Implementing psychosocial programming at a level 1 trauma center: results from a 5-year period

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ABSTRACT

Background The primary goal of the present study is to describe the psychosocial support services provided at our institution and the evolution of such programming through time. This study will also report the demographics and injury patterns of patients using available resources.

Methods Trauma Recovery Services (TRS) is a social and psychological support program that provides services and resources to patients and families admitted to our hospital. It includes a number of different services such as emotional coaching from licensed counselors, educational materials, peer mentorship from trauma survivors, monthly support groups, post-traumatic stress disorder (PTSD) screening and programming for victims of crime. Patients using services were prospectively recorded by hired staff, volunteers and students who engaged in distributing programming. Demographics and injury characteristics were retrospectively gathered from patient’s medical records.

Results From May of 2013 through December 2018, a total of 4977 discrete patients used TRS at an urban level 1 trauma center. During the study period, 31.4% of the 15,640 admitted adult trauma patients were exposed to TRS and this increased from 7.2% in 2013 to 60.1% in 2018. During the period of 5.5 years, 3317 patients had ‘direct contact’ (coaching and/or educational materials) and 1827 patients had at least one peer visit. The average number of peer visits was 2.7 per patient (range: 2–15). Of the 114 patients who attended support groups over 4 years, 55 (48%) attended more than one session, with an average of 3.9 visits (range: 2–10) per patient. After the establishment of PTSD screening and Victims of Crime Advocacy and Recovery Program (VOCARP) services in 2017, a total of 482 patients were screened for PTSD and 974 patients used VOCARP resources during the period of 2 years, with substantial growth from 2017 to 2018.

Conclusions Hospital-provided resources aimed at educating patients, expanding support networks and bolstering resiliency were popular at our institution, with nearly 5000 discrete patients accessing services during a period of 5.5 years. Moving forward, greater investigation of program usage, development, and efficacy is necessary.

Level of evidence Level II therapeutic.
employment status, and insurance were retrospectively collected from the electronic medical record. Injury characteristics including mechanism, region of injury (head/neck, face, chest, spine, abdomen, pelvis, upper extremity or lower extremity) and hospital length of stay were similarly recorded.

Founding TRS
The development of psychological and social resources for trauma patients and families, referred to as TRS at this trauma center, began through TCCS via METRC. This was a multi-center study designed to study its effects on clinical and functional outcomes after high-energy orthopedic trauma, through introducing patients at six intervention sites to similar services. Since its initiation, TRS at our hospital subsequently evolved by modifying or discontinuing services patients did not find useful and through implementation of new programs tailored to our unique patient population and the needs of the surrounding community. See table 1 for greater detail.

Direct contact
‘Direct contact’ refers to offering patients educational materials and/or personalized coaching. Both services were offered from TRS program onset in 2013. Specifically, patients received the TSN Handbook for Trauma Patients and Their Families. This text includes explanations of common injuries and typical treatments for these injuries. The handbook also provides lay information about hospitals, services and policies. Patients who receive the TSN Handbook are also informed about the TSN website, which can serve as another resource for information needed to patients and/or family members.

Table 1 Overview of services offered through Trauma Recovery Services

| Service                  | Brief description of service                                           | Personnel involved                      | Program initiation | Source                   |
|--------------------------|------------------------------------------------------------------------|-----------------------------------------|--------------------|--------------------------|
| Educational materials    | Patients are provided a copy of the TSN Handbook and/or instructions for TSN website access. | Peer volunteer or TRS coach             | 2013               | TSN (for TCCS)           |
| TRS App                  | Patients are provided information about TRS App that includes information about injuries, hospitalization and recovery. | Peer volunteer, TRS coach or research assistant | 2017               | Novel                   |
| Coaching                 | Licensed counselor provides emotional support and other counseling as needed to patients and/or family members. | TRS coach                               | 2013               |                         |
| Family classes           | Help prepare family members to assume a caregiving role after discharge. | TRS coach                               | 2013 (discontinued in 2015) | TSN (for TCCS)           |
| Support groups           | Allowed patients and/or family members to engage in open discussion about their injuries and recovery. | TRS coach                               | 2013               | TSN (for TCCS)           |
| NextSteps classes        | Self-management classes for patients after hospital discharge. | TRS coach                               | 2013 (discontinued in 2015) | TSN (for TCCS)           |
| Peer mentorship          | A trauma survivor who can share their story and offer support.         | Peer volunteers                          | 2013               | TSN (for TCCS)           |
| Comfort bags             | Bags containing hygiene products, socks, blankets and other items donated by trauma survivors. | Peer volunteers                          | 2014               | Novel                   |
| PTSD screening           | PCL-5 administered at postdischarge clinic visits.                      | Clinical providers                      | 2017               | Novel                   |
| VOCARP                   | Victim advocacy, educational resources, and referral to internal or external resources for patients with violence-related activations. | Social workers                          | 2017               | Novel                   |

PCL-5, PTSD checklist for Diagnostic and Statistical Manual for Mental Illness, Fifth Edition; PTSD, post-traumatic stress disorder; TCCS, Trauma Collaborative Care Study; TRS, Trauma Recovery Services; TSN, Trauma Survivors Network; VOCARP, Victims of Crime Advocacy and Recovery Program.

