Marion County

OREGON

Health & Human Services

Marion County Air Quality & Illness Surveillance Report 2019-2023

Release Date: 4/4/2024

Purpose of this report

Environmental factors affect population health, risking an individual's ability to live a healthy and purposeful life. This report evaluates air quality-related respiratory illness, asthma, fire and smoke inhalation, and pollen-related allergy emergency department and urgent care visits and hospitalizations in relation to the air quality index experienced among Marion County residents using data from the ESSENCE surveillance system and the Environmental Protection Agency.

All counts and rates are based on patient's residence and not the location of where they are seen for care.

Contents

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Definitions

Air Quality-related Respiratory Illness (ESSENCE): To identify emergency department and ambulatory care visits for respiratory illnesses associated with poor air quality. Definition includes chief complaint terms and diagnosis codes for acute bronchitis, emphysema, chronic obstructive airway disease, chronic obstructive lung disease, chronic obstructive pulmonary disease, asthma, bronchasthma, reactive airway disease, acute respiratory distress syndrome, difficulty breathing, chest tightness, dyspnea, shortness of breath and wheezing. Using this query in combination with air quality trends may further assist with surveillance efforts. Developed by the National Syndromic Surveillance Program (NSSP) Community of Practice in collaboration with Council of State and Territorial Epidemiologists in collaboration and the National Center for Environmental Health.

ESSENCE: The State of Oregon has a public health syndromic surveillance system known as ESSENCE, which stands for Electronic Surveillance System for the Early Notification of Community-Based Epidemics. It provides real-time data for public health and hospitals to monitor what is happening in emergency departments across the state before, during, and after a public health emergency.

Fire & Smoke Inhalation (ESSENCE): To identify emergency department and ambulatory care visits associated with fire and smoke inhalation. The primary purpose of the query is for wildfire surveillance, although the query may return visits not limited to wildfires. Using this query in combination with air quality trends may further assist with surveillance efforts. It was developed by the National Syndromic Surveillance Program (NSSP) Community of Practice in collaboration with the Council of State and Territorial Epidemiologists and the National Center for Environmental Health.

Pollen Allergy-related Illness (ESSENCE): To identify emergency department and ambulatory care visits associated with pollen-related allergy. Developed for the CDC Center for Surveillance, Epidemiology, and Laboratory Services, through a National Syndromic Surveillance Program (NSSP) contract with the ICF.

US Air Quality Index: The Environmental Protection Agency's (EPA) tool for communicating daily air quality. It uses color-coded categories and provides statements for each category that tell you about air quality in your area, which groups of people may be affected, and steps you can take to reduce your exposure to air pollution. It's also used as the basis for air quality forecasts and current air quality reporting. Air quality data is found at www.airnow.gov.

Air Quality Index (AQI)

Table 1: AQI Basics for Ozone & Particle Pollution, EPA[2]			
Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

Figure 1: Monthly Moderate or worse Air Quality Index in Marion County, 2019-2023, EPA[2]

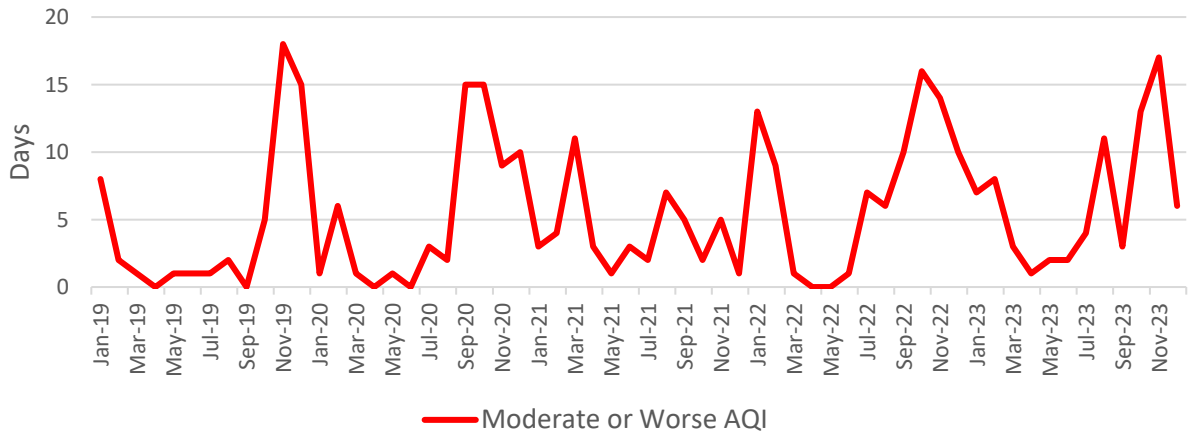
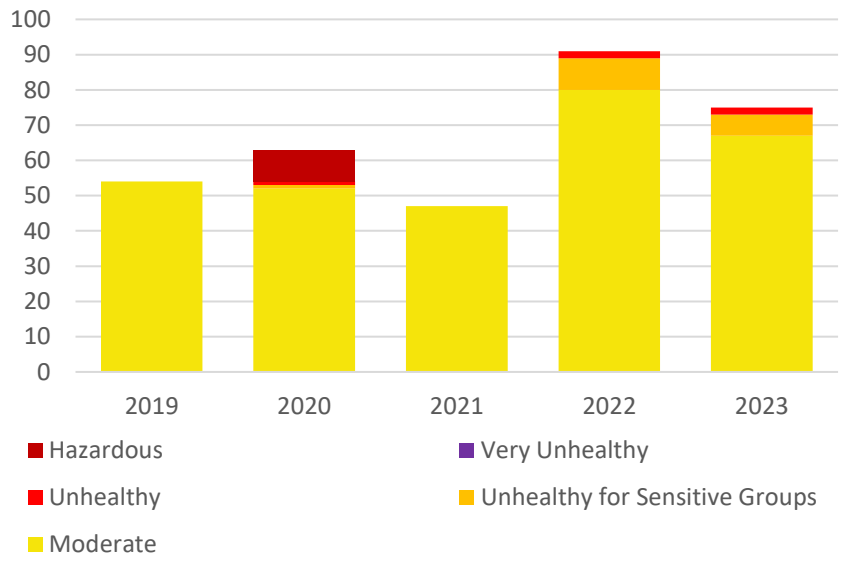


Figure 2: Moderate or Worse Air Quality Days in Marion County, EPA[2]



According to Air Now, "AQI values at or below 100 are generally thought of as satisfactory." However, some sensitive groups can still be affected by moderate air quality. According to historical data from the Environmental Protection Agency, 2022 had more moderate or worse air quality days than any year between 2019-2023. 2020 had the most hazardous air quality days (nine total) due to smoke from the Beachie Creek and Lionshead fires in the Santiam Canyon. Poor air quality index days can put sensitive individuals and groups at risk of utilizing the healthcare system and experiencing poor health outcomes. (Figure 1, 2, and Table 1)

Air Quality-related Respiratory Illness

Emergency Department & Urgent Care Visits

Figure 3: Emergency Department & Urgent Care Visits due to Air Quality-related Respiratory Illness in Relation to Moderate or worse Air Quality Index in Marion County, OR, ESSENCE[1], EPA[2]

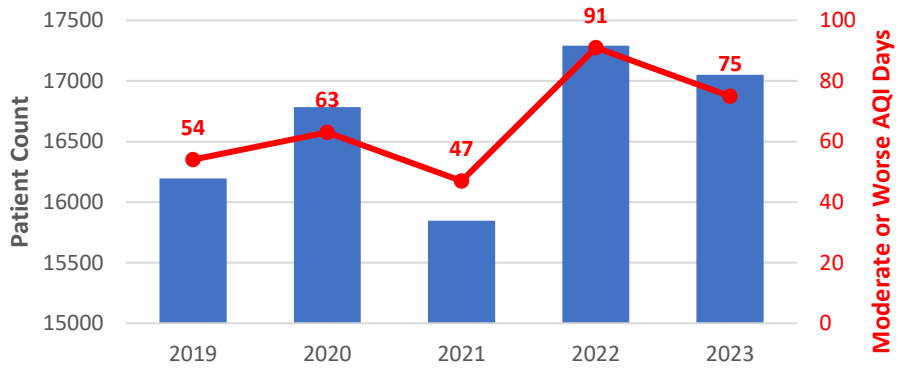
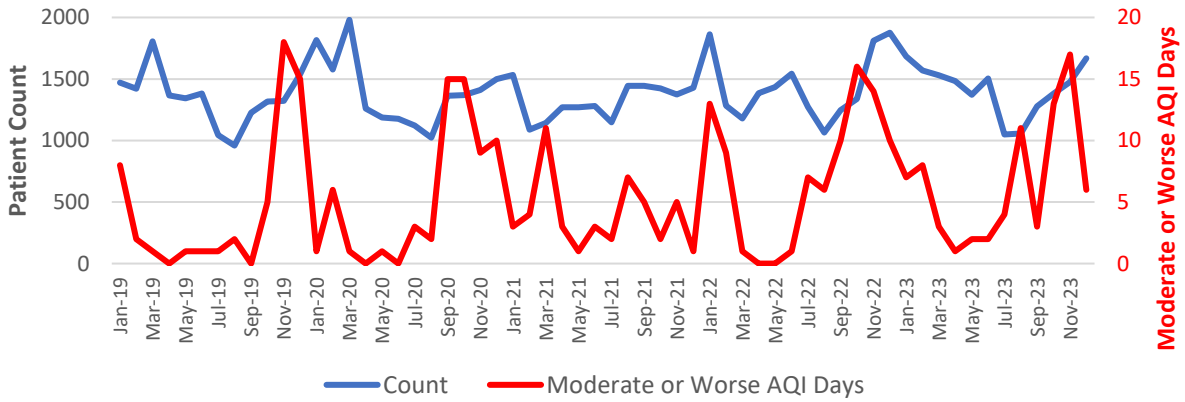
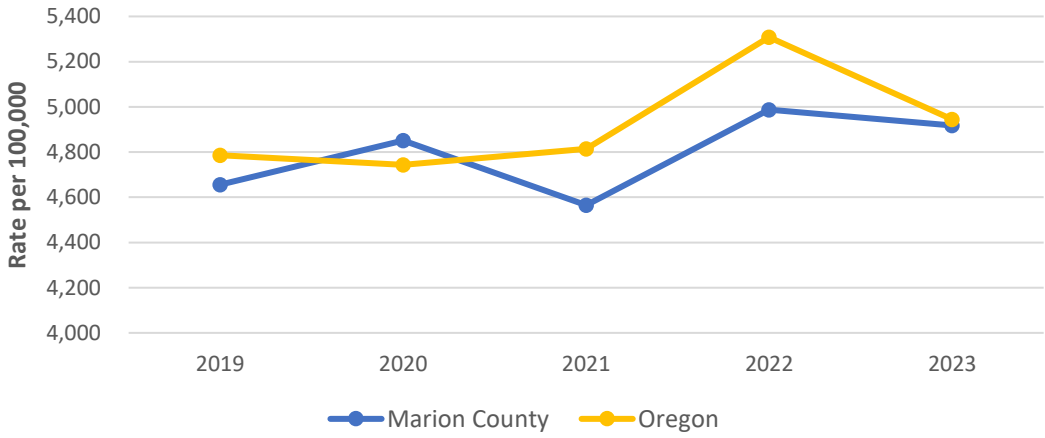


Figure 4: Monthly Emergency Department & Urgent Care Visits due to Air Quality-related Respiratory Illness in Relation to Moderate or worse Air Quality Index in Marion County, OR, ESSENCE[1], EPA[2]



Between 2019-2023, air quality-related respiratory illness (AQRI) made up 7.4% of all emergency department and urgent care visits. Trends in patient visits for AQRI illness have fluctuated between 2019 to 2023. AQRI's do follow seasonal trends, peaking in colder fall, winter, and early spring months (Figure 4). Monthly and yearly AQRI patient counts follow similar trends to moderate or worse air quality index days (Figures 2-4). This indicates that while other factors contribute to an increase in air quality-related respiratory illnesses, moderate or worse air quality days play a role in the fluctuation of patient numbers. Other environmental factors that may contribute to AQRI patient counts include temperature, poor indoor air quality, and pollen levels.

Figure 5: Rate of Air Quality-related Respiratory Emergency Department & Urgent Care Visits, OR ESSENCE[1], US Census[3]



Between 2019-2023, Marion County has maintained a lower rate of Air Quality-related Respiratory Illness than the state of Oregon (Figure 5). While Oregon showed an increasing rate between 2019-2022, Marion County had a fluctuating rate across the same timeframe (4,795.7 per 100,000 for Marion County Vs. 4,919.4 per 100,000 for Oregon).

