Environmental Health

Environmental Health

Our natural and built environments affect human health and quality of life. Nearly one in every four comments by SHA participants was directly related to environmental health. Many themes in the previous chapter on social determinants of health are also environmental concerns. Although most people in Oregon take pride in the beauty of our state and the abundance of natural resources, communities identified common concerns in the environment. Only 60% of survey respondents agreed that it's easy to be healthy in their community.

My community needs…

" Clean water and air. Parks that are safe and have great play equipment. Safe routes to school, work, worship, and home using multiple modes of transportation. Health care, grocery stores, restaurants, fitness centers, entertainment are in walking distance or accessible by public transportation. "

– SHA Community Participant

Natural Environment

Many SHA participants voiced concerns related to the natural environment, especially about air and water. Some also expressed concern about climate change, which intensifies environmental health threats from wildfires, drought, floods, harmful algal blooms, and other events.

Air Quality

As the state's population continues to grow, so do the activities that contribute to pollution. Overall, Oregon's air quality has improved since the 1970s and levels of air quality pollutants in Oregon have been declining over time.*

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* State of Oregon, Department of Environmental Quality Should Improve the Air Quality Permitting Process to Reduce Its Backlog and Better Safeguard Oregon's Air, http://sos.oregon.gov/audits/Documents/2018-01.pdf. Accessed 5/16/18

> "Too often, I smell the chemicals released by the factories on Johnson Creek Road (I'm in SE Portland), and I wonder if it's safe for my kids to breathe the air outside. And then I see one of my kids getting water from a water fountain at the park or at their school, and I worry- is there lead in that water? And then we try to get some exercise, but riding bikes with kids on streets without protected bike lanes is downright terrifying- there are so many cars, and so many of them are driving faster than the speed limit. How can we teach our kids to build exercise into their lives when it's not even safe to go for a bike ride?"
>
> –SHA Community Participant

However, air quality varies across the state. While most Oregon communities are meeting federal air-quality standards, in many parts of the state, the air is unhealthy to breathe on many days. The air pollutants of greatest concern in Oregon are fine particulate matter, air toxics, and ground level ozone (smog).[*] Fine particulate matter (PM2.5)[†] consists of airborne particles such as dust, dirt, soot, smoke, and droplets. Motor vehicles, wood stoves, forest fires, construction sites, and factories produce particle pollution. Long term exposure to fine particulate matter has been associated with adverse health outcomes such as reduced lung function, the development of chronic bronchitis, heart disease, and early death.

Poor air quality can result from daily human activities, such as driving cars and trucks and burning wood for heating in uncertified wood stoves. Other causes include high-intensity events such as wildfires or prescribed burns, which weather conditions often make worse.[‡] There is also evidence that people living near sources of PM2.5, such as roadways, are at higher health risk.[§] Industrial sources of air toxics can make up a significant proportion of air pollution health risk to people living, working, and going to school nearby who breathe facility emissions,[¶] even though these emissions represent a smaller source of overall pollutants in an airshed.

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[*] Oregon Department of Environmental Quality. Oregon Air Quality Annual Report – 2016. Published October 2017. http://www.oregon.gov/deq/FilterDocs/OrAirQualityAnnualReport2016.pdf. Accessed May 16, 2018.

[†] PM 2.5 is fine particulate matter with a diameter of 2.5 micrometers or less; a human hair is about 70 micrometers in diameter. (Environmental Protection Agency. Particulate Matter Basics. https://www.epa.gov/pm-pollution/particulate-matter-pm-basics. Accessed 2/15/1

[‡] Oregon Department of Environmental Quality. 2015 Oregon Air Quality Data Summaries. July 2016.) Accessed online at http://www.oregon.gov/deq/FilterDocs/2015AQAnnualReport.pdf

[§] Health Effects Institute. Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects. Special Report 17, January 2010.)

[¶] Environmental Protection Agency. Health and Environmental Effects of Hazardous Air Pollutants. https://www.epa.gov/haps/health-and-environmental-effects-hazardous-air-pollutants. Accessed May 16, 2018.

