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To cite this article: Andrew Curtis, Chaz Felix, Susanne Mitchell, Jayakrishnan Ajayakumar & Peter R. Kerndt (2018) Contextualizing Overdoses in Los Angeles's Skid Row between 2014 and 2016 by Leveraging the Spatial Knowledge of the Marginalized as a Resource, *Annals of the American Association of Geographers*, 108:6, 1521-1536, DOI: [10.1080/24694452.2018.1471386](https://doi.org/10.1080/24694452.2018.1471386)

To link to this article: <https://doi.org/10.1080/24694452.2018.1471386>



Published online: 14 Jun 2018.



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# Contextualizing Overdoses in Los Angeles's Skid Row between 2014 and 2016 by Leveraging the Spatial Knowledge of the Marginalized as a Resource

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Opioid drug overdoses in the United States have continued to rise since 2014. Overdoses are one of several interlinked health challenges faced by marginalized populations. Here we side with the argument that these populations can also be a valuable resource to address these challenges, and we use methods that can elevate this critical belief into real-world application. In this article, we use spatially inspired interviews from both marginalized and provider participants in the Los Angeles Skid Row to map out the microspaces of drug activity. The resulting map reveals a complex space in terms of drug types and associated social activities. These geonarratives reveal a nuanced space of locations, activities, and context—how these substances enter Skid Row, the associated violence, and the physical and emotional toll on the marginalized. We find both quantitative and qualitative support that the “street” community is complex, full of variation in terms of where people live, how they live, and the social fabric that has evolved. We suggest that these data can be used to reduce the structural violence often found in many “solutions” to the homeless and their problems. Instead we show that the marginalized could be used to provide a vital resource not only in terms of their knowledge and their communities but also in delivering medical care. We end by suggesting that this approach to data collection could evolve into an ongoing resource that could develop into a near-real-time tool to reduce overdose mortalities. *Key Words:* geonarrative, GIS, marginalized, overdose, Skid Row.

在美国, 鸦片类药物成瘾自 2014 年开始便不断增加。药物成瘾是边缘化人口所面临的若干相互连结的健康挑战之一。我们于此支持这些人口同时也是应对这些挑战的宝贵资源之主张, 并运用能够将此一批判理解提升至真实世界应用的方法。我们于本文中, 运用对洛杉矶贫民区中受到边缘化者与供养人之参与者进行受空间启发的访谈, 以绘制药物活动的微观空间。我们获得的地图, 揭露出药物种类和相关社会活动的复杂空间。这些地理叙事, 揭露出地点、活动与脉络的细緻空间——这些物质如何进入贫民区、与之相关的暴力, 以及边缘化者的物质和情绪损失。我们同时发现质化与量化的支持, 证实“街头”社群是复杂的, 且在何处生活、如何生活、及其形成的社会纹理上充满了变异。我们主张, 这些数据能够用来减少针对游民及其问题的诸多“解决方案”中经常发现的结构性暴力。我们反而展现, 边缘化者不仅在其知识与社区上、更在传递医疗照护上, 能够用来提供有效的资源。我们于结论中主张, 此般数据搜集方法, 能够演变成持续不断的资源, 并能发展成为近乎及时降低药物成瘾致死率之工具。关键词: 地理叙事, 地理信息系统, 边缘化, 药物成瘾, 洛杉矶贫民区。

Las sobredosis con drogas opioides en los Estados Unidos han seguido en aumento desde 2014. Las sobredosis son uno de los varios retos entrelazados de salud pública que enfrentan las poblaciones marginadas. Aquí concordamos con el argumento de que estas poblaciones pueden a su turno ser un valioso recurso para abocar esos retos, y usamos métodos que pueden promover esta crítica creencia en una aplicación para el mundo real. En este artículo usamos entrevistas inspiradas espacialmente tanto con los marginados como con proveedores participantes en el Skid Row de Los Ángeles para cartografiar los microespacios del tráfico de drogas. El mapa resultante revela un espacio complejo en términos de los tipos de drogas y actividades sociales asociadas. Estas geonarrativas revelan un espacio matizado de localizaciones, actividades y contexto—cómo entran estas sustancias al Skid Row, la violencia asociada y el estrago físico y emocional que recae sobre los marginados. Hallamos apoyos tanto cuantitativos como cualitativos en el sentido de que la comunidad “callejera” es compleja, plena de variación en términos de dónde vive la gente, cómo viven, y la fábrica social que ha evolucionado. Sugerimos que estos datos pueden usarse para reducir la violencia estructural que a menudo se encuentra en muchas de las “soluciones” que se plantean sobre los sin hogar y sus problemas. En su lugar, mostramos que los marginados podrían servir como un recurso vital no solo en términos de su conocimiento y de sus comunidades, sino también para distribuir cuidado médico. Terminamos sugiriendo que este enfoque de recolección de datos es

susceptible de transformarse en un recurso actuante que podría desarrollarse como una herramienta casi de tiempo real para reducir las mortalidades por sobredosis. *Palabras clave:* geonarrativas, marginados, SIG, sobredosis, Skid Row.

Like [A] and [D], ah that's like THE heroin spot, um you can also buy heroin on [B], between those like around [D], [E], [C] . . . you can also get stuff like that but [B] is like a really hot street with the police. People get busted on [B] all the fucking time, and then like overdoses happen constantly. . . . Just recently . . . just before [A] on [D] street. A white girl, maybe only nineteen, twenty years old overdosed and died in a tent. . . . Heroin gets sold up and down on [H] right here, same as [A], this was the spot as far as heroin goes. [G] coming up right here, is another good crack spot, if you want to buy rocks, and also my personal favorite is [I], this street right here, down here on the right, if you were to go south on it, that's another big-time crack rock area, and then as far as the crystal meth thing goes, that's taken over, you can buy crystal meth anywhere, it's constantly being thrown at your face.

Opioid overdoses have risen across the United States since approximately 2014 to reach what are now described as epidemic levels, affecting all sizes and types of communities (Madras 2017). The marginalized, those who live on the fringes of society, such as sex workers, substance users, those suffering from mental health problems, and the homeless, pose a particular public health challenge. Within this group, overdoses are not a recent phenomenon but rather one more challenge to be navigated in the neoliberal city (Dear and Wolch 2014). Although institutional knowledge of different professionals might mean that we know where the marginalized often gather—along certain streets, in camps, or in broader urban areas often referred to as Skid Row—from a public health perspective, data are lacking that combine both location and health outcome and that could be used to help fashion an intervention. In this article, while acknowledging the various examples of structural violence, which we define here as being the direct and indirect harm caused by institutions as they design and implement strategies designed to solve the “homelessness problem” (DeVerteuil 2015), and accepting that solutions should not be couched in terms of pathology and that the marginalized need to be saved, we develop methods appreciative of the critical perspective that can still be used as an outreach tool to reduce overdose mortalities. We use spatial video geonarratives to create a microspace contextualized map of drug activity in the Los Angeles

Skid Row (SR), an area that has continued to experience significant drug-related casualties<sup>1</sup> and show why these spaces exist, what activities happen within, and the resulting impacts on the marginalized community. In so doing, we borrow from the critical perspective, and a key tenet of harm reduction theory, that solutions can be found from within: the marginalized are a resource and not a problem. As a cohort they have developed an experience set, much of it spatial, that is vital in understanding and contextualizing the street drug overdose situation in SR.

