Domestic Violence, Poverty, and Social Services: Does Location Matter?*

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Objective. This study investigates whether or not domestic violence agencies are located in areas of need. Recent research indicates that community economic disadvantage is a risk factor for intimate partner violence, but related questions regarding the geographic location of social service agencies have not been investigated. *Methods.* Using Connecticut as a case study, we analyze the relationship of agency location and police-reported domestic violence incidents and assaults using OLS regression and correcting for spatial autocorrelation. *Results.* The presence of an agency within a town has no relationship with the rates of domestic violence. However, regional patterns are evident. *Conclusion.* Findings indicate that programs are not geographically mismatched with need, but neither are programs located in towns with higher rates of incidents or assaults. Future research and planning efforts should consider the geographic location of agencies.

Numerous studies have documented the overrepresentation of domestic violence in poor households relative to middle- and upper-income households and the associated risk of poverty (Benson and Fox, 2004; Carlson et al., 2003; Hotaling and Sugarman, 1990; Tjaden and Thoennes, 2000). According to the U.S. Department of Justice, the average annual female intimate partner victimization rate per 1,000 persons between 2001 and 2005 was 12.7 for women residing in households earning less the $7,500 annually compared to 2.0 for women with annual household incomes over $50,000 (Catalano, 2007). The relationship between poverty and domestic violence is complex. In some situations, poverty may exacerbate the likelihood of experiencing domestic violence. With fewer options for economic self-sufficiency and social support systems with little ability to offer financial help, poor women may feel more trapped in unhealthy relationships

(Tolman and Raphael, 2000). In other situations, domestic violence may lead to poverty for women in previously financially sound situations as women who escape violent relationships are often left with no financial resources (Davis, 1999). Moreover, victims of domestic violence often have related difficulties such as limited or inconsistent work experience, poor education, physical and mental health problems, and substance abuse issues (Lloyd and Taluc, 1999; Logan et al., 2007; Tolman and Raphael, 2000; Williams and Mickelson, 2004). Such problems pose serious barriers in escaping violence and achieving self-sufficiency and present a challenging situation for social service programs (Renzetti, 2009).

Survivors of domestic violence report that successful transitions to violence-free and independent lives are often made with the assistance of social services such as shelters, counseling, and public cash assistance (Lyon, Lane, and Menard, 2008; Postmus et al., 2009). Such services are particularly important for low-income women who likely encounter barriers when attempting to leave an abusive relationship and often turn to public assistance and services for help (Lyon, 2000). Services are only useful, however, if they are accessible to and utilized by those in need. In designing and delivering services to domestic violence victims, policymakers and program administrators are faced with a dilemma. On one hand, research on geography and social services aimed at the poor indicates that spatial proximity is a strong predictor of service uptake (Allard, Tolman, and Rosen, 2003). On the other hand, research on domestic violence indicates that contact with agencies outside a woman's neighborhood is a critical link to accessing services (Warrington, 2001).

The current study investigates the relationship between poverty and domestic violence on a town level and explores where domestic violence programs are located as related to domestic violence assaults and incidents. The central research question asks whether or not the location of services at the town level is related to rates of domestic violence. In other words, if social services aimed at domestic violence victims are to be accessible to victims, one should see a geographic pattern of domestic violence related to the location of shelters and agencies after controlling for other environmental risk factors such as poverty. We hypothesize that because domestic violence agencies developed out of grassroots and community activism, the geographic location of agencies is not related to rates of domestic violence or other community risk factors.

Place and Social Policy

Academic research and policy reports on the causes of poverty and efficacy of anti-poverty programs have adopted a strong focus on the importance of place and community (e.g., Blank, 2004). Policy scholars have shown that the proximity of services to the target population is an important aspect of

service uptake because the location of social services greatly affects the ability of those in need to access and utilize services and programs (Allard, 2004; Allard, Tolman, and Rosen, 2003). In other words, place matters and the closer services are placed to individuals in need, the more likely these individuals will utilize these services. This finding makes intuitive sense, as services located close to one's home would be more convenient. However, recent research demonstrates a mismatch between where providers are located and the communities where individuals in need reside (Allard, 2009).

Community Risk Factors and Domestic Violence

Building on findings related to individual poverty and domestic abuse, researchers in geography, criminology, and public health have begun examining the relationship between community context and domestic violence. Qualitative studies have utilized concept mapping to frame how abused women perceive the relationship between community factors and interpersonal violence (O'Campo et al., 2005; Burke, O'Campo, and Peak, 2006). A growing number of quantitative studies empirically document these relationships. Miles-Doan (1998), in a case study of Duval County, Florida, found that neighborhoods with larger proportions of unemployed males, female-headed households, and residents in poverty also had higher rates of domestic violence than other neighborhoods. Studies using the National Survey of Families and Households support the hypotheses that economic disadvantage on the community level as well as the household level affects the likelihood of experiencing domestic violence (Benson et al., 2003; Fox and Benson, 2006). Grana (2001) explores the relationship of state-level characteristics and domestic femicide and concludes that the association between state size and homicide rates may be related to other variables such as poverty and public services. International case studies in Australia (DiBartolo, 2001) and Bangladesh (Koenig et al., 2003) also conclude that domestic violence is related to community contextual variables.

