

## White Paper

# Vulnerable Population Index

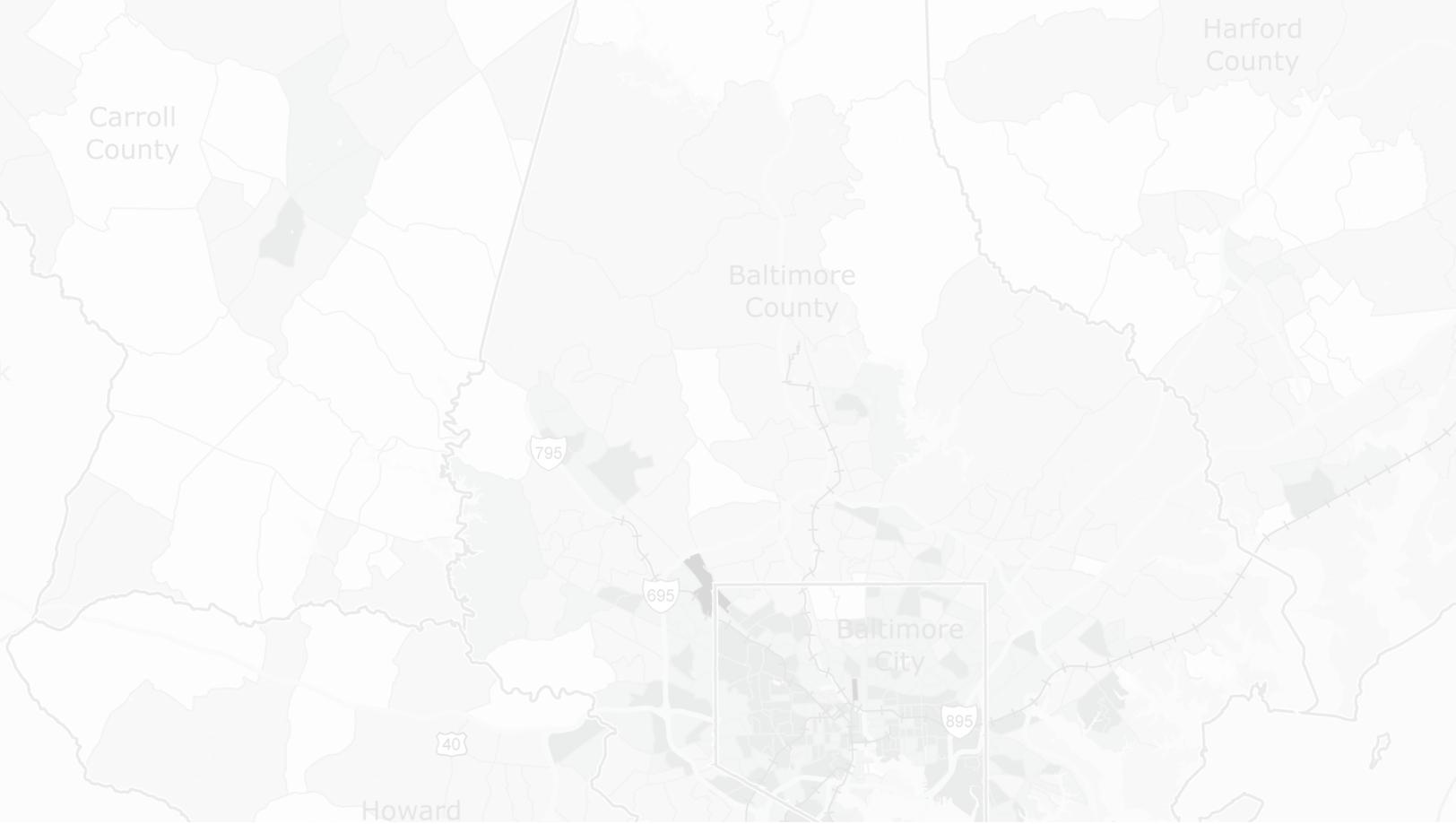
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May 2015



Baltimore Metropolitan Council



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# Introduction

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Title VI of the Civil Rights Act of 1964 and the 1994 President’s Executive Order on Environmental Justice (#12898) state that no person or group shall be excluded from participation in, or denied the benefits of, any program or activity utilizing federal funds. Each federal agency is required to identify any disproportionately high and adverse health or environmental effects of its programs on minority and low income populations. In turn, Metropolitan Planning Organizations (MPOs) are charged with evaluating their plans and programs for environmental justice (EJ) sensitivity, and expanding their outreach efforts to low-income, minority, and other disadvantaged populations, as part of the United States Department of Transportation’s certification requirements.

The Vulnerable Population Index (VPI) is intended to:

1. Guide location selection and stakeholder identification for public involvement
2. Inform Title VI and Environmental Justice (EJ) performance measurement

The VPI can also be viewed online at: <http://www.baltometro.org/about-the-brtb/transportation-equity>.

# Methods

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The method used to develop the VPI is based on the concept of the economic base — developed by Robert Murray Haig in his work on the Regional Plan of New York in 1928. Haig posited that activities in an area divide into two categories: basic and non-basic. Basic industries are those exporting from the region and bringing wealth from outside, while non-basic industries support basic industries. Economic development professionals have utilized the economic base approach ever since. In recent years, the economic base concept has been applied to support Title VI and EJ planning activities at MPOs such as the Delaware Valley Regional Planning Commission (DVRPC) and the Atlanta Regional Council (ARC) and now the Baltimore Regional Transportation Board.

The Baltimore Regional Transportation Board uses data from the US Census Bureau to determine the concentrations of seven sensitive populations for the region and for each census tract. A tract with a concentration of a sensitive population greater than the concentration of the Baltimore region as a whole is considered to be “vulnerable” for the sensitive population. The Vulnerable Population Index (VPI) indicated the number of vulnerable populations for each tract, and thus provides a general indication of the extent to which each tract is vulnerable.

