

primary diagnosis field from the NEDS ICD-9-CM, indicating that drug poisoning was the primary reason for the visit. The following prescription opioids, sedatives, and tranquilizers were included: 965.02 (methadone); 965.09 (other narcotics including codeine, meperidine, morphine); 965.5 (pyrazole derivatives); 965.8 (pentazocine); 967.0 (barbiturates); 969.4 (benzodiazepine-based tranquilizers); 969.5 (other tranquilizers including hydroxyzine); 967.8 (other sedatives and hypnotics); and 967.9 (unspecified sedatives and hypnotics). Intentionality was determined by the presence of an External Cause of Injury Code (e-code) in the E850-E858 range (accidental poisonings by drugs, medicinal substances, and biologicals). We also examined the number of admissions, disposition, sex, age, expected payer, income, geographic region, charges, and procedures performed. SAS-Callable SUDAAN software was used to create unbiased standard errors and to produce weighted estimates.

Results: From 2006 to 2008, there were 437,940 ED visits by adults for poisoning by opioids, sedatives, and tranquilizers. Of these, 35% (154,804) were unintentional poisonings. The mean age of the sample was 43.3 years (43.1-43.5). Significantly more visits were made by females (59.7%; 95% CI 59.2-60.2% versus 40.3%; 95% CI 39.8-40.8%, males). Less than half (44.7%) were discharged from the ED and 49.9% were admitted to the same hospital, while 3.9% were transferred to another hospital. Approximately 27.6% of visits were from patients residing in communities with a median annual household income was less than \$38,999 and 17.9% of visits were from those > \$64,000. There were significantly more visits by those with private insurance (31.6%; 30.8-32.3%) compared to Medicare (23.2%; 22.7-23.8), Medicaid (19.6%; 18.9-20.3%), or self-pay (19.9%; 19.1-20.6%). Significantly more visits were made in the southern region (40.6%; 38.1-43.0%) compared to the Northeast (14.6%; 13.1-16.3%), Midwest (23.6%; 21.5-25.8%), and West (21.3%; 19.5-23.1). Only 3.1% of patients required intubation. The average charge per visit was \$2,957 (\$2,837-\$3,078) for those discharged and \$19,936 (\$19,158-\$20,713) for those admitted.

Conclusion: There were over 430,000 visits to EDs in the US from 2006-2008 for the primary diagnosis of poisoning by a prescription opioid, sedative or tranquilizer. The majority of the patients were female and over half were admitted to the hospital. Over 1/3 of cases were thought to be unintentional. Future studies should examine how to best prevent such poisonings and determine optimal screening and intervention programs for these patients.

## 85 Factors Associated With Frequent Users of Emergency Department Resources

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Study Objectives: As fiscal resources continue to shrink and emergency department (ED) crowding increases, communities need to reallocate resources to optimally improve care of a region's patients. One issue is that of so-called frequent flyers, patients who disproportionately utilize acute service resources with frequent visits to EDs. The purpose of this study is to evaluate patient characteristics and patterns of use of frequent users of ED resources.

Methods: This is a retrospective multi-center cohort study of hospital ED visits between 2008 and 2010 using data submitted to the California Office of Statewide Health Planning and Development (OSHPD) from all 18 non-military acute care hospitals serving the San Diego region (population 3.2 million). Patients included in the inpatient discharge dataset who were admitted from an ED were extracted and merged with the ED discharge dataset to construct a complete ED utilization database. Patients without a valid patient identifier were excluded. Occasional users were defined as having 1 to 5 visits in a 12 consecutive month period over the study period. Frequent users were defined as having 6 to 20 visits and super users were defined as having more than 20 visits. Demographics and patterns of use were identified for the 3 patient populations. Two logistic regression models were developed to compare demographic characteristics, payer, and primary diagnoses between occasional users and frequent users and frequent users and super users. Odds ratios (ORs) and 95% confidence intervals (CI) are reported.

Results: During the study period there were 925,719 individual patients seen in area EDs resulting in a total of 2,016,537 visits. Of these, 895,489 (96.7% of all patients) were identified as occasional users who were responsible for 1,592,453 of the visits (79.0% of total visits), 28,569 individual patients were identified as frequent users responsible for 333,648 of all ED visits (3.1% of patients resulting in 16.5% of all visits) and 1,661 were identified as super users responsible for 90,436 visits (0.2%

of patients resulting in 4.5% of all ED visits). Respiratory and abdominal symptoms were the leading primary diagnoses for all 3 groups. Super users were significantly more likely to have Medi-Cal (35.1%) or be self-pay (22.3%) compared to occasional and frequent users (17.5%, 29.1% and 13.6%, 14.2%, respectively) during visits. In the regression model comparing frequent users to occasional users, pain diagnosis, heart failure diagnosis, and payer status had the highest associations with being a frequent user (pain, OR=13.5, 95% CI=12.8, 14.3; heart failure, OR=7.4, 95% CI=7.0, 7.7; Medi-Cal versus self-pay, 4.7, 95% CI=4.6, 4.9; Medicare versus self-pay, 4.2, 95% CI=4.0, 4.5). In the model comparing super users with frequent users, pain diagnosis and mental disorder diagnosis had the highest associations with being a frequent user (pain, OR=7.7, 95% CI=6.9, 8.6; mental disorder, OR=3.0, 95% CI=2.7, 3.4).

