

Revenue Lost from Unbilled Procedures on Trauma Patients in the Emergency Department

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Abstract

Background: Trauma services are an important yet expensive facet of emergency medical care. One way to recuperate costs is billing for procedures. In academic medical centers, attending physicians must attest for procedures performed by residents in order to bill for them.

Objective: We aimed to quantify lost revenue from unbilled procedures performed on trauma patients.

Methods: We evaluated all trauma activations for one year. Data included demographics, procedure performed, service performing the procedure, procedure cost, procedure billing status, were recorded. Resident procedures not attested by attending staff were considered lost revenue. Procedure-specific charges were obtained from Current Procedural Terminology 2015 edition.

Results: A total of 7001 patient charts were reviewed, 65% male. A total of 2678 patients had billable procedures, of which 1035 (39%) were unbilled. The most common procedures were laceration repair, reduction/fracture care, and Focused Assessment with Sonography in Trauma (FAST). Billing for procedures by trauma residents was less than those by emergency medicine residents (47% vs. 82% respectively, $p < .0001$). Billing for procedures by consulting residents was less than those by emergency medicine residents (22% vs. 82% respectively, $p < .0001$) and trauma surgery residents (22% vs. 47% respectively, $p < .0001$). Billed procedure charges totaled \$1,257,386; Unbilled procedure charges totaled \$875,328. The median charge per billed (\$529, IQR \$374-\$960) and unbilled (\$515, IQR \$383-\$1110) procedure was similar ($p = 0.85$).

Conclusion: Significant potential revenue was lost through unbilled procedures by consulting residents. Increasing billing for procedures by consulting residents would have the most impact on revenue.

Keywords: Trauma center; Health care cost; Billing; Supervision; Trauma; Procedures

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Introduction

According to the Centers for Disease Control and Prevention, the healthcare cost of trauma and injuries in the United States is on the order of hundreds of billions annually. The 2013 total was \$671 billion [1]. Trauma services are expensive due to high fixed costs of staff such as surgeons, anesthesiologists, nurses, and auxiliary staff. Each of these groups has an essential function

and all must be available during a trauma activation to provide optimal patient care.

It is possible for trauma centers to operate as financially neutral or to make profit without additional subsidies provided by the government. This is especially difficult, however, for large urban hospitals which serve uninsured or underinsured patient groups, as these groups show the largest disparity between services

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provided and actual reimbursement. Medicaid patients and patients who are uninsured present a significant burden on level 1 trauma centers, as they fail to provide adequate reimbursement even after the addition of government funds is factored in, and in many situations, operating a level 1 trauma center without financial assistance is not sustainable [2]. In 2002, a survey of multidisciplinary expert trauma panels in each state showed inadequate funding and economic instability to be the major concern and threat to successful trauma systems in each state. These experts furthermore identified this economic instability to be a large factor in difficulties with recruiting trauma personnel, especially physicians and nurses [3].

Trauma services are unique in that they require large amounts of staff and other resources which must be present all day and night. Trauma services are fixed in that equipment and personnel must be present all the time as trauma patients may arrive at any time. Hospitals must invest in this fixed cost if they wish to be a certified trauma center.

To balance the high cost with the relatively low reimbursement by insurers, hospitals must make up the difference by billing for goods and services provided to patients during their hospital stay. Billing for procedures performed on patients is a viable means to support hospitals' needs to balance their costs and reimbursements. Identifying billable procedures translates to concrete, tangible entities on which to bill healthcare insurance providers and/or the patients.

In academic medical centers, patients seen by the trauma service and other specialties may have procedures done by residents who are not yet board certified in their respective fields. The Centers for Medicare and Medicaid Services (CMS) states that all procedures performed by residents must be supervised and attested by an attending physician in order to be billed [4]. Therefore, if no attending physician is present, or they did not attest their presence in the medical record, no fee can be generated, and the procedure cannot be billed. These attestations are often phrased such that, "the attending was personally present for the key portions of the procedure;"

Such instances are lost opportunities for revenue generation. Lost revenue in the trauma setting of the emergency department has not previously been estimated in the published literature. If a hospital could identify the amount of lost revenue and put in place a protocol for reducing the amount of unbilled procedures, it could potentially make the hospital more financially independent and less reliant on government subsidies to remain solvent.

