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Understanding the Role of Service Providers, Land Use and Resident Characteristics on the Occurrence of Mental Health Crisis Calls to the Police

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Abstract

Similar to concentrations of crime, mental health calls have been found to concentrate at a small number of places, but few have considered the context of places where mental health calls occur. The current study examines the influence of the physical and social context of street segments, particularly the role of service providers, land use features of the street and nearby area, and characteristics of residents on the likelihood of a mental health crisis call to the police occurring on the street. The findings demonstrate that the social context, such as offending and drug use among residents, levels of social cohesion and community involvement, and drug and violent crime influenced the occurrence of mental health crisis calls. Findings from this study make theoretical and practical contributions to a number of disciplines by improving our understanding of where mental health crisis calls occur and why they are found at specific places.

Keywords

mental health; service providers; crisis calls to police; micro-geographic places; land use

Introduction

Crime has been found to be highly concentrated in a small number of microgeographic places and this concentration exists for crime more generally, as well as for a few specific crime types such as property crime, drug markets and juvenile crime (Andreson, Linning, & Malleson, 2017; Braga, Papachristos, Hureau, 2010; Weisburd, 2015; Weisburd & Green, 1995; Weisburd, Groff, & Yang, 2012; Weisburd, Morris, & Groff, 2009). Furthermore, a great deal of research, has explored why certain places are more likely to have crime. Characteristics of places such as the types of facilities on the street (e.g. bars, schools, shopping centers) (Bernasco & Block, 2011; Engstad, 1975; Roncek & LoBosco, 1983; Roncek & Maier, 1991), low levels of resident collective efficacy (Browning 2009;

Mazerolle, Wickes, & Mc Broom, 2010; Sampson, Raudenbush, & Earls, 1997; Sampson & Raudenbush, 1999; Weisburd et al., 2014), high social disorganization (Weisburd et al., 2014), and physical design of the street (Reynald, 2015) have been shown to “attract” crime to a street.

The police are responsible for responding to a variety of other types of issues besides crimes, such as mental health crisis calls, but these types of calls are not often studied. We do not yet understand whether these encounters are more likely to occur in specific places due to certain characteristics, such as has been found in analyses of crime more generally. Initial research in this area has found that while mental health crisis calls tend to be related with certain forms of crime, such as violent crime calls (Vaughan, Hewitt, Andresen, & Brantingham, 2016; White & Goldberg, 2018), places with high concentrations of these crime calls do not necessarily co-locate where mental health calls occur (White & Goldberg, 2018). That is, while there is some spatial overlap in the location of these calls (mental health and violent), these calls also occur in distinct places, and there may be unique characteristics of places where mental health crisis calls occur compared to more traditional crime hot spots. Additionally, social and structural characteristics of a community, including crime levels, have an impact on the mental and physical health of its residents (Curry, Latkin, Davey-Rothwell, 2008; Wandersman & Nation, 1998). Factors such as socioeconomic disadvantage, structural dilapidation and disorder, and collective efficacy are related to a number of negative health outcomes at the community level; and while these factors have received less attention in research at the microgeographic level, they may inform where mental health calls are more likely to occur.

In this study, we draw from opportunity and crime pattern theory, as well as community theories of crime and health, to examine factors associated with the increased likelihood of a mental health crisis call to the police occurring on a street segment. We extend the work on concentrations of mental health calls by using unique data at the street segment level to understand the social and physical context of places where calls to the police for mental health crises occur. Specifically, we examine the presence of mental health and drug treatment service provider on or nearby the street, along with a number of land use features of the area, as well as characteristics of the residents and street environment, to explain the occurrence of mental health crisis calls to the police.

Explaining Crime Concentrations

Studies have consistently found that crime is highly concentrated on small percent of city streets (Pierce, Spaar, & Briggs, 1988; Sherman, Gartin, & Buerger, 1989; Weisburd, 2015). While there is variability in levels of crime on street segments within neighborhoods, typically 25% of crime is found on 1% of street segments and 50% of crime is located on 5% of street segments (Weisburd, 2015). These findings have been found for crime generally, but also with specific types of crimes such as drug markets (Weisburd & Green, 1995; Weisburd & Mazerolle, 2000), juvenile crime (Weisburd, Morris, & Groff, 2009), and gun violence (Braga, Papachristos, & Hureau, 2010). Additionally, research has found evidence for the stability of crime concentrations. Several studies point to a small proportion of places that house persistent crime and disorder issues, both general crime and specific

crime types, for long periods of time (Weisburd et al., 2006; Braga et al., 2010; Hibdon, Telep & Groff, 2017; Andresen, Linning, & Malleeson, 2017).

Most of the work that has attempted to address crime concentrations has focused largely on opportunity structures, and in specific on the types of environmental features that might generate or attract crime. Features that generate crime are those that draw high volumes of people to the location and crime results (e.g., school or stadium). Places that attract crime are those that create situations that draw people who are strongly motivated to commit crime (e.g., transportation hubs) (see Brantingham & Brantingham, 1995). Overall, studies have demonstrated support for the influence of crime attractors and generators. For instance, research has pointed to the influence of parks (Groff & McCord, 2011), stadiums (Kurland, Johnson & Tilley, 2014), transportation hubs like bus stops or Metro/subways stations (Groff & Lockwood, 2014; Irvin-Erickson & LaVigne, 2015) and bars/alcohol outlets (Groff & Lockwood, 2014; Snowden & Freiburger, 2015) on crime. Other place features, like the presence of schools, have been found to generate disorder offenses (Groff & Lockwood, 2014). Using surveys, mapped respondent and land-use street addresses, census data aggregated to the neighborhood level, and geocoded crime aggregated to the neighborhood level, McCord and colleagues (2007) examined non-residential land use and its effect on residents' perceptions of crime and disorder in the area. The authors found that attractors and generators (such as density of and proximity to crime-generating land) led to higher reported levels of perceived crime by residents.

