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**LONGITUDINAL STUDY OF COMMUNITY HEALTH AND ANTI-SOCIAL  
BEHAVIOR AT DRUG HOT SPOTS:**

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**DETAILS OF METHODOLOGY**

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## **Data**

We selected Baltimore City, Maryland as a study site for three reasons: 1) the levels of drug problems and crime were serious and persistent enough to allow us to identify a sufficient sample of study sites; 2) the police department agreed to provide the necessary data for site selection and tracking of official crime problems (see data agreement for the proposed study attached under supplemental information); and 3) because of its proximity to the main study team at George Mason University (which significantly simplified data collection and reduce project costs). Comprising a population of over six hundred and twenty thousand people living within 80.9 square miles, Baltimore City bears a common metropolitan affliction of dealing with the interconnected problems of drug addiction, violence, and street gangs. Although violent crime has declined significantly since the mid 1990s, in 2009 the violent crime rate for Baltimore City was still more than four times the national average. Identifying the severity of the drug problem as compared with other jurisdictions becomes more difficult, as these crimes are not reported within the Uniform Crime Report. Nonetheless, based on official data from the Baltimore Police Department (BPD) the drug problem appears serious. In 2010 the BPD reported 52,773 drug crime calls to the police.

We received calls for service and incident data for the City of Baltimore at the address-level for 2010-2012 and continue to receive subsequent years of the data through a data sharing agreement with the Baltimore City Police. The 2012 data were received in two separate data pulls, January 1, 2012-September 15, 2012 and September 1, 2012 December 31, 2012. We removed the overlap in dates, and geocoded the addresses of all the calls of interest (drug-related calls, predatory calls, and other crime and disorder related calls that did not meet our definition

of drug or predatory). Administrative related calls were excluded from the call data. See Appendix 1 for the call codes and their type according to our definition which is consistent with UCR type I and type II calls. We recognized at the outset that the use of official data to identify drug and predatory crime hot spots includes specific biases, but our choice of emergency call information as a criterion for drug crime, as contrasted with incident or arrest information comes from our desire to avoid as much as possible police enforcement bias in our data (i.e. that drug problems are identified selectively by the police). There is a general consensus that emergency calls are less affected by police enforcement bias than other official data sources such as arrests or crime incidents (Ensminger, Anthony & McCord, 1997; Mazerolle, Soole & Rombouts, 2006; Sparrow, Moore & Kennedy, 1990). In this context, it is not surprising that similar portraits of crime concentrations have been found when identifying drug hot spots using community survey and police call information.

During the 4<sup>th</sup> year of the project we conducted an audit (hereafter referred to as 4<sup>th</sup> year audit) of the files and data provided by the police department, primarily focusing on the geocator and shapefiles and of the 2012 calls for service data provided by the police department to geocode subsequent years of calls for service data to the street segments. It became apparent that there was a substantial drop in calls for service between the two sets of data from 2012. While a seasonal decline in crime was observed similar to other years, this decline was more dramatic than subsequent years of data. As a result, we requested the 2012 CFS again as one data pull, without the break and overlap that occurred in September during the original data acquisition. This data set showed a smaller decline than the original data provided by the department, but also contained a larger number of events.

We consulted the data analysts in the Information Technology (IT) unit at the police department during the audit to understand this decline between the two different datasets from 2012 and differences between the new data pull and the original one. The data analysts at the department indicated that in 2012 as Commissioner Batts started his term, the research and development unit was dissolved and all data future requests went through the IT unit. This was an explanation for the different number of total events in the data set due to filters. The data analysts could not explain the substantial drop in the two separate pulls from the 2012 original data requests without knowing the exact query used to pull the data, but confirmed that there were no filters placed on the new 2012 data request. As such, new 2012 data pull from the department contained all the CFS for the selection year.

In the original receipt of data we were not given the option of distinguishing between police initiated and citizen initiated calls for service. The new data pull included an indicator to distinguish whether the call was officer-initiated or citizen-initiated. Administrative calls were excluded from our sampling based on the call type, but were identified by a code in the new data pull. Our study uses both citizen-initiated and police-initiated calls to define crime counts at the segments.