Some of these empirical studies, along with related research investigating teenage sexual activity, crime involvement, and health outcomes (e.g., Browning, Leventhal, and Brooks-Gunn, 2005; Dembo et al., 2009), have found evidence of a concentrated disadvantage effect on individual-level outcomes. Wilson (1987) introduced the theory that communities with a very high concentration of poverty or disadvantage have different effects on residents than does poverty alone. The seminal work of Sampson, Raudenbush, and Earls (1997) operationalized concentrated disadvantage as a combination of the proportion of poverty, public assistance receipt, female-headed households, unemployment, children under 18, and African Americans; their work demonstrated the effect of residing in a very disadvantaged community on stranger violence. Other domestic violence studies have investigated the possible similarities and differences between stranger violence

and domestic violence. Although community socioeconomic characteristics are less powerful predictors of domestic violence compared to stranger violence (Frye et al., 2008), increased community violence is associated with higher rates of domestic violence (Raghavan et al., 2006), further bolstering the case for a consideration of community characteristics and concentrated disadvantage as risk factors for individual domestic violence.

Domestic Violence Services and Program Goals

Social services designed to assist victims of domestic violence provide a wide range of services at the community level. The first emergency shelters were founded in the 1970s in response to a growing grassroots movement focused on the rights and needs of battered women and their children, primarily their immediate safety (Schechter, 1982). Over the past 40 years, the movement has grown and evolved to a professionalized, institutionalized system supported in part by public funding (Reinelt, 1995). The goal of the movement has also evolved, from a focus on coaching women to leave relationships to a goal of empowerment (Arizona Coalition Against Domestic Violence, 2000). Empowerment service models aim to provide the necessary support, encouragement, and resources to enable a woman to make her own choices and decisions about herself and her life. Thus, many agencies have vastly expanded their services to include longer-term housing along with nonresidential services as well as support groups aimed at different subpopulations and financial literacy programs (Sullivan and Gillum, 2001).

A growing body of literature examines the efficacy of this system. Studies provide strong support that domestic violence services, including shelter, advocacy, legal services, and counseling, have positive effects on the ability of women to escape and remain free from abusive relationships as well as enhance their well-being (Sullivan and Bybee, 1999; Tan et al., 1995; Tutty, Weaver, and Rothery, 1999; Weisz, Tolman, and Bennett, 1998). However, poor women's ability to access services is often compromised by the difficulties they face in escaping an abusive relationship (Davis, 1999). In a national study of 20 domestic violence programs, Zweig, Schlichter, and Burt (2002) found that agencies consistently cited poverty as a barrier to obtaining and receiving services. It seems reasonable to conclude that nonresidential services and thus their location are especially important for this at-risk population.

Location and Domestic Violence Services

Research on the structure of domestic violence services has focused on integrated community responses and the importance of cooperation and

communication among service providers (Clark et al., 1996). However, little research has been completed on the question of place and location. Mainstream geographic literature focuses on stranger violence, particularly fear of crime outside the home and in public spaces (for a review, see Pain, 2000). Feminist geographic studies have expanded this view and have much to contribute to the question of space and safety for domestic violence victims (Pain, 2001; Whitzman, 2007). Warrington (2001) provides a framework for how women conceptualize restricted spaces and theorized that shelters exist in a space distant and isolated from the home regardless of measured distance.

Thus, unlike social service provision literature, the findings from this literature seem to indicate that distance or geographic accessibility or proximity may not be as important as availability or the level of services. Perhaps findings based on geographic location and service uptake of other types of social services are not generalizable to domestic-violence-related services. However, intuitively, some measure of geographic distance may be too far, especially for poor women. If certain communities are at an increased risk of experiencing a higher rate of domestic violence, it seems to make sense that more services should be made available to them, regardless of physical location. In a study of a rural community in New Zealand, Panelli, Little, and Kraack (2004) caution that domestic violence service providers should consider the cultural and spatial construction of violence and safety in designing appropriate services.

If community and individual poverty both increase one's risk of domestic violence and decrease one's ability to obtain services, then perhaps the current construction that Panelli, Little, and Kraack (2004) are emphasizing is such that an investigation of agency location is merited. The limited amount of empirical research in this area is problematic in a pragmatic sense as domestic violence agencies, in particular nonresidential services, are structured to deliver services to geographic areas. We hypothesize that because the history of agency formation is based on grassroots and community awareness and involvement, agency location is likely not related to town-level need.

