HHS Public Access

Author manuscript

J Surg Res. Author manuscript; available in PMC 2021 December 01.

Published in final edited form as:

J Surg Res. 2020 December ; 256: 143–148. doi:10.1016/j.jss.2020.06.009.

Factors Influencing Nonadherence to Recommended Post-Discharge Follow-Up following Trauma

E.I. Truong[1], **B.S. DeMario**[1], **S. Hendrickson**[2], **M. Kalina**[2], **H.A. Vallier**[3], **E.S. Tseng**[1], **J.A. Claridge**[1], **V.P. Ho**[1,4]

[1]Department of Surgery, MetroHealth Medical Center and Case Western Reserve University School of Medicine, Cleveland, OH, USA

[2]Community Trauma Institute, MetroHealth Medical Center, Cleveland, OH, USA

[3]Department of Orthopedic Surgery, MetroHealth Medical Center, Cleveland, OH, USA

[4]Department of Population and Quantitative Health Sciences, Case Western Reserve University School of Medicine, Cleveland, OH, USA

Abstract

Introduction: Historically, trauma patients have low adherence with recommended outpatient follow-up plans, which is crucial for improved long-term clinical outcomes. We sought to identify characteristics associated with nonadherence with recommended outpatient follow-up visits.

Methods: This is a single-center retrospective examination of inpatient trauma survivors admitted to a Level 1 trauma center (March 2017 – March 2018). Patients with known alternative follow-up were excluded. All outpatient visits within one year from the index admission were identified. The primary outcome was nonadherence, which was noted if a patient failed to follow-up for any specialty recommended in discharge instructions. Factors for nonadherence studied

Corresponding Author: Vanessa Ho, MD, MPH, FACS, Department of Surgery, Division of Trauma, Critical Care, Burn, and Acute Care Surgery, 2500 MetroHealth Drive, Cleveland, OH 44109, vho@metrohealth.org, Phone: 216-778-4979, Fax: 216-778-1351.

Author Contributions:

Author	Literature Review	Study Design	Data Collection	Analysis	Manuscript Writing	Critical Revisions
EIT	x	x	x		x	x
BSD	x		x		x	x
SH		x				x
MJK		x	x			x
HAV	x	x			x	x
EST				x	x	x
JAC		x			x	x
VPH		x		x	x	x

included age, injury severity (ISS), mechanism, length of stay, number of referrals made, and involvement with a Trauma Recovery Services (TRS) program. Bivariate and logistic regression analyses were performed.

Results: 498 patients were identified (69% male, median age 43 (26–58), median ISS 14 (9–19). 240 (47%) were nonadherent. The most common specialties recommended were orthopedic surgery (56% referred, 19% nonadherent), trauma (54% referred, 35% nonadherent), and neurosurgery (127 referred, 35% nonadherent). Lowest levels of follow-up were seen for non-surgical referrals. In adjusted analysis, a higher number of referrals made (OR 2.45, 95% CI 1,95–3.05) and older age (OR 1.01, 95% CI 1.00–1.02) were associated with nonadherence. TRS participants and penetrating trauma patients were more likely to be adherent (OR 0.60, 95% CI 0.37–0.97).

Conclusion: The largest contributor to nonadherence was the number of referrals made; patients who were referred to multiple specialists were more likely to be nonadherent. Peer support services may lower barriers to follow-up.

Keywords

follow-up; adherence; access to care; traumatic injury; peer recovery; trauma

Introduction

Unintentional injury remains the leading cause of morbidity and mortality for people aged 1–44 years in the United States and costs the US billions in direct medical expenses and indirect expenses, primarily due to lost work productivity.[1–3] Trauma recidivism is high, and the financial, emotional, and physical sequelae of traumatic injury are substantial.[4,5] Adherence to discharge instructions after inpatient hospitalization is associated with improved outcomes, including lower 30-day mortality and lower rates of readmission.[6–9] Unfortunately, post-discharge follow-up in trauma patients remains low; one single-center study reported a follow-up rate of 10% for their trauma clinic.[10] Institutional programs have attempted to address barriers to healthcare access; at our hospital, Trauma Recovery Services (TRS) is a community-based support system for trauma patients that provides assistance through education, peer mentorship, counseling, financial assistance, legal advocacy, and emotional support.[11,12]

