Published in final edited form as:

J Am Geriatr Soc. 2010 November ; 58(11): 2122–2128. doi:10.1111/j.1532-5415.2010.03152.x.

The Quality of Emergency Department Pain Care for Older Adult Patients

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Abstract

OBJECTIVES—To evaluate if there are differences in emergency department (ED) pain assessment and treatment in older versus younger adults.

DESIGN—Retrospective observational cohort.

SETTING—Urban, academic tertiary care ED during July and December 2005.

PARTICIPANTS—Adult patients with conditions warranting ED pain care.

MEASUREMENTS—Age, Charlson comorbidity score, number of prior medications, gender, race/ethnicity, triage severity, degree of pain, treating clinician, and final ED diagnosis. Pain care process measures were *pain assessment* and *treatment*, and time of activities.

RESULTS—A total of 1,031 ED visits met inclusion criteria. Ninety-two percent of these had a documented pain assessment. Of those reporting pain, 41% had follow-up pain assessments and 59% received analgesic medication (58% of these as opioid, 24% as non-steroidal anti-inflammatory drug (NSAID)). In adjusted analyses, there were no differences by age in pain assessment and receiving any analgesic. Older patients (65–84 years) were less likely than younger patients (18–64 years) to receive opioid analgesics for moderate to severe (OR=0.44, 95% CI (0.22, 0.88)) and had a trend to more likely to receive NSAIDs for mild pain (OR=3.72, 95% CI (0.97, 14.24)). Older adults had a lower reduction of initial to final recorded pain scores ($p<0.01$).

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Author Contributions: Ula Hwang is responsible for study concept and design, acquisition of data, analysis and interpretation of data, and preparation of this manuscript.

Lynne D. Richardson is responsible for study concept and design, interpretation of data, and preparation of this manuscript.

Ben Harris is responsible for study concept and design, acquisition of data, and preparation of this manuscript.

R. Sean Morrison is responsible for study concept and design, interpretation of data, and preparation of this manuscript.

Sponsor's Role: None.

CONCLUSION—There appear to be differences in acute ED pain care for older adults. Both lower overall reduction of pain scores and decreased opioid use for the treatment of painful conditions in older patients highlight disparities of concern. Future studies should determine if these differences represent inadequate ED pain care.

Keywords

emergency department; pain; quality of care; geriatrics

INTRODUCTION

Pain is a common symptom experienced by older adults. Pain severe enough to impede normal functioning has been reported in as high as 25–50% of community-dwelling seniors.¹ Despite the high prevalence of pain in elders, studies demonstrate that older adults receive significantly lower doses of analgesia,^{2–4} with the oldest old at greatest risk for inadequate pain treatment when compared to younger adults.^{5, 6} Additionally, disparities exist in outpatient and inpatient pain care based on gender,^{7, 8} race/ethnicity,^{7, 9–11} cognitive impairment,^{12, 13} and characteristics of the treating clinician.¹⁴

The management of acute pain – particularly in older adults – in the Emergency Department (ED) remains relatively understudied. Data to date suggests disparities in the way older and younger adults with acute pain are treated in the Emergency Department (ED) and specifically that older adults are less likely to receive ED analgesia in the ED and less likely to receive analgesics at discharge.^{15, 16} Little data exist, however, as to how patient-related characteristics unique to older adults may impact acute pain care in the ED setting. Furthermore, prior studies have 1. focused on specific types of painful conditions (e.g., fracture pain, musculoskeletal pain) but not painful conditions in general, and 2. focused on types of medications received but not measures of pain care processes.

The objective of this study was to complete an in depth look at the quality of acute ED pain care received by older adults, examining if there were differences in ED *pain assessment* and *pain treatment*, and times to pain care for older adult patients when compared to younger patients. We hypothesized that older adults compared to younger adults presenting with pain in the ED would receive fewer pain assessments and pain treatments. Understanding differences in pain care process will better inform treatment algorithms for acute pain in older adults in the ED.

METHODS

Design and setting

This was a retrospective observational cohort study of adult patients with conditions warranting analgesia seen at an urban, academic, tertiary care ED. All adult visits during the months of July and December 2005 (i.e., 7/1/05–7/31/05 and 12/1/05–12/31/05) were reviewed. This study was approved by the Institutional Review Board at the study site.

