

# Lung Cancer Disparities in Screening Age New Jersey Adults



February 2019



Prepared by: Pamela Agovino, MPH; Lindsay Eberhart; Susan German, MPH; Jie Li, MPH; Lisa E. Paddock, MPH, PhD; Antoinette Stroup, PhD

Phil Murphy  
*Governor*

Sheila Oliver  
*Lt. Governor*

Shereef Elnahal, MD, MBA  
*Commissioner*



## BACKGROUND

### Lung Cancer Disparities in Screening Age New Jersey Adults

Lung cancer is the leading cause of cancer death in the United States (US) and in New Jersey (NJ).<sup>1</sup> In the US each year, about 154,050 people will die from lung cancer and 234,030 people will be newly diagnosed with lung cancer.<sup>1</sup> Compared to the national average, NJ has a slightly elevated incidence of lung cancer (57.4 vs. 54.5 per 100,000; 2011-2015).<sup>2,3</sup> Conversely, lung cancer mortality rates in NJ are slightly lower than the US average (38.3 vs. 43.4 per 100,000; 2011-2015).<sup>2,3</sup>

In NJ, lung cancer is the second most commonly diagnosed cancer with about 5,879 new cases each year, although disparities in who gets diagnosed with lung cancer exist.<sup>4</sup> Men are more likely than women to be diagnosed with lung cancer (64.3 vs. 52.6 per 100,000; 2011-2015).<sup>3</sup> In addition, geographic variations of cancer incidence rates are not uncommon and usually arise from differences in sociodemographic characteristics of the population (age, race and ethnicity, geographic region, urban or rural residence), screening use and health-related behaviors (tobacco use, diet, physical activity).<sup>5</sup>

Exposure to factors that increase the risk of lung cancer can make a diagnosis of lung cancer more likely.<sup>1</sup> The main risk factor for lung cancer is smoking.<sup>1</sup> Other risk factors include exposure to radon or asbestos and a family history of lung cancer.<sup>1</sup> From 1965 to 2014, the prevalence of smoking among adults in the US decreased from 42.4% to 16.8%, although smoking rates have plateaued recently.<sup>6</sup> The decline in smoking started in 1984 for men, whereas smoking among women did not start to decline until 1998.<sup>7</sup> From 1965-1995, Black men were more likely to be smokers than White men, however Black men and White men now smoke at similar rates, 20.2% and 17.8% respectively.<sup>8,9</sup> Cigarette smoking tends to be higher among those with less education and those living below the poverty line.<sup>10</sup>