We ran a series of analyses to compare the two data pulls to identify which types of calls accounted for the difference. A large proportion of the difference in the number of calls was due to administrative calls (83.6%) such as 911 no-voice calls, which were excluded from the sampling selection process. “Other” types of calls accounted for 12% of the difference, 3.5% were due to drug calls, and violent calls accounted for less than 1% of the difference. Furthermore, the old and new 2012 data met a near perfect Pearson’s  $r$  correlation of 0.99 for the full sample and at each of the hot spot types. In regard to the street segment categorization (i.e.

type of hot spot), the difference in the two datasets changed 122 street segments' category type out of 25,045 total segments. Of those segments, 70 had 20+ dwelling units, making them eligible for our sampling frame. Given the fact that the differences between the new and old data pulls were primarily found for call types not defined as crime calls in our study, and the strong correlation between the original 2012 data pull and the new data pull, we continued to use the original 2012 data that we received to develop our sampling frame and hot spot classifications.

### **Geolocator**

In order to be consistent in the procedures of the police department for geolocating calls for service and crime incidents we used the geolocator and shapefile provided by the Baltimore City Police Department. The settings for the geolocator were a threshold 60% minimum match score and side offset of 10 feet and end offset of 15%, meaning 15% of percent of the length of the line (street segment) in question. When the data is geocoded with these settings, we had a 98.8% match rate, which was reduced to 97.6% when using the default settings of ArcMap (85% match score and side offset of 20 feet and end offset of 3%). Additionally, we identified random breaks in the lines that represent street segments provided by the Baltimore City Police Department, which create artificial intersections that do not exist on the street. The total number of street segments included in the final shapefile was 25,045.

Due to our ability to observe and clean boundaries for the 449 street segments included in the final sample to reflect the consistency between the shapefiles in ArcGIS and the physical layout of the streets, discussed in more detail below, as well as improve the geocoding process, a small number of segments (8) changed hot spot categories post sampling. Five streets segments

changed from drug segments to combined hot spot segments, two from control segments to violent segments, and one from control segment to drug segment.

### **Overview of Sampling Criteria and Selection of Street Segments**

The original shapefile used for geocoding the calls for service for the city of Baltimore had 25,045 street segments. We began by setting a threshold for hot spot streets in the sample. During the initial proposal of the study we used a 2% cutoff as the “hot spot” segments for both drug and violent crime. The initial proposal was based upon examination of 2011 CFS data, but we found that during the initial analysis of the 2012 data that we had a marked decrease in the number of calls for service associated with drug and violent crime. To that end, prior to starting the random selection process, the threshold was subsequently modified to 2.5% to ensure an adequate number of potential sites.

Based on the original shapefiles and data we received from the police department and the housing data we received from the mayor's office, the streets were first rank ordered by number of drug-related calls and/or violent crime calls and identified the top 2.5% of street segments for the applicable hot spot type (drug, violent, or combined). The cutoffs were 18 drug CFS as the threshold for drug hot spots and 19 violent CFS for violent hot spots. In other words, 2.5% of the street segments had 18 or more drug-related calls and 2.5% of streets had 19 or more violent crime calls. We also defined combined hot spots as those meeting both of these criterion, 18 drug calls and 19 violent. About 0.77 percent of streets in the city met the threshold for both criteria.

Next, we specified two additional criteria for inclusion in the sampling frame. First, to ensure these streets segments were stable over time in regard to the amount of calls, the calls had to occur over a minimum of a 6-month period, during which each month had at least one call for

service. Therefore, if a street had a large number of calls but they occurred in a period less than 6 months, it did not meet the criteria for inclusion in the hot spot sampling frame. Second, the purpose of the study is to speak to residents living on the street, so we removed any segments with less than 20 occupied dwelling units from the sampling frame, using data obtained from the Baltimore City Mayor's Office for year 2010 to identify occupied households on city streets. This reduced the number of street segments included in our sampling frame to 4,630. Finally, when sampling the street segments, a program in ArcGIS, Model Builder, was used to random sample under the criterion that there be a one-block buffer area between sampled streets. Additionally, no two segments within the sample could be contiguous (i.e., connecting).

As the sampling proceeded, it became clear that we would not be able to reach our goal of 125 violent crime and 125 drug crime hot spots, though we were able to reach our goal of 50 combined hot spots with the original threshold (2.5%). As such, we increased our sampling threshold to the top 3% corresponding to 16 drug calls for drug crime hot spots and 17 violent crimes for violent crime hot spots. The cutoffs for combined hot spots remained 18 drug-related calls and 19 violent crime calls. We also specified a one block buffer in regards to geography around the segments in selecting street segments for the study. When new street segments needed to be sampled to achieve 125 drug hot spots or 125 violent hot spots, we would randomly select a segment from the respective category (streets with 16+ calls for drug hot spots, or 17+ calls for violent hot spots) and assess whether it met the additional criteria for a hot spot. If the street did not meet one of the criteria, the street was categorized as a control site, and another street was selected. This process was completed until the required number of streets was obtained.