Study State and Policy Environment: Connecticut

We use Connecticut as a case study to examine our hypotheses and focus on services and need at the town level. Connecticut is a small state encompassing 4,844 square miles and was home to 3,405,565 residents in 2000. The state contains rural in additional to urban areas, but does not have the difficulty of remote or isolated regions due to its relatively small size. Although it is possible to drive across the state, from the southwest corner to the northeast corner, in less than two-and-a-half hours, a commute of this length is not conducive to service uptake. Connecticut's relative wealth and high cost of living also present formidable challenges to low-income women

struggling to achieve self-sufficiency and find safe and affordable housing, making social services critical.

Connecticut is a useful and manageable case study site for a number of reasons. Connecticut's Department of Public Safety has been collecting family violence data since 1986 and maintains an extensive electronic database of this information, making data easily accessible for research purposes. The community of domestic violence advocates also has a strong history in Connecticut, with the first emergency shelter founded in 1975, following closely the history of the movement on the national level. Like many other states, Connecticut has a state coalition, the Connecticut Coalition Against Domestic Violence, which serves as an umbrella organization. The state currently has 18 domestic violence agencies, that are active members of the Coalition and all receive at least part of their funding from the state. The Department of Social Services, the Judicial Branch via the Office of Victim Services, and the Office of Policy and Management provide support focused on different aspects of service provision. All these sources are partially comprised, to differing degrees, of federal pass-through dollars. These 18 funded agencies provide a range of support services to victims of domestic violence and their children. Shelter, legal services, counseling, and public education are the most common services. All agencies provide some type of emergency shelter to victims. Sixteen of the 18 agencies run shelters with between 12 and 20 beds. The remaining two agencies arrange for host homes.

As seen in Figure 1, the domestic violence agencies are not disbursed evenly throughout the state. Most agencies are clustered in the western half of the state, with five of the 18 agencies located in the southwest corner. Only four agencies are located east of the Connecticut River, which divides the state in half. Many of the agencies are located near the capital of Hartford in the center of the state or in the southwestern corner in the suburbs of New York City. Measuring from town center to town center, the average distance from a town without a domestic violence agency to the closest town with an agency is 8.6 miles, with the furthest distance at 19.5 miles.

Methods

Sample and Dependent Variable Definitions

The sample for the research project consists of the 169 Connecticut towns and cities. Two measures of domestic violence arrests in the year 2000—domestic violence incidents and domestic violence assaults per 1,000 residents—serve as the dependent variables for the analyses. Data were gathered by the Connecticut State Police, Department of Public Safety. According to the Department, family violence is defined as physical abuse or a violent threat that causes fear of imminent danger. Verbal and emotional abuse does

FIGURE 1

Domestic Violence Agencies in Connecticut
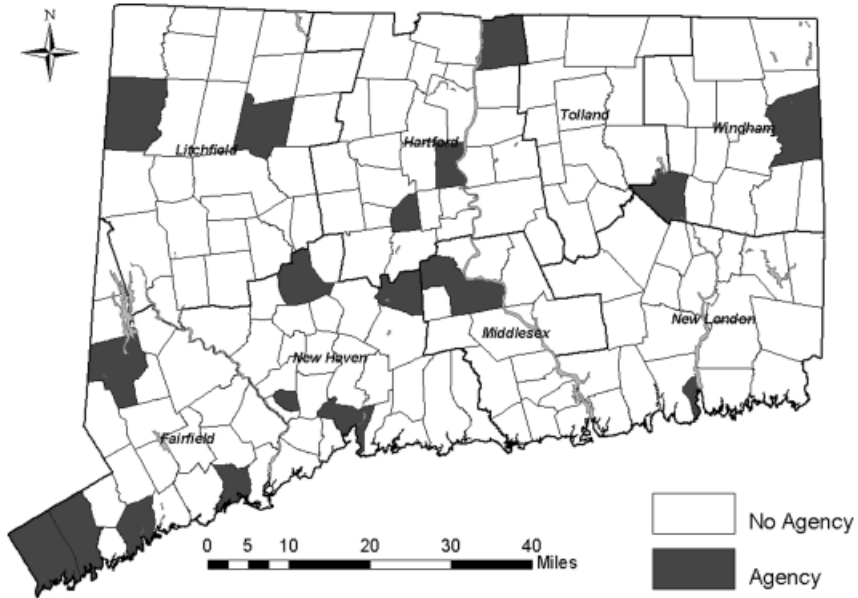
NOTE: Map shows the town location of the 18 domestic violence agencies in Connecticut.
SOURCE: Connecticut Coalition Against Domestic Violence.

not constitute family violence per the definition. Data are collected by police officers who fill out a one-page, three-ply, offense report when the incident to which they are responding is a family violence offense. The original is sent to the Crime Analysis Unit of the Department of Public Safety, and the data are entered into the Family Violence Reporting Program by Family Violence Data Entry Persons. The second copy is sent to the State's Attorney of the appropriate court, and the third copy is retained in the local police files. The report includes information on date, time, and town location of the offense; the type of offense; the type of weapon used; the extent of injuries; whether or not drugs or alcohol were involved; and who was involved in the incident and their relationship to the victim. There is also a box for optional remarks.

