

USE OF A TRAUMA INFORMED CARE FRAMEWORK TO CREATE  
BIDIRECTIONAL LEARNING OPPORTUNITIES IN A  
CRITICAL SERVICE LEARNING CURRICULUM

A Thesis  
Submitted to  
the Temple University Graduate Board

---

In Partial Fulfillment  
of the Requirements for the Degree  
MASTER OF ARTS

---

by  
Whitney Vielka Cabey MD, MSHP  
Diploma Date (August 2020)



Thesis Approvals:

Nora Jones PhD, Thesis Advisor, Center for Bioethics, Urban Health, and Policy

## ABSTRACT

Addressing childhood trauma is increasingly being recognized as a priority in public health, healthcare and health policy sectors. As evidence mounts that the effects of trauma are both graded and dose responsive, stakeholders in healthcare are turning more attention to preventing and addressing experiences of trauma in childhood, commonly referred to as adverse childhood experiences (ACEs). Trauma Informed Care (TIC), is a promising clinical approach attuned to the specific needs of traumatized patients that is still in its infancy with regards to training and evaluation of practitioner skills. Although physicians of all specialties will encounter patients who have experienced trauma, few undergraduate medical education curriculums provide formal training in TIC. Additionally, the approach to TIC in clinical settings has largely been biomedical and individual, with a focus on screening and treatment. This model ignores the role that communities play in both propagating trauma and generating resiliency.

Urban academic medical centers, often geographically located in highly traumatized communities, must take a specific interest in developing TIC research, theory and praxis that includes and empowers communities. Service learning, a form of experiential education that cultivates self-awareness in students while simultaneously meeting community objectives, is a pedagogy that aligns with a community driven TIC framework. This thesis outlines the implementation of a community driven, bi-directional TIC learning model designed to serve the needs of medical students and low income K-8<sup>th</sup> grade students living in the geographic catchment of an urban, academic medical center.

For Finley, Hassan, and Octavia, who support and guide my work.

For the children of North Philadelphia, who give my work meaning.

## ACKNOWLEDGMENTS

Special thanks to:

Carol Smith, MBA

The Pincus Family Foundation

TABLE OF CONTENTS

ABSTRACT.....II

ACKNOWLEDGMENTS ..... IV

LIST OF FIGURES ..... VII

FORWARD ..... VIII

CHAPTER 1 ..... 1

SCOPE AND IMPACT OF CHILDHOOD TRAUMA ..... 1

    Trauma Informed Care: Promises and Challenges ..... 3

    Trauma in North Philadelphia..... 5

    Trauma in Philadelphia Schools ..... 6

    Traumatic Impacts of the COVID-19 Global Pandemic ..... 7

    Trauma Informed Care in Out of School Time: Creating an Intersectional Space  
    for Healing, Learning and Violence Prevention ..... 8

CHAPTER 2 ..... 11

EQUITABLE COMMUNITY-ACADEMIC PARTNERSHIP: CREATING  
BIDIRECTIONAL LEARNING OPPORTUNITIES IN SERVICE LEARNING USING  
A TRAUMA INFORMED CARE FRAMEWORK..... 11

    Challenges to Critical Service Learning at Micro, Meso and Macro Levels..... 13

        Micro-Level Challenges..... 13

        Mezzo-Level Challenges ..... 14

        Macro-Level Challenges..... 15

    Trauma Informed Care as Operationalized Critical Service Learning Theory..... 16

Case Study: The STEM Stars Program.....	17
Gaps and Tensions in the Community Driven TIC Service Learning Approach .	22
Next Steps and Future Directions .....	24
WORKS CITED .....	26

## LIST OF FIGURES

Figure	Page
1. Figure 1. ACEs Pyramid.....	03
2. Figure 2. Privilege/Oppression Wheel.....	21
3. Figure 3. Identity Word Cloud.....	21

## FORWARD

This thesis outlines my experience developing, implementing and refining STEM Stars, a trauma informed, out-of-school time (OST) program for kindergarten through 8<sup>th</sup> grade low income students, that also functioned as a service learning program for first and second year medical students. Developed in collaboration with partners at a community center serving low income public housing residents in North Philadelphia, STEM Stars embedded TIC principles within a science, technology, engineering and mathematics enrichment curriculum. Staffed by medical students and administered to K-8<sup>th</sup> grade students who attended the OST program, STEM Stars developed into a hands-on, bi-directional learning experience that addressed the needs of both medical students and K-8<sup>th</sup> grade students.

The thesis is divided into two sections; first, background to the need for the program, outlining the scope of the problem of trauma and adverse childhood experiences in North Philadelphia. Second, a reflection on the year one implementation of STEM Stars as a trauma informed service learning program.



## CHAPTER 1

### SCOPE AND IMPACT OF CHILDHOOD TRAUMA

Addressing childhood trauma is increasingly being recognized as a priority in public health, healthcare and health policy sectors. Contemporary definitions of trauma encompass a wide range of physical, psychological and emotional forms of violence, as well as forms of structural violence resulting from systemic inequalities like poverty and racism. Exposure to violence and other forms of adversity (including food insecurity, neglect, and housing instability) as a child increases the risks of poor health outcomes and future victimization or perpetration of violence in adolescence and adulthood (Berg and Mulford 2020; Duke et al. 2010; Farrell and Zimmerman 2018; Fox et al. 2015). Untreated trauma taxes children's developing neurologic, endocrine and immune systems in ways that can cause impairments in learning (Hair et al. 2015; Lomanowska et al. 2017; National Scientific Council on the Developing Child 2010). This, in turn, increases the risks for low academic achievement and behavioral problems (Delaney-Black et al. 2002; Greeson et al. 2014; Spano, Rivera, and Bolland 2010). The likelihood of longstanding functional impairment increases with repeated exposures.