The following seven populations were determined to be sensitive — based on understanding of both federal requirements and regional demographics:

1. Poverty
2. Non-Hispanic, Non-White
3. Hispanic
4. Limited English Proficiency (LEP)
5. Disabled
6. Elderly, and
7. Car-less

Concentrations of each sensitive population are then calculated, mapped and evaluated. A brief description of the methods used follows:

## Step 1

Obtain the most recent data for each vulnerable population in raw form from the Decennial Census or the American Community Survey to determine the average concentration for the region for each of the vulnerable populations. For example:

$$\text{RegionalHispanic\%} = \text{RegionalPopulationHispanic} / \text{RegionalPopulationTotal}$$

## Step 2

Determine the concentration of each sensitive population for each census tract. For example:

$$\text{TractHispanic\%} = \text{TractPopulationHispanic} / \text{TractPopulationTotal}$$

## Step 3

For each sensitive population for each tract, calculate the Vulnerability Quotient. For example:

$$\text{VulnerabilityQuotientHispanic} = \text{TractHispanic\%} / \text{RegionalHispanic\%}$$

## Step 4

For each of the sensitive populations, tracts with a Vulnerability Quotient greater than or equal to one (1) are determined to have a Vulnerable Population. For example:

If  $VQ_{Hispanic} > 1$  Then  $VP_{Hispanic} = 1$ , If  $VQ_{Hispanic} < 1$  Then  $VP_{Hispanic} = 0$

## Step 5

For each tract sum VPI for all seven sensitive populations to determine the Vulnerable Population Index (VPI). A lower VPI indicates a less vulnerable population, while a higher VPI indicates a more vulnerable population. For example:

$VPI_{tract} = \text{Sum}(VP_x)$

## Step 6

Map the VPI to the show the location of the vulnerable populations in general, and map the concentrations of each of the seven vulnerable populations.

Details on each vulnerable population and the VPI can be found on the following pages.

Vulnerable Population  
**Poverty**

Population in poverty, Baltimore region: 251,680

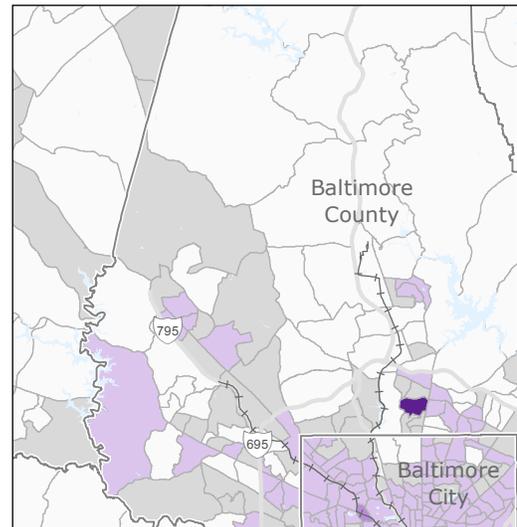
Concentration of population in poverty, Baltimore region: 9.80%

**Definition**

The U.S. Census Bureau presents single and multi-year estimates of median household income for small areas in the American Community Survey (ACS). The Census Bureau uses a set of income thresholds that vary by household size and composition to determine poverty. If a household's total income is less than the threshold, then that household and every individual in it is considered in poverty. For example the threshold for 2010 for a four-person household with two dependent is \$22,113. While the thresholds do not vary by place, they are updated for inflation using the Consumer Price Index (CPI-U).

The concentration (or percentage) of the population in poverty in the Baltimore region is 9.80%; so census tracts with a concentration of population in poverty greater than 9.80% are considered vulnerable. The table below shows the 10 most vulnerable tracts for poverty in the region. The map below is a sample of the map of poverty for all tracts in the region, found on [page A-1](#).

Census Tract	Jurisdiction	Percent
2506.00	Baltimore City	100.0
4906.05	Baltimore Co.	91.9
2502.04	Baltimore City	69.5
1702.00	Baltimore City	66.4
1002.00	Baltimore City	59.3
402.00	Baltimore City	59.0
1402.00	Baltimore City	58.7
2805.00	Baltimore City	53.9
703.00	Baltimore City	51.5
4925.00	Baltimore Co.	50.0



**Source**

American Community Survey 2006–2010

Next update: 2015

Vulnerable Population  
**Hispanic Minorities**

Population of Hispanic minorities, Baltimore region: 122,302

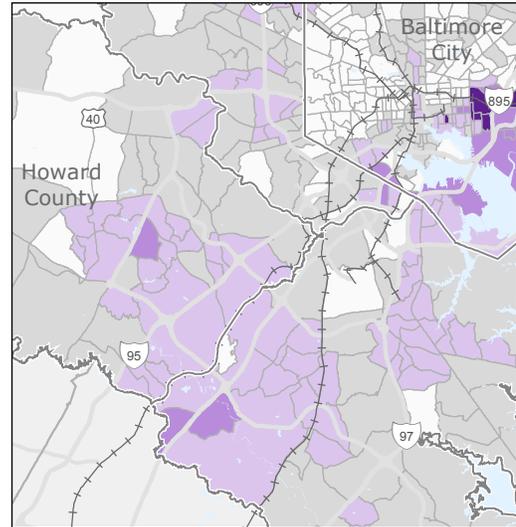
Concentration of Hispanic minorities, Baltimore region: 4.59%

**Definition**

The U.S. Census Bureau defines Hispanic as person(s) of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

The concentration (or percentage) of Hispanic minorities in the Baltimore region is 4.59%; so census tracts with a concentration of Hispanic minorities greater than 4.59% are considered vulnerable. The table below shows the 10 most vulnerable tracts for the Hispanic population. The map below is a sample of the map of tracts considered vulnerable for the Hispanic minorities population, found on [page A-2](#).

Census Tract	Jurisdiction	Percent
7064.01	Anne Arundel Co.	39.6
2608.00	Baltimore City	38.0
2604.04	Baltimore City	36.9
2607.00	Baltimore City	36.0
202.00	Baltimore City	33.5
2610.00	Baltimore City	29.0
601.00	Baltimore City	25.4
2604.01	Baltimore City	25.3
2605.01	Baltimore City	25.0
7515.00	Anne Arundel	23.5



**Source**

Census 2010

Next update: 2020

Vulnerable Population  
**Non-Hispanic Minorities**

Population of non-Hispanic minorities, Baltimore region: 955,923

Concentration of non-Hispanic minorities, Baltimore region: 35.90%

**Definition**

The U.S. Department of Transportation (DOT) Order (5610.2) on EJ defines “Minority” as:

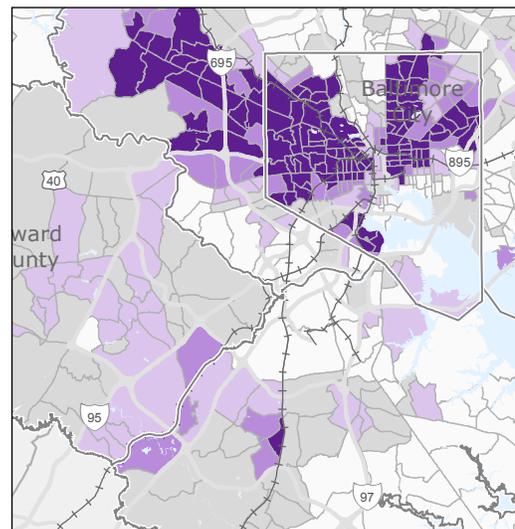
1. Black: a person having origins in any of the black racial groups of Africa
2. Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent
3. Native Hawaiian or Pacific Islander
4. American Indian and Alaskan Native: a person having origins in any of the original people of North America who maintain cultural identification through tribal affiliation or community recognition

In addition to the groups mentioned above, the U.S. Census recognizes two additional racial categories:

5. Some other race alone and
6. Two or more races

The concentration (or percentage) of non-Hispanic minorities in the Baltimore region is 35.9%; so census tracts with a concentration of non-Hispanic minorities greater than 35.9% are considered vulnerable. The table below shows the 10 most vulnerable tracts for the Non-Hispanic Minorities population. The map below is a sample of the map of tracts considered vulnerable for the non-Hispanic minorities population, found on [page A-3](#).

