

# How Differential Privacy Harms Census Data in Virginia

## 1 Total Population

While populations for counties and cities in Virginia are distorted by no more than 3.1%, they are distorted significantly for towns under DP. Twenty-two towns have errors of more than 20%, including Port Royal (artificially increased by 87%) and Stony Creek (artificially decreased by 43%).

### WHAT IS DIFFERENTIAL PRIVACY?

“Differential Privacy” (DP) is a new mathematical procedure by which the US Census Bureau will infuse noise into all sub-state data products to increase privacy protection. This algorithm will damage the statistical validity and social value of any Census data below the state-level (city, county, town).

## 2 Age-Distribution

DP introduces significant distortion across all age groups. For example, within the 5-9 year old age group, 15 localities have errors of more than 20%. For the 85-plus age group, 52 localities have errors of more than 20%.

### POSITIVE ERRORS

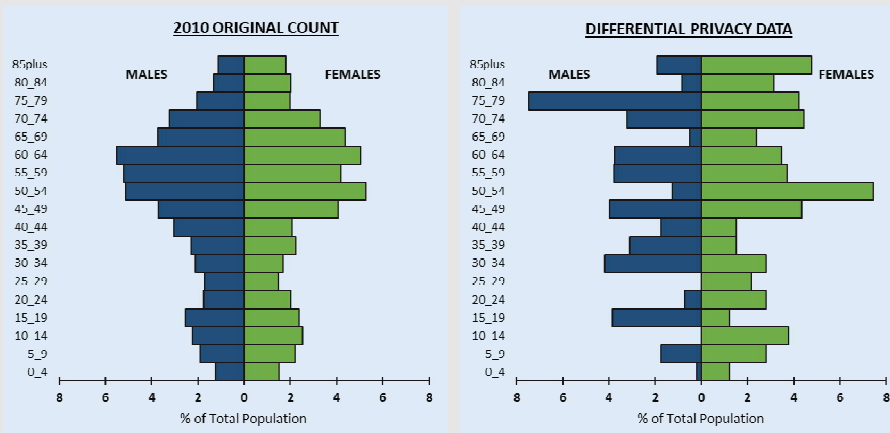
- **61%** over-estimation for **Matthews County 5-9** age-counts
- **90%** over-estimation for **Highland County 30-34** age-counts
- **196%** over-estimation for **Norton City 85-plus** age-counts

### NEGATIVE ERRORS

- **89%** under-estimation for **Falls Church City 0-4** age-counts
- **68%** under-estimation for **King and Queen County 55-59** age-counts
- **90%** under-estimation for **Rappahannock County 85-plus** age-counts

## 3 Age-Sex Composition

The age-sex makeup of communities are altered substantially. For example, Highland County, home to over 2,300 people, loses all men between the ages of 10-14 and 25-29 with DP data.



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## 4 Race/Ethnicity

Across Virginia's 133 counties and cities, the average error for each racial/ethnic group with DP data is:

- **0.2%** for White
- **8%** for Blacks
- **16%** for Hispanics
- **21%** for Asian
- **23%** for American Indian or Alaska Native
- **39%** for multiracial

## 5 Vacant Housing

Housing vacancy rates under DP data show 17 localities have zero vacant units, such as New Kent, Falls Church, and Williamsburg. On the other hand, some localities see large increases in number of vacant units.

Number of Vacant Homes	ORIGINAL COUNT	DIFF. PRIVACY	% ERROR
Loudoun County	4,859	8,315	<b>71%</b>
Chesapeake County	3,622	5,566	<b>54%</b>
Chesterfield County	6,875	10,251	<b>49%</b>
Fairfax County	16,371	23,201	<b>42%</b>

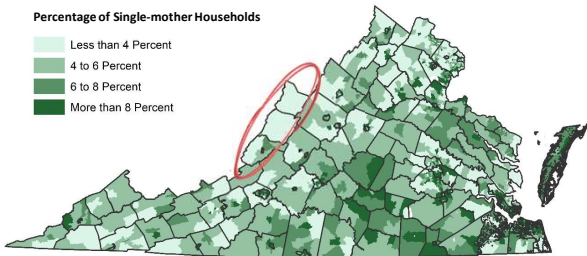
## 6 Single-mother Households

The number of single-mother households is off by over 25% in 37 counties and cities, according to DP data. In Harrisonburg, the number of single-mothers is artificially decreased by 23%, while in Goochland County the number is artificially increased by 65%. The maps below show the distribution of single-mother households across the state. Alleghany, Bath, and Highland counties, for example all show high-concentrations of single-mother households, but they actually have some of the lowest rates within Virginia, as per the original count data.

### 2010 ORIGINAL COUNT

Percentage of Single-mother Households

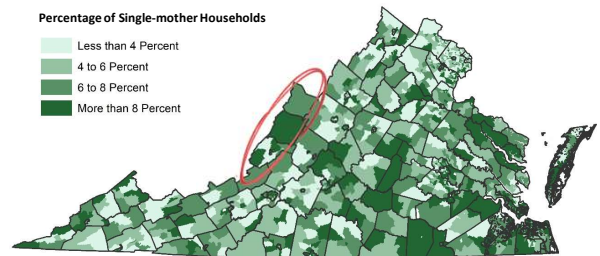
- Less than 4 Percent
- 4 to 6 Percent
- 6 to 8 Percent
- More than 8 Percent



### DIFFERENTIAL PRIVACY DATA

Percentage of Single-mother Households

- Less than 4 Percent
- 4 to 6 Percent
- 6 to 8 Percent
- More than 8 Percent



Source Notes: Cooper Center's Analysis of 2010 Demonstration Data Products, released October 29, 2019 by U.S. Census Bureau.