As Feinstein et al. pointed out, Medicare and Medicaid do not reimburse for procedures performed by trainees without attending supervision, but they do contribute to medical education funds for these hospitals. Private insurers, however, do not reimburse for unsupervised procedures by trainees, nor do they contribute monetarily to medical education at hospitals. They therefore stand to benefit greatly from procedures done by trainees which for their clients are effectively done on a "pro bono" basis. This study found a total loss of upwards of \$10 million over a 10-year period due to unbilled procedures, with nearly \$7 million of that total from private insurers [5].

A 2009 study evaluated whether lost revenue from unbilled procedures in the surgical intensive care unit (SICU) would have been sufficient to reimburse faculty to staff the uncovered weeknights and weekends which generated the unbilled procedures. The authors concluded that the actual amount of money recuperated (based on the institution's collection ratio) would not be entirely sufficient to employ another surgeon to cover the SICU, but it would contribute a significant portion of money toward such a salary. At that point, the authors posit, the increased safety and more positive patient outcomes would have to be weighed against the increased cost of employing additional staff [6].

The current study aimed to identify unbilled procedures during trauma activations due to lack of attending physician presence or attestation, to calculate the amount of money lost due to these unbilled procedures, and ultimately to identify factors associated with unbilled procedures. Once these factors are identified, emergency department and surgical staff may be able to target ways to increase compliance with physician presence and attestation. This would lead to reduction of unbilled procedures, thus increasing revenue generation and financial stability for the hospital.

Research Methodology

After obtaining IRB approval, data were collected through an institutional trauma registry maintained by trained abstractors at a single large urban emergency department. Patients were included if they:

1. Presented to the emergency department as trauma activations during the period January 1, 2015 – December 31, 2015 and
2. Had procedure(s) done while in the emergency department. Patients were excluded if they were transferred out of the emergency department prior to admission. Burn patients who were not seen in the ED by ED staff and were immediately transferred to the burn unit were also excluded.

Once a patient with a procedure(s) was identified, the type of trauma (e.g. blunt, gunshot wound, etc.), the type of procedure (e.g. laceration repair, reduction, etc.), the service of the resident performing the procedure (e.g. emergency medicine, trauma surgery, etc.), the service of the attending supervising the procedure, and the cost of the procedure were recorded. We defined unbilled procedures as a medical procedure performed by a resident without attending attestation for the procedure. Collected data also included demographics (age, race/ethnicity) and disposition at discharge.

Total charges lost due to unbilled procedures were calculated based on the cost of the procedure according to *Current Procedural Terminology 2015 edition*. Total charges for billed procedures were also calculated. Billed and unbilled procedure groups were organized by trauma type, procedure type, and resident service performing the procedure. Resident service performing the procedure was compared via chi-square test, whereas trauma

type and procedure type were compared via one-way ANOVA. Charges per billed and unbilled procedure were compared via the Wilcoxon rank sum test. We choose a collection net revenue ratio of 28% to best approximate the actual monies collected from the amounts billed as this approaches the collection ratio of hospitals in our region. All statistical analysis was performed using STATA software version 14.0 (College Station, TX).

Results

A total of 7001 patients presented to the emergency department as trauma activations within the one-year time period. Care of these patients included billable procedures in 2678 encounters. Sixty-five percent of patients undergoing procedures were male. The median age for patients undergoing procedures was 40 (IQR 24-58). Thirty-nine percent of billable procedures (1035) were unattested and therefore could not be billed. The majority of patients undergoing procedures listed “White” as their race/ethnicity, with “Black/African American” the largest minority group (Table 1). The majority of trauma activations over the course of the year were classified as Category 2 (3404), followed by Category 3 (2246) and Category 1 (1031), as displayed in Table 2 (See appendix for defining characteristics of trauma categories). A smaller group of patients was not classified as a trauma activation until after initial assessment (320).

All procedures performed over the course of a year are represented in Figure 1. The most commonly performed procedures were laceration repairs (1242), fracture care/reductions (842), and Focused Assessment with Sonography in Trauma (FAST) with 453 instances. Most patients who underwent procedures had one single procedure (1903), with 561 patients undergoing two procedures, and even fewer patients undergoing three or more procedures (173).