We also contribute to the tradition of taking a geographic perspective in characterizing illicit drug landscapes (Thomas, Richardson, and Cheung 2008; Wilton and Moreno 2012; Jayne, Valentine, and Holloway 2016), promoting the importance of place, most notably with a risk exposure approach, where the immediate environment of an individual produces and magnifies individual behavioral risk traits (Rhodes et al. 2005; Strathdee et al. 2010). It is vital to expand the activity space of a potential overdose from where the event happens to include the other spaces of harm in which individuals move, not always through their own choice (Martinez, Lorvick, and Kra 2014). This type of insight is vital to develop an empathetic and effective approach to reducing overdoses (Kori et al. 2014). We add to the growing literature that crosses GIScience, public health, and various geographic subdisciplines regarding the impact of context on data (Kwan 2012a, 2012b, 2016; Conners et al. 2016) and, more specifically, how methods that combine both new data collection attached with contextual attributes can replace or improve existing methods and in some instances provide new insights where none otherwise exist.<sup>2</sup> We have a set of tools that fit within the harm reduction perspective, including real-world strategies like Housing First (Watson et al. 2017)<sup>3</sup> that switch the emphasis from a pathological focus on drugs and drug use to instead seek solutions that will improve the quality of individuals' lives (including living conditions) and in so doing remove the desire for drugs (Collins and Loukaitou-Sideris 2016). Insights gained can be used to move toward such lofty goals, but we can also showcase the utility of including the marginalized as a resource in a more immediate triage role in reducing the number of overdose deaths.

The reasons contributing to homelessness, including pronounced income disparity and social service and housing rationing, are beyond the scope of this article. Some homeless control measures (Kushel et al. 2005; Amster 2008; Aykanian and Lee 2016), though, including ordinances that create a criminalized population (DeVerteuil 2006; Reese, DeVerteuil, and Thach 2010), have helped cause and perpetuate a landscape of marginalization with features of shelters, street tents, camps, and other temporary living locations (Speer 2016). The homeless are continually squeezed into a patchwork of society-tolerated spaces, before changes in policy, policing, or other social attitudes such as gentrification exclude them from where their communities had developed and where associated services have clustered (McNeil et al. 2015). In so doing, harm has been caused by both removing services and within cohort support mechanisms, both of which could lead to more of a likelihood to take drugs. Although inhabitants of these spaces are homogenized by the outside world, stigmatized because of their “nonnormal” lifestyle and often vilified because of a connection with illicit drug use (Wacquant 2014; McNeil et al. 2015), the reality is that variations in experiences create a spatially and socially diverse cohort. The marginalized suffer multiple health challenges, including widespread substance use and the risk of overdoses (Rhoades et al. 2011; Martinez, Lorrivick, and Kra 2014), yet the risk is not universally constant, with many within this cohort being vulnerable to their individual and immediate situation. The characteristics of microspaces can either increase the likelihood of the individual finding harm through drug use or exposure to violence or they can provide sanctuary or protection. In addition, these spaces can produce a heterogeneous map, sometimes by as little as half a city block (Shannon et al. 2008). Therefore, a homogeneous strategy makes little sense but, in fairness, we have few data to support our desire to create more sensitive and contextualized policies. Even worse, as an illustration of the structural violence the marginalized often experience, some policies actually worsen health outcomes; arrests can lead to reduced drug tolerance<sup>4</sup> and a greater risk of an overdose death, and street sweeps can remove personal medications and Narcan from a micro area, resulting in harm to both the individual and his or her community. Although not as relevant to SR, elsewhere policies of exclusion (removing the marginalized from their normal activity spaces) create barriers to the services that had clustered there, also risking increased violence due to

forcing people into unknown spaces (McNeil et al. 2015). Because drug use is correlated with many other poor health outcomes such as issues of mental health and exposure to infectious and chronic disease (Marshall et al. 2009; Beijer, Wolf, and Fazel 2012; Fazel, Geddes, and Kushel 2014) and the risk of interpersonal violence (McNeil et al. 2014), especially to sex workers (Shannon et al. 2008; Shannon et al. 2009; P. Duff et al. 2011; Draus, Roddy, and Asabigi 2015), such harm-causing policies can result in multiple poor health manifestations beyond increased overdoses. If we return to the core concept of harm reduction theory, these violate the concept that the individual should be placed in a setting and situation whereby life-improving choices can be made.

Although we risk further stigmatization by even discussing overdoses in SR (Hannem and Bruckert 2012), with the perception possibly being that we are attempting to “recover and resocialize” by identifying a landscape of victims with deficiencies who need help (Sparks 2016) without developing critically informed methodologies that have application in real-world settings, we run the risk of continuing policies that do more harm than good (Shannon et al. 2008; McNeil et al. 2015). We agree that any intervention can be both protective and aggressive, caring and punitive (DeVerteuil 2014), but there are fundamental data missing to make better decisions. From a public health perspective, a park, a street, a hidden space, and a run-down hotel all pose different challenges (Connors et al. 2016; Goldenberg et al. 2017), even if we were able to map them by activity. We need to add in the role, context, and importance that each has to the marginalized community through bottom-up approaches (Speer 2016).

How to achieve this? Ethnographic work has been successful in revealing the complexity and social structures in nontraditional living, detailing how communities and their friendship networks have emerged where rules, regulation, and enforcement give participants structure and a social fabric to care and be cared for (Speer 2016; Sparks 2017). Indeed, if left alone, camp or street living involves stability, pride, and a sense of civic responsibility (Sparks 2016; Speer 2016), a “hidden” yet socially connected community (Wolch, Rahimian, and Koegel 1993; Stablein 2011). This potential resource has also been explored using drug-related social network visualization to tease out potentially harm-causing social connections (Fisher 1988; Latkin et al. 1995; Hwang et al. 2009; Kennedy et al. 2016). Yet, a deficiency is that the harm-causing spaces are not as readily identified using these methods.