Additionally, Weisburd and colleagues (2012) found evidence for the impact of both social characteristics and opportunity structures at street segments as a way to explain higher concentrations of crime. Specifically, they found that a large presence of employees followed by a large residential population on the street segment were the two most important variables in explaining the likelihood a street segment would have a high chronic crime problem (Weisburd, Groff, & Yang, 2012; 2014). They also found that presence of more public facilities within a quarter mile of a street segment were significant risk factors. These findings are consistent with opportunity theories of crime. Other key variables reflecting social explanations for crime that were found to have impact on whether a segment was chronically high in crime include: socioeconomic status (property values), physical disorder (e.g. litter and neglected houses), and collective efficacy (percent of active voters).

Mental Health

Researchers have also attempted to understand both physical and mental health problems of residents in disadvantaged, high crime areas (Aneshensel & Sucoff, 1996; Diez Roux & Mair, 2010; Fitzpatrick et al., 2005; Foster & Giles-Corti, 2008; Lorenc et al., 2012; Natsuaki et al., 2007). There is a vast area of research that has shown that residents who live in areas with high levels of crime and poverty are also at higher risk for mental health problems (Kim, 2008; Latkin & Curry, 2003; Mair, Diez Roux, & Galea, 2008; Ross, 2000; Truong & Ma, 2006), substance use (Boardman, Finch, Ellison, Williams, & Jackson, 2001; Karriker-Jaffe, 2011; Stockdale et al., 2007), and chronic diseases such as asthma (Cagney & Browning, 2004), obesity and cardiovascular disease (Boardman, Onge, Rogers & Denney, 2005; Browning, Cagney, & Iveniuk, 2012; Chaix, 2009; Chang, Hillier et al.,

2009). Residents of these areas also have higher mortality rates compared to those who do not live in disadvantaged areas (Fang, Madhaven, Bosworth, & Alderman, 1998; Haan et al., 1987; Jackson, Anderson, Johnson & Sorlie, 2000). This work, however, has traditionally focused on larger geographic areas, like neighborhoods and communities (i.e., census tracts).

While the relationship between neighborhood disadvantage and mental health is well established, the mechanisms are less so. Kawachi and Berkman (2000) identified three plausible pathways of how social factors (e.g. social capital) at the neighborhood level can affect individual health – through influencing health-related behaviors, through influencing access to service and amenities, and through affecting psychosocial processes. Stockdale and colleagues (2007) underscored the importance of social context of neighborhood on the mental health of residents. They found that people who were exposed to violence and lived in high crime areas were vulnerable to depression and anxiety. They also found that people who have a low level of support in their neighborhood and were socially isolated were likely to have a mental illness as well. Additionally, collective efficacy has also been found to be related to residential mental health. Neighborhoods with low levels of collective efficacy or social support have high higher levels of residential mental illness (Araya et al. 2006, Xue et al. 2005; also see Latkin & Curry, 2003). Low collective efficacy is also related to higher crime and homicide rates (Sampson et al. 1997). In response to these environments and associated health problems, compounded with lack of resources and social support, people often resort to alcohol and substance use to cope with the stress and strain of living in these neighborhoods (Boardman et al., 2000; Jackson, Knight, & Rafferty, 2009). While there is a need to better understand these mechanisms, the role that social context plays in the relationship between neighborhoods and mental health is clear.

The extent to which the relationship between crime and mental health problems exists at microgeographic places is less developed. Recently, Weisburd and colleagues (2018) examined mental health at a micro geographic level using residential surveys collected on 449 street segments in Baltimore. They found that residents of violent crime hot spots had an increased likelihood of depression and PTSD symptoms compared to residents living on non-hot spot streets (see also Weisburd and White, 2019). Additionally, Vaughn and colleagues (2016) examined why calls involving an emotionally disturbed person (EDP) might cluster in places different from that of crime generally. The authors overlaid various “attractor” locations (e.g. the city’s only hospital, substance abuse services, and pharmacies) with the kernel density estimates of the EDP hot spots. The authors found that many of the attractors they identified were within the hotspots of the EDP calls and thus may be what is causing these types of calls to cluster where they do (Vaughn et al., 2016).

Given the strong relationship between community context and mental health, and initial research on crime hot spots and mental health, questions related to treatment and programs that address mental health needs are important to consider as avenues to remedy mental health problems and prevent crises. Most of the research on access to treatment has focused on individual characteristics such as attitudinal barriers and perceived need, as well as financial barriers (Andrade, Alonso, Mneimneh, et al., 2014; Sareen, Jagdeo, Cox, Clara, ten Have, Belik, de Graad, & Stein, 2007); those that focus on geographical barriers have found location is not often cited as a barrier to treatment by individuals (Alegria, Bijl, Lin, Walters,

& Kessler, 2000). From a geographic perspective, however, research has devoted attention to the lack of providers in rural areas (Davis, Spurlock, Dulacki, et al., 2015; Edmond, Aletraris, & Roman, 2015; Ringel & Sturm, 2001; Skubby, Bondine, Novisky, Munetz, & Ritter, 2013), rather than the locations of treatment providers in urban environments. To date, there have been no examinations of social processes or environmental features of streets that house high concentrations of calls to the police for mental health crises, and specifically whether having a service provider nearby prevents crisis calls to the police.

Current Study

The current study uses a number of independent variables to predict whether a street had a mental health call occur on the street, in an effort to explain why certain streets may be more likely to have a mental health crisis call to the police. Our study advances knowledge by using direct measures of the physical context, or characteristics, of places where mental health crisis calls have occurred as well as the social context comprised of the residents who live there. In regard to the physical context, we were particularly interested in whether having a service provider for mental health or drug treatment nearby the street increased the likelihood of a mental health crisis call occurring on the street. From the crime attractor perspective, these type of facilities may attract individuals with mental health and substance use problems who are frequenting these facilities for services, therefore increasing the likelihood of a mental health call occurring on the street. Alternatively, when considering access to treatment, the presence of having a service provider may reduce the likelihood of a mental health call occurring on the street because there is available treatment in the area and less need or reliance on the police.

