



**COPD is a chronic health condition that affects thousands of Kansans. While cigarette smoking is the leading cause of COPD, there are other commonalities among individuals with COPD. This report shares COPD prevalence, hospitalizations, and mortality in Kansas during a five-year time period. Development and data analysis for the report was conducted by the Kansas Environmental Public Health Tracking Program (KS-EPHT), which is part of the Kansas Department of Health and Environment (KDHE). The program is committed to the advancement of environmental health in the state to support KDHE's goal, "to protect and improve the health and environment of all Kansans."**

## **Introduction**

Chronic Obstructive Pulmonary Disease (COPD) is a group of chronic lung diseases which includes chronic bronchitis and emphysema (1). COPD makes breathing difficult because there is less air flow in the lungs due to inflamed and damaged lung tissue (2, 3). With chronic bronchitis, the lining of the bronchial tubes is irritated and inflamed causing long term coughing and mucus (4). With emphysema, air sacs in the lungs are damaged and the walls of these air sacs can rupture (5). Individuals with COPD may have both chronic bronchitis and emphysema. The rupturing creates larger air spaces reducing the amount of oxygen reaching the blood (5). COPD also has the potential to limit an individual's ability to work and sleep and the symptoms of the disease can affect mental health (3). Cigarette smoking is the leading cause of COPD, although non-smokers can also be affected (6). An estimated 5.8% of adults age 18 and above in the US were diagnosed with COPD in 2015 and it was the third leading cause of death for all US resident deaths in 2014 (7, 8). In 2015, COPD affected 6.2% of Kansans age 18 and above.

## **Methods**

### ***Prevalence***

For the purposes of this report, prevalence is the measurement of all individuals affected by COPD at a particular time in a particular place. COPD prevalence estimates for Kansas come from published data by the Kansas Behavioral Risk Factor Surveillance System (BRFSS) program for years 2011-2015. Prevalence of COPD by sex, age, educational attainment, household

income, population density, and smoking status was determined and weighted by the Kansas BRFSS program. Prevalence estimates for the US came from data published by the Centers for Disease Control and Prevention (CDC) BRFSS program for years 2011-2015. National COPD prevalence was estimated using the age-adjusted median for 50 states and Washington DC. Where there was a difference in prevalence between Kansas and the US, a statistical test was used to determine if the difference was a true difference.

### ***Hospitalizations***

Kansas hospital discharge data for the period between January 1, 2011 and December 31, 2015 were used to calculate COPD hospitalization statistics for Kansans age 25 and older. COPD was defined as any hospitalization where the primary diagnosis code contained ICD-10-CM code J40, J41, J42, J43, or J44 or 496 ICD-9-CM code 490, 491, 492, or 496. ICD-9-CM code 493.2 as a primary diagnosis was also included when 490, 491, 492, or 496 were present as a secondary diagnosis code. Both sets of codes were used because hospitalization codes in the US transitioned from ICD-9-CM to ICD-10-CM on October 1, 2015. Age-adjustment is used to compare multiple populations when the distribution of age groups in those populations are different. The age-adjusted rate of COPD hospitalizations by sex and average number of hospitalizations by month and sex were calculated. Age-adjusted rates were calculated by the direct method using 2000 US Standard Population.