As evidence mounts that the effects of trauma are both graded and dose responsive, stakeholders in healthcare are turning more attention to preventing and addressing experiences of trauma in childhood, commonly referred to as adverse childhood experiences (ACEs). While there are a wide variety of traumas experienced by both children and adults, researchers and clinicians are often referring to 10 common and well researched childhood events when describing ACEs and the ACE score, a summary value of exposure to those 10 forms of trauma. Five are personal: verbal abuse, physical abuse, sexual abuse, physical neglect, and emotional

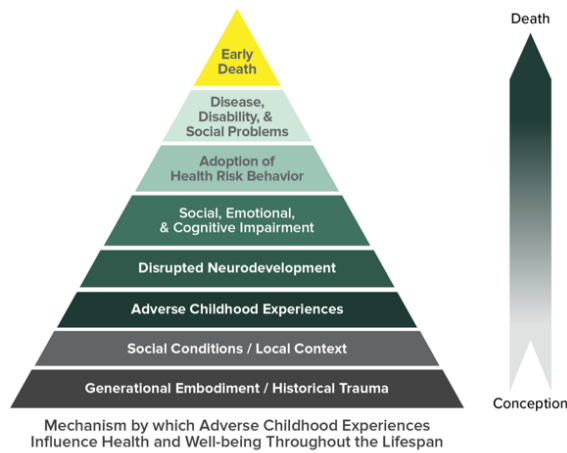


Figure 1. ACEs Pyramid, adapted from cdc.gov

neglect. The other 5 are related to family members: parental alcoholism, witnessing interpersonal violence, experiencing a family member being incarcerated, living with a mentally ill family member, or the disappearance of a parent through divorce, death or

abandonment. Originally conceptualized and described in a landmark paper by Felitti, high ACE scores have been associated with increased risks for the leading causes of death in the United States including heart disease, lung disease, substance abuse, suicidality, and violence perpetration/victimization (Dube et al. 2003; Felitti et al. 1998; Gaylord-Harden et al. 2017; Gorman-Smith and Tolan 1998). This causal pathway is commonly referred to as the ACEs pyramid (Figure 1). Finding effective strategies to interrupt this pathway, i.e. limiting the exposures at the base of the pyramid to prevent early death at the peak of the pyramid, is a critical need for the healthy success of communities impacted by trauma.

Trauma can impact anyone, but its incidence and lasting effects are not spread equally across populations. Low income minorities have higher reported incidences of many forms of traumatic exposures (Cronholm et al. 2015; Dube et al. 2003; Felitti et al. 1998). Poverty and racism are themselves forms of violence. Individual experiences of bias, discrimination and bigotry can be psychologically damaging. In addition to the direct stressors from housing instability and food insecurity, living in poverty limits access to resources and opportunities that

ameliorate the negative impacts of trauma, such as high quality schools, cohesive neighborhoods and adequately trained service providers.

### Trauma Informed Care: Promises and Challenges

Trauma Informed Care (TIC) is a framework for a clinical approach attuned to the specific needs of traumatized patients. While no universally accepted definition of TIC exists, many rely on the description outlined by the Substance Abuse and Mental Health Administration of a trauma informed practitioner or organization as one that “realizes the widespread impact of trauma and understands potential paths for recovery; recognizes the signs and symptoms of trauma in clients, families, staff, and others involved with the system; responds by fully integrating knowledge about trauma into policies, procedures, and practices; and seeks to actively resist retraumatization (i.e. a relapse into a state of trauma, triggered by a new, sometimes unintentional event)”(Substance Abuse and Mental Health Services Administration (SAMHSA) 2014). TIC shows promise as a framework for patient-centered medical and behavioral healthcare that promotes healing, decreases the risks of inadvertent emotional injury during healthcare encounters and improves the therapeutic alliance between patient and provider. Although the principles of TIC are framed around trauma survivors, implementing TIC may improve patient-centered communication skills regardless of the patient’s trauma history (Green et al. 2015).

Physicians of all specialties will invariably encounter patients who have experienced trauma because ACEs are exceedingly common in the United States. As many as 90% of American adults have had a prior exposure to at least one traumatic event, and up to 70% were exposed during childhood (Kilpatrick et al. 2013). Statewide, an estimated 51% of Pennsylvania adults have experienced one or more adverse childhood experiences (Pennsylvania DOH, 2018).

The city of Philadelphia is no less impacted; 70% of adults report at least one childhood exposure to trauma (Cronholm et al. 2015). Given that the problem is so pervasive, it is concerning that few undergraduate medical education curriculums provide formal training in TIC (Nandi et al. 2018). Graduate medical education offerings are also far behind the need; residency directors and medical residents in diverse specialties report low rates of formal training and lack of confidence translating didactic knowledge into clinical practice (Dichter et al. 2018; Kosman and Levy-Carrick 2019; Rosen et al. 2017; Tink et al. 2017). Widespread adoption of TIC in healthcare settings will remain limited without more focused attention on the development of educational best practices.

Simultaneously, more focus is needed on the development of community driven pathways to healing. Although the principles of TIC have always been framed around trauma survivors, the emphasis has been on screening, linkages to treatment and organizational change. Additionally, the theory behind TIC is well referenced, while design and implementation strategies are largely anecdotal and typically lack rigorous evaluation. The most publicized and popular models arise from institutional, rather than community, settings (Kataoka et al. 2018; Marsac et al. 2016).

The leading edge of the field is now challenging TIC experts to better address the ways that both geographically bound and socially constructed communities play a role in the creation of trauma, healing from trauma and developing protective factors against future trauma. Notably absent are validated programs that address both individual and structural violence. Only a few established models are explicit about understanding and addressing injuries from bias, discrimination, residential segregation, and intergenerational poverty, in addition to interpersonal forms of violence. This is especially relevant for the approach to research, theory and praxis of

TIC in urban academic medical centers where the of residents highly disparate, highly traumatized communities are often the primary patient populations for medical trainees.

### Trauma in North Philadelphia

The community partner is a community service center serving residents in and around a privately owned Housing and Urban Development property in North Philadelphia. Currently there are 283 residents: 38.2% are children, 80% of units have single female head of households and all meet the 30% below federal poverty level income requirement. In 2012, the owners self-invested 1.5 million dollars to erect the 8,500 sq. ft. community center. With 2,500 unique lives served annually, the reach of the center goes far beyond the geographic borders of the housing development. They design high quality, community-based initiatives focused on wellness, educational enrichment and economic empowerment in an environment that is safe and invites sharing of ideas. Their staff reflects the demographics of the community: 85% are African American, 50% are women and 80% are native Philadelphians. The OST program is now in its 7th year of providing free enrichment services to K-8th grade housing development residents and surrounding community members. Since 2012, 450 children have participated in OST or summer camp programming. Enrollment in OST hovers at 25 students.

Understanding both the ACEs pyramid and the concept of structural violence provides some theoretical explanation for why residents in the neighborhood surrounding the housing development have the second lowest life expectancy at birth in the city of Philadelphia. The average resident in the 19121 zip code lives 69 years, compared to 88 years in the healthiest neighborhood (Chapman, 2016). 19121 bounds a predominantly African American (80%) community where rates of interpersonal, community and structural violence are alarmingly high.

This zip code has consistently been among the top three for fatal and non-fatal shootings citywide since homicide rates began to rise in 2014. Key among the structural and systemic traumas is poverty. The neighborhood suffers from high rates of individuals living below the federal poverty level (45.96%), who are unemployed (20.95%) and who were unable to graduate from high school (23.13%) (American Community Survey, 2018). This environment sets residents born in this section of Philadelphia on a collision course with ACEs and adversity.

