

Evaluation of Fayetteville's ShotSpotter Installation

Results from the First 18 Months



Overview of Findings

- **Police Response Times:** Police dispatch and arrival are notably faster following ShotSpotter alerts compared to 911 calls alone, primarily because ShotSpotter notifications enabled quicker dispatch. We lack data to fully assess whether this resulted in improved investigative productivity or outcomes. *There is evidence it did not.*
- **Investigation and Victim Outcomes:** Evidence collection, victim identification, and arrests occur most frequently when ShotSpotter alerts are accompanied by 911 calls. *ShotSpotter-only alerts produce comparatively fewer investigative or victim-related outcomes.*
- **Resource Efficiency:** Many ShotSpotter-only alerts involve detection of a small number of rounds or “probable gunfire” only. These are associated with lower productivity in terms of evidence collection and victim identification.
- **Better Data Needed:** An increased number of alerts in ShotSpotter zones did not produce measurable impacts, absent companion 911 calls. To better examine effectiveness, integrated data is needed. No data on gunshot confirmation or other outcomes was available. Strategic prioritization of alerts—such as deprioritizing single-shot alerts lacking 911 confirmation—may improve efficient use of police resources.
- **Acknowledgements.** This work was supported by the City of Fayetteville, North Carolina, which solicited this independent evaluation from the Wilson Center for Science and Justice at Duke University School of Law. Data and consultation were provided by Kimberly Richards in the Fayetteville Police Department and members of the City of Fayetteville’s City Manager’s Office and Office of Community Safety. We also acknowledge Eric Moore and Jenny Hutchison at the Urban Institute at University of North Carolina – Charlotte for helpful conversations. This project was also supported by the Wilson Center, including with consultation by Brandon L. Garrett, Madeline Stenger, and Rita Grunberg.



Data Examined and Key Limitations

- **Data Examined:**

1. Gunshot-related Calls for Service data (from FPD)
2. ShotSpotter Ground Truth Tracking Worksheet (from FPD)
3. Supplemented by Gunshot-related incidents extracted Crimes against Persons data (from Fayetteville Open Data Portal)

- **Time Period Examined:**

18 months of ShotSpotter (Sept. 26, 2023 – March 31, 2025) to preceding 18 months (January 1, 2022 – Sept. 25, 2023).

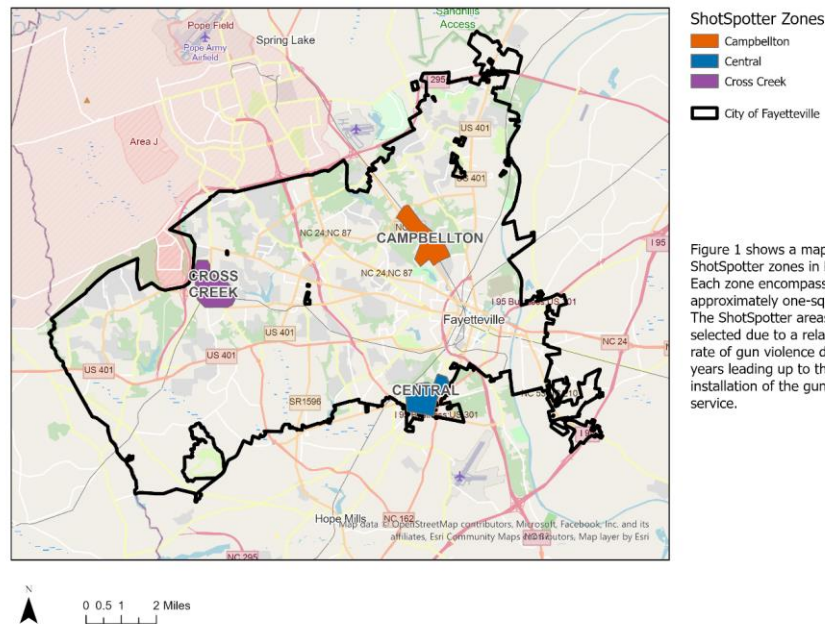
- **Key limitations:**

- *No data, for ShotSpotter dataset, on whether shots were confirmed or regarding any arrests or court outcomes that followed alerts.*
- *No data, for the Calls for Service dataset, on whether 911 calls were confirmed as involving gunfire or any arrests or court outcomes after 911 calls.*

