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Youth Gun Violence Prevention in a Digital Age

Desmond Upton Patton, PhD, MSW[a], **Kyle McGregor, PhD**[b,c], **Gary Slutkin, MD**[d]

[a]School of Social Work, Columbia University, New York, New York;

[b]Department of Division of Medical Ethics, Population Health, School of Medicine, New York University, New York, New York;

[c]Departments of Child and Adolescent Psychiatry, School of Medicine, New York University, New York, New York;

[d]University of Illinois, Chicago, Illinois

Gakirah Barnes, a 17-year old who publicly claimed affiliation with a well-known Chicago gang, was killed just 3 blocks from her home in 2014. She had revealed her address in real time on social media, which directed the perpetrators to her exact location. Her Twitter account revealed a road map of clues about the trauma she endured and her own engagement in violence. Her online history included direct and indirect threats toward known rival gangs, boastful discussions of the perpetration of past violence, images and videos of her with semiautomatic handguns, and countless expressions of loss and grief. Although it is evident that Gakirah's Twitter posts played a role in her killing, could the same social media information have been used to prevent her death?

Firearm violence is a serious public health problem in the United States, where the firearm death rate is 10 times higher than other high-income, industrialized nations. Firearm violence is particularly acute in large cities, where violence tends to cluster in marginalized communities of color. In a report from the University of Chicago Crime Laboratory,[1] researchers stated that Chicago experienced a 58% increase in homicides in 2016; 80% of those homicide victims were African American, and within that group, most were males between the ages of 15 and 34 with at least 1 previous arrest. In addition, for the first 6 months of 2017, Chicago logged 327 homicides, which puts it on pace to match the number of homicides last year.

Increasingly, we understand violence as an epidemic by which violent behavior transmits and spreads from exposure through face-to-face social interactions.[2] However, the transmission and spread of violence has moved beyond face-to-face interaction to virtual interaction, exacerbated by growth in social media usage. Such usage creates a "digital street" where youth experiences in violent neighborhoods are depicted with aggressive

Address correspondence to Desmond Upton Patton, PhD, MSW, Columbia University School of Social Work, 1255 Amsterdam Ave, New York, NY 10027. dp2787@columbia.edu.

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and threatening text, video, and images. The level of aggression, threat, and provocation content escalates on social media and leads to retaliation, a behavior known as "internet banging."[3] Social media, with their built-in (re)sharing features (eg, retweets, hashtags) can also inadvertently spread the traumatic effects of violent events among individuals and communities not directly involved in the violence.

Although Gakirah's story ended tragically, the ways in which she used Twitter to express herself are not unique in our current digital era. People from all segments of society all over the world are turning to social media to tell their stories, share their lives, and find and build community. Social media have become a space where people post a great deal of information, some of which may provide insight and solutions to highly complex social problems. Social media data can provide an easier way to generate and access information about marginalized communities. In data from the Pew Research Center,[4] it is indicated that African American and Latino youth use the internet more frequently than white teenagers, with 34% and 32% (respectively) going online almost constantly compared with just 19% of white teenagers using the internet that often. Similarly, African American and Latino youth were found to use Twitter more often (45% and 34% use compared with 31% for white teenagers). Whereas several policy initiatives to curb gun violence have failed because of lack of interest, partisanship, or the negative influence of lobbying groups, social media data are readily available and could be a gateway to understanding and disputing gun violence.

Recent examples of social media data use to track influenza[5] and Zika[6] have had some success in understanding the spread and contagion of these disease processes. Under the right circumstances, this approach could be used for reducing firearm violence in our urban centers if researchers can identify and detect key content in social media posts that may predict offline violence. However, harnessing the power of this approach will require a drastic reconceptualization of firearm violence detection and prevention.

Social media data (eg, text, images, emojis, and hashtags) can allow for instant identification of risky behaviors, such as individuals brandishing guns, mentions of intent to commit violence, or discussions of past violent actions. Additionally, social media data can provide unique insight into overall well-being as well as mental and physical health. However, the use of social media data in clinical settings should not be taken lightly. Misinterpretation of social media content might lead to misdiagnosis of one's mental health status or trigger unnecessary mandated reporting of perceived criminal behavior, which could lead to criminalization of our most marginalized patients.

Researchers from the SAFE Lab at Columbia University, led by one of the authors, Desmond Patton, used natural language processing algorithms to identify a sequence of expressed emotion on grief (eg, "Young brotha's still getting shot babies still dying…") and aggression (eg, "If we see a opp screw it we gne smoke em…") in Twitter data from gang-involved youth, which may serve as an indicator of violence to come.[7] In addition to identification, this research also elucidates an important social and psychological relationship between grief and aggression that can be used to prevent violence by providing youth with mental health counseling in newly developed virtual settings as well as traditional clinical practice.

Although law enforcement currently employ social media strategies to reduce homicide rates, the use of social media data can be punitive and lead to ethical concerns regarding the impact of surveillance on communities of color, how we interpret child behavior, and how we consult parents about their child's digital life. Rather than a punitive approach, some community organizations (eg, Cure Violence) embrace a prevention-based model to violence prevention that has had some success in reducing fatal injuries and homicides.[8]

We envision innovative youth gun violence prevention strategies in which social media and advances in artificial intelligence are used to identify unique characteristics in social media data that might indicate when, how, and why gun violence may occur. For example, researchers can use social media to gather real-time, population-level information regarding threatening content online, and they could partner with organizations such as the E-Responder program[9] in New York City that use individuals they called "credible messengers" to interrupt violence. In this program, the Citizens Crime Commission trained 26 credible messengers to track, identify, and de-escalate potentially violent conflicts online across 5 Cure Violence sites in New York City. During their pilot, credible messengers used an interruption tool kit to identify and assess 154 risky social media posts (eg, direct threats, pictures with guns) and determine how to respond. These initial efforts have highlighted some specific steps pediatric caregivers should consider implementing into clinical practice: asking patients and concerned family members to refrain from social media use while a patient is under physician care, asking direct questions about patients' social media use before an incident, partnering with violence outreach workers within the community to develop relationships and strategies to respond to violence, and working with community organizations and law enforcement to develop enhanced procedures to respond to violence.

The concept of prevention is the fundamental tenet of public health. Effective use of social media data can provide insights (in real time) about people and communities with the granularity necessary to prevent a wide range of social phenomena. With persistent barriers such as an absence of federal funding as well as a polarized political environment, this effort will be costly, ethically complex, and involve a great deal of research community partnerships. Effective use of social media data offers a potential opportunity to prevent violent ideas from turning into violent actions. However, these data are meaningless unless we can develop culturally and contextually driven prevention and intervention models. Investments are required to pilot some of these cutting-edge strategies that integrate computer science and strengths-based, trauma-informed care with public health and epidemic-control approaches. In addition, serious thought and consideration is needed in the process of developing appropriate intervention mechanisms that can provide responders with the resources and information needed to effectively disrupt violence online and in communities.

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