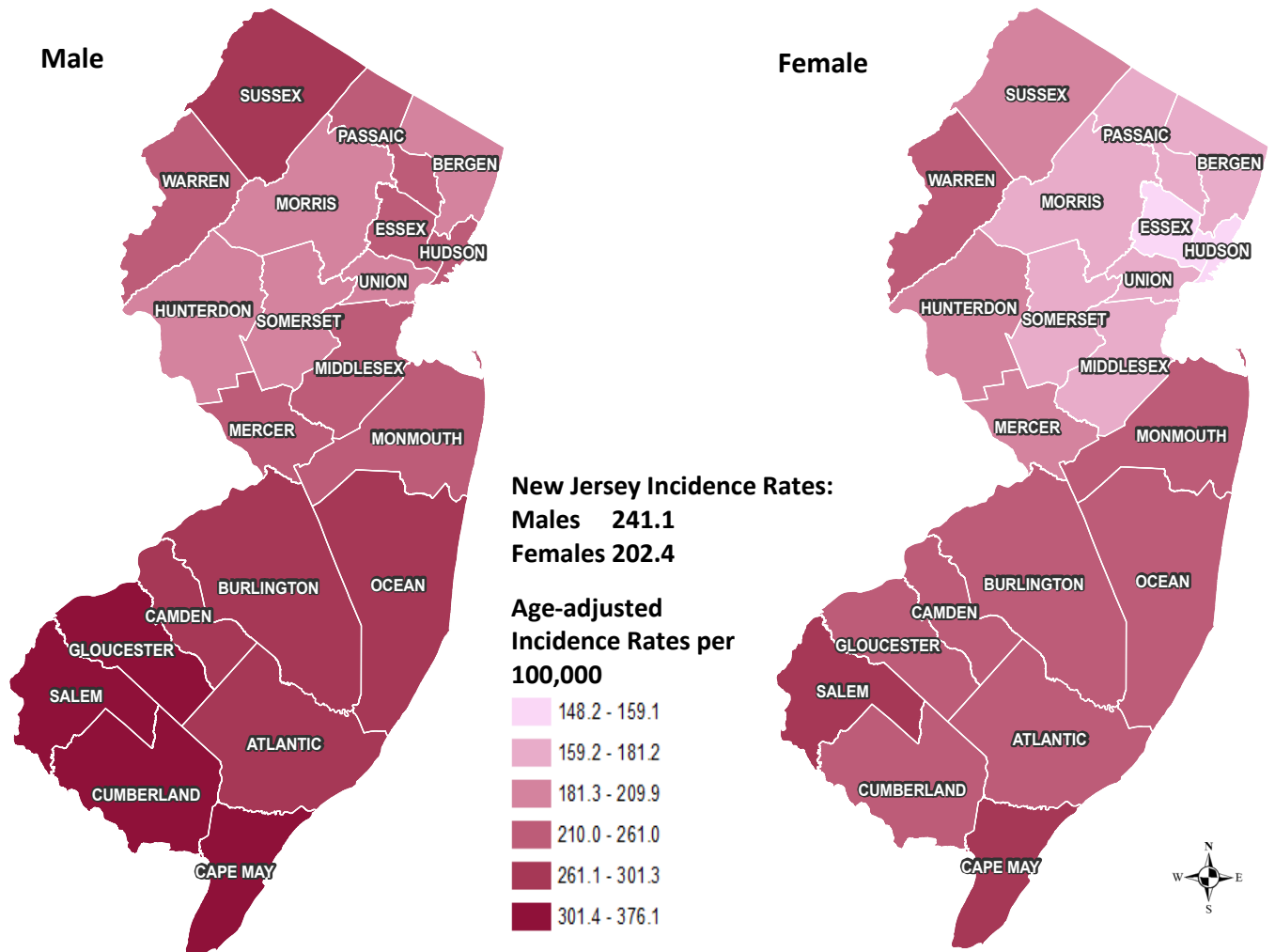
The average 5-year survival rate for lung cancer is 17.7%, although the survival rate varies widely by stage at diagnosis.<sup>7</sup> People who are diagnosed in the earliest stages of lung cancer have a 55% survival rate compared to a 4% survival rate in people who are diagnosed in later stages when the cancer has spread.<sup>7</sup> Unfortunately, only 16% of lung cancers are diagnosed at an early stage.<sup>7</sup>

Late stage diagnosis of lung cancer is common due to a lack of symptoms in early stage lung cancer.<sup>1</sup> Therefore, lung cancer screening has been suggested for those at higher risk.<sup>1</sup> The National Lung Screening Trial, which enrolled individuals at high risk for lung cancer, found that low-dose computed topography screening reduced lung cancer deaths by 20%.<sup>11</sup> Based on this study and a review of lung cancer literature, the US Preventive Services Task Force (USPSTF) released a statement in 2013 recommending lung cancer screening for current and former (quit within past 15 years) smokers aged 55-80, with a 30-pack year smoking history.<sup>12</sup> Pack-years can be determined by multiplying the number of cigarette packs smoked a day, by the number of years a person has smoked.<sup>12</sup>

Data on the implementation of lung cancer screening recommendations is limited, however, existing data suggests poor uptake. In 2015, only about half of primary care physicians were aware of the lung cancer screening guidelines.<sup>13</sup> Another study used 2015 National Health Interview Survey data to determine that of the 6.8 million smokers meeting USPSTF screening guidelines, only 262,700 were screened.<sup>14</sup> An exploratory study in 2017 also found that of the participants meeting the USPSTF guidelines, only 22.7% had been screened for lung cancer.<sup>15</sup> Furthermore, non-Black patients meeting USPSTF screening guidelines were 2.8 times more likely to be screened than Black patients meeting the same standards.<sup>15</sup> ScreenNJ (<https://screennj.org/>) is a collaborative project of organizations across New Jersey, headed by Rutgers Cancer Institute of New Jersey, committed to reducing cancer incidence and mortality through an effective cancer prevention and screening project.