### Trauma in Philadelphia Schools

Unfortunately for many OST program participants, the school environment is also unsafe. Students in the OST program attend one of four neighborhood schools including one parochial, two charter and one public school. The decentralized landscape of the Philadelphia educational system creates and reinforces inequities; the students have different rates of exposure to violence, curricula of differing intensities, and differing degrees of access to enrichment and extracurricular opportunities.

Very little public information is available regarding the parochial school. Publicly available information on the charter schools reveals low academic performance on standardized tests in comparison to state medians and up to 10 reportable safety incidents per 100 students in the 2018-19 school year. Most concerning is the landscape of the public school, which is recognized as one of the poorest performing schools statewide. There were 12.6 reportable safety incidents per 100 students in 2018-19. While this is typical of low performing schools in the city, it is far out of step with state and national averages. Compared to all schools throughout the state of Pennsylvania, Philadelphia public schools average twice as many assaults on students and almost three times as many assaults on staff (PA Safe Schools, PA Department of Education).

Physical and relational bullying are also critical safety concerns that traverse school, home and community. In informal focus groups with neighborhood students to prepare for the STEM Stars program development process, 80% of the students reported being victims of bullying and all students agreed that decreasing bullying would make them feel safer. Addressing physical and relational aggression will be a key component of creating a TIC healing space and disrupting the cycle of violence.

The data is stark and convincing, but the stories and experiences of children in the OST program are most compelling. Consistent with the community level statistics, many OST program participants are already polytrauma victims; in quiet moments they share experiences with bullying, interpersonal violence, parental separation (primarily due to incarceration), exposure to substance abuse, and food insecurity.

### Traumatic Impacts of the COVID-19 Global Pandemic

Due to the impacts of COVID-19 the 2020-21 school year may be extremely difficult. The need for safe, healing, therapeutic spaces for children will be immense. The burden of morbidity and mortality from COVID-19 has been greater in low income minority communities like the 19121 zip code, where the rates of chronic disease that increase risk for poor outcomes are high. The economic impact on working poor families is already manifest in the record number of layoffs and unemployment claims. As the economic burdens of the pandemic have grown deeper, food typically reserved for children may need to be divided with other friends and family. The community center has experienced a steady uptick in residents from the housing development (who do not typically receive assistance) seeking resources for food. Finally, some

children had to shelter in place with family members who are abusive, substance abusers, or struggling with their own mental health during the crisis. Bringing the trauma informed care framework to this community, at this time, will be a critical part of the solution to healing from a prolonged state of emergency and traumatic experience.

### Trauma Informed Care in Out of School Time: Creating an Intersectional Space for Healing, Learning and Violence Prevention

Supportive out-of-school time programs can act as a springboard for achievement during the school day, and help students develop social and emotional skills (McCombs, Whitaker, and Yoo 2017; Neild, Wilson, and McClanahan 2019). However, emotional dysregulation (i.e. emotional responses that are poorly modulated and fall outside of the generally acceptable range of emotive response) can be triggered by negative experiences during the school day. This, added to children's chronic stressors in their homes and communities, is impeding the ability of OST programs to fill in the gaps for schools and students most in need. The manifestations of trauma include behavioral outbursts, regression, bullying, and an impaired ability to form positive social relationships with adults and peers. These behaviors counteract the ability of OST to promote healing and wellness. The issue worsens when providers are not adequately trained to recognize and respond to the behaviors of traumatized children.

Engaging the OST community in TIC is especially critical given that children in low income and minority families, who are also at higher risk for under treated trauma, are the most dependent on OST programs to provide safe after school environments (Afterschool Alliance, 2014 & 2016). Knowledge of TIC can enhance an organizations' abilities to empower children, families and communities to prevent traumatic stress and heal from existing traumas. OST



practitioners can also leverage their position to spread TIC best practices throughout school, home and larger community environments. Expectedly, implementation, efficacy and best practices for TIC have not been evaluated in the OST space. In a national review of OST programs, findings suggest that few are prepared to address the manifestations of childhood trauma in a comprehensive manner (Neild et al. 2019).

A long term goal of this community-academic partnership is to help fill this knowledge and implementation gap. The academic partners of the interdisciplinary team assembled for STEM Stars have content expertise in community engaged research, TIC and the design of school-based interventions for addressing ACEs in low income communities through our work with the Philadelphia Healthy and Safe Schools (PHASeS) project, among others. We are combining lessons learned from PHASeS, best practices from promising and research-based models from the sectors of education and healthcare, and the tacit knowledge of our community partners. The result will be an outcomes-driven program that is culturally aware and sensitive to systemic injustices. The program will work to address knowledge gaps in community based models for healing childhood trauma as well as teaching TIC to future healthcare providers. An OST program that is more equipped to respond to trauma will be poised to help children learn, decrease aggressive behavior and thrive within families and communities. OST programs are well suited to generate new paradigms for community engaged trauma work because they exist at the intersection of children's home, school and community lives.

Incorporating community level trauma into trauma theory and frameworks requires listening to the collective voices of those who are most adversely affected by structural violence. It means committing to developing a deeper understanding of the impact of systemic bias, poverty and other structurally oppressive forces on the psyche of both individuals and

communities. Achieving this mandates that organizations committing to a TIC approach examine and address their entrenchment and complicity with systems of oppression as well as the ways their practices intentionally or unintentionally reproduce trauma through various forms of bias and oppression. Section 2 looks at these principles in action through analysis of the impacts of recent trauma informed changes to the service learning model at an urban medical school.

## CHAPTER 2

### EQUITABLE COMMUNITY-ACADEMIC PARTNERSHIP: CREATING BIDIRECTIONAL LEARNING OPPORTUNITIES IN SERVICE LEARNING USING A TRAUMA INFORMED CARE FRAMEWORK

Service learning (SL) is a “form of experiential education where learning occurs through a cycle of action and reflection as students seek to achieve real objectives for the community and deeper understanding and skills for themselves” (Anon n.d.). It has been an increasingly popular approach to community engagement in academic settings since the 1990s (Hironimus-Wendt and Lovell-Troy 1999; Hondagneu-Sotelo and Raskoff 1994; Pompa 2002; Stewart and Wubbena 2015). Properly calibrated service learning experiences are associated with increasing abilities in cross-cultural communication, empathetic behavior and civic engagement (Hand et al. 2018; Laks et al. 2016; White et al. 2020). For these reasons, service learning has become a key part of the approach to teaching complex concepts like the social determinants of health, cultural humility and health disparities in American undergraduate medical education (Rinaudo 2017; Rodriguez 2017; Sabo et al. 2015; Stewart and Wubbena 2015).