Subjects

To study the quality of ED pain care received, this cohort consisted of adult patients with painful conditions presenting for treatment. Adult patients (≥ 18 years age) with a chief complaint of painful condition *and* a final primary ED diagnosis of a painful condition were reviewed for their ED pain care using a text filter algorithm of the chief complaint and ED diagnosis. The filter included word such as “-ache”, “appendicitis”, “appendix”, “arthritis”, “biliary”, “burn”, “cancer”, “cholangitis”, “cholecystitis”, “colic”, “contusion”, “Crohn”,

“diverticulitis”, “fall”, “fell”, “fracture”, “fx”, “gout”, “hernia”, “injury”, “kidney”, “laceration”, “ligament”, “-lithiasis”, “meniscus”, “obstruction”, “pain”, “pancreatitis”, “perforation”, “problem”, “pyelonephritis”, “sprain”, “stone”, “strain”, “tear”, and “tendon.” Patients with complaints of chest pain were excluded as these patients typically follow a cardiac algorithm for pain care instead of pain care at ED presentation. An example of a patient included in the study would be: chief complaint of toe pain, and final ED diagnosis of gout. An example of a patient excluded from the study would be: chief complaint of leg pain, final ED diagnosis of congestive heart failure. This method of developing a cohort of patients with painful conditions has been successfully utilized by investigators in a previous study.¹⁷

Data collection

The study ED utilizes a comprehensive electronic medical record (ED Pulsecheck, PICIS Inc.) for patient tracking, physician and nursing documentation, and order entry. All data entered into the system are time stamped and patient charting is organized by presenting condition. Patient-related and pain care data were collected with medical record review.

All data were extracted by an investigator or trained research assistants (RAs) following 12 recommended criteria for medical record review studies.¹⁸ All RAs had at minimum a 4-hour training session of the ED medical record abstraction process, with shadowing of at minimum 10 record reviews. At minimum 20 test abstractions were independently completed by each RA and then compare with that of the investigator. The RA was qualified to abstract independently when test abstractions were completed with 95% agreement. Performance on abstractions was monitored with 10% of the charts randomly reviewed by the investigator. There was 100% interobserver reliability of the variables of interest for this cohort.

Variables studied

The primary patient-related predictors studied included age, Charlson comorbidity score,¹⁹ number of prior medications, gender, race/ethnicity [White, Black, Hispanic, Asian, other], Emergency Severity Index (ESI)²⁰ [triage score whereby 1=urgent, 5=non-urgent], final ED diagnosis, and degree of pain [on a 0–10 scale, 0=none, 1–3=mild, 4–7=moderate, 8–10=severe pain]. Age was categorized as 18–64, 65–84 and ≥85 years. Younger adults (18–64 years) were the referent comparison group. Information on initial treating clinician was also collected to adjust for the clustering effects by clinician.

Outcomes studied

The process of pain care outcomes studied were *pain assessment* (documentation of pain assessment, documentation of follow-up pain assessment), *pain treatment* (analgesic medications ordered, opioids vs. non-steroidal anti-inflammatory drugs (NSAIDs) vs. others ordered), *opioid analgesic dosing* (first and total morphine equivalent dosing for any opioid medications ordered), and times of activities (e.g., arrival, pain assessment, ordering and administration of medications). We categorized any oral, intravenous, or intramuscular “analgesic medication” into three classes: opioid, NSAID, and other analgesic medication. Morphine, fentanyl, hydromorphone, oxycodone, propoxyphene, codeine and combination opioid and non-opioid medications (e.g. acetaminophen/oxycodone) were classified as opioids. Aspirin, ibuprofen, indomethacin, naproxen, ketorolac, and any COX-2 inhibitors were classified as NSAIDs. Acetaminophen, and for patients with abdominal pain we also included antacids, H1 antagonists, and proton pump inhibitors (e.g., magnesium hydroxide, famotidine, lansoprazole), were classified as other analgesic medication. All opioid analgesic doses were converted to intravenous morphine milligram equivalents using standard conversion tables.

