Crime rates have dropped dramatically in cities across the United States over the past two decades (U.S. Department of Justice, 1995). In 1979, U.S. Attorney General Edwin Meese established the Task Force on Crime Mapping and Data-Driven Management to advance efforts to reduce and prevent crime (U.S. Department of Justice, 1995). Since that time, crime mapping has been an increasingly utilized tool by law enforcement agencies across the country, and with the use of computer software, such as ArcGIS, with greater concentrations of crime are able to be identified, which then allows law enforcement agencies to more effectively allocate their resources. Crime is not spread evenly across a city. Crime actually tends to occur in concentrated areas. These areas of more frequent crimes are known as "hot spots" (U.S. Department of Justice, 2003). This term can refer to areas that have a greater number of criminal events, or an area where people have a higher than average rate of being victimized. It has become increasingly important for law enforcement agencies and local government to identify these hot spots. Community members can also use this information to make more informed decisions about neighborhoods and schools. Crime mapping has become a convenient digital format and implementing GIS software, it is anticipated that the type and frequency of particular crimes, such as murder, rape, robbery, aggravated assault, burglary, larceny/theft, and motor vehicle theft, can be more accurately identified. Also, through researching these data points and the frequency of crimes in certain areas, the various "hot spots" within Boston can be identified, which can serve as a helpful tool for Boston residents in planning future home locations, grocery stops, and even jogging routes. Various research and studies are also incorporated to make known Boston police policies or mitigation attempts and their effectiveness in making crime rates in the area.

Crime mapping is a powerful tool that can be utilized to identify patterns and trends in crime data. By using geographic information systems (GIS) and other spatial analysis tools, law enforcement agencies can identify areas where crime is concentrated and make informed decisions about resource allocation. In recent years, GIS technology has become increasingly important for law enforcement agencies and local government to identify hot spots (U.S. Department of Justice, 2003). Crime mapping has become a convenient digital format and implementing GIS software, it is anticipated that the type and frequency of particular crimes, such as murder, rape, robbery, aggravated assault, burglary, larceny/theft, and motor vehicle theft, can be more accurately identified. Also, through researching these data points and the frequency of crimes in certain areas, the various "hot spots" within Boston can be identified, which can serve as a helpful tool for Boston residents in planning future home locations, grocery stops, and even jogging routes. Various research and studies are also incorporated to make known Boston police policies or mitigation attempts and their effectiveness in making crime rates in the area.


Boston Crime Mapping

II. Literature Review

Crime rates have dropped dramatically in cities across the United States over the past two decades (U.S. Department of Justice, 1995). In 1979, U.S. Attorney General Edwin Meese established the Task Force on Crime Mapping and Data-Driven Management to advance efforts to reduce and prevent crime (U.S. Department of Justice, 1995). Since that time, crime mapping has been an increasingly utilized tool by law enforcement agencies across the country, and with the use of computer software, such as ArcGIS, with greater concentrations of crime are able to be identified, which then allows law enforcement agencies to more effectively allocate their resources. Crime is not spread evenly across a city. Crime actually tends to occur in concentrated areas. These areas of more frequent crimes are known as "hot spots" (U.S. Department of Justice, 2003). This term can refer to areas that have a greater number of criminal events, or an area where people have a higher than average rate of being victimized. It has become increasingly important for law enforcement agencies and local government to identify these hot spots. Community members can also use this information to make more informed decisions about areas to avoid when selecting a home or due to higher crime rates, choosing a grocery store, and even in planning jogging routes. Boston is currently the twentieth largest city in the country with an estimated population of 645,169 people. Similar to many large cities, Boston has a relatively high crime rate. In the late 1980s and continuing through the 1990s, as Boston, as well as other large cities across the country, experienced a dramatic decrease in gun-related crimes (Braga et. al., 2009). Studies suggest that these gun crimes occurred in concentrated hot spots or "micro-places." One study suggests that "gun violence trends at these places follow trajectories that are consistent with a spatial diffusion process" (Braga et. al., 2009, p. 50). In other words, crime follows a very distinct pattern when occurrences begin to increase. This has many implications for law enforcement agencies. It allows police officers to focus on specific areas that are predicted to have increased criminal activity. This also suggests that crime prevention should focus on very specific locations rather than sprawl across large areas or neighborhoods (Braga et. al., 2009).

