuals of all ages with disabilities in 2016 through the Dial-a-Bus program. The program serves over 1,000 people in Benton County.[110] Dial-a-Bus provides curb-to-curb transportation within Benton County and connects individuals with similar services in neighboring counties. Dial-a-Bus provides critical access to seniors and individuals with disabilities who live in rural parts of Benton County or other areas not served by public transit.

Access to Healthy Foods

Transportation options and limited public transportation for residents contributes to challenges in the region with regard to nutritious food access. For households without private vehicles, the ability to shop for food at grocery stores is highly dependent on proximity. Nineteen percent of households in Benton County are within one half mile of a grocery store, about equal to the state average. The average distance between a household and the nearest grocery store

is 2.13 miles.[111] However, since grocery stores tend to be located in larger towns, the county average may overestimate the urban average and underestimate the rural average

Access to nutritious foods can be particularly difficult for residents with unreliable transportation or tight budgets. A rural community is considered to have low access to food when it is ten or more miles from a supermarket or large grocery store.[112] Rural residents must often travel long distances for food. For rural residents this could mean traveling as much as 20 miles to the nearest full service grocery store. Rural grocery stores throughout the county report barriers that may limit rural low-income families' access to healthy food. These include: administrative barriers to becoming an authorized vender for SNAP and WIC programs, economic barriers to offering fresh fruits and vegetables, meat, dairy and other refrigerated foods.[113] For residents in non-rural areas, the most accessible grocery store may also not be the most affordable.

Approximately five percent of Benton County residents do not live "close" to a grocery store (defined as within 1 mile for urban residents or within 10 miles for rural residents).[*] Nearly two times as many residents live within one half mile of a tobacco vendor compared to those who live within one half mile of a grocery store or a WIC authorized store (Table 3.3). [114]

Table 3.2: Proximity to grocery stores compared to tobacco vendors in Benton County, 2012

Store type	Average (mean) walking distance in miles	Percent of population living within ½ mile
Grocery stores	2.1	19 %
WIC-authorized stores	2.1	18 %
Tobacco vendors	1.3	34 %

Source: Oregon Environmental Public Health Tracking Tool

In addition to access to nutritious food, proximity to fast food can affect the health of the community. Although complex in nature, the food environment can impact what people eat, and providing healthy options is vital for the health of the community. Studies have shown an increase in the prevalence of obesity and diabetes with increased access to fast food outlets in a community, although one has not been proven to cause another. Forty-six percent of restaurants in Benton County are fast food vendors, compared to 21 percent in Lincoln County and 38 percent in Linn County.[115]

Food Safety and Health Inspections

Food safety falls under the jurisdiction of county health departments when food is served in restaurants or from mobile vendors. The Centers for Disease Control and Prevention has five categories of foodborne illness risk factors. These are:

- Improper holding temperatures;
- Contaminated equipment;

[*] "Close" is defined as within 1 mile for urban areas and within 10 miles for rural areas

- Poor personal hygiene;
- Unsafe sources; and
- Inadequate cooking.[116]

County health inspectors conducted 100% of the required 520 restaurant inspections for the county in 2015, as well as 137 reinspections. There were 20 food complaints, 66 foodborne illness complaints, and three foodborne illness investigations. There were two failure-to-comply notices, no summary closures, and no voluntary closures.[117]

Food sold in grocery stores is under the jurisdiction of the Oregon Department of Agriculture. A total of 240 facilities in Benton County are licensed by the Oregon Department of Agriculture, which includes grocery stores, bakeries, distilleries, and meat and egg processors.[118]

Environmental Hazards

The majority of the regional population does not come into contact with large-scale, human-caused environmental hazards on a regular basis. However, the presence of contaminants in the community, such as sewage overflows, environmental clean-up sites, and pesticide applications, demonstrates some of the broader potential for health exposures that can impact the health of the region.

Domestic Sewage Systems

The majority of waterborne disease outbreaks are caused by bacteria and viruses present in domestic sewage. Septic tanks are the largest contributor to bacterial and viral groundwater contamination. Health risks are higher in areas where older, failing septic systems discharge untreated or partially treated sewage above or below ground, potentially contaminating nearby streams and wells.

As of May 2017, there were 15 certified wastewater system collection operators and 20 certified wastewater system treatment operators in Benton County.[119]

The Oregon Department of Environmental Quality (DEQ) has 66 active permits for wastewater disposal in Benton County as of May 2017.[120] These permits are designed to limit storm water run-off, industrial wastewater, sewage, and other sources of water pollution.

Environmental Clean Up Sites and Leaking Underground Storage Tanks

The Oregon Department of Environmental (DEQ) Cleanup Program protects human health and the environment by identifying, investigating, and remediating sites contaminated with hazardous substances. The program's objective is to improve sites to the point where no further cleanup action is necessary.

The Oregon Community Right to Know and Protection Act (ORS 453.307-453.414) is a law that makes information about hazardous materials in Oregon available to emergency service personnel, emergency planners, health officials, and the public. Facilities throughout Oregon that are storing a reportable quantity of hazardous substances are required to annually report this information to the State Fire Marshal.[121] Incidents that release hazardous materials into the environment may occur in facilities that manufacture, use, or store these substances. Incidents may also occur during transport of these materials or by equipment malfunction.[122]

The DEQ is tracking and monitoring 49 environmental clean-up sites in Benton County.[123] Sites contain different levels and types of contamination from hazardous substances including petroleum from residential heating oil tanks, regulated tanks at gas stations, and other commercial facilities. Some sites may have one contaminant in a small area of shallow soil, while others may have high concentrations of many substances in soil, surface water, sediments or groundwater.

The DEQ's Land Quality Division also runs Oregon's Leaking Underground Storage Tank Program. An underground storage tank system is a tank or any underground piping that is attached to the tank and has about ten percent of its combined volume underground.[124] These underground storage tanks may store petroleum or other hazardous substances that can pose a risk to groundwater quality if leakage occurs. Oregon's program handles issues related to clean up of soil and groundwater contamination from spills or releases and enforces state and federal rules. In 2016, Benton County documented eight leaking underground storage tanks.[125]

Pesticide Exposure

Residents of the region may come into contact with pesticides either through personal use or as a by-product of commercial use for agriculture or forest management. Many pesticides have the potential to harm humans, birds, fish and aquatic organisms, and land-based vertebrates and invertebrates. Due to this potential for harm, the Oregon Department of Agriculture restricts the use of 495 distinct pesticide products, comprising over 100 different active ingredients.[126] Some better-known compounds include atrazine, permethrin, and organophosphates. A 2013 study of pesticides and herbicides lists glyphosate as one of the most common active ingredients in aerial spraying.[127] Glyphosate is also widely available in home products. Many agricultural operations such as wheat, annual rye-grass, and other cash crops also rely on herbicides. Grass and crop fields are sprayed on an annual basis to clear the fields for a new crop the following year.

In the 2009-2011 period, Benton County reported seven cases of acute pesticide related illness, compared to Linn County's reported eight cases, and Lincoln County's zero reported cases. The number of pesticide related illnesses for Benton County is well above the mean (4.75 cases) and median (1 case) of all Oregon counties, but these small numbers indicate the likelihood of high variability in the data . Statewide, the majority of pesticide related illness occurs in residential use (69 percent), as opposed to work, agricultural, or industrial use. The majority of residential

illnesses were due to exposures not related to actual use of a pesticide (63 percent), but rather as accidental contact with pesticides applied earlier. A further 28 percent of residential exposures occurred during application of pesticides. These proportions were similar for work-related pesticide exposures.[128] Anyone using pesticides should take reasonable precautions to avoid direct contact or inhalation, and limit secondary exposure through accumulation on clothes or equipment.

Local Data

The following are descriptions of local data collected by Benton County Health Department and partners are taken in part or in full from existing documents. Sources are cited at the bottom of each section.

Well water testing

In 2016, Benton County Environmental Health received a grant to provide free well-water testing to 30 residents. The county had participated in the same program the previous year, and in 2016 they incorporated a health equity approach in their outreach.

Out of the 30 wells tested, 10 tested positive for nitrates, a water pollutant that can cause serious harm to infants. Three of these wells had nitrate results exceeding the maximum contaminant level (10 parts per million); all of these were located in the Southern Willamette Valley Groundwater Management Area.

6 wells tested positive for arsenic, a carcinogen that is concentrated in the body as it is consumed. None of these wells tested over the EPA limit of 0.01 parts per billion, but there is no known safe level of arsenic for consumption.

10 wells tested positive for coliform, which indicates that the well has been contaminated with fecal matter. One of these wells was positive for E. Coli.

Overall, 19 of the 30 wells tested positive for one or more contaminants; 7 wells tested positive for multiple contaminants. Benton County Environmental Health followed up with the well owners, providing them additional information about well safety and how to remediate well contaminants. [129]

North Albany County Park

Benton County Health Department partnered with Benton County Parks and Natural Areas to update the North Albany County Park Master Plan in a way that will reflect the needs of the neighbors and provide amenities that support a healthy, livable community. As part of this process, the two departments conducted an observational study, key informant interviews, and

a public meeting. Data from these assessments gives insight into recreation in North Albany and also throughout the county.

The majority (69 percent) of North Albany County Park users were observed in sedentary activities such as sitting or picnicking. Twenty-eight percent of users were engaged in moderate physical activity such as walking or light exercise. Three percent of users were very active.

The most consistent message was that neighbors like the open space, the natural areas, and the rural character of the park. While the majority of Benton County residents live in cities, they are very connected to natural areas and value the rural character of the county.

In North Albany County Park, as well as in other city and county parks, the playgrounds were seen as deteriorated and in need of updating. Also, while North Albany County Park is close to housing, many respondents identified the need for better foot access. This is also a challenge for other county parks, which are frequently too distant from neighborhoods to be accessed by non-motorized transit.[130]

Community Health Inclusion Index

Through the recently funded National Association of Chronic Disease Directors grant, the Benton County Healthy Communities/Developmental Diversity program conducted disability assessments at 17 locations in rural and urban Benton County. Assessments were completed at schools, public parks, community organizations, government buildings, and medical facilities. Each of the 17 sites was chosen by a community coalition of disability rights advocates who recognized the needs that exist in these 17 locations.

Preliminary results from the surveys indicate that community facilities for public transit and walking/biking are mostly excellent and that most buildings have many accommodations for people with disabilities. Common themes among the challenges highlighted by the survey include accessible parking, promotion of activities for people with disabilities, healthy food accessibility at community locations, and playgrounds and workout facilities that fully accommodate people with disabilities.

As a result of these studies, three main areas of need rose to the top as community priorities:

1. downtown Corvallis - need to address a lack of parking in the downtown Corvallis area for people with disabilities. An assessment of a downtown Corvallis community organization, the Majestic Theater, highlighted the need to increase accessibility not just for Majestic Theater patrons for but at many downtown Corvallis businesses. The assessment results showed that very little parking exists in downtown Corvallis for people with disabilities and that the parking that does exist is often far away from places that people want to go. There is also very little space for pickups and drop-offs of people with disabilities that need more room to maneuver when entering and leaving their vehicle. The results of this assessment

were shared with community partners who confirmed the need to address the lack of parking for people with disabilities in the downtown area.

2. Monroe Library - The main entrance of the library is approximately 100 feet from the one handicap accessible parking spot in the parking lot. There is parking available on the cross street, Ash Street, and another entrance at the corner of Ash Street and N 5th Street. A dedicated handicap accessible parking space on Ash Street would be much closer to the secondary entrance of the library. In addition, neither entrance has a power assist door.
3. SamFit Albany - SamFit in both Albany and Corvallis serves approximately 3,000 people at each site every month. The results of the CHII survey highlighted a number of areas of opportunity for both locations to increase accessibility for people with disabilities: new equipment can be purchased; healthy food can be offered; and bathrooms, hallways, workout spaces, parking, and entrances can be made more accessible. SamFit is associated with the local hospital system and has a stated goal of reaching all people within our community.

Conclusion

From particulate matter to ocean temperature, the health and stability of the environment that we live in creates opportunities and hazards for our own health. We rely on the natural resources of our region to maintain our livelihoods while being available for our enjoyment. We expect our built environment to function in our day-to-day lives and help us make healthy lifestyle choices. Our environment shapes who we are, even as we shape our environment. Slow trends and sudden disasters can have wide-reaching effects for everyone living in our region. Intersections between individual health and environmental factors are often complex but undeniable. In subsequent chapters, the complex nature of environmental factors will be better understood and highlighted through the lens of social determinants of health.

Chapter 4
Social Determinants of Health

Opportunities for health among residents of Benton County and its neighbors begin within their communities including their homes, neighborhoods, places of worship, workplaces, and schools. A growing body of scientific research shows that all people benefit when communities invest in health.

The World Health Organization defines social determinants of health as "the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life".[131] These non-medical factors contribute to a large percent of preventable poor health outcomes. Social determinants include influences such as: "early years' experiences, education, economic status, employment and decent work, housing and environment, and effective systems of preventing and treating ill health."[132] These aspects of health are often referred to as "upstream factors" since their effect occurs well before illness manifests and curative intervention becomes necessary. In this chapter regional data will be presented for education, employment, income, poverty, economic challenges, food security, home ownership, and homelessness. Environmental factors have been presented in Chapter 3, and access to health services will be presented in Chapter 5.

Income, Poverty, and Economic Challenges

Income and Poverty

Income and poverty are the strongest predictors of health among all social determinants of health. Not only are there many studies showing a strong association between income and health,[133] but income also affects all other social determinants of health, including education, food security, and housing. The National Longitudinal Mortality Survey observed that people in the top five percent of incomes had life expectancies 25 percent longer than people in the bottom five percent of incomes.[134] While income, poverty, and income inequality are not "one size fits all" measures of health, understanding the income of the region provides a solid foundation for measuring social determinants of health in Benton County. This is particularly true in Benton County, which has the highest income inequality in the state.

Income

Income influences an individual's ability to choose where to live, what food to eat, participation in physical activities (especially those that require fees or special equipment), and availability of leisure time. Regional data is highlighted here, as the story of economic disparity is similar across all three counties.

Median and Per Capita Incomes

The median income of a population is one measure of the overall income in that population; 50% of the population earns more than the median income, and 50% of the population earns less. The median (inflation-adjusted) household incomes in in Benton County is higher than in neighboring counties (Lincoln and Linn), but lower than in Oregon. (Table 4.1).

Table 4.1: Median household income of Linn, Benton, and Lincoln counties and Oregon, 2011-2015

	Benton	Lincoln	Linn	Oregon
Median household income	$49,802	$42,101	$45,644	$51,243

Source: U.S. Census Bureau American Community Survey, 5-year estimates

Per capita income is another measure of income. It is the average income of a person. Per capita income is lower than median household income because it is per person, not per household. Figure 4.1 below displays the per capita income of different racial and ethnic subpopulations in Benton County.

Figure 4.1: Per capita median income by race or ethnicity in the Benton County, 2011-2015

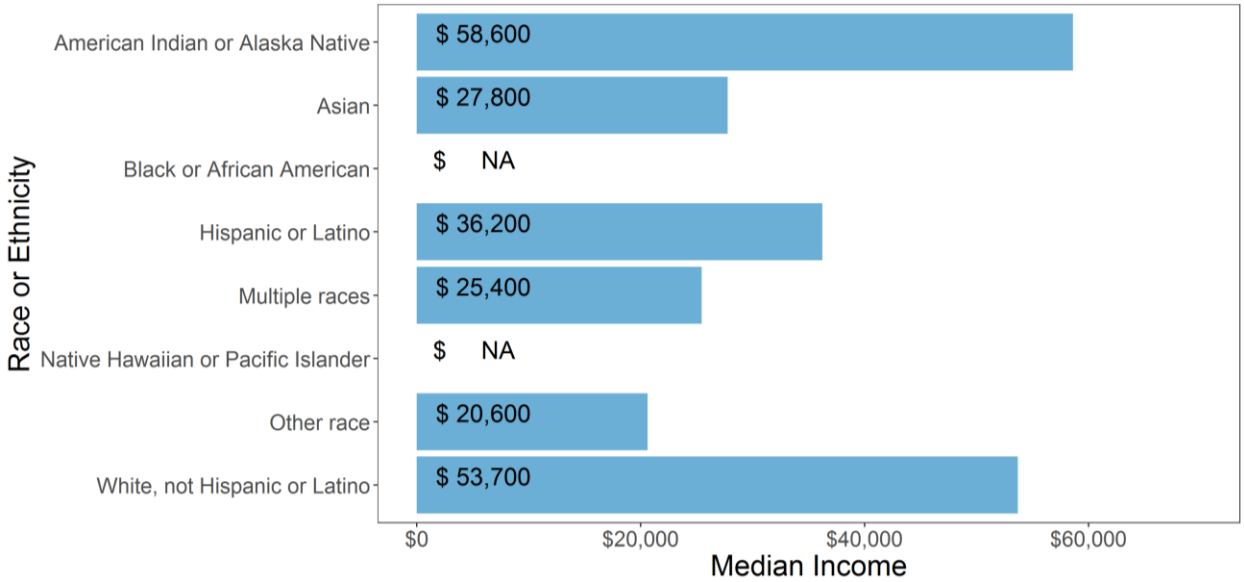


Figure notes: Black or African American and Native Hawaiian or Pacific Islander data is suppressed due to small sample sizes. American Indian or Alaska Native, Multiple races, and Other race data should be interpreted with caution due to small sample sizes.

Source: U.S. Census Bureau American Community Survey, 5-year estimates

Income Inequality

Income inequality (the distribution of wealth between richer and poor segments of the population) is associated with many health outcomes. Regions with higher inequality are more likely to experience increased infant mortality, lower life expectancy, higher rates of

depression, and lower health status overall. Income inequality can decrease upward mobility, making it more likely that a person born into poverty will remain in poverty. Income inequality can segregate a community so that those who experience poverty experience separateness in the community and don't have access to networks of opportunity. Income inequality is commonly measured by calculating the ratio of the 80th income percentile to the 20th income percentile of the [135] population.* In Oregon, the 80th income percentile is 4.7 times the 20th income percentile (Figure 4.2).

Benton County has the highest income inequality in the state with a ratio of 6.0, and is among the two percent of all counties in the United States with the highest income inequalities when measured in this way.

Figure 4.2: Income inequality: ratio of the 80th income percentile of residents to 20th income percentile of residents in Benton, Lincoln, and Linn counties, and the state of Oregon, 2015

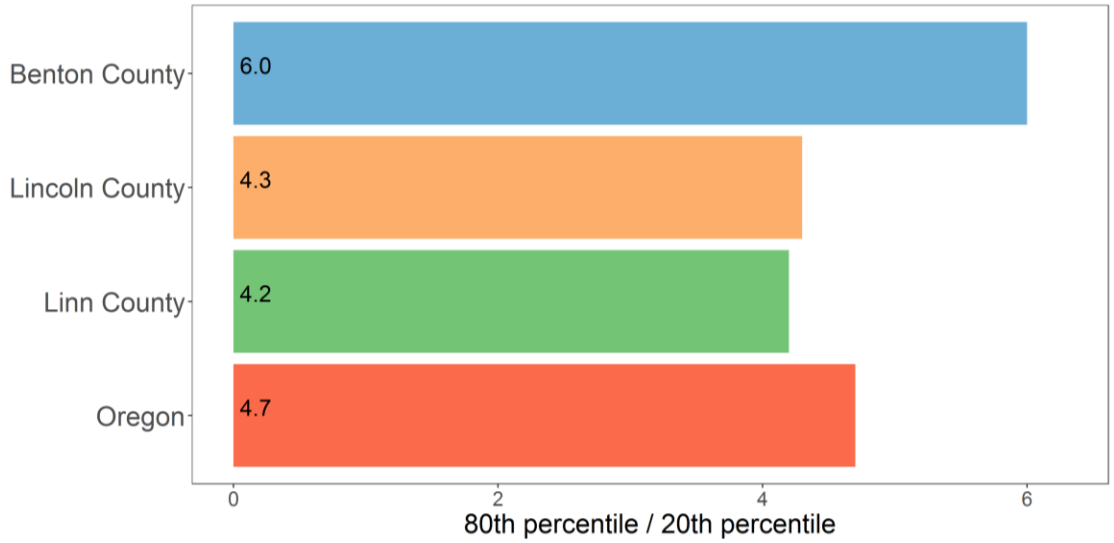


Figure notes: This measure of income inequality is taken by computing the 80th income percentile (the dollar amount that is greater than 80% of household incomes in the geography), computing the 20th income percentile, and dividing the result. A larger ratio indicates more income inequality.
Source: U.S. Census Bureau American Community Survey, 5-year estimates, 2011-2015

Poverty

Poverty is strongly linked to poor health outcomes. Poverty is related to both limited income and lack of economic stability, limited choices in education, employment, and living conditions, and reduced access to safe places to live, work, and play. It can also frequently hinder choices and access to healthy food.

* The 80th income percentile is the income of the individual who earns more than 80 percent of the population. The 20th income percentile is the income of the individual who earns more than 20 percent of the population. Those who earn more than the 80th income percentile are the richest 20% of the population; those who earn less than the 20th percentile are the poorest 20% of the population.

The United States Census Bureau determines the Federal Poverty Level (FPL) each year. The Federal Poverty Level was originally an estimate of the amount of money required to meet the cost of living for individuals or families, but over time the measure has become less realistic in terms of estimating what would support an individual's or family's minimum needs and does not take into account the differences in cost of living across the country. It is not generally recognized as an accurate measure of true poverty, but it is used for determining eligibility for assistance programs.[136] Below, in Table 4.2, the Federal Poverty Level for individuals and families is presented, as well as additional Federal Poverty Level ratios that are used for eligibility and comparison purposes.

Table 4.2: Annual Income and Federal Poverty Levels and related ratios for 2017

Family size	Percent of Federal Poverty Level					
	50 %	**100 %**	**138 %**	**185 %**	**200 %**	**400 %**
Individual	$ 6,041	$ 12,082	$ 16,673	$ 22,352	$ 24,164	$ 48,328
Three person family	$ 9,436	$ 18,871	$ 26,041	$ 34,911	$ 37,742	$ 75,484
Four person family	$ 12,129	$ 24,257	$ 33,475	$ 44,875	$ 48,514	$ 97,028

Source: U.S. Census Bureau, Historical Poverty Threshold Table

Approximately 22 percent of Benton County's population lives below the federal poverty line, compared to 17 percent of Oregon's total population. Benton County's regional neighbors have a rate of poverty similar to the state-wide rate, with 17 percent of Lincoln County residents living below the federal poverty line, and 19 percent of Linn County residents. Benton County's greater percent of the population living below the federal poverty line is partly due to poverty among 18 to 24 year olds, which is nearly twice that among individuals of the same age group in the rest of Oregon (Figure 4.3). The poverty rate among this age group, combined with the large proportion of Benton County residents that are between age 18 and 24, is the reason that Benton County's poverty rate is very high. Another worrisome statistic is that children less than five years of age are among the age groups with the highest percentage living below the federal poverty level, accounting for nearly a quarter of children under five years of age in Benton County.[137] Figure 4.3 on the following page illustrates each age group's contribution to the overall poverty rate in Benton County.

[Figure 4.3 is displayed on the following page]

Figure 4.3: Percent of population living below the federal poverty line by age group in Benton County, 2011-2015

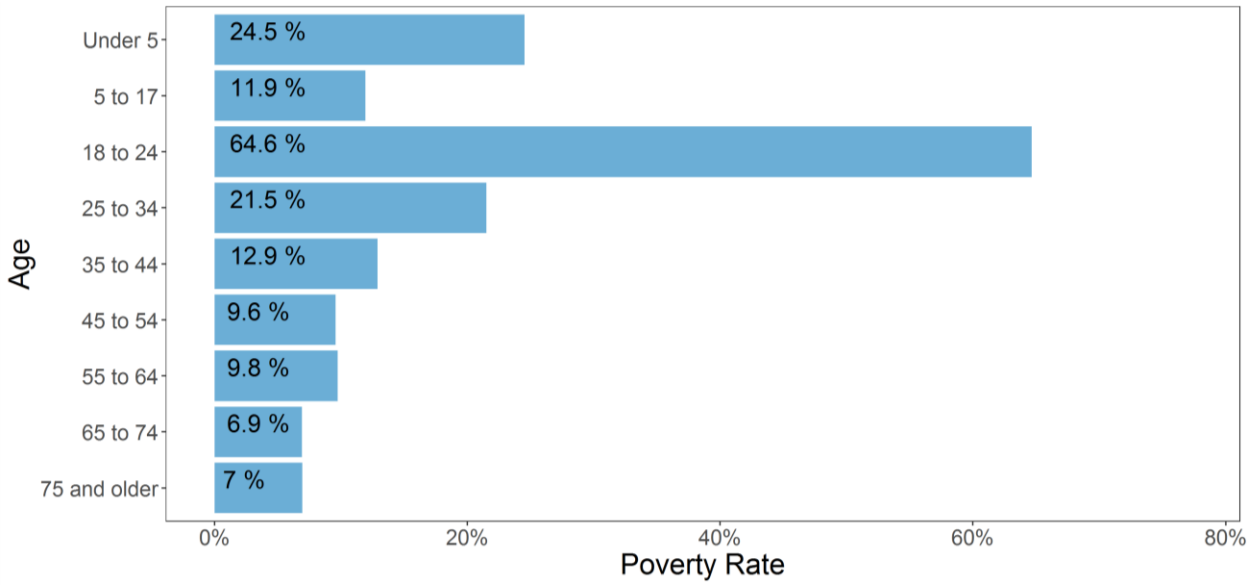


Figure notes: The population of Benton County, as recorded in this ACS data, is approximately 86,000.
Source: U.S. Census Bureau, American Community Survey

Earning less than a high school education increases the risk of experiencing poverty.[138] Of the adults in Benton County over the age of 25 who did not complete high school, 35 percent are below the federal poverty line, compared with 18 percent of those who completed high school. These figures are slightly higher than those of Benton County's regional neighbors, with 28 and 24 percent, respectively, of Lincoln and Linn County's adult population over the age of 25 that did not complete high school living below the federal poverty line.[139]

Variation also exists between racial and ethnic population groups. As shown in Figure 4.4, all racial and ethnic groups in the region have a higher poverty rate than the White, non-Hispanic/Latino population, which is similar to Oregon overall. Individuals in Benton County who identify as Hawaiian or Pacific Islander and Asian are among the racial/ethnic groups with the highest poverty rates at 90.8 percent and 45.5 percent, respectively.[140] It is important to note, however, that the population for these racial/ethnic groups, in addition to the American Indian and Asian populations, is small relative to other groups within the county, which creates more uncertainty in the estimates.

Figure 4.4: Percent of population living below the federal poverty line by race and ethnicity, 2011-2015

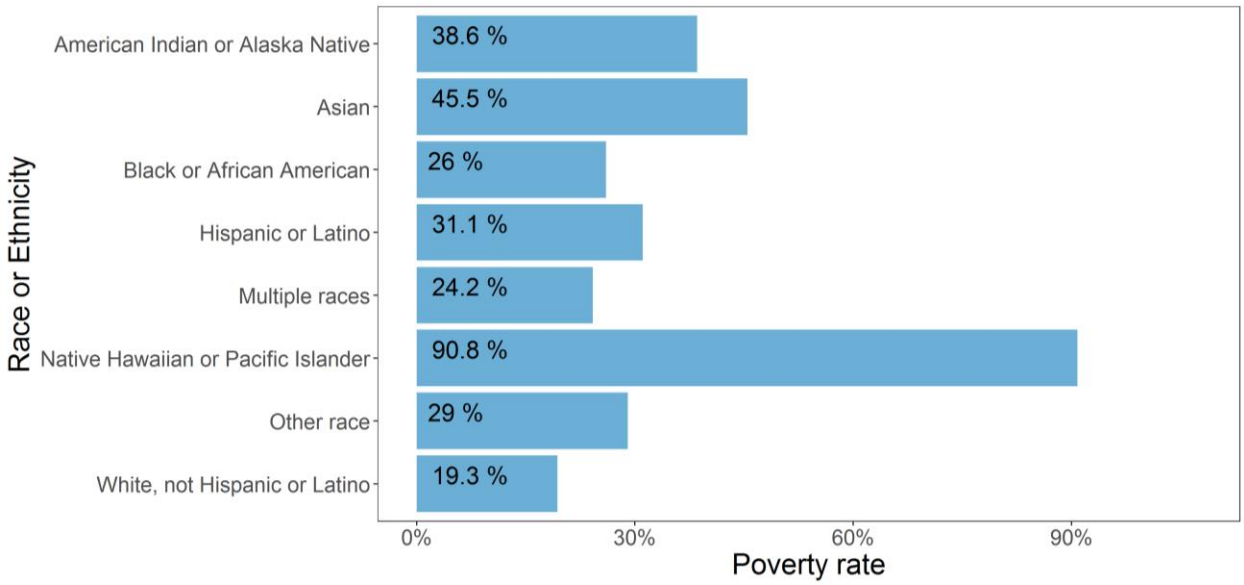


Figure notes: The population of Benton County, as recorded in this ACS data, is approximately 86,000. The estimates for Black or African American, American Indian or Alaska Native, and Other race poverty rates are based on small sample sizes and should be interpreted with caution.
Source: U.S. Census Bureau, American Community Survey 5-year estimates, 2011-2015

Children Living in Poverty

A growing body of research shows that children who are raised in families experiencing long-term poverty are at greater risk of significant and long-term deficits in health.[141] Across Benton County, approximately one in four children under the age of five were living in poverty (24.5 percent) in 2015.[142] That same year, an estimated 15 percent of children under 18 years of age in the region were living in households earning less than the federal poverty level.[143] This accounts for approximately 2,200 residents of Benton County. In comparison, Oregon and the United States have higher rates of childhood poverty (each 22 percent).

Low Income and Cost of Living

Many regional residents earn incomes higher than the federal poverty level but still struggle economically to meet their everyday needs. Approximately 36 percent of Benton County's population earn less than 185 percent of the federal poverty level ($21,775 annually for an individual or $44,863 annually for a family of four in 2015).[144,145] This is the threshold that many assistance programs, such as the Supplemental Nutrition Assistance Program (SNAP), use for income eligibility.

Research suggests that the cost of living in Benton County is well above the federal poverty level. Table 4.3 below shows the cost of living for three family types in Benton County and the

corresponding percentage of the Federal Poverty Level. These figures take into account costs such as housing, child care, food, transportation health care, and taxes.[146]

Table 4.3: Cost of living as a percent of the federal poverty level in Benton County, 2014

One adult, one preschooler		One adult, one preschooler, one school-age		Two adults, one preschooler, one school-age	
Annual cost of living	Percentage of FPL	Annual cost of living	Percentage of FPL	Annual cost of living	Percentage of FPL
$44,684	284 %	$55,389	280 %	$62,671	263 %

Source: The Self-Sufficiency Standard for Oregon

Employment

Stable and secure employment influences health, not only by being a source of income, but also by providing access to health insurance. Compared to unemployed workers, individuals who are employed fulltime have higher incomes and standards of living, less stress, and may be less likely to turn to unhealthy coping behaviors such as alcohol consumption or smoking.[147] The 2017 annual seasonally adjusted unemployment rate in Benton County in 2016 was 3.9 percent, compared with 4.9 percent statewide.[148] The unemployment rate has been decreasing steadily since 2009 and reached 2.8 percent in Benton County in April 2017.[149] Generally an unemployment rate of 5 percent is considered "full employment" as there is always a certain amount of turnover in the labor force.

Economic Activity

The education, health care, and social assistance sector employs approximately 38 percent of the workforce in Benton County, compared with just under one-quarter of the population statewide (23 percent). The next most populous economic sectors are the professional, scientific, management, administrative and waste management services sector and the arts, entertainment, recreation, accommodation and food services sector, each employing approximately 10 percent of the workforce .[150]

Education

Health and education are closely connected. Educational access and attainment are very important predictors of health status. Individuals with higher levels of education are less likely to die prematurely or report acute diseases. They also report positive health behaviors, like maintaining healthy weight, and fewer risky behaviors, like smoking.[151] Furthermore, education levels are the strongest predictor of income and wealth, which strongly influence lifelong health.[152]

Early Learning

Early childhood development supports nurturing relationships and learning opportunities that foster children's readiness for school. The early years are crucial for influencing health and social well-being across a child's lifetime. Research evidence accumulated over the past 40 years supports the conclusion that children who participate in high-quality early childhood development (ECD) programs benefit from a broad range of immediate and long-term health benefits.[153]

The Head Start Program is one such federal program that promotes the school readiness of children from low-income families by enhancing their cognitive, social, and emotional development. Head Start programs provide a learning environment that supports children's growth from birth to age five in several areas, such as language, literacy, and social and emotional development. Head Start programs also emphasize the role of parents as their child's first and most influential teacher and support the development of healthy familial relationships and well-being.[154] In Oregon, Head Start programs include at least the Oregon Head Start Prekindergarten (OHS PreK) program, which serve children ages three to five from low-income families. Some Head Start programs also include Early Head Start (EHS), which is a comprehensive program for children below the age of three and pregnant women from low-income families. Oregon children whose families are below the federal poverty level ($24,250 for a family of four) are eligible for these benefit programs.[155]

Table 4.4: Oregon Head Start PreK and Early Head Start programs and enrollment by county, 2014-2015

OHS PreK and EHS program	County	OHS PreK enrollment	EHS enrollment	Total enrollment
Kids and Company of Linn County	Linn and Benton	466	52	518
Oregon State University Child Development Center	Benton	76	0	76

Source: Oregon Department of Education, Early Learning Division, Oregon Head Start Pre-kindergarten Programs

Despite strong research showing the positive impact of high-quality early education, many families in the region who are in need of child care may not be served. While data are not available for informal child care options, in 2014, for every 100 children there were 22 available child care slots in Benton County, down from 24 available slots in 2012. In Oregon, there were 17 available child care slots per 100 children. The goal for the state is 25 slots per 100 children; all counties in the region failed to meet the goal, with Lincoln and Linn counties at 19 and 12 slots, respectively. In addition to availability, price may be a barrier for many families. The average annual cost of toddler care in child care centers in Linn, Benton, and Lincoln counties are shown in Figure 4.5 on the following page. To give an example, two parents, both earning $9.75 per hour (Oregon's minimum wage) in full time jobs would make approximately $39,000 for their household (before taxes, credits, or adjustments). The median annual cost of child

care for one child in Benton County is $13,100, which is one third of these parents' household income.

Figure 4.5: County-level median annual cost of child care for a toddler, 2014

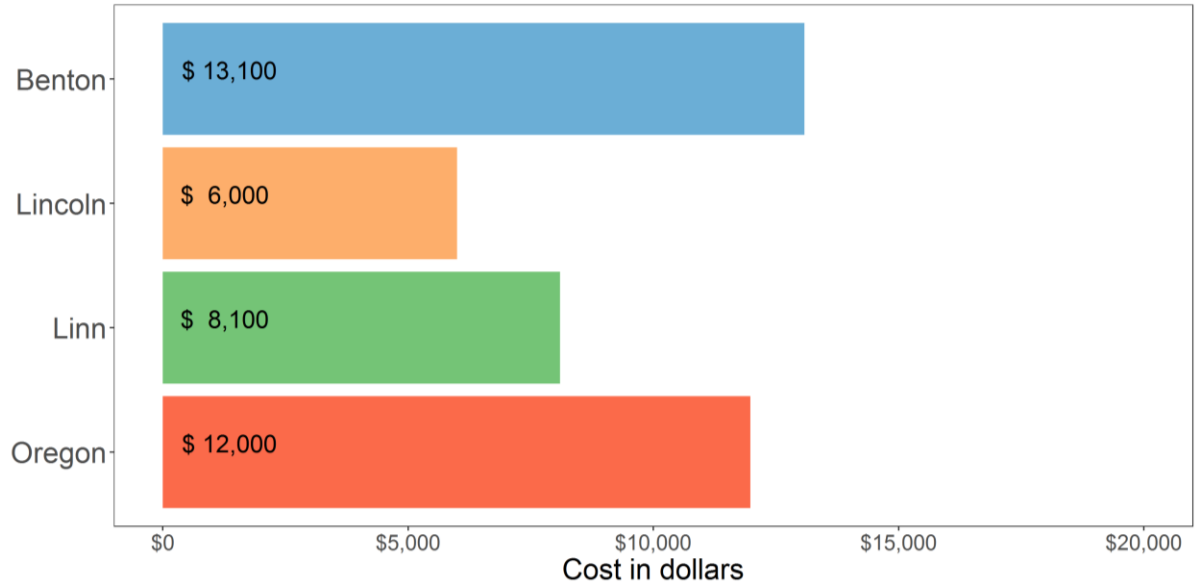


Figure notes: There are approximately 3,700 children under the age of 5 in Benton County. The median annual cost of child care is equal to 25% of the median annual household income in Benton County.
Sources: Oregon State University, Child Care and Education in Oregon and Its Counties, 2014; U.S. Census Bureau American Community Survey 5-year estimates, 2011-2015

High School Education

High school graduation is a strong predictor of future employment and earnings. Conversely, dropping out of school is associated with lower income, multiple social and health problems,[156,157] and health risks.[158] For example, 32 percent of Oregonians who do not have a high school degree smoke, compared with 24 percent of high school graduates, 18 percent with some post-secondary education, and seven percent of college graduates (age-adjusted).[159]

In the 2015-2016 school year, Benton County experienced a high school dropout rate of 9 students per 1,000 9th–12th graders, well below the Oregon rate of 35 per 1,000 high school students. The dropout rates for Benton County and Oregon are shown in Figure 4.6.[160]

Figure 4.6: High school dropout rate per of 1,000 students; Benton County and Oregon; 2010-2016

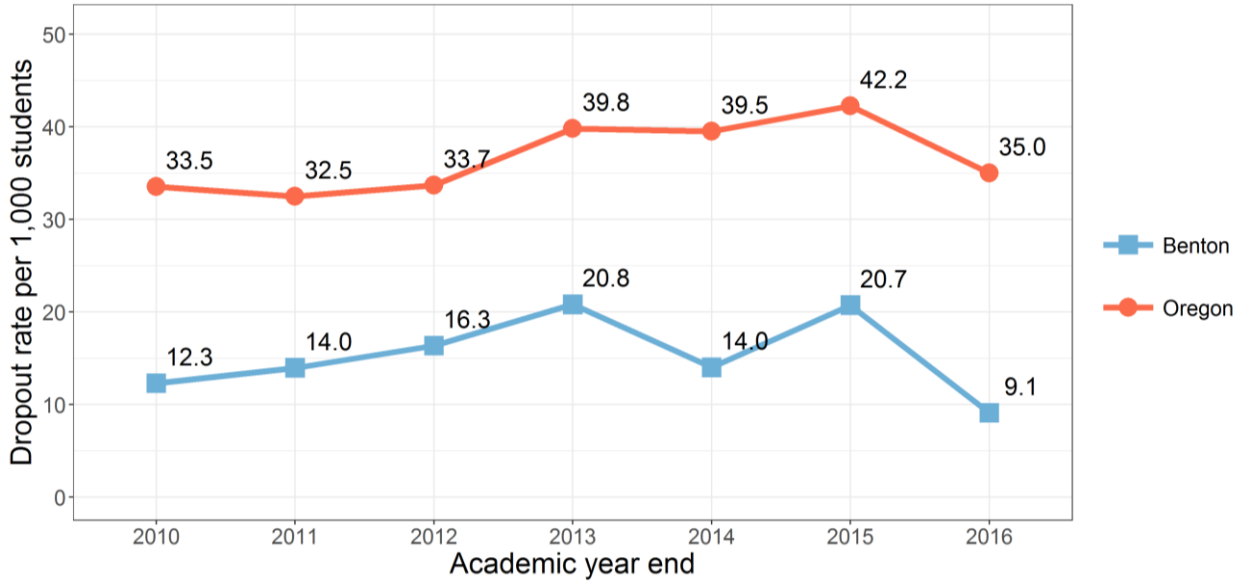


Figure notes: Annual high school student enrollment in Benton County is approximately 6,000 students.
Source: Oregon Department of Education, Oregon High School Dropout Rates

Within the county, the high school dropout rate for minority youth populations is generally higher compared to the total county dropout rate. Among underserved racial and ethnic groups, the dropout rate in 2015-2016 was 13.3 per 1,000 students, compared to 9.1 per 1,000 among all students.[161]

In 2011, Oregon set a goal of 40-40-20, meaning that by 2025, 40 percent of Oregonians age 25 and above would have a bachelor's degree or higher, an additional 40 percent would have an associate's degree, and the remaining 20 percent would have graduated high school. This translates to a goal of 100% of Oregonians having a high school degree or higher and 80% having an associate's degree or higher.[162] As of 2015, approximately 95% of Benton County residents 25 and older had completed high school or GED equivalent. Out of all Benton County residents, 27% had an associate's degree or some college, while 53% had a bachelor's degree or higher (Figure 4.7). The proportion of individuals who have a bachelor's degree or higher in Benton County is significantly higher than the overall state percentage of 31 percent; the proportion of high school finishers and above is also 5 percent higher in Benton County than Oregon as a whole.[163]

Figure 4.7: Rates of educational attainment in Benton County, 2011-2015

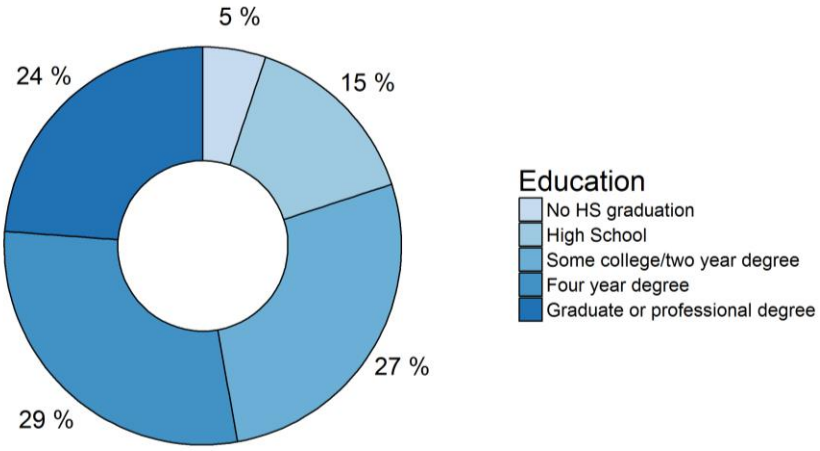


Figure notes: The educational attainment proportions are out of the population of residents age 25 and older, approximately 52,000 residents.
Source: U.S. Census Bureau American Community Survey 5-year estimates, 2011-2015

Education among Oregon Health Plan Members

When reviewing education measures, differences between Oregon Health Plan members and the general state population are quite clear. According to the 2014 MBRFSS survey, 23.3% of OHP adults did not receive a high school diploma or GED (compared with 11.1% in the general population). The same study revealed that 12.8% of those on OHP had graduated college, less than half of those in the general population (26.5%).[164]

Food Security

Food security is defined as having enough to eat, and being able to purchase or obtain healthy food in socially acceptable ways.[165] Adequate nutrition is particularly important for children, as it affects their cognitive and behavioral development. Children from food insecure, low-income households are more likely to experience irritability, fatigue, and difficulty concentrating on tasks, especially in school, compared to other children.[166]

Feeding America, a national nonprofit that monitors food security, estimates that 27 percent of children in the region are living in food insecure households, more than one out of every four children.

Oregon Department of Education data report 38 percent of regional K-12 students were eligible for free or reduced lunch during the 2016-2017 school year. The percentage of students eligible for free or reduced lunch varies significantly from school-to-school, from 18 percent to 69 percent of students attending schools with at least 100 students (Table 4.5).[167] Students whose family incomes are below 130 percent of the federal poverty level ($31,525 annually for a family of four) are eligible for free lunches, and students whose family incomes lie between 130 and 185 percent of the federal poverty level (between $31,525 and $44,863 annually for a family of four) are eligible for reduced-price lunches.[168,169]

Table 4.5: Percentage of children eligible for free and reduced-price lunch, 2016-2017.

School district	Eligible for free lunch	Eligible for reduced-price lunch	Percent of total students eligible for free or reduced lunch
Alsea	73	23	69%
Corvallis	1,985	355	35%
Monroe	200	43	55%
North Albany schools	223	44	18%
Philomath	521	116	40%
Benton County	2,779	537	38%
Oregon			49%

Source: Oregon Department of Education

An analysis of factors* determining food insecurity suggests that in 2015, 16 percent of the regional population, or nearly 14,000 individuals, were residing in households that were food insecure. Among those who were food insecure, 28 percent earned incomes above 185 percent of the federal poverty level, making them ineligible to receive government assistance programs (Table 4.7). The childhood food insecurity rate was higher, at 20 percent of the children in the region. Of the children living in food insecure households in the region, it is estimated that 38 percent of these children are likely ineligible for federal nutrition assistance programs as they live in households with incomes above 185 percent of the federal poverty level.[170]

[Table 4.5 is displayed on the following page]

* Factors include indicators of food insecurity such as poverty, unemployment, median income; food budget shortfalls; a cost of food index; and national average meal costs.

Table 4.6: Food insecurity in the Benton County, the LBL Region, and Oregon, 2015

	Age group	Number of food insecure individuals	Percent of population that is food insecure	Percent of food insecure population ineligible for benefits *
Benton County	All residents	13,810	16%	25%
	Children	2,930	20%	38%
LBL Region	All residents	39,350	16%	19%
	Children	12,170	24%	28%
Oregon	All residents		14%	26%
	Children		23%	35%

*Table notes: * indicates that the percent ineligible figure is produced by modeling and is an estimate*
Source: Feeding America

Supplemental Nutrition Assistance Program Participation

The Federal Supplemental Nutrition Assistance Program (SNAP) is the largest domestic food and nutrition assistance program for low-income Americans. U.S. households must meet certain eligibility criteria, such as income, to receive benefits. As of 2015, an estimated 13 percent of all households (4,476 of 33,840 households) in Benton County received SNAP benefits, compared to 19 percent in Oregon. Of the households in Benton County that received SNAP benefits, 51 percent (2,269 households) had an income in the past 12 months below poverty level, and 49 percent (2,207 households) had an income in the past 12 months at or above poverty level. Of the remaining 87 percent of households (29,364 households) that did not receive SNAP benefits, 17 percent (4,999 households) were below the poverty level.[171] Furthermore, 37 percent of benefit-receiving households that received Food Stamps/SNAP benefits during this time supported children under the age of 18.[172] This rate is lower than Oregon's 46 percent.

Women, Infants and Children (WIC)

WIC is a public health nutrition program that is vital to the health of women, infants, and children across Oregon. The WIC program provides health and nutrition services to pregnant and breastfeeding women and children ages 0 to 5 that have a household income less than 185 percent of poverty guidelines.[173] Overall in 2016, a total of 1,266 families were served by WIC in Benton County; 70 percent of these were infants and children under five, and 30 percent were pregnant, breastfeeding, and post-partum women. Approximately 32 percent of pregnant women in Benton County were served by WIC, as well as 72 percent of all working families in the county.[174]

Emergency Food Support

Linn Benton Food Share, the regional food bank system, distributes emergency food boxes to 23 food pantries (emergency food box agencies) located in both Linn and Benton counties. In addition to the pantries, Linn Benton Food Share also provides assistance through programs, such as emergency meal sites (soup kitchens), supplemental programs, and gleaners and wood share.[175]

Below are the most salient demographic characteristics of the population that is served by the Linn Benton Food Share:

- 36 percent of those receiving emergency food are children;
- 7 percent of those receiving emergency food are 65 years and older;
- 55 percent of households have children;
- 46 percent of households had at least one member working;
- 30 percent of households have one or more member working a full-time job;
- 58 percent of households report delaying medical care;
- 68 percent of households report delaying dental care;
- 47 percent of households delay filling medical prescriptions due to cost;
- 56 percent report medical/hospital debts.[176]

Linn Benton Food Share distributed over 47,000 food boxes from July 2015 through June 2016.[177] One food box typically contains enough groceries for a four day supply.[178] In addition, the Food Share served over 272,000 meals in soup kitchens and shelters. Between food boxes and emergency meals, Linn Benton Food Share provided enough meals to feed nearly 2,500 people three meals a day for the whole year.[179]

Food Security among Oregon Health Plan Members

As previously mentioned, about 16% of the region's population is food insecure. Among Medicaid recipients, this number climbs to 50.7%. That value is also slightly higher than the reported 48.6% for Oregon's state-wide Medicaid population. About 24.7% of the region's OHP members reported hunger, compared with 22.3% of members across the state.[180]

Housing and homelessness

Housing is an important part of the built environment and another key factor contributing to good health. Older housing in particular can present multiple threats to health, including the presence of mold, asbestos, lead-based paint, and lead solder in plumbing and in the soil.

Poor quality and inadequate housing contribute to health problems such as infectious and chronic diseases, injuries, and poor childhood development. Indoor allergens and damp

housing conditions play an important role in respiratory conditions including asthma, which currently affects over 20 million Americans, and is the most common chronic disease among children. Approximately 40 percent of diagnosed asthma among children is believed to be attributable to residential exposures.

Residential exposure to environmental tobacco smoke, pollutants from heating and cooking with gas, volatile organic compounds, and asbestos have been linked with respiratory illness and some types of cancer. People who have difficulty paying rent, mortgage or utility bills are less likely to have an established source of medical care, more likely to postpone treatment, and more likely to use the emergency room for treatment. Families who lack affordable housing are more likely to move frequently. Residential instability is associated with emotional, behavioral and academic problems among children, and with increased risk of teen pregnancy, early drug use, and depression during adolescence.

Housing Affordability

Affordable, quality housing provides shelter that is safe and healthy for all people. Figure 4.8 below shows the distribution of Benton County residents who rent and own their homes.

Figure 4.8: Housing renters and owners in Benton County, 2011-2015

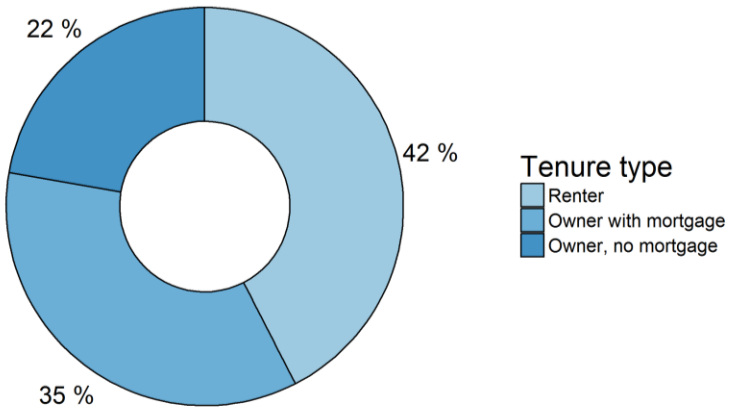


Figure notes: There are approximately 33,000 households in Benton County.
Source: U.S. Census Bureau, American Community Survey

Housing that costs more than 30 percent of household income is considered to be "unaffordable."[181] Table 4.7 shows the similarities in housing burden between Benton County, the region, and Oregon. Similar to Oregon, 59 percent of renters in Benton County spend 30 percent or more of household income on housing rent. Of home owners with mortgages, 29 percent spend 30 percent or more of household income on housing, compared to 36 percent in Oregon. Of home owners without mortgages, 12 percent spend 30 percent or more of household income on housing, compared to 15 percent in Oregon.[182]

Table 4.7: Occupants with housing cost burden more than 30 percent of income, 2011-2015

	Category	Percent with housing cost burden
Benton County	All residents	37 %
	Renters	59 %
	Owners with mortgages	29 %
	Owners without mortgages	13 %
	Residents with annual incomes below $50,000 (renters and owners)	67 %
LBL Region	All residents	30 %
	Renters	55 %
	Owners with mortgages	35 %
	Owners without mortgages	15 %
	Residents with annual incomes below $50,000 (renters and owners)	62 %
Oregon	All residents	32 %
	Renters	54 %
	Owners with mortgages	36 %
	Owners without mortgages	15 %
	Residents with annual incomes below $50,000 (renters and owners)	66 %

Source: U.S. Census Bureau, American Community Survey

Home values

Higher home values can indicate healthier homes, since more expensive homes tend to have design or construction features that support health, such as adequate insulation and weather-proofing. Homes are also a major source of wealth, which helps home owners afford health care and other health promoting activities. However, high median home prices can also signal inequality or housing insecurity in a community. Unaffordable housing has strong negative effects on health for many of the same reasons that stable housing promotes health.

