**Background**: In the United States, already-prevalent power outages are increasing in frequency and duration with climate change. Studies from New York State show that power outages may increase hospitalizations for cardiovascular (CVD) and respiratory disease in vulnerable populations such as older adults, but exposure data limitations have constrained nationwide studies of power outages and health.

**Question**: Are power outages associated with emergency CVD and respiratory disease-related hospitalizations among older adults in the United States?

**Methods**: We developed a national dataset of power outage exposure and identified county-days with ≥1% of customers exposed to 8+ hour power outages in 2018. This dataset was missing substantial amounts of data, so we first conducted a simulation study to test the impacts of missing data on study results. We then leveraged data on 23 million Medicare Fee-For-Service beneficiaries aged 65+ to estimate daily county-level rates of emergency CVD- and respiratory-related hospitalizations. We applied a case-crossover design with a conditional Poisson model to estimate the lagged association (up to 1 week) between daily county-level power outage exposure and cause-specific hospitalization rates. Models controlled for daily temperature, precipitation, and wind speed.

**Results**: Power outages were associated with increased emergency CVD and respiratory hospitalizations. The association between power outage and CVD hospitalizations was strongest the day after power outage exposure (rate ratio [RR]=1.02, 95% CI: 1.01, 1.03), while the association between outage and respiratory disease was strongest the day of power outage exposure (RR=1.03, 95% CI: 1.01, 1.04). Our simulation showed that missing exposure data only introduced minimal bias towards the null.

**Conclusion**: Power outages increase risk of CVD and respiratory hospitalizations among US older adults. Improving electricity reliability could support community health and protect older adults from CVD and respiratory disease exacerbations.