

# Exploring Rural and Urban Mortality Differences in the Appalachian Region

*A Consortium of*



Center *for*  
Rural Health

The University of North Dakota  
School of Medicine & Health Sciences

The Walsh Center   
for Rural Health Analysis

NORC AT THE UNIVERSITY OF CHICAGO

## Rural Health Reform Policy Research Center (RHRPRC)

RHRPRC is a consortium that combines the resources of two premier institutions:

- The University of North Dakota Center for Rural Health
- NORC Walsh Center for Rural Health Analysis

Research conducted by the RHRPRC informs policy makers and rural providers to:

- Increase access to health care services
- Improve overall health status of rural residents
- Assist rural communities in securing adequate, affordable, high-quality health care services

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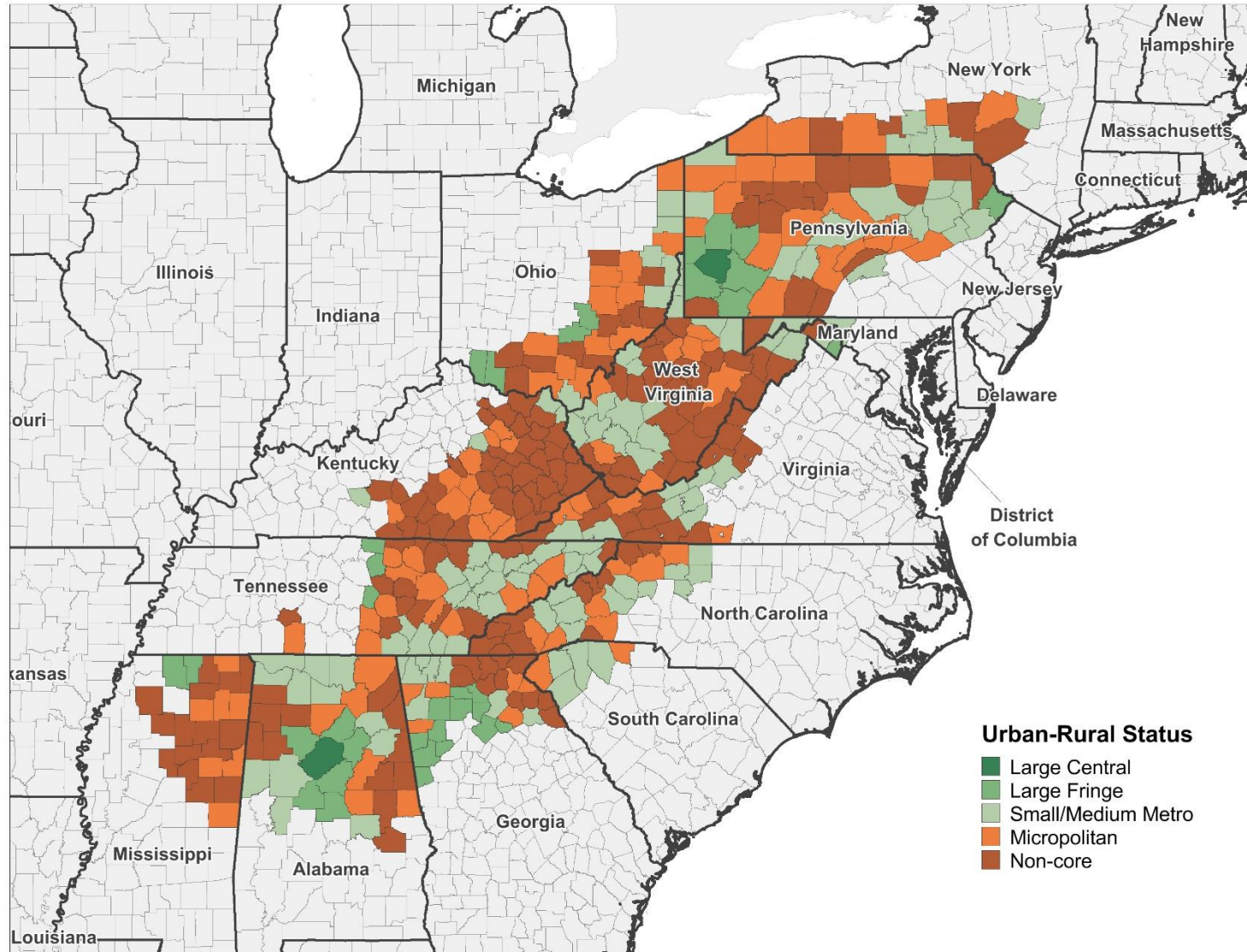
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Where you live should not determine  
whether you live, or whether you die  
— Bono

# Appalachian Region



The Appalachian Region is 205,000-square-mile and spans the Appalachian Mountains from southern New York to northern Mississippi. It includes all of **West Virginia** and parts of 12 other states: **Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia.**

The Region includes 420 counties in 13 states and has a population of 25 million people. Forty-two percent of the Region's population is rural, compared with 20 percent of the national population.

Source: Appalachian Regional Commission, <http://www.arc.gov/>.