Statistical analyses

Descriptive statistics of patient characteristics (demographic and clinical) were completed. Bivariate analyses using chi-square, logistic and linear regression evaluated patient characteristics with pain care outcomes. For purposes of construct validity and conservatively evaluating conditions and patients that warranted pain care, multivariable outcomes (i.e., *pain follow-up*, *treatment* and *opioid analgesic dosing* outcomes) subsequent to *documentation of pain assessment* excluded patients initially report no pain (pain score = 0) (i.e., patients who do not complain of pain do not receive treatment for pain and hence should not be evaluated for the quality of pain care delivered to them). Multivariable generalized linear models were created for adjusted pain outcomes using covariates that were significant ($p < 0.10$) or of construct validity. Generalized Estimating Equations (GEE), were used to account for the possible correlation of observations by ED physician. Cox proportional hazard regression modeling was used for outcomes evaluating times of activities. All analyses were completed in SAS (version 9.1) (Cary, N.C.)

RESULTS

There were a total of 9,148 unique ED visits during the two study months; 1,031 were of visits and conditions warranting pain care in adult patients. Characteristics of this study cohort comparing differences among younger (18–64 years), older (65–84) and oldest (≥ 85 years) patients can be found in Table 1.

Differences by age group of reported pain levels and scores can be found in Table 2. A lower proportion of older adults initially reported severe pain (pain score 8–10) when compared to younger adults. Thirty-one percent of younger adults initially reported having severe pain versus 20% of those 65 to 84 years (OR 1.79 (1.19, 2.69), $p < 0.01$ when compared to younger) and 10% of those adults age ≥ 85 years (OR 4.00 (1.57, 10.2) $p < 0.01$ when compared to younger). Based on final recorded pain scores, no patients were discharged from the ED in severe pain. Forty-five percent of older adults, however, were still in moderate pain compared to 37% of younger adults (OR 1.41 (1.01, 1.97), $p = 0.05$). Although not statistically significant for trend between age groups, fewer older and oldest adults continued to report no pain (None (0)) from their initial to final reported pain score (chi-square $p = 0.20$). For patients initially reporting any pain (thus excluding patients initially reporting no pain), older adults also had a lower reduction from initial to final recorded pain score (younger adults had a mean pain score reduction of 1.89 (sd 4.45) versus 0.83 (sd 4.69) for older adults and 0.2 (sd 4.56) for the oldest adults, $p < 0.01$).

Ninety-two percent ($n = 946$) of this cohort had a documented pain assessment during their ED stay. Of patients with documented pain assessments, 11% ($n = 105$) reported initially having no pain; thus a total of 926 patients should have received at least pain treatment and 841 patients should have received follow-up assessment and pain treatment. Of those patients having an initial documented assessment *and* reporting pain, 41% ($n = 348$) had documented follow-up pain assessments. Fifty-two percent ($n = 496$) of those with documented pain assessment initially reported having moderate to severe pain and 59% ($n = 561$) of those with documented pain assessments received analgesic medication while in the ED. Of those with documented assessment and report of pain (i.e., excluding patients with no pain) 61% ($n = 515$) received analgesic medication; 57% ($n = 293$) initially received an opioid, 25% ($n = 128$) initially received an NSAID, and 18% ($n = 94$) initially received some other analgesic medication.

Median time to first pain assessment was 91 minutes (iqr 58, 152). Of all patients receiving opioid analgesia, mean initial dose (when converted to parenteral morphine equivalents) was 4.59 milligrams (sd 3.47). Median time to first analgesia administration was 113 minutes

(iqr 69, 177). Median ED lengths of stay for this cohort was 283 minutes (iqr 149, 486). A breakdown of median times to activities by age group are presented in Table 2.

Twenty-one percent of older adults and 26% of oldest adults compared to 12% younger adults initially received NSAIDs (OR 1.97 (1.29, 3.01) $p < 0.01$ and OR 2.53 (1.30, 4.93) $p < 0.01$, respectively). With regards to opioid medications, 30% of both older adults and oldest adults compared to 32% younger adults initially received these (OR 0.89 (0.48, 1.68) $p = 0.84$ and OR 0.91 (0.63, 1.30) $p = 0.65$, respectively). A comparison of the initial analgesic medication ordered is provided in Figure 1 for each pain level by percentage of age category.

