

## Orthopaedic Urgent Care Versus the Emergency Department: Cost Implications for Low-energy Fracture Care

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### ABSTRACT

**Introduction:** This study compared costs, length of visit, and utilization trends for patients with fractures seen in an immediate care orthopaedic center (I-Care) versus the emergency department (ED) in a major metropolitan area.

**Methods:** A retrospective chart review of consecutive patients seen on an outpatient basis in the ED and I-Care over a 6-month period was conducted. Patient demographics, procedures done, care category, estimated costs, and disposition information were included for statistical analysis. Within the low-acuity fracture care group, a cost-comparison analysis was conducted.

**Results:** A total of 610 patients met inclusion criteria with 311 seen in I-Care and 299 in the ER. I-Care patients were more likely to have low-acuity injuries compared with ED patients (60.1% versus 18.1%,  $P < 0.001$ ). The length of visit was longer for patients seen in the ED compared with I-Care (6.1 versus 1.43 hours,  $P$  value  $< 0.001$ ). A cost analysis of low-acuity patients revealed that an estimated \$62,150 USD could have been saved in healthcare costs by the initial diversion of low-acuity patients seen in the ER to I-Care during the study period.

**Discussion:** These results suggest that the I-Care orthopaedic urgent care model is a more cost-effective and more efficient alternative to the ED for patients with fractures requiring procedural treatment and low-acuity patients managed on an outpatient basis.

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The United States spent an estimated \$3.2 trillion USD on health care in 2015, representing 18% of the country's gross domestic product.<sup>1</sup> In recent history, paradigm shifts in American health care continue to emphasize transitions to value-based care systems and the prioritization of high quality, cost-efficient care. Efforts to improve patient quality of care and containing expenditures include eliminating redundant healthcare services, reducing patient wait times, and minimizing expensive visits to the emergency department (ED) for ambulatory care sensitive conditions (ACSCs).<sup>2</sup>

Historically, up to 30% of urgent care visits and local ED visits are related to musculoskeletal injuries.<sup>3</sup> Recently, there has been a surge in ED visits of 32%, from 103 to 136 million per year. These ED visits often serve patients who present with nonemergent ACSCs in addition to those in need of immediate care, such as patients with cardiac arrest, stroke, or trauma.<sup>3,4</sup> Over time, the number of emergent patients seen within target periods has also decreased. These overcrowded facilities have long wait times and high patient dissatisfaction scores. These trends may reflect a higher number of patients seeking non-emergent care for ACSCs in the ED, and efforts to divert patients to ambulatory facilities and urgent cares have increased.<sup>5</sup> Urgent care facility costs and fees are historically much lower than ED facilities costing an average of \$168 as compared with hospital-based ED visits costing an average of \$2,259.<sup>6</sup> Development of orthopaedic-specific urgent care facilities may aid in these diversion efforts and improve quality of care, and in fact, they have already been shown to decrease wait times and improve time to follow-up.<sup>7</sup> However, the utilization of orthopaedic urgent cares has not been well researched, and the question remains as to whether some degree of redundant additive care rather than efficient substitutive care is being delivered by urgent care facilities.

At our institution, a profitable orthopaedic urgent care facility called “Orthopedic Immediate Care” (I-Care) has been in place for 30 years and caters exclusively to patients with musculoskeletal complaints. Although its structure and staffing have changed over the years, it is currently staffed by an orthopaedic resident who is overseen by an emergency medicine attending with an on-call orthopaedic attending on standby for the escalation of care. Orthopaedic residents perform 32 I-Care shifts (8 AM to 10:30 PM) during their second year of residency, which is a scheduled part of the adult reconstructive, sports, and pediatrics rotations. This study sought to compare costs, acute length of visit (LOV), and utilization trends for patients with fracture seen in the I-Care versus the ED in a major metropolitan area. It was hypothesized that LOV would be shorter and estimated costs would be lower for patients with fracture seen in the I-Care setting.

## Methods

All data for this study were collected retrospectively through chart review from an Institutional Review Board-approved database. This study included consecutive patients aged >18 years who presented to the ED

or I-Care facility of a major urban academic medical center with an orthopaedic injury over a 6-month period from February 2019 through July 2019.