Trauma type was also examined in this study (Figure 2). The most common overall trauma type seen in this period was fall, with 2273 instances, followed closely by motor vehicle collision (MVC) with 2242 instances. Fall and MVC were also the most common trauma mechanisms resulting in the need for procedures in the trauma bay, with 574 and 643 instances, respectively.

Payor source was also recorded (Figure 3). The largest group of patients in this study were insured by Medicaid or Medicaid managed care plans, followed by Medicare patients. A smaller portion of patients were self-pay, had other commercial insurance, or were covered by the Department of Veterans Affairs. The vast majority of patients in both groups (with and without procedures) were discharged home (79% and 82% respectively), with the largest minority of patients in both groups being discharged to a skilled nursing facility (11% and 6% respectively).

No procedures were less likely to be billed than any of the others (all $p > 0.05$). The median cost for billed procedures was (\$529, IQR \$374-\$960) and the median cost for unbilled procedures was (\$515, IQR \$383-\$1110), which was statistically similar ($p = 0.85$) according to the Wilcoxon rank sum test.

The proportion of unbilled procedures contributed by each

Table 1 Demographics in Trauma Registry.

Race/Ethnicity	Number of Patients (%)
White	3867 (52)
Black/African American	2686 (36)
Hispanic	417 (6)
Unknown	391 (5)
Asian, Pacific Islander, Native American/Native Hawaiian	55 (1)

Table 2 Trauma activation category.

Trauma Category*	Number of Patients (%)
Category 1	1031 (15)
Category 2	3404 (49)
Category 3	2246 (32)
Trauma Not Activated**	320 (4)

*See appendix for defining characteristics of trauma categories
**Trauma Not Activated (TNA) denotes patients for whom the trauma protocol was only activated after the initial assessment.

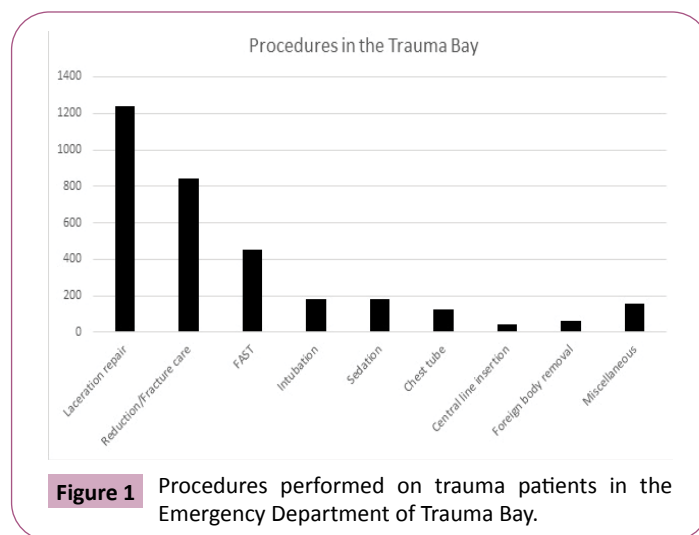


Figure 1 Procedures performed on trauma patients in the Emergency Department of Trauma Bay.

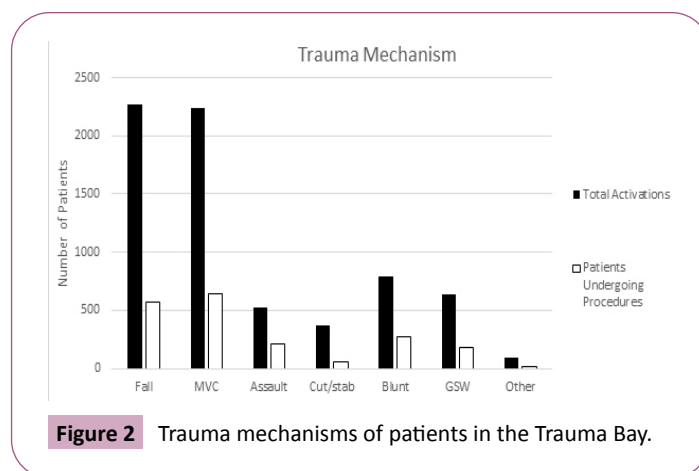


Figure 2 Trauma mechanisms of patients in the Trauma Bay.

service is shown in Figure 4, with emergency medicine residents (346, 33%) and trauma surgery residents (341, 33%) producing almost equal proportions of the total unbilled procedures followed by orthopedic surgery residents (258, 25%). Emergency medicine residents had the highest portion of billed procedures

