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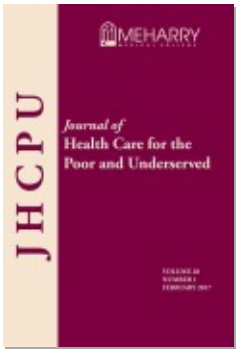

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ORIGINAL PAPER

Neighborhood Trauma Due to Violence: A Multilevel Analysis

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Abstract: In Syracuse, New York the social determinants of trauma from neighborhood violence are rooted in historical processes, including urban renewal, the Rockefeller drug laws, and de-industrialization. These contributed to destabilizing Syracuse communities of color, resulting in disproportionate incarceration, family disruption, and economic devastation. Community violence, clustering in densely populated neighborhoods, creates unmanageable stress for the families who live in them. A map of gunshots and gun fatalities (2009 to 2014) illustrates the continuing onslaught of bullets being fired, often in close proximity to elementary schools. A community survey indicated that over half of respondents personally knew more than 10 murder victims. Half the respondents scored positive on the Civilian PTSD Checklist; there thus is a great deal of unaddressed traumatic stress in the commu-

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nity. This analysis, conducted to prepare for planning future interventions to reduce the community trauma and violence, is part of an ongoing university-community collaboration.

Key words: Stress disorders, post-traumatic; historical trauma; violence; social determinants; structural racism.

This article presents a multilevel analysis of the social determinants and consequences of neighborhood trauma due to violence in Syracuse, New York. This community-based violence appears to be a risk factor for various adverse outcomes including severe emotional distress, disproportionate health and mental health problems, and school failure.[1] Beginning in 2008 Syracuse University faculty and community members conducted joint research leading to the development of a model of the draw of street crime as a behavioral addiction, based on ethnographic interviews with former gang members.[2] The publication describing this model advised that gang member treatment programs include addiction recovery services. In 2010, community members established the Trauma Response Team (TRT), in collaboration with local police, emergency response teams, health care organizations, Mothers against Gun Violence, and faculty of Syracuse University. The TRT responds to neighborhood murders, assisting police and first responders and providing immediate help to family members of the victims.[3] Emerging from this work is the understanding that for each neighborhood murder, an estimated 200 people are affected. Our article on the TRT reviewed the gang violence interventions nationwide which we found were commonly focused on gang member mediation to the near exclusion of the trauma of close associates and neighbors living in high murder neighborhoods.[3] Unaddressed community trauma appears to fuel subsequent retaliatory murders in a feuding pattern.[3] In the past year, as described below, the violence in Syracuse has increased. Perpetrators of the violence have spread beyond the originally identified gangs to include youth and young adults who had not been identified as gang members.[3] We realized that we needed a more comprehensive approach to address the increasing conflict and undertook the steps outlined below, which are the focus of this article.

- Reviewed several conceptual models to better understand the Syracuse situation.
- Compiled historical and contemporary socioeconomic data relevant to the violence.
- Undertook two phases of additional research to provide a baseline and community assessment for future interventions: 1) an analysis of spatio-temporal trends and determinants of all gunshots for a four-year period (2009 to 2014) with data from the Syracuse Police, and 2) a survey of 111 neighborhood residents at outdoor fairs and public activities assessing each respondent's score on the civilian Post-Traumatic Stress Disorder screening tool and the number of murdered individuals with whom they had been acquainted. Those studies were approved by the Syracuse University IRB (#14:188).

This collaboration is an extension of a model of university-community collaboration developed by Lane and Rubinstein, called Community Action Research and Education (CARE).[4–6] This collaborative approach draws on action anthropology, and is a

form of community-based participatory research, university-community partnerships, problem-based learning, and community-engaged scholarship. Each CARE project is based upon respectful collaboration with community members in which students, faculty, and community members together conduct research and undertake interventions.[5,7] As we describe in detail elsewhere, the selection of research questions, research design, and data collection strategies are all worked out collaboratively in the context of the CARE research network.[5] Additionally, university faculty, community members, and students are co-authors on all publications and each grant application is jointly crafted.

