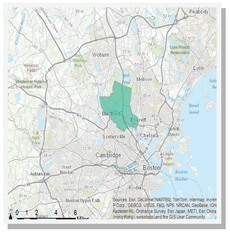
A Closer Look at Crime and Overdose in Medford, MA |2011-2013

Overview

Medford, Massachusetts is in Middlesex County, located a few miles northwest of Boston with a population of approximately 56,000. Although Medford generally exhibits better health outcomes than those of the state at large, there are certain areas, particularly substance abuse, that are alarming.



Health statistics demonstrate that substance abuse and overdose are a greater source of community concern in Medford than in the state at large. The alcohol and drug related hospital discharge rate in 2012 in Medford was higher than in the state overall - 535.3 per 100,000 persons compared to 345.6 in the state. Medford also had a larger proportion of injection drug users admitted to DPH funded treatment programs.

Table 1
Primary Drug by District and State FY 2010

	Alcohol	Heroin	Marijuana	Cocaine	Crack
Medford	24%	56%	3%	3%	1%
MA	43%	38%	5%	4%	4%

Table 1: Primary substance of use reported in 2010 by individuals that were admitted to treatment programs.

The Communities that Care Youth Survey conducted in 2011, further underscores the high rates of substance abuse among youth in the city. Medford High School students reported lifetime use rates of alcohol (65%), marijuana (38%), cigarettes (33%), smokeless tobacco (16%), inhalants (9%), and methamphetamine and heroin (1.75%). Due to the high rates of teen substance abuse and given that early onset use of drugs is a predictor for substance abuse later in life, it was of interest to see the location of "convenience stores/mini-marts" that have been identified through the Medford Environmental Scan as selling drug paraphernalia relative to the location of Medford schools.

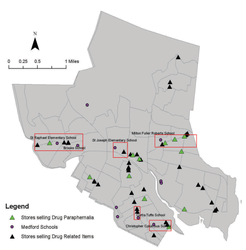


Figure 1: Schools with the identified stores nearby are boxed in red.

It is important to know where substance abuse is occurring in order to take better preventative measures.

In order to gain a better understanding of substance abuse and overdose occurrences in Medford, the available overdose data was obtained from the Medford Police Department. The relationship between drug use and crime was also of interest and therefore one of the objectives of this project was to see if the locations of crime and overdose overlapped in Medford, where drug rates, especially the use of heroin is higher than the state's overall rate.

The relationship between drug use and crime has been examined and it is believed that there is a correlation between the two. Many models, such as the addiction model, frame crime as being driven by a need for money to support drug habits; other models state that criminal behavior leads to drug use. Therefore, crime data, specifically home and motor vehicle breaking and entering calls were obtained from the Medford Police Department. Although the overdose and crime data only provides a rough estimate of what has occurred in Medford, it is currently the most accurate data that can be used to get a spatial representation of where these events occurred. In addition to that relationship between crime and substance abuse, another objective was to see if any correlation between the location of where overdoses occurred and where the stores selling drug paraphernalia or drug related items such as cigars and blunt wraps are located.

Overdose Counts by Census Block 2011-2013

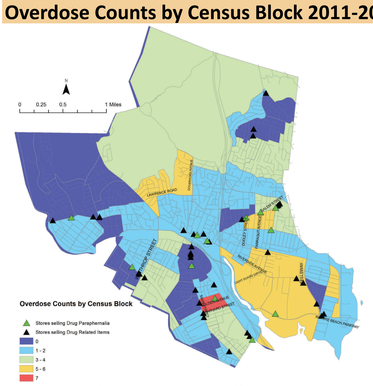


Figure 2: Available overdose counts in Medford are shown in relation to stores that sell both drug paraphernalia and drug related items.

Crime Hot Spots 2011-2013

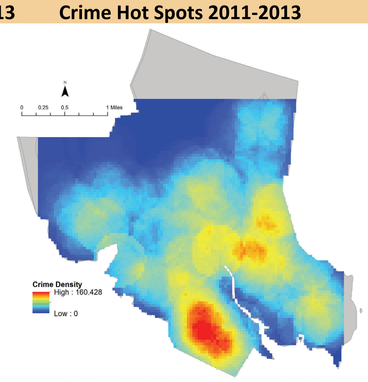


Figure 3: Areas that have a high concentration of crime are depicted in red.

Combined Crime and Overdose Hot Spots 2011-2013

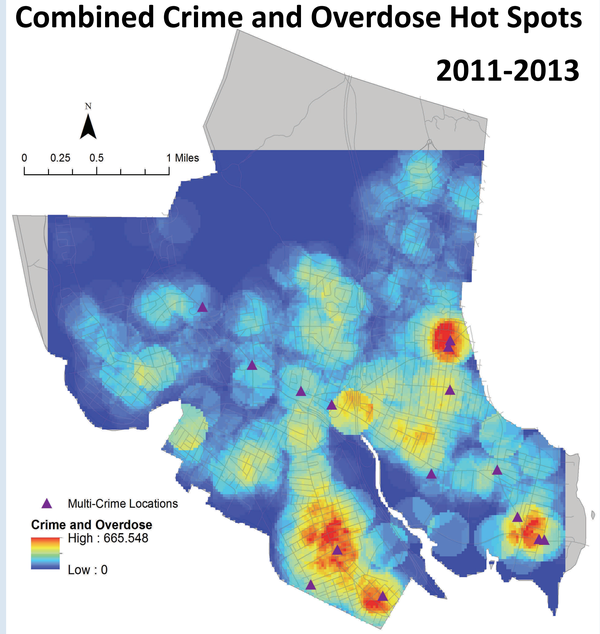


Figure 4: Hot Spots are crime and overdose concentrated areas and they are shown in red. Specific locations that are depicted with the triangles are areas that have a combination of crime and overdose calls associated to them.

