CENTRAL OREGON DISEASE RATES AND THE COUNTY HEALTH RANKINGS

2014-2016

Public Health Department | Jefferson County | Oregon

INTRODUCTION

The intent of this analysis for the most common health indicators and health rankings within Oregon is to compare specific health outcomes within public health services, determine the highest priority disease incidences and prevalence and describe behavioral risk factors in Central Oregon County compared with other Oregon counties.

These health indicator comparison-based rates and rankings of morbidity and mortality (such as premature deaths, rates of disease and deaths including communicable and chronic disease, rates of immunization rates) are for 2014-2016.

This data analysis illustrates how health services and health status could improve with better service quality, people's quality of life and other environmental and socio-economic factors.

Figures and maps illustrate that some health rankings have improved, while some were at nearly the lowest level measured.

Thus, we need to develop strategies and interventions for how to maintain our success and how to improve risk factors for certain health conditions.

Jefferson County Public Health Department

MADRAS, OREGON **2018**

Contact details:
745 SW.4th Street, Suite C, Madras, OR 97741

Michael K. Baker Ph.D.
Michael.Baker@co.jefferson.or.us
Nansalmaa Conway Ph.D.
Nansalmaa.Conway@co.jefferson.or.us

METHODS

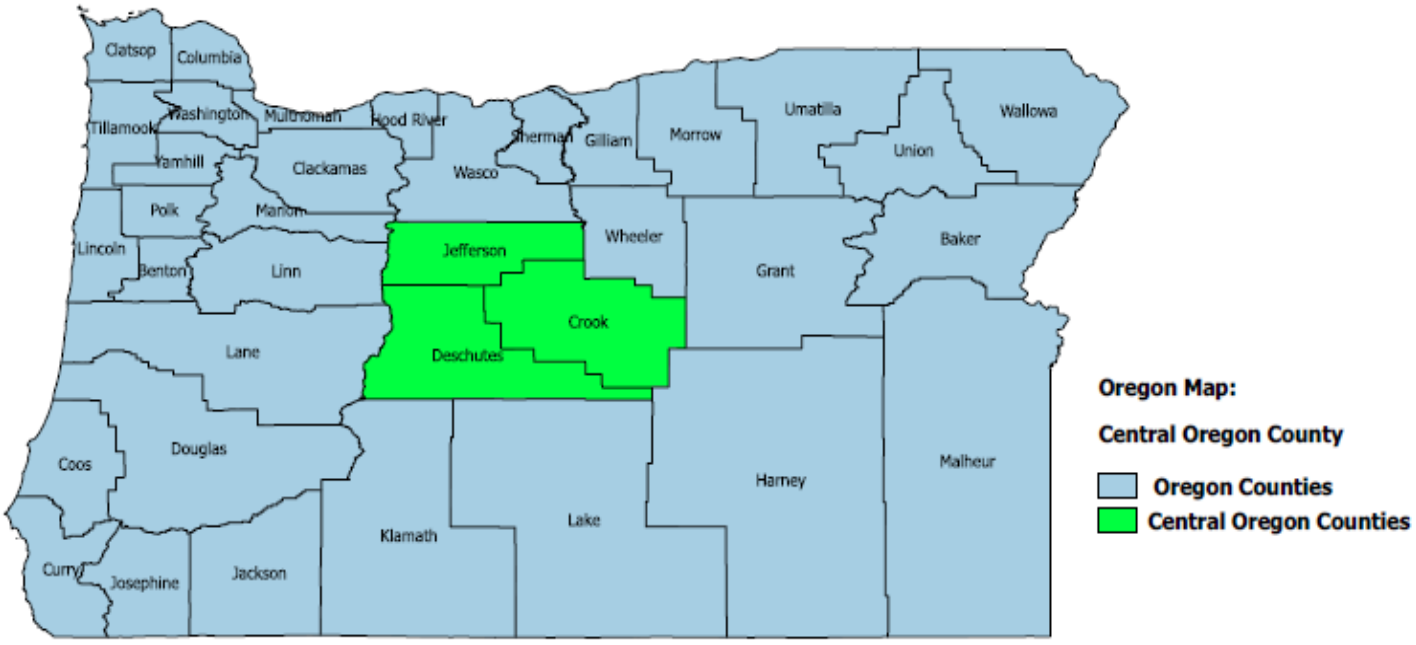
Existing data on communicable and non-communicable diseases, deaths, immunization, maternal health and most common behavioral risk factor indicators in Central Oregon County, compared with Oregon overall, were analyzed using recent data from OPHAT, Vital Statistics, Census and other sources for 2014-2016.

Ranking analysis was based on age-adjusted rates and proportions, applying descriptive and analytic epidemiologic approaches.

SAS programs for multiple variables and GIS mapping for geographical analysis were applied.

CONTENTS

Map 1. Location of Central Oregon County



Map 1 illustrates that Central Oregon include Deschutes, Crook and Jefferson counties, located in east of the Cascades, between the Columbia River region and Klamath and Burns Falls.

The total population of these three counties was 219,872 in 2014-2016. 79.8% of those people were living in Deschutes County population.

Demographic Information

Table 1. Central Oregon Population Ethnicity (percentage) by County, 2014-2016

County	Total population number	Ethnicity (percent)			
		White NH	*Hispanic*	*American-Indian/Alaska-Native NH*	*Other*
Crook	21751	88.5	7.4	2.4	1.7
Deschutes	175481	87.9	7.6	1.9	2.6
Jefferson	22640	59.9	20.0	19.0	1.1

In table 1, Jefferson County has the highest percentage of ethnic minority groups such as Hispanic and American Indian among Central Oregon Counties. Those ethnicities constituted 39% of Jefferson County's overall population in 2016.

In Table 2, Crook County's population was the oldest. Middle-aged groups dominated in Deschutes county, and young adults in Jefferson in 2014-2016.

Table 2. Population Age Distribution (percentage) by County, 2014- 2016

County	Total population number	Age Distribution (percent)				
		<15	*15 to 24*	*25 to 44*	*45 to 64*	*65+*
Crook	21751	15.8	10.2	20.4	29.1	24.5
Deschutes	175481	17.4	10.7	25.3	27.7	18.9
Jefferson	22640	20.0	12.2	23.1	26.5	18.3

Maternal & Child Health

Pregnancy rates were significantly higher ($p<0.05$) in Jefferson and Crook counties than in Deschutes County in 2014-2016 (Table 3.).

County	2014	2015	2016
Crook	74.80	72.10	77.73
Deschutes	68.50	66.93	67.06
Jefferson	86.27	84.80	85.12
Oregon State	68.72	68.21	67.31

The infant mortality rate is an essential measurement of the overall population health.

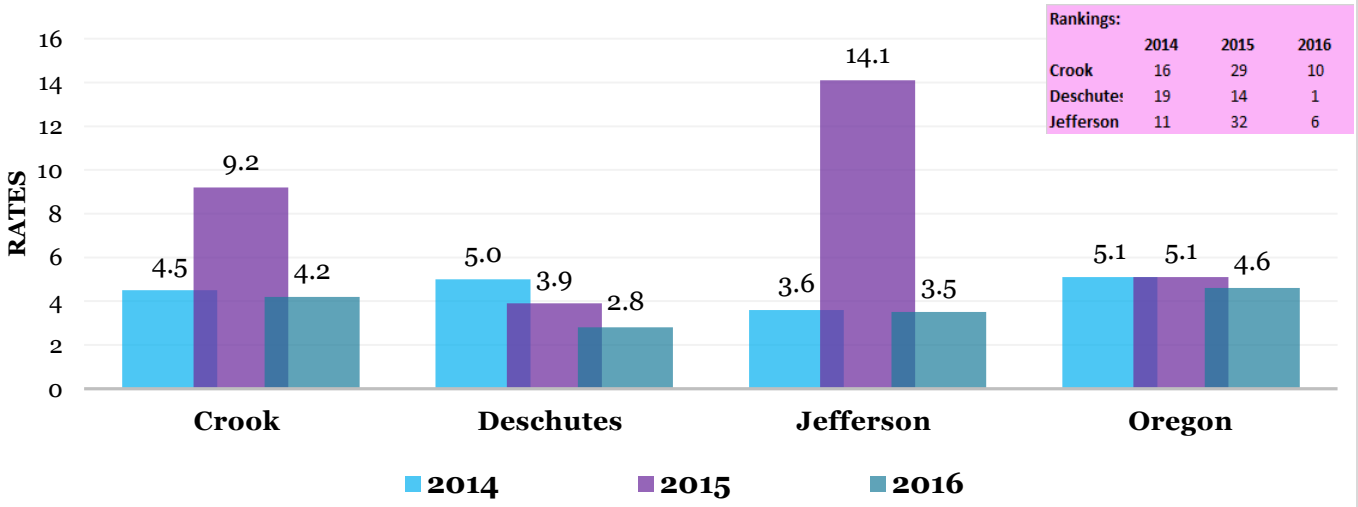
In Figure 1 (below), Deschutes County's infant mortality rate decreased gradually, 2014 - 2016 with rankings improving each year.

This indicator appeared to decrease sharply in Crook and Jefferson Counties from 2015 to 2016, which would improve their rankings.

Table 3. Pregnancy Rates per 1,000 women (Age 15-44) by Central Oregon County, 2014-2016

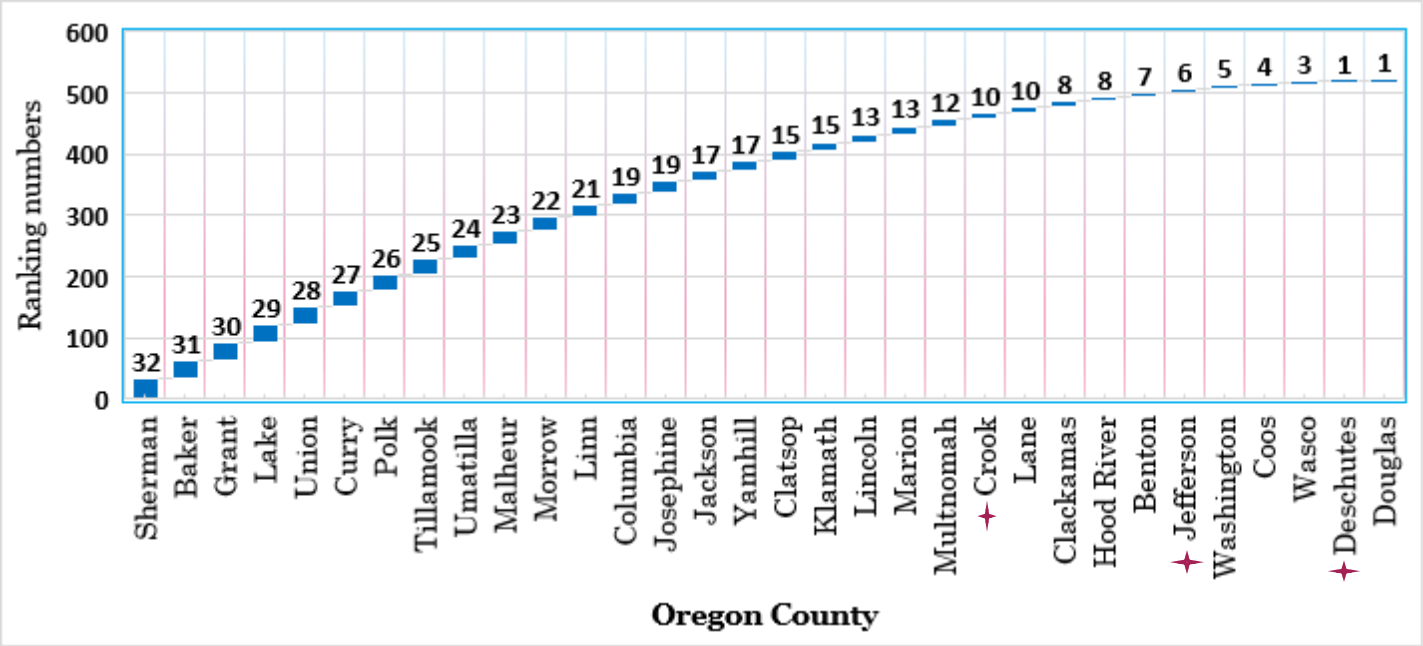
Data source: OPHAT, 2014-2016

Figure 1. Central Oregon Infant Mortality Rates & Rankings, 2014-2016 (per 1,000 live births)



Central Oregon County Infant Mortality Rates were lower than Oregon Average in 2016. Figure 2 illustrates Central Oregon County infant mortality rankings among Oregon counties.