Social disruption and violence in Syracuse, New York. Located in Onondaga County, Central New York's hub, Syracuse had a population of 145,170 in 2010.[8] In 2013 the average household income was $31,459.[8] One third of all Syracuse residents live below the federal poverty level, and among families with children under age 18, 43% fall below the poverty level. Nearly half (44%) Syracuse residents are People of Color: 30% of Syracusans are African American, 5.5% Asian, 1.1% Native American, and 8.3% are of Latino ethnicity.[8] Prior to the Affordable Care Act, about 25,000 Syracuse adults lacked health insurance.[9] Among Syracuse families with children under 18, 54% are female-headed, rather than two-parent.[8] Eleven percent of houses are vacant, making Syracuse is the 7th worst city in the U.S..[10] Vacant houses are a site for drug sales, rape, and other crimes.[11]

Syracuse's once booming economy has collapsed in the past three decades, a loss of income that is fundamental to the problems we are addressing.[12,13] Only about half of Syracuse students graduate from high school.[14] In Syracuse 18 of the 34 public schools have been designated as failing by New York State.[15] Among African American and Latino children who graduate from college, according to our community partners, very few stay in Syracuse because of lack of employment opportunities and perceived racism. The resulting "brain drain" among African American and Latino college graduates results in Syracuse Communities of Color having more concentrated poverty, fewer role models, and fewer adult leaders.

In Syracuse, law enforcement personnel identified 27 individual gangs, with 1,472 gang members.[16] Syracuse gangs operate in impoverished neighborhoods, covering 21 census tracts with a total of 49,000 residents (2010 U.S. Census). In those census tracts 53% of residents are People of Color, including 8% who are Latino.

In 2013 the per capita murder rate in Syracuse topped all cities in New York State.[17] Since 2009 Syracuse neighborhood murders (as opposed to domestic violence or other types of homicide) surpassed 20 per year. Between 2009 and 20014 Syracuse gang members committed 78% of all the city's homicides compared to the national average 12%.[18] On average police have documented 325 yearly gunshot episodes (more than one bullet was fired in each episode), which the map below demonstrates are tightly clustered in impoverished neighborhoods.[19] Between January and May 2015, 38 individuals were injured by gunshots and the July 4th weekend was especially violent, with 11 individuals shot, two of whom died. A study, using data from 2006 to 2008 calculated that just the emergency medical care for each gunshot victim totaled $28,510,[20] with much greater costs for the continuing care of those injured. Multiplying the estimated cost of emergency care to treat each gunshot victim by the number of such injuries in

Syracuse, our analysis suggests that the cost to cover the emergency care of gunshot injuries in Syracuse totals over $2.5 million per year.

Conceptual models, unintended consequences of policies, and syndemics. Our multilevel approach draws on a number of different theoretical models, as befits the level of analysis being conducted.[21,22] The models from each level are complementary and interlocking—they reinforce rather than contradict or fail to relate to one another. This section also integrates historical and contemporary policies with socioeconomic data, which illustrate the context that we argue gives rise to Syracuse's current violence.

Stage-state model of community disintegration. Overall, we integrate our individual level understandings of the many types of trauma in Syracuse using the perspective of the "stage-state model of community disintegration," developed by Mindy Thompson Fullilove.[23,24] This model posits that communities can be destabilized by processes of historical trauma and uprooting, such as in urban renewal, which lead to a rupture of social networks, loss of resources and alteration in social interaction. The communities will immediately try to restabilize themselves, but, if assaulted again, will fall apart more, typically from a lower baseline than they had at first. This disintegration involves negative feedback loops, with maladaptive behaviors that arise in the context of a new social state. The behaviors that arise in this downward spiral include greater aggression and violence, as well as drug use. Those maladaptive behaviors may appear to solve the immediate problem of fear and overwhelming stress, but also create the context for the next cycle of community violence and breakdown.

The stage-state model incorporates the concept of structural racism.[25,26] It also integrates an understanding of historical trauma, as described by Sotero, who argues that populations that suffered mass trauma experience persistent, intergenerational suffering.[27] A Substance Abuse and Mental Health Services Administration fact sheet on historical trauma points out that such suffering is both "cumulative and collective," involving unresolved grief that lacks public recognition, as well as internalized oppression.[28] Among the repeated and historical traumas that have increased minority community destabilization in Syracuse have been four major processes: urban renewal (1960s to 1970s), the Rockefeller drug laws (1972 to 2009), deindustrialization (1960 to present), and RICO legislation (2003 to present). The unintended consequences of these policies have been particularly destabilizing for Communities of Color in Syracuse despite each of the policies having been implemented with the intention to improve the social, economic and political health of Syracuse.