This report characterizes lung cancer diagnosis and smoking prevalence by NJ county using data from the New Jersey State Cancer Registry (NJSCR) and the NJ Behavioral Risk Factor Survey by examining cases of NJ adults who were diagnosed with invasive lung cancer between 2011 and 2015 and who were in the age category recommended for lung cancer screening (ages 55-79 for purposes of this report).

# Newly Diagnosed Lung Cancer in Screening Age New Jersey Adults



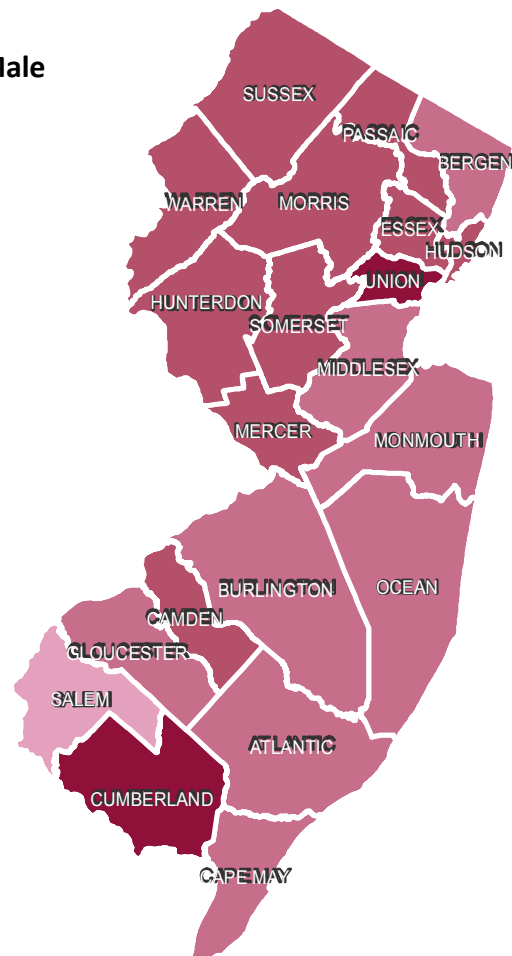
State/County	Male Age-adjusted Rate	Male Count	Female Age-adjusted Rate	Female Count
New Jersey	241.1	10,122	202.4	10,276
Atlantic	271.2	391	246.4	420
Bergen	209.9	970	179.8	1,006
Burlington	275.0	611	220.9	584
Camden	301.3	717	248.1	716
Cape May	346.5	255	265.8	218
Cumberland	343.3	248	236.3	199
Essex	215.5	666	159.1	657
Gloucester	326.6	444	250.4	414
Hudson	225.1	531	148.2	449
Hunterdon	200.5	135	201.7	149
Mercer	249.3	418	198.1	395
Middlesex	215.5	774	181.2	785
Monmouth	238.8	754	240.5	903
Morris	181.4	454	175.0	508
Ocean	275.6	1,005	261.0	1,195
Passaic	222.5	487	165.9	444
Salem	376.1	136	272.5	116
Somerset	203.6	317	168.9	304
Sussex	282.2	220	208.7	181
Union	197.7	450	167.8	474
Warren	238.0	139	248.1	159

- ◇ Lung cancer incidence rates are higher among males compared to females.
- ◇ Male and female incidence is higher among the southern counties compared to the northern counties.
- ◇ Female incidence rates are notably lower in the northeastern portion of the state whereas males in this area have higher incidence rates.