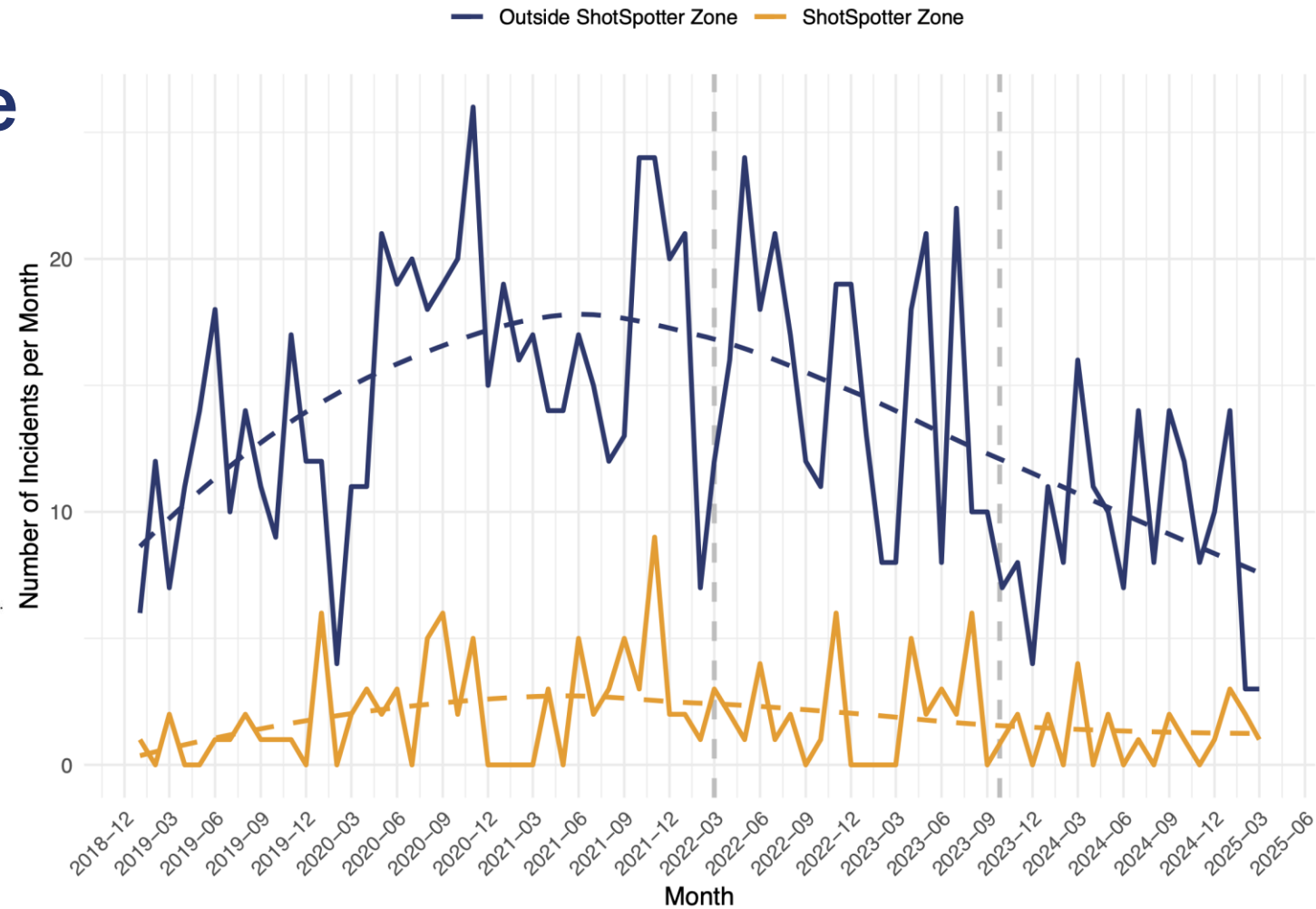


Overall Trends in Gunshot-related Incidents in Fayetteville (1/2019 – 3/2025)