In regard to the social context, streets with residents struggling with mental health problems or using drugs may also impact the likelihood of a mental health crisis call occurring, therefore, we also hypothesize that an increase in residents reporting mental health problems on the street will increase the likelihood of a mental health crisis calls. Given the connection between collective efficacy and health (and crime), level of trust and shared values with neighbors and community involvement are also assessed, as they may influence the occurrence of mental health crises and calls to the police. Finally, other features of the physical context of the street such as number of vacant buildings may also be more conducive to the occurrence of a mental health crisis calls due to individuals, such as homeless persons who experience high rates of mental illness (Fischer & Breakey, 1991; Shelton, Taylor, Bonner, & van den Bree, 2009), spending time on the street.

Data and Sampling Procedure

Data used in the current study come from a larger project on crime hot spots in Baltimore, funded by National Institute on Drug Abuse (Weisburd, Lawton, Ready, & Haviland, 2011). The project collected data from a number of different sources including police calls for service data, residential survey data, physical observation data, and land use data from the city of Baltimore. At the onset of the larger project, calls for service data from Baltimore City Police Department were obtained in 2012 to identify high crime streets segments (i.e. crime hot spots) and streets with little crime for comparison purposes.¹ Street segments (both block faces on a street between two intersections) were selected through a multistage

cluster sampling procedure. We began with a sample of 25,045 street segments as the primary unit of analysis. The police calls for service were geocoded to the street centerline to create counts of crime for service for every street segment in Baltimore.² Additionally, we only included residential street segments with 20 or more occupied dwelling units in order to have a large enough sampling frame to conduct 7–10 residential surveys per street segment in the study.³

Thresholds for crime levels were then identified using violent and drug calls for service as the primary indicators of crime.⁴ Hot spot street segments were divided into three categories--drug crime hot spots (in the top 3 percent of calls for drug crime), violent crime hot spots (in the top 3 percent for violent crime), and combined drug and violent crime hot spots. Once the categories of hot spots were identified, street segments were randomly sampled from their respective crime hot spot category, as well as sampled from the remaining group of street segments that did not meet the thresholds for a crime hot spot. After selecting the sample of street segments, we then divided the non-hot spot streets into “cold” (three or fewer calls for service) and “cool” (at least four calls for service, but less than the cut-offs for crime hot spots). The final sample of street segments consisted of 47 cold spots, 100 cool spots, 121 drug hot spots, 126 violent hot spots, and 55 combined drug and violent crime hot spots. Descriptive data on crime and disorder call counts for the sample of street segments are reported in Appendix A.

Door-to-door residential surveys were then conducted on the final sample of 449 street segments. A random sample of dwelling units was selected to conduct face-to-face surveys with residents with a goal of at least seven surveys per street segment.⁵ The survey included a number of questions related to health and well-being in addition to questions related to drug use and sales, offending, and the social environment of the street segment. The survey data collection conducted in 2015 included a total of 3,615 completed residential surveys, with a contact rate of 80.0% and the cooperation rate of 71.6%.

Physical observations were also conducted on the 449 street segments to measure the physical environment and land use of the street segment. Pairs of trained field researchers walked both sides of the street segment to document the characteristics of the street segment including the number of buildings, building purposes, nature of commercial and public/

¹This data was obtained through a data sharing agreement as part of a large ongoing project in the city of Baltimore to better understand crime hot spots. Address-level calls for service that included the date and the type of call were geocoded to street segments throughout the city using shapefiles and geolocator was provided by the BCPD. For more information regarding data and geolocating calls for service see online methodology at <http://cebc.org/wp-content/cpwg/NIDA-Methodology>

²We sought to identify 125 streets for the violent and drug crime hot spots; and 50 combined drug and violent crime hot spots. We also sought to include 150 non-hot spot streets in our sample (see fn.4). The final sample numbers depart slightly from these because of one street dropped from the study during data collection, and cases where street segments were reclassified when street boundaries were corrected. Calls for service that occurred on the street intersections and could not be located on the segment were not included in the crime counts for the street segments

³We used data obtained from the Baltimore City Mayor’s Office for year 2010 to identify occupied households on city streets.

⁴The initial threshold for violent and drug crime was 18 drug calls and 19 violence-related calls, respectively (approximately the top 2.5% of segments in the city for each category). Although this was the final threshold for the combined violent and drug crime hot spots, to meet sampling goals for streets that were hot spots of violence and hot spots of drug crime, the threshold was reduced to 17 violent calls and 16 drug calls (approximately the top 3% of all city street segments in that category). We also required that streets evidence drug or violent crime throughout the year by setting a criterion that calls be spread across at least 6 months. In our sampling frame of residential streets (4,630), 284 were classified at violent crime hot spots, 248 as drug crime hot spots, 98 as combined drug and violent hot spots, and 4000 were comparison street segments.

⁵The first adult resident, over 21 years of age, who also had resided on the street for at least 3 months was eligible for participation.

social establishments, such as convenience stores, restaurants, schools and churches. Indicators of vacancy were also used to identify vacant dwelling units and buildings such as boarded up doors and windows, eviction notices, and realtor locks.