## Index for Regional Mortality Rates in Appalachian Region, by Rural-Urban Status: United States, 2011-2013

- [Introduction](#)
- [Figure 2: Infants \(Age Under 1 Years\)](#)
- [Figure 3: Children \(Age 1 to 14 Years\)](#)
- [Figure 4: Adolescents and Young Adults \(Age 15 to 24 Years\), Males](#)
- [Figure 5: Adolescents and Young Adults \(Age 15 to 24 Years\), Females](#)
- [Figure 6: Working-Age Adults \(Age 25 to 64 Years\), Males](#)
- [Figure 7: Working-Age Adults \(Age 25 to 64 Years\), Females](#)
- [Figure 8: Seniors \(Age  \$\geq\$ 65 Years\), Males](#)
- [Figure 9: Seniors \(Age  \$\geq\$ 65 Years\), Females](#)

## Introduction

- Cause-specific mortality is often higher in rural counties than urban counties
- 42% of the Appalachia region's population is rural, compared with 20% of the national population
- Risk factors contribute to high mortality rates in rural areas
  - Smoking
  - Obesity
  - Physical inactivity
- High mortality rates and risk factors are a reflection of the physical and social environment in which people live and work

## Study Purpose

- To examine the impact of rurality on mortality in Appalachia



## Research Question

- What are the differences in rural and urban mortality rates in Appalachia?

## Methods

Source of Mortality data:

National Vital Statistics System (NVSS)

- Years 2011-2013

Data are grouped by:

- 2013 NCHS Urban-Rural Classification Scheme for Counties
  - (Large Central, Large Fringe, Small/Medium Metro, Micropolitan, Non-core)
- Age
- Gender
- Cause of Death
  - Top 10 Nation-wide causes of death for each age group

## 2013 NCHS Urban-Rural Classification Scheme for Counties

2013 NCHS Urban-Rural Classification	Definition
<b>Large central</b> (inner cities)	Counties in MSA of 1 million or more population that: Contain the entire population of the largest principal city of the MSA; Are completely contained in the largest principal city of the MSA; or Contain at least 250,000 residents of any principal city of the MSA
<b>Large Fringe</b> (suburban)	Counties in MSAs with a population of at least 1 million residents
<b>Small Metro</b>	Counties in MSAs with a population of less than 1 million residents
<b>Micropolitan</b> (large rural)	Counties with populations of 10,000 to 49,999
<b>Non-core</b> (small rural)	Remaining nonmetropolitan counties that are not in a micropolitan statistical area

## Additional Notes on the Charts

- Estimates for the top ten causes of death are shown.
- Data Tables and Technical Notes are available via electronic access with explicit details including mortality rates, explanation of mortality index, age-adjustment, cause of death, etc.
- A missing dot indicates either 1) a suppressed rate or 2) identical values between an urban and rural estimate (where more urban cases cover the more rural cases). See Appendix A for list of such cases.
- Suppressed data points occur when there are fewer than 10 deaths within that population sub-group (age, sex, rural-urban status, region).
- If a cause is not listed on the graph, then all data points for that cause are suppressed. A graph with fewer than 10 causes of death indicates that all points are suppressed for the missing cause(s).
- Rates are age-adjusted for ages 1-14 Years, 25-64 Years, and 65 Years and Over, and represent deaths per 100,000 population.
- Index is calculated as:  $(\text{local mortality rate} / \text{national mortality rate}) * 100$  where the national mortality rate is calculated using age-specific and sex-specific (over 15 years) death rates.

## Additional Notes on the Charts

- The graphs and accompanying text are part of a group of available information including Technical Notes and data tables corresponding to the graphed data. The Technical Notes provide information about data sources and methods.
- All data tables include the mortality rates underlying the graphics. The tables also include related data not included in the chart, as well as standard errors of estimates and results of statistical comparisons.

### **Electronic access:**

Exploring Rural and Urban Mortality Differences by HHS Region may be accessed from the Rural Health Research Gateway website at:

<http://www.ruralhealthresearch.org/>.

The graphs from this presentation may be accessed at:

[https://viz.norc.org/views/On-LineToolIndexforMortalityRates/Introduction?:embed=y&:display\\_count=no](https://viz.norc.org/views/On-LineToolIndexforMortalityRates/Introduction?:embed=y&:display_count=no)

Figure 2

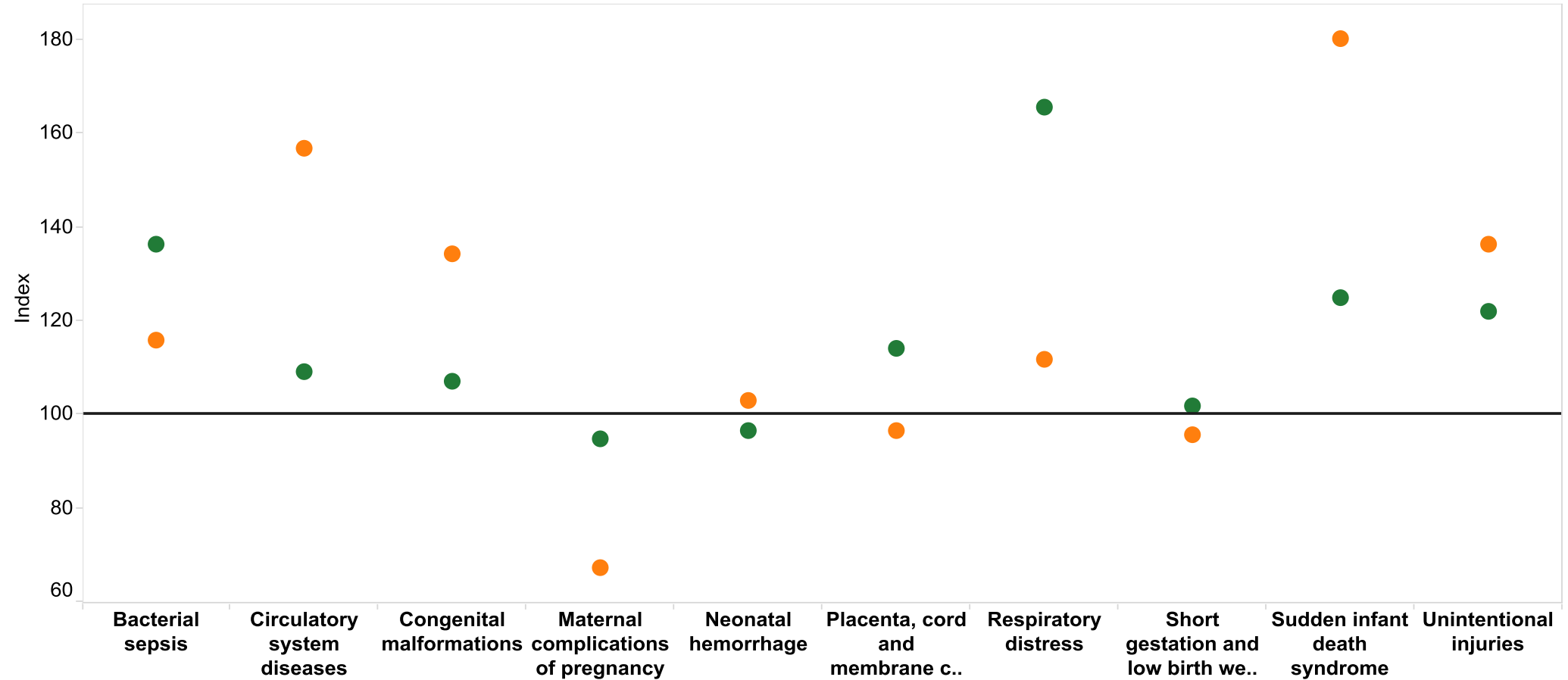
Please select:

