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30 April 2024

Dr. May R. Berenbaum
Editor-in-Chief, *PNAS*

Dear Dr. Berenbaum,

On behalf of my co-authors, I would like to submit our paper "Disruption to Test Scores after Hurricanes in the United States" for consideration in *PNAS* as a Research Report.

Hurricanes cause major societal disruption and are increasing in frequency, duration, and intensity due to climate change. While recent studies have shown that hurricanes are associated with mortality and hospitalization, less is known about their societal burden on long-term mental and behavioral health. These long-term impacts are especially important to understand in children and adolescents who are vulnerable to the impacts of climate-related disasters, particularly pertaining to their educational attainment. Limited case study-based research has documented the impacts of individual storm events on educational outcome, including devastating impacts of Hurricane Katrina, which displaced 348,000 students across Louisiana, Mississippi, and Alabama and destroyed nearly 80 percent of New Orleans's public school buildings. *This is the first study to comprehensively assess the disruptive effects of hurricanes on educational outcomes among elementary- and middle school-aged students in all affected United States counties*. Using a Bayesian formulation of a hierarchical linear model, we estimated the association between standardized math and reading/language arts (RLA) test score data from 2008/2009 to 2017/2018 and county-level exposure to hurricane-force tropical cyclones based on sustained maximal wind speed ≥64 knots, controlling for several grade cohort and county-level sociodemographic covariates.

We found that for hurricane-exposed counties, compared with the rest of the state, there were worse test scores in North Carolina (math), and better scores in Florida (math & RLA). Overall, grade cohorts and counties with more racial/ethnic minority, low socioeconomic status, and English language learner students tended to have lower test scores, while those with greater shares of Asian and special education students and college-educated adults tended to have higher scores. These state-specific results can inform disaster preparedness policies to maximize resilience to climate-related stressors' impact on academic achievement.

This manuscript has not been previously published and is not under review in any other journal. All authors have contributed to the paper, have approved its submission, and take responsibility for its contents.

The following individuals are qualified to assess its contents and their implications, and are independent of this work:

1) Dr. Mary C. Waters, *NAS Member* (sociology; disaster studies)
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We look forward to your response and would be happy to answer any questions that you may have on this paper.

Sincerely,

Gabriella Y. Meltzer, PhD