Figure 1: Map of Fayetteville and ShotSpotter Zones



Shots Fired Related Crimes Against Persons Incidents

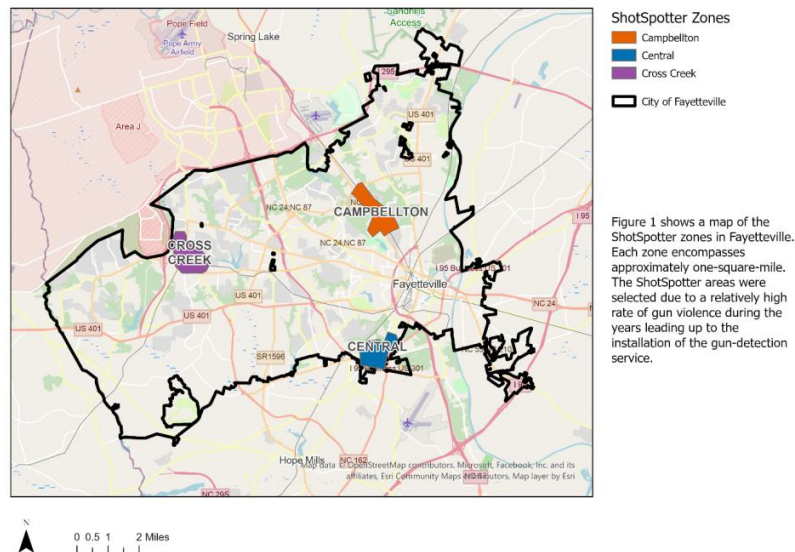


Gunshot-related 911 calls & SS alerts (3/2022 – 3/2025)

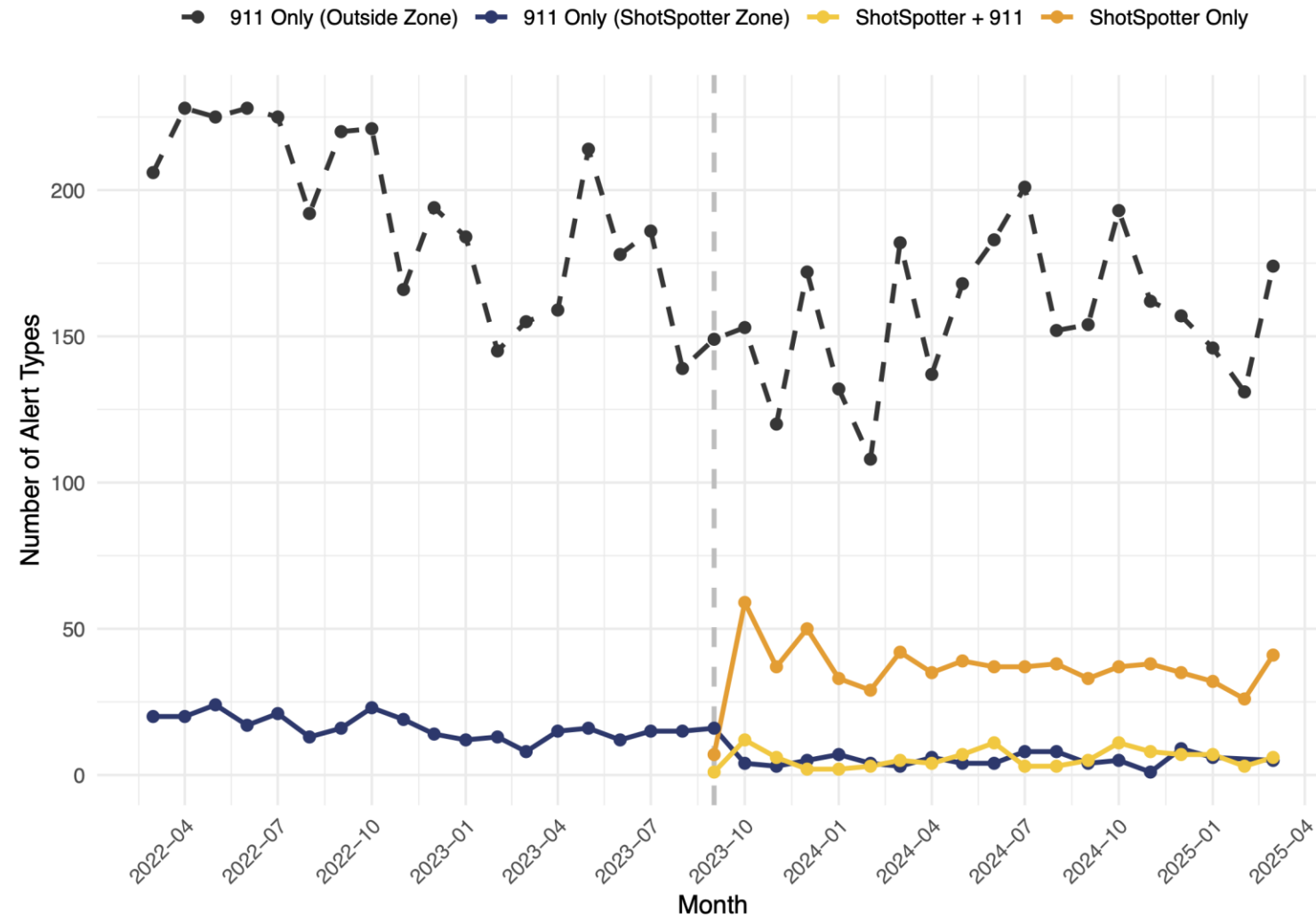
Gunshot-related 911 call volume has decreased over the evaluation period