Hospitalizations

Figure 6: Air Quality-related Respiratory Illness Hospitalizations in Marion County, OR, ESSENCE[1]

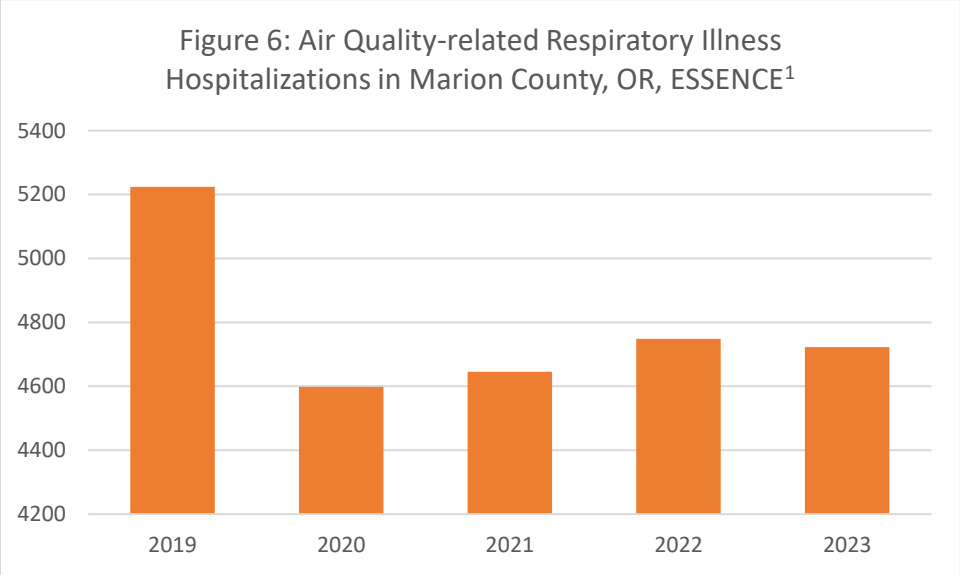
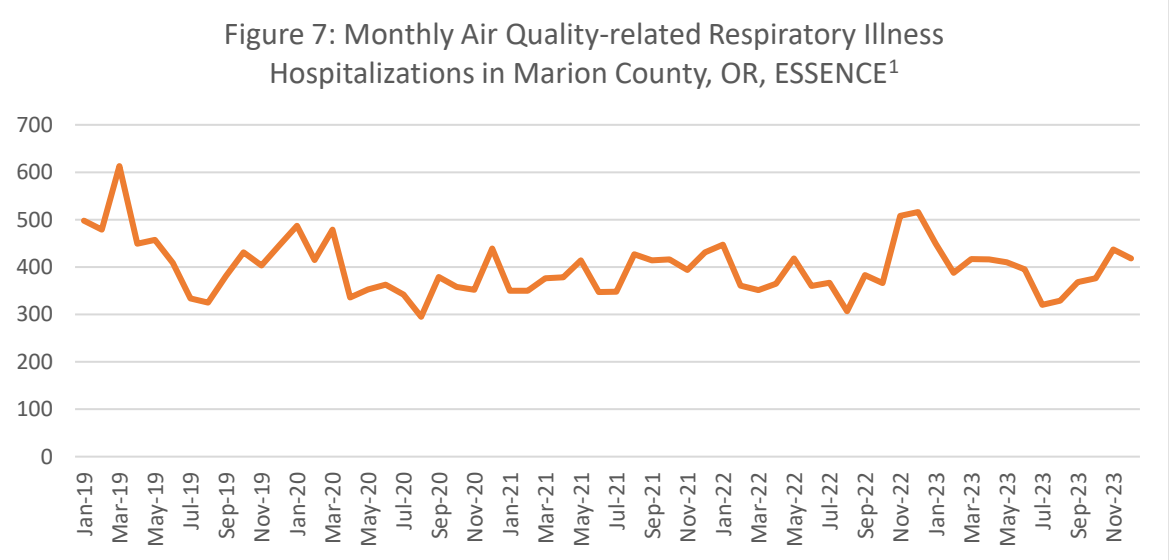


Figure 7: Monthly Air Quality-related Respiratory Illness Hospitalizations in Marion County, OR, ESSENCE[1]



Between 2019-2023, trends in air quality-related respiratory illness (AQRI) hospitalizations (spending 24 or more hours at the hospital) peaked at 5,224 in 2019, dropped to 4,598 in 2020 (Figure 6). Monthly hospitalizations show a fluctuation in case counts (Figure 7). 28.8% of Marion County residents who visited an emergency department or urgent care facility for an AQRI were hospitalized. In total, 23,939 AQRI hospitalizations occurred between 2019 and 2023 among Marion County residents (average visits per year = 4,787.8).

Demographics

Sex

Figure 8: Rate of Air Quality-related Respiratory Illness patient visits by sex in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

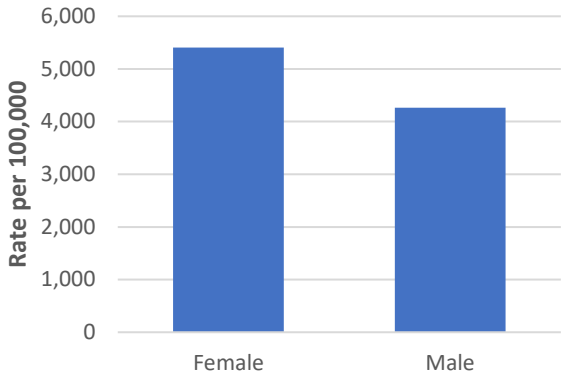
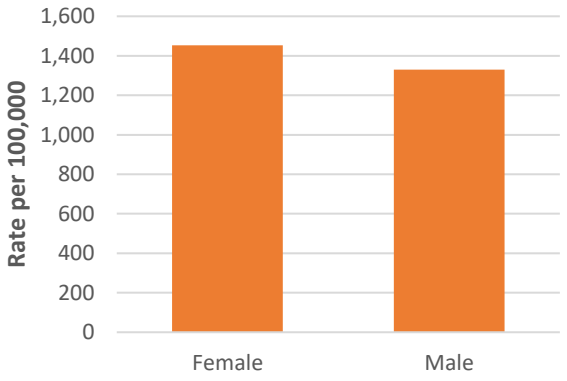


Figure 9: Rate of Air Quality-related Respiratory Illness hospitalizations by sex in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



Between 2019-2023, female residents in Marion County visited emergency department and urgent care facilities for an air quality-related respiratory illness 1.3 times as often as male residents (Figure 8: 5,405 per 100,000 for females Vs. 4,264 per 100,000 for males). Females were also hospitalized for an AQRI at a higher rate (Figure 9: 1,453 per 100,000 for females Vs. 1,330.2 per 100,000 for males). Between 2019-2023, 26.9% of females and 31.2% of males who visited an emergency department or urgent care facility for an AQRI were hospitalized.

Age

Figure 10: Rate of Air Quality-related Respiratory Illness patient visits by age in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

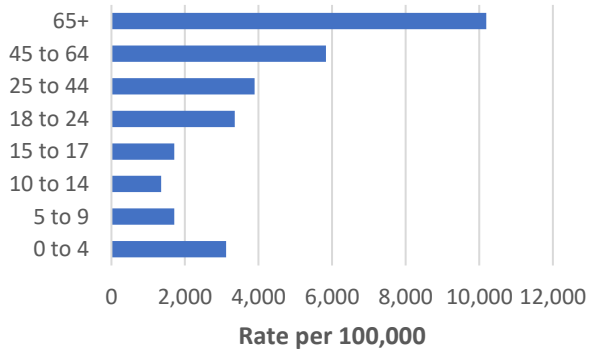
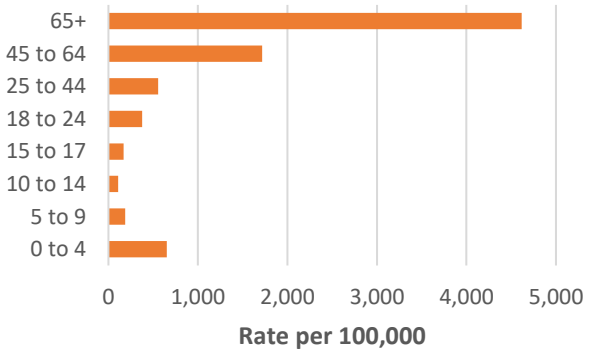


Figure 11: Rate of Air Quality-related Respiratory Illness hospitalizations by age in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



The rate of patient visits to an emergency department or urgent care facility for air quality-related respiratory illness increased with age for Marion County residents between 2019-2023 (Figure 10). Older adults (age 65 or older) had the highest patient visit rate at 10,187.7 per 100,000, while infants and toddlers (age 0 to 4) had the highest rate among children and teenage age groups at 3,121.8 per 100,000. Accounting for visit severity, the older adult age group (age 65 or older) had the highest hospitalization rate at 4,617.7 per 100,000, which was 8.3 times that of the 24-44 age group at 554.8 per 100,000 (Figure 11). Between 2019-2023, 45.3% of older adults (age 65 or older) who visited an emergency department or urgent care facility for an AQRI were hospitalized, the highest rate among all demographic groups.

Race

Figure 12: Rate of Air Quality-related Respiratory Illness patient visits by race in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

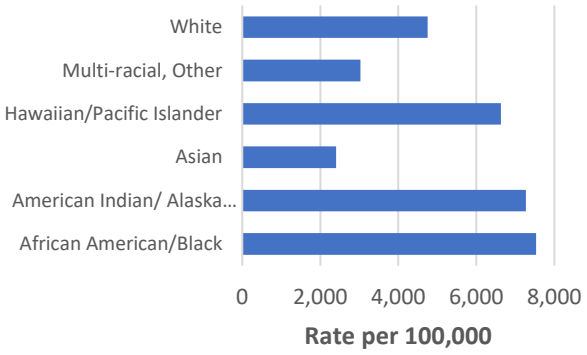
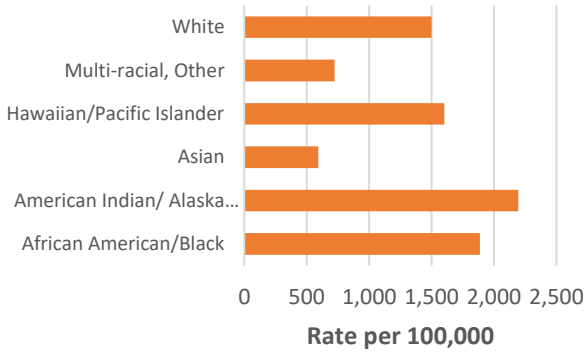


Figure 13: Rate of Air Quality-related Respiratory Illness hospitalizations by race in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



Between 2019-2023, Marion County residents who identified as African American/Black had the highest rate of visits to emergency departments or urgent care for air quality-related respiratory illness than their peers (7,532.5 per 100,000), followed by American Indian/Alaska Native (7,272.7 per 100,000) (Figure 12). The highest rate trend flips when looking at severity of illness, where residents who identify as American Indian/Alaska Native had the highest rate of hospitalizations (2,194.8 per 100,000), followed by African American/Black (1,887.1 per 100,000) (Figure 13).

Ethnicity

Figure 14: Rate of Air Quality-related Respiratory Illness patient visits by ethnicity in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

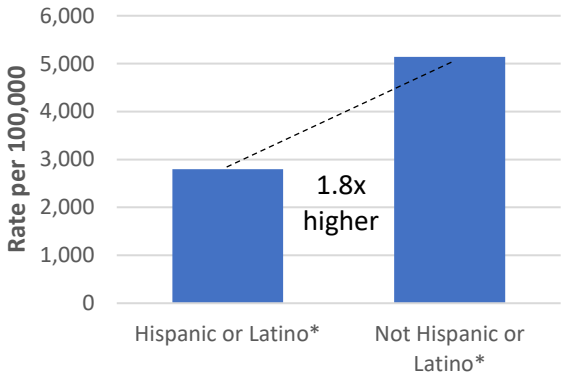
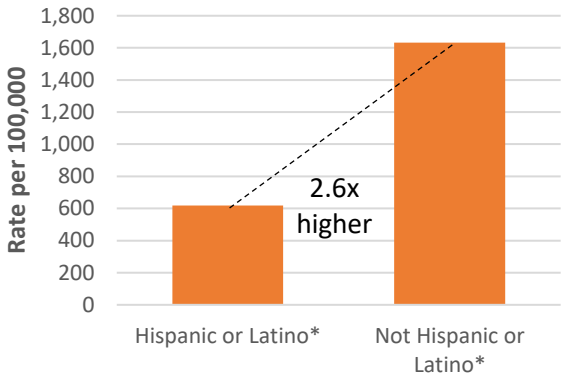


Figure 15: Rate of Air Quality-related Respiratory Illness hospitalizations by ethnicity in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



**Ethnicity as it is defined in OR ESSENCE system*

Between 2019-2023, Marion County residents who identified as 'Not Hispanic or Latino' had a rate of visits to emergency departments or urgent care for air quality-related respiratory illness 1.8 times that of residents who identified as 'Hispanic or Latino' (Figure 14: 5,139.2 per 100,000 for not Hispanic or Latino Vs. 2,799.7 per 100,000 for Hispanic or Latino). This trend increased with hospitalizations, where residents who did not identify as Hispanic or Latino had a rate 2.6 times that of residents who identified as Hispanic or Latino (Figure 16: 1,633.2 per 100,000 for not Hispanic or Latino Vs. 618.5 per 100,000 for Hispanic or Latino). Of residents who visited an emergency department or urgent care facility for an air quality-related respiratory illness, 32% of non-Hispanic or Latino residents and 22.3% of Hispanic or Latino residents were hospitalized.