**Age** Under 1 Year  
**Sex** Both Sexes  
**Region** Appalachia Region

**Rural-Urban Status**  
Rural  
Urban

### Index for Mortality Rates for Cause Related to the National Mortality Rate among Persons (Both Sexes) Age Under 1 Year, in Appalachia Region, by Rural-Urban Status: United States, 2011-2013

Objects above the horizontal line where index=100 indicates mortality rates higher than the national average, below the line are values below the average.



SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death.  
SUGGESTED CITATION: Rural Health Reform Policy Research Center. Exploring Rural and Urban Mortality Differences, August 2015 Bethesda, MD. 2015.

Figure 3

Please select:

**Age** 1 to 14 Years

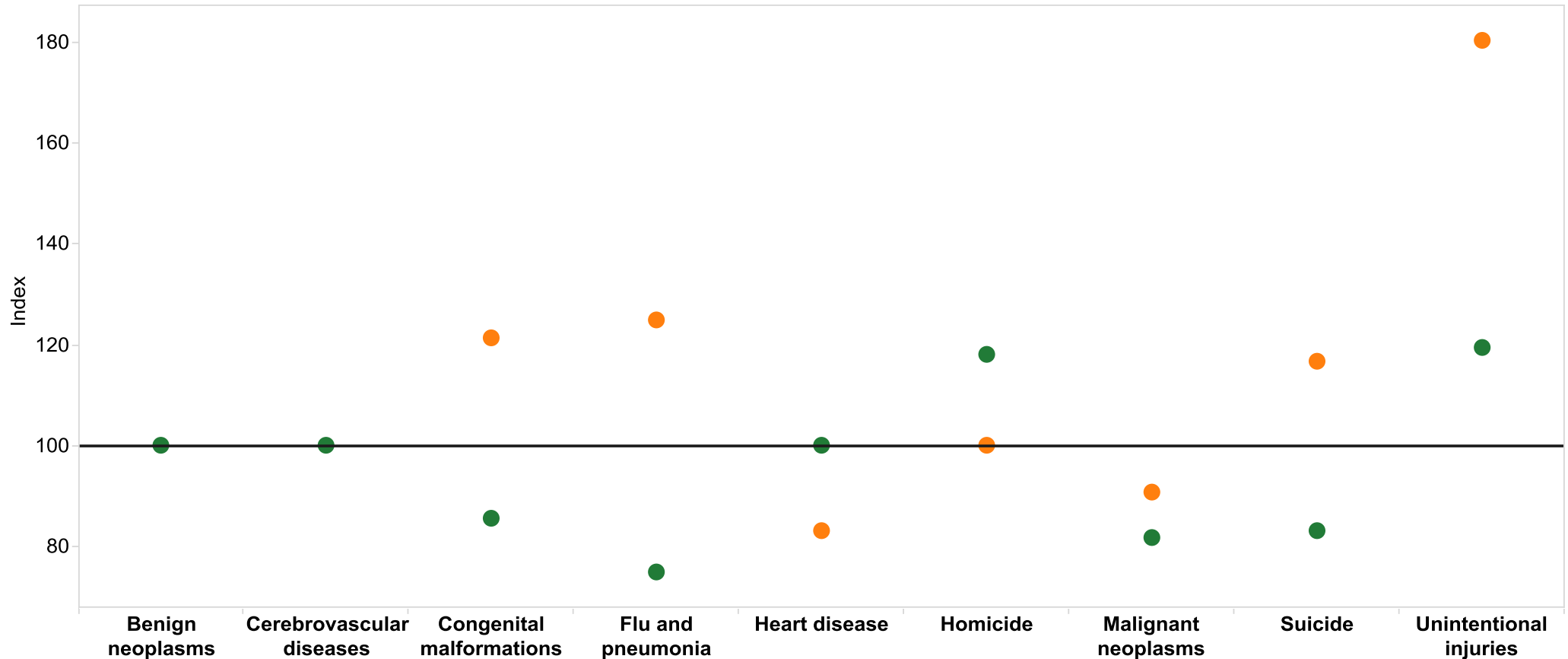
**Sex** Both Sexes

**Region** Appalachia Region

**Rural-Urban Status**  
Rural  
Urban

### Index for Mortality Rates for Cause Related to the National Mortality Rate among Persons (Both Sexes) Age 1 to 14 Years, in Appalachia Region, by Rural-Urban Status: United States, 2011-2013

*Objects above the horizontal line where index=100 indicates mortality rates higher than the national average, below the line are values below the average.*



SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death.

