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The geography of drug markets, drug crime and systemic gang violence—Open drug scenes in Sweden

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ABSTRACT

Introduction: Drug market related violence has plagued Sweden in the last decade and has geographically been linked to open drug scenes, ODSs. Surveys have been used to identify ODSs in local police districts in Stockholm County since 2017. The present study analyzes how ODSs and hot spots of police-reported crime relate to geographical indicators of systemic drug market violence.
Method: Drug hot spots are identified using clustering methods. Drug hot spots and ODSs are then both geographically matched with markers for organized crime to analyze the extent to which they can serve as geographical markers for systemic drug market related violence. The markers for organized crime employed are shootings and organized crime related activities described in court cases that include encrypted phone texts.
Results: Our findings suggest that drug hot spots are a rather weak predictor of systemic drug market related violence, whereas ODSs function reasonably well, particularly in the case of ODSs in areas with an established presence of criminal networks.
Conclusion: Measuring drug market locations is complex, but drug market related violence can be understood geographically by linking typical gang-related crimes to places with open drug scenes.

Introduction

During the past decade, Sweden has seen a surge in gang violence driven by gangs involved in the drug trade. The country has gone from being a fairly peaceful country to become one of the worst in terms of gun homicides in Europe (Hradilova Selin et al., 2023). The increase was initially almost exclusively driven by developments in poor neighborhoods (BRÅ, 2015) and among men under the age of 30, mirroring the rise of criminal networks in deprived neighborhoods (Sturup et al., 2019). The trend has also been exacerbated by a large increase in the use of explosives. In 2016, the number of detonated hand grenades peaked at 36 (Sturup et al., 2020), and in 2018 the police started recording statistics to track the number of bomb attacks, with 129 detonations being registered in 2024 (Polismyndigheten, 2025). To understand these developments, it is important to understand the driving factors behind this violence. Narcotics constitute one of the biggest sources of income for criminal networks, and the street distribution of drugs often goes hand in hand with the presence of gangs, violence, and a reduction in perceived safety among those living in the areas concerned (Magnusson, 2020). Locations where drugs are openly sold and used have very high concentrations of gun violence in Sweden (Gerell et al., 2021; Magnusson, 2022), which mirrors previous findings from the US showing an association between drug markets and violence (Ousey & Lee, 2002; Reuter, 2009). Violence constitutes a focus for many policy initiatives in Sweden, and identifying and understanding drug markets has become a core issue, mirroring a similar increase in attention at the EU level (see Liem & Moeller, 2025). Since 2017, the Swedish police in collaboration with other authorities have developed tools to track and analyze drug markets, which we refer to as open drug scenes, ODSs. Establishing a joint definition and operationalization of what constitutes an open drug scene is considered key to such work (Grønnestad et al., 2020). Locations of drug distribution and use have been labeled open drug scenes, ODSs, by Swedish police since 2017 when the term was defined as part of a project to adopt a common definition that would facilitate collaboration between and within crime prevention actors such as the police, municipalities, and county administrative boards (Magnusson, 2022). The definition states that an open drug scene is a “a geographically durable place where the use and dealing of drugs takes place in public and is conceived as problematic by authorities and/or the public” (Magnusson, 2020). These locations are referred to in some countries as open drug

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markets, open air drug markets, or just drug markets.

In the present paper we compare a systematic, practitioner-based method for scanning and mapping drug markets to a commonly used technique based on crime data. The comparison shows that the systematic tools employed to identify ODSs outperform the use of police-reported drug offences as a proxy for drug markets and the overlapping gang violence that occurs in the form of shootings and organized crime activities. Organized crime activities and gun violence are both considered to constitute viable proxies for the systemic aspects of drug market related violence. Employing systematic methods to identify and track ODSs may therefore also be considered a geographical approach to understanding systemic drug market violence. The focus on methods of scanning crime problems is crucial to crime prevention and to the targeting of high-crime locations such as drug markets in order to achieve better effects. The method could also be adapted to the situation in other countries to facilitate the development of improved insights into the geographical footprint of open drug markets and drug related violence across urban areas in Europe.