Figure 2. Comparison of Central Oregon Infant Mortality Rate-Based Rankings with Oregon Overall, 2016



✦ Central Oregon County

Data source: Vital statistics, 2014-2016

Table 4. Teen Pregnancy Rates per 1,000 women by Central Oregon County, 2014-2016

County	Pregnancy rates (age 10 to 17 years old)			Rankings among Oregon Counties		
	2014	*2015*	*2016*	*2014*	*2015*	*2016*
Crook	5.1	10.3	7.2	18	29	28
Deschutes	4	3.6	2.3	12	6	5
Jefferson	5.9	7.7	5.2	24	27	22
Oregon	4.9	4.4	3.9			

Data source: Vital Statistics, 2014-2016

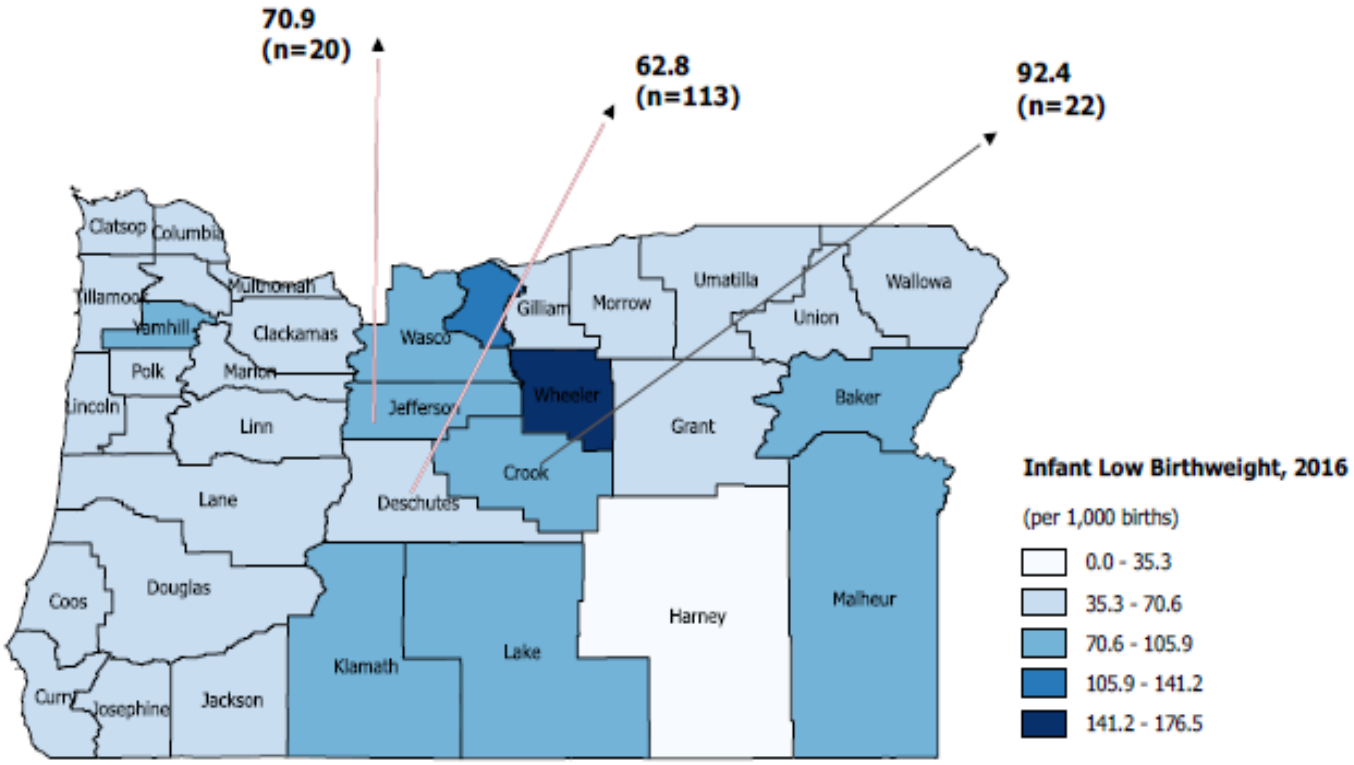
Teen pregnancy is a crucial indicator in reproductive health. Preventing and reducing teen unintended pregnancy related-maternal/child health consequences are significant priorities of public health services.

In Oregon, the teen pregnancy rate among girls 15 to 17 years declined continuously from 2014 to 2016 (Table 4). At the same time, the teen birth rate declined from 8.5 in 2014 to 6.7 per 1,000 women in 2016 (Vital Statistics, 2014-2016).

Table 4 illustrates that Crook County teen pregnancy rate doubled in 2015, but moderated in 2016.

Jefferson and Crook County rates were significantly higher than Deschutes and Oregon averages.

Map 2. Infant Low Birthweight (per 1,000 births) by Central Oregon County, compared with Oregon Overall, 2016



Data source: Vital Statistics, 2014-2016

Babies born with low birthweight (less than 2,500 grams=5.5 pounds and very low birthweight less than 1,500 gr=3.3 pounds) lead to increase infant mortality versus normal weight (≥2,500 grams=5.5 pounds). It is also at increased risk of babies' physical and mental health development and disability.

The infant death rates have been lower than the U.S. average for last decades. However, this indicator increased slightly each year in 2014- 2016 (62.5; 64.2; 65.5 per 1,000 births)

Map 2 shows that Crook and Jefferson County infant low birthweight rates were substantially higher than Deschutes and the Oregon Average (respectively 65.5) in 2016.

Table 5. Abortion rate (per 100 pregnancies) & rankings, Central Oregon Counties, 2014-2016

County	2014		2015		2016	
	Abortion %(n)	Rank	Abortion %(n)	Rank	Abortion %(n)	Rank
Crook	8.3 (n=20)	10	9.2(n=22)	15	11.2(n=30)	17
Deschutes	14.6 (n=305)	32	15.0(n=314)	32	16.9(n=366)	34
Jefferson	11.1 (n=35)	19	9.6(n=30)	16	12.2(n=39)	20

Data source: OPHAT, 2014-2016

Abortion is a critical indicator of reproductive health. Women with socio-economic disadvantages, religious specifics and health conditions influence likelihood of abortion.

Abortion rates per 100 increased slightly from 2014 in 2016 in Oregon (14.4; 14.6 and 15.3 per 100 pregnancies).

Deschutes county abortion rates were significantly ($p<0.05$) higher than Crook and Jefferson county rates. Deschutes also had increasing rates each year between 2014 and 2016 (Table 5).

Risk Factors for Maternal & Child Health

Table 6. Central Oregon Maternal Education (combining High School Only & Less than High School by Percent of Births) and Rankings Compared with Oregon Overall, 2014-2016

County	Percent of Education for Live Births	Rank	County	Percent of Education for Live Births	Rank
Baker	42.5	18	Lake	49.3	31
Benton	18.9	1	Lane	33.2	9
Clackamas	27.1	4	Lincoln	53.9	32
Clatsop	42.1	17	Linn	40.8	14
Columbia	37.4	12	Malheur	60.7	36
Coos	47.8	28	Marion	47.9	29
Crook	45.1	23	Morrow	60.2	35
Curry	43.3	19	Multnomah	29.9	7
Deschutes	28.9	6	Polk	36.5	10
Douglas	44.6	21	Sherman	26.2^	3
Gilliam	41.5	16	Tillamook	46.4	26
Grant	44.7	22	Umatilla	54.2	33
Harney	45.1	24	Union	37.2	11
Hood River	41.2	15	Wallowa	32.2	8
Jackson	44.4	20	Wasco	48.7	30
Jefferson	57.8	34	Washington	27.6	5
Josephine	47.6	27	Wheeler	24.5^	2
Klamath	45.8	25	Yamhill	38.2	13

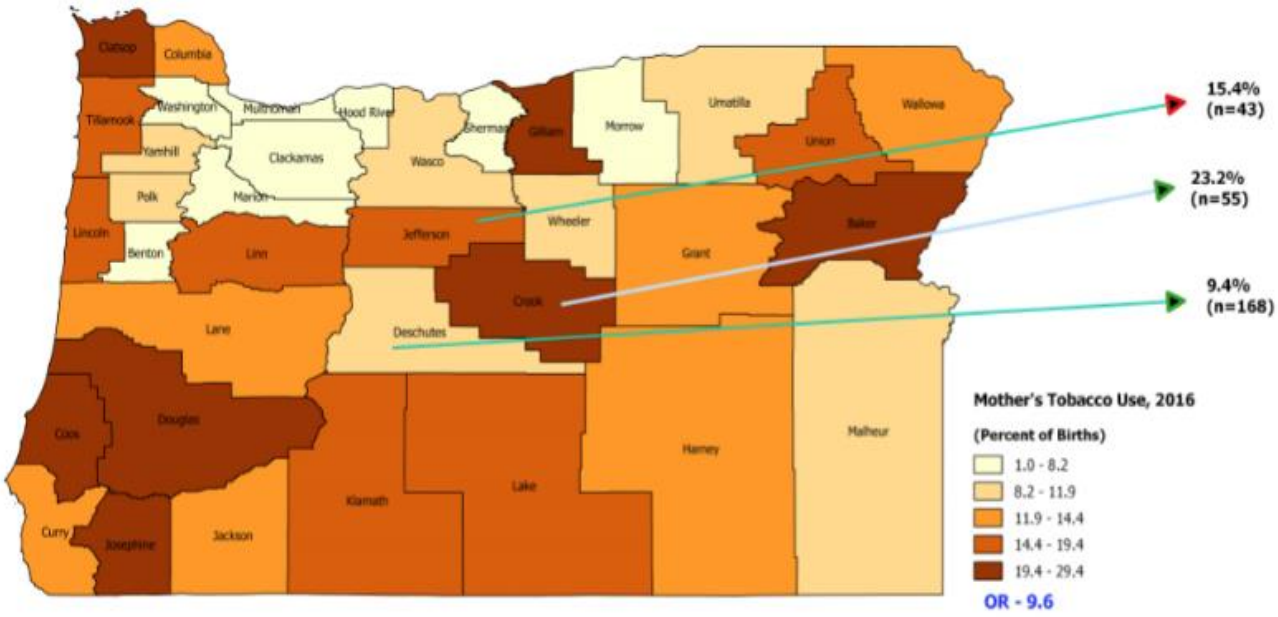
Note: ^ Statistically unreliable
Data source: OPHAT, 2014-2016

A lower level of maternal education may contribute to an increased risk profile for their children's and families' health and behaviors.

Thus, maternal education is one of the most essential predictors for child care and development.

Low education level among new mothers was more common in Crook and Jefferson counties than in Deschutes (Table 6).

Map 3. Central Oregon New Mother's Tobacco Use (by Percent of Births) compared with Oregon Overall, 2016



Note: OR -Oregon
Data source: Vital Statistics, 2014-2016

Tobacco use is a major risk factor for preventable diseases and deaths as well as population health. Health data indicates that tobacco use has killed more than 7,000 people each year for last 6 years in Oregon (OHA, 2017).

Map 3 shows that new mothers' tobacco use was more common in Crook and Jefferson counties. This Crook County indicator was double and Jefferson 1.6 times higher than the Oregon average.

The rate was substantially lower in Deschutes County than the other Central Oregon counties.

Table 7. Percentage of Inadequate or No Prenatal Care for Live Births by Central Oregon County compared with Oregon Average, 2014-2016

County	Inadequate or no prenatal care					
	Percentage			Rank		
	2014	2015	2016	2014	2015	2016
Crook	10.9	6.9	10.5	4	2	6
Deschutes	7.7	9.1	6.5	1	3	1
Jefferson	23.1	22.3	17.7	32	31	29
Oregon State	13.7	13.2	13.1			

Data source: OPHAT, 2014-2016

Accessing systematic and early prenatal care and health care during pregnancy is crucial to improve the chances of a healthy pregnancy and reduce infant/maternal health challenges and complications.

The percentage of pregnant women with inadequate or no prenatal care decreased gradually each year in Jefferson county from 2014 to 2016.

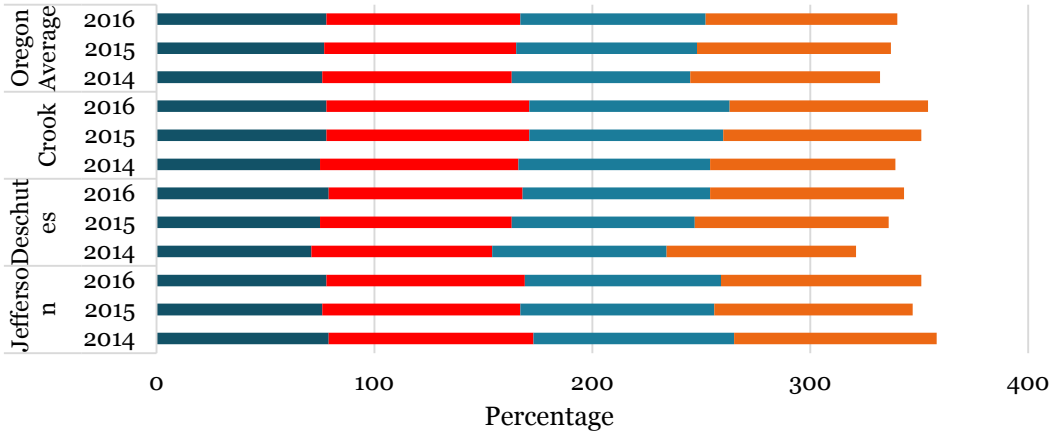
But this indicator remained significantly higher ($p<0.05$) in Jefferson county than the Oregon average rate, reflected in its rank.

In Deschutes and Crook counties, 89 to 94 % of mothers could access adequate prenatal care (Table 7).

CHILDREN'S IMMUNIZATION

In figure 3, Jefferson and Crook counties' vaccine coverage of two year old children was good, with rates higher than Oregon average and the Deschutes county rate.

