

Economic Benefit of Addressing Psychosocial Concerns in the Orthopaedic Trauma Outpatient Setting

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Objectives: Mental illness and adverse social circumstances negatively affect recovery trajectory after orthopaedic trauma. However, these concerns are not usually addressed in the outpatient setting. Lack of knowledge regarding professional billing for services directed toward common mental health and social diagnoses remains a barrier. This study will describe practices and revenue related to psychosocial concerns addressed by surgeons in the outpatient setting.

Design: Retrospective cost-analysis study

Setting: Urban level 1 trauma center.

Patients/Participants: All patients were seen by a single orthopaedic trauma surgeon from 2020 to 2021.

Intervention: Concurrent access to Trauma Recovery Services programming

Main outcome measurement: Revenue as determined by Relative Value Units per Current Procedural Terminology codes multiplied by \$34.61, the Medicare conversion unit for 2022

Results: Mean number of outpatient visits was 37 patients/clinic day. Prior to recovery programming, this corresponded to CPT codes: 99243 (n=2), 99244 (n=4), 99245 (n=3), 99024 (n=27), 99214 (n=1) for a weekly average of \$2,474 and a yearly revenue (50 weeks/year) of \$123,679. In 2022, the average clinic day consisted of CPT codes: 99243 (n=0), 99244 (n=2), 99245 (n=7), 99024 (n=0), 99213 (n=2), 99214 (n=6), 99215 (n=20). The corresponding weekly average was \$8,848 for a yearly total of \$442,402. Following institutional changes, post-operative visits within the 90-day global period were often modified to billable codes secondary to addressing psychosocial concerns.

Conclusion: Addressing psychosocial concerns in the orthopaedic clinic setting led to a \$318,723/year increase in professional and facility revenue for a single surgeon. This substantial increase in revenue could be extrapolated to other trauma surgeon providers who have access to similar

resources for their patients. The revenue far exceeds the cost of recovery programming.

Level of Evidence: III, economic

Keywords: Trauma, psychosocial, Trauma Recovery Services, Cost-Analysis, Coding,

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INTRODUCTION

Mental health concerns not limited to depression, anxiety, and posttraumatic stress disorder (PTSD) are pervasive within orthopaedic trauma patient populations¹⁻³. When left unaddressed, the negative sequelae of these mental health conditions include heightened pain intensity^{4,5}, worse functional status⁶⁻⁹, more complications, readmissions, and revision surgeries¹⁰, and more frequent trauma recidivism^{11,12}. Social concerns carry similar weight. Social determinants of health (SDOH), or aspects of a patient's environment—the conditions under which they are born, raised, work, and live—have pronounced implications for their physical and mental health¹³. Examples of SDOH include financial stability, access to food, educational attainment, social support, and neighborhood safety¹⁴. Given the significant impact of psychosocial phenomena on outcomes, several institutions have implemented programming for trauma survivors aimed at improved screening, education, referral to appropriate ancillary services, and treatment for these concerns^{15,16}.

Notable barriers exist to establishing recovery programming. Insufficient trauma system support likely underscores these obstacles, resulting in part from a paucity of evidence in this area until recently¹⁶. Consequently, surgeons report a dearth of dedicated funding and time constraints when queried regarding developing programming within their facilities¹⁷. Pervasive, ingrained stigma, whereby surgeons assign higher levels of blame to patients with psychosocial concerns, may also play a role¹⁸. On the patient side, support services including mental health care are frequently reported as unmet needs, which largely stem from financial barriers to

obtaining counseling and pharmacotherapy^{19,20}. However, no current published evidence exists, to our knowledge, exploring revenue opportunities from billing for psychosocial care provided in the outpatient setting of an orthopaedic surgeon. Furthermore, no literature exists showing the positive return on investment, in direct revenue, for providing this multidisciplinary care.

Therefore, the objectives of this current study were to first describe the professional and facility billing procedures for social and mental health concerns of a single orthopaedic trauma surgeon in the outpatient setting, and second, to document the revenue associated with this provision of care.

METHODS

Coding and Reimbursement

All outpatient clinic visits for a single orthopaedic trauma surgeon at an urban level 1 trauma center were gathered over a two-year period from 2020-2021. Associated Current Procedural Terminology (CPT) codes were gathered for these visits. The CPT codes often utilized in this setting were 99212-99215 for outpatient established visits, 99243-99245 for office consultations, and 99202-99205 for

outpatient new visits. The corresponding work Relative Value Units (RVUs) and facility RVUS were collected. These were summed to give a total RVU value for each CPT code (Table 1). Revenue projections were calculated by multiplying RVUs by \$34.61, the Medicare conversion per RVU for 2022.