Payor Source for Patients Undergoing Procedures

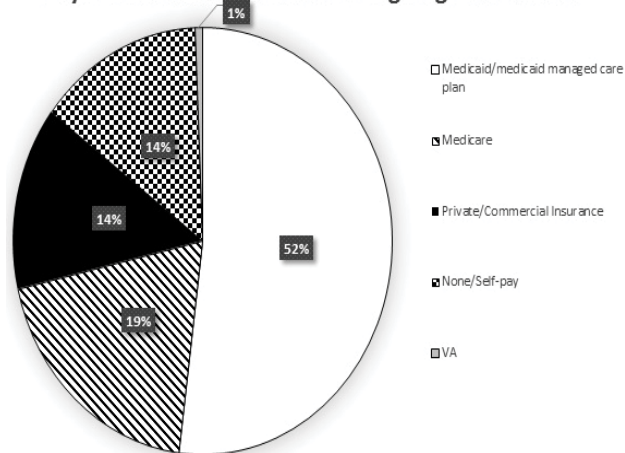


Figure 3 Payor sources for patients undergoing procedures.

Procedures by Resident Service

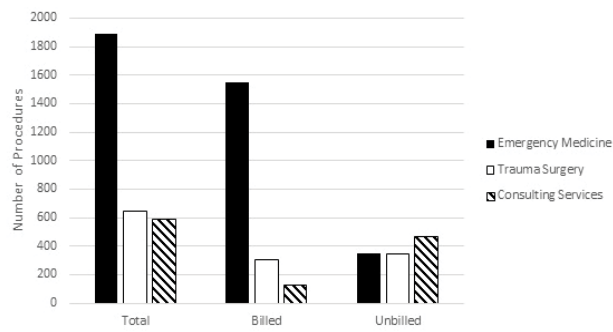


Figure 5a Billed procedures by resident service.

Unbilled Procedures by Service

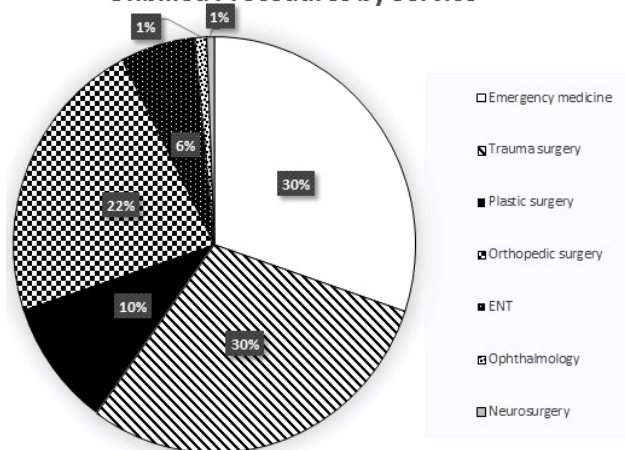


Figure 4 Unbilled procedures by resident service.

Billing Efficiency

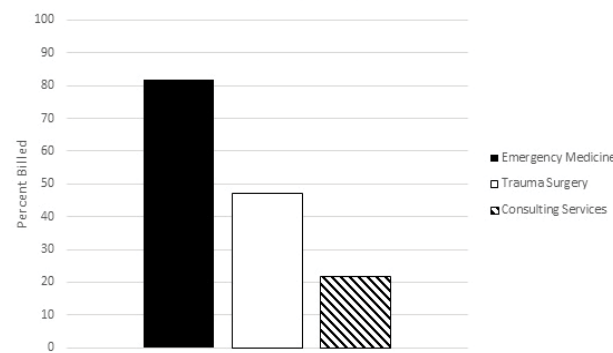


Figure 5b Billing efficiency.

as shown in **Figure 5A** and the highest “billing efficiency” as shown in **Figure 5B**. Billing efficiency was defined as the number of billed procedures divided by the total number of procedures performed. Billing for procedures by trauma residents was significantly less likely than those by emergency medicine residents (47% vs. 82% respectively, $p < .0001$). Billing for procedures by consulting residents (including orthopedic surgery, plastic surgery, otolaryngology, neurosurgery, and ophthalmology) was significantly less likely than those by emergency medicine residents (22% vs. 82% respectively, $p < .0001$) and trauma surgery residents (22% vs. 47% respectively, $p < .0001$).