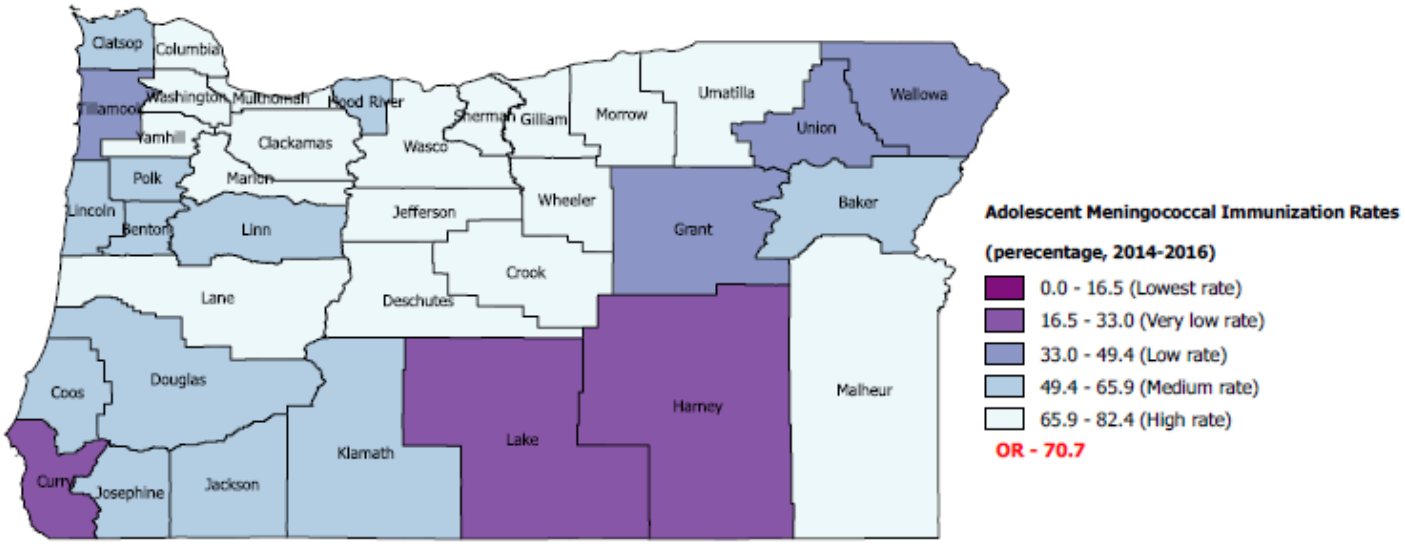
Figure 3. Central Oregon Two Year Old Children's Immunization Rates, 2014-2016 (by percentage)



Data source: OHA, 2014-2016

County	Year	DTaP	IPV	Hep B	MMR
		Percentage			
Jefferson	2014	79	94	92	93
	2015	76	91	89	91
	2016	78	91	90	92
Deschutes	2014	71	83	80	87
	2015	75	88	84	89
	2016	79	89	86	89
Crook	2014	75	91	88	85
	2015	78	93	89	91
	2016	78	93	92	91
Oregon	2014	76	87	82	87
	2015	77	88	83	89
	2016	78	89	85	88

Map 4. Central Oregon Adolescent Age 13 to 17 Meningococcal Immunization Rates (percentage) Compared with Oregon overall, 2014-2016



Jefferson county meningococcal immunization in adolescents age 13 to 17 years ranked 1 and Crook county ranked 3 among Oregon counties in 2014- 2016 (Map 4 & Table 8).

But Crook and Deschutes Counties' Tdap vaccine coverages were significantly lower than Jefferson county's (Figure 4 & Table 9.)

Table 8. Meningococcal Immunization Rates & Rankings in Central Oregon Counties vs. other Counties, 2014-2016

County	*Rates (%)*	*Rank*	*County*	*Rates (%)*	*Rank*
Baker	53.2	24	**Lake**	24.2	36
Benton	59.6	21	**Lane**	74.8	5
Clackamas	74.4	6	**Lincoln**	61.4	18
Clatsop	51.5	27	**Linn**	51.5	26
Columbia	71.2	10	**Malheur**	67.2	15
Coos	61.4	19	**Marion**	68	14
Crook	80.4	3	**Morrow**	69.3	13
Curry	29.2	33	**Multnomah**	78.4	4
Deschutes	72.4	8	**Polk**	65.4	16
Douglas	58.2	22	**Tillamook**	38.7	31
Grant	45.1	29	**Umatilla**	69.8	12
Harney	28.1	35	**Union**	47.2	28
Hood River	63.2	17	**Wallowa**	45	30
Jackson	52.8	25	**Wasco, Gilliam, Sherman**	70.3	11
Jefferson	82.4	1	**Washington**	80.5	2
Josephine	53.4	23	**Wheeler**	72.4	9
Klamath	59.7	20	**Yamhill**	74	7

Figure 4. Central Oregon Adolescent (age 13-17) Tdap Immunization Rates (by percentages), 2014-2016

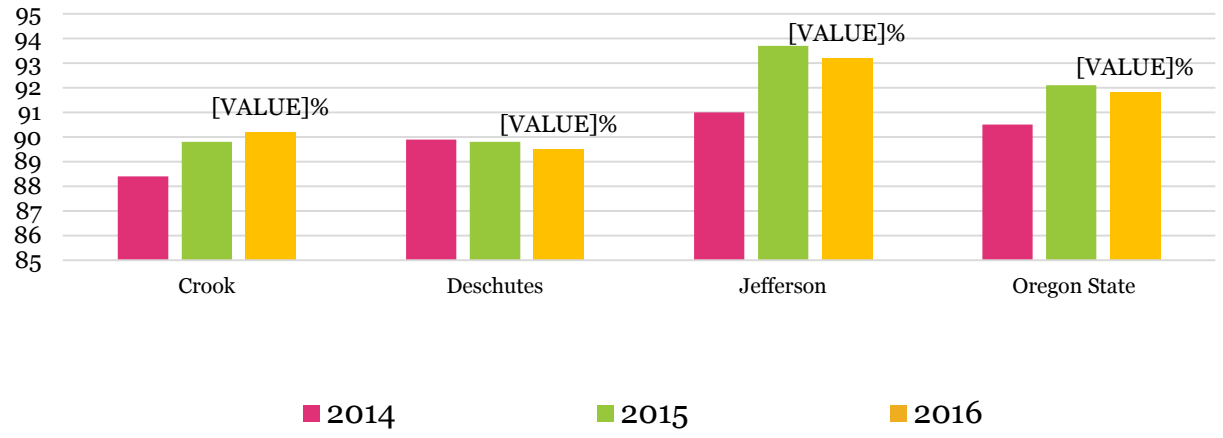


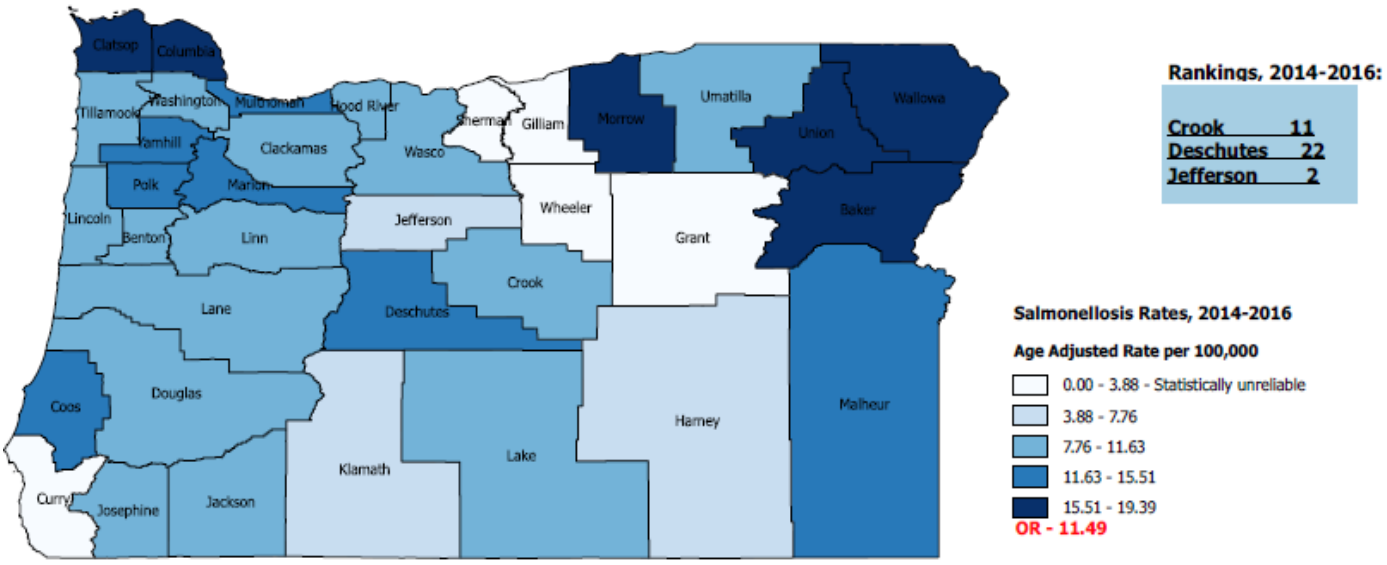
Table 9. Rankings of Tdap Immunization Rates by County, Compared with Oregon, 2016

County	Rates (%)	Rank	County	Rates (%)	Rank
Baker	93.9	2	Lake	92.6	10
Benton	89.2	30	Lane	90.6	21
Clackamas	91.4	16	Lincoln	87.5	31
Clatsop	85.7	34	Linn	91.7	15
Columbia	93	6	Malheur	91	19
Coos	90	26	Marion	92.3	11
Crook	90.2	25	Morrow	90.6	21
Curry	85.8	33	Multnomah	91.2	17
Deschutes	89.5	28	Polk	92	13
Douglas	94.3	1	Tillamook	90.3	24
Gilliam	86.5	32	Umatilla	90.6	21
Grant	92.9	7	Union	90.7	20
Harney	92.9	7	Wallowa	93.2	4
Hood River	93.3	3	N. Central	92.9	7
Jackson	92.1	12	Washington	89.8	27
Jefferson	93.2	4	Wheeler	82.7	35
Josephine	91.2	17	Yamhill	91.8	14
Klamath	89.3	29			

N. Central: Gilliam, Sherman & Wasco

COMMUNICABLE/REPORTABLE DISEASES

Map 5. Central Oregon Salmonellosis Rates and Rankings (Age-Adjusted Rate per 100,000 Persons) compared with other counties and Oregon , 2014-2016



Salmonella bacterial infection is a reportable communicable diseases.

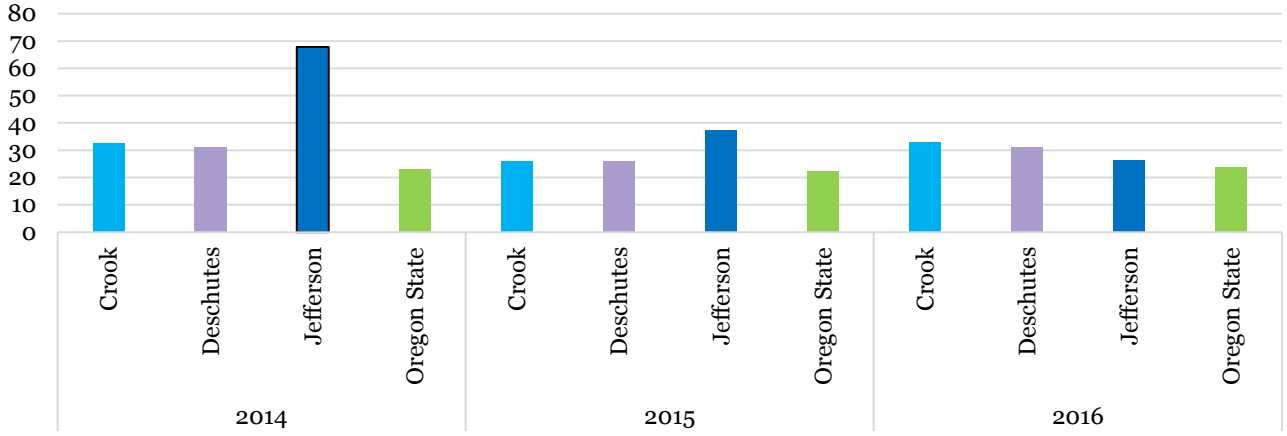
Enteritidis and Typhimurium species of these bacterial infections are common in Oregon.

Salmonellosis rates increased from 2014 (10.1 per 100,000 population) in 2015 (13.4) and increased from 2015 in 2016 (10.9) in Oregon.

Deschutes County's Salmonellosis rate (12.6 per 100,000 population) was higher and Crook and Jefferson County rates lower than the Oregon average (Map 5 above).

Jefferson County's rate (6.5 per 100,000 population) was nearly one-half the Oregon average (respectively 11.5) for 2014-2016.

Figure 5. Campylobacteriosis (Age-Adjusted per 100,000 population), 2014-2016, Central Oregon



County	2014		2015		2016	
	Rate per 100,000	Rank	Rate per 100,000	Rank	Rate per 100,000	Rank
Crook	32.61(n=5)	22	26.09 (n=5)	18	32.95 (n=7)	23
Deschutes	30.89(n=52)	21	25.80 (n=44)	17	31.14 (n=59)	21
Jefferson	67.89 (n=13)	26	37.42 (n=8)	22	26.31 (n=6)	18
Oregon	22.9 (n=907)		22.1 (n=891)		23.7 (n=994)	

Campylobacteriosis is a gram-negative bacteria and a relatively common gastrointestinal infection.