Finally, for the current study we used a variety of sources to create different “attractor” variables. There was no complete and up to date database of service providers for Baltimore City, so we used a variety of sources to create our own. We began by using an online resource from Behavioral Health System Baltimore (BHSB) (<http://bhsbaltimore.org/>), which provided the contact information for mental health resources for adults in Baltimore City.⁶ We then conducted a web-based search for the types of providers listed in the BHSB resource guide and added any providers that were not already included. In total, there were 129 service providers identified in the city and included in the study. The rest of the land use attractor data were collected from Open Baltimore, Baltimore City’s source of open source geographic data. Here we downloaded and geocoded data on bus stops, parks, religious buildings (Christian or Jewish only), schools, and pharmacies. Once all of the geographic data were geocoded onto a shapefile of Baltimore City, we used the spatial join function in ArcGIS to create counts of each of the facilities within ¼ mile of the selected 449 street segments.

Measures

Dependent Variable

Mental health call.: The calls for service data from the Baltimore City Police Department for 2015 were used to create our dependent variable by geocoding mental health crisis calls to the police.⁷ There were a total of 7,456 mental health crisis calls in 2015 for the entire city, 1.84% of all calls for service. In our sample of 449 street segments, there were 662 mental health calls, with streets ranging from 0 calls to 15 calls. The dependent variable of interest is a dichotomous measure reflecting whether a *mental health call on the street* segment occurred during the study year (1=yes; 0=no). In our sample of 449 street segments, a mental health call occurred on 255 of the streets, 56.8% of our sample. The descriptive statistics for all variables included in this study are provided in Table 1.

Independent Variables

Service providers.: One of the key independent variables of interest is the proximity of service providers with respect to our sample of street segments. As previously discussed, there were 129 service providers in the city, and they provided a range of services (see fn6). We created a binary measure of whether a service provider was located within a ¼ mile of the street segment (1=yes; 0=no). Out of the 449 street segments, 170 streets, 38%, had a service provider within a ¼ mile of the street.

⁶Facilities were included if they provided any of the following services: Outpatient Mental Health, Outpatient Substance Abuse, Inpatient Substance Abuse, Inpatient Mental Health, Case Management, Crisis Response, Mobile Assertive Services Team, Mobile Treatment Program, Psychiatric Evaluation, ACT Team, Inpatient Emergency Room Care, Capitation Program, Emergency Shelter, Transitional Housing, HIV/AIDS Residential Treatment, Facility/Housing for Individuals in Recovery, Legal Resource Centers, Recovery and Advocacy Grief and Loss Domestic Violence, Elder Abuse and Trauma Resource.

⁷A mental health crisis call included two dispatcher codes—1) behavioral crisis and 2) suicide attempt.

Land use facilities.: We also included several other facilities and land use features of the surrounding area that may be associated with places or attributes of places that may attract individuals with mental health problems. These included *parks*, *religious institutions*, *schools*, and *pharmacies*.⁸ We used dichotomized measures of whether each type facility was located within ¼ mile from the street (1=yes; 0=no).

Bus stops.: Additionally, to capture public transportation and street activity that may bring people with mental health problems into contact with residents, we included a measure of the number of bus stops within a ¼ mile of the street segment.

In regard to physical and social characteristics of the 449 sampled street segments, we included land use measures from the physical observation data, such as the presence of a bar or liquor store on the street, and two measures of building use—the number of commercial buildings and the number of vacant buildings on the street segment. Additionally, aggregated measures from the residential surveys were included to capture the prevalence of self-reported victimization, offending, drug use, the level of socioeconomic disadvantage, and mental health problems of the residents.

Bar or liquor store.: We included a binary measure of whether there was a bar or liquor store on the street (1=yes; 0=no). This measure was collected during the physical observations to include any establishment on the street that served or sold alcohol.

Commercial buildings.: Percent commercial buildings was a continuous measure of the number of buildings on the street that were used for commercial purposes divided by the total number of buildings on the street.⁹

Vacant buildings.: Similarly, percent vacant buildings was the total number of buildings that were coded as clearly vacant divided by the total number of buildings.

Victimization.: Streets with more individuals who have experienced victimization or involved in offending or drug use may attract or be at increased risk of police contact, possibly for mental health issues in particular. The residential survey included a number of items to measure victimization in the past year that were combined into a single binary measure of whether the individual responded “yes” to any of the items.¹⁰ We then aggregated this measure to the street segment, therefore, victimization is the percent of residents who responded positively to being a victim of a crime in the past year.

Offending.: In regard to offending, survey respondents were also asked about a number of different crimes they may or may not have committed in the past year, as well as if they or

⁸Given the city data only provided Christian and Jewish religious buildings, we also ran the regression model with the measure of a religious building on the street observed by our field researchers during the physical observation. This would be more inclusive of other types of religious buildings on the street, but would not capture a religious institution nearby. The results did not change with this other measure of religious buildings, so we reported the models with the original measure.

⁹Mixed-use buildings that included a commercial establishment were included in the calculation.

¹⁰Respondents were asked a general question, “Have you been a victim of a crime in the past year?” (1= yes, 0= no), as well as additional questions about different types of crime victimization including whether anyone used violence against them, whether anyone had broken into their home, or whether anyone had stolen something from their porch, yard, or driveway.

anyone else in their home had been released from jail or prison in the past year.¹¹ Again, we combined these items into a single binary measure (1=yes; 0= no) and then aggregated to the street segment for a measure of percent of residents who reported offending or having an prior offender in the home in the past year.

Drug use.: Residents were also asked about drug use, both in their lifetime and in the past year.¹² If the respondent reported using any of the drugs in the past year, they were coded as 1 (0=no) and positive responses were again aggregated to the street to measure the percent of residents who used any drugs in the past year.

Socioeconomic disadvantage.: Given the relationship between community disadvantage and mental health, we included a measure of socioeconomic disadvantage. Residents were asked about their household income from all sources before taxes for the year 2014. We created a street-level measure of the proportion of residents that reported making less than \$25,000.

We also wanted to have a sense of residents experiencing recent mental health problems who may increase the likelihood of a mental health call to the police occurring on the street. Two validated screening instruments were included in the survey to measure symptoms of depression and post-traumatic stress disorder (PTSD) in the past 30 days.