Home values as reported by the U.S. Census Bureau, American Community Survey, tend to be out of date. Currently this means that home values are underestimated by ACS data. Zillow.com, a housing website, tracks home values based on recent sales and other assessments, and produces more contemporary estimates. Zillow.com currently estimates the median Benton County home value to be $323,000 (as of May 2017), compared to the ACS estimate of $270,000. The median list price of houses listed on Zillow in Benton County is $373,000. Figure 4.9 shows the change in home values and list prices in Benton County over the past 8 years.

Figure 4.9: Median list price and home value of owner-occupied housing units, Benton County, 2010-2017

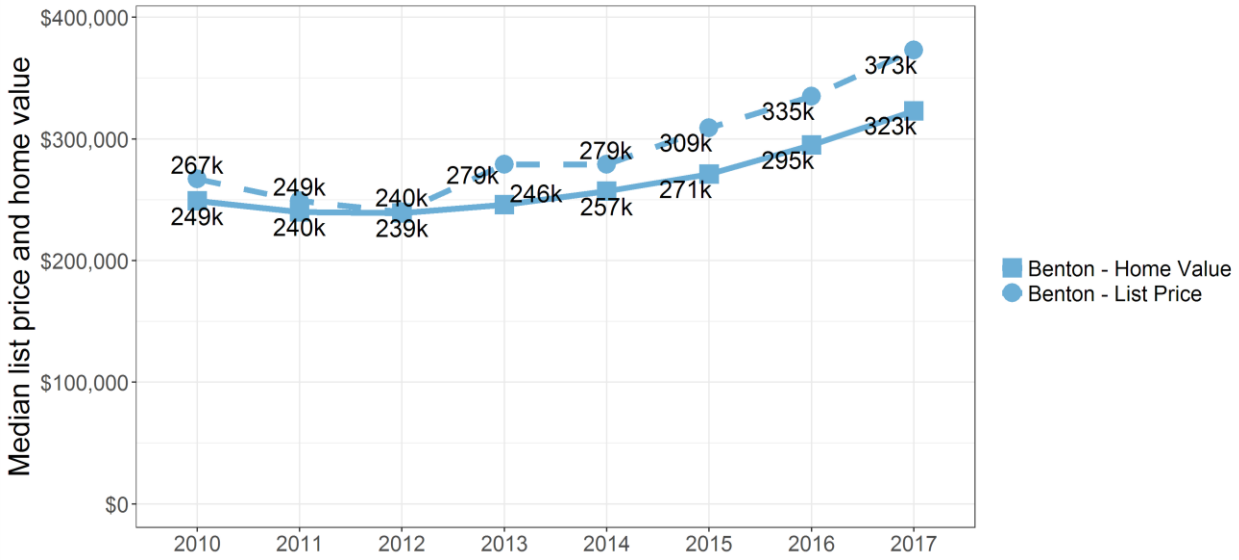


Figure notes: Home values and list prices are based on July data.
Source: Zillow.com historical housing data for Benton County

Homelessness

The Oregon's Ending Homelessness Advisory Council defines homelessness as being without a decent, safe, stable, and permanent place to live that is fit for human habitation.[183] Understanding homeless populations is a challenge for public health. Even counting the number of people experiencing homelessness is a difficult task, because they tend to lack a fixed address or living location, and many individuals change homeless status over time. Each January, communities conduct a point-in-time count of homeless populations. This snapshot of the homeless population is limited in scope and depth. Canvassers visit shelters, transitional housing, and known homeless encampments. Individuals staying with other people out of economic necessity are not counted, nor are homeless people who are in areas not covered by the canvassing. Furthermore, the one-night count misses any individual who is homeless at other points during the year. Notwithstanding these limitations, the point-in-time estimates have the benefit of being a consistent approach across years and geographies, and therefore may give some insight into the homeless population in Benton County.

In 2015, the Benton County point-in-time survey counted 127 individuals experiencing homelessness (Table 4.8). Sixty-eight percent of the homeless population was male.

The most recent data on homeless populations is from 2017 (Table 4.8). In 2017, there were 287 individuals identified in the January point-in-time survey, an increase of 226 percent in two years.

Table 4.8: One-night count homeless population figures, 2015 and 2017

	2015		2017	
	Benton County	**LBL Region**	**Benton County**	**LBL Region**
Total count	**127**	**403**	**287**	**653**
Subcategories				
Sheltered count	**74**	**255**	**139**	**287**
Unsheltered count	**53**	**148**	**148**	**266**
Male	**86**	**226**	**189**	**411 ***
Female	**41**	**161**	**97**	**541 ***
Transgender	**0**	**16**	**0**	**0 ***
Children under 18	**7**	**41**	**68**	**114**
Unaccompanied children under 18	**	**	**39**	**61**
Veterans	**19**	**22**	**28**	**66**

Table notes: * indicates that cells do not sum to total. ** indicates that data has been suppressed due to small numbers.

Source: Oregon Housing and Community Services, 2015, 2017

Another source for recording the number of homeless individuals is the set of statistics gathered by federally qualified health centers (FQHCs). Among the data that FQHCs are required to collect is housing status, which they report each year to the federal government. According to the Bureau of Primary Health Care, a patient's status should be recorded as homeless if the patient was residing in a shelter, transitional housing, on the street, if the patient was doubled up or temporarily living with others, had been homeless within the last 12 months, or resided in a housing program targeted to homeless populations.

In 2015, the Community Health Centers of Benton and Linn Counties served approximately 710 homeless patients, or 8% of its total patient population. This number is a decrease from 2014, when 835 homeless patients were served.[184] Compared with the one-night counts, FQHCs may identify homeless individuals who were not staying in shelters or in canvassed encampments or who were homeless at other times throughout the year. However, only those individuals who were able to seek out medical care at an FQHC and chose to do so were identified. Nevertheless, the records provided by the FQHCs indicate a much broader level of homelessness than the one-night counts.

Student homelessness is a recurring problem in Oregon as well. Across the state, an increasing number of Oregon's K-12 public school students are homeless at some point during the school year. Homelessness among students has more than doubled since the 2003-2004 academic school year. Just over 3 percent of students in grades K-12 experienced homeless during the 2015-2016 school year (Table 4.9).

Table 4.9: Homeless students grades K-12 in Benton County and Oregon, 2015-2016

School District	Number of students in grades K-12 experiencing homelessness	Proportion of student body experiencing homelessness
Alsea	10	6.9 %
Corvallis	253	3.8 %
Monroe	10	2.2 %
Philomath	17	1.1 %
Benton County *	290	3.3 %
Oregon	--	3.7 %

Table notes: * Benton County data does not include North Albany Schools.
Source: Oregon Department of Education 2016-2017.

While these three data sources can broaden the understanding of the homeless population in the region, a major challenge is reconciling their different purposes and methodologies. The Corvallis League of Women Voters developed the *Homelessness in Corvallis* report, which adopts a transparent process for maximizing the set of sources, while minimizing double counting. Their 2017 report estimates that 855 people in Benton County experienced homelessness during 2016.[185]

Housing and Homelessness among Oregon Health Plan Members

There is a significant disparity in home ownership between Oregon's Medicaid and non-Medicaid populations. About 21.5 percent of OHP adults own their home, contrasted with the 64.7 percent reported by the state's general population. In addition, a little over 1 percent of the state's OHP members are homeless.[186]

Local Data

The following descriptions of local data collected by Benton County Health Department and partners are taken in part or in full from existing documents. Sources are cited at the bottom of each section.

Housing Opportunities Action Council Special Population Surveys

In 2016, Benton County Health Department conducted outreach with 147 adult community members in Corvallis and Monroe who were identified as being high-risk for housing instability. Each respondent was asked three questions. Responses are summarized below.

Question 1: What has helped you find housing in the past?
Many respondents said that friends or family have helped them find housing, whether by taking them in or helping them find other housing. Access to shelters, transitional housing, and affordable housing were also frequently mentioned. Other respondents mentioned financial

support such as employment income and rent assistance. Case management, supportive services, and community resources were listed as well.

Question 2: What are the biggest challenges that you have [in your current housing/finding housing]?
Many respondents discussed lack of income, employment and education, which create financial barriers but are also frequently red-flagged on rental applications. Criminal history, lack of rental history, and poor credit were also listed as challenges. Many other respondents said that addictions and mental health were barriers, both to qualifying for housing and to become stable enough to consider housing. Most respondents also discussed the lack of affordable housing as a major challenge.

Question 3: What do you think this community needs to do to prevent and end homelessness?
Respondents mentioned the need for shelters, rental assistance (financial and logistical), and more transitional, supportive, and affordable housing. Respondents also listed the importance of education about accessing services, case management, addictions and mental health treatment, and employment and training. In addition, respondents discussed the role that policy plays in ensuring that everyone has access to affordable housing and that everyone is considered a part of the community.[187]

Garfield and Linus Pauling Schools Neighborhood Assessment

In 2016, Benton County Health Department conducted a neighborhood assessment of the neighborhood surrounding Garfield Elementary School and Linus Pauling Middle School. Approximately 30 percent of respondents were primary Spanish speakers. On the topic of socioeconomic determinants of health, respondents were asked the two questions "Are you worried about losing housing?" and "How often do you worry about running out of food?"

In response to the housing question, 12 percent of respondents identified concern over losing housing or being evicted because they could not pay their rent or mortgage. In response to the food security question, 4 percent said they often worry about running out of food and an additional thirty two percent said they sometimes worry about running out of food.[188]

Strategic alignment forum on Health and Housing in Linn, Benton, and Lincoln counties

Over 150 stakeholders gathered to share ideas on ways to align and integrate their work across housing, social services, and health to improve the health and vitality of Linn, Benton, and Lincoln County residents. This event was sponsored by the Federal Reserve Bank, Oregon Housing and Community Services, and InterCommunity Health Network Coordinated Care Organization. Regional stakeholders will use input from this forum to guide recommendations for systems alignment and specific health and housing projects.

Two morning panels highlighted issues, challenges, and opportunities for advancing housing and health collaborations at the local, regional, and state levels. Participants subsequently worked in small, facilitated table groups to answer the following four questions regarding the health of their communities:

1. **Core values:** What are the core values that should guide our goal to build healthy communities?
2. **Working together:** How can housing providers, community based organizations, regional collaboratives (Coordinated Care Organization, Early Learning HUB, Workforce Investment Board, etc.) and local governments work together to address local needs and priorities?
3. **Innovation and integration:** What potential innovations and integrations are possible in the region? Do they address local needs and priorities? What agencies should be involved?
4. **Next steps:** What would it take to make the project happen? Who needs to be at the table? Are the necessary resources available to implement?

Facilitators posted responses to each question on the wall and participants prioritized two options from each question. Full results were compiled and organized into general categories by question, ranked according to the number of votes each suggestion received, and are presented following this summary.

Participants identified several **core values** that should guide our communities' work, including:

- Collaboration
- Equity
- Community
- Accessibility
- Sustainability
- Cultural competence, and
- Strengths-based

When asked how housing providers, community based organizations, regional collaboratives, and local governments can **work together** to address local needs and priorities, participants overwhelmingly stressed the need for cross-sector collaboration, communication, and information sharing. In addition, participants recommended using a collective impact model with strong backbone organizations identified to accomplish the work. Other important components of collaboration included shared and integrated assessment activities, data collection, and flexible funding models.

Looking toward **innovation and integration**, participants stressed the importance of looking beyond the "usual suspects" and creating public/private partnerships, prioritizing planning, ensuring that adequate infrastructure exists to support the plan, identifying concrete actionable goals that can be addressed collaboratively, and sharing information about best practices were also identified as key steps. The group felt that health navigators, universal case management

systems, community empowerment, bringing services closer to the community, and tiny houses also offered promising opportunities for innovation.

Regarding **next steps**, participants felt that our region has the resources and willingness to think outside of the box to create meaningful change with better alignment. Having the right partners at the table will be critical to accomplishing this, including housing, government, health care providers and systems (including IHN-CCO), community organizations, and consumers. Forum participants felt that a core or centralized housing collaboration hub that convened partners would be helpful. Key ingredients for successfully advancing efforts to advance health and housing integration and partnerships include: collaboration, transparency and accountability, flexible funding, measurable outcomes, policy change, and true community engagement.[189]

Housing SWOT

In January 2016, the Corvallis/Benton County Housing Opportunities Action Council released a 4 question on-line survey to initiate feedback from the public. The Benton County Health Department administered the survey, distributing it widely to community groups and coalitions throughout the county, with 168 community members participating. At the February 2017 HOAC meeting, participants were asked to supplement the results with anything they felt was missing, given the changes in the landscape over the last year.

In November 2016, Benton County Health Department began conducting key informant interviews with organizations, government entities, and individuals. Preliminary themes from 42 interviews were included in March 2017.[190]

Summarized results of the Strengths/Weakenesses/Opportunities/Themes (SWOT) analysis are presented in the table below.

Table 4.10: Corvallis/Benton County Housing Opportunities Action Council SWOT summary, 2016

Strengths	**Weaknesses**
Civic engagement and community awareness Wealth and financial resources of Corvallis Strong network of service agencies, businesses, housing sector, and faith communities.	Housing unaffordability Restrictive zoning, building, and land use codes Lack of low-cost, healthy housing
Opportunities	**Threats**
Updating codes and policies to promote affordable housing Redevelopment and investment in existing and new housing	Poor understanding of the issue Conflicting values and priorities Social services and safety net at capacity Poorly coordinated services

Source: HOAC Scanning the Landscape SWOT analysis

South Benton County Agricultural Workers

As part of its Monroe Farms Survey, Benton County Health Department asked agricultural workers about their employment relationships, housing, and transportation.

Most agricultural workers are hired by third parties who contract with farms to provide labor. This labor contractor is considered the sole employer of the farmworker. Farms will frequently have multiple contractors, and each contractor may hire workers from many different areas.

Twenty-five percent of the agricultural workers spoken to live in temporary housing. Some farms provide housing during harvest time. In other cases, workers will rent an apartment and often share housing with eight to fifteen people. In most of these cases the agricultural workers leave the area after the harvest season to seek work elsewhere

The remaining seventy five percent of the agricultural workers have permanent residences, but not necessarily close to the farms where they work. Some farmworkers travel 2 to 3 hours one way each day between their homes and the farms. Usually the contractor who hires the farmworker provides transportation and charges the worker a fee.

Most of the agricultural workers who have permanent homes are engaged in other industries during the off season, including construction, meat processing, and dairy operations. During their agricultural work, all farmworkers surveyed reported that 100 percent of their work is heavy duty labor.[191]

Conclusion

Socioeconomic factors, income and wealth, form the base of Frieden's Health Impact pyramid (p. 7)[192] and are powerful determinants of health. Socioeconomic factors that are affected by income and wealth, such as education, food security, and housing, in turn have powerful effects on a person's health. Social determinants of health interact with individual characteristics such as age, and environmental factors such as air quality and proximity to healthy or unhealthy built environments. People with a strong set of social resources are more resilient to challenges to their health, and are better able to navigate the health care system. In the next chapter on access to health services, many of the disparities seen in social determinants of health recur when people try to access health care services.

Chapter 5
Access to Health Services

Access to health care is important to physical, mental, and social health. The Institute of Medicine (IOM) defines access to health care as "the timely use of personal health services to achieve the best health outcomes," with a special focus on the importance of equity of health care usage and health outcomes among and across different groups of people.[193]

The ability to access healthcare can impact other areas of life, including employment, education, family life, nutrition, and emotional outlook, which play major roles in one's overall health status. Scarcity of health services, rising health care costs, lack of insurance coverage, and other limiting factors create barriers that prevent individuals and families from accessing quality health care. Persistent or cumulative barriers to health care lead to worsening health conditions, preventable hospital visits, limited use of preventive care, and other negative health outcomes.[194]

According to the Agency for Healthcare Research and Quality (AHRQ) 2013 National Healthcare Disparities Report (NHDR), there are three steps to attaining adequate access to health care:

- Gaining entry into the health care system,
- Getting access to sites of care where patients can receive needed services, and
- Finding providers who meet the needs of individual patients and with whom patients can develop a relationship based on mutual communication and trust.[195]

Healthy People 2020 cites both the IOM and AHRQ documents on access to health care, and divides access into four major components:

- **Insurance Coverage and Affordability** – Health insurance coverage is highly emphasized by current policy in the United States as a means to affordable health care services.
- **Service Availability** – Having a usual and ongoing source of care, especially a primary care provider, leads to better health outcomes. Existence of preventive services and emergency medical services are also key.
- **Workforce** – Health care centers must be staffed with appropriate employees in order for people to access health care. Healthy People 2020 focuses on tracking the number of primary care providers.
- **Timeliness of Care** – Timeliness is defined as receiving care quickly after a need is recognized. This can be measured both in appointment and office wait times as well as the time lag between identifying a needed service (such as a test or course of treatment) and receiving it.[196]

This chapter will highlight recent data on the four major components discussed above.

It is important to examine health services access and capacity in the larger context of overall factors that contribute to health. "Health care is necessary but not sufficient for improved health; in fact, health care accounts for only about 10–20 percent of health outcomes, according to some experts."[197] Social determinants of health, the upstream factors listed in Chapter 4, are responsible for a much larger percentage of health outcomes than health services alone. People need a healthy and accessible environment to achieve good health. This includes the broader community context, as well as the characteristics of the local health care system itself. Both a strong health system and good population health are needed, and can be mutually reinforcing to achieve optimal health in a community.

Many of the forces that shape the opportunity for better health in the Linn, Benton, and Lincoln tri-county region – education, employment, and transportation, for instance – can also affect access to health services. Frieden's Health Impact Pyramid (illustrated in the Introduction on p. 7) provides a helpful model for recognizing some of those larger forces.[198] Upstream factors play a large role in any individual's ability to make healthy choices and decisions, and this holds true for accessing health services. For example, the ratio of providers to patients in a region may be considered excellent, but a prospective patient may work during clinic hours, find transportation difficult to navigate, or be unable to find child care options during the time of the visit. While having access to good doctors and health care facilities are visible indicators of access to health services, there are numerous other factors that influence opportunities for health.

Demographic Differences in Access to Health services

Many populations face increased barriers to accessing care and receive poorer quality care when they get it. In its 2011 reports on health care quality and disparities, the Agency for Healthcare Research and Quality (AHRQ) finds that, at a national level, low income individuals and people of color experience more barriers to care and receive poorer quality care. Moreover, other research shows that individuals with limited English proficiency are less likely than those who are English proficient to seek care even when insured. Research also finds differing patient experiences and levels of satisfaction by race, gender, education levels, and language.[199]

Health Insurance Coverage

Lack of adequate health insurance coverage is often a major barrier to health services. People who are uninsured or underinsured receive fewer health services than their insured counterparts.[200] Inadequate coverage creates a financial barrier between a patient and needed health services. People without health insurance are less likely to know about or seek out preventive services, and are more likely to have new and worsening health problems, and shorter lifespans.[201] In general, even when uninsured or underinsured persons receive health

services, care is often postponed (due, in part, to concerns about cost). These individuals suffer significantly worse health outcomes than those who have adequate medical coverage.[202]

Recent changes in policy on both the national and state level have altered the landscape of health care and health insurance access in the past five years. The Affordable Care Act (ACA), enacted on a federal level in 2010, made it illegal to deny coverage due to pre-existing medical conditions, mandated health coverage for most individuals, expanded Medicaid funding and coverage, and subsidized health insurance through exchanges* for lower income individuals, among other provisions. Most of these provisions went into effect by 2014.[203] As part of the ACA, Oregon accepted federal funding to expand Oregon Health Plan (OHP) membership, setting targets for enrollment and expanding the variety of services (e.g. dental services). Statewide, membership in OHP increased 104 percent over seven years, from 469,000 members in January 2010 to 957,000 members in January 2017. Regional enrollment increased from 30,000 members to 61,000 members over the same time period, and Benton County enrollment has swelled from 6,000 to 13,000.[204,205] In addition to OHP expansion, 80 percent of the consumers registered to the new health care exchange received tax credits or cost-sharing subsidies as of April 2014.[206]

Insurance coverage rates in the region, and across the nation, have risen recently, largely due to the ACA and other healthcare transformation policies. The regional insurance coverage rate in 2012 was 76 percent, rising to 97 percent in 2014.[207] As of 2014, 98 percent of Linn County, 95 percent of Benton County, 96 percent of Lincoln County residents have insurance.[208] These rates include adults age 65 and older. This population has insurance coverage rates of close to 100 percent due to Medicare.

Uninsured Rates

Uninsured rates have decreased over the past eight years, with the largest decrease coming after the implementation of the Affordable Care Act. Figure 5.1 displays this trend.

[Figure 5.1 is displayed on the following page]

* Health insurance exchanges are online, state or federally run marketplaces where an individual can compare plans from different insurance companies and purchase individual health insurance. Individuals with a qualifying level of income can receive federal subsidies to help pay premiums on health insurance plans.

Figure 5.1. Proportion of individuals age 0 to 64 without health insurance in Benton County, the LBL Region, and Oregon, 2010-2015

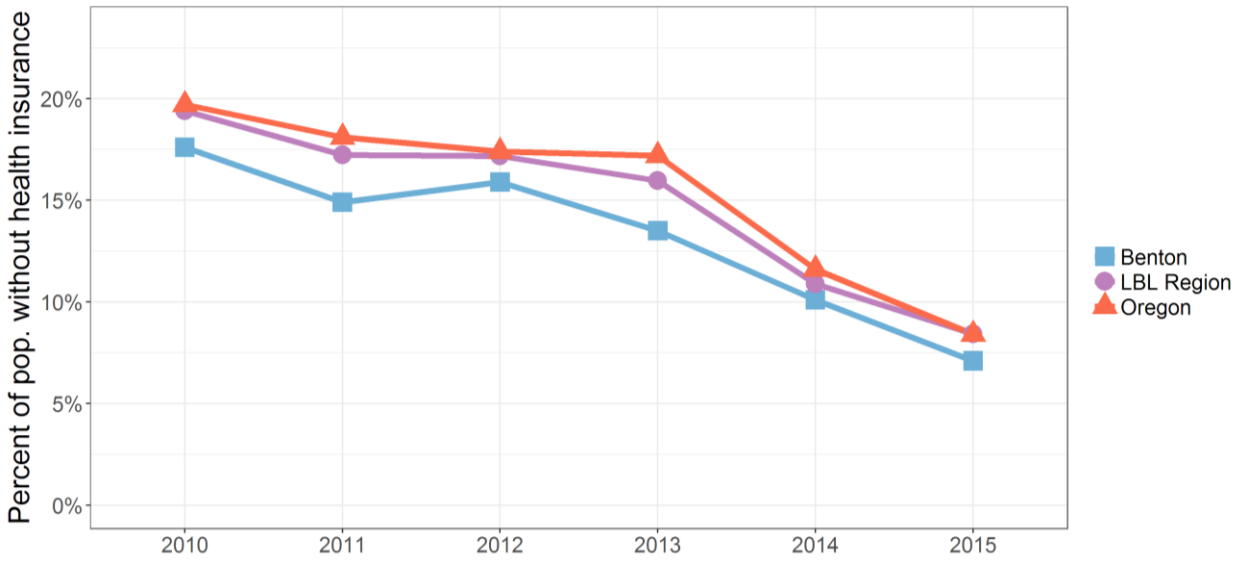


Figure notes: There are currently 54,000 individuals in Benton County under age 65. The data represents individuals who lacked health insurance at the time the data was collected. Individuals age 65 and older are excluded from this figure.

Source: U.S. Census Bureau, Small Area Health Insurance Estimates

Uninsured rates differed greatly between age groups before ACA. The uninsured rate among children across the region was lower than the rate for working-age adults (Table 5.1).[209] Overall, in both age groups, regional uninsured rates were similar to the rest of Oregon. Across the region, less than one percent of individuals 65 and older lack health insurance. The age group with the highest uninsured rates in the region was 25 to 34 year olds, at 22.4 percent, down from 28.7 percent in 2013.

Table 5.1: Uninsured rates in the Benton County and Oregon, 2015

	Benton County	Oregon
Under 18 years old	1.8 %	3.6 %
18 to 64 years old	7.3 %	10.0 %
65 years old and older	0.0 %	0.4 %

Source: U.S. Census Bureau, American Community Survey 1-year estimates

Insurance coverage rates were also pronounced across racial and ethnic categories, employment status, and citizenship status. Data from 2015 does not have a large enough sample size to be reliable. 2011-2015 five-year average data is older, but may indicate relative differences better. In Benton County, approximately 20 percent of Latino individuals and over 30 percent of American Indian and Alaska Natives were uninsured, compared to 10 percent of Asians and 7 percent of the White population. Black or African American, two or more races, and other races had uninsured rates ranging between 15 and 23 percent. Additionally, over 22 percent of the unemployed are uninsured, compared to 10 percent of those currently employed. The foreign born and non-citizens have high uninsured rates, at 18 percent and 22

percent, respectively.[210] Insurance coverage data is not available for undocumented immigrants, and undocumented immigrants are excluded from both Medicaid and the health insurance exchange.[211] However, the Oregon Legislature passed a "Cover All Kids" bill during the 2017 legislative session that guarantees that all individuals under the age of 18 will be eligible to be covered by Medicaid, regardless of immigration status.

Among the employed, those working less than full time year-round were uninsured at a higher rate (12 percent) compared to those working full time year-round (9 percent). Residents earning less than 200 percent of the federal poverty level are more likely to be without insurance coverage than those with higher incomes, 15 percent versus 5 percent.[212]

The implementation of the Affordable Care Act has had a major impact on insurance coverage rates in the region as Figure 5.1 demonstrates. However, even given the growth in insurance coverage rates over the past 5 years, insurance gaps and inequalities remain, especially for people of color, individuals living in rural areas, and low income workers.[213] As data for recent years become available, it will be important to measure these disparities.

Health Insurance Among Children

Examining insurance coverage rates among children up to age 18 (Figure 5.2) shows a gradual increase of insurance coverage in all three counties in the region from 2006 to 2014. As of 2015, all three counties had an insurance coverage rate of 92 to just over 95 percent for children under the age of 18. During the 2017 Oregon legislative session, the Oregon Legislature passed Cover All Kids, a bill that provides funding for medical assistance for all Oregon residents under age 19, up to 300% of the federal poverty level.

[Figure 5.2 is displayed on the following page]

Figure 5.2. Proportion of children age 0 to 17 without health insurance in Benton County, the LBL Region, and Oregon, 2006-2015

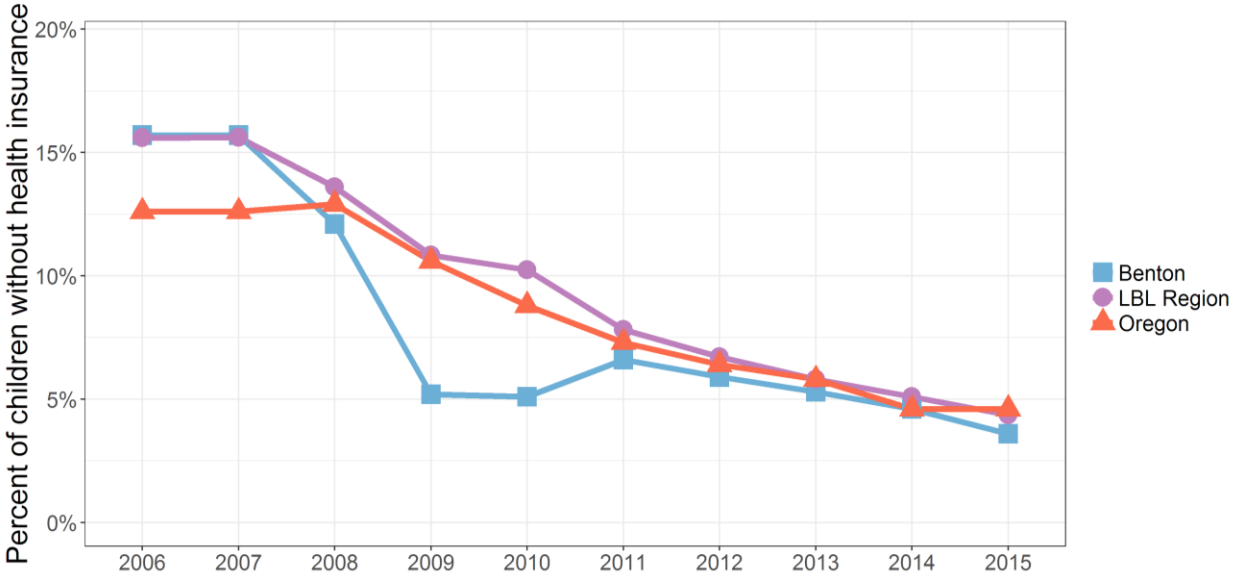


Figure notes: There are currently 14,000 children age 0-17 in Benton County. The data represent children without coverage at the time the data were collected.
Source: Kids Count Data Center

Insurance Types and Sources

People secure insurance from many different sources, including employer-based insurance, private insurance and public insurance. Figure 5.3 illustrates the distribution of the type of health insurance coverage among Benton County residents as of February 2015; with employer-based health insurance constituting the majority of coverage. The Oregon Health Plan provides health care coverage to low-income Oregonians. Medicare is the federal health insurance program for people who are 65 or older, certain younger people with disabilities, and people with end stage renal disease.[214]

[Figure 5.3 is displayed on the following page]

Figure 5.3: Percent of population covered by different insurance types in Benton County, 2011-2015

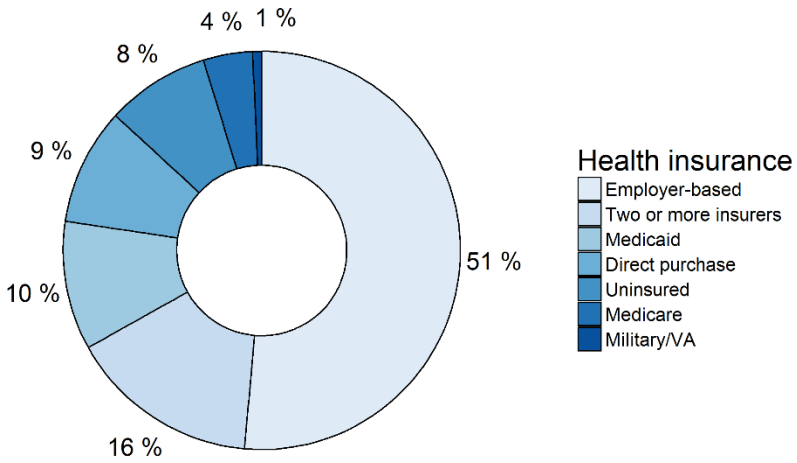


Figure notes: Two or more insurers includes individuals with two or more private insurers, two or more public insurers, and other combinations. All other categories represent individuals with only one source of insurance. The population underlying this data is approximately 86,000.
Source: U.S. Census Bureau, American Community Survey 5-year estimates, 2011-2015

Medicare

Medicare provides insurance to 13,260 Benton County residents over the age of 65 and 1,600 younger Benton County residents with permanent disabilities (about 17 percent of all Benton County residents).[215] The program helps pay for primary care, prescription drugs, home health care, hospitalization, and other health services. Part of Medicare is funded by a payroll tax, and other parts are funded by premiums paid by Medicare recipients. Medicare does not pay for all services and supplies that are needed by older adults and individuals with disabilities. For example, Medicare does not pay for routine dental care and does not cover long-term care. Most Medicare recipients have additional coverage to make up these gaps, whether private insurance or public insurance such as Medicaid.[216] Seventy-eight percent of Benton County residents who have Medicare have another source of health insurance. [217]

Oregon Health Plan

The Oregon Health Plan (OHP) provides health care coverage to low-income Oregonians through programs overseen by Oregon Health Authority. Service to OHP members in the region is largely provided through the local coordinated care organization (CCO), InterCommunity Health Network-CCO (IHN-CCO). Eighty-eight percent of OHP members in Benton County are enrolled with IHN-CCO. The other 13 percent of the county's OHP membership are enrolled in another CCO, Managed Care, or Fee for Service (Figure 5.4).[218]

Figure 5.4: Percent of OHP members enrolled in Coordinated Care Organizations, Managed Care or Fee for Service in Benton County, 2017

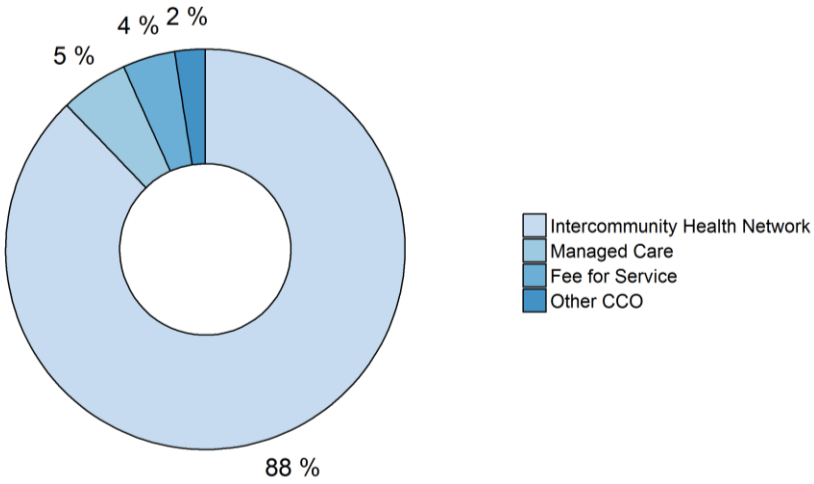


Figure notes: There are approximately 13,400 OHP members in Benton County, out of 90,000 residents.
Source: OHA Office of Health Analytics, May 2017 OHP Enrollment

The OHP population increased greatly from 2010 to 2015. In 2010, approximately 6,070 Benton County residents were OHP members. In 2017, there were 13,173 members, an increase of over 100 percent from 2010.[219,220]

Cost of Health Services

Insurance coverage is only part of the cost of health services. Additional costs are referred to as cost-sharing and include costs such as copayments, coinsurance, and deductibles. Health reform legislation has reduced financial burdens for many people with a lower income or significant health care needs. Nevertheless, one in three Americans say they have put off getting medical treatment that they or their family members need because of cost.[221] According to the most recently available data, during the 2006-2012 period, 17 percent of adults in Linn County, 10 percent of adults in Benton County, and 19 percent of adults in Lincoln County reported they did not see a doctor in the past 12 months because of cost.[222]

Cost of Health Care Services

Oregon has one of the highest hospital adjusted expenses per inpatient day when compared with all 50 states. The average cost per inpatient day in Oregon is $3,368, while the average cost across the United States is $2,271.[223] Data that is specific at the county or tri-county level is not publically available.

Cost of Insurance Premiums

When insurance is purchased through an employer, the cost of the premium may be shared by both the employee and the employer. Premium costs are set by the insurer, but the employer decides how much of the cost to pass on to their employee. Individuals who do not purchase insurance through an employer can purchase insurance through the Marketplace Exchange or directly through a private insurance company. The ACA also provides subsidies to reduce premiums, thus making options more affordable for consumers when bought in the marketplace. Regardless of where insurance is purchased, costs have steadily climbed over time. Since at least as far back as 1970, growth rates of health spending per capita have exceeded the rate of growth for GDP per capita. Within the U.S. between 2002 and 2012, the average annual premium for family coverage through an employer nearly doubled from $8,003 to $15,745.[224] Oregon insurance premiums are slightly below the U.S. average for insurance premiums. In 2015, the average cost of employer-based family insurance premiums in the U.S. was $17,322 annually; the average cost in Oregon was slightly lower at $17,141.[225]

Table 5.2 provides a snapshot of insurance premium costs for Oregon. It includes average monthly health care insurance premium costs paid by employee and employer, as well as the monthly cost for an individual purchasing non-employer provided insurance through the health insurance exchange. Individuals purchasing private, non-employer based coverage in Oregon are paying considerably more than individuals who purchase insurance through an employer.[226]

Table 5.2: Average cost of insurance coverage in Oregon, 2015

Source of insurance	Type of coverage	Individual/Employee contribution to annual premium	Employer contribution to annual premium	Total annual premium cost
Employer-purchased insurance	Individual	$ 898	$ 4,924	$ 5,822
Employer-purchased insurance	Family	$ 4,729	$ 12,412	$ 17,141

Source: Kaiser Family Foundation: State Health Facts

Comparable data for individual or family marketplace plans are not available, but in 2013, an individual marketplace-purchased plan averaged $2,460.[227]

Looking at the average cost for insurance premiums does have limitations due to the number of variables that influence costs for insurance premium (e.g., age, gender, health risk factors, zip code). However, it can give a general picture of the financial burden to both employers and employees for their health insurance coverage.

Health services Hardship Due to Cost

Uninsured Americans are still the most likely to report having put off medical treatment because of cost. However, even among those who have insurance, cost can be a barrier to care. Data from national studies report that families with private, non-employer sponsored insurance and with low income earnings face barriers to accessing services.[228]

National studies have found a number of challenges to meeting premiums and deductibles for low and middle income families with insurance, including the fact that households with the lowest incomes (100 percent to 249 percent FPL) lack resources to meet health insurance cost sharing demands, such as deductibles, co-pays, and co-insurance.[229] The majority of these families (68-80 percent) surveyed by the Kaiser Family Foundation in 2013 reported that they could not afford to cover the cost of their insurance deductible.[230] Similarly, among families earning 250-400 percent of the federal poverty level, between one third and one half reported that they were unable to afford the out-of-pocket deductible limits.[231]

Findings from the national studies reported above suggest that households in the region with insurance coverage may also experience significant barriers to health care services due to cost of care.

Access Capacity

Primary care, mental health, and oral health are foundational to a comprehensive offering of health services for a population. Table 5.3 can help to provide insight on the number of providers in each of these categories. It is important to remember however, that Benton County is a regional hub for health services. This means that while the number of patients to providers may be lower than the other counties, these same providers serve many patients from outside of the county.

While primary care provided by physicians is an important measure of the quality of the health care system, as the Robert Wood Johnson Foundation writes,

> *Physicians are not the only providers of primary health care. Other professionals can serve as usual sources of routine, preventive care including nurse practitioners (NP), physician assistants (PA), and clinical nurse specialists. The Health Services Research Administration estimates that the primary care NP and PA workforces are projected to grow far more rapidly than the physician supply in the next ten years, and could help alleviate shortages as demand increases.*[232]

One reason for the expected rapid increase in the supply of NPs and PAs is that those qualifications typically take less time to obtain than a physician's Doctor of Medicine (MD) or Doctor of Osteopathy (DO) license. Other primary care providers are especially vital in rural areas that may not have the population density to support a full time physician. Many rural

communities in the region have clinics staffed by nurse practitioners and other primary care providers. In the State of Oregon, NPs have independent prescribing authority, while PAs must abide by the practice agreement of a supervising physician.[233]

Table 5.3 below shows the number of residents per provider for primary care physicians and other types of providers. The numbers assume that the residents would be equally distributed across providers within a given provider type. Therefore, a smaller number of residents to providers indicates more capacity.

Table 5.3: Number of residents per provider in Benton County, the LBL Region, and Oregon, 2016 (physicians) and 2014 (other providers)

Provider type	Number of residents per provider		
	Benton	LBL Region	Oregon
Primary care physicians (2016)	764	1,209	1,039
Other primary care providers (non-physicians)	995	1,548	1,446
Mental health providers	144	279	250
Dentists	1,460	1,582	1,300

Table notes: Physician data is available for 2016. Other data is from 2017. Other primary care providers include nurse practitioners, physician assistants, and clinical nurse specialists. A smaller number of residents per provider indicates more capacity.

Sources: 2017 data: County Health Rankings, 2017; 2016 data: American Health Association

Having a usual primary care provider (PCP) is associated with improved health outcomes, increased health equity, and lower healthcare costs. Effective PCPs work to maintain sustainable relationships with patients, connect them with additional health resources in the community, and coordinate their care. Patients with ongoing access to PCPs and other healthcare services have better relationships with their providers and are more likely to receive appropriate care than patients without a regular healthcare provider.[234]

A 2012 study concluded that a primary care team (PCP and non-PCP staff) could reasonably care for a panel size between 1,387 and 1,947 patients.[235] The region has a ratio of 1,184 patients for each primary care physician. Using these ratios as benchmarks, the tri-county region has a good ratio of patients per PCP.

Although the region overall has a good ratio of patients to primary care providers, there is significant variation between the counties. Benton County has close to half as many patients per providers as Linn, and less than half as many as Lincoln County (see Table 5.3, above).

Behavioral/mental health services include an array of resources including assessments, individual and group therapy, case management, and other supportive therapies for people

with a mental illness and/or addictions. A continuum of behavioral health services is available in Linn, Benton, and Lincoln counties. Included in these services are acute care inpatient facilities for adult psychiatric patients, specialty mental health services for adult and child mental health and substance use disorders, residential services, and therapeutic services for clients with mild or moderate behavioral health needs. However, many residents have difficulty accessing these services due to limitations in geography, income, cultural competency, or time.

The Benton, Lincoln, Linn Regional Oral Health Coalition has recently completed a needs assessment which provides a more comprehensive look and analysis of oral health needs in the region.[236] Regionally there are about 1,730 residents for each oral health provider. This ratio is worse than the ratio in Oregon, which has about 1,360 residents per provider. Additionally, there is less variation between counties compared to primary care providers. The oral health provider ratios range from 1,600 to 1,850 residents per provider across the counties.

Oregon Health Plan Access to Care

According to public data from IHN-CCO, as of 2017 there are 80 providers practicing in Benton County who accept Oregon Health Plan insurance. Of these 80 providers, 62 are physicians and 18 are NPs or PAs.[237]

As mentioned above, patients having an established primary care team is critical for a variety reasons. An important trend among Medicaid participants in the region is the percentage of members that are enrolled in a primary care home. In 2015, IHN was 2nd in the state at 94 percent. This value dropped to just under 85 percent in 2016, the biggest decline of any CCO region in the state.[238]

For oral health, the percentage of OHP members in Benton County receiving any dental service in 2015 was 37.8 percent. This is slightly lower than the regional value of 38.5 percent.[239]

IHN-CCO members were also asked a series of questions in a CAHPS* survey in 2015 to understand the access to care and quality of care they receive. Of those who responded:

- Eighty eight percent of respondents reported that they always or usually received immediate care when they needed it.
- Seventy nine percent of respondents reported that the always or usually got an appointment for routine care as soon as they needed it.
- Ninety percent of respondents reported that their provider always or usually explained things in a way that was easy to understand.
- Ninety percent of respondents reported that their provider always or usually listened carefully to them.

* CAHPS stands for Consumer Assessment of Healthcare Providers and Systems and is developed and maintained by the Centers for Medicare and Medicaid.

- Ninety percent of respondents reported that their provider always or usually showed respect for what they had to say.
- Eighty seven percent of respondents reported that their provider always or usually spent enough time with them.
- Ninety five percent of respondents reported that their health plan's customer service staff were always or usually courteous and respectful.[240]

Health Services and Workforce

The health service needs of people who live, learn, work and play in Benton County are met through a variety of medical services, and residents of the county often travel to other counties for the care they need. Private group and individual practices offer primary care, dental, mental health, services for the developmentally disabled, specialty care, and alternative medicine services. Corvallis functions as a center for regional healthcare and enjoys unusually sophisticated health services for a community of its size. The range of services include a 188-bed regional medical center including a Level II trauma center, inpatient mental health care, cancer center, heart institute, outpatient surgery center, and hospice services.[241] Safety net providers serve a large proportion of low-income, uninsured, and rural populations through community health centers, rural health centers, school-based health centers, public health, and other community service organizations. Traditionally, safety net clinics focus on primary care and may also provide mental health, oral health, and pharmacy services.

Safety Net Services & Community Benefits

The health care "safety net" refers to the component of the health care system serving low-income and uninsured people. Safety net services are complemented by community funding, programs, and activities.[242]

Federally Qualified Health Centers* (FQHCs) and Free Clinics or "charity" clinics are the most common types of safety net clinics. FQHCs in the region provide primary care, mental/behavioral health, and oral health services. Benton County has four federally qualified health centers: one in Corvallis, a school-based health center in south Corvallis, and a school-based health center in Monroe. An independent rural health clinic has operated for many years in Alsea; the clinic joined the Benton County FQHC network in 2015. Two FQHCs operate in Linn County under the umbrella of the Community Health Centers of Benton and Linn Counties, one in Lebanon and one in Sweet Home. The Community Health Centers of Benton and Linn Counties served just over 9,000 patients in 2015.[243] Several auxiliary safety net providers also serve the region's vulnerable populations, such as women and children, persons experiencing homelessness, and people who are HIV-positive.

* FQHCs have a legal mandate or expressly adopted mission to serve all patients, regardless of ability to pay or legal status.

Cultural and Linguistic Competency

One measure of workforce competency is quantifying the level of cultural and linguistic ability among providers. The Center for Linguistic and Cultural Competency in Health Care (CLCCHC) has created National Standards for Culturally and Linguistically Appropriate Services (CLAS) in Health and Health Care in order to "…improve health care quality and advance health equity by establishing a framework for organizations to serve the nation's increasingly diverse communities."[244] These standards are used by many health and medical care organizations as a tool in order to improve cultural competency. Cultural competency alone cannot address disparities in health, but is seen as a way to increase access for all patients and promote health equity.[245]

Cultural competency, while often framed in terms of language barriers, includes more than having a provider who is able to speak the same language as the patient. By using the National CLAS Standards as a framework, it is clear that communication must include respect, engagement, and overall health literacy as well. This includes the ability to effectively communicate with and understand diverse patients, including those from at-risk populations such as LGBTQ, developmentally diverse, elderly, and those with chronic mental health issues.

Low-income Latinos, and migrant and seasonal farm workers living in the tri-county region face multiple barriers to accessing culturally and linguistically appropriate health care and other related prevention, treatment, and disease self-management services. Many are employed in agriculture sectors that provide few or no employment benefits, or live in geographically isolated rural areas with limited access to public transportation. Cultural, linguistic, and literacy barriers further reduce access to needed information. Oregon's Latino population is expected to grow by an anticipated 184 percent from 2010 to 2025, increasing the need for health services by this population.[246]

Oregon Health Plan Race/Ethnicity Perceptions

Medicaid recipients' perception of treatment when seeking health care is different among races and ethnicities. 6.4 percent of the state's adult OHP population feel that their health care experience is worse than other races and ethnicities. In the IHN-CCO region, this proportion is 7.8 percent.[247]

Health Care Professional Shortage Areas

Knowing the number of providers and types of services are very important for gauging the capacity and presence of a health care system. However, an understanding of the geographical distribution of these services helps paint a more accurate picture.

While the region enjoys a good ratio of health care providers to overall population, geographic distribution of providers can make it difficult for those with limited transportation to access services. Because rural areas of the region have either no or very few health services providers, portions of the region are designated as geographic Health Care Professional Shortage areas (HPSA). Designation as an HPSA means that there is an increased risk of poor access to health professionals.[248] Linn, Benton, and Lincoln counties all qualify in part as an HPSA for primary care, dental health, and mental health.

In addition to the geographic designation, the region also has population-based HPSAs for migrant seasonal farmworkers and low income individuals. Migrant seasonal farmworkers and their families are a particularly vulnerable subgroup of the Latino/Hispanic population.

Farmworkers have different and more complex health problems than those of the general population. Many of the Latino/Hispanic migrant seasonal farmworkers are documented but have undocumented family members with them. Many are employed in agriculture sectors that provide few or no employment benefits. While most are low income, many immigrants and migrant seasonal farm workers do not qualify for Medicaid due to their residency status or they are unable to access Medicaid due to language, transportation and cultural barriers.[249]

Emergency Responders

Emergency Management Services (EMS) responses serve an important role in the community. According to the Oregon Office of Rural Health, the mean travel time to the nearest hospital for rural service areas is 23 minutes. Estimated travel time is calculated from the largest town/city in each of the rural service areas to the nearest town/city with a hospital. This is the protocol unless the city already has a hospital, in which case driving time is defaulted to 10 minutes.[250] Seven areas in the region have a mean travel time to the nearest hospital which is greater than 23 minutes, with the longest mean travel time in eastern Linn County at approximately one hour. With the exception of the Alsea area, which has a mean travel time to the nearest hospital of 34 minutes, most of Benton County has a mean travel time to the nearest hospital under the rural average of 23 minutes.[251]

Timeliness

Once a health need is recognized, a health care system must be able to respond to this need in a timely manner. Measures of timeliness include the length of time it takes to get a medical appointment, wait time in doctors' offices and emergency departments, and the interval between identifying a need for specific tests and treatments and actually receiving services.

According to Healthy People 2020, in 2013, 4.9 percent of the U.S. population reported delays in receiving necessary care. For families below 200 percent of the poverty line, the proportion increased to nearly 7 percent.[252] Individuals enrolled in InterCommunity Health Network (IHN-CCO), the Coordinated Care Organization (CCO) for the Linn-Benton-Lincoln region, reported

that they received appointments and care when needed 85.5 percent of the time in 2015, up from approximately 82 percent of the time in 2011.[253] When looking at Oregon CCOs as a whole, timeliness for children increased from 76.1 percent to 88.7 percent between 2011 and 2015; the percentage of adults reporting timely care increased only 0.8 percentage points, from 79.4 percent to 80.6 percent.[254]

There is evidence that type of insurance can affect the timeliness of care for an individual. A 2014 study, in which researchers called primary care providers to set up mock appointments, found significant disparities in the ability to successfully set up an appointment by insurance type.[255] Callers representing themselves as privately insured in Oregon were able to secure a timely appointment 75 percent of the time, while those calling as Medicaid beneficiaries were only able to do so 37 percent of the time. It is possible that this disparity was magnified at the time of the study (calls were made in 2012 and 2013), as the health care transformation plan in Oregon created a new pool of Medicaid patients looking for services without expanding workforce capacity. However, this appears to be a similar trend across the nation.[256] When the privately insured were turned down, the reason was largely because the doctor was not taking new patients. Conversely, 69 percent of Medicaid callers across multiple states were explicitly told their type of insurance was not accepted. Uninsured patients in Oregon were able to book an appointment 71 percent of the time; however that was with an up-front cash payment that averaged $176. Only 20 percent of uninsured appointments cost less than $75.[257] In addition to causing economic hardships, expensive medical services can also cause delays in receiving health services, as individuals have to seek alternative, less expensive sources of care, or wait until they have enough money to pay for care.