### ***Mortality***

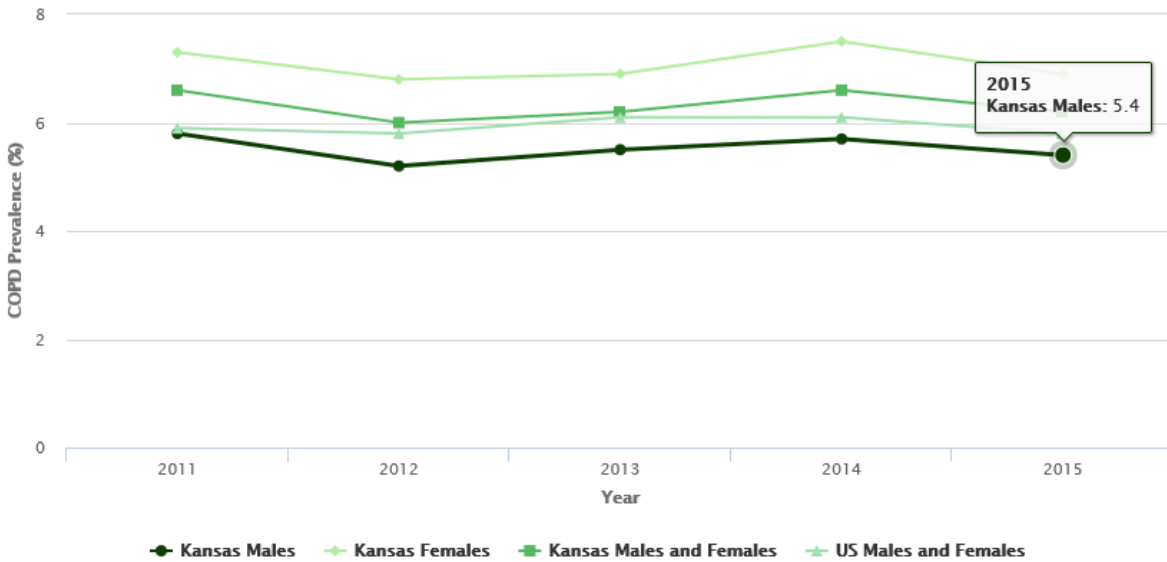
National Vital Statistics System (National Center for Health Statistics) data for the period between January 1, 2011 and December 31, 2015 were used to determine COPD mortality rates for Kansas and the same data source for the period between January 1, 2011 and December 31, 2014 were used to determine COPD mortality rates for the US. COPD was defined as any death where the ICD-10-CM code J40, J41, J42, J43, or J44 was reported as an underlying cause anywhere on the death certificate. The age-adjusted rate of COPD mortality for Kansas and for the US were calculated by the direct method using 2000 US Standard Population.

## **Results**

### ***Prevalence***

Over the 2011-2015 period, the estimated prevalence of COPD was consistently higher among women than men in Kansas (Figure 1). The estimated COPD prevalence in the US and the COPD prevalence in Kansas were similar, although the Kansas prevalence was slightly higher, 5.8% and 6.2% in 2015, respectively, though this difference was not statistically significant for any years in the 2011-2015 period. All groups depicted had a slightly lower prevalence of COPD in 2015 compared to 2011.

Figure 1. COPD Prevalence\* Adults Age 18 and Over by Sex, 2011-2015



\*Note: The median age-adjusted COPD prevalence among the 50 states and Washington DC is used to estimate the US Males and Females COPD prevalence.

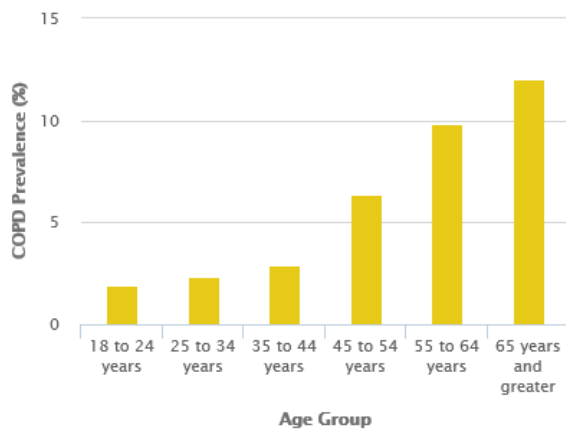
Source: Kansas BRFSS Data: <http://www.kdheks.gov/brfss/index.html> National BRFSS Data:

[https://nccd.cdc.gov/cdi/rdPage.aspx?rdReport=DPH\\_CDI.ExploreByLocation&rdRequestForwarding=Form](https://nccd.cdc.gov/cdi/rdPage.aspx?rdReport=DPH_CDI.ExploreByLocation&rdRequestForwarding=Form)

The prevalence of COPD in Kansas increased as age increased (Figure 2). In 2015, the COPD prevalence was highest in adults that were 65 and older compared to all other age groups (12.0%). Adults aged 18 to 24 years old had the lowest COPD prevalence (1.9%). The difference between these two groups was statistically significant.

COPD was most prevalent among those with a household income of less than \$15,000 (Figure 3). According to the data, adults with a lower household income are at a greater risk of COPD, and the prevalence between those making less than \$15,000 was statistically significantly higher than all other household income groups.