Census Tract	Jurisdiction	Percent
2007.01	Baltimore City	98.9
1604.00	Baltimore City	98.8
1002.00	Baltimore City	98.8
2502.04	Baltimore City	98.8
1605.00	Baltimore City	98.7
1505.00	Baltimore City	98.7
1503.00	Baltimore City	98.7
850.00	Baltimore City	98.7
1607.00	Baltimore City	98.6
1602.00	Baltimore City	98.6



**Source**

Census 2010

Next update: 2020

## Vulnerable Population Limited English Proficiency (LEP)

Population of LEP individuals, Baltimore Region: 47,865

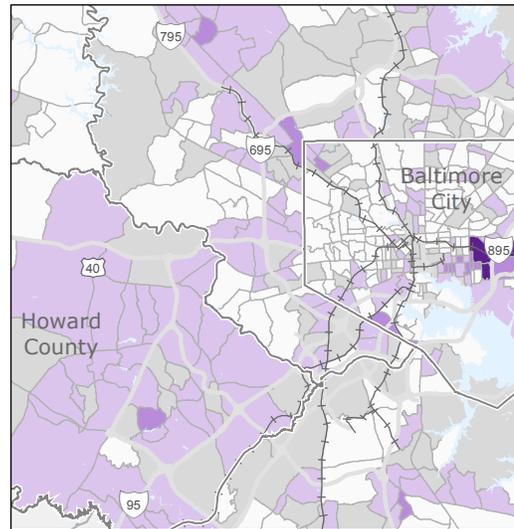
Concentration of LEP individuals, Baltimore region: 1.94%

### Definition

The LEP population is defined as households in which no one 14 and over speaks English only; or speaks a language other than English at home, and speaks English “not well” or “not at all.”

The concentration (or percentage) of LEP individuals in the Baltimore region is 1.94%; so census tracts with a concentration of LEP individuals greater than 1.94% are considered vulnerable. The table below shows the 10 most vulnerable tracts for the LEP population. The map below is a sample of the map of tracts considered vulnerable for the LEP population, found on [page A-4](#).

Census Tract	Jurisdiction	Percent
2607.00	Baltimore City	35.7
2604.04	Baltimore City	27.8
2610.00	Baltimore City	19.6
4034.02	Baltimore Co.	17.1
105.00	Baltimore City	16.6
201.00	Baltimore City	15.8
102.00	Baltimore City	14.9
2720.06	Baltimore City	14.1
2605.01	Baltimore City	13.4
2608.00	Baltimore City	12.5



### Source

American Community Survey 2006–2010

Next update: 2015

## Vulnerable Population Disabled

Population of disabled individuals, Baltimore region: 436,112

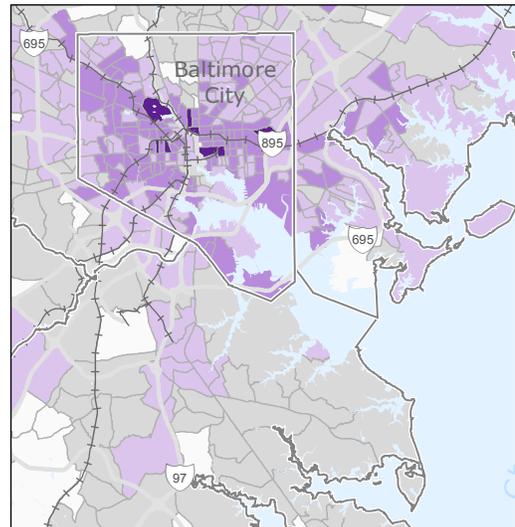
Concentration of disabled individuals, Baltimore region: 18.96%

### Definition

The U.S. Census Bureau classifies individuals as disabled if they report difficulties working at a job, leaving home, or report long-lasting sensory, physical, mental, emotional, or self-care disabilities.

The concentration (or percentage) of disabled individuals in the Baltimore region is 18.96%; so census tracts with a concentration of disabled individuals greater than 18.96% are considered vulnerable. The table below shows the 10 most vulnerable tracts for the disabled population. The map below is a sample of the map of tracts considered vulnerable for the disabled population, found on [page A-5](#).

Census Tract	Jurisdiction	Percent
4084.00	Baltimore Co.	46.2
604.00	Baltimore City	41.0
1205.00	Baltimore City	40.5
1304.00	Baltimore City	39.6
1206.00	Baltimore City	39.0
1603.00	Baltimore City	38.9
1601.00	Baltimore City	38.7
2805.00	Baltimore City	38.7
2604.01	Baltimore City	37.2
1204.00	Baltimore City	37.0



### Source

Census 2000

Next update: 2015

Vulnerable Population  
**Elderly**

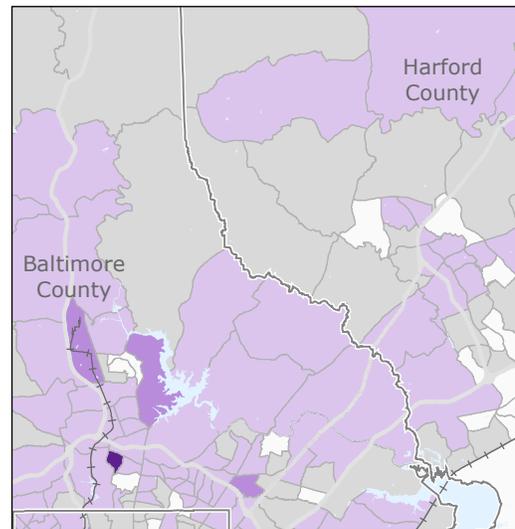
Population of elderly individuals, Baltimore region: 156,588  
 Concentration of elderly individuals, Baltimore region: 5.88%

**Definition**

Elderly is defined as age 75 and above.

The concentration (or percentage) of elderly individuals in the Baltimore region is 5.88%; so census tracts with a concentration of elderly individuals greater than 5.88% are considered vulnerable. The table below shows the 10 most vulnerable tracts for the elderly population. The map below is a sample of a map of all tracts considered vulnerable for the elderly population, found on [page A-6](#).