As service learning becomes more widely adopted, educational researchers, theorists and SL practitioners are focusing more attention on gaps between pedagogy and praxis. Chief among the identified gaps is inattention to the power differentials between academic and community stakeholders. Service learning arises from academic spaces and is designed, in part, to meet the educational needs of students. At the same time, centering on the empowerment of the community is necessary for programs to be successful. Otherwise, programs run the risk of replicating historic dynamics of inequality, misunderstanding and bias between the academy and the community rather than dismantling them (Boles et al. 2020; Mitchell 2008).

There is now a strong body of scholarship calling for a pedagogy of critical service learning (CSL) (Brown 2001; King 2004; Wubbena and Stewart 2017). Critical consciousness, a pedagogical approach most appropriately attributed to Paulo Freire, analyzes the constructs of power, privilege and inequity in teaching and learning. CSL blends traditional service learning principles with a pedagogy more equipped to promote equitable community engagement and the development of students as agents of social change.

Although advocates for CSL can be found in the medical education literature (Kangovi et al. 2018; Kumagai and Lypson 2009; Rodriguez 2017) as far back as 2009, neither the term nor the tenets have had widespread uptake into modern medical education curricula. This may be due to the fact that adopting a pedagogy of critical consciousness requires faculty skill sets and institutional commitments that are more commonplace within social science epistemologies. Traditionally, such epistemologies have not held significant weight in medical education curricular priorities, although progress is being made (Betancourt and Maina 2004).

Another reason for poor uptake is intrinsic to the pedagogy. Critical consciousness approaches give practitioners the language to interrogate and advocate for the restructuring of dominant social constructs on micro (student-client), mezzo (SL program-community partner), macro (academic institution-community) levels. Thus, adopting critical consciousness can unearth complex personal, institutional and community responses that medical school faculty and administrators are not often well trained to manage. The next section provides illustrative examples of the complex challenges that may be unearthed in the process of embracing critical pedagogy and critical service learning.

## Challenges to Critical Service Learning at Micro, Meso and Macro Levels

### *Micro-Level Challenges*

High quality SL programs allow students to form strong personal bonds, develop empathy for people with life circumstances different than ones' own and ask critical questions about why those differences exist. SL can lead medical students, who are often active or passive beneficiaries of various forms of social privilege, through the process philosopher Maxine Green calls defamiliarization (Lyons 2010). Defamiliarization occurs when a person begins to recognize a previously unrecognized or misunderstood culture or identity as familiar. In turn, their previous worldview is experienced as unfamiliar or strange. Integrating the inconsistencies of preconceived notions with a new lived reality through experiential learning is, among other things, an embodied approach to exposing hegemony and developing cultural humility. In other words, an approach that focuses on the lived experience of individual bodies in socio-historical context as a way to more clearly see cultural forces of power and dominance of one group over others.

The entry point for defamiliarization is often the development of empathetic personal connections with community members. John King suggests that without a pedagogy that includes critical self-reflection and attention to injustice, the process of defamiliarization cannot be achieved (2004). The process requires skill and language to identify and question structural, systemic and historic forces of oppression that contribute to the health and social circumstances of clients served. What occurs, far too often, is the opposite: students are placed in positions of leadership in community-facing organizations with little training or oversight. Without a formal process for recontextualizing what they are experiencing, students risk falling back on preconceived stereotypes or failing to identify goals that place community priorities ahead of their own.

### *Mezzo-Level Challenges*

The pedagogy is explicit about the need for radical shifts away from traditional thinking, true transfers of power to historically disadvantaged populations, and a self-critical acknowledgement of one's own privilege. To be successful, critical service learning requires faculty knowledgeable about community and trained to provide the facilitated experience for medical students to gain the desired skill set. It also, ideally, engages or creates community partners who are similarly skilled in helping students understand what they are seeing and experiencing. This can be a time and resource intensive process of professional development for faculty and community leaders before students are even invited to participate (Brown 2001; Kangovi et al. 2018; Kumagai and Lypson 2009). Programs of this nature require significant institutional investment. This includes, among other needs: (1) adequate administrative support for the smooth execution of the program, (2) protected academic time for affiliated faculty and valuation of the developed skill set during the process of promotion, and (3) equitable investment in partner organizations to promote quality and continuity.

In promoting equitable investment in the community, CSL programs address another mezzo-level challenge: rectifying the traditional imbalances of power between academic medical centers and their more vulnerable community partners. This may need to start with accounting and atoning for previous relationships that failed or lacked a framework of empowerment. Continuous attention must be paid to whether the program as a whole, and the projects undertaken by students, are achieving a primary aim of meeting community identified needs in ways that are both value-driven and capacity-building. Challenges specific to service learning as a form of community engagement are well outlined in the literature. Many can be addressed in program design. These include the potential for medical students' short service commitments to

create a sense of “helicopter volunteerism”. This is a phenomenon where the SL participants quickly swoop in and out of a community to meet their academic requirements without developing relationships or capacity in the community. As an indication of progress yet to be made in centering the needs of community, few SL references in the medical literature are co-authored by community partners, present the perspective of the community or report community focused outcomes (Boles et al. 2020; Johnson et al. 2019; Khandpur et al. 2019).

### *Macro-Level Challenges*

The questions surrounding equity in benefit and outcomes from service learning has both mezzo and macro level considerations. Medical education is itself a form of hegemony that promotes or reinforces bias and inequities that can be damaging to the marginalized communities students serve in CSL programs. Further, medical education perpetuates inequality for students whose identities overlap with vulnerable communities, i.e. racial and ethnic minorities, gender non-conforming persons and people in poverty. Part of students’ defamiliarization may result in identifying as problematic and strange the medical community they are actively acculturating into. CSL programs have responsibilities to continue to unearth and respond to systemic inequalities while simultaneously maintaining an uncomfortable perch within the medical establishment and teaching value aligned students how to successfully maintain a similar insider-outsider status.

The tension between educational hegemony and CSL is important to consider in the process of evaluation. Metrics of evaluation are, in effect, distillations of the values of the medical establishment and the currency of advancement for students. Modern medical education places emphasis on evaluable skills, attitudes and knowledge. Evaluators are encouraged to categorize students in ways that can be quantified and normalized. Therefore, most rubrics are

hierarchical, reductive and focused on standardization. Methods of assessment in medical education are rarely nuanced enough to encapsulate learning of the type valued in critical service learning; that which is longitudinal, multilinear, dependent on self-consciousness and lacking an external gold standard. Skills like empathy, reflective thinking, and defamiliarization develop in an evolutionary way. Simultaneously, there are key moments of realization and milestones of achievement. A successful evaluation strategy would, rather than assessing competency, identify emerging competencies and identity formation as a physician. The evaluation would ideally be able to differentiate the development of self-awareness from simple participation, without a hierarchical structure that relies on inapplicable dominant educational constructs.