Communities exposed to poorer air quality include minority and low-income communities, tribal members, rural communities, and other communities traditionally underrepresented in environmental public processes.* For example, air toxics affect minority and low-income populations in the Portland area at higher rates than other groups in the metro area. Different types of emission sources also effect different minority groups. In general, the Latino/a population experiences the highest impacts from residential wood smoke; Asian communities and people living below the federal poverty level, from diesel emissions; and African Americans, from area source emissions such as dry cleaners, gas stations, or auto body shops.†

Water Security

Inadequate water supply poses risks to the health of people in Oregon and local economies. Climate change intensifies many of these risks. For example, storms and flooding can increase the risk of water contamination. Climate change models project heavier rainfall in Oregon's future, and the state has 258 cities and counties located in floodplains. Harmful Algal Blooms (HABs) are another water quality issue related to climate change that adversely affects recreation, tourism, livestock, and food production. Finally, Oregon will continue to experience recurring droughts that affect water supply.

Climate Change

Climate change is already affecting human health and is projected to increase health risks in the years to come. By 2050, average temperatures in Oregon are expected to rise by three to seven degrees and snowpack is expected to be less than half of what it was last century. These changes will result in more wildfires, drought, insect and disease outbreaks, and flooding.‡

The Oregon Health Authority's 2014 Climate and Health Profile Report (https://bit.ly/2m33ZND) outlines projected climate impacts in Oregon and their associated health risks. In many cases, climate change expands the variability and severity of existing environmental health risks. Communities of color and low-income communities face more environmental stressors, while having less access to the resources and opportunities they need to cope and adapt.

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* Institute of Medicine. 1999. Toward Environmental Justice: Research, Education, and Health Policy Needs. Washington, DC: The National Academies Press. https://doi.org/10.17226/6034

† Oregon Department of Environmental Quality. Portland Air Toxics Solutions Committee Report and Recommendations. April 2012.

‡ The Third Oregon Climate Assessment. Oregon Climate Research Institute. January 2017. Accessed online at http://www.occri.net/media/1042/ocar3_final_125_web.pdf

Natural and Human-Caused Hazards

In Oregon, natural and human-caused hazards include winter storms, heat waves, earthquakes, tsunamis, new diseases, pandemics, and bioterrorism. The 2017 Oregon Public Health Hazard Vulnerability Assessment ranked the top threats based on probability of occurrence, public health consequences, and public health risk. A Cascadia Subduction Zone earthquake and resulting tsunami are most hazardous for the most-populated areas of the state. While winter storms pose the greatest risk for central and eastern Oregon.

People who responded to a previous statewide hazard vulnerability assessment completed in 2012* noted the need to better understand and meet the unique vulnerabilities of at-risk persons in our communities. For example, people with disabilities face additional barriers to care after disasters if shelter access, communication tools, equipment, and transportation systems are not designed to address their needs. Conversely, people with higher incomes and higher levels of education and home ownership tend to be better prepared for disasters.†

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* https://www.oregon.gov/oha/PH/PREPAREDNESS/PARTNERS/Documents/OHA%208584%20PH%20Hazard%20Vulnerability.pdf

† Levac J, Toal-Sullivan D, O'Sullivan TL. Household emergency preparedness: a literature review. Jr comm Health. 2012 June;37(3):725-733.

2017 Oregon Public Health Hazard Vulnerability Assessment Summary

Threat level	Western Oregon	Central/Eastern Oregon
Top 10 hazards posing the largest risk to public health infrastructure, by region. (1 is the most probable.)		
1	Earthquake – Cascadia (3–5 minutes)	Winter storm
2	Public health emergency	Wildfire (with urban interface)
3	Flood – riverine	Flood – riverine
4	Winter storm	Public health emergency
5	Wildfire (with urban interface)	Drought
6	Earthquake – crustal (1 minute)	Windstorm
7	Landslide/debris flow	Hazmat release – transportation
8	Windstorm	Landslide/debris flow
9	Hazmat release – transportation	Earthquake – crustal (1 minute)
10	Hazmat release – fixed facility	Hazmat release – fixed facility

Built Environment

Many people in Oregon expressed the need for a built environment that provides access to basic needs and encourages connectivity and healthy behaviors. This includes access to healthy foods, active transportation options, safe housing, and safe places to be physically active, play and relax. SHA participants offered many ideas for ensuring that fitness and recreation opportunities are available to people of all ages and abilities. These ideas included improving the walkability and "bikeability" of communities and increasing access to Oregon's bountiful recreational areas and parks. SHA participants also mentioned community gardens and farmers markets as community assets. Finally, participants frequently mentioned the effects of substandard housing on health, particularly for people with lower incomes.