Census Tract	Jurisdiction	Percent
4907.01	Baltimore Co.	53.3
4001.00	Baltimore Co.	51.6
4114.07	Baltimore Co.	32.9
7516.00	Anne Arundel Co.	31.4
4084.00	Baltimore Co.	29.4
4034.01	Baltimore Co.	26.4
2715.03	Baltimore City	25.0
4085.02	Baltimore Co.	23.0
5077.03	Carroll Co.	22.8
4301.00	Baltimore Co.	21.3



**Source**

Census 2010  
 Next update: 2020

Vulnerable Population  
**Car-less**

Car-less households, Baltimore region: 113,313

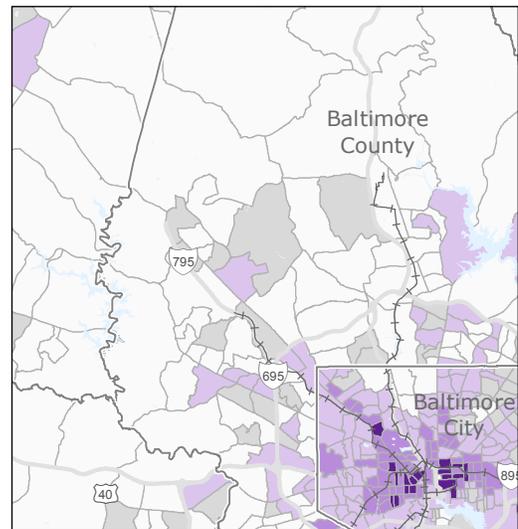
Concentration of car-less households, Baltimore region: 11.32%

**Definition**

The U.S. Census Bureau defines car-less as a household with no vehicle access.

The concentration (or percentage) of car-less households in the Baltimore region is 11.32%; so census tracts with a concentration of car-less households greater than 11.32% are considered vulnerable. The table below shows the 10 most vulnerable tracts for the car-less population. The map below is a sample of the map of tracts considered vulnerable for the car-less population, found on [page A-7](#).

Census Tract	Jurisdiction	Percent
1002.00	Baltimore City	53.3
2805.00	Baltimore City	51.6
704.00	Baltimore City	32.9
2502.04	Baltimore City	31.4
1802.00	Baltimore City	29.4
804.00	Baltimore City	26.4
1601.00	Baltimore City	25.0
1512.00	Baltimore City	23.0
909.00	Baltimore City	22.8
1702.00	Baltimore City	21.3



**Source**

American Community Survey 2006–2010

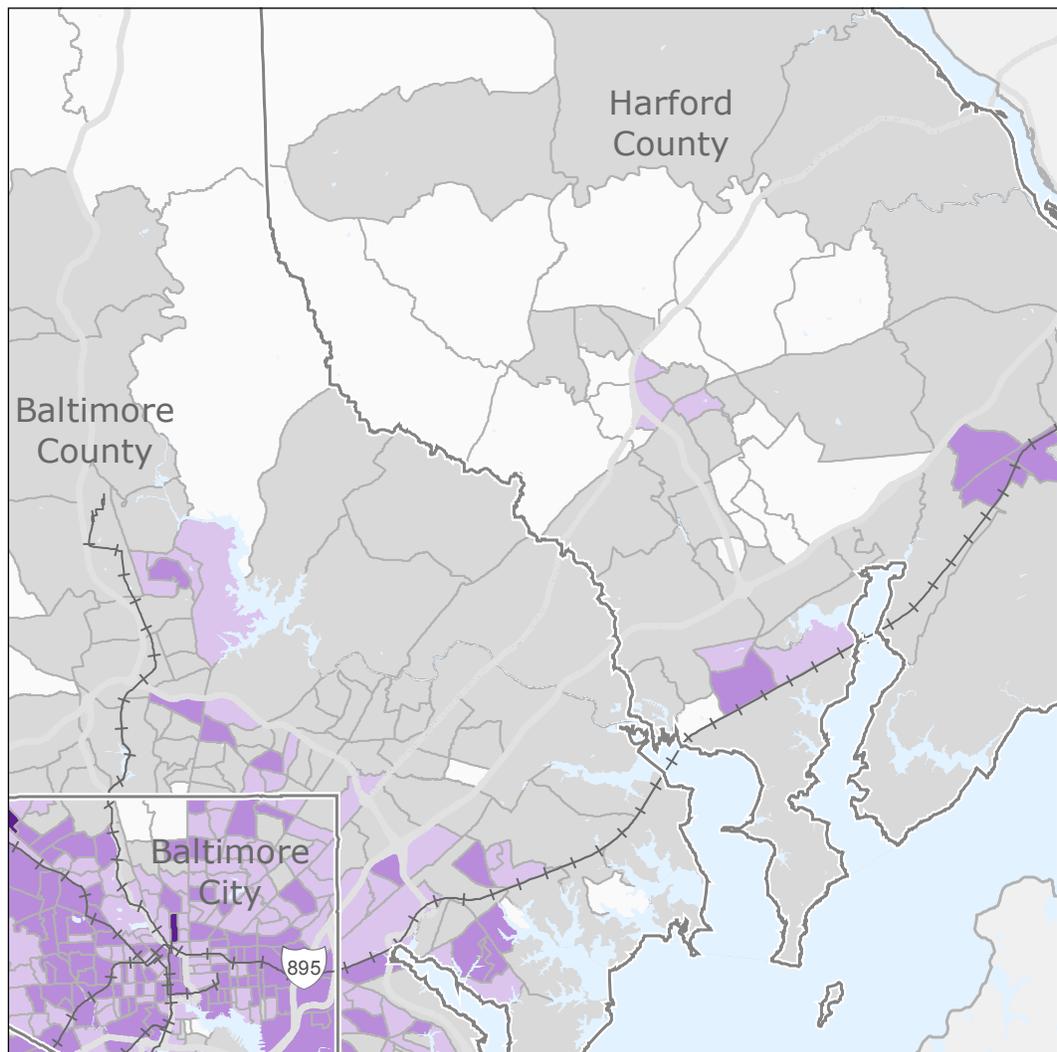
Next update: 2015

Vulnerable Population  
**Vulnerable Population Index**

### Definition

Each census tract can contain a concentration greater than the regional threshold for each individual population group considered sensitive, so each census tract is considered vulnerable for between zero and seven sensitive populations. The number of vulnerable populations in each census tract is referred to as the Vulnerable Population Index — or VPI — for each tract. A lower VPI indicates a less vulnerable tract, while a higher VPI indicates a more vulnerable tract.