Conclusion: In this study of 18 EDs serving a large metropolitan area over a 3-year period, frequent users of acute emergency resources were responsible for a large and disproportionate share of ED visits. There were significant differences found in ED visit primary diagnosis and individual patient insurance coverage between occasional, frequent and super users of ED resources.

## 86 Magnitude of National Emergency Department Utilization By the Uninsured

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Study Objectives: Nearly 51 million uninsured people in the United States have limited access to health care. The emergency department (ED) functions as a safety net for the uninsured because no patient is denied care based on ability to pay. Much public rhetoric has characterized ED utilization by uninsured patients, but few objective data have been presented. Therefore, we estimated national ED utilization by uninsured patients, and compared uninsured and insured ED patients in terms of demographics, diagnostic testing, disposition and final diagnoses. Our primary hypothesis was that uninsured patients comprise a large proportion of ED visits. Secondary hypotheses were that types and severity of illnesses (by acuity level in minutes), and ED resource utilization were similar between groups.

Methods: Data from the most recent available National Hospital Ambulatory Medical Care Survey (NHAMCS) (2006-2009) were stratified by insurance coverage status. We excluded cases with missing insurance data. Visits with private insurance, Medicare, Medicaid, workers compensation and "other" were classified as "insured." Visits coded as no charge/charity and self-pay were classified as "uninsured." "Immediate" and 1-15 minute categories were combined for triage acuity levels. Demographic data, diagnosis (ICD-9 codes), testing and procedures performed in the ED were tabulated for each visit. Weighted percentages provided by NHAMCS were used to estimate national rates for each variable.

Results: Of the 140415 ED visits in the NHAMCS dataset, 5330 (3.8%) did not report payment/insurance type and were excluded leaving 135,085 visits for analysis. These data estimate 475 million ED visits between 2006 and 2009, of which 78.9 million (16.6%) were made by uninsured patients. This is approximately 20 million uninsured ED visits annually (mean 19.7 million, range 18-21 million). Compared to patients with insurance, uninsured patients were more often male (51% versus 41.5%), younger (age 18-44, 66.2% versus 35.4%), and Black/African-American (26% versus 19.8%) (p<0.0001). Uninsured patients had higher percentages of ED visits diagnosed with mental illness (7.9% versus 5.2%) and skin complaints (6.4% versus 4.4%) (p<0.0001) while insured patients had higher rates of circulatory/cardiovascular (7.5% versus 4.1%) and respiratory diagnoses (14.6% versus 11.8%) (p<0.0001). Uninsured patients presented with a greater percentage of lower acuity complaints than insured patients (<15 minutes 15.6% versus 18.8%, p=0.0005, 15-60 minutes 41.1% vs.45.8%, p<0.0001, 61-120 minutes 28.6% versus 24.6%, p<0.0001, >120 minutes 14.7% versus 10.7%, p<0.0001). Uninsured patients had blood tests (32.7% versus 40.9%, p<0.0001), radiographic testing (39.6% versus 46.6%, p<0.0001) and procedures (44.1% versus 50.6%, p<0.0001) performed less frequently than patients with insurance. Less uninsured patients were admitted to the hospital (31.3% versus 34.2%, p=0.0043).

Conclusion: Uninsured patients account for approximately 20 million, or 1 in 6, ED visits annually in the United States. Uninsured ED patients are distinct in terms of demographics, diagnoses and acuity. Uninsured patients receive fewer diagnostic tests and procedures and are admitted less frequently than those patients with insurance.

Results: Thirty-five patients (54.3% male, 97.1% black; mean age 31.6 years [SD 11.8]) from 3 sites (site 1: 11; site 2: 3; site 3: 21) were included for analysis. Subjects had a mean of 8.1 ED visits (range 1-71 visits, SD 14.8) and a mean of 22.2 summative concurrent ICD-9 codes (range 0-122 codes, SD 33.4) during the study period. 1047 total ICD-9 codes were recorded, most common were hematologic (31%), sign/symptoms (14.3%) and vascular (10.4). Upon multivariate analysis, and after adjustment for age, sex and site, a higher number of concurrent ICD-9 codes was associated with a higher number of ED visits (coefficient=0.025 (95% CI 0.016, 0.033; p<0.0001)) and more frequent hospital admission (OR=3.1 (95% CI 2.3, 4.2; p<0.0001)).

Conclusion: In our sample of a prospective SCD cohort, a higher number of concurrent ICD-9 codes were associated with more frequent ED visits and hospital admissions. Associated ICD-9 codes may represent an important predictor of SCD severity and warrant further study.

## 148 Multiple Hospital Emergency Department Visits Among Frequent Users With a Pain-Associated Discharge Diagnosis

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Study Objectives: As fiscal resources continue to shrink and emergency department (ED) crowding rises, communities need to better pool resources to optimally improve care of a region's patients. One issue is that of frequent users, who disproportionately utilize acute service resources. If these patients can be identified to determine if patterns of ED use/misuse are occurring, hospital systems can potentially intervene to offer case management and other options such as pain contracts and more consistent management plans. The purpose of this study is to evaluate the pattern of emergency department utilization among frequent ED users with and without pain-related visits.