Background

Crime is strongly clustered in space, and this clustering can to a large extent be understood in terms of the environmental backdrop. Gun or gang violence is often linked to deprived neighborhoods (Kraviz-Wirtz et al., 2022), and among gangs, retaliation can fuel waves of violence (Gravel et al., 2023). Street-corner drug sales provide a typical location for such violence (Ratcliffe & Rengert, 2008), and the association between drug markets and violence is well established, although its intensity varies greatly across different types of drug markets (Reuter, 2009).

According to Goldstein's (1985) model, drug market related violence can be divided into psychopharmacological, economic compulsive, and systemic. Psychopharmacological violence refers to the way some drugs may make you more violent, whereas economic compulsive violence refers to the need to commit crime/violence to pay for drugs. The systemic aspect relates to the production, distribution, and consumption of drugs. This includes "territory disputes between dealers, turf wars, robberies of drug dealers and subsequent violent retaliations, punishment for selling low-quality drugs, elimination of informants, cancelation of debt by punishment" (Liem & Moeller, 2025). In the present paper we are mostly interested in this systemic aspect and therefore focus on criminal activities that can be linked to criminal networks. This largely corresponds to the local and national aspects of the extended model of drug market related violence described by Liem and Moeller (2025).

In major Swedish cities, residents are regularly surveyed about whether they have observed drug dealing in their neighborhood, and findings indicate large differences across neighborhoods, with more than half the population of some areas reporting having seen or been bothered to some extent by drug dealing (Stockholms stad, 2025; Polismyndigheten, 2025a; Gerell & Ellberg, 2020), which constitutes a clear indication of the "open" nature of the drug dealing in these areas. In 2017, 67 % of the residents in the worst affected Stockholm neighborhoods reported being a little or very disturbed by drug dealing (Gerell et al., 2020, p.139), and there is a strong association between perceptions of drug dealing among the public in Stockholm and the presence of ODSs (Magnusson, 2020; SSR, 2025). The surrounding community is typically negatively affected in multiple ways, with crime and disorder, littering and feelings of unsafety being among the more common consequences (Saberi Zafarghandi et al., 2019; Weichselbraun et al., 2024). ODSs fulfill a specific role precisely because of their openness, which may be viewed as facilitating both the marketing of drugs and the exertion of gang control, since these are more possible at such locations than elsewhere.

A very strong concentration of violence and gun incidents has been noted at open drug scene locations in Sweden (Magnusson, 2020, 2025; Chrysoulakis et al., 2025). The pattern is particularly pronounced when ODSs are situated in neighborhoods that the police have labelled as vulnerable due to the presence of criminal networks, with one study finding that levels of gun violence were at least 12 times higher at such locations than comparable non-ODS locations (Gerell et al., 2021). It has also been shown that the absolute risk for a new shooting at an open drug scene in a gang neighborhood can reach an operationally meaningful level in the period following an initial shooting, with 0.4 and 0.23 follow-up shootings within 400 m and 4 weeks of an initial shooting in the cities of Malmö and Stockholm respectively (Gerell et al., 2021). In another study, the use of ODS locations was shown to enhance the ability of a data driven model to predict areas affected by gun violence (Magnusson, 2025).

Retaliatory violence can be interrupted, however, for instance by making an arrest (Wheeler et al., 2021), and sending officers to open drug scene locations characterized by violent incidents is therefore a viable option. It has also been shown that targeting gangs can reduce violence (Dominguez, 2021; Chalfin et al., 2021). When adding drug markets to the picture of gang violence, the issue becomes more complex however, as police interventions to disrupt drug markets in some cases tend to increase rather than decrease violence (Werb et al., 2011; Moeller & Hesse, 2013). There are several examples of cities successfully combating problems associated with open drug scenes, but due to the complexity of the problem it is necessary for several actors and interventions to be combined in order to achieve success (Grønnestad et al., 2020).