Support groups and family classes
In May 2013, support groups, family classes, and NextSteps classes were offered. Support groups are offered monthly and are confidential meetings that allow patients and family members to speak about their experiences and to support one another. In the month of May, a National Trauma Survivors Day celebration is offered in lieu of a regular meeting. This is an opportunity for patients and families to come together along with healthcare providers to celebrate recovery and engage in fellowship. In December, a holiday potluck dinner is held, instead of a regular support group meeting. Initially, support groups were tailored for general trauma populations, but have expanded to be more inclusive to amputees, patients who have sustained a traumatic brain injury (TBI) and their families. Family classes were initially designed to help prepare family members to take on caregiving roles and offered family members the opportunity to connect with others in similar circumstances. Family classes were discontinued in 2015, due to low utilization levels. All support groups, family classes and NextSteps classes are run by TRS coaches.

Peer mentorship
Peer mentorship also began in May 2013. Each peer visitor is a trauma survivor, with his or her own story of a traumatic experience or injury. Peer visitors offer patients and families the opportunity to connect with someone who understands their position.

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Table 2  Patient demographics for all who had resource utilization beyond educational materials, coaching, or VOCARP (n=2324 of 4977). Frequency (%) is based on the number of patients with available data

| Demographic                          | Frequency (%) |
|--------------------------------------|---------------|
| All patients (n=2324)                |               |
| Age, years; mean (SD)                | 45.4 (18.5)   |
| Male                                 | 1453 (64.1%)  |
| Race and ethnic background           |               |
| Caucasian                            | 1555 (69.0%)  |
| African-American                     | 605 (26.9%)   |
| Hispanic                             | 93 (4.1%)     |
| Other race                           | 82 (3.6%)     |
| Marital status                       |               |
| Single                               | 1100 (48.8%)  |
| Married/significant other            | 862 (38.3%)   |
| Divorced                             | 191 (8.5%)    |
| Widowed                              | 100 (4.4%)    |
| Emergency contact                    |               |
| Spouse/significant other             | 717 (31.8%)   |
| Parent/grandparent                   | 769 (34.1%)   |
| Child/grandchild                     | 275 (12.2%)   |
| Sibling                              | 201 (8.9%)    |
| Friend                               | 101 (4.5%)    |
| Other                                | 162 (7.2%)    |
| None                                 | 27 (1.2%)     |
| Employment                           |               |
| Employed*                            | 915 (40.7%)   |
| Not employed                         | 903 (40.2%)   |
| Retired                              | 354 (15.7%)   |
| Student                              | 77 (3.4%)     |
| Insurance                            |               |
| Medicare                             | 370 (18.2%)   |
| Medicaid                             | 794 (39.1%)   |
| Uninsured                            | 170 (8.4%)    |
| Managed care                         | 359 (17.7%)   |
| Commercial                           | 232 (11.4%)   |
| BWC                                  | 100 (4.9%)    |
| Mechanism of injury                  |               |
| Assault                              | 36 (1.6%)     |
| ATV/dirt bike/snowmobile             | 40 (1.8%)     |
| Burn                                 | 15 (0.7%)     |
| Crush                                | 77 (3.4%)     |
| Fall                                 | 569 (25.3%)   |
| Motor vehicle collision              | 717 (31.8%)   |
| Motorcycle collision                 | 270 (12.0%)   |
| Other                                | 40 (1.8%)     |
| Pedestrian struck                    | 127 (5.6%)    |
| Penetrating (GSW or stab)            | 314 (13.9%)   |
| Sport related                        | 48 (2.1%)     |
| Injuries                             |               |
| Head/neck                            | 429 (19.1%)   |
| Face                                 | 204 (9.1%)    |
| Chest                                | 555 (24.7%)   |
| Spine                                | 339 (15.1%)   |
| Abdomen                              | 322 (14.3%)   |

Continued

RESULTS

Overview and patient capture

From 2013 until 2018, there were a total of 32,637 trauma activations at our institution. Although the mean age of all trauma patients was slightly younger compared with those using TRS (43 years vs. 45.4 years, p<0.001), neither population was different in terms of sex (both 64% male). Among all trauma activations the most common mechanisms of injury were falls (33.5%), motor vehicle collisions (MVC; 28.7%) and penetrating trauma (gunshot wounds or stabbings: 12.2%). Of the 32,637 trauma activations, 16,997 patients (52.1%) were discharged home from the ED. 31.4% of admitted patients used TRS during the study period. This increased from 7.2% of admitted patients using services in 2013 to 60.1% of admitted patients in 2018.