Figure 2. COPD Prevalence by Age Group, Kansas 2015



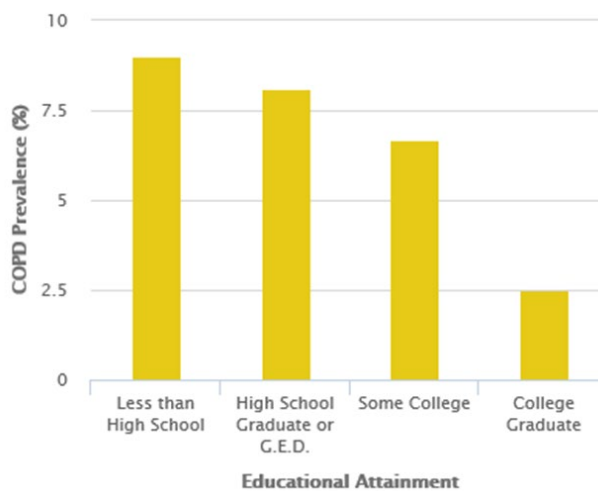
Source: Kansas BRFSS Data: <http://www.kdheks.gov/brfss/index.html>

Figure 3. COPD Prevalence by Annual Household Income, Kansas 2015



Source: Kansas BRFSS Data: <http://www.kdheks.gov/brfss/index.html>

Figure 4. COPD Prevalence by Educational Attainment, Kansas 2015



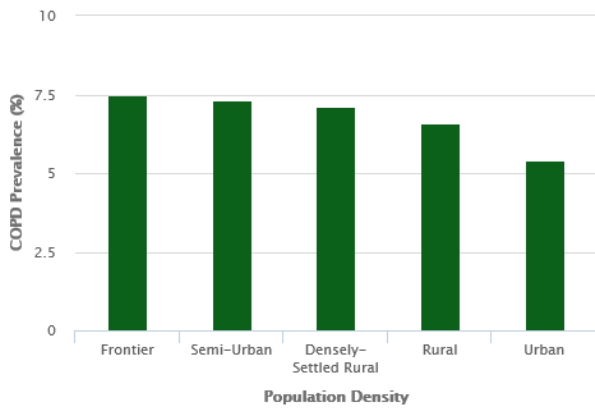
Source: Kansas BRFSS Data: <http://www.kdheks.gov/brfss/index.html>

The prevalence of COPD decreased with higher levels of educational attainment in Kansas (Figure 4). About 9% of people with less than a high school education had COPD compared to less than 3% of those that were college graduates. The difference in prevalence between these two groups was statistically significant indicating a true difference.

In general, the prevalence of COPD did not differ greatly by different population densities in Kansas (Figure 5). Frontier areas had the highest prevalence (7.5%) while urban areas had the lowest (5.4%). No prevalence differences by population density were statistically significant.

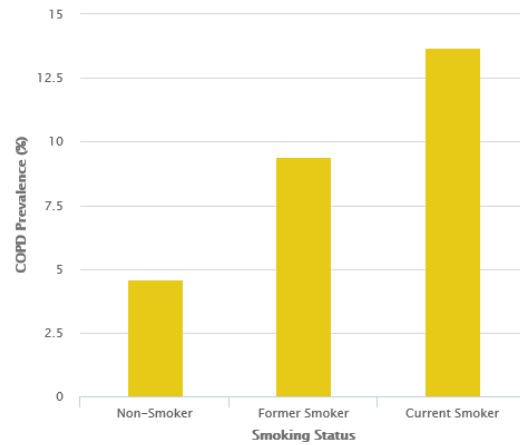
In 2015, the prevalence of COPD was 13.7% among current smokers and 4.6% among non-smokers (Figure 6). This difference in prevalence was statistically significant indicating a true difference. The prevalence of COPD among former smokers was 9.4%; the difference was statistically significant compared to both non-smokers and current smokers.