The authorities in Stockholm conduct an annual mapping and analysis of the number of ODSs, their locations, and crime levels in these areas in the Stockholm County region, with the number of ODSs and their impact showing a steady decline since 2022 (SSR, 2025). This method for identifying ODSs differs from typical crime hot spot analysis, which in general relies on offences reported to the police (Telep & Hibdon, 2017). When police recorded offences are used, crime counts are often viewed as corresponding to a true representation of (citizen-reported) crimes. The reporting of drug crimes, however, largely consists of crimes detected via the presence and prioritizations of the police. Where there is high presence of police resources there will be a higher level of recorded drug crimes. The police detect drug crimes at known places for drug use, such as drug markets, bars, or concerts. A fair amount of drug offences is also detected in the form of secondary findings during the investigation of other crimes (Egnell, 2023). In Sweden this has previously been shown to occur in relation to the investigation of weapons offences (Chrysoulakis et al., 2025) and traffic offences (Ceccato et al., 2023). Identifying ODSs based on hot spots of reported crimes is therefore problematic, and may be subject to multiple reliability issues, as opposed to crimes such as violence, where police reported crime counts provide an imperfect, but reasonable estimate of crime hot spots.

In order to reliably identify and understand drug markets it is therefore necessary to employ other sources of data. The Stockholm police method is based on expert knowledge among local police officers and municipality workers, who complete an annual survey on open drug scenes.

In the present paper we will compare the drug market locations that emerge when reported drug crimes are used as the identifying data with those identified using the Stockholm method of surveying ODSs. We will then proceed to analyze the two types of drug market locations in relation to shootings and organized crime activity in order to assess the extent to which they can be used as geographical proxies for systemic drug market related violence.

Method and data

The present study focuses on Stockholm County, which has about 2.5 million residents (Region Stockholm, 2025). We employ two different methods to identify drug market locations. The first method uses density analysis and clustering to analyze hot spots of police reported drug crime as a proxy for drug markets. The second employs systematically collected ODS data as a proxy for drug markets. In our main analysis we then match both drug market data sets with data on gun violence and organized criminal group activity to assess the extent to which the respective methods appear to adequately capture the geographical footprint of systemic drug market related violence at the local/national level (e.g., Liem & Moeller, 2025). We also consider whether there are differences between ODSs in vulnerable areas and other locations, since previous research has highlighted this as an important factor (Gerell et al., 2021; Magnusson, 2022). The data are briefly outlined below.

Data

The main data source for this study is the open drug scene survey. This involves mapping open drug scenes on a GIS dashboard based on the operational knowledge of police and municipality representatives. The method also includes a dashboard survey, that is linked to the locations, and which includes questions on 22 themes, generating approximately 100 variables on the types of drugs being used or sold at the location, the types of problems that characterize the location, the actors present, and the characteristics of the surrounding environment. The police officer charged with coordinating the exercise alongside local municipality representatives is often the "municipality police officer" – an officer specifically tasked to collaborate with the municipality. The data collected for this study consist of the ODSs that have been mapped for each of the years 2019 to 2024 as polygons ($N = 365$), with the primary focus of the analysis being directed at 2024 ($N = 53$). This study uses only the ODS polygons as a data set on drug market locations. The other information from the survey is not included.

The secondary drug market data, in the form of police reported drug offences, was collected from the police. These data comprise recorded drug offences for the year 2024 ($N = 37{,}609$) in the region of Stockholm. The drug offences included are drug use (crime code 5010), possession (5011) and drug dealing (5005). Together, these three offence codes account for about 90 % of drug crimes in Stockholm County. The crime data consists of geographical coordinates, crime code, date, and time and have been geocoded in the form of point data for further analysis.