Trauma patients are often expected to follow complex care plans after discharge. Patients may be referred to multiple specialties for follow-up care, such as trauma, orthopedics, or neurosurgery. Additionally, nearly one-third of blunt trauma patients have incidental findings on their imaging studies, some of which should require follow-up with non-trauma specialties.[13] Trauma patients also may have limited healthcare access, and hospitalization represents a potential place for intervention.[14] Factors like discharge destination, insurance status, and operative intervention have been identified as influential in follow-up to outpatient trauma clinics within four weeks of discharge.[15] It is unknown how well patients adhere to multidisciplinary discharge referrals and follow-up in an outpatient setting with physicians of different specialties. Additionally, it is unknown if the use of TRS helps patients to follow up after discharge.

Knowing that patient follow-up to outpatient trauma clinics is poor, and that improving follow-up adherence is beneficial for patient outcomes, we sought to identify factors associated with adherence to plans communicated to patients at the time of discharge. We hypothesized patients would be adherent to care plans less than 50% of the time, and that participation in the Trauma Recovery Services program would be associated with higher adherence.

Methods

We retrospectively studied adult trauma inpatients at an academic Level 1 Trauma Center from March 2017 through March 2018 who survived their index admission and were offered Trauma Recovery Services. The trauma team at MetroHealth evaluates nearly 5500 trauma patients per year, ranging from patients who are minimally injured to those who present without signs of life. Patients who were known or expected to follow up outside of the local metropolitan area or with Veterans Affairs, went to prison, died, or were not recommended to follow up with any specialties were excluded.

Patients who were offered Trauma Recovery Services were entered in a database to track adherence to follow-up plans. The TRS program offers comprehensive psychosocial programming and support such as education, counseling, peer mentors, and legal assistance. TRS identifies eligible adults via inpatient and outpatient provider referrals, standardized hospital and ED reports, and prospective chart review. Patients are not eligible for TRS if they had active psychosis at the time of initial meeting. Patients may decline services if offered. TRS participation was defined as having participated with any service from the TRS team. All patients who were offered TRS services were included in our analysis, regardless of whether they accepted services. Trauma registry data, including demographics, injury mechanism (blunt or penetrating), Injury Severity Score (ISS), and hospital length of stay (LOS), race, ethnicity, and insurance coverage, were merged with the TRS database.

Follow-up recommendations were collected from patient discharge instructions. Patients are discharged with printed instructions that list all referrals, and instructions are discussed verbally with patients prior to discharge. All subsequent outpatient visits for one year after index trauma admission were recorded through chart review. All specialties recommended at discharge were documented, including: Trauma Surgery, Orthopedic Surgery, Neurosurgery, Otolaryngology, Plastic Surgery, Ophthalmology, Plastic Surgery, Urology, Vascular Surgery, Dentistry, and nonsurgical referrals such as Internal Medicine, Physical Medicine & Rehabilitation, and Cardiology. Patients who were known or expected to follow up outside of the local metropolitan area or with Veterans Affairs, went to prison, died, or were not recommended to follow up with any specialties were excluded. Adherence was defined at the patient level, as well as for each specialty. Patients were categorized as adherent or nonadherent. Adherent patients attended follow-up appointments to all recommended specialties within one year of index admission. Patients who cancelled but rescheduled and completed appointments were considered adherent. Patients were defined as nonadherent if they failed to follow up with any specialty that was recommended within one year. Adherence for each specialty was calculated as a rate: the adherence rate for each specialty

was defined as (# of patients who followed up) divided by (# times recommended). Specialties are not shown if they received less than ten referrals over the study period.