Geographic Designation – Rural & Urban Communities

Figure 16: Rate of Air Quality-related Respiratory Illness patient visits by geographic designation in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

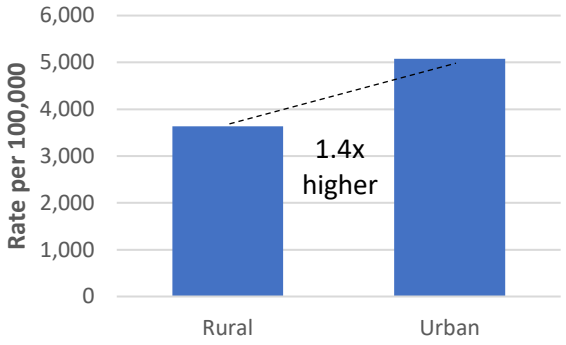
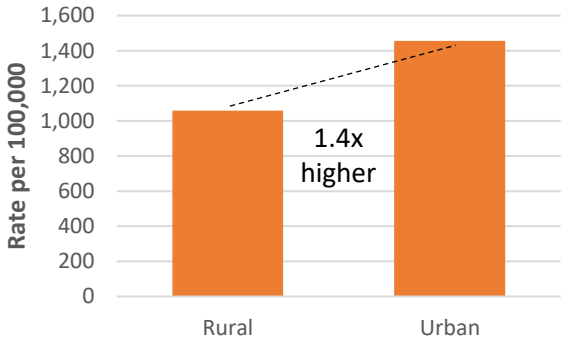


Figure 17: Rate of Air Quality-related Respiratory Illness patient visits by geographic designation in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



Rural = Any geographic area that is ten or more miles from the centroid of a population center of 40,000 or more

Between 2019-2023, Marion County residents living in geographic areas with an urban designation had a higher rate of emergency department and urgent care visits for air quality-related respiratory illness than areas with a rural designation (Figure 16: 5,075.6 per 100,000 urban Vs. 3,632.5 per 100,000 rural). This trend continued with hospitalizations, where geographic areas with an urban designation had a higher rate of hospitalizations from air quality-related respiratory illness than areas with a rural designation (Figure 17: 1,456.6 per 100,000 urban Vs. 1,059 per 100,000 rural). Although this trend indicates urban areas are more affected by air quality, when reviewing zip code data, some rural communities specifically show a disproportionate outcome to AQRI than others.

Zip code

Figure 18: Rate of patients visits among Marion County residents for air quality-related respiratory illness by zip code per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

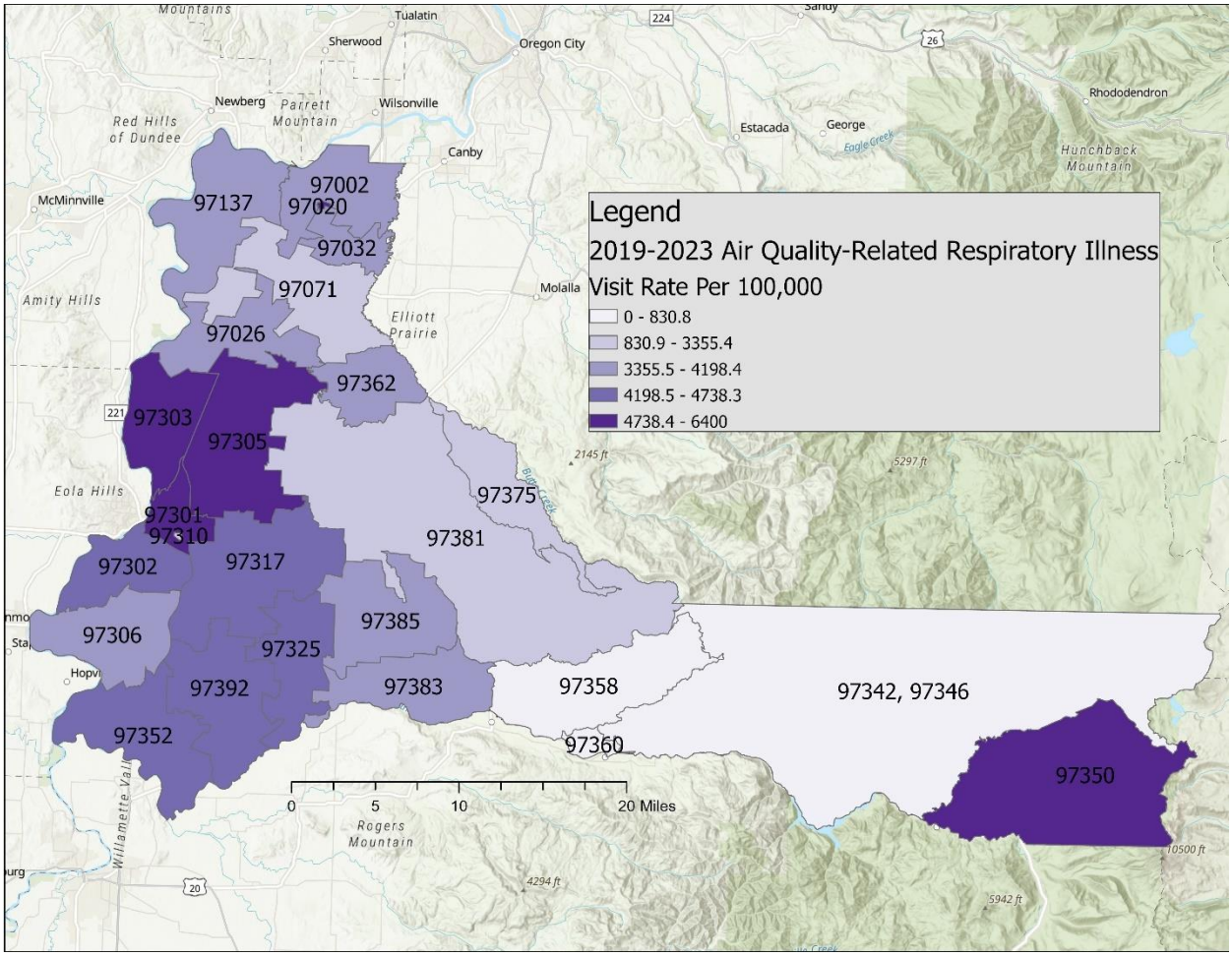


Table 2. Marion County Zip Code rates for patient visits to urgent care or emergency departments for air quality-related respiratory illness per 100,000 population, 2019-2023, OR ESSENCE[1], US Census[3]

Zip Code	Name	Count of Visits	Population‡	Rate per 100,000
97002	Aurora	1,266	6,558	3,860.9
97020	Donald	312	1,200	5,200.0
97026	Gervais	735	3,620	4,060.8
97032	Hubbard	1,034	4,991	4,143.5
97071	Woodburn	5,259	31,345	3,355.6
97137	St Paul	218	1,157	3,768.4
97301	Central Salem	17,260	56,636	6,095.1
97302	South Salem	9,455	41,371	4,570.8
97303	Keizer	10,640	41,101	5,177.5
97305	NE Salem	11,741	43,869	5,352.8

97306	South Salem, Sunnyside	6,833	33,481	4,081.7
97310	Salem, OSP	147	1,194	2,462.3
97317	SE Salem	5,968	25,635	4,656.1
97325	Aumsville	1,535	6,884	4,459.6
97342 & 97346	Detroit & Gates	42	1,011	830.9
97350	Idanha	64	200	6,400.0
97352	Jefferson	1,505	6,740	4,465.9
97362	Mt. Angel	819	4,174	3,924.3
97375	Scotts Mills	191	1,339	2,852.9
97381	Silverton	2,536	16,217	3,127.6
97383	Stayton	2,003	9,977	4,015.2
97384	Mehama	35	80	8,750.0
97385	Sublimity	732	3,487	4,198.5
97392	Turner	1,363	5,753	4,738.4
Other	Other		NA	NA
All	**Total**	**83,166**	**348,211**	**4,795.7**

NA – not available

‡ - American Community Survey (US Census) population estimate 2017-2021

** - Suppressed due to low counts (less than 6); Zip codes with no pollen allergy-related illnesses between 2019-2023 appear without "*"*

Between 2019-2023, the rates of visits for air quality-related respiratory illness were highest in Santiam Canyon communities, and the Northeast Salem/Keizer area. People living in zip code 97384 (Mehama area at 8,750 per 100,000) and 97350 (Idanha area at 6,400 per 100,000) had the highest rates of AQRI (Figure 18 and Table 2). Surprisingly, 44% of all AQRI visits among Detroit, Mehama, and Idanha residents between 2019-2023 occurred in 2019, compared to 29% in 2020. This indicates that given the 2020 Beachie Creek and Lionshead wildfires, the smoke from the wildfires did not have a noticeable influence on the yearly AQRI visits of residents directly affected by those wildfires.

Identified Homeless & Unsheltered Persons

Figure 19: Percentage of patient visits for an air quality-related resporatory illness by identified housing status, 2019-2023, OR ESSENCE[1]

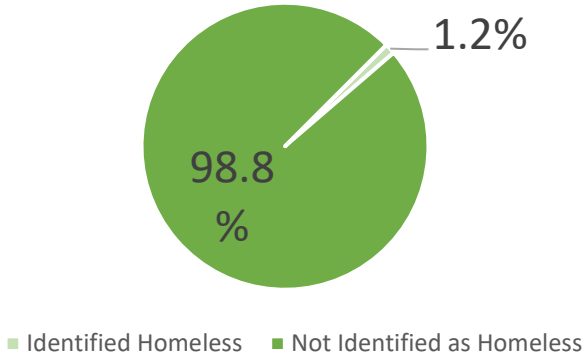
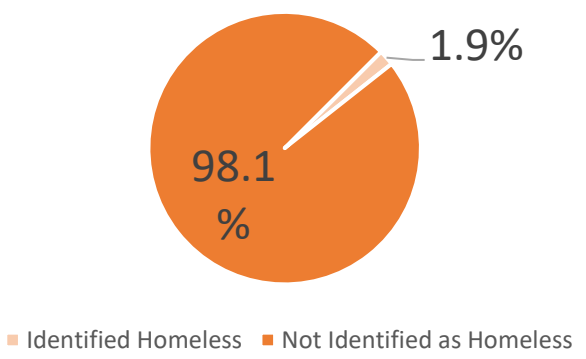


Figure 20: Percentage of hospitalizations for an air quality-related resporatory illness by identified housing status, 2019-2023, OR ESSENCE[1]



Homelessness data acquired from Oregon ESSENCE is limited to if a provider identifies an individual or an individual self-identifies as homeless, houseless, unsheltered, or unhoused and it was notated in the patient chart.

Between 2019-2023, 1.2% (989 people) of all air quality-related respiratory illness urgent care and emergency department visits in Marion County were identified as homeless (Figure 19). Among hospitalizations, 1.9% (450) of people living in Marion County were identified homeless (Figure 20). While the proportion of patient visits among residents identified as homeless are low compared to other weather-related illnesses, 45.5% of all homeless visits were hospitalized, drastically above the 29% rate of people not identified as homeless. This indicates an increased level of severity AQRI among residents identified as homeless individuals.

Among individuals identified as homeless between 2019-2023, AQRI disproportionately affected individuals differently. 66.4% of homeless individuals were male, 63.9% were between the age of 45-64, and 62.4% stated they resided in the 97301-zip code. The high residential percentage may be due to sheltering sites and homelessness services being provided centrally in the 97301-zip code area of Salem.

Asthma

Emergency Department & Urgent Care Visits

Figure 21: Asthma-related Emergency Department & Urgent Care Visits in Marion County, OR ESSENCE[1]

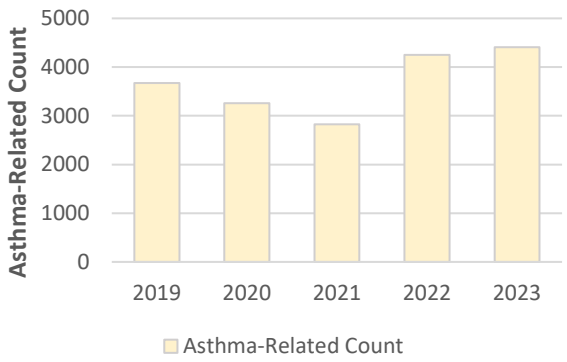
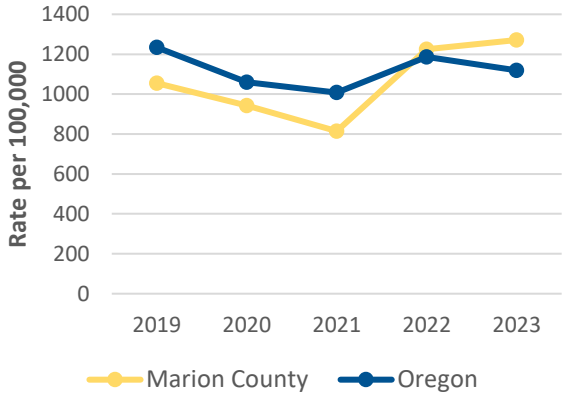
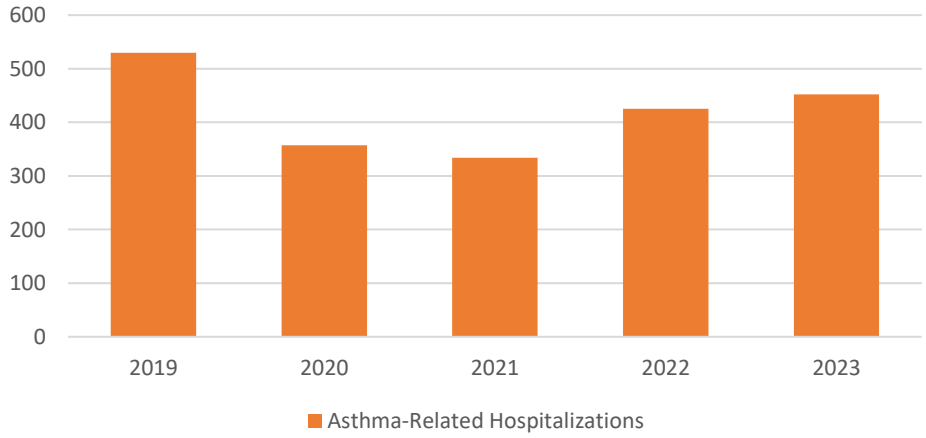


Figure 22: Asthma-related Emergency Department & Urgent Care Visits, OR ESSENCE[1], US Census[3]



Hospitalizations

Figure 23: Asthma-related Hospitalizations in Marion County, OR ESSENCE[1]



Between 2019-2023, 18,415 asthma-related emergency department and urgent care visits occurred, making up 22.1% of Air Quality-related Respiratory Illness visits (Figure 21). Of all Air Quality-related Respiratory Illness hospitalizations, asthma only makes up 8.8% of hospitalizations with 2,098 (Figure 23). When compared to Oregon, Marion County averaged lower rates of asthma between 2019-2021 and higher rates in 2022-2023 (Figure 22). Patient visits decreased during the Oregon COVID-19 State of Emergency from March 2020 – March 2022, with an average rate of 247.9 per month compared to 349.4 per month. In addition, as

the air quality index worsens with each category, asthma-related patient visits per month increases. Other environmental factors that may contribute to asthma-related patient visits and hospitalizations include temperature, poor indoor air quality, and pollen levels.