Drinking Water

Access to safe drinking water is essential to human health. Larger water systems that serve the majority of the state population generally meet safe drinking water standards, and this compares favorably to water systems across the United States. In 2016, 89% of community water systems in Oregon met all health-based standards, just below the national standard of 92%.

Human-generated as well as naturally-occurring contaminants (such as arsenic and nitrates) can affect drinking water, particularly for the roughly one in every four people in Oregon who rely on private wells for their drinking water. Long-term exposure to high levels of arsenic in drinking water has been associated with increased risk for diabetes, high blood pressure, and several types of cancer.* Statewide, nearly 10% of all OHA test results from private domestic wells show arsenic levels above 10 parts per billion (ppb), which is the safe drinking water standard for arsenic. Some parts of the state, such as Harney County (27%) and Malheur County (62%), have much higher rates. Private well owners in Oregon are not required to conduct routine water quality testing or treatment.

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* https://ephtracking.cdc.gov/showArsenicYourHealth.action

Community water systems meeting all health-based standards by year, Oregon and U.S.

Percent of community water systems

100%
75%
50%
25%
0%

2014 – 18 EPA Target = 92%
2016 Oregon = 89%
2016 U.S. = 90%

Oregon
U.S.

1994   1997   2000   2004   2007   2011   2016

Source: Oregon State and Federal Safe Drinking Water Information Systems
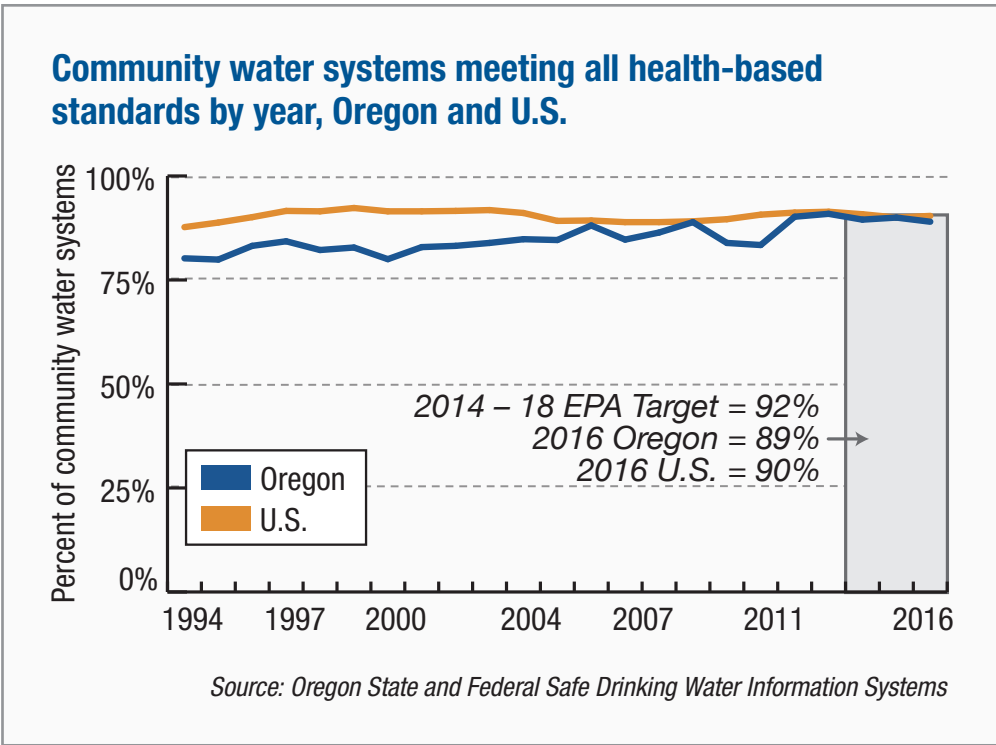
Fluoride is an effective and affordable way to protect children, adults, and seniors from tooth decay and is recognized as one of the 10 greatest public health achievements of the 20th century. After communities fluoridate their water supplies, the percentage of children in the population with at least one cavity decreases by 15%, on average.[*] Despite strong evidence that water fluoridation is safe and improves oral health, Oregon ranks 48th among U.S. states by proportion of public water systems that are fluoridated.[†]

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[*] The Guide to Community Preventive Services. Preventing Dental Caries: Community Eater Fluoridation. 2013. Retrieved from:
www.thecommunityguide.org/oral/supportingmaterials/RRfluoridation.html
[†] America's Health Rankings, 2017.