### Trauma Informed Care as Operationalized Critical Service Learning Theory

The transformative potential of critical service learning holds great promise for stakeholders interested in advancing equity in the halls of medicine. The process of reflection and critical analysis is potentially unending; as consciousness brings about change, it simultaneously uncovers new sites for resistance. However, once the posture of critical consciousness is embraced there is little existing guidance on how to move from theory to a more informed service learning praxis. Specific to medical educators is the question of how CSL insights translate into skills directly applicable to clinical practice.

A community-driven trauma-informed-care model is a framework that can move CSL theory into a praxis of clinical applicability. Recall that the scope of the community driven framework is wider than the traditional TIC framework, addressing the manifestations of trauma in both individuals and communities, the aggregate impact of highly prevalent trauma at the community level, and the multi-level impact of forms of structural violence like racism and



residential segregation. Yet, the foundations of the approach are the same. Specifically, it is grounded in: (1) the *realization* of the pervasiveness of trauma, (2) a *recognition* of trauma's manifestations in people and communities, (3) the development of fully integrated *responses* to trauma, and (4) seeking to *resist* further injury in the process of attempting to help. Realization and recognition of the experiences of traumatized individuals requires self-consciously releasing the primacy of one's own perspective and becoming familiar with the other. This is exactly the process CSL hopes to promote. A contextual understanding of how trauma is created and reinforced at the community level is an application of critical consciousness. Both defamiliarization and critical consciousness are skills that can be applied to the process of preventing retraumatization, which necessitates viewing a common experience through the lens of the most vulnerable person to identify potential triggers and sites for injury. It also means working collaboratively to identify strategies for empowerment for vulnerable patients and communities.

### Case Study: The STEM Stars Program

At the urban medical school, the SL program and social determinants of health (SDOH) curriculum complement one another in a way that could be consistent with critical service learning pedagogy. During the 2019 -2020 academic year, educators further revised the curriculum by incorporating TIC into the didactic and experiential learning for pre-clerkship education. First year (M1) students received a 60 minute didactic session that introduced (1) TIC theory and background, including relevant associated topics such as Adverse Childhood Experiences (ACEs) and epigenetics, (2) individual and community-level signs and symptoms of trauma, and (3) best practices for SL and clinical encounters with people who have experienced trauma. The lecture and associated readings emphasized systematic, systemic, and historical

traumas such as poverty, discrimination, and residential segregation. The didactic coursework explicitly linked the SDOH curriculum to the core TIC concepts.

The majority of students completed their experiential requirements at one of two elementary schools within the geographic footprint of the health system's main campus. Small groups of motivated students could elect to participate in specialized experiences at the start of the fall semester. One offering was to assist with the pilot year of the STEM Stars program. STEM Stars was developed by a bioethics fellow and clinician alongside a third year medical student, in collaboration with partners at the community center serving low income public housing residents in North Philadelphia. The program grew from a masters' level course in community engagement, which was itself a service learning experience. The program directors used their experience as tutors and participant observers in the OST program to inform conversations with the community center leadership. Jointly, they identified the need for a science, technology, engineering, arts and math (STEAM) enrichment experience for the K-8<sup>th</sup> grade students in the OST program. Based on an understanding of North Philadelphia, the public school system and tacit knowledge gained from tutoring the students, STEM Stars was created with an intentionally trauma informed design to address the social and emotional needs of the elementary and middle school students. As a secondary goal, it provided hands-on TIC training for the pre-clerkship medical students.

Fifteen pre-clerkship students (13 first year, 2 second year) along with two research assistants employed by the medical school participated in the year 1 pilot. The pilot consisted of four two-day learning modules for K-8<sup>th</sup> grade students (2 fall and 2 spring semester modules) and a TIC training session to begin each semester for medical students. Medical student participants received monthly site specific readings and in situ trainings as the program evolved

and needs arose. The fall semester training used a flipped classroom model where students came

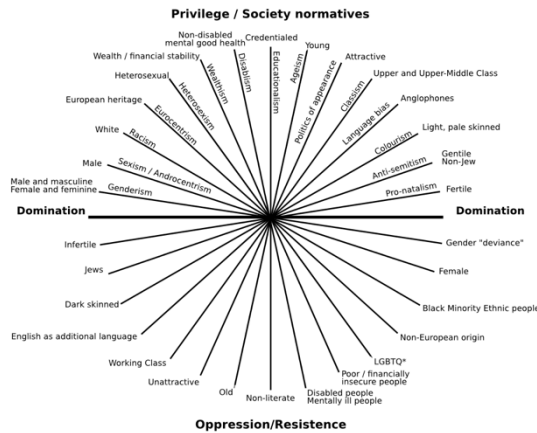


Figure 2. Privilege/Oppression Wheel

identity wheel (Figure 2) and write down all of the identities they felt comfortable revealing (Figure 3). Students were encouraged to discuss their identities in the context of how it may help or inhibit connection with the children in the STEM Program. Then, they brainstormed ways they could use or overcome the identity to form connections. This exercise gave them an opportunity contextualize their identities and the role self-identity plays in one’s interpretation of new experiences. It helped students move from a fixed, static conceptualization of identity into the complexity of social construction. Understanding that identity is contextual and socially constructed is a component of both critical consciousness and defamiliarization.

Several of the identities students shared during the introductory exercise were used by medical students to create relationships with the young children in the STEM program. As an example, a white cis-gender man identified himself by his rural upbringing and thought he could connect with students based on experiences in under resourced schools. At the end of the year, he

prepared to discuss an article that went in depth into the experience of using TIC in a classroom of low income children with social and emotional needs. Medical students reflected on their prior experiences, preconceptions and concerns. Then, they were instructed to review a domination-oppression



Figure 3. Identity Word Cloud

approached a program director to express concern for a young black girl who was often off task compared to peers and had a tough time working in groups. He correctly identified that the behaviors were the result of not feeling challenged by some of the STEM projects. He noted that something in her words and actions sparked a memory of his own behavior at the same age. This was an important moment of defamiliarization for a student who had been open about feeling overwhelmed in the environment and hamstrung by his cultural differences. He had experienced a lot of hesitancy and discomfort over the course of the year despite having articulated that he would try to connect to children through their shared educational identity.