Multivariable adjusted analyses of pain care outcomes

With regards to documentation of *pain assessment*, there were no significant differences in adjusted analyses when comparing younger to older and oldest patients. There were also no significant differences in follow-up pain assessment by age categories (excluding patients with no reports of pain). (Table 3. *Pain Assessment*)

In multivariable adjusted analyses for *pain treatment* of those reporting pain, if patients received analgesic medication, when compared to younger adults (18–64 years) older patients (65 to 84 years) were less likely to receive opioid medications (OR=0.59, 95% CI (0.35, 0.98), $p = 0.04$). For patients initially reporting mild pain, there was a trend with oldest patients more likely to receive NSAIDs for mild pain (OR=3.72, 95% CI (0.97, 14.24), $p = 0.05$) and for those reporting moderate to severe pain, older adults were again much less likely to receive opioids for their pain (OR=0.44 (95% CI (0.22, 0.88), $p = 0.02$). (Table 4, *Pain Treatment*)

Whether including or excluding patients initially reporting no pain, there were no significant differences in adjusted analyses of opioid analgesic dosing for younger, older, and oldest patients (results not presented in tables). It is interesting to note, however, when including patients initially reporting “no pain”, when compared to younger patients both older and oldest patients were at decreased risk of initially receiving opioids (OR=0.64, 95% CI (0.41, 1.00), $p = 0.05$, and OR=0.46, 95% CI (0.23, 0.89), $p = 0.02$ respectively). Additionally, including patients reporting no pain, there was a trend of older adults with increased risk of initially receiving NSAIDs (OR=1.70, 95% CI (0.99, 2.91), $p = 0.05$) and a significant risk of increased NSAID use for oldest adults (OR=3.31, 95% CI (1.45, 7.56), $p < 0.01$).

In adjusted analyses of times to pain assessment and treatment, there were no significant differences in times to care for younger, older, and oldest patients, even when excluding those patients initially reporting no pain.

DISCUSSION

As with previous studies documenting disparities in use of analgesia for fracture and musculoskeletal pain,^{15,16} results of this study demonstrate that older adults may be at risk of poor or inadequate ED pain care for all types of pain and disparities may exist in the *type* of analgesia used for pain care. A significant strength of this study when compared to prior studies was the ability to adjust for potential confounding covariates of comorbidity, number of prior medications, final diagnosis and degree of reported pain. When adjusting for these covariates, there were differences in the choice of analgesic agent based on age alone; older adults were less likely to receive opioid analgesia when compared to younger adults, and the oldest adults appeared to be at potentially greater risk of receiving NSAIDs for mild pain. While our study found there were no differences in the quality of pain assessment, there were differences in the *types* of pain medications used for younger, older, and oldest

patients. The older adults were *less* likely to receive opioid analgesia for pain when compared to younger adults. The disparities in choice of analgesic medication used are highlight areas of future study to further elucidate optimal management of acute pain in older adults seen in the ED.

In adjusted analyses, (albeit a $p=0.05$ with a wide confidence interval) there was a trend of the oldest adults at greater risk of receiving NSAIDs for mild pain. (We would like to emphasize that additional analyses *including* patients reporting “no pain” found that older and oldest adults receiving medication were at increased risk of receiving NSAIDs (OR=1.70, 95% CI (0.99, 2.91), $p=0.05$ and OR=3.31, 95% CI (1.45, 7.56), $p<0.01$), respectively) when compared to younger adults.) Older adults in this cohort were also more likely than younger adults to present with musculoskeletal causes of pain, which may have affected choice of analgesic medication (i.e., treating musculoskeletal pain with NSAIDs). Adjusted analyses accounting for such final diagnoses, however, should have accounted for preferential use of certain types of pain medications. While not absolutely contraindicated for analgesic use in geriatric patients and although frequently used in the ED setting and found to be very effective for mild to moderate pain associated with inflammation and musculoskeletal conditions, NSAIDs should not be a first-line agent and should be used with extreme caution in older adults as they are associated with renal impairment and increased risk of upper gastrointestinal bleeding. The effect of aging on physiology, pharmacokinetics and pharmacodynamics results in prolonged elimination of NSAIDs and a greater likelihood of side effects. Age, combined with increased comorbidity and greater use of medications, in particular use of oral corticosteroids or anticoagulants, may increase the risk of peptic ulcer disease complications exacerbated by the use of NSAIDs.^{21, 22} Because of these risks, NSAIDs should *not* have been a preferentially favored analgesic medication for geriatric pain as they were in this study, but instead alternatives such as acetaminophen could have been used for mild pain.