Depression.: The depression symptomology measure was the well-established PHQ9, which included nine items to assess affect or mood including behaviors such as social withdrawal, trouble concentrating; physical symptoms such as eating or sleeping too much or too little; and cognitive symptoms like difficulty concentrating (Kroenke, Spitzer, & Williams, 2001). Referencing the past 30 days, response options included 0= not at all, 1= several days, 2= more than half the days, and 3= almost every day and scores for each item were summed across the nine items to create a scale ranging from 0 to 27 ($\alpha = 0.859$). Symptomology scores were recoded into five levels of depression based on scaling recommendations of the PHQ9 (Kroenke et al., 2001).¹³

Post-Traumatic Stress Disorder.: The measure for PTSD was also a screening scale based on the DSM-IV (Breslau, Peterson, Kessler, & Schultz, 1999; Kimerling et al., 2006). If the respondent answered that they had experienced a traumatic life event such as abuse, an act of violence, or a serious accident in their lifetime, seven follow-up questions were asked to measure symptoms of PTSD in the past month such as avoidance behavior, lack of interest in activities, numbing, and hyperarousal, with “yes” or “no” response options. Once again, these items were summed to create a 7-point scale ($\alpha = 0.818$), and those with a score of four or higher were identified as persons with PTSD (Breslau et al., 1999; Kimerling et al.,

¹¹Offenses included driving a vehicle under the influence of alcohol, damaged someone else's property on purpose, taken something that didn't belong to you, used someone else's credit card or a personal check to steal something, owned or carried a gun without a license, broken into a home or business to steal something, sold illegal drugs, stolen a car or some other type of motor vehicle, used violence against someone-like in a fist fight or assault, and taken something from someone using violence or the threat of violence.

¹²Drugs included marijuana, powder cocaine, crack cocaine, heroin, methamphetamine, ecstasy, and illegal use of prescription drugs.

¹³Minimal depression (score 1–4), mild depression (5–9), moderate depression (10–14), moderately severe (17–19) and severe (20–27).

2006). The current study used a combined aggregated measure of the percent of survey respondents that met the threshold for either moderate depression (or higher) and/or PTSD.

Finally, we included a number of measures to capture the social norms and environment of the street. Two scales used to measure the social and communal environment of the street, the extent to which drugs are sold on the street, and a measure of crime levels on the street were included in the current study.

Social cohesion and trust.: The scale included six items that ask the respondents about whether neighbors shared the same values, can be trusted, get along, help each other, talk to one another, and watch out for each other (see Sampson et al., 1997). The questions were measured on a four-point Likert scale, ranging from *strongly disagree* (1) to *strongly agree* (4) ($\alpha = .775$).

Community involvement.: The community involvement scale asked the respondent whether they or anyone in their household participated in a number of activities in the past year (1=*yes*, 0=*no*). The activities included speaking to a person or group that was causing problems on the block, attending a neighborhood or community meeting, speaking to a local religious leader about doing something to improve your block, getting together with neighbors to do something about a problem or to organize efforts to improve your block, and speaking with an elected official about a specific problem on your block ($\alpha = .743$).

For both social cohesion/trust and community involvement, a mean score was created across the items for each survey respondent, and then the scores were averaged across survey respondents on each street to create a street-level mean score of social cohesion and trust as well as community involvement.

Drug sales.: Given drug sales may involve individuals who are experiencing or displaying symptoms of mental illness or substance abuse, residents were also asked about the drugs being sold on the street. Any positive response to different types of drugs (same list of drugs as the ‘use’ question) was summed across residents to create a measure of the number of drugs sold on street.

Crime.: Lastly, we accounted for crime on the street that may also control for residents’ general willingness to call the police, by including a continuous measure of the total count of violent and drug crime calls for service occurring on the street in 2015.

Analysis—The analysis proceeded in two stages. First, we explored the bivariate relationship between the independent variables and whether a mental health crisis call to the police occurred on the street segment.¹⁴ Significant differences between groups were estimated using independent sample t-tests and chi-squared tests. The second stage of the analysis was performed using logistic regression for binary outcomes to examine the influence of the independent variables on the likelihood of a mental health crisis call occurring on the street.

¹⁴The correlations among independent variables are provided in Appendix B.

Results

We begin with the bivariate relationship between the independent variables and dependent variable, presented in Table 2. As indicated in the table, there are significant differences between streets with and without mental health calls--for school, percent vacant buildings, percent of residents who reported moderate depression and/or PTSD, as well as income, social cohesion, community involvement, number of drugs sold on the street, and amount of violent and drug crime on the street. More specifically, roughly 78% of the streets with a mental health call had a school within .25 miles compared to 60.8% of the streets with no mental health calls. Streets with a mental health call also had a greater percentage of vacant buildings (12.9%) compared to those without a mental health call (10.1%). Additionally, a greater percentage of residents, 14.2%, met the threshold for moderate depression or PTSD on streets with mental health calls, compared to 11.8%. Streets with a mental health call had a greater percent of individuals earning less than \$25,000 annually, 50.4% compared to 41.7%. Concerning social cohesion/trust and community involvement, streets with mental health calls had lower mean scores on both social cohesion/trust and community involvement. Finally, streets with mental health calls had a greater mean number of drugs sold on the street, and had significantly more violent and drug calls for service to the police.