It is important to note that the transformative process of service learning is neither guaranteed nor instantaneous. It took almost a full year before the medical student was able to stop seeing the community center and the children as strange, but once his lens shifted, he crossed quickly into empathetic connection with a child who had experiences very close to his own. Most importantly, he was able to articulate a strategy to help her based on their shared experiences.

This anecdote is also an example of a student on the pathway to forging an authentic relationship. According to Ed.D and service learning scholar Tania Mitchell, “authentic relationships demand attention to social change and understanding of the root causes of social problems. Authentic relationships also demand an analysis of power and a reconfiguration of power in the service relationship” (2008). In the process of developing authenticity, students move from a necessarily self-critical mindset (i.e. who am I and how does my identity influence my perceptions of individuals/communities?) to a socially critical mindset (i.e. how can I use my understanding of the privilege and power in identity to bring value to my relationships with individuals/ communities?).

Each project day concluded with a 20 to 30 minute formal debrief with the program directors. Debriefs were times to provide feedback on the evolving program model and reflections on the experience. The two were interconnected, since their TIC training gave them a framework to translate difficult experiences with students away from “what is wrong with these children?” to “what new strategies can we use to meet children’s’ needs?”. Using a consensus based, iterative approach, one or more components of the program were changed each cycle until the group was comfortable with the model. Giving students ownership of the organizational process to become trauma informed, as is necessary in a TIC model, gave them an entry point for participation observation. Participant observation, a technique of field research by which an investigator studies the life of a group by sharing in its activities. is a skill that does not come easily for some premedical students who have focused entirely on objective, biomedical approaches to knowledge generation. Each session required students to pay attention to themselves, the students and the group dynamics rather than just the science lesson. This encouraged an awareness of self and awareness of the relationship of the self to the community. These were the precursor steps to identifying actions that were potentially in line with the needs of the students. Stated differently, participating meaningfully in the reflection exercises required both analysis of their behaviors (self-critique) and situating their individual experience against the backdrop of the STEM program and the students’ realities (social critique).

Reflection was a cognitive activity, but it also required medical students to bring attention to the affective. As a primary example, the didactic and in situ learning sessions often emphasized the role of mirror neurons in the interaction with children. Students learned about the ability of children, especially traumatized children, to pick up subtle body language cues that convey disgust, anger, frustration and fear and mimic those cues regardless of what is being said to them. Medical students were encouraged to acknowledge and reflect on emotions that they knew were socially

unacceptable and were sometimes arising from subconscious places over which they had little control. Rather than trying to overcome affect with the cognitive, they were taught strategies of recognition and mindful management. This is a critical skill for a practitioner who fully understands what a TIC approach requires of the clinician. Traumatized individuals can, at times, bring the most difficult versions of themselves to clinical encounters because healthcare experiences can be triggering and disempowering. Feeling frustration, irritation, anger or fear when a patient is threatening or intentionally using hurtful language is only natural. While giving into the emotion is never appropriate, few physicians are taught evidence based strategies of self-management, with the idea that self-regulation promotes the activation of mirror neurons and self-regulation in others. CSL program directors saw moments of success in teaching this difficult skill when they saw medical students patiently wandering the halls of the community center with frustrated children or using calming strategies to help angry children return to their bodies while maintaining their own sense of calm. At those moments, the service learning model became truly bi-directional. Medical students learned clinically applicable skills of trauma sensitivity, while STEM program participants were learning social and emotional skills through modeled behavior.

### Gaps and Tensions in the Community Driven TIC Service Learning Approach

The STEM Stars program represented an important first step in the development of a critical service learning curriculum informed by a community driven TIC framework. The program was well received by the medical students. In a year end feedback survey, 80% percent described themselves as highly engaged with the program and 70% said they were likely to return in year 2 (n = 10). 100% of survey respondents felt the K-8<sup>th</sup> grade students were happy and satisfied with the program. Although the K-8<sup>th</sup> students were not formally surveyed in the pilot year, we conducted a year end feedback session and the only negative feedback was that the

brand of hot chocolate chosen for snack time was not tasty. At year end, students were taken off campus for a scavenger hunt and rocket launch without any reservations or concerns for the potential of behavioral incidents. Students who initially groaned and complained “I don’t like science” on project day 1, were completing tasks and looking for harder projects by the final day. The oldest cohort built and coded the activity of a functioning robot, exceeding the expectations of program and community center leaders. While it is easy to rest on the idea of the program being a success, a more critical approach allows for the possibility that the students and the curriculum are not yet sufficiently critical. When needs are great and opportunities limited, vulnerable populations (especially children) may falsely correlate contact with benefit. More dangerously, traumatized children sometimes dissociate or dampen their emotional responses once they realize there is no ability to relieve experiences of suffering. Feeling any feelings can become a dangerous and scary experience. It is the opinion of program leaders that true success is achieved when the STEM Stars curriculum empowers students with the skills to identify discomfort and dislikes in their bodies, with the accompanying language to safely share their feelings.

Other gaps and tensions in the model and its application became apparent. First, the limited time invested in service learning and turnover of pre-clinical medical students runs contrary to developing a maximally protective environment for children. Expertise needed for mastery in TIC is beyond the scope of a one or two year service learning intervention. The time to develop skills is further compromised by the fact that service learning has a small footprint in the medical school curriculum compared to the biomedical science and other clinical/professional development activities. The turnover of medical students compromises the stability of relationships that develop between the K-8<sup>th</sup> grade participants and the medical students, which runs counter to our understanding that high quality, stable adult relationships are a key

component of healing from adversity. Overall, this reflects a tension within medical education regarding the overwhelming evidence that interpersonal skills like empathy, communication and ability to motivate are at least as impactful (if not more) in improving the health of individuals and communities, yet developing the skills necessary for this form of clinical success are not prioritized or given at least equal weight as skills more amenable to standardized assessment and quantification, like rote memorization of biomedical information.

Second, it must be stated that using a TIC framework in medical SL programs does not guarantee a critically conscious approach. TIC is not "ready to use" CSL. Rather, it is a framework that straddles the world of the social scientist and medical scientist in a natural way while also being extremely clinically applicable. However, educators who understand both TIC and critical consciousness understand that TIC, as a framework arising from medical and behavioral health, has just as much ability to widen power differentials as any other framework arising from a powerful sector. TIC has been critiqued for the tendency of proponents to overemphasize deficits and reduce trauma survivors to their trauma identity. This serves the medical model of screening, diagnosis and treatment, placing power with the physician to define the survivor and grant the ability to heal.

### Next Steps and Future Directions

To address the gaps, the next version of STEM Stars will focus on a goal of equity for the students at the community center rather than equality of benefit between K-8<sup>th</sup> students and medical students. This is in line with the goal to truly center the community as the primary beneficiary, with the value to the service learner arising from developing a process of reflection



that encompasses why their centrality is less important. That can be accomplished by weighting decision-making and outcome measurement towards impact on children.