Demographics of the study population

Between 2013 and 2018, a total of 4977 patients used TRS, with 2324 patients (46.7%) receiving more than direct contact or VOCARP services, only. Of these 2324 patients, the mean age was 45.4 years (SD=18.5) and 64% were male (table 2).
The majority were Caucasian (69%), single (48.8%) and had Medicaid as their primary insurance coverage (39.1%). Equivalent numbers of patients were employed (40.6%) or unemployed (40.2%) at time of presentation.

**Injury characteristics of the study population**

The mean hospital length of stay was 10 days (SD=11.2). Mechanisms of injury were variable, with MVCs (31.8%), falls (25.3%), penetrating trauma (13.9%), and motorcycle collisions (MCC, 12%) representing the primary etiologies. See table 2. Of these 2324 patients, 1519 (67.7%) had at least one orthopedic injury, including those to the spine, pelvis, or extremities. The most common injuries were to the lower extremities (39.7%), chest (24.7%), upper extremities (20.4%) and head/neck (19.1%).

**Use of TRS**

The total number of discrete patients using TRS rose from 209 in 2013 to 1388 in 2018. Although the number of direct contacts reached a plateau between 550 and 700 each year, the total number of patients informed about resources spiked to 1443 in 2017 and remained steady in 2018. Peer visits also became more frequent with program expansion and, accordingly, there was a steady growth in peer visits from 2013 to 2016 (figure 1, supplemental digital contact).

From 2014 to 2018, between 50 and 100 patients received more than one peer visit. The average number of peer visits in this population was 2.7 and the median was 2.0 (range: 2–15).

Support groups also became more widely used over time, with the highest attendance seen in 2017 (figure 2). Of the 114 patients who attended support groups over 4 years, 55 (48%) attended more than one session, with an average of 3.9 visits and median of 3.0 visits (range: 2–10) per patient. The onset of PTSD screening and VOCARP services in 2017 led to 482 patients being screened for PTSD within a period of 2 years and 974 patients using VOCARP resources as well, with substantial growth from 2017 to 2018 (table 3).

**Demographics and injury characteristics per resource utilization**

Patients who used different services (>1 peer visit, support groups, VOCARP, and PTSD screening) had varying demographics (table 4). In particular, patients using VOCARP resources were younger (33 years vs. 44 years), were more often male (78% vs. 60% to 65%), single (76%), and were less often Caucasian (30% vs. 60% to 73%), all p<0.02.

The majority of patients who attended support groups were married or had a significant other (56% vs. 20% to 40%) and were often employed (52% vs. 26% to 45%), both p<0.001. Patients with >1 peer visit had longer average hospital stays: 16.7 days (SD=14.9). MVCs and MCCs were more common mechanisms for patients with >1 peer visit and support group attendees, whereas VOCARP users had substantially more penetrating trauma (78%, p<0.0001).

The majority of patients receiving a peer visit (n=1827) only had one visit (73%). Eighteen percent of these patients had two peer visits, and 9% had three or more, with one patient receiving 15. Patients with more peer visits were younger but were no different in terms of sex or marital status (table 5). Patients with more peer visits were less often retired (9% vs. 16% to 17%, p=0.02), but were no different in terms of rates of employment. Patients with three or more peer visits were less likely to be injured by falls (8.4% vs. 20% to 25%) and were more likely to present after MCCs (24% vs. 12% to 16%), both p<0.001, potentially related to hospital stay. As the number of peer visits increased, patients had longer associated hospital stays (1 visit: 9 days; 2 visits: 14 days; 3+ visits: 23 days), p<0.001.

**DISCUSSION**

Since program initiation in May 2013 through December 2018 nearly 5000 unique patients were reached by TRS at our institution. Patients represented a wide variety of social and economic backgrounds, being inclusive to both employed and unemployed individuals, those with both low and high levels of social support, and to the young and elderly alike. Close to half of all patients (2324 of 4977, 47%) had resource use beyond direct contact or VOCARP services alone. This group represents patients who demonstrated greater engagement with the programming, thus were studied in more detail.