ShotSpotter alerts have substantially increased (x2.7 – x4.1) notifications about *potential* gunfire in the SS zones

Figure 1: Map of Fayetteville and ShotSpotter Zones

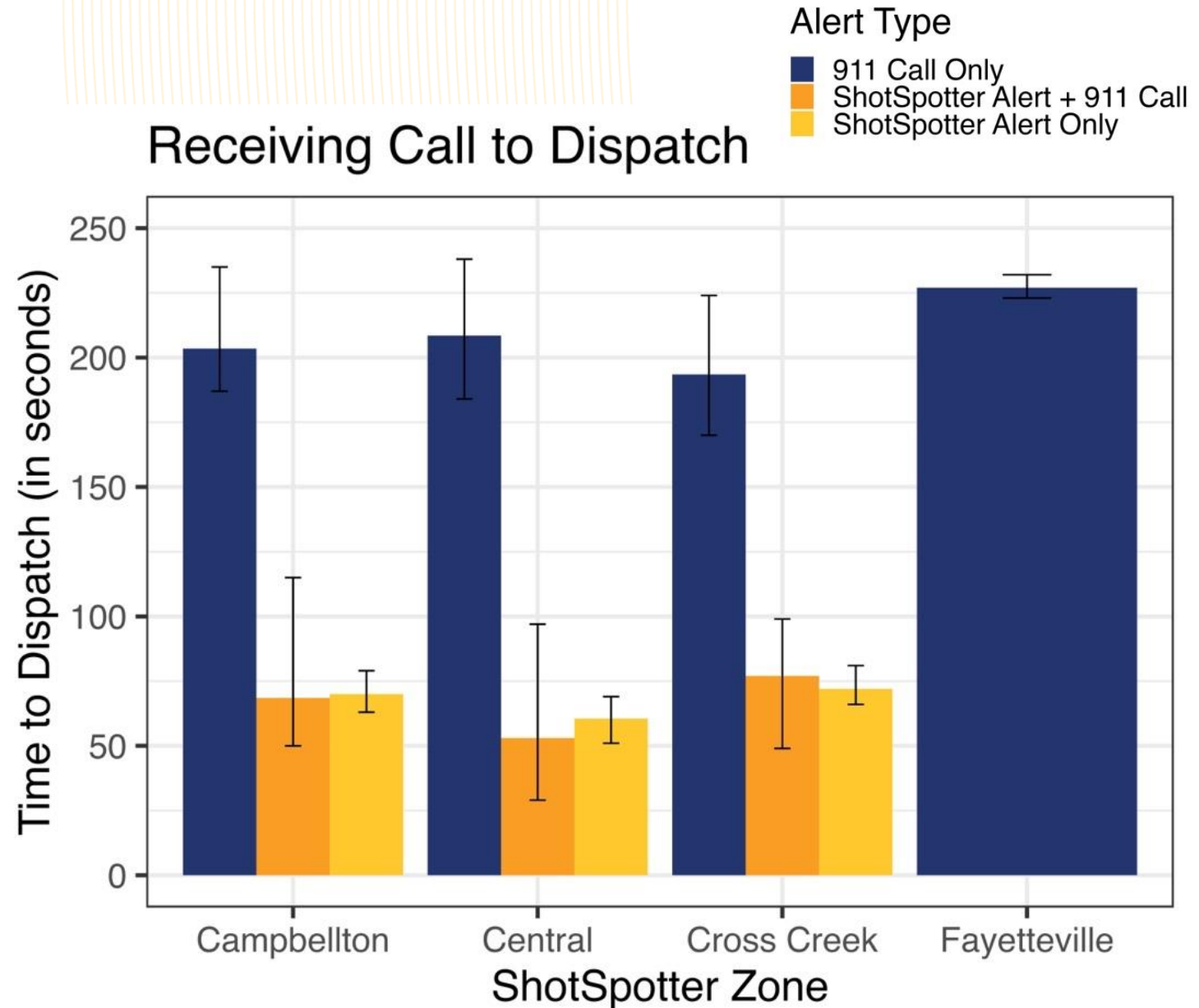


Monthly Counts of Alert Types by Location