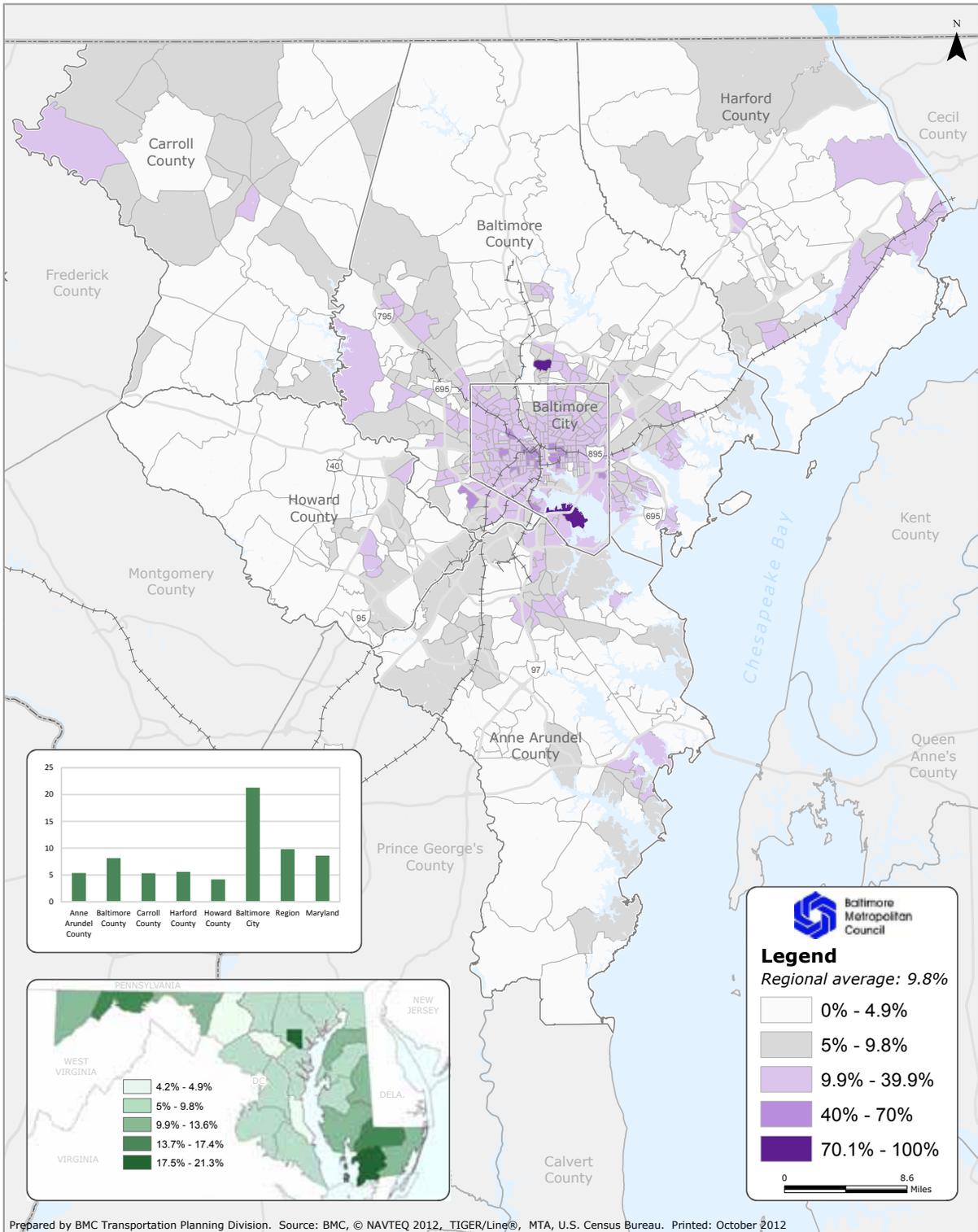
The map below is a sample of the map of the VPI for all tracts, found on [page A-8](#).