Timeliness in Access to Care for the Oregon Health Plan

Statewide, the percentage of OHP members who thought they received timely care was about 84 percent in 2016. This varies widely by race, ranging from 63 percent (Asian Americans) to 87 percent (American Indians or Alaska Natives) in adults. The IHN-CCO region 2016 results (83 percent) were down from the 2015 results (86 percent).[258]

Preventable Hospitalizations

Preventable hospital stays are another way to measure timely health care. Measurement focuses on hospital admissions for conditions that might otherwise have been controlled in an outpatient setting. Effective management of chronic conditions (e.g. asthma, heart disease and diabetes) on an outpatient basis can help avoid hospitalizations. Likewise, timely outpatient care for conditions such as pneumonia or cellulitis can often prevent deterioration and hospitalization.[259] Local data is available for Medicare enrollees and preventable hospital stays as of 2014. The three counties show marked differences in rates per 1,000 Medicare enrollees per year. Benton County has the lowest rate in the state at 22 preventable hospital stays per 1,000 Medicare enrollees. Lincoln County has a rate of 38 preventable admissions per 1,000

Medicare enrollees, slightly higher than Oregon's average of 33 preventable admissions per 1,000 Medicare enrollees. Linn County has a rate of 40 preventable admissions per 1,000.[260]

Emergency Services

Emergency services are an important indicator of timely access to health services, as they represent the most time-sensitive and critical medical conditions. Good Samaritan Regional Medical Center in Corvallis had approximately 23,000 emergency room visits (not necessarily unique patients) in 2015. The following table (Table 5.4) provides further statistics for Good Samaritan regarding timely care in the emergency department in 2015-2016.

Table 5.4: Emergency room statistics for Good Samaritan Regional Medical Center, 2015-2016

	Good Samaritan Regional Medical Center	Oregon average
Median wait time patients spent in an emergency department before being seen by a medical professional	39 minutes	32 minutes
Median wait time for pain medication among emergency department patients with broken bones.	50 minutes	53 minutes
Percent of emergency department patients who left before being seen	1 %	3 %

Source: Hospital Compare, Medicare.gov

Transportation to Medical Care for Oregon Health Plan Members

Oregon Cascades West Council of Governments coordinates the Cascades West Ride Line, which provides transportation to and from non-emergent medical appointments for Oregon Health Plan and Medicaid members. Beginning from the expansion of Medicaid in 2013, the Ride Line has increased its service from 2,300 clients in the third quarter of 2013 to 3,300 clients in the second quarter of 2015. The total number of trips increased from 25,000 trips to 41,500 trips over the same time period.[261] In 2016, Ride Line provided about 26,000 rides or gas reimbursements to approximately 320 clients in Benton County. [262]

Oral Health Services

Oral health is a key indicator of wellbeing, and, especially among children, access to oral health services is important in creating a foundation of health. There is little county level data on access to oral health care.

The Oregon Pregnancy Risk Assessment Monitoring System (PRAMS) asks new mothers and parents of two-year-olds about their dental care. In 2011, 52 percent of pregnant women visited the dentist during their pregnancy. In 2011, 24 percent of two-year-olds in Oregon had had a dental visit. [263]

According to the Oregon Smile Survey, in 2012, 38 percent of children age 6-9 had protective sealants on at least one permanent molar, and 3 percent of children age 6-9 were in need of urgent dental care.[264]

Oregon Healthy Teens data indicates that 79 percent of Benton County 8th graders and 84 percent of Benton County 11th graders had seen a dentist for preventive care in the past year. These proportions are higher than among Oregon students (73 percent and 75 percent, respectively). [265]

There is no available county level data on adult oral health access. Sixty-seven percent of all Oregonians had seen a dentist within the past year. The most common reason given for not visiting a dentist was lack of insurance or inability to pay (44 percent of respondents who do not usually visit a dentist).[266]

Oral Health Services for Oregon Health Plan members

Among dentists in Oregon, 59 percent report that they do not see Medicaid members. Among dentists who do see OHP members, 46 percent have less than one quarter of their patient panel filled by Medicaid members. [267]

Seventy-seven percent of children and 49 percent of adult OHP members had a regular dentist in 2015. [268]

Thirty-four percent of Oregon OHP members received any dental service in the past year. Thirty-six percent of IHN-CCO members received any dental service in the past year. When examining service rates by race and ethnicity (statewide), Hawaiian and Pacific Islander Medicaid members receive the lowest rates of dental services at 30 percent, while Asian American members have the highest rates at 39 eprcent.[269]

In 2016, 20 percent of all IHN-CCO members reported receiving a preventive dental service during the previous year. 51 percent of IHN-CCO members who were children had a preventive dental service during the previous year. However, only 16 percent of IHN-CCO members who were children received at least two topical fluoride applications during the past year. And only 6 percent of IHN-CCO children age 6 or below had an oral health assessment in 2016. [270]

Behavioral Health Services

Residents of Benton County with behavioral health illness such as mental illness and substance abuse disorders are served by a number of different types of providers, including the hospital system, private clinics, county behavioral health, residential facilities, and individual practitioners. Many residents with behavioral health issues are also treated within the criminal justice system in Benton County and Oregon.

There are approximately 280 Benton County residents who are being treated at the Oregon State Hospital or in a residential facility. This represents a rate of 313 individuals per 100,000 residents, compared with a rate of 574 individuals per 100,000 residents statewide. This is due to higher statewide institutionalization rates at all facilities, and especially at the OHP Psychiatric Hospital and in supportive housing. [271]

There are longstanding gaps between the need for behavioral health services and the capacity of these services. The National Survey on Drug Use and Health estimates that 4 percent of youths, 7 percent of young adults, and 2 percent of adults age 26 and up are in need of services but are not receiving treatment for illicit drug use. The gap for alcohol treatment is generally wider, with 13 percent of young adults and 6 percent of other adults needing but not receiving treatment.[272]

Oregon Health Plan members

The Oregon Health Plan covers mental health and substance abuse disorder treatment, and as a result, treatment rates for these conditions are substantial. In Benton County, 2,440 Oregon Health Plan members are receiving mental health services through OHP, and 541 members are receiving substance abuse disorder treatment services. [273]

Table 5.5 shows the percentage of OHP members who receive treatment for mental health conditions and substance abuse disorders. These proportions demonstrate both the burden of disease and also access to care, with the caveat that disease burden is always higher than treatment rates, but by how much is unknown. Young adults are generally less likely to seek treatment, so the treatment rates may understate the comparable disease burden.

Table 5.5: Percent of OHP members in Benton County receiving treatment for mental health conditions and substance abuse disorders, 2015

Age group	Mental health conditions	Substance abuse disorders
Children age 0 – 17	11.2 %	2.2 % *
Young adults 18 – 25	8.2 %	3.0 %
Adults 26 and older	10.9 %	3.8 %
All members	10.3 %	2.6 %

Table notes: * indicates that substance abuse statistics for children under 18 were reported for children age 12-17.
Source: OHA Benton County Behavioral Health Profile

Local Data

The following descriptions of local data collected by Benton County Health Department and partners are taken in part or in full from existing documents. Sources are cited at the bottom of each section.

Community Health Centers of Benton and Linn Counties Patient Experience of Care

Patients of the Community Health Centers in Benton County completed Experience of Care (CAHPS)* surveys that included information about access to care and experience of care. Their responses are collected and used as part of a quality improvement process to ensure that patients are receiving the best possible care. The following data are from the CAHPS survey results.

- Seventy eight percent of respondents reported that they always or usually received immediate care when they needed it.
- Eighty seven percent of respondents reported that the always or usually got an appointment for routine care as soon as they needed it.
- Seventy two percent of respondents reported that they always or usually spent 15 minutes or less in the waiting room before seeing their provider.
- Ninety six percent of respondents reported that their provider always or usually explained things in a way that was easy to understand.
- Ninety six percent of respondents reported that their provider always or usually listened carefully to them.
- Ninety five percent of respondents reported that their provider always or usually showed respect for what they had to say.
- Ninety three percent of respondents reported that their provider always or usually spent enough time with them.
- Ninety seven percent of respondents reported that the clerks and receptionists were always or usually courteous and respectful.[274]

Garfield and Linus Pauling Schools Neighborhood Assessment

In 2016, Benton County Health Department conducted a neighborhood assessment of the neighborhood surrounding Garfield Elementary and Linus Pauling Middle Schools. Approximately 30 percent of respondents were primary Spanish speakers. On the topic of access to health care, respondents were asked about visits to the doctor and visits to the dentist.

* CAHPS stands for Consumer Assessment of Healthcare Providers and Systems and is developed and maintained by the Centers for Medicare and Medicaid.

In response to the questions about doctor visits, 15 percent of respondents said they had not seen a doctor in over a year. The top three reasons for not seeking care were that it was too expensive, that they didn't have insurance, or that they had not been sick. Among respondents who had visited a doctor, the top three sites were the Community Health Center, the Corvallis Clinic, and Samaritan Health Services.

In response to the questions about dentist visits, 30 percent of respondents said that they had not seen a dentist within the past year. The top two reasons for not seeking dental services were that it was too expensive or that they did not have insurance.[275]

Linn, Benton, Lincoln Colorectal Cancer Screening Campaign

The Linn Benton Lincoln Colorectal Cancer Screening Program's Planning and Evaluation Team (PP&E) consisted of public health specialists from each county, employing the principles of evidence-based practice and science for colorectal cancer screening. To address barriers associated with regular screening, the PP&E worked with clinics to promote the fecal immunochemical test (FIT), as well as more traditional methods like colonoscopy, and to create sustainable clinical processes to screen, refer, and follow-up with patients.

The regional campaign also utilized Oregon Health Authority's social marketing campaign, The Cancer You Can Prevent (thecanceryoucanprevent.org). This campaign recruited local champions to educate the public, to promote regular screening, and to encourage individuals to talk to their friends and family about their own experiences getting screened. Clinics were invested in the process, but the PP&E Team found that the pilot period (three-month implementation period) was too short for clinics to develop and implement a new clinical workflow. The PP&E Team recommends allotting more time, so clinics have an adequate amount of time to use quality improvement processes.

Additionally, the PP&E recommends offering training to clinics on electronic health record (EHR) use, workflow development and implementation, and staffing plan modification. Through interviews with clinic staff, it was apparent that some of the clinics struggled with these skills and reported more training in these areas would have been beneficial. The PP&E Team found that having educational materials, like posters and brochures, in the waiting room and in the exam rooms helped start the conversation between providers and patients. The PP&E Team also recommends having FIT kits in the exam rooms, so providers can show their patients the FIT, can better discuss the process, and can address patients' barriers to completing the test.

Clinics developed many ways to follow-up and address patient barriers. Examples include sending reminders via birthday cards, sending FIT kits in the mail, sending reminder cards and letters, making phone calls, and sending text messages. The PP&E Team recommends utilizing technology to make these follow-up procedures less cumbersome on staff.[276]

Clinical Health Navigator Evaluation

In collaboration with InterCommunity Health Network, Benton County Health Services has implemented a pilot program with Geary Street Family Medicine, MidValley Children's Clinic, Samaritan Family Medicine, and Samaritan Internal Medicine. These four clinic sites are the focus of the present evaluation. In those clinics, Clinical Health Navigators help clients navigate an increasingly complex health care and social services system. Using a mixed-methods approach, we conducted a formative evaluation of the Clinical Health Navigator Pilot Program at these sites, capturing the experiences of clients, clinical health navigators, and clinic providers/staff. Touches data was collected for the entire pilot program period (May 2015 through December 2016). During summer and autumn of 2016, one focus group with Spanish-speaking clients (6 participants), six interviews with non-Spanish speaking clients, one focus group with clinical health navigators (10 participants), and thirteen provider interviews were conducted. At the end of each focus group/interview, participants completed an anonymous brief socio-demographic survey.

Clinical health navigators performed 7,162 touches between May 2015 and May 2016. The top three categories for client interactions were Medicaid/OHP assistance (2,824 touches), accessing community resources (1,428 touches), and coordinating care through information (935 touches).

Clients interviewed stressed that clinical health navigators filled needs that would otherwise go unmet. One barrier to access is making appointments that accommodate a client's schedule. Often clients would have difficulty in completing paperwork because they could not get timely appointments. Clients reported that clinical health navigators were more available, in the case of one client, "If a letter arrives, I call her, and she gets things resolved right away."

In addition to helping with OHP enrollment and other insurance related issues, clinical health navigators have helped clients with transportation issues, and even other non-clinical resources, such as housing, clothing, and emergency food boxes.

Boys and Girls Club of Corvallis Year End BBQ 2016

The Benton County Health Department partnered with the Boys and Girls Club of Corvallis at an end of year celebration in June 2016. Close to 400 youth attended the event. Three open-ended questions were asked of attendees:

- In response to the question "What do you need to be healthy?," 121 respondents answered "Healthy food," 44 answered "Drink water," 34 answered "Exercise," and 11 answered "Sleep".

- In response to the question, “I feel most healthy when I…”, 66 respondents answered “Exercise”, 48 answered “Eat Healthy”, and between 11 and 16 answered “Sleep well”, “Play”, ”Drink water”,” or “Stay active”.
- In response to the question, “Why don’t you see the doctor?” most respondents did not understand the question, answering that they do see the doctor. However, 38 answered “Because I’m healthy”, 13 answered “It’s scary”, and 9 answered “My illness will pass”.

As part of the celebration, Trillium Family Services collected demographic and healthy behaviors data from the attendees. This data is presented in the tables below.

Table 5.6 Age group of respondents. 2016

Age group	Percent of respondents
5-9 years old	28 %
10-12 years old	23 %
13-15 years old	4 %
16-18 years old	1 %
Did not give age	44 %

Table notes: There were approximately 360 total respondents

Source: Boys and Girls Club of Corvallis Year End BBQ questionnaire results.

Table 5.7 Percent of respondents who are active at least 3 days a week for 30 minutes, 2016

Age group	Percent active at least 3 days a week
5-9 years old	65 %
10-12 years old	87 %
13-15 years old	68 %
16-18 years old	100 %
Did not give age	85 %

Table notes: There were approximately 360 total respondents

Source: Boys and Girls Club of Corvallis Year End BBQ questionnaire results.

Table 5.8 Percent of respondents who eat some fruits and vegetables every day, 2016

Age group	Percent eating fruits and vegetables
5-9 years old	87 %
10-12 years old	89 %
13-15 years old	100 %
16-18 years old	50 %
Did not give age	82 %

Table notes: There were approximately 360 total respondents

Source: Boys and Girls Club of Corvallis Year End BBQ questionnaire results.

Table 5.9 Percent of respondents who have food they can eat in their house every day, 2016

Age group	Percent active at least 3 days a week
5-9 years old	79 %
10-12 years old	90 %
13-15 years old	75 %
16-18 years old	100 %
Did not give age	76 %

Table notes: There were approximately 360 total respondents

Source: Boys and Girls Club of Corvallis Year End BBQ questionnaire results.

South Benton County Agricultural Workers

As part of its Monroe Farms Survey, Benton County Health Department asked agricultural workers about their access to health care.

Lack of health insurance is a very large barrier to health care. 45 percent of the workers surveyed said they will only seek medical help if it is an emergency. In this case they utilize emergency departments. Twenty-two percent of the workers seek health care at community clinics, such as the Monroe School-Based Health Clinic. Eleven percent use private practice, 11 percent use special programs such as health fairs, and 11 percent use other options, such as lay healers. Lay healers may provide patients with teas, herbal remedies and creams. Two reasons commonly given for seeking care from other sources are lack of affordability of conventional health services, and fear of being reported to immigration authorities and being deported.

The most common health services needed by agricultural workers are medical care and dental care, which were each cited by 31 percent of respondents. Most of the agricultural workers have severe gum disease, in part due to never having had a dental cleaning. Many have decayed teeth or other dental needs. The agricultural workers surveyed said that they only seek medical care for conditions that require immediate attention rather than preventive care which could protect them against more serious medical issues.[277]

Conclusion

Examining the ways in which various populations interact with the health care system is important to help us recognize the barriers that many residents face when obtaining health services. As highlighted throughout this chapter, the data-driven exploration of health services access is still developing, as are the frameworks that act as a guide. We still have little knowledge on a local scale of how factors such as race and ethnicity, education level, disability status, language ability, immigration status, and gender identity influence an individual's ability and desire to access health services. Finally, closing gaps in quantifying the workforce would provide a better understanding of the co-development of the health care system with those it serves. The data presented in this chapter can support an initial understanding and baseline of access to health services in the region, while calling attention to challenges faced by many in our community when accessing health services.

Chapter 6
Physical Health

Physical health is influenced by a combination of factors, including environment, social and behavioral factors, genetics, nutrition, and exercise. There are large overlaps between physical health and behavioral health (Chapter 7). Many measures listed in this chapter, such as domestic violence, could alternately be organized with behavioral health, and vice versa.

Traditional measures used to evaluate the health of populations are morbidity (incidence of disease) and mortality (deaths). Examining various cancers, heart disease, and other major causes can highlight notable improvement as well as areas in which the region is in need of improvement. The more detailed data available about disparities within particular populations and illnesses, the better communities can address these issues effectively in the region. Many of the conditions that cause illness and death within the region have well-established causes, a number of them rooted in behaviors or risk factors that can be prevented.

Throughout this chapter, many statistics are aggregated over a set of years in order to report reliable data. When incidence or prevalence rates are reported across many years, the statistic is per person per year. For example, the all-cancer incidence rate in Oregon across 2010-2014 was 433 cases per 100,000 people; this means that in each of the five years between 2010 and 2014, 433 cases were diagnosed for every 100,000 people in the population.

Maternal and Infant Health

All fertility and maternal/infant health data is based on the county of residence of the mother, not the county where the infant was born.

Fertility Rates

The total fertility rate is the total number of births per 1,000 women in a given year. The total fertility rate is based on the age-specific fertility rates of women in their "child-bearing years", which is ages 15 to 44. Figure 6.1 below illustrates the total fertility rates of different racial/ethnic groups within Benton County. Among racial/ethnic groups, women who identify as Hispanic or Latina have the highest total fertility rate in Benton County, equal to about 1.5 times the total fertility rate of women who identify as White.

Figure 6.1: Fertility rate, (births per 1,000 women) by race/ethnicity in Benton County, 2013-2015

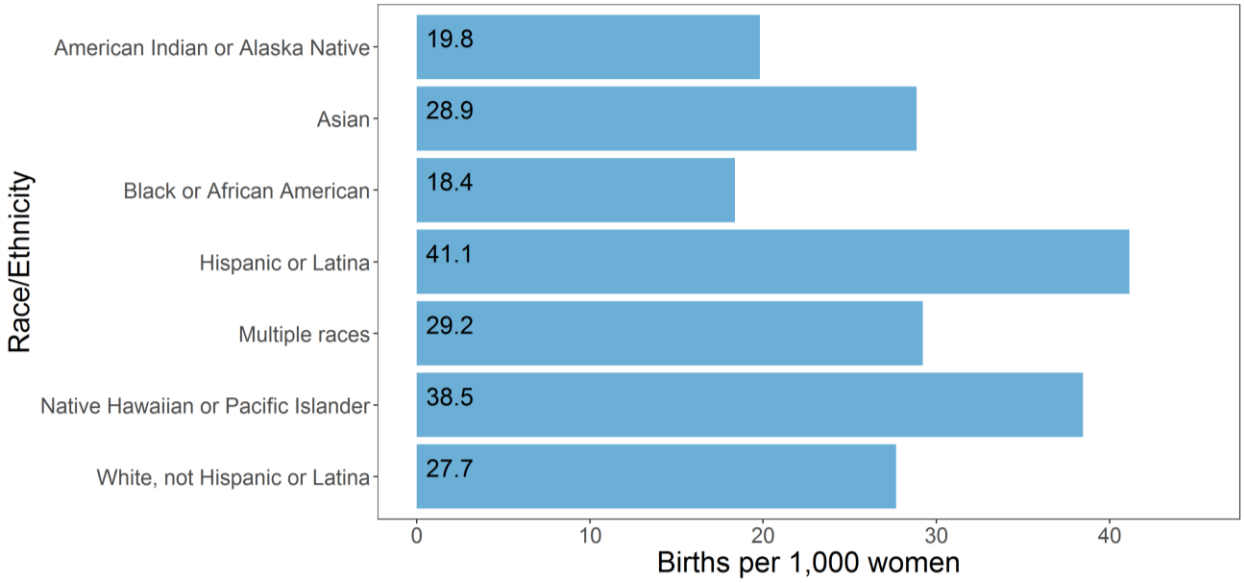


Figure notes: These data represent 4,242 births over 3 years. Fertility rate data is based on county of residence, not county of birth.

Source: Oregon Healthy Authority, Center for Health Statistics, Birth Certificate Data

Compared to Oregon, women in Benton County tend to have fewer births per 1,000 women across all age groups, as well as having children at a later age than women in Linn or Lincoln counties.[278] The highest fertility rate in Benton County occurs for women between ages 30 to 34, while in Linn and Lincoln counties the fertility rate is highest for women ages 20 to 29.[279]

[Figure 6.2 is displayed on the following page]

Figure 6.2: Age-specific fertility rates (births per 1,000 women) by maternal age in Benton County, 2013-2015

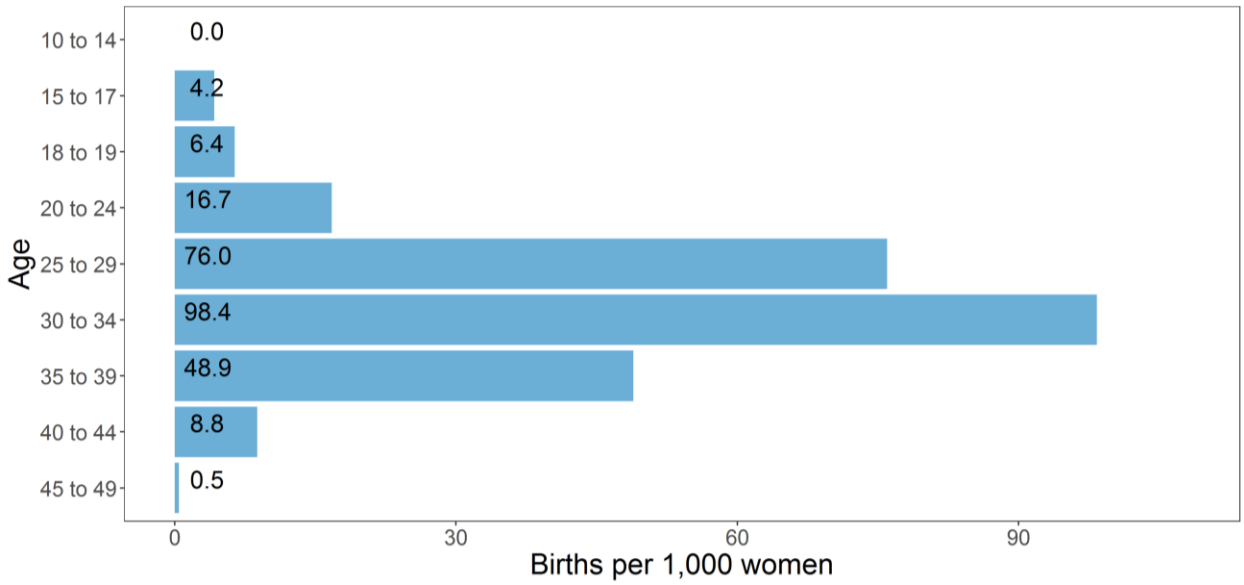


Figure notes: These data represent 4,242 births over 3 years.
Source: Oregon Health Authority, Center for Health Statistics, Birth Certificate Data

Prenatal Care and Healthy Pregnancy

Infants born to mothers who receive no prenatal care are three times more likely to have a low birth weight, and five times more likely to die of complications than those whose mothers received prenatal care.[280] Prenatal care with/by a medical professional includes discussing a mother's healthy choices and body changes; prenatal testing and counseling; identifying and treating medical complications like gestational hypertension, diabetes, and anemia; promoting optimal weight gain; testing for and treating sexually transmitted infections; oral health assessment and treatment; and maternal mental health, tobacco and substance abuse screening.

Across the region from 2013 to 2015, a total of 88 percent of all mothers were able to access adequate prenatal care, only slightly higher than the 87 percent of Oregon mothers during the same time period. Disparities exist among different age groups within Benton County. As shown in Figure 6.3, younger mothers are less likely to access adequate prenatal care than older mothers. Compared with women over the age of 25, women under the age of 25 are nearly twice as likely to receive inadequate or no prenatal health care.[281]

Figure 6.3: Percent of births for which mothers accessed inadequate or no prenatal care in Benton County by age group, 2008-2015

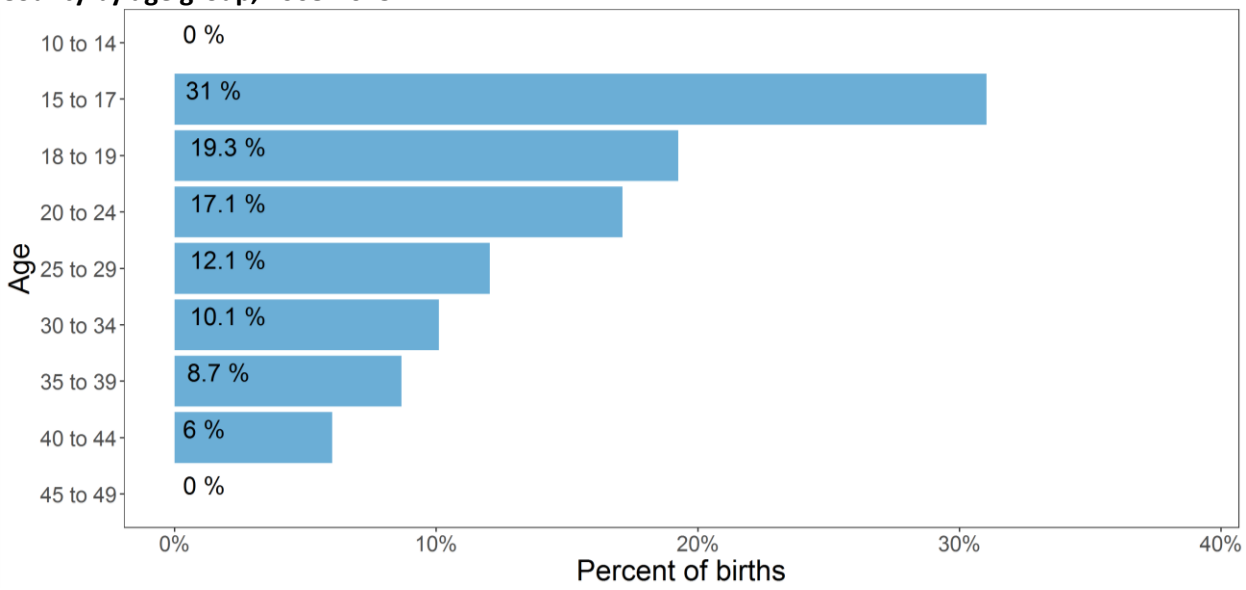


Figure notes: These data represent 5,894 births over 8 years.
Source: Oregon Health Authority, Center for Health Statistics, Birth Certificate Data

There also exist disparities in prenatal care access among mothers of different race/ethnic groups in Benton County. Overall, mothers who identify as White, non-Hispanic tend to access adequate prenatal care more frequently when compared to all other racial/ethnic groups (Figure 6.4).[282]

Figure 6.4: Percent of births for which mothers accessed inadequate or no prenatal care by race/ethnicity in Benton County, 2008-2015

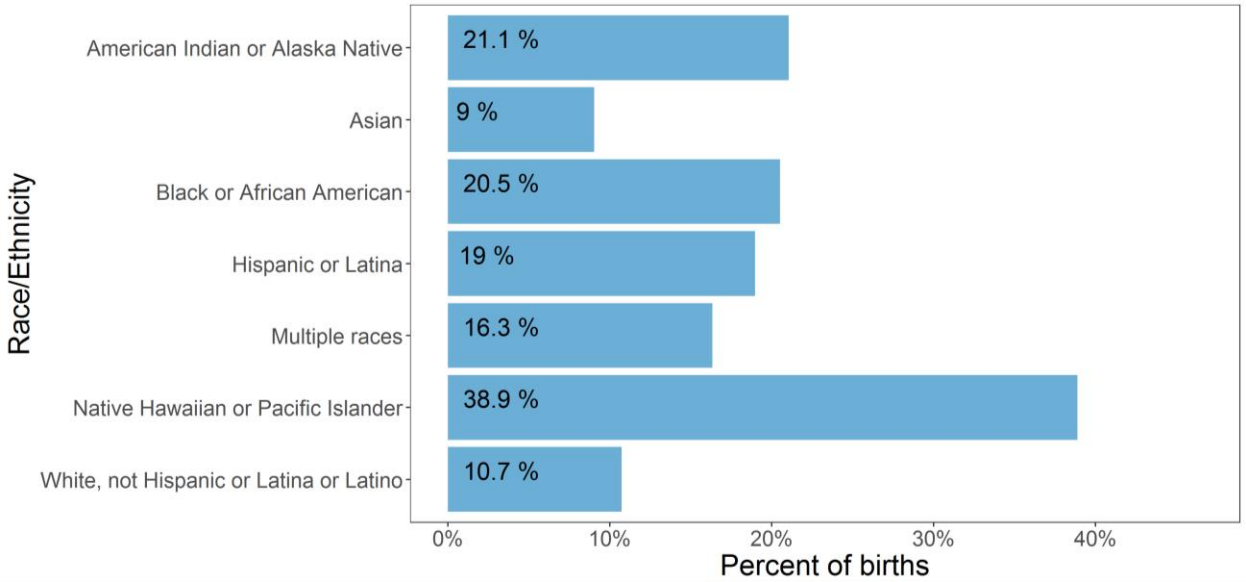


Figure notes: These data represent 5,894 births over 8 years. Results should be interpreted with caution for the American Indian/Alaska Native, Black, and Pacific Islander groups due to a low number of births.
Source: Oregon Health Authority, Center for Health Statistics, Birth Certificate Data

Smoking during Pregnancy

Smoking during pregnancy is the single most preventable cause of illness and death among infants. Smoking during pregnancy increases the risk of stillbirth, low birth weight, sudden infant death syndrome (SIDS), and preterm birth. It also contributes to cognitive and behavioral problems and respiratory problems in both the mother and the child.[283]

Children exposed to tobacco before birth are more than twice as likely to become regular smokers themselves later in life, compared with children not exposed to tobacco in utero.[284] Women who quit smoking before pregnancy or early in pregnancy also significantly reduce their risks for delays in conception (e.g. infertility) and other complications during birth.[285]

On average in 2013-2015, 8 percent of mothers smoked during pregnancy in the Benton County. This percentage is higher than both the state average of 11 percent and the Healthy People 2020 target of 1.4 percent.[286] The maternal smoking rate in the Benton County is lower than Oregon (10 percent) across all age groups. However, there is a notable difference in smoking rates when comparing age groups, in which the rate of smoking among pregnant women under the age of 25 is over two times the rate of smoking among pregnant women over the age of 25.

The rate of smoking among pregnant women in Benton County is highest among 18 to 19 year women (at almost 1 in 4 pregnant women), followed by 20 to 24 year old women (Figure 6.5).

Figure 6.5: Maternal smoking rates (percentages) among pregnant women in Benton County, 2013-2015

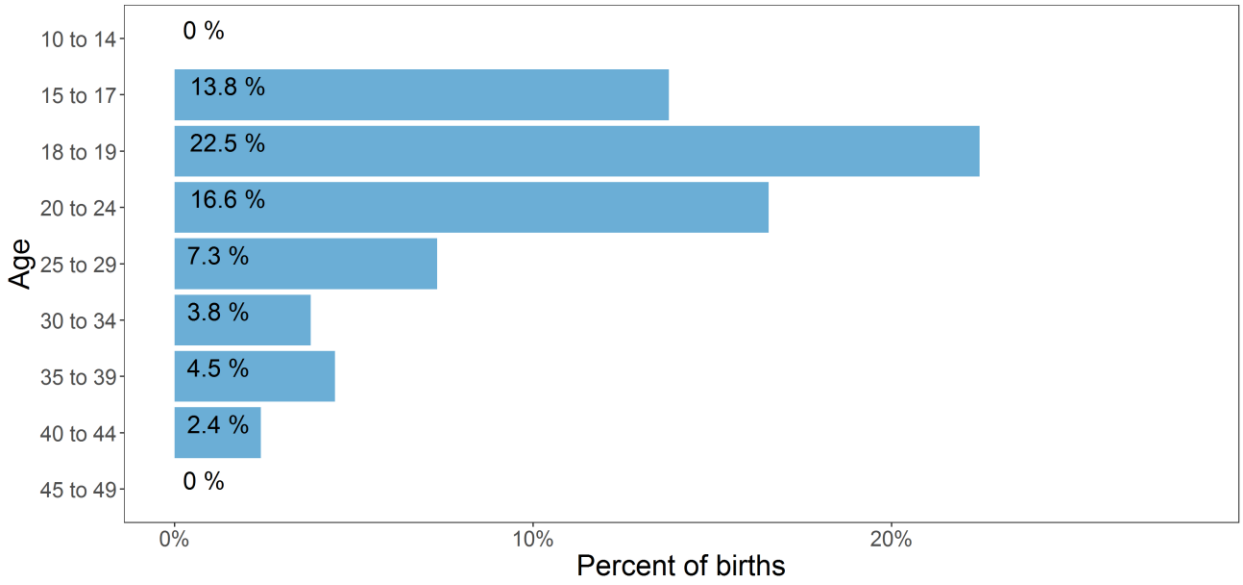


Figure notes: These data represent 5,882 births over 8 years.
Source: Oregon Health Authority, Center for Vital Statistics

Smoking cessation counseling and programs offered during prenatal care can provide effective assistance to encourage pregnant women to quit smoking. There currently are no established smoking cessation programs specifically for mothers in the region, but efforts are being made to make them available at the county level. The standard of care among health professionals providing prenatal care is to determine if the mother smokes and, if so, to discuss the benefits of quitting smoking and offer resources to support the mother if she decides to quit.

Alcohol Use During Pregnancy

Drinking alcohol during pregnancy can cause miscarriage, stillbirth, and a range of lifelong disorders known as fetal alcohol spectrum disorders (FASDs). Children with FASDs can have a host of problems, including poor coordination, hyperactivity behavior, difficulty paying attention, poor memory, difficulty in school, learning disabilities, speech and language delays, poor reasoning and judgment skills, vision or hearing problems, and complications with the heart, kidney, or bones. There is no known safe amount of alcohol to drink during pregnancy and no known safe time to drink alcohol during pregnancy.[287]

The Pregnancy Risk Assessment Monitoring System (PRAMS), a national surveillance system, provides information about women who have had a recent live birth. The most recent data is from 2011. Oregon state-level data indicates that 92 percent of pregnant mothers abstained from alcohol during the last 3 months of their pregnancies. Less than one percent had more than one drink per week during the third trimester.[288] There are no regional or county-level data available at present.

Teen Pregancy

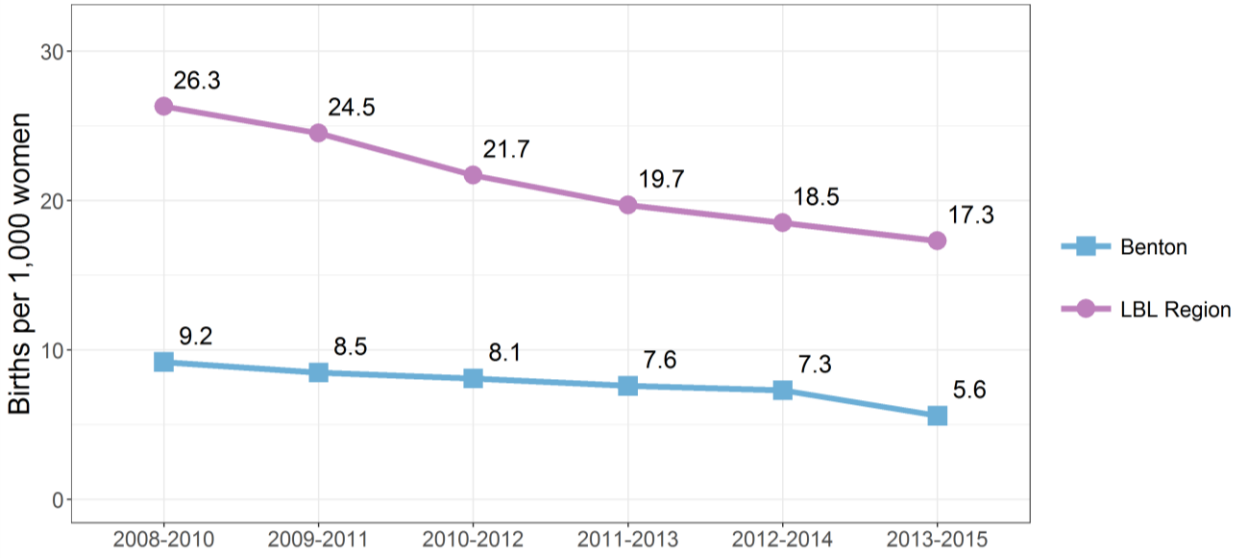
Teen mothers face significant social stigma for becoming pregnant while young or before marriage. Becoming pregnant while still a teenager is not a sign of poor health, but teenage pregnancy rates are a commonly reported measure of health because it indicates a social environment that raises the risk of poor health outcomes and because teen mothers face greater barriers to health than older mothers.

Teen mothers are less likely to receive early prenatal care, and are more likely to experience blood-pressure complications and premature birth.[289] Children of teenage mothers are also more likely to become teen parents themselves, be incarcerated during adolescence, drop out of school, experience more health problems, and are two times as likely to experience abuse and neglect. Negative effects of early childbearing on teenage fathers include an increased likelihood of partaking in delinquent behaviors, such as alcohol and drug abuse or dealing, and fewer years of completed school in comparison to their childless peers.[290] On average in the United States, 50 percent of teen mothers receive a high school diploma by age 22, compared to 90 percent of women who had not given birth as a teenager.[291]

The most recent information available indicates that, overall, regional teen pregnancy rates (ages 15 to 19) have decreased between 2008 and 2015 (Figure 6.6). Given the small number

of teen pregnancies each year, three year averages are shown. The three year average in 2008-2010 in Benton County was 9.2 pregnancies per 1,000 women age 15-19. This number declined to 5.6 pregnancies per 1000 women age 15-19 in 2013-2015. Regional teen pregnancy rates were below state teen pregnancy rates in all years.

Figure 6.6: Pregnancy rate per 1,000 women age 15-19 years in Benton County and the LBL Region, 3 year moving average, 2008-2015



Source: Oregon Health Authority, Center for Health Statistics, Birth Certificate Data

Despite the overall decline in rates, there are striking differences in teen birth rates for Hispanic and non-Hispanic populations at both the regional and state levels. Between 2013 and 2015, Hispanic teens aged 15 to 19 had a pregnancy rate in Benton County that was 2.3 times higher than that of all teens. Notwithstanding the greater Hispanic teen pregnancy rates, the pregnancy rate among Hispanic teens is declining faster than the pregnancy rate among non-Hispanic teens. More data is presented in Chapter 8.

Oregon Health Plan effective use of contraception

The Oregon Health Authority assessed the proportion of female adult members who were not seeking to become pregnant and who used effective contraception. Effective contraception includes intra-uterine devices, implants, sterilization, and hormonal birth control such as pills and patches. Effective contraception does not include condoms. 63 percent of IHN-CCO members in this group used effective contraception in 2014. [292]

Infant Mortality

The annual infant mortality* occurrence in Benton County was 3.3 deaths per 1,000 births from 2013 to 2015. Infant mortality rates are lower in Benton County than in Oregon (5.1 deaths per 1,000 births).[293] Benton County has surpassed the Healthy People target of 6.0 per 1,000 births.[294] Principal causes of infant mortality over the 10 years between 2004 and 2013 included include congenital malformations, low birthweight and/or premature birth, sudden infant death syndrome, accidents, and complications from birth.[295]

Premature Birth and Low Birth Weight

Premature birth and low birth weight among infants are commonly used measures of maternal and infant health. Infants that are born too early and/or with a low birth weight are at higher risk of dying in the first year of life and of having developmental problems and worse health outcomes throughout life.[296,297] Both conditions are preventable to varying degrees and have been found to be influenced by a variety of factors.

Premature Birth

Premature birth (also known as preterm birth) is a measure of births that occur before the projected full term of the pregnancy. Infants are considered premature when they are born before completing 37 weeks (about 8.5 months) of pregnancy.[298]

Many maternal factors can influence premature birth. Established preventable risk factors for premature birth include:

- Chronic health conditions in the mother, such as high blood pressure, and diabetes;
- Certain infections during pregnancy; and
- Cigarette smoking, alcohol use, or illicit drug use during pregnancy.[299]

The percent of preterm births in Benton County is generally below the Healthy People 2020 target of 11.4 percent.[300] However, disparities exist among women when stratified by race/ethnicity, as shown in Figure 6.7.

[Figure 6.7 is displayed on the following page]

* Infant mortality is defined as the death of a live-born infant before the age of 1.

Figure 6.7: Percent of births that are premature in Benton County, 2008-2015

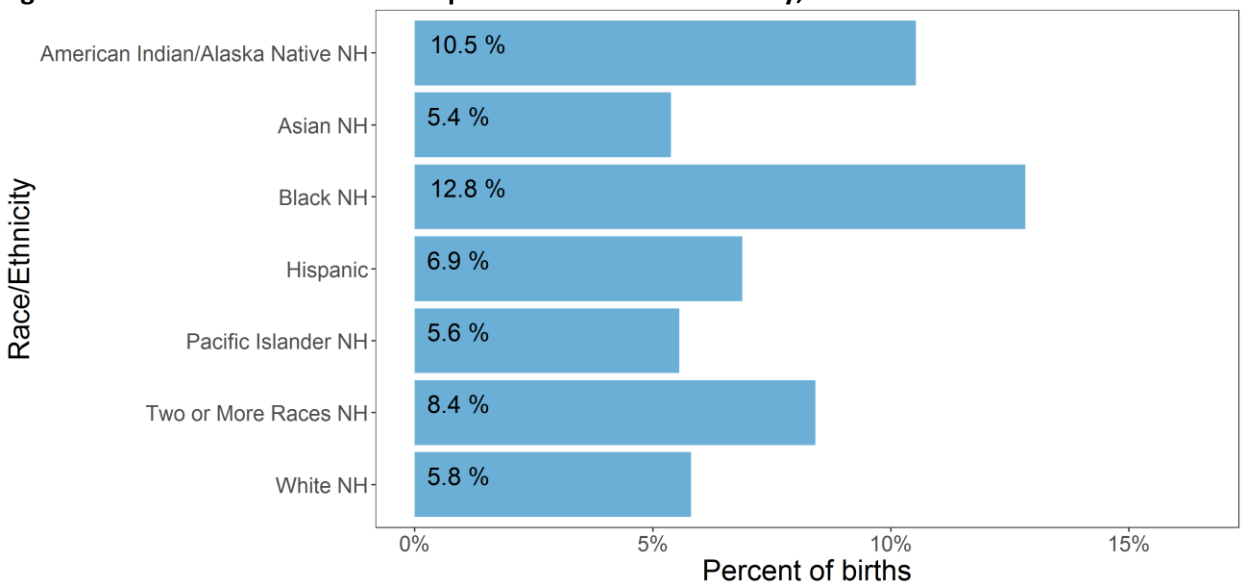


Figure notes: These data represent 5,893 births over 8 years. Premature birth data is based on county of residence of the mother, not county of birth. Data for American Indian/Alaska Native, Black, and Pacific Islander rely on small numbers and may not be reliable.

Source: Oregon Health Authority, Center for Health Statistics, Birth Certificate Data

Low Birth Weight

Low birth weight results when an infant fails to grow sufficiently during pregnancy, and can both signal and cause health problems with the infant. Infants are considered to have low birth weight if they weigh less than 2,500 grams (about 5.5 pounds) at birth.

Established risk factors for low birth weight include:

- Premature birth;
- limited weight gain of the mother during pregnancy;
- the mother being younger than 15 years or older than 35 years;
- exposure to air pollution or drinking water contaminated with lead;
- cigarette smoking, alcohol use, or illicit drug use during pregnancy; and
- socioeconomic factors, such as having a low income, low educational level, or a high level of stress.[301]

From 2013 to 2015, approximately 5.6 percent of all infants born in Benton County had a low birth weight, which meets the Healthy People 2020 target of 7.8 percent.[302] While Benton County and Oregon (6.2 percent) meet the Healthy People 2020 objective for low birth weight infants, differences exist among racial/ethnic groups within the county. Figure 6.7 and Figure 6.8 illustrate the variation across different racial/ethnic groups within the region.

Figure 6.8: Percent of infants born with low birth weight by race/ethnicity in Benton County, 2008-2015

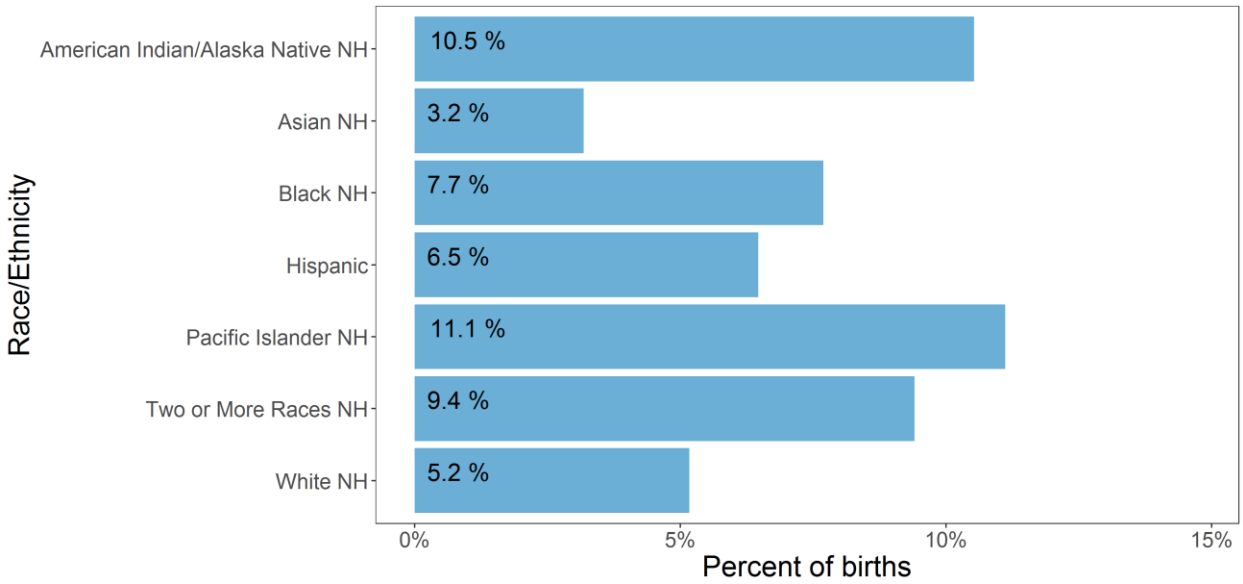


Figure notes: These data represent 5,895 births over 3 years. Low birth weight data is based on county of residence of the mother, not county of birth. Data for American Indian/Alaska Native, Black, and Pacific Islander rely on small numbers and may not be reliable.

Source: Oregon Health Authority, Center for Health Statistics, Birth Certificate Data

Breastfeeding

Breastfeeding is associated with numerous health benefits for infants, such as boosting immune system response, reducing the risk of Type 2 diabetes, and preventing obesity. Breastfeeding also promotes maternal-child bonding. The American Academy of Pediatrics recommends exclusively breastfeeding for the first six months after birth and further recommends continued breastfeeding for a year or more after birth.[303]

Barriers to Breastfeeding

Breastfeeding may not always come easily to new mothers, and other barriers to initiation of breastfeeding and continuation of breastfeeding might include:

- lack of support from the child's other parent,
- lack of support from family and friends,
- hospital practices that interfere with breastfeeding,
- misperceptions about milk supply,
- no timely follow-up to questions or problems that arise after hospital discharge,
- lack of workplace support for breastfeeding,
- lack of acceptance by the community and society in general,
- widespread advertising and promotion of infant formula, and
- the common portrayal of bottle-feeding in the mass media.[304]

Breastfeeding in the Region

State programs, such as the Nutrition and Health Screening Program for Women, Infants, and Children (WIC), give some insight into the percentage of participating women who breastfeed. Table 6.1 displays the available county data on mothers who participate in the WIC program and the rate of breastfeeding. [305]

Table 6.1: Breastfeeding rates among WIC mothers in Benton, Lincoln, and Linn counties, 2016

	Benton County	Lincoln County	Linn County
Percent of pregnant women served by WIC	**32 %**	**49 %**	**43 %**
Percent of WIC mothers who started out breastfeeding	**94 %**	**94 %**	**92 %**
Percent of WIC mothers who breastfed exclusively for 6 months	**45 %**	**36 %**	**34 %**

Source: Oregon Health Authority, 2016 WIC Facts

In addition to WIC, most health care providers encourage women to breastfeed their children, and there are many breastfeeding classes and support groups available in the region.

Immunizations

Immunization against communicable disease is one of the greatest advancements in public health. The major causes of premature death and disability before the development of vaccines and antibiotics were communicable disease such as measles, diphtheria, and polio. The current CDC recommendations are for children to be fully vaccinated by age two against:

- Diptheria, Tetanus, Pertussis;
- Polio;
- Measles, Mumps, Rubella;
- Hib (a bacterial infection that can cause meningitis);
- Hepatitis B; and
- Varicella (Chickenpox).
- Pneumococcal disease

This is known as the 4:3:1:3:3:1:4 schedule. In Benton County 67 percent of two-year-olds have met the 4:3:1:3:3:1:4, schedule, compared to 66 percent of children statewide. Benton County WIC children also have an immunization rate of 67 percent.[306]

The Oregon Health Authority tracks immunization rates among adolescents as well. The following table displays immunization rates among Benton County youth age 13 to 17 and compares them to immunization rates in the LBL Region and in Oregon.

Table 6.2: Immunization rates among youth age 13-17 in Benton County, the LBL Region, and Oregon, 2017

	Benton County	LBL Region	Oregon
Tdap	93 %	93 %	93 %
Meningococcal	68 %	65 %	75 %
Seasonal influenza	26 %	24 %	25 %
HPV up to date	39 %	37 %	44 %
MMR (2+ doses)	86 %	87 %	97 %

Table notes: Tdap is the tetanus, diphtheria, and pertussis vaccine; HPV is the human papilloma virus vaccine; MMR is the measles, mumps, and rubella vaccine.

Source: Oregon Health Authority, Adolescent Immunization Rates by County

Immunizations are also an important component of preventive medicine among adults and seniors, especially for seasonal influenza. While data for all Benton County adults is not available, influenza vaccination rates tend to be higher among older adults. Approximately 53 percent of Benton County adults over age 65 are regularly vaccinated against influenza, compared to 56 percent statewide.[307] Research indicates that vaccination rates of 80 percent in healthy persons and 90 percent in high-risk persons are necessary to provide herd immunity from influenza.[308]

Oregon Health Plan Immunizations

Two-year-olds on the Oregon Health Plan in the LBL Region have the same immunization rate as in the rest of Benton County, 65 percent, compared to 68 percent of OHP two-year-olds statewide.

