

Ranking institutions, communities, or individuals based on normative criteria can be difficult. It is tempting for those doing the ranking to substitute their own priorities and values for those of the people who are intended to benefit from the list. This is especially true when the attribute that is being ranked is associated with a large number of diverse variables. Picking and choosing how to weight the impact of the individual variables on the quality on which the rankings are based creates many opportunities for bias and is inherently subjective. There is also the problem of locating comprehensive data on such a large number of variables. However, employing a large number of variables can help to alleviate bias or subjectivity because consistent patterns can emerge from the analysis.

To minimize the number and impact of these potential complications, the Schroeder Center rankings of the healthiest Virginia Communities is based on the same methodology used by the United Health Foundation to create that organization's 2006 "America's Health Rankings"<sup>1</sup> for states. Using a preexisting method removes some of the troublesome judgment calls that come with creating a ranking system while ensuring that the results can be related those of the referenced system, even if the prior ranking is itself arbitrary.

### **Methodology**

The tables that present each component contain three columns: data, score, and rank. They are calculated as follows:

The data are the raw data as obtained from the stated sources and adjusted for age, race and/or population when possible and appropriate. Components expressed on a per population basis use 2005 population figures for the counties and cities unless otherwise noted.

The Virginia Atlas of Community Health was used as a source for many of the health indicators. The Virginia Atlas of Community Health was developed by the Virginia Center for Healthy Communities (VCHC) and is an independent, non-profit organization dedicated to improving the health of Virginia's communities<sup>2</sup>. To derive many of the indicators, the VCHC uses multivariate analysis to explore relationships between a set of known predictor variables and the variable of interest, i.e. smoking prevalence. They then develop synthetic estimates for the variables using data from sources such as the Census, Scientific Research Corporation, and the BRFSS.

Some localities are grouped together with respect to certain measures. For example, Falls Church City, Fairfax City and Fairfax County are treated as one area in terms of health care spending. In cases such as these, the combined population is used to determine per capita measures and the same figure would apply to all localities in the area.

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<sup>1</sup> <http://www.unitedhealthfoundation.org/ahr2006.html>

<sup>2</sup> <http://www.vahealthycommunities.com/>

The score for each indicator is based on the following formula:

$$\text{Score} = \frac{\text{Locality Value} - \text{State Mean}}{\text{State Mean}} \times 100$$

This calculation results in a score of 0.0 for a locality with the same value as the state average for a certain indicator. Localities that have a higher value than the state average will have a positive score while those with lower values will have a negative score.

To prevent an extreme value for any one indicator from excessively influencing a final composite index score for a locality, the maximum score any locality could receive for a indicator is limited to plus or minus two standard deviations across all Virginia localities. If a locality's score for a particular indicator was greater or less than the maximum allowable score, the maximum allowable score was substituted for the locality's score for that indicator.

Where a value for the Virginia overall is not available, the state average is set at the average value of the counties and cities measured.

The overall index score was calculated by adding the scores of each indicator multiplied by its weight (percent of total overall ranking). Note: Scores reported for individual components may not add up to the overall scores due to the rounding of numbers.

The last step involved ranking the total index score of all localities in ascending order. Ties in index scores are assigned equal rankings.

### **Selection of Components**

Four primary considerations drove the design of this ranking system and the selection of the individual components:

1. The overall rankings had to represent a broad range of issues that affect a population's health,
2. Individual components needed to use common health measurement criteria,
3. Data had to be available at a local level and
4. Data had to be current and updated periodically.

The measures selected are believed to be the best available indicators of the various components of healthiness at this time and parallel attempts at producing similar rankings for states.

The components are divided into two categories: determinants and outcomes. For further clarity, determinants are divided into groups: Personal Behaviors, Community Environment, and Public and Health Policies. These groups of measures influence the health outcomes of a locality, and improving these inputs will eventually improve outcomes. Most individual components are actually a combination of activities in all three areas. For example, the prevalence of smoking is a personal behavior that is strongly influenced by the community environment in which we live and by public policy,

including taxation and restrictions on public places and by the care received to treat the chemical and behavioral addictions. However, for simplicity, we placed each measure in a single category.

As with all indices, the America's Health Rankings Scientific Advisory Committee weighed the positive and negative aspects of each component when choosing and developing them. These aspects they considered include:

- 1) the interdependence of the different measures
- 2) the possibility of the overall ranking disguising the effects of individual components
- 3) an inability to adjust all data by age and race
- 4) an over-reliance on mortality data as a measure of outcome
- 5) the use of indirect measures to estimate some effects on health.

These aspects cannot be addressed directly by adjusting the methodology, however, assigning weights to the individual components can mitigate their impact.

Each component is assigned a weight that determines its percentage of the overall score. The weights are based on input from a panel of health experts. Determinants account for 57 percent of the results, and outcomes account for 42 percent.