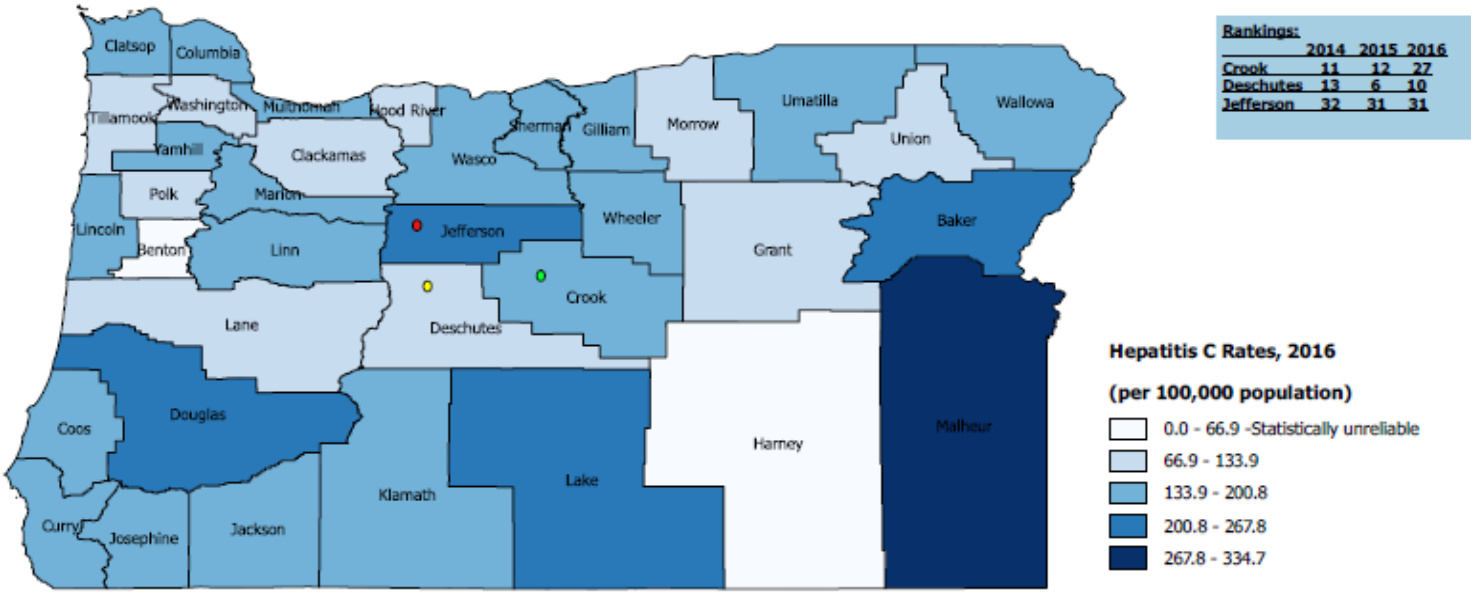
Children are susceptible to this infection through cross contamination such as contaminated water and food, unpasteurized milk, etc.

This infection rate increased slightly from 2015 in 2016 in Oregon (Figure 5).

In Figure 5, Jefferson County Campylobacteriosis infection decreased sharply in 2015 and 2016 compared with 2014.

This data also indicated that Crook and Deschutes Counties' rate slightly increased in 2016.

Map 6. Chronic Hepatitis C Rates and Rankings (Age-Adjusted per 100,000 population) compared with Oregon overall, 2014-2016



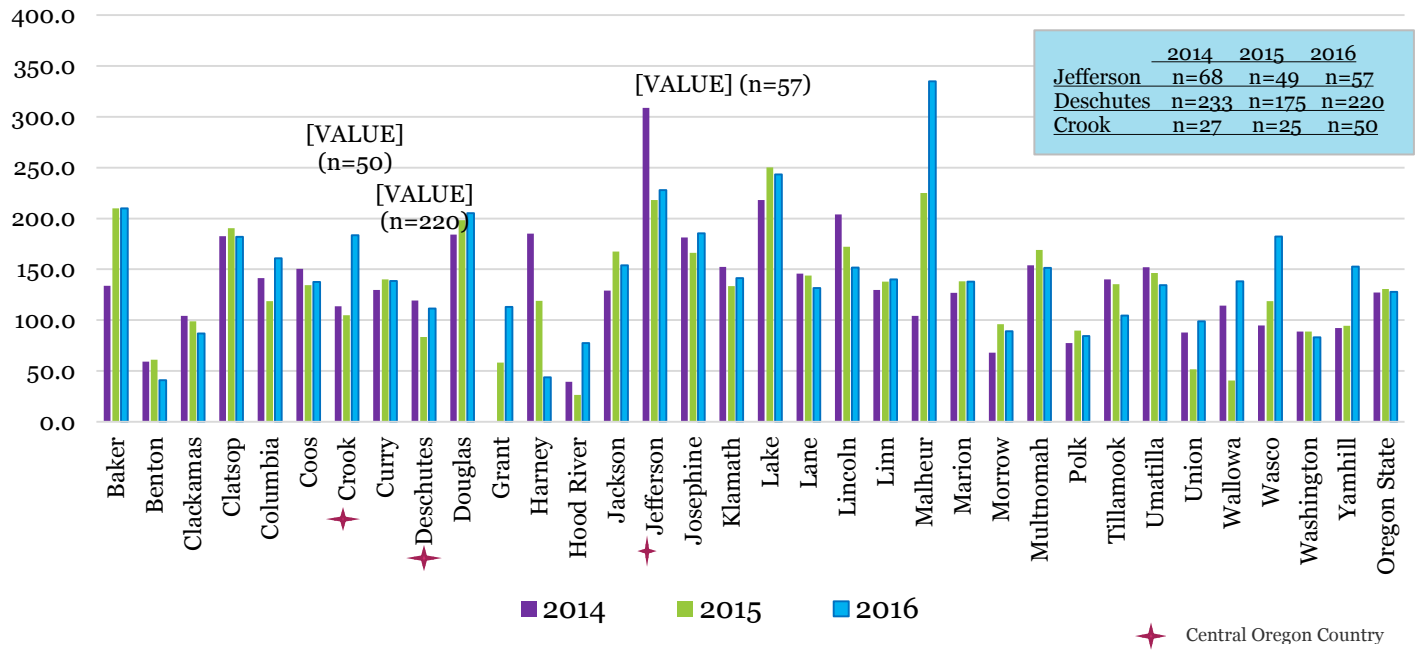
Data source: OPHAT, 2014-2016

Hepatitis C is a bloodborne viral infection which may lead to chronic and active HCV infection.

In Oregon (OPHAT, 2016), this chronic infection increased from 2014 (127.3 per 100,000 population) to 2015 (130.5) and decreased slightly in 2016 (128.0).

Jefferson County's Hepatitis C rate was among the highest in Oregon (Map 6) placing it among the last four counties for this indicator on the average rates during 2014-2016.

Figure 6. Central Oregon Chronic Hepatitis C compared with OR counties (Age adjusted per 100,000), 2014-2016

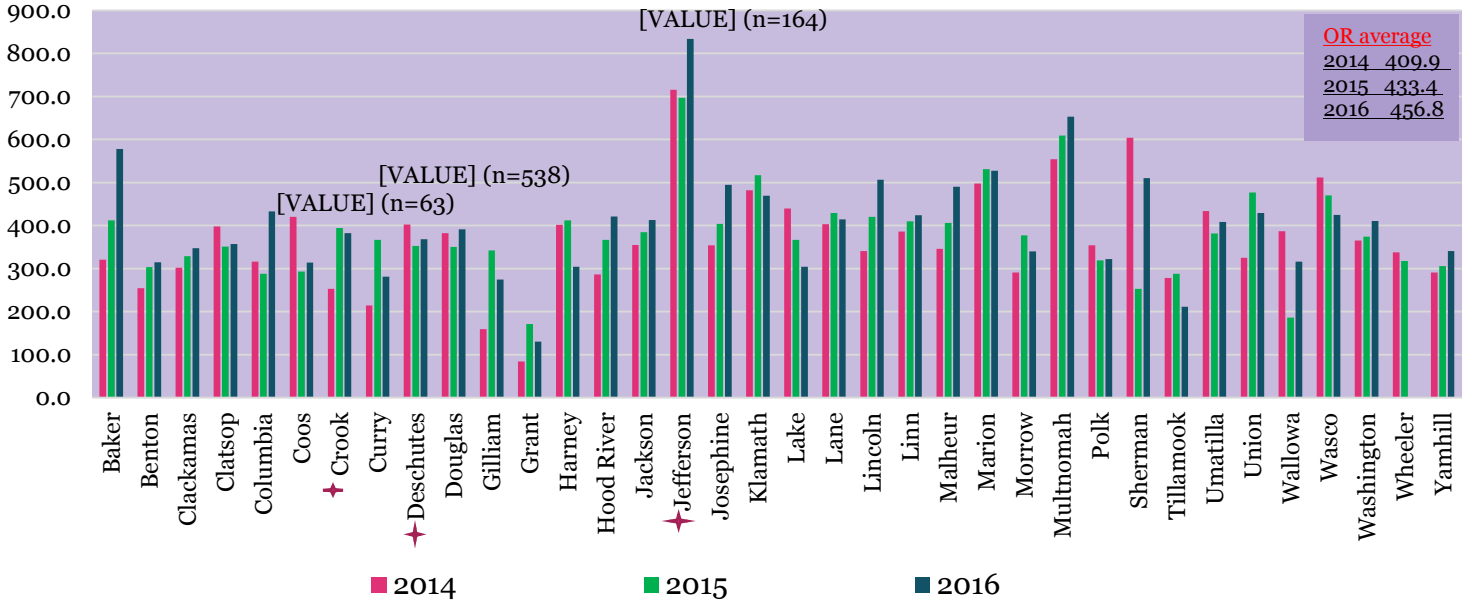


Data source: OHA, 2016

The prevalence of Hepatitis C in Jefferson County decreased significantly ($p<0.05$) in 2015 and 2016 compared with 2014 (Figure 6).

But Figure 7 (below) also shows that its rates increased significantly ($p<0.05$) in Crook County and increased slightly in Deschutes and Jefferson in 2016 compared with 2015.

Figure 7. Central Oregon County Chlamydia Rates (age adjusted per 100,000 population), compared with Oregon overall 2014-2016



Note: ✦ Central Oregon County

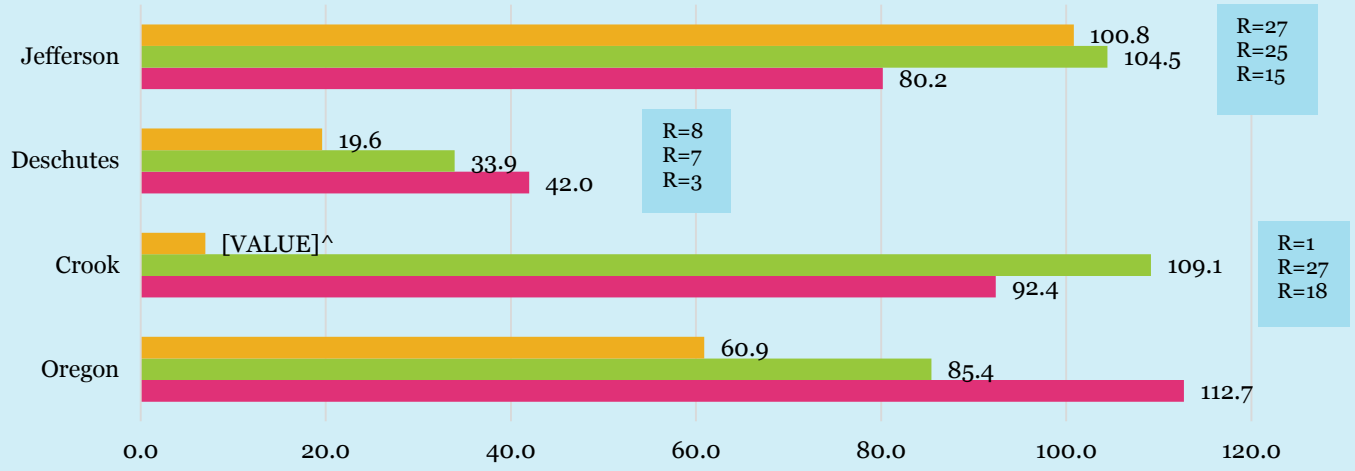
In Figure 7, remarkably, the prevalence of Chlamydia infection in Jefferson County had the highest rates, with bottom rank among Oregon overall counties, double the Oregon average.

However, the Crook County rate decreased slightly and Deschutes County rate increased slightly (Table 11).

Table 11. Chlamydia Rates (age adjusted per 100,000 population) & Rankings by Central Oregon County

County	Rates			Rankings		
	2014	2015	2016	2014	2015	2016
Crook	253.066	394.237	382.483	4	23	17
Deschutes	402.152	352.524	368.529	26	15	16
Jefferson	715.361	696.473	833.361	36	36	36

Figure 8. Central Oregon Gonorrhea Rates compared with Oregon Average (Age adjusted per 100,000) including rankings , 2014-2016



Number of Cases:

	2014	2015	2016
Jefferson	n=15	n=65	n=16
Deschutes	n=17	n=50	n=20
Crook	n=1	n=29	n=19

n- case number
R- rankings among OR counties
^- Statistically unreliable

Gonorrhea is a common sexually transmitted bacterial infection with Neisseria gonococcus.

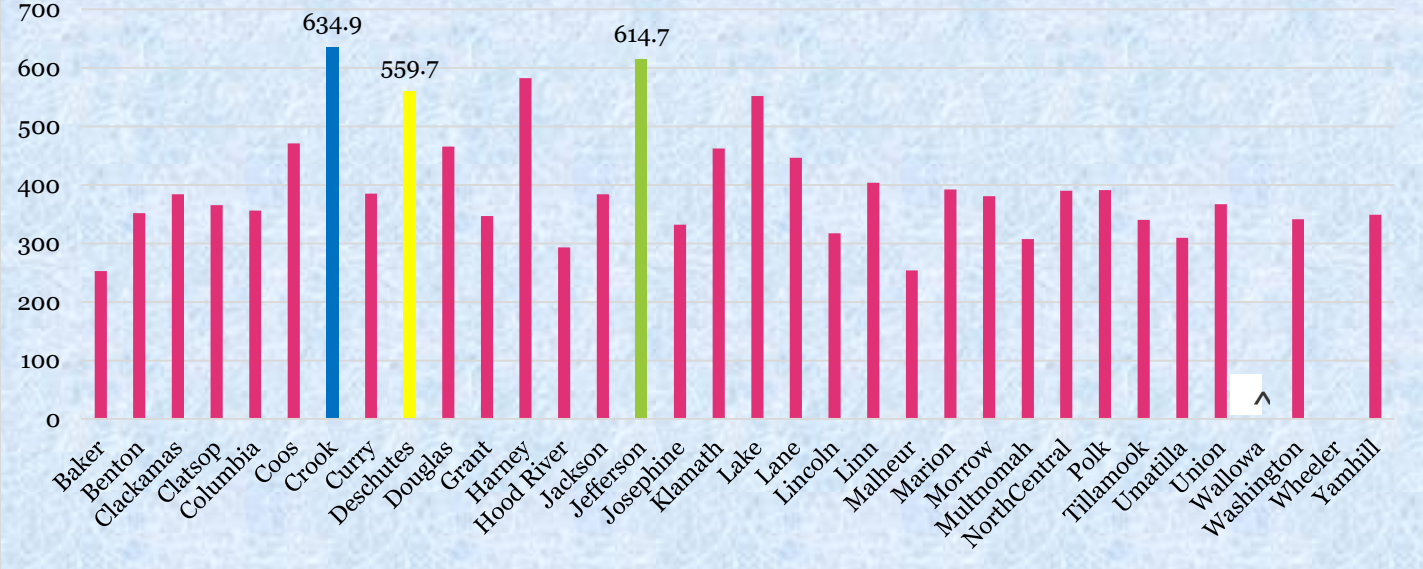
In Oregon, Gonorrhea infection had an increasing trend from 2014 to 2016.