There is no directly comparable data for adolescent immunization rates among OHP adolescents, but the Oregon Health Plan does track the percent of adolescents who received meningococcal and Tdap vaccines before their 13th birthday. In the LBL Region, 58 percent of OHP adolescents received these vaccines, compared to 68 percent statewide. [309]

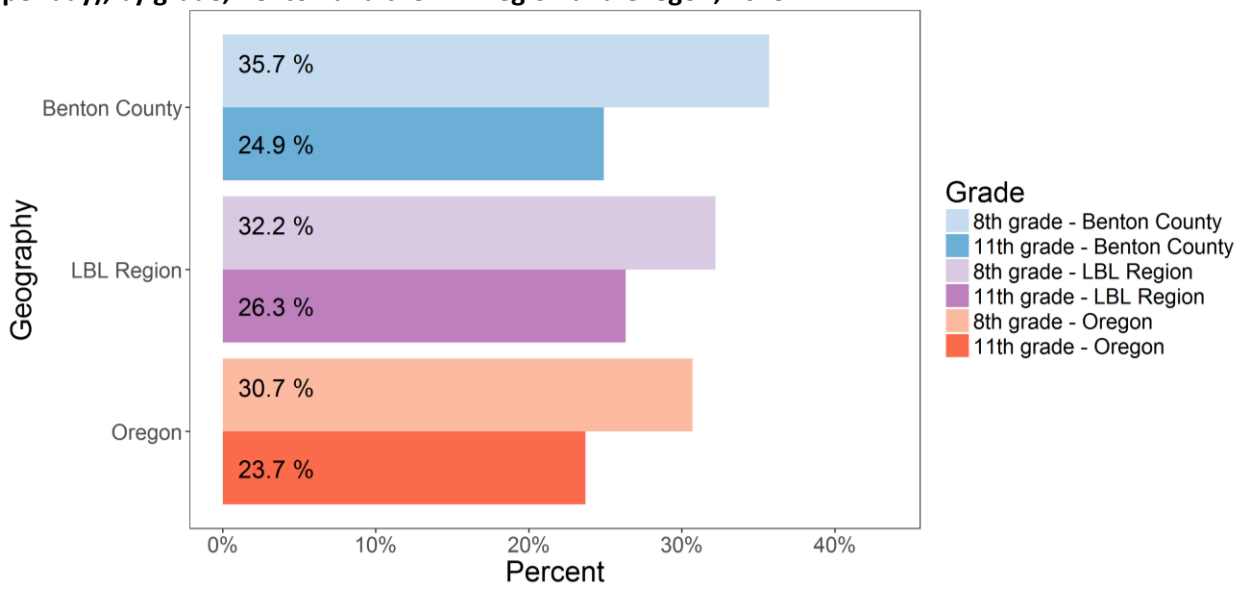
Physical Activity

Regular physical activity helps improve overall health and wellness, reduces risk for obesity, and lessens the likelihood of developing many chronic diseases including diabetes, cancer, and heart disease. National physical activity guidelines recommend that children engage in at least 60 minutes of physical activity each day, including aerobic, muscle strengthening, and bone strengthening activity.

The Healthy People 2020 objective for physical activity aims to increase the proportion of adolescents who meet current national physical activity guidelines to 32 percent.[310] As shown in Figure 6.9, 8th graders in Benton County exceeded the Healthy People 2020 objective while 11th graders did not. Overall, a larger percentage of youth in Benton County self-report

exercising for the recommended amount of time compared to Oregon youth overall.[311]

Figure 6.9: Percent of youth meeting CDC recommendations for physical activity (at least 60 minutes per day), by grade, Benton and the LBL Region and Oregon, 2015



Source: Oregon Healthy Teens Survey

Reducing the amount of time youth spend in front of a screen, such as viewing television, videos, or playing video games is a key strategy to promote physical activity. In 2011, the Academy of Pediatrics recommended limiting television and video time to a maximum of two hours per day for children over the age of two and no exposure to television and or videos (i.e., zero hours) for children younger than two years of age.[312]

Healthy People 2020 supports increasing the proportion of children and adolescents aged two years through 12th grade who view television, videos, or play video games for no more than two hours a day to the following percentages:

- 83.2 percent of children aged two to five years,
- 78.9 percent of children and adolescents aged 6 to 14 years, and
- 73.9 percent of adolescents in 9th through 12th grade.[313]

Although data are unavailable for the aforementioned age groups at the county and regional level, the data shown in the following table (Table 6.3) may serve as an indicator of screen time (television and computers) among the child and adolescent population of Benton County. Table 6.3 shows that the majority of youth in 8th and 11th grade in the region do not spend more than two hours per school day watching television. Among 8th and 11th graders, Benton County youth surpass the state average and Healthy People 2020 target.[314] Table 6.3 shows that about two-thirds of 8th and 11th graders in Benton County spend less than two hours per day on the computer or on their phone. These rates are comparable to the state average, but fall well short of the Healthy People 2020 target of 82.6 percent.[315]

Table 6.3: Percent of youth who view television or other screens for no more than two hours per school day in Benton County, the LBL Region, and Oregon, 2015

	Grade	Benton County	LBL Region	Oregon
Limited television exposure	8th grade	83 %	77 %	76 %
	11th grade	82 %	79 %	80 %
Limited screen exposure	8th grade	65 %	56 %	54 %
	11th grade	63 %	58 %	58 %

Table notes: Limited television exposure is defined as no more than 2 hours per school day. Limited screen exposure is defined as no more than two hours per day of video/computer games, computer use, social networks, or smartphone use, excepting school work.

Source: Oregon Healthy Teens Survey

Adult Physical Activity

Physical activity is important for maintaining health as a person ages. Recommendations for adults include at least an hour and fifteen minutes of vigorous-intensity activity or two-and-a-half hours of moderate-intensity activity every week, in addition to muscle-strengthening activities on two or more days a week.[316]

Overall, 30 percent of adults in Benton County met the CDC guidelines for physical activity* from 2010-2013, compared to 23 percent of adults in Oregon.[317] There is still a significant amount of room for improvement for the county and for the state, as neither geographical region meets the Healthy People 2020 objective of having 48 percent of the population meeting the CDC guidelines for physical activity.[318]

Table 6.4: Age-adjusted percent of adults who meet CDC recommendations for physical activity and who get any physical activity outside of work in Benton County and Oregon, 2010-2015

	Benton County	Oregon
Meeting CDC recommendations for physical activity	30 %	23 %
Any physical activity outside of work	87 %	82 %

Source: Oregon Health Authority, Behavioral Risk Factors Surveillance System

At the state level, participation in physical activity varies by race/ethnicity, household income, and by level of education. Adults with less than a high school education, those earning less than $25,000, and Latinos are less likely to meet CDC physical activity recommendations than their peers.[319] As with children and youth, regional-level data that describe physical activity levels among adults by race/ethnicity or level of household income are not available.

* The CDC recommends 30 minutes of moderate physical activity on five or more days per week.

Recent data are not available at the county level for physical activity among older adults. The CDC recommends that adults 65 years of age or older get two hours and 30 minutes of moderate-intensity exercise (e.g. brisk walking) each week and engage in muscle-strengthening activities at least two days a week.[320] Statewide, older adults have only a small decrease in physical activity compared to younger adults, and there are minor differences between men and women. Table 6.5 below displays physical activity at the state level among older adults.

Table 6.5: Physical activity among older adults in Oregon, 2015

		45 to 54	55 to 64	65 and older
Meets recommended physical activity	Women	60 %	67 %	64 %
	Men	64 %	64 %	61 %
Any physical activity outside of work	Women	80 %	81 %	76 %
	Men	79 %	79 %	75 %

Source: Oregon Health Authority, Behavioral Risk Factors Surveillance System

Nutrition

There is a well-established link between eating a healthy and balanced diet, and an increasing number of health benefits. A healthy and balanced diet involves eating a variety of foods which provide essential nutrients (like dietary fiber and potassium), in the right amount – with negative health consequences from consuming too little or too much food.[321] In addition to promoting health and supporting a healthy weight, mounting evidence links a healthy diet to lowered risks of chronic disease, including several types of cancer, osteoporosis, and cardiovascular disease.[322]

The 2010 recommendations released by the U.S. Department of Health & Human Services and the U.S. Department of Agriculture highlights three major guidelines for Americans:

- balance calories with physical activity to manage weight;
- consume more of certain foods and nutrients such as fruits, vegetables, whole grains, fat-free and low-fat dairy products, and seafood; and
- consume fewer foods with sodium (salt), saturated fats, trans-fats, cholesterol, added sugars, and refined grains.[323]

While research continues to show that healthy eating is a key ingredient to good health, the food environment has been changing in dramatic ways, parallel to increases in obesity rates. Portions, prices, and media messaging encourage consumption of foods high in calories, sugars, and fat. These unhealthy foods are all readily available at fast food restaurants, vending machines, and convenience stores. Meanwhile, work, school, and leisure environments are allowing fewer opportunities to burn the extra calories consumed. These changes include cut-backs in physical education classes, office jobs which include hours of sitting, and television and

computers representing a large portion of leisure activity.[324] With so many aspects of daily life supporting improper nutrition, it becomes essential to look at both healthy behaviors and environmental factors to improve the nutrition and health of the entire community.

Proper nutrition among children and adolescents is essential in supporting healthy growth and development, academic performance, and well-being, while also preventing obesity and a number of chronic diseases.[325] Including education about the importance of nutrition early in life helps children and adolescents to develop healthy habits that often continue into adulthood.

As shown in the table below (Table 6.6), more adolescents in Benton County self-report consuming at least five servings of fruits and vegetables per day when compared with Oregon.[326]

Table 6.6: Percent of youth consuming at least 5 servings of fruits and vegetables per day and consuming no sugar sweetened sodas in the past 7 days, Benton County, the LBL Region, and Oregon, 2015

	Grade	Benton County	LBL Region	Oregon
5 servings of fruits and vegetables	8th grade	29 %	26 %	23 %
	11th grade	26 %	22 %	20 %
No sugar-sweetened sodas	8th grade	37 %	29 %	29 %
	11th grade	41 %	33 %	33 %

Source: Oregon Healthy Teens Survey

Nutrition and eating habits are frequently set early in life. Good nutrition can delay the physical signs of aging and prevent or slow the development of many chronic diseases, including diabetes and cancer. Approximately one in five adults in the region and in Oregon consumes at least five servings of fruits and vegetables per day (Table 6.7).[327] This is similar to the percentage of children in the region. Additional assessments of fruit and vegetable intake by race/ethnicity, age group, and income levels are needed for future planning and outreach among adults in the region.

Adults are also at risk of metabolic disease from excessive consumption of sugar, from sugar-sweetened beverages and other sources. There is no data on abstinence from sugar-sweetened beverages, but Table 6.7 below does report the percent of Benton County and Oregon residents who drink 7 or more sodas per week.

Table 6.7: Percent of adults who consumed at least 5 servings of fruits and vegetables per day and who drank 7 or more sodas per week in Benton County and Oregon, 2012-2015.

	Benton County	Oregon
5 servings of fruits and vegetables	20 %	20 %
7 or more sodas per week	13 %	12 %

Source: Oregon Health Authority, Behavioral Risk Factors Surveillance System

Nutrition among older adults plays an important role in immune function, as well as cognitive changes that take place as part of the aging process. Older adults can also be at increased risk for poor nutrition and dehydration, as taste sensitivity and thirst mechanisms often decline with age. Good nutrition has been shown to decrease inflammatory responses and improve immune function, as well as slow some types of cognitive (brain function) decline associated with aging.[328] Data at the county level are not available for older adults on consumption of fruits and vegetables and is a possible area for future surveillance, but statewide data is shown in Table 6.8.

Table 6.8 Nutrition among older adults in Oregon, 2015

		45 to 54	55 to 64	65 and older
5 servings of fruits and vegetables	Women	19 %	24 %	21 %
	Men	12 %	19 %	15 %

Source: Oregon Health Authority, Behavioral Risk Factors Surveillance System

Obesity

Being obese or overweight* is a complicated health condition. The risk of unhealthy weight is influenced by diet, exercise, and other behaviors, but it also depends strongly on genetic and environmental factors. Obesity is also correlated with socio-economic status and other social determinants of health. In addition to being a poor health outcome, obesity and overweight status can increase the risk of many diseases such as diabetes, heart disease, and possible cancer.

The Oregon Healthy Teens Survey found that 21 percent of all eighth graders in Benton County are overweight or obese (Table 6.9). Rates of being obese or overweight are lower for 11th graders in Benton County, with 16 percent identifying as overweight or obese.[329]

* Obesity is defined as having a body mass index (BMI) of 30 or more; Overweight is defined as having a BMI of above 25 and less than 30. Healthy weight is a BMI between 20 and 25.

Table 6.9: Overweight and obesity prevalence in Linn, Benton and Lincoln counties and Oregon, 2015

		Benton County	LBL Region	Oregon
Overweight	**8th grade**	**14 %**	**16 %**	**15 %**
	11th grade	**9 %**	**14 %**	**15 %**
Obese	**8th grade**	**7 %**	**11 %**	**11 %**
	11th grade	**7 %**	**12 %**	**13 %**

Source: Oregon Healthy Teens Survey

About 20 percent of children in Benton County are overweight or obese, but the prevalence of overweight or obesity among adults more than doubles. An estimated 22 percent of adults in Benton County are obese; an additional 32 percent are overweight (Table 6.10).[330] Therefore, about 54 percent of Benton County adults are either overweight or obese. Since 1990, Oregon's adult obesity rate has increased 121 percent. Obesity contributes to the death of about 1,400 Oregonians each year, making it second only to tobacco as a preventable cause of death.[331]

Table 6.10: Estimated prevalence of overweight and obesity among adults in the region and Oregon, 2014-2015

	Benton County	Oregon
Overweight	32 %	34 %
Obese	22 %	27 %

Source: Oregon Behavioral Risk Factors Surveillance System, Small Area Estimates

Statewide combined obesity and overweight rates are similar among the elderly population and among adults between 45 and 64 years of age (approximately 63 percent).[332] Specific data is not available at the county level.

Oregon Health Plan Obesity

Among IHN-CCO members, the prevalence of obesity is 39 percent, slightly higher than the prevalence of obesity among all Oregon Medicaid members at 36 percent. Obesity is least prevalent among Asian Medicaid members and most prevalent among Pacific Islander Medicaid members.[333]

Oral Health

Good oral health is essential to overall physical and mental health and encompasses more than just dental check-ups. Oral disease can lead to cavities and gum disease, which can in turn contribute to other diseases or conditions. Conversely, certain chronic mental and physical health conditions can also contribute to declines in oral health. Gum disease is associated with endocarditis (an infection of the inner lining of the heart), cardiovascular disease, premature birth, and low birth weight.[334] Osteoporosis can lead to tooth loss, and individuals with diabetes and immune system disorders are more susceptible to gum and bone infections. Poor

oral health can also affect self-esteem, reduce employment opportunities, and increase absenteeism.[335]

Among children in the U.S., dental cavities are the most common childhood disease.[336] Cavities are almost completely preventable through optimal water fluoridation, application of dental sealants to children's teeth, effective oral hygiene (brushing teeth and flossing), and regular preventive visits to the dentist.[337] Across the county, the proportion of 8th grade and 11th grade youth who have ever had a cavity is higher than the Healthy People 2020 target of no more than 48.3 percent (Table 6.11). The proportions do not change much in the three years between 8th grade and 11th grade – this indicates that most tooth decay occurs in children before the 8th grade.[338]

Table 6.11: Percent of youth who have ever had a cavity in Benton County, the region, and Oregon, 2015

Grade	Benton County	LBL Region	Oregon
8th grade	65 %	71 %	69 %
11th grade	70 %	73 %	75 %

Source: Oregon Healthy Teens Survey

Achieving and maintaining good oral health is a significant challenge for many people in the region, particularly those with lower incomes. This challenge may be exacerbated by the fact that not all cities, districts, or water supplies in the region are fluoridated (see Chapter 3 Environment).

One of the objectives of Healthy People 2020 is to increase the proportion of U.S. communities with fluoridated water to 75 percent.[339] Benton County surpasses this percentage (at 96 percent).[340] In contrast, approximately 27 percent of Oregon residents have access to fluoridation through community water systems, the second lowest statewide percentage in the country.[341]

Infectious Diseases

Prevention and control of infectious illnesses rank among the greatest health advances of the 20th century. The World Health Organization defines infectious diseases as those that are caused by bacteria, viruses, parasites, or fungi; and can be passed from person to person.[342] Some are transmitted via ingesting contaminated food or water, many are spread by microorganisms in coughs or sneezes, and others result from exposures in the environment or insect bites. Diseases that spread from animals are called zoonotic infections.

All physicians, health care providers, and laboratories in Oregon are required by law to actively report confirmed or suspect diagnoses of over 50 infectious diseases and conditions to their local health departments.[343] These reports are directed through county health departments to the Oregon Public Health Division which collects and distributes data to inform health departments, physicians and the public. Reporting enables appropriate public health follow-

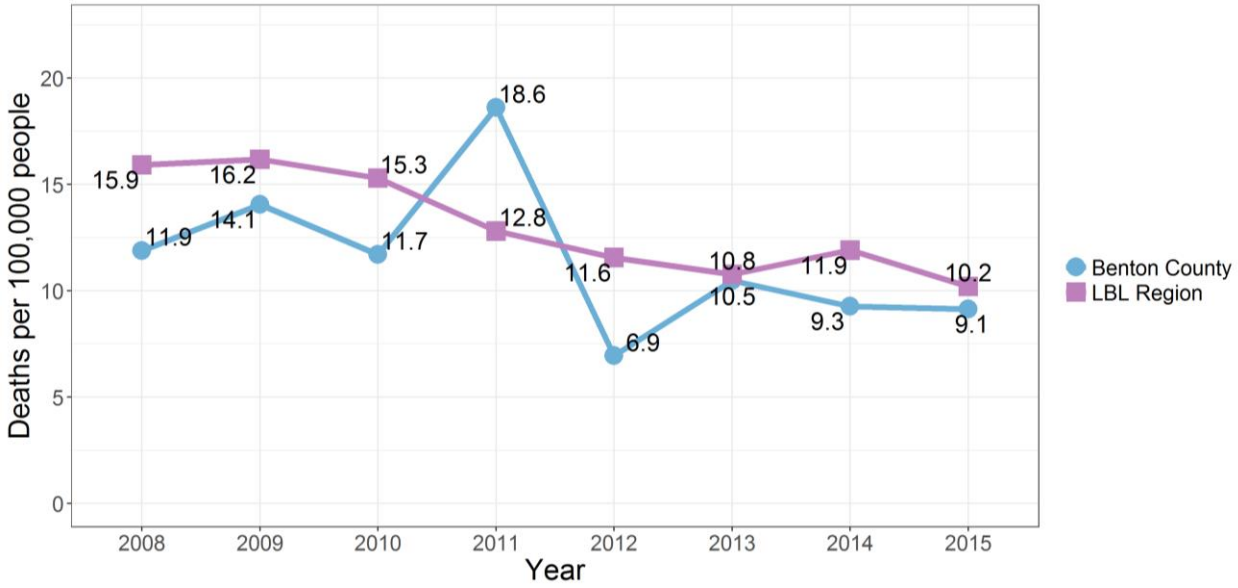
up for patients, helps identify outbreaks, and provides a better understanding of disease transmission patterns. Some diseases are subject to restrictions on school attendance, day care attendance, patient care, and food handling. Communicable disease nurses in Benton County investigated 642 reports of reportable communicable diseases during 2016, a rate of 12.3 investigations per week.[344]

Respiratory Illnesses

Respiratory illnesses such as the influenza virus, commonly referred to as the flu, spread from person to person when droplets from a cough or sneeze of an infected person move through the air and enter the mouth or nose of people nearby. Some of the microorganisms in these droplets can also live on surfaces for hours, such as desks or doorknobs, and can spread when people touch these surfaces and then touch their eyes, mouth, and nose.

The common cold* and influenza are the most common respiratory illnesses. However, local, state, and national statistics for these diseases are difficult to ascertain because doctors and laboratories are not required to report them to public health authorities. This is because most people experience only mild, short-term illness, and do not seek medical attention. The Oregon Health Authority reports influenza and pneumonia mortality jointly; Benton County rates have been steadily declining, despite a sudden spike in 2011 (Figure 6.10).

Figure 6.10: Age-adjusted influenza and pneumonia mortality rates in Benton County and the LBL Region, 2008-2015



Source: Oregon Public Health Assessment Tool

* More than 200 viruses cause what is typically considered the common cold, including rhinovirus, coronavirus, respiratory syncytial virus, and the parainfluenza virus.

Less common, but more serious respiratory illnesses include pneumonia, pertussis (whooping cough), and tuberculosis. In general, infectious tuberculosis is extremely rare in Benton County. Between 2010 and 2016, an average of 2.5 cases were reported annually.[345] Tuberculosis cases are actively managed and treatment is overseen by public health nurses.

Pertussis is a very contagious bacterial infection that causes a coughing illness which may last six to ten weeks or longer. It is an endemic disease with epidemic peaks occurring every two to seven years and has proven persistence despite widespread childhood immunization. There was a sharp rise of pertussis in the United States during 2012. Washington State was particularly impacted and declared a pertussis epidemic in April 2012, reporting almost 10 times more cases of pertussis than in 2011. Oregon reported more than twice as many pertussis cases in 2012 as in 2011. The number of cases of pertussis in the region fluctuates annually; an outbreak in 2012 pushed the incidence above the historical average of approximately 14 diagnoses per 100,000 people per year, and it continues to rise. In Benton County in particular, the number of reported cases of pertussis in 2015 were more than three times higher the number of reported cases in 2011 (Figure 6.11).

Figure 6.11: Age-adjusted rate of pertussis infections per 100,000 persons in the Benton County and the LBL Region, 2007-2016

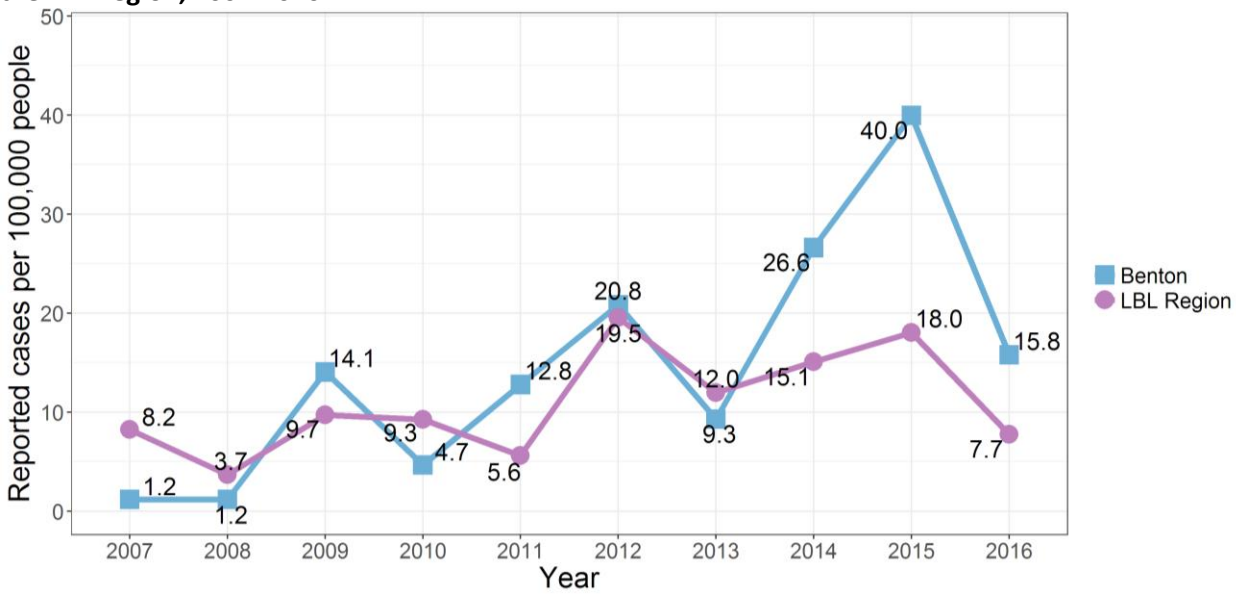


Figure notes: Case numbers may be updated as reports are confirmed.

Source: Oregon Health Authority, Oregon Public Health Epidemiologists' User System

Foodborne Illnesses

The Centers for Disease Control and Prevention (CDC) estimate that each year, one in six Americans (48 million people) get sick, 128,000 are hospitalized, and 3,000 die of foodborne diseases.[346] The leading causes of foodborne illness in the United States are due to exposure to norovirus, Salmonella, Campylobacter, and *Clostridium perfringens*. Norovirus, Salmonella, and Campylobacter are also among the leading causes of death due to foodborne illness.[347]

Figure 6.12 below shows that the incidence of campylobacter in the region has historically ranged between 15 and 32 cases per 100,000 people each year.

Figure 6.12: Incidence of Campylobacter infection per 100,000 persons in Benton County and the LBL Region, 2007-2016

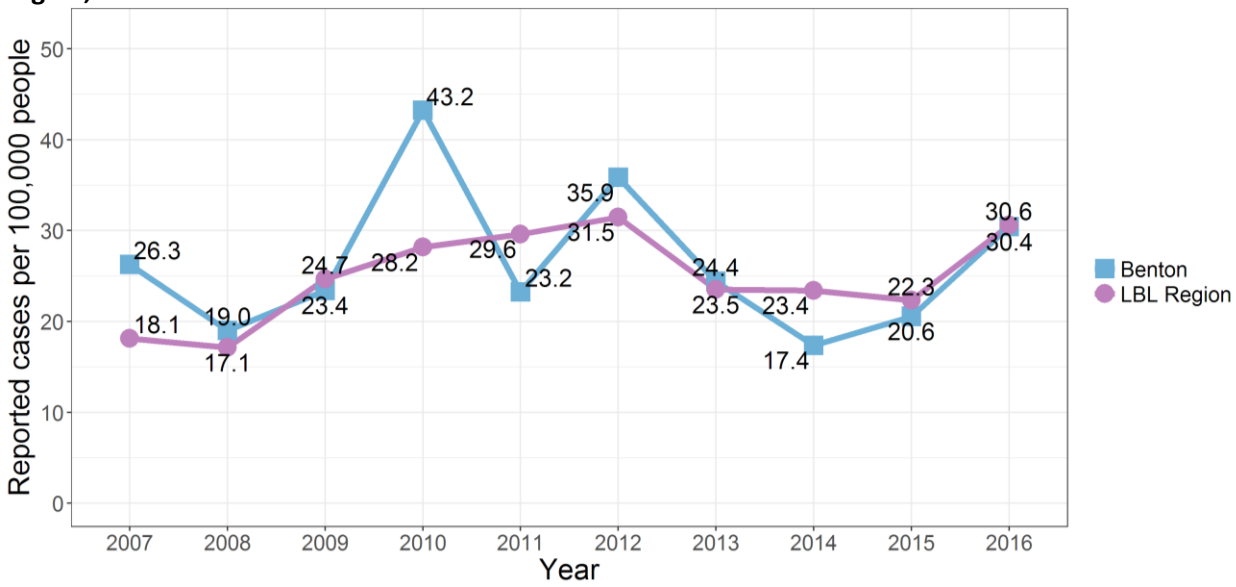


Figure notes: Case numbers may be updated as reports are confirmed.

Source: Oregon Health Authority, Oregon Public Health Epidemiologists' User System

Escherichia coli infections, most commonly 0157:H7 (a specific strain of *E. coli*), is another significant cause of foodborne illness. Around 5 to 10 percent of those who are diagnosed with *E. coli* develop potentially life-threatening complications.[348] Benton County's rate of *E. coli* per 100,000 persons has remained near the tri-county average of in between five and six cases annually per 100,000 people (Figure 6.13).[349]

[Figure 6.13 is displayed on the following page]

Figure 6.13: Rate of *E. coli* infections per 100,000 persons in Benton County and the LBL Region, 2007-2016

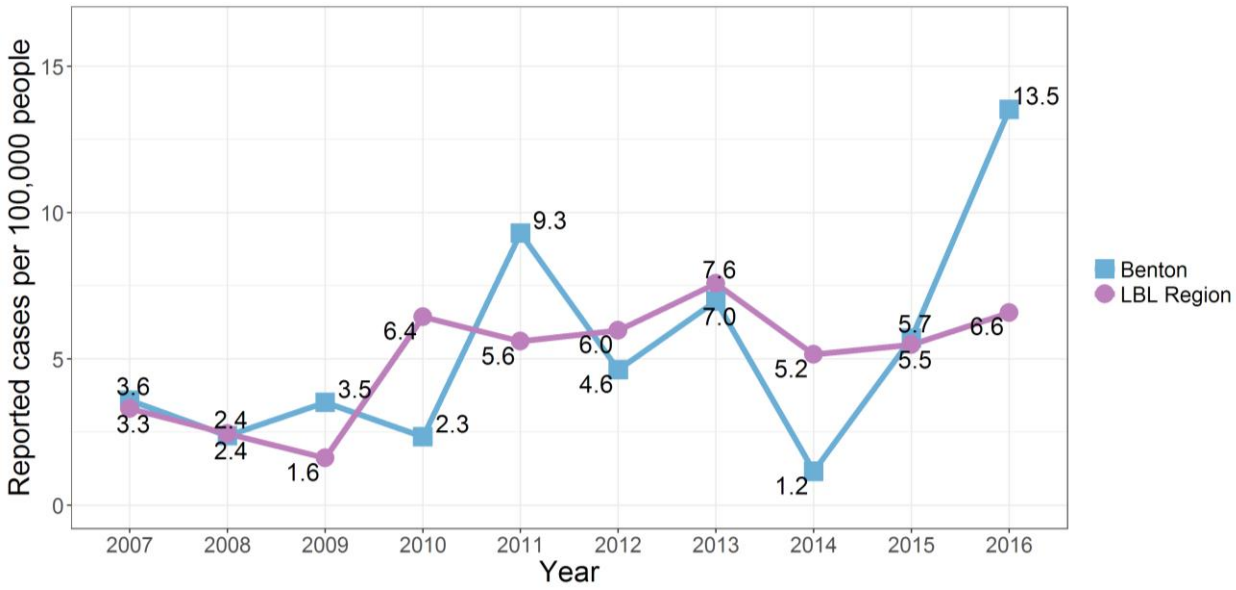


Figure notes: Case numbers may be updated as reports are confirmed.

Source: Oregon Health Authority, Oregon Public Health Epidemiologists' User System

Sexually Transmitted Infections (STIs)

Sexually transmitted infections (STIs, also sometimes called sexually transmitted diseases, STDs) are infections that can be passed from one person to another through sexual contact. Untreated STIs can have consequences for individuals' health such as infertility and even death. Testing for STIs is a very effective mechanism for preventing the spread of STIs. Even incurable STIs, like HIV, are much less likely to spread if infected individuals receive proper treatment. However, untested individuals are unable to receive the treatment they need and are also much more likely to pass on the infection to others.

Chlamydia and gonorrhea are the most common STIs in the region. Approximately 80 to 90 percent of chlamydia infections and about 50 percent of gonorrhea infections are asymptomatic in women and may go undiagnosed. If left untreated, these infections may lead to pelvic inflammatory disease, which can cause tubal infertility, ectopic pregnancy and chronic pelvic pain.[350]

Chlamydia

Chlamydia is the most common reportable illness in Oregon, with infection rates steadily increasing over the past decade. In both Oregon and the region, reported rates of chlamydia are more than twice as high in women as in men; for every 10 men diagnosed with chlamydia, 25 women are diagnosed. Current guidelines recommend chlamydia screening in women who are not symptomatic, but do not recommend the same screening for men without symptoms. This likely contributes to the higher rate of reported chlamydia cases among women, rather

than a difference in infection rates by gender.[351] Overall, Benton County has had a higher rate of chlamydia than the region, although rates are increasing at both geographic levels (Figure 6.14).

Figure 6.14: Rate of chlamydia infection per 100,000 persons in Benton County and the LBL Region, 2007-2016

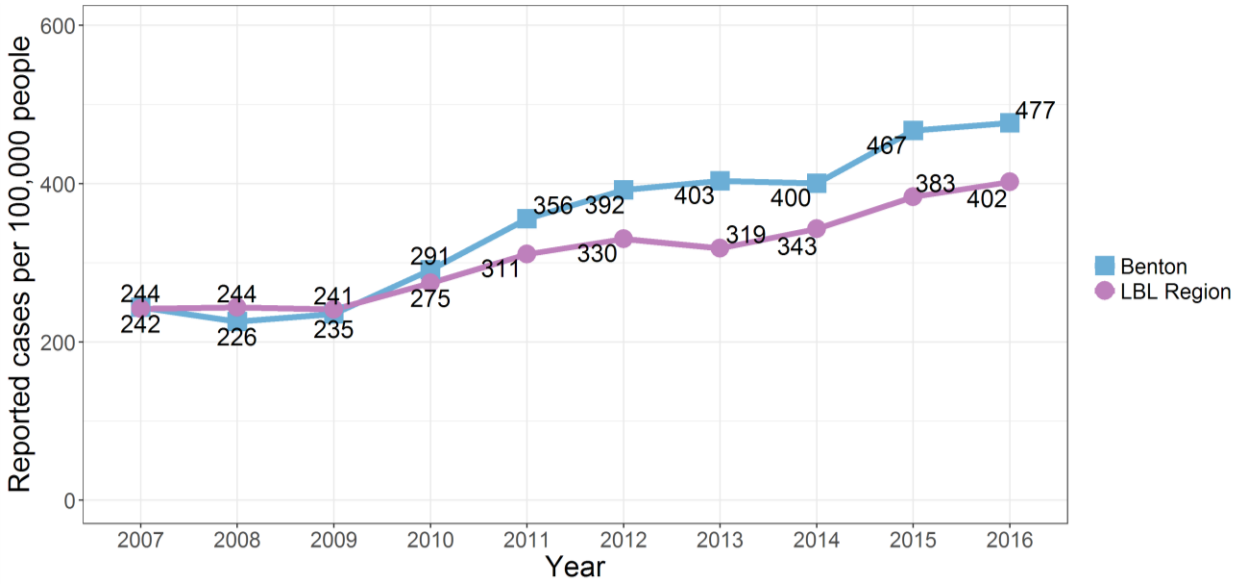


Figure notes: Case numbers may be updated as reports are confirmed.

Source: Oregon Health Authority, Oregon Public Health Epidemiologists' User System

Oregon Health Plan Chlamydia Screening

Oregon must track and report the percentage of sexually active young women (ages 16-24) on the Oregon Health Plan who are screened for chlamydia. Statewide, 48 percent of young women on OHP underwent screening in 2016, about a half-percent increase from 2015. African American women on OHP are screened at a rate of 56 percent, while Asian American women are screened at a rate of 37 percent. Young women on OHP in the IHN-CCO region are screened at a rate of 45 percent.[352]

Gonorrhea

Another reportable sexually transmitted infection that is present in the region is gonorrhea. In general, women are more likely than men to become infected with gonorrhea after exposure. However, as with chlamydia, women are less likely than men to develop symptoms following infection.[353] Gonorrhea infection rates in the region have consistently stayed below the state rate, but rates have recently spiked. Figure 6.15 shows the variation in gonorrhea incidence rates in the region and Benton County for the past ten years.

Figure 6.15: Rate of gonorrhea infection per 100,000 persons in Benton County and the LBL Region, 2007-2016

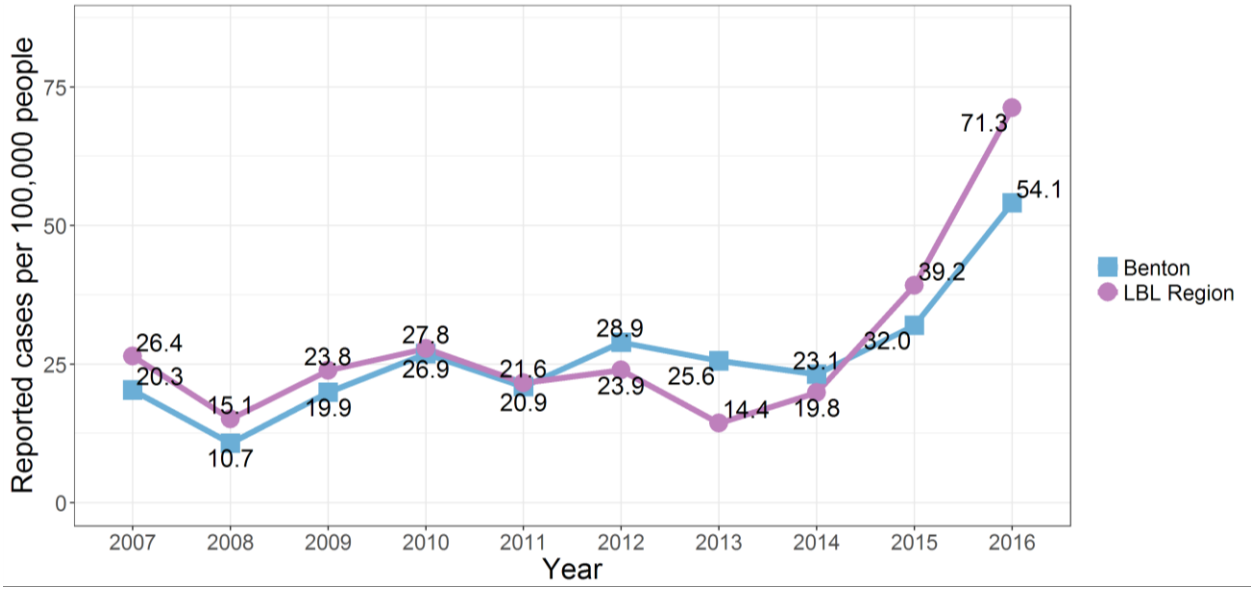


Figure notes: Case numbers may be updated as reports are confirmed.

Source: Oregon Health Authority, Oregon Public Health Epidemiologists' User System, 2007-2016

The key risk factor for sexually transmitted infections is age. Regional residents between 15 and 24 years of age contract chlamydia at a rate 4.3 times higher than the infection rate among all ages. This trend holds for state infection rates as well. Gonorrhea infection rates are also influenced by age; 15-24 year olds in the region have infection rates 2.7 times as high as the infection rate among all ages (Table 6.12).

Table 6.12: Age-specific incidence rates of chlamydia and gonorrhea, diagnoses per 100,000 persons in Benton County and Oregon, 2015

	Chlamydia		Gonorrhea	
Age	Benton County	Oregon	Benton County	Oregon
15-24	1,283	1,698	63	187
25-44	348	454	50	170
45-64	30	40	10	32
65 and older	0	2	8	3

Source: Oregon Health Authority, Oregon Public Health Assessment Tool

Syphilis

Syphilis is a historically rare but potentially fatal sexually transmitted infection. The number of cases of syphilis grew very quickly between 2011 and 2015, from about one case per year to 15 cases in 2015. It is unclear if the spike in 2015 is transient or if the incidence rate will remain above the historical average. Figure 6.16 shows the increase in syphilis incidence in Benton County and the LBL region over the past 10 years.

Figure 6.16: Rate of syphilis infection per 100,000 persons in Benton County and the LBL Region, 2007-2016

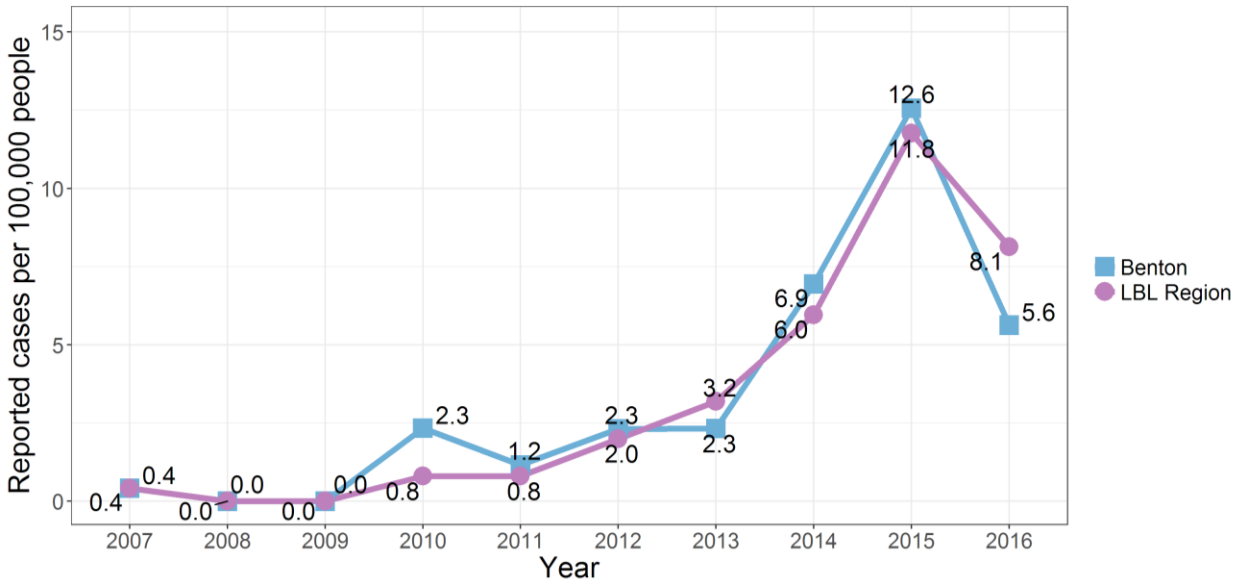


Figure notes: Case numbers may be updated as reports are confirmed.

Source: Oregon Health Authority, Oregon Public Health Epidemiologists' User System, 2007-2016

HIV/AIDS

HIV/AIDS (human immunodeficiency virus/acquired immunodeficiency syndrome) remains an important public health problem in Oregon. From 1981 through 2010, 8,753 Oregonians were diagnosed with HIV infection. Of those, 40 percent (3,540) have since died.[354] Fortunately, death rates have decreased dramatically since the development of effective antiretroviral therapies. HIV/AIDS is now managed as a serious but not necessarily fatal chronic disease. As a result, the number of Oregonians living with HIV infections has increased from 2,720 to 5,213 from 1997 to 2010. New HIV diagnoses in Oregon are most common among 35–39 year old males. Between 2007 and 2015 the incidence of HIV in Benton County was 3.5 cases per 100,000 persons per year, about two-thirds of the state's incidence (6.5 cases per 100,000 persons per year) during that time period.[355]

HIV Testing among Oregon Health Plan Members

Just under half (49 percent) of OHP members state-wide have ever been tested for HIV as of 2014. There is a wide range in the testing rates among differing races and ethnicities. Asian OHP members were screened the least of all races and ethnicities with a testing rate of 25 percent, while African Americans and American Indians/Alaska Natives were tested at the highest rate (58 percent). In the IHN-CCO region, only 46 percent of Medicaid adults have been tested for HIV. Only three regions in the state reported lower testing rates.[356]

Viral Hepatitis

Although there is a very low incidence rate, viral Hepatitis, especially Hepatitis A, B, and C, are other infectious diseases affecting residents of the region. Transmission of Hepatitis A can occur person-to-person through an oral-fecal route; through exposure to contaminated water, ice, or shellfish harvested from sewage-contaminated water; or from fruits, vegetables, or other foods that are eaten uncooked and that were contaminated during harvesting or subsequent handling. Hepatitis B and C infection are transmitted by activities that involve contact with blood, blood products, and other bodily fluids, such as unprotected sexual contact, injection drug use, and transfusions with blood that has not been screened for viral hepatitis.[357]

Table 6.13: Annual hepatitis infection rate per 100,000 people, Benton County, the LBL Region, and Oregon, 2007-2015

	Benton County	LBL Region	Oregon
Hepatitis A	**	0.2	0.5
Hepatitis B (acute)	0.5	1.2	1.0
Hepatitis B (chronic)	10.3	6.7	12.0
Hepatitis C (acute)	**	0.3	0.6
Hepatitis C (chronic)	70	128	130

Table notes: ** indicates a rate based on fewer than 5 reported infections. Infection rates are based on 9 years of data, from 2007 to 2015 but represent infections per 100,000 people per year.
Source: Oregon Health Authority, Oregon Public Health Assessment Tool

Benton County recorded four Hepatitis A cases from 2007 to 2013. Between 2007 and 2013, there were 19 new recorded cases of acute Hepatitis B and seven recorded cases of acute Hepatitis C (past or present case, unspecified).[358] Current estimates suggest that 65 percent of people infected with Hepatitis B and 75 percent of people infected with Hepatitis C are unaware of their infections.[359] Overall, males experience higher rates of Hepatitis B and C infection than females.

Zoonotic Illnesses

Zoonotic illnesses are infectious diseases that can be spread from animals to humans. There are many zoonotic diseases, and their threat to human health is growing. This is due to increasing global movement of people and animals, and the effects of human populations expanding into previously undeveloped wildlife habitats.

Some zoonotic diseases are transmitted directly from animals to people, some result from contamination of the environment by animals, and others require a vector such as a tick or mosquito. Examples of zoonotic diseases include:

- Bacterial - *Salmonella*, *E. coli*, leptospirosis;
- Viral - Rabies, avian influenza;
- Fungal - Ringworm, sporotrichosis;

- Parasitic - Toxoplasmosis, larval migraines due to roundworms;
- Vector-borne - West Nile virus, spread by mosquitoes, and Lyme disease, spread by ticks.

Climate change may also lead to greater zoonotic disease threats. Zoonotic diseases can cause symptoms such as diarrhea, muscle aches, and fever. Some diseases cause only mild illness while others can be life threatening. One such disease is rabies, which is virtually always fatal if left untreated. Rabies is endemic in the Oregon bat population.

Injury and Violence

Child Abuse

In 2016, there were a total of 359 reports of child abuse or neglect in Benton County, of which 110 (31 percent) were founded (determined to be abuse).[360] The types of abuse/neglect include mental injury, physical/medical neglect, physical abuse, sexual abuse, sexual exploitation, or threat of harm. Most often, the perpetrators of child abuse and neglect are family members (94 percent of reports in Oregon); parents account for 78 percent of all perpetrators.[361] Child abuse rates in Benton County have remained lower than Oregon and have been fairly stable over the years.[362,363,364,365]

Figure 6.17: Founded abuse rate per 1,000 for children under 18 years of age in Benton County, the LBL Region, and Oregon, 2011-2015

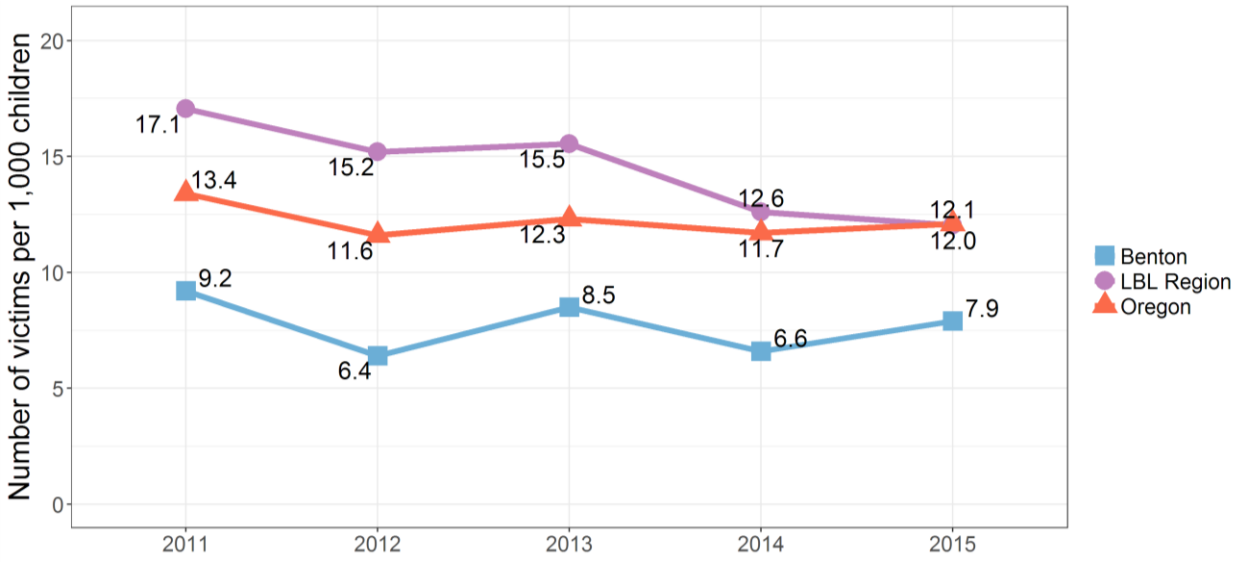


Figure notes: Rates include neglect, physical abuse, and sexual abuse. 2012 data is from the Portland State University Population Research Center. Starting in 2013, the population data is one year behind the year shown and is from Puzzanchera, C., Sladky, A. and Kang, W. (2014). "Easy Access to Juvenile Populations: 1990-2013."
Source: Oregon Department of Human Services, Child Welfare Data Book

Not all reported cases of child abuse result in a foster care placement. Children are placed in foster care for a variety of reasons. Some are placed in foster care because their families cannot provide them with basic safety and protection, while others have had negative experiences such as parental substance abuse, sexual or physical abuse, and abandonment. In Oregon, many children are in foster care due to a history of abuse or neglect.[366] The rates of foster care (Figure 6.18) parallel the rates of child abuse (Figure 6.17).

Figure 6.18: Children in foster care, rate per 1,000 children Benton County, the LBL Region, and Oregon, 2011-2015

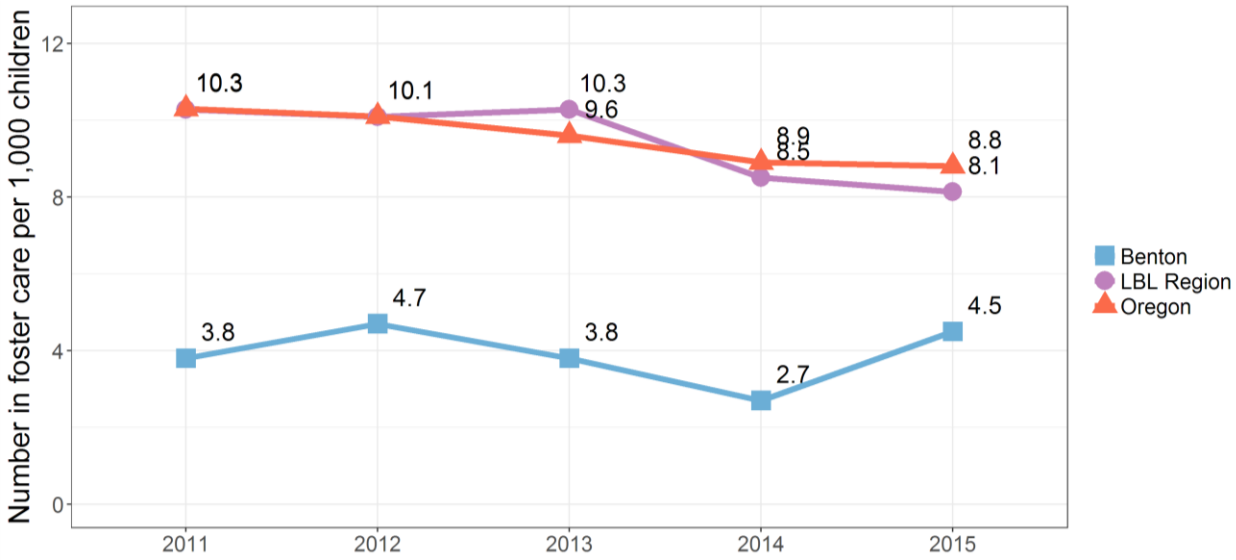
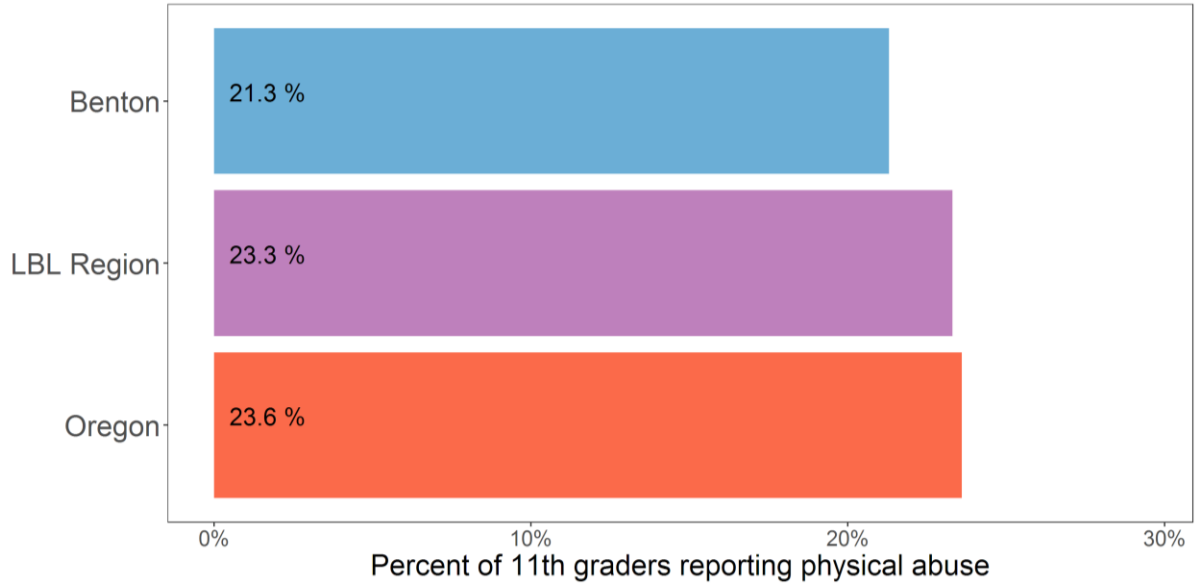


Figure notes: State totals do not include Title IV-E eligible children served by tribes.
Source: Oregon Department of Human Services: Children, Adults and Families Division. Child Welfare Data Books

Family stress is a major underlying factor associated with families of abused and neglected children. Major sources of family stress often include drug and/or alcohol abuse, domestic violence, parental involvement with law enforcement agencies (LEA), and financial distress within the family. Many families also have significant child care responsibilities, and some parents may even have a history of abuse as children. Often, families experience multiple sources of stress. Nearly half of document child abuse in Oregon is linked to parent or caregiver alcohol or drug use. Other common sources of stress are domestic violence, involvement with law enforcement, and financial distress.[367]

The Oregon Healthy Teens Survey asks 11th graders if they had been hit or hurt by an adult in the past year. One in five 11th graders in Benton County reported being hit or hurt by an adult (Figure 6.19).