Psychosocial Resources for Trauma Patients

Trauma Recovery Services (TRS) is a recovery program for trauma survivors that was adapted from resources instituted during the Trauma Collaborative Care Study (TCCS) in 2013 (16,21,22). Programming was adapted over time to meet the evolving needs of trauma patients and their families. Some program elements were added, and others were eliminated or modified²³. TRS includes print and online health education resources, coaching from licensed professional counselors, peer mentorship from trauma survivors, support groups, and resources for survivors of violence-related injury²³. It also includes mental health screening for PTSD and related conditions along with referrals for pharmacotherapy and/or counseling²⁴. PTSD screening is initiated during the first post-trauma outpatient clinic visit.

Table 1. Current Procedural Terminology codes and associated Relative Value Units for outpatient visits

	CPT Code	Description of visit	Work RVU	Facility RVU	Total RVU
Established outpatient	99212	Office outpatient established sf 10-19 min	0.70	1.06	1.76
	99213	Office outpatient established low 20-29 min	1.30	1.95	3.25
	99214	Office outpatient established moderate 30-39 min	1.92	2.86	4.78
	99215	Office outpatient established high 40-54 min	2.80	4.25	7.05
Outpatient consult	99241	Office consultation	0.64	0.93	1.57
	99242	Office consultation	1.34	1.96	3.30
	99243	Office consultation	1.88	2.76	4.64
	99244	Office consultation	3.02	4.41	7.43
	99245	Office consultation	3.77	5.46	9.23
New outpatient	99202	Office outpatient new sf 15-29 min	0.93	1.43	2.36
	99203	Office outpatient new low 30-44 min	1.60	2.44	4.04
	99204	Office outpatient new moderate 45-59 min	2.60	3.95	6.55
	99205	Office outpatient new high 60-74 min	3.50	5.36	8.86

CPT: current Procedural Terminology; RVU: relative value unit.

Table 2. International Classification of Disease-10 diagnosis codes for common mental health and social determinants of health diagnoses

Mental Health ICD-10-CM Codes	Description	Socioeconomic ICD-10-CM Codes	Description
F41.1	Generalized anxiety disorder	Z55	Problems related to education and literacy
F41.3	Other mixed anxiety disorder	Z56.0	Unemployment
F41.9	Anxiety disorder, unspecified	Z56.1	Change of job
F43.0	Acute stress reaction	Z56.2	Threat of job loss
F43.10	Post-traumatic stress disorder, unspecified	Z56.4	Discord with boss and workmates
F43.11	PTSD, acute	Z56.6	Other physical and mental strain related to work
F43.12	PTSD, chronic	Z57	Occupational exposures to risk factors
F43.20	Adjustment disorder, unspecified	Z58	Problems related to physical environment
F43.9	Reaction to severe stress, unspecified	Z59	Problems related to housing and economic circumstances
F32.9	Major depressive disorder, single episode, unspecified	Z59.00	Homelessness, unspecified
F33.9	Major depressive disorder, recurrent, unspecified	Z59.2	Discord with neighbors, lodgers, and landlord
F39	Unspecified mood [affective] disorder	Z59.41	Food insecurity
F51.01	Primary insomnia	Z59.6	Low income
F51.02	Adjustment insomnia	Z59.86	Financial insecurity
F51.05	Insomnia due to other mental disorder	Z60	Problems related to social environment
F51.09	Other insomnia not due to substance or known physiologic condition	Z62	Problems related to upbringing
		Z65	Problems related to other psychosocial circumstances
		Z65.4	Victim of crime and terrorism

ICD-10-CM: International Classification of Diseases-10 Clinical Modification; PTSD: posttraumatic stress disorder.

Social Determinants of Health

SDOH screening consists of a survey unique to this intuition based on the Centers of Medicare and Medicaid 10-question health-related social needs screening tool²⁵. It includes 28 questions under nine domains including financial resource strain, food insecurity, intimate partner violence, physical activity, social connection, stress, transportation needs, housing stability, and digital connectivity²⁶. This survey is administered during admission as a part of the standard of care. The gathered data is then available in the electronic medical record for reference in the outpatient setting.

Diagnostic Coding of Psychological and Social Concerns

Psychological and social concerns were identified based on available data from mental health screening questionnaires, information obtained from the patient's history, and SDOH information within the electronic medical record. Patients were then referred, as indicated, to appropriate resources or connected with necessary providers. Commonly

utilized International Classification of Diseases, version 10, with Clinical Modification (ICD-10-CM) codes are shown in Table 2.