Our first dependent variable is incidents per 1,000 residents. Incidents include all occurrences of family violence that result in at least one arrest. These crimes include breach of peace and disorderly conduct (the formal charges associated with threats, harassment, and endangerment) as well as the less common charges of assault, homicide, and kidnapping. The second

dependent variable, assaults, serves as a measure of more serious instances of family violence in which physical violence such as punching or kicking results in injuries. Homicides and kidnappings were prohibitively small to allow for analyses.

Town Characteristics and Data Sources

Variables measuring domestic violence services and socioeconomic-related characteristics are also from the year 2000 and come from two additional data sources. Data on the sociodemographic and economic characteristics come from the 2000 U.S. Decennial Census. Measures of community characteristics include the proportion of the population below the poverty rate, the proportion of population below 18 years old, population density, the log of the median house value, local crime rate per 1,000 residents, and a composite risk indicator. Due to multicollinearity among a number of other risk-related community variables of interest and the theoretical importance of concentrated disadvantage, we created a risk indicator to reflect the combination of multiple poor social-economic characteristics of a certain town or city. The town variables used in creating the composite risk indicator were: (1) proportion of population receiving public assistance, (2) proportion of female-headed households, (3) unemployment rate, and (4) proportion of population below poverty level. The towns falling in the top quarter of the distribution for every variable were categorized as towns at risk for an increased level of domestic violence. Thus, the risk indicator is a dummy variable with a value of 1 for towns meeting this criteria ($N = 23$) and zero for all other towns ($N = 146$).[1] This variable also reflects the theory of concentration effects or concentrated disadvantage, which says that a nonlinear relationship exists between crime and neighborhood disadvantage and that only over a particular threshold do risk characteristics become important (Sampson and Wilson, 1995). Lastly, we created a dummy variable, CONNECTICUT RIVER, that equals 1 if the town is located west of the river and 0 if the town is east of the river. This variable is used to correct for spatial autocorrelation as discussed later and is based on the observation of the clustering of agencies in the western portion of the state.[2]

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[1]We also calculated the risk indicator without including the poverty variable, since this variable is already included in the model. The result was the same in terms of which towns were coded for concentrated disadvantage.

[2]We investigated the possibility that two dummy variables measuring clustering around Hartford and New York City, the two areas with noticeably more agencies, might be a better fit. We set the New York City variable equal to 1 if a town was within 25 miles from the center of Greenwich and the Hartford variable equal to 1 if a town was within 10 miles from the center of that city (in order to capture areas of similar geographic size). Neither variable was statistically significant, but they did correct for the spatial autocorrelation—similar to the correction achieved by the river variable.

Domestic Violence Agency Variables and Data Source

The Connecticut Coalition Against Domestic Violence provided data on the number and location of domestic violence agencies in the state. In 2000, 18 domestic violence agencies were located in Connecticut. We constructed three measures of agency location. AGENCY is a dummy variable that indicates whether or not an agency is located in the town. AGENCY BOUNDARY is also a dummy variable, which equals 1 when the town borders at least one town with a domestic violence agency. The third measure, DISTANCE, is the distance in miles to a town with an agency, measured from town centroid to centroid. Models were run with the first two measures and separately with the third measure. Because the results were very similar and because the distance measure is only an approximation of the actual distances, we do not present the models with the distance measure. Similarly, we had originally planned to include the number of beds in the model, but upon further investigation into the realities of service provision, we decided not to include the variable. We discovered that the state hotline facilitates temporary placements and moves among the agencies and that programs are also willing to use other arrangements to meet overflow demands. Moreover, because 83 percent (15 out of 18 agencies) of the agencies have between 12 and 16 beds, there is little variation in the on-paper capacity as well.

The present analysis focuses on the location of agencies exclusively designed, funded, and implemented for serving victims of domestic violence. Of course, other more general social service agencies also offer programs for domestic violence victims such as emergency funds or legal counseling. The present analysis focuses on domestic violence agencies because they offer more extensive and comprehensive services, are more permanent and stable, and are more visible to the community through public education and advocacy programs.

Analyses and Spatial Autocorrelation Tests

We examined the relationship between rates of domestic violence and poverty using bivariate correlations and spatial patterns. We then analyzed the influence of community indicators and domestic violence services on domestic violence rates using multivariate and spatial statistics. Specifically, we investigated variations of an OLS model and tested for spatial autocorrelation. The model was run for the two dependent variables, INCIDENCE RATE and ASSAULT RATE.

Tests for spatial autocorrelation were run to determine if the models were biased. Town characteristics, such as rates of domestic violence arrests, are usually spatially clustered. In extant studies, few consider the spatial autocorrelation issue in regression analyses of domestic violence (Miles-Doan, 1998). Although the inclusion of other independent variables that have

similar spatial patterns can explain some of the spatial error of the dependent variable, the regression error can still be spatially biased. If additional variables cannot explain the spatial error, geographically weighted regression is one frequently used spatial regression technique to address this issue.