Methods

To see if there was an overlap between where overdose and crimes were being reported, the hot spots for multiple instances of breaking and entering (B&E) and for overdose calls were identified. Due to the widespread belief that crime is often a result of a lack of money to purchase drugs, all crime calls related to breaking and entering of homes and motor vehicles were looked into since those two type of crimes would be more relevant considering substance abuse.

After entering all of the calls related to B&Es and overdose into Excel, the calls were geocoded, along with the addresses of the convenient stores. A spatial join was then carried out with the overdose data and the census blocks.

The following layers then had to be clipped or select by attribute had to be used: the Medford boundary, Census tract, Massachusetts's schools, the geocoded BE/MV data, and the Street Map USA layer.

The point density tool was used on the crime data to locate hot spots. In order to find the relative change in crime from 2011-2013 the raster calculator was used. The mask tool was used on both of those layers. The crime and overdose data layers were also merged in order to run the point density tool to show where the overlap between the substance abuse and crime is occurring. In order to locate specific areas in which multiple events are occurring, the intersect tool was applied to the two data layers.

Results

One of the goals of this project was to see if there was a relationship between where overdose and crime calls are being reported which can be seen at a glance in Figure 4. To get a deeper understanding of the relationship, Figure 2 shows that the census block with the highest overdose count between 2011 and 2013 is in the same area in which there is also high crime density (Figure 3). Figure 2 also shows that there is not a clear relationship between the location of the stores that sell drug paraphernalia and drug related items to where overdoses were reported. Although that relationship is not clear, it is of concern that there are stores located near schools (Figure 1). Due to manner that tobacco and drug related products are marketed, this should still be of concern when considering youth substance abuse.

Relative Change in Crime 2011-2013

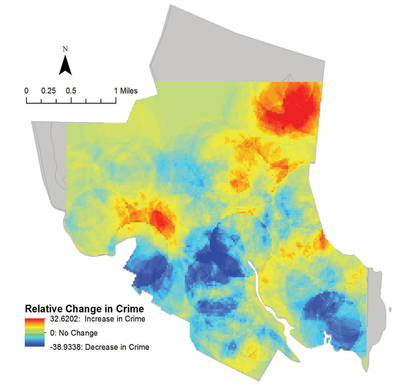


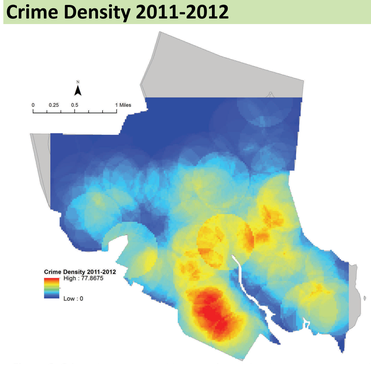
Figure 5: Relative change in crime between 2011-2012 and 2012-2013 is shown, with areas that have experienced an increase in crime depicted in

The maps also highlight crime hot spots for B&Es and it is clear that there are areas that have consistently had high B&E rates throughout 2011 and into 2013 (Figure 6). Although those areas do exist, the relative change in crime map, Figure 5, also shines light onto areas that are experiencing an increase in B&E instances than they have in the past and that may go unnoticed when looking at just Figure 3, which brings attention to the heavily crime populated areas in red.

Conclusions

The results from this analysis show that there are clear areas in which crime and overdose overlap. These areas, along with the other reported crime and overdose concentrated areas should be of concern to the City of Medford and measures should be taken or current efforts should be re-evaluated in order to alleviate these areas from crime and substance abuse. Since there are areas that have consistently had high crime rates throughout the years, special interest should be taken to those areas, along with areas that have had a rise in crime because they may be key to identifying future crime patterns. Due to the limited data that was available on breaking and entering and on overdose instances, more thorough data gathering and research should be completed on other crime types and on the causes of the given overdoses reported so that they can be spatially represented with more precision and accuracy.

Crime Density 2011-2012



Crime Density 2012-2013

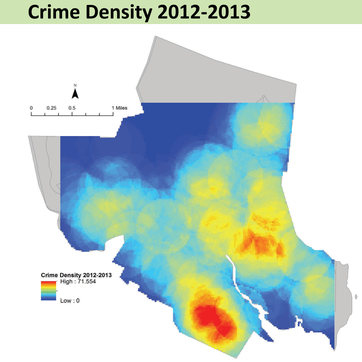


Figure 6: Crime data separated by year. Areas that have more reported breaking and entering's, both home and of motor vehicles, are depicted in red.

Cartographer: Celina Garza
Projection: NAD 1983 State Plane Massachusetts Mainland FIPS Feet
Scale: 1:30,603
Data Sources: MassGIS, Medford Police Department, US Census TIGER, Medford Environmental Scan, Tufts M: Drive, ESRI Basemaps
GIS 101
April 28, 2013

References:
Medford Communities That Care Youth Survey. Executive Summary of Substance Abuse Results. 2011
Bruce, P., Johns, B. (2012).Environmental Scan. City of Medford.
Nurco, D. N., Hanlon, T. E., & Kinlock, T. W. (1991). Recent Research on the Relationship Between Illicit Drug Use and Crime. *Behavioral Sciences & The Law, 9(3), 221-242. Retrieved from:http://ehis.ebscohost.com.proxy21.noblenet.org/ehost/pdfviewer/pdfviewer?sid=685aec19-39fd-4bc1-9d1d-849e5d0a4929%40sessionmgr110&vid=2&hid=17*

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