- Urban renewal: Starting in 1961, 27 square blocks of what was called the 15th Ward were leveled, displacing some 1,300 residents.[29] The displaced families moved largely to the near South and Southwest sides of Syracuse.[11] The 15th Ward was home to a multiethnic group of mainly African American and Jewish residents; although many were impoverished, the 15th Ward had numerous small businesses, including groceries, a community center, and entertainment venues. Many 15th Ward residents had been homeowners, and were given lump sum payments by the county toward the purchase of a new home in compensation for their homes having been taken by eminent domain. Because of persistent mortgage discrimination, many former homeowners became renters in areas that became

increasingly racially segregated.[11] After two expressways were built that bisected Syracuse, White flight to the suburbs further increased segregation in the city.[11]

- Rockefeller Drug laws: In 1973 New York State enacted legislation to control the sale and consumption of illicit drugs, mandating lengthy sentences.[30] A 2007 report documented that in Onondaga County the per capita sentencing of African Americans for drug related crimes was 98 times that of European Americans during 2006.[31] Important contextual information for interpreting this racial disparity is the fact that urine drug screens conducted on all pregnant women in one of the largest prenatal clinics serving lower socioeconomic patients in Syracuse found no statistically significant difference in evidence of drug use between African American and European American women.[11] This biological evidence of drug use by pregnant women can be viewed as a proxy for drug use by the populations from which they are drawn. While urine drug screens may be an imperfect measure it is a striking finding that there was no racial disparity in drug ingestion by pregnant women, yet drug related sentencing was 98 times higher for African Americans. The Rockefeller Drug Laws were revised in 2009,[32] but during their 36 years of implementation the proportion of African American female-headed households in Onondaga County doubled.[33] Our research team also demonstrated that such disproportionate incarceration was a major risk factor for the rise in heterosexual transmission of HIV among women of color.[30]
- Deindustrialization (1960 to present): In common with other areas of the Northeast, Syracuse experienced a shift in its economic base away from manufacturing, with the loss of jobs at more than 11 major industries.[34] Those industries had created well-paying jobs for people with skilled trades or high-school level education, because they were heavily unionized.[35] The major employers remaining in Syracuse are many universities and hospitals, with the majority of jobs in the service economy, many paying minimum wage and lacking benefits.[36,37] Syracuse has not only recovered fewer than three-fourths of the jobs lost in the recession of 2008, lagging behind other upstate New York cities in this recovery, as well the new jobs do not replace the income or job stability that manufacturing jobs offered.[37]
- RICO, the Racketeer Influenced and Corrupt Organization Act of 1970, was intended as a criminal justice response to organized crime. In 2009, Syracuse became the first city in which RICO legislation was applied in a geographic manner.[38] The gang violence problem in Syracuse is serious and alarming. Using the RICO statutes, however, has been an extremely aggressive but ultimately unsuccessful response to the problem. Since the implementation of RICO, neighborhood murders have increased. Syracuse Police Lt. Carr summed up the failure of RICO-based efforts to control the violence, "Through the course of time there's been RICO. Racketeering and arrests on the federal end, for different gangs, but that hasn't ended all gang activity in the city of Syracuse."[38]

Syndemics: Our analysis of neighborhood trauma due to violence also draws on the syndemic model developed by Merrill Singer who argues that a negative synergy happens when two or more diseases or exposures occur in a population, especially among

those living in poverty.[39] Three conditions that negatively interact are lead poisoning, exposure to violence and school failure.