Healthy Foods

Food is a necessity, and people's access to affordable, healthy food varies widely. Related concerns are discussed elsewhere in this report: Affordability, in Chapter 3 (Social Determinants of Health); how healthy food affects health outcomes, Chapter 5 (Prevention and Health Promotion); and foodborne- illness, Chapter 7 (Communicable Disease Control). Important environmental contexts also affect access to healthy food, such as climate change.

A resilient food system provides enough food to meet current needs while maintaining healthy ecosystems that can continue to produce food for future generations. A resilient food system also protects farmers and other food workers, consumers, and communities from the negative environmental effects and chemical exposures involved with growing and consuming food. Agriculture workers are disproportionately affected by pesticide exposures and are more likely to be food-insecure, compared to other groups.[*][†]

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* Grauel K; Chambers, K. 2014.Food Deserts and Migrant Farmworkers: Assessing Food Access in Oregon's Willamette Valley. Journal of Ethnobiology 34 (2):228-250.

† Farquhar-SA; Goff-NM; Shadbeh-N; Samples-J; Ventura-S; Sanchez-V; Rao-P; Davis-S Occupational health and safety status of indigenous and o farmworkers in Oregon. J Agric Saf Health 2009 Jan; 15(1):89-102

Transportation

Convenient, affordable transportation to and from work, school, stores that sell healthy foods, and health care providers is important to health. Transit gaps or deserts, where access to public transit is limited or doesn't exist, are common in Oregon, particularly in rural and frontier areas of the state.

Older adults, persons with disabilities, and children and youth with special health care needs in particular can be healthier when they have greater access to transportation. For example, sidewalks that meet the Americans with Disabilities Act guidelines and quality transit and paratransit services are critical to enabling people with restricted mobility to engage socially, to attend medical appointments, to shop, and to go to work.

My community needs…

" A better transportation system. Towns outside the Portland metro area don't usually have that resource. Silverton is a model. They have a shuttle that seniors can ride to the grocery, library, senior center, etc. It's by donation and makes it possible for them to age in place. Every community needs that. "

– SHA Community Participant

Walking, biking, and public transportation each allow people to get where they need to go and be physically active at the same time. When people have transportation options beyond motor vehicles, such access can boost their physical activity, reduce their exposure to air and noise pollution, minimize the risk and severity of crashes, decrease stress, and improve access to a variety of resources that contribute to health, including parks, trails, medical and social services, jobs, and schools. In 2016, only 10% of people in Oregon walked, biked, or took public transit to work.

From 2011 to 2015, 71% of people in Oregon drove to work alone. Of these solo drivers, 27% spent more than 30 minutes commuting; this figure ranges from 10% of commuters in Lake County to 55% in Columbia County.*
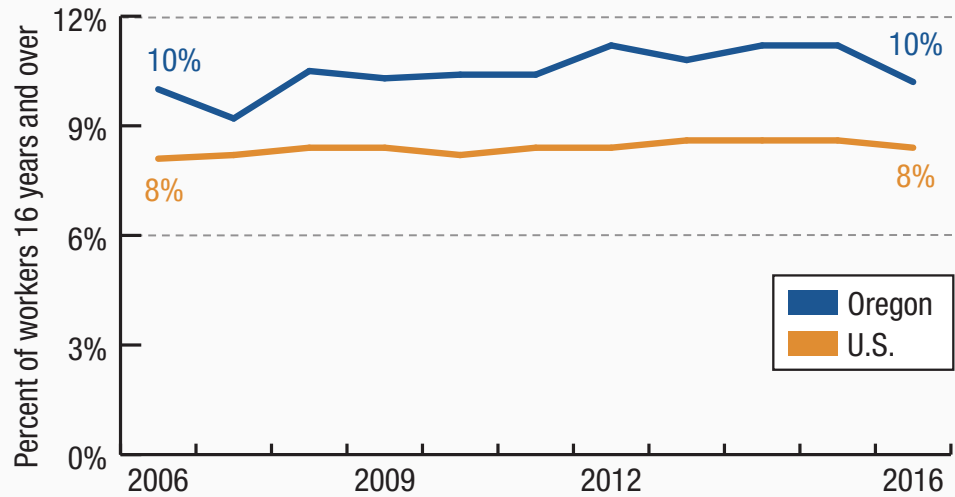
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* County Health Rankings

Workers who walk, bike or take public transit to work, by year Oregon and U.S.