What is interesting is that the marginalized are one of the most spatial of all cohorts, with an unparalleled knowledge of an area's streets, alleys, buildings, and other spaces and the ability to safely navigate them (DeVerteuil 2003; Marr, DeVerteuil, and Snow 2009; Kerr 2016).<sup>5</sup> Knowing where to walk and where to sleep is vital for survival and comes from acquiring lived and shared experiences (Kerr 2016). The question is how we can turn these resources into a useful, applicable tool (Shannon et al. 2008; Martinez, Lorvick, and Kra 2014; McNeil et al. 2014; McNeil et al. 2015; Allen et al. 2016; Goldenberg et al. 2017). The geography of marginalized populations, especially the street homeless (SH) as we refer to those who live or interact in SR, has created a long-standing public health dilemma. Simply put, the SH, who suffer a wide array of health challenges, have no address and therefore a limited connection into more traditional health data sets. For example, Curtis and Lee's (2010) investigation of diabetic patients using the Los Angeles County Hospital emergency department revealed a sizable "homeless" cohort that had to be excluded from all spatial analysis, even though they carry one of the highest health burdens. Alternative data from sources such as the homeless shelter system have several limitations, not least of which is that only a subset of the SH use them (Kuhn and Culhane 1998; Sparks 2016). Spatial data collection is not a priority for many SR providers working with limited resources and operating under stressful situations.<sup>6</sup> As an illustration of this, the not-for-profit Homeless Health Care Los Angeles Center for Harm Reduction (HHCLA-HRC) health organization has a wall map of Narcan reversals that is literally a road map with pins pushed in (Curtis et al. 2015). Therefore, we need to rethink spatial data collection, while still maintaining a level of sensitivity and context gained from the critical perspective (Marr, DeVerteuil, and Snow 2009), drawing on the experiences of those who live and work in SR (Kerr 2016). One approach that has previously been used is spatial recall, often including sketch mapping exercises (Shannon et al. 2008; McNeil et al. 2015). Although these are valuable in gaining previously unknown spatial insights, here we create further geographic richness by using a spatial video geonarrative (SVG), which is a synced video and audio commentary that can be turned into maps to produce spatially precise and visually enriched insights.

SVG benefits from the stimulation of the senses, with the sights, sounds, and smells of moving through SR triggering spatially specific experiences that are recorded and then turned into maps. In so doing, these recalls improve on data collected in a sterile environment,<sup>7</sup> as the role of an alley or a grouping of sidewalk tents will only be described if the subject sees (and smells and hears) them or sees events happening around them. We follow other SR-focused research that has used fewer but more in-depth interviews (Collins and Loukaitou-Sideris 2016) to show that the resources of the SH living in SR, along with their providers, can improve the way we deliver health care. To illustrate this, and building on our prior work that has shown the ineffectiveness of many traditional data sets (Curtis et al. 2015), we show how a context-enriched map of drug activity, when including social outcomes and primarily sourced by marginalized insight, can be used to reduce overdose mortality.

## Method

SR is an area covering approximately fifty square blocks, with an estimated population of between 12,000 and 14,000 people, of whom 75 percent are African Americans (Collins and Loukaitou-Sideris 2016). As a result of services being squeezed here during the 1970s (Goetz 1992), the area now serves as a vital hub for both the homeless living inside and those scattered across Los Angeles County. Wolch et al. (2007) identified seventy not-for-profit groups and approximately 3,300 beds located in the area.

For our study, most participants were recruited through contacts originating from the Los Angeles County Public Health Department's relationships with local area support groups. From these contacts, SH participants were introduced to investigators on site (either on the street or at a facility) and offered the opportunity to be part of the project. Providers were contacted directly by investigators and invited to be involved. Before the SVG ride began, the lead researcher described the research, and informed each participant as to his or her rights.<sup>8</sup> The topic of safety and comfort was discussed and each participant was assured that he or she had the right to stop data collection at any point, before the participant signed an informed consent form. All participants were offered a \$10 gift card for their involvement.<sup>9</sup>

Each participant was encouraged to talk freely about any topic of interest and to pick the data collection route. The researcher performing the data collection had the freedom to ask clarifying questions but did not dictate topic selection. Although the theme of this article involves drug pathology in SR, this was not the main reason for data collection.<sup>10</sup> After each ride, the SVG was transcribed with audio time stamps inserted before each comment. This narrative was read using NVivo (QSR International Pty Ltd., Version 10), a software tool commonly used to analyze text, to identify themes and key words associated with drug activity. To map these themes, each word was spatialized by combining the word file with its associated location coordinate using interpolation computer code developed at Kent State University.<sup>11</sup> By combining all spatialized narratives in ArcGIS (Esri, Version 10.1, Redlands, CA, USA), a variety of different spatial investigations could be performed, such as comparing SH to provider (P) narratives, or finding hotspots of a key word. A kernel density estimation (KDE) was used to explore the geographic pattern of each key word; the density of words inside a circular window is calculated using a quadratic function to weight the impact of words closer to the kernel center.<sup>12</sup> The KDE grid is contoured in ArcGIS using the lowest of the ten classification values as a minimum contour resolution, resulting in approximately ten possible contour lines per key word. Only the top 50 percent of the contours of each word are mapped to show the higher intensity areas of SR. By overlaying these 50 percent contours onto the same map, similarities and variations in the geographies of drug-related keywords in SR can be determined. KDE is a common approach employed in criminology, epidemiology, public health, and previous investigations into marginalized populations (Davidson, Scholar, and Howe 2011; Goldenberg et al. 2017), and it has also been used to visualize SVG patterns (Curtis et al. 2016). By returning to each SVG falling inside these heat map hotspots, additional context can be added to the interpretation of the map. In other words, individual narratives falling inside each composite key word hotspot could be read to find out what was happening there.

A series of SVG rides covering every street in SR were also collected to map daytime SH street camps. Each camp, or evidence of a camp (e.g., a collapsed tent) were digitized into Google Earth and then imported into ArcGIS 10.4. The street camp layer is added to each of the SVG maps. To reduce spatial stigma within SR, all maps and descriptions are presented without street names.

## Results

We begin this section with a brief overview of the described geography in the geonarratives before presenting the results of the key word mapping.

Seventeen SVG rides, including nine SH and eight P participants,<sup>13</sup> were collected between September 2014 and February 2016. A further six SVG rides covering all streets in SR also occurred during this period. Drug activity key words (guided by an NVivo analysis) were identified. Spatially specific locations included corners,<sup>14</sup> alleys, hotels, parks,<sup>15</sup> fences or walls, and certain streets, many of which were associated with specific drug types. Some of these spaces were surprising, such as the steps of the police station, which was frequently mentioned in the SVG as a source for drugs, with some subjects commenting how each would sit on its small brick wall to take the drugs after purchasing.<sup>16</sup> This is an example of how adding context elevates our understanding of the locations. Spaces and places are identified, but each has a story. In keeping with other studies, shelters were identified as being important drug interaction places (Kerr 2016) and were disliked by our SH participants. Previous research has criticized shelters as being symbolic of the neoliberal approach to warehousing the poor, as an attempt by society to impose “normalcy” and “home” (rather than the relative self-autonomy found in camps) on the homeless, and the dehumanizing effect of treating adults as prisoners or school children (Sparks 2016 2017). The SVG revealed more tangible risks,<sup>17</sup> with one shelter in particular having a reputation for being dirty, drug dealing, and violence. Although some of the blame lay with the staff, others excused their lack of oversight because of exhaustion, both mental and physical, because they had to carry too much of a burden:

They don't have that much staff, and honestly, most of the people that work in the agencies down here are super burned out, like the work that they are doing is so high-stakes every day, they don't have support from anybody else. Their hands are tied, there's like no solutions for their clients except these like little bits of hope, they just get fucking tired of it.

This again supports the contention that policies designed to help can actually cause harm, but from a public health perspective it is also worrying, because these shelters are often the only information source regarding the homeless, and having an exhausted staff is not conducive to capturing good data.