Early childhood lead poisoning is a risk factor for subsequent criminal justice involvement and for school failure.[40] From 2000–2001, during the infancy of adolescents now aged 14 to 15, the prevalence of elevated blood lead (EBL) among children in Onondaga County was the second highest in New York State outside of New York City. From 2000–2003, elevated blood lead (10 mcg/dl) was identified in 10.8% of White children (425 of 3940 tested) and 22.7% of African-American children (1112 of 4899 tested) in Onondaga County.[5] Although lead exposure has fortunately decreased in the past decade it remains a problem in the areas hardest hit by neighborhood violence: the highest gunshot and murder ZIP codes 13204 and 13205 account for 38% of blood lead (10–15mcg/dl) and 44% blood lead (>/=15mcg/dl) in Onondaga County.[41] A landmark study in Cincinnati found that early childhood lead exposure was a significant risk factor for adolescent and young adult involvement in violent crime.[42] A wealth of studies demonstrate the link between lead exposure and learning deficits.[43–45] Lead exposure is a major risk factor for the racial gap in school readiness and for the over representation of minority children in special education.[46,47] Exposure to violence and living in communities with pervasive violence also have adverse effects on children's academic achievement.[48] Violence exposure is associated with higher rates of school absence, lower reading ability, lower graduation rates, and decreased IQ scores.[49,50]

The tragic synergy of lead poisoning and exposure to violence may be the root causes of the low level of educational attainment in the Syracuse City School District (SCSD).[14] Syracuse City School District official graduation rate in 2012 was 51.1%, compared with the state average of 74% and national average of 71%. However, the Syracuse official 2012 graduation rate is based only on students who reached the 12th grade; starting from this cohort's entry into the 9th grade, only 44% graduated. Among the four elementary schools located in the hardest-hit murder neighborhood, the 3rd grade English and Math standardized scores were troubling. New York State Department of Education grades those scores on a four point scale, with scores of 3 or 4 characterized as proficient. In the four elementary schools the proportion of students meeting the 3rd grade level of English proficiency ranged from 18 to 26%; in math the range was from 14 to 31%. Syracuse City School District suspension rates K-12 are 20%; the suspension rate for secondary school students is 31%.[14,34] The risk of suspension among African American males in SCSD secondary school is 38% among this population; among those with a disability the rate jumps to 55%.[14] Low levels of educational attainment in Syracuse may in turn increase community violence, when we consider the fact that success in school helps mitigate the effects of trauma exposure and reduces the likelihood of youth engaging in high-risk behavior and becoming involved with the justice system.[51]

The trauma that children experience influences their behavior in school. The Syracuse City School District is facing serious student behavioral issues, many that appear to result from children of different gang turf areas attending class together. Children have reported to our community collaborators that they do not feel safe in school, sitting next to students who might do them harm during visits to the bathroom where they might be assaulted, nor do they feel safe walking to school through adversarial gang turf neighborhoods. The School District has been criticized for its high suspen-

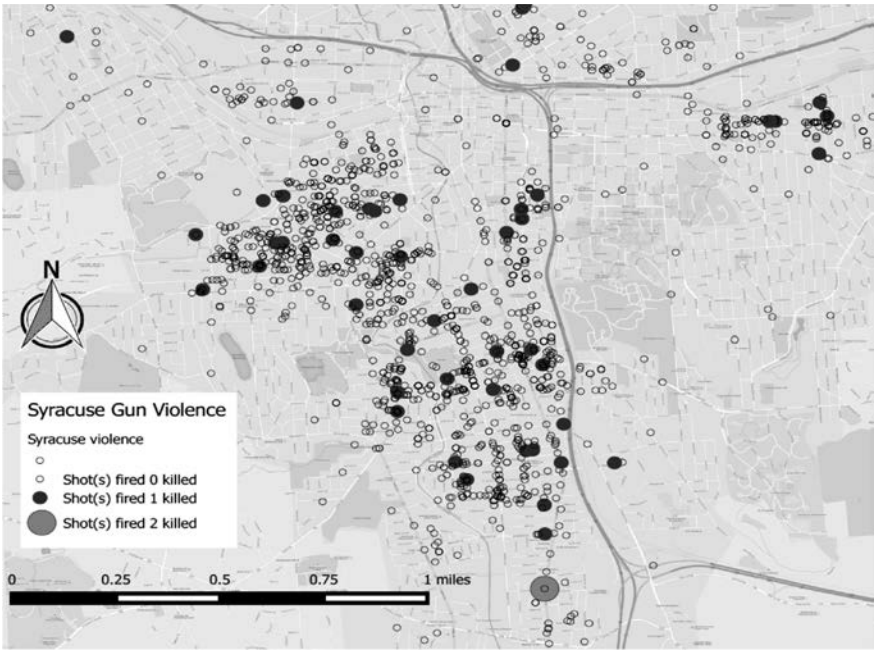

Figure 1. Gunshots and gunshot deaths, Syracuse NY 2009–2014.

