

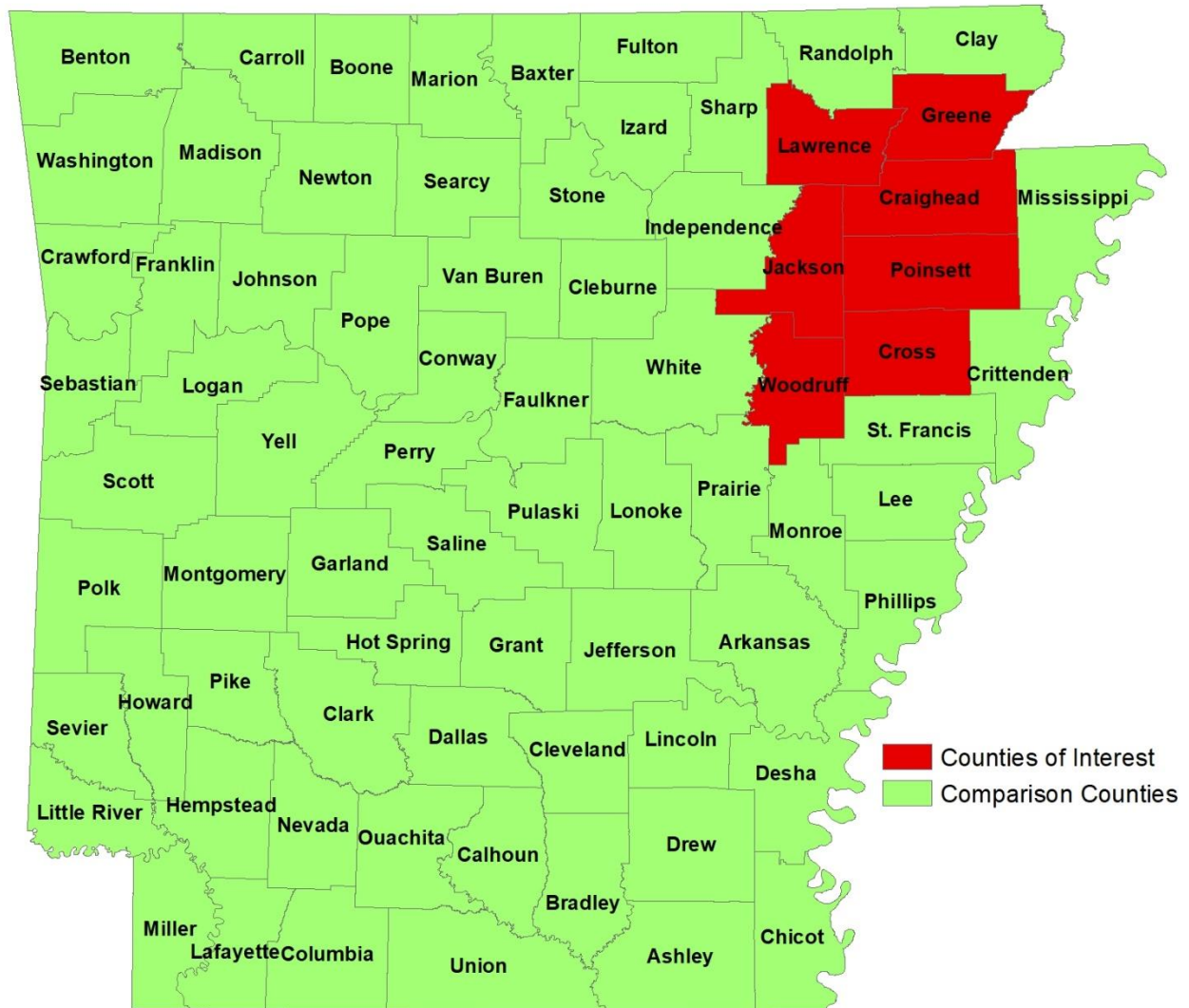
Chronic Obstructive Pulmonary Disease Review

Comparison of Counties of Interest to the Rest of the State

2017-2021



Figure 1: Counties of Interest for COPD Comparisons



Background

Chronic Obstructive Pulmonary Disease (COPD)* has regularly been the 3rd or 4th leading cause of death among Arkansans each year. The American Lung Association estimates that 9.6% of Arkansans have COPD, which makes Arkansas the 5th worst state for COPD. Annually, it costs nearly \$300 million to treat COPD in the state and over 200,000 workdays are lost due to the health impact of COPD. Individuals with the highest barriers to treatment, and the worst outcomes, are those who live in rural communities, those with lower income levels, and those with lower education levels.¹

As noted in “Crop burning and the prevalence of asthma and COPD emergency department treatments in a rural Arkansas county”, there have been multiple studies showing associations between crop burning and worsening respiratory symptoms across the world. Crop burning releases significant amounts of air pollution, including large amounts of fine particulate matter (PM 2.5), which is associated with a higher risk of chronic respiratory diseases and other poor health outcomes.²

Seven counties in the northeast portion of Arkansas – Craighead, Cross, Greene, Jackson, Lawrence, Poinsett, and Woodruff – burn large crop areas every fall (see Figure 1). To determine whether crop burning in these counties could be associated with an increased burden of COPD, this document will review the COPD morbidity and mortality in these seven counties (hereafter referred to as “Counties of Interest”) as compared to the 68 other Arkansas counties (hereafter referred to as “Comparison Counties”).