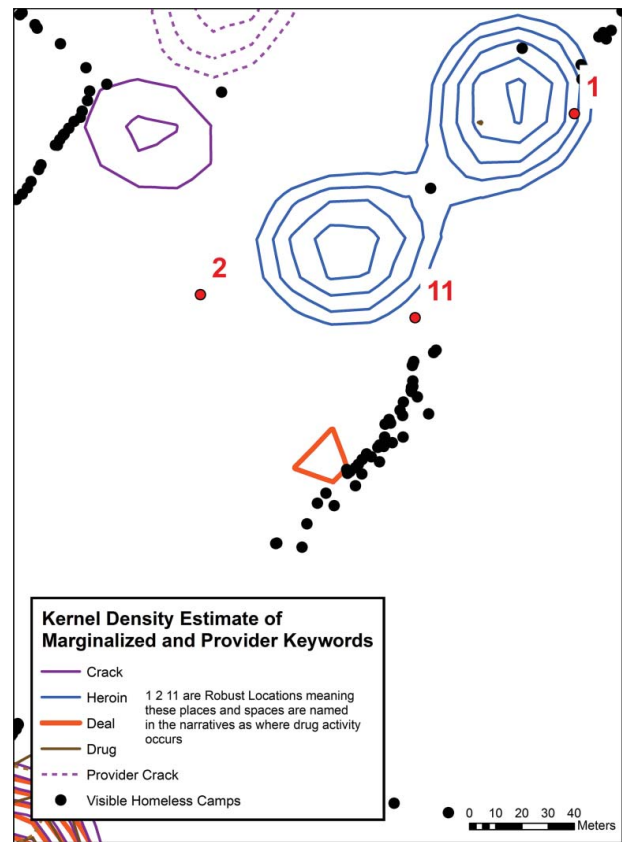
A further benefit of the SVG approach is that key locations and insights can be linked back to the images seen in the car, such as a drug dealing corner, or where overdoses were described to happen,<sup>18</sup> tents and cars where drugs are stored, tents and fence sections where people go to use, and areas associated with prostitution and frequent violence.<sup>19</sup> The context of these spaces makes each unique, with actions at one location having implications for others. For example, using tents as drug storage points is all the “justification” needed for the police to conduct broader street sweeps and busts.<sup>20</sup> On one ride a tent was identified that had been “busted” the previous night,<sup>21</sup> although the SH suggested a new proximate distribution tent will soon emerge.

Although many of these specific spaces are identified using personal experience, there are also visual cues that the SH use to read the ephemerality of the streets during the ride; for example, unusual activity around a tent or fence (“full of people, I mean just too many people”) or more mobile or smaller dealers and their user entourage. Sometimes these sights caused the participant to become emotive, displaying sadness, anger, and even fear.<sup>22</sup>

### Mapping Drug Activity in Skid Row

Although these spatial insights are interesting and potentially useful, one goal we set for this project was to develop a tool that could be used to decrease overdose mortality. To do this, each word was spatialized (given a location on the map) and then combined into one of two geographic information system (GIS) summary tables for either SH or P participants (55,535 and 29,561 spatially referenced words, respectively). Reading of the narratives, along with an NVivo analysis, helped identify key drug-related words (crack, crack, deal, dope, drug, heroin, and overdose). Each word was queried from the composite word files and mapped using a 50-m KDE.<sup>23</sup> In this way, the combined SVG could reveal drug-related hot and cold spaces throughout SR.

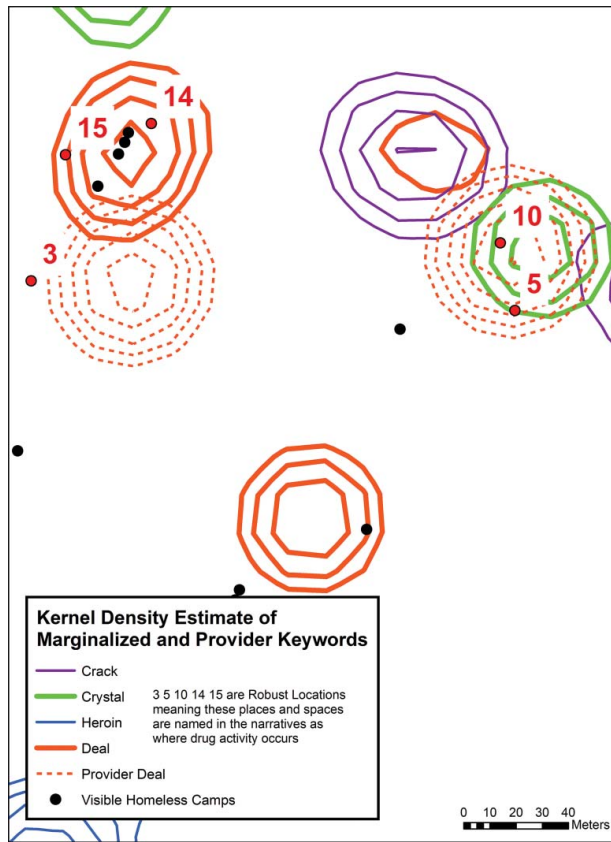
Figures 1 through 6 display the contoured results of the KDE analysis for both SH and P combined word maps.<sup>24</sup> For the SH participants, there were 101 word locations for crack, thirty-eight for crystal, fifty-seven for dealer, thirty-nine for dope, 109 for drugs, seventy-nine for heroin, and twenty-six for overdose. For the P participants, only crack (twenty-nine), dealing (twenty-six), drugs (thirty-four), and heroin (twenty) had enough mentions to



**Figure 1.** An area known for heroin just north of an alleyway with a reputation for spice use. (Color figure available online.)

warrant a KDE. There was some spatial variation in the key words for both groups of participants. The SH also had more detail about drug locations (where to buy, what to buy), which resulted in a more spatially specific map. In comparison, the P participants either had less knowledge about each microspace or focused more on generalities and outcomes (drugs are dealt all along this street).

This key word map could be used to distribute Narcan if we accept the widely held view that, in general, overdoses tend to happen close to where drugs are purchased. Although we can go far further than that simple proximity argument, we must first decide whether the map is indeed accurate. To do this, we use the map to validate locations known for drug activity throughout SR. In other words, we need to determine whether our hotspot map locates and contextualizes these “robust” locations (RB), which include buildings, corners, parks, and so on. By overlaying these RB onto Figures 1 through 6 we can see whether each is adequately captured by the KDE contours. In this way, an RB known for the sale of



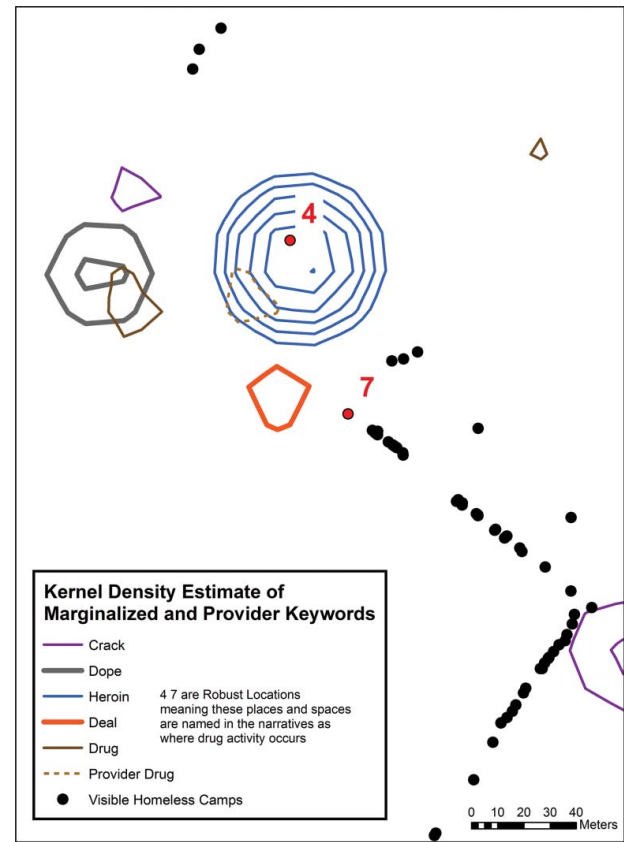
**Figure 2.** An area known for drug dealing centered on one hotel. (Color figure available online.)

cocaine should fall inside or be proximate to a cocaine keyword hotspot contour.