sion rates, especially of minority students, and its harsh school discipline of children's behavioral problems. The analysis presented in this article supports the argument that the students' behavioral problems, and their test score failures and low graduation rates are likely part of a systemic problem of which the increasing school disruptive behavior is the most visible.[34]

The neighborhood violence and trauma map. Syracuse Police Chief Fowler provided us with the location of all gun shots fired, and gun-related fatalities in Syracuse during 2009 to 2014. The data were de-identified by the police prior to it being sent to us. Using Geographic Information System software the data were mapped on a City of Syracuse map for two outcomes: incidents of gunshots and the location of gunshots that resulted in fatalities. We did this by using the MMQGIS plug-in for Quantum GIS version 2.0 to convert the addresses of gunshots to geo-coordinates. In another paper from our research network we explore in greater depth the spatio-temporal patterning of gun violence in Syracuse.

This spatial distribution of gunshots, non-fatal gun injuries and gun fatalities has been used in numerous neighborhood meetings, to share this information with the community and to get feedback on community members' ideas about how to best address the violence.

In addition to this geo-spatial documentation of gunshots, another study conducted in the same Syracuse neighborhoods using photo-voice mapping by community members links local perspectives of danger and risk to specific aspects of the neighborhoods where gunshots are tightly clustered on the map.[52]

The survey of neighborhood trauma. In the past five years, as documented in

Medline, published studies have begun to assess post-traumatic stress disorder (PTSD) symptoms among urban dwellers in the United States. The DSM V defines PTSD as an anxiety disorder following "exposure to actual or threatened death, serious injury or sexual violation."[53[p. 1]] Studies that examined the association of PTSD with traumatic injury, sexual violence, and poverty found that the ability to focus was reduced, whereas obesity and criminal justice involvement was increased among those who screened positive for PTSD.[54–56] Our study features the Civilian PTSD checklist in the survey and compares this measure with emotional distress associated with gun-related murders.

The survey began with demographic information (ZIP code of residence, gender, age, and race/ethnicity). Next it asked respondents to fill in the *Civilian PTSD Checklist*. This checklist, which has been extensively evaluated, was found to have "internal consistency, test–retest reliability, convergent validity, and discriminant validity."[57[p. 495]] Civilian Version (PCL), a 17-item inventory evaluates self-reported PTSD symptoms resulting from traumatic and stressful events. Participants respond to each item rating how much they have been bothered by the symptoms in the past month on a scale of 1 (not at all) to 5 (extremely). The PCL yields an aggregate score ranging from a possible low of 17 to a high of 85. The PCL is based on DSMIV diagnostic criteria of (a) re-experiencing the traumatic event; (b) avoidance of stimuli and reminders associated with the event and numbing; and (c) increased arousal, hyper-arousal, and startle response. The recommended cutoff criteria for the PCL in a non-clinical or institutionalized population is a score of 35 or higher.[57–59] The PCL has demonstrated reliability and validity for use with urban civilians.[60] The survey then asked how many people the respondent has known in his or her lifetime who have been murdered.

We requested and were granted a waiver of written informed consent from the IRB for this phase of the study, instead providing oral consent, because the nature of this information is potentially legally sensitive and the only record of a participants' role in the study would be the written informed consent document.

In order to gain an understanding of the burden of trauma in the gunshot cluster areas we conducted a survey of individuals at sites within the general geographic area. This survey was solicited from approximately 130 individuals. Of those approached a total of 111 individuals (a participation rate of about 85%) completed the survey, which was administered at outdoor and other public locations. Those who declined to take the survey said they preferred not to participate as participating would be too upsetting for them. We selected sentinel locations, where minority residents would be in attendance, such as the Juneteenth celebration, Pop Warner football games, and the waiting area of a hair salon. The majority of respondents (n = 95) identified themselves as African American; 10 reported more than one race/ethnicity and six identified themselves as White. Given this data collection strategy the survey results are not generalizable to the gunshot cluster areas. Rather, the extremes found in this survey give an indication of the depth and severity—but not the precise prevalence—of trauma within the community.