RESULTS

Over a two-year period, the average number of outpatient visits for a single orthopaedic trauma surgeon was 37 patients per clinic day. Prior to the establishment of recovery programming more than two years earlier, this corresponded to the following CPT codes 99243 (n=2), 99244 (n=4), 99245 (n=3), 99024 (n=27), 99214 (n=1) (Table 3). This was associated with a total RVU of 71.47 for a weekly average revenue of \$2,473.58. Approximating fifty weeks of clinic per year, this totaled \$123,679 in yearly revenue attributed to the professional and facility billings, based on Medicare rates of reimbursement. Notably, the majority of clinic visits were for post-procedural care within the global period (99024), accounting for 73% of encounters. Post-procedure encounters did not generate any billing for Evaluation and Management services in the outpatient setting.

Table 3. Revenue generated per clinic day prior to Trauma Recovery Services*

CPT codes	# of patients	RVU	Total RVU	Revenue
99243	2	4.64	9.28	\$321.18
99244	4	7.43	29.72	\$1,028.61
99245	3	9.23	27.69	\$958.35
99024	18	0	0	\$0
99024	9	0	0	\$0
99214	1	4.78	4.78	\$165.44
Mean per week	37		71.47	\$2,473.58
Per year (50 weeks)				\$123,679

*Mean RVU amounts are provided for each designated billing code. Medicare rates for RVUs are shown. Total RVUs generated by multiplying the number of patients per RVU. Revenue calculated multiply by \$34.61, the conversion unit for 2022.

Following the establishment of recovery programming and integration of psychosocial resources into the outpatient setting, the following CPT codes were utilized during the average clinic day 99243 (n=0), 99244 (n=2), 99245 (n=7), 99024 (n=0), 99213 (n=2), 99214 (n=6), 99215 (n=20) (Table 4). This was associated with a total RVU value of 255.65 for a weekly revenue of \$8,848.05 and a yearly revenue of \$442,402. This represents a 258% increase in yearly revenue after the practice of addressing and billing for psychosocial concerns was well-established. This resulted in an increase in annual revenue of \$318,723 for the outpatient clinic of a single orthopaedic trauma surgeon in one year.

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Notably, patients returning post-procedure (often following surgery) for injury were now provided with screening for PTSD and SDOH, as were all trauma patients seen in follow-up. They were provided feedback about the

Table 4. Revenue generated per clinic day after Trauma Recovery Services was well-established*

CPT codes	# of patients	RVU	Total RVUs	Revenue
99243	0	4.64	0	\$0
99244	2	7.43	14.86	\$514.30
99245	7	9.23	64.61	\$2,236.15
99024	0	0	0	\$0
99213	2	3.25	6.50	\$224.97
99214	6	4.78	28.68	\$992.61
99215	20	7.05	141.00	\$4,880.01
Mean per week	37		255.65	\$8,848.05
Per year (50 wks)				\$442,402

*Mean RVU amounts are provided for each designated billing code. Medicare rates for RVUs are shown. Total RVUs generated by multiplying the number of patients per RVU. Revenue calculated multiply by \$34.61, the conversion unit for 2022.

screening results, with the additional assignment of diagnosis and referrals for treatment, if indicated. All patients were also provided educational information about their injury and recovery and were informed about the TRS program elements. Due to the increased complexity of assessment and treatment, the Evaluation and Management codes used were consistent with a higher level than had been previously assigned, i.e. prior to TRS implementation.

DISCUSSION

The present study utilized a representative sample of a single orthopaedic trauma surgeon's outpatient clinic to demonstrate an increase in yearly revenue from \$123,679 to \$442,402 after recovery programming was well-established. The notable shift came from the twenty-seven patients seen for post-operative or post-hospital discharge visits, previously within the 90-day global period. These were often switched to billable codes secondary to addressing psychosocial concerns after the introduction of TRS. Patients with other CPT codes (non-post-procedural patients) prior to TRS implementation were also often coded at a higher level of complexity due to the additional psychosocial diagnostic and treatment services provided. This study shows the economic feasibility and benefit of supporting a multidisciplinary trauma recovery program that can provide mental and social health care resources and referrals.