Psychosocial resources for trauma patients including educational materials, counseling, peer mentorship, and support groups are not widespread among trauma systems; therefore,
Table 4  Breakdown of patient demographics and injury patterns for different services used. Frequency (%) is based on the number of patients with available data

| Service                                    | >1 peer visit (n=489) | Support group (n=114) | VOC (n=140) (6.0%) | PTSD screening (n=482) (20.7%) | P value* |
|--------------------------------------------|-----------------------|-----------------------|--------------------|--------------------------------|-----------|
| **Age, years; mean (SD)**                  | 43.9 (18.2)           | 43.6 (16.1)           | 32.6 (12.1)        | 43.6 (17.6)                    | <0.001    |
| Male                                       | 307 (62%)             | 36 (61%)              | 107 (78%)          | 312 (65%)                      | 0.014     |
| **Race/ethnicity**                         |                       |                       |                    |                                |           |
| Caucasian                                  | 355 (73%)             | 37 (66%)              | 41 (30%)           | 287 (60%)                      | <0.001    |
| African-American                           | 105 (22%)             | 16 (29%)              | 89 (64%)           | 174 (36%)                      | <0.001    |
| Hispanic/other race                        | 29 (6%)               | 3 (5.4%)              | 9 (6.5%)           | 21 (4.4%)                      | 0.60      |
| **Marital status**                         |                       |                       |                    |                                |           |
| Single                                     | 235 (48%)             | 23 (42%)              | 105 (76%)          | 266 (55%)                      | <0.001    |
| Married/significant other                  | 193 (40%)             | 31 (56%)              | 27 (20%)           | 154 (32%)                      | <0.001    |
| Divorced/widowed                           | 61 (13%)              | 1 (1.8%)              | 6 (4.3%)           | 62 (13%)                       | 0.003     |
| **Employment**                             |                       |                       |                    |                                |           |
| Employed                                   | 222 (45%)             | 27 (52%)              | 36 (26%)           | 174 (36%)                      | <0.001    |
| Not employed                               | 183 (37%)             | 14 (27%)              | 87 (63%)           | 227 (47%)                      | <0.001    |
| Retired                                    | 65 (13%)              | 8 (15%)               | 4 (3%)             | 56 (12%)                       | 0.006     |
| Student                                    | 19 (4%)               | 3 (6%)                | 11 (8%)            | 25 (5%)                        | 0.15      |
| **Hospital LOS, days; mean (SD)**          | 16.7 (14.9)           | 12.4 (12.4)           | 9.4 (12.1)         | 4.9 (6.1)                      | <0.001    |
| **Mechanism of injury**                    |                       |                       |                    |                                |           |
| Assault                                    | 0 (0)                 | 0 (0)                 | 5 (3.6%)           | 14 (2.9%)                      | –         |
| ATV/dirt bike/snowmobile                   | 10 (2.0%)             | 1 (1.9%)              | 0 (0)              | 16 (3.3%)                      | –         |
| Burn                                       | 2 (0.4%)              | 1 (1.9%)              | 1 (0.7%)           | 6 (1.2%)                       | 0.44      |
| Crush                                      | 22 (4.5%)             | 4 (7.5%)              | 0 (0)              | 13 (2.7%)                      | –         |
| Fall                                       | 80 (16%)              | 7 (13.2%)             | 1 (0.7%)           | 157 (33%)                      | <0.001    |
| Motor vehicle collision                    | 184 (37%)             | 18 (34%)              | 11 (8.0%)          | 98 (20%)                       | <0.001    |
| Motorcycle collision                       | 92 (19%)              | 8 (15%)               | 4 (2.9%)           | 43 (9%)                        | <0.001    |
| Other                                      | 9 (1.8%)              | 2 (3.8%)              | 2 (1.4%)           | 8 (1.7%)                       | 0.73      |
| Pedestrian struck                          | 28 (5.7%)             | 4 (7.5%)              | 7 (5.1%)           | 22 (4.6%)                      | 0.74      |
| Penetrating (GSW/stab)                     | 53 (11%)              | 7 (13.2%)             | 107 (78%)          | 99 (21%)                       | <0.001    |
| Sports related                             | 9 (1.8%)              | 1 (1.9%)              | 0 (0)              | 6 (1.2%)                       | –         |
| **Injuries**                               |                       |                       |                    |                                |           |
| Head/neck                                  | 102 (21%)             | 9 (19%)               | 17 (12%)           | 29 (6%)                        | <0.001    |
| Face                                       | 49 (10%)              | 4 (8.3%)              | 18 (13%)           | 32 (6.6%)                      | 0.081     |
| Chest                                      | 117 (24%)             | 15 (31%)              | 27 (20%)           | 78 (16%)                       | 0.006     |
| Spine                                      | 90 (18%)              | 5 (10%)               | 8 (5.8%)           | 41 (8.5%)                      | <0.001    |
| Abdomen                                    | 87 (18%)              | 11 (23%)              | 45 (33%)           | 62 (13%)                       | <0.001    |
| Pelvis                                     | 64 (13%)              | 6 (13%)               | 8 (5.8%)           | 40 (8.3%)                      | 0.023     |
| Upper extremity                            | 121 (25%)             | 19 (40%)              | 25 (18%)           | 107 (22%)                      | 0.019     |
| Lower extremity                            | 200 (41%)             | 29 (60%)              | 57 (41%)           | 316 (66%)                      | <0.001    |

Bold type denotes statistical significance.