SUGGESTED CITATION: Rural Health Reform Policy Research Center. Exploring Rural and Urban Mortality Differences, August 2015 Bethesda, MD. 2015.

Figure 4

Please select:

**Age** 15 to 24 Years

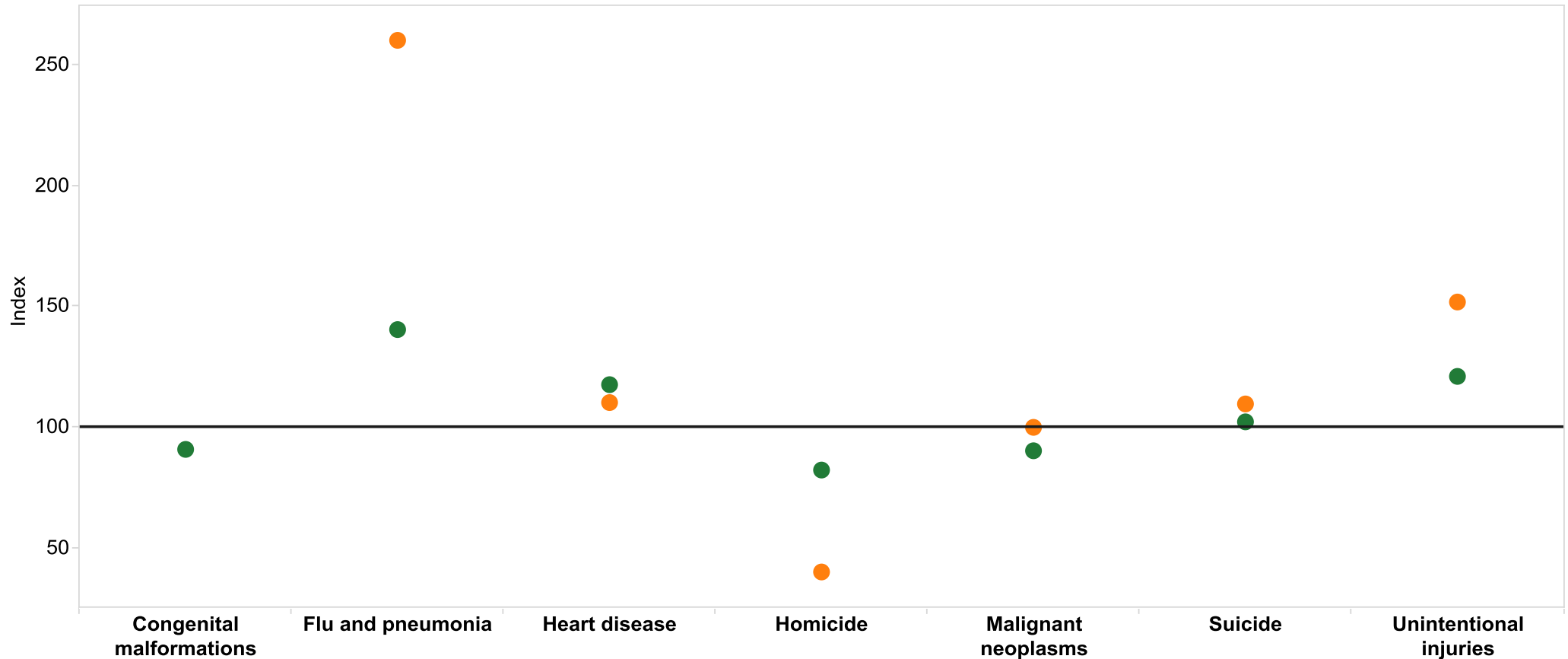
**Sex** Males

**Region** Appalachia Region

**Rural-Urban Status**  
Rural  
Urban

### Index for Mortality Rates for Cause Related to the National Mortality Rate among Persons (Males) Age 15 to 24 Years, in Appalachia Region, by Rural-Urban Status: United States, 2011-2013

*Objects above the horizontal line where index=100 indicates mortality rates higher than the national average, below the line are values below the average.*



SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death.

SUGGESTED CITATION: Rural Health Reform Policy Research Center. Exploring Rural and Urban Mortality Differences, August 2015 Bethesda, MD. 2015.



Figure 5

Please select:

**Age** 15 to 24 Years

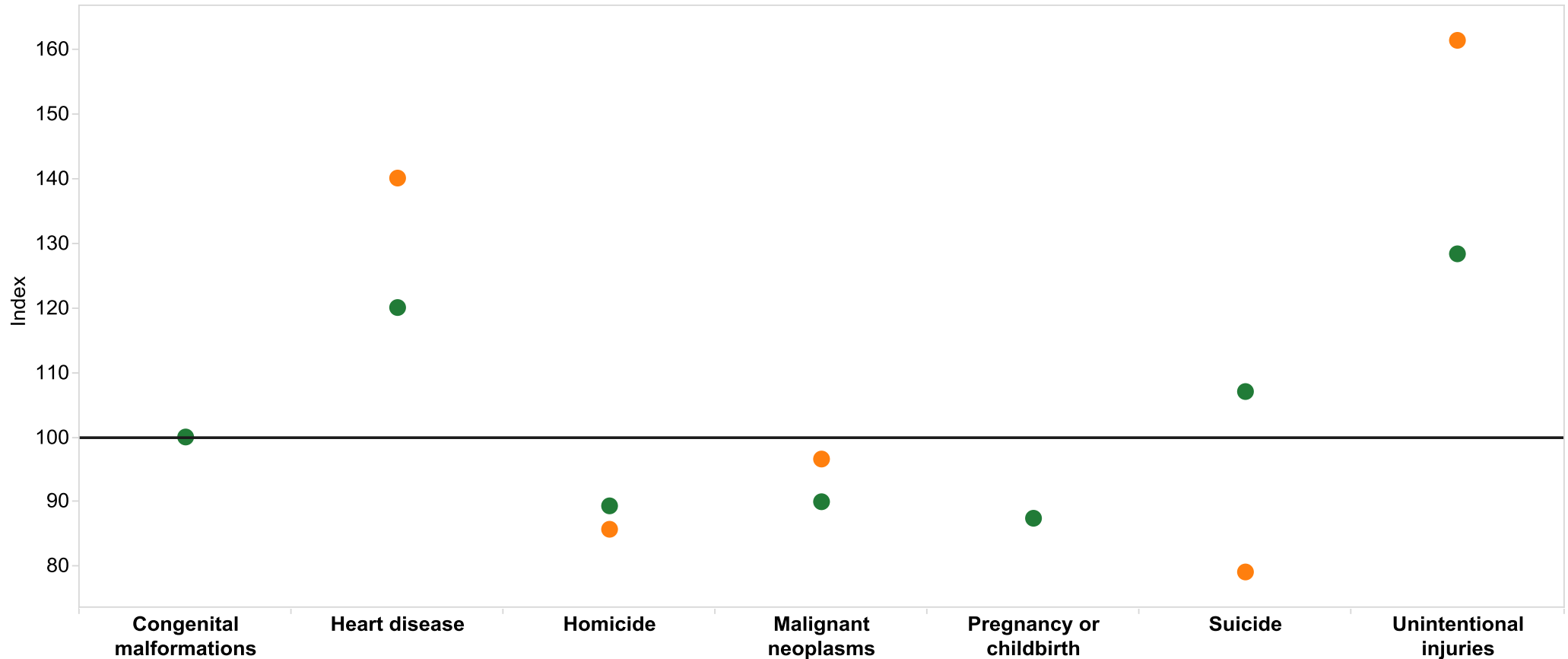
**Sex** Females

**Region** Appalachia Region

**Rural-Urban Status**  
Rural  
Urban

### Index for Mortality Rates for Cause Related to the National Mortality Rate among Persons (Females) Age 15 to 24 Years, in Appalachia Region, by Rural-Urban Status: United States, 2011-2013

Objects above the horizontal line where index=100 indicates mortality rates higher than the national average, below the line are values below the average.



SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death.

SUGGESTED CITATION: Rural Health Reform Policy Research Center. Exploring Rural and Urban Mortality Differences, August 2015 Bethesda, MD. 2015.

Figure 6

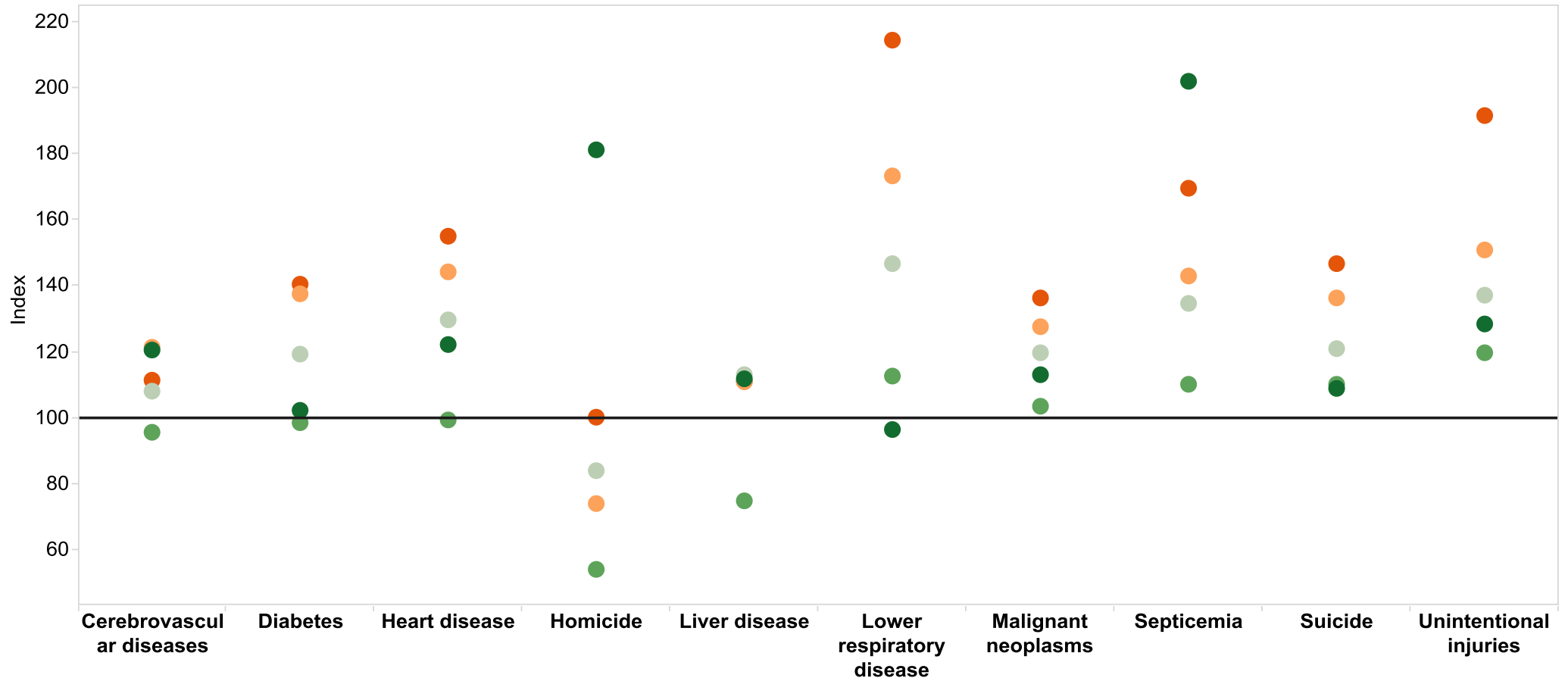
Please select:

**Age** 25 to 64 Years  
**Sex** Males  
**Region** Appalachia Region

**Rural-Urban Status**  
■ Large Central  
■ Large Fringe  
■ Medium/Small Metro  
■ Micropolitan  
■ Non-core

**Index for Mortality Rates for Cause Related to the National Mortality Rate among Persons (Males) Age 25 to 64 Years, in Appalachia Region, by Rural-Urban Status: United States, 2011-2013**

*Objects above the horizontal line where index=100 indicates mortality rates higher than the national average, below the line are values below the average.*



SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death.  
 SUGGESTED CITATION: Rural Health Reform Policy Research Center. Exploring Rural and Urban Mortality Differences, August 2015 Bethesda, MD. 2015.

Figure 7

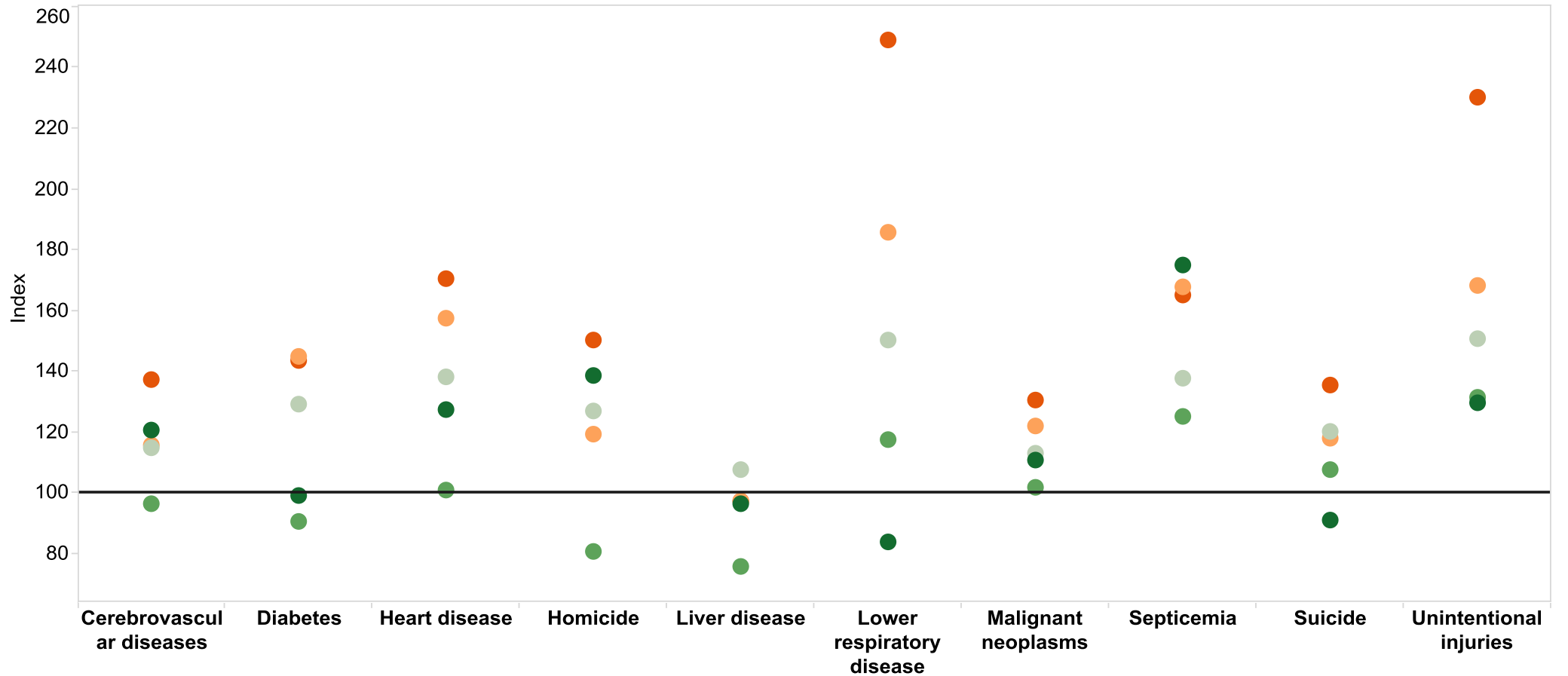
Please select:

**Age** 25 to 64 Years  
**Sex** Females  
**Region** Appalachia Region

**Rural-Urban Status**  
 Large Central  
 Large Fringe  
 Medium/Small Metro  
 Micropolitan  
 Non-core

**Index for Mortality Rates for Cause Related to the National Mortality Rate among Persons (Females) Age 25 to 64 Years, in Appalachia Region, by Rural-Urban Status: United States, 2011-2013**

*Objects above the horizontal line where index=100 indicates mortality rates higher than the national average, below the line are values below the average.*



SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death.  
 SUGGESTED CITATION: Rural Health Reform Policy Research Center. Exploring Rural and Urban Mortality Differences, August 2015 Bethesda, MD. 2015.