Percent of workers 16 years and over

- 12%
- 10%
- 9%
- 8%
- 6%
- 3%
- 0%

2006 — 2009 — 2012 — 2016

Legend: Oregon, U.S.

Source: American Community Survey (ACS)

❝ For everyone in my community to be healthy, it would mean that physical activity is baked into everyone's daily lives. For example, it should be easy and safe for everyone to walk and bike in their community. Where I live, I get physical activity every day by taking my dog for a walk in the neighborhood, and it's safe to do so at any time of day. I'm lucky to have a trail connecting my neighborhood to my office, so I can safely bike to work for most of my commute and get additional physical activity that way. Getting regular physical activity should not require driving to the gym, and it wouldn't if more people were served by safe walking and bicycle infrastructure. It would be great if we tracked access to safe walking and bicycling facilities, which is really access to the means for physical activity, as a public health measure. ❞

— SHA Community Participant

❝ If I had a sidewalk, I would drive less, but I don't, so I have to drive more, and my kids have a limited area where they can play. ❞

— SHA Community Participant
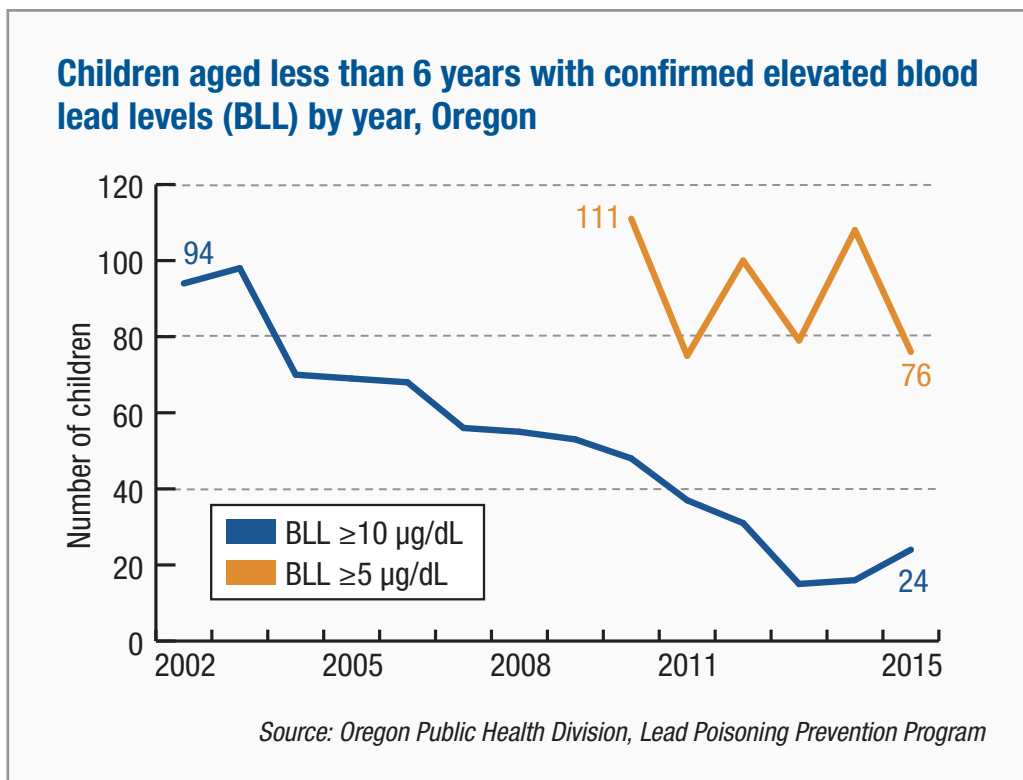
Healthy and Safe Housing

Many SHA participants identified the need for affordable housing that is also healthy and safe. Having safe housing means experiencing less exposure to lead and radon, secondhand smoke, fire hazards, mold and infestations, as well as having proper heating and cooling systems. From 2009 to 2013, 21% of Oregon households were living with a severe housing-related health problem,* ranging from 11% of households in Gilliam County to 24% in Josephine County.