Following the 4<sup>th</sup> year audit, the total number of street segments (and residential street segments) in the shapefile and the number of calls for service geocoded to the street segments changed, which in turn impacted the hot spot thresholds. We recalculated the percent threshold associated with the cutoffs for calls for service used to originally classify streets as hot spots (16 for drug, 17 for violent, and 18 drug/19 violent for combined spots) and since they remained within the range of 2.5 to 3%, we did not change these cutoffs (see Table 1). The total number of street segments in the city was 25,045 and the number of residential street segments in the sampling frame was 4,630. The final sampling frame included 284 violent crime hot spots, 248 drug crime hot spots, 98 combined drug and violent hot spots, and 4000 comparison street segments. We divided the comparison segments into "cold spots" (3 or fewer drug and violent crime calls in the selection year) and "cool spots" based on the distribution of these streets.

**Table 1: Percent Thresholds following 4<sup>th</sup> year audit**

<b>Original CFS Thresholds</b>	<b>% of Total Segments</b>
<b>Drug Hot Spot- 16 or greater Drug Calls</b>	2.77%
<b>Violent Hot Spot- 17 or greater Violent Calls</b>	2.99%
<b>Combined Hot Spot- 18 Drug Calls, 19 Violent Calls</b>	0.69%

*Real World Challenges of Defining the Street Segment and Included Dwelling Units*

Prior to Wave 1 survey data collection, a census was conducted of the selected 450 streets. Field researchers visited the streets to confirm the cross-streets of the selected street segments, as well as document the addresses of the dwelling units and unit number, if multiple dwelling units existed at one physical address. If a building's address did not locate to the street segment of interest, but it still abuts the segment of interest, it was included in the sample (see Figure 1), and all associated calls for service tied to that address were included in the counts of calls for that street. For apartment building complexes, it is not always clear which street the addresses are tied to so while the address may be associated with a different street name, if the

building was physically located on the selected street segment, the building and calls associated with it were included to accurately categorize the type of street segment. Additionally, the dwelling units in the apartment building were eligible for the sampling frame of households on the street segment (see Sampling households below).

**Figure 1.**



During the 4<sup>th</sup> year audit it became apparent that there were a number of discrepancies between the shape file and the physical layout of the city when we originally visited the 450 streets. These discrepancies needed to be corrected to have an accurate count of the calls for

service associated with the sample of street segments, and the sampling frame of hot spot categories. First, there were random breaks throughout the shapefile that would break the lines (i.e., streets) where there was not a true intersection or break in the street. This affected one street in our sample (see Table 2).

Additionally, boulevards were not represented consistently in the shape file. Boulevards are typically high-traffic, four lane roads, often with a median down the center. In the shapefile, boulevards were sometimes two separate lines and other times just one line. In order for the street segments in the shapefile to be consistent with our conceptualization of a street segment for data collection, calls for service located on both sides of the street (each line) needed to be accounted for when classifying the street segment as a hot spot. When we made this adjustment to the shapefile and calculated the calls for service associated with the street, four streets changed category (See Table 2).

**Table 2. Change in Hotspot category from original sampling**

Segment ID	Calls for service				Main Issue	Change in type
	Original Drug	Revised Drug	Original Violent	Revised Violent		
10378	16	13	19	9	Ineligible street-Removed	Violent to control
17520	47	56	16	20	Random break	Drug to combined
8262	52	95	18	24	Blvd Issue	Drug to combined
21210	21	22	10	19	Blvd Issue	Drug to combined
21204	14	17	8	19	Blvd Issue	Control to violent
3790	20	39	16	33	Blvd Issue	Drug to combined
12230	25	25	14	31	Alley Issue	Drug to combined
12892	4	6	12	19	Alley Issue	Control to violent
19796	2	11	32	12	Alley Issue	Control to drug

Finally, Baltimore has many alleys, some of which have street names, which are represented in the shapefile as a line/street. There is not an objective way to distinguish between streets and alleyways with the shapefile without visiting the streets. There were several instances

when the named cross-street did not meet our definition of a cross-street and we determined it was an alley. An alleyway was defined as having no buildings or dwelling units facing or addressed to the street. They were typically narrow, such that only one vehicle could travel through the alley at one time. When conducting the census of the streets, the field researchers identified the true intersection of the street segment. In the shapefile, when we removed alleyways from the street segments that were not true cross-streets by our definition, this created breaks in the street segment. Subsequently, calls for service on the two sides of the breaks were not accounted for when calculating the total number of calls for service on the street segment. When we adjusted for these breaks caused by alleys, and recalculated the calls for service, three streets changed hot spot category (see table 2). During this process, it also became apparent that one of the streets was not eligible for the study and it was removed from the study sample. The final sample was composed of 449 streets, descriptive statistics for the calls for services across the different hot spot categories are provided in Table 3.