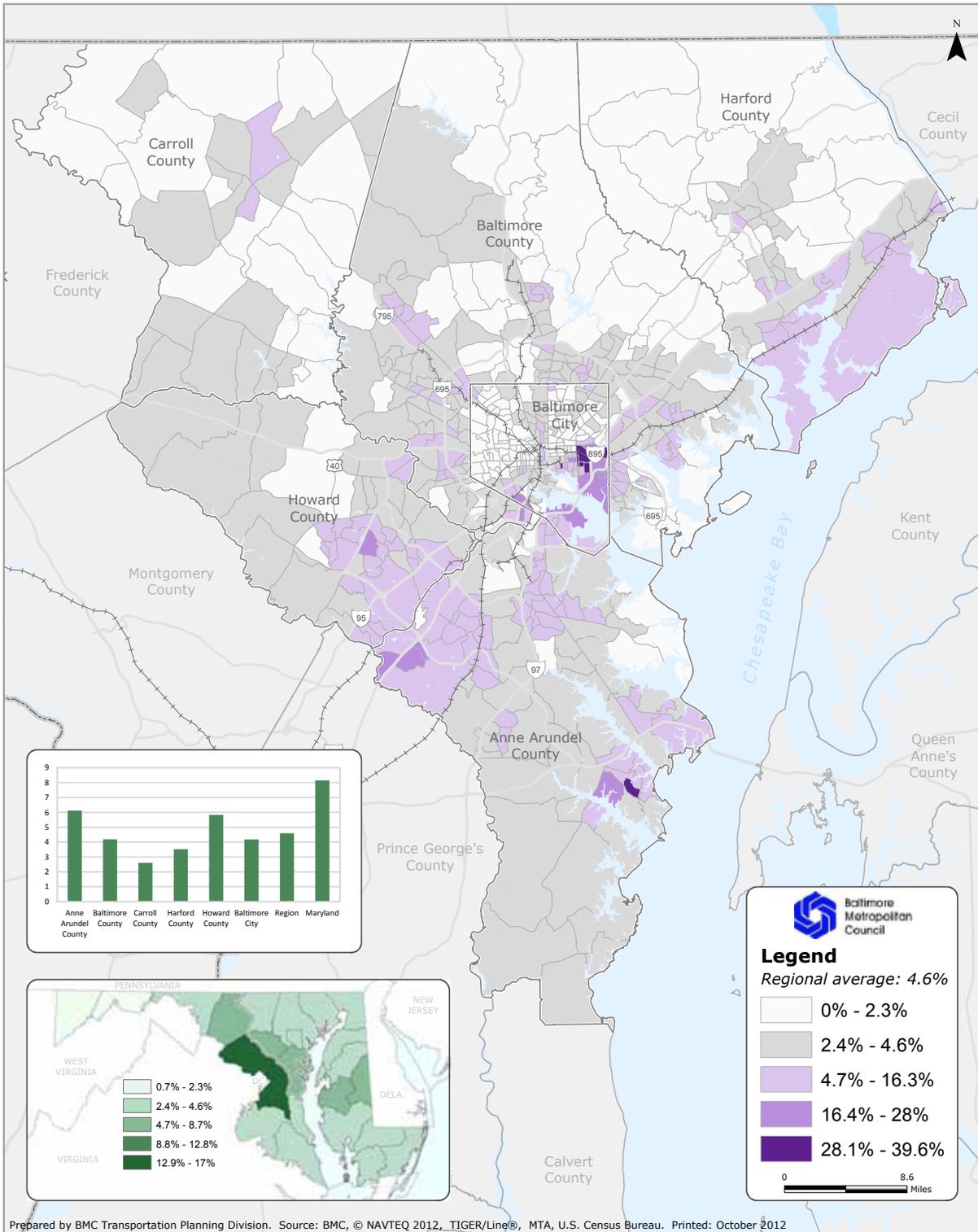
# Appendix

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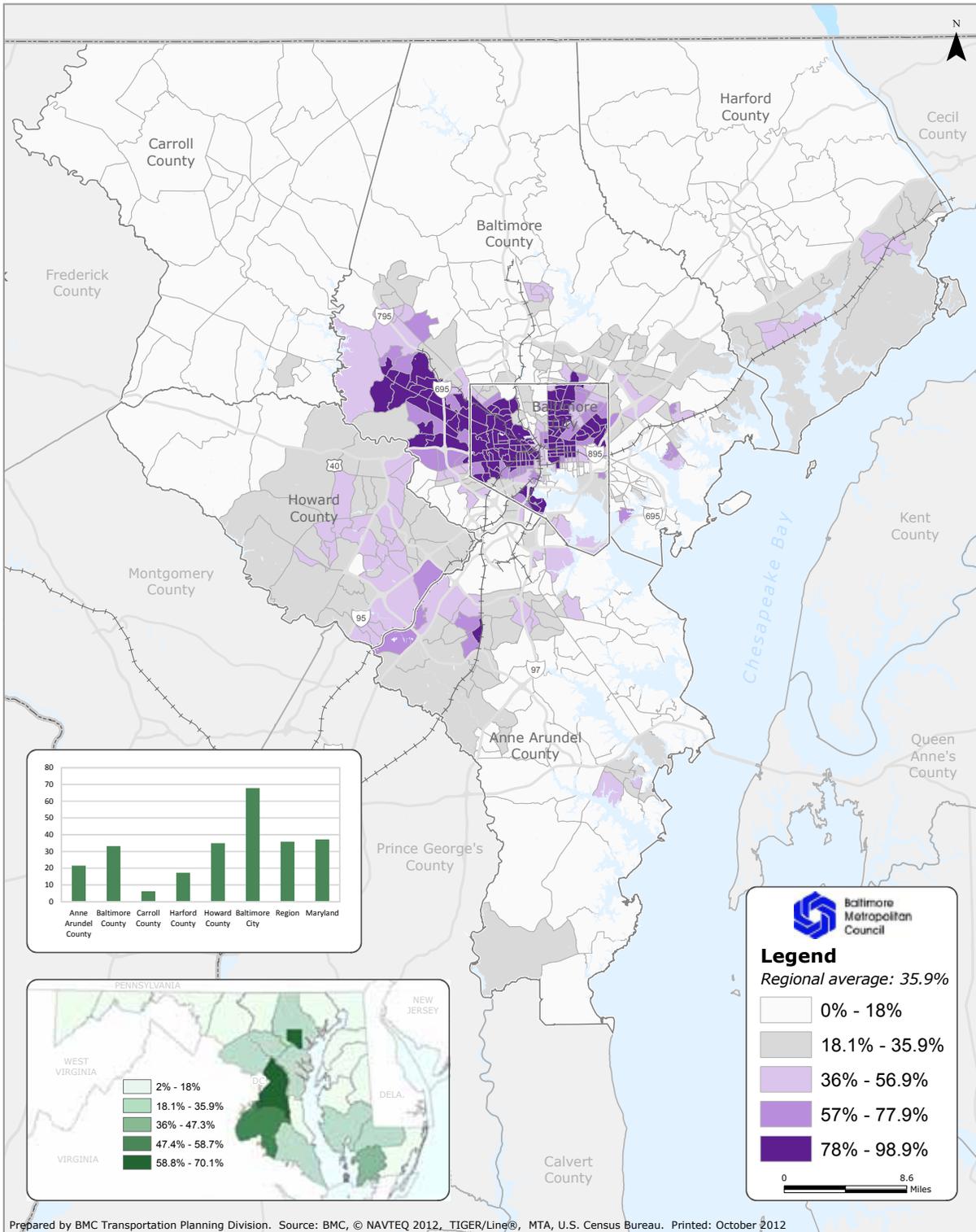
# Poverty



