Proximity to Environmental Hazards and Reported Illness in Periurban Households of the Dominican Republic

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This research utilized data obtained from a household socioeconomic and health survey of three periurban neighborhoods in the Dominican Republic. A proxy for the frequency and severity of illness experienced by each household was generated based on survey responses. A demographic correction model was used to remove the correlation between this proxy and the number of household inhabitants. The residuals from this model represent the measure of illness in the house which is above or below that which would be expected based on the number and ages of household inhabitants.

Environmental hazards analyzed included inadequate disposal of solid waste and sanitary facilities in poor condition measured through a scoring of survey responses, and uncontained wastewater in the street measured by qualitative evaluations. The dispersion of risks was modeled through the use of raster images in ArcGIS. Values extracted from these images were compared to the geographically referenced health data for correlation and Analysis of Variance or relative risks between populations grouped by dichotomous variables or ranges of values. Significant correlations were found between the metric of illness and the prevalence of uncontained wastewater in the street and sanitary facilities in poor condition.

There was also a significant correlation between inadequate disposal of solid waste and the measure of illness though the modeled dispersion suggests that solid waste disposal is of more concern to welfare of the inhabitants of the house than it is for the general health of the neighborhood. Socioeconomic factors were also analyzed with no significant correlations found between illness and income or education. Those who reported drinking tap water rather than purchased filtered water were significantly more likely to report illness. Earlier studies used dichotomous variables to model risk of exposure to environmental hazards whereas this research is unique in using spatial techniques with continuous variables to model severity of and proximity to hazards and the relation to reported waterborne illness.