This cohort consisted of 2,951 patients in total, 1,056 of whom presented to the ED, whereas 1,895 presented to the I-Care facility. After removing patients without fracture and patients directly admitted to the hospital, there were 610 patients from both facilities combined, 299 from the ED and 311 from the I-Care facility.

Patient demographics were recorded including age at admission, sex, race, and residence zip code. Other information gathered included insurance type, source of referral, discharge disposition, type of injury, low-acuity or high-acuity injury, recent surgery (and if so, what type of surgery), LOV (hours), and laboratory tests, imaging, or procedures conducted (splinting, reduction maneuver, aspiration, or physician-assisted radiography) during the stay. Injuries were classified as either low acuity or high acuity after review by two of the authors (C.P. and D.B.).

To calculate cost burden, the price of laboratory tests and radiographs incurred during patient visits was compiled using publicly available charge data from similar studies and calculated per patient (Table 1).<sup>6,7</sup> Using this model, the cost per I-Care visit was calculated to be \$670. Although patient visits to ED and I-Care were through the same institution, price differentials between the two settings inherent to the American model of healthcare reimbursement were accounted for in this study. For comparative purposes, the average ED visit cost used was \$1,800. This was taken by averaging mean cost quotes for ED visits related to a musculoskeletal injury as reported in a study by Caldwell et al in 2015 and consistent with similar ED cost projections in the literature.<sup>8–11</sup> Differences in variables between patients treated in I-Care versus the ED were statistically analyzed using independent Student *t*-tests for continuous variable and a  $\chi^2$  test for categorical variables. All statistical analyses were conducted using SPSS v 18.0.

## Results

The most common fractures treated in the overall cohort were distal radius fractures (66 patients, 10.8%). Gender distribution was similar between groups (62.7% female in ED and 60.3% female in I-Care; *P* value = 0.523) as were insurance type and race. Low-acuity injuries primarily comprised hand and foot fractures not requiring a reduction or immobilization procedure (Table 2).

The LOV was longer for patients seen in the ED compared with I-Care (6.1 versus 1.43 hours, *P* value <

**Table 1. Charge Data for Facility Management and Tests<sup>6,7</sup>**

Evaluation and management	\$300
Radiograph	\$250
Durable medical equipment	\$200
Casting	\$300
Radiologist professional fee	\$380
Laboratory	\$500

0.001). This difference persisted when analyzing 241 patients with low-acuity injuries only (avg LOV 5.08 hours ER SD  $\pm$  0.12 versus 1.66 hours I-Care SD  $\pm$  0.12  $P$  value  $<$  0.001). A cost analysis of low-acuity patients revealed that an estimated \$62,150 USD could potentially have been saved in healthcare costs by the initial diversion of patients seen in the ED to I-Care during the 6-month period of this study.

## Discussion

Patients with fractures seen in our I-Care facility had markedly lower wait times than comparable patients seen in the ED. Our results suggest that the orthopaedic urgent care model is a more cost-effective alternative to the ED for patients with fractures requiring procedural treatment and low-acuity patients managed on an outpatient basis. In a study by Anderson and Althausen,<sup>7</sup> it was noted that wait times were markedly shorter for patients treated in a musculoskeletal urgent care compared with an ED. Their study also reported a decrease in orthopaedic visits to the ED, suggesting that a musculoskeletal urgent care may divert orthopaedic patients away from the ED, in turn enabling greater ED access for nonorthopaedic patients. Although our study

did not quantify changes in ED volume in correlation with patients seen in I-Care, our findings support the orthopaedic urgent care model as a cost-effective, viable alternative to the ED for patients with musculoskeletal injuries.

Differences in costs in this study are consistent with those demonstrated in previous comparisons of ED to urgent care costs.<sup>6,10-13</sup> Our cost savings estimate is likely conservative in that we only accounted for low-acuity visit diversions in our calculation. The capacity for treatment of higher acuity injuries requiring fracture reduction or other procedures was equivocal between the ED and I-Care, which suggests that cost savings could be substantially higher with proper triaging.