Moran's *I* test is used as an index of spatial autocorrelation based on feature location and attribute values. It is widely used to test for the presence of spatial dependence such as clusters and dispersion (Hongfei, Calder, and Cressie, 2007). The null hypothesis is that the data are random in their spatial distribution. The test compares the difference in values for neighboring features and the difference in value of all features. The values are clustered if the average of the differences in values of adjacent features is less than between all features. The Moran's *I* index ranges from -1 to $+1$, with values close to 0 indicating the lack of spatial dependence. A Moran's *I* value indicates spatial clustering when its value is near $+1.0$ and spatial dispersity when it is near -1.0. Moran's *I* indices of domestic violence incidence rates and assault rates indicate that domestic violence rates and assault rates are significantly clustered in Connecticut. In our final model, a variable indicating whether or not an agency was located west of Connecticut River is added to adjust the spatial autocorrelation bias. This variable corrects the bias and weighted regression models were deemed unnecessary.

Findings

Correlation Between Poverty and Domestic Violence

The maps in Figure 2 present the percent of the population living below the federal poverty line and the rates of domestic violence incidents and assaults for the 169 towns and cities of Connecticut. The geographic patterns of each variable are noticeably similar. Higher rates of poverty and domestic violence seem to cluster around the more urban areas of the state, including the area surrounding Hartford in the center of the state and New Haven in the south.
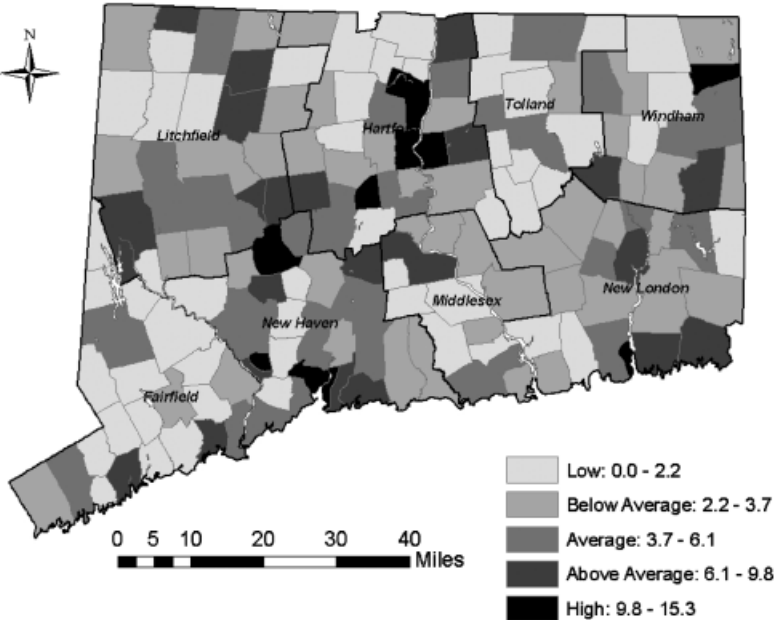
Table 1 contains correlation coefficients between domestic violence rates and other indicators of socioeconomic distress. Similar to the literature on neighborhood indicators, we find a high correlation between these variables. Specifically, these values are all over 0.5, with most in the 0.7 to 0.85 range and all correlations are statistically significant at the 0.01 level. The relationships between community risk characteristics and assault rates are slightly stronger than the relationships between these variables and the rate of domestic violence incidents. For example, the correlation between poverty rates and domestic violence assaults is nearly 0.8, more than one-tenth greater than the correlation with domestic violence incidents (0.683).

FIGURE 2

Connecticut Town-Level Maps, 2000; Poverty Rates by Town, 2000
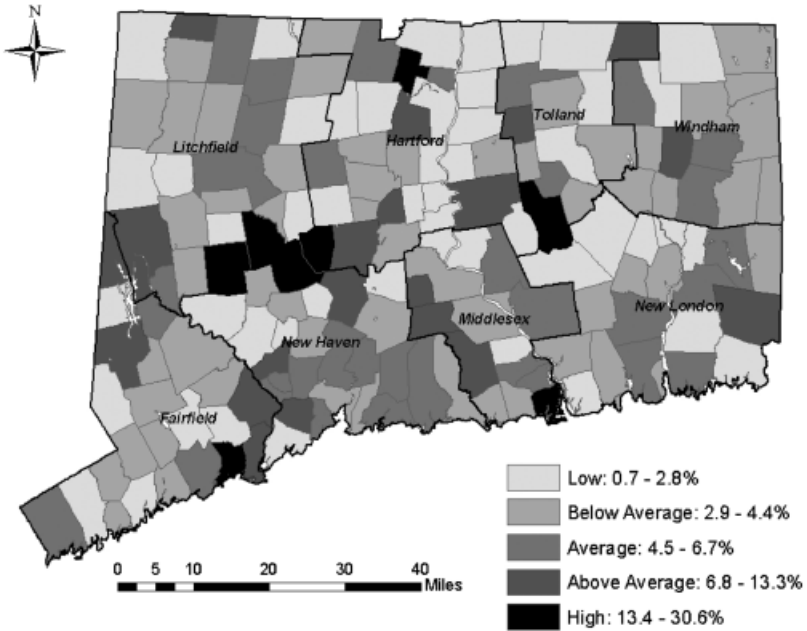
Domestic Violence Incidents per 1,000 Residents by Town, 2000