In Figure 8, Deschutes County's rate was significantly lower than the Oregon average and those of other Central Oregon Counties. However, Deschutes had increasing rates between 2014 and 2016.

Crook and Jefferson County Gonorrhea rates were significantly higher ($p<0.05$) than Deschutes, but lower than Oregon average. However, both county rates decreased significantly ($p<0.05$) in 2016 (Figure 8).

CHRONIC DISEASES

Figure 9. Central Oregon Arthritis hospitalization rates compared with Oregon overall, 2016 (age adjusted per 100,000 population ages ≥18)



^- Statistically unreliable

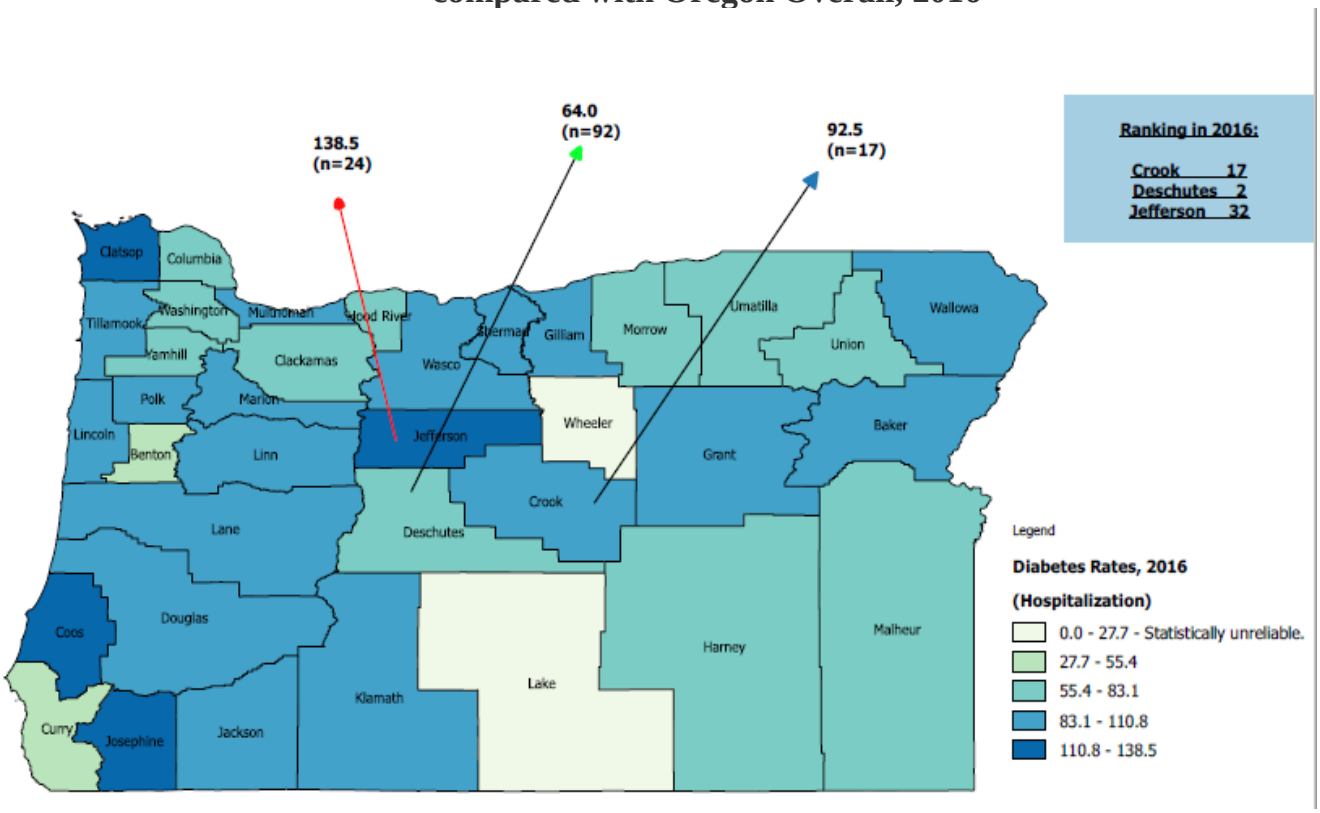
Data source: OHA, 2016

Arthritis is one of the chronic diseases which may lead to disability.

The Oregon Health Authority indicated that the number of people who have been diagnosed with arthritis is high in Oregon.

In Figure 9, the incidence of arthritis hospitalization rate per 100,000 population ages 18 and over was much higher in Central Oregon Counties than other counties among Oregon overall for 2016 (with statistically significant $p<0.05$).

Map 7. Age-Adjusted Diabetes Hospitalization Rates (per 100,000 population ages ≥18) and Rankings by Central Oregon County compared with Oregon Overall, 2016

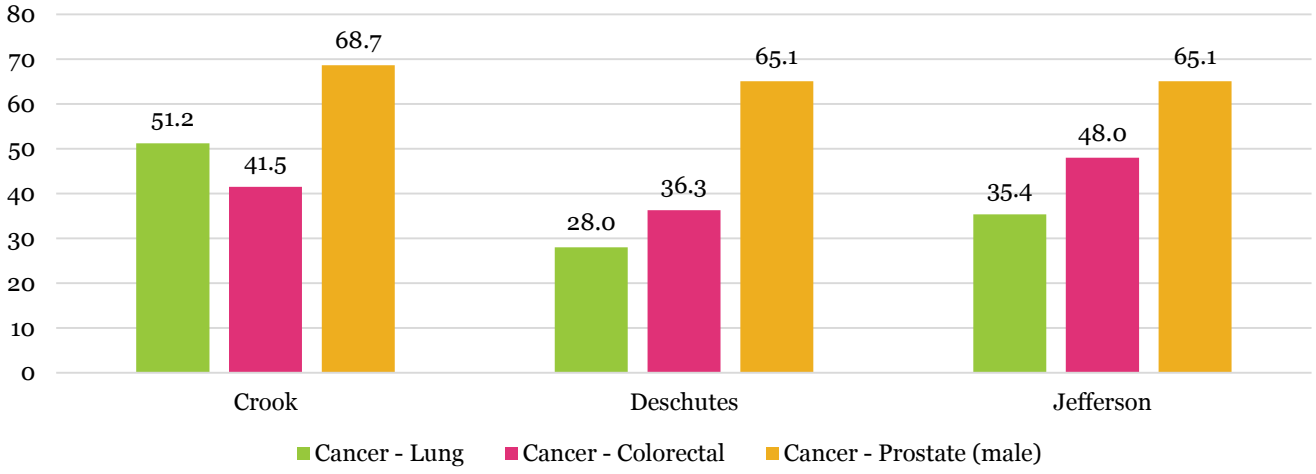


Oregon data indicated that approximately 287,000 Oregonians were diagnosed with diabetes in 2013 (OHA, 2017).

Map 7 shows that Jefferson County's diabetes hospitalization rate ranked 32, one of the highest among Oregon county rates. This rate was 1.5 times higher in Jefferson County than Oregon average (respectively 90.1 per 100,000 population) in 2016.

This data indicated that Deschutes County was one of the Oregon counties which had the lowest incidence diabetes rates in 2016.

Figure 10. Central Oregon Age Adjusted Cancer Hospitalization Rates per 100,000 population ages ≥18, including rankings, 2016

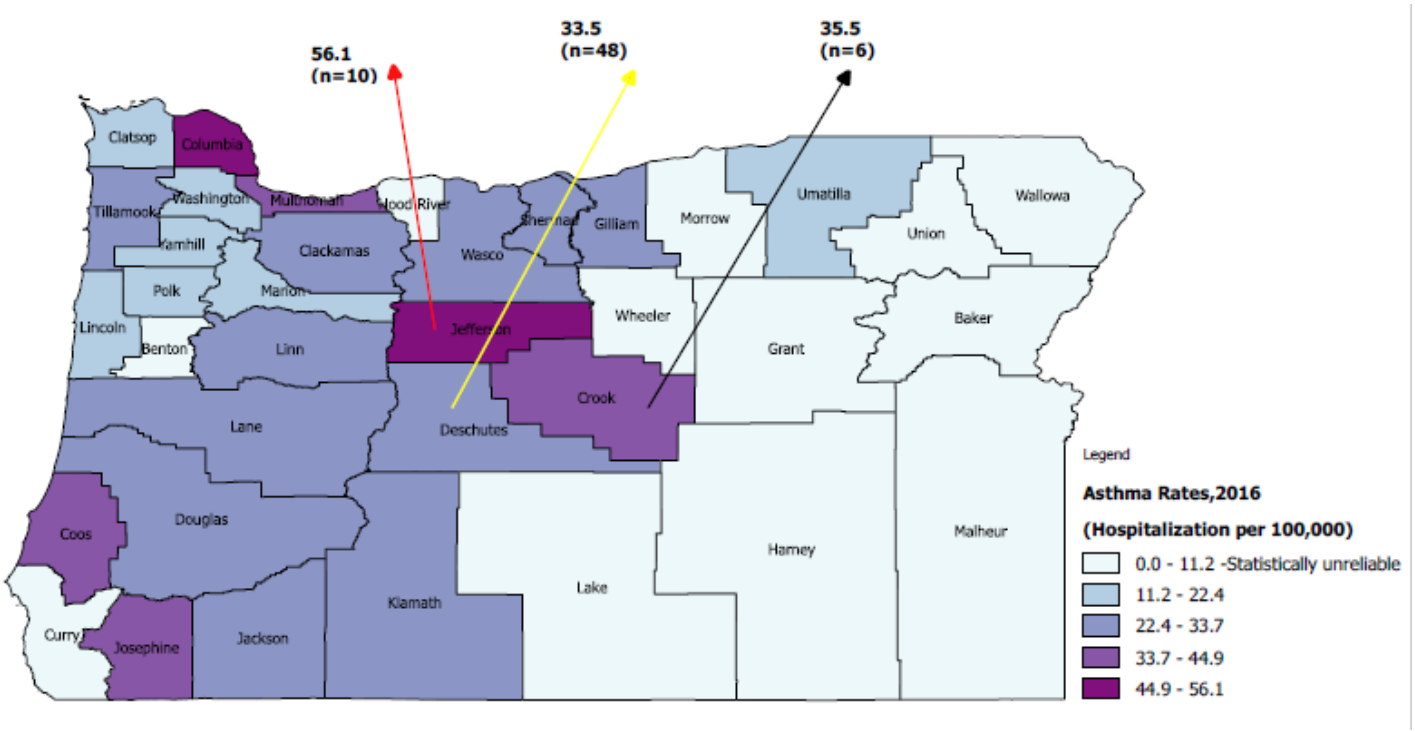


County	Rates			Rankings		
	Colorectal cancer[3]	Cancer - Lung[3]	Cancer - Prostate (male)[3]	Colorectal cancer[3]	Cancer - Lung[3]	Cancer - Prostate (male)[3]
Crook	41.5	51.2	68.7	20	25	21
Deschutes	36.3	28.0	65.1	16	13	19
Jefferson	48.0	35.4	65.1	24	21	19
Oregon	33.5	24.9	45.8			

In Figure 10, the incidence rate per 100,000 population for ages 18 and over of colorectal and prostate cancers had a similar level in Jefferson and Deschutes counties in 2016. There was no significant difference. However, prostate cancers appeared to be a more common health problem in Central Oregon Counties than Oregon overall.

The Crook County lung cancer rate was significantly higher ($p<0.0.5$) and prostate cancer rate slightly higher than the other two county's rates. The incidence of colorectal cancer was higher in Jefferson County than the other two counties. However, Central Oregon County rates were higher than the state average rate (respectively 33.5; 24.9; 45.8) for colorectal, lung and prostate cancer in 2016.