In contrast to the potentially riskier use of NSAIDs in older adults for pain relief, opioids have been demonstrated to be well or even better tolerated in geriatric patients than younger patients,²³ are the preferred treatment of choice for elders with moderate to severe chronic pain,²⁴ and are recommended for use in pain care guidelines by the Agency for Healthcare Quality Research (formerly the Agency for Health Care Policy and Research), the American Pain Society, and the American Geriatrics Society.^{25–27} The findings of this study, however, found that older adults were much less likely to receive opioids for pain, especially if they had moderate to severe pain. Concurrent to the recommendation that opioids be used for moderate to severe pain, judicious titration of analgesic medication and “starting low and going slow”^{22,28} is also advised for older adults. This cohort of patients received similar starting and total doses of opioid analgesic medications regardless of age. Lower starting doses of opioid medications and prompt reassessment for the need to titrate appropriately may be another focus of ED pain care improvement in older adults.

We had hypothesized that greater age, multiple comorbidities and increased numbers of medications would be associated with longer times to pain care. These factors, however, were not associated with shorter or longer times to pain assessment or treatment. ED quality indicators for acute pain management have recently been published recommending that older adults should have baseline pain assessments with 1 hour and follow-up pain intensity scores within 6 hours of ED arrival to guide pain management and decisions.²⁸ While it is reassuring there were no significant differences by age group in ED pain assessment and follow-up pain assessment, overall, ED pain care for this cohort could be considered poor for all patients since median time to first pain assessment was 91 minutes, thus taking clinicians over 1½ hours to identify and document pain scores. Patients also spent long times in this ED, especially the older and oldest patients (with median ED stays up to and over 6

hours, Table 1.) There should have been more opportunities to assess, intervene, and reduce pain levels for older patients who were in the ED for longer periods than their younger counterparts.

In contrast, we found that older adults had a lower mean reduction of their initial to final pain scores when compared to younger patients. There are several possible reasons for this finding. First, as noted in the results section for Table 1., older adults were more likely to develop pain in the ED (i.e., a greater proportion of older adults who reported an initial pain score of 0 or none reported a higher subsequent pain score as compared to younger adults). These results in addition to raising questions as to the adequacy of ED pain management and could account for some of the decreased reduction of mean pain scores for older adults when compared to younger patients. Second, and more likely, is that older patients received inadequate pain treatment as compared to younger adults. Older adults were less likely to receive opioids in adjusted analyses, especially for moderate to severe pain. This may have accounted for the decreased success in pain relief with older patients. Third, age-related changes in pain sensitivity and physiology may have influenced our results. While the medical literature contains mixed empirical findings of how pain sensitivity changes as individuals age, there appears to be growing evidence of age-related decline in experimental pain sensitivity.²⁹ This decrease in pain sensitivity may have accounted for the lower reported initial pain scores by the older and oldest patients. Likewise, the decreased pain sensitivity (or increase pain threshold) may have also accounted for the lower reduction of final pain scores. It has been proposed that such increases in pain perception threshold may place older adults at greater risk of injury and make it more difficult for the older adult to cope with the consequences of pain and injury.³⁰ Finally, it is also possible that the spectrum painful conditions experienced by this cohort (e.g., a less painful musculoskeletal sprain versus a more painful abdominal complaint from renal or gall bladder colic), may have also been associated with the lower pain scores of the older patients who predominantly experienced musculoskeletal conditions (while younger patients had more abdominal pain conditions).