*P values represent comparisons between all groups.

ATV, all-terrain vehicle; GSW, gunshot wound; LOS, length of stay; PTSD, post-traumatic stress disorder; VOC, victims of crime.

A prior investigation of their use is limited. Peer mentorship programs are most notable among patients with spinal cord injuries,27 28 TBI or for military veterans.21 Several positives include heightened self-efficacy, better coping mechanisms and bolstered use of mental health resources.21 27–29

Aside from peer mentorship, there has been more limited study of resources similar to those provided at our institution. In a preliminary study of the TSN, Castillo et al found use of such programs to be limited, even when available to patients. Of the 94 participants with follow-up data (out of 126) in their study, 3% reported attending NextSteps classes, 6% attended support groups, 10% met with a peer visitor, 17% visited the TSN website and 27% received the TSN Handbook.22 In some respects, these results are similar to our findings. At our institution, support groups and family/NextSteps classes were not well attended, with a participation rate of 2.3%. However, patients who did participate appeared to benefit, as 48% attended more than one session, with a median of three visits per patient. Other resources were more popular: 40.6% of our patients received a peer visit and 73.7% received direct contact, which includes educational materials and/or personalized coaching. Therefore, our TRS program as a whole was much more used than like interventions in prior reports.
VOCARP was a recent addition to TRS at our hospital, beginning in March 2017, due to a grant from the State of Ohio to support this type of programming. Programming includes financial resources, education about criminal justice and victim rights, general and personal advocacy, emergency resources, individual and group counseling, and referrals for both internal and external services. Major goals of such programming are to increase patient education and engagement, to promote recovery and well-being in the community, and to limit recidivism in this high-risk group. Although new to our institution, other hospitals around the country have investigated the impact of similar violence intervention programs.30–34 These programs have noted a number of benefits including reduced recidivism, cost savings, and transformed attitudes about violence and shame.35–34 In future studies, we hope to explore VOCARP in greater detail, focusing on possible associations with mental illness, recidivism and outcomes.

Many interventions in healthcare never reach widespread implementation. This is poignantly true for psychosocial resource programs similar to our own. One reason behind this trend is that many high-risk groups, including those with cancer, HIV, and autoimmune diseases, are reluctant to use such services.35–39 For example, a foremost barrier to attending support groups among these populations is a lack of perceived need.35–39 In many respects, this is true for trauma patients as well. These patients may be encumbered by psychiatric illness, social habits, and inadequate support systems that create challenges for managing clinical adherence, let alone promoting use of elective services.35–39 Environmental resources may also impede patients from accessing available programming. Many patients live far away or rely on family and friends to provide transportation after injury. Therefore, patients with lower social support might have more difficulty securing resources, even if they are in greatest need. Some critically injured patients are also not discharged directly home after injury. Patients recovering for extended periods in skilled nursing facilities or rehabilitation centers will not have access to resources provided within the hospital. Provider and institutional barriers may hinder establishing programming as well. Specifically, Bradford et al investigated barriers to fully introducing TSN resources.40 In a survey of providers trained to launch these services at 30 centers, the foremost obstacles to implementation included lack of time, insufficient funding, institutional barriers and poor collaboration among departments.40 We realized more provider knowledge of programming and more collaboration among providers within the first years of TRS implementation. We also aggressively sought internal and external funding resources to support program continuation and growth once the TCCS grant funding was expended.

Shortly after program inception in 2013, internal and external funders were solicited, recognizing that program sustainability would not necessarily occur if reliant completely on our hospital system operating budget, regardless of demonstrating program efficacy. By 2015, we were able to support a portion of the TRS budget with funds outside of our hospital system. Since the TCCS grant support ended, the TRS program has been supported by our hospital operating budget and by external resources. Additional funding from the State of Ohio, which was acquired in 2017, has afforded robust resources including personnel to address those trauma patients who are victims of crime.

This study does have several limitations. Despite prospective accumulation of patients using TRS resources, data collection may have been incomplete. As multiple team members including counselors, interns, and volunteers are all involved in distribution of programming, data management was inconsistent. This led to under-reporting, most notably of those who attended support groups in 2015 and 2016 and those who received comfort bags in 2016. Given the small sample sizes of these particular programs, we do not think that this skewed the general population demographics, though it may have impacted subgroup analyses. Given program design, it was not feasible nor ethical to offer programming to individual patients while preventing a