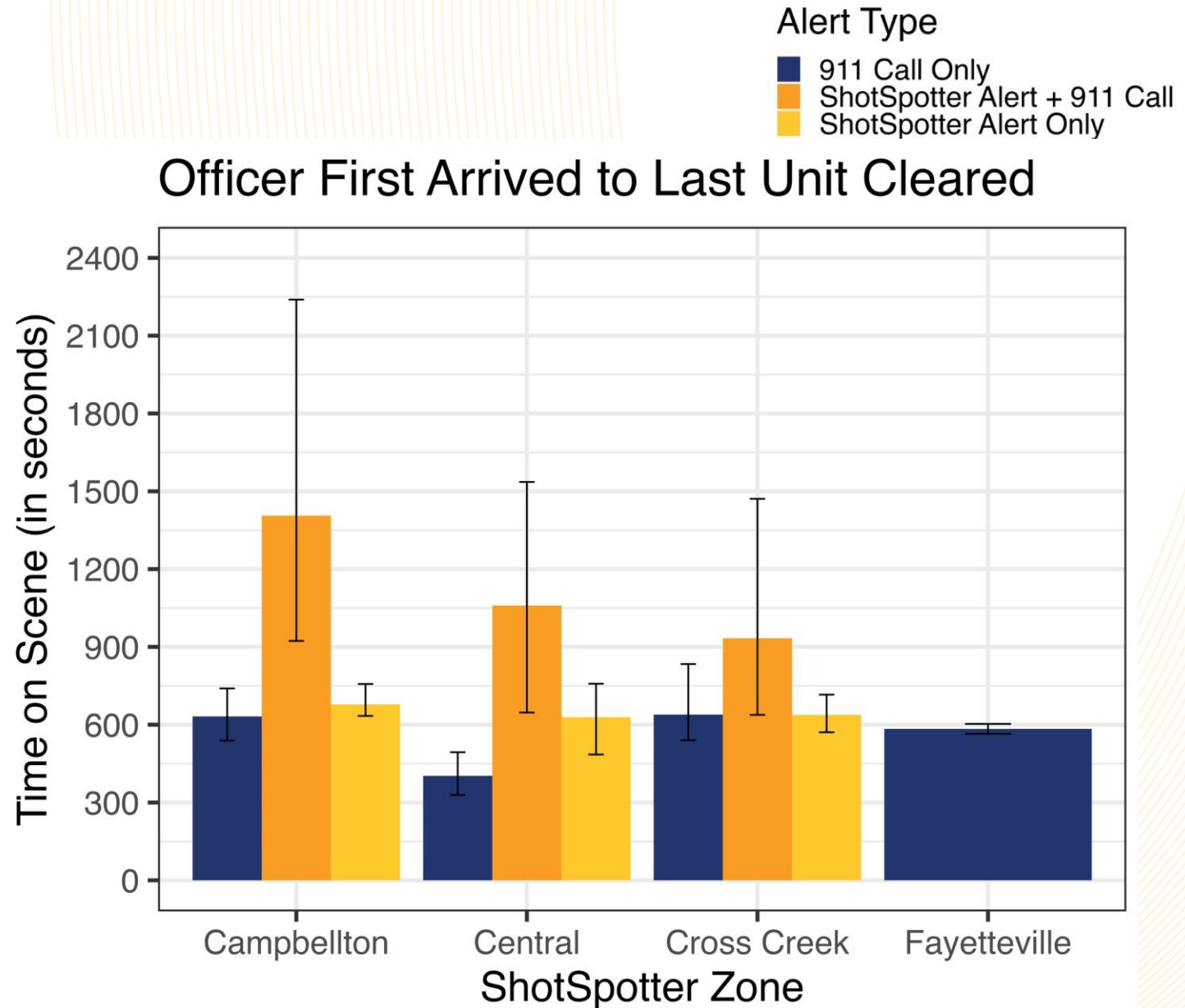
Police dispatch times under SS

Officers were dispatched over 2 minutes (~135 seconds) faster when a ShotSpotter alert was involved, regardless of whether a 911 call was also received.