**Table 3. Calls for Service by Hot Spot Type**

	Hot spot type							
	Control spot <i>N=147</i>		Drug hot spot <i>N=121</i>		Violent hot spot <i>N=126</i>		Combined hot spot <i>N=55</i>	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<b>Drug calls</b>	2.01	2.99	34.03	21.58	6.45	4.73	74.75	157.56
<b>Violent calls</b>	4.75	3.78	10.05	4.36	25.43	9.99	31.24	12.76
<b>Other calls</b>	27.54	15.95	65.45	27.77	88.33	45.30	145.27	112.98

### *Sampling Households*

Once the street segments were selected for the sample, we specified the household sample for conducting the survey. As previously discussed, a census of every sampled street was conducted by supervisors and field researchers. In addition to clarifying the boundaries of the street, the addresses of the dwelling units were documented, as well as whether the dwelling unit

appeared vacant through a number of vacancy indicators (see Appendix B). We removed vacant dwelling units from the sampling frame prior to the selection of dwelling units for the survey. Since we had a goal of 10 surveys per street, we released 2.5 dwelling units per survey, so the number of dwelling units in the sample ranged from 20 to 25 households per street. As we visited streets over the period of survey data collection, we had to re-sample dwelling units when it was clear that we could not meet our minimum of seven surveys for that street. After eight visits to the dwelling unit with no contact with an individual residing at the dwelling unit *or* three visits with no contact and one vacancy indicator, we re-sampled from the eligible dwelling units on that street. On four occasions, it was apparent that we would not be able to complete the minimum of seven surveys for the street. In these instances, we re-sampled a new street segment from its respective group and began survey data collection on those streets.

#### *Re-Sampling for Wave 2*

In order to analyze within individual change, we attempted to re-survey residents who participated in Wave 1 survey. Again, we conducted a census of the 449 streets to account for changes in dwelling unit address/unit numbers as well as vacant dwelling units. Only in instances where researchers were threatened by residents of the dwelling unit during Wave 1, or the dwelling unit has since been burnt out, boarded up or otherwise uninhabitable, was the dwelling unit removed from the sample. We returned to the dwelling units where the Wave 1 respondent completed the survey with noted demographic information (age, race, gender) about the individual and a name if it was provided during Wave 1. In addition to the sample of dwelling units from Wave 1 completed surveys, we sampled two additional dwelling units for every survey that was short of 10 in Wave 1. If a street had seven surveys during Wave 1, the Wave 2 sample included those seven dwelling units plus six additional dwelling units in an effort to meet

the goal of 10 surveys on the street during Wave 2. Because of this sampling procedure, the released sample of dwelling units was substantially lower in Wave 2 (N=6,938) compared to Wave 1 (N=10,863), improving our contact and cooperation rate.

If the individual still resided at the dwelling unit, we attempted to survey them again. If they were available and cooperative, the Wave 2 survey was completed. If the same family household remained, but we could not contact the Wave 1 individual after 4 visits to the dwelling unit, or the Wave 1 respondent refused to participate, we would ask to speak with another adult in the family to participate in the survey. If the previous family household no longer lived at the dwelling unit and a new family household lived in the dwelling unit, we surveyed the first eligible adult to agree to participate, similar to visiting a new dwelling unit. Consistent with the process for re-sampling in Wave 1, if we were unable to get a survey at the dwelling unit, we re-sampled to replace that dwelling unit with a randomly sampled case from the Wave 2 sampling frame. There were two street segments in Wave 2 that needed to be replaced. On one street there were only 10 non-vacant dwelling units, limiting our ability to achieve the required seven surveys on the street segment, and the second street the residents refused to participate, as a group, in the second wave of the survey and were hostile towards field researchers on the segment.

### *Re-Sampling for Wave 3*

We followed the same sampling procedure as conducted in Wave 2 in regard to targeting the previous wave's respondents and sampling two additional dwelling units for every survey short of the 10 survey per street goal. To begin, we conducted the census of dwelling units and buildings on each street segment to update the sampling frame in regard to vacancy, boarded-up buildings, and changes of units or addresses, such as a unit becoming commercial property or

newly constructed housings. We removed and added dwelling units into the sampling frame based on these changes on the street. Since seven surveys were completed on every street during Wave 2, the number of dwelling units on the streets initially released in the sample ranged from 10 to 16.