Total possible charges for procedures over the course of a year was calculated and compared to actual billings yielding a difference of \$875,328 attributed to unbilled procedures. Based on this institution’s collection ratio of 28%, total loss of revenue was \$245,092 in 2015 (**Table 3**).

Table 3 Annual revenue.

Total number of billable procedures	2678
Total possible charges for procedures	\$2,132,714
Eligible procedures which went unbilled	1035
Actual charges for procedures	\$1,257,386
Total missed charges	\$875,328
Estimated revenue lost (based on collection ratio)	\$245,092

Discussion

The current structure of healthcare reimbursement pressures hospitals and providers to be cost efficient. Expensive services such as trauma services at level 1 trauma centers particularly feel this pressure, but they cannot lower costs by traditional means such as personnel or inventory reduction. Trauma services, being heavily procedural in nature, are able to balance out their costs by billing for procedures performed on patients.

At academic medical centers, resident doctors are responsible for performing the majority of procedures on patients. According to CMS regulations, attending physicians must supervise these procedures in order for them to be billed. CMS makes this rule because it already subsidizes medical education and resident salaries through Direct Medical Education and Indirect Medical Education payments. Therefore if residents billed for procedures,

it would be considered double-billing⁴. This rule is additionally supported by the theoretical greater safety level of procedures supervised by attending physicians. Not every patient, however, is insured by Medicare or Medicaid, yet hospital billers apply the CMS rule to all patients.

Some geographic locations may have alternative billing models such as a flat fee that is provided based on the diagnosis. With this in place there would be no additional billing for procedures and this would not change the revenue earned in our study. In such a system there would be no financial incentive for an attending physician to attest to a procedure.

As major legislative change would need to occur for residents to be able to bill for procedures performed on their own, this study focuses on increasing billing efficiency within the limits of the current CMS rules.

It should be highlighted that the resident physicians performing these procedures have been well trained and are more than competent to perform them. They provide great patient care and are an essential part of initial emergency care for trauma patients. Attendings from other services are available by phone for consultation always for their surgical service and can provide guidance and assistance with treatment decisions.

Previous studies have pointed out that these attending physicians cannot be expected to supervise every one of these procedures, as they are assumedly engaged in a higher value activity such as operating elsewhere in the hospital.

To mitigate this, attending physicians who are already located in the ED, such as those assigned to cover trauma activations during their shift, should aim to supervise procedures performed on trauma patients, even when it is not an emergency medicine resident performing the procedure. Individual qualifications/certifications must also be taken into account, as there are indeed certain highly-specialized procedures performed by consulting services which the emergency medicine physician may not be qualified to supervise. According to the data, however, the vast majority of procedures performed by consulting residents still consist of basic procedures within the skill set of an emergency department physician, such as laceration repairs and fracture reductions. It is possible that much of this lost revenue could

be recouped if the ED physician attested their presence for the procedure. For example, an ED physician could bill for a reduction and splinting of a fracture that was performed by an orthopedic resident, so education of ED staff and billing policies would be beneficial.

Furthermore, the charges lost via unbilled procedures in this period equals \$875,328. These charges, if captured, could generate \$245,092 in annual net revenue at our institution. This amount could contribute toward employing physician staffing or other needs as determined by the institution.

Limitations

The observations made in this study originate from one large urban emergency department at a level 1 trauma center. Total cost is based on the frequency of each of these types of procedures. Changes to geographical location, suburban/rural setting, and frequency of different types of trauma will change the total cost. Staffing numbers are specific to this institution, so hospitals which have relatively greater or fewer staff per resident may have different rates of supervision and therefore billing. Likewise, the collection ratio for this institution may not reflect that of other institutions so total lost revenue will vary.

Additionally, it was noted during the course of this study that not all procedures without attending physician attestations actually occurred without supervision. Unfortunately, however, if a procedure was supervised, there must be documentation of supervision for the procedure to legally be billed.

Conclusion

A large amount of potential revenue was lost due to unbilled procedures. To increase billing efficiency, solutions aimed at increasing supervision of procedures performed by consulting residents would have the most impact. Revenue recaptured from supervised procedures could be used to finance additional attending physician supervision in the future.

Acknowledgement

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