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Application of Syndromic Surveillance to Describe Gunshot-related Injuries in Houston

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Objective

To introduce a model to track gunshot-related injuries, describe gun-related injuries in Houston, and investigate the association between gun-related injuries and social determinants of health using syndromic surveillance data.

Introduction

In 2011, injury by firearms accounted for 32,351 deaths (10.4 deaths per 100,000 population) in the United States[1]. This rate was higher than any infectious or parasitic disease (the highest being 2.5 for both viral hepatitis and HIV disease)[1]. Furthermore, death by gunshots accounted for over half of all suicides and over two-thirds of all homicides in the US[1]. Despite the disproportionate media coverage of mass shootings and assault weapon violence, the vast majority of these deaths are attributable to non-mass shootings and to handguns[2]. Though a contentious issue in the United States, understanding this cause of death is vital to confronting the issue locally and nationally. Traditionally, death certificates, crime data, cross-sectional studies, and retrospective studies have most commonly been utilized in this endeavor; however, the collection of real-time emergency department (ED) visit information presents a unique opportunity to track gun-related injuries to supplement our current understanding of this issue. The Houston Department of Health and Human Services (HDHHS) has been receiving this information for over a decade from EDs in the greater-Houston area, and the department is currently connected to 32 of the largest EDs in the area. The current study aims to enhance the understanding of gunshot-related injuries in the Houston area and present a model for utilizing RODS information for this purpose.

Methods

Gun-related injury data was collected by Real-time Outbreak Disease Surveillance (RODS) v.4.2, an electronic database of ED visits in the Houston area, between September 2012 and August 2014. This data was cleaned, described, and analyzed for associations with social determinants of health, using 2010 United States Census data. Moreover, the data was compared with national cause of death data provided by the CDC[1]. Oracle SQL Developer v.3.2 was used to extract and clean data from the RODS system. ArcGIS v.10.1 was used for geo-coding and geographic analysis. SAS v.9.3 was used to conduct the descriptive and statistical analyses.

Results

In the past two years, more than 900 gunshot-related ED visits were collected in RODS. The data was 84.7% complete for age and 58.4% complete for ZIP code. Using the ZIP code data, ArcGIS identified ZIP codes and areas of Houston most common for gunshot-related ED visits (Figure 1). Most patients were male (86.3%), between the ages of 18 and 34 (64.7%), and received at two hospitals in the Texas Medical Center (69.2%). No temporal or seasonal trends were identified in the past two years of information; however, annual trends may be able to be identified over larger time periods or in larger datasets.

Conclusions

The use of syndromic surveillance data provided a useful tool for understanding gunshot-related injuries in the greater-Houston area. Despite incomplete demographic information for all the ED visits collected for the present study, this data was able to characterize the demographic trends of these visits and identify populations most affected by gunshot-related injuries. In addition to current sources of information on gun-related violence and deaths, this source supplements our understanding of this issue by providing information that may not be collected through traditional means. Additional conclusions are pending the completion of further analysis of this data.

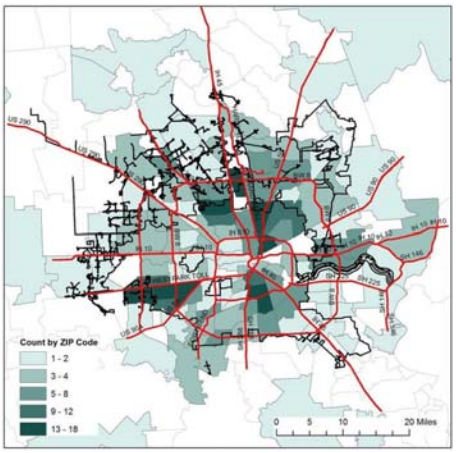

Figure 1. Density of gunshot-related ED visits in the greater-Houston area, 09/2012-08/2014.

Keywords

syndromic surveillance; gun-related injuries; geographic analysis; determinant of health

Acknowledgments

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References

1. Hoyert, DL, Xu, J. Deaths: Preliminary data for 2011. Hyattsville (MD): National Center for Health Statistics (US). October 2012. 52 p. Report No.: (PHS) 2013-1120.
2. United States Department of Justice, Federal Bureau of Investigation. Crime in the United States, 2012. Clarksburg (WV): United States Department of Justice, Federal Bureau of Investigation. 2013.

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