Again, general demographic information of the Wave 2 respondent was provided to aid in identifying this individual when going door-to-door on the street. Similar to the previous wave, we made four attempts to survey the Wave 2 respondent, if they continued to not be available or refused, we interviewed another eligible individual in the household. If a new household moved into the dwelling unit, we surveyed the first eligible adult. Also, consistent with the resampling procedure from Wave 1 and Wave 2, if we were unable to get a survey at the dwelling unit,<sup>1</sup> we re-sampled to replace that dwelling unit with a randomly sampled case from the Wave 2 sampling frame.

Finally, we released additional dwelling units to the sample based on progress with data collection and in effort to meet our goal of seven surveys per street segment. At approximately 5 months into data collection, we identified 41 streets that had one or less surveys to assess problems and started to develop strategies to improve responses. In order to maintain strong response rate, opening sample was done strategically and on a case-by-case basis.

As part of this process we came up with a number of guidelines for replacing or adding sample. In addition to our three rules for replacing sample (boarded up/abandoned, three visits with no contact and at least one vacancy indicator, or 8 visits with no contact), we began replacing sample after two hard refusals or three soft refusals at the five-month mark. We also released two additional dwelling units across all streets that were still open with less than 7

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<sup>1</sup> After eight visits to the dwelling unit with no contact *or* three visits with no contact and one vacancy indicator.

surveys. The following month (month 6), a total of 32 streets had 3 or less surveys. We conducted qualitative assessments on 17 streets that had 1 or less surveys to identify problems. We noted changes to specific streets and dwelling units that created challenges to achieving contact and surveys with residents. Generally, the issues pertained to access issues such as apartment buzzers that limited accessibility into the building and units, and residents not answering the doors, multiple no contact visits.

After making these assessments, we adjusted the replacement criteria for streets with 4 or less surveys. Specifically, we started replacing each household meeting replacement requirement with two additional pieces of sample. The streets with three or fewer surveys was reduced from 32 to 17 with these efforts. On these remaining 17 problem streets, we took a more targeted approach by sending only our most experienced field researchers. We also increased efforts using contact information provided by the resident to contact residents by phone when field researchers were visiting the street or schedule appointments in advance. We also released more sample on specific streets. Finally, during the final weeks of data collection, we sent formal letters with University letter head to residences on cold spots where we had not completed a survey, as well as apartment units in buildings where accessibility was a problem, totaling approximately 330 letters. Based on the sampling procedure and decisions to release sample on a case-by-case basis, the total released sample of dwelling units in Wave 3 was 8,505 dwelling units. Importantly, response rates were calculated for each street because the denominator is different across street segments.



## Data Collection

### *Household Survey*

Household interviews were conducted in three waves over the five year study period at the street segment level. The first wave of data collection was August 2013 and June 2014, Wave 2 was completed between April-December 2015, and Wave 3 was completed between April 2017 and March 2018. The goal was to complete ten household interviews on each of the 450 street segments, with a minimum of seven surveys. In Wave 1, a total of 3,738 surveys were completed, 3,615 were completed in Wave 2, and in Wave 3, a total of 3,141 surveys were completed, for a total of 10,494 eligible surveys across the three waves. In Waves 1 and 2, an average of eight surveys was completed on each street segment, and in wave 3 the average was 7.2 surveys per street. With the exception of six streets in Wave 1 and one street in Wave 2<sup>2</sup>, we completed 7 surveys on each street segment, and as many as 14 surveys in Wave 1 and 12 surveys in Wave 2. When we completed data collection of Wave 3, 392 street segments (87.3%) had seven or more surveys (see Table 4).

**Table 4. Wave 3- Frequency of Street Segments by Number of Surveys**

	<b>N</b>	<b>Percent</b>
<b>1 Survey</b>	1	0.2%
<b>2 Surveys</b>	2	0.4%
<b>3 Surveys</b>	6	1.3%
<b>4 Surveys</b>	8	1.8%
<b>5 Surveys</b>	11	2.4%
<b>6 Surveys</b>	29	6.5%
<b>7 Surveys</b>	299	66.6%
<b>8 Surveys</b>	76	16.8%
<b>9 Surveys</b>	14	3.1%
<b>10 Surveys</b>	3	0.7%
<b>Total Number of Street Segments</b>	<b>449</b>	<b>100%</b>

<sup>2</sup> One street segment had 4 surveys and five streets had 6 surveys in Wave 1. One street had 6 surveys in Wave 2.