Methods: This is a retrospective multi-center cohort study of hospital ED visits between 2008 and 2010 using data submitted to the California Office of Statewide Health Planning and Development (OSHPD) from all 18 acute care hospitals (excluding Federal facilities) serving the San Diego region (population 3.2 million). Patients included in the inpatient discharge dataset who were admitted from an ED were extracted and merged with the ED discharge dataset to construct a complete ED utilization database. Patients without a valid patient identifier were excluded. Pain-related visits were defined as any of the following primary diagnoses (codes): pain (338), migraine (346), abdominal symptoms (789), head and neck symptoms (784), and other disorders of the back (724). Frequent ED users were defined as having 4 or more ED visits over any consecutive 12-month period, and were further defined by the number of pain-related visits. Frequent pain users were defined as frequent users with 4 or more pain-related visits in a 12-month period. Occasional pain users were defined as frequent users with one to 3 pain-related visits and non-pain frequent users were defined as frequent users with no pain-related diagnoses during the entire study period. Demographics and patterns of use were identified between the 3 groups; differences in proportions and 95% CI are presented.

Results: During the study period there were 925,719 individual patients seen in an ED resulting in 2,016,537 total visits. A total of 78,902 (8.5%) of these patients had 4 or more visits, which accounted for 696,276 (34.5%) of all visits. Among these patients with 4 or more visits, 46,324 (58.7%) were from non-pain frequent users, 28,078 (35.6%) were from occasional pain frequent users, and 4,500 (5.7%) were from frequent pain users. Frequent pain users were younger, less likely to be admitted, and more likely to have a primary diagnosis indicating a mental disorder and drug or alcohol dependence/abuse than non-pain users and occasional pain users. Compared to non-pain users (1.8%) and occasional pain users (4.0%), a significantly higher percentage of frequent pain users (23.6%) visited more than 5 hospitals (difference = 21.8%, 95% CI = 20.6, 23.1; and 19.6%, 95% CI = 18.3, 20.9, respectively).

Conclusion: Frequent pain users are more likely to have a diagnosis related to mental disorders and substance abuse, and tend to visit more hospitals, compared to other frequent users. Regional approaches to managing patients with pain diagnoses may be helpful to improve patient care and decrease unnecessary utilization in this population.

## 149 Pain Scores Among Emergency Department Patients: Comparison By Emergency Department Diagnosis

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Study Objectives: Treatment for pain and pain-related conditions has been identified as the most common reason for emergency department (ED) visits. This study was undertaken to characterize the distribution of self-reported pain scores for common ED diagnoses.

ED Diagnosis with Highest Pain Scores

Diagnosis	N	Mean Pain Score	95% CI
Sickle cell crisis	13	8.7	(8.0-9.4)
Back, neck, shoulder pain	65	8.5	(8.0-9.0)
Headache	60	8.3	(7.8-8.7)
Dental pain	40	8.1	(7.5-8.7)
Renal and biliary colic	25	8.0	(7.5-8.6)
Abdominal pain NOS	101	8.0	(7.6-8.4)
Muscle sprain, strain	66	7.6	(7.1-8.0)
GI infections	37	7.4	(6.7-8.0)
Oritis, sinusitis, conjunctivitis	33	7.3	(6.4-8.2)

Methods: In this retrospective exploratory chart review, eligible participants included all adult ED patients age 18 and over, with a self-reported triage pain score of 1 or higher during January - June 2011. Data were collected from ED electronic medical records.

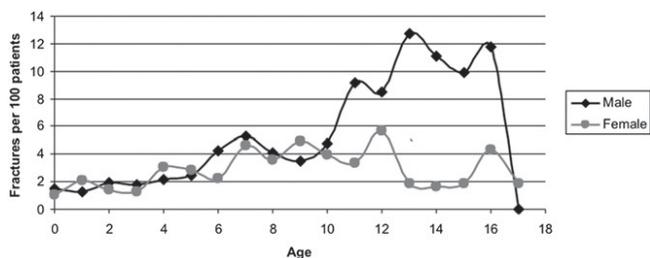
Results: Among 1,229 patients, the mean age was 44 years. 56% of patients were female, and 59% were white. The mean triage pain score for all patients was 7.1 (IQR 6-9). The most common reported diagnoses included: minor injuries (10%), abdominal pain (8%), and respiratory infections (8%). The diagnoses with the highest mean pain scores were: sickle cell crisis (mean pain score 8.7), back/neck/shoulder pain (8.5), headache/migraine (8.3). Higher pain scores were significantly correlated with younger age (p <0.001) and number of ED visits (p <0.001). Demographic factors including female sex, black race, and Medicaid insurance reported significantly higher pain scores (p-value<0.001). Patients with multiple ED visits in the recent 12 months reported significantly higher pain scores (p-value<0.001).

Conclusion: ED patients report a wide variety of pain scores. Factors associated with higher pain scores included younger age, female sex, black race, Medicaid insurance status, multiple ED visits in the past year, and ED diagnoses of sickle cell crisis, back/neck/shoulder pain, and headache.