### **Description of Components**

The following table is a summary of each of the components in America's Health Rankings. A short discussion of each component immediately follows. The data for each year are the most current data available at the time the report was compiled.

**Table 1 Summary Description of Components**

<b>Determinants</b>	<b>Description</b>
<b>Personal Behaviors</b>	
Prevalence of Smoking	Percentage of the population over age 18 that smokes tobacco products regularly. This is an indication of known, addictive, health-adverse behaviors within the population (1).
Motor Vehicle Deaths	Number of deaths per 100,000 drivers in a locality. It is a proxy indicator for excessive drug and alcohol use within a population (1).
Prevalence of Obesity	Percentage of the adult population estimated to be overweight or obese, with a body mass index (BMI) of 25.0 or higher. Obesity is known to contribute to a variety of diseases, including heart disease, diabetes and general poor health (1).
No High School Graduation	Percentage of residents 25 years and older who did not graduate from a high school with a regular degree. It is an indication that the resident lacks the ability to learn about, create and maintain a healthy lifestyle and to understand and access health care when required (1).
<b>Community Environment</b>	
Violent Crime	The number of murders, rapes, robberies and aggravated assaults per 100,000 population. It reflects an aspect of overall lifestyle within a state and its associated health risks (2).
Infectious Diseases	Number of HIV, AIDS and STD cases reported to the Centers for Disease Control and Prevention per 100,000 population. This is an indication of the toll that infectious disease is placing on the population (4).
Poverty	The percentage of persons who live in households that are at or below the poverty threshold. Poverty is an indication of the lack of access to health care by this vulnerable population (5).
<b>Health Policies</b>	
Per Capita Public Health Spending	The dollars spent on direct public health care services, community-based services and population health activities. This indicates the actual financial commitment a locality has made to public health (3).
Lack of Health Insurance	Percentage of the population that does not have health insurance privately, through their employer or the government. This is another indicator of the ability to access care as needed, especially preventive care (1).
<b>Outcomes</b>	<b>Description</b>
Limited Activity	Number of individuals per 100,000 who experience limitations due to health. This is a general indication of the population's ability to function on a day-to-day basis (1).
Cardiovascular Deaths	Number of deaths due to all cardiovascular diseases, including heart disease and stroke, per 100,000 population. This is an indication of the toll that these types of diseases place on the population (4).
Cancer Deaths	Number of deaths due to all causes of cancer per 100,000 population. This is an indication of the toll cancer is placing on the population (4).
Total Mortality	Number of deaths per 100,000 population. This is an overall indicator of health of a population as it measures death from all causes (4).
Infant Mortality	Number of infant deaths (before age 1) per 1,000 live births. This is an indication of the prenatal care, access and birth process for both child and mother (4).

## Weighting of Components

Three criteria were considered when assigning weights to components.

1. What effect does a component have on overall health?
2. Is the effect measured solely by this component or is it included in other components?
3. How reliable are the data supporting a component?

The final weights used to calculate the composite index score are based on input from experts on the America’s Health Ranking Scientific Advisory Committee. The column labeled “% of Total” indicates the weight of each component in determining the overall ranking of each locality. The column labeled “Effect on Score” presents how each component positively or negatively relates to the composite index score and ranking. For example, a high prevalence of smoking would have a negative effect on the index score and thus lower the ranking of the locality. An increase in the amount of per capita public health spending has a positive effect on the index score and will increase the overall ranking of a state.

**Table 2 - Weight of Individual Components**

Name of Component	% of Total	Effect on Score
<b>PERSONAL BEHAVIORS</b>		
Prevalence of Smoking	12	Negative
Motor Vehicle Deaths	6	Negative
Prevalence of Obesity	6	Negative
No High School Graduation	6	Negative
<b>COMMUNITY ENVIRONMENT</b>		
Violent Crime	6	Negative
Infectious Disease	6	Negative
Poverty	6	Negative
<b>HEALTH POLICIES</b>		
Per Capita Public Health Spending	3	Positive
Lack of Health Insurance	6	Negative
<b>HEALTH OUTCOMES</b>		
Limited Activity Days	6	Negative
Cardiovascular Deaths	9	Negative
Cancer Deaths	9	Negative
Infant Mortality	9	Negative
Total Mortality	9	Negative
<b>OVERALL HEALTH RANKING</b>	<b>~100</b>	—

## Sources

1. Virginia Atlas of Community Health. (<http://67.92.69.86/>)
2. Virginia State Police, *Crime in Virginia 2005*
3. Virginia Department of Health, 2006 District Budgets
4. Virginia Department of Health, Center for Health Statistics
5. U.S. Census Bureau, Small Area Income and Poverty Estimates