Demographics

Sex

Figure 24: Rate of Asthma-related patient visits by sex in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

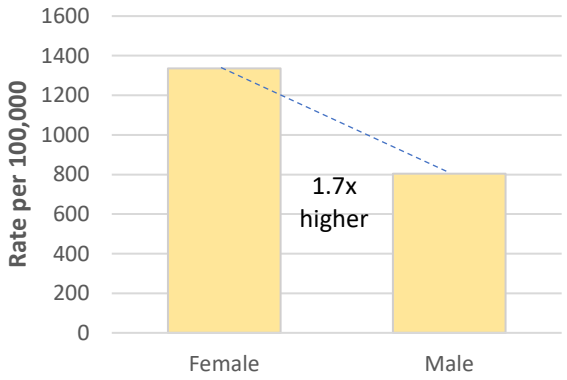
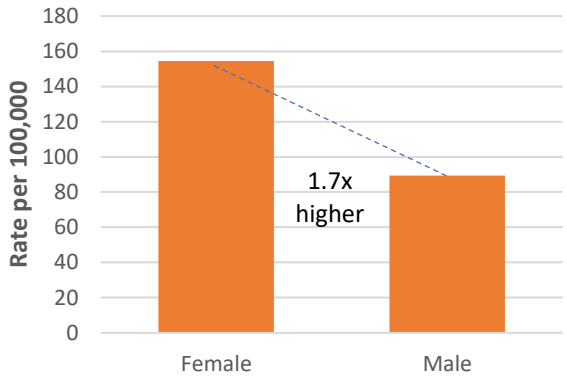


Figure 25: Rate of Asthma-related hospitalizations by sex in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



Between 2019-2023, female residents in Marion County visited emergency department and urgent care facilities for asthma 1.7 times as often as male residents (Figure 24: 1,336.4 per 100,000 for females Vs. 804.6 per 100,000 for males). Females were also hospitalized for asthma at a higher rate (Figure 25: 154.5 per 100,000 for females Vs. 89.5 per 100,000 for males). Between 2019-2023, 11.6% of females and 11.1% of males who visited an emergency department or urgent care facility for asthma were hospitalized.

Age

Figure 26: Rate of Asthma-related patient visits by age in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

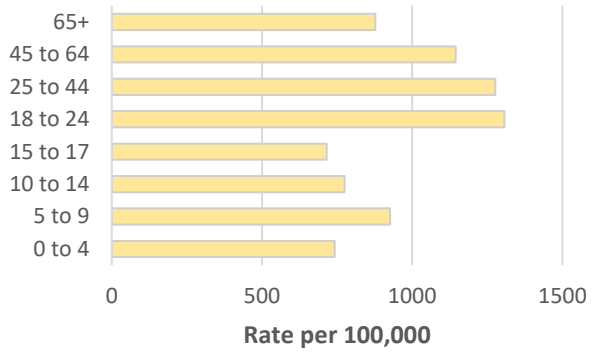
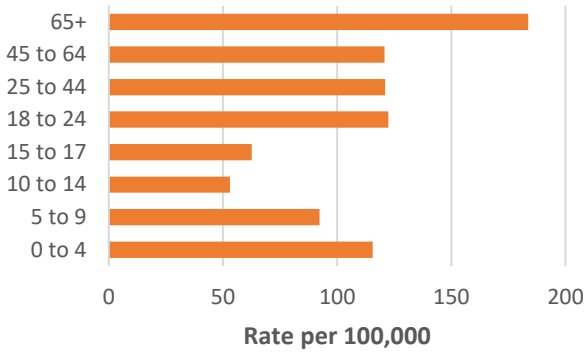


Figure 27: Rate of Asthma-related hospitalizations by age in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



Between 2019-2023, the rate of patient visits to an emergency department or urgent care facility for asthma peaks at early adulthood, age 18-24 years old (1,306.8 per 100,000) (Figure 26). Older adults (age 65 or older) had the highest hospitalization rate at 183.6 per 100,000, showing that while earlier adult ages have more emergency department and urgent care visits, older adults are more affected by asthma than earlier age groups. Between 2019-2022, 20.9% of older adults (age 65 or older) and 15.6% of infants and toddlers (0-4 years old) who visited an emergency department or urgent care facility for asthma were hospitalized, the two highest rates among all demographic groups.

Race

Figure 28: Rate of Asthma-related patient visits by race in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

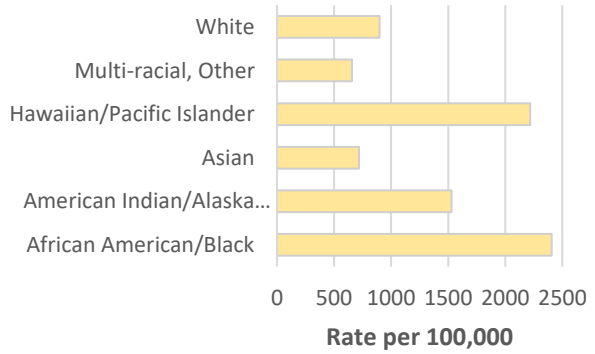
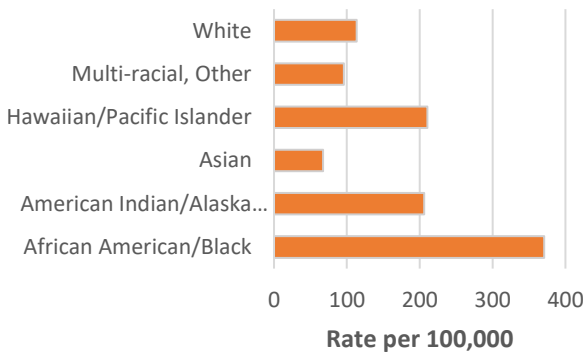


Figure 29: Rate of Asthma-related patient visits by race in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



Marion County residents who identified as African American/Black had the highest rate of visits to emergency departments or urgent care for asthma than their peers (2406.6 per 100,000), followed by Hawaiian/Pacific Islander (2,217.9 per 100,000) (Figure 28). Regarding hospitalizations, residents who identify as African American/Black had the highest rate of hospitalizations (371.1 per 100,000), followed by Hawaiian/Pacific Islander (210.7 per 100,000) and American Indian/Alaska Native (205.9 per 100,000) (Figure 29). African American/Black residents had the highest hospitalization rate at 15.4%, followed closely by multi-race/other at 14.6%.

Ethnicity

Figure 30: Rate of Asthma-related patient visits by ethnicity in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

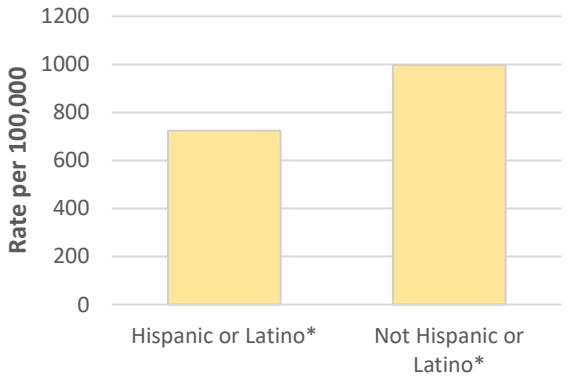
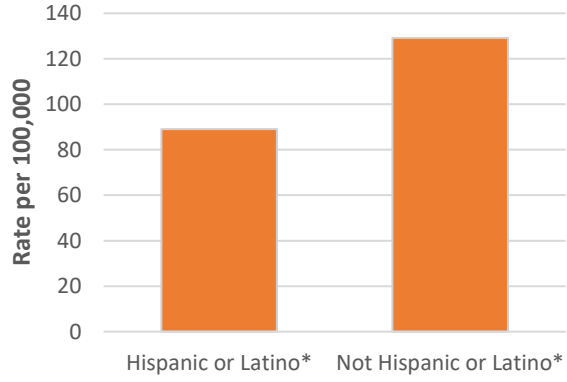


Figure 31: Rate of Asthma-related patient visits by ethnicity in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



**Ethnicity as it is defined in OR ESSENCE system*

Between 2019-2023, Marion County residents who identified as 'Not Hispanic or Latino' had a rate of visits to emergency departments or urgent care for asthma 1.4 times that of residents who identified as 'Hispanic or Latino' (Figure 30: 996.7 per 100,000 for not Hispanic or Latino Vs. 723.4 per 100,000 for Hispanic or Latino). For hospitalizations, residents who did not identify as Hispanic or Latino had a rate 1.4 times that of residents who identified as Hispanic or Latino (Figure 31: 129.1 per 100,000 for not Hispanic or Latino Vs. 89.1 per 100,000 for Hispanic or Latino). Of residents who visited an emergency department or urgent care facility for asthma, 12.9% of non-Hispanic or Latino residents and 12.3% of Hispanic or Latino residents were hospitalized.

Geographic Designation – Rural & Urban Communities

Figure 32: Rate of Asthma-related patient visits by geographic designation in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

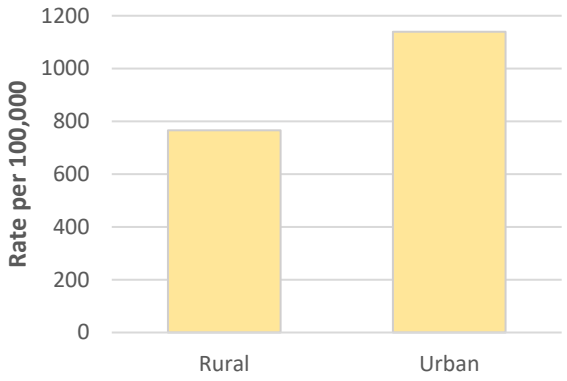
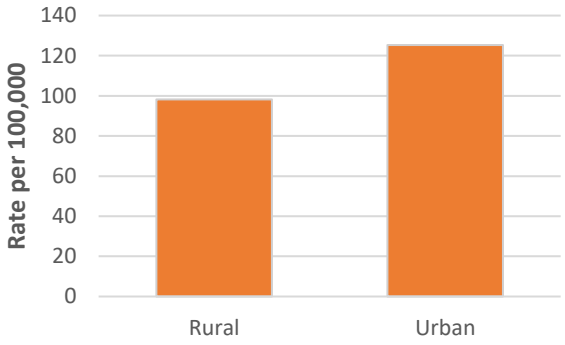


Figure 33: Rate of Asthma-related hospitalizations by geographic designation in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



Between 2019-2023, Marion County residents living in geographic areas with an urban designation visited emergency department and urgent care facilities for asthma 1.5 times as often as residents in a rural designation (Figure 32: 1,138.9 per 100,000 urban Vs. 766.2 per 100,000 rural). This trend continued with hospitalizations, where geographic areas with an urban designation hospitalized from asthma 1.3 times as often as residents in a rural designation (Figure 33: 125.3 per 100,000 urban Vs. 98.2 per 100,000 rural). Although this trend indicates urban areas are more affected by asthma, when reviewing zip code data, some rural communities specifically show a disproportionate outcome to asthma than others.