RB 1 (Spice Alley) falls inside an SH heroin hotspot even though it is better known for spice. RB 2 (X Mission) is touched by both SH crack and heroin hotspots, which makes sense because the building is described as having multiple drug issues. Close by is RB 11 ([B] and [D]), which is described in the SVG as being where heroin use and dealing occurs.

RB 3 (Y Hotel) has a reputation for having a lot of drug activity, although not tied to one particular drug type, which is reflected in being proximate to the contour for P dealing. RB 5 (DD corner) and RB 10 ([B] and [C]) sit within SH crack and meth and P dealing hotspots, which again agree with the SH descriptions for those intersections. RB 14 and 15 ([L] and [C] and a park) are known for meth, dope, and marijuana, and these fall within both SH and P dealing hotspots, which indicates the overall drug nature of this area, especially when adding in the proximate Y Hotel.

RB 4 (Police Station) has an SH heroin hotspot directly over it, with SH dealing, drugs, coke, and



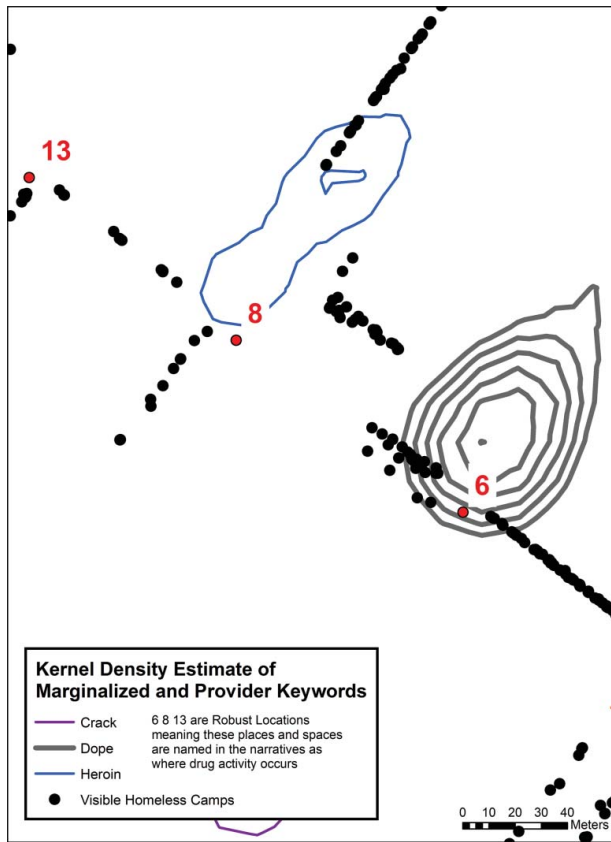
**Figure 3.** Area around the police station that has a reputation for both drug dealing and use. (Color figure available online.)

dope also being close by. Again, this is understandable given the reputation of the amount and breadth of activity described around this building in many of the SVGs. Interestingly, the role the police station plays in local drug activity is only known (or described) by the SH, suggesting a different experience set between the two participant groups. RB 7 ([D] and [K]), which is located next to the police station, is mentioned on one professional ride for its overdoses, which is not reflected by an overdose hotspot. It is likely that an intense drug area such as this will produce overdoses.

RB 6 ([C] and [J]) lies within a dope hotspot, although the P description of the intersection includes overdoses. RB 8 ([A] and [F]), which is described in some narratives for crack and overdoses, is less well captured on the map, falling inside a weak heroin concentration. RB 13 ([C] and [H]), although being described for crack, is one of the few locations that has no proximate hotspots, although there are a lot of visible street camps in this area.

RB 9 ([A] and [D]), which is one of the highest drug intensity areas in SR is frequently described in terms of its heroin and overdoses, and this is reflected in terms





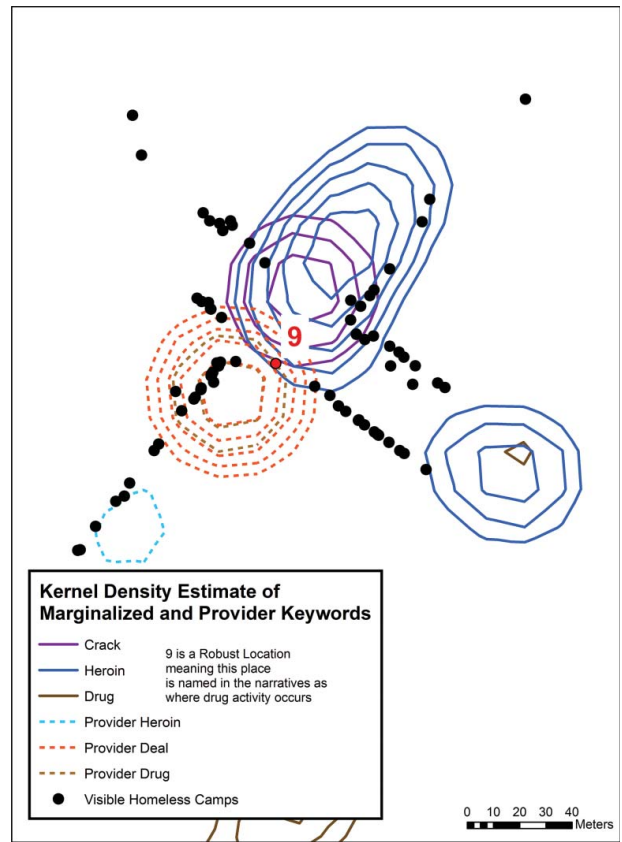
**Figure 4.** A dope hotspot centered on a particularly dense set of street camps. (Color figure available online.)

of the hotspots for SH drugs, heroin, and crack, and P dealing.

RB 12 ([B] and [E]) is described as being heroin, although this is only one of the hotspots that overlays it or is in close proximity, the others being SH crack, drug, and dealing, and for P, crack and heroin. Both Figures 5 and 6 also reveal a high concentration of camps in the general vicinity.