Next, the results from the logistic regression predicting whether a mental health call occurred on the street segment or not are presented in Table 3. When controlling for all the covariates in the model, we found significant effects for schools, percent of residents that reported offending, the percent of residents who reported drug use, percent of residents earning less than \$25,000, social cohesion/trust, community involvement, and the number of violent and drug calls for service on the street. Similar to the bivariate statistics, having a school nearby was the only land use feature that affected the occurrence of a mental health call on a street segment. Specifically, street segments that had a school within .25 miles were almost two and half times ($\exp[0.915] = 2.497$) more likely to have a mental health crisis on the street. Contrary to our hypothesis, a service provider located nearby the street segment was not significantly related to the occurrence of a mental health call. In regard to drug use and offending, streets with greater percent of residents who reported using drugs and offending (both in the past year) were associated with a decrease in the likelihood of a mental health call occurring on the street. A one unit increase in percent of residents reporting any drug use was associated with a 1.9% reduction in the odds of a mental health call occurring on the street ($(1 - \exp[-0.019]) \times 100$). Additionally, a one unit increase in the percent of residents who reported prior offending reduced the likelihood of a mental health call by 1.7% ($(1 - \exp[-0.017]) \times 100$). While these findings seem counterintuitive at first, as we note in our discussion, they may reflect a more general unwillingness among these populations to use the police as a resource to intervene.

Level of social cohesion and trust as well as community involvement among residents on the streets also significantly reduced the likelihood of a mental health call occurring. Streets with higher levels of social cohesion/trust and those where residents reported more community involvement were less likely to experience a mental health call on the street. In particular, a one unit increase on the mean social cohesion/trust scale was associated with a 85.7% ($(1 - \exp[-1.683]) \times 100$) reduction in the likelihood of a mental health call, and

similarly, a one unit increase on the community involvement scale reduced the likelihood of a mental health call by 78.9% ($1 - \exp[-1.665] \times 100$). Finally, streets with more violent and drug calls for service were more likely to have a mental health crisis call occur on the street, each additional call for service was associated with a 1.3% increase in the likelihood of mental health crisis call occurring on the street. The standardized coefficients are also provided to compare the magnitude of the effects of the independent variables. The amount of violent and drug calls for service on the street and having a school nearby had the largest effect sizes at roughly 0.21, followed by social cohesion and trust at -0.16 . The effects of the amount of drug use, community involvement, and offending on the street were not far behind in their effect sizes.

Discussion

In the current study, we explored characteristics of residents, streets, and the land use features of nearby areas to identify factors associated with the increased likelihood of a mental health call to the police occurring on the street in a sample of 449 street segments in Baltimore. We were particularly interested in whether the location of service providers relative to a street segment influenced the occurrence of mental health calls to the police. From a crime attractor perspective, we hypothesized that since these establishments attract clientele with mental health and drug use problems, residents may resort to calling the police if the individuals are displaying symptoms and “overstaying their welcome.” Alternatively, from the perspective of accessible treatment, the availability of treatment services in the area may reduce the need for residents to call the police during a time of crisis because there is a service provider nearby.

We did not find either of these to be the case, rather it appears that having a service provider close to your block had little effect on calling the police for a mental health related crisis. Residents were perhaps comfortable or at the very least, used to the individuals visiting the service providers and did not feel threatened by their presence on the street. Nor did having a service provider nearby translate to accessible treatment that may reduce crises. Alternatively, these competing hypotheses may have washed one another out; the service provider nearby may have provided access to care that reduced crisis calls by individuals with mental health problems or their families, while at the same time the service provider may have also prompted crisis calls, both within the treatment provider and by residents, therefore these two processes result in little overall change in occurrence of a mental health crisis call to the police.

Not only was service provider non-significant, very few of the land use and physical environment measures had an effect on mental health crisis calls occurring on the street, which greatly differs from the research on crime attractors and opportunity theory. The only exception is schools—having a school nearby increased the likelihood of a mental health call. Similar to the crime attractor/generator literature, an incident involving someone experiencing a mental health crisis near a school may concern residents, increasing their willingness to call the police because of youth in the area attending school. Additionally, mental health crisis calls may be generated by students experiencing emotional health

problems in the school and the school staff, feeling ill-equipped to handle these crises, may have called the police.

The primary factors that did contribute to the occurrence of mental health calls on the street were related to the level of offending and drug use among residents on the street, the level of social cohesiveness and community involvement of residents on the street, and the level of violent and drug crime on the street. To begin, there appears to be two different processes decreasing the likelihood of the police being called for a mental health crisis; 1) the prevalence of drug use and offending among residents on the streets and 2) higher levels of social cohesion, trust and involvement in problems related to the street segment.

Thus, it seems that places where residents are involved in illegal behavior may be apprehensive to draw “unnecessary” police attention to the street, reducing the likelihood of calling the police for a mental health related issue. It is possible that relations between residents and the police on streets with higher levels of drug use and offending may be strained due to negative encounters, and therefore, residents are less willing to call the police for a mental health crisis or they are fearful they will be apprehended rather than helped (Payne & Gainey, 2007; Weitzer & Tuch, 2004). Another possible explanation is that these residents may be less likely to recognize a problem as mental health related or feel it is not appropriate to intervene in such a personal matter of neighbors.

Alternatively, consistent with research on communities and mental health, those streets where neighbors know and trust one another, share similar norms, and are involved with issues on the block appeared to provide a protective factor against mental health crisis calls (Araya et al., 2006). Mental health crises may simply be less likely to occur in these places because of a level of social support, access to resources, and social capital amongst residents (Kawachi & Berkman, 2001; McKenzie, Whitley, & Weich, 2002). Residents of streets with more social cohesion and trust, and involvement in the community of the street may know one another better and be more aware of personal problems, to some extent, and problems that do come up do not rise to the level of crisis that need police attention. Rather, if a neighbor is having a mental health issue, residents may be more willing to check on the neighbor directly and provide informal support or know someone, such as a family member, that can help, reducing the need to call the police. In short, the occurrence of mental health crisis calls were largely attributable to the characteristics of the residents and social dynamics on the street and they were less impacted by opportunity features of streets that have been identified in many prior studies (Groff & Lockwood, 2014; McCord, Ratcliffe, Garcia, & Taylor, 2014; Snowden & Freiburger, 2015).