Zipcode

Figure 34: Rate of patients visits to emergency department and urgent care among Marion County residents for asthma by zip code per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

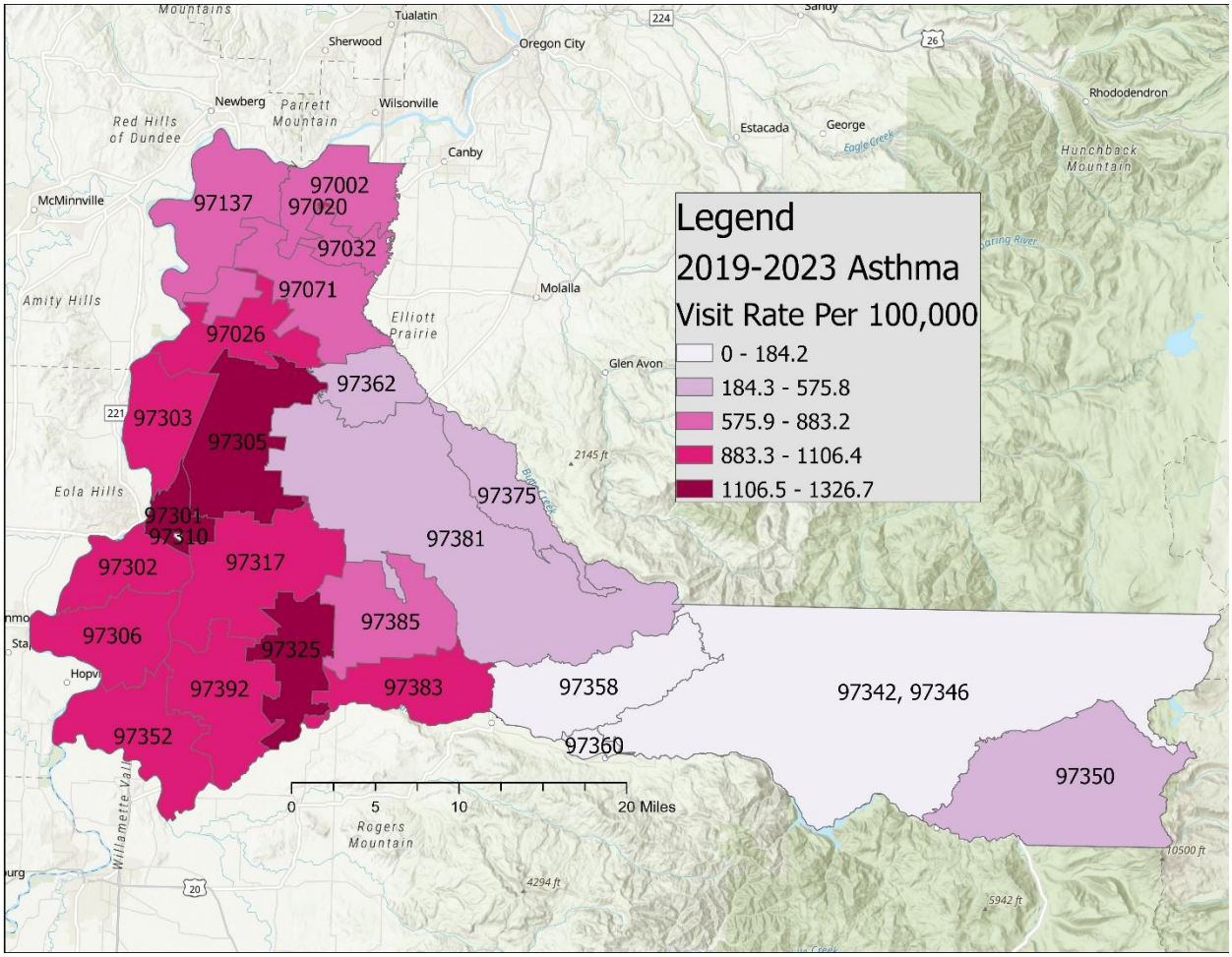


Table 3. Marion County Zip Code rates for patient visits to urgent care or emergency departments for asthma per 100,000 population, 2019-2023, OR ESSENCE[1], US Census[3]

Zip Code	Name	Count of Visits	Population‡	Rate per 100,000
97002	Aurora	243	6,558	741.1
97020	Donald	65	1,200	1083.3
97026	Gervais	167	3,620	922.7
97032	Hubbard	206	4,991	825.5
97071	Woodburn	1114	31,345	710.8
97137	St Paul	44	1,157	760.6
97301	Central Salem	3757	56,636	1326.7
97302	South Salem	1940	41,371	937.9
97303	Keizer	2274	41,101	1106.5
97305	NE Salem	2850	43,869	1299.3
97306	South Salem, Sunnyside	1701	33,481	1016.1
97310	Salem, OSP	11	1,194	184.3
97317	SE Salem	1402	25,635	1093.8
97325	Aumsville	432	6,884	1255.1

97342 & 97346	Detroit & Gates	*	1,011	*
97350	Idanha	*	200	*
97352	Jefferson	332	6,740	985.2
97362	Mt. Angel	104	4,174	498.3
97375	Scotts Mills	31	1,339	463.0
97381	Silverton	467	16,217	575.9
97383	Stayton	504	9,977	1010.3
97384	Mehama	*	80	*
97385	Sublimity	154	3,487	883.3
97392	Turner	298	5,753	1036.0
Other	Other	308	NA	NA
All	**Total**	**18,414**	**348,211**	**1,061.8**

NA – not available

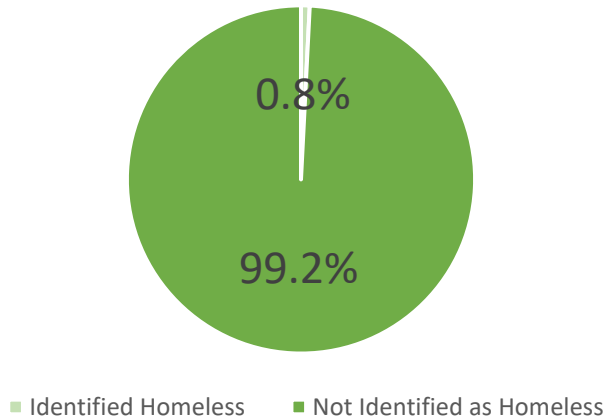
‡ - American Community Survey (US Census) population estimate 2017-2021

** - Suppressed due to low counts (less than 6)*

Between 2019-2023, the rates of visits for asthma were highest among people living in zip code 97301 (Central Salem area at 1,326.7 per 100,000), 97305 (Northeast Salem area at 1,299.3 per 100,000), and 97325 (Aumsville area at 1,255.1 per 100,000). (Figure 32 and Table 3)

Identified Homeless & Unsheltered Persons

Figure 35: Percentage of patient visits for asthma by identified housing status, 2019-2023, OR ESSENCE[1]



Between 2019-2023, 0.8% (148 people) of all asthma urgent care and emergency department visits in Marion County were identified as homeless (Figure 35). Among asthma patients identified as homeless, 60% were female, 43.2% between the age of 25 to 44, and 84% resided in an urban geographic designation.

Fire & Smoke Inhalation

Emergency Department & Urgent Care Visits

Figure 36: Fire & Smoke Inhalation Related Emergency Department & Urgent Care Visits in Marion County, OR ESSENCE[1]

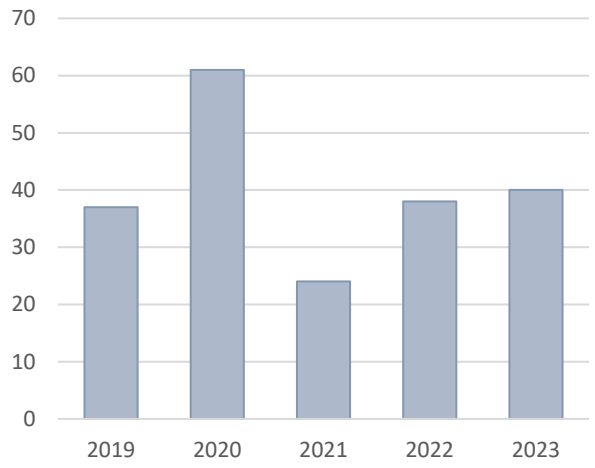


Figure 37: Fire & Smoke Inhalation Related Emergency Department & Urgent Care Visits, OR ESSENCE[1], US Census[3]

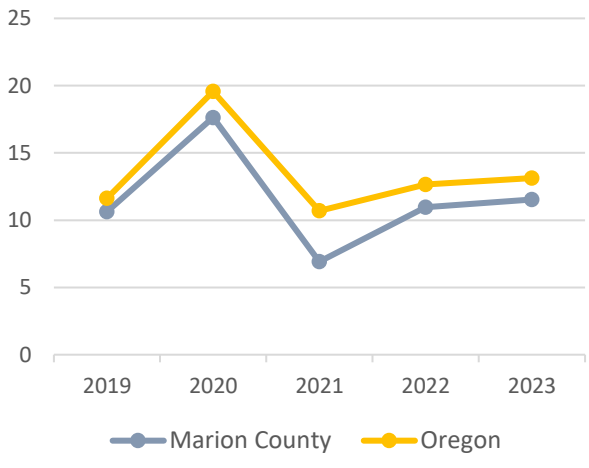
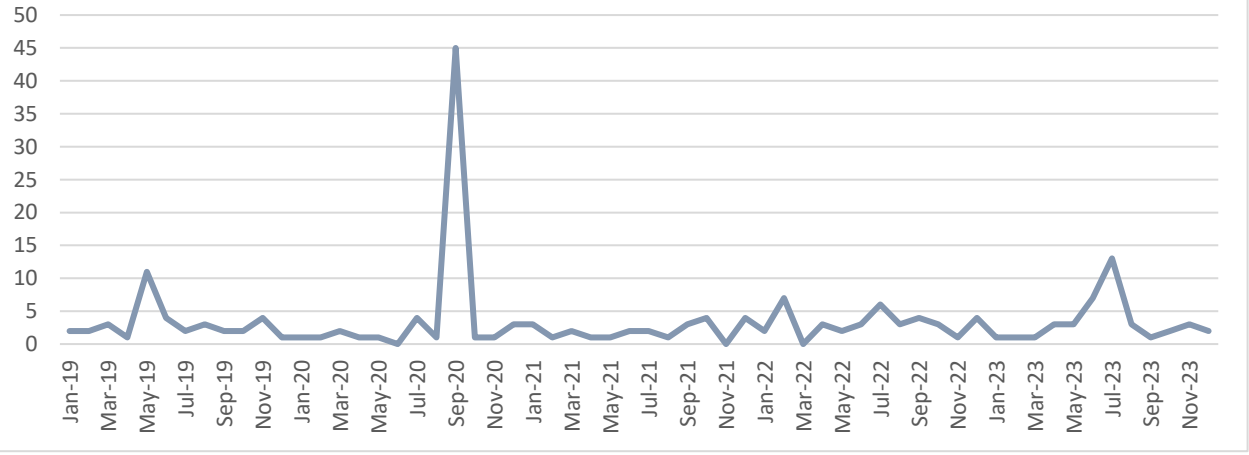


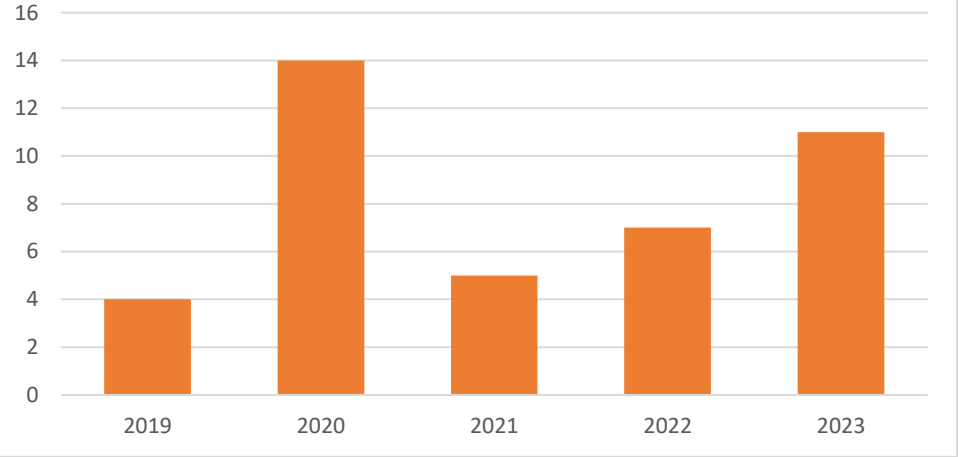
Figure 38: Fire & Smoke Inhalation Related Emergency Department & Urgent Care Visits in Marion County, OR ESSENCE[1]



Between 2019-2023, 200 Marion County residents visited an emergency department or urgent care facility for fire and smoke inhalation (Figure 36). 2020 saw the largest spike of cases in Marion County and Oregon during the four-year span due to the 2020 wildfires across the state (Figures 36-38). In September 2020, 45 patient visits occurred in Marion County due to two class 7 wildfires up the Santiam Canyon – the Beachie Creek Fire that burned 193,566 acres and Lionshead wildfire that burned 204,469 acres. Hundreds of residents were forced to evacuate with short notice as strong wind patterns shifted the fire west towards Salem, causing hazardous air quality for 9 straight days across Marion County and the region.[6,7]

Hospitalizations

Figure 39: Fire & Smoke Inhalation Related Hospitalizations in Marion County, OR ESSENCE[1]



Between 2019-2023, hospitalizations peaked in 2020 due to the Beachie Creek and Lionshead wildfires, following a similar trend to emergency department and urgent care visits.

