

# Piloting Hospital-based Violence Intervention Programming in Rural South Carolina

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## About TTVIP

MUSC's Turning the Tide Violence Intervention Program (TTVIP) launched in July 2021 in response to the overwhelming prevalence of community violence victims treated in our trauma centers facing treatment and recovery from firearm assault without specialized services. The mission of TTVIP is to support youth and young adults (and their families) at high risk of or experiencing violent injury in their communities with a trauma-informed, culturally competent approach. This is accomplished through the provision of wraparound services, an individualized intervention plan that is informed by assessing and addressing one's risk for violence, including their psychosocial history and current socioeconomic status. To date, TTVIP has served over 650 violently injured and high-risk youth and young adults.

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### **MUSC Turning the Tide Violence Intervention Program**

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# Executive Summary

Hospital-based violence intervention programs (HVIPs) are one of only a few evidence-based community violence intervention (CVI) strategies.<sup>1</sup> Although the model was first developed in the nineties, widespread adoption across trauma centers in the US occurred when rates of firearm assaults spiked during the COVID-19 pandemic. Despite rural communities facing similar spikes in violence, intervention and prevention strategies have traditionally focused on urban areas where community violence is highly concentrated.

MUSC's Turning the Tide Violence Intervention Program (TTVIP) piloted an expansion of their eligibility criteria to determine the feasibility and acceptability of providing HVIP services to violently injured patients transferred to MUSC Health – Charleston from outlying rural communities. Overall, rural patients accepted services and agreed that they would benefit from TTVIP services. TTVIP-enrolled rural patients had higher medical and mental health follow-up rates after discharge compared to non-TTVIP rural patients. However, rural patients' engagement with TTVIP was less consistent; more rural patients were lost to follow-up compared to TTVIP's traditional patient population.

While this is a small, single-site pilot project, it provides valuable formative data regarding HVIPs' ability to support patients living in rural communities beyond the urban/suburban catchment areas that HVIPs traditionally serve. First, many of the same barriers to achieving health and safety in urban communities are exacerbated in rural communities by the added challenge of poorer access to limited services and resources. Urban-based HVIPs must consider alternative approaches to service connection and navigation in deeply rural areas. Second, hiring credible messengers from the rural communities impacted by violence is critical. Physical proximity to patients and local knowledge allows for more responsive and intensive case management support and violence intervention. Community hospitals and trauma centers that serve a high number of violently injured patients from their rural communities need additional resources to improve their capacity to equitably serve their violently injured patient populations.

In summary, with the rapid growth of HVIPs across the Southeast, research and investment in the model's application in rural communities must also be considered.

# Background

Higher rates of poverty correlate with higher rates of firearm homicide, regardless of urbanicity or rurality and across racial and ethnic groups; the southern US exhibits the largest poverty gap between urban and rural areas, with rural areas experiencing the greatest poverty.<sup>2</sup> Combined, the Area Deprivation Index,<sup>3-4</sup> which ranks census block groups by socioeconomic disadvantage based on income, education, employment, and housing quality, and CRPH's SC Rural Healthcare Resource Dashboard based on how they define rural areas,<sup>5</sup> illustrate that the most rural areas of South Carolina are also the most disadvantaged (see Figures 1 and 2).

Yet, fewer resources are allocated to rural communities facing these disparities, and many of the same risk factors for community violence in urban settings also exist for rural residents: intergenerational poverty, violence exposure, social immobility, lack of access to healthcare and safety net programs, and conversely, increased rates of firearm ownership and access. This combination of risk factors causes rural communities in SC to experience various poor health outcomes, including violence.<sup>6</sup>