Implications

The police are confronted with a variety of issues and individuals in the community, including people experiencing mental health crises. Understanding the environmental context of where these crises take place and factors that may increase the likelihood of a mental health crisis may inform law enforcement practices and preventive efforts to better divert individuals with mental health problems from the criminal justice system. There have been major strides in the development of programs to improve police response to a mental health crisis, such as crisis intervention teams (CIT) and the co-responder model. These

programs are primarily aimed at de-escalation training, building collaborative partnerships with mental health agencies, and diverting individuals from the criminal justice system (Bonfine, Ritter, & Munetz, 2014; Ritter, Teller, Munetz, & Bonfine, 2010; Teller, Munetz, Gil, & Ritter, 2006; Reuland, 2010; Watson, Ottati, Morabito, Draine, Kerr, & Angell, 2010), and thus are predominantly reactive—responding to crises and then following up with high risk individuals in an effort to facilitate treatment and prevent future crises. Despite a recent focus by police on crime hot spots, police efforts largely fail to consider the utility of spatial concentration of mental health calls for targeted, prevention efforts.

Arguably, what we know about the concentration of crime and the success of hot spot policing in reducing crime when strategies are targeted at these microgeographic places (Braga et al., 2014; Weisburd & Majmundar, 2018) can inform other preventative efforts by police and social service agencies that focus on public health. For instance, the departments, in conjunction with social service providers, could institute the practice of wellness checks, targeted to segments with high mental health call activity. This approach can still utilize the additional training of CIT officers or partnership with mental professionals along with the hot spot strategies to provide proactive care to individuals of these places. In fact, White & Weisburd (2017) developed a program, the Crime Hot Spot Outreach Team, which partnered a police officer and licensed social worker to visit crime hot spots in an effort to connect people to service and prevent crises. While piloted on only a small number of street segments, the process evaluation demonstrated success in residents' willingness to discuss mental health problems with the team and the team's ability to connect individuals to services (White & Weisburd, 2017). Additionally, these partnerships with other social service providers may help police work in places with high levels of drug use and offending to rebuild trust and destigmatize treatment, which was also demonstrated in White and Weisburd's (2018) pilot program. Given the established connection to violent crime, departments might consider using information on mental health calls to further advance preventative police efforts focused on harm reduction more broadly (see Ratcliffe, 2015).

Aside from police practices, the results point to the potential benefit of improving cohesion and trust among residents on the same street segment. Building relationships among neighbors through encouraging community involvement and developing cohesion and trust in the community, particularly at the street-level, may not only provide crime prevention through informal social control, but also provide social support for those experiencing mental health problems. Efforts focused on establishing ties among neighbors that can provide informal care to a neighbor in crisis may prevent the involvement of the police and potential for confrontational, unwarranted contacts with the police.

The challenge becomes translating the protective mechanisms of collective efficacy theory to programmatic efforts of developing programs or ways to facilitate cohesion, trust, and involvement among residents, particularly in already disadvantaged, high-crime places. In a first attempt to develop such a program, Weisburd, Davis, & Gill (2015) described the ACT intervention comprised of three components—Asset identification, Coming together, and Taking action. Essentially, the program builds on traditional community-oriented and problem-oriented policing to develop police-community partnerships aimed at facilitating community action and enabling residents to take ownership over their street. Such a

program, not accounting for the mental health issues that may arise in these places, may prove helpful in building community involvement and trust among neighbors, providing that protective element towards mental health crises.

Limitations

One of the main limitations in using calls for service data to examine patterns of mental health calls, is the way that calls for service are categorized by dispatchers and/or police officers on a scene. When officers and dispatchers are not trained in how to identify someone who is having a crisis or how to identify if a mental health concern might be the cause for the call, it is likely that calls will become miscategorized. Even if departments have classifications for mental health related calls, the lack of training or lack of clear definitions or guidelines for what constitutes one of these calls may also result in inaccurate classification. Furthermore, even if dispatchers and officers are well trained and know the proper procedures for classifying calls when a situation involves mental health issues in some way, they may still be limited classifying the call as another type, particularly if a crime is involved, as calls for service are usually limited to one type of call.

For example, domestic violence, nuisance or loitering calls, drug-related calls, and other types of violent calls may actually involve someone with a mental health problem who is unmedicated or who is going through a crisis. It is more likely that these calls would be identified as the other types as they are the more obvious, crime-related label and most relevant to the function of the police—law enforcement. To overcome these issues, it would be helpful if departments adopted primary and secondary labels to calls, similarly to what is done in Canada. Here, departments have the option of noting whether an “emotionally disturbed person” was involved while still categorizing the calls in other ways such as domestic violence, assault, etc. (Vaughn et al., 2016). Officers and dispatchers would also benefit from more training in helping them identify when a person who is emotionally disturbed may be involved so that it can be relayed in the report, which would also help researchers identify which calls have a mental health component.

Furthermore, the mental health call data do not allow us to distinguish between calls for residents and non-residents on the street, so it is difficult to assess who called the police, who the police are responding to, and the context under which people are calling the police for a mental health crisis. For instance, is a resident of the street calling about a neighbor or someone in the home, or even themselves, or are they calling about a person loitering or passing through on the street that appears out of place? Streets with high amounts of cohesion, trust and community involvement, may be less likely to call the police on their own neighbors for a mental health crisis, but more likely if the person is not from the street. These complexities are difficult to capture without more information about the reason for calling the police and the role of mental health in these calls.

Finally, we assessed characteristics related to whether a mental health call occurred on the sample of street segments rather than the count of calls, due to the relatively few streets with multiple calls in our sample. Future research should consider places with a high number or concentration of mental health calls, and whether characteristics of these places have differing effects on the occurrence of multiple mental health calls. Additionally, when

examining places with high concentrations of mental health calls, commercial places may prove helpful to include and examine attractors in these areas, which was beyond the nature of the current study with a sample of residential streets.