It must be noted that little has been studied on how acute pain for older adults should be optimally managed in the ED. Published guidelines for acute pain management in older adults have either focused on *chronic* pain, pain not specific to older adults, or pain care not specific to the ED.^{25–27} The evidence for optimal treatment of acute pain in older persons is scarce and without it, ED management of acute pain is limited to quality indicators and recommendations of how to minimally (as opposed to optimally) provide pain care for older adults in the ED setting.²⁸ The findings of this study highlight areas requiring further investigation to establish if such differences in pain care exist based on the cause of painful condition (e.g., abdominal, musculoskeletal, headache, etc.), types of medication classes used (i.e., opioid, NSAIDs, other (e.g., acetaminophen)), and patient satisfaction with pain care.

Limitations of this study include its generalizability to other settings. Future multi-center studies evaluating ED patient-related factors and their impact on pain care are needed to validate these findings. Another potential limitation of this study is the retrospective study design. We attempted to diminish expected biases by following 12 recommended criteria for medical record review studies.¹⁸ The investigators were also unable to accurately assess cognitive and functional impairment of individuals, two factors that may have affected the pain care outcomes studied. Investigators were unable to determine if patient preferences for types of analgesic medication used may have affected treatment choice. Older adults may have been leery of adverse effects of opioid treatment and requested alternatives such as NSAIDs be used²⁹ or treating clinicians may have been wary of using opioids with older adults. Clustered analyses by treating clinician, however, should have accounted for the

latter inter-physician differences in treatment preferences. Finally, because process of pain care measures were evaluated as the primary outcomes of this study, recorded pain scores of actual patient pain levels may not be accurate or precise. Data about patient satisfaction with pain relief were not available thus limiting the ability to determine how successful pain care was by patient report. Patient satisfaction with pain relief and actual levels of pain (as opposed to recorded levels of pain), however, were not the foci of this investigation. Instead, process of pain care measures were evaluated for this study. *Documentation* of patient care is necessary to demonstrate and guide clinical care of a condition, in this case pain. Just as documentation of glucose levels or blood pressure readings is needed to guide the management of uncontrolled hyperglycemia or hypertension, pain assessment scores and response to pain treatment also require documentation for proper management. Documentation of care by clinical staff via medical record data abstraction is the most commonly used method of measuring quality.¹⁸ The National Committee on Quality Assurance, Health Care Financing Administration, and local and national providers routinely use abstraction of data from medical records to assess inpatient care.^{18, 31}

In conclusion, results of this study indicate differences exist in acute pain care for older adults in the ED. The principle findings of lower overall reduction of pain scores and decreased opioid use for the treatment of painful conditions in older adults suggest that older adults may be suboptimally treated in the ED. Future studies should determine whether or not these represent inadequate ED pain care for older adults and if other factors (e.g., acute versus chronic causes, caregiving circumstances, goals of care) may impact the quality of ED pain care.

Acknowledgments

We would like to thank Susan Holland and Amy Kossoy for their assistance with data acquisition.

Financial Disclosure: *Ula Hwang* was a recipient of a Jahnigen Career Development Award administered by the American Geriatrics Society.

R. Sean Morrison is a recipient of a Mid-Career Investigator Award in Patient-Oriented Research (K24 AG022345) from the National Institute on Aging.

This study was supported by a Jahnigen Career Development Award administered by the American Geriatrics Society (*Ula Hwang*) and a Mid-Career Investigator Award in Patient-Oriented Research (K24 AG022345) from the National Institute on Aging (*R. Sean Morrison*).

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Figure 1.
Comparison of initial analgesic medication ordered for each pain level by percentage of age category (N=946) NSAID = non-steroidal anti-inflammatory drug

Table 1

Patient Characteristics (N=1031)

Characteristics of Age groups	<65 years n=813	65–84 years n=168	≥85 years n=50	p-value
Female, %	63	73	76	0.02
Race, %				<0.01
White	22	31	53	
Black	32	30	26	
Hispanic	37	33	16	
Other	9	6	5	
Emergency severity index (ESI) [1=acute, 5=non-acute], mean (sd)	3.27 (0.65)	3.09 (0.54)	3.00 (0.55)	<0.0001
Charlson comorbidity score, mean (sd)	0.70 (1.68)	1.58 (1.82)	1.22 (1.25)	<0.0001
Number of prior medications, mean (sd)	1.77 (2.49)	4.44 (4.16)	5.12 (3.44)	<0.0001
ED pain diagnoses, %				<0.0001
Musculoskeletal	25	42	44	
Abdominal	47	38	36	
Back	15	5	8	
Fall	1	6	8	
Renal	5	5	0	
Head	7	4	4	

Table 2

Pain scores for cohort.