Teams of three to four field researchers<sup>3</sup>, including a team leader, visited street segments between the hours of 11am and 8pm, seven days a week across the study period. The surveys were conducted as face-to-face interviews with interviewers walking door to door to the households in our sample. As noted above, the sampling frame was taken from a census of households on each street segment that was conducted at the outset of each wave to update the sampling frame of households. When a resident was not home, a note was left in the household's door or mailbox describing the study, information on payment for participation, and asking for an adult member of the household to call the study director to schedule an interview. The first eligible adult member of the household who spoke with the field researcher was selected as the participant for the study.<sup>4</sup> Respondents had to be a minimum of twenty-one years of age and resided at the household for a minimum of 3 months. The surveys took an average of 20 minutes and respondents who completed the survey received \$15 compensation for their participation in the research. In Wave 1, interviewers returned to dwelling units an average of 4 times and up to 25 visits. In Wave 2, the teams visited the dwelling unit an average 6.3 times, up to 32 visits. In Wave 3, the number of visits to the streets ranged from 2 to 27 visits, with a mean of 13 visits to the streets.

Dwelling units where a survey was not completed were visited an average of eight times (at which point we re-sampled a new dwelling unit if no contact was made), but we continued to visit these dwelling units over the course of the study unless a hard refusal was made by a resident of the dwelling unit. When residents were not available to complete the survey at that

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<sup>3</sup> Undergraduate and graduate students were hired from local universities in Baltimore as field researchers. They participated in a two-day training on in-person survey data collection, conducting physical observations, and safety protocols for working in high crime areas.

<sup>4</sup> If multiple visits were made to the household, the first eligible adult who agreed to participate was surveyed.

time or the identified adult from a previous wave was not at home, interviewers scheduled timeframes or appointments to return to the household to complete the survey.

Based on the number of eligible dwelling units released on the street for the sample of households, the contact with residents from the households, and participation of the resident in the survey, we calculated two types of response rates—the contact rate (contact with individual/eligible dwelling units) and the cooperation rate (completed survey/contacted individuals). After accounting for abandoned housing, our contact rate during Wave 1 was 71.2 percent and the cooperation rate was 60.5 percent, which is above average for door to door surveying (Babbie, 2007; Holbrook, Krosnick, & Pfent, 2008). During Wave 2, we attempted to complete a survey with the Wave 1 respondent and were successful with 1,281 individuals, or 34 percent of the Wave 1 sample. The contact rate during Wave 2 was 80.0 percent and the cooperation rate was 71.6 percent. Again, in Wave 3 we attempted to complete the survey with the respondent from Wave 2 (including those from Wave 1). Out of the 3,141 surveys completed in Wave 3, 1,174 respondents (37.4%) participated in an earlier wave, 627 respondents from Wave 1 (and Wave 2; participated in all three waves) and 547 respondents that participated in only Wave 2. Regarding the response rates, the contact rate was 87.9% and the cooperation rate was 58%. Finally, we accounted for vacancies on the street over the course of data collection to remove ineligible households from the sample as previously discussed; in Wave 1, 16.3% of the dwelling units were determined to be vacant, in Wave 2, 14.4% of the sampled dwelling units were vacant, and in Wave 3, 15.0% were determined to be vacant over the course of data collection.

The investigators have extensive experience conducting research in the field, particularly in dangerous neighborhoods (Mazerolle, Ready & Terrill, 2000; Weisburd, Wyckoff, Ready,

Eck, Hinkle & Gajewski, 2006; Weisburd, Morris & Ready, 2008). To begin with, the field researchers were instructed to assess the level of risk on the street and all team members' level of comfort walking on the street. Due to the fact that three hundred of the street segments were located in drug and crime saturated areas, we developed a number of safety protocols for procedures for working in dangerous or high-risk conditions in the field. First, all interviewers and observers worked in pairs and field researchers never spent time on the street alone. Second, all field researchers had access to cell phones to communicate with team leaders and other researchers while in the field. The survey manager kept current record of locations where field interviewers have been deployed on a daily basis. Third, if a street segment is an identified hot spot and a large number of teenagers or young adults are socializing in a public area, the researchers were instructed to skip that street segment and return later, when less activity is taking place. Fourth, field researchers memorized responses to frequently asked questions (i.e., FAQ sheet) in order to provide a standard set of responses to curious citizens on the street. Finally, field researchers were instructed to leave the field when they felt physically threatened or intimidated by something that is occurring on the street, as well as call the police if there was an emergency requiring immediate attention.

