

Maternal and Child Health Report

Focus on Hamilton County Women and Children

Volume 5 Issue 10

November 2000

Testing the WCHOP Deprivation Index

This issue of the Maternal and Child Health Report presents follow-up information on the Deprivation Index, an ongoing Women's and Children's Health Outcomes Program (WCHOP) project. The Deprivation Index and the way it was constructed was first explained in the June/July 2000 Maternal and Child Health Report. That report is available on our website, www.chsc-chmc.edu.

Previous Research on Neighborhood Characteristics and Health

Characteristics of individuals, such as education and income have been found to be related to health outcomes through a variety of processes including access to care, poor nutrition, and inadequate housing.¹ Additionally, recent studies of public health have sought to clarify the relationships between neighborhood characteristics and population-based health outcomes such as low birthweight (LBW) and prematurity. There is growing evidence to suggest that neighborhood characteristics can indeed effect individual health. One such study found that living in a neighborhood with a higher income level than that of the individual (positive income incongruity) was associated with positive outcomes such as lower likelihood of LBW.² Other studies of neighborhood characteristics and health have found a correlation between neighborhood income, unemployment rate, and birth weight.³

Deprivation Index

The deprivation index is created by combining five measures of neighborhood social structure. Those five variables are : percent adults with no high school diploma, percent of children below poverty, percent of households receiving public assistance, percent unemployed, and percent of families that are female-headed households with children. These measures were combined and

transformed so that each of the 94* neighborhoods/municipalities in Hamilton County assigned a score of 0 to 10, with 0 being least deprived and 10 being most deprived.⁴

Table 1 : Mean Deprivation Score

Area	Mean
City of Cincinnati neighborhoods	3.7
Hamilton County Municipalities (not including Cincinnati)	1.8
All 94 Hamilton County Neighborhoods	2.8

Testing the Deprivation Index

While the Deprivation Index was created in order to find a clear, quantitative way of distinguishing between county neighborhoods, our goal was also to find a measure of neighborhood social structure that could predict which neighborhoods would have poor health outcomes as well as predict which neighborhood would have other poor social outcomes, such as higher crime rates. Therefore, the research hypothesis for this specific study was the following: Can the WCHOP Deprivation Index predict both poor maternal and child health outcomes and crime?

British and Swedish physicians have developed several indices of social deprivation in order to predict health-related outcomes such as morbidity and practitioner workload.⁵

Other researchers, however, have argued that classifying neighborhoods on one measure of social structure, such as unemployment, is just as useful as using indices of deprivation such as the Jarman Index.

The purpose of this study was to 1) determine how well the WCHOP Deprivation Index predicted health outcomes and crime, and also 2) to determine if other social structure measures were better equipped to predict health outcomes and/or crime.

Study Sample and Methods

Although there are over 90 neighborhoods within Hamilton County, the sample for this study included only the 47 neighborhoods within the City of Cincinnati because crime data are only available on a neighborhood level from the Cincinnati Police Department.

Independent and Dependent Variables

Independent (predictor and control) variables in the study included: the Deprivation Index, racial heterogeneity, residential mobility, marital disruption, older housing, rentals, and percent of children in private schools.

Dependent (predicted) variables included both health outcomes and crime. The health outcomes included: LBW, VLBW, inadequate prenatal care, births to mothers who smoked, teen births, and infant mortality. Crime data included only serious crimes, and was divided into two measures: violent crime rate and property crime rate. The rate was calculated as each neighborhood's number of crimes per 1,000 population.

Findings

The hypotheses that the Deprivation Index could predict both poor health outcomes and crime was tested using multiple regression. Multiple regression is a statistical technique where relationships between the independent variables and each dependent variable are tested while controlling for all other independent variables. For example, one equation would involve determining if the Deprivation Index predicted low birth weight rates in neighborhoods regardless of the levels of racial heterogeneity, marital disruption, mobility, housing, and rentals.

The main finding of our study was that our Deprivation Index was a good predictor of almost all health outcomes with the exception of VLBW and maternal smoking. Generally, the relationships were positive, meaning, neighborhoods with higher scores on the Deprivation Index had higher levels of low birth weight, inadequate prenatal care, infant mortality, and teen births.

The Deprivation Index, however, was not the best predictor of crime. The relationship between deprivation scores and crime was fairly weak. The

best predictor of crime in our model was marital disruption which was measured as the proportion of married over divorced residents.

Conclusion

An important reminder about this study is the distinction between individual and neighborhood relationships with health. In social science research, one common mistake researchers are warned about is the "Ecological fallacy." This is the tendency to confuse individual and group level relationships. For instance, if a study finds that most crimes are committed while the perpetrator was under the influence of alcohol, one might presume that states with higher rates of alcohol use have higher crime rates. This in fact, is not the case. When one has information on relationships that exist at a group (i.e. neighborhood, state) level, it is not always the case that the relationship also exists at the individual level.

The next step in our research is to attempt to sort out these affects by trying to distinguish between what are called aggregational effects versus contextual effects. An example that illustrates this problem is maternal smoking. The model that best explained the percentage of maternal smoking in a neighborhood was one that included the racial composition of the neighborhood and the percentage of high school education for that neighborhood. The question is, are mothers who live in predominately white neighborhoods and neighborhoods with lower education levels more likely to smoke because of the environment of that area, or is it that mothers who are white and less educated are more likely to smoke?

To answer this question, one can examine individual level data and determine that, indeed, most of the mothers who smoked while pregnant were white and did have less than the average level of education. Therefore, we would conclude that the neighborhood level relationship is simply a matter of aggregation - adding up all the people in that neighborhood.

A contextual effect would be where the characteristics of the neighborhood influence individual behavior, i.e. are mothers more likely to smoke in neighborhoods with high levels of smoking. It might be the case that in areas where smoking is more socially acceptable, pregnant women feel less stigma and are more likely to smoke.