Among the respondents, a total of 96 answered the question about the number of individuals they knew who had been murdered. Many who did not complete that section said that it was too painful to answer. The majority of respondents (n = 80) knew at least one individual who had been murdered (range 1–101), although two

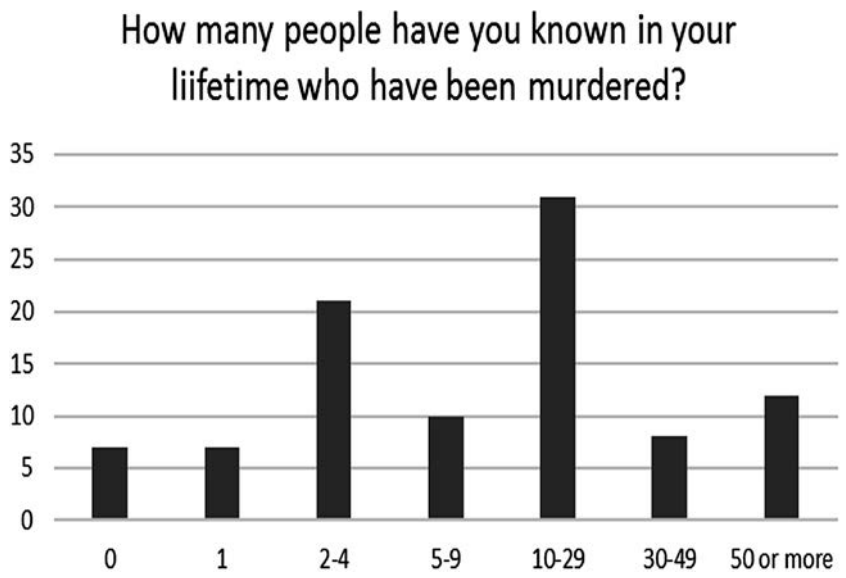

Figure 2. Total number of murdered individuals known to survey respondents.

were not able to give precise numbers, responding instead, "too many to count." Only seven knew no murdered individuals. The graph above shows the responses to that question.

Half of the respondents (n = 58, 52%) met the criteria for PTSD based on their score (of 35 or greater) on the Civilian PTSD checklist. Of course, this was a one-time screening, not a professional diagnosis; the participants are also not statistically representative of Syracuse or even all minority residents in Syracuse. However, the results indicate that there may be a great deal of unaddressed traumatic stress and pain in the community. According to the Veterans Administration, about 7–8% of the average American civilian population would screen positive for PTSD based on the Civilian PTSD checklist, while the prevalence for veterans is 11–22%.[61] As we noted earlier, the sampling strategy used for the collection of these data limits their generalizability. While we had a relatively high participation rate of 85% in our survey, there is still the possibility of self-selection bias. Those who declined to participate most commonly said they did so because they felt that responding to the survey would cause them discomfort. We do not see any other patterning of the characteristics of those who refused to participate. Nonetheless, these results are indicative rather than definitive.

Discussion

Community violence is more closely related to traumatic stress and PTSD than any other form of violence exposure, which has far reaching harmful effects on the entire community.[62] Researchers have found significant associations between children's exposure to violence in urban communities, posttraumatic stress, and maladaptive behavior.[62–66] Exposure to community violence and unaddressed trauma have been shown to be

significant risk factors for future perpetration of crime and violence. Youth exposed to violence are at greater risk of aggression, substance abuse, adult criminality, depression, anxiety and other mental health problems.[67] Childhood exposure to violence increases reactivity and worsens impulse control, both of which contribute to the perpetuation of aggression, violence and retaliatory behavior.[68,69] Witnessing community violence increases the risk of substance use and emotional numbing.[70–72] Emotional numbing in response to trauma exposure (witnessing and experiencing community violence, or seeing a dead body) can lead to the development of de-humanization symptoms that further increase risk of perpetrating violence and future offending.[71] The emotional and neural dysregulation that accompany continued and unaddressed trauma promote the propensity of future violence, delinquency, acting out, and antisocial behaviors.[73,74]

The problem with applying the concept of PTSD to individuals, and families living in the Syracuse neighborhoods with high rates of community violence, is that there is no "post" phase to the traumatic stress, which instead has continued and has gotten worse for over a decade. The resultant hyper-vigilance and fear are among the reasons that youth who witness violence in their neighborhoods are more likely to carry a weapon.[75] Fear from community violence also disrupts behavioral regulation, thus reinforcing the perception that violence can be an effective problem-solving technique.[75] These factors contribute to the perpetuation of cycles of violence.