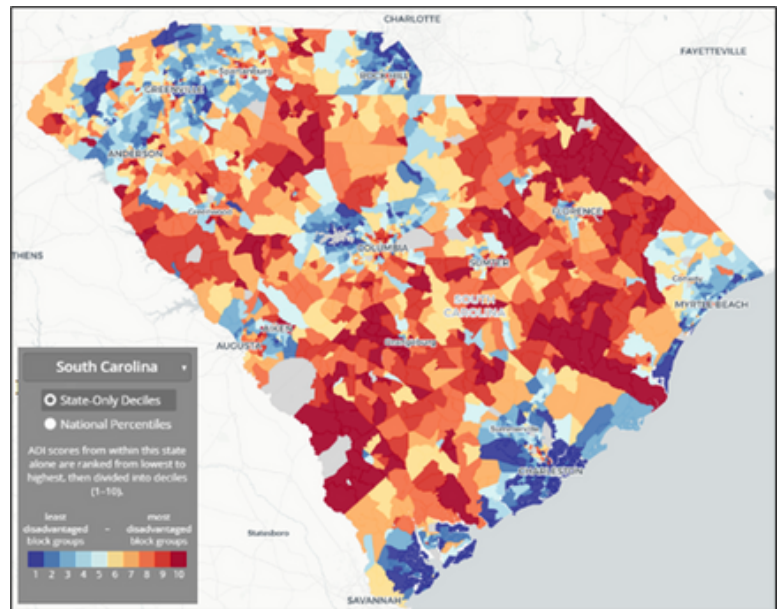


Figure 1.

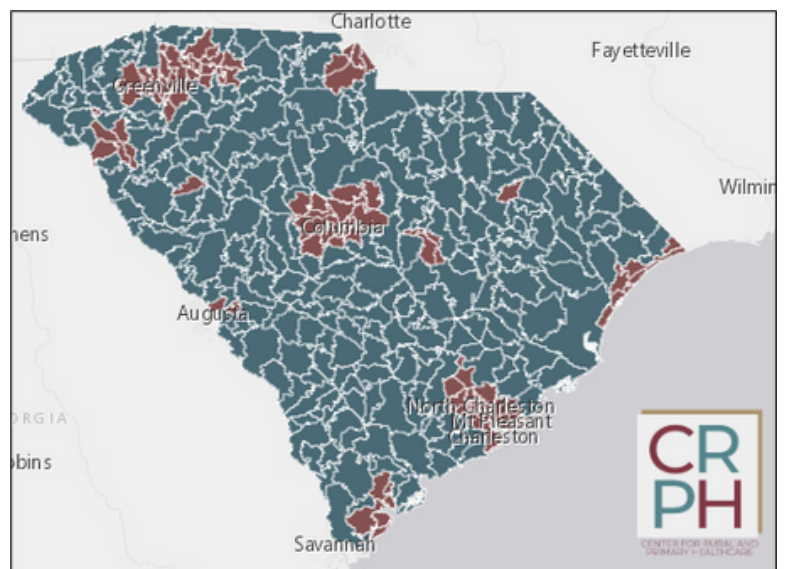


Figure 2.

Regarding firearm violence, it is a common misconception that rural communities are more vulnerable to suicide than homicide. In actuality, national data demonstrates that for firearm deaths of all ages, homicide rates are quite similar between rural and urban settings.<sup>7</sup> Rural youth in particular (1-19 years old) experience equal rates of firearm homicide and suicide.<sup>8</sup> In South Carolina, from 2017-2021 rural counties including Dillon, Lee, Allendale, Hampton, and Colleton, had the highest homicide death rates, which ranged from 26.5 to as high as 37.4 per 100,000, compared to the statewide rate of 10.4 per 100,000.<sup>9</sup> Likewise, rural counties including Orangeburg, Dillon, Darlington, and Allendale, had the highest rate of aggravated assaults (of which about 43% were committed with firearms).<sup>10</sup>

Significant racial disparities among victims of firearm violence persist in rural communities, too. In 2022, a third of all deaths among Black rural youth were firearm related. In the same year, the firearm mortality rate of Black rural youth was four times as high as their White peers, and even equaled or surpassed their Black urban peers. Most of these deaths were homicides and concentrated in the South.<sup>11</sup> In South Carolina, the pediatric firearm death rate of Black children is two times higher compared to White children, with more than half of these deaths being homicides.<sup>12</sup>

### Hospital-based Violence Intervention Programs (HVIPs)

While deaths remain the most severe consequence of firearm violence, most victims survive their firearm injuries, with an estimated 5 survivors for every fatality.<sup>13</sup> Survivors of firearm violence are at increased risk of being re-victimized<sup>14</sup> and HVIPs aim to interrupt this cycle, improve outcomes, and promote recovery by capitalizing on the teachable moment that presents itself during one's hospitalization (see Figure 3).