* In this document COPD refers to ICD-10 codes J40-J47, also referred to as Chronic Lower Respiratory Disease.

Counties of Interest

Of the seven Counties of Interest, Craighead is the only county considered to have a metro area and has a population of approximately 112,000. Greene County has a population of approximately 46,000, with more than half of the population residing in the city of Paragould. The rest of the Counties of Interest are defined as rural counties and have populations between 6,000 and 23,000. As a group, the Counties of Interest contain just below 8% of the Arkansas population as of 2021 (Table 1).

County Group	2017	2018	2019	2020	2021
Counties of Interest	233,416	234,268	235,049	236,577	237,095
Comparison Counties	2,770,863	2,779,557	2,782,755	2,793,945	2,788,796
Entire State	3,004,279	3,013,825	3,017,804	3,030,522	3,025,891

Most of the Counties of Interest have historically had poor health outcomes. Two of these seven counties – Jackson and Poinsett – have been listed among the Red Counties[†], since the Arkansas Red County Reports began in 2011. A third county, Cross, has been listed as a Red County in each year since 2011, except for 2014; and Lawrence County has been listed as a Red County for the last 2 years (2020 & 2021).

One commonly used measure to determine the health of communities is the Centers for Disease Control and Prevention’s (CDC) Agency for Toxic Substances and Disease Registry (ATSDR) Social Vulnerability Index (SVI). ATSDR uses 16 community-related demographic measures to determine a community’s vulnerability to public health crises and poor health outcomes. Of the seven Counties of Interest, all counties except Craighead had a High or Very High SVI score[‡].

[†] Red Counties are Arkansas counties with the lowest life expectancies and heaviest health burdens. How Red Counties are determined and details on each county is listed in the Red County Report.

[‡] Each county in the United States is given an SVI score between 0.00 and 1.00. The higher the score the more vulnerable the county is to crises and poor outcomes. In this document, a high score refers to a score between 0.60 and 0.79. A very high score refers to a score between 0.80 and 1.0.

COPD Morbidity

Chronic Obstructive Pulmonary Disease (COPD) is a chronic and progressive illness that takes years to develop. For those diagnosed with COPD, irritation of the lungs caused by various factors, including air pollution, can cause acute attacks referred to as COPD flare-ups and require emergency care. COPD also increases the likelihood of respiratory illnesses, such as the flu or pneumonia, and heart disease, including heart attacks, that can lead to the need for emergency care.³

As the Counties of Interest contain just under 8% of the state population, it would be expected that – all other factors being equal – these counties would account for about 8% of Arkansas’s emergency department (ED) visits for COPD. Reviewing ED information collected by the ADH Syndromic Surveillance Program shows that approximately 7% to 10% of the state’s COPD related ED visits were in the Counties of Interest. As the ADH Syndromic Surveillance Program is an active program that updates information constantly, 2022 and 2023 to-date data are available. This breakdown of ED visits continues to remain within the 7% to 10% range for both years.

Table 2: ED Visits Among Counties of Interest vs. Comparison Counties, 2017-2021

County Group	2017	2018	2019	2020	2021
Counties of Interest	3,445	3,400	4,452	2,413	2,585
Comparison Counties	39,563	40,997	40,816	30,270	24,524
Entire State	43,008	44,397	45,268	32,683	27,109

Source: Arkansas Department of Health, Hospital Discharge Data System

To better compare data between two geographical areas with different populations, a population level rate is calculated. This population rate is usually the number of a specific type of event (visits, diagnoses, deaths) for every 100,000 individuals in the population of interest. While age-adjusted rates are preferred, as such rates account for different age distributions between populations, they are not always available. This document uses crude rates, that is simple rates without any adjustments for differences in populations, for all events so that the seven Counties of Interest can easily be compared with the Comparison Counties (all other 68 counties in Arkansas) and with the entire state.

Table 3: ED Visit Rate Among Counties of Interest vs. Comparison Counties, 2017-2021

County Group	2017	2018	2019	2020	2021
Counties of Interest	1,475.9	1,451.3	1,894.1	1,020.0	1,090.3
Comparison Counties	1,427.8	1,474.9	1,466.7	1,083.4	879.4
Entire State	1,431.6	1,473.1	1,500.0	1,078.5	895.9

Source: Arkansas Department of Health, Hospital Discharge Data System

As the ED visit rates between the two groups show, the difference between the Counties of Interest and the Comparison Counties varies greatly by year (Table 3). In 2019, there were over 400 more COPD related visits per 100,000 population in the Counties of Interest than in the Comparison Counties. However, in 2020, there were over 60 more COPD visits per 100,000 population in the Comparison Counties than in the Counties of Interest. Given that the rates of ED visits between 2017 and 2018 were fairly stable, the dramatic shifts in ED visits rates between 2019 and 2021 may be related to the COVID-19 pandemic. It’s known that the COVID-19 pandemic impacted both the availability of hospital staff to care for ED visitors and the willingness of individuals experiencing distress to seek emergency care. A

look at the Syndromic Surveillance program data for 2022 shows a slightly greater difference between the Counties of Interest and the Comparison Counties. However, the 2023 to-date data is more representative of the rates prior to the pandemic. This later data should be interpreted with care, as it is not yet complete.