## 150 The Effect of Intranasal Ketorolac on Pain in Adults in the Emergency Department: A Prospective, Open-Label, Efficacy, Safety and Feasibility Trial

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Study Objectives: Pain is the most common chief complaint for patients seeking care in the emergency department (ED). Up to 70% of ED visits are related to pain as the rationale for the ED visit. Ketorolac is effective in relieving pain, is nonaddicting, avoids many opioid side effects including respiratory depression, hypotension, constipation, nausea, and vomiting. Compared with starting an intravenous (IV) line, intranasal (IN) drug administration is less painful, faster (starting an IV takes time) which allows for earlier onset of drug administration and earlier onset of pain relief, easier to administer, and with a lesser cost than IV (since it takes less ED staff time to administer). It is also less painful than the intramuscular (IM) route. IN has a much quicker onset and less variable absorption than the oral



Mechanism of Injury	Number of Patients	% Male	Average Age	Most common fracture site
Fall from >1m	112	57.1	6.2	112 57.1 6.2 Radius/ulna
Fall from <1m	103	90.3	12.1	Hands/fingers
Fall from standing	79	38.0	8.3	Radius/ulna
Direct blow from person	71	85.9	11.6	Hands/fingers
Sports	49	55.1	2.8	Skull
Hit by car	36	69.4	9.6	Fibula/tibia
Unwitnessed	36	63.9	3.1	Radius/ulna; humerus; skull
Miscellaneous	175			
Total	661	64.0	8.2	

Site of Injury	Number of Patients	% Male	Average Age
Hands/finger	144	74.5	10.0
Radius/ulna	133	60.9	8.7
Fibula/tibia	88	53.8	9.1
Humerus	64	52.9	5.2
Skull	48	67.3	2.5
Foot/ankle	43	68.4	10.3
Facial bones	37	68.4	10.3
Femur	36	67.5	8.3
Clavicle	35	69.4	6.9

## 286 Patterns of Emergency Department Presentation for Pediatric Traumatic Brain Injury

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Study Objective: To characterize the patterns of presentation of children with head trauma to the pediatric emergency department.

Methods: This is an observational cohort study that sought to collect injury and outcome variables with the goal of characterizing the very early natural history of pediatric traumatic brain injury in children over the age of 3 years. This institutional review board approved project was conducted in collaboration with our Institution's Center for Translational Science Institute. Data were entered in RedCap, a secure database. Statistical analyses were performed using JMP 10.0 for windows.

Results: The cohort consisted of 201 children ages 4-17, with 40% of them being girls. Out of 201, 74% were white, 20% black, and 5% Hispanic. In terms of mechanism, 55% were due to fall, 26% during recreational activity, 17% during sports, and 28% due to road traffic accidents (percentages overlap for first 3 categories as the fall could have been due to sports or recreational activity).

Thirty one percent were admitted to the hospital, with a median length of stay (LOS) of 1 day and an interquartile range (IQR) of 1-3 days. Older children were significantly more likely to be admitted ( $p=0.0129$ ), as were those with vomiting ( $p=0.0416$ ) or post-traumatic amnesia (PTA) ( $p=0.0002$ );  $R^2$  was 27%. Fourteen percent were admitted to the ICU. Median ICU LOS was 2 days with an IQR of 1 to 5.5. One percent had an in-hospital death. Kids with amnesia or alteration in consciousness were significantly more likely to be admitted to the ICU (both  $p<0.0001$ ,  $R^2$  41%). Older children were significantly more likely to be re-admitted to the hospital within 30 days. ( $p=.0354$ ).

Conclusion: These preliminary data suggest that pediatric brain injury is not without significant morbidity.

## 287 Identification of Frequent Users of Hospital Emergency Department Resources Using a Community-wide Approach

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Study Objectives: As fiscal resources continue to shrink and emergency department (ED) crowding rises, communities need to better pool resources to optimally improve care of a region's patients. One issue is that of frequent users and ED super-users who utilize a disproportionate share of acute emergency care resources. If these patients can be identified, hospital systems and county public health can potentially intervene to offer case management and more consistent management plans to reduce any inappropriate or preventable ED utilization that may be occurring. The purpose of this study was to compare a hospital-specific approach versus region-wide approach in identifying frequent users of ED resources.

Methods: This is a retrospective multi-center cohort study of hospital ED visits from all 18 non-military, acute care hospitals serving the metropolitan San Diego region (population 3.2 million) between 2008 and 2010 using data submitted to the California Office of Statewide Health Planning and Development (OSHPD). Patients included in the inpatient (IP) discharge dataset who were admitted from an ED were extracted and merged with the ED discharge dataset to construct a complete ED utilization database. Patients without a valid patient identifier were excluded. Frequent users were defined as having 6 to 20 ED visits between any consecutive 12 months during the study period. Super users were defined as having 21 or more ED visits over the same time period. Comparisons between community-wide and hospital specific frequent user identification methods were made and differences and 95% CI are presented.

Results: During the study period there were 925,719 individual patients seen in an ED resulting in 2,016,537 total visits. A total of 28,569 patients were identified as frequent users and 1,661 patients were identified as super users using a community-wide approach. Most of these patients were seen in multiple hospital EDs (69.6% of frequent users and 97.2% of super users). When community-wide data are not utilized, individual hospitals are limited to hospital-specific visits for identification of frequent users and super users presenting at their ED and are grossly under-identified. Because patients use multiple hospitals, individual hospitals would have only been able to identify from 15.6% to 62.4% of all frequent users and from 0.3% to 15.2% of all the super users who visited their facility of the total population that was actually identified by using the county-wide approach. The mean difference in total number of patients identified (and 95% CI) between individual hospital versus community-wide methods for frequent users and super users was 2,699 (1762, 3635) and 505 (334, 674), respectively. Overall, the hospital-specific approach failed to identify 32.7% of frequent users and 65.6% of super users visiting San Diego County EDs, which would have otherwise been identified using a community-wide approach.