Map 8. Age-Adjusted Asthma Hospitalization Rates per 100,000 population ages ≥18 by Central Oregon County Compared with Oregon Overall, 2016

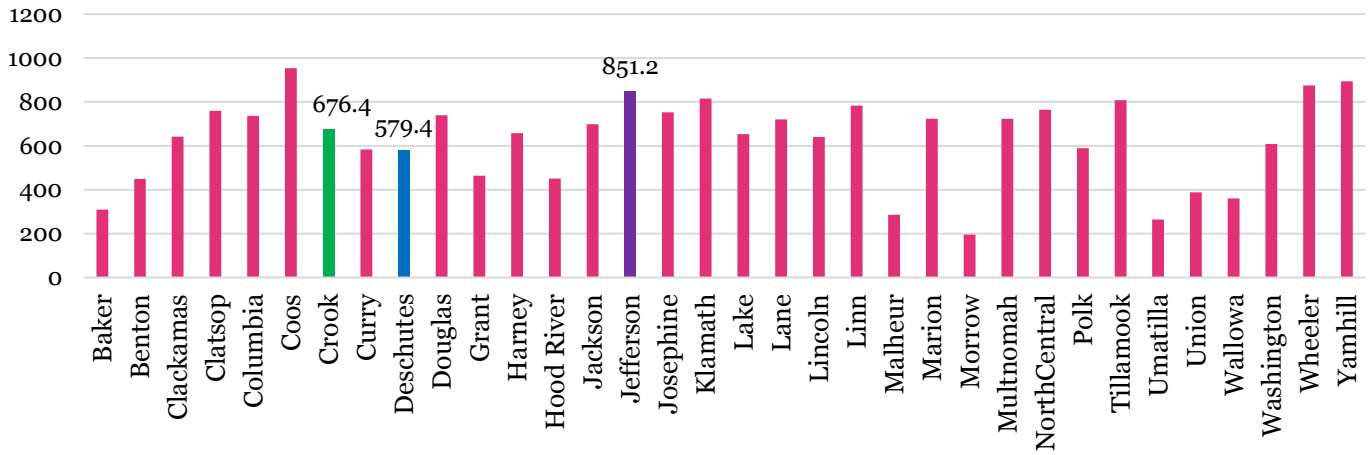


The Jefferson County asthma hospitalization rank was highest among Oregon county rates and significantly higher than the Crook and Deschutes County incidence for 2016 (Map 8).

In figure 11 (below), per our Central Oregon County health analysis data, incidence of heart disease (851.2) hospitalization rates were significantly higher in Jefferson, placing it 31st rank among Oregon Counties (Table 12).

Crook and Jefferson County heart disease rates were 1.1 and 1.4 times higher than Oregon average (594.3 per 100,000) in 2016.

Figure 11. Central Oregon Heart disease hospitalization rates, including myocardial infarction, compared with Oregon Counties, 2016 (age adjusted per 100,000 population ages ≥18)

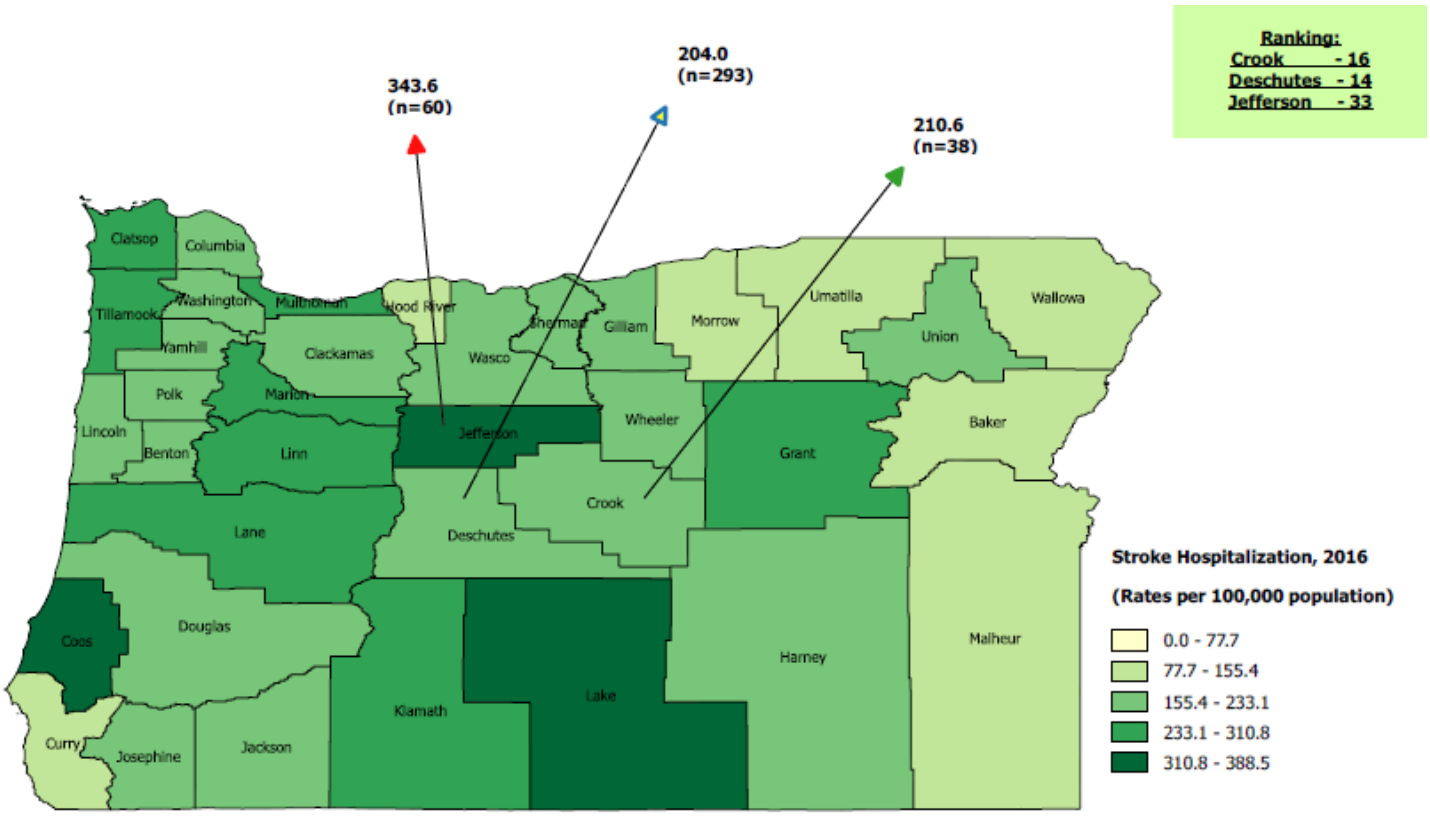


North Central: Gilliam, Sherman & Wasco

Table 12. Rankings in heart disease hospitalization rates per 100,000 population (age adjusted), 2016

County	Rates	Rank	County	Rates	Rank
Baker	309.3	4	Lake	653.3	16
Benton	448.9	7	Lane	721.1	20
Clackamas	641.6	15	Lincoln	639.9	14
Clatsop	760	26	Linn	783.7	28
Columbia	735.9	23	Malheur	286.2	3
Coos	953.8	34	Marion	723	21
Crook	676.4	18	Morrow	195.8	1
Curry	582.8	11	Multnomah	723.8	22
Deschutes	579.4	10	NorthCentral4	764	27
Douglas	738.9	24	Polk	588.7	12
Grant	464.3	9	Tillamook	807.3	29
Harney	658	17	Umatilla	263.5	2
Hood River	450.9	8	Union	387.6	6
Jackson	698.8	19	Wallowa	360.5	5
Jefferson	851.2	31	Washington	608.8	13
Josephine	752.8	25	Wheeler	874.5	32
Klamath	814.6	30	Yamhill	893.8	33

Map 9. Central Oregon Age-Adjusted Stroke Hospitalization Rates per 100,000 population, Compared with Other Oregon Counties, 2016



Stroke is one of the leading causes of deaths in Oregon. For example, almost 8,000 people diagnosed with stroke were hospitalized in Oregon, 2016 (OHA, 2017).

In addition, more than 1,800 people died due to strokes in Oregon in 2015.

The stroke hospitalization rate (343.6 per 100,000) was second-highest among Oregon county rates in Jefferson in 2016. Jefferson County ranked 33rd among Oregon County (Map 9).

The Crook and Deschutes County rates were slightly higher than the Oregon average (201.9 per 100,000 population) in 2016.

MORTALITY (DEATHS)

Decreasing the number of premature deaths before age 75 and increasing people's life expectancy is a public health priority.

Crook and Jefferson County premature death rates were significantly higher($p<0.05$) and Deschutes County rate was significantly lower ($p<0.05$) than Oregon average in 2014-2016 (Figure 12).

Figure 12. Central Oregon Premature Death Rates (YPLL, age 75 per 100,000) compared with Oregon Average, 2014-2016

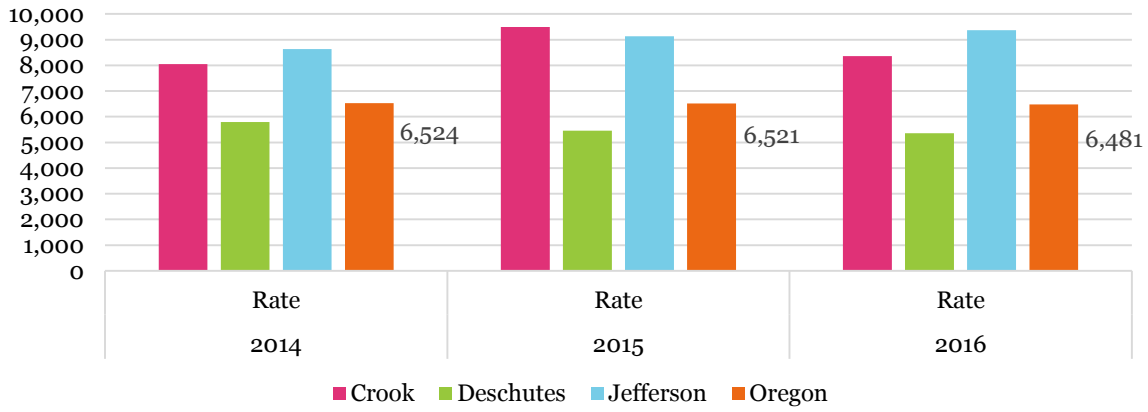


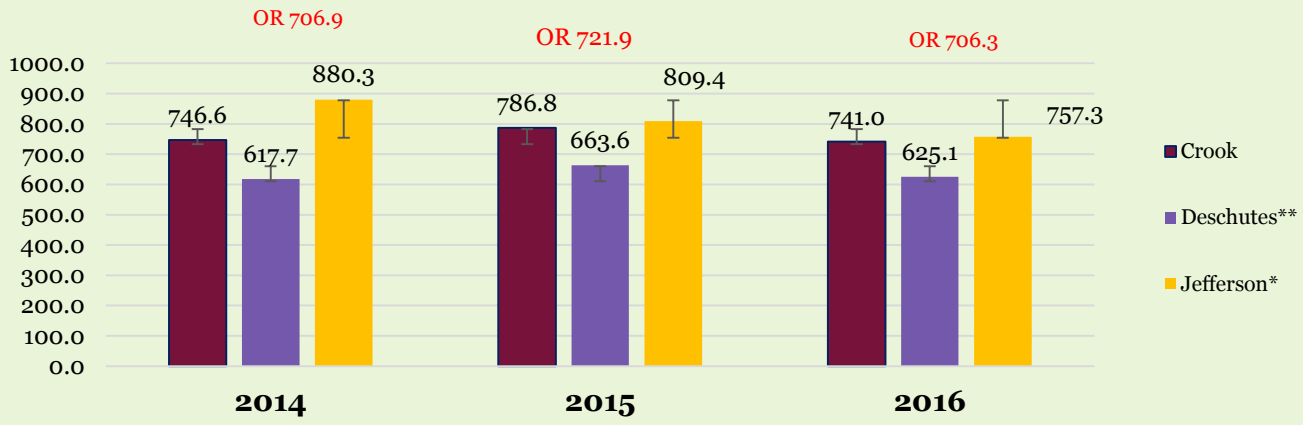
Table 13. Rates & Rankings:

County	Rates			Rankings		
	2014	2015	2016	2014	2015	2016
Crook	*8045.9 (n=1540)*	*9492.8 (n=1866)*	*8358.5 (n=1710)*	***19***	***29***	***24***
Deschutes	*5798.5 (n=9195)*	*5455.1 (n=8878)*	*5352.9 (n=9022)*	***8***	***4***	***5***
Jefferson	*8629.4 (n=1792)*	*9131.8 (n=1927)*	*9363.1 (n=2014)*	***25***	***27***	***27***

In table 13 (above), Jefferson County had a low County Health Ranking due to premature mortality.

Our County health analysis showed that premature death rates under age 75 increased (8,629.4 to 9,363.1 per 100,000) during 2014-2016 .

Figure 13. Central Oregon Age-Adjusted Mortality Rates (per 100,000 population), 2014-2016



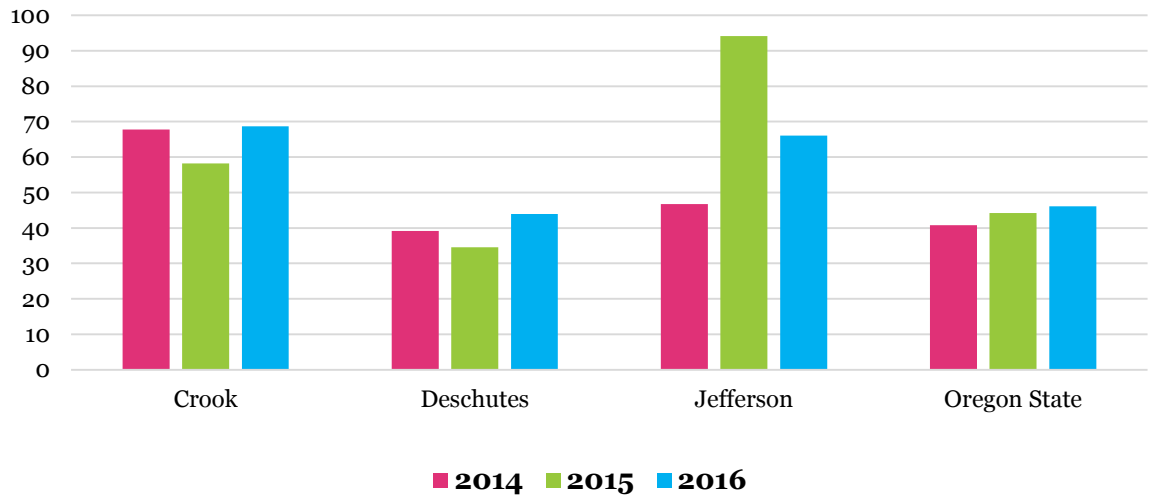
	Crook	Deschutes	Jefferson
2014	n= 245	n= 1,341	n= 226
2015	n=257	n=1,505	n= 207
2016	n=256	n=1,474	n= 207

County	Ranking		
	2014	2015	2016
Deschutes	6	6	5
Jefferson	36	25	22
Crook	22	22	19

In Figure 13, Jefferson County population deaths (mortality) decreased every year from 2014 to 2016. As a result of this trend our County ranking for this moved from 36 to 22.