Demographics

Sex

Figure 40: Rate of Fire & Smoke Inhalation Related patient visits by sex in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

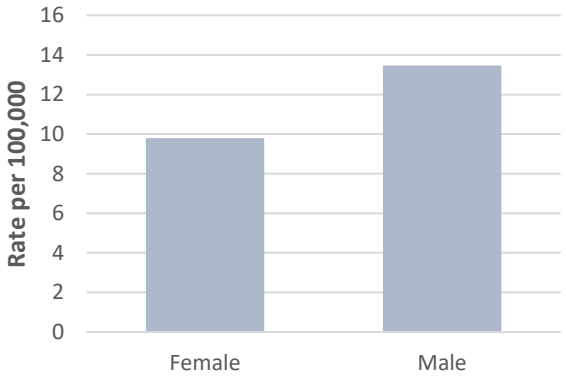
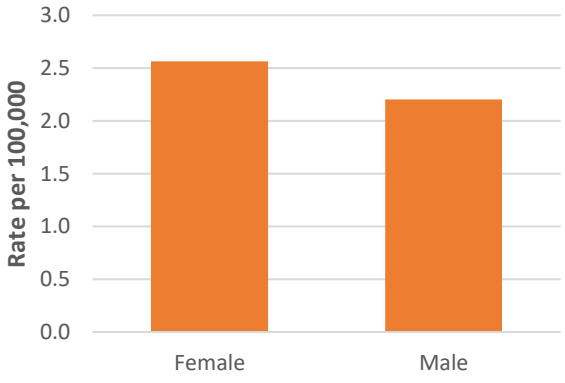


Figure 41: Rate of Fire & Smoke Inhalation Related hospitalizations by sex in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

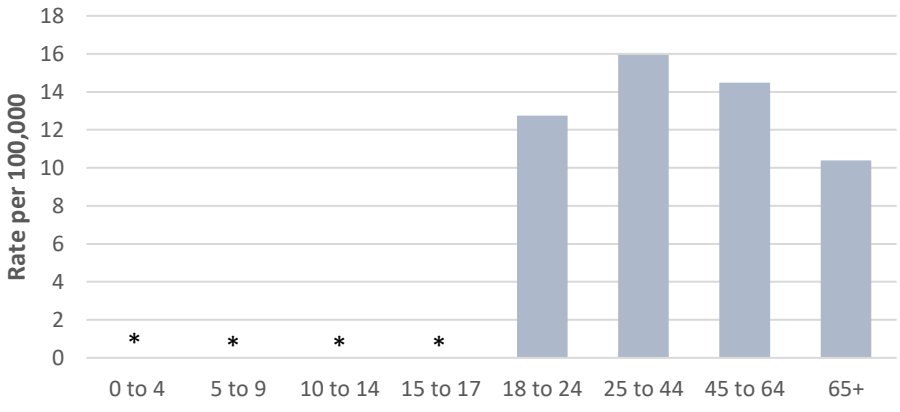


Between 2019-2023, male residents in Marion County visited emergency department and urgent care facilities for fire and smoke inhalation 1.4 times as often as female residents (Figure 40: 13.5 per 100,000 for males Vs. 9.8 per 100,000 for females). This trend switched for hospitalizations, where females were hospitalized for fire and smoke inhalation at a higher rate than males (Figure 41: 2.6 per 100,000 for females Vs. 2.2 per 100,000 for males). Between

2019-2023, 16.4% of males and 26.2% of females who visited an emergency department or urgent care facility for fire and smoke inhalation were hospitalized.

Age

Figure 42: Rate of Fire & Smoke Related patient visits by age in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

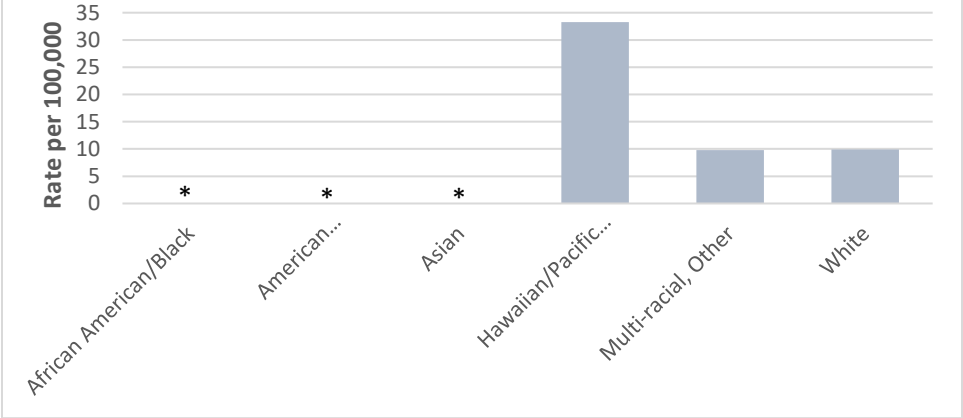


** - Suppressed due to low counts (less than 6)*

Between 2019-2023, the rate of patient visits to an emergency department or urgent care facility for fire and smoke inhalation peaked for ages 25-44 years old (15.9 per 100,000) (Figure 42). Older adults (age 65 or older) had the highest hospitalization rate at 5.6 per 100,000, showing that while earlier adult ages have more emergency department and urgent care visits, older adults are more severely affected by fire and smoke inhalation than younger age groups. Between 2019-2023, 54% of older adults (age 65 or older) who visited an emergency department or urgent care facility for fire and smoke inhalation were hospitalized.

Race

Figure 43: Rate of Fire & Smoke Related patient visits by race in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



** - Suppressed due to low counts (less than 6)*

Between 2019-2023, Marion County residents who identified as Hawaiian/Pacific Islander had the highest rate of patient visits to an emergency department or urgent care facility for fire and smoke inhalation (33.3 per 100,000) (Figure 43). Hospitalizations for almost all race categories are suppressed due to low numbers.

Ethnicity

Figure 44: Rate of Fire & Smoke Related patient visits by ethnicity in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

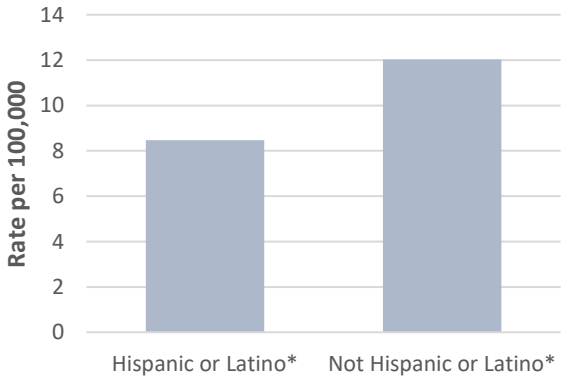
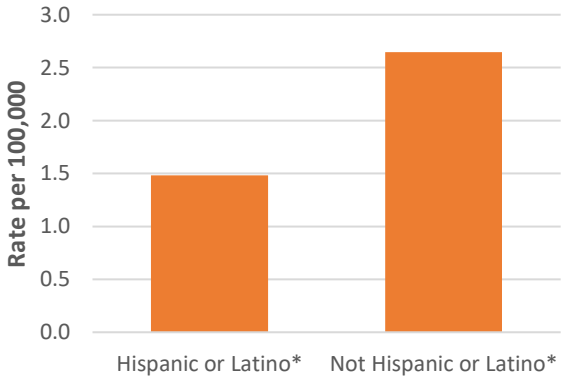


Figure 45: Rate of Fire & Smoke Related hospitalizations by ethnicity in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



**Ethnicity as it is defined in OR ESSENCE system*

Between 2019-2023, Marion County residents who identified as 'Not Hispanic or Latino' had a rate of patient visits to an emergency department or urgent care facility for fire and smoke inhalation 1.4 times that of residents who identified as 'Hispanic or Latino' (Figure 44: 12 per 100,000 for not Hispanic or Latino Vs. 8.4 per 100,000 for Hispanic or Latino). For hospitalizations, residents who did not identify as Hispanic or Latino had a rate 1.8 times that of residents who identified as Hispanic or Latino (Figure 45: 1.5 per 100,000 for not Hispanic or Latino Vs. 2.6 per 100,000 for Hispanic or Latino). Of residents who visited an emergency department or urgent care facility for fire and smoke inhalation, 22% of non-Hispanic or Latino residents and 17.5% of Hispanic or Latino residents were hospitalized.

Geographic Designation – Rural & Urban Communities

Figure 46: Rate of Fire & Smoke Related patient visits by geographic designation in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

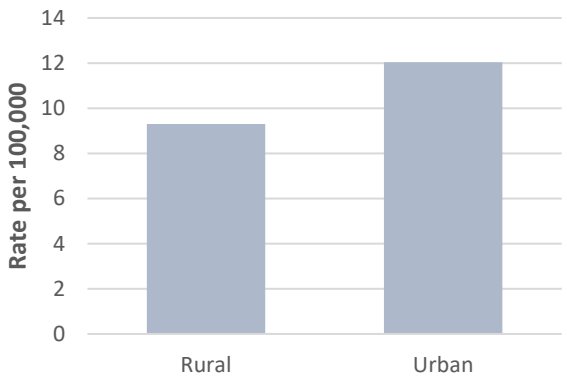
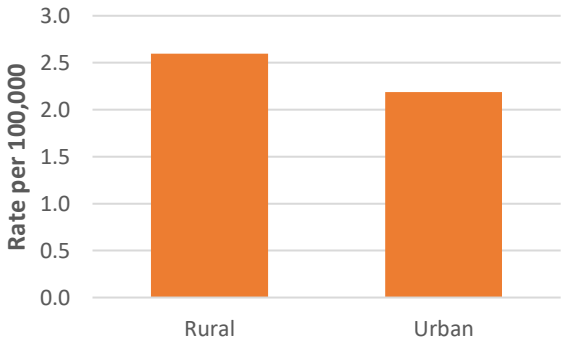


Figure 47: Rate of Fire & Smoke Inhalation hospitalizations by geographic designation in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



Rural = Any geographic area that is ten or more miles from the centroid of a population center of 40,000 or more

Between 2019-2023, Marion County residents living in geographic areas with an urban designation visited emergency department and urgent care facilities for fire and smoke inhalation 1.2 times as often as residents in a rural designation (Figure 46: 12 per 100,000 urban Vs. 9.3 per 100,000 rural). This trend switched for hospitalizations, where geographic areas with a rural designation were hospitalized from fire and smoke inhalation at a slightly higher rate than urban designation (Figure 18: 2.6 per 100,000 rural Vs. 2.2 per 100,000 urban). In September 2020, 57% of all rural residents (4 out of 7) who visited an emergency department and urgent care facility were hospitalized for fire and smoke inhalation. Overall, these trends show that fire and smoke inhalation from wildfire influence the health of both urban and rural residents.

Zip code

The zip code map has been excluded due to low numbers for most zip codes in Marion County.

Table 4. Marion County Zip Code rates for patient visits to urgent care or emergency departments for fire and smoke inhalation per 100,000 population, 2019-2023, OR ESSENCE[1], US Census[3]

Zip Code	Name	Count of Visits	Population‡	Rate per 100,000
97002	Aurora	*	6,558	*
97020	Donald	*	1,200	*
97026	Gervais	*	3,620	*
97032	Hubbard	*	4,991	*
97071	Woodburn	16	31,345	10.2
97137	St Paul	0	1,157	0
97301	Central Salem	50	56,636	17.7
97302	South Salem	24	41,371	11.6
97303	Keizer	13	41,101	6.3
97305	NE Salem	25	43,869	11.4
97306	South Salem, Sunnyside	20	33,481	11.9
97310	Salem, OSP	0	1,194	0
97317	SE Salem	13	25,635	10.1
97325	Aumsville	6	6,884	17.4
97342 & 97346	Detroit & Gates	*	1,011	*
97350	Idanha	*	200	*
97352	Jefferson	6	6,740	17.8
97362	Mt. Angel	*	4,174	*
97375	Scotts Mills	0	1,339	0
97381	Silverton	*	16,217	*
97383	Stayton	*	9,977	*
97384	Mehama	0	80	0
97385	Sublimity	*	3,487	*
97392	Turner	*	5,753	*
Other	Other	NA	NA	NA
All	**Total**	**200**	**348,211**	**11.5**

NA – not available

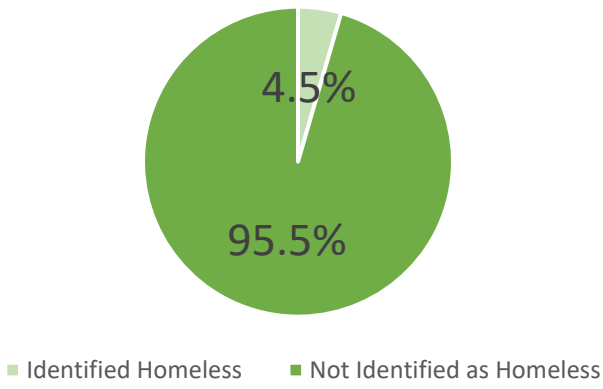
‡ - American Community Survey (US Census) population estimate 2017-2021

** - Suppressed due to low counts (less than 6); Zip codes with no fire and smoke inhalation between 2019-2023 appear without "*"*

Between 2019-2023, the rates of emergency department and urgent care facility visits for fire and smoke inhalation were highest in zip codes 97352 (Jefferson area at 17.8 per 100,000), 97301 (Central Salem area at 17.7 per 100,000), and 97325 (Aumsville area at 17.4 per 100,000) (Table 4).