Factors evaluated for association with patient nonadherence included age, ISS, mechanism, LOS, number of referrals, and participation in TRS programming. Two-group comparisons between adherent and non-adherent patients were performed using Chi-square for categorical variables or the two sample Wilcoxon Rank Sum test for continuous variables. Data are presented as median [Interquartile Range, IQR]. All factors above were examined for association with nonadherence via multiple logistic regression, adjusted for the all factors (alpha<0.05). Adherence rates for specialties are presented as raw values, grouped by specialty type. All analysis was performed using STATA SE 16.0 (StataCorp LLC, College Station, TX). This study was approved by the hospital's Institutional Review Board, and a waiver of informed consent was obtained from the Institutional Review Board.

Results

Within the one-year period, 594 patients who were admitted after their trauma were identified and were offered TRS services; of these, 10 patients died and 68 patients were expected to follow up remotely or were admitted to jail and were excluded from analysis. An additional five patients were excluded because TRS services started more than a month after injury. Of the remaining patients, 13 patients were not recommended to follow up with any specialties at the time of discharge and were excluded. After exclusions were applied, 498 patients were included for analysis. Included patients were 69% (n=343) male, with a median age of 43 [26–58] and a median ISS of 14 [9–19]. Of these patients, 72% (n=357) accepted TRS services.

Overall, more than half of the patients were adherent to prescribed follow-up plans, with 51% (276 patients) following up with all recommended specialties at least one time (Table 1). In bivariate analysis, adherent patients were more likely to be younger (40 [24–55] vs 47 [28–59], p=0.003), and less injured (ISS 13 [9–17] vs 14 [10–21], p=0.0005). More than half of patients were discharged home (n=285, 57%). Insurance statuses were equivalent between groups, as were gender, race and ethnicity (all p>0.05). Patients who had a penetrating trauma mechanism were more likely to be adherent than blunt trauma patients (29% vs 17%, p=0.001). Patients who were discharged home were more likely to be adherent than patients who were not discharged home (62% vs 51%, p=0.008). Participation with TRS was not associated with adherence on bivariate analysis (70% vs 73%, p=0.48).

Discharge instructions included a median of 2 specialties for follow-up. Most commonly, this included Orthopedic Surgery (281, 56%), Trauma (268, 54%), and Neurosurgery (127, 26%). Nonsurgical referrals commonly included outpatient referrals to Internal Medicine or Family Medicine (97, 19%) and Physical Medicine and Rehab (62, 12%). Follow-up rates by specialty are shown in Table 2. Failure to follow-up was noted for 19% of those referred to Orthopedic Surgery, and 35% each for Trauma Surgery and Neurosurgery. Nonadherence rates for non-surgical referrals were greater, with 51% of patients not presenting to Internal Medicine/Family Medicine, and 40% of patients not following up with Physical Medicine and Rehabilitation. The number of referrals made at discharge was different between groups.

Adherent patients received a median of one referral, while nonadherent patients received a median of three referrals at discharge (p<0.0001).

A logistic regression model was created to assess factors associated with nonadherence. Factors included in the model were: age, Injury Severity Score, hospital length of stay, TRS participation (vs. nonparticipation), penetrating mechanism (vs. nonpenetrating), total number of referrals made, discharge to home, and underinsured. In our regression analysis, nonadherence was positively associated with increased numbers of referrals made; for every additional referral made, the odds of nonadherence increased (odds ratio 2.44, 95% CI 1.95–3.05, p<0.0001). Use of the Trauma Recovery Services program was associated with better adherence after adjustment for other factors (OR 0.60, 95% CI 0.34–0.97), as was a penetrating trauma mechanism (OR 0.57, 95% CI 0.34–0.97). Older age was associated with nonadherence (OR 1.01, 95% CI 1.00–1.02).