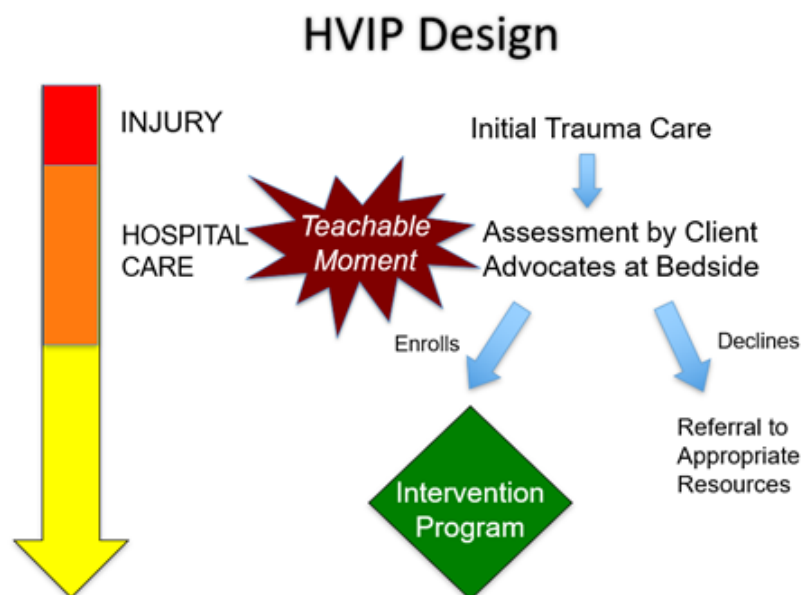


Figure 3.

HVIPs are an evidence-based public health approach to reducing and preventing community gun violence by relying on “credible messengers,” or relatable and trustworthy community members that best understand the population’s unmet needs and safety challenges. These credible messengers connect patients and families to healthcare and community-based service providers that promote recovery after injury and address social determinants of health such as employment, food assistance, mental health care, education, housing, criminal justice or victim advocacy, substance use counseling, and more (see Figure 3). Participation in HVIPs can prevent violent re-injury,<sup>14-15</sup> increase connections to relevant resources,<sup>16</sup> and improve recovery outcomes like returning to school and reduced onset of PTSD symptoms.<sup>17</sup>