Figure 5. COPD Prevalence by Population Density, Kansas 2015



Source: Kansas BRFSS Data: <http://www.kdheks.gov/brfss/index.html>

Figure 6. COPD Prevalence by Smoking Status, Kansas 2015

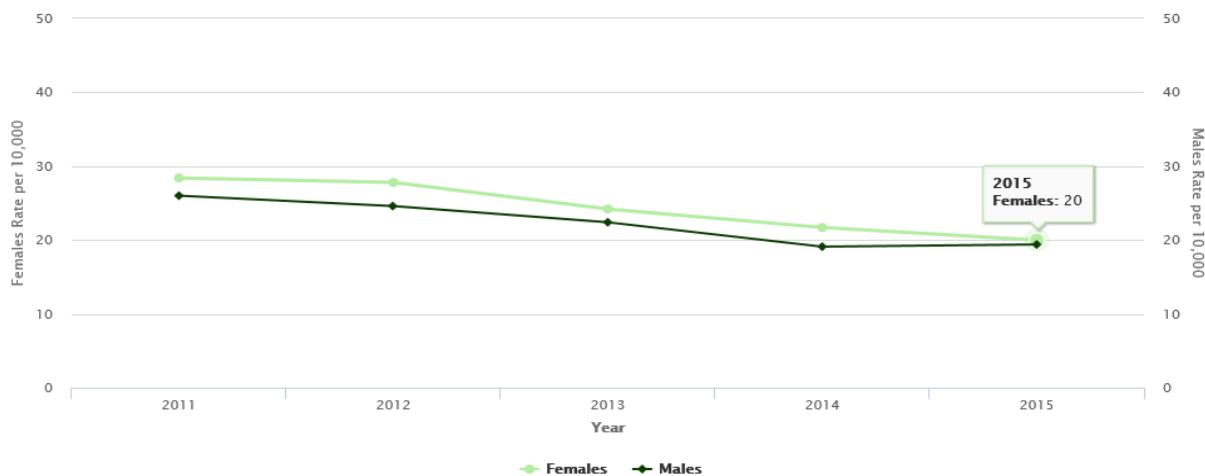


Source: Kansas BRFSS Data: <http://www.kdheks.gov/brfss/index.html>

### Hospitalizations

Over the 2011-2015 period, the rate of COPD hospitalizations in Kansas generally decreased for both males and females (Figure 7). Females consistently had a slightly higher rate of hospitalization for COPD than males.

Figure 7. Age-Adjusted Rate of COPD Hospitalizations Adults Age 25 and Over by Sex, Kansas 2011-2015\*

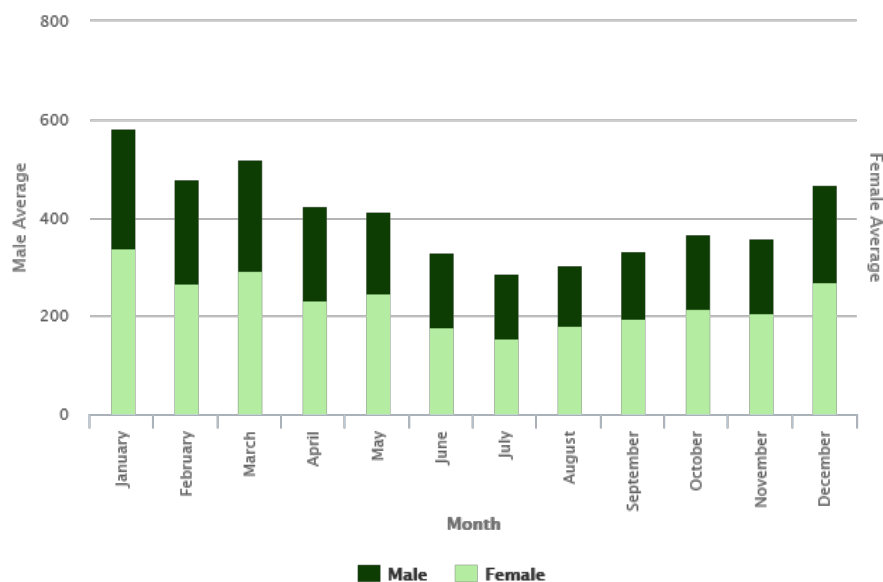


\*Note: The US transitioned from ICD-9-CM to ICD-10-CM on October 1, 2015. Difference in results before 2015 and for 2015 could be due to this coding change and not an actual difference in the number of events.

Source: Kansas Environmental Public Health Tracking Data: <https://keap.kdhe.state.ks.us/Ephtm/>

Colder weather months tended to have a higher average number of COPD hospitalizations compared to warmer weather months in Kansas for the 2011-2015 period (Figure 8). January experienced the highest average number of hospitalizations for both males and females (243.2 and 337.8, respectively). Females had the lowest average number of hospitalizations in July while males had the lowest average number of hospitalizations in August (155 and 122.6, respectively).