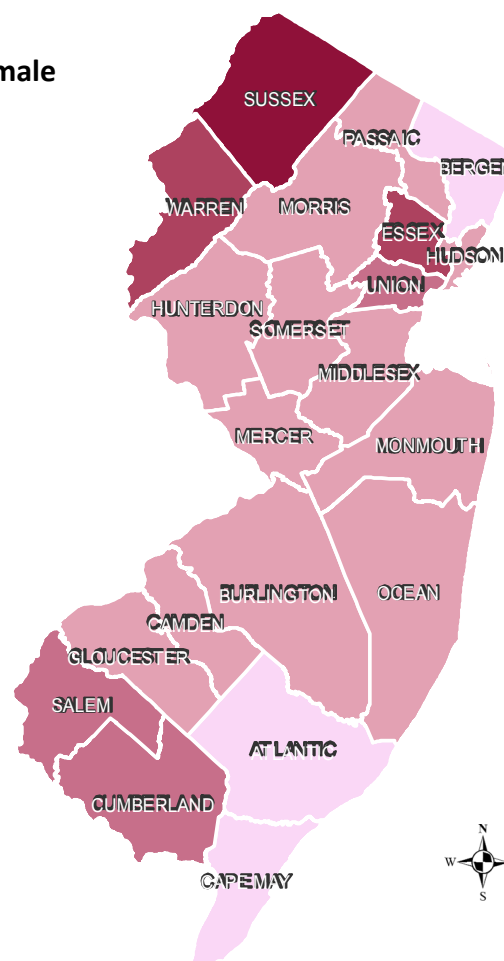
Incidence data are from the New Jersey State Cancer Registry and include invasive lung cancers from 2011-2015 in adults ages 55-79 years.

# Late Stage Lung Cancer Diagnosis Among New Jersey Adults of Screening Age

Male

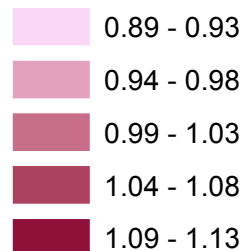


Female



New Jersey overall: 1.00

Late Stage SPR\*



State/County	Male SPR*	Female SPR*
New Jersey	1.04	0.97
Atlantic	1.00	0.92
Bergen	1.01	0.93
Burlington	1.02	0.97
Camden	1.06	0.97
Cape May	1.02	0.89
Cumberland	1.10	1.00
Essex	1.08	1.04
Gloucester	0.99	0.95
Hudson	1.06	0.98
Hunterdon	1.07	0.96
Mercer	1.06	0.94
Middlesex	1.02	0.95
Monmouth	1.01	0.95
Morris	1.04	0.97
Ocean	1.00	0.94
Passaic	1.05	0.97
Salem	0.98	0.99
Somerset	1.05	0.97
Sussex	1.07	1.13
Union	1.10	1.02
Warren	1.08	1.05

- ◇ Among screening age adults, men have a higher proportion of late stage lung cancer.
- ◇ Northern New Jersey counties have higher proportions of people being diagnosed with late stage lung cancer than the early, more treatable stages.
- ◇ Women in Sussex county have 13% more (SPR 1.13) and men have 7% more (SPR 1.07) late stage lung cancer diagnoses compared to overall New Jersey proportions. Essex and Warren counties also have a high proportion of men and women who are diagnosed with late stage lung cancer.