Discussion

During a trauma hospitalization, patients are often treated by complex multidisciplinary teams, and may even undergo multiple surgeries by different surgeons, while undergoing complex physiologic changes. At discharge, patients are often expected to follow complex care plans that includes follow-up with multiple teams. In general, hospitalized patients who follow up with their primary care provider soon after discharge experience lower readmission rates.[16] Factors that may influence follow-up in trauma clinics include age, race, hospital length of stay, insurance status, and discharge disposition.[15,17] Prior studies have examined trauma clinical follow-up rates after discharge and found low adherence rates of around 30%.[15] In our study, trauma patients were most often referred to surgical specialties, with Orthopedic Surgery(n=281), Trauma Surgery (n=268), and Neurosurgery (n=127) receiving the most number of referrals. In our study, follow-up rates with surgical specialties was high – of those we studied, follow-up adherence with surgical specialties was more than 50%. Interestingly, patient populations who historically have low adherence such as younger patients and patients who had a penetrating trauma mechanism, had higher rates of adherence than older patients or blunt trauma patients. Referrals to nonsurgical specialties was lower than referrals to surgical specialties, and adherence was also lower.

In our study, most patients referred to trauma clinic followed up: 65% of patients who were referred to Trauma Surgery went to at least one outpatient appointment, suggesting that trauma patients may be more adherent to care plans than previously reported. Stone et al. studied patients over a two-year period and described factors that influenced follow-up in the trauma clinic after discharge from their Level 1 trauma center.[15] Their study examined defined follow-up as occurring within 4 weeks of discharge, and found that nearly 70% were nonadherent. We defined the follow-up window as one year to capture longer follow-up intervals. Using this broad definition, we observed a much lower rate of nonadherence for follow-up to trauma clinic (35%). Similarly, we found that ISS did not have a significant association with follow-up. However, a penetrating injury mechanism was associated with better follow-up adherence, which we hypothesize may be related to the injury patterns – perhaps more visible injuries serve as a strong motivating force to follow up and ensure good wound healing. Leukhardt et al. similarly reported that patients who follow up are

younger, more likely to have penetrating injuries, and are more severely injured than those who do not follow up, consistent with our study.[18] We also examined patient follow-ups to all specialties referred at discharge, in contrast to solely follow-up visits to the outpatient trauma clinic. We found that adherence was highest for patients referred to Orthopedic Surgery, Trauma Surgery, and Neurosurgery, which we theorize may be influenced by the severity of those types of injuries and the obvious connection between injuries and those subspecialties. In our study, we did not collect the specific reasons for each referral, but we hypothesize that referrals to surgical specialties saw higher adherence due to the more compelling need for things like staple or suture removal, planning for future operations, and wound healing checks. In contrast, referrals to nonsurgical specialties might have been related to incidental findings or medication monitoring, which may have felt less salient to patients and lead to lower prioritization of following up.

In previous studies, methods for improving outpatient follow-up include providing specific discharge instructions, while patients have reported barriers to adherence such as distance, financial difficulties, and lack of adequate knowledge.[19,20] The number of referrals made at discharge was clearly a significant factor in determining a patient's ability to fully adhere to discharge instructions, conferring an odds ratio of 2.52 (95% CI 2.02–3.15). One possible limitation is in our definition of "adherent." For a patient to be labeled as "adherent" in this study, they had to appear at every specialty recommended, so it may be easier for a patient to be adherent if there was only one follow-up required, whereas if a patient needed to go to five appointments and missed one, they were labeled as nonadherent. To lessen the bias created from this measurement, we allowed follow-up to occur in a prolonged time frame of up to one year. Our finding that more referrals leads to more nonadherence for patients is logical but is not easily fixed. Complex discharge instructions with multiple referred specialties require many appointments, each needing transportation, scheduling, and other personal arrangements; it is conceivable to imaging that making coordinated outpatient visits would benefit patients. One potential solution to explore is the development of wraparound clinics, where multiple appointments are integrated into outpatient clinics,[21] a "one-stop-shopping" experience for follow-up that would patients to have sequential appointments with different practitioners. It may be most fruitful to link surgical with nonsurgical appointments to improve adherence with nonsurgical referrals.