However, Crook and Jefferson County mortality rates were significantly higher ($p<0.05$) than the Oregon average (respectively 709.6; 721.9; 706.3) in 2014-2016.

Figure 14. Central Oregon Age-Adjusted Injury Related-Death Rates per 100,000 population compared with Oregon Average, 2014-2016



County	2014		2015		2016	
	Rate	Rank	Rate	Rank	Rate	Rank
Crook	67.7(n=16)	30	58.2(n=15)	20	68.6(n=16)	29
Deschutes	39.1(n=73)	9	34.6(n=69)	5	43.9(n=90)	10
Jefferson	46.7(n=10)	19	94.2(n=21)	34	66.0(n=15)	28
Oregon	40.8(n=1796)		44.2(n=1987)		46.1(n=2108)	

Data source: OPHAT, 2014-2016

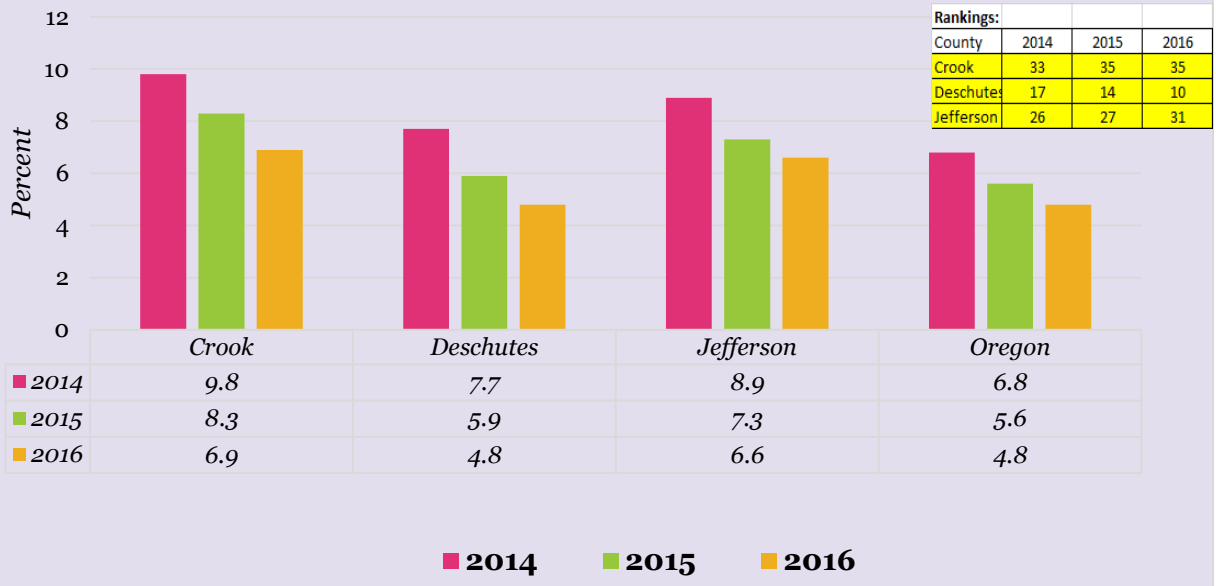
Injury related-deaths are a major cause of population mortality due to occupational, transportation, sports and other unintentional events.

Figure 14 indicated that Crook and Deschutes County injury related-deaths increased slightly and Jefferson County rate decreased significantly from 2015 to 2016.

However, for Crook and Jefferson County this indicator was significantly higher ($p<0.05$) than Oregon average in 2014-2016.

RISK FACTORS FOR POPULATION HEALTH

Figure 15. Central Oregon Unemployment Rates (by percent) Compared with Oregon Average, 2014-2016



	Crook	Deschutes	Jefferson	Oregon
2014	9.8	7.7	8.9	6.8
2015	8.3	5.9	7.3	5.6
2016	6.9	4.8	6.6	4.8

Rankings:			
County	2014	2015	2016
Crook	33	35	35
Deschutes	17	14	10
Jefferson	26	27	31

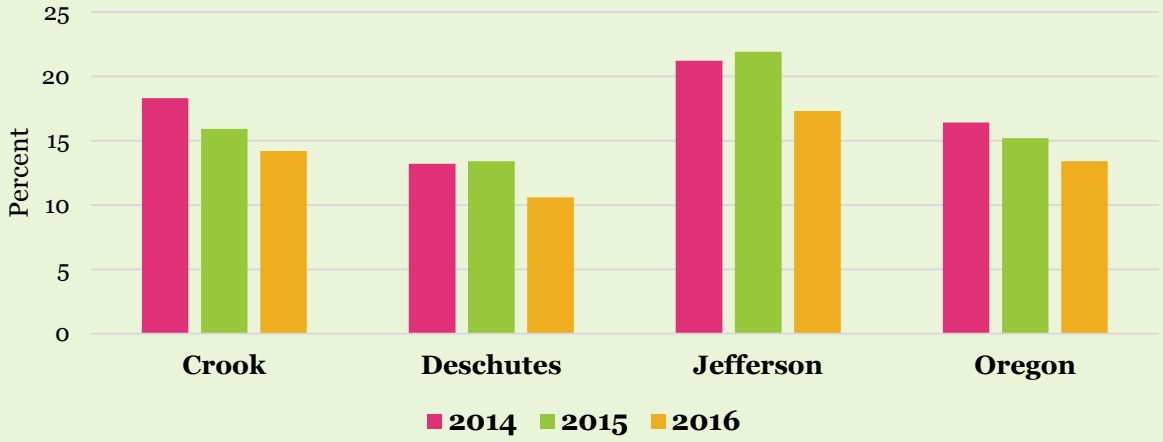
Data source: Bureau of Labor Statistics, 2014-2016

According to Bureau of Labor Statistics (2014-2016), Oregon unemployment rates had a decreasing trend in 2014-2016 (Figure 15).

Central Oregon County unemployment rates decreased every year from 2014 to 2016.

However, Crook and Jefferson County rates were significantly higher ($p<0.05$) than Oregon average. They were placed 35 and 31 among Oregon counties in 2016.

Figure 16. Central Oregon Poverty Rates (by percent) Compared with Oregon Average, 2014-2016 including rankings



County	Rates			Rank		
	2014	2015	2016	2014	2015	2016
Crook	18.3	15.9	14.2	21	15	15
Deschutes	13.2	13.4	10.6	5	6	3
Jefferson	21.2	21.9	17.3	32	34	27
Oregon	16.4	15.2	13.4			

Data source: Census, 2014-2016

Poverty can be a strong factor in population health and premature deaths.

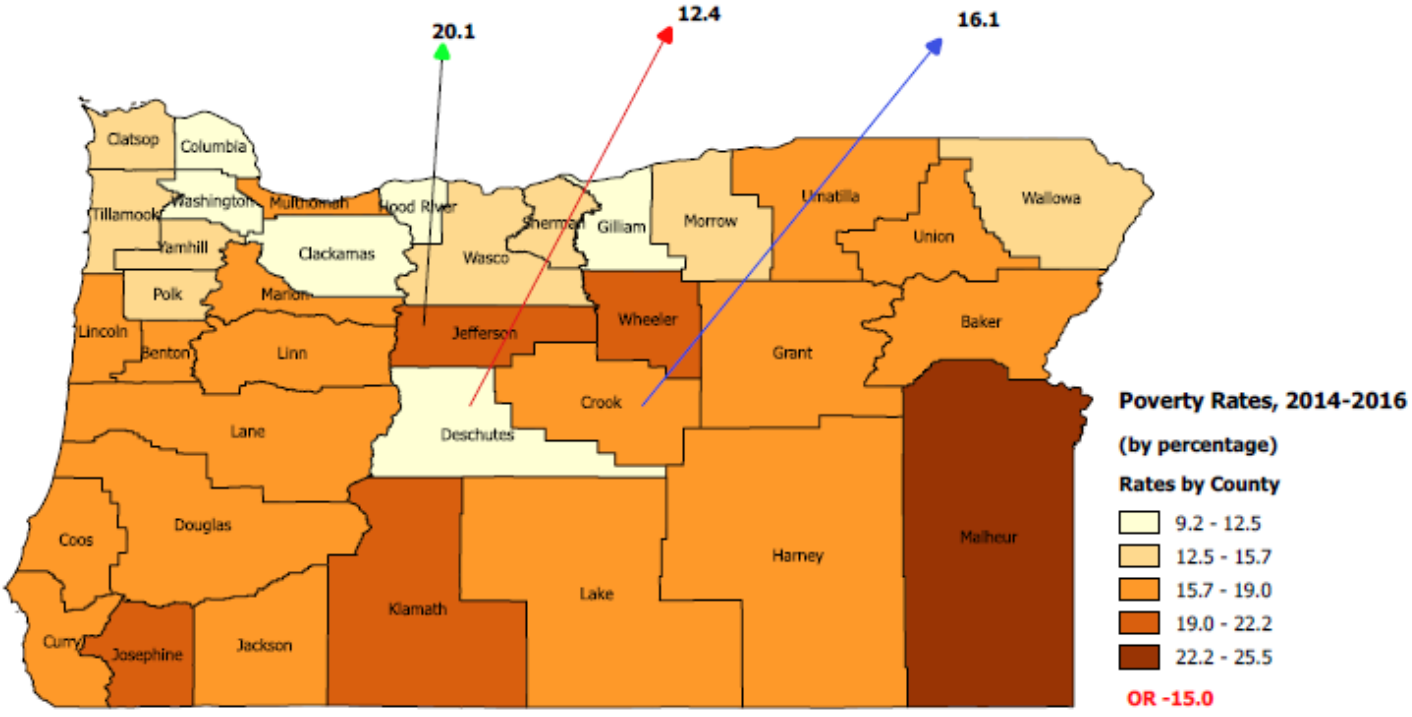
In Figure 16, Crook County had a decreasing trend of poverty from 2014 to 2016.

Deschutes and Jefferson County rates decreased significantly ($p<0.05$) in 2016.

However, Jefferson County rate ranked 27 in 2016.

Deschutes County rates were significantly lower ($p<0.05$) than Oregon average in 2014-2016.

Map 10. Central Oregon Poverty Rates (by percent) Compared with Oregon Overall, 2014-2016



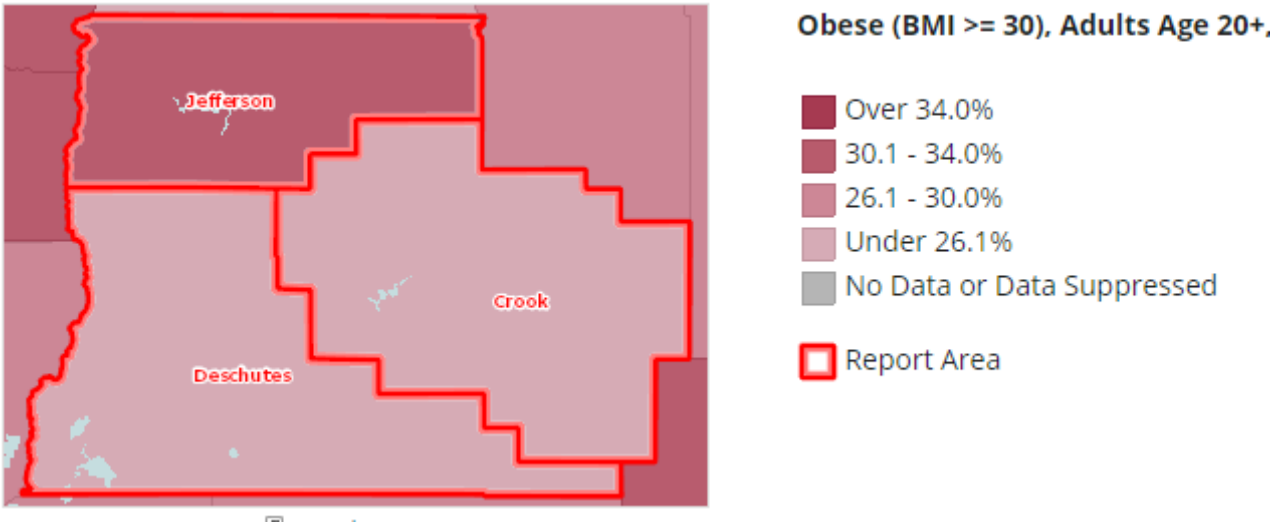
Data source: Census, 2014-2016

Poverty is also one of the fundamental factors leading to health disparities.

Many studies indicate that living in poverty can effect health by factors such as high prevalence of communicable and non-communicable diseases, chronic conditions, unhealthy behavior and premature deaths.

This (Map 10) data compares which County's poverty rate was high and which County's low.

Map 11. Central Oregon Adult Obesity Rates by County, 2013



Data source: Self-report survey -CDC & NCCDP/HP, 2013

Obesity indicates an unhealthy chronic condition leading to many consequences, including high risk for diabetes, joint wear with resulting disability, and other health disadvantages.