Identified Homeless & Unsheltered Persons

Figure 48: Percentage of patient visits for fire & smoke inhalation by identified housing status, 2019-2023, OR ESSENCE[1]



Between 2019-2023, nine Marion County residents who visited an emergency department or urgent care facility for fire and smoke inhalation were identified as homeless or unsheltered, making up 4.5% of all patient visits (Figure 48).

Pollen-related Allergies

Emergency Department & Urgent Care Visits

Figure 49: Pollen Allergy-related Emergency Department & Urgent Care Visits in Marion County, OR ESSENCE[1]

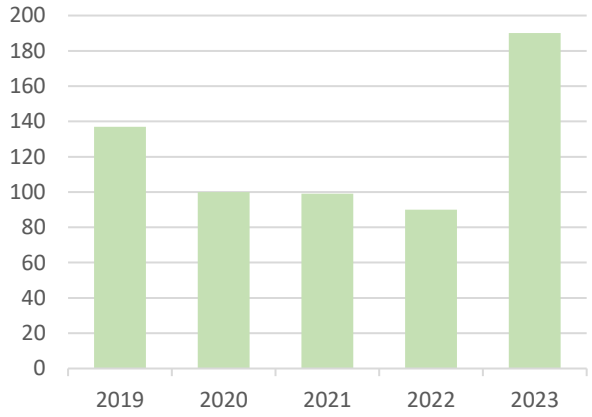


Figure 50: Rate of Pollen Allergy-related Emergency Department & Urgent Care Visits, OR ESSENCE[1], US Census[3]

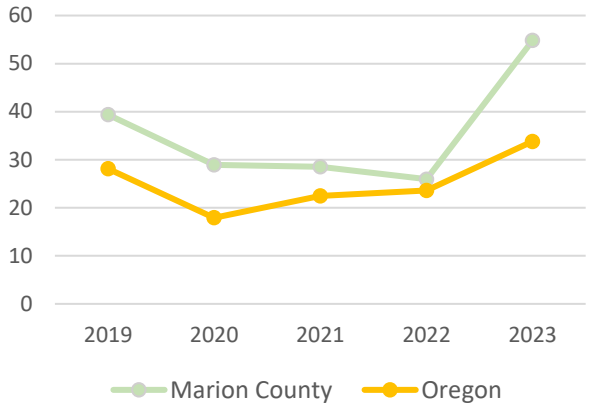
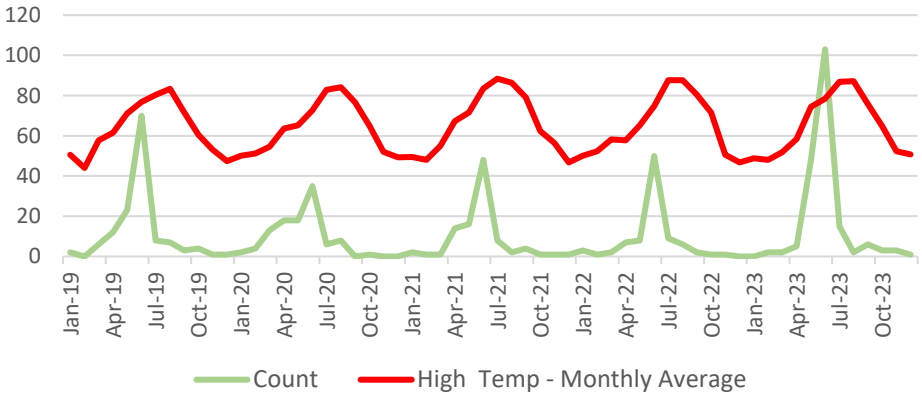


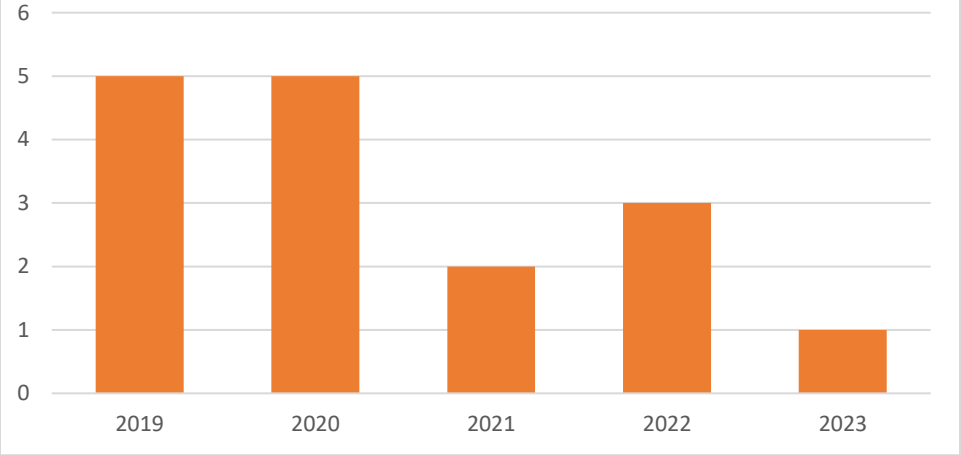
Figure 51: Monthly Pollen Allergy-related Emergency Department & Urgent Care Visits and high average temperatures in Marion County, OR ESSENCE[1], NWS[4,5]



Between 2019-2023, pollen allergy-related emergency department and urgent care visits fluctuated in Marion County, peaking at 190 visits in 2023 (Figure 49). Marion County pollen-related patient visits remained higher than the state average, contributing to 11.6% of the state's total cases (35.5 per 100,000 for Marion County Vs. 25.2 per 100,000 Oregon) (Figure 50). Pollen-related allergy visits do follow seasonal trends, peaking in June each year as the weather warms and pollen is released (Figure 51). Unfortunately, no pollen sensors from the American Academy of Allergy Asthma & Immunology (AAAAI) exist in Marion County to track pollen counts with patient visits. However, Dr. Kraig Jacobson, Medical Director at the Oregon Allergy Associates in Eugene stated that "tree pollen was high in the early spring… (and in June 2023) the grass pollen count has been extremely high, record levels, above 950."[8]

Hospitalizations

Figure 52: Pollen Allergy-related Hospitalizations in Marion County, OR ESSENCE[1]



Between 2019-2023, only 16 total hospitalizations occurred due to pollen-related allergies. This means only 2.6% of all patient visits resulted in hospitalization.

Demographics

Sex

Figure 53: Rate of pollen allergy-related patient visits by sex in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

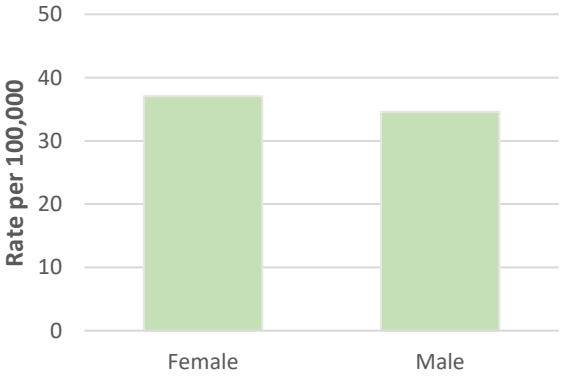
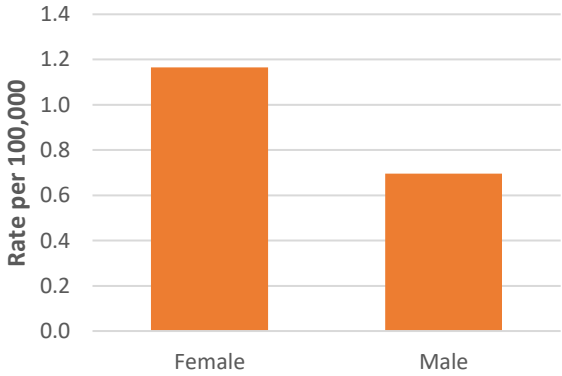


Figure 54: Rate of pollen allergy-related patient visits by sex in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

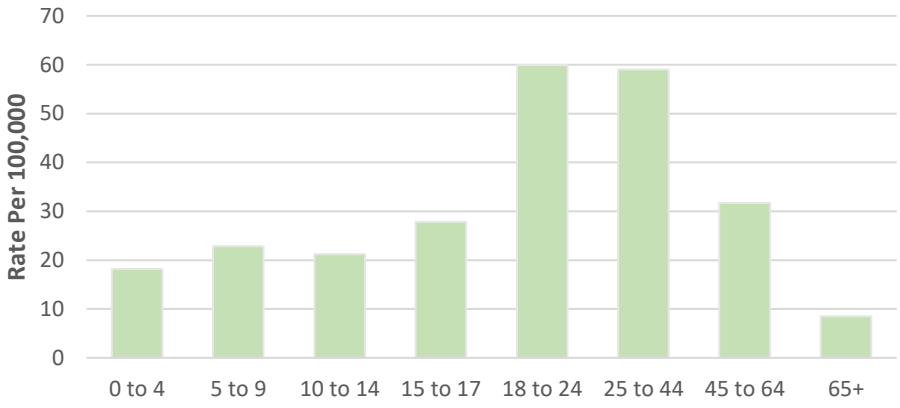


Between 2019-2023, female residents in Marion County visited emergency department and urgent care facilities for pollen-related allergies slightly more often than male residents (Figure 23: 37.1 per 100,000 for females Vs. 34.6 per 100,000 for males). While pollen allergy-related

hospitalizations were low, females were also hospitalized for pollen-related allergies at a slightly higher rate (Figure 24: 1.2 per 100,000 for females Vs. 0.7 per 100,000 for males).

Age

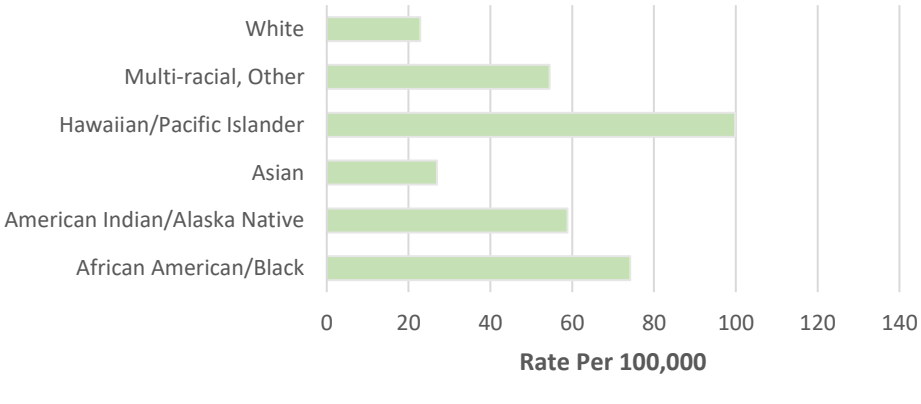
Figure 55: Rate of pollen allergy-related patient visits by age in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



Between 2019-2023, the rate of pollen allergy-related patient visits to an emergency department or urgent care facility peaked for young adults ages 18-24 (59.9 per 100,000) and early middle age 25-44 years old (59 per 100,000) (Figure 55). Hospitalization rates are suppressed due to low numbers.

Race

Figure 56: Rate of pollen allergy-related patient visits by race in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



Marion County residents who identified as Hawaiian/Pacific Islander had the highest rate of pollen allergy-related patient visits to emergency departments or urgent care (99.8 per 100,000), followed by African American/Black residents (74.2 per 100,000) (Figure 56). Hospitalizations rates are suppressed due to low numbers.

Ethnicity

Figure 57: Rate of pollen allergy-related patient visits by ethnicity in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

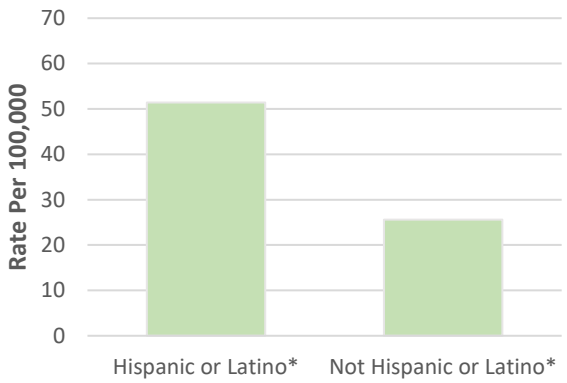
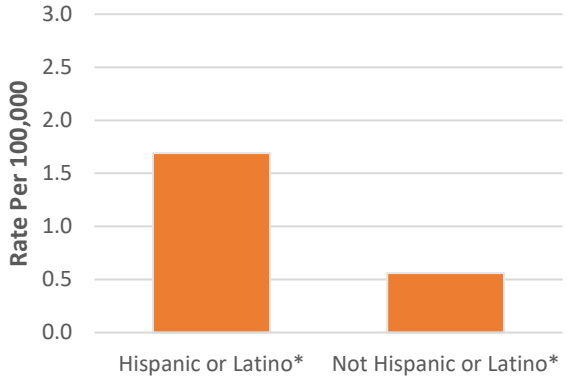


Figure 58: Rate of pollen allergy-related hospitalizations by ethnicity in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

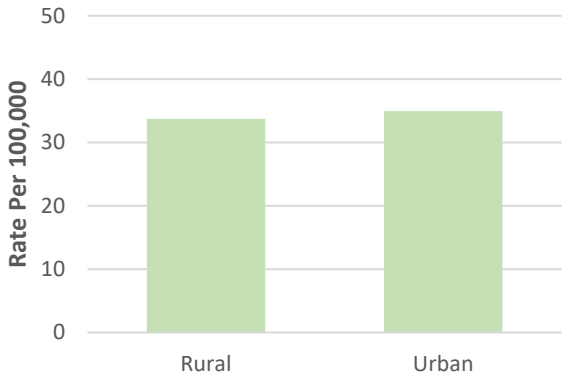


**Ethnicity as it is defined in OR ESSENCE system*

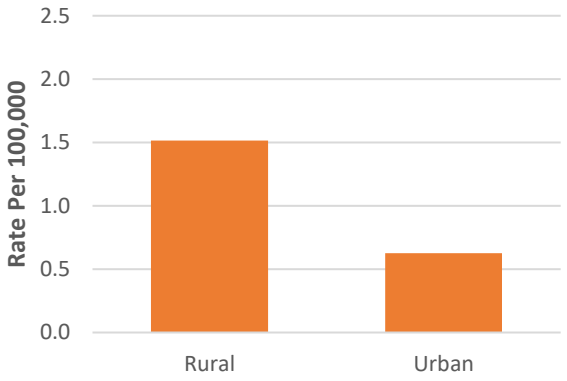
Between 2019-2023, Marion County residents who identified as 'Hispanic or Latino' had a rate of pollen allergy-related emergency department or urgent care patient visits 2.0 times that of residents who identified as 'Not Hispanic or Latino' (Figure 57: 51.4 per 100,000 for Hispanic or Latino Vs. 25.6 per 100,000 for not Hispanic or Latino). While pollen allergy-related hospitalizations were low, Hispanic or Latino identifying residents (1.7 per 100,000) were hospitalized 3.0 times as often as non-Hispanic or Latino identifying residents (0.6 per 100,000) (Figure 58).

