



## **The Effects of ShotSpotter on Gun-Crime in Denver: An Impact Evaluation**

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### **Summary**

#### **Background**

The current study is an impact evaluation of the ShotSpotter acoustic gunshot detection system that was implemented at four sites in Denver. The Denver Police Department (DPD) and the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) along with several other federal and local law enforcement agencies collaborated to form Denver's Crime Gun Intelligence Center (CGIC) for processing forensic ballistics evidence. The ShotSpotter system was installed to support CGIC operations to improve the detection of shooting incidents, the apprehension of shooting suspects, and the collection of forensic evidence. This system uses a number of acoustic sensors installed in fixed locations across a specified catchment area. When a gunshot is detected, these sensors triangulate the location of the incident and provides this information to the police department. This evaluation was conducted to determine whether ShotSpotter led to reductions in firearm-related violent crime in Denver.

#### **Methods**

The ShotSpotter system was installed in phases, which provided separate start dates for the four sites. For this reason, it was possible to use an Interrupted Time Series design with Multiple Non-Equivalent Controls to evaluate this intervention. This is a very strong quasi-experimental design that allows for comparisons within and across sites. In an intervention site, the pre-existing level and trend of crime is compared to the level and trend of crime after the intervention to determine if there are crime reductions. Further, the results in the intervention site can be compared to non-intervention sites to ensure that the same reductions are not seen in the control sites. The outcomes examined were firearm-related robbery, aggravated assault, and a composite measure of serious violent crime. Crime incident data were provided by the Denver Police Department from 2010 – 2019. Site-specific segmented regression models were used to assess the impact of ShotSpotter at these four sites and a section of Denver that was not covered by ShotSpotter.

#### **Findings**

We found that ShotSpotter was associated with reductions in firearm-related violent crime and aggravated assaults in the North Area, but similar reductions occurring at the same time were seen at other sites. In the West Area, we found significant reductions in all three crime types but no similar reductions at the same time with other sites. We found reductions in firearm-related violent crime in Montbello, but similar reductions were seen at other sites. ShotSpotter did not have a significant effect at the East Colfax site. In sum, this study provided mixed evidence for the relationship between ShotSpotter and violent firearm-related crime. Implications for future research and policy are discussed.