High levels of lead are toxic to people of all ages, and young children face the highest risks for adverse health effects. Lead poisoning has neurological effects that are most damaging in early childhood when the brain is developing rapidly. In Oregon, the number of children with elevated blood lead levels (greater than or equal to 10 micrograms per deciliter) declined from 2003 to 2013, but the number has remained relatively flat since then.

My community needs…

"Gardens and parks, shelter from rain and weather in affordable and accessible housing, a circle of wise elders, a multi-generational common ground area, a recreation center, great schools, air quality, and environmental awareness of healthy eco-systems."

– SHA Community Participant

Children aged less than 6 years with confirmed elevated blood lead levels (BLL) by year, Oregon

Source: Oregon Public Health Division, Lead Poisoning Prevention Program

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* Having at least one of the following: overcrowding, high housing cost, or lack of kitchen or plumbing facilities.

For secondhand smoke, there is no risk free level of exposure; even brief exposure can be harmful to health. Cigarette smoking and exposure to secondhand smoke is the number one preventable cause of chronic disease, including heart disease, stroke, and diabetes. While Oregon has made much progress in limiting exposure to secondhand smoke in public spaces, exposure still occurs in homes and private spaces. In 2016, 17.9% of Oregon adults reported having been exposed to secondhand smoke, a slight decrease since 2010. Among students in 11th grade, 6% said they lived with someone who smokes or vapes tobacco inside the home.

Adults with any exposure to secondhand smoke, Oregon

Source: Oregon Behavioral Risk Factor Surveillance System (BRFSS)
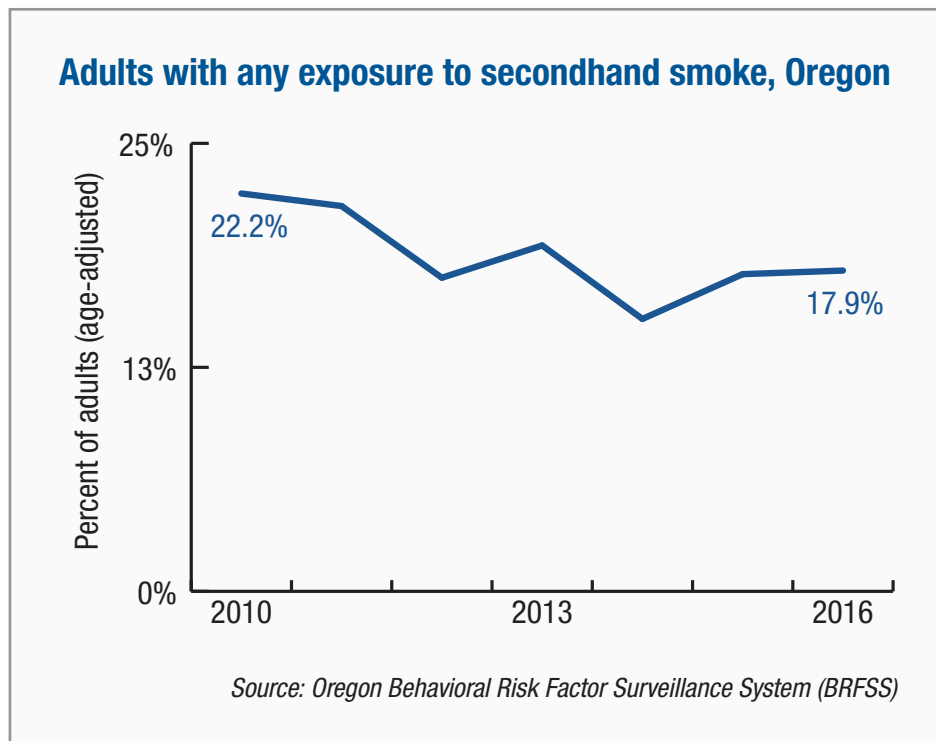
Mold and radon also contribute to health concerns in our homes. Mold results from moisture caused by water leaks, humidity, and ventilation problems. Some types of mold can increase asthma and allergy risks. Radon is a radioactive gas found in soil and rock that can accumulate in buildings. Radon exposure is the second-leading cause of lung cancer after smoking, causing an estimated 13% of lung cancer deaths.[*] Removal of mold and radon from a home can be expensive and is often unaffordable for low-income households.

* NRC (National Research Council). 1999. Health Effects of Exposure to Radon: BEIR VI. Washington, DC:National Academies Press.