Figure 8. Average Number of COPD Hospitalizations Adults Age 25 and Over by Month and Sex, Kansas 2011-2015\*



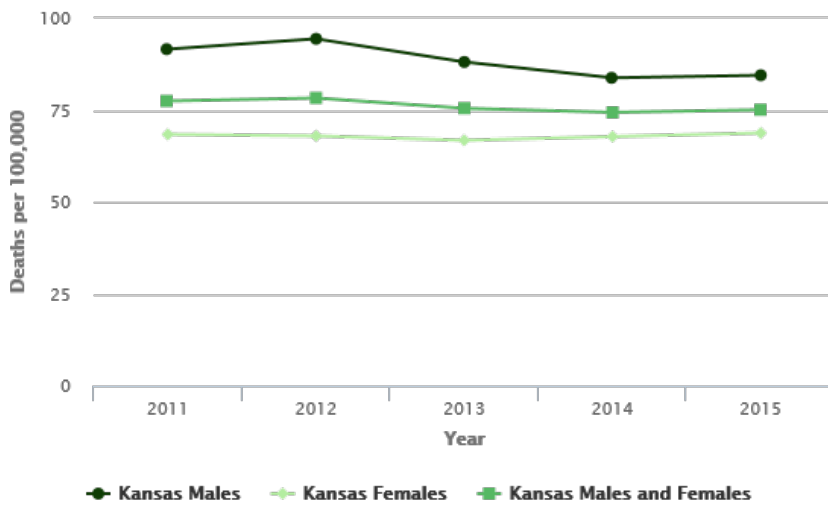
### Mortality

Both nationally and in Kansas, males experienced a higher rate of COPD mortality than females (Figures 9 and 10). Kansas had a lower rate of COPD mortality for both males and females than the national rate in the 2011-2014 period.

\*Note: The US transitioned from ICD-9-CM to ICD-10-CM on October 1, 2015. Difference in results before 2015 and for 2015 could be due to this coding change and not an actual difference in the number of events.

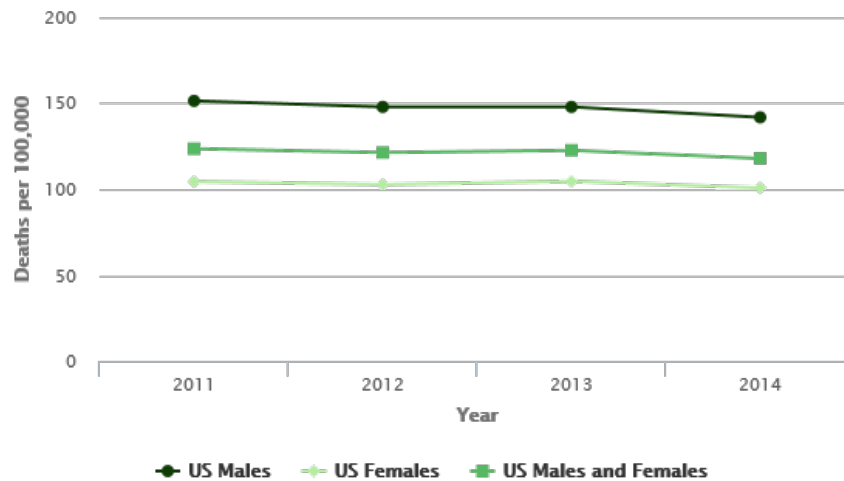
Source: Kansas Environmental Public Health Tracking Data: <https://keap.kdhe.state.ks.us/Ephtm/>

Figure 9. Age-Adjusted Mortality Rate of COPD Adults Age 25 and Over by Sex, Kansas 2011-2015



Source: COPD Mortality Data: <https://ephtracking.cdc.gov/DataExplorer/#/>

Figure 10. Age-Adjusted Mortality Rate of COPD Adults Age 25 and Over by Sex, US 2011-2014



Source: COPD Mortality Data: <https://ephtracking.cdc.gov/DataExplorer/#/>

# Key Findings

- COPD is more prevalent in females than males in Kansas. Females also have a higher rate of hospitalization for COPD than males, but males have a higher rate of mortality due to COPD than females.
- COPD is slightly more prevalent in Kansas compared to the prevalence of COPD in this US, but the mortality rate for COPD in Kansas is lower than that of the US.
- Individuals with lower educational attainment and lower household income have a higher prevalence of COPD.
- COPD is more prevalent in older age groups in Kansas, the same is observed nationally.
- Smokers have a higher prevalence of COPD than non-smokers and former smokers.

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