Police time on scene under SS

Across all three ShotSpotter zones, officers spent the most time on scene when incidents were reported through *both* ShotSpotter alerts and 911 calls (~19 minutes) compared to those reported through only one source (~11 minutes for ShotSpotter alerts only and ~10 minutes for 911 calls only).



Productivity of SS alert responses – firearms and shell casings

We lack data on whether SS alerts were confirmed as gunfire.

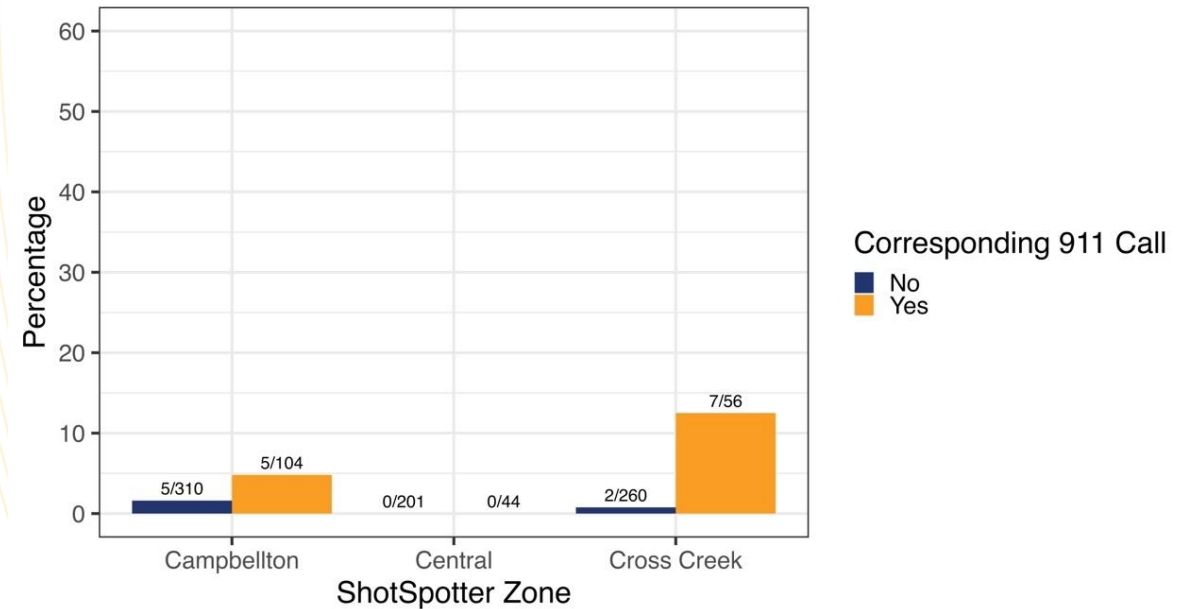
We estimate that *at most* 24% of the SS-only alerts were confirmed.

Available measures of productivity—including evidence collected, arrests made, and victims located rates—are low in response to SS-only alerts.

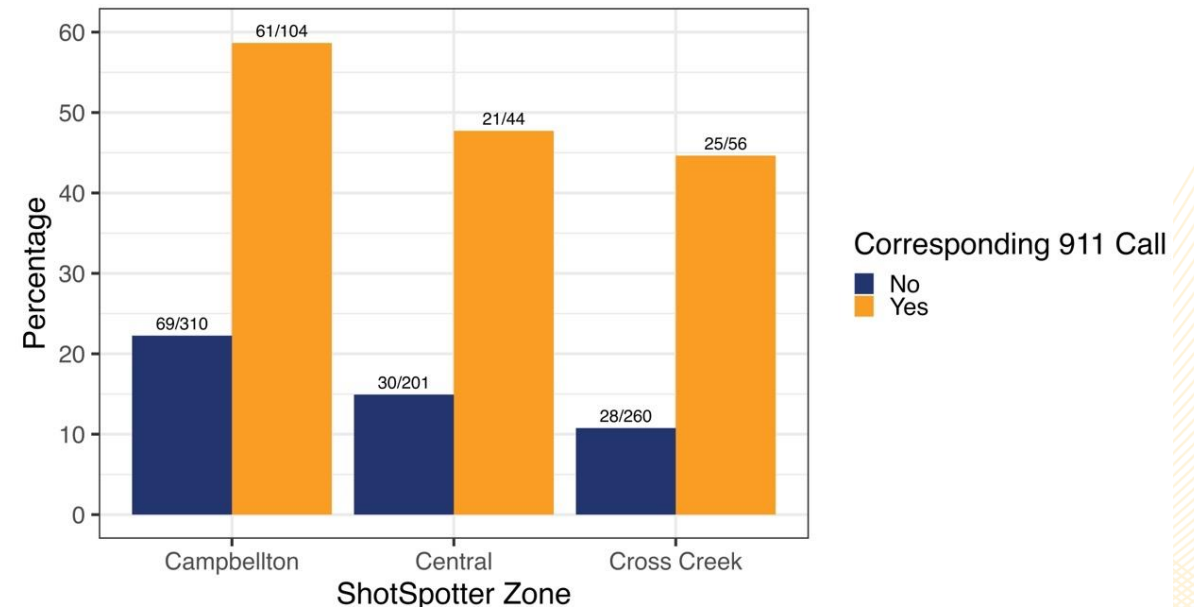
Across the board, SS alerts with a corresponding 911 call were much more productive, based on available data.

