

## **PAA 2011 Abstract Submission**

### **Spatial Variation in Contraception Use in the Dominican Republic: Associations with Health Services and Educational Resources**

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#### **Abstract**

Early childbearing and unintended or mistimed pregnancy have been linked to negative outcomes for maternal-child health, education, and family well-being. In the Dominican Republic, contraceptive use varies by province, ranging from 59.7% to 81.8% of women in unions. This study explores the importance of spatial effects on contraceptive use among women of reproductive age in the Dominican Republic. Using spatial analytic techniques with two recent national-level datasets (2007 DHS and 2006 SIGpas3), I examine whether access to health services and educational resources explain province-level variation in modern contraceptive use. I conduct exploratory spatial analysis and estimate geographically weighed regression models that account for spatial autocorrelation. Independent variables include socioeconomic conditions, female workforce participation, distance to health care facilities, and proximity to primary and secondary schools. Preliminary results suggest coefficients for the association of covariates with contraceptive use vary significantly by geography, in both the magnitude and direction of the coefficients.

#### **Background**

Early childbearing and unintended or mistimed pregnancy have been linked to negative outcomes for maternal health, and in some situations, for education and family well-being (Brown & Eisenberg, 1995; Gipson, Koenig, & Hindin, 2008). In Latin America and the Caribbean, despite reductions in many countries' adolescent fertility rates over the past 20 years, both early childbearing and unintended pregnancy are common. This study considers the importance of spatial effects on contraceptive use among women of reproductive age in the Dominican Republic. Specifically, using spatial analytic techniques, I aim to establish whether (1) access to health services and (2) educational resources explain province-level variation in modern contraceptive use.

In the Dominican Republic, contraceptive use is moderate at the national level but varies dramatically at the province level<sup>1</sup>. Among women who are married or living together, modern contraceptive use ranges from 59.7% in Pedernales and 60.3% in Elías Piña, to 78.6% in Samaná and 81.8% in San José de Ocoa. Contraceptive use is particularly low among adolescents 15-19 years old (43.8% for married/living together, 44.2% for unmarried but sexually active). In contrast to many developing countries, there is only a weak association between modern

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<sup>1</sup> In this study we refer to 32 provinces, which includes 31 provinces and the capital of Santo Domingo (*Distrito Nacional*).

contraceptive use and either education or household poverty; there is no significant association with urban or rural residence.

Prior research on fertility and family planning has examined contextual factors at multiple levels including the family, community, district, and province (Entwisle & Mason, 1985; Stephenson, Beke, & Tshibangu, 2008). However, many of these studies have relied on fixed or random-effects analytic models that ignore the potential for spatial autocorrelation, or dependency of observations based on proximity. A spatial perspective allows us to visualize differences in contraceptive use over geographic space, to better conceptualize how and why such variation may occur, and to calculate statistical models that account for spatial autocorrelation. The current study adds to this rapidly-expanding literature on reproductive health using spatial analytic techniques by examining the case of the Dominican Republic, exploring the association of contraceptive use with the spatial distribution of health services and educational resources.

### **Data and Methods**

This study uses existing data from the 2007 Dominican Republic Demographic and Health Survey (known as ENDESA 2007), as well as the *Sistema de información geográfica para salud* (Geographic Information System for Health; SIGpas3), a geographic and health database compiled in 2006 using records of Dominican national public health, epidemiology, and census agencies, among others. The two data sets will be linked by geographic location, which is possible because the DHS data include information on region, province, and crucially, geocodes (latitude and longitude) at the cluster (census tract) level.

The 2007 Dominican DHS was a household survey designed to be representative of households and adults living within households at the national, regional, and provincial levels. This study uses questionnaire data from women ages 15-49 who are either “in-union” (married or living together) or unmarried but sexually active in the month prior to interview. The resulting analytic subsample is 17,588 women, or about 65% of all women interviewed. The dependent variable of interest is a dichotomous measure for current use of modern contraception (i.e., oral contraceptives, injectibles, implant, IUD, condom, lactational amenorrhea, or male or female sterilization). The primary independent variables of interest are (1) access to health services, operationally defined as distance to public or private health care facilities, and (2) educational resources, defined as distance to primary and secondary schools. Other independent variables to be examined include socioeconomic conditions and female workforce participation.