Conclusion

Prior research has found the locations of mental health crises do not occur randomly throughout a city, but tend to occur in places that often overlap geographically with crime hot spots, particularly violent hot spots (see White & Goldberg, 2018). Our study was a first attempt to identify characteristics of places where mental health crisis calls occur in effort to understand risk or protective factors that influence the likelihood of calls occurring. We found that land use features of the street and surrounding area appear less important in understanding mental health calls than in understanding crime more generally. At the same time, we find that such calls are very much dependent on the social and normative environment on the street. Relations between neighbors, as reflected in trust and cohesion, and previous experiences with police and drug use, have key impacts on whether calls are found on specific streets. This reinforces the importance of social features of streets and social interventions in ameliorating these problems.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Descriptive Statistics of Street Segments (n=449)

	Mean/%	SD	Range
<i>Dependent Variable</i>			
Mental Health Call Occurred on Street (y/n)	0.57	0.50	0 – 1
<i>Independent Variables</i>			
Land use measures (within .25 miles)			
Service provider (y/n)	0.38	0.49	0 – 1
Park (y/n)	0.86	0.35	0 – 1
Religious institution (y/n)	0.81	0.39	0 – 1
School (y/n)	0.70	0.46	0 – 1
Pharmacy (y/n)	0.47	0.50	0 – 1
Number of bus stops	12.62	5.58	0 – 30.00
Land use measures (on street)			
Bar or liquor store (y/n)	0.15	0.36	0 – 1
Percent commercial buildings	3.45	8.70	0 – 91.30
Percent vacant buildings	11.69	12.27	0 – 72.73
Resident characteristics			
Percent reported victimization (past year)	22.75	16.47	0 – 85.71
Percent reported offending (past year)	11.10	11.39	0 – 55.56
Percent reported drug use (past year)	21.49	15.30	0 – 87.50
Percent reported moderate Depression/PTSD	13.18	12.60	0 – 57.14
Percent with income <\$25,000	46.56	25.55	0 – 100.00
Street characteristics			
Social cohesion/trust scale	2.83	0.19	2.23 – 3.38
Community involvement scale	0.34	0.15	0.03 – 0.76
Number drugs sold on street	1.22	1.04	0 – 5.50
Violent and drug calls for service	24.34	32.44	0 – 330.00

Table 2.

Bivariate Statistics: Comparative analysis of streets with and without a MH crisis call

	MH Call Occurred on Street	
	Yes	No
	Mean/%	Mean/%
Land use measures (within .25 miles)		
Service provider	40.0	35.1
Park	85.5	85.6
Religious institution	82.4	78.9
School ***	77.7	60.8
Pharmacy	47.8	45.4
Number of bus stops	12.7	12.5
Land use measures (on street)		
Bar or liquor store	16.1	13.9
Percent commercial buildings	3.8	3.0
Percent vacant buildings *	12.9	10.1
Resident characteristics		
Percent reported victimization (past year)	23.6	21.6
Percent reported offending (past year)	10.3	12.1
Percent reported drug use (past year)	20.7	22.6
Percent reported moderate Depression/PTSD *	14.2	11.8
Percent with income <\$25,000 ***	50.4	41.7
Street characteristics		
Social cohesion/trust scale ***	2.79	2.88
Community involvement scale *	0.33	0.36
Number drugs sold on street *	1.33	1.09
Violent and drug calls for service ***	29.6	17.5

Note: Continuous measures were examined using independent sample t-test, while categorical variables were analyzed using a chi-square test.

* $p < .05$,

*** $p < .001$

Table 3.

Logistic Regression Predicting the Occurrence of MH Call on Street

	b	β	SE	CI	OR
Land use measures (within .25 miles)					
Service provider	−0.035	−0.009	0.244	[−0.513 – 0. 443]	0.965
Park	0.042	0.007	0.324	[−0.594 – 0.678]	1.043
Religious building	−0.135	−0.026	0.291	[−0.705 – 0.436]	0.874
School	0.915***	0.206	0.239	[0.447 – 1.383]	2.497
Pharmacy	0.061	0.015	0.237	[−0.403 – 0.525]	1.063
Number of bus stops	−0.019	−0.053	0.022	[−0.062 – 0.024]	0.981
Land use measures (on street)					
Bar or liquor store	−0.106	−0.019	0.290	[−0.674 – 0.461]	0.899
Percent commercial buildings	0.001	0.003	0.011	[−0.020 – 0.021]	1.001
Percent vacant buildings	0.011	0.068	0.010	[−0.009 – 0.031]	1.011
Resident characteristics					
Percent reported victimization (past year)	0.011	0.091	0.006	[−0.001 – 0.024]	1.011
Percent reported offending (past year)	−0.019*	−0.109	0.010	[−0.038 – −0.001]	0.981
Percent reported drug use (past year)	−0.017*	−0.127	0.007	[−0.030 – −0.003]	0.983
Percent reported moderate Depression/PTSD	0.007	0.045	0.009	[−0.010 – 0.025]	1.007
Percent with income <\$25,000	0.006	0.081	0.005	[−0.003 – 0.016]	1.006
Street characteristics					
Social cohesion/trust scale	−1.683*	−0.157	0.712	[−3.079 – −0.287]	0.186
Community involvement scale	−1.557*	−0.113	0.722	[−2.972 – −0.143]	0.211
Number drugs sold on street	−0.022	−0.011	0.132	[−0.281 – 0.237]	0.978
Violent and drug calls for service	0.013*	0.210	0.006	[0.001 – 0.025]	1.013
Constant	4.805*	--	2.182	[0.528 – 9.081]	122.087
Log likelihood	−272.833				
Wald χ^2 ; <i>df</i>	55.570***; 18				
Pseudo R ²	0.112				

Note: Unstandardized coefficients, standardized coefficients, robust standard errors, 95% confidence interval, and odds ratios are reported

*
 $p < .05$,

 $p < .001$