Understanding Epidemiological Measures in Public Health Surveillance: **Counts and Rates**

Counts and rates are two ways to measure the impact of health events.

Counts represent the number of times a health event occurs.

Use counts when you want to:
- Show the total number of health events
- Measure burden on health care systems
- Understand trends within a single population

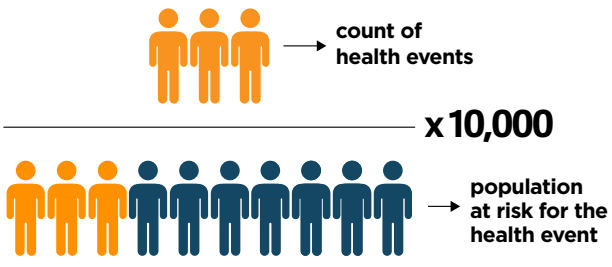
Counts are easy to understand, but are not helpful for comparing populations of different sizes.

Rates represent the number of new or unique health events over a specific period of time, for a given number of people.

Use rates when you want to compare health events between groups with different population sizes. For example, when comparing different:
- Counties
- Race/ethnicities
- Sexes
- Health disparities
- Populations of different sizes (urban versus rural areas)

Rates allow us to compare health events over time among populations of different sizes.

How to calculate a rate per 10,000 population



Rate = (Count ÷ Population) × 10,000

Example: Comparing heat-related illness (HRI) emergency department (ED) visits between counties.

Wake is a large urban county and Martin is a small rural county. Both reported HRI ED visits in 2024. Let's see how their counts and rates of HRI ED visits compare and what that means for how we interpret the impact of HRI in each county.

The table below compares the number of HRI ED visits (count), population size, and rates (per 10,000 population) for each county. Figure 1 shows how the counts and rates of HRI ED visits compare between Wake County (pink) and Martin County (purple) over time.

County	Count	Population	Rate per 10,000
Wake County	356	1,132,103	3.1
Martin County	14	21,992	6.4

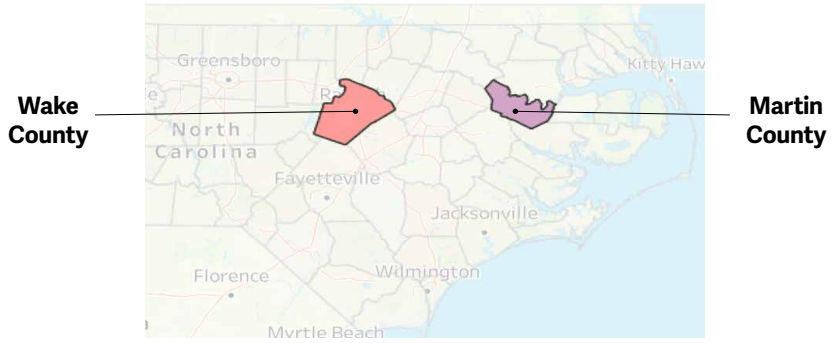
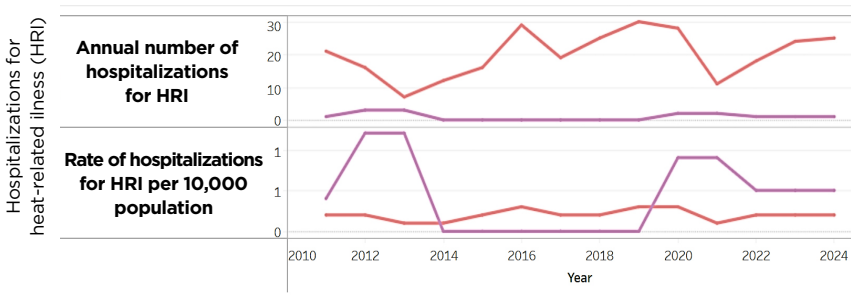


Figure 1. HRI hospitalization counts and rates in Wake County vs. Martin County



Source: NC Environmental Health Data Dashboard

Takeaway: As you can see, if we rely on the count of HRI ED visits, it appears that HRI is a bigger problem in Wake County, compared to Martin County. However, when we account for the difference in population size between these two counties by calculating the rate, we find that HRI affects more people per capita in Martin County compared to Wake County.

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