Our independent variables are vulnerable areas, shootings and organized crime activities. Data on vulnerable areas were retrieved from the national police, and capture residential neighbourhoods in which criminal networks affect the local population (Polismyndigheten, 2023). Data on illegal firearm discharges (shootings) were delivered separately by the Stockholm County police, since these comprise multiple offence codes and cannot easily be extracted from reported crime databases. The shootings register for Stockholm was provided by the police, with geographical coordinates rounded to the nearest hundred meters, and includes variables on coordinates, time, date, and the number of injured and fatalities. These data cover the period 2019 to 2024 and include 755 shootings. It should be noted that in Sweden, gun violence is largely associated with criminal networks, and as such is a reasonable proxy for systemic violence.

Organized crime locations were retrieved from the Omega database on court cases linked to the use of the encrypted chat applications Encrochat, Sky ECC or An0m (See Ursing et al., 2024 for a description of the data). Students working in this OMEGA project have coded all criminal activities, and when available the location of these activities. In total, the dataset includes 3335 activities linked to organized criminal groups, 1202 of which took place in Stockholm County. Of these, 528 included sufficient information to identify the street ($N = 132$) or the street and street number ($N = 396$, spread over $N = 144$ unique addresses). When no street number was available, the location was coded to the centroid of the street. These 528 locations were identified in a total of 49 court cases covering 228 offences. Narcotics was the most common offence category ($N = 145$), followed by weapons offences ($N = 35$), money laundering ($N = 15$) and violence ($N = 13$, including 1 homicide and 6 attempted homicides). The municipality of Stockholm was by far the most common municipality ($N = 83$), but a further 18 municipalities in the Stockholm region were represented to a lesser degree. It is important to note that these data focus on activities linked to organized criminal activity, but that multiple activities may be linked to the same crime event. Someone may for instance have delivered a gun (activity) to someone else who stored the gun (another activity). It should also be stressed that this is a sample from court cases, and as such cannot be viewed as representative of organized criminal activity (OCA) more generally, which is often undetected by authorities. Nevertheless, since many of the offences discovered via the encrypted chats would otherwise have remained unknown, these data may exhibit patterns that differ from those found among regular police reported crimes.

Results

In the first step we conducted a cluster analysis of areas comprising at least 100 drug crimes, employing a density-based clustering, based on point data. Our preferred cluster size of 100 m resulted in 21 clusters (referred to as hot spots) across Stockholm County, which together accounted for 35 % of the reported drug crimes ($N = 12{,}948$). In Fig. 1 these are displayed in green, with the survey-based ODSs for 2024 highlighted in red for comparison. In this step we found that 26 % of the ODSs intersect with drug hot spots, while 43 % of the drug hot spots intersect with an ODS (See Fig. 1). One hot spot, the northernmost, is an outlier, with around 3000 more recorded drug crimes than any other drug hot spot. Fig. 1 shows the locations of the ODSs and drug hot spots, with some locations overlapping, while others emerge on the basis of data from only one of the two methods employed. For both methods, the identified locations broadly follow population density, with the center of the map representing Stockholm City, while the southwestern most part of the map represents the municipality of Södertälje followed by the municipality of Botkyrka to the northwest. The map also shows some of the natural geography of Stockholm, which is located in an archipelago. Waterways are shown in darker colors.

Exploring the local geography of each cluster reveals that they are of very differing types. Almost half ($N = 10$) the clusters intersect with open drug scenes, and the remaining clusters can be divided into three categories, postal service points, police stations (with cells) and known nightlife or event areas, as shown in Table 1. Below we will briefly discuss each of these location types.

The strong clustering of drug crimes to postal distribution points is a relatively new development which we will explain further in the discussion section. Another recurring pattern among the hot spots of police recorded drug crime is an association with the location of police stations. This may reflect recovered drugs being recorded there when no address is available but it may also be related to the presence of detention cells where suspects are held in custody. At these police stations, body searches are conducted before placing a suspect in a cell, which at times involves finding drugs. Either way, a lot of drug crimes are recorded at police stations, but this is not a reflection of their being drug markets. The fact that postal service points and police stations have high levels of police reported drug offences highlights the weakness of using police reported drug crime as a proxy for drug markets.