Figure 6.19: 11th graders hit or physically hurt by an adult within the past year in Benton County, the LBL Region, and Oregon, 2015



Source: Oregon Health Teens Survey

Domestic Violence

Domestic violence, which includes many forms of abuse, affects children and adults. Physical abuse, sexual abuse or assault, intimidation, verbal abuse and emotional abuse, or threats of such harm are all forms of domestic violence. Domestic violence can include abuse from a household member (including roommates or caregivers), intimate partners (including dating partners), or a family member (whether or not they live with the victim).[368]

The Center Against Rape and Domestic Violence (CARDV) is a non-profit organization serving Linn and Benton counties that provides supportive services to victims of domestic violence, sexual assault, and dating abuse.[369] Services include crisis intervention, emergency shelter, 24-hour crisis line, safety planning, advocacy, court information and support, agency and resource referrals, education, peer counseling, and outreach activities.

In their 2016-2017 fiscal year, CARDV responded to a total 6,297 calls on its 24-hour crisis line and provided emergency shelter to 116 adults and 85 children for a total of 3,092 bed nights. CARDV also provided legal system support to 860 adults and 30 teens and provided medical advocacy to 190 adults and 25 teens in Benton and Linn Counties.[370]

Domestic violence not only has an effect on the victim, but can also have an effect on children; domestic violence poses a threat to children's emotional, psychological, and physical well-being. Children who live with domestic violence are also at an increased risk to become direct victims of child abuse.[371]

Abuse of Vulnerable Adults

Vulnerable adults include the elderly and adults of all ages with physical or mental disabilities, whether living at home or being cared for in a health facility. Abuse and maltreatment of vulnerable adults can include physical, emotional, or sexual abuse, caregiver neglect, and financial exploitation. The information in this section includes adults and seniors.

In 2015, the Oregon Department of Human Services Office of Adult Abuse Prevention and Investigations received almost 43,000 reports of potential abuse.[372] Of those:

- 4,215 Oregon seniors and adults with physical disabilities experienced abuse or self-neglect, up sharply from 2,608 in 2010,
- Physical abuse had the highest rate of substantiation (35.6 percent) from reports,
- The category of abuse with the greatest number of substantiated cases was financial exploitation (1,188 substantiations),
- 25 percent of substantiated abuse claims occurred in facilities, while the other 75 percent occurred in community settings.[373]

Within Linn and Benton counties (reported together by the Department of Human Services Office of Adult Abuse Prevention and Investigations), there were 532 investigated allegations of abuse against adults with intellectual and/or developmental disabilities, of which 115 were substantiated. Of the substantiated claims in Linn and Benton counties, 21 occurred in care facilities and 94 took place in community settings.[374]

Violent Crime

Violent crimes are defined as offenses that involve face-to-face confrontation between the victim and the perpetrator, including homicide, forcible rape, robbery, and aggravated assault. High levels of violent crime compromise physical safety and psychological well-being. Crime rates can also deter residents from pursuing healthy behaviors such as exercising outdoors.[375] Additionally, exposure to crime and violence has been shown to increase stress, which may exacerbate hypertension and other stress-related disorders and contribute to obesity prevalence.[376] Exposure to chronic stress also contributes to the increased prevalence of certain illnesses such as upper respiratory illness and asthma in neighborhoods with high levels of violence.[377]

Violent crime rates varied widely between counties. Benton County had a violent crime rate of 116 crimes per 100,000 people from 2010-2012. This was well below the Oregon rate of 249 crimes per 100,000 people.[378] In 2013, the tri-county region recorded 55 violent deaths, including suicide, homicide, and undetermined causes. This was a rate of 22 violent deaths per 100,000 residents, equal to the rate in Oregon. [379]

Adverse Childhood Experiences and Intimate Partner Violence among Oregon Health Plan Members

There are two sets of results from the 2014 MBRFSS survey that are related to this section. First is a topic called "adverse childhood experiences" (ACEs). Adult Medicaid members were asked a series of 11 questions regarding whether they or a parent/adult in the home experienced depression or mental illness, alcoholism, drug abuse, incarceration, separation or divorce, physical or verbal abuse, or sexual abuse. Any 4 or more "yes" responses would qualify the responder as having had an adverse childhood experience.

A little over one-third (35 percent) of adult Medicaid members in the state of Oregon reported ACEs (compared to 23 percent for the general Oregon adult population). This value ranged from 8 percent among Asians to 51 percent among American Indians / Alaska Natives. The IHN-CCO region reported 36 percent of members as having adverse childhood experiences.

The other topic is intimate partner violence. The survey measured the number of adult Medicaid members who were physically assaulted or harmed by an intimate partner in the past 12 months. Across the state, 5 percent of members reported being victims of this violence. Only 1.4 percent of Asians, and as much as 9 percent of African Americans reported being victims. The IHN-CCO region values were similar to that of the state, with 4 percent of members stating they had experienced intimate partner violence.[380]

Occupational Safety and Health

With the large majority of the population engaged in some form of employment for some portion of their lives, the workplace represents an important opportunity to improve health. Occupational Safety and Health is concerned with all aspects of health and safety in the workplace, and focuses mostly on primary prevention of hazards. On a global scale, the World Health Organization (WHO) is currently addressing a wide scope of determinants of workers' health, which includes risks for disease and injury, social factors, and access to health services. In the United States, one of the primary organizations leading the way towards health and safety in the workplace is the Occupational Safety and Health Administration (OSHA) through the United States Department of Labor.

Despite established legislation, like the Occupational Safety and Health Act of 1970, requiring employers to provide workplaces "free from recognized hazards that are causing or likely to cause death or serious physical harm"[381] to their workers , the toll of workplace fatalities, injuries and illness continues to exact a large toll on society. Impacts of these injuries, both social and financial, usually fall to workers and their families, as well as taxpayer-supported programs. Examining the data around particular industries can help illustrate the various workplaces and their relative rates of injury, illness, or fatality, ultimately painting a picture of the working conditions present in the community as a whole.

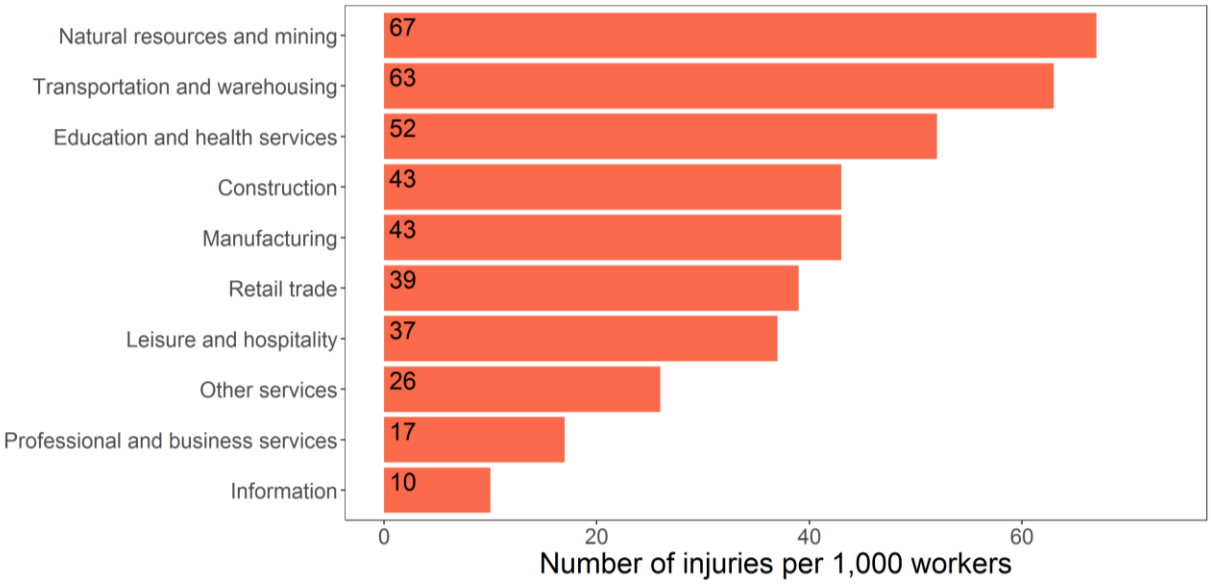
Injuries

County-specific data on workplace injuries are not available, but trends in state level data can be applied to major industries in the region to get a sense of the regional risk of workplace injury and illness. Statewide, the worker injury rate was approximately 41 injuries per 1,000 workers in 2013. Worker injury rates can be broken down first by industry, and then by category (a subset of industry).

The natural resources and mining industry has the highest incidence of non-fatal workplace injuries, with approximately 69 injuries per 1,000 workers in 2013. At a finer level of detail, certain specific workplace categories (not necessarily within the natural resources or mining industry) have high incidences of injury, including structural and motor vehicle manufacturing, fire protection, and wood preservation, which all had over 120 injuries per 1,000 workers. Surpassing all other workplace categories was local government nursing and residential care, with approximately 210 injuries per 1,000 workers in 2013. Industries with low workplace injury rates are concentrated in services such as educational and social services, business services, and private health care.

The variety of industries that constitute the bulk of Benton County's economy means that the risks of workplace injury are widely distributed. Benton County has a large natural resource industry, as well as large educational and health care sectors. As shown in Figure 6.20, natural resources and education and health services have relatively high workplace injury and illness rates in Oregon.

Figure 6.20: Oregon workplace injury and illness rates by industry, 2015



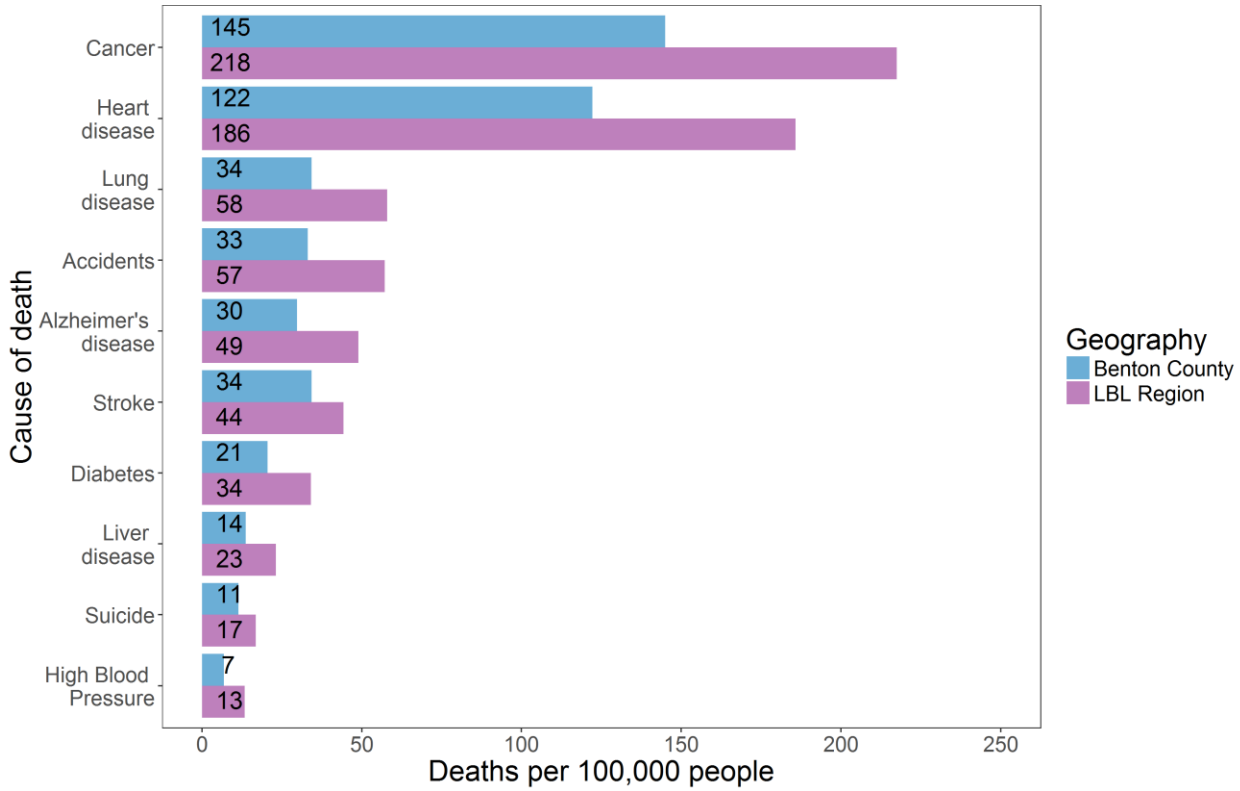
Source: Oregon Department of Consumer and Business Services

Leading Causes of Death in the Region

In 2015, the leading causes of death (for all ages combined) in Benton County were cancer, heart disease, lung disease, stroke, and accidents. Compared with the LBL region, Benton County has fewer deaths per 100,000 residents for each of its top ten causes of death (Figure 6.21).

Preventable risk factors, such as tobacco use, diet, activity, and alcohol use, contribute substantially to these deaths. For example, in 2014, it is estimated that 17 percent of deaths in Benton County were tobacco-related deaths. This is slightly lower than the 21 percent of tobacco-related deaths in Oregon during the same time period.[382]

Figure 6.21: Top 10 causes of death per 100,000 persons, age-adjusted, Benton County and region, 2015



Source: Oregon Health Authority, Oregon Public Health Assessment Tool

Chronic Diseases and Conditions

Chronic diseases, such as cancer, heart disease, stroke, and diabetes are among the most prevalent, costly, and preventable of all health problems. Healthy lifestyles, such as avoiding tobacco, being physically active, and eating well, greatly reduce a person's risk for developing chronic illnesses. Research shows that access to resources that support healthy lifestyles, such as nutritious food, recreational opportunities, and high quality and affordable prevention

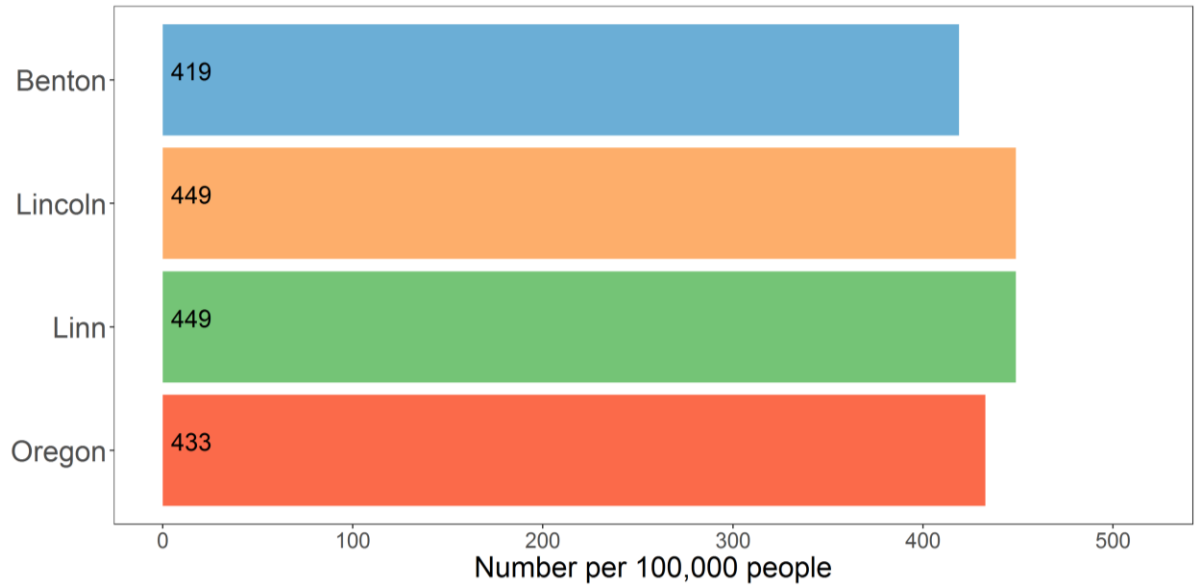
measures (including screening and appropriate follow-up) saves lives, reduces disability, and lowers medical costs.[383]

Cancer

Cancer is the leading cause of death in Benton County and in Oregon.[384] Five types of cancer are discussed in the section: lung, colorectal, breast, prostate, and pancreatic. Lung cancer is the most common cause of cancer death for Oregonians, followed by colorectal cancer and pancreatic cancer.[385] Pancreatic cancer has a very high mortality rate, in part due to the likelihood of a late diagnosis after the cancer has already progressed. Prostate cancer is a common cancer among men.

The region's annual rate of newly diagnosed cancer cases is similar to the rate in Oregon, with the three counties ranging between 427 and 460 diagnoses per 100,000 individuals each year (Figure 6.22).

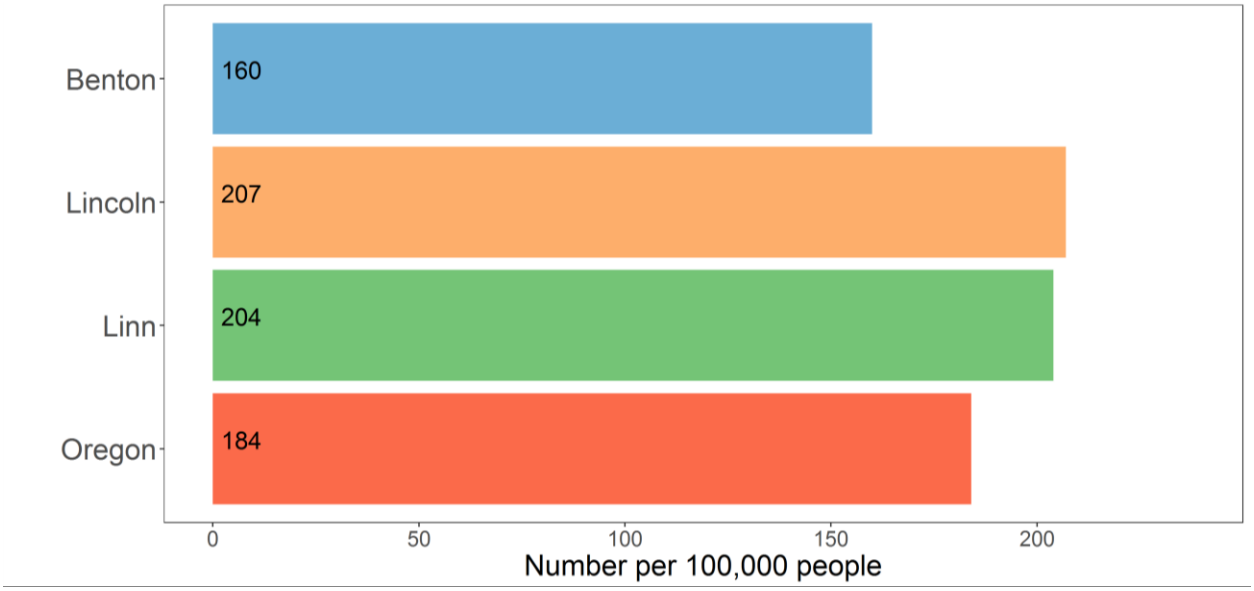
Figure 6.22: Annual age-adjusted incidence for all cancers, Benton, Lincoln, and Linn counties and Oregon, 2010-2014



Source: National Cancer Institute: State Cancer Profiles

As shown in Figure 6.3, age-adjusted incidence of tobacco-related cancer in the three counties varies greatly. Benton County's age-adjusted incidence of tobacco related cancer is significantly lower than Oregon's incidence, while Linn and Lincoln counties' incidences are significantly higher.[386] Data for all cancer and tobacco related cancer incidence are from different years and are therefore not directly comparable.

Figure 6.23: Age-adjusted tobacco related cancer incidence (per 100,000) in Benton, Lincoln, and Linn counties and Oregon, 2006-2010



Source: Oregon Tobacco Facts and Laws, 2013

Cancer rates also vary between different racial and ethnic groups. In Oregon, prevalence of cancer (the proportion of the population living with cancer) varies from a low of 3.6 percent among Asians and Pacific Islanders, to a high of 11.4 percent among American Indians and Alaska Natives. Figure 6.24 below displays data for cancer prevalence in Oregon by race and ethnicity.

Figure 6.24: Prevalence of cancer in Oregon by race and ethnicity, 2010-2011

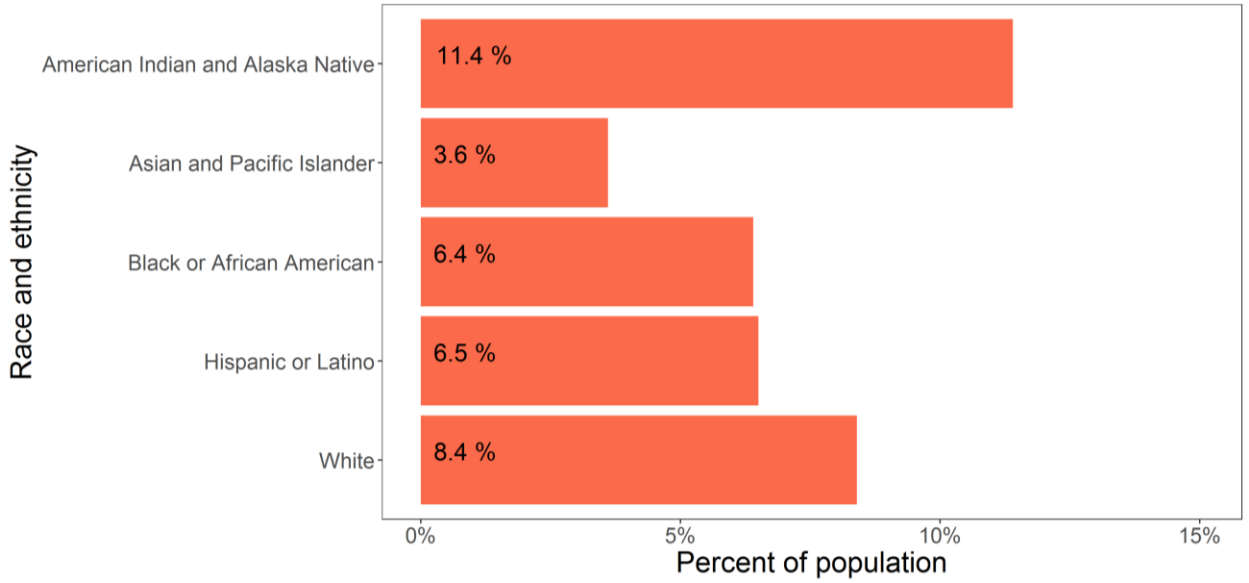
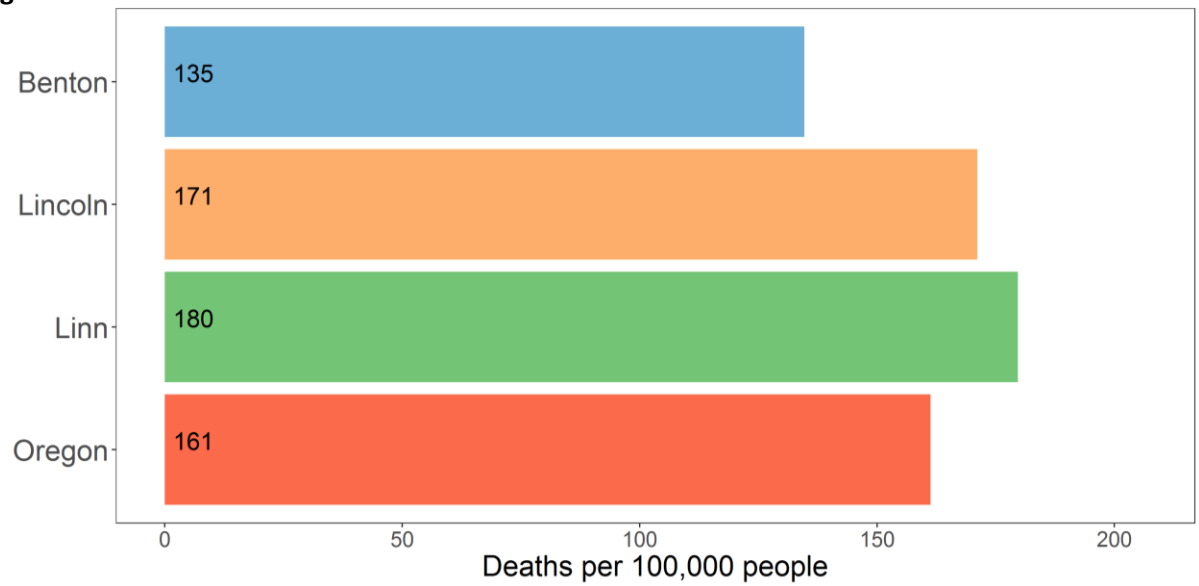


Figure notes: Prevalence of cancer is the percent of the population that have cancer.
Source: Oregon Health Authority, 2010-2011

Between 2013 and 2015, the mortality rate from all cancers in Benton County was 135 deaths per 100,000 people per year. Mortality rates, while lower in Benton County, were similar between the counties and close to the state rate of 161 deaths per 100,000 people, as shown in Figure 6.25, below.

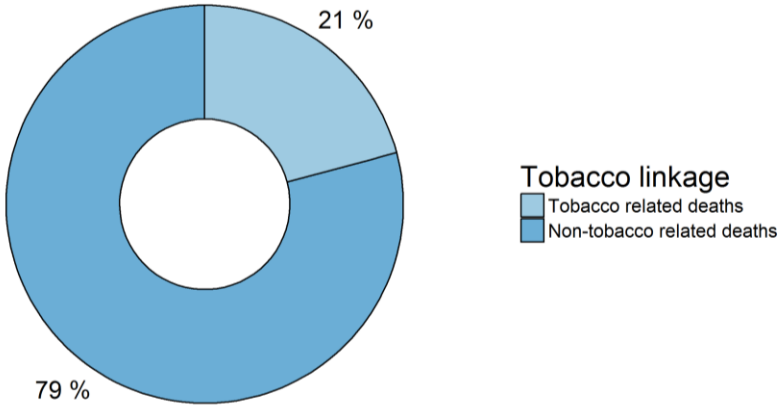
Figure 6.25: Age adjusted cancer deaths from all causes, Benton, Lincoln, and Linn counties and Oregon. 2013-2015



Source: Oregon Public Health Assessment Tool, 2013-2015

Tobacco contributed to 21 percent of cancer deaths in Benton County between 2013 and 2015, as shown in Figure 6.26, below. This percentage is lower than the state's percentage (29 percent).

Figure 6.26: Age adjusted tobacco related and non-tobacco related cancer mortality in Benton County, 2013-2015



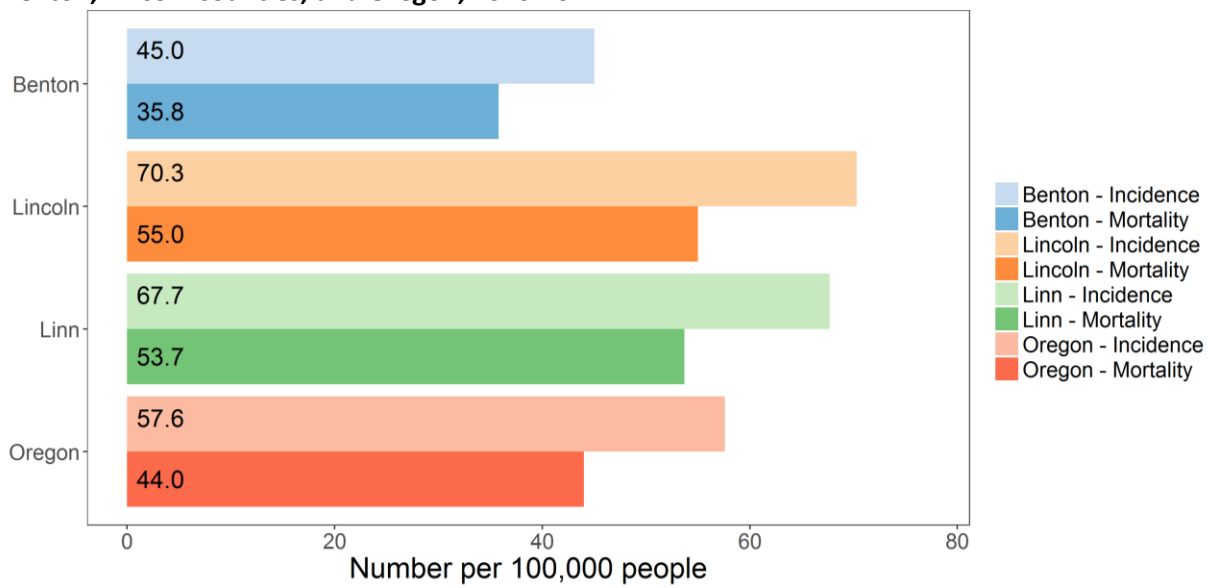
Source: Oregon Public Health Assessment Tool, 2013-2015

Lung and Bronchial Cancer

Because lung and bronchial cancers are closely related, this section will combine them both as lung cancer. Lung cancer incidence in men is steadily declining as a result of decreasing smoking rates, but the incidence in women remains relatively flat.[387] Lung cancer is the deadliest cancer in Oregon, accounting for 27 percent of cancer deaths in the state in 2013; a number which includes tobacco and non-tobacco caused lung cancers.[388] The rate of lung cancer has remained fairly constant in Oregon and the United States over time.

Across the region, the decline in smoking from 2004 to 2011 reflects major implication for cancer rates, since smoking is the leading cause of lung cancers.[389] The lung and bronchial cancer incidence rate for the state was 58 per 100,000 from 2010-2014, higher than the Benton County rate of 45 per 100,000.[390] Oregon has a mortality rate of 44 per 100,000, while Benton County has a rate of 36 per 100,000 (Figure 6.27). Only Benton County achieves the Healthy People 2020 goal of 45.5 or fewer deaths per 100,000 people.[391]

Figure 6.27: Age-adjusted incidence and death rate of lung and bronchial cancer per 100,000 persons in Benton, Lincoln counties, and Oregon, 2010-2014



Source: National Cancer Institute, State Cancer Profiles, 2016

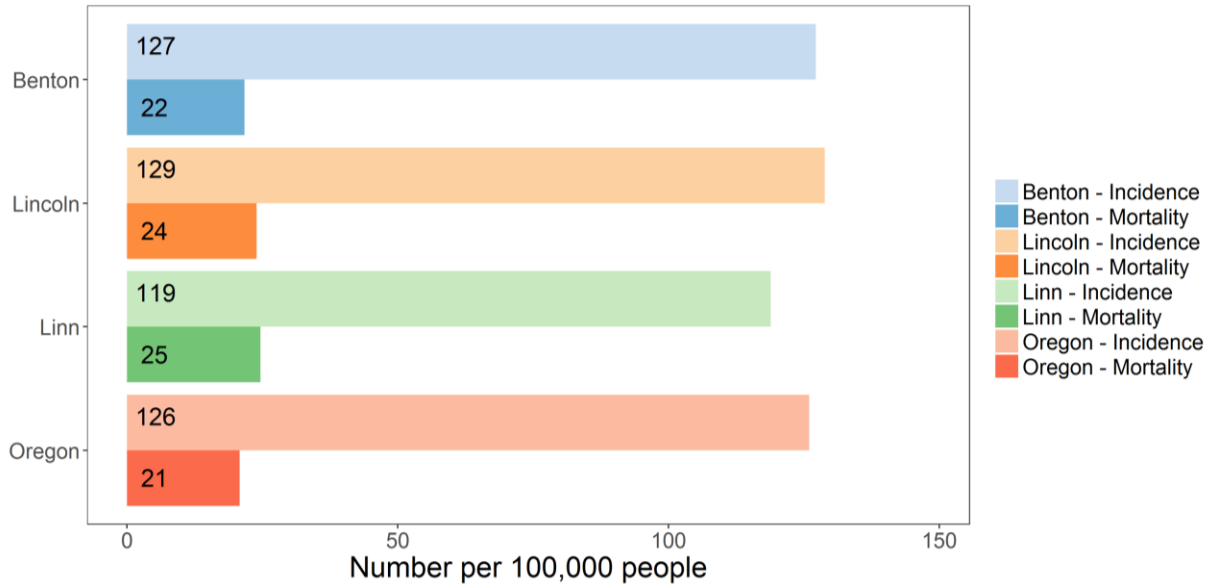
Breast Cancer

Oregon has the 11th highest incidence rate for breast cancer in the United States.[392] Although significant improvements have occurred in early detection and treatment, breast cancer is still a leading cause of death for women in Oregon. Only a small fraction of breast cancer cases can be linked to genetics.[393]

The 2010-2014 age-adjusted incidence of breast cancer among women in Benton County was 127 diagnoses per 100,000 women, compared to 126 diagnoses per 100,000 women in Oregon.

In 2010-2014, the female breast cancer mortality rates in all three counties were close to the Oregon mortality rate, as shown in Figure 6.28.[394] Benton County had mortality rates above the Healthy People 2020 target of 20.7 deaths per 100,000 females.[395]

Figure 6.28: Age-adjusted breast cancer incidence and mortality rates per 100,000 women in Benton, Lincoln counties, and Oregon, 2010-2014



Source: National Cancer Institute, State Cancer Profiles, 2016

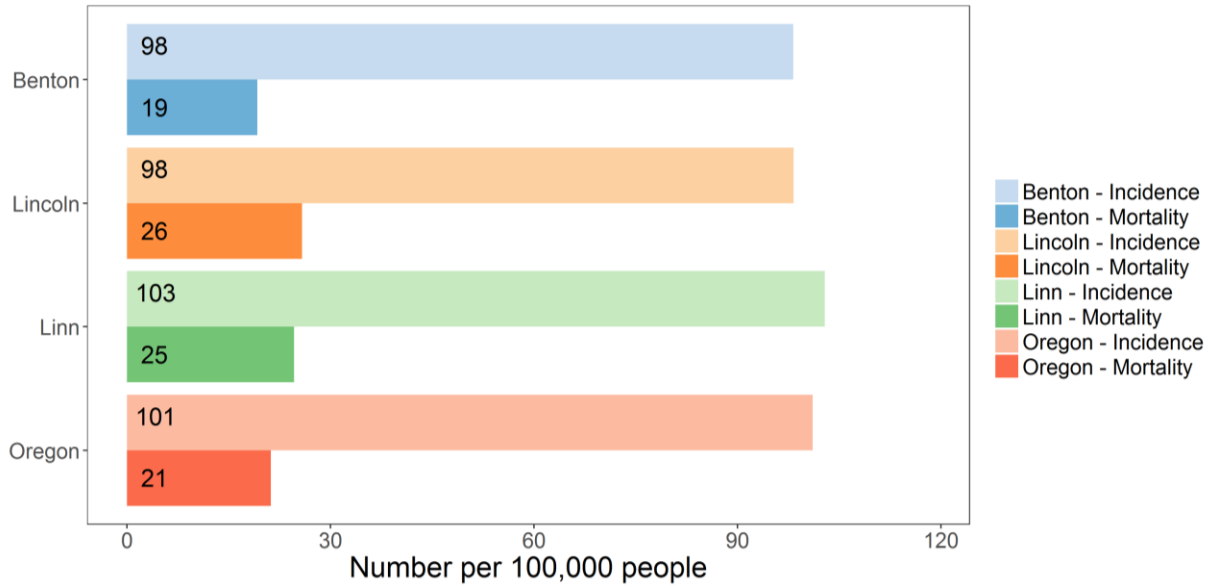
State trends in breast cancer are summarized as follows:

- Women are at highest risk for breast cancer.
- Women age 40 and older are at greatest risk for being diagnosed with breast cancer.
- A small percentage of women under the age of 40 develop breast cancer.
- About 85 percent of all women diagnosed with breast cancer do not have a family history of breast cancer.
- Only about 10-15 percent of breast cancers occur as a result of inherited genetic traits.
- Breast cancer in men is rare, but it does occur and should be recognized as an important area for screening and treatment.
- Race is not considered a factor for increased risk of breast cancer. However, rates of death from the disease differ among ethnic groups. In Oregon, breast cancer is the leading cause of cancer associated deaths among Latino and Asian Pacific Islander women.[396]
- Some women may be at risk for a later stage diagnosis due to lack of access or referral to cancer screening services. Women with disabilities and African American women are more likely to be diagnosed at later stages for breast, cervical, and colorectal cancer.[397]

Prostate Cancer

The 2010-2014 incidence of prostate cancer in Benton County was 98 per 100,000, slightly lower than that of Oregon's incidence of 101 per 100,000 men (Figure 6.29). Benton County's mortality rate for prostate cancer was also lower than that of the state, at 19 per 100,000 men compared to the state mortality rate of 21 per 100,000 men.[398] Both Benton County and Oregon's rates meet the Healthy People 2020 objective to reduce the mortality rate due to prostate cancer to 22 deaths per 100,000 men.[399]

Figure 6.29: Age-adjusted incidence and death rate of prostate cancer per 100,000 men in Benton, Lincoln counties, and Oregon, 2010-2014

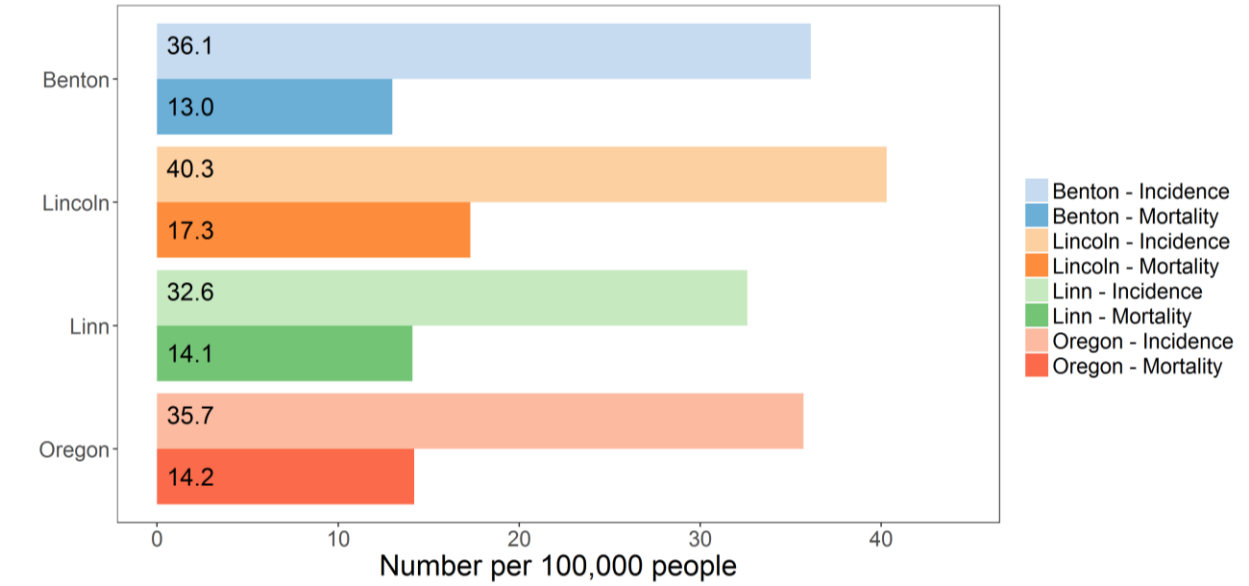


Source: National Cancer Institute, State Cancer Profiles, 2014

Colorectal Cancer

The age-adjusted incidence of colorectal cancer in Benton County is similar to the state incidence, as Figure 6.30 demonstrates. Mortality rates of colorectal cancer in Benton County, at 13 deaths per 100,000, are slightly lower than the state rate of 14 deaths per 100,000. Both Oregon and Benton County have achieved the Healthy People 2020 target to reduce the mortality rate due to colorectal cancer to 14.5 deaths per 100,000 people.[400]

Figure 6.30: Age-adjusted incidence and death rate of colorectal cancer per 100,000 persons in Benton, Lincoln counties, and Oregon, 2010-2014



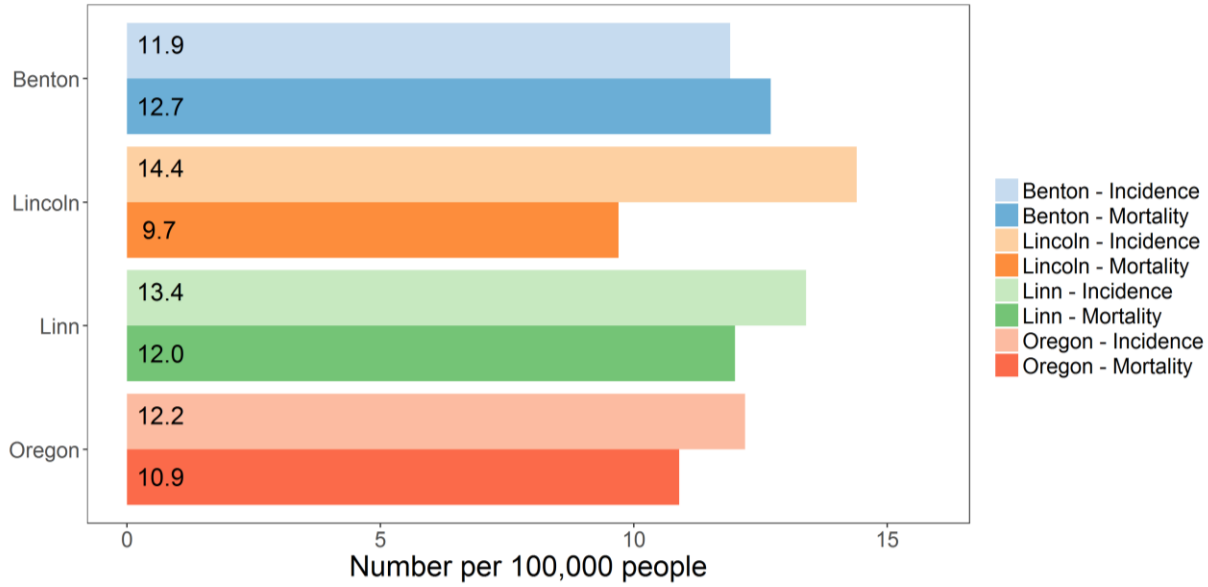
Source: National Cancer Institute, State Cancer Profiles, 2014

Pancreatic Cancer

Pancreatic cancer is a disease in which cancer cells form in the tissue of the pancreas. Risk factors for pancreatic cancer include smoking, long-standing diabetes, chronic pancreatitis, and certain conditions such as hereditary pancreatitis.[401]

The incidence rate for pancreatic cancer in Benton County from 2010-2014 was just under 12 cases per 100,000 persons, very similar to the incidence rate in all of Oregon which was just over 12 cases per 100,000.[402] In contrast with the other cancers discussed in this section, pancreatic cancer mortality rates are close to incidence rates, with rates of 12.7 per 100,000 in Benton County and 10.9 per 100,000 in Oregon. Pancreatic cancer is difficult to diagnose before it has advanced, so survival rates tend to be lower than for other common cancers. One consequence of similarities in incidence and mortality rates is the potential for mortality rates in a given year or set of years to exceed incidence rates, as is the case for Benton County, shown in Figure 6.31. This is because the cancer may be diagnosed in a year prior to the year of death.

Figure 6.31: Age-adjusted incidence and death rate of pancreatic cancer per 100,000 persons in Benton, Lincoln counties, and Oregon, 2010-2014



Source: National Cancer Institute, State Cancer Profiles, 2014

Cancer Screening

Research shows that screening for cancer is effective in reducing serious consequences of the disease, which is generally more treatable when detected early. Breast and cervical cancer screening rates in the region are fairly consistent with state-level screening rates (Table 6.14). Additional data are needed to identify rates of screening among race/ethnic populations, age group and income level, as risk factors differ among different populations.

Table 6.14: Age-adjusted percent of cancer screening in Benton County and Oregon, 2012-2015

Cancer screening practice	Benton County	Oregon
Mammogram within past 2 years (women 50-74 years old)	79 %	77 %
Cervical cancer screening within past 3 years (women 21-65 years old)	83 %	81 %
Current on colorectal cancer screening (50-75 years old)	71 %	69 %

Table notes: Current on colorectal cancer screening includes the following: having a fecal occult blood test (FOBT) in the past year; a colonoscopy within the past 10 years; or, a sigmoidoscopy within the past 5 years as well as an FOBT within the past 3 years.

Source: Oregon Health Authority, Oregon Public Health Assessment Tool

Cancer among Oregon Health Plan Members

When surveyed about whether they had ever been told they had cancer by a health care professional, 6 percent of Oregon Medicaid members reported they had (against 8 percent of the state's general adult population). The lowest rate was among Pacific Islanders at 2.5 percent, with the highest rate among American Indians / Alaska natives at 8 percent. The three counties served by IHN-CCO report a slightly higher rate than the state at 6.4 percent.[403]

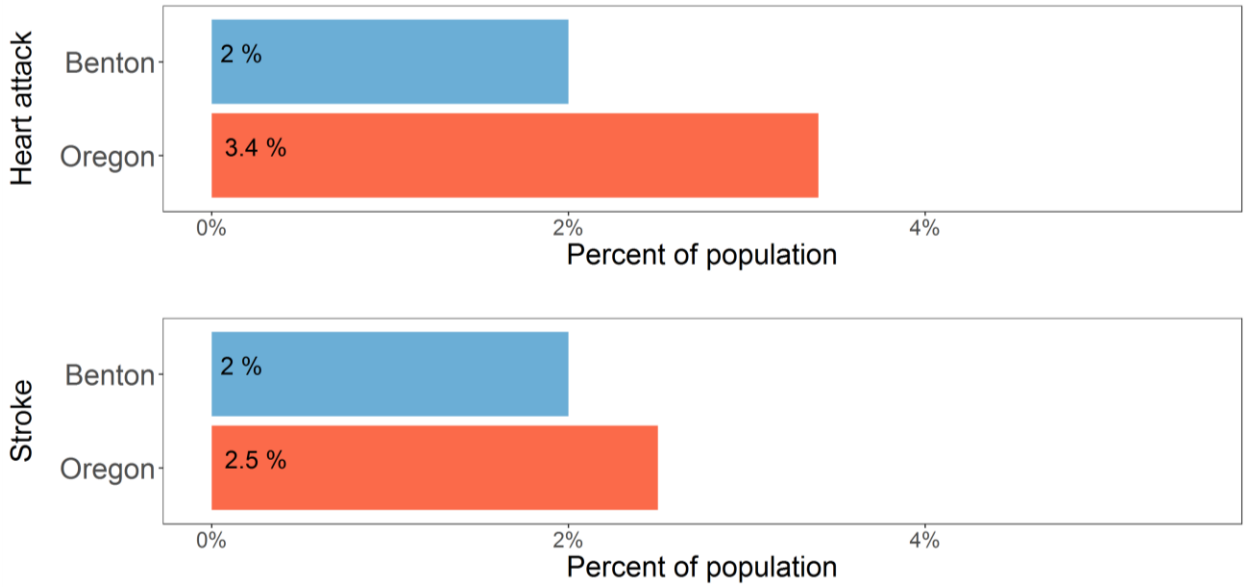
Heart Disease and Stroke

After cancer, heart disease is the largest contributor to the mortality rate in the region and in Oregon. When combined with stroke and adjusted for age, diseases of the circulatory system are the leading causes of death in the region and Oregon.

Cardiovascular Disease and Stroke

The incidence of both heart attack and stroked are lower in Benton County than in Oregon, as demonstrated in Figure 6.32.

Figure 6.32: Age-adjusted incidence of heart attack and stroke per 100,000 persons in Linn, Benton, and Lincoln counties, and Oregon, 2010-2003



Source: Oregon Health Authority, Behavioral Risk Factors Surveillance System, 2010-2013

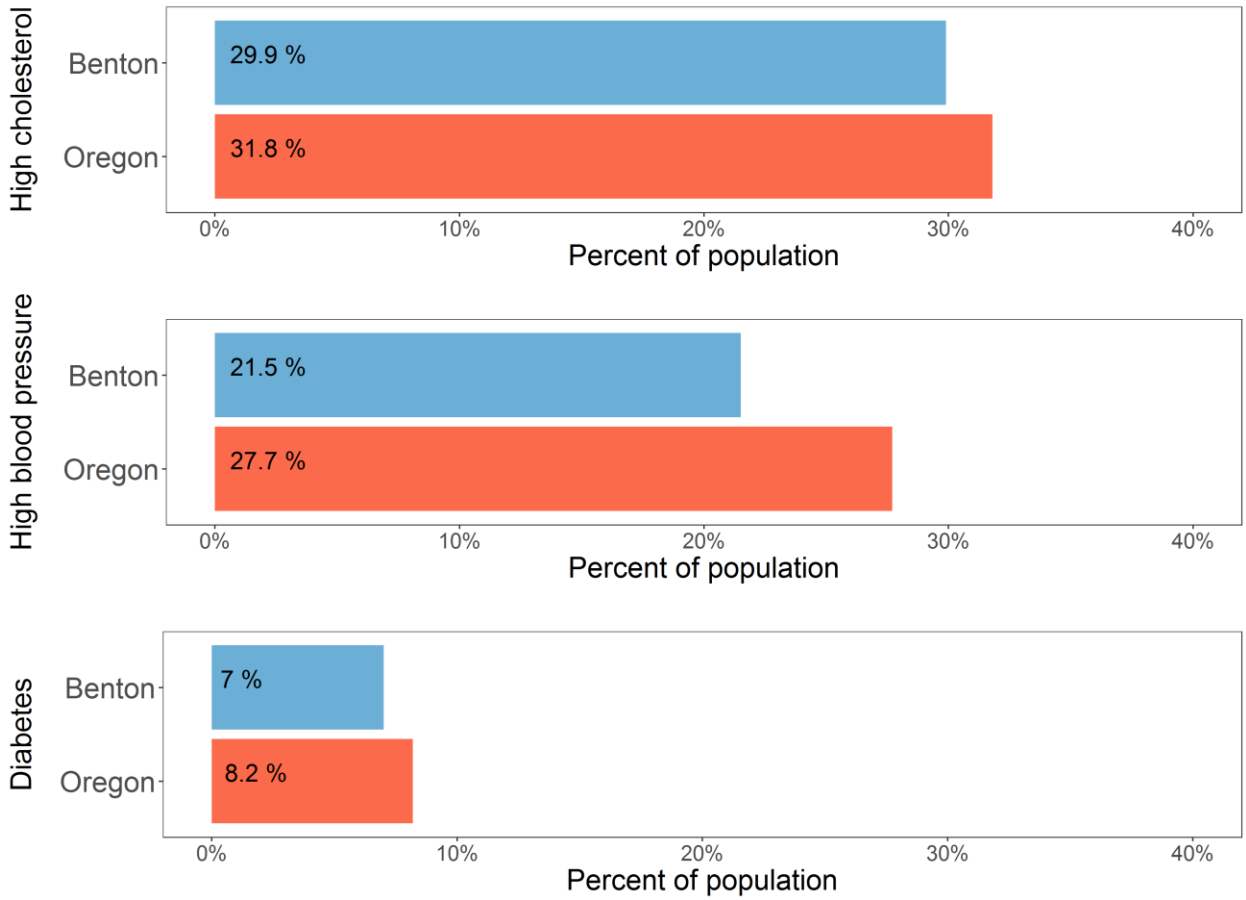
Numerous health conditions and behaviors contribute to the potential for heart disease and stroke. These include:

- High blood pressure,
- High blood cholesterol,
- Diabetes,

- Obesity,
- Lack of exercise, and
- Smoking.[404]

Figure 6.33 illustrates that these contributing factors tend to be similar in prevalence in both Benton County and the state.