The only other factor besides number of referrals made that had a significant effect on adherence was participation in the Trauma Recovery Services program. TRS provides supportive programs, peer mentors, parking vouchers, meal tickets, and housing services,[22] with an aim to provide resources beyond medical care to improve mental and emotional health and remove barriers to follow-up. Hall et al found that a nursing-based trauma transitional care program was beneficial in reducing unplanned 30-day readmission for trauma patients.[23] They similarly found that patients in their support program had a 75% follow-up rate with their outpatient trauma clinic and 44% had new primary care provider appointments. While our bivariate comparison of adherent vs nonadherent groups did not show a significant difference in their engagement with TRS, some of our previous, unpublished data has indicated that patients who accept TRS services tend to be older and more severely injured than those who do not. In our regression analysis, removal of these factors indicated a significant impact of TRS on adherence. Our findings that the use of

support services is associated with a higher odds of adherence with discharge instructions further highlights the value of such peer support services on improving patient adherence.

Our study has some limitations that are important to consider. This study was retrospectively conducted, and therefore we cannot draw conclusions about causative effects other than to highlight associated factors. We also performed this study at a single site, although our hospital does serve the majority of trauma patients in our metropolitan area. Our study is limited by an inability to track outpatient visits made outside our hospital systems, so our estimations of follow-up rates may be lower than recorded. We were also only able to track discrete visits and therefore could not account for non-discrete appointments, such as those at a wound clinic. Additionally, as we wanted to assess the effect of peer support recovery services on follow-up, we only included patients who qualified for such services at the time of their injury. For the study period, geriatric patients were not included as frequently as younger patients due to funding priorities and personnel limitations of the TRS program. Since that time, services have been expanded and inclusion criteria in the program have been liberalized to include geriatric trauma patients, and studies are ongoing to evaluate the effects of TRS on this patient population. Older individuals have different set of behaviors and barriers to healthcare access and we cannot make strong inferences about the follow-up adherence in this group. However, our study was able to investigate long-term follow-up across multiple specialties, giving us a fuller picture of outpatient behaviors and barriers to adherence to care plans of trauma patients.

Identification of factors associated with outpatient visits is an important initial step in improving patient adherence and, by extension, healthcare outcomes. Our study identified a rate of adherence to discharge follow-up instructions that was higher than previously reported for Trauma Surgery, with a comparable rate for surgical specialties like Orthopedic Surgery and Neurosurgery. Future work should identify interventions that might help trauma patients reach even higher rates of adherence, especially with nonsurgical specialties, as the trauma admission may provide an excellent opportunity for patients to establish comprehensive healthcare services within a system. As providers, we must work to decrease the barriers to follow-up that exist for our patient population, and psychosocial support programs such as the Trauma Recovery Service program may provide an avenue to help patients thrive.

Author Disclosures:

VPH is supported by the Clinical and Translational Science Collaborative of Cleveland (KL2TR002547) from the National Center for Advancing Translational Sciences (NCATS) component of the National Institutes of Health and NIH roadmap for Medical Research.

VPH spouse is a consultant for Zimmer Biomet, Medtronic, Sig Medical, and Atricure.

This publication was made possible by the Clinical and Translational Science Collaborative of Cleveland, KL2TR002547 from the National Center for Advancing Translational Sciences (NCATS) component of the National Institutes of Health and NIH roadmap for Medical Research. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH.