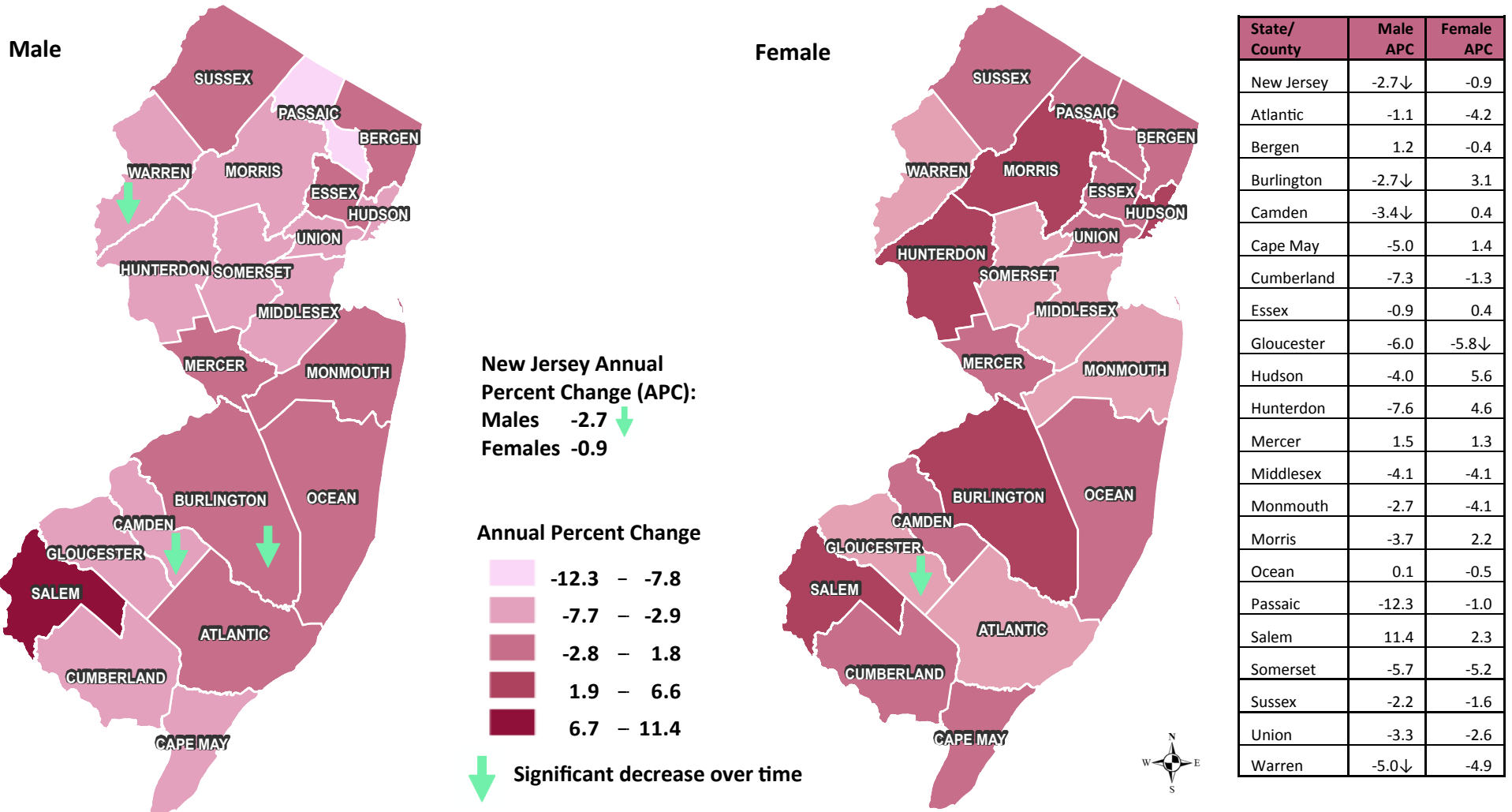
\*Standardized Proportion Ratio (SPR) of late stage lung cancer cases in each county compared to New Jersey. SPRs can be interpreted as the percentage above or below the reference population's SPR of 1.00 or 100%.

A SPR of 1.13 represents 13% higher than the New Jersey SPR, while a 0.89 SPR represents 11% lower than the New Jersey SPR.

Late stage includes regional and distant stages. The denominator includes all cases (*in situ*, local, regional, distant).

Incidence data are from the New Jersey State Cancer Registry and include lung cancers from 2011-2015 in adults ages 55-79 years.