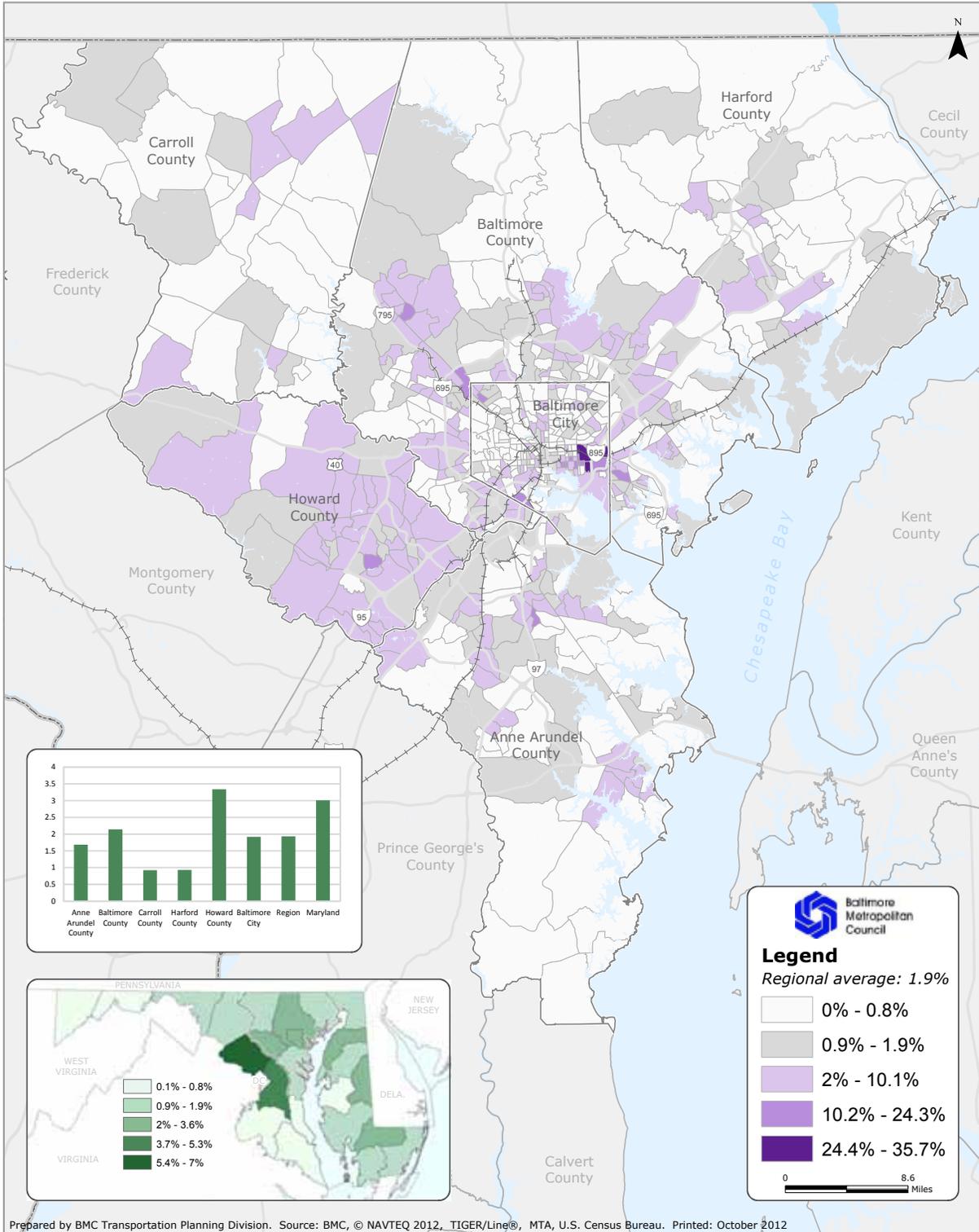
# Hispanic or Latino Heritage



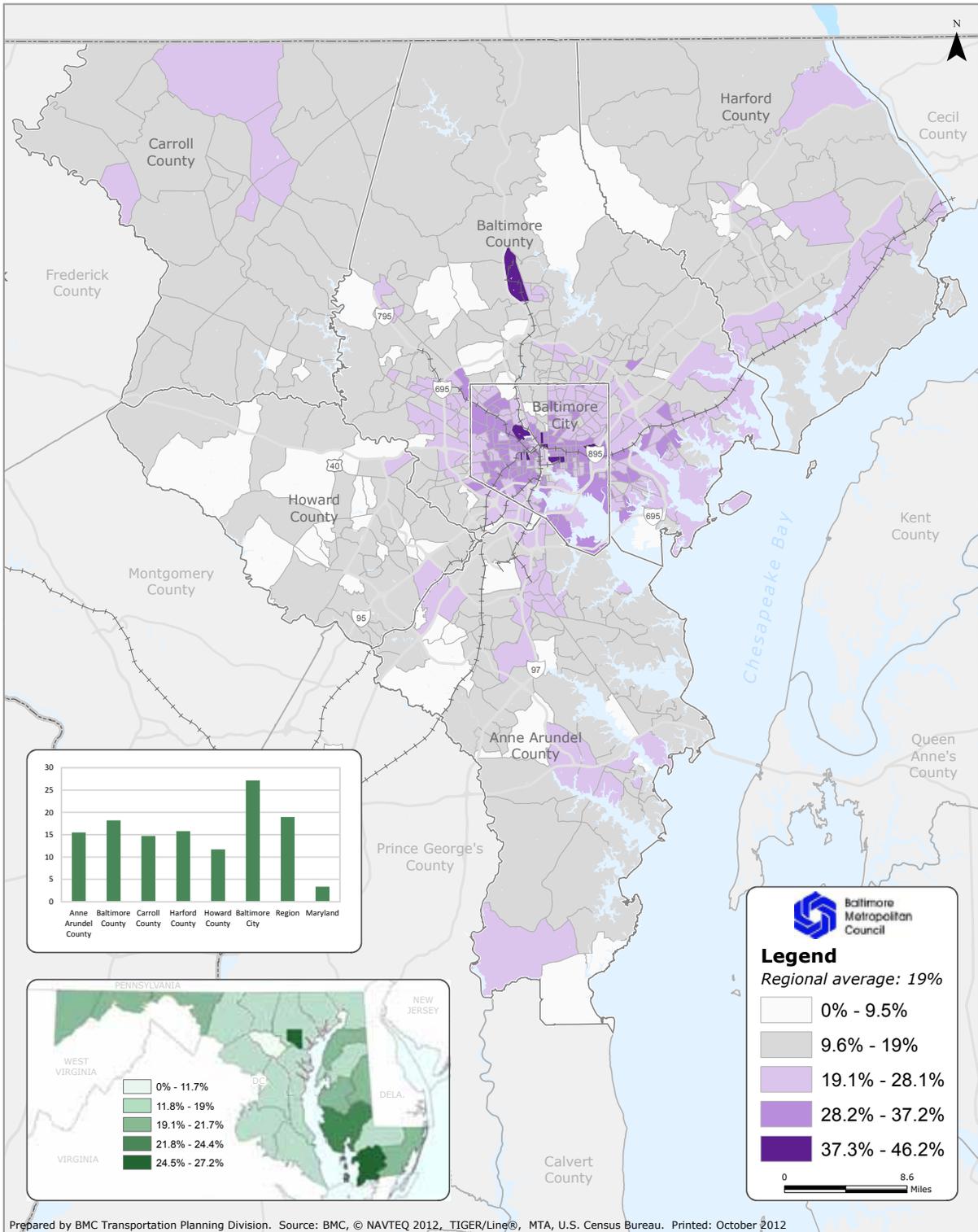
# Non-Hispanic Minorities



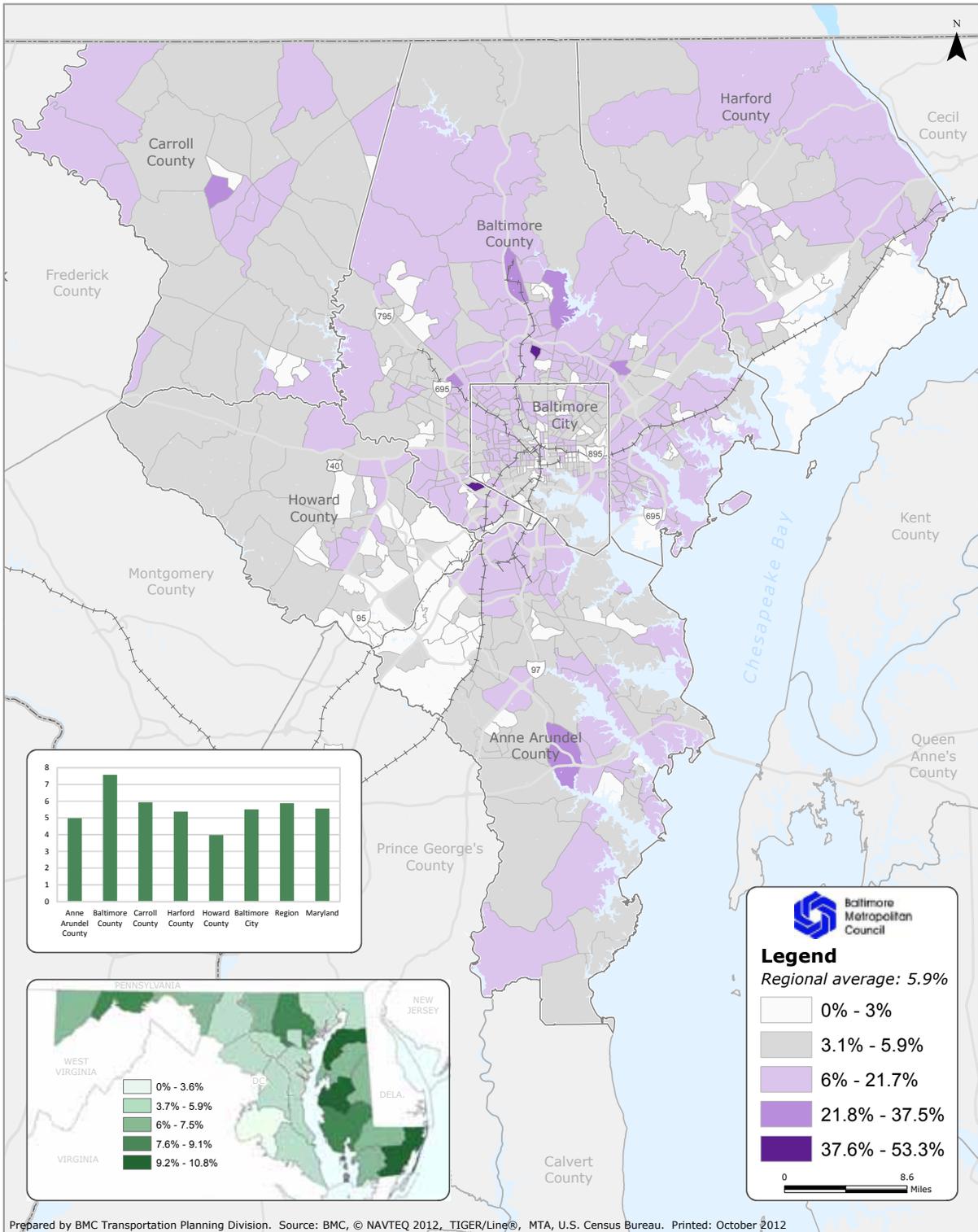