In Syracuse exposure to the trauma of prolonged and intense neighborhood violence, occurs in communities that have suffered historical trauma, uprooting, disproportionate incarceration, family disruption, lead poisoning and economic devastation. Communities awash in gang violence and chaos create unmanageable stress for the families who live in them. When communities are not safe for the people who live in them, it is difficult for family members to thrive well enough to do the work needed to care for each other. Children cannot play outside and walking to school is filled with danger. The violence and level of danger does not stop at the school door but is carried into the building. Learning becomes a challenge and behavior management in the school district becomes a top priority. Helping and service professionals of all backgrounds, who interact daily with the traumatized Syracuse communities may experience vicarious traumatization. Such secondary trauma can cause compassion fatigue leading teachers, early childhood providers, social workers, police, emergency personnel, and others to dehumanize the very people they are intended to help, fear for their own safety, and respond more aggressively than they would have otherwise.[76,77]

Future steps. As described in the introduction to this article, we have established a partnership with the Trauma Response Team, Syracuse Police, Mothers against Gun Violence, health care and emergency personnel, and Syracuse University faculty and students. The analyses presented herein are the background to our future work. To date we have successfully obtained two foundation grants and have submitted other proposals for funding. The interventions that we have begun to implement aim to reduce violence and traumatic stress of residents in the gunshot cluster areas. Our interventions aim: 1) to directly intervene to cut the cycle of feuding and retaliatory violence, 2) to begin to restabilize the community, by reducing the traumatic stress, and 3) to increase mechanisms for community input into the interventions.

- Extending the work of the Trauma Response Team to provide care and follow up for non-fatal shooting victims and their families. Earlier work by our team indicates that shooting victims and their close associates may be the next perpetrators of violence. TRT plans on establishing a case management protocol (offering psychotherapeutic, mindfulness, conflict resolution, and other services) for the non-fatally injured and their families, seeking partnership with local institutions to establish a respite house (similar to a domestic violence shelter) where non-fatally injured persons and their families could stay after release from the hospital and receive services.
- Expanding community access to individual and family therapy and mind-body-stress-reduction, as well as offering training in trauma informed practice to Syracuse professionals (teachers, police, emergency personnel, social workers, and health care providers) to help them better deal with their traumatized students and clients and to gain skills to psychologically protect themselves. The interventions aimed at reducing traumatic stress among residents of the gunshot cluster areas and the professionals who care for them include: 1) Offer mindfulness based stress reduction, by training a cohort of community members and assisting them to incorporate such training into their professional practice and to lead such groups in the community, 2) Expand no cost access to individual and family psychotherapy offered by faculty and graduate students of the Department of Marriage and Family Therapy, and 3) Offer training in Trauma-Informed Practice and Non-violence conflict resolution to Syracuse professionals at their worksites to help them better deal with their traumatized students and clients and to gain psychological skills to protect themselves.
- Hosting community meetings, bringing together a community advisory board, and developing a website with publically available information about violence and interventions in Syracuse, so that the most affected individuals can help guide the interventions.

Those interventions are based on approaches to trauma-informed practice, fueled by the intersection of research from the fields of neuroscience, developmental and attachment theories, and interpersonal neurobiology, coupled with evidence-based practice in individual models of psychotherapy treatment. Faculty researchers on our team have implemented such approaches with returning military veterans experiencing PTSD,[78,79] as well as families experiencing interpersonal violence.[80] However, Syracuse has long-standing and severe inequalities and stresses that led to today's tragic situation of overwhelming violence; the violence is ongoing and increasing. The interventions that we have developed may positively influence elements of the situation, and we may decrease the violence, as well as the stress and trauma of residents. However, the systemic and multifaceted problems that led to and serve to fuel the violence will be a challenge to ameliorate.

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