The analytic techniques of this paper include exploratory spatial analysis and geographically weighted regression (Fotheringham, Brunson, & Charlton, 2002). Exploratory spatial analysis is used to visualize the spatial relationships between access to health services, educational resources, and modern contraceptive use. It also allows the assessment of spatial dependence and spatial heterogeneity. A formal assessment of spatial autocorrelation is conducted by calculating the local Moran’s I statistic. Next, geographically weighed regression is used to account for spatial autocorrelation.

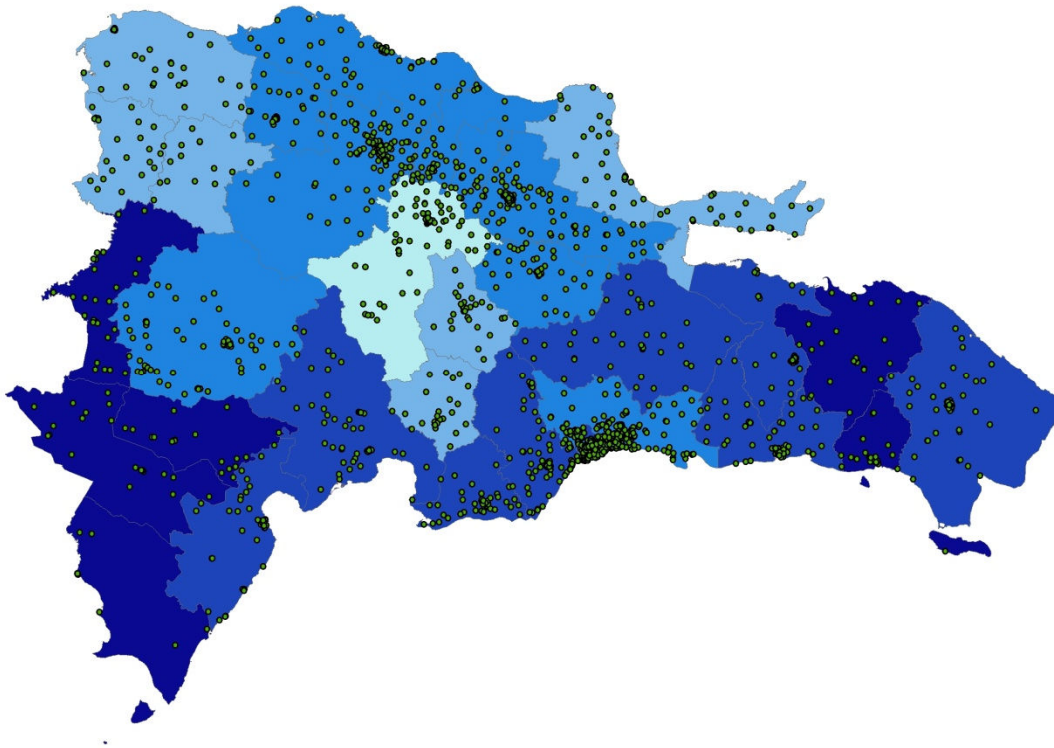
### **Preliminary Results and Next Steps**

Several steps in exploratory spatial analysis have been completed using the 2002 Demographic and Health Survey. These steps will need to first be repeated with the 2007 DHS data and then additional analytic steps will be completed. The exploratory results to date suggest the association of health care access with contraceptive use varies by province, as shown in

Figure 1. The lighter-colored areas of the map indicate greater contraceptive use, and the locations of public and private health care facilities are shown as points.

Although there is a moderate, positive association apparent between the presence of health care facilities and contraceptive use, the strength of this association varies across provinces. This suggests that access to health services may not fully explain differences in contraceptive use across the provinces. Additional multivariate analyses are needed to better understand the potential mechanisms at work at the province level.

**Figure 1.** Contraceptive Use by Province and Locations of Public and Private Health Care Facilities, Dominican Republic 2002.



## References

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