References

1. Centers for Disease Control and Prevention. 10 Leading Causes of Death by Age Group, United States 2017 [Internet]. [cited 2019 Sep 14];Available from: https://www.cdc.gov/injury/images/lc-charts/leading_causes_of_death_by_age_group_2017_1100w850h.jpg
2. Centers for Disease Control and Prevention. Cost of Injuries and Violence in the United States [Internet]. 2018 [cited 2019 Sep 14];Available from: https://www.cdc.gov/injury/wisqars/overview/cost_of_injury.html
3. Moore BJ, Stocks C, Owens PL. Trends in emergency department visits, 2006–2014. Healthc Cost Util Proj Stat Briefs [Internet] 2017;Statistica(12 2012):893–908. Available from: https://www.hcup-us.ahrq.gov/reports/statbriefs/sb227-Emergency-Department-Visit-Trends.pdf
4. Alghnam S, Tinkoff GH, Castillo R. Longitudinal assessment of injury recidivism among adults in the United States: findings from a population-based sample. Inj Epidemiol 2016;3(5):1–10. [PubMed: 27747538]
5. Koleszar JC, Childs BR, Vallier HA. Frequency of recidivism in patients with orthopedic trauma. Orthopedics 2016;39(5):300–6. [PubMed: 27359281]
6. Lee KK, Yang J, Hernandez AF, Steimle AE, Go AS. Post-discharge Follow-up Characteristics Associated With 30-Day Readmission After Heart Failure Hospitalization. Med Care 2016;54(4):365–72. [PubMed: 26978568]
7. Tung Y-C, Chang G-M, Chang H-Y, Yu T-H. Relationship between Early Physician Follow-Up and 30-Day Readmission after Acute Myocardial Infarction and Heart Failure. PLoS One 2017;1–20.
8. Malhotra A, Phatharacharukul P, Thongprayoon C. Risk factors for 90-day readmission in veterans with inflammatory bowel disease-Does post-discharge follow-up matter? Mil Med Res 2018;5(5):1–6. [PubMed: 29502531]
9. Emdin CA, Hsiao AJ, Kiran A, et al. Referral for Specialist Follow-up and Its Association With Post-discharge Mortality Among Patients With Systolic Heart Failure (from the National Heart Failure Audit for England and Wales). Am J Cardiol 2017;119(3):440–4. [PubMed: 27884420]
10. Dalton MK, Fox NM, Porter JM, Hazelton JP. Outpatient follow-up does not prevent emergency department utilization by trauma patients. J Surg Res 2017;218:92–8. [PubMed: 28985883]
11. Hendrickson SB, Simske NM, DaSilva KA, Vallier HA. Improvement in Outpatient Follow-up With a Postdischarge Phone Call Intervention. J Am Acad Orthop Surg 2020;0(0):1–8.
12. Simske NM, Benedick A, Rascoe AS, Hendrickson SB, Vallier HA. Patient Satisfaction Is Improved With Exposure to Trauma Recovery Services. J Am Acad Orthop Surg 2019;00(00):1.
13. James MK, Francois MP, Yoeli G, Doughlin GK, Lee S-W. Incidental findings in blunt trauma patients: prevalence, follow-up documentation, and risk factors. Emerg Radiol 2017;24:347–53. [PubMed: 28181026]
14. Hambright G, Agrawal V, Sladek PL, Slonim SM, Truitt MS. Acute care surgery: trauma, critical care, emergency general surgery … and preventative health? Am J Surg [Internet] 2016;212(5):803–6. Available from: 10.1016/j.amjsurg.2016.07.006
15. Stone ME, Marsh J, Cucuzzo J, Reddy SH, Teperman S, Kaban JM. Factors associated with trauma clinic follow-up compliance after discharge: Experience at an urban Level I trauma center. J Trauma Acute Care Surg 2014;76(1):185–90. [PubMed: 24368377]
16. Misky GJ, Wald HL, Coleman EA. Post-Hospitalization Transitions: Examining the Effects of Timing of Primary Care Provider Follow-Up BACKGROUND: The transition between the inpatient and outpatient setting is a high-risk period for patients. The presence. J Hosp Med [Internet] 2010 [cited 2019 Sep 14];5(7):392–7. Available from: www.interscience.wiley.com
17. DeLia D, Tong J, Gaboda D, Casalino LP. Post-discharge follow-up visits and hospital utilization by medicare patients, 2007–2010. Medicare Medicaid Res Rev 2014;4(2):1–20.
18. Leukhardt WH, Golob JF, McCoy AM, Fadlalla AMA, Malangoni MA, Claridge JA. Follow-up disparities after trauma: a real problem for outcomes research. Am J Surg [Internet] 2010;199(3):348–53. Available from: 10.1016/j.amjsurg.2009.09.021
19. Gilmore-Bykovskyi AL, Kennelty KA, Dugoff E, Kind AJH. Hospital discharge documentation of a designated clinician for follow-up care and 30-day outcomes in hip fracture and stroke patients

discharged to sub-acute care. BMC Health Serv Res [Internet] 2018 [cited 2019 Sep 14];18(103):1–7. Available from: 10.1186/s12913-018-2907-2