Geographic Designation – Rural & Urban Communities

Figure 59: Rate of pollen allergy-related patient visits by geographic designation in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



Fiure 60: Rate of pollen allergy-related patient visits by geographic designation in Marion County per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]



Between 2019-2023, Marion County residents living in geographic areas with an urban designation had a slightly higher rate of pollen allergy-related emergency department and urgent care patient visits than residents in a rural designation (Figure 59: 35 per 100,000 urban Vs. 33.8 per 100,000 rural). While pollen allergy-related hospitalizations were low, geographic areas with a rural designation were hospitalized at a slightly higher rate than urban designation (Figure 60: 1.5 per 100,000 rural Vs. 0.6 per 100,000 urban).

Zipcode

Figure 61: Rate of patients visits to emergency department and urgent care among Marion County residents for pollen allergy by zip code per 100,000, 2019-2023, OR ESSENCE[1], US Census[3]

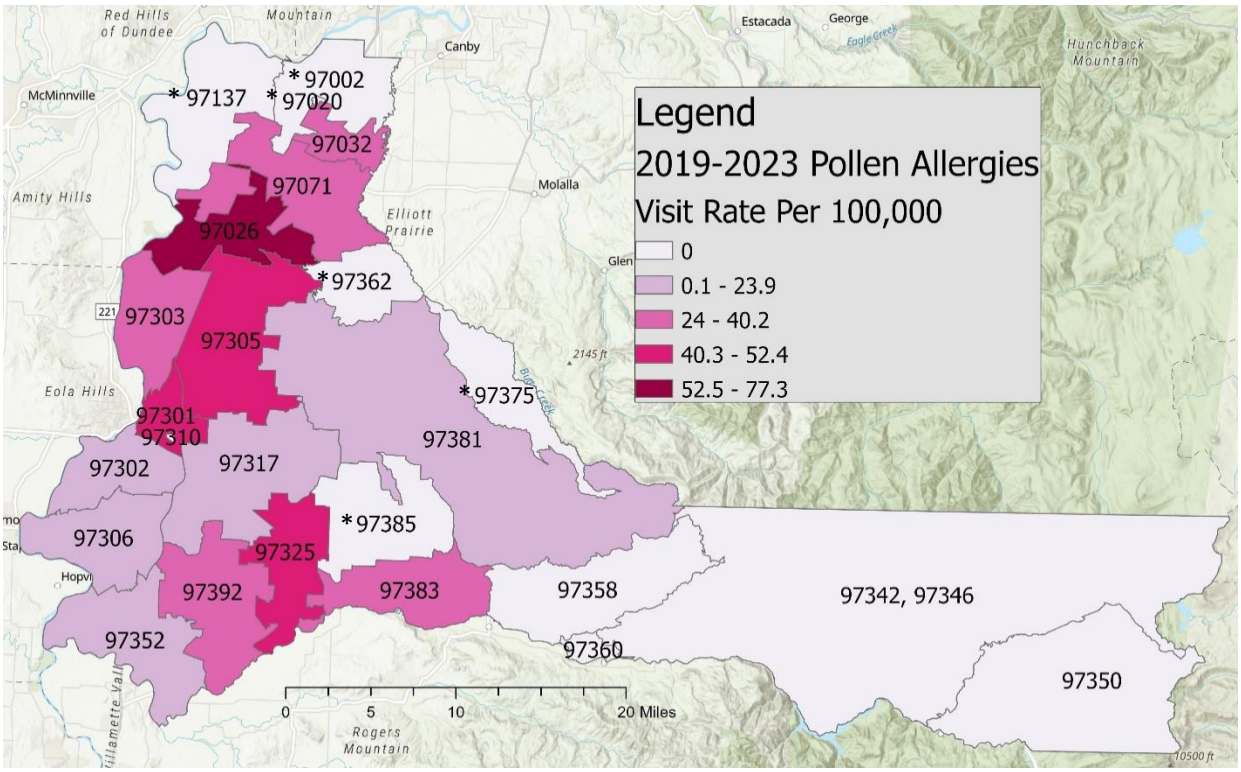


Table 5. Marion County Zip Code rates for patient visits to urgent care or emergency departments for pollen allergy per 100,000 population, 2019-2023, OR ESSENCE[1], US Census[3]

Zip Code	Name	Count of Visits	Population‡	Rate per 100,000
97002	Aurora	*	6,558	*
97020	Donald	*	1,200	*
97026	Gervais	14	3,620	77.3
97032	Hubbard	9	4,991	36.1
97071	Woodburn	63	31,345	40.2
97137	St Paul	*	1,157	*
97301	Central Salem	127	56,636	44.8
97302	South Salem	49	41,371	23.7
97303	Keizer	69	41,101	33.6
97305	NE Salem	115	43,869	52.4
97306	South Salem, Sunnyside	40	33,481	23.9
97310	Salem, OSP	0	1,194	0
97317	SE Salem	30	25,635	23.4
97325	Aumsville	17	6,884	49.4

97342 & 97346	Detroit & Gates	*	1,011	*
97350	Idanha	*	200	*
97352	Jefferson	8	6,740	23.7
97362	Mt. Angel	*	4,174	*
97375	Scotts Mills	*	1,339	*
97381	Silverton	15	16,217	18.5
97383	Stayton	20	9,977	40.1
97384	Mehama	0	80	0
97385	Sublimity	*	3,487	*
97392	Turner	9	5,753	31.3
Other	Other	NA	NA	NA
All	**Total**	**616**	**348,211**	**35.5**

NA – not available

‡ - American Community Survey (US Census) population estimate 2017-2021

** - Suppressed due to low counts (less than 6); Zip codes with no pollen allergy-related illnesses between 2019-2023 appear without "*"*

Between 2019-2023, the rates of emergency department and urgent care facility visits for pollen allergies were highest in zip code 97026 (Gervais area at 77.3 per 100,000) and 97305 (northeast Salem area at 52.4 per 100,000) (Figure 61 and Table 5).

Identified Homeless & Unsheltered Persons

Emergency department and urgent care data between 2019-2023 for patients identified as homeless or unsheltered is suppressed due to low numbers.

Summary

Between 2019-2023, Marion County has seen a fluctuating number of poor air quality index (AQI) days. The yearly difference in the amount of emergency visits for air quality-related respiratory illnesses (AQRI) follows a similar trend to the number of moderate or worse air quality days, spiking in years with multiple 'Unhealthy for Sensitive Groups' or worse AQI days (2020, 2022, and 2023). Emergency visits for Asthma and Fire and Smoke Inhalation Illness steadily increased as the daily AQI index increased.

Other air quality related environmental factors such as pollen count, wildfire, smoke, and air temperature appear to correlate to illnesses and visits to the emergency department and urgent care facilities. During the Beachie Creek and Lionshead wildfires in September 2020, Marion County saw a dramatic increase in Fire and Smoke Inhalation Illnesses. In June 2023, pollen allergy-related visits were highest when pollen counts in the Willamette Valley were near "record levels."[8]

Regarding severity, hospitalizations to AQRI's and Asthma were noticeably high in 2019, despite lower numbers of emergency visits – especially when compared to other years. In 2019, 32.3% of all AQRI emergency visits resulted in hospitalization, compared to 28.0% between 2020-2023. Likewise, 14.4% of all Asthma emergency visits resulted in hospitalization in 2019, compared to 10.8% between 2020-2023. Further examination is needed to understand why this disproportion occurred in 2019.

The air quality related illnesses reviewed in this report do not affect all people and communities the same. Between 2019-2023, the data shows the following disparities in health outcomes amongst various demographic groups:

- Air Quality-related Respiratory Illnesses (AQRI):
    - Marion County had lower rates of emergency visits than the state of Oregon at 4,795.7 visits per 100,000 residents between 2019-2023.
    - Females had higher rates of emergency visits and hospitalizations than males.
    - Emergency visits and hospitalizations increased with age, peaking at 65 years old or older.
    - Residents who identified as African American/Black and American Indian/Alaska Native had the highest rates of emergency visits and hospitalizations.
    - Residents who did not identify as Hispanic or Latino had higher rates of emergency visits and significantly higher rates of hospitalizations.
    - Northeast Salem, central Salem, Keizer, and Idanha had the highest emergency department visits geographically.
    - 1.2% of all resident emergency visits were identified as homeless.

- Asthma:
    - Marion County had lower rates of emergency visits than the state of Oregon at 1,061.8 visits per 100,000 residents between 2019-2023.
    - Asthma makes up about 22% of all AQRI visits.

    - Fewer monthly emergency visits and hospitalizations occurred during the Oregon COVID-19 State of Emergency between March 2020 – March 2022.
    - Females had higher rates of emergency visits and hospitalizations than males.
    - Emergency visits were highest among adults aged 18-44, while hospitalizations occurred most often among adults 65 years old or older and infants and toddlers 0-4 years old.
    - Residents who identified as African American/Black had the highest rates of emergency visits and hospitalizations.
    - Residents who did not identify as Hispanic or Latino had higher rates of emergency visits and hospitalizations.
    - Northeast Salem, central Salem, and Aumsville had the highest emergency department visits geographically.
    - 0.8% of all resident emergency visits were identified as homeless.

- Fire and Smoke Inhalation:
    - Marion County had lower rates of emergency visits than the state of Oregon at 11.5 visits per 100,000 residents between 2019-2023.
    - Males had higher rates of emergency visits than females, but this trend flipped for hospitalizations.
    - Emergency visits were highest among adults aged 18-24.
    - Residents who identified as Hawaiian/Pacific Islander had the highest rates of emergency visits.
    - Residents who did not identify as Hispanic or Latino had higher rates of emergency visits and hospitalizations.
    - Residents who lived in urban geographical areas had higher rates of emergency visits, but this trend flipped for hospitalizations.
    - 4.5% of all resident emergency visits were identified as homeless.

- Pollen Allergies:
    - Marion County had higher rates of emergency visits than the state of Oregon at 35.5 visits per 100,000 residents between 2019-2023.
    - Fewer monthly emergency visits occurred during the Oregon COVID-19 State of Emergency between March 2020 – March 2022.
    - Females had higher rates of emergency visits and hospitalizations than males.
    - Emergency visits were highest among adults aged 18-44.
    - Residents who identified as Hawaiian/Pacific Islander had the highest rates of emergency visits.
    - Residents who identify as Hispanic or Latino had higher rates of emergency visits and hospitalizations.
    - Residents who lived in urban geographical areas had slightly higher rates of emergency visits, but this trend flipped for hospitalizations.

This report and its associated indicators provide timely information that can detect trends and groups disproportionately affected by air quality related illnesses for targeted interventions. Like

any source, ESSENCE has key limitations, including the requirement that a person must be seen at an urgent care or emergency department to be detected in the ESSENCE surveillance system. Patients seen in other settings, such as a clinic, would be missed. Duplications in patient visits may also exist, where one person could be counted more than once due to multiple visits. Other limitations include errors in medical coding, or incomplete notes, which may influence results.

ESSENCE remains amongst the timeliest surveillance system for tracking resident patient visits for air quality related illness in our community. Like any system, it is most effective when used in concert with other systems and indicators that describe air quality related illness and its contributing risk factors.

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[6] United State Forest Service. Beachie Creek Fire Story & Data. 2020. https://www.fs.usda.gov/detailfull/willamette/fire/?cid=fseprd835368. Viewed on 1/10/24.

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[8] McDonald, R. (2023). *Live in Willamette Valley and have allergy symptoms? It might be because pollen counts are sky high.* OPB. https://www.opb.org/article/2023/06/07/willamette-valley-pollen-counts-high-grass/. Viewed 12/11/2023.