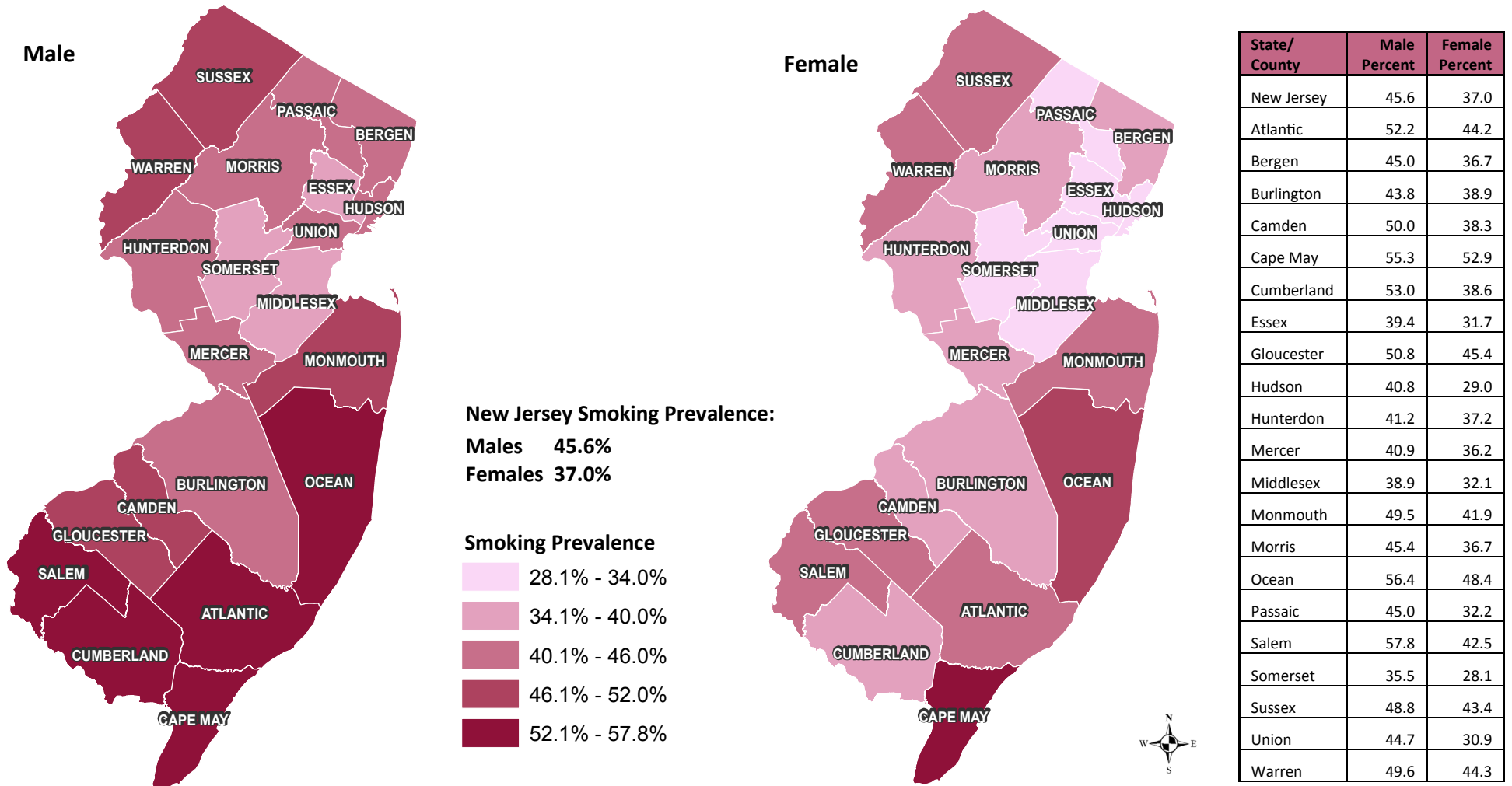
# Changes Over Five Years of Newly Diagnosed Lung Cancer in Screening Age New Jersey Adults



- ◇ Overall, rates of newly diagnosed lung cancer decreased significantly in men. Rates of newly diagnosed lung cancer in women also decreased (not statistically significant).
- ◇ Rates of new lung cancer among men decreased significantly in Burlington, Camden, and Warren counties.
- ◇ In men, Warren county had the highest decline in rates of new lung cancer among counties that showed a significant decline.
- ◇ Among women, newly diagnosed lung cancer rates decreased significantly in Gloucester county.

Incidence data are from the New Jersey State Cancer Registry and include invasive lung cancers from 2011-2015 in adults ages 55-79 years.

# Smoking Prevalence in New Jersey Adults by County



- ◇ Overall, males have higher smoking prevalence than females.
- ◇ Smoking prevalence is highest in most of the southern counties as well as in Sussex and Warren counties for males, and in Ocean and Cape May counties among females.
- ◇ Smoking prevalence is lowest (below 40%) in Essex, Somerset, and Middlesex counties for both males and females.

Smoking prevalence data are from 2011-2016 New Jersey Behavioral Risk Factor Survey presented as percentages not age-adjusted and include current and former smokers. Current smoker is defined as someone who now smokes "every day" or "some days". Former smoker is defined as someone who does not smoke "at all" now, but had smoked at least 100 cigarettes in their entire life.