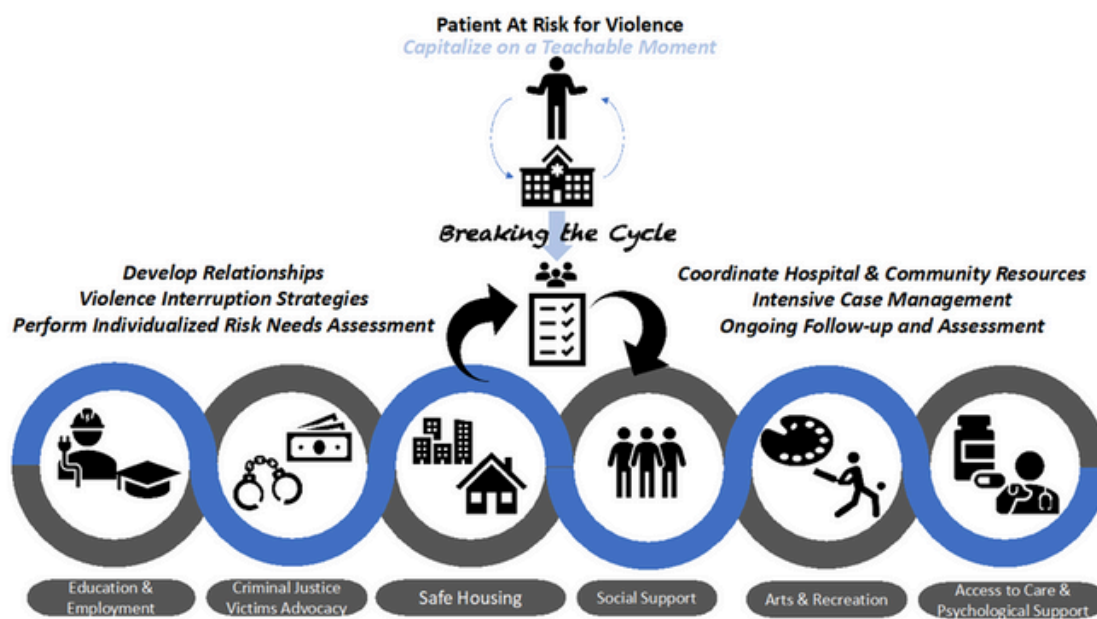


Figure 4.

TTVIP launched in July 2021 in response to the increasing prevalence of community gun violence in the greater Charleston and North Charleston areas and in recognizing that victims treated at MUSC Health – Charleston’s trauma centers faced recovery without specialized support services. Following the HVIP model, TTVIP supports youth and young adults (and their families) at high risk of or experiencing community violence with a focus on trauma-informed and culturally competent care. A comprehensive assessment of one’s psychosocial history and socioeconomic status informs individualized intervention plans. TTVIP’s credible messengers, called client advocates, meet patients at bedside in the hospital and provide long-term intensive wraparound services in the community for about a year post-injury. The advocates use tenets of case management, social work, and mentorship or peer counseling to meet patients’ needs and goals. Patients are educated and empowered to identify and navigate services and resources independently over time until they are ready to “graduate” from TTVIP.

# Proposed Solution

Traditionally, TTVIP's priority population includes patients 12-30 years old who are treated for community violence-related injuries at MUSC Health – Charleston's trauma centers. Our primary catchment area is the tri-county (Charleston, Dorchester, and Berkeley Counties), however as the only adult and pediatric Level 1 trauma centers in the region, patients are treated from well beyond this area. Nearly a quarter of patients responded to and supported by TTVIP in the hospital live outside the tri-county, creating a gap in care for several dozen patients who could not be offered long-term intervention services solely due to their distance from the trauma centers. Engaging patients and families in person, in their homes, schools, and communities, is an integral component of the HVIP model, reinforcing and building upon the rapport developed during a patient's hospitalization. In some cases, client advocates will see their patients multiple times a week via home visits, providing transportation to appointments, or navigating community services together.

Although the HVIP model has been replicated in over 100 US trauma centers and counting, its efficacy serving rural communities is unknown; an HVIP's focus is typically in the urban areas where trauma centers are located and where community violence is highly concentrated. Also, the southeastern US is a delayed adopter of the HVIP model. TTVIP was the first of its kind in the Carolinas in 2021, and while HVIPs have since spread across the Southeast, their implementation and outcomes are not yet well represented in the literature.

The objective of this project was to pilot an adaptation of the HVIP model to determine the feasibility and acceptability of serving rural victims of community violence. This project initially focused on residents of Hampton and Orangeburg Counties as these rural areas represented nearly a quarter of patients TTVIP responded to from outside the Charleston tri-county area, and whose cohort was growing since the acquisition of what is now the MUSC Health – Orangeburg medical center (see Figure 5).