Given COPD’s chronic and progressive nature, as well as the illnesses that individuals with COPD are more susceptible to, many individuals will be hospitalized multiple times during the years following diagnosis. A review of inpatient hospitalizations, that is times that an individual must remain in the hospital for one or more nights, can show the continuing burden of COPD in a location. Between 2017 and 2021, 12% to 13% of COPD related inpatient hospital stays in Arkansas were in the Counties of Interest, much higher than would be expected given the share of the population that lives in these counties (Table 4).

Table 4: Inpatient Hospitalizations Among Counties of Interest vs. Comparison Counties, 2017-2021

County Group	2017	2018	2019	2020	2021
Counties of Interest	10,521	10,339	10,738	8,603	8,694
Comparison Counties	73,420	71,832	71,690	60,994	60,285
Entire State	83,941	82,171	82,428	69,597	68,979

Source: Arkansas Department of Health, Hospital Discharge Data System

Converting the number of inpatient hospital stays to a rate per 100,000 population, shows the drastic difference in hospital burden caused by COPD in these counties. Individuals in the Counties of Interest are approximately 70% more likely to require a hospital stay for COPD than in other counties (Table 5).

Table 5: Inpatient Hospitalizations Rate Among Counties of Interest vs. Comparison Counties, 2017-2021

County Group	2017	2018	2019	2020	2021
Counties of Interest	4,507.4	4,413.3	4,568.4	3,636.4	3,666.9
Comparison Counties	2,649.7	2,584.3	2,576.2	2,183.1	2,161.7
Entire State	2,794.0	2,726.5	2,731.4	2,296.5	2,279.6

Source: Arkansas Department of Health, Hospital Discharge Data System

As crop burning only occurs in the fall months, emergency department visits and inpatient visits for the Counties of Interest and the Comparison Counties were examined by season. There was no noticeable difference between the two groups in either type of visit over the years examined. For both ED and inpatient visits, the three months of fall – September, October, and November – accounted for approximately one-fourth of visits for both county groups.

COPD Mortality

Chronic Obstructive Pulmonary Disease (COPD) has been the 3rd or 4th leading cause of death among Arkansans for several years. More than 2,300 Arkansans are expected to die of COPD in 2023. In addition, COPD increases the likelihood of dying from other illnesses, such as flu, pneumonia, and heart disease. Over the last five years, approximately 9% to 10% of COPD deaths in Arkansas were in the Counties of Interest (Table 6).

Table 6: Deaths Among Counties of Interest vs. Comparison Counties, 2017-2021					
County Group	2017	2018	2019	2020	2021
Counties of Interest	239	242	237	240	218
Comparison Counties	2,278	2,143	2,127	2,175	2,157
Entire State	2,517	2,385	2,364	2,415	2,375

Source: Centers for Disease Control and Prevention (CDC), Wide-ranging ONline Data for Epidemiologic Research (WONDER)

When converting the number of deaths to mortality rates per 100,000 population, the increased likelihood of dying from COPD in the Counties of Interests is more apparent. As this table shows, between 15 and 26 more people died per 100,000 population from COPD in the Counties of Interest than in the Comparison Counties (Table 7).

Table 7: Crude Mortality Rate Among Counties of Interest vs. Comparison Counties, 2017-2021					
County Group	2017	2018	2019	2020	2021
Counties of Interest	102.4	103.3	100.8	101.4	91.9
Comparison Counties	82.2	77.1	76.4	77.8	77.3
Entire State	83.8	79.1	78.3	79.7	78.5

Source: Centers for Disease Control and Prevention (CDC), Wide-ranging ONline Data for Epidemiologic Research (WONDER)

Age-adjusted rates, which are preferable to crude rates when comparing geographies as they allow for comparisons between areas with different age demographics, are available for four years of COPD mortality data.

Table 8: Age-adjusted Mortality Rate Among Counties of Interest vs. Comparison Counties, 2017-2021					
County Group	2017	2018	2019	2020	2021
Counties of Interest	85.6	84.7	81.5	82.1	NA
Comparison Counties	65.2	59.9	58.5	58.7	NA
Entire State	66.7	61.7	60.2	60.4	NA

Source: Centers for Disease Control and Prevention (CDC), Wide-ranging ONline Data for Epidemiologic Research (WONDER)

A comparison of age-adjusted rates also shows a higher level of mortality from COPD in the Counties of Interest, with between 20 and 25 more individuals per 100,000 population dying from COPD than in the Comparison Counties (Table 8).

Bibliography

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