Conclusion: In our study in a single, large metropolitan region, a community-wide identification method resulted in significantly greater numbers of individuals being identified as frequent user and super user ED patients than when utilizing individual hospital data.

## 288 Characteristics of Repeat Emergency Department Users at a University Medical Center: Frequent Emergency Department Utilization Is Associated With Higher Rates of 30-day Inpatient Readmission

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Study Objectives: Repeat emergency department (ED) users are common in academic and community hospitals alike. We conducted this study to characterize repeat ED users, according to frequency of repeat encounters.

**Methods:** We performed a retrospective analysis of all ED visits over a 6-month period using an electronic database. Repeat ED users (REDUs) were defined as having 2 or more ED visits within the study period. We categorized patients as non-REDUs (single visit), low REDUs (2-3 visits), moderate REDUs (4-9 visits) and high REDUs (> 9 visits). Comparisons were made to identify differences between REDUs and non-REDUs according to several demographic, medical and visit-related characteristics. Admission and 30-day readmission rates were calculated. Statistical analysis was performed using Chi-Square tests for categorical data and Fisher's exact test for small sample sizes. Continuous data were analyzed using one way ANOVA and Student's t-tests.

**Results:** REDUs accounted for 19.7% of all individual ED patients and 39.7% of visits. Low REDUs accounted for 28.9% of visits averaging 2.2 visits per patient, moderate REDUs accounted for 8.9% of visits averaging 4.9 visits per patient and high REDUs accounted for 1.9% of visits averaging 16.9 visits per patient. REDUs were more likely to be African American, living within close proximity to the hospital, publically insured, indigent and chronically ill. High REDUs were more likely to receive Medicare coverage (42.9%) and had significantly greater odds of having psychiatric comorbidities. Of note, low and moderate REDUs demonstrated no significant difference in the rate of inpatient admission per visit relative to that of non-REDUs (14.2%, 14.9% and 15.1% of ED visits, respectively), while high REDUs had significantly lower admission rates per visit (4.6%,  $p < 0.001$ ). When admitted, all REDU groups demonstrated significantly higher rates of 30-day readmission (low- 25.8%, moderate- 42.1% and high- 68.2% of inpatient visits,  $p$  values  $< 0.05$ ) in comparison to non-REDUs (6.7%). High REDUs had significantly shorter lengths of stay (average 3.86 days,  $p < 0.05$ ) compared with non-REDUs at 6.06 days.

**Conclusion:** REDUs tend to have more chronic illness, greater numbers of comorbidities and higher 2-year mortality than non-REDUs. Admission rates by visit were similar for all categories except for high REDUs, indicating that ED visits by low to moderate REDUs are justified as necessary. While high REDUs incur fewer and shorter inpatient admissions, they exhibit the highest rates of 30-day readmission. Federal programs designed to penalize providers for 30-day readmissions may be unreasonable for all patient populations.

## 289 Mortality Rate Weekdays versus Weekends for Adult Patients Presenting to US Emergency Departments

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**Background:** In the U.S. not all health care services are available 24/7. It is assumed that serious life-threatening conditions receive appropriate care regardless of time of day or day of the week, and less serious elective services are the ones relegated to Monday-Friday. Spain and Canada have shown this assumption false, prompting further investigation to eliminate higher mortality rates on the weekend. It is not currently known if similar disparities exist in the U.S. or if our system is more consistent as shown in the evaluation of Great Britain.

**Study Objective:** Determine if the mortality rate for adult patients admitted through US emergency departments (ED) varies on weekends versus weekdays. Identify patient- and hospital-level characteristics that have an effect on differences in weekday versus weekend mortality.

**Methods:** Design: A retrospective cohort analysis of the 2008 Nationwide Emergency Department Sample (NEDS) using logistic regression clustered at the hospital level. Analysis was adjusted for comorbidities, age, sex, income and insurance status for individuals. At the hospital-level analysis was adjusted for ED volume, trauma status, teaching status, and ownership. Setting: The 2008 NEDS is a 20% sample representative of U.S. emergency departments. NEDS is part of the Health care Cost and Utilization Project (HCUP) sponsored by the Agency for Healthcare Research and Quality (AHRQ). It is a compilation of the State Emergency Department Databases (SEDD) and the State Inpatient Databases (SID).

**Participants:** 4,226,800 adults admitted to the hospital, or dying after presenting to an ED in 2008.

**Results:** Mortality rates differed between weekdays and weekends OR=1.073 ( $p < 0.001$ ). This difference was maintained OR=1.026 ( $p=0.012$ ) after adjusting for individual and hospital level variables. The adjusted marginal differences in weekend mortality were highest for self-pay and Medicaid patients. In contrast to previous state analysis there was not a significant difference in weekend mortality rate for teaching hospitals compared to non-teaching hospitals ( $p=0.077$ ).