In some cases, inner city ODSs overlap with drug crime hot spots, but only partially, as shown in Fig. 2. The green drug crime hot spot largely overlaps with an underlying ODS, the blue drug crime hot spot partly overlaps an ODS, and the orange does not overlap at all with an ODS. All three of these locations are located in densely populated areas with public transport hubs. Clusters which do not overlap with either an ODS, a police station, or a postal distribution point (such as the orange example in Fig. 2) were typically characterized by drug offences reported in the evenings and late at night, which corresponds to the presence of nightlife in these areas.

To sum up, density-based clustered hot spots of police reported drug crime vary in the extent to which they may be related to systemic drug

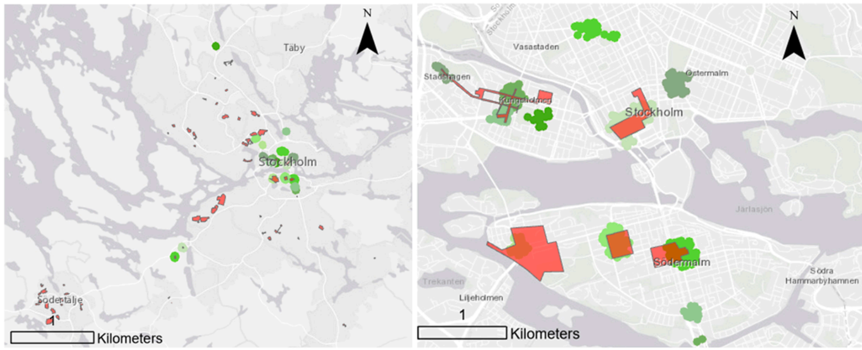

Fig. 1. ODSs in red and drug crime density based clusters in green in region of Stockholm (left) and zoomed in to innercity area (right).

Table 1
Drug crime Cluster type, mean level of police reported drug crime and area.

Cluster type	N	%	Mean level crimes	Shape area mean
ODS	10	48	318	67,398
Post terminal	4	19	2134	1688
Police arrest	2	10	145	22,097
Night life	4	19	190	36,910
Big event site	1	0,5	178	3788
All	21	100	617	41 470

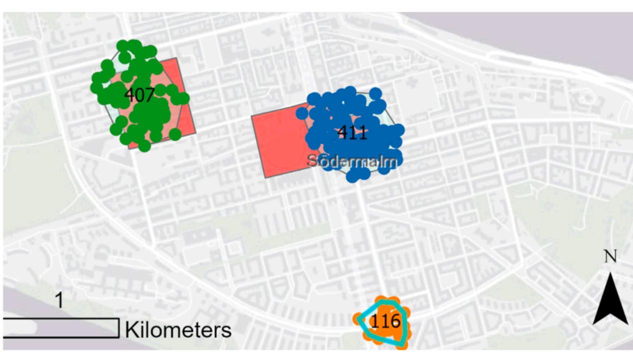

Fig. 2. Three drug crime clusters in innercity, Södermalm, Stockholm in green, blue and orange. Where the two northern ones are overlapping ODS (in red polygons) and the orange one marked with turkose is not.

related violence. While some may well capture the geographical locations of such violence, others arguably do not. Postal service points and police stations, for instance, are not locations typically identified for having an issue with drug market related violence. Below we will explore this more explicitly by comparing hot spots of police reported drug crime with ODS locations with regard to shootings and organized criminal group activity.