Evaluation of differences in crime trends over various time periods, the possible correlation between crime totals and total law-enforcement agents, and identifying districts with the highest and lowest crime rates for the different years (1990, 2000, and 2010) allows for a comprehensive comparison of crime types, frequencies, and when changes occurred between the years of 1990 and 2010, as depicted in Figures 3 and 4. Significant decreases in violent crimes occurred in 1990 (Braga et. al., 2009). In 2010, Boston has experienced a 62.7% decrease in crime occurrences (calculated from non-normalized data), or a 64.98% decrease in occurrences when considering normalized data, both of which, over the past 10 years, exhibits a very significant percentage decrease. This decrease can be observed in the Figure 3: Choropleth map of districts A-15, B-2, and E-14 respectively (Figure 3). The classification set for 2010) in order to manually set all but the last break value to illustrate the 2010 data. Choropleth maps that synthesize the Boston police department’s data and represent the types and frequencies of violent crimes occurring over this geographic scope during different years (1990, 2000, and 2010) are depicted in Figures 5 and 6. These maps visually depict the crime information and present a more accurate and user-friendly way to understand crime patterns and trends.


V. Discussion

Crime mapping is limited by the scale and accuracy of the data provided by police departments around the country. The Boston Police Department is responsible for compiling crime statistics for the city, but they are not responsible for ensuring that it is consistent with others. Citizens have the right to access crime statistics, but it is often extremely time-consuming and inaccurate. Gathering police data is often too difficult, possibly because there is less public demand for older data. Furthermore, boundary changes and missing data are common when evaluating longer time periods, as is the difficulty in acquiring sufficient data for visualization. While we were able to identify high crime areas and high crime rates of common-specific data is needed to identify hotspots on a neighborhood and citywide basis. Also, while we were able to normalize data using population statistics for the whole of Suffolk County, one may wish to obtain population statistics for each individual district and normalize the data by those Standards for more accurate projections. One additional that could be made should data be available in a more suitable format that allows for depicting the type of event and the frequency of crimes in certain areas. More detailed research and data on this issue would allow for community members to better avoid criminal activity and law enforcement officers to focus on their resources in needed areas. Large crimes such as CrimeReports utilize software that is able to process thousands of crimes of which they are aware when and where they occurred, and when CrimeReports offers software that is able to process thousands of crimes of which they are aware when and where they occurred, and when CrimeReports offers software that is able to process thousands of crimes of which they are aware when and where they occurred.

VI. Conclusion

Crime mapping is limited by the scale and accuracy of the data provided by police departments around the country. The Boston Police Department is responsible for compiling crime statistics for the city, but they are not responsible for ensuring that it is consistent with others. Citizens have the right to access crime statistics, but it is often extremely time-consuming and inaccurate. Gathering police data is often too difficult, possibly because there is less public demand for older data. Furthermore, boundary changes and missing data are common when evaluating longer time periods, as is the difficulty in acquiring sufficient data for visualization. While we were able to identify high crime areas and high crime rates of common-specific data is needed to identify hotspots on a neighborhood and citywide basis. Also, while we were able to normalize data using population statistics for the whole of Suffolk County, one may wish to obtain population statistics for each individual district and normalize the data by those Standards for more accurate projections. One additional that could be made should data be available in a more suitable format that allows for depicting the type of event and the frequency of crimes in certain areas. More detailed research and data on this issue would allow for community members to better avoid criminal activity and law enforcement officers to focus on their resources in needed areas. Large crimes such as CrimeReports utilize software that is able to process thousands of crimes of which they are aware when and where they occurred, and when CrimeReports offers software that is able to process thousands of crimes of which they are aware when and where they occurred.