More firearms and shell casings were recovered in response to SS alerts with (versus without) corresponding 911 calls, though firearms were rarely recovered regardless of the type of notification received.

Percentage of Alerts where Firearms were Recovered



Percentage of Alerts where Shell Casings were Recovered

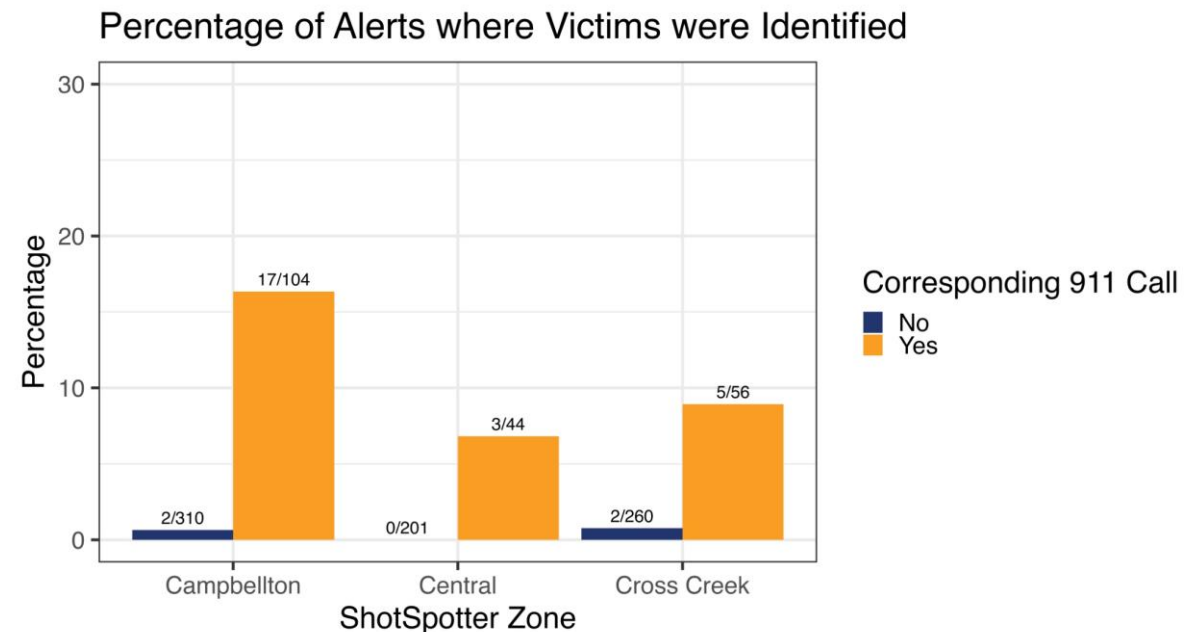
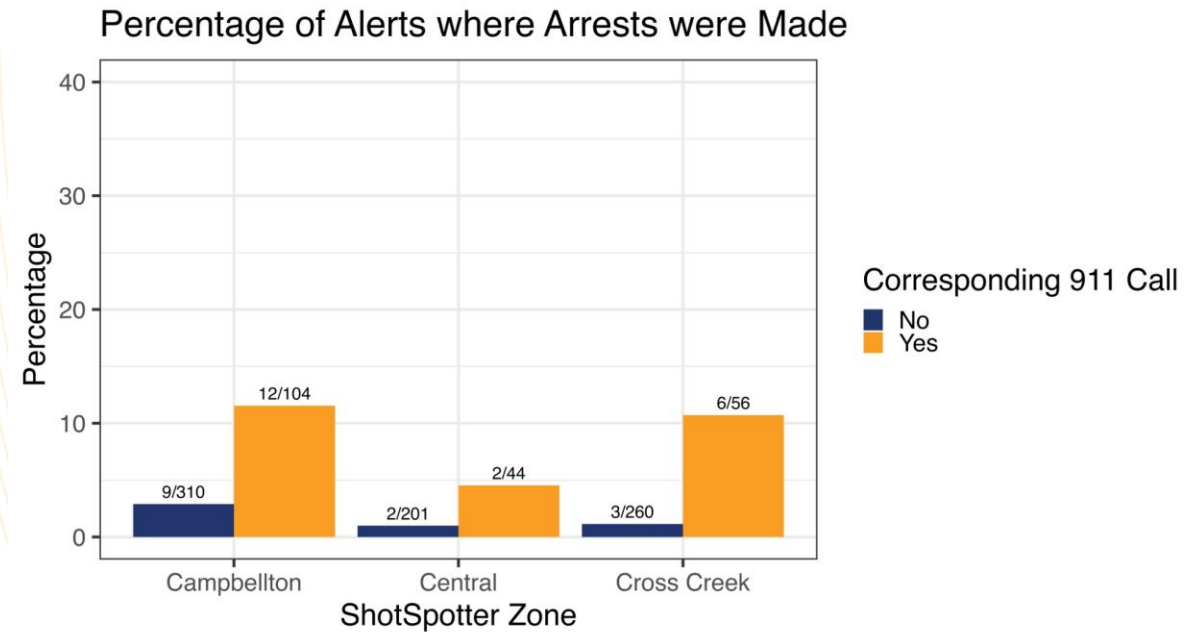