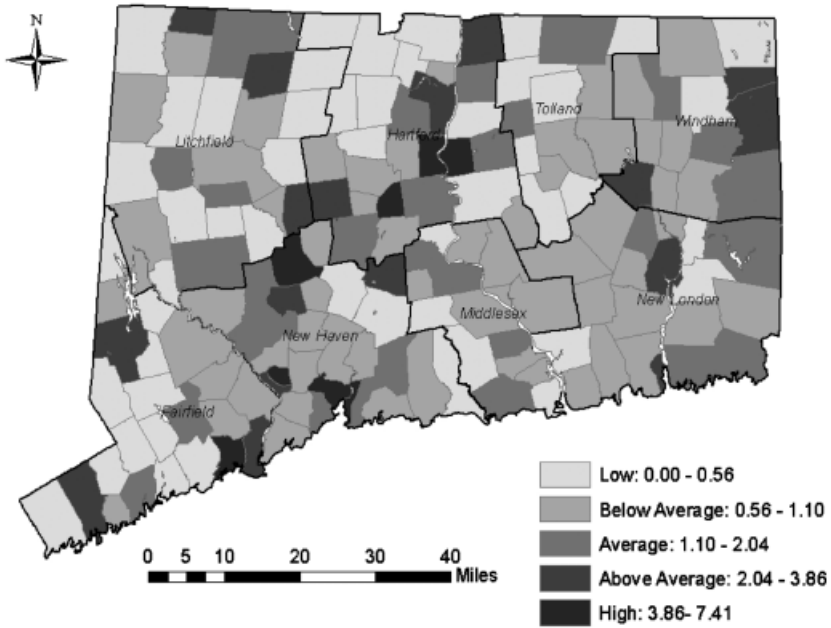Domestic Violence Assaults per 1,000 Residents by Town, 2000

Low: 0.00 - 0.56
Below Average: 0.56 - 1.10
Average: 1.10 - 2.04
Above Average: 2.04 - 3.86
High: 3.86- 7.41

FIGURE 2–CONTINUED

NOTES: Maps are at the town level; shading indicates the level of poverty, domestic violence incidents, and domestic violence assaults, respectively.
SOURCES: The poverty rate is from the 2000 Census, U.S. Bureau of the Census. Measures of domestic violence come from the Connecticut Department of Public Safety.

Agency Location and Community Characteristics

The overlap between domestic violence rates and measures of community disadvantage demonstrates geographic areas of service need. Moreover, comparing the maps in Figure 2 to the map of agencies in Figure 1, it seems at a glance that at least some agencies are located in towns with great need. Table 2 presents a comparison of socioeconomic characteristics of towns with and without a domestic violence agency within its borders. On average, agencies are located in more disadvantaged towns and cities and have higher rates of general crime, domestic violence incidence, and domestic violence assaults.

Agency Location and Domestic Violence Incidents

OLS regression was used to analyze the relationship between domestic violence and agency location controlling for other community characteristics.

TABLE 1

Correlation Between Reported Domestic Violence per 1,000 Residents and Socioeconomic Indicators, 2000

	Domestic Violence Incidents	Domestic Violence Assaults
Percent below poverty line	0.683**	0.797**
Percent receiving public assistance	0.775**	0.849**
Percent female-headed households	0.782**	0.841**
Percent unemployed	0.514**	0.581**

**$p < 0.01$.

NOTE: $N = 169$ Connecticut towns and cities.

SOURCES: U.S. Bureau of the Census and the Connecticut Department of Public Safety.

Regression results examining the relationship between domestic violence incidence rates and key town characteristics are presented in the first three columns of Table 3. Results in Column 1 shows that without controlling for other variables, the presence of a domestic violence agency in the town

TABLE 2

Socioeconomic Indicators of Towns With and Without Domestic Violence Agencies, 2000

	Towns With an Agency ($N = 18$)	Towns Without an Agency ($N = 151$)
Percent below poverty line**	12.21 (7.27)	3.94 (2.18)
Percent receiving public assistance**	5.7 (3.82)	1.66 (1.07)
Percent female-headed households**	15.19 (7.73)	8.12 (2.4)
Percent unemployed**	6.89 (3.74)	3.43 (1.81)
Crime rate per 1,000 residents**	52.48 (34.66)	19.38 (10.92)
Domestic violence incidences per 1,000 residents**	8.49 (3.76)	3.51 (2.35)
Domestic violence assaults per 1,000 residents**	3.08 (1.95)	0.94 (0.73)

**$p < 0.01$.

NOTES: $N = 169$ Connecticut towns and cities; t test of means, standard errors in parentheses.