With 60% of patients seen in our I-Care facility sustaining low-acuity injuries likely amenable to outpatient management, findings from this study also indicate that there are continued opportunities for improved delivery of care and management of certain patients with fracture with ACSCs. Although these patients are not seeking care in the more urgent and expensive ED setting, the proportion of patients with low-acuity injuries in our study may indicate an opportunity for patients with fracture to be managed on an outpatient or remote basis if triaged appropriately. Several studies have established that many ED visits are nonurgent and could be evaluated in alternative settings. One review estimated between 14% and 27% of ED visits could be treated at alternative sites with a potential cost savings of approximately \$4.4 billion annually. Our study indicates that there may be similar opportunities to implement more cost-efficient methods of low-acuity fracture care seen in the urgent care setting. Many patients in our study had injuries that could have been managed remotely. Because we excluded all nonfracture patients, it is likely that the overall proportion of telehealth amenable injuries was even higher than demonstrated in our database.

**Table 2. Low-acuity Injury Prevalence in Cohort**

Injury	Frequency	Percentage
Nondisplaced hand fracture (eg, phalanx fracture or triquetral avulsion not requiring reduction)	63	25.6
Nondisplaced midfoot, metatarsal (pseudotarsal), or toe phalanx fracture	76	30.7
Nondisplaced radial head fracture without block to motion	26	10.5
Stable ankle fracture not requiring stress view (eg, Weber A fibula fracture)	34	13.8
Subacute fracture	22	8.9
Other low-acuity injuries and postoperative visit without intervention	26	10.5

Shifts toward increasing the utilization of telehealth are occurring rapidly, especially after the advent of the COVID-19 pandemic.<sup>14</sup> In a study by Fenelon et al,<sup>15</sup> a telehealth surveillance program for intraarticular phalangeal fractures proved successful at assessing range of motion using mobile device photographs and remote services. A consultation phone program described in a study by Hallfors et al in 2018 for total joint arthroplasty patients also reduced the number of unnecessary ED visits.<sup>16</sup> A telehealth consultation and assessment program for low-acuity orthopaedic patients may further reduce unnecessary visits that we noted in this study, streamline referrals, and improve the value of care.<sup>17</sup>

There are myriad of challenges to facilitating more appropriate utilization of orthopaedic urgent care facilities. A prearrival telehealth triage system could aid in diverting low-acuity visits from I-Care or the ED. However, in addition to the limitations of performing a physical examination through telehealth, many injuries require imaging which limits the extent of orthopaedic care that can be delivered remotely. Furthermore, for patients with fractures in particular, some form of immobilization is often required, and once receiving a fracture diagnosis, patients may feel more comfortable being seen in-person rather than through telehealth, potentially adding the number of visits and travel per patient diagnosis rather than reducing unnecessary care. Our cost analysis is limited in that expenditure data are based on historical visit quotes from databases in the literature rather than using institution-specific direct charge data. This was done to more broadly apply our findings, although different hospital systems have proprietary pricing that differs substantially by facility, level of care, and insurer-negotiated rates. Cost calculations also do not consider labor, lost opportunity, travel, and other expenditures incurred to the patients by longer waiting times in the ED and clinically unnecessary visits. Other limitations include the retrospective nature of this study and potential limited broader applicability to nonacademic and rural settings, which may not have the capacity to staff an I-Care similar facility.

The more rapid visit time in I-Care and potential cost savings for patients with fracture seen in this study show promise for expanding this model of care. Decreased wait times and more rapid treatment would likely also lead to increased patient satisfaction.<sup>5</sup> In addition to streamlining evaluation by an orthopaedic surgeon, this study demonstrates that a stand-alone musculoskeletal urgent care can expedite treatment of patients with fracture and lower healthcare costs. Additional study could evaluate factors linked to seeking a nonurgent musculoskeletal care in the ED and characterize the proportion of

nonurgent, nonfracture musculoskeletal injuries presenting to the ED and musculoskeletal urgent care settings. In addition, the utilization of telehealth care models for preliminary evaluation of musculoskeletal injuries warrants additional exploration.

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