**Disruption to Test Scores after Tropical Cyclones in the United States**

Gabriella Y. Meltzer1,2, Joan A. Casey1, Joel Schwartz3, Michelle L. Bell4, G. Brooke Anderson5, Marianthi-Anna Kioumourtzoglou1, Robbie M. Parks1

1. Department of Environmental Health Sciences, Columbia University Mailman School of Public Health, New York, New York, USA
2. Department of Epidemiology, Columbia University Mailman School of Public Health, New York, New York, USA
3. Department of Environmental Health, Harvard T.H. Chan School of Public Health, Boston, Massachusetts, USA
4. Department of Environmental Health, Yale University School of the Environment, New Haven, Connecticut, USA
5. Department of Environmental & Radiological Health Sciences, Colorado State University, Fort Collins, Colorado, USA

**Background and Aim**

Hurricanes and other tropical cyclones affect every element of everyday lives of impacted communities. Knowledge of how tropical cyclones impact student educational attainment is essential to understanding the full burden of climate-related disasters, and previous studies have shown other climate-related disasters, such as wildfires, have a negative impact of test scores. Our aim is to examine the association between the tropical cyclones and educational attainment among elementary- and middle school-age students in all areas affected by tropical cyclones in the United States.

**Methods**

We based education on county-level average standardized test scores in math and reading/language arts (RLA) among third to eighth grade students during 2009–2018 from the Stanford Educational Data Archive. Our exposure of interest was tropical cyclones, developed from a comprehensive record of tropical cyclone occurrence over 10 years, defined as counties with a sustained maximal wind speed ≥34 knots, as well as a subset of the data including only gale-to-violent storms (≥34 knots and <64 knots) or hurricanes (≥64 knots). We developed a difference-in-differences model, associating tropical cyclones and annual average test scores, while controlling for time-varying covariates at the county and grade-cohort level, including student-level racial/ethnic composition, student-level socioeconomic status, county-level urbanicity, and county-level socioeconomic status. Wd

**Results**

In initial results, for hurricane-exposed counties in Florida during 2009–2018, we found that exposure to hurricane force-winds was associated with a -0.10 SD (95% CrI: -0.17, -0.03) decrease in average math scores, equivalent to XX% of the average difference between grades XX and XX. We observed no association with RLA scores (0.00 SD [95% CrI: -0.05, 0.05]).

**Conclusion**

Our initial results indicate that exposure to hurricane-force winds within a county was associated with lower math performance among elementary- and middle school-age students in Florida. Disaster preparedness plans may include resilience to the impacts of climate-related stressors on overall academic achievement across the lifespan.