**Conclusion:** Patients are more likely to die when admitted to the hospital through the ED on the weekend compared to weekdays. Further research is needed to

identify the root cause of this difference in order to target system changes that avoid unnecessary death.

## 290 Opt-in versus Opt-out HIV Screening in Emergency Departments: A Randomized Trial

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**Background:** In 2006, the Centers for Disease Control and Prevention (CDC) recommended universal opt-out HIV testing for all patients aged 13-64 years old. The American College of Emergency Physicians (ACEP) supports routine HIV screening of patients presenting to the emergency department (ED) with due consideration for local disease prevalence and testing appropriateness in the context of the patient's ED presentation. While the feasibility of universal testing has been examined in several emergency departments, opt-out testing has not been rigorously studied against opt-in testing. How these choices are presented to patients has potential to influence their health care decisions. We studied the impact of the wording and timing of HIV test offers on patient consent rates for HIV testing in a suburban emergency department.

**Methods:** Trained research assistants enrolled a convenience sample of emergency department patients during the course of their routine ED evaluation. Consenting patients were randomized to one of 3 treatment groups: opt-in, opt-out, and active-choice. Opt-out patients were routinely HIV-tested unless they declined, opt-in patients were HIV-tested only if they requested testing, and active-choice patients were required to state whether they wanted to be HIV-tested. All enrolled study patients were also given a questionnaire assessing their risk of HIV and were randomly assigned to receive this survey before or after their HIV test offer.

**Results:** 396 out of 449 patients consented to study inclusion. Among the participants, 133 (33.5%) accepted an HIV test, and no HIV infections were detected. Routine opt-out HIV testing yielded a 38.2% acceptance rate, opt-in HIV testing yielded a 28.4% acceptance rate (OR 0.64, 95%CI: 0.353 - 1.159,  $p = 0.116$ ), and active choice testing (asking patients directly whether they would like a test) yielded a 31.2% acceptance rate (OR: 0.731, 95% CI: 0.442 - 1.208,  $p = 0.196$ ). There were no significant differences when the 3 treatments were considered together ( $p = 0.216$ ). Patients reporting behaviors associated with increased HIV-risk accepted 55.6% of test offers while those denying any HIV-risk factors accepted 31.9% of tests (OR: 2.66, 95%CI: 1.13 - 6.278,  $p = 0.012$ ). Patients who were offered an HIV-risk questionnaire prior to their HIV test offer were 26.1% less likely to accept testing than those offered the HIV tests prior to being offered the survey (OR: 0.636, 95% CI: 0.407 - 0.995,  $p = 0.037$ ).

**Conclusion:** We found that a lower proportion of patients accepted HIV tests in opt-in and active-choice schemes as compared to an opt-out scheme. Offering patients an HIV-risk questionnaire prior to the test offer also significantly decreased the rate of HIV test acceptance. Therefore, understanding the impact of the HIV-test offer procedure, wording and timing can potentially influence the rate of patient compliance with HIV-testing in the emergency department setting.

## 291 Prolonged Observation Stays and Utilization Rates Across 12 States

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**Study Objectives:** To describe the characteristics of observation services (OS) visits whose length of stay (LOS) is prolonged (over 48 hours) and hospital level variations in the use of OS. Though ED observation units have been shown to improve OS and LOS, the national profile of OS is unknown.

**Methods:** We combined and analyzed multiple statewide 2009 databases made available to the Agency for Health care Research and Quality (AHRQ) / Healthcare Cost and Utilization Project (HCUP), selecting states which had complete datasets that identified outpatient OS and represented diverse regions of the U.S. These data include standard patient demographic information, expected primary payer, patient disposition, and International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnoses and procedure codes and/or current procedural terminology (CPT) codes. Visits were then grouped by time in observation status (8-24, 25-48, 49-72, 73+ hours) for bivariate analyses of the factors associated with longer OS stays. The factors examined include age, sex, race, expected primary payer, patient disposition, community income quartile, and the top 25 Clinical

Classification Software (CCS) diagnosis codes, the ratio of OS only encounters to the total of OS and in-patient (IP) encounters, Critical Access Hospital (CAH) status, hospital teaching status, hospital size, hospital urban/rural location, hospital ownership/control, and Medicare Case Mix Index (CMI).

Results: Of the 1,076 acute care and community hospitals in these states, 962 (89%) hospitals reported patient encounters resulting in OS, and 13 had proportions of encounters resulting in OS use greater than 50%. The median rate of hospital patient encounters resulting in OS use was 12%, 26% of hospitals had less than 5% of patient encounters result in OS use, and 73% of hospitals had 20% or less of their patient encounters result in OS use. The largest portion of patients using OS is in the very young children group and the older adult population. There were 27,672 Medicare patients whose stay was over 48 hours - of these 8% (n=2,231) were subsequently admitted to a skilled nursing facility (SNF). **Of the 696,732 observation visits of 8 hours or more, 30.9% were for visits 25-48 hours in length, 4.6% were for visits 49-72 hours in length, and 4.2% were for visits 73 or more hours in length.** Relative to those who had observation visits 8-24 hours long those treated in observation for 49-72 and 73+ hours tended to be adults of older age, female, and to be discharged to SNF care (p<.01 in each case). With regard to diagnoses and observation visit length, those with non-specific chest pain were less likely to stay beyond 24 hours (p<.01 in each case). Those with diagnoses related to back pain were more likely to stay for 73 or more hours (p<.01). Patients with OS stays more than 73 hours were more likely to be treated in large hospitals and those in small metropolitan areas and those who were not-for profit.