Orthopaedic trauma patients often require multidisciplinary services including both mental and social

health care given the complex dynamics which both underlie their injury and commonly occur following definitive care. Among patients with traumatic lower-extremity injuries, Archer et al. documented 85% of patients required one support service post-hospitalization, yet 32% reported an unmet need after 12 months¹⁹. Fifty-three percent of unmet needs were for mental health or vocational services, secondary to patients' belief that the problem would improve on its own or not knowing how to access appropriate services, respectively (19%). These are modifiable concerns when recovery programming is institutionally available. However, the problem may be further reaching still. In a nationally representative population, Jella et al. found that among orthopaedic trauma survivors with severe mental illness, 25% faced financial barriers to counseling and 41% to pharmacotherapy for mental health conditions²⁰. Although the hospital system in this study was able to provide mental health care to all patients regardless of insurance status without additional charges, many hospital systems do not have such provision capabilities²⁰. This suggests that the provision of screening and referral resources alone may not be sufficient to combat the issue in a broader sense.

Barriers exist on the provider side of mental and social health care provision, as well. Vranceanu et al. found that 90% of surgeons are somewhat or very likely to notice psychosocial factors among their patients, yet only 60% are somewhat or very likely to refer patients for psychological treatment²⁷. This is comparable to other reports denoting low rates of identification and treatment of mental health concerns by orthopaedic trauma surgeons³. Although lack of time, know-how, and institutional support are important underlying factors, stigma remains a significant barrier. Reichman et al. documented this in their work, observing surgeons' beliefs that psychosocial issues were under a patient's conscious control, possibly stemming from lacking mental toughness¹⁸. However, professional confidence in this area directly increased with perceived resource availability and among surgeons with training or mentorship in the area¹⁸. This is consistent with findings from TCCS in which Wegener et al. documented increased surgeon confidence in managing psychosocial sequelae at centers where resources were

available²⁸. Lack of knowledge or proficiency in coding for psychosocial care provided in the outpatient setting likely contributes to reduced confidence in this area.

In recent years, the spotlight on physician wellness has intensified. Rightfully so, given that physician burnout is pervasive among surgeons, including orthopaedic surgeons, and this is on the rise^{29,30}. Some have purported that burnout may overlap with or be eclipsed by moral injury. In theory, moral injury occurs when physicians observe or fail to act in a way that conflicts with their moral belief system³¹. Therefore, when surgeons realize that their patients require psychosocial services but are ill-equipped to provide these due to lacking system or individual competencies, or a combination of the two, moral injury occurs. However, when physicians feel confident about identifying and treating mental health concerns, they realize higher rates of job satisfaction.

Historically, the provision of mental health care starts at the primary care level. Primary care providers have encountered their own barriers with regard to providing mental health care, specifically with notable low utilization rates of psychology and psychiatric referrals³². As a result, some have opted for design and implementation of collaborative care models as a means of delivering integrated behavioral and mental health care. Integrated behavioral health models proffer reductions in healthcare costs stemming from decreased healthcare utilization, as it is well-established that untreated behavioral and mental health conditions contribute to costs via increased medical care utilization³³. Behavioral health integration also allows for streamlining of care through increased efficiency in screening and treatment³⁴. Recent literature suggests that the initiation of collaborative care models generates a minimal increase in cost to the healthcare system³⁴. Likely, initial upfront costs required to integrate services diminish as the benefit from a reduction in overall healthcare utilization expands. This study demonstrates that integrating psychosocial care into the specialty clinic setting can result in increased revenue for the hospital system, in addition to the positive benefits patients realize when these concerns are addressed.

This study has several limitations. First, the values presented here are revenue projections, not those collected by

the hospital system. Actual revenue would vary between institutions depending on the payer mix. Systems with a greater proportion of publicly insured patients (Medicare, Medicaid) and uninsured patients would yield less revenue. Those with greater proportions of workers' compensation patients or those with commercial insurance would yield more revenue. Practices with a more favorable payer mix would realize higher revenue from these shifts in coding practices. Second, the findings here are representative of a single orthopaedic trauma surgeon and therefore do not accurately represent variability in practice patterns. Finally, the psychosocial care provided at this institution is not necessarily representative of that available within other systems. After nearly a decade of its availability, TRS has a breadth of screening tools to identify, provide education, and address a wide range of mental and social sequelae after acute traumatic injury.

CONCLUSION

This study adds to the growing body of literature supporting the development of trauma recovery programming and showcasing its positive benefits, including its economic feasibility. Addressing psychosocial sequelae in a representative sample of a single orthopaedic trauma surgeon's outpatient clinic led to a projected 258% increase in yearly revenue from \$123,679 to \$442,402 after recovery programming was well-established at the institution. The increase in revenue is attributed to psychosocial diagnostic and treatment services and/or referrals provided that allowed for coding at a higher level of complexity or for billable codes among post-procedural patients previously within the 90-day global period. Future research should expand on the economic feasibility of programming to include charges and billing by hospital systems, as well as investigation of cost versus revenue on the inpatient side of recovery program allotment.

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