20. Aaland MO, Marose K, Zhu TH. The lost to trauma patient follow-up: A system or patient problem. J Trauma Acute Care Surg 2012;73(6):1507–11. [PubMed: 23147179]
21. Vest JR, Harris LE, Haut DP, Halverson PK, Menachemi N. Indianapolis provider's use of wraparound services associated with reduced hospitalizations and emergency department visits. Health Aff 2018;37(10):1555–61.
22. Simske NM, Rivera T, Breslin MA, et al. Implementing psychosocial programming at a level 1 trauma center: Results from a 5-year period. Trauma Surg Acute Care Open 2020;5(1):1–8.
23. Hall EC, Tyrrell R, Scalea TM, Stein DM. Trauma Transitional Care Coordination: protecting the most vulnerable trauma patients from hospital readmission. Trauma Surg Acute Care Open [Internet] 2018 [cited 2019 Sep 14];3:1–4. Available from: http://tsaco.bmj.com/

Table 1.

Demographic, injury, and dispositions are shown for all patients and based on adherence to discharge recommendations. Percentages reflect the portion of patients in that column with a given characteristic P values reflect comparisons between adherent and non-adherent patients.

	Overall N=498	Adherent N = 263 (51%)	Nonadherent N = 235 (46%)	p value
Age	43 (26–58)	40 (24–55)	47 (28–59)	0.003
Male gender	343 (69%)	183 (70%)	160 (68%)	0.72
Race				0.08
White	319 (64%)	158 (60%)	161 (69%)	
African American	156 (31%)	94 (36%)	62 (26%)	
Other	23 (5%)	11 (4%)	12 (5%)	
Hispanic Ethnicity	22 (4%)	13 (5%)	9 (4%)	0.65
Insurance status				0.10
Private	249 (50%)	138 (52%)	111 (47%)	
Medicaid	160 (32%)	88 (33%)	72 (31%)	
Medicare	61 (12%)	23 (8%)	38 (16%)	
No insurance	28 (6%)	14 (5%)	14 (6%)	
Injury Severity Score	14 (9–19)	13 (9–17)	14 (10–21)	0.0005
Length of Stay	6 (3–10)	5 (3–9)	6 (3–12)	0.19
Penetrating Mechanism	116 (23%)	77 (29%)	39 (17%)	0.001
Discharge Disposition				
Home with or without Services	283 (57%)	164 (62%)	119 (51%)	0.008
Trauma Recovery Services	357 (72%)	185 (70%)	172 (73%)	0.48
# of Specialties Referred	2 (1–3)	1 (1–2)	3 (2–3)	<0.0001

*Facility denotes discharge to skilled nursing facility or acute rehabilitation facility. Trauma Recovery Services denotes that a patient participated (and did not decline) services

Table 2.

Follow-up Rates by Specialty

	Referred	Followed Up	Percent
Surgical Specialties			
Orthopedic Surgery	281	229	81%
Plastic Surgery	64	48	75%
Trauma Surgery	268	174	65%
Neurosurgery	127	83	65%
Dentistry	23	15	65%
ENT	44	28	64%
Vascular Surgery	29	18	62%
Urology	15	8	53%
Ophthalmology	36	18	50%
Nonsurgical Specialties			
Physical Medicine & Rehab	62	37	60%
Internal Med/Primary Care	97	48	49%
Cardiology	11	4	36%

Table 3.

Factors influencing Nonadherence

Nonadherence Factor	Odds Ratio	95% Confidence Interval	p-value
Age	1.01*	1.00–1.02	0.049
Injury Severity Score	0.99	0.97–1.02	0.57
Index Length of Stay	1.00	0.97–1.03	0.96
Trauma Recovery Services	0.60*	0.37–0.97	0.037
Penetrating Mechanism	0.57*	0.34–0.97	0.037
Total Number of Referrals	2.43*	1.95–3.05	<0.0001
Discharge to Home	1.04	0.65–1.68	0.87