Conclusion: There is considerable hospital-level variation in the use of OS. Patients in OS for prolonged periods tended to be elderly patients.

## 292 Frequent Fliers and Hot Spotters: Characterization of Distinct Subgroups of Frequent Users of the Emergency Department

Posinelli A, Hamedani A, Svenson JE/University of Wisconsin, Madison, WI

Study Objectives: With rising numbers of emergency department (ED) visits, focus should be placed on patients who are frequent users of the ED. Efforts have been made to characterize this “frequent user” population in the hopes of implementing systems or protocols to reduce ED utilization. These efforts have yielded conflicting results largely because of great variance within the population. If we can define distinct subgroups within this population, then more targeted strategies, (eg, intensive case management or chronic pain protocols) could be attempted. The objective of this study is to examine the medical and demographic characteristics of “frequent users” of the ED, with the aim of characterizing distinct subgroups of “frequent fliers” and “hot spotters” (Gawande, New Yorker, 2011).

Methods: This is a retrospective study of patient ED visits from a single academic medical center, with annual volume of about 45,000. All patients with ≥ 7 visits in any calendar year between 2008-2011 were identified. Demographic and ED encounter-specific data for each visit was then obtained. We define “frequent fliers” as those with ≥ 7 visits but < 10% admissions and “hot spotters” as those with ≥ 7 visits with a greater than 50% admission rate.

Results: There were 779 patients who had ≥ 7 visits in any one of the calendar years. Of these, the overwhelming majority (601, 77%) were frequent users for only one year. 5% (39) were frequent visitors all 4 years, 6.3% (49) for 3 of the 4 years and 11.5% (90) for 2 years. Overall frequent users made up approximately 8% of ED caseload over all 4 years. Frequent fliers accounted for 26% of these visits, while hot spotters accounted for another 25%. Patterns of use (number of frequent visit years) over time were the same for both frequent fliers and hot spotters. However, there was a trend over the 4-year period to fewer frequent fliers and more hot spotters. Frequent fliers made up 33% of the visits in 2008, while hot spotters made up 25%. This was reversed over the 4-year period, such that by 2011, hot spotters made up 31% of visits while frequent fliers made up 21% of visits. The average age of frequent users was 43 years. The frequent fliers were younger (38 yo) than hot spotters (48 yo), but did not differ in sex mix (56% women). The average length of stay all frequent users was 4.2 hours. Frequent fliers averaged 3.3 hours and hot spotters averaged 4.7 hours. Hot spotters had a higher triage acuity than frequent fliers (2.7 versus 3.3). Frequent fliers account for only 2% of the admissions of the group, while hot spotters account for 60%.

Conclusion: Frequent users of the ED are a heterogeneous group. Hot spotters and frequent fliers are distinct subgroups of the group of frequent users. Efforts to target this group of patients to reduce ED use must formulate appropriate interventions recognizing these differences

## 293 National Pattern of Risk-Standardized Emergency Department Hospital Admission Rates for Adult Patients

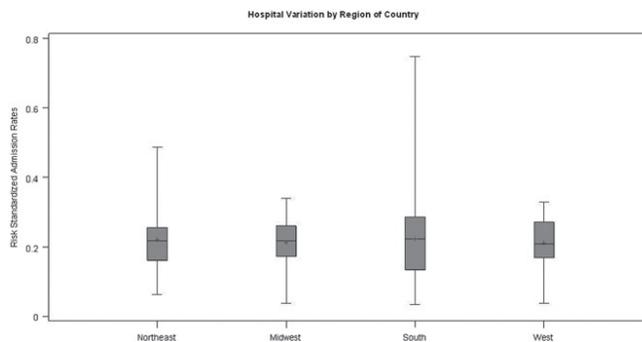
Capp R, Fox J, Desai M, Wang Y, Krumholz H/Yale University-Robert Wood Johnson Clinical Scholars, New Haven, DE; Yale University-Robert Wood Johnson Clinical Scholars, New Haven, CT; CORE (Center for Outcomes Research Yale University), New Haven, CT

Study Objectives: Over 50% of all hospitalizations occur through the emergency department (ED). Many decisions about whether patients presenting to the ED require hospitalization are discretionary. In this study, we study variations in emergency department risk-standardized hospital admission rates (RSHAR) in the United States.

Methods: Using data from the 2009 National Hospital Ambulatory Medical Care Survey, we identified all adult patients (>18 years) presenting to the ED for non-traumatic or non-poisoning diagnoses. Patients who were transferred to another hospital and those treated in hospitals contributing fewer than 25 patients were excluded. We then calculated RSHAR for each hospital using 2-level (patient and hospital) hierarchical logistic regression models while controlling for difference in patients’ socio-economic status, disease severity, co-morbidities, vital signs, hospital factors. Weights were accounted in the analysis using proc survey programming in SAS. Hierarchical logistic regression were re-run without hospital factors, such as region of country. We analyzed correlation of region of country and RSHAR using spearman correlation. SAS 9.2 was used for all statistical analysis.