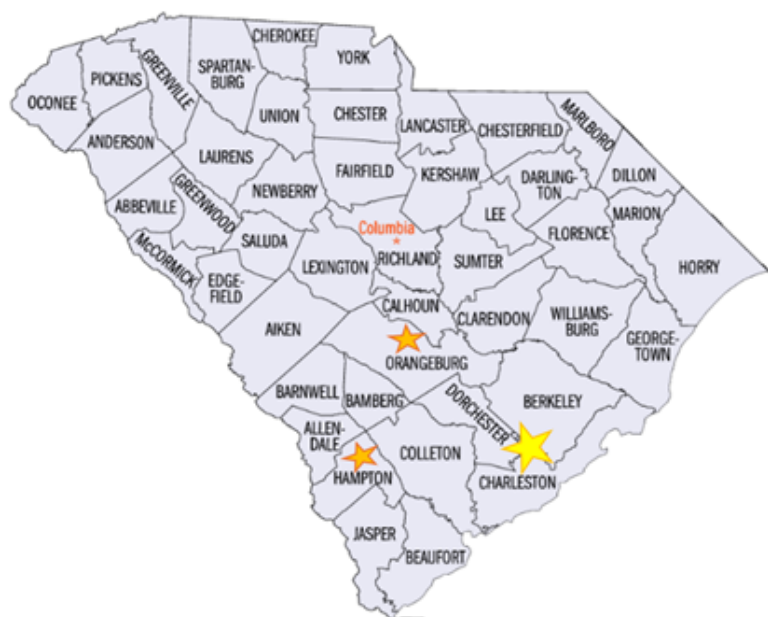


Figure 5.

Patients from these communities who otherwise met TTVIP's eligibility criteria for long-term intervention services (i.e., age, mechanism of injury) were offered the same follow-up services as our traditional population. Provision of services post-discharge would occur in person at times, but more heavily relied on phone and virtual-based settings to communicate and connect to services and resources more efficiently. TTVIP expanded eligibility criteria for 1 year with a goal of recruiting 10-12 patients.

Importantly, this adaptation of the HVIP model deviated from two of the CVI field's best practices: employing credible messengers who are local community members to deliver the intervention, and providing intensive in-person wraparound services in patients' communities, schools, and homes. Understanding that these deviations may limit the success of the pilot project, a second arm of the project was designed to build capacity within MUSC Health – Orangeburg's trauma center to improve services for violently injured patients more locally.

# Methods

## Expanded Eligibility

TTVIP initially expanded eligibility to include patients treated at MUSC Health – Charleston from Hampton and Orangeburg counties, but due to low patient volume, we further expanded criteria to include any zip code within a 75-mile driving distance from downtown Charleston that was considered rural by CRPH, based on various definitions including Federal Office of Rural Health Policy, RUCA, Census, and more (see Figure 2).<sup>5</sup> We later expanded our age maximum from 30 to 34 years old in an effort to increase our sample size. In total, eligibility was expanded from July 2023 to August 2024.

TTVIP's standard bedside response and support services provided to all hospitalized patients remained the same, but patients that met the expanded eligibility criteria were recruited to enroll in long-term services post-discharge. TTVIP's client advocates were resourced to provide the same intervention services to their rural patients as they would their local patients, including mileage reimbursement for gas and maintenance expenses of the advocates' personal vehicles and reduced caseloads to accommodate increased driving time to the rural communities. Local resource lists were curated to support client advocates' service navigation, including both statewide services (ex. SNAP benefits) and more locally specific resources (ex. food banks).

TTVIP's client advocates were surveyed before and after implementation of the project to assess their attitudes, knowledge, and beliefs of extending intervention services to patients from rural communities. Similarly, enrolled rural patients were surveyed at the beginning of their participation in TTVIP and 6 months later to assess their receptiveness to the intervention offered and acceptability of the services provided.

## Capacity Building

While the client advocates implemented the expansion of services to rural patients, TTVIP's leadership pursued capacity building activities at MUSC Health – Orangeburg, a Level 3 trauma center that treats a disproportionately high rate of violently injured patients in a predominantly rural setting. This trauma center often serves as the initial source of trauma care for patients from Orangeburg and Hampton counties and transfers patients to MUSC Health – Charleston for a higher level of trauma care. The objective was to create a committee of stakeholders that would inform and execute the planning, design, implementation, and evaluation of quality improvement initiatives for patients treated for firearm-related injuries.

