Longitudinal Study of Crime Hot Spots:
Dynamics and Impact on Part 1 Violent Crime

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Abstract

Objectives: Design and estimate the impacts of a prevention program for part 1 violent crimes in micro-place crime hot spots.

Methods: A longitudinal study of crime hot spots using 21 years of crime offense report data on part 1 violent crimes from Pittsburgh, Pennsylvania. Based on kernel density smoothing for a definition of micro-place crime hot spots, we replicate past work on the existence of “chronic” hot spots, but then with such hot spots accounted for introduce “temporary” hot spots.

Results: Chronic hot spots are good targets for prevention. They are easily identified and they tend to persist. Temporary hot spots, however, predominantly last only one month. Thus the common practice of identifying hot spots using a short time window of crime data and assuming that the resulting hot spots will persist is ineffective for temporary hot spots. Instead it is necessary to forecast the emergence of temporary hot spots to prevent their crimes. Over time chronic hot spots, while still important, have accounted for less crime while temporary hot spots have grown, accounting for a larger share. Chronic hot spots are relatively easy targets for police whereas temporary hot spots require forecasting methods not commonly in use by police.

Conclusions: The paper estimates approximately a 10 to 20 percent reduction in part 1 violent crimes in Pittsburgh if the hot spot enforcement program proposed in this paper were implemented.

Keywords: crime hot spots, longitudinal study, kernel density smoothing