Figure 8

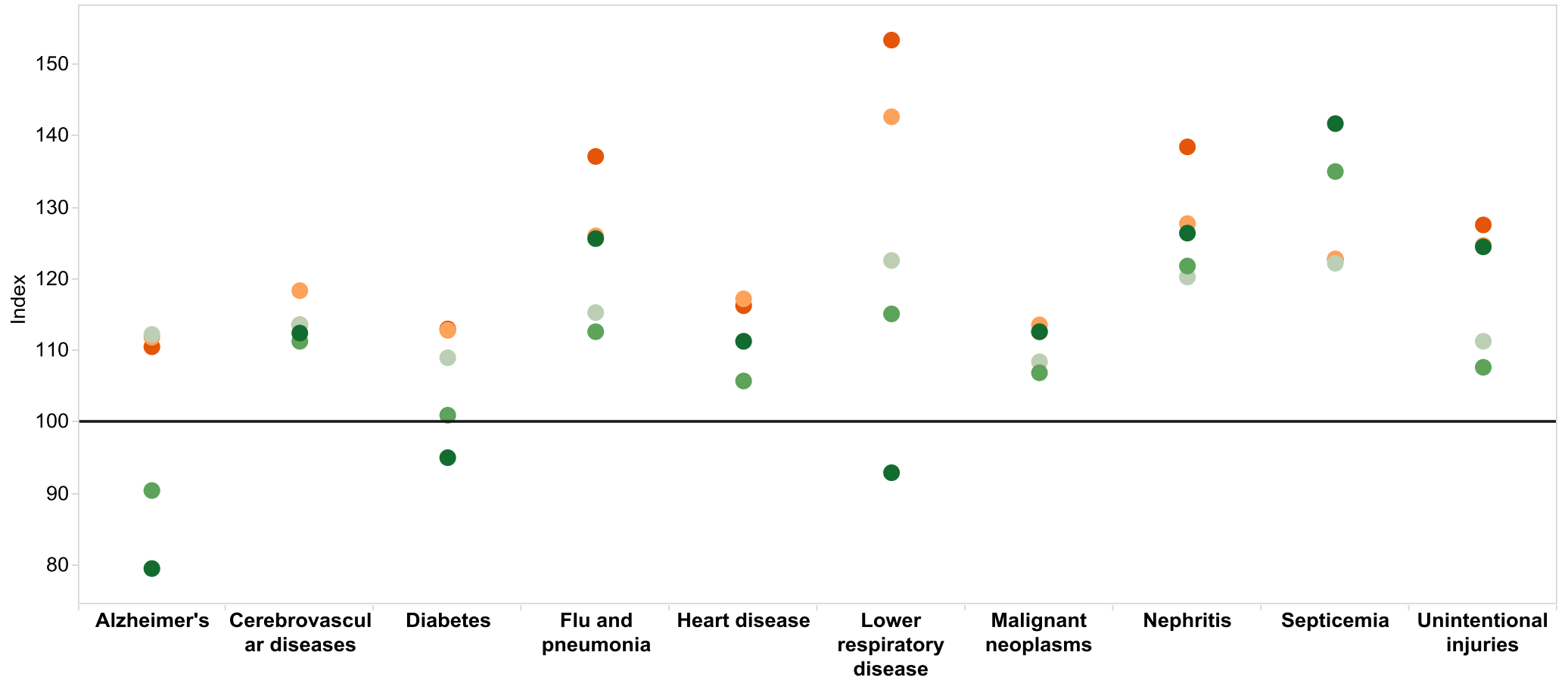
Please select:

**Age** 65 Years and Older  
**Sex** Males  
**Region** Appalachia Region

**Rural-Urban Status**  
■ Large Central  
■ Large Fringe  
■ Medium/Small Metro  
■ Micropolitan  
■ Non-core

**Index for Mortality Rates for Cause Related to the National Mortality Rate among Persons (Males) Age 65 Years and Older, in Appalachia Region, by Rural-Urban Status: United States, 2011-2013**

*Objects above the horizontal line where index=100 indicates mortality rates higher than the national average, below the line are values below the average.*



SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death.  
 SUGGESTED CITATION: Rural Health Reform Policy Research Center. Exploring Rural and Urban Mortality Differences, August 2015 Bethesda, MD. 2015.