# Limited English Proficiency (LEP)



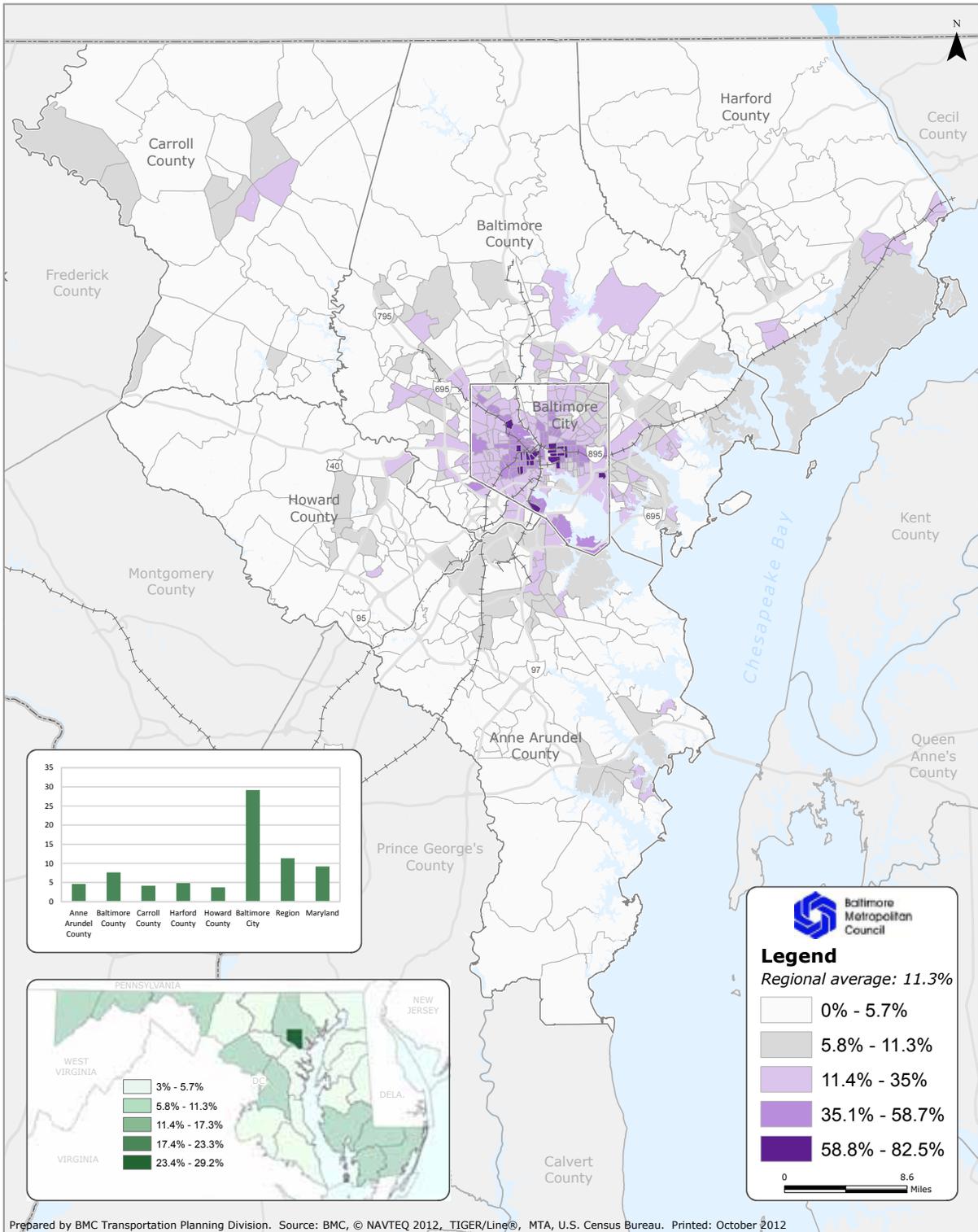
# Disabled



# Elderly



# Car-less



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# Vulnerable Population Index