There were 53 registered ODSs in Stockholm County in 2024, more than twice as many as the hot spots of police reported drug crime. The ODSs comprise a total area of 673 hectares compared to the drug crime hot spots, which comprise 87 hectares. Next, we will consider the extent to which the different operationalizations of drug markets show a relationship with organized crime activities and shootings, viewing these as proxies for drug market related violence. As our drug crime hot spots are much smaller than our ODSs, we also analyze a larger categorization of drug crime clusters, using 500-meters rather than 100-meters as the cluster cut off, which results in 35 clusters. We also test increasing the size of the ODSs by adding a 200-meter buffer, thus testing two sizes of drug hot spots and ODSs respectively, see Table 2. Based on previous research, we also divide the ODSs into whether or not they are located in "vulnerable areas" (gang areas) (Gerell et al., 2021; Magnusson, 2022).

Table 2
Indicators of organized crime and drug market related violence for drug hot spots and ODS in 2024.

2024	N	Shootings N	Shootings / 1 M sqm	OCA N	OCA / 1 M sqm	Area
Drug crime hot spots 100m	21	1	1.1	1	1.1	870 863
Drug crime hot spots 500m	35	41	.41	250	2.5	101 344 240
ODS	53	8	1.19	66	9.8	6 732 384
ODS+200 m buffer	53	13	.41	153	4.9	31 346 700
ODS in Vulnerable Areas	24	5	1.43	53	15.1	3 515 504
ODS not in Vulnerable Areas	29	3	.93	13	4.0	3 216 880

As can be seen from Table 3, there was a lot more OCAs per area in the ODSs than in the drug hot spots, and for both the drug hot spots and ODSs, the number of OCAs per area decreased when focusing on the larger areas. The pattern of higher levels of OCA in ODSs is particularly pronounced for ODSs in neighborhoods that the police have labeled as vulnerable. Since we have already shown that the drug hot spots are an imperfect way of identifying drug markets, this is perhaps unsurprising, but nevertheless it is important to point out. For shootings, the patterns are in the same direction, but the differences are much less pronounced. Whereas ODSs in vulnerable areas have 6 to 15 times more OCAs than drug crime hot spots, they only have about 1.3 to 3 times as many shootings. Shootings in ODSs in general (i.e., not only in vulnerable areas) lie at about the same level as in drug crime hot spots. Exploring the proportion of shootings at ODSs for each year in the data, we found that with between 8 and 13 % of all incidents between 2019 and 2024 were located at the ODSs. This still represents a substantial share of the total number of shootings.

To further explore the violence, the proportion of injuries and

Table 3
Proportion of deceased and injured due to shooting in 2024 at ODS, ODS with buffer zone and density-based cluster of 100 m and 500 m and their total area in hectar.

Area	ODS	+buffer	DBC 100	DBC 500
Area size (h)	673	3130	87	10,130
% of fatal shootings	21	43	0	28
% of injured	30	50	0	47

fatalities due to shootings in 2024 were analyzed and compared between the areas.

The results show that ODSs accounted for 21 % of shooting fatalities and 30 % of shooting injuries, while the density-based hot spots of 100 m captured 0. The density-based hot spots of 500 m captured a slightly larger proportion of fatal shootings than the ODSs but covered an area >15 times as large. The ODSs with buffers of 200 m captured the largest amount, 43 % of the fatalities and 50 % of the injuries, and these areas comprise a third of the area of the density-based drug crime hot spots of 500 m. Thus in a geographical comparison, the ODS areas provide a better unit of analysis for actors who need to combat this systemic drug market violence.