| Table 5 | Breakdown of patient demographics and injury patterns by number of peer visits. Frequency (%) is based on the number of patients in a given column with available data |
|---------|----------------------------------------------------------------------------------|
| Demographics | 1 Peer visit (n=1334) (73%) | 2 Peer visits (n=326) (17.8%) | 3+ Peer visits (n=168) (9.2%) | P value* |
| Age, years; mean (SD) | 46.6±18.7 | 45.3±18.6 | 41.2±17.1 | 0.002 |
| Male | 873 (65%) | 194 (60%) | 113 (68%) | 0.099 |
| Race/ethnicity | | | | |
| Caucasian | 952 (72%) | 236 (73%) | 119 (72%) | 0.914 |
| African-American | 324 (25%) | 71 (22%) | 34 (21%) | 0.370 |
| Hispanic/other race | 49 (3.7%) | 16 (5%) | 13 (7.8%) | 0.040 |
| Marital status | | | | |
| Single | 624 (47%) | 153 (47%) | 82 (49%) | 0.882 |
| Married/significant other | 531 (40%) | 126 (39%) | 67 (40%) | 0.928 |
| Divorced | 111 (8.4%) | 32 (9.9%) | 12 (7.2%) | 0.554 |
| Widowed | 61 (4.6%) | 13 (3.7%) | 5 (3%) | 0.532 |
| Employment | | | | |
| Employed | 546 (41%) | 140 (43%) | 82 (49%) | 0.139 |
| Not employed | 515 (39%) | 120 (37%) | 63 (38%) | 0.823 |
| Retired | 229 (17%) | 50 (16%) | 15 (9%) | 0.022 |
| Student | 36 (2.7%) | 13 (4%) | 6 (3.6%) | 0.430 |
| Insurance | | | | |
| Medicare/Medicaid | 785 (59%) | 166 (51%) | 89 (54%) | 0.020 |
| Uninsured | 102 (7.7%) | 26 (8.0%) | 11 (6.6%) | 0.848 |
| BWC | 52 (3.9%) | 20 (6.2%) | 14 (8.4%) | 0.015 |
| Managed care/ commercial | 386 (29%) | 111 (34%) | 52 (31%) | 0.189 |
| Injury characteristics | | | | |
| Mechanism of Injury | | | | |
| Assault | 24 (1.8%) | 0 (0%) | 0 (0%) | – |
| ATV/dirt bike/ snowmobile | 17 (1.3%) | 7 (2.2%) | 3 (1.8%) | 0.474 |
| Burn | 6 (0.5%) | 2 (0.6%) | 0 (0%) | – |
| Crush | 39 (2.9%) | 12 (3.7%) | 10 (6%) | 0.111 |
| Fall | 335 (25.2%) | 66 (20%) | 14 (8.4%) | <0.001 |
| Motor vehicle collision | 454 (34.2%) | 123 (38%) | 61 (37%) | 0.419 |
| Motorcycle collision | 154 (11.6%) | 53 (16%) | 39 (24%) | <0.001 |
| Other | 23 (1.7%) | 5 (1.5%) | 4 (2.4%) | 0.787 |
| Pedestrian struck | 76 (5.7%) | 16 (5%) | 12 (7.2%) | 0.577 |
| Penetrating (GSW/ stab) | 167 (12.6%) | 32 (9.9%) | 21 (12.7%) | 0.397 |
| Sports related | 34 (2.6%) | 7 (2.2%) | 2 (1.2%) | 0.557 |
| Hospital LOS, days; mean (SD) | 9.2±9.6 | 13.5±11.3 | 23±17.7 | <0.001 |

*P values represent comparisons between all groups.
ATV, all-terrain vehicle; BWC, Bureau of Worker’s Compensation; GSW, gunshot wound; LOS, length of stay.
control group from having any exposure to available services. These thoughts were similarly reflected by Castillo et al and are a reason behind the institution-wide provision of TS resources during the TCCS study.22,23 Finally, this study does not measure satisfaction; therefore, we cannot objectively speak to patient valuation of available resources. However, prior work at our institution identified more patient satisfaction among trauma patients who felt more confident about likelihood to recover.41 Going forward, the authors would like to more critically investigate satisfaction, as well as the intersection of TRS and opioid consumption, new or untreated mental illness, and clinical outcomes related to injury.

Hospital-provided resources aimed at educating patients, expanding support networks and bolstering resiliency were popular at our institution, with close to 5000 discrete patients accessing services during a period of 5.5 years. With growth of available resources over time, more patients were able to be ‘touched’ by TRS. Program evolution during this time also allowed for adaptation to specific trauma populations pervasive in our community. It is clear that there is patient demand for such programming and that it will not go unused if made available.