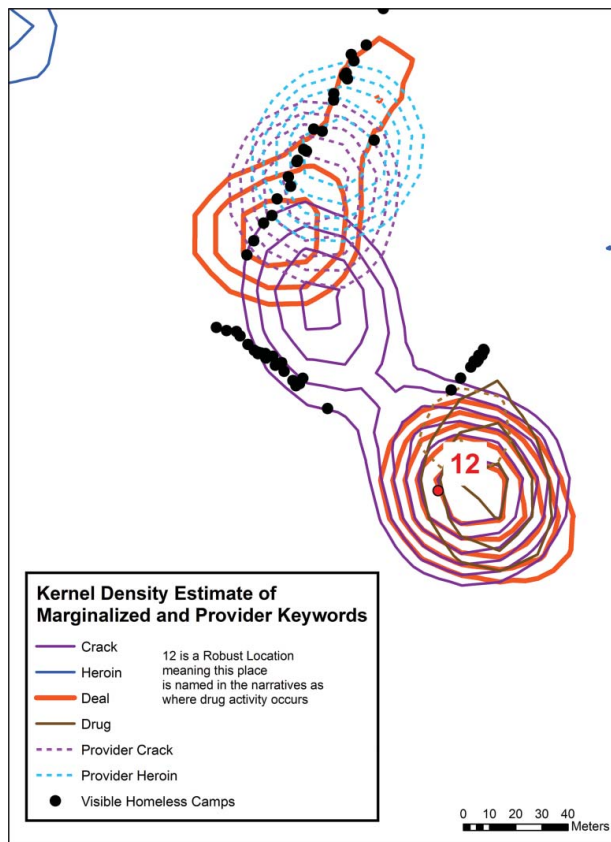
## Discussion

In this article, we sought to gain a fresh perspective on the overdose situation in SR by using the experiences of SH and P participants as a resource. In this way, the spaces and places causing and created by drug activity can be mapped and set within a broader social, physical, and emotional landscape. Our analysis of the experiences of both SH and providers revealed a complex cartography made up of drug types and dealer and user locations. To use this map as a tool for harm reduction, we overlaid and compared known drug locations onto the key word hotspots. The level of



**Figure 5.** One of the most notorious corners in Skid Row with a reputation for both drug dealing and violence. (Color figure available online.)

agreement was high, suggesting that mapping key words in this way can be an effective method to identify drug-related spaces. This is useful as these maps also reveal several lesser known, more ephemeral spaces (“those tents . . . these people . . . along here”) that could also indicate where overdoses will occur. In this regard, we are successful in achieving our goal, and this map can be used to target Narcan distribution. The SVG approach, however, goes further than just identifying locations, because it can be used to help explain why these spaces exist, how they change, and how they can be changed, all of which pushes us beyond a response strategy to determine how conditions for the SH can be made better. For example, the maps in Figures 1 through 6 are temporally variable, from day to night or from week to week. Some locations are spatially stable, such as the corner the drug dealers operate, whereas other locations fluctuate based on outside interests, policy change (and policing), or drug type. For example, Spice Alley emerged as an area (and drug) of concern during the period of SVG collection. Although the intersections between



**Figure 6.** A well-recognized complex drug space involving different drug types and dealing locations. (Color figure available online.)

[A] and [D] or [M] and [B] are both known for heroin, their activity (and therefore overdose risk) varies because the first has more traffic because it has less of a police presence. Other external influences include those who bring drugs in, store them, and then sell through another level of the same “organization” or through affiliates.<sup>25</sup>

Onto these factors are layered the spatial patterns of use, as drug users will often congregate around and even sleep near their preferred drug dealers. Indeed, drug types cluster for a variety of reasons, not least being those on “uppers” do not mix with those on “downers.”<sup>26</sup> The SH living in SR are not the only client base, either, with other homeless coming into “the box”<sup>27</sup> but leaving before nightfall, and even non-homeless (often described as middle class and white), who see SR as being an easy and safe place to buy drugs. Given all this variation it seems obvious that there can be no one homogenous “solution” for SR.

Throughout this article, we have described various forms of structural violence, from the warehousing of the marginalized within this area of Los Angeles (and

its subsequent emotional and physical toll) to the street sweeps and arrests that can deprive people of medication and reduce drug tolerance. This is only part of the violence the SH experience on a daily basis, however (DeVertueil 2015). In addition, there are multiple examples of interpersonal violence. Being disrespected, not paying what is owed, stealing to gain drug money, robbery of drug money, turf issues, and sexual violence all contribute to a landscape of violence where victims can also be perpetrators (Bungay et al. 2010). Although these locations can be mapped as we did with drug use, with certain corners, buildings, streets, and alleys all being known as trouble spots (Blomley 2003), the reality is that anywhere in SR can quickly become problematic. To survive it is imperative to be able to read any situation, with different narratives likening the experience to being in prison, not disrespecting, not allowing oneself to be disrespected, knowing who to “hang with,” and how to read situations.<sup>28</sup> Indeed, although not as relevant to SR, this supports the findings of others that “homeless solutions” including exclusion are likely to cause harm by forcing the marginalized into unknown street settings (McNeil et al. 2015). Just as we described with our drug map, violence becomes even more intense at night, so much so that many SH leave when dusk falls. The map changes, too, with some streets filling with SH to the point of being impassable,<sup>29</sup> especially after the parks close and the shelters shut.

Therefore, it is not surprising that living in SR can create a vicious cycle of stress, leading to or exacerbating mental illness, which further fuels the desire for drugs. To break this cycle not only involves immediate reversals as with Narcan but finding how and where to make living better. The narratives are full of this understanding of the impact of drugs: how they change personality, behavior, and social ties,<sup>30</sup> causing loneliness, sadness, and feelings of hopelessness. The worst of these experiences are the overdoses: “Yeah, its depressing, depressing to see your friend die, especially overdosed,” and “Instead of listening, you can always do more but you never could do less.” This despair deepens as many feel as though SR is getting worse. The SR shelters are known for dealing drugs and violence and the number of toilets in SR has been seriously reduced, even more so at night after the parks are locked, because of their association with dealing and prostitution. Even some of the sanctuary spaces, which had offered a degree of normalcy such as TV watching,<sup>31</sup> have been lost to the activities of a spreading drug culture.<sup>32</sup> There is constant trepidation

regarding the raids and street sweeps, which are explained to them as being “justified” because of a few locations dealing and storing drugs. During these sweeps, objects with emotional attachment, medications, and Narcan can all be lost.

So how do these additional social and spatial insights help us in terms of addressing overdoses? Although the mapped locations of drug pathology can help in terms of targeting Narcan and an understanding of the fear, emotional stress, and potential willingness to improve their living situation might help in designing more culturally appropriate strategies, it is actually the positive aspects found in the SVG that might provide the greatest help. SR has many sanctuary spaces, such as the Hippy Kitchen, that provide both sustenance and a safe, friendly environment. There are also less well known mechanisms that the SR use, however, including hidden personal safe spaces where each SH can temporarily remove himself or herself from the stresses of the area. Friendship, companionship, and community are also vital, and it is the potential loss of these through drug use (especially overdoses) where a common ground with intervention might be found. SR is composed of multiple small communities, sometimes along a street segment or just a few tents. The social fabric that binds these communities might sometimes have a drug origin (similar users living together), but just as with other studies focused on homeless communities (Sparks 2016, 2017; Speer 2016), there is a sense of “this is my home, my space,” where friendship, care, and support exist. People look after each other, they check in on one another, and they claim spaces that are identified as theirs, even if it is a section of sidewalk. These sanctuary spaces and communities should be seen as a resource in SR. Indeed, HHCLA-HRC have already recognized the importance of these networks to deliver both health-related messages and Narcan kits.<sup>33</sup> These communities become their own first responders, often being the only ones available who can save a life. This is coupled with a genuine feeling of wanting to look after each other and therefore being part of the solution to the problem that surrounds them. The SVG approach described here can facilitate this approach by being showing not only where drug activities occur but what communities exist around and how best to work with the SH. The benefit over existing approaches is that this method that can be formalized, applied anywhere, and not be vulnerable to the loss of institutional memory.