SOURCES: U.S. Bureau of the Census, Connecticut Department of Public Safety, Connecticut Coalition Against Domestic Violence.

TABLE 3

OLS Regression Models Explaining Domestic Violence Incidents and Assaults per 1,000 Residents at the Town Level, 2000

	Domestic Violence Incidents			Domestic Violence Assaults		
Predictor	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Agency in town	5.262***	0.735	0.657	2.167***	0.052	0.032
	(0.662)	(0.732)	(0.726)	(0.107)	(0.227)	(0.226)
Agency in adjacent town	0.557	0.092	0.024	0.057	− 0.151	− 0.168+
	(0.411)	(0.319)	(0.318)	(0.151)	(0.099)	(0.099)
% below poverty line		0.117+	0.145*		0.090***	0.097***
		(0.069)	(0.070)		(0.021)	(0.022)
Risk indicator		2.267**	2.253**		0.460*	0.457*
		(0.658)	(0.651)		(0.204)	(0.203)
Log of median house value		− 2.054***	− 2.438***		− 0.546***	− 0.646***
		(0.458)	(0.480)		(0.142)	(0.152)
% less than 18 years old		− 0.028	− 0.011		0.025	0.030+
		(0.057)	(0.057)		(0.018)	(0.018)
Population density		0.000	0.000		0.000	0.000
		(0.000)	(0.000)		(0.000)	(0.000)
Crime rate per 1,000 residents		0.015	0.012		0.004	0.004
		(0.016)	((0.016)		(0.005)	(0.005)
Located west of CT River			0.750*			0.195+
			(0.365)			(0.113)
Moran's *I*	0.19**	0.09+	0.07	0.22**	− 0.02	− 0.02
Adjusted R^2	0.271	0.584	0.593	0.331	0.731	0.733

+$p<0.10$; *$p<0.05$; **$p<0.01$; ***$p<0.001$.

NOTES: $N = 169$ Connecticut towns and cities. The above are OLS models with standard errors shown in parentheses. INCIDENTS is a continuous variable, ranging from 0 to 15.28, with a mean of 4.043. ASSAULTS is also continuous, ranging from 0 to 7.41, with a mean of 1.172.

relates to an increase of 5.3 arrests per 1,000 residents, but the presence of an agency in a neighboring town has no effect.

The model presented in Column 2 of Table 3 has additional independent variables to control for town characteristics. Similar to our hypothesis, the proportion of population below the poverty line and the composite risk indicator have a significant positive impact on the domestic violence rate. A 1 percent increase in the proportion of population below the poverty line relates to an increase of about 1 arrest for every 10,000 town residents. In towns with a combination of high poverty rates, unemployment rates, and proportions of female-headed households and public assistance recipients, the number of arrests is greater by about 2.3 per 1,000 residents. Also, the domestic violence rate of incidents is lower in towns with higher median income, at a statistically significant level. No longer significant is the variable of interest, location of a domestic violence agency, indicating that the rate of domestic violence incidents is not related to the location of an agency.

When the models in the first two columns of Table 3 are tested for spatial autocorrelation, the Moran's *I* test indicates cause for concern. Although the

additional socioeconomic variables in the second model explained some of the spatial autocorrelation error, it is still significant at the 10 percent level. In Model 3, the geographic variable, LOCATED WEST OF CT RIVER, adjusts the spatial error, and spatial autocorrelation of the regression error is not statistically significant. In this final model, the three statistically significant variables of the previous model, percent below poverty line, the risk indicator, and the log of the median house value, retain their significance. No previously insignificant variables gain statistical significance. The new geographic variable, however, has a statistically significant impact on incidents; towns located west of the Connecticut River (where 14 out of the 18 agencies are located) have higher incidence rates, holding other variables constant, indicating that this clustering of agencies is related to areas of need.

Agency Location and Domestic Violence Assaults

Regression results examining the relationship between assault per 1,000 residents and key town characteristics are presented in the last three columns of Table 3. The dependent variable in this case is limited to domestic-violence-related arrests in which a charge of assault was made. This measure of domestic violence is stricter and more narrow than the dependent variable in the previous models. Without controlling for other influences, again, the location of a domestic violence agency within the town limits has a significantly positive relationship with the rate of assaults in a town, but the location of an agency in a neighboring town does not.

Model 2, presented in the fifth column of Table 3, contains additional independent variables measuring other town characteristics. Similar to the models explaining domestic violence incidents, the proportion of the population below the poverty line and the risk indicator have significantly positive impacts on rates of domestic violence assaults. The log of the median house value has a negative impact on domestic violence assaults.