The field of SCL needs much more rigorous design, evaluation and reflection with respect to the ways it can be applied and unified with trauma informed care in academic medical centers. As the program model continues to evolve, we move from “how do we do this?” to “what are we doing well and how do we do it better?”. From this iterative, reflective process, a model for authentic service and empowerment will arise.

## WORKS CITED

- Anon. n.d. "What Is Service Learning or Community Engagement? | Center for Teaching | Vanderbilt University." Retrieved June 25, 2020 (<https://cft.vanderbilt.edu/guides-sub-pages/teaching-through-community-engagement/>).
- Berg, Mark T. and Carrie F. Mulford. 2020. "Reappraising and Redirecting Research on the Victim–Offender Overlap." *Trauma, Violence, & Abuse* 21(1):16–30.
- Betancourt, Joseph R. and Angela W. Maina. 2004. "The Institute of Medicine Report 'Unequal Treatment': Implications for Academic Health Centers." *The Mount Sinai Journal of Medicine, New York* 71(5):314–21.
- Boles, Ramy, Leshawn Benedict, Joyce Lui, Roxanne Wright, and Fok Leung. 2020. "Assessing Community Organization Needs for Medical School Community Service-Learning." *Journal of Contemporary Medical Education* 10(2):55.
- Brown, D. M. 2001. *Pulling It Together: A Method for Developing Service-Learning and Community Partnerships Based in Critical Pedagogy*.
- Cronholm, Peter F., Christine M. Forke, Roy Wade, Megan H. Bair-Merritt, Martha Davis, Mary Harkins-Schwarz, Lee M. Pachter, and Joel A. Fein. 2015. "Adverse Childhood Experiences: Expanding the Concept of Adversity." *American Journal of Preventive Medicine* 49(3):354–61.
- Delaney-Black, Virginia, Chandice Covington, Steven J. Ondersma, Beth Nordstrom-Klee, Thomas Templin, Joel Ager, James Janisse, and Robert J. Sokol. 2002. "Violence Exposure, Trauma, and IQ and/or Reading Deficits Among Urban Children." *Archives of Pediatrics & Adolescent Medicine* 156(3):280.
- Dichter, Melissa E., Anne Teitelman, Heather Klusaritz, Douglas M. Maurer, Peter F. Cronholm, and Chyke A. Doubeni. 2018. "Trauma-Informed Care Training in Family Medicine Residency Programs." *Family Medicine* 50(8):617–22.
- Dube, Shanta R., Vincent J. Felitti, Maxia Dong, Wayne H. Giles, and Robert F. Anda. 2003. "The Impact of Adverse Childhood Experiences on Health Problems: Evidence from Four Birth Cohorts Dating Back to 1900." *Preventive Medicine* 37(3):268–77.
- Duke, Naomi N., Sandra L. Pettingell, Barbara J. McMorris, and Iris W. Borowsky. 2010. "Adolescent Violence Perpetration: Associations With Multiple Types of Adverse Childhood Experiences." *PEDIATRICS* 125(4):e778–86.
- Farrell, Chelsea and Gregory M. Zimmerman. 2018. "Is Exposure to Violence a Persistent Risk Factor for Offending across the Life Course? Examining the

- Contemporaneous, Acute, Enduring, and Long-Term Consequences of Exposure to Violence on Property Crime, Violent Offending, and Substance Use.” *Journal of Research in Crime and Delinquency* 55(6):728–65.
- Felitti, Vincent J., Robert F. Anda, Dale Nordenberg, David F. Williamson, Alison M. Spitz, Valerie Edwards, Mary P. Koss, and James S. Marks. 1998. “Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults.” *American Journal of Preventive Medicine* 14(4):245–58.
- Fox, Bryanna Hahn, Nicholas Perez, Elizabeth Cass, Michael T. Baglivio, and Nathan Epps. 2015. “Trauma Changes Everything: Examining the Relationship between Adverse Childhood Experiences and Serious, Violent and Chronic Juvenile Offenders.” *Child Abuse & Neglect* 46:163–73.
- Gaylord-Harden, Noni K., Suzanna So, Grace J. Bai, David B. Henry, and Patrick H. Tolan. 2017. “Examining the Pathologic Adaptation Model of Community Violence Exposure in Male Adolescents of Color.” *Journal of Clinical Child & Adolescent Psychology* 46(1):125–35.
- Gorman-Smith, Deborah and Patrick Tolan. 1998. “The Role of Exposure to Community Violence and Developmental Problems among Inner-City Youth.” *Development and Psychopathology* 10(1):101–16.
- Green, Bonnie L., Pamela A. Saunders, Elizabeth Power, Priscilla Dass-Brailsford, Kavitha Bhat Schelbert, Esther Giller, Larry Wissow, Alejandra Hurtado-de-Mendoza, and Mihriye Mete. 2015. “Trauma-Informed Medical Care: CME Communication Training for Primary Care Providers.” *Family Medicine* 47(1):7–14.
- Greeson, Johanna K. P., Ernestine C. Briggs, Christopher M. Layne, Harolyn M. E. Belcher, Sarah A. Ostrowski, Soeun Kim, Robert C. Lee, Rebecca L. Vivrette, Robert S. Pynoos, and John A. Fairbank. 2014. “Traumatic Childhood Experiences in the 21st Century.” *Journal of Interpersonal Violence* 29(3):536–56.
- Hair, N. L., J. L. Hanson, B. L. Wolfe, and S. D. Pollak. 2015. “Association of Child Poverty, Brain Development, and Academic Achievement.” *JAMA Pediatrics* 169(9):822–29.
- Hand, Jane, Alison Koransky, Jason Feinman, Maria B. Pellerano, Manuel E. Jimenez, Susan Giordano, and Eric Jahn. 2018. “Alumni Perspectives on the Role of Medical School Service Learning Experiences in Their Professional Development and Practice.” *Journal of Health Care for the Poor and Underserved* 29(4):1386–99.
- Hironimus-Wendt, Robert J. and Larry Lovell-Troy. 1999. “Grounding Service Learning in Social Theory.” *Teaching Sociology* 27(4):360.