Access to Nature

Oregon is renowned for its natural resources, and community members identified access to and preservation of the natural environment as important to their health. They expressed the importance of hiking, beaches, parks, and the value of a healthy environment. Exposure to nature has been shown to improve health outcomes, including those related to obesity, cardiovascular disease, depression, and anxiety.[*] At the same time, many people in Oregon do not have easy access to nature and its benefits because of socioeconomic disparities and cultural barriers, particularly for communities of color.[†]

Land Use Planning

Land use decisions affect air quality, traffic safety, water quality, physical activity, and mental health. Modern land-use planning arose from a need to protect public health; industrialization led to cities establishing requirements to separate residents from industrial pollution emissions and to combat unsanitary conditions and overcrowding that promoted disease transmission. In contrast, land use decisions today tend to be driven by economic development. This separation between land use planning and public health has had broad implications for community health, with disproportionate effects for communities of color and lower-income communities.

For example, affluent and predominantly white communities and neighborhoods tend to have sidewalks, greenspace, and adequate street lighting, all of which foster physical activity and contribute to positive mental health outcomes.[‡] Communities of color and lower-income communities, in contrast, tend to live closer to industrial facilities and air pollution;[§] live further from stores that offer healthy foods;[¶] and have fewer parks in their neighborhoods.[**] Land use planning decisions contribute to people spending more time in cars and less time being physically active. This also increases their risks for chronic disease, worsens air quality, and increases greenhouse gas emissions.[††] Land use planning, transportation, and community design interact and significantly influence many of the primary determinants of community health.

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* Nature Contact and Human Health: A Research Agenda. Environmental Health Perspectives. 2017 July.

† https://www.cnn.com/2017/09/12/health/nature-wilderness-minorities/index.html OR https://www.nature.nps.gov/socialscience/docs/CompSurvey2008_2009RaceEthnicity.pdf

‡ National Association of County and City Officials. Factsheet: Public Health in Land Use Planning and Community Design. http://archived.naccho.org/topics/environmental/landuseplanning/upload/Land-Use-Fact-Sheet6-19-03.pdf. Accessed 3/8/2018.

§ Maantay J., Chakraborty, J., Brender, J. Proximity to Environmental Hazards: Environmental Justice and Adverse Health Outcomes. USEPA "Strengthening Environmental Justice Research and Decision Making: A symposium on the Science of Disproportionate Environmental Health Impacts," March 17-19, 2010. https://archive.epa.gov/ncer/ej/web/pdf/maantay.pdf. Accessed 3/8/2018.

¶ Hilmers, A., Hilmers, D. Dave, J. Neighborhood Disparities in Access to Healthy Foods and Their Effects on Environmental Justice. American Journal of Public Health 2012 September, 102(9): 1644-1654.

** Wen, M., Zhang, X., Harris, C., Holt, J., Croft, J. Spatial Disparities in the Distribution of Parks and Green Spaces in the USA. Annals of Behavioral Medicine 2013 February; 45(Supplement1): 18-27.

†† Frumkin H, Frank L, Jackson R. Urban Sprawl and Public Health: Designing, Planning, and Building for Healthy Communities. Island Press. Washington. 2004.