Figure 6.33 Age-adjusted percent of residents with lifestyle behaviors of heart disease and stroke in Benton County and Oregon, 2010-2013



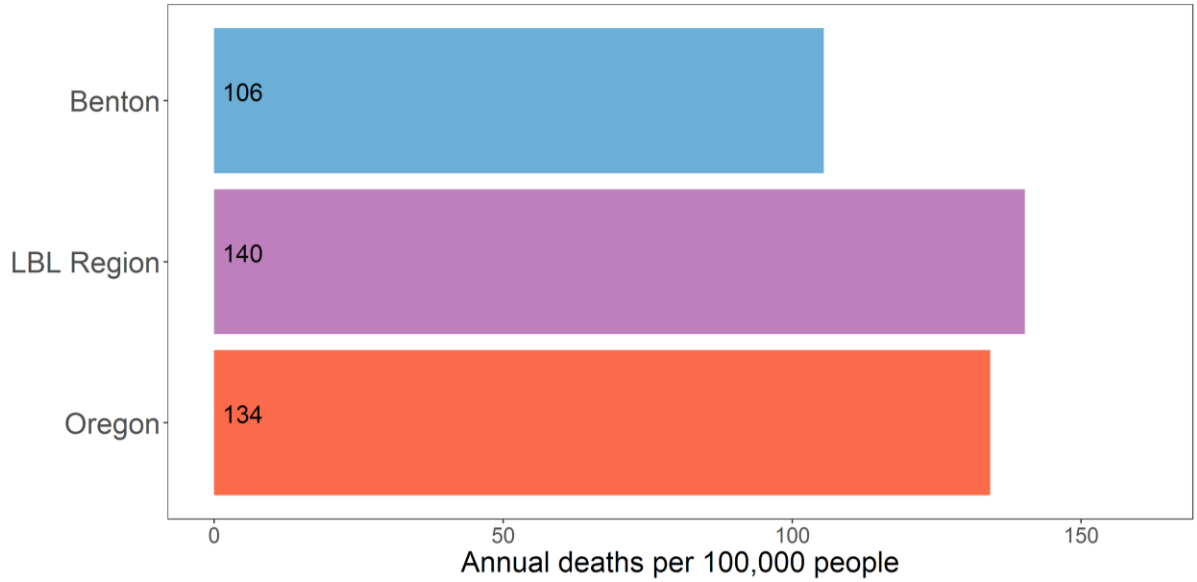
Source: Oregon Health Authority, Behavioral Risk Factors Surveillance System, 2010-2013

Many of the effects of heart disease can be reversed with healthy eating, exercise, avoidance of tobacco, and stress reduction. In addition to high blood pressure, high cholesterol, and diabetes being critical health factors of heart disease and stroke, social and economic factors are also important. For example, in the U.S., low-income adults are 50 percent more likely to suffer heart disease than top wage earners, even when other risk factors such as cholesterol or smoking, are taken into account.[405]

Heart Disease Mortality

After cancer, cardiovascular disease is the second leading cause of death in Benton County.[406] Across Oregon, the death rate for heart disease is higher in rural areas than urban areas.[407] Mortality rates are very different across the region (Figure 6.34), but the rate is lower in Benton County than in the Linn-Benton-Lincoln region and the state.[408]

Figure 6.34: Age-adjusted heart disease mortality rate per 100,000 individuals in Benton County, the LBL Region, and Oregon, 2013-2015

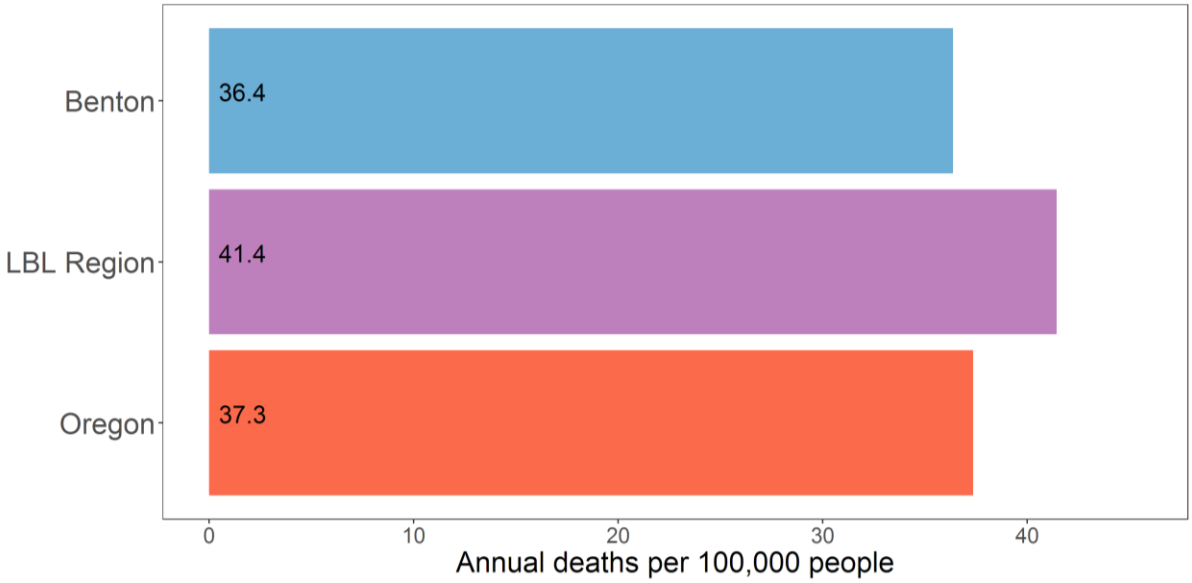


Source: Oregon Health Authority: Oregon Public Health Assessment Tool, 2013-2015

Stroke Mortality

Stroke mortality rates in the region and in Oregon have not achieved the Healthy People 2020 target of a reduction to 34.8 deaths per 100,000 persons (Figure 6.35).[409] However, Benton County's mortality rate is the lowest in the region at 36 deaths per 100,000 people, as opposed to Oregon's rate of 37 deaths per 100,000 people, and the Linn-Benton-Lincoln regional rate of 41 deaths per 100,000 people.

Figure 6.35: Age-adjusted stroke mortality rate per 100,000 individuals in Benton County, the LBL Region, and Oregon, 2013-2015



Source: Oregon Health Authority: Oregon Public Health Assessment Tool, 2013-2015

Heart Attack and Stroke among Oregon Health Plan Members

Adult Medicaid members in Oregon were also surveyed about whether they had ever had a heart attack. A little over 4 percent of members responded that they had (a value slightly lower than the general state adult population). The range in race and ethnicity included 2.4 percent among Hispanics to 6.2 percent among American Indians/Alaska Natives. Across the IHN-CCO region, the 5 percent heart attack report rate was a little higher than the state.[410]

Four percent of Oregon's Medicaid population reported having had a stroke. This is higher than the state's population in general (3 percent). Only 1.3 percent of Hispanic OHP members reported they have had a stroke, with just over 5 percent of American Indians / Alaska Natives reporting the same. Stroke rates for the IHN region are worse than the state at 4.5 percent.[411]

Diabetes

Diabetes in Adults

There are two types of diabetes identified by the medical community. Type 1 diabetes is a hormonal condition in which the body does not produce enough insulin to regulate the conversion of sugar and starches into energy. Type 1 diabetes is caused by genetic and unknown factors and is usually diagnosed in children. Fewer than five percent of diabetics are diagnosed with Type 1 diabetes.

Most diabetics are diagnosed with Type 2 diabetes. In Type 2 diabetes, the body develops resistance to insulin, so that dietary sugar absorbed into the bloodstream is not converted into glycogen at a healthy rate. There are both genetic risk factors and behavioral risk factors for developing Type 2 diabetes. Because diabetes can cause serious health complications, it is important to prevent Type 2 diabetes through healthy life choices and also catch diabetes early through health screenings.[412]

Hereafter, Type 2 diabetes will be referred to as diabetes.

Risk factors for diabetes include the following:

- Being overweight or obese,
- having a parent or sibling with diabetes,
- having high blood pressure,
- having high cholesterol,
- being physically inactive,[413] and
- smoking.[414]

Prevalence of diabetes among adults in Benton County was 7 percent from 2010-2013.[415] This estimate may be conservative, however, as many people are unaware of their status. Diabetes often develops gradually as symptoms and complications can take years to manifest.

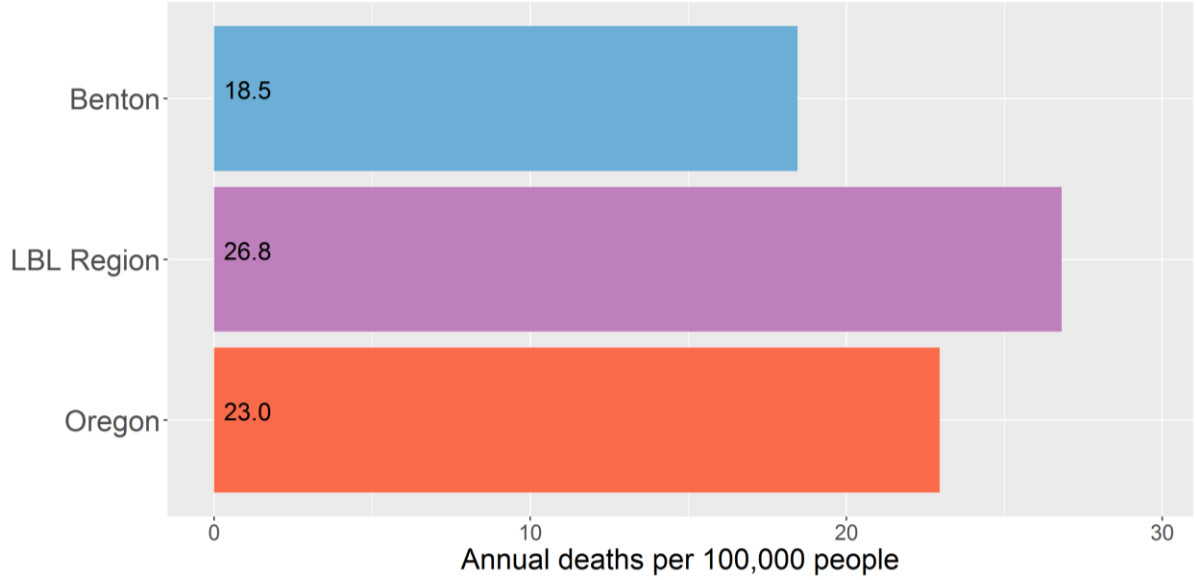
The growing burden of diabetes affects everyone in Oregon, but rates vary by age, race/ethnicity, and household income:

- Diabetes prevalence increases with age. Oregonians under 45 have the lowest rates of diabetes (2.6 percent), while 21.1 percent of adults aged 65 to 74 years of age and 18.9 percent of adults 75 years and older have been diagnosed with diabetes.
- Oregon's Hispanic/Latino, African American, and American Indian/Alaska Native communities have significantly higher rates of diabetes than do non-Latino Whites and Asian/Pacific Islanders.
- In 2011, the prevalence of diabetes among adults with an annual household income of less than $20,000 was nearly three times that of those with an annual household income of $75,000 or more (13.8 percent versus 4.9 percent, respectively).[416]

Diabetes Mortality

Overall, 2013-2015 age-adjusted annual diabetes mortality rates have been consistently lower in Benton County than in the region or the state. All of these rates, however, are lower than the national diabetes mortality rate and meet the Healthy People 2020 objective of no more than 66.6 deaths per 100,000 persons.[417]

Figure 6.36: Age-adjusted diabetes mortality rate per 100,000 in Benton County, the region, and Oregon, 2015



Source: Oregon Health Authority: Oregon Public Health Assessment Tool, 2015

Early detection and prompt treatment can reduce the burden of diabetes and its complications. Table 6.15 below shows that of the three counties in the region, a higher percentage of Lincoln County residents have had their blood sugar and cholesterol tested compared to the rest of the region and Oregon. The rate of screening in Benton and Linn counties are more similar to that of the state.

Table 6.15: Age-adjusted percent of adults with diabetes-related health screenings in Benton County and Oregon, 2010-2013

Health screening practice	Benton County	Oregon
Blood sugar test within the past 3 years (45 years or older)	68 %	63 %
Cholesterol checked within the past 5 years	72 %	71 %

Source: Oregon Health Authority, Health screenings among Oregon adults, 2010-2013

Diabetes among Oregon Health Plan Members

Medicaid members in Oregon report having diabetes at a rate of 12 percent, whereas the general adult population report a rate of 9 percent. The highest rate in the survey came from Pacific Islanders (22 percent), while other races and ethnicities were more closely bunched around 13 percent. The three county region served by IHN had a rate that was similar to the state (12 percent).[418]

Asthma

Over the past 20 years, asthma has become one of the most common chronic diseases in the United States. Oregon has one of the highest asthma rates in the nation.[419] Asthma results in direct health care costs (e.g., hospitalizations and emergency department visits) and indirect costs (e.g., missed school and work days and days of restricted activity) that affect the quality of life for people with asthma and their families.

Common asthma triggers include:

- 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; and
- illnesses, such as influenza and colds.[420]

Prevalence of Asthma in Adults

For the past 10 years, the percent of Oregonians with a current asthma diagnosis has been rising slowly. Oregon ranked among the top six states for the highest percentage of adults with current asthma diagnoses in 2011.[421]

Two important risk factors contribute to the likelihood of an asthma diagnosis, tobacco use and obesity. Consequently, Oregon counties with asthma levels higher than the state average also tend to be counties with high smoking rates.[422] Likewise, counties with high levels of obesity also tend to have increased prevalence and incidence of asthma.

Asthma rates are self-reported on the Oregon Healthy Teens survey. In 2015, 10 percent of Benton County 8th graders and 13 percent of 11th graders reported having asthma (Table 6.16).

Table 6.16: Asthma rates among high school students, 2015

Grade	Benton County	LBL Region	Oregon
8th grade	10 %	12 %	12 %
11th grade	13 %	14 %	13 %

Source: Oregon Healthy Teens Survey, 2015

Just under 10 percent of Benton County adults have an asthma diagnosis. This is similar to the rate in Oregon, which is just over 10 percent.[423]

Detailed information on the prevalence of asthma among other sub-populations in the region is not currently available. Even so, results from statewide surveillance suggest that prevalence varies by race/ethnicity, level of education, sexual orientation, and household income (Table 6.17).

Table 6.17: Age-adjusted prevalence of asthma in at-risk groups in Oregon, 2011

Population characteristic	Prevalence
Total population	11 %
African American	12 %
American Indian and Alaska Native	18 %
No high school diploma	17 %
Gay or Lesbian	12 %
Bisexual	16 %
Household income below $15,000	18 %
No health insurance	12 %
Oregon Health Plan	20 %
Rural	12 %

Table notes: African American and American Indian and Alaska Native data from 2010-2011; Gay or Lesbian and Bisexual data from 2007 – 2011 combined.
Source: Oregon BRFSS 2011

Asthma among Oregon Health Plan Members

Among adult Medicaid members, 17 percent reported having been diagnosed with asthma. There is a wide range among different races and ethnicities, with 7 percent of Asian members diagnosed and 25 percent of American Indians/Alaska Natives diagnosed. Among the local region served by IHN-CCO, 18 percent of OHP members report an asthma diagnosis.[424,425]

Arthritis

Arthritis continues to be the most common cause of disability in the United States, affecting one in five Americans. Arthritis consists of over 100 different diseases and conditions that affect the joints, surrounding tissues and other connective tissues. The two most common types are osteoarthritis and rheumatoid arthritis.

The prevalence of arthritis in Benton County is similar to the state-wide prevalence, at 24 percent in Benton County, compared to Oregon's 25 percent.[426]

Older adults in Oregon are disproportionately affected by arthritis. Prevalence of arthritis is expected to increase dramatically as the population ages. Women are more likely to be affected than men because they live longer than men. The growth of the aging population in

the region will add to the high prevalence of arthritis in the coming decades. Other risk factors include sedentary lifestyle, obesity/overweight, joint injury, and work-related joint trauma.[427]

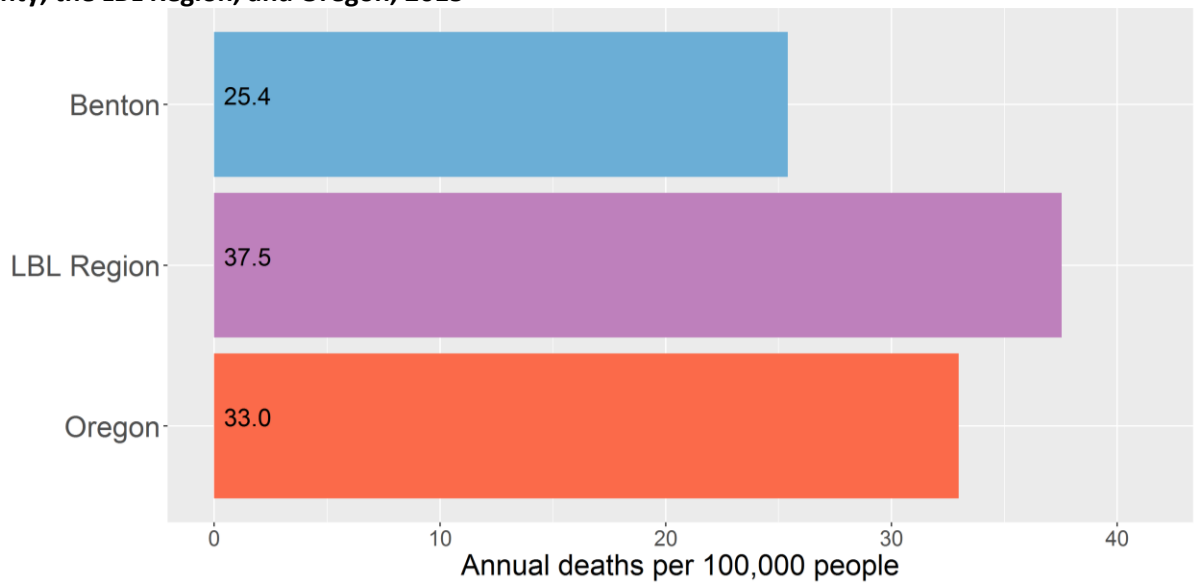
Arthritis among Oregon Health Plan members

Among adult Medicaid members across the state, 27 percent report being diagnosed with arthritis. In terms of race and ethnicity, both Whites and American Indian/Alaska Native members have rates above 30 percent. Across the region served by IHN, 29 percent of members have been diagnosed with arthritis.[428]

Alzheimer's Disease

Alzheimer's disease is the most common form of dementia, which is a general term for loss of memory and other intellectual abilities serious enough to interfere with daily life. Alzheimer's disease accounts for 60 to 80 percent of all cases of dementia. Alzheimer's disease is terminal and is the 6th most common cause of death in Benton County. From 2013-2015, Benton County's mortality rate for Alzheimer's disease was 25 deaths per 100,000 people (Figure 6.37). The Alzheimer's disease mortality rate in Oregon was much higher than in Benton County.

Figure 6.37: Age-adjusted Alzheimer's disease mortality rate per 100,000 individuals in Benton County, the LBL Region, and Oregon, 2015



Source: Oregon Health Authority: Oregon Public Health Assessment Tool, 2015

It is anticipated that the number of Oregonians with Alzheimer's disease and related dementia will increase significantly in the next two decades, mostly due to an increase in the elderly population. Currently, about 76,000 Oregonians live with Alzheimer's disease and this number is expected to increase to 110,000 by 2025.[429]

Unintentional Injury Mortality

Injuries are the number one cause of death among people under the age of 44 in Oregon and the fifth leading cause of death overall. Injury is also the number one cause of disability at all ages.[430] Most of the events resulting in injury, disability, or death are preventable. According to Healthy People 2020, injuries and violence have an impact on the well-being of people by contributing to premature death, disability, poor mental health, high medical costs, and high unproductivity.[431]

Nationally, the leading causes of death from injury are a result of motor vehicle traffic accidents, unintentional poisoning, and falls. Overall, these are the same leading causes of death resulting from unintentional injury in Oregon. However, falls is the number one cause, followed by poisoning and motor vehicle accidents. Risky behaviors, such as drinking and driving and the use of a hand-held cell phone while driving can be contributing factors to motor-vehicle traffic accidents. About three percent of Oregon adults report driving after having too much to drink on at least one occasion in the past month. About 15 percent of Oregon youth rode with a parent or other adult who had been drinking on at least one occasion in the past month.

Regional injury deaths follow the same pattern as the state (see Figure 6.38 below). Falls contributed to 32 percent of accidental deaths between 2009 and 2013, followed by poisoning and motor vehicle accidents. Together, these three causes comprise 82 percent of accidental deaths in the region.

Figure 6.38: Causes of unintentional injury deaths in Benton County, 2011-2015

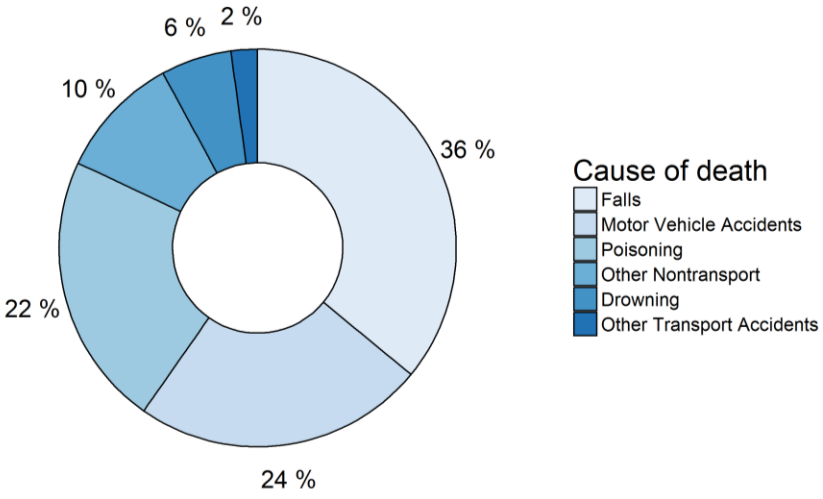


Figure notes: These data represent 139 deaths among all Benton County residents between 2011 and 2015; a death rate of 32.1 deaths per 100,000 people per year.
Source: Oregon Public Health Assessment Tool, 2011-2015

Injury mortality is higher among males than females in all age groups in Oregon. Injury mortality rates increase with age for both sexes, starting at age five.[432] The risks of different

major types of injury fluctuate through a person's life. These include, among other types, falls, unintentional poisonings, motor vehicle accidents, and self-harm.

Out of the 34,160 Oregon deaths in 2014, approximately 1,796 (5 percent) were due to unintentional injuries. Of those, 33 were in Benton County.[433] The top causes of unintentional injury deaths in the region in 2014 included falls (11 total deaths), poisoning (including overdoses of drugs and medications; 9 total deaths), and motor vehicle accidents (8 total deaths).[434] These deaths are recorded by county of residence, not county of death. The Healthy People 2020 target for unintentional injury deaths is 36 per 100,000 persons, slightly lower than Benton County's death rate of 38 per 100,000 persons.[435]

Preventing Falls

Falls are a major cause of injury and hospitalization, and the 10th leading cause of death among older Oregonians.[436] Nearly one in three older adults experiences a fall each year, and 20-30 percent of those who fall suffer injuries. As commonly as they occur, injuries and deaths due to falls are not an inevitable consequence of aging; they can be prevented. Muscle weakness is a significant contributing factor in falls, so physical activity is widely viewed as among the most important interventions for preventing injuries related to falls among older adults.

Hospitalization rates for falls increase drastically as adults age; the rate of hospitalizations due to a fall for adults 75 years and older is more than six times the rate for adults 60-74 years. Older adults hospitalized for falls are nearly six times more likely to be discharged into long term care compared to older adults hospitalized for other conditions. In 2013, the cost for fall injury hospitalization among adults 65 years and older in Oregon totaled to more than $219 million.[437] Between 2011 and 2015, the mortality rate from falls in the region was 388 deaths per 100,000 residents age 85 and older. Figure 6.39, below, highlights the difference in mortality rates for different age groups among the elderly in the region and Oregon. Regional data is presented here as the numbers are too small for publication at the county level.

[Figure 6.39 is displayed on the following page]

Figure 6.39: Fall mortality among older adults in the LBL Region and Oregon, 2011-2015

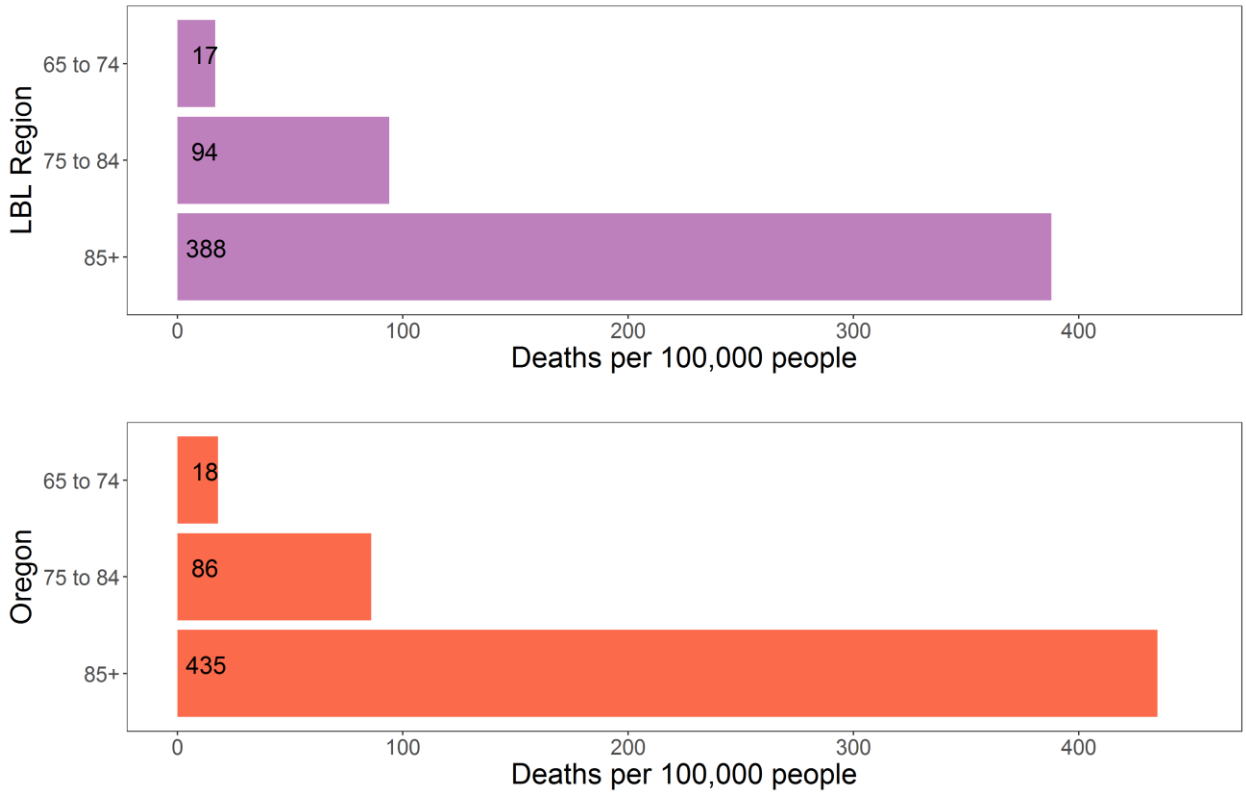


Figure notes: Regional data is presented here as the numbers are too small for publication at the county level.
Source: Oregon Health Authority, Oregon Public Health Assessment Tool, 2011-2015

Conclusion

It is important to be aware of and understand the conditions and outcomes that can affect how well our bodies function, improving our quality of life and preventing loss of life. While leading causes of death in Benton County mirror those of the state, examining various physical ailments reveals areas of vast improvement, as well as areas in which the county is doing more poorly than the state average. Data on many sub-populations are noticeably absent throughout this chapter.

While we know that factors such as access to health care, mental health status, and other demographics are closely linked to particular conditions at a state or national level, without more robust data we can only guess at local trends. The more detailed data we have about disparities within particular populations and illnesses, the more ability we have to address these issues effectively in the region. As discussed throughout the chapter, many of the conditions that cause illness and death within the region have well-established causes, with a number of them linked with preventable mental health illnesses and socioeconomic situations. The following chapter takes a closer look at mental health and behavioral risk factors that affect and interplay with a person's health and well-being.

Chapter 7
Behavioral Health

Mental health disorders are experienced by people of all ages, from early childhood through old age. Research suggests that only about 17 percent of U.S. adults are considered to be in a state of optimal mental health. An estimated 26 percent of Americans age 18 years and older are living with a mental health disorder in any given year and 46 percent will have a mental health disorder during their lifetime.[438] These disorders include, among others, anxiety, depression, behavior disorders, persistent suicidal thoughts, schizophrenia, and Alzheimer's disease.[439] County Health Rankings reports the number of poor mental health days each month, both as a proxy for mental health diagnoses and as an indicator of overall mental wellness. Residents of Benton County reported an average of 4.2 poor mental health days over the previous month. This measure is based on survey responses to the question: "Thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?"[440] The average of 4.2 poor mental health days in Benton County is the highest number of poor mental health days reported by the County Health Rankings for Benton County since 2011. Oregonians across the state reported an average of 4.6 poor mental health days. The Healthy People 2020 benchmark is 2.3, placing the region and the state in the worst 10 percent nationwide for this measure, with clear room for improvement. From 2008 to 2011, 60 to 64 percent of regional residents reported zero poor mental health in the past 30 days. These rates are statistically equivalent to the statewide rate of 65 percent.[441] From 2010 to 2013, self-reported depression rates in Benton County was 23 percent, close to the state rate of 25 percent.[442]

There is a strong link between chronic disease, injury and mental illness. Tobacco use among people diagnosed with mental health conditions is twice that of the general population. Other associations between mental illness and chronic disease include cardiovascular disease, diabetes, obesity, asthma, arthritis, epilepsy, and cancer. Injury rates for both intentional and unintentional injuries are 26 times higher among people with a history of mental health conditions than for the general population.[443] National research indicates that people with serious mental illness die on average 25 years earlier than the general population. Sixty percent of those deaths are due to medical conditions such as cardiovascular disease, diabetes, respiratory diseases, and infectious illnesses; 40 percent are due to suicide and injury.[444]

Many mental health disorders can be treated effectively, and prevention of mental health disorders is a growing area of research and practice. Early diagnosis and treatment can decrease the disease burden of mental health disorders as well as associated chronic diseases. Assessing and addressing mental health remains important to ensure that all Americans lead longer, healthier lives.[445]

One group of particular concern regarding mental health is the incarcerated population. In Oregon, the provision of effective mental health service has been shown to lead to positive outcomes. These outcomes include a dramatic drop in arrests, reduction in the likelihood and duration of incarceration, and fostering of self-sufficiency and well-being as a result of improved social, emotional, and vocational functioning.[446] Approximately 3,400 adults with mental illnesses were incarcerated in prisons in Oregon in 2010.[447] This was a prevalence of approximately 24 individuals with mental illness for every 100 incarcerated individuals.[448]

Substance Abuse and Mental Health Services Administration

The Substance Abuse and Mental Health Services Administration (SAMHSA) is a part of the U.S. Department of Health and Human Services that deals with "reducing the impact of substance abuse and mental illness on America's communities."[449] SAMHSA defines any mental illness among adults over 18 as:

"….currently or at any time in the past year having had a diagnosable mental, behavioral, or emotional disorder (excluding developmental and substance use disorders) of sufficient duration to meet diagnostic criteria specified within the DSM-IV."[450]

SAMSHA conducts an annual survey, called the National Survey on Drug Use and Health (NSDUH), which provides sub-state estimates of a variety of mental health and substance abuse topics. However, SAMHSA does not evaluate individual counties but instead divides the state into regions. Region 3 includes Benton, Linn, Lincoln, Clatsop, Columbia, Polk, Tillamook, Lane, Marion, and Yamhill counties. Therefore the statistics from SAMHSA should be interpreted in the correct context.

Suicide

There are more deaths in Oregon due to suicide than due to car crashes. Benton County recorded 14 suicides per 100,000 residents in 2013. The statewide rate in 2013 was 18 per 100,000 persons.[451] Suicide is a death resulting from an intentional injury against oneself with an intent to die.[452] As a public health concern, it relates to both injury and violence and mental health. However, while many unintentional injuries can be prevented by making one's environment safer, suicide can also be effectively prevented by providing treatment to those with mental health disorders. Therefore, suicide is discussed in the context of mental health. Suicide is an important public health problem in Oregon. It is also the leading cause of injury-related death in the state and is the 9th leading cause of death for Oregonians.

Depression, Suicide, and Suicidal Ideation

Depression is the most common type of mental illness and it is estimated to affect more than 26 percent of the U.S. adult population.[453] Depression is characterized by a depressed or sad mood, diminished interest in activities which used to be pleasurable, weight loss or gain, fatigue, psychomotor agitation or retardation, inappropriate guilt, difficulties concentrating, and recurrent thoughts of death.[454] Depression has many degrees of severity, including

dysthymia (a chronic, persistent mild depression)[455] to major depressive disorder (clinical depression).[456] Depression is also the most common underlying cause of suicide, and many individuals who die by suicide have a diagnosable mental or substance abuse disorder, and most have more than one disorder.[457]

In Oregon, suicide rates are higher than the national average and about 70 percent of people who died by suicide from 2003 to 2012 also had depression. Among all age groups, the suicide rate in 2011-2015 was 13 per 100,000 people in Benton County.[458]

Factors associated with an increased risk of suicide include:

- having a family history of suicide;
- having a family history of child maltreatment;
- having previously attempted suicide;
- having a history of mental disorders, particularly clinical depression;
- having a history of alcohol and substance abuse;
- living in an area where there is a local epidemic of suicide;
- isolation or feeling cut off from other people;
- encountering barriers to accessing mental health treatment;
- encountering loss (relational, social, work, or financial);
- having a physical illness;
- having easy access to lethal methods; and
- an unwillingness to seek help due to the stigma attached to mental health and substance abuse disorders or to suicidal thoughts.[459]

While protective factors against suicide have not been studied as extensively as risk factors, they are equally important. Factors that have been found to buffer individuals from suicidal thoughts or behavior include:

- Effective clinical care for mental, physical, and substance abuse disorders;
- Easy access to a variety of clinical interventions and support for help seeking;
- Family and community support (connectedness);
- Support from ongoing medical and mental health care relationships; and
- Skills in problem solving, conflict resolution, and nonviolent ways of handling disputes.[460]

Table 7.1 highlights the percentage of 8th and 11th grade students in the region that exhibited signs of depression, thought about suicide, or attempted suicide during 2015. The rate of attempted suicide is higher among 8th graders in the region than among 11th graders in the region.[461]

Table 7.1: Percent of 8th and 11th grade students that exhibited signs of depression, thoughts about suicide, or actually attempted suicide during the last 12 months, Linn, Benton, and Lincoln counties, and Oregon, 2015

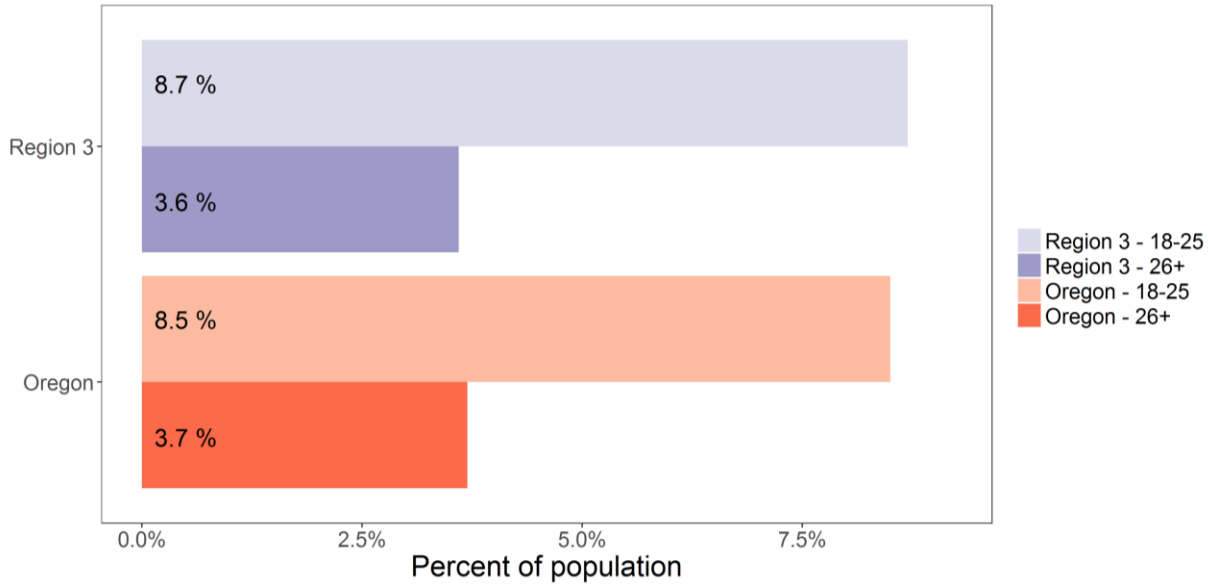
	Grade	Benton County	LBL Region	Oregon
Major depressive episode	8th grade	26 %	29 %	27 %
	11th grade	28 %	29 %	29 %
Suicidal ideation	8th grade	18 %	18 %	16 %
	11th grade	14 %	14 %	16 %
Suicide attempt	8th grade	7 %	9 %	8 %
	11th grade	5 %	5 %	6 %

Table notes: Major depressive episode was asked as: feeling so sad or hopeless for two weeks that the youth stopped doing most normal activities.

Source: Oregon Healthy Teens Survey, 2015

SAMHSA estimated suicidal ideation among adults (Figure 7.1). Young adults ages 18-25 consider or think about suicide at more than twice the rate as adults 26 and higher, and this is consistent in both Region 3 and at the state level.

Figure 7.1: Young adults (ages 18-25) and adults (26+) that experienced serious thoughts of suicide in the past year in Region 3 and Oregon, 2012-2014



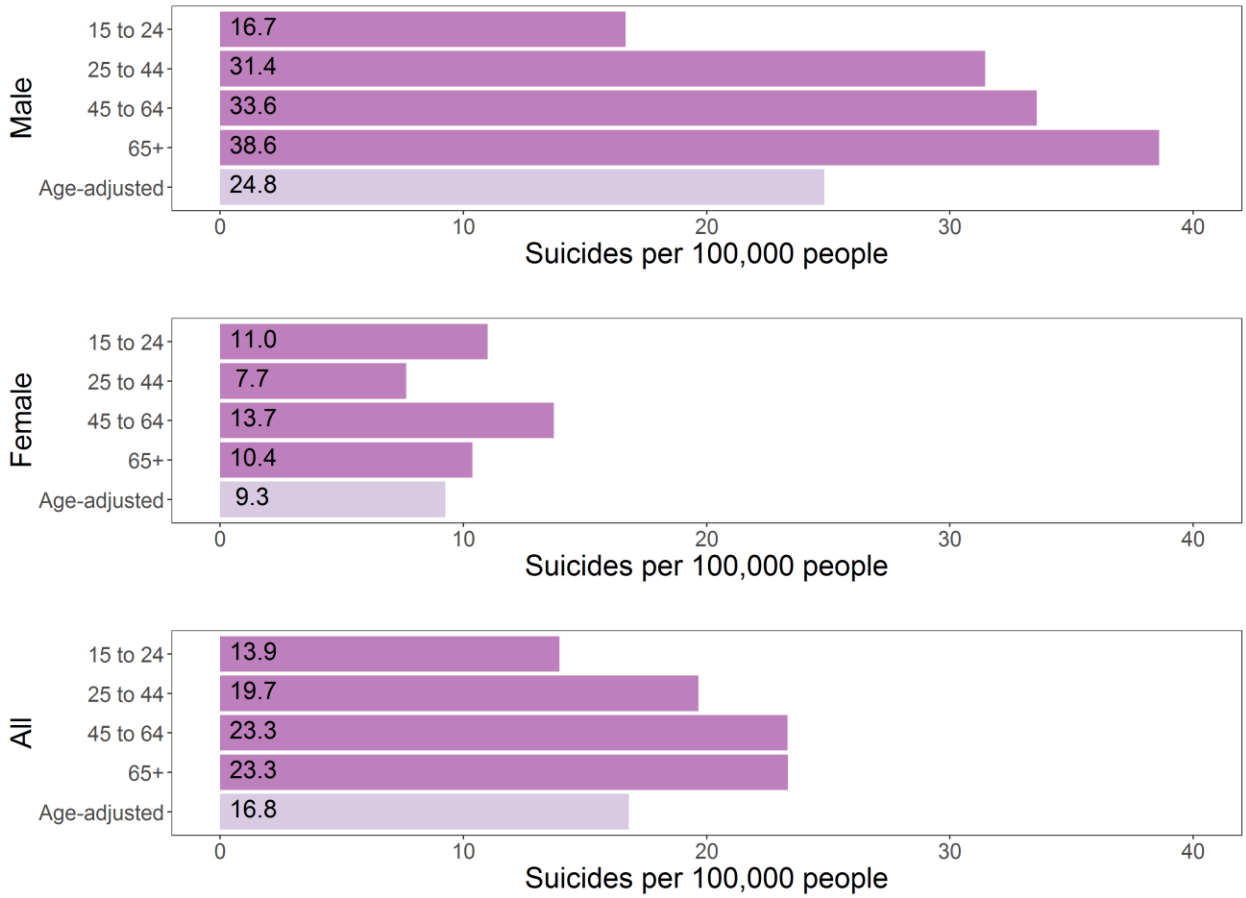
Source: Substance Abuse and Mental Health Services Administration, 2014

Overall, the suicide rate among Benton County adult males is 2.6 times the rate among adult females.[462] The total suicide rate increases with age, but this is due primarily to the outsize effect of male suicide rates, which increase with age. Among males of all age groups in the region from 2011 to 2015, males over the age of 65 had the highest suicide rate, at 38.6 deaths per 100,000 men (Figure 7.2).[463] Females had a much lower rate of suicide, averaging 9.3

deaths per 100,000 women, and this rate does not increase with age. The suicide rate among women peaks at 13.7 deaths per 100,000 women between the ages of 45 and 64.[464]

Due to the small numbers of suicides in a given year, the age-specific data presented here is aggregated across the LBL Region for confidentiality and more accurate estimates.

Figure 7.2: Suicide rates per 100,000 men, per 100,000 women, and per 100,000 individuals, with regional age adjusted averages, 2011-2015

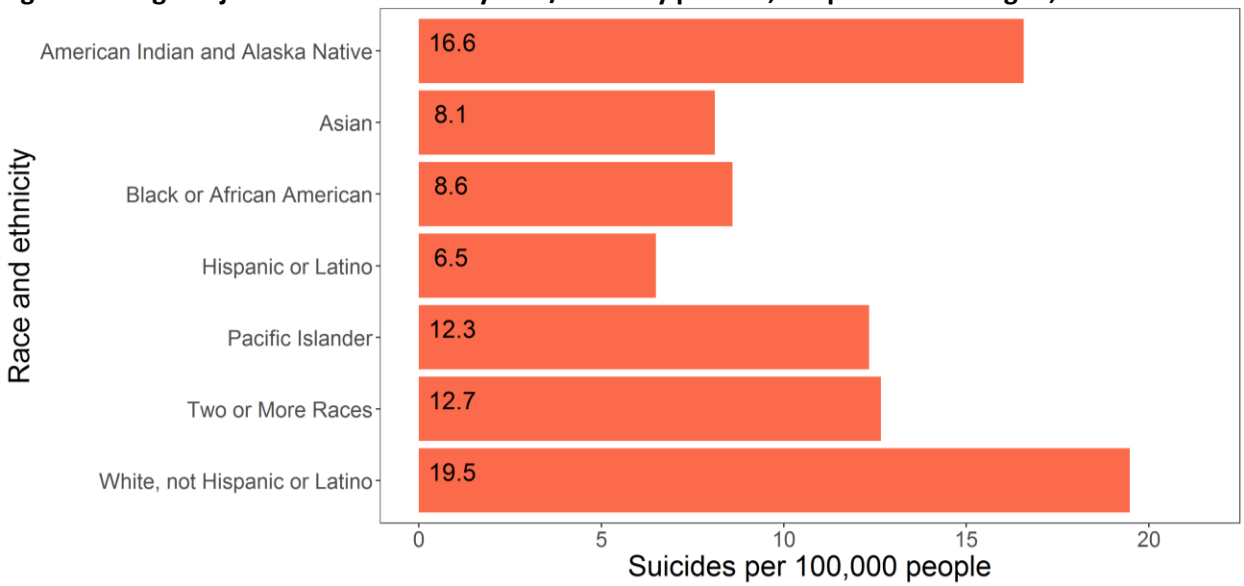


Source: Oregon Health Authority, Oregon Public Health Assessment Tool

Race/Ethnicity

Due to small populations of racial and ethnic groups, suicide events among non-white individuals are rare in the region, therefore race/ethnicity data cannot be reported at the regional level for confidentiality and reliability reasons. However, state suicide rates in the following figure may be used to understand trends in suicide deaths by race and ethnicity among all age groups (Figure 7.3).

Figure 7.3: Age-adjusted suicide rates by race/ethnicity per 100,000 persons in Oregon, 2011-2015



Source: Oregon Public Health Assessment Tool, 2011-2015

Suicide among Veterans

Veterans are twice as likely as nonveterans to die by suicide. Approximately 23 percent of suicides that occurred in Oregon between 2008 and 2013 were among veterans, but less than 9 percent of Oregonians were veterans during that time. Ninety-seven percent of veteran suicides were male. Overall, male veterans had a much higher suicide rate than non-veteran males (46 per 100,000 male veterans versus 28 per 100,000 male non-veterans).[465] However, the ratio between female veterans and female non-veterans was even higher (21 per 100,000 female veterans versus 9 per 100,000 female non-veterans). Between 2008 and 2012, 9 veterans in Benton County died by suicide.[466]

Suicide among older adults

Regional suicide rates are also higher among older adults, with 23 suicides per 100,000 adults age 65 and older between 2011 and 2015. This rate is 39 percent higher than the age adjusted rate for all regional residents. This increased rate conceals the difference between older men and women, however. The suicide rate among older men was 56 percent higher than among all men. The suicide rate among older women was 12 percent higher than among all women, and was lower than the suicide rate among women age 45-64. See Figure 7.2 for a visual representation of these data.

Mental Health

Perinatal Depression

In Oregon, nearly 1 in 5 mothers report symptoms of depression during and/or after pregnancy. This rate has been relatively constant since 2009.[467] Maternal depression, or perinatal depression, is a depressive disorder characterized by feelings of sadness or hopelessness, reduced interest or pleasure in activities, changes in weight/appetite, sleeping disruption or too much sleep, restlessness or irritability, or diminished ability to think or concentrate during pregnancy and/or soon after giving birth. Mothers with maternal depression are less likely to engage in healthy parenting behaviors. As a result, mother-infant bonding and attachment can be compromised. In extreme cases, mothers with maternal depression have harmed themselves or their babies.[468]

Regional and county-level data depicting maternal depression is currently limited; however, state level data can provide some insight into the experiences of mothers in the region.

The most recent detailed data on maternal depression and disparities among women in Oregon is from 2004 to 2008:

- Low income women are twice as likely to report depressive symptoms as high income women (36 percent versus 177 percent).
- Current smokers are more likely to report depressive symptoms than non-smokers (34 percent versus 22 percent).
- Women who experienced partner stress are twice as likely to report depressive symptoms (42 percent versus 16 percent).
- Racial/ethnic minority mothers are more likely to report depressive symptoms than white mothers (Hispanic 31 percent versus white 21 percent).
- Teen mothers are more likely to report depressive symptoms than older mothers (36 percent of mothers less than 20 year olds versus 17 percent of mothers 35 years and older).[469]

Mental Illness

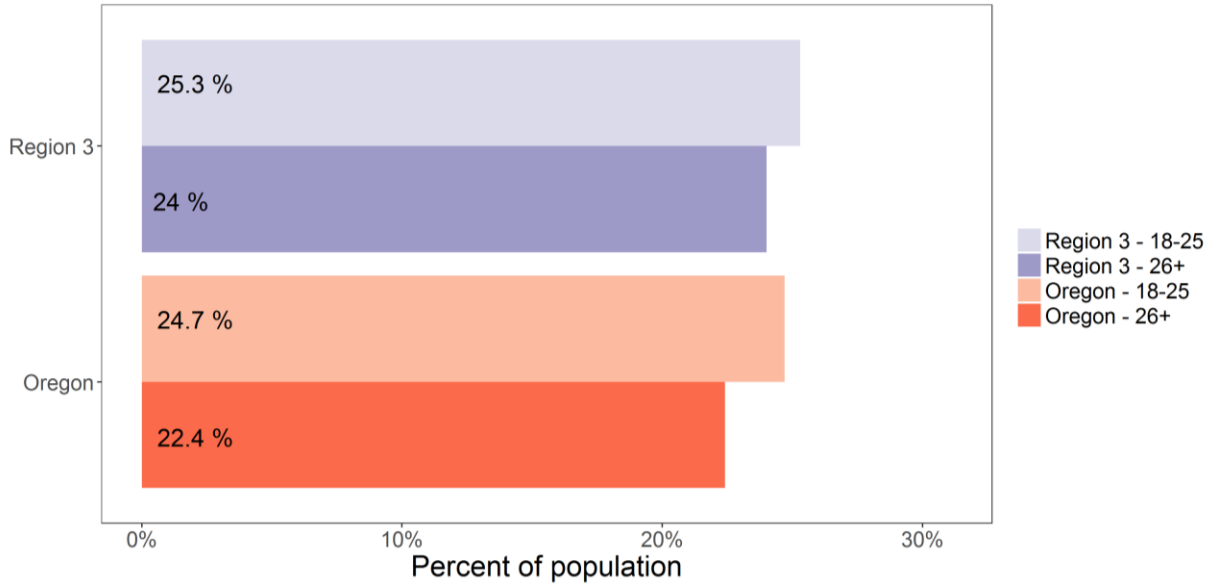
The Substance Abuse and Mental Health Services Administration (SAMHSA) and their definition of mental illness was discussed earlier in this chapter. Again, their regional data also includes additional counties in addition to the Linn, Benton, and Lincoln county region mentioned throughout this report. It is important to consider this when making interpretations or conclusions about Region 3 data.