In summary, the SVG approach can be used to support more effective outreach by identifying the important

locations where overdoses might occur and using the insights of those affected and the locations and social fabric of local communities to target effective interventions. As an illustration of how this might work, consider a cluster of spice overdoses in 2016 that occurred around [C] and [B]. This location was identified on the SVG map for dealing, crack, and meth and being proximate to Spice Alley, where spice dominated. Even though the narratives were collected between one year and six months before these overdoses, they had already begun to identify where spice was emerging. The narratives had clearly outlined the danger of the drug and the impact it was having on some SH. We are not saying that the map could have predicted or stopped the overdose outbreak from happening, but it might have helped lessen the severity of its occurrence.

Limitations to this study and its subsequent adoption as an intervention tool include the challenge in finding marginalized individuals willing to participate, especially given a common feeling of distrusting any “official” strategy. For collected SVGs, spatial bias might occur on some rides when participants are too worried to travel along certain road segments, which might also correspond to where drug pathology is particularly active. It is possible that some participants make erroneous statements based on what they believe the researcher wants to hear or exaggerating events and not remembering exactly where an event happened. Without multiple participants, there is always a danger of relying too much on a single interpretation of events. In terms of analyzing the SVG, there is potential error in analyzing all key words with the same weight, because not all mentions are spatially specific. The selection of key words has the potential to change hotspot maps, and there is little guidance in the literature with regard to what drug names and alternative street nomenclature should be included (indeed this will change with study location). The final maps are also spatially and temporally sensitive, because many conditions are fluid and there is a danger in using old data as a guide to future interventions. Finally, the data manipulation used in this study requires expert knowledge and as such makes it less than an ideal intervention tool. Although each of these limitations was addressed in this study, next steps are needed to further explore how best to account for context within spatial data and to develop data guidelines so that the method can be adopted across multiple environments. In addition, user-friendly (and nonexpert) software is required for the easy dissemination of video, mapping, and SVG manipulation.

## Conclusion

Marginalized populations have been studied from a variety of different perspectives, including the nexus between geography and drug use (Moore and Dietze 2005; Rhodes et al. 2006). We have advanced this literature by taking the first step toward understanding the spatial complexities of drug pathology in SR. We have again verified that the SH are spatially attuned to the ebb and flow of the microspaces through which they must navigate daily. In so doing, the SH also present a valuable resource in any strategy designed to reduce the number of overdoses. We argue that by using spatially varying stimuli to aid recall, we can identify microspace patterns that might prove invaluable to guide how and where to target intervention, such as where to distribute Narcan kits. We acknowledge the risk of a pathological focus enforcing stereotypes, so we have balanced the public health need for better data by including a more contextualized approach to data creation and interpretation (Cummins et al. 2007; C. Duff 2012, 2014). In so doing, we have also developed an approach that can be used to get ahead of new and potentially even more destructive drug trends.

What are the next steps? How else can geospatial approaches improve our understanding and outreach in SR? SVG can be combined with social media mining to reveal activity patterns of the marginalized (Blondell et al. 2017) and help connect providers into these networks.<sup>34</sup> It is not hard to imagine how an SVG–social media mix could provide both breadth and depth (Higgs et al. 2007), identifying how and why marginalized spaces exist and how they change and move. The SVG presented here can be further mined for insights into community health challenges and a more specific look at violence, especially gendered violence, all of which can be vital in developing a more comprehensive health strategy. Because SR is always in flux—camps move, drugs change, police strategies adapt, new policies are introduced—and as both SH and the dealers cycle, there is also a need to make these types of data collection ongoing. Ideally SVG collection could become part of a standardized data collection protocol. These data can provide a window into SR but also a way to capture the longevity of the SH experience. An illustration of what might be achieved came with the prediction of the spice overdose outbreak, but the speed of collection and analysis, and therefore support for effective intervention, depends on available resources. To move toward these goals, we are currently

developing software that improves SVG mapping and analysis. In addition, this software requires no spatial expertise, which is vital so that these types of tools can be used by all interested parties. The hope is that SVG could become part of near-real-time intervention strategies. Currently (but not typical), an SVG lasting one hour could be turned into a useful map within five hours (one hour of map making plus the time taken to transcribe the narrative). As voice recognition software becomes more advanced, and with the possibility of tailoring this code to include time stamps, it is possible to imagine that the ride-to-map process could be reduced to two hours. This would open even more response possibilities to emerging public health concerns, such as tuberculosis or other infectious disease outbreaks.

## Acknowledgments

The authors thank Homeless Health Care for their guidance and continued work in Skid Row; Eric Shook for developing the prototype geonarrative code that made this type of work possible; students in the GIS Health and Hazards Lab; Jacqueline Curtis for reading early versions of the article; Kenneth Wilson for his work with the homeless; and Martin Kennedy for being a supporter and inspiration.

## Notes

1. See <http://abc7.com/news/14-skid-row-overdoses-in-3-days-from-new-ingredient-in-spice-rescue-mission-says/1307527/>.
2. Accurate data on overdoses are difficult to obtain in any location. Police calls, Narcan use, medical 911 calls, hospital and clinic admission data, or the coroner's office all might have overdose-related data, much of which are not cross-referenced or shared. This means being able to understand that a developing problem, especially through mapping, is extremely difficult, even if the victims have known addresses. The combination of all of these factors means that there is no alternative mapping strategy available to the one proposed in this article.
3. It should be noted that Housing First approaches vary geographically and as with many "solutions," there is debate surrounding their effectiveness in terms of concept, implementation, and outcomes.
4. "They are totally trying to gentrify, and you know kind of use reverse broken windows theory, where like if we make it look nice then it will be easier to get these people out of here. They do sweeps on Fridays so they can hold people til Monday, and then they will release them in Long Beach at like 2 a.m. and they will overdose 'cause they didn't use for three days so their tolerance changed." (Health provider)