Results: Included in this study were: 311 hospitals, 16,055 patients, projecting a weighted estimate of approximately 61 million patients. The mean age was 46.9; majority females (62% STE .622), White (61% STE 2), and had Medicare insurance (32% STE .998). A total of 22% (STE .60) of all patients presenting to the ED were considered to have emergent clinical severity status. The average unadjusted weighted ED admission rates was 20% (STE .0093 95% CI 18-22%), while RSHAR mean was 22% (STD .091 95% CI 21-23%). RSHAR ranged from 3%-75% (median 22% IQR 16%-27%). A correlation of 19% between region location and RSHAR was found (p<.0001), with hospitals in the South (23%) and Northeast (23%) having higher admission and variance, compared to hospitals located in the Midwest (22%) and West (21%) regions of the country (see figure 1).

Conclusion: Marked variation exists in ED hospital admissions across the US, even when accounting for hospital clinical severity and patient socio-economic mix. Region of country did not account for substantial differences in mean RSHAR. Future studies evaluating other hospital factors, such as teaching and safety net status, and most importantly, the relationship of variation in ED hospital admission and outcomes should be performed.



## 294 Variation in Use of All Types of Computed Tomography by Emergency Physicians

Levine MB, Moore AB, Kuehl DR, Franck C, Li J/Virginia Tech Carilion School of Medicine, Roanoke, VA; Carilion Clinic, Roanoke, VA; Virginia Tech, Blacksburg, VA

Study Objectives: The rise in CT use and associated costs suggests optimization is necessary to minimize costs and reduce radiation exposure. Variation in CT

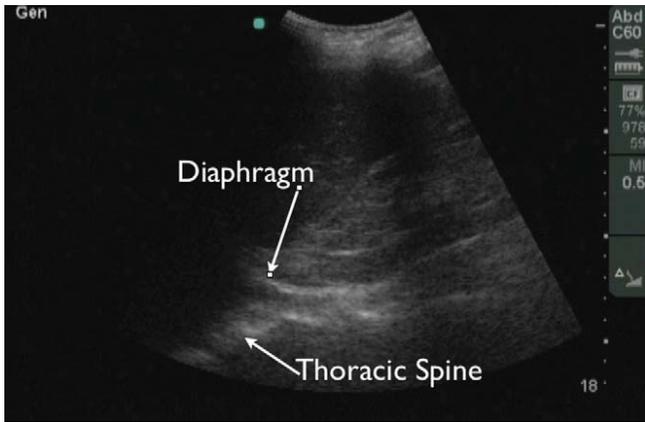


Figure 2 demonstrates extension of the thoracic spine superior to the level of the diaphragm indicating pleural fluid.

	CT +	CT -	Total
T-Spine +	42	21	63
T-Spine -	15	213	228
Total	57	234	291

### 414 There Is No Rock Bottom: Emergency Physicians' Approach and Adaptations to Alcohol Intoxicated Patients

Rindal KE, Chin N, Shah MN, Sellers C/University of Rochester, Rochester, NY

**Study Objectives:** Patients with alcohol problems are more likely to present to the emergency department (ED) than to a primary care setting, rendering ED physicians the gatekeepers of addiction health care for many. Understanding ED physicians' perspectives is crucial in implementing programs to screen, intervene upon, and refer these patients. The goal of this study is to identify the attitudes and beliefs of ED physicians towards alcohol intoxication patients.

**Methods:** We performed a qualitative study using the Theory of Planned Behavior to create an interview guide and thematic categories of analysis. Emergency physicians (residents and faculty) were interviewed at a university tertiary referral center. Sampling was purposive capturing years practicing and sex. Data were collected via 15 semi-structured individual interviews.

**Results:** Four themes were characterized:

**Behavioral beliefs:** Emergency physicians believe they can help young binge drinkers but not "chronic" alcohol intoxication/addicted patients who are felt to have no "rock bottom," and thus have no teachable moment. Experience with substance addiction/abuse in friends or family is a very strong influence on emergency physicians' approach to these patients.

**Control Beliefs:** Barriers to care are the patient's intoxicated state and associated behaviors, inadequate resources and referral infrastructure, patient choice/"being ready," competing priorities, and inadequate counseling skill. Over time, emergency physicians tend to transform their maladaptive reactions (psychological barriers), reframing them into functional enablers to optimize their ability to care for the alcohol intoxication patient.

**Normative beliefs:** The behavioral expectations are "sober and go," patient/staff safety, and avoidance of "short cuts". Alcohol acute care, such as diagnosing occult trauma, is valued. Underling alcohol abuse or addiction is considered a chronic or social issue and is not highly valued and is considered less "fixable". The social norm seems to be comprised of competing humanizing and dehumanizing culture towards these patients, which emergency physicians recognize as disparate.

**Alcohol abuse/addiction:** The chances of recovery were thought to be poor, with a median estimate of 10%. The degree to which emergency physicians believe these patients have choice in the development and persistence of their addiction is important. This affects emergency physicians' attribution of responsibility, tendency to empathize, and degree of judgment.

**Conclusion:** Emergency physicians have developed reframing mechanisms as a way of transforming barriers into enablers in the care of the alcohol intoxication patients. These adaptations may improve chances of emergency physicians' development of cultural competence in caring for alcohol intoxication patients. Further, personal experience with substance abuse/addiction and one's attribution of choice/fault to the