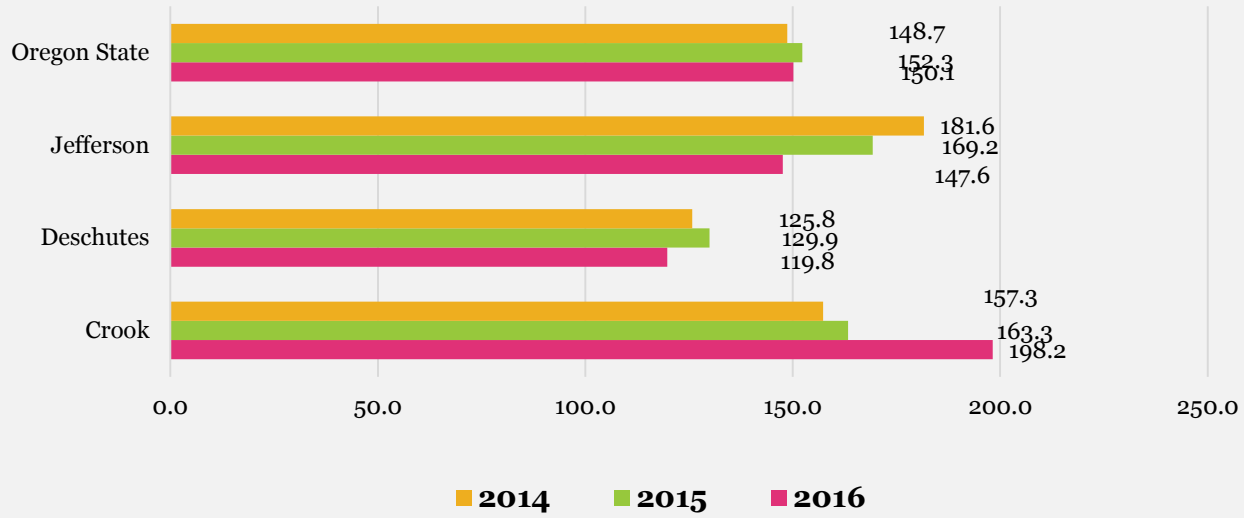
Adult obesity over 20 years (BMI >30) increased from 2014 (27.9%) to 2015 (30.1%) in Oregon (The State of Obesity, 2014-2015).

Jefferson County's obesity rate (32.3% per 100 adults age >20 years) was much higher, and Deschutes (23.7%) and Crook (25.3%) Counties' rates were lower, than Oregon average (28.7%) in 2013 (Map 11).

It is worth noting that Oregon's obesity rate (28.9%) ranked 31st among other US states in 2016 (The State of Obesity, 2016).

Thus, increasing physical activity and healthy nutrition are public health priority to reduce Central Oregon chronic disease and deaths.

Figure 17. Tobacco Use related-Death Rates (age adjusted per 100,000 population) by Central Oregon County compared State Average, 2014-2016



Data source: OPHAT, 2014-2016

Table 14. Rankings

County	Rankings (Tobacco use related deaths)		
	2014	2015	2016
Crook	17	16	25
Deschutes	7	9	5
Jefferson	25	18	11

Oregon health data indicates that behavioral risk factors such as smoking and drinking were common in Central Oregonians including adults, pregnant mothers and teens.

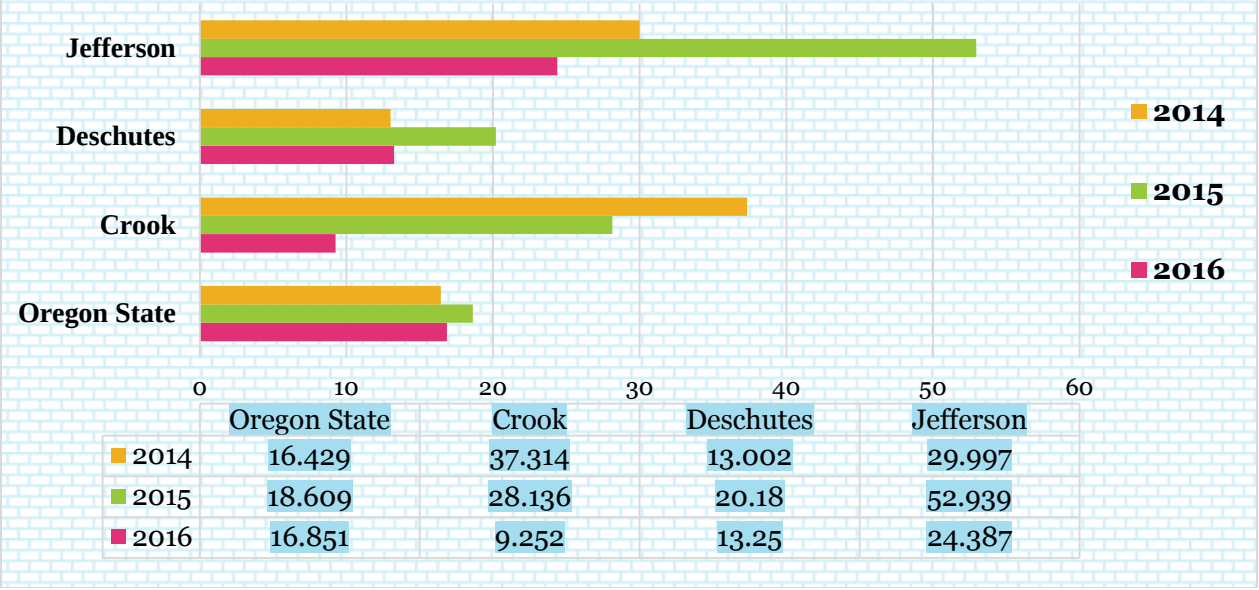
Moreover, our data analysis (Figure 17 & Table 14) demonstrates that Crook County had an increasing trend of tobacco use related-deaths in 2014-2016.

Remarkably, the Crook County indicator was sharply elevated in 2016.

Jefferson County had a decreasing trend each year from 2014 to 2016.

Deschutes County rates fluctuated but were generally lower than the Oregon average in 2014-2016.

Figure 18. Central Oregon Alcohol-Induced Deaths (Age adjusted per 100,000 population), 2014-2016



	Oregon State	Crook	Deschutes	Jefferson
2014	16.429	37.314	13.002	29.997
2015	18.609	28.136	20.18	52.939
2016	16.851	9.252	13.25	24.387

Data source: OPHAT, 2014-2016

Table 15. Alcohol Related-Deaths Rankings:

County	2016	2015	2014
Crook	36	28	3
Deschutes	13	20	7
Jefferson	33	34	22

Alcohol use contributes to Central Oregon County population health and deaths (Figure 18).

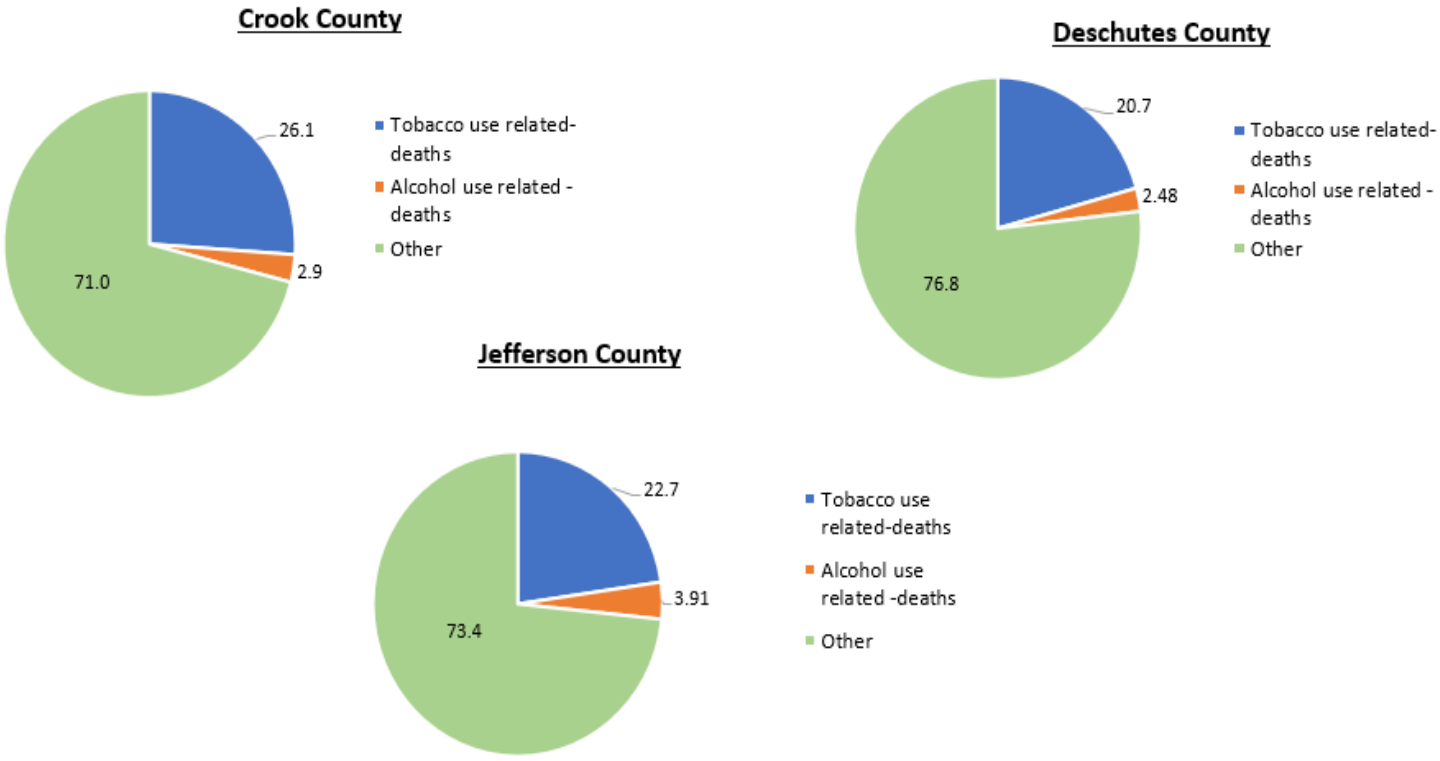
Crook County alcohol use related-deaths decreased every year from 2014, and dropped sharply in 2016.

Jefferson County rates varied widely during the period.

Deschutes rates were substantially lower than the other two county's rates in 2014 and 2016. However, it increased in 2015 and decreased in 2016.

Crook County indicator ranked 3 and Jefferson County rank moved from 34 to 22 between 2015 and 2016 (Table 15).

Figure 19. Tobacco and Alcohol Use-Related Deaths:
Percentage of Overall Deaths by Central Oregon County, 2014-2016



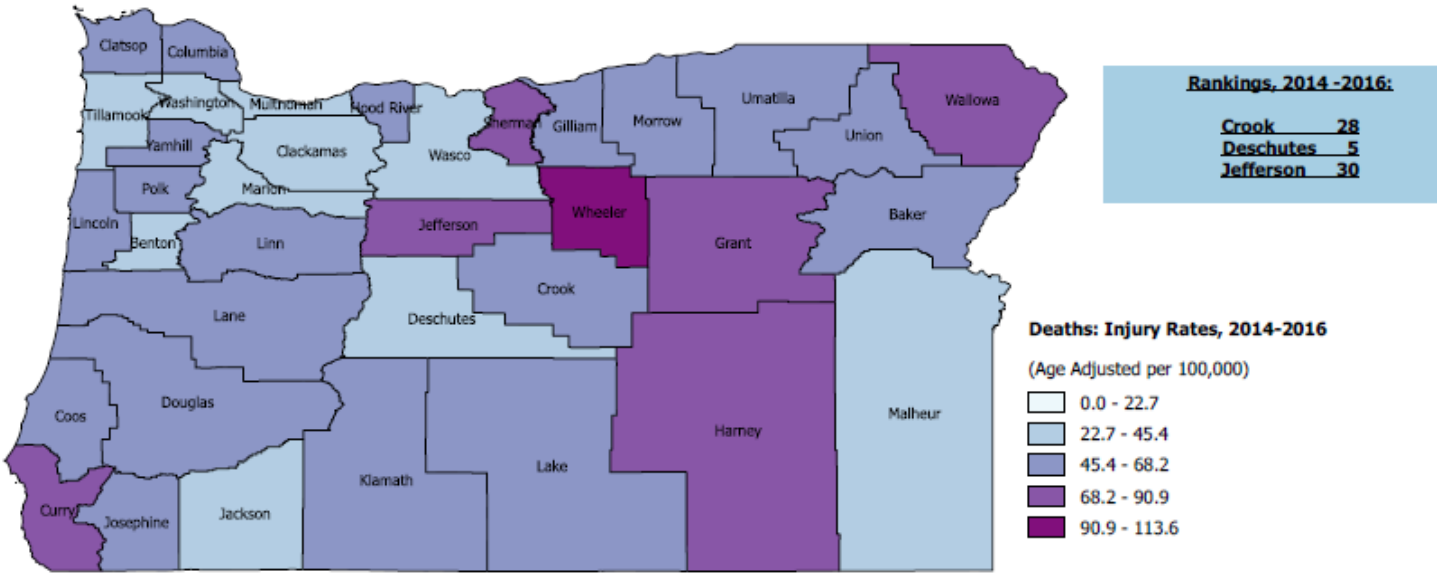
Data source: OPHAT, 2014-2016

In a comparison of tobacco use and alcohol use related-deaths (Figure 19) tobacco use was of great public health importance in the population health of Central Oregon Counties.

It may have a considerable negative impact on population health and deaths.

While alcohol use related-deaths are lower than smoking related-deaths, both have a substantial deleterious effect on our population.

Map 12. Central Oregon Age-Adjusted Injury Related-Death Rates per 100,000 population compared with Oregon Overall (including rankings), 2014-2016



Data source: OPHAT, 2014-2016

Most cases of injuries are preventable events in population health. It is one of leading (first 10) causes of population mortality.

Unintentional injury rates increased each year from 2014 to 2016 in Oregon (40.8; 44.2 & 46.1 per 100,000 population).

Map 12 illustrates that Crook and Jefferson County injury related -death rates (64.9 & 69.0 per 100,000 population) were 1.5 times higher than Oregon average (respectively 43.7) in 2014-2016.