Discussion and concluding remarks

This paper has compared two different methods of identifying drug markets in relation to two proxies for drug market related violence; organized criminal group activities and police recorded shootings. In both cases the systematic method of mapping ODSs was found to be more valid, but for shootings only with regard to ODSs in vulnerable areas – neighborhoods where criminal networks exert a substantial influence. This mirrors previous findings suggesting that while ODSs in themselves tend to have high levels of systemic violence, this effect is even more pronounced for ODSs in neighborhoods with strong criminal networks (Gerell et al., 2021; Magnusson, 2022). Hot spots of police reported drug crime sometimes capture locations characterized by drug market related violence and gang activity, but often do not, at least in Stockholm Sweden. The fact that four hot spots in the first analysis, including the hottest by far, were postal distribution points highlights the need for a contextual understanding of locations to facilitate reasonable interpretations. Another two hotspots comprised police stations with detention cells, and the remaining non-ODS hotspots were all related to events or nightlife areas. While nightlife areas do have drug market related violence, it is largely of a different type (i.e., psychopharmacological or economic compulsive) than the drug market related violence found in ODSs, which has strong links to systemic drug market violence. ODSs, and especially those in areas where criminal networks have a presence, are plagued by gang shootings (Magnusson, 2022), whereas the nightlife districts more often see extremely high rates of common or aggravated assault. A viable way of moving towards an understanding of the multiple dimensions of drug market related violence may therefore be to combine the mapping of ODSs and areas characterized by organized crime activity with the mapping of nightlife, something that might for instance be based on the density of bars and night clubs (Gerell, 2016; Gerell & Kronkvist, 2017). This would allow for the identification of different types of geographical markers for drug market related violence that are able to capture the complexity and nuances of this violence and allow for more tailored interventions targeting the specific types of drug market related violence associated with each type of location.

While ODSs emerge as reasonable markers of systemic violence, they might have been expected to function even better in this regard. One reason that they did not do so may be that the ODSs are very big, on average about 67,000 square meters. This is substantially larger than would normally be expected for a drug hot spot (e.g., Sherman & Weisburd, 1995), and it is plausible that much of the drug activity – and systemic violence – is clustered within a subsection of an ODS. In practice, the large size of the ODSs may thus dissipate the performance of ODSs as predictors of systemic violence, and if so, this may also be of operational importance to the police or other agencies working to combat or prevent crime.

The strong concentration of drug crimes at postal service points was not surprising, but it is a relatively new development that has to date not been explored to any major extent in academic research. We are unaware of the extent to which this is a Swedish phenomenon or whether similar patterns can also be found in other countries. The change is rather recent, and follows a legislative amendment to the Swedish Postal Act in 2023, which eased the confidentiality rules that had prevented postal employees from notifying authorities about suspicious parcels. Since the introduction of this change, postal staff and agents may now independently make reports to the police if they suspect a package to contain narcotics, weapons, or explosives. This reform has significantly enhanced levels of detection. National figures indicate that over 20,000 drug-related postal shipments have been intercepted, with >30 individuals being arrested and over 2000 suspected purchasers identified (Polismyndigheten, 2025b; SVT Nyheter, 2025; Drugnews, 2024). Specifically in Stockholm, collaborative efforts with the postal company PostNord have led to substantial seizures: approximately 17,000 parcels suspected of containing narcotics or doping agents have been confiscated at PostNord distribution points since the winter of 2023 (Polismyndigheten, 2025; Drugnews, 2024). It is therefore perhaps not surprising that postal service points have become hot spots of police recorded drug crime, but it is important to be aware of this when trying to understand drug markets. Postal service points are largely irrelevant to an understanding of drug market related violence.

In the analysis based on larger hot spots, of 500 m, the results showed that while these capture a larger amount of the criminal network violence, similar to the amount captured by the ODSs, they cover a much larger area making them an unsuitable option for determining resource allocation and prioritization, but also unfit for use in predictive analysis.

In the present study we have focused on the systemic side of drug market violence by using proxies for criminal network related crime in association with drug market locations. Future studies could employ similar methods to explore this issue further in relation to other types of drug market violence. Economic compulsive drug market violence could perhaps be geographically analyzed by considering personal robberies, purse snatching, or pick pocketing, all of which may be hypothesized to capture the relevant type of short-term economic drivers. Psychopharmacological drug market violence could in turn plausibly be identified by considering assaults in public environments, a measure that, at least in Sweden, typically captures nightlife districts, with such assaults largely being driven by alcohol use.

CRediT authorship contribution statement

Mia-Maria Magnusson: Writing – original draft, Formal analysis, Data curation. **Manne Gerell:** Writing – original draft, Project administration, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known other competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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