A major depressive episode (MDE) is defined by SAMHSA as experiencing a depressed mood or loss of interest or pleasure in daily activities and a majority of specified depression symptoms lasting over 2 weeks within the last year. A serious mental illness among adults aged 18 and over meets the same criteria as any mental illness provided that the symptoms resulted in serious functional impairment.[470]

In all categories measured (Any Mental Illness, Serious Mental Illness, Major Depressive Episodes, Suicidal Ideation) there is little difference between state and Region 3 numbers, but there are differences between age groups.

As seen in Figure 7.4, one quarter of individuals surveyed age 18-25 in Oregon and Region 3 report experiencing any mental illness within the last year. Nearly one in five people in Oregon and one in four people in Region 3 age 26 and older reported the same.

Figure 7.4: Adults with any mental illness in the past year in Oregon and Region 3, 2012-2014

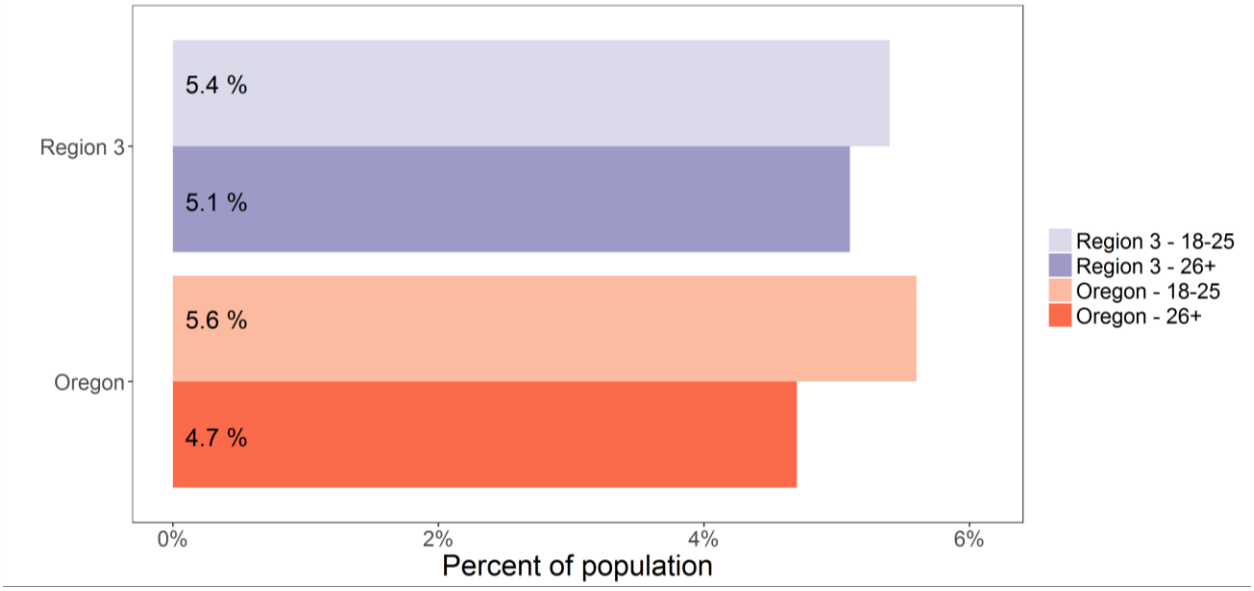


Source: Substance Abuse and Mental Health Services Administration, 2014

Populations of adults ages 18-25 and 26 and older experience relatively the same rate of severe mental illness in Oregon and Region 3 (Figure 7.5). This is consistent with the National Alliance on Mental Illness's findings that 1 in 25 adults experience severe mental illness.[471]

[Figure 7.5 is displayed on the following page]

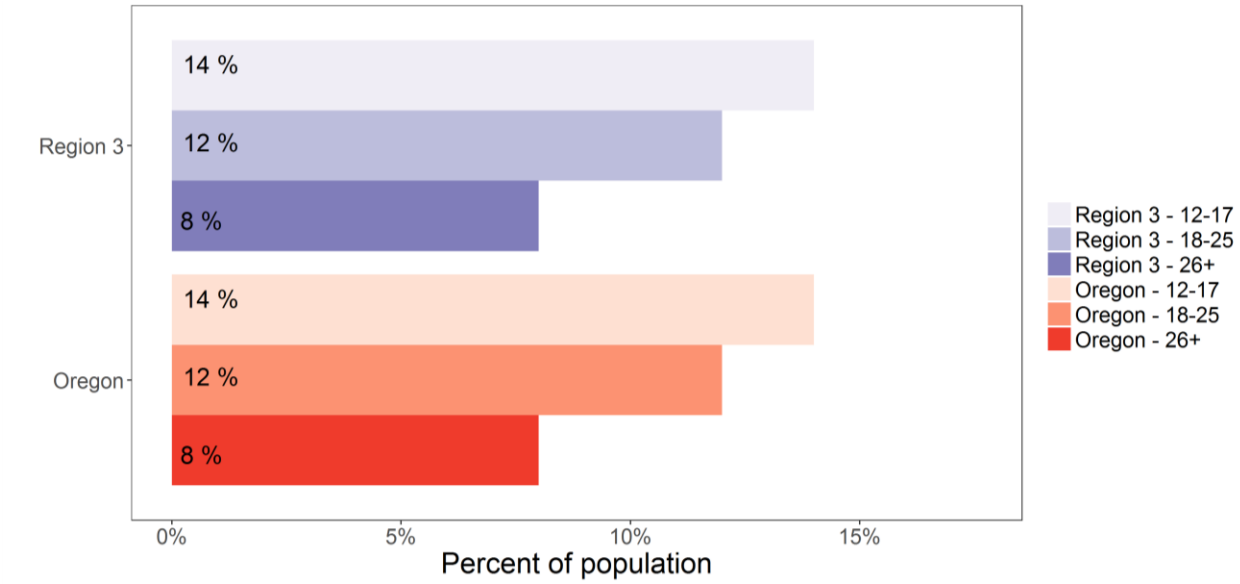
Figure 7.5: Young adults (18-25) and adults (26+) with a serious mental illness in the past year in Oregon and Region 3, 2012-2014



Source: Substance Abuse and Mental Health Services Administration, 2014

A correlation appears in the data that suggests the probability of experiencing a major depressive episode decreases with age (Figure 7.6). Children ages 12-17 have the highest rate of major depressive episodes with 15% in Oregon and 14% in Region 3. Twelve percent of adults 18-25 and 8% of adults 26 and older reported experiencing major depressive episodes; a marginally lower rate than adolescents.

Figure 7.6: Children (12-17), young adults (18-25), and adults (26+) that experienced a major depressive episode in the past year in Oregon and Region 3, 2012-2014



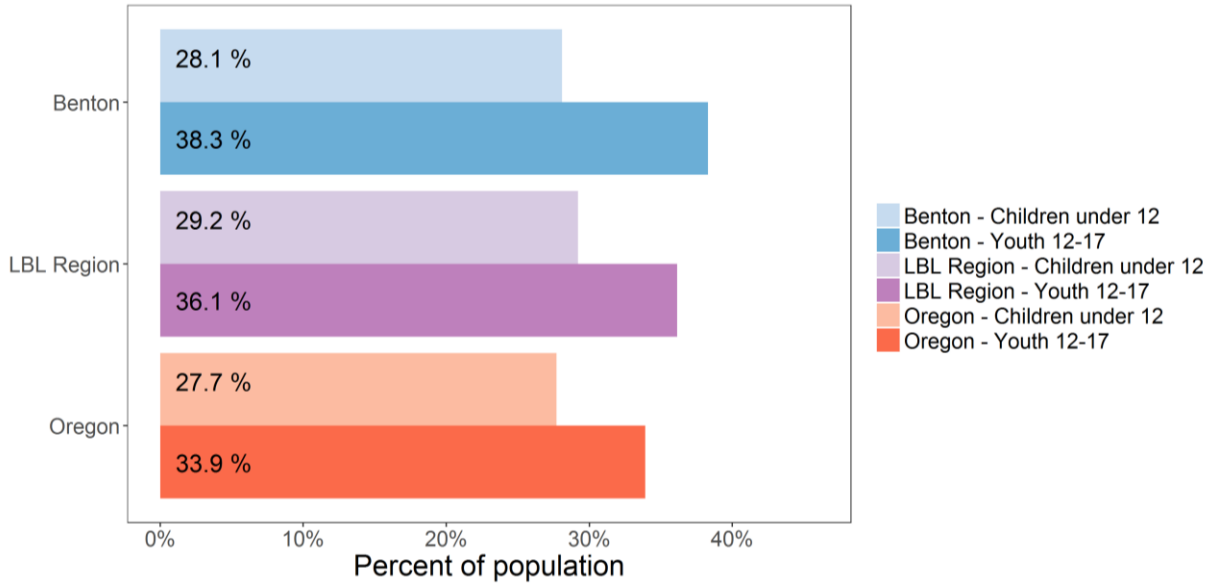
Source: Substance Abuse and Mental Health Services Administration, 2014

Less serious mental health conditions also have an impact on wellbeing. The Oregon Health Authority produces annual county behavioral health profiles for Oregon Health Plan members. The most recent

publically available profile was produced in 2015. These data provide information about the population receiving the Oregon Health Plan (OHP) and that population's mental health and demographics.

The following data represents only identified mental health conditions. These data indicate access to mental health services or treatment, so actual prevalence is likely underestimated. As seen in Figure 7.7, a little over 1 in 3 OHP members aged 12-17 have received some type of service(s) for a mental health condition. These results are consistent from Linn County to the state level. Children under age 12 are also consistently lower, with a 5 to 6 percent difference from their older counterparts.

Figure 7.7: OHP members age 0-17 with a mental health condition in Oregon, Benton, Lincoln, and Linn counties, 2015



Source: Oregon Health Authority Behavioral Health Profiles, 2015

In OHP adults aged 18 and older, mild or moderate mental health disorders are more prevalent in the population than severe mental health disorders (Table 7.2). Though the prevalence remains the same in both age groups for mild or moderate disorders, the prevalence of severe disorders increases in the 26 and older population. This may be explained by the later onset of certain serious disorders including schizophrenia.

Table 7.2: Percent of OHP members, age 18-25 and age 26+, with a mild, moderate, or severe mental health disorder in Benton County, the LBL Region, and Oregon, 2015

Age group	Severity of mental health disorder	Benton County	LBL Region	Oregon
18-25	Mild or moderate	23 %	24 %	27 %
	Severe	8 %	9 %	8 %
26+	Mild or moderate	24 %	27 %	28 %
	Severe	17 %	16 %	14 %

Source: Oregon Health Authority Behavioral Health Profiles, 2015

Bullying among youth

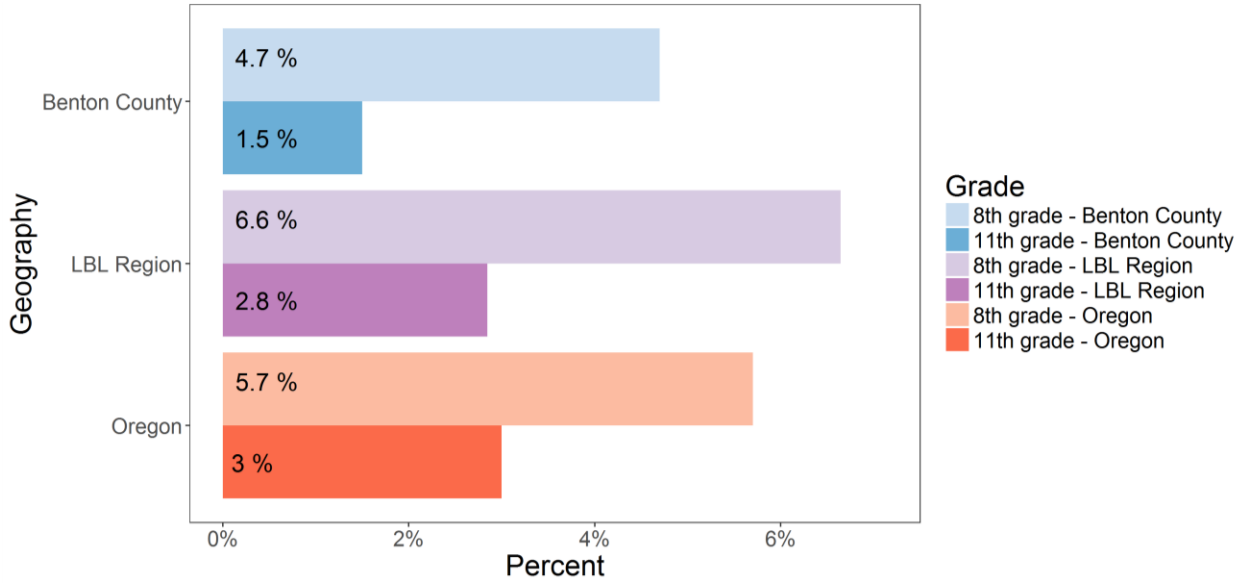
Childhood and adolescence are formative times in a person's life. The number and severity of adverse experiences during childhood affects an individuals' risk for alcoholism, depression, heart disease, liver disease, intimate partner violence, sexually transmitted infections, smoking, and suicide. Adverse events include emotional, physical, and sexual abuse and neglect, and various types of household dysfunctions such as violence against mothers, substance abuse, mental illness, parental separation or divorce, or an incarcerated household member.[472,473]

Gender Identity and Sexual Orientation

Most state and national surveys do not ask questions related to sexual orientation or gender identity, so it is difficult to estimate the health needs of lesbian, gay, bisexual, transgender, or queer children, youth, and adults in the region and Oregon.

Available data include survey responses on harassment among adolescents in our public schools. Across the county during the 2014-2015 school year, 8th graders reported having been harassed by a peer who thought they were gay, lesbian, bisexual, or transgender more frequently than 11th graders (Figure 7.10). Overall, harassment based on perceptions about sexual orientation declines with age.[474,475, 476]

Figure 7.8: Percent of students who were harassed in the last 30 days by peers who derisively called them gay, lesbian, bisexual, or transgender in Benton County, the LBL Region, and Oregon 2015



Source: Oregon Healthy Teens Survey, 2015

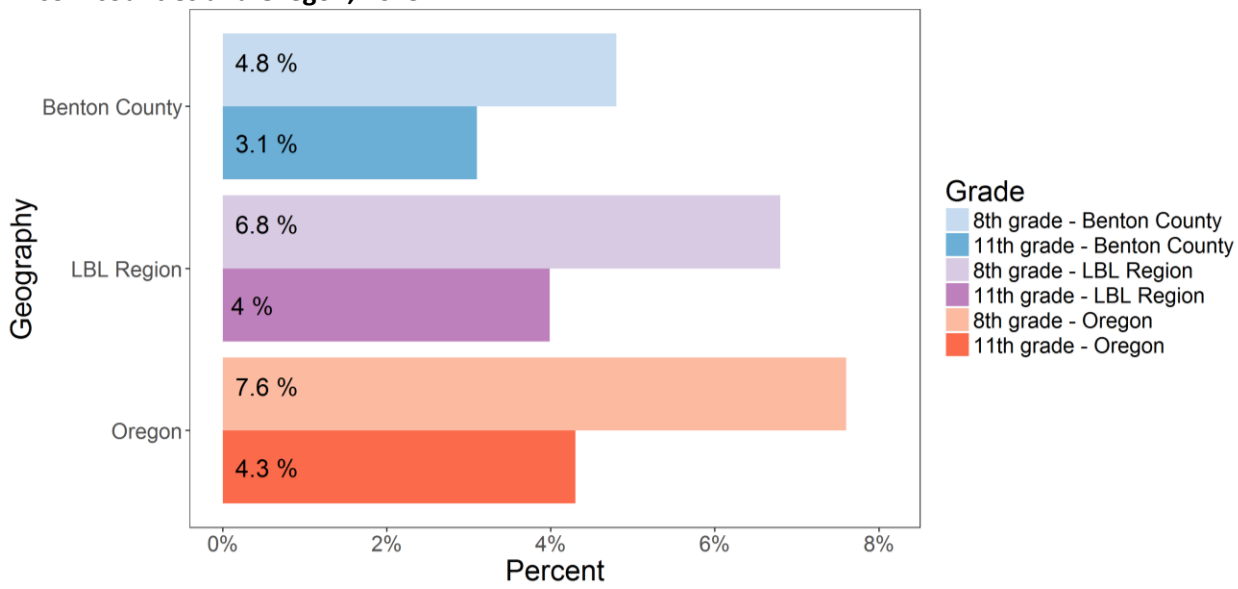
Bullying and Peer Abuse

Violence in schools can affect the learning environment and contribute to absenteeism. Students who are bullied, harassed, and feel unsafe or otherwise victimized, are more likely to

miss classes, skip school, feel depressed, or exhibit problem behaviors. Research shows that comprehensive discipline, positive behavioral support, and anti-bullying programs in schools can reduce the incidence of harassment among primary and secondary school students.[477]

Figure 7.9 shows the percent of students in 2015 that did not go to school at least once in the past 30 days due to feeling unsafe at school or on their way to school. Both 8th and 11th graders in Benton County reported missing fewer days of school than their peers statewide.[478]

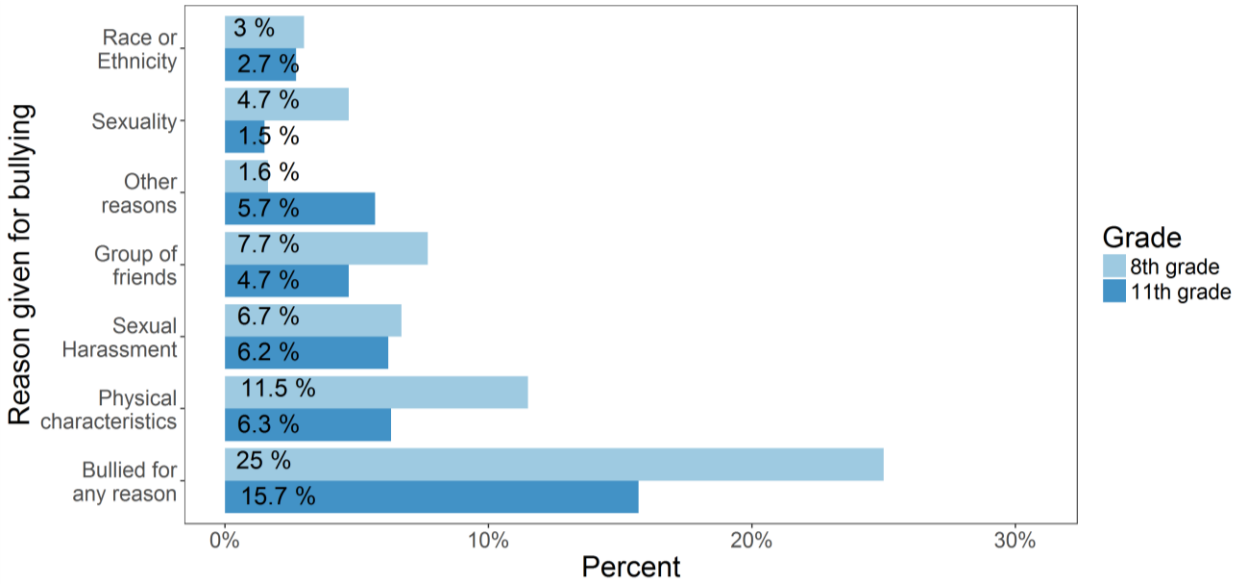
Figure 7.9: Percent of students, 8th and 11th grade, that did not go to school one or more times in the past 30 days due to feeling unsafe at school or on their way to or from school in Linn, Benton, and Lincoln counties and Oregon, 2015



Source: Oregon Healthy Teens Survey, 2015

Figure 7.10 shows that reasons for harassment at school differ among age groups at the regional level, and that the overall incidence of harassment among regional students is common. While the percent of students who report having been harassed at school in the past month tends to decrease with age, reasons for and severity of harassment vary among age groups. Aside from all or other reasons, harassment for physical characteristics is the most reported reason for harassment across all age groups.[479]

Figure 7.10: Percent of students in 8th and 11th grade, who experienced bullying in the past 30 days by reason in Benton County, 2015

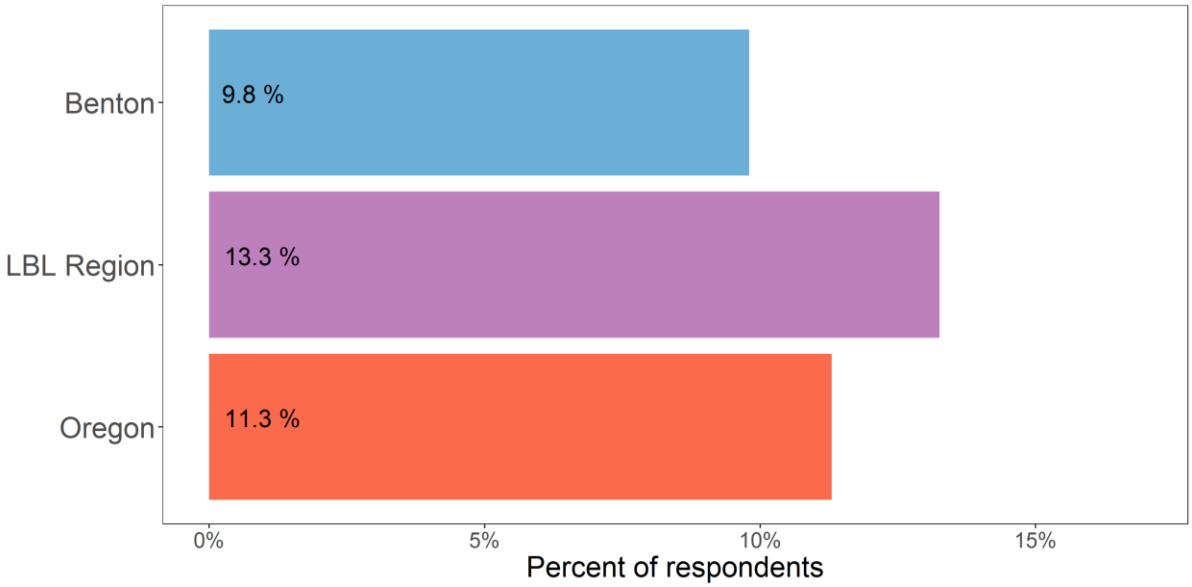


Source: Oregon Healthy Teens Survey, 2015

Sexual violence against youth

The Oregon Healthy Teens Survey also asks 11th graders if they experienced pressure to have sex in the past year. Eleven percent of Benton County 11th graders reported having been pressured to have sex, which was lower than the regional proportion of 14 percent, but equal to the proportion statewide.

Figure 7.11: 11th graders pressured to have sex in Benton County, the LBL Region, and Oregon, 2015



Source: Oregon Health Teens Survey, 2015

Hate crimes

Accurate data on hate crimes is difficult to obtain for a variety of reasons. First, at least half of hate crimes go unreported.[480] Second, there is an evidentiary standard that must be met for a crime to be considered motivated by hate. Third, only offenses for which an arrest is made are included in crime data. The most accurate data on hate crimes in Benton County would come from personal stories and accounts, but this data is not currently collected.

The Federal Bureau of Investigation collects statistics on crimes that manifest evidence of prejudice based on race, ethnicity, ancestry, religion, sexual orientation, gender, gender identity, or disability. This data comes from the Uniform Crime Reporting (UCR) program. The FBI cautions that "data users should not rank locales because there are many factors that cause the nature and type of crime to vary from place to place…Rankings ignore the uniqueness of each locale."[481] Furthermore, this data represents arrests, not criminal complaints or convictions.

In 2015, law enforcement jurisdictions designated 66 crimes in Oregon as hate crimes.[482] Crimes with a hate crime designation represented 0.05 percent of all crimes reported in Oregon (i.e. one out of every 2,000 crimes were motivated by hate). However, not all the jurisdictions that reported overall crime data also reported hate crime data, including the Portland Police Department.[483] In terms of population, this is 3.9 recorded hate crimes for every 100,000 people under the jurisdiction of reporting agencies.

Five hate crimes in Benton County were reported by the UCR program in 2015.[484] There were 22 violent crimes and 187 property crimes reported in Benton County during the same time period.[485] Therefore, 2.4 percent of crimes reported in Benton County were recorded as including a hate motivation. In terms of population, this is 5.6 recorded hate crimes per every 100,000 people in Benton County. Between 2011 and 2015, there have been thirteen hate crimes in Benton County reported to the Uniform Crime Reporting program. These included bias against race, ethnicity, religion, sexual orientation, or disability.[486]

The difference in hate crime rates between Benton County and Oregon could be due to many factors, including, but not limited to, more reporting of hate crimes, more investigations of hate crime allegations, or more hate crimes in Benton County.

The Bureau of Justice Statistics is another source of hate crime data. It conducts an annual, national survey to determine how many people are victims of hate crimes, whether they report to the police or not. Nationally, in 2015, there were an estimated 70 hate crimes for every 100,000 people over the age of 11.[487] This is compared to 1.9 hate crimes per 100,000 people that were reported by law enforcement jurisdictions in the UCR program.[488]

Forty-six percent of the hate crimes listed in the survey were reported to the police. This represents 32 reported hate crimes per 100,000 people, over 16 times higher than the rate of hate crimes reported by law enforcement jurisdictions. One reason for this difference is that hate crimes are not included in UCR data unless the offender is arrested. 70 percent of hate crime reports were not signed, meaning the police would not make an arrest. Police made arrests in eleven percent of reported hate crimes.[489] There are other differences in between the Bureau of Justice Statistics survey and the Uniform Crime Reporting program data that make direct comparisons difficult, including the definitions each program relies on to classify a crime as a hate crime.[490] What is clear is that tabulating hate crime data by the number of arrests significantly underestimates actual hate crime occurrence.

Alcohol, Tobacco, and Drug Abuse

Alcohol and prescription medications are consumed appropriately and responsibly by most of the population. However, problems frequently occur when these substances are over-consumed, used inappropriately, combined with other substances, or consumed while engaging in risky activities such as driving or unsafe sexual activity. The costs to society of the misuse of alcohol, prescription medications, and other drugs include injury and death due to overdose; effects on unborn children of drug users; impacts on family, crime and homelessness; spread of infectious disease, through sexual transmission and needle sharing; and financial costs associated with lost productivity, healthcare, and legal expenses for individuals and the wider community.[491]

Research has shown that people are most likely to try drugs for the first time—including tobacco, alcohol, and illegal and prescription drugs—during adolescence and young adulthood. Misuse of substances at an early age (particularly before age 18) is shown to be an important predictor of substance use disorders later in life, making this period an important focus for prevention efforts.[492]

Some of the primary factors related to whether an adolescent tries drugs include the availability of drugs in the home, neighborhood, and community, as well as the home environment. Adolescents who experience violence, emotional or physical abuse, mental illness, or drug use in the home are at increased risk of using drugs. In addition, certain genetic factors and mental health conditions (including depression, anxiety, and poor impulse control) increase the likelihood that an adolescent will use drugs.[493] Table 7.3 depicts adolescent alcohol and drug use in the region.[494]

Alcohol Use

The younger a person begins drinking regularly, the greater the chance that person will develop a clinically defined alcohol disorder. Youth who start drinking before age 15, compared to those who start at age 21, are far more likely to be injured while under the influence of alcohol, to be in a motor vehicle crash after drinking, or to become involved in a physical fight after

drinking.[495] Overall, alcohol use among Benton County youth tends to increase with age, reflecting the state trend displayed in Table 7.3.

Binge Drinking

Binge drinking, in which a person consumes a significant amount of alcohol in a short period of time, is associated with the same serious health problems as other forms of alcohol abuse. Middle and high school youth in the region and Oregon report binge drinking at similar rates. Approximately 3 percent of Benton County 8th graders reported binge drinking in 2015 (Table 7.3). This rate increases 15 percent among 11th graders.[496] The region likely meets the Healthy People 2020 objective of reducing the percent of high school seniors (12th graders) who binge drink to below 23 percent, but it is not possible to directly compare the rates between 11th graders and 12th graders.[497]

Table 7.3: Percent of youth who reported consuming alcohol in the past 30 days in Benton County, the LBL Region, and Oregon, 2015

	Grade	Benton County	LBL Region	Oregon
Consumed at least one alcoholic beverages	8th grade	7 %	12 %	12 %
	11th grade	13 %	29 %	30 %
Consumed at least 5 alcoholic beverages on one occasion	8th grade	3 %	6 %	5 %
	11th grade	15 %	16 %	17 %

Source: Oregon Healthy Teens Survey, 2015

Alcohol accessibility

Thirty-six percent of Benton County 8th graders said it would be "very easy" or "sort of easy" to obtain alcohol. This proportion doubles to 72 percent of 11th graders, and is similar to the rest of the LBL region and to Oregon. [498]

Alcohol abuse among adults

Excessive drinking is a risk factor for many adverse health outcomes, such as hypertension, alcohol poisoning, unintended pregnancy, fetal alcohol syndrome, inter-personal violence, and motor vehicle crashes.[499] It can also contribute to a number of health issues including heart disease and stroke, high blood pressure, cirrhosis, coma, and even death.[500] The following data includes adults ages 18 and older.

Excessive drinking is defined differently for men and women, due to different metabolic rates and average body weights. Among men, excessive drinking is defined as two or more alcoholic drinks per day for a period of 30 days. In Benton County about 7 percent of men reported excessive drinking. For women, excessive drinking is defined as one or more alcoholic drinks per day for a period of 30 days. 9 percent of women reported excessive drinking (Table 7.4).

Binge Drinking Among Adults

For adults over the age of 18, binge drinking is defined as consuming five or more drinks at one time for men and four or more drinks at one time for women.[501] Binge drinking is more common across the region and in the state than drinking every day. Nineteen percent of Benton County men and 15 percent of Benton County women reported binge drinking (Table 7.4).[502]

Table 7.4: Alcohol abuse among adults who drink, 18 years and older in Benton County and Oregon, 2012-2015

	Sex	Benton County	Oregon
Consumed at least two alcoholic beverages per day for the past 30 days	Male	6 %	7 %
Consumed at least one alcoholic beverage per day for the past 30 days	Female	7 %	7 %
Consumed at least 5 alcoholic beverages on one occasion in the past 30 days	Male	16 %	22 %
Consumed at least 4 alcoholic beverages on one occasion in the past 30 days	Female	18 %	14 %

Source: Oregon BRFSS 2012-2015

State data indicates that older adults are much less likely to engage in excessive or binge drinking. Table 7.5 compares rates among elderly adults to adults age 45 to 64.

Table 7.5: Excessive drinking and binge drinking among older adults who drink in Oregon, 2015

	Sex	45 to 54	55 to 64	65 and older
Excessive drinking	Men	7 %	6 %	6 %
	Women	7 %	7 %	7 %
Binge drinking	Men	21 %	13 %	8 %
	Women	13 %	8 %	3 %

Table notes: Excessive drinking is defined as more than two drinks (men) or one drink (women) per day for the past 30 days. Binge drinking is defined as more than five drinks (men) or four drinks (women) on one occasion within the past 30 days. Denominators are all survey respondents who reported having at least one drink in the past 30 days.

Source: Oregon Health Authority, Oregon BRFSS, 2015

Binge Drinking among Oregon Health Plan Members

About 10 percent of IHN-CCO members reported binge drinking in the previous 30 days. This is slightly lower than the proportion of all adult Oregon Medicaid members (12 percent). Binge drinking varied among different population groups, from 4.5 percent among Asians OHP members to 16 percent among American Indian and Alaska Native OHP members.[503]

Tobacco Use

Tobacco use is the single most preventable cause of disease, disability, and death in the United States. Tobacco use in any form can cause serious diseases and health problems, including cancers of the lung, bladder, kidney, pancreas, mouth, and throat; heart disease and stroke; lung diseases (i.e., emphysema, bronchitis, and chronic obstructive pulmonary disease); pregnancy complications; gum disease; and vision problems.[504]

Smoking patterns are predictive of increased rates of future disease and early death. Smokers die, on average, 10 years earlier than nonsmokers.[505] Health impacts are more severe among those with lower socio-economic status as well. In the United States, low-income smokers are more likely to become ill and die sooner from tobacco-related diseases than smokers who have a higher income.[506]

Tobacco Use among Adolescents

Tobacco products are designed to deliver nicotine, an addictive drug that causes tobacco users to crave repeated doses. Youth are especially sensitive to nicotine and can become dependent more quickly than adults. Because of their dependency, nearly three out of four teen smokers continue using tobacco products into adulthood.[507] Tobacco use has been decreasing over time among Benton County youth, with a nearly 50 percent decrease among 11th graders from 2008 to 2015.[508,509]

Due to the growing popularity of electronic cigarettes, in 2015 the Oregon Healthy Teens Survey asked students about electronic cigarette use. Among both 8th and 11th graders, and in all three counties, electronic cigarette use was significantly higher than smoking cigarettes (Table 7.6). One percent of Benton County 8th graders reported smoking cigarettes, but 5 percent reported using e-cigarettes. That difference is consistent with 11th graders, as they were also much more likely to use e-cigarettes than smoke (12 percent e-cigarette use versus 7 percent smoking).

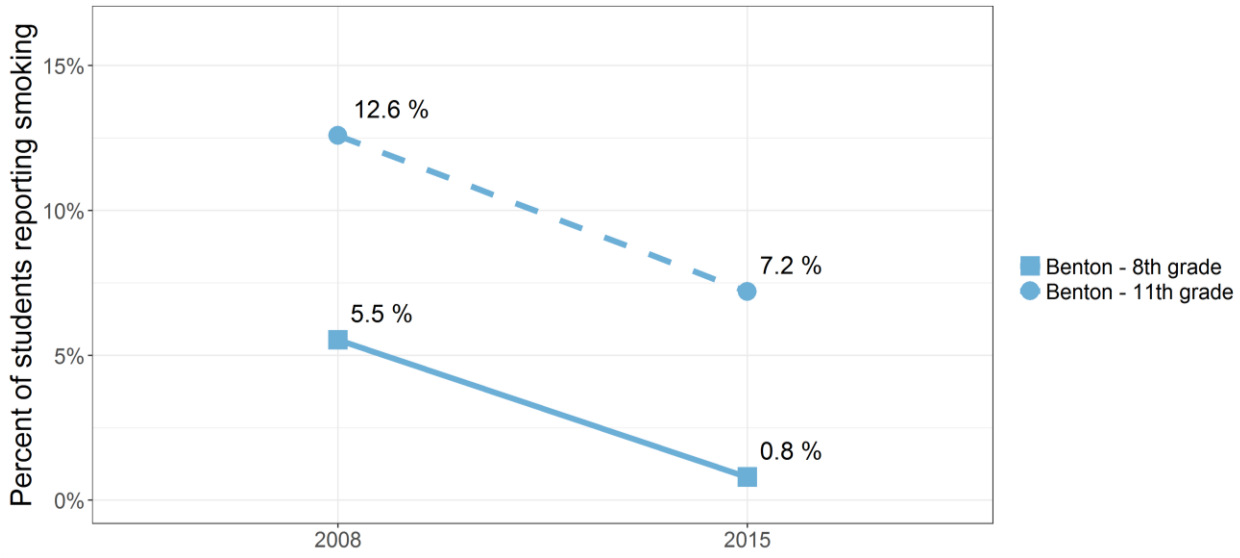
Table 7.6: Percent of youth who reported consuming alcohol, tobacco, or drugs in the past 30 days in Benton County, the LBL Region, and Oregon, 2015

	Grade	Benton County	LBL Region	Oregon
Smoked cigarettes	8th grade	0.8 %	5 %	4 %
	11th grade	7.2 %	9 %	9 %
Used e-cigarettes	8th grade	5 %	10 %	9 %
	11th grade	12 %	16 %	17 %

Source: Oregon Healthy Teens Survey, 2015

Cigarette smoking among youth in Benton County has historically had lower rates than other counties in Oregon. Nevertheless, cigarette smoking has decreased even further over the past 7 years.

Figure 7.12: Percent of students that smoked cigarettes in the past 30 days, Benton County, 2008 and 2015



Source: Oregon Healthy Teens Survey, 2008 and 2015

Tobacco Use among Adults

Overall, the smoking rate among adults has been slowly decreasing in the region. Benton County has consistently maintained a smoking rate lower than that of the state. Eleven percent of Benton County adults report smoking cigarettes, compared to 18 percent of all Oregonians.[510] The current Healthy People 2020 objective is to reduce the percent of adults who currently smoke to 12 percent or below.[511]

Alternative forms of tobacco use, especially e-cigarettes, are becoming more popular. An additional 8 percent of Oregonians report using tobacco in a form other than smoking cigarettes on a regular basis. [512]

Statewide, far fewer older adults are current smokers than are adults between the ages of 45 and 64. Furthermore, there is a greater proportion of former smokers among the elderly than among younger adults. The data suggest that older adults are both more likely to quit and are more likely to have smoked when they were younger than adults age 45 to 64. Table 7.7 displays these data.

Table 7.7: Current and former smoking status in Oregon, 2015

	Sex	45 to 54	55 to 64	65 and older
Current smoker	Men	20 %	21 %	9 %
	Women	18 %	17 %	9 %
Former smoker	Men	23 %	36 %	53 %
	Women	20 %	32 %	35 %

Source: Oregon Health Authority, Oregon BRFSS, 2015

Tobacco's toll on the health and economy of Benton County each year is significant. For example, in 2014:

- 9,900 adults regularly smoked cigarettes,
- 1,857 people suffered from a serious illness caused by tobacco use,
- 95 people died from tobacco use,
- $18.9 million were spent on medical care for tobacco-related illnesses, and
- $15.2 million in productivity were lost due to tobacco-related deaths.[513]

Secondhand Smoke Exposure

Secondhand smoke is a mixture of the smoke exhaled by a person smoking, and the smoke from burning tobacco in a cigarette, pipe, or cigar. Secondhand smoke contains the same toxic chemicals and carcinogens as inhaled tobacco smoke, and even brief exposure has been found to put a nonsmoker's health at risk. In adults, secondhand smoke exposure has been found to cause lung cancer and heart disease. Children exposed to secondhand smoke are more at risk

for ear infections, asthma attacks, respiratory symptoms and infections, and at greater risk for sudden infant death syndrome (SIDS).[514]

According to the Oregon Healthy Teens survey, approximately 20 percent of Benton County 8th and 11th graders live with someone who smokes. This rate is lower than the state proportion of 30 percent.[515] Measures to reduce the amount of secondhand smoke exposure to others include, but are not limited to, quitting smoking, forbidding smoking in the home, and forbidding smoking in a shared car. Measures to reduce the amount of secondhand smoke exposure to others include, but are not limited to, quitting smoking, forbidding smoking in the home, and forbidding smoking in a shared car. 83 percent of Benton County residents have rules against smoking in the home. [516]

Tobacco Use among Oregon Health Plan Members

There is a tremendous difference in tobacco use between Medicaid members and the general population among adults in Oregon. Approximately 31 percent of OHP adult participants either smoke or chew tobacco, compared to 18 percent of all Oregon adults. Only 10 percent of Hispanic members use tobacco, but 41 percent of American Indians and Alaska Natives do, although the data do not distinguish between ceremonial and recreational use. IHN-CCO members have higher tobacco use rates than state, with 35 percent of members using tobacco.[517]

Marijuana, Prescription Drug, and Illicit Drug Use

Recreational marijuana is still illegal for all individuals under 21 years of age. The effects of marijuana on children and adults have not been studied to the degree that other legal substances have been, including alcohol and cigarettes. Another major public health concern is the abuse of prescription drugs. When these drugs are misused or taken without a doctor's prescription they can be just as harmful as illegal street drugs. This section focuses on adolescents who choose to abuse prescription drugs as opposed to accidental poisonings. Discussed in this section, illicit drugs include cocaine, methamphetamine, and heroin.

Among youths in the region, marijuana use was generally more than twice as prevalent as cigarette smoking as shown in Table 7.8. Benton County rates were lower than the rest of the region and the state among 8th graders, but marijuana use increased across geographies from 8th grade to 11th grade. In the region, one out of every five 11th graders surveyed reported using marijuana in the past 30 days. Adolescents in the region abuse prescription drugs at rates higher than the state, particularly among 11th graders in Benton County and youth in Lincoln County.[518] There are no reliable data on other illicit drug use among adolescents in the region.

Table 7.8: Percent of youth who reported consuming alcohol, tobacco, or drugs in the past 30 days in Benton County, the LBL Region, and Oregon, 2015

	Grade	Benton County	LBL Region	Oregon
Used marijuana	8th grade	4 %	11 %	9 %
	11th grade	21 %	21 %	19 %
Used prescription drugs without a doctor's orders	8th grade	3 %	5 %	4 %
	11th grade	10 %	8 %	7 %

Source: Oregon Healthy Teens Survey, 2015

Marijuana use among adults

While marijuana use is now legal for individuals 21 years and older, the effects of marijuana on children and adults have not been studied to the degree that other legal substances have been, including alcohol and cigarettes. Another major public health concern is the abuse of prescription drugs. When these drugs are misused or taken without a doctor's prescription they can be just as harmful as illegal street drugs. In this section, illicit drugs include cocaine, methamphetamine, and heroin.

County data is not available for marijuana use among adults. However, state data demonstrates some patterns that may hold for local populations. Statewide, two third of BRFSS survey respondents under the age of 65 who reported every using marijuana said that they were 17 or younger the first time they tried it. The 65 and older age group is an outlier, which is probably because marijuana was not culturally widespread in the United States until the late 1960s. A 65 year old in 2014 was 20 in 1969, older than the average age of first use.

Additional data from Oregon BRFSS in 2014 is displayed on the next page.

Table 7.9: Proportion of respondents in Oregon who have ever used marijuana, by age and sex, 2014

	18-24	25-44	45-64	65 and older
Men	49 %	54 %	67 %	27 %
Women	48 %	50 %	55 %	18 %
Both	49 %	52 %	62 %	22 %

Source: Oregon BRFSS 2014

Table 7.10. Proportion of respondents reporting marijuana use in the past 30 days in Oregon among those who have ever used marijuana, by age and sex, 2014

	18-24	25-44	45-64	65 and older
Men	52 %	35 %	16 %	14 %
Women	23 %	19 %	15 %	10 %
Both	48 %	23 %	16 %	12 %

Table notes: These percentages only reflect usage among people who have ever used marijuana.
Source: Oregon BRFSS 2014

Taken together, these two tables indicate that young adults (age 18-24) are actually less likely to have ever used marijuana than older generations (ages 45-64). However, young adults are much more likely than older adults to be active users of marijuana, suggesting that historically many adults have stopped using marijuana as they aged. There is no data available yet to indicate whether this pattern will hold after marijuana legalization, or if current young adult marijuana users will continue to use marijuana as they age.

Marijuana Use among Oregon Health Plan Members

About 18 percent of adult Oregon Medicaid members surveyed reported using marijuana in the previous 30 days, compared to 23 percent of all Oregon adults. There is a wide range of rates between different races and ethnicities, with Asian Medicaid members having the lowest rate (3 percent) and both African American and American Indian / Alaska Native members having the highest rate (23 percent). The proportion of IHN-CCO members who use marijuana is the same as the state's (18 percent).[519]

Prescription drugs, opioids, and illicit drugs

Another particular area for concern is the misuse of prescription drugs. Misuse of these drugs is highest among young adults (aged 18 to 25).[520] As the most commonly abused type of prescription drugs, painkillers provide a useful marker for prescription drug misuse trends. While data shows little change in the self-reported pain experienced by Americans, the amount of painkillers dispensed in the U.S. has quadrupled since 1999, as have the deaths resulting from prescription painkillers. While this epidemic represents an enormous burden to society, 2012 saw a national drop in both prescribing rates and prescription overdose deaths. This is the first decrease since the 1990s, offering promise for further progress in reversing the epidemic.[521] Oregon (along with the majority of states) has implemented a system to track and improve prescribing practices around certain types of controlled substances, including painkillers. The Oregon Prescription Drug Dashboard uses information provided by Oregon-licensed retail pharmacies to help track prescription drug use, hospitalizations, and deaths.[522]

Opioids are a common drug class, representing half of the prescriptions tracked by the Oregon Health Authority. In the 4th quarter of 2016, there were 224 opioid prescriptions per 1,000 Oregon residents, out of 395 total prescriptions per 1,000 residents. As a comparison, Benton County had 141 opioid prescriptions per 1,000 residents and 292 total prescriptions per 1,000 residents during the same time period. Table 7.11 displays these data in more detail.

Table 7.11 Annual prescription rates per 1,000 residents by drug class in Benton County, the LBL Region, and Oregon, 2016.

	Benton County	LBL Region	Oregon
Total prescriptions	292	430	395
All opioids	141	244	224
Sedatives (including Benzodiazepine)	86	115	101
Stimulants and pseudoephedrine	62	64	63
Methadone and muscle relaxants	3	7	7

Source: Oregon Prescription Drug Dashboard, 2016

In Benton County, the LBL Region, and Oregon, high prescription rates are associated with higher rates of hospitalization and death due to drug overdose. Benton County had an annual rate of 17 hospitalizations per 100,000 residents due to drug overdose between 2012 and 2014 and a rate of 6.6 deaths per 100,000 residents due to drug overdose between 2013 and 2015[523]. This equates to one hospitalization for every 1,400 prescriptions and one death for every 4,800 prescriptions. A comparison of hospitalizations and deaths in Benton County, the LBL Region, and Oregon is shown in figure 7.13, below.

Figure 7.13: Drug overdose hospitalizations and deaths in Benton County, the LBL region, and Oregon, 2011-2014.

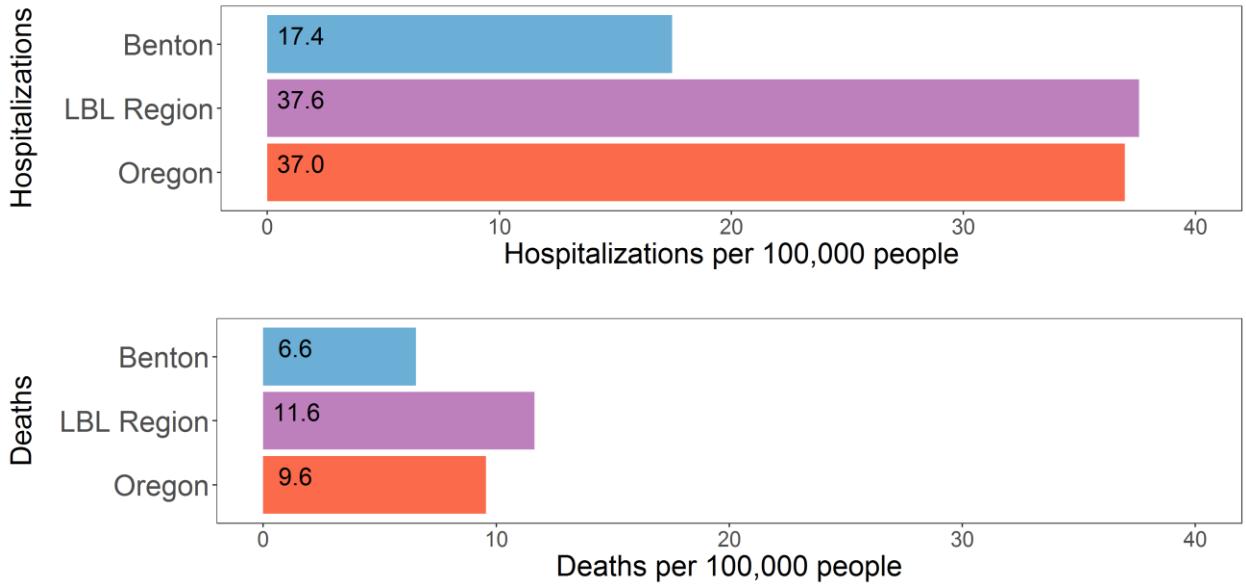


Figure notes: Data are 3-year averages of annual rates for both drug overdose hospitalizations (2012-2014) and deaths (2013-2015).

Source: Oregon Prescription Drug Dashboard, 2016

In Benton County, approximately one quarter of the hospitalizations and two-thirds of deaths were due to opioids. Most of the others were due to other prescription drugs, with a very

limited number due to illegal, street drugs.[524] Given that about half of prescriptions are for opioids, this is means that opioid hospitalization rates are smaller than hospitalization rates for other drugs, but death rates are higher for opioid overdoses.

Age differences in drug overdose

Drug use is more prevalent among young adults. National Survey on Drug Use and Health (NSDUH) data indicate that approximately ten percent of Oregonians age 18-25 have used prescription drugs for non-medical purposes within the last 30 days. This is about twice the rate of both children age 12-17 (5 percent) and adults 25 and older (4 percent).[525]

According to the Oregon Prescription Drug Dashboard, drug overdoses are more common among older adults than children or young adults. In the LBL Region, the hospitalization rate was higher among adults age 45-64 than among young adults. This pattern is the same in Oregon; the rate of hospitalization in Oregon among adults age 45 to 64 is nearly twice the rate of adults age 18-44. Additionally, there is a high rate of hospitalizations among older adults in Oregon (age 65 and up). In contrast, there were few hospitalizations of adults over the age of 65 in the LBL region.

Deaths from drug overdose in the LBL Region are more likely in middle age adults (22 deaths per 100,000 people age 45-64) than in young or older adults. The death rate among middle age adults in the LBL Region is much lower than in Oregon (56 deaths per 100,00 middle age adults). The full data is given in table 7.12, below.

Table 7.12: Hospitalization and death rates per 100,000 people due to drug overdose among adults in the LBL Region and Oregon, by age, 2011-2014

	Age group	LBL Region	Oregon
Hospitalization rate per 100,000 people	Less than 18	0	15.1
	18 – 44	13.2	33.6
	45 – 64	22.0	56.4
	65 – 74	5.0	53.5
	75 and older	0	61.3
Death rate per 100,000 people	Less than 18	0	0.3
	18 – 44	13.5	13.5
	45 – 64	21.1	16.4
	65 – 74	6.4	4.4
	75 and older	0	2.9

Source: Oregon Prescription Drug Dashboard, 2016

Illicit Drug Use and Prescription Drug Misuse among Oregon Health Plan Members

A very small percentage (1 percent) of adult OHP members report having used meth, heroin, cocaine, crack, or ecstasy in the previous 30 days, and there are no equivalent data for the state in general. Similarly low values across races and regions for Medicaid members make it difficult to conclude any significant differences.

Similarly, about 1.4 percent of adult OHP members report misusing prescription pain relievers in the previous 30 days. There is no data for the general state population. Hispanic members had the lowest percentage at 0.7 percent, while African Americans had the highest at 3 percent. The region served by IHN reports a rate of 1.8 percent for misusing prescription pain relievers. [526]

Local Data

The following descriptions of local data collected by Benton County Health Department and partners are taken in part or in full from existing documents. Sources are cited at the bottom of each section.