Occupational Environment

Oregon does an excellent job ensuring safety in the workplace, ranking 7th in the country in occupational fatalities.* However, some SHA participants identified the need for healthier workplaces. Controlling occupational hazards is an important way to prevent injuries and illnesses. Industries where workers experience the highest rates of days away from work include agriculture, forestry, fishing, utilities, transportation, warehousing, and construction.
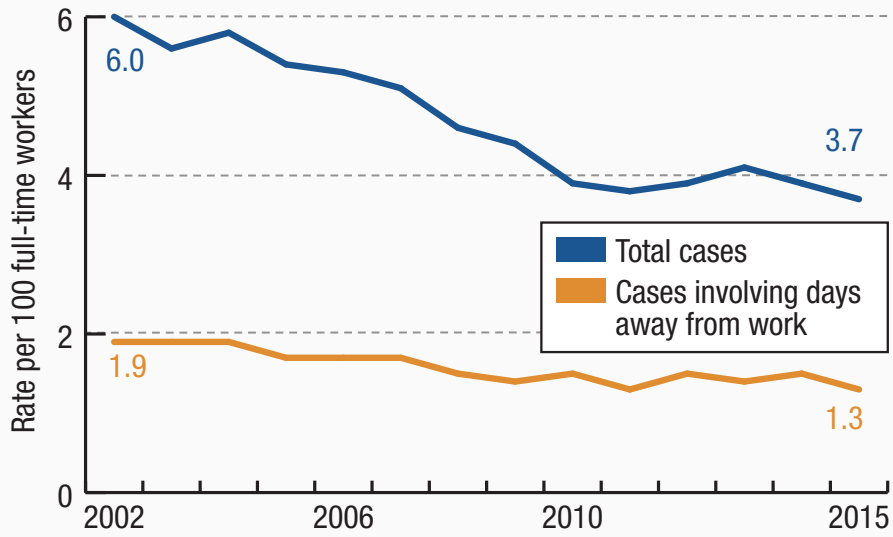
Collecting information about work related fatalities can lead to the development of regulations to protect workers. In 2016, 72 Oregon workers (3.9 deaths per 100,000 full-time workers) died from occupational injuries. This is a decrease from 2006 when the rate was 5.1 per 100,000 full-time workers. The industries with the highest percentage of fatalities were agriculture, forestry, fishing, and hunting (27.2%, combined); transportation and warehousing (20.5%, combined); and construction (13.6%).

Occupational lead exposure is another critical health problem in Oregon and the nation. Lead exposure can lead to cognitive impairment and adverse cardiovascular, kidney, and reproductive health issues. The rate of occupational lead exposure in Oregon declined from 2002 to 2010 but has remained flat since then (currently 2.4 per 100,000 workers). However, because many workers exposed to lead may not be tested or their tests may not be reported, data on adult blood lead exposure should be considered a low estimate.

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* America's Health Rankings

Non-fatal occupational injuries and illnesses by year, Oregon

Rate per 100 full-time workers

6.0

3.7

1.9

1.3

- **Total cases**
- **Cases involving days away from work**

2002 — 2006 — 2010 — 2015

Source: Bureau of Labor Statistics, Annual Survey of Occupational Injuries and Illnesses

Elevated blood lead levels (more than or equal to 25 mg/dL) among employed persons age 16+ by year, Oregon

Rate per 100,000 employed persons age 16+

4.4

4.1

3.3

2.8

2.1

2.4

2002 — 2006 — 2010 — 2014
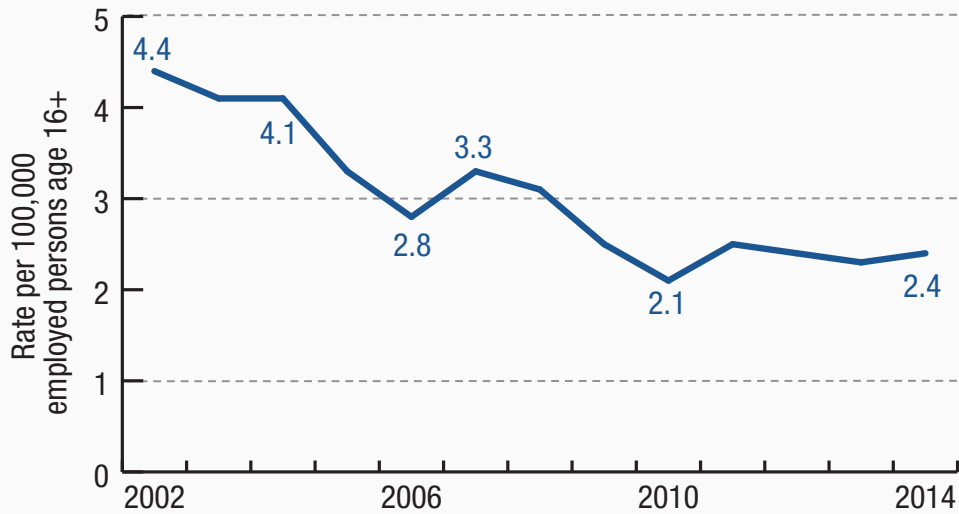
Source: Oregon Public Health Division, Lead Poisoning Prevention Program

My community needs…

"Strong government regulation and oversight of industry to ensure clean water air and soil are maintained, that businesses ensure the safety of their workers, and schools are safe for students. Regulation of industrial and commercial pollutants, as well as day to day pollutants such as vehicle emissions."

– SHA Community Participant