Figure 9

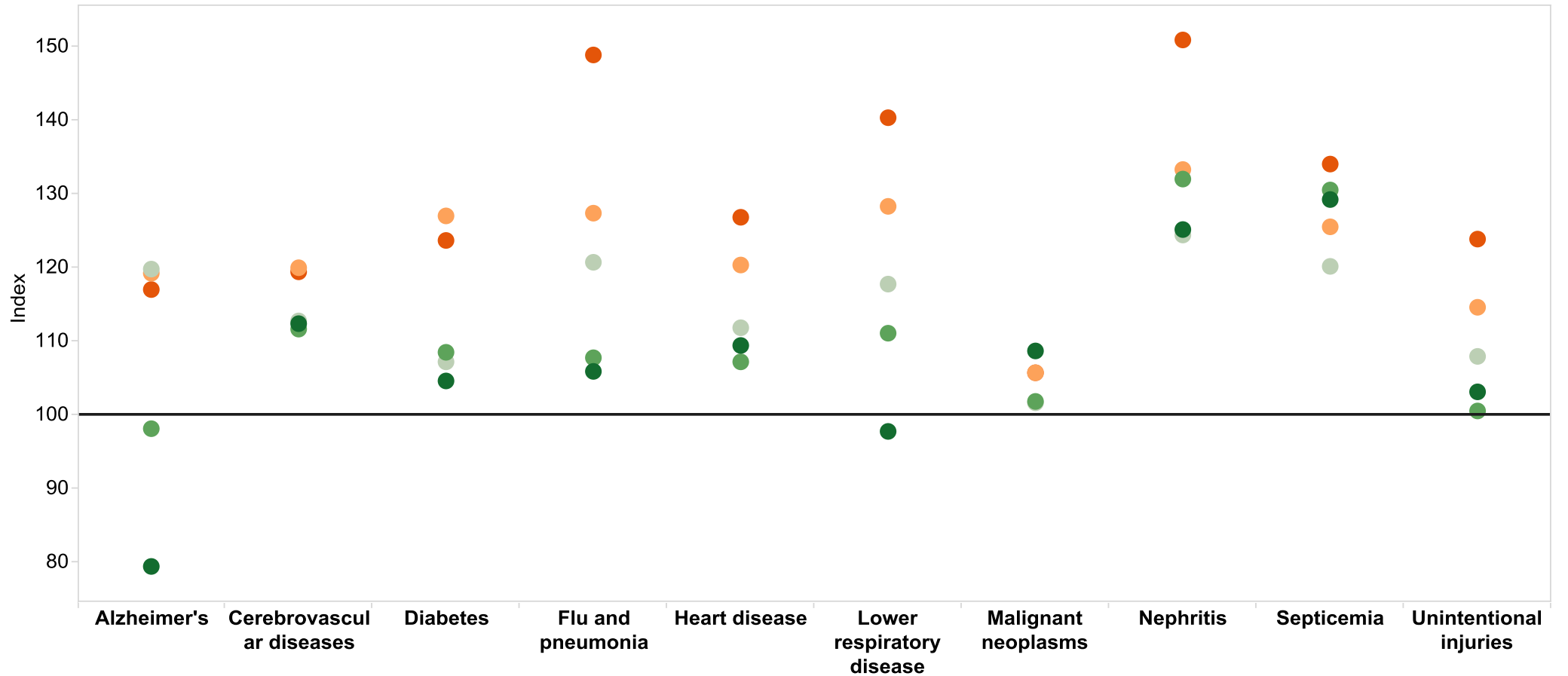
Please select:

**Age** 65 Years and Older  
**Sex** Females  
**Region** Appalachia Region

**Rural-Urban Status**  
■ Large Central  
■ Large Fringe  
■ Medium/Small Metro  
■ Micropolitan  
■ Non-core

**Index for Mortality Rates for Cause Related to the National Mortality Rate among Persons (Females) Age 65 Years and Older, in Appalachia Region, by Rural-Urban Status: United States, 2011-2013**

*Objects above the horizontal line where index=100 indicates mortality rates higher than the national average, below the line are values below the average.*



SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death.  
 SUGGESTED CITATION: Rural Health Reform Policy Research Center. Exploring Rural and Urban Mortality Differences, August 2015 Bethesda, MD. 2015.

## Summary: Appalachia

- Cause-specific, rural mortality rates worse than the nation in:
  - Unintentional injuries, all ages
  - Circulatory system diseases, congenital malformations, sudden infant death syndrome, <1 year of age
  - Malignant neoplasms, heart disease, suicide, diabetes, lower respiratory, cerebrovascular diseases, homicide, septicemia, and chronic liver disease (men) 25 to 64 years of age
  - All top-ten causes of death, 65 or more years of age

## Summary

- Place matters in Appalachia
  - Cause-specific mortality varies by rural vs. urban status
  - Regional differences that may impact mortality include:
    - Culture
    - Demographics
    - Health behaviors
    - Morbidity
- Sparsely populated areas have high mortality rates

## Appendix A: Overlapping Point

- Graphs with less than two (0 to 24 years of age) or five points (25+ years of age) indicate either 1) overlapping data or 2) suppressed or unreliable data.
- Appendix A lists all overlapping points allowing users to ascertain the suppressed and unreliable estimates.
- Overlapping points do not imply equality between two mortality rates. Please see the data tables for exact rates.
- Numbers are used to indicate overlap as more than one overlap may be present within an Age, Sex, Region, Disease combination.



## Appendix A: Overlapping Points by Disease and Age

Age	Sex	Disease	Rural-Urban Status				
			Large Central	Large Fringe	Medium/Small Metro	Micropolitan	Non-core
25 to 64	Males	Cerebrovascular diseases	1			1	
25 to 64	Males	Liver disease	1		1	1	1
25 to 64	Females	Cerebrovascular diseases			1	1	
25 to 64	Females	Diabetes				1	1
25 to 64	Females	Liver disease	1			1	1

Overlapping points are represented across the rows, not the columns. For example, Males age 25 to 64, Liver disease have two overlapping points. Numbers are used to indicate overlap as more than one overlap may be present within an Age, Sex, Region, Disease combination.

## Appendix A: Overlapping Points by Disease and Age

Age	Sex	Disease	Rural-Urban Status				
			Large Central	Large Fringe	Medium/Small Metro	Micropolitan	Non-core
65+	Males	Alzheimer's			1	1	1
65+	Males	Cerebrovascular diseases	1	1	1		1
65+	Males	Diabetes				1	1
65+	Males	Flu and Pneumonia	1			1	
65+	Males	Heart Disease	1		1		
65+	Males	Malignant Neoplasms	1			1	
65+	Males	Septicemia			1	1	1
65+	Males	Unintentional injuries	1			1	
65+	Females	Alzheimer's			1	1	1
65+	Females	Cerebrovascular diseases	1	1	1		
65+	Females	Malignant Neoplasms		2	2	1	1

Overlapping points are represented across the rows, not the columns. For example, Males age 65+ Alzheimer's have overlapping points.

## For More Information

For state specific mortality rates, contact the state health department's vital records department.