Characteristics of Age groups	<65 years	65–84 years	≥85 years	p-value
Level of <i>initial</i> reported pain [0-none, 10-severe], % within age category for entire cohort (n=1031),	N=813	N=168	N=50	<0.01
Severe (8–10)	31%	20%	10%	
Moderate (4–7)	19%	21%	30%	
Mild (1–3)	32%	37%	38%	
None (0)	9%	15%	16%	
No pain scores recorded	9%	7%	6%	
Level of <i>final</i> reported pain [0-none, 10-severe], % within age category for subcohort with documented pain (n=946),	n=742	n=157	n=47	0.15
Severe (8–10)	0%	0%	0%	
Moderate (4–7)	37%	45%	34%	
Mild (1–3)	48%	41%	58%	
None (0)	15%	14%	8%	
Initial recorded pain score, mean (sd)	5.24 (3.37)	4.16 (3.35)	3.57 (2.91)	<0.0001
Final recorded pain score, mean (sd)	3.81 (3.29)	4.17 (3.39)	4.02 (3.22)	0.29
Difference initial-final pain score, mean (sd) (excluding patients initially reporting no pain and without follow-up pain scores)	1.89 (4.45)	0.83 (4.69)	0.2 (4.56)	<0.01
*Time to pain assessment, median (iqr)	91 (55, 153)	96 (64, 151)	77 (55, 148)	0.42
*Time to analgesic administration, median (iqr)	112 (68, 175)	124 (73, 185)	112 (94, 259)	0.35
*ED Length of stay, median (iqr)	274 (138, 467)	364 (215, 554)	326 (214, 596)	<0.01

*
Time in minutes

Table 3Multivariable Adjusted Analysis of *Pain Assessment* Outcomes^{*}

	Documentation of Any Pain Assessment OR (95% CI) N=1031	[†] Documentation of Follow-up Pain Assessment OR (95% CI) N=841
Age		
Younger (18–64 years)	Ref	Ref
Older (65–84 years)	1.19 (0.60, 2.33)	1.09 (0.74, 1.63)
Oldest (≥ 85 years)	1.88 (0.38, 9.25)	1.16 (0.58, 2.33)

^{*} Adjusted for comorbidity, number of medications, gender, race/ethnicity, emergency severity index, final diagnoses, and clustering effects of initial treating clinician.

[†] Excluded 105 patients initially reporting no pain (pain=0) and adjusting for ^{*} plus degree of pain

Table 4

Multivariable Adjusted Analysis of *Pain Treatment Outcomes*^{**§}

	Received Pain Medication OR (95% CI) N=926	** Initially Received NSAID OR (95% CI) N=515	** Initially Received Opioid OR (95% CI) N=515	** Initially Received nonNSAID OR (95% CI) N=515	** Initially Received NSAID for Mild Pain N=180	**§ Initially Received Opioid for Moderate- Severe Pain N=335
Age						
Younger (18–64 years)	Ref	Ref	Ref	Ref	Ref	Ref
Older (65–84 years)	1.28 (0.83, 1.96)	1.70 (0.91, 3.19)	0.59 (0.35, 0.98)	1.31 (0.73, 2.34)	1.42 (0.49, 4.14)	0.44 (0.22, 0.88)
Oldest (≥ 85 years)	1.15 (0.65, 2.03)	1.85 (0.68, 5.03)	0.81 (0.37, 1.76)	0.72 (0.25, 2.07)	3.72 (0.97, 14.24)	1.21 (0.41, 3.55)

NSAID = non-steroidal anti-inflammatory drug

* Adjusted for comorbidity, number of medications, gender, race/ethnicity, emergency severity index, degree of pain, final diagnoses, and clustering effects of initial treating clinician.

† Patients with no pain (pain score = 0) excluded from analyses.

** Of those receiving any pain medications

§ degree of pain excluded from adjusted analyses