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REFERENCES

1 Becher S, Morath M, Ziran B. Orthopaedic trauma patients and depression: a prospective cohort. J Orthop Trauma 2014;28:e242–6.
2 Wan JJ, Morabito DJ, Khaw L, Knudson MM, Dicker RA. Mental illness as an independent risk factor for unintentional injury and injury recidivism. J Trauma 2006;61:1299–304.
3 Vranceanu A-M, Bachoura A, Weening A, Vrahas M, Smith RM, Ring D. Psychological factors predict disability and pain intensity after skeletal trauma. J Bone Joint Surg Am 2014;96:e20.
4 Muscatelli S, Spurr H, O’Hara NN, O’Hara LM, Sprague SA, Slobogean GP, O’Ylan NN. Prevalence of depression in penetrating trauma recidivists: it only gets worse. J Trauma 2006;61:16–20.
5 Caufield J, Singhal A, Moulton R, Brenneman F, Redelman D, Baker AJ. Trauma recidivism in a large urban Canadian population. J Trauma 2004;57:872–6.
6 Kronenberg C, Doran T, Goddard M, Kendrick T, Gilboy S, Dare CR, Ayloff L, Jacobs R. Identifying primary care quality indicators for people with serious mental illness: a systematic review. Br J Gen Pract 2017;67:e519–30.
7 Rosenberger PH, Ickovics J, Ickovics J. Psychosocial factors and surgical outcomes: an evidence-based literature review. J Am Acad Orthop Surg 2006;14:397–405.
8 Yeoh JC, Pike JM, Slobogean GP, O’Brien PJ, Broekhuysse HM, Lefavre KA. Role of depression in outcomes of low-energy distal radius fractures in patients older than 55 years. J Orthop Trauma 2016;30:228–33.
9 Simske NM, Audet MA, Kim C-Y, Benedick A, Villier HA. Mental illness is associated with more pain and worse functional outcomes after ankle fracture. Ota International 2015;2:e0037.
10 Becher S, Morath M, Ziran B. Orthopaedic trauma patients and depression: a prospective cohort. J Orthop Trauma 2014;28:e242–6.
11 Vranceanu A-M, Bachoura A, Weening A, Vrahas M, Smith RM, Ring D. Psychological factors predict disability and pain intensity after skeletal trauma. J Bone Joint Surg Am 2014;96:e20.
12 Muscatelli S, Spurr H, O’Hara NN, O’Hara LM, Sprague SA, Slobogean GP, O’Ylan NN. Prevalence of depression in penetrating trauma recidivists: it only gets worse. J Trauma 2006;61:16–20.
13 Caufield J, Singhal A, Moulton R, Brenneman F, Redelman D, Baker AJ. Trauma recidivism in a large urban Canadian population. J Trauma 2004;57:872–6.
14 Kronenberg C, Doran T, Goddard M, Kendrick T, Gilboy S, Dare CR, Ayloff L, Jacobs R. Identifying primary care quality indicators for people with serious mental illness: a systematic review. Br J Gen Pract 2017;67:e519–30.
15 Rosenberger PH, Ickovics J, Ickovics J. Psychosocial factors and surgical outcomes: an evidence-based literature review. J Am Acad Orthop Surg 2006;14:397–405.
16 Yeoh JC, Pike JM, Slobogean GP, O’Brien PJ, Broekhuysse HM, Lefavre KA. Role of depression in outcomes of low-energy distal radius fractures in patients older than 55 years. J Orthop Trauma 2016;30:228–33.
17 Simske NM, Audet MA, Kim C-Y, Benedick A, Villier HA. Mental illness is associated with more pain and worse functional outcomes after ankle fracture. Ota International 2015;2:e0037.
18 O’Toole RV, Castillo RC, Pollak AN, Mackenzie EJ, Bosse MJ, O’Toole RV, Group LS, LEAP Study Group. Determinants of patient satisfaction after severe lower-extremity trauma. J Bone Joint Surg Am 2008;90:1206–11.
19 Knutsen EJ, Payavi E, Castillo RC, O’Toole RV. O’Toole RV. Is satisfaction among orthopaedic trauma patients predicted by depression and activation levels? J Orthop Trauma 2015;29:e183–7.
20 Holman JE, Stoddard GJ, Horwitz DS, Higgins TF. The effect of preoperative counselling on duration of postoperative opiate use in orthopaedic trauma surgery: a surgeon-based comparative cohort study. J Orthop Trauma 2014;28:502–6.
21 Greden JF, Valenstein M, Spinner J, Blow A, Gorman LA, Dalek GW, Marcus S, Kees M. Buddy-to-Buddy, a citizen soldier peer support program to counteract stigma, PTSD, depression, and suicide. Ann N Y Acad Sci 2010;1208:90–7.
22 Castillo RC, Wegener ST, Newell MX, Carlini AR, Bradford AN, Heins SE, Wysocicki E, Pollak AN, Tether H, Mackenzie EJ, et al. Improving outcomes at level I trauma centers: an early evaluation of the trauma survivors network. J Trauma Acute Care Surg 2013;74:1534–40.
23 Bradford AN, Castillo RC, Carlini AR, Wegener ST, Tether H, Mackenzie EJ. The trauma survivors network: survive. connect. rebuild. J Trauma Acute Care Surg 2011;70:1557–60.
24 Wegener ST, Pollak AN, Frey KP, Hymes RA, Archer KR, Jones CB, Seymour RB, O’Toole RV, Castillo RC, Huang Y, et al. The trauma collaborative care study (TCCS). J Orthop Trauma 2017;31:578–87.
25 Wegener ST, Carroll EA, Gary JL, McKinley TO, O’Toole RV, Sietsma DL, Castillo RC, Frey KP, Scharfstein DO, Huang Y, et al. Trauma collaborative care intervention: effect on surgeon confidence in managing psychosocial complications after orthopaedic trauma. J Orthop Trauma 2017;31:57–3.
26 Castillo RC, Huang Y, Scharfstein DO, Frey K, Bosse MJ, Pollak AN, Villier HA, Archer KR, Hymes RA, Newcomb AB, et al. Association between 6-week Postdischarge risk classification and 12-month outcomes after orthopedic trauma. JAMA Surg 2019;154:e184824.
27 Divanoglou A, Georgiou M. Perceived effectiveness and mechanisms of community peer-based programmes for spinal cord injuries—a systematic review of qualitative findings. Spinal Cord 2017;55:225–34.