Upon completion of the survey, respondents were asked if they would be willing to participate in the two follow-up waves of the study. Before leaving the household, additional contact information was collected if the respondent was willing to remain in the study sample. We recognize that residents may move within the time frame of our study. At the same time, a key interest of our study was in information that describes the characteristics of the places, and how characteristics of street segments influence individuals who live on the street. As previously discussed, we replaced households that changed over the study period with a new household

randomly selected from the sampling frame for subsequent waves. We attempted to contact respondents that have moved for one survey cycle with a brief survey over the phone if contact information was provided. In this survey, we focus questions on the reasons for moving from the segment. At Wave 2, we completed 29 surveys on the phone with respondents who had moved from their Wave 1 residence and in Wave 3 we completed 50 phone surveys with respondents who had moved.

### *Variables of Interest*

The survey instrument from Wave 1 (see Appendix C) is composed of 146 questions with over 300 unique items. At the beginning of the interview, field interviewers explained the general purpose of the study to residents in the household sample, and asked them for their written, voluntary consent. When the field researchers were working in teams, one interviewer would often read the survey items to the respondent while another researcher recorded verbal responses on a form that is formatted for automated data entry.

The survey instrument contained a broad range of variables related to the topics of health, safety, drug use, community involvement and crime. Self-reported drug use items included marijuana, cocaine, heroin, methamphetamines, and ecstasy, as well as alcohol and tobacco. Many of these indicators related to the nature and frequency of drug use were drawn from the Arrestee Drug Abuse Monitoring (ADAM) project instrument (Webb, Katz & Decker, 2006). In addition, respondents were asked to report on the availability of specific types of drugs on their street, and the seriousness of drug use and dealing on their street. Self-report criminal behavior questions included measures of theft, fraud, assault, burglaries and a range of other crimes. Respondents were also asked to report on their general health, their frequency of exercise and sexual activity, serious medical conditions, as well as sexually transmitted infections such as

gonorrhea, Chlamydia and HIV. Many of these items were drawn from the National Survey on Drug Use and Health and the Survey of Community, Crime, and Health (US Department of Health and Human Services, 2008; Ross & Britt, 1995).

Scales measuring physical health, depression and traumatic stress were drawn from the RAND 36-Item Health Survey and the Patient Health Questionnaire used by Sikkema et al. Social structural variables such as community involvement, social cohesion, and collective efficacy were also measured using a series of scales initially developed for the Project on Human Development in Chicago Neighborhoods (Sampson, Raudenbush, & Earls, 1997). In addition to these health-related topics, respondents were also asked about their use of public space, social interactions with neighbors, the role of neighbors in providing guardianship over children and property, and efforts on the part of the respondent to become involved in collective actions to ameliorate problems in their community. Some of these indices were drawn from the National Survey of Neighborhood Experiences and Characteristics (Smith, 2009). Finally, many of the items on the survey instrument were concerned with safety, fear of crime, and perceptions of physical disorder and urban blight, which have been measured by the investigators in prior studies (Mazerolle, Ready & Terrill, 2000; Weisburd, Wyckoff, Ready, Eck, Hinkle & Gajewski, 2006; Weisburd, Hinkle, Famega & Ready, 2011).

### *Physical Observations*

We also collected information concerning the physical layout and architectural attributes of the street segments in order to better understand the relationship between the physical environment and behavioral patterns in hot spots. The physical observations were conducted simultaneously with the respondent surveys. A single physical observation assessment form was completed for each street segment (see Appendix D). This resulted in four hundred and fifty

observations collected at three points in time, for a total of thirteen hundred and fifty observations. We relied on primary data collection rather than public data provided by Google Earth, as seen in other research (Odgers, Moffitt, Tach, Sampson, Taylor, & Matthews, 2009), because the street view images for Baltimore City would not be current with our data collection.

For each of the street segments, two trained observers rated the discrete characteristics of the street segment independently in order to test for and periodically monitor inter-rater reliability. The observers went to each street during the period of the survey data collection, but not when other research activities were being carried out. Field researchers spent between ½ hour and an hour carefully coding the physical attributes of the street, and moved to multiple viewing areas along the street in order to accurately code the observation items.