Testing these models for spatial autocorrelation, the Moran's *I* test indicates cause for concern in only the first model. When the social-economic town variables are added to Model 2, the error is adjusted and the spatial autocorrelation of the regression error is not statistically significant. Model 2 is not spatially biased. However, we decided to add the geographic variable measuring location in relation to the Connecticut River in the third model because the variable was statistically significant in the model explaining incidents. Similar to the results in Table 2, towns located to the west of the Connecticut River tend to have higher domestic violence assault rates, holding other variables constant. Moreover, the addition of this variable changes the effect of the variable measuring the presence of an agency in an adjacent town. When the CT RIVER variable is added to the model, the adjacent town variable gains statistical significance. The findings indicate that although towns west of the Connecticut River have higher rates of

assaults, holding other variables constant, towns with an agency in a neighboring town have lower rates of assaults by 0.168 assaults per 1,000 residents.

Discussion

Our findings offer a beginning answer to our research question asked in the introduction to this article. Is the location of domestic-violence-related services at the town level related to rates of domestic violence? We hypothesized that the data would show a geographic pattern of domestic violence rates unrelated to the location of agencies after controlling for other environmental risk factors such as poverty. On one hand, findings indicate no relationship between the presence or lack of a domestic violence agency within a town or in an adjacent town and the rate of police-reported domestic violence incidents. On the other hand, the results of our second set of models demonstrate that towns with agencies located in adjacent towns have lower rates of domestic violence assaults, albeit this effect is very small. Importantly, in both cases, we found that the clustering of agencies in the western half of the state is related to higher rates of both domestic violence incidents and domestic violence assaults. Furthermore, although the location of domestic violence agencies at the town level does not match town-level needs, neither were agencies overrepresented in affluent or privileged towns. In fact, we find that domestic violence rates are correlated with other community measures of disadvantage and agencies are overrepresented in these areas.

These findings are bound by the limitations of the project. Most importantly, the findings do not address the question of causal direction. We analyze cross-sectional data from 2000 and thus cannot examine the direction of causality. Second, the analysis unit is the town and the data are at the polygon level. Given the sensitive and confidential nature of the topic, available data on both arrest and service locations were limited and point data were unavailable.

Third, our sample is limited to domestic abuse experiences that were reported to the police and resulted in at least one arrest. Domestic violence is an underreported crime and we likely vastly undercount the extent of the issue using police data. Additionally, the data measure only physical assaults and threats and do not capture emotional or economic violence and perhaps sexual coercion as well. To the extent, however, that domestic violence agencies serve women who are in the process of escaping the abuse, police data are not an unreasonable data source. Agencies would not serve women who have not yet recognized the situation and are not ready to seek help. It is also possible that certain subpopulations of women such as immigrants or rural residents may be less likely to reach out to either law enforcement or shelter providers. Ideally, we could either match police calls with service

utilization or complement them with service utilization rates. While domestic violence agencies do keep track of the number of women and children served, these data had no town information. Thus, we were unable to determine in what towns clients resided or even if they were Connecticut State residents and could not include service utilization rates in our analyses.

Finally, the project is limited to an investigation of domestic violence agencies. As noted in the methodology section of the article, this limits the scope of our research in that victims also report seeking services from other organizations such as churches and synagogues, health-care agencies, and community organizations. Other work has shown that faith-based organizations are more likely than other social service agencies to locate in areas of great need (Allard, 2009). Our findings may be different if we were to include other agencies. However, because domestic violence agencies are designed particularly for this population and receive public funding to serve them, their services are less volatile and vulnerable. Thus, we feel they merit particular attention.

Conclusion

Although limited in scope, our analyses push current research into a new realm. Research on domestic violence services should examine geography as well as capacity and community coordination. The efficacy of service provision should consider those for whom services are unavailable or inaccessible in addition to the outcomes of those served by the programs. More qualitative research into the influence of community sentiments regarding domestic violence and service provision would also further our understanding. Similarly, qualitative research on the program decisions of agencies themselves would add valuable insight into the factors that agencies consider when locating or expanding programs. Service providers already consider many place-related factors such as security, confidentiality, and legal and police policies. An understanding of how agencies also investigate and consider geographic need is lacking.

Future quantitative research can build on the modest findings presented here. The limited scope of our research leaves a number of other questions unanswered, such as the role of more general social service organizations and investigations with other measure of domestic violence. If data on the point location of organizations and incidences were to become available, research with distance measures could be completed and complemented with investigations of transportation accessibility and cost. Research in other states and with other data sets could serve to bolster or refine our findings. Finally, and most obviously, longitudinal studies could illuminate questions regarding causality and the possible interconnection among service availability, propensity to report and seek services, positive resident outcomes, and public awareness of the issue.

From a policy and planning perspective, the spatial pattern of domestic violence and community characteristics should be to taken into consider-

ation in designing the location and services of agencies. Our findings indicate that established domestic violence agencies are not necessarily located in areas of great need. Similar to other domestic violence research, however, this study provides evidence that a regional perspective may be warranted and that services just outside one's immediate town may be appropriate. Town borders, after all, are very real on paper, but may not pose barriers to service update. It is possible that the closest agency is not on the other side of one's own town, but just down the block and in the neighboring town. Future conversations about services should question scope, capacity, and location at the town and regional level.

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