Productivity of SS alert responses – arrests and victims

Arrests were made more frequently in response to SS alerts with corresponding 911 calls.

Victims were more likely to be identified when SS alerts were accompanied by 911 calls as well.

Overall, the Campbellton SS zone had the highest number of productive SS alerts, followed by the Cross Creek zone and then the Central zone.



Conclusions

- **Crime and Alert Patterns:** Gunfire incidents and gunfire-related 911 call volumes declined citywide during the evaluation period, while ShotSpotter alerts increased notifications within the three coverage zones.
- **Response Time:** Police are dispatched more quickly following ShotSpotter alerts compared to 911 calls alone. We are unable to assess whether this faster response has resulted in improved investigative or victim outcomes, however. In addition, police spend more time on scene when dispatched in response to both a ShotSpotter alert and 911 call, compared to either type of notification alone.
- **Alert Effectiveness:** Despite high volume of ShotSpotter alerts, we do not have evidence ShotSpotter-only notifications significantly improve police productivity or outcomes without corroborating 911 calls. Alerts confirmed by both ShotSpotter and 911 calls produce more evidence collection, victim identification, and arrests than ShotSpotter-only alerts. ShotSpotter alerts alone, when not accompanied by a 911 call, however, have low yields.
- **Resource Efficiency:** A majority of ShotSpotter-only alerts involve detection of a small number of rounds, and many alerts are for “probable gunfire” only. These alerts are associated with lower productivity in terms of evidence collection and victim identification. Strategic prioritization of alerts—such as deprioritizing single-shot alerts lacking 911 confirmation—may improve efficient use of police resources.
- **Data Integration Challenges:** Since we are unable to examine data on the outcomes or confirmation of 911 calls for shots fired (without a corresponding ShotSpotter alert), we are unable to speak to the outcomes of ShotSpotter relative to 911 calls. Better integrating data from ShotSpotter, 911 calls, police incident reports, and investigations would allow deeper evaluation insights.
- **Overall Assessment:** We do not offer a conclusion on whether ShotSpotter's benefits exceeded costs. While ShotSpotter provided more alerts about potential gunfire than 911 calls alone and enabled faster response times, it remains unclear to what extent these increased alerts represent false positives. The value of increased alerts and faster responses, including if some portion of them are false positive alerts, must be weighed against budgetary and opportunity costs.



Thank you!
Questions?

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