28 Gassaway J, Jones ML, Sweatman WM, Hong M, Anziano P, DeVault K. Effects of peer mentoring on self-efficacy and hospital readmission after inpatient rehabilitation of individuals with spinal cord injury: a randomized controlled trial. Arch Phys Med Rehabil 2017;98:1526–34.

29 Morris RP, Fletcher-Smith JC, Radford KA. A systematic review of peer mentoring interventions for people with traumatic brain injury. Clin Rehabil 2017;31:1030–8.

30 Gillespie GL, Gates DM, Mentzel T, Al-Natour A, Kowalenko T. Evaluation of a comprehensive ED violence prevention program. J Emerg Nurs 2013;39:376–83.

31 Kramer EJ, Dodgington J, Hunt A, Henderson T, Nwakwuru A, Dicker R, Jiullard C. Violent reinjury risk assessment instrument (VRRAI) for hospital-based violence intervention programs. J Surg Res 2017;217:177–86.

32 Bell TM, Gilyan D, Moore BA, Martin J, Ogbemudia B, McDuffin LE, Moore R, Simons CJ, Zarzaur BL. Long-Term evaluation of a hospital-based violence intervention program using a regional health information exchange. J Trauma Acute Care Surg 2018;84:175–82.

33 Jiullard C, Smith R, Anaya N, Garcia A, Kahn JG, Dicker RA. Saving lives and saving money: hospital-based violence intervention is cost-effective. J Trauma Acute Care Surg 2015;81:834–42.

34 Loveland-Jones C, Feller L, Charles S, Ramsey F, van Zandt A, Volgraf J, Santora T, Pathak A, Dujon J, Spohlm L, et al. A prospective randomized study of the efficacy of “Turning Point,” an inpatient violence intervention program. Journal of Trauma and Acute Care Surgery 2016;81:834–42.

35 Kupprat SA, Dayton A, Guschlbauer A, Halkitis PN. Case manager-reported utilization of support group, substance use and mental health services among HIV-positive women in New York City. AIDS Care 2009;21:874–80.

36 Mehnet A, Koch U. Psychological comorbidity and health-related quality of life and its association with awareness, utilization, and need for psychosocial support in a cancer register-based sample of long-term breast cancer survivors. J Psychosom Res 2008;64:383–91.

37 Holmes JM, Ford E, Yuill F, Drummond AER, Lincoln NB. Attendance at a psychological support group for people with multiple sclerosis and low mood. Disabil Rehabil 2012;34:1223–7.

38 Delisle VC, Gumuchian ST, Pelaez S, Malcarne VJ, El-Baalbaki G, Korner A, Hudson M, Baron M, Thoms BD, et al. the Scleroderma Support Group Project Advisory Team. Reasons for non-participation in scleroderma support groups. Clin Exp Rheumatol 2016;34:56–62.

39 Bui LL, Last L, Bradley H, Law CH, Maier B-A, Smith AJ. Interest and participation in support group programs among patients with colorectal cancer. Cancer Nurs 2002;25:150–7.

40 Bradford AN, Castillo RC, Carlini AR, Wegener ST, Frattaroli S, Heins SE, Teter H, MacKenzie EJ. Barriers to implementation of a hospital-based program for survivors of traumatic injury. J Trauma Nurs 2013;20:89–99.

41 Rascoe AS, Teiman S, Gunasekar A, Vallier HA, Breslin MA. Self-Reported recovery likelihood predicts higher physician ratings: a survey of patients after orthopaedic surgery. J Orthop Trauma 2019;33:e19–23.