Garfield and Linus Pauling Schools Neighborhood Assessment

In 2016, Benton County Health Department conducted a neighborhood assessment of the neighborhood surrounding Garfield Elementary and Linus Pauling Middle Schools. Approximately 30 percent of respondents were primary Spanish speakers. On the topic of behavioral health, respondents were asked the two questions “What causes stress” and “What reduces stress”.

Twenty eight percent of respondents said that employment instability and/or income insecurity caused stress. Twenty percent said that racism or discrimination causes stress. Other common responses were lack of health services, immigration status, education, lack of connection, and trauma.

Twenty six percent respondents said that family was the biggest reducer of stress. Another 26 percent said that exercise was the biggest reducer of stress. Other common responses were friendships and healthy and affordable food.[527]

Mental Health Promotion and Prevention

In 2015, InterCommunity Health Network and Benton County partnered to assess readiness and capacity to address mental health promotion in Linn, Benton, and Lincoln counties. They

conducted a series of key informant interviews with 25 interviewees that represented a diverse cadre of perspectives.

Key informants identified a long list of contributing factors to mental health in the LBL Region.

- Lack of effective parenting skills
- Poverty
- Trauma
- Stress on family systems
- Lack of family support networks
- Lack of family structure
- Foster care
- Access to care

These, along with other responses, formed three overarching themes in the key informant interviews.

- A primary barrier for families voluntarily accessing, or following through with referrals to, mental health services is the stigma associated with mental health and mental illnesses or the lack of buy-in (acceptance) of the presence of a problem. This encompasses youth behavioral issues that are also avoided due to the stigma of poor parenting.
- The "service delivery system," especially for the working poor and disenfranchised is extremely complex and fragmented; and, for the most part, requires a professional navigator, or mentor, to access.
- Additional barriers to families and youth accessing mental health services consist of a cluster of elements including proximity and lack of transportation; service hours; and chaotic life styles that inhibit follow-through with services identified for example.[528]

Conclusion

Mental health disorders and illnesses can be addressed and treated effectively, with prevention and early diagnosis and treatment the surest method to reduce the disease burden of mental health illnesses and any of their associated chronic physical illnesses. A number of social, environmental, and economic circumstances, such as those described in previous chapters, can influence an individual's mental health as well as their physical health. These multifaceted inputs to poor mental health make it necessary to take a thoughtful, informed approach to address the root causes of mental illness.

Chapter 8
Health through an Equity Lens

This summary, taken from Healthy People 2020, is a good introduction to the concept of health equity:

> Healthy People 2020 defines *health equity* as the "attainment of the highest level of health for all people. Achieving health equity requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and health care disparities."
>
> Healthy People 2020 defines a *health disparity* as "a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion."[529]

There are many challenges in describing the key health equity issues in Benton County and its communities. First and foremost, to describe inequities, we need data that both encompasses populations facing inequities and the health inputs or outcomes that embody those inequities. Populations and communities experiencing inequities tend to be small, marginalized, or underrepresented. In contrast, data collection efforts tend to focus on large, privileged, and well-represented groups. Therefore, health equity data frequently suffers from large margins of error, poor specificity, and sometimes the complete absence of information that truly reflects marginalized communities. These factors greatly restrict which health equities can be presented from a data perspective.

Another challenge to describing health inequities is the interconnected nature of health equity. As an example, experiencing homelessness is a major inequity. It arises from "historical and contemporary injustices", lack of access to services, and marginalization. In addition, being homeless is a major cause of health inequities. People who experience homelessness have much worse health outcomes as a direct result of not having a home.

Different groups and communities often define health in different ways. This can make it challenging both to measure and to describe health inequities in different populations. As an example, if one community's measure of health is to have a large household with many generations, while another community's measure is the ability to live independently, the same question asked of people sixty-five and older ("Do you live alone?") could provide evidence of a

healthy or an unhealthy community. Even more straightforward measures of health, such as disparate cancer diagnosis rates, could represent either an inequity in outcomes or better access to care. If cancer diagnosis rates in a community rise, it could be because cancer is an inequitable burden on that community, or it could be because access to cancer screening has improved.

The standard approach to health equity (listing distinct groups or topics), is also limited by the intersectionality of individuals and communities. Lisa Bowleg of Drexel University describes intersectionality as "… a theoretical framework that posits that multiple social categories (e.g., race, ethnicity, gender, sexual orientation, socioeconomic status) intersect at the micro level of individual experience to reflect multiple interlocking systems of privilege and oppression at the macro, social-structural level (e.g., racism, sexism, heterosexism)...[P]ublic health studies that reflect intersectionality in their theoretical frameworks, designs, analyses, or interpretations are rare."[530] Every topic presented in this chapter is a part of the health equity landscape of Benton County and cannot be considered alone.

Regardless of the challenges of describing health equity in Benton County, it is a critical measure of our community's health. In this chapter, different populations are described that have historically faced inequities in their health.

Race and Ethnicity

Eighty-two percent of Benton County residents are white, non-Hispanic, according to the U.S. Census Bureau. It should be noted that residents without fixed addresses are frequently excluded from Census Bureau surveys. These populations include migrant farmworkers and people experiencing homelessness. The long history of Oregon and Benton County as communities that excluded or discouraged non-white immigration has led to many historical and contemporary injustices that contribute to inequities in health factors and outcomes.

Poverty and Income

Poverty rates in Benton County are much higher for non-white populations. The poverty rate among white, non-Hispanic Benton County residents is approximately 19 percent. All other races and ethnicities have higher rates of poverty, as is shown in Figure 8.1, below. It should be noted that due to very small populations of American Indian or Alaska Native, Black or African American, and Native Hawaiian or Pacific Islander groups, the error in those estimates are quite large and the data should be interpreted with caution.

Figure 8.1. Poverty rates, stratified by race and ethnicity. Benton County, 2011-2015

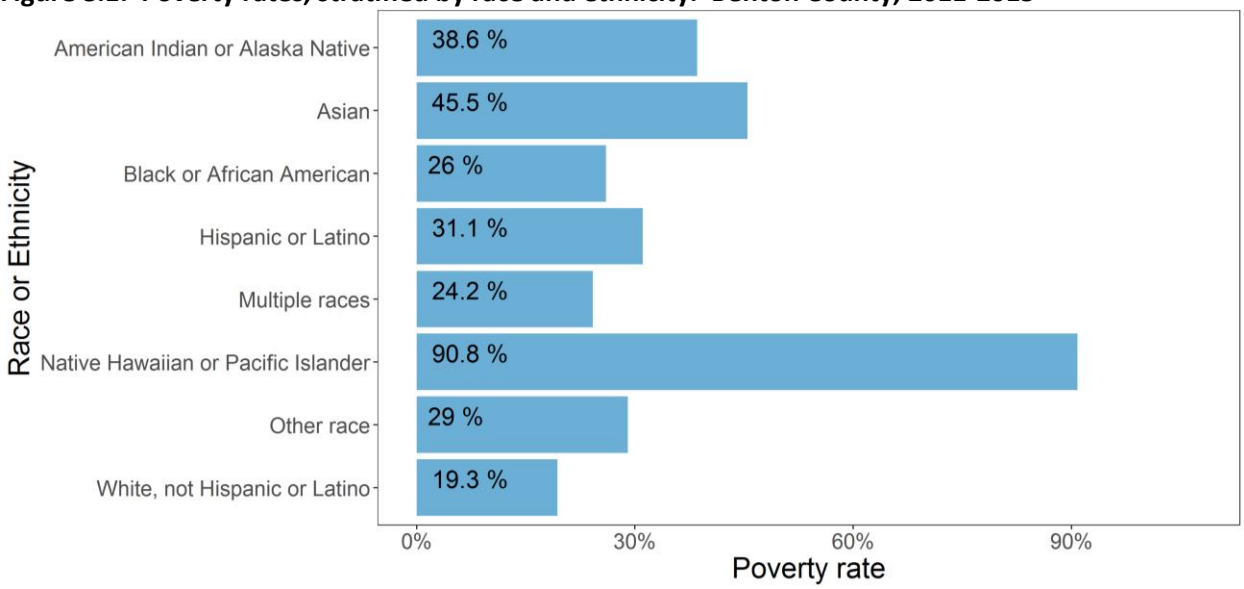


Figure notes: Due to very small populations of American Indian or Alaska Native, Black or African American, and Native Hawaiian or Pacific Islander groups, the error in those estimates are quite large and the data should be interpreted with caution.

Source: U.S. Census Bureau American Community Survey. 2011-2015

Median incomes in Benton County tend to be lower for non-white populations, with the exception of the American Indian or Alaska Native population. The median income among white, non-Hispanic Benton County residents is approximately $54,000. American Indian and Alaska Native residents have an estimated median income of $59,000. Compared to the higher poverty rate among American Indian and Alaska Native residents, this indicates that income inequality may be much higher in this population than in Benton County as a whole. Asians, Hispanics and Latinos, other races, and people who report multiple races all have a much lower median income, between $20,000 and $36,000. Due to small representative populations, data for Black or African Americans and Native Hawaiian and Pacific Islander populations is unavailable.

[Figure 8.2 is displayed on the following page]

Figure 8.2. Median income, stratified by race and ethnicity. Benton County, 2015

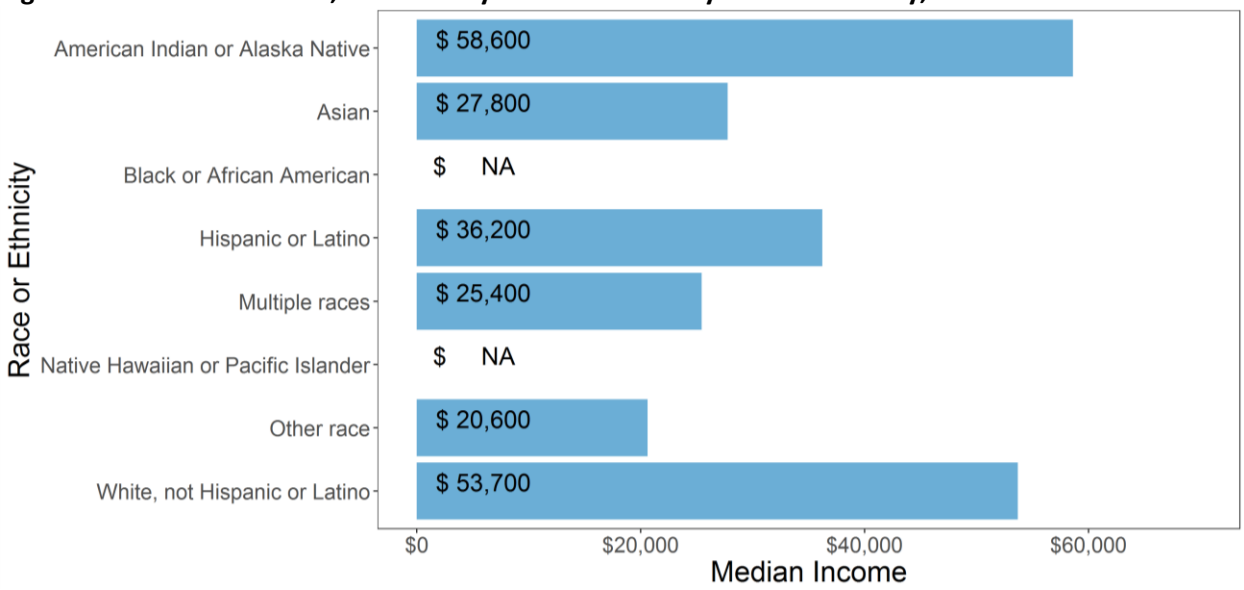


Figure notes: Due to very small populations of American Indians or Alaska Natives, the error is large and the data should be interpreted with caution. Data for Black or African American and Native Hawaiian or Pacific Islander groups have been suppressed.

Source: U.S. Census Bureau American Community Survey. 2011-2015

Home Ownership

Home ownership is the most reliable way to build wealth in the United States. Furthermore, home ownership usually creates stability for families if they don't have to worry about rents rising, evictions, or inability to maintain the health of their living space since they are renters, not owners.

Data on home ownership in Benton County is difficult to stratify by race due to small numbers of non-white households, but it is possible to draw a comparison between home ownership among white, non-Hispanic households and Hispanic households. Overall, about 57 percent of households in Benton County are occupied by owners, as opposed to renters. Among white, non-Hispanic households, that number rises to 62 percent. However, only 26 percent of Hispanic or Latino households own the home they live in.

Figure 8.3. Housing tenure type, Benton County, 2011-2015

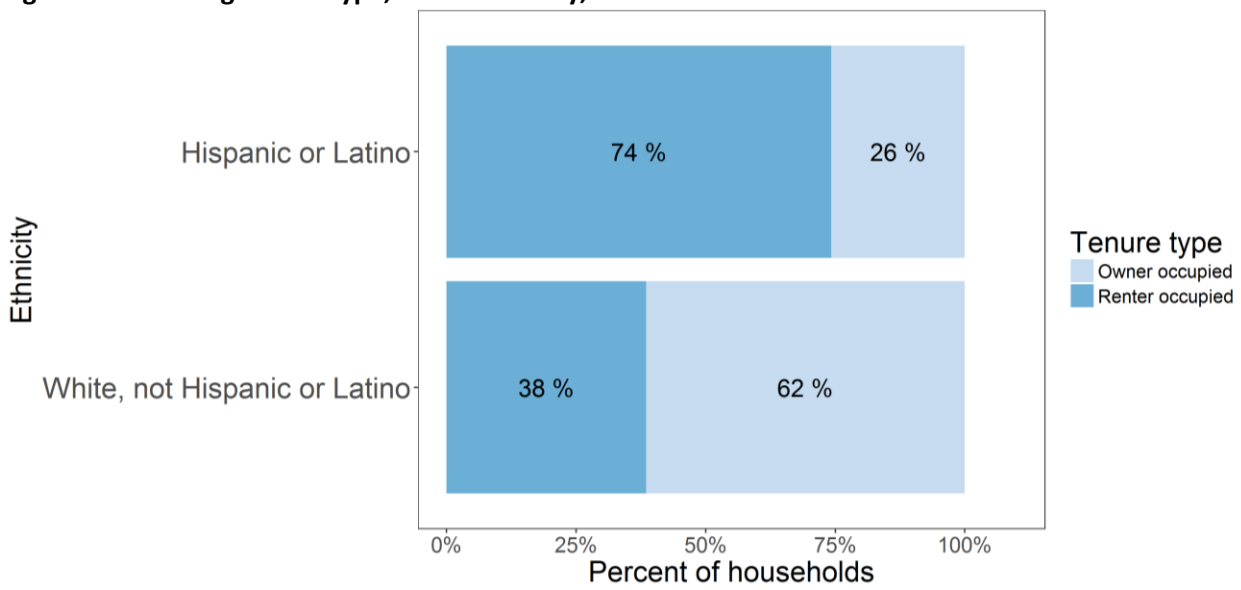


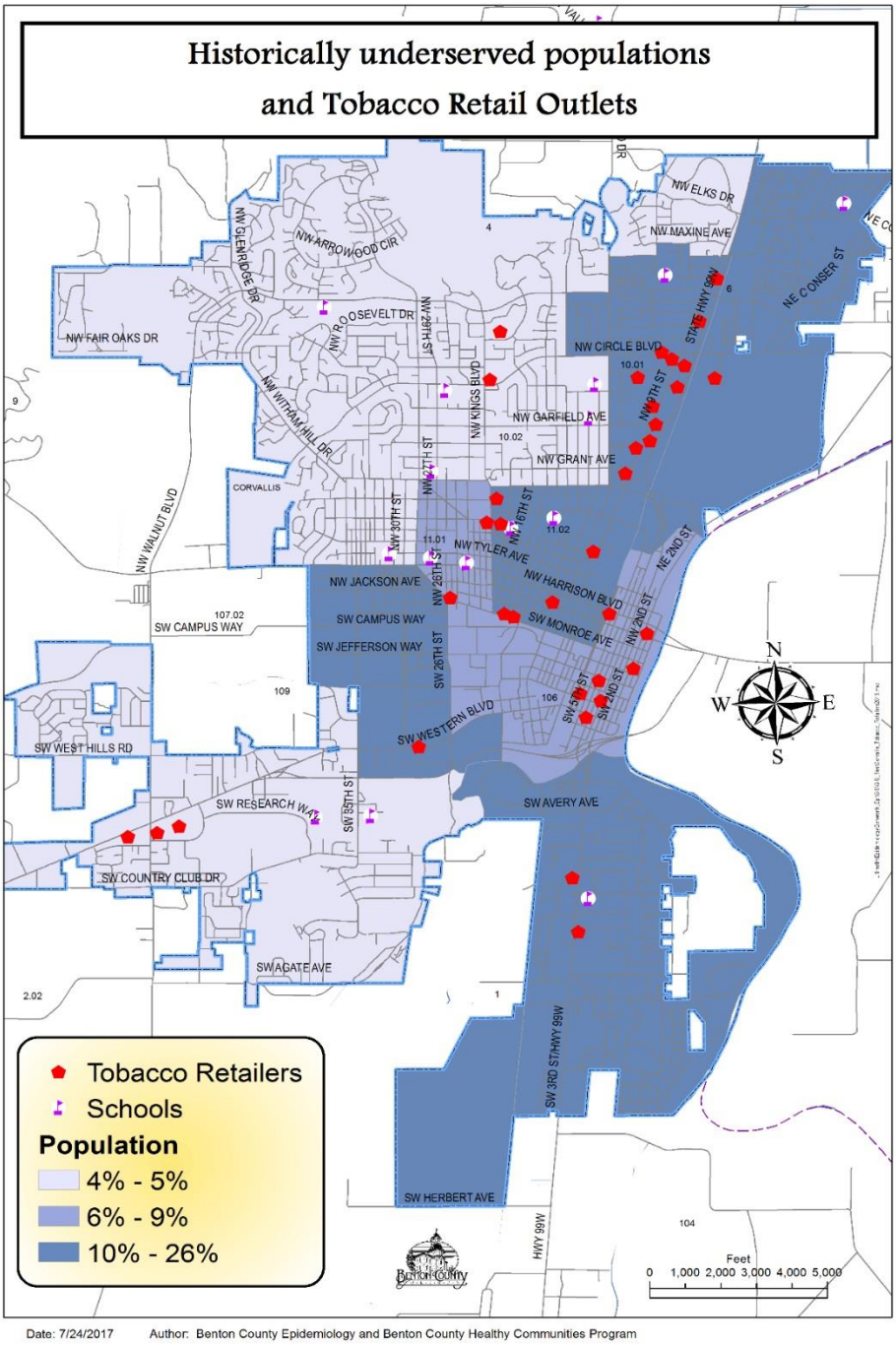
Figure notes: There are approximately 1,761 Hispanic households in Benton County. There are approximately 29,000 white, non-Hispanic households in Benton County.
Source: U.S. Census Bureau American Community Survey. 2011-2015

Healthy Environments

Environments that contribute to health are not equally accessible to all people, and marginalized communities Benton County are disproportionately likely to live in neighborhoods or communities that with higher health risks.

Clear data on neighborhood-level environmental health risks is difficult to capture, as most environmental data is available at the county or city level. However, as an example of the increased exposure to unhealthy environments experience by non-white communities, the map below shows the location of tobacco retail outlets in Corvallis, overlaid onto the proportion of Black, Native American or Alaska Native, Native Hawaiian or Pacific Islander, or Hispanic residents. All but five of the 33 retail outlets are located in neighborhoods with a higher proportion of these historically marginalized groups than the overall proportion in Corvallis.

Map 8.1. Tobacco Retailer Outlets and historically underserved racial and ethnic communities in Corvallis, 2017



Map notes: 9 percent of all Corvallis residents identify as Black or African American, Native American or Alaska Native, Native Hawaiian or Pacific Islander, or Hispanic or Latino.
Sources: U.S. Census Bureau American Community Survey, 2011-2015. Corvallis City Council, 2017.

Early learning

A good education and opportunities to learn are key components of building a healthy life. Learning and development begins before school. The Oregon Department of Education produces a report each year on kindergarten readiness in Oregon counties and CCO regions. The Early Learning Hub of Linn, Benton, and Lincoln counties analyzed the data and identified disparities in readiness among non-white children. Children who identify as a minority were 24 percent more likely to score below average readiness in early literacy and 13 percent more likely to score below average readiness in early math. The largest non-white race or ethnicity represented among kindergartners in Benton County and the LBL region are Hispanic or Latino children. They had a 50 percent increased risk of scoring below average on early reading and a 26 percent increased risk for scoring below average on early math. [531]

High school completion rates

Inequities persist throughout formal education. For high school students, the risk of dropping out or not completing high school is higher among non-white students. In Benton County, Native American or Alaska Native, Asian or Pacific Islander, Black or African American, and Hispanic or Latino students made up 25 percent of the high school student body in 2016 but comprised 37 percent of the students who dropped out. The drop-out rate among white students was 7.7 students dropping out per 1,000 students, while among the aforementioned groups, the drop-out rate was 13.3 per 1,000 students.[532]

Maternal health and teen pregnancy

Access to health care during and following pregnancy is an area where significant health equity issues exist. In Benton County, 11 percent of white, non-Hispanic pregnant women had inadequate medical care or did not have any medical care during their pregnancies. In contrast, 19 percent of Hispanic or Latino pregnant women lacked adequate care, and 39 percent of Pacific Islander pregnant women lacked adequate care.

[Figure 8.4 is displayed on the following page]

Figure 8.4. Inadequate or no prenatal care among pregnant women, stratified by race and ethnicity. Benton County, 2008-2015.

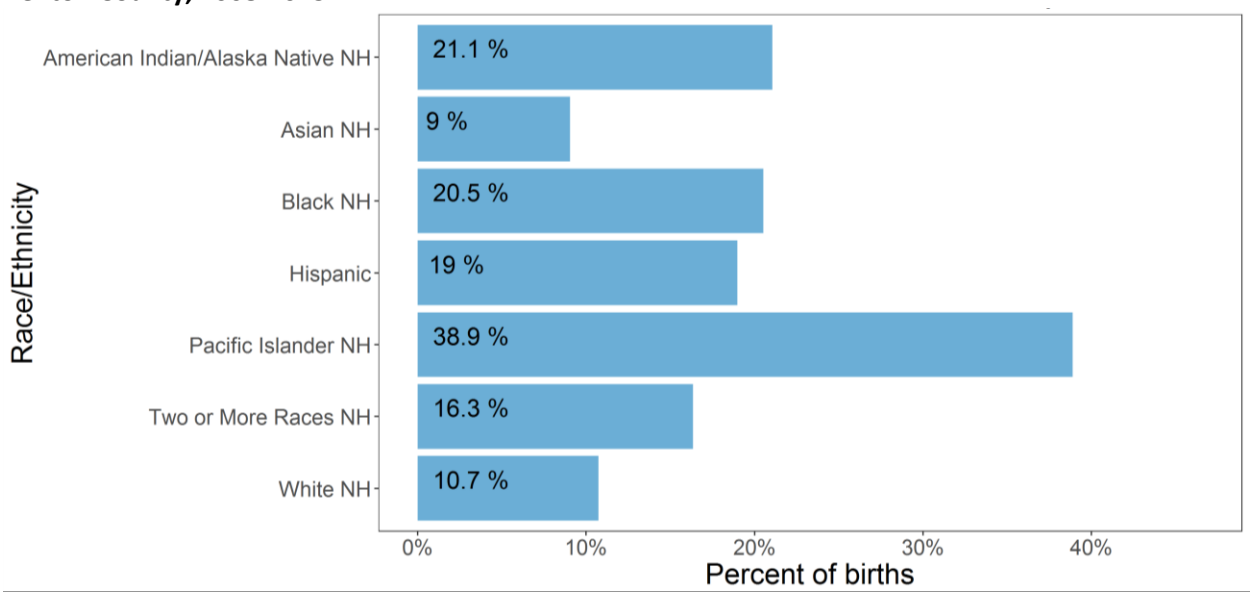


Figure notes: Proportions for groups other than Asian, Hispanic, and White, non-Hispanic should be interpreted with caution due to small numbers.
Source: Oregon Public Health Assessment Tool

A number of birth risk factors also display racial inequities. These data are presented in the table below.

Table 8.1. Percent of births where the mother had a birth risk factor, by race and ethnicity. Benton County, 2008-2015

Race or ethnicity	Maternal smoking	Gestational diabetes	Unhealthy weight gain during pregnancy
American Indian or Alaska Native	21 %	8 %	75 %
Asian	0 %	12 %	52 %
Black or African American	3 %	10 %	74 %
Hispanic	3 %	13 %	70 %
Pacific Islander	17 %	6 %	90 %
Two or more races	12 %	11 %	71 %
White, non-Hispanic	9 %	7 %	67 %

Figure notes: Proportions for groups other than Asian, Hispanic, and White, non-Hispanic should be interpreted with caution due to small numbers.
Source: Oregon Public Health Assessment Tool

Teen pregnancy is another area where racial and ethnic inequities exist. While the teen pregnancy rate among Hispanics and Latinas has decreased in Benton County, it still remains among the pregnancy rate for all teens. Between 2013 and 2015, the teen pregnancy rate

among Hispanic and Latina women was 13.1 births per 1,000 women, compared to 5.6 births per 1,000 teenage women in general.

Figure 8.5. Pregnancy rates among teenagers age 15-19, Benton County and the LBL Region, 2008 - 2015

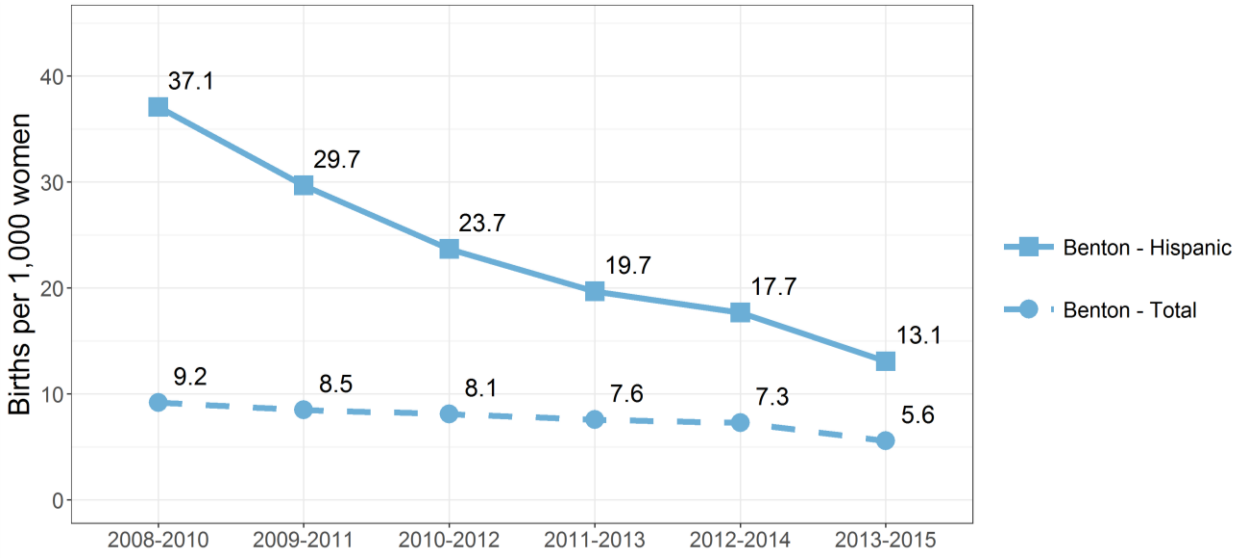


Figure notes: pregnancy rates are aggregated across 3 years.
Source: Oregon Public Health Assessment Tool, 2008-2015.

Hate crimes

In Benton County, between 2011 and 2015, there were eight hate crimes with a racial or ethnic bias reported by law enforcement jurisdictions, an annual rate of 1.9 racially or ethnically motivated hate crimes per 100,000 people per year, based on Uniform Crime Reporting data.[533] Nationally, in 2015, there were 35 racially motivated hate crimes per 100,000 people, and Hispanics experienced 130 hate crimes per 100,000 people (these rates may represent some of the same hate crimes), based on Bureau of Justice Statistics data.[534]

Oregon Health Plan members and racial and ethnic inequities

When surveyed by the Oregon Health Authority, close to eight percent of IHN-CCO members said that they feel their experiences with health care are worse than other races and ethnicities (this data includes respondents who identified as white). Statewide, Black or African American respondents were most likely to feel this way (16 percent), compared to an average of 6.4 percent of all respondents. Statewide, non-white Oregon Health Plan members were much more likely to experience physical or emotional symptoms due to treatment based on race, compared white Oregon Health Plan members.[535]

Sex and gender

There are many health disparities that exist between men and women based on biology. Women are much more likely to be diagnosed with breast cancer than men, while other cancers, like prostate cancer, only occur in men. Maternal health risks such as preeclampsia only affect women. However, other health disparities that exist between men and women are not due to intrinsic difference, but to inequities. One challenge in reporting equity issues at the county level is the scarcity of county-level data that both addresses equity and stratifies by sex. Count Her In, a report of the Women's Foundation of Oregon, identifies 8 major topics that affect women's health and wellbeing. These are:

1. Violence against women,
2. Cost of caregiving,
3. Gaps in reproductive health access,
4. Wage/wealth gap,
5. Economic fragility,
6. Mental health challenges,
7. Public/private glass ceiling, and
8. Systemic racism.[536]

Sexual and domestic violence

As discussed in the Injury and Violence section of The Health of Our Bodies chapter, the Center Against Rape and Domestic Violence (CARDV) responded to a total 6,297 calls on its 24-hour crisis line and provided emergency shelter to 116 adults and 85 children for a total of 3,092 bed nights. CARDV also provided legal system support to 860 adults and 30 teens and provided medical advocacy to 190 adults and 25 teens in Benton and Linn Counties.[537] CARDV does not report the sex of the individuals it serves.

In Benton County, approximately 2.3 percent of 11th grade girls reported being physically forced to have sexual intercourse.[538] While this percent is lower than statewide (9 percent), it does indicate that an estimated 90 current female high school students in Benton County have been forced to have sexual intercourse. Approximately 8 percent of 11th grade girls reported having given in to unwanted sexual activity because of pressure, or approximately 300 girls in Benton County. Sexual violence against any children is a major concern, but these rates are approximately four times higher among girls than among boys.[539]

Poverty and economic instability

Single women with children are at a much higher risk of poverty and economic instability compared to married women or single men with children. The median household income for a married couple with children is $85,300. The median household income for a single man with

children is just over half that total: $43,500. However, single women with children make on average only $24,600, slightly over half of what single men with children make. The federal poverty level for a single parent with two children is $19,337. This corresponds to 44 percent of single women with children living below the federal poverty line in Benton County, compared to 2 percent of single men with children.[540]

Figure 8.6. Median incomes of family with children, stratified by head of household, Benton County, 2015.

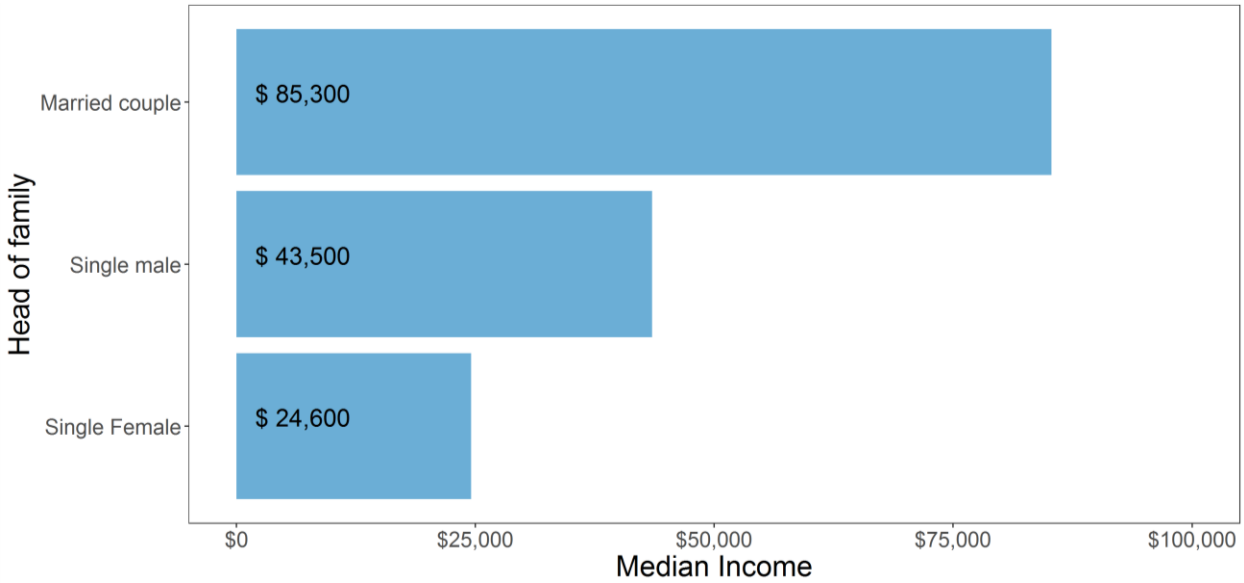


Figure notes: There are 5,900 married couples with children, 390 single men with children, and 1,300 single women with children in Benton County.
Source: U.S. Census Bureau, American Community Survey, 2011-2015.

For single women with children, the cost of child care can be completely out of reach. The median annual cost of child care in Benton County is $13,000, more than half of the median single mother's income.[541] This may in fact be one of the reasons that the median income of single mothers is low – child care may be too expensive for them to afford it in order to work. However, it doesn't explain the gap between single men and single women. Median annual rent in Benton County is $9,300, more than one third of median income among single mothers.[542]

Fifty-four percent of households headed by single women receive SNAP benefits (food stamps), compared with 9 percent of households with children headed by single men and 14 percent of married couple families with children.

Disability status

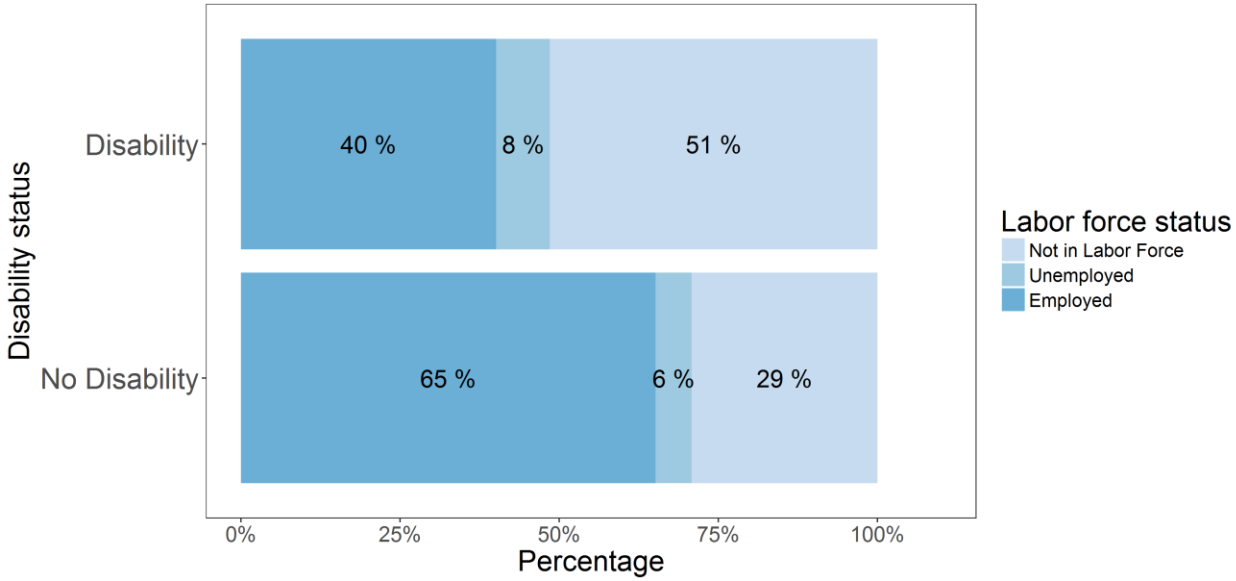
Individuals with disabilities are not inherently less healthy than able individuals. However, many individuals with disabilities encounter barriers to achieving health that create inequities. As with many groups, specific data on health equity issues facing individuals with disabilities is

scarce. According to the American Community Survey, 10 percent of Benton County residents have disabilities. This figure may underestimate the true proportion; other sources, such as the Behavioral Risk Factors Surveillance System, estimate that closer to 30 percent of individuals report a disability.

Special Olympics conducts screening of their athletes, and this data can shed some light on health inequities. In Oregon, 48 percent of Special Olympics athletes who answered a health promotion survey were obese, and 31 percent were overweight. This is compared to 34 percent and 27 percent, respectively, among all Oregonians. Twenty-two percent of athletes use tobacco products, thirty-five percent of athletes had untreated tooth decay, and 63 percent had signs of gum disease.[543]

Employment is the major source of income for most individuals in the United States, especially for individuals who do not have significant wealth. Therefore the ability to find and hold a job is a powerful socioeconomic determinant of health. In addition, steady work generally contributes to an increased sense of self-worth, independence, and integration with the community. Individuals with disabilities are far less likely to work than individuals without disabilities. Only forty percent of individuals with disabilities in Benton County are employed, compared with 65 percent of residents without disabilities.

Figure 8.7. Labor force participation, stratified by disability status, Benton County, 2015



Source: U.S. Census Bureau American Community Survey, 2011-2015 Tables

The Oregon Department of Human Services tracts reports of abuse against vulnerable adults, including adults with self-care and cognitive disabilities. There is no comparable data to definitively point to an increased rate of abuses against these vulnerable adults compared to the general population. Within Linn and Benton counties (reported together by the Department of Human Services Office of Adult Abuse Prevention and Investigations), there were 532 investigated allegations of abuse against adults with intellectual and/or

developmental disabilities, of which 115 were substantiated. Of the substantiated claims in Linn and Benton counties, 21 occurred in care facilities and 94 took place in community settings.[544]

Age

Everyone has different health issues and health needs at different ages. Age is an intrinsic quality as opposed to a social construct, and everyone experiences different ages throughout their lifetimes. However, the society in which we live privileges some age groups and disadvantages others. In general, adults age 18 to 50 experience fewer health equity issues due to age because they are young enough to avoid age-associated illness and old enough to work, drive, and make their own healthy decisions.

Children

Socioeconomic determinants of health

Children are at increased risk of food insecurity compared to the general population. According to the Oregon Department of Education, 36 percent of Benton County children in public schools qualify for free or reduced-price lunches.[545] Another measure produced by Feeding America estimates that 20 percent of children under 18 in Benton County are estimated to be food insecure, compared to 16 percent of the general population.[546]

While it is difficult to accurately measure the number of residents who experience homelessness, the data suggest that Benton County children are at increased risk for housing instability compared to the general population. According to the Oregon Department of Education, 3.3 percent of Benton County children in public schools were homeless at some point in the 2015-2016 academic school year.[547] The best estimate of homelessness in the general population suggests that approximately 1 percent of the general population experienced homelessness in 2016.[548]

Abuse

In 2016, there were a total of 359 reports of child abuse or neglect in Benton County, of which 110 (31 percent) were founded (determined to be abuse). This amounts to 8 founded abuses reports per 1,000 children.[549] The types of abuse/neglect include mental injury, physical/medical neglect, physical abuse, sexual abuse, sexual exploitation, or threat of harm. Most often, the perpetrators of child abuse and neglect are family members (94 percent of reports in Oregon); parents account for 78 percent of all perpetrators.[550] There is no comparable data for abuse rates among the general population.

Behavioral health

Data on suicidal ideation suggests that teenagers are nearly twice as likely to seriously consider suicide as young adults and more than four times as likely as other adults. Eighteen percent of eighth graders reported suicidal ideation, compared to 9 percent of young adults age 18-25 and less than 4 percent of adults age 26 and older.[551]

Older adults

Many health equity issues for older adults are related to an environment that is not supportive of older adults with mobility limitations. Older adults who do not drive and do not live near public transport systems are at risk for poorer access to health care, food insecurity, and social isolation. The driving time to a primary care medical clinic in Benton County can be upwards of an hour for rural Benton County, and there are no public transportation systems that serve the outlying part of the county. Benton County Special Transportation Fund provided over 65,300 trips within Benton County for adults age 60 and older and individuals of all ages with disabilities in 2016 through the Dial-a-Bus program. Dial-a-Bus also provided 3,500 rides on the Coast to Valley route and 5,800 rides on the 99 Express route.[552]

Food insecurity is a major concern among older adults. The SNAP utilization rate among Benton County residents age 65 and older is 8 percent, compared to 13 percent of all residents.[553]

Suicide rates among men age 65 and older are the highest of any other age group in the LBL region; there were 39 suicides per 100,000 men age 65 and older between 2011 and 2015, compared to 25 suicides per 100,000 men overall and 17 suicides per 100,000 residents (men and women).

Immigration and documentation status

Access to health care

Immigrants without documentation are excluded from receiving insurance through the Affordable Care Act.[554] This means they cannot get Medicaid insurance through the Oregon Health Plan or Medicare if they are over 65. Historically, undocumented children were ineligible for insurance through the Children's Health Insurance Plan (CHIP). Furthermore, undocumented immigrants are not able to enter into formal employment, preventing them from having employer-provided health insurance. In order to seek medical care, most undocumented immigrants turn to safety net clinics, emergency rooms, and social service agencies.

In 2014, the Community Health Centers of Linn and Benton counties provided care to 363 patients who were classified as agricultural workers. There is no data specifically about immigrants without documentation.[555]

Since immigrants without documentation do not have legal access to most government services, there is very little data collected about their health. This is a major challenge in describing their health inequities.

Other potential sources of health inequities are supported by state or national data but lack local data:

- Many immigrants without documentation work in agricultural industries, which have higher rates of injury and exposures to pesticides than other industries, or construction, which has higher rates of injury than many other industries.[556]
- Immigrants without documentation are excluded from government services such as Medicaid and housing vouchers. This exacerbates poverty among this group.[557]
- Immigrants frequently have limited English ability, raising barriers to accessing care and services if those services are not provided in the immigrants' languages.
- Many immigrants without documentation are at risk of deportation if they encounter immigration authorities. As a result, many immigrants avoid seeking services, and many immigrants are at higher risk of abuse due to fear of reporting abuse to authorities.

Cover All Kids

One major step to improving access to care for immigrants without documentation was taken by the Oregon Legislature when it passed the "Cover All Kids" legislation, which extends eligibility for the Oregon Health Plan to all children in Oregon living in households up to 300 percent of the Federal Poverty Level, regardless of residency status.[558] It is expected that the Governor will sign the bill into law. Cover All Kids will take effect on January 1st, 2018.

Veteran status

There are 5,300 veterans who live in Benton County, approximately 7.5 percent of the civilian population over age 18.

Mental health

There are no available local data detailing disparities in mental health status between veterans and non-veterans. National data indicate that combat veterans are two to four times as likely to have post-traumatic stress disorder (PTSD) as non-veterans. Reported PTSD rates among combat veterans at Veterans Affairs primary care clinics average 12 percent, compared to an estimated 6 percent among non-veterans.[559] Another study found that the diagnosis rate of PTSD in veterans was 36 per 100,000 veterans each year between 2001 and 2014. Veterans were diagnosed with major depressive disorder at a rate of 9 diagnoses per 100,000 veterans over the same time period.[560]

Suicide among veterans

Veterans are twice as likely as nonveterans to die by suicide. Male veterans had a much higher suicide rate than non-veteran males (46 per 100,000 male veterans versus 28 per 100,000 male non-veterans).[561] The ratio between female veterans and female non-veterans was even higher (21 per 100,000 female veterans versus 9 per 100,000 female non-veterans). Between 2008 and 2012, 9 veterans in Benton County died by suicide.[562]

Disability status

In Benton County, veterans are nearly three times as likely to have a disability as non-veterans. According to American Community Survey data, 29 percent of Benton County veterans have a disability, compared to 11 percent of Benton County non-veterans. There is no data for National Guard members who served in combat roles.

Lesbian, Gay, Bisexual, and Transgender populations

There is a scarcity of data indicating health inequities among the lesbian, gay, bisexual, and transgender (LGBT) population in Benton County and in Oregon.

National data indicates that LGBT adults are more likely to smoke cigarettes or binge drink than straight adults. Bisexual adults are much more likely to report experienced psychological distress than either straight, gay, or lesbian adults.[563]

The Centers for Disease Control reports that "gay, bisexual, and other men who have sex with men made up an estimated 2% of the population but 55% of people living with HIV in the United States in 2013".[564] Men who have sex with men are also more likely to contract other sexually transmitted infections such as gonorrhea. Approximately 5 percent of Oregon men are gay, but 42 percent of men who have been diagnosed with gonorrhea report sex with other men.[565]

Income and poverty

Income is the largest single determinant of health in the United States. Individuals in poverty or with low incomes are more likely to have unstable housing, have unreliable transportation, food insecurity, poor access to health care, and live in less healthy environments. All of these trends hold in Benton County to various degrees.

In addition to social determinants of health, income is closely linked with health behaviors and health outcomes. A comparison of the Oregon Behavioral Risk Factors Surveillance System and its Medicaid counterpart demonstrate this very clearly:

- Out of fourteen healthy and risky behaviors, IHN-CCO (Medicaid) members scored worse on ten of them than Benton County as a whole (IHN-CCO members scored better

on consumption of fruits and vegetables, attempting to quit smoking, smokeless tobacco usage, and binge drinking).

- Out of ten chronic diseases, IHN-CCO (Medicaid) members scored worse on nine of them than Benton County as a whole (IHN-CCO members scored better on cancer).
- IHN-CCO (Medicaid) members scored **better** on all of seven measures of health care access than Benton County as a whole.[566]

Rural communities

The Office of Rural Health, located at Oregon Health and Sciences University identifies unmet health care needs in rural Oregon. The Alsea area (southwest Benton County) and the Blodgett-Eddyville area (which includes some of northwest Benton County) are identified as having unmet needs.

There are a great many health disparities that are evident between rural and urban populations. However, it is not always clear whether these disparities are due to inequitable conditions or underlying differences in the population. Benton County Health Department has produced maps that illustrate differences between urban and rural parts of Benton County and between different areas of Corvallis. These maps are collected in Appendix A, which is available on the Benton County Health Department website, https://www.co.benton.or.us/health.

Conclusion
Meeting Challenges Together

As highlighted throughout this Community Health Assessment (CHA) report, there are many factors that influence and affect health outcomes both positively and negatively in Benton County. The CHA provides an opportunity to identify the many health concerns, disparities and impacts that residents face in their daily lives.

A health assessment is truly important to help identify needs and opportunities for improvement. At the same time, it is important to highlight the various strengths and assets that are alive and well within our communities. These strengths and assets refer to the many types of human, social, and economic resources that our region can offer to address problems. Organizations, agencies, and partners within and across the three counties can collaborate to improve the health and quality of life for residents. Together we can build a road to better health for the region.

General Health Status

In 2017, the Robert Wood Johnson Foundation ranked Benton County 3 out of 36 counties in Oregon for health outcomes and 1 out of 36 for health factors.[567] These rankings look at the different factors and conditions that affect the health and well-being of county residents, and are made up of four categories: health behavior, clinical care, social and economic factors, and physical environment. Despite these positive rankings, there are many opportunities to work on improving the health for all of the people who live, work, and play in Benton County, particularly for those who experience difficulty achieving optimal health.

Benton County has many quality community resources that can help meet the identified challenges and needs in the region. A few highlights of the many resources are summarized here.

Knowledge and Skills in Caring for and Promoting Health

The three-county region of Linn, Benton, and Lincoln counties shares a long history of collaboration and partnership among various organizations and agencies to improve and promote health.

- Across the three counties, a unified Tobacco Prevention & Education Program aims to reduce tobacco-related illness and death. There also exist other population-based prevention and chronic disease programs that reduce the onset and incidence of many chronic conditions and help residents in the region take control of their health.

- The county is home to a variety of medical care, dental care, vision care, elder care, medical clinics, doctors, nurse practitioners, and alternative medicine which can be expanded upon to meet the needs of all residents.
- The county is part of a single Coordinated Care Organization (InterCommunity Health Network CCO) which unifies services and systems for Oregon Health Plan (Medicaid) patients within the Linn-Benton-Lincoln region. This includes a broad partnership and a number of collective projects, committees, and initiatives.
- The Benton County health department works in close collaboration with the Linn and Lincoln County health departments. Information and surveillance is shared, resources are pooled, and expertise is lent as needed between the counties.

Social Support Networks

- Benton County shares a comprehensive network of social support and opportunity for the aging population with Lincoln and Linn counties.
- The region offers specialized support for people with mental illness, addictions, disabilities, and children with behavioral or emotional problems.
- The region shares a strong commitment to the health and wellbeing of children and youth. This commitment includes a focus on issues such as increasing family stability, kindergarten readiness, and equitable service coordination. Numerous organizations exist to address education, nutrition, and social support for children and families.

Without being able to call out every organization and project that supports the health of the region, what is shown above only highlights a few examples; each example is the result of efforts by countless community partners. A wealth of collective action and resources exists within and across the Linn, Benton, and Lincoln County region. Overcoming the many health challenges facing residents depends on this collective action and the vitally important part that each of our community partners play.

Acronyms used throughout the Regional Health Assessment document

ACA	Affordable Care Act
ACS	American Community Survey
AHRQ	Agency for healthcare Research and Quality
AIDS	Acquired Immune Deficiency Syndrome
BMI	Body Mass Index
BRFSS	Behavioral Risk Factor Surveillance System
CARDV	Center Against Rape and Domestic Violence
CCO	Coordinated Care Organization
CDC	Centers for Disease Control and Prevention
CHA	Community Health Assessments
CHIP	Community Health Improvement Plan
CLAS	Culturally and Linguistically Appropriate Services
CLCCHC	Cultural Competency in Health Care
DEQ	Department of Environmental Quality
DMAP	Division of Medical Assistance Programs
DSM	Diagnostic and Statistical Manual
ECD	Early Childhood Development
EDs	Emergency Departments
EHS	Early Head Start
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
FASDs	Fetal Alcohol Spectrum Disorders
FPL	Federal Poverty Level
FOBT	Fecal Occult Blood Test
FQHC	Federally Qualified Health Centers
GED	General Education Development
GFR	General Fertility Rate
HIV	Human Immuno-Deficiency Virus
HPSA	Health Professional Shortage Areas
IOM	Institute of Medicine
LBCC	Linn-Benton Community College
LEA	Law Enforcement Agencies
LGBTQ	Lesbian, Gay, Bi-sexual, Transgender, Queer
MDE	Major Depressive Episode
MSFW	Migrant Seasonal Farmworkers
MSP	My Sister's Place
NHDR	National Healthcare Disparities Report
NOAA	National Oceanic and Atmospheric Administration
OCCC	Oregon Coast Community College

ODF	Oregon Department of Forestry
OHP	Oregon Health Plan
OHS	Oregon Head Start
OSHA	Occupational Safety and Health Administration
OSU	Oregon State University
PCP	Primary Care Provider
PDMP	Prescription Drug Monitoring Program
$PM_{2.5}$	Particulate Matter
PPD	Postpartum Depression
PRAMS	Pregnancy Risk Assessment Monitoring System
RHA	Regional Health Assessment
SIDS	Sudden Infant Death Syndrome
SNAP	Supplemental Nutrition Assistance Program
STD	Sexually Transmitted Diseases
STI	Sexually Transmitted Infections
TFR	Total Fertility Rate
USDA	US Department of Agriculture
WHO	World Health Organization
WIC	Women, infants, and children

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