## CONCLUSIONS

### Lung Cancer Disparities in Screening Age New Jersey Adults

- ◇ Rates of new lung cancer diagnoses are higher in men compared to women who are in the age group recommended for lung cancer screening (55-79), although geographic disparities exist.
- ◇ For both men and women who are screening age, newly diagnosed (incidence) lung cancer rates tend to be higher in the southern portion of the state compared to the northern portion.
- ◇ Late stage lung cancer by county is more often diagnosed in men compared with women. Because late stage diagnosis in the 55-79 age group is often the result of poor screening rates, the data and maps presented here can be used to direct screening efforts to assist in early detection, and thereby decreasing the proportion of lung cancers detected in later stages.
- ◇ Past and current smoking prevalence is generally higher among men compared to women as well as in the southern and northwestern counties of the state.
- ◇ Areas that had a high smoking prevalence also had high lung cancer incidence, as we would expect to see given the strong association between smoking and lung cancer risk. This is particularly evident in southern New Jersey counties.
- ◇ Men of screening age displayed a statistically significant recent decline in rates of newly diagnosed lung cancer while the rates among women of screening age showed little change. This most likely reflects historical differences in tobacco use and cessation, such that women took up smoking many years later than men.<sup>16,17</sup>
- ◇ Warren, Burlington and Camden counties saw a statistically significant decline in rates of newly diagnosed lung cancer among men in the screening age group, while Gloucester county saw a statistically significant decline among women in the same age group. More than likely, these declines are due to reduced smoking prevalence over the past several decades.
- ◇ Overall, New Jersey is making very good progress toward the Healthy New Jersey (HNJ) 2020 target lung cancer mortality rate of 31.5 per 100,000 population.<sup>18</sup> In 2016, New Jersey's lung cancer mortality rate was 33.8 per 100,000 population. The HNJ 2020 target for the percentage of adults who smoke is 12.4%.<sup>18</sup> New Jersey is making progress toward this goal, with 14.2% of adults reporting having smoked cigarettes in 2016.<sup>18</sup>

Data were collected by the New Jersey State Cancer Registry under contract HHSN 261201300021I and control No. N01PC-2013-00021 from the Surveillance, Epidemiology, and End Results Program of the National Cancer Institute, and under cooperative agreement 5U58DP003931-02 from the National Program of Cancer Registries, Centers for Disease Control and Prevention, in addition to funding from the State of New Jersey, and the Rutgers Cancer Institute.

### Lung Cancer Disparities in Screening Age New Jersey Adults

#### Data Sources

- ◇ New Jersey incidence data for this report were derived from the NJSCR December 2017 file. This report includes lung and bronchus cancer cases from 2011-2015 in adults ages 55-79 years. Lung and bronchus cancer is defined by the topography codes C340-C349 as detailed in the International Classification of Diseases for Oncology (ICD-O) third edition.
- ◇ Smoking data were obtained from the New Jersey Behavioral Risk Factor Survey (NJBRFS): New Jersey Department of Health, Center for Health Statistics, New Jersey State Health Assessment Data (NJSHAD). Accessed at <http://nj.gov/health/shad> on 05/16/18. The estimated percentages have been produced by weighting the sample so that the results better represent the New Jersey population and to adjust for the probability of selection.

#### Software

- ◇ Data analyses were conducted using SEER\*Stat version 8.3.5 and ESRI ArcMap version 10.4.1.

#### Methods

- ◇ Rates are per 100,000 and age-adjusted to the 2000 US population standard.
- ◇ The annual percent change is statistically significant at  $p < 0.05$ .
- ◇ The standardized proportion ratio displays the burden of late stage (regional and distant) lung cancer cases in each county compared to New Jersey. Total number of cases include *in situ*, local, regional, and distant stage. Because unstaged cases were not used for the standardized proportion ratio calculation, caution is advised when interpreting the results.
- ◇ Map legend categories were created using equal intervals for the complete range of data for males and females and then applying breakpoints to male and female data separately.
- ◇ The NJSCR Data Guidelines containing comprehensive data analysis methods, race and ethnicity classification, population and mortality data sources, and additional information related to NJSCR data can be found at <https://nj.gov/health/ces/reports.shtml>.



