VACCINE HESITANCY:

Geographic Overlay of Pertussis Outbreak and Nonmedical Exemptions to School Immunization Requirements in Texas

Christina Onianwa, Class of 2018, Department of Ecology and Evolutionary Biology, Levin Lab

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Introduction
- In the United States, school immunizations play a critical role in controlling vaccine-preventable diseases.
- Nonmedical exemptions to vaccine requirements are available in 48 out of 50 U.S. States.
- A previous Saad Omer study has already demonstrated the link between nonmedical vaccine exemptions and an increased rate of pertussis outbreak in Michigan.

Objective
- Observe whether the same relationship between high rates of nonmedical vaccine exemption and pertussis outbreak can be observed in a different region of the U.S.

Work Profile
- The Levin Lab seeks to explore how macroscopic patterns and processes are maintained at the level of ecosystems and the biosphere.
- My role was to research patterns in the effect of socioeconomic factors on geographic clustering on vaccine hesitancy in the United States.

Methods
- Recreate the Saad Omer Michigan study on the geographic overlap of areas with pertussis outbreaks and high rates of nonmedical exemptions.
- Use Texas instead of Michigan.
- 1. Identify nonmedical vaccination exemption clusters
   - School locations (geocoded addresses) will be used to locate vaccine exemption clusters.
- 2. Identify pertussis outbreak clusters
   - Pertussis outbreak sites will be determined by geocoding of the case addresses.
- 3. Observe geographic overlap
   - Logistic regression will be used to assess the geographic overlap between pertussis outbreak sites and areas with high rates of nonmedical vaccine exemptions.

Significance
- Saad Omer’s results in his Michigan experiment promote the idea that higher rates of nonmedical vaccine exemptions cause and/or perpetuate pertussis outbreaks. Performing this experiment with Texas data will either support or weaken his argument.

Questions
- Do areas of geographic overlap between vaccine exemptions and pertussis outbreak have any other factors in common (i.e., socioeconomic make-up)?
- If so, do these same factors appear in the Omer Michigan study?
- What would legislation to address these high exemption rates look like?

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