5. "It's out here twenty-four hours a day. You ain't got the neighborhood watch, which always want to harass you and call the police, 'Hey it's (twelve o'clock) you got three guys over here on the corner standing around, look suspicious.' . . . but see down here, all you got to do is walk, you going to get what you want. You can wake up, two o'clock in the morning, they out here all night long (24/7) . . . so whatever corner you turn, you going to find it. And drugs play a big role in that. That's basically why we're all still homeless. Yeah, 'cause we cannot afford to support our habit plus rent . . . your body needs it, it depends on it and if you don't get it, you get physically ill, it's not in the brain either, it's not psychological . . . your body depends on it, and you vomit, you can't eat, you shake, you shiver, you got chills you got fevers, you're basically miserable—trust me and I was hooked on heroin for a while, you will do whatever it takes, no matter how bad, demoralizing, or illegal it is, so you don't feel that way."
6. "About two weeks ago a guy died right there in a wheelchair, this old guy, and he took a hit of crack and just had a heart attack and died right there. It took two hours before the coroner came and we're all just looking at his dead body. Nowhere else would they leave a body in the street but down here, right? And the impact that it has on anybody that walks by, like the message is clear, you can literally die in the streets down here and don't nobody in LA give a shit about it, and we are going to leave your body in the street until we get to it, cause you guys don't count, we don't care about you." (Provider)
7. A further benefit of this approach is that the individual might also feel more at ease in his or her environment, especially if precautions are made to minimize the identity of the subject. The vehicles have tinted windows, the windows are rolled up, and the car drives at normal road speed. The cameras have a very small footprint and if positioned correctly in the corner of the window are extremely hard to see from the outside.
8. This was in accordance with what was passed by the institutional review board.
9. It is understandable that there is concern with regard to how information from these rides is used. We believe that insight into the social and spatial structures of the marginalized could prove invaluable insight for effective health outreach. None of these findings would ever be supplied to law enforcement.
10. The initial rationale for data collection was to gain an understanding of the health situation in SR, more specifically responding to recent tuberculosis and sexually transmitted infection outbreaks. The spatial video interview technique is freeform, however, and encourages discussion about any topic deemed important by the participant.
11. The original computer code was developed by Eric Shook, Department of Geography, University of Minnesota.
12. The size of this window will result in heat maps showing localized patterns (along one street) to more generalized areas (the whole of SR).
13. Provider rides were employees and volunteers who worked in health care, housing, and food distribution in SR.
14. "That corner is owned and operated by the DDs (a proxy name we use) and they hit that corner every frigging day. . . . I don't even like walking down this corner, you know it's wild, and not only that there's a lot of crime, a lot of violence on that corner, too. It happens more so than other areas and when it does, you can pretty much bet it's over a drug deal gone wrong, cause the XXs don't play."
15. "[L] park ain't nothing but dope dealers in there and people financing it and you will never, ever see a cop in there."
16. "You know how many times I've bought dope on those steps, sometimes smoke a little bit of it, too, well what better place to do it, right under their nose they'll never see you. This wall along here, even though it's connected to the police station, is notorious for people hanging out and selling crack. When I used to smoke crack this was my favorite spot to come, I'd go sixteen blocks out of my way just so I could smoke right here, I wouldn't smoke anywhere else, I don't know why I felt comfortable there and felt safe but I did . . . it was weird."
17. "But I don't know if you've been down there by the X mission and all that, it's really, really crazy, I mean literally crazy, insanity. Going to the bathroom, it's wild man, it's the only place I know in the world you can use the facilities and take a shower, buy your dope, do your dope and get robbed all at the same time, you don't even have to move. It's just a dope spot, it's a huge, huge dope spot."
18. "This is where most of our overdoses are, [C] and [J], and [C] and Town, here and right there. Well we give out our (Narcan) kits and if they use them on somebody they come tell us about it and we give them another one. And then also [D] and [K], over by the police station." (Health provider)
19. "Yea, these tents are used for dealing and they store their drugs in the tents from the distribution centers where they get more drugs and take them back out to where they are selling."
20. "There are some that are called jump outs and basically they'll be in an undercover car and they'll just roll up to a tent and literally jump out of the car, swarm the tent, guns drawn. Make you all come out of the tent, they'll search everybody, search the tent, check everybody for warrants or if they're on parole."
21. "See that corner right, the tents we just passed back there, they just got busted like last night . . . well they be hanging out like wet clothes right there, that is a hot spot, a very hot spot, (for) everything."
22. On crack users: "They are all dirty," these "dope fiends," "look how dusty they looking, they sucked up in the face. Like skeleton their jaw is all sucked in." On one ride the subject started to become nervous, telling the driver to keep up his speed because "so now you're in like a lot of desperation. I don't know if you can kind of feel the energy's changed. The vibe is different, they definitely like looking at the car, but this is how it used to be."
23. Three different KDE kernel or window sizes were chosen to examine variations occurring with distance; only the middle, 50 meters, is presented in this article.
24. These maps also display visible camps from the first spatial video ride in September 2014. The location of

daytime camps suggests considerable variation across the different streets of SR, with intensity varying from one block to another and even from one side of the street to the other.

25. Outside dealers once made the mistake of dressing too well, but now they “camouflage” themselves, “so basically they started switching up, wearing plain t-shirts, jeans, tennis shoes, blending in, looking like the area.” Participants, however, could still tell outside dealers by their shoes. Another visual and audio cue are the way dealers “post up,” which means the way each walks, holds himself or herself, and what is shouted out.
26. “Because crack users and dope fiends don’t like each other. It’s totally different (kind of high) and if you’re on heroin you don’t want to deal with a crack head or a meth smoker bouncing around being paranoid and stuff. They are just trying to sleep basically.”
27. A commonly used phrase to describe SR.
28. “You gotta know the streets, ‘cause if you know what you doing, ain’t nobody going to fuck with you. (How long does it take you to learn the streets?). Not long at all. Pretty much, keeps me alive. [A] street is one of the streets that’s very dangerous to be on. A lot of people have nothing to live for. Some do, those who do I advise them to keep on living . . . those who don’t, I don’t fuck with them . . . experience is the best teacher, man.”
29. SV rides were also conducted at night and during the very early hours of the morning to capture this nighttime change.
30. “It varies certainly and there are degrees of homelessness and degrees of drug use. The more drugs a person uses, unless it’s marijuana, that’s pretty social. Crystal meth, heroin, and crack cocaine, those are isolating drugs, people use those on a regular basis, will often isolate to primarily be alone. If they communicate with any other people, it’s usually other users who use what they use, to get more. Many people prefer to isolate if they are using any of their drugs.”
31. “It’s not going to make the headlines but there’s so much good that goes on down here. The true good people, they shine out over everybody.” Homeless Health Care was identified: “There’s not a person that doesn’t volunteer in there or work that does not care, even the ones that have never stuck a needle in their arm in their life, never smoked a joint, but they’re there to help, they care. They got time for us.”
32. “I miss when you could go in there and hang out and be safe from everything. A lot of people liked that. People started selling drugs so it was shut down. Now nobody can go in there, so you get your needles and leave. Shitty people ruined it . . . it was nice to have a place to go sit down and watch TV and talk, chill, feel safe.”
33. “And everybody shares drugs down here, everybody shares resources, everybody shares clothes and food. You’d think they’d be super stingy with it, but it’s the opposite, so when I do their overdose training I’ll give them two (Narcan) kits, like this one is yours, you go give this to somebody else ‘cause otherwise they will split it up.” (Health provider)
34. “I mean we usually know where to find people, like either that corner or that corner like they might go to that corner

to get their drugs but then they hang out at that corner but it’s usually not very far.” (Health provider)

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