- Hondagneu-Sotelo, Pierrette and Sally Raskoff. 1994. "Community Service-Learning: Promises and Problems." *Teaching Sociology* 22(3):248.
- Johnson, Michelle, Charlie Goldberg, Lindia Willies-Jacobo, Lori Wan, Kama Guluma, and Sunny Smith. 2019. "Implementation and Outcomes of a Community Assessment Service-Learning Activity Within Academic Learning Communities." *Journal of Medical Education and Curricular Development* 6:1–6.
- Kangovi, Shreya, Tamala Carter, Robyn A. Smith, Horace M. Delisser, Robyn A. Smith, and Horace M. Delisser. 2018. "Students in the Social Determinants of Health." *29(2):581–90.*
- Kataoka, Sheryl H., Pamela Vona, Alejandra Acuna, Lisa Jaycox, Pia Escudero, Claudia Rojas, Erica Ramirez, Audra Langley, and Bradley Stein. 2018. "Applying a Trauma Informed School Systems Approach: Examples from School Community-Academic Partnerships." *Ethnicity & Disease* 28(Supp):417–26.
- Khandpur, Umang, Benjamin P. Sugar, Heidi A. Sasvin, and Robert Cooper. 2019. *Medical Student Service Learning Improves Community Health Literacy*. Columbus, Ohio.
- Kilpatrick, Dean G., Heidi S. Resnick, Melissa E. Milanak, Mark W. Miller, Katherine M. Keyes, and Matthew J. Friedman. 2013. "National Estimates of Exposure to Traumatic Events and PTSD Prevalence Using DSM-IV and DSM-5 Criteria." *Journal of Traumatic Stress* 26(5):537–47.
- King, John T. 2004. "Service-Learning as a Site for Critical Pedagogy: A Case of Collaboration, Caring, and Defamiliarization across Borders." *Journal of Experiential Education* 26(3):121–37.
- Kosman, Katherine A. and Nomi C. Levy-Carrick. 2019. "Positioning Psychiatry as a Leader in Trauma-Informed Care (TIC): The Need for Psychiatry Resident Education." *Academic Psychiatry* 43(4):429–34.
- Kumagai, Arno K. and Monica L. Lypson. 2009. "Beyond Cultural Competence: Critical Consciousness, Social Justice, and Multicultural Education." *Academic Medicine* 84(6):782–87.
- Laks, Jordana, Lindsay A. Wilson, Christine Khandelwal, Eleni Footman, Margaret Jamison, and Ellen Roberts. 2016. "Service-Learning in Communities of Elders (SLICE): Development and Evaluation of an Introductory Geriatrics Course for Medical Students." *Teaching and Learning in Medicine* 28(2):210–18.
- Lomanowska, A. M., M. Boivin, C. Hertzman, and A. S. Fleming. 2017. "Parenting Begets Parenting: A Neurobiological Perspective on Early Adversity and the Transmission of Parenting Styles across Generations." *Neuroscience* 342:120–39.

- Lyons, Nona, ed. 2010. *Handbook of Reflection and Reflective Inquiry*. Boston, MA: Springer US.
- Marsac, Meghan L., Nancy Kassam-Adams, Aimee K. Hildenbrand, Elizabeth Nicholls, Flaura K. Winston, Stephen S. Leff, and Joel Fein. 2016. "Implementing a Trauma-Informed Approach in Pediatric Health Care Networks." *JAMA Pediatrics*.
- McCombs, Jennifer, Anamarie Whitaker, and Paul Yoo. 2017. *The Value of Out-of-School Time Programs*. RAND Corporation.
- Mitchell, Tania D. 2008. "Traditional vs . Critical Service-Learning : Engaging the Literature to Differentiate Two Models." *Michigan Journal of Community Service Learning* 50–65.
- Nandi, Meghna, Sravanthi Puranam, Margaret Paccione-Dyszlewski, Harry VanDusen, and Sadie Elisseou. 2018. "Making Universal Trauma-Informed Health Care a Reality: A Pilot Initiative to Train Future Providers." *The Brown University Child and Adolescent Behavior Letter* 34(12):1–6.
- National Scientific Council on the Developing Child. 2010. "Early Experiences Can Alter Gene Expression and Affect Long-Term Development: Working Paper." *Center on the Developing Child at Harvard University*.
- Neild, Ruth Curran, Sandra Jo Wilson, and Wendy McClanahan. 2019. "Afterschool Programs: A Review of Evidence Under the Every Student Succeeds Act."
- Pompa, Lori. 2002. "Service-Learning as Crucible: Reflections on Immersion, Context, Power, and Transformation\*." *Service-Learning in Higher Education: Critical Issues and Directions* 67–76.
- Rinaudo, Christi M. 2017. "The Effect of Service Learning on Medical Students' Cultural Competence and Servant Leadership." Louisiana State University - Shreveport.
- Rodriguez, Roy. 2017. "Civic Engagement and Service Learning for Medical Students: A Phenomenological Study of Transformation."
- Rosen, Cherise, Nev Jones, Eleanor Longden, Kayla A. Chase, Mona Shattell, Jennifer K. Melbourne, Sarah K. Keedy, and Rajiv P. Sharma. 2017. "Exploring the Intersections of Trauma, Structural Adversity, and Psychosis among a Primarily African-American Sample: A Mixed-Methods Analysis." *Frontiers in Psychiatry* 8:57.
- Sabo, Samantha, Jill de Zapien, Nicolette Teufel-Shone, Cecilia Rosales, Lynda Bergsma, and Douglas Taren. 2015. "Service Learning: A Vehicle for Building Health Equity and Eliminating Health Disparities." *American Journal of Public Health* 105(S1):S38–43.

- Spano, Richard, Craig Rivera, and John M. Bolland. 2010. "Are Chronic Exposure To Violence and Chronic Violent Behavior Closely Related Developmental Processes During Adolescence?" *Criminal Justice and Behavior* 37(10):1160–79.
- Stewart, Trae and Zane C. Wubben. 2015. "A Systematic Review of Service-Learning in Medical Education: 1998–2012." *Teaching and Learning in Medicine* 27(2):115–22.
- Substance Abuse and Mental Health Services Administration (SAMHSA). 2014. *SAMHSA's Concept of Trauma and Guidance for a Trauma-Informed Approach*. Rockville, MD: Substance Abuse and Mental Health Services Administration.
- Tink, Wendy, Jessica C. Tink, Tanvir C. Turin, and Martina Kelly. 2017. "Adverse Childhood Experiences: Survey of Resident Practice, Knowledge, and Attitude." *Family Medicine* 49(1):7–13.
- White, Meghan, Norma Perez, Sema Hajmurad, and Melissa Victory. 2020. "Health Disparities Past the Classroom: The Impact of Frontier Medicine on Students." *Cureus*.
- Wubben, Zane and Trae Stewart. 2017. "Critical Service Learning in College and University Preprofessional Programs." Pp. 309–20 in *The Cambridge Handbook of Service Learning and Community Engagement*, edited by C. Dolgon, T. D. Mitchell, and T. K. Eatman. Cambridge: Cambridge University Press.