Project leaders met with MUSC Health – Orangeburg leaders to garner buy in and identify stakeholders to represent impacted care teams, including case management, emergency department nursing and physicians, surgery, community outreach & engagement, and the trauma program. Stakeholder committee members were surveyed at the conclusion of the project period to identify opportunities to improve the committee's effectiveness and garner insights on local drivers of violence, perceived barriers and challenges to implementing capacity building initiatives, and feasible intervention strategies moving forward.

# Outcomes

## Expanded Eligibility

During the project period, a total of 15 violently injured patients from eligible rural communities were supported during hospitalization. Of those, 8 patients met full criteria and were offered TTVIP's long-term services, and 5 chose to enroll. Ultimately, 3 of the enrolled patients were lost to follow up after a period of receiving intervention services, while the remaining two patients graduated from the program after their goals and/or needs were met (see Figure 6). The eligibility and enrollment rates in this project population were reflective of TTVIP's traditional population, however the lost to follow up rate was higher for rural patients.



Figure 6.

Non-enrolled patients still benefited from TTVIP's bedside support during hospitalization and immediately post-discharge. The most common services provided by TTVIP included safety planning, family support/liasing, coordinating clinic appointments, submitting victims of crime compensation forms, and counseling on high-risk relationships. Patients that enrolled in TTVIP also benefitted from these services, in addition to community-based services and resources provided throughout the duration of their enrollment in the program, most commonly including transportation, employment, and financial assistance, education enrollment, healthcare navigation, law enforcement liaising, firearm safety counseling, engagement in arts/recreation activities, and mental health treatment.

All but one enrolled patient completed the pre-survey. Patients reported agreement in their comfort and anticipated benefit of working with a TTVIP client advocate, in addition to confidence that their advocate could understand them and help them get connected to services and resources in their communities. They reported slightly less agreement with their own knowledge of and confidence in identifying and accessing these services and resources. Patients reported slightly less agreement in their comfort working with and being understood by a mental health clinician but agreed that they would benefit from mental health services.

Two patients who graduated from TTVIP completed the post-survey. Their responses were nearly opposite each other's, though it is important to note they worked with the same client advocate. For example, when asked if they benefitted from working with a TTVIP client advocate, one strongly agreed and one strongly disagreed. Due to the low sample size and conflicting responses across the survey, the results provided limited insight into rural patients' experiences with TTVIP and were deemed inconclusive.

From the client advocates' perspectives, the barriers and challenges they anticipated prior to project implementation were fairly consistent with their actual experience during implementation. In the pre-survey, the primary concerns reported by the advocates were related to the increased driving time to/from the rural communities and a lower self-efficacy around their knowledge of and ability to expertly navigate services and resources local to their patients.

After implementation, the advocates confirmed these barriers and elaborated on their impact. For instance, the increased driving time itself reduced the time available to provide intervention services to these patients and others on their caseload, and these trips required significantly more time and effort to coordinate. Relatedly, advocates reported less flexibility and responsiveness to their patients' needs because the driving time inhibited spontaneity or timely follow-up. Regarding service navigation, advocates reported a lack of services in proximity to patients' homes as a bigger barrier than their lack of local expertise. Lastly, the advocates reported strong agreement that this approach to serving rural patients was not sustainable and that client advocates local to the rural communities could provide a more effective intervention.

## Medical & Mental Health Follow-Up

Eligible rural patients who enrolled in TTVIP had higher rates of medical and mental health follow-up compared to their counterparts that declined enrollment. Figure 7 below illustrates patients' acceptance and completion rates of mental health services, which include brief intervention and education during hospitalization, a PTSD and depression screening at 30 days post-injury, and provision of therapeutic services if appropriate. Although patients that were not enrolled in TTVIP accepted mental health services at a higher rate, patients participating in TTVIP had higher rates of mental health follow-up at 30 days post-injury.

