Keep the Kids Inside?
Juvenile Curfews and Urban Gun Violence

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Gun violence is a chronic problem in the United States. Nationally in 2012, 11,622 people were killed by assault with a firearm. Many more people are injured by guns each year: in 2011, 693,000 individuals were treated in emergency rooms for injuries due to assaults by firearms and similar mechanisms. Gun violence takes a particularly large toll on young people: according to the Centers for Disease Control and Prevention (CDC), homicide accounted for 18 percent of deaths for males aged 15–19 and 20–24—more than for any other age group. For black males, homicide is the leading cause of death for those age groups, explaining 48 percent and 50 percent of deaths, respectively. The vast majority of these are gun-related homicides.

Thus policies to reduce lethal violence must determine how to prevent young men from shooting each other. This has been a difficult question to answer and attracts a great deal of academic and policy attention. In general, violence-prevention policies can work either by deterring violence or by incapacitating would-be offenders. If offenders have high discount rates and are unlikely to be deterred by future punishments, then limiting their opportunities to commit crime could be the most effective crime-prevention policy. With this in mind, cities across the United States have enacted, and actively enforce, juvenile curfews.

Juvenile curfews require young people to be home during the nighttime hours when crime is most prevalent. Their goal is to reduce criminal activity via an incapacitation effect, but these curfews might unintentionally reduce a deterrent effect that comes from having lots of people around. By incentivizing young people (and by extension their caregivers) to be at home, juvenile curfews remove many would-be bystanders and witnesses from public areas. Removing those people decreases the probability that any remaining offenders will get caught (because there are fewer witnesses who would call or assist the police), as well as the potential punishment (which would be higher if bystanders were injured). Thus, the net effect of juvenile curfews on public safety is unknown, and so the passage and enforcement of such policies continues unabated.

In our research, we test the net effect of juvenile curfews on the number of gunfire incidents using exogenous changes in curfew hours in Washington, D.C. By law, the weekday curfew time changes from midnight to 11 p.m. on September 1st, and back to midnight on July 1st, roughly following the school year. (We focus here on the September change because the July change is difficult to isolate from the July 4th holiday.) If curfews reduce crime, then when the curfew shifts to 11 p.m. rather than midnight, crime between 11 p.m. and midnight should go down. To isolate the effect of the juvenile curfew from seasonal changes in gun violence, we compare the effect in the 11 p.m. hour on weekdays to effects during two sets of control hours: the 11 p.m. hour on weekends (which is always before curfew), and the midnight hour (which is always after curfew). With a nod to the concept of a witching hour, we will henceforth refer to the treated hour—11:00–11:59 p.m. on weekdays—as the "switching hour."

We use the full universe of gunfire incidents detected by an audio sensor technology called ShotSpotter (described in more detail below) as our outcome measure. ShotSpotter data have several advantages over counting the number of homicides in this context. First, gunfire incidents capture many more of the threatening uses of guns than do homicides, which results in more variation in the outcome measure and makes it easier to pick up policy effects. Second, ShotSpotter data are more highly correlated with actual gunfire than 911 calls and other reported crime data, thus reducing measurement error. And third, the accuracy of gunfire detection is unaffected by the change in curfew time, so using these data removes the potential confounding effect of a simultaneous change in reporting.

Using ShotSpotter data, we estimate that the juvenile curfew in Washington, D.C., increases the number of gunfire incidents. On average, there are 0.015 more gunfire incidents during the switching hour after September 1st than during that hour before the curfew changed; this is a 50 percent increase relative to the late-curfew baseline. This comparison, however, does not fully isolate the effect of the curfew from seasonal changes in gun violence. We therefore control for changes in gun violence during similar, non-treated hours (11 p.m. on weekends and midnight), which provides a cleaner estimate. We find that the curfew increases gun violence by 0.045 incidents per hour (approximately 150 percent of the baseline). This aggregates to seven additional gunfire incidents per week, city-wide, during the switching hour alone.

We can rule out a number of alternative competing hypotheses. For instance, the increase in observed gun violence is not simply due to an increase in reporting, since our measure of gun violence does not rely on reporting. We can also rule out seasonal effects and the possibility that gun violence is simply shifted to other times. These results suggest that, on balance, the deterrent-reducing effect of juvenile curfews (due to the removal of witnesses and bystanders) outweighs the incapacitation effect of sending juveniles inside.

Using traditional crime data—such as 911 calls or reported crimes—for this analysis would not allow us to study this effect. Like some other types of crime, gun violence is likely underreported in a highly selected manner. Particularly in inner-city communities that distrust the police, gunshots may not be reported unless the bullet hits someone and medical assistance is required (and even then some individuals might avoid hospitals to avoid arrest). The result is that traditional data on reported gunfire (via 911 calls) or violent crime (via reported crime data) are extremely noisy and potentially unrepresentative measures of the timing and frequency of gunfire incidents. In addition, most policy interventions that aim to reduce gunfire probably also affect reporting rates. Any empirical analysis of a policy intervention's impact on gunfire will therefore be biased, and often the direction of the bias will be unknown.

In the past, these concerns have limited researchers to using homicide (which is reported with near-perfect accuracy) as an outcome measure, but this approach has two problems. First, homicide is a relatively rare event, and limited variation in the outcome makes it difficult to detect policy effects. Second, homicide is not the only outcome of interest. Ideally, we would observe all instances where a gun threatened someone's safety.

If we define gun violence in this way, a very small share of gun-violence events result in homicides. For comparison, we also consider the effects of the curfew on reported crime and 911 calls, using geocoded data from the Metropolitan Police Department. If we wanted to study the impacts of this policy on gun violence without ShotSpotter data, these are the data we would have to use. The results are imprecise but generally suggest that the early curfew decreases gun violence. This different (and we argue incorrect) conclusion is likely due to the simultaneous effect of the curfew on reporting behavior and emphasizes the problem with using traditional crime data for the study of gun violence.

NOTE

This research brief is based on Jillian B. Carr and Jennifer L. Doleac, "Keep the Kids Inside? Juvenile Curfews and Urban Gun Violence," Batten Working Paper no. 2014-003, December 2015, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2486903.