The physical observation instrument had three separate focus areas. First, observational items included visual indicators of drug activity (drug paraphernalia) and prostitution (e.g. condoms on the street). Second, the instrument contained measures of broader signs of physical disorder, such as burned-out or abandoned buildings, litter, graffiti, broken windows, structural damage and abandoned vehicles. Third, observations were collected on known ecological risk factors for anti-social behavior (e.g. bars, transportation nodes). Finally, information concerning the amount and nature of commercial establishments, industrial buildings, and residential structures was collected.

### *Qualitative Data Collection*

During each wave of survey data collection, qualitative data collection including ecological mapping, direct observation of street segments (including the businesses, individuals and groups within them) and in-depth, semi-structured interviews were conducted. The use of

multiple methodologies triangulates the data sources, offering greater depth and reliability in the results (Lofland, Snow, Anderson, & Lofland, 2006; Morrill, 1995; Snow & Anderson, 1993).

Qualitative fieldwork during Wave 1 occurred between September 2013 and January 2014 at 75 stratified and randomly selected street segments (from the larger study sample of 450 within the city of Baltimore). The stratified subsample consists of 25 control segments (comparison group), 21 predatory segments (high violent crime), 21 drug (high drug-related crime) and eight overlap segments (high violent and drug crime). Segments vary in length and population density, but each meets minimum project specifications for number of occupied households. Qualitative methods included ethnographic observation and informal interviewing of residents or occupants of each street segment during fieldwork. All work for this project is approved by the Institutional Review Board (IRB). During phase one of this project, the qualitative research team spent roughly 125 hours in the field between all researchers and an additional 125 hours typing fieldnotes.

To begin fieldwork, the research team, consisting of five ethnographic fieldworkers, received training conducted by the qualitative director, Dr. Rudes, to ensure common safety, ethical and data gathering protocols. Then, the research team conducted pilot field observations and interviews on four street segments to test the protocols. Upon returning to a common location, the fieldwork team debriefed regarding the piloted fieldwork. The ethical and data gathering (interview and observational foci) protocols remained as designed and the fieldwork team made only one change to the safety protocol. They agreed to cover control segments solo, but to conduct fieldwork in two-person teams in all drug and predatory segments. During the pilot (and subsequent fieldwork) researchers took extensive notes using the data gathering protocol as a guide and created an ecological map for each segment using printed segment maps



from Google Earth. To assemble each segment's ecological map, fieldworkers brought printed maps into the field for each segment and drew/labeled relevant items on the map. These included drug areas, crime areas, residences, and pro-social/community spaces.

During fieldwork, researchers spent one hour on each street segment in the qualitative subsample gathering observational (n=75) and interview data (n=72) to address the following main research question: *How do residents views, use and perceive the street segment?* Within each segment, researchers captured (whenever possible) demographic information for each interviewee including gender, race/ethnicity, age, education/training, job (line of work) and length of time or affiliation with segment. Then, researchers compiled ecological maps of each segment complete with information about dwellings/residences, commercial/other buildings, community locations, seemingly dangerous/risky locales, and drug locations. Finally, researchers focused observation data collection on six focal areas including: 1) street activity; 2) visible pro-social activity; 3) visible drug/crime activity; 4) blight and physical disorder; 5) use of space, and 6) visible social organization. When individuals were present on segments and willing to participate in an interview, interviews focused primarily on five main themes: 1) segment navigation (formal/informal); 2) segment history/changes over time; 3) decision-making regarding living in segment; 4) social contextual relationships and experiences in segment, and 5) knowledge of drug/crime within segment. When possible, interviewers also asked secondary questions about overall physical/mental health problems, healthcare, and treatment/services in/near segment. Researchers then linked all typed fieldnotes and ecological maps to Atlas.ti (software program for qualitative data management) for coding and analysis.

Within each street segment, we maximized diversity in the recruitment of individuals by speaking with and providing study information sheets to all eligible residents and inhabitants.

While paying attention to local demographics (i.e. age, race/ethnicity, and gender) we interviewed individuals based on the following inclusion criteria: 1) at least 21 years old; 2) present in street segment during fieldwork; 3) voluntarily participates. Rather than engaging in formal interviews (with interview questionnaires/protocols), we used direct observation time for conducting semi-structured interviews (thematically focused interviews that occur during the course of everyday conversation). We engaged participants in talk to delve for information using Snow and Anderson's "interviewing by comment" procedure for eliciting information by making a statement that sparks response (Snow & Anderson, 1987). The specific goal of the direct observation and interviews was to illuminate how residents and participants within each street segment view, use and perceive the segment. During Wave 1, we spoke with 72 individuals across 42 interviews; in some instances we spoke with small groups (2-4 individuals) on the street.

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