These groups performed similarly with their medical appointment follow-up after injury. Most patients with firearm-related injuries are scheduled to follow-up with the trauma surgery team within 1-3 weeks post-discharge. The trauma clinic serves as a checkpoint for the surgery team to assess patients' post-operative recovery and wound healing, remove retained bullets, refer to other outpatient services, sign work or school absence notes, and more. It is also an opportunity for TTVIP client advocates to engage with patients and families (whether enrolled in long-term services or not), reconnect after discharge, and offer additional support. Again, patients not enrolled in TTVIP had higher rates of scheduled clinic appointments, but TTVIP enrolled patients had higher attendance rates at their clinic appointments (see Figure 8).

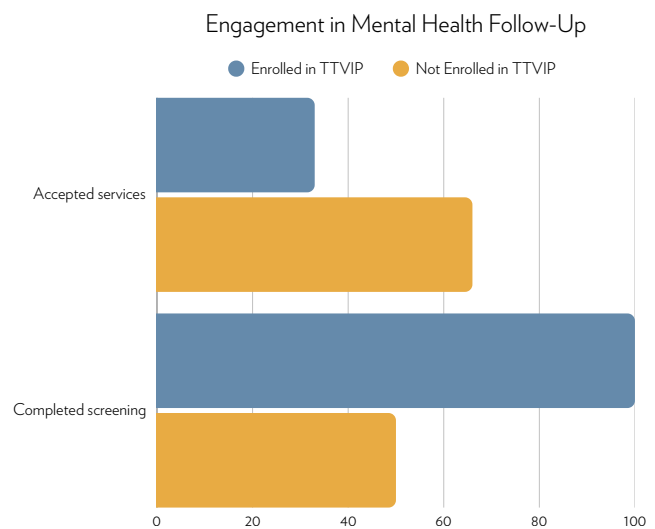


Figure 7.

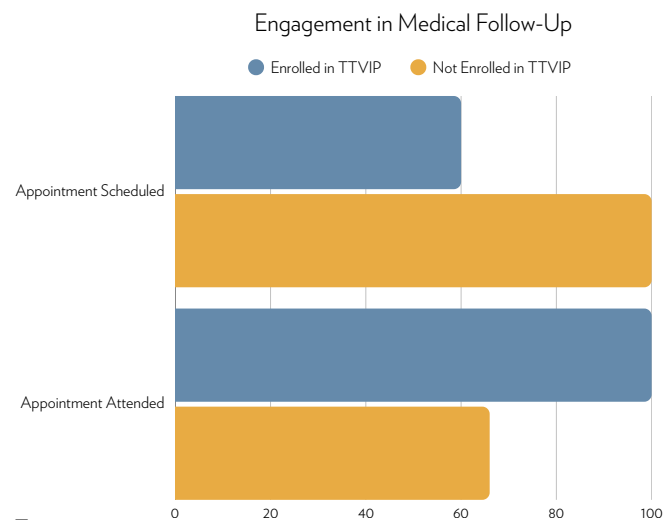



Figure 8.

 Rural patients enrolled in TTVIP had a 100% follow-up rate with medical and mental health services after injury.

## Capacity Building

Over the course of nearly 1 year, the stakeholder committee at MUSC Health – Orangeburg completed three foundational phases of the capacity building effort. First, a comprehensive gap analysis was conducted to create a framework for the committee’s objectives. The analysis facilitated goal setting by identifying available resources, existing resource gaps and the barriers those gaps created, actions that could be taken to address the gaps, and the anticipated timeline to complete the actions. For example, committee members felt there were opportunities to improve continuity of care from inpatient to outpatient settings. As anecdotally reported by committee members, hospitalized patients report unmet social needs (ex. housing or food assistance), and the committee recognized the opportunity to improve connections with community-based service providers that could more effectively address those needs. As such, the committee then worked through identifying existing resources, resource gaps, and strategies to address the gaps. This resulted in the committee creating a screening and resource referral pathway in the emergency department, including the development of a brochure with local agencies and organizations that can address basic needs.