## REFERENCES

- 1) American Cancer Society. Lung Cancer. Available at: <https://www.cancer.org/cancer/lung-cancer.html>. Accessed May 2018.
- 2) Noone AM, Howlander N, Krapcho M, Miller D, Brest A, Yu M, Ruhl J, Tatalovich Z, Mariotto A, Lewis DR, Chen HS, Feuer EJ, Cronin KA (eds). SEER Cancer Statistics Review, 1975-2015, National Cancer Institute. Bethesda, MD, [https://seer.cancer.gov/csr/1975\\_2015/](https://seer.cancer.gov/csr/1975_2015/), based on November 2017 SEER data submission, posted to the SEER web site, April 2018.
- 3) New Jersey State Cancer Registry December 2017 file.
- 4) New Jersey State Cancer Registry. Cancer Incidence and Mortality in New Jersey, 2010-2014. Available at: <http://www.nj.gov/health/ces/documents/reports/report10-14.pdf>. Accessed May 2018.
- 5) Centers for Disease Control and Prevention. *Interpreting the Incidence Data*. Centers for Disease Control and Prevention; 2005. Available at: [https://www.cdc.gov/cancer/uscs/technical\\_notes/contributors/index.htm](https://www.cdc.gov/cancer/uscs/technical_notes/contributors/index.htm). Accessed December 2018.
- 6) Center for Disease Control and Prevention. Trends in Current Cigarette Smoking Among High School Students and Adults, United States, 1965–2014. Available at: [https://www.cdc.gov/tobacco/data\\_statistics/tables/trends/cig\\_smoking/index.htm](https://www.cdc.gov/tobacco/data_statistics/tables/trends/cig_smoking/index.htm). Accessed May 2018.
- 7) American Lung Association. Lung Cancer Fact Sheet. Available at: <http://www.lung.org/lung-health-and-diseases/lung-disease-lookup/lung-cancer/resource-library/lung-cancer-fact-sheet.html>. Accessed May 2018.
- 8) U.S. Department of Health and Human Services. Tobacco Use Among U.S. Racial/Ethnic Minority Groups—African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics: A Report of the Surgeon General. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1998.
- 9) Centers for Disease Control and Prevention. Burden of Tobacco Use in the U.S. Available at: <https://www.cdc.gov/tobacco/campaign/tips/resources/data/cigarette-smoking-in-united-states.html>. Accessed May 2018.
- 10) Centers for Disease Control and Prevention. Cigarette smoking And Tobacco Use Among People of Low Socioeconomic Status. Available at: <https://www.cdc.gov/tobacco/disparities/low-ses/index.htm>. Accessed May 2018.
- 11) National Lung Screening Trial Research Team. "Reduced lung-cancer mortality with low-dose computed tomographic screening." *New England Journal of Medicine* 365.5 (2011): 395-409.
- 12) U.S. Preventive Services Task Force. Final Recommendation Statement: Lung Cancer: Screening. Available at: <https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/lung-cancer-screening>. Accessed May 2018.
- 13) Raz, Dan J., et al. "Perceptions and utilization of lung cancer screening among primary care physicians." *Journal of Thoracic Oncology* 11.11 (2016): 1856-1862.
- 14) Jemal, Ahmedin, and Stacey A. Fedewa. "Lung Cancer Screening With Low-Dose Computed Tomography in the United States—2010 to 2015." *JAMA Oncology* 3.9 (2017): 1278–1281. *PMC*. Web. 15 May 2018.
- 15) Japuntich, Sandra J., et al. "Racial Disparities in Lung Cancer Screening: An Exploratory Investigation." *Journal of the National Medical Association* (2017).
- 16) Siegel RL, Miller KD, Jemal A. Cancer statistics, 2018. *CA Cancer J Clin* 2018;68:7-30.
- 17) American Cancer Society. Facts & Figures 2018: Rate of Deaths from Cancer Continues Decline. Available at: [https://www.cancer.org/latest-news/facts-and-figures-2018-rate-of-deaths-from-cancer-continues-decline.html#helpful\\_resources](https://www.cancer.org/latest-news/facts-and-figures-2018-rate-of-deaths-from-cancer-continues-decline.html#helpful_resources). Accessed October 2018.
- 18) New Jersey Department of Health. Healthy New Jersey 2020 Objectives, Baselines, and Targets: CA-14. Available at: <http://www.state.nj.us/health/chs/hnj2020/documents/objectives/allobjtable.pdf>. Accessed December 2018.