There was a 50% response rate on the stakeholder committee survey. Respondents overwhelmingly reported poverty as the biggest driver of gun violence in the Orangeburg area. When asked what violently injured patients would need to prevent future victimization and improve injury recovery, respondents cited social determinants of health such as education and employment opportunities, affordable housing, and reliable transportation. When asked which evidence-informed intervention strategies should be prioritized at their trauma center, the group most endorsed 1) firearm safe storage counseling and gun lock distribution, 2) a hospital-based or hospital-linked violence intervention program, and 3) bedside screening for firearm violence risk and referrals to community resources. When asked what barriers currently exist that may inhibit implementation of these interventions, the group most reported short staffing of 1) ancillary clinical providers such as social workers, case managers, or pastoral care, and 2) community-based providers such as community health workers, outreach coordinators, and patient advocates/navigators. The other barrier most cited was limited capacity to write grants to obtain external funding for initiative support and sustainment. In an open-ended question asking for additional feedback, respondents repeatedly shared their belief that to effectively increase capacity to better serve victims of violence at their trauma center, additional staff dedicated to the effort would be essential.

# Discussion

Despite implementation challenges including low patient volume, reduced patient engagement, and smaller service referral networks, this project provides valuable formative data on traditional HVIPs' ability to support rural populations.

At baseline, patients reported lower confidence and knowledge identifying and navigating services in their own communities, although they reported more confidence in their advocates being able to do so. However, the advocates found that many services that they are accustomed to referring patients to (ex. GED classes, employment assistance) were on average 45+ minutes away in areas without public transportation options. On the other hand, engagement with TTVIP was correlated with higher rates of medical and mental health follow-up after hospital discharge. The literature shows that many of the same barriers to achieving health and safety in urban communities are exacerbated in rural communities due to poorer access to limited services and resources, including the trauma centers where they are treated. This project's findings highlight the need and promising utility of follow-up violence intervention services for rural populations.

TTVIP's client advocates reported a significant increase in driving time that not only limited their capacity to respond to their rural patients' needs in a timely manner but also reduced the amount of time available for the rest of their caseload. Inevitably, the advocates spent more time in their car than they did providing services to the patients they were driving to see. Relatedly, advocates reported that less face time after hospital discharge seemed to impact their rural patients' engagement in services, as seen by the increased lost-to-follow-up rate in the project population. These outcomes reinforce the HVIP model's best practice of hiring credible messengers from the communities served.<sup>18</sup> In addition to local community knowledge and familiarity, physical proximity to patients allows for more responsive and intensive case management support and intervention.

Lastly, the stakeholder committee's work at MUSC Health – Orangeburg provided key insights into the opportunities and challenges other rural community hospitals and trauma centers likely face when considering their capacity to implement violence intervention programming. Two main conclusions were made clear by this committee's work: 1) there is a nearly universal desire to improve care and outcomes of violently injured patients, and 2) there are far fewer resources available to equitably serve violently injured patients in these settings. Consistent with the abovementioned findings, the committee's capacity building efforts amplified the need to invest in local champions, credible messengers, and dedicated violence intervention programming that are adequately resourced to focus on the initiatives.

# Conclusion

This project suggests that violently injured patients from rural communities may be accepting of hospital-based violence intervention services. However, expansion of a traditional HVIP's catchment area is not feasible – implementing hospital-based violence intervention programming locally in rural areas would be more impactful for patients and their communities and more cost-effective for service providers and healthcare institutions.

01

## Invest locally in CVI strategies

Equitable investment in community violence intervention strategies should be commensurate to the scope of the problem in each community.

02

## Build capacity to scale interventions across trauma systems

Smaller scale intervention strategies can be cost-saving to local community hospitals and trauma centers.

03

## Provide modified HVIP support to rural patients

Traditional HVIPs can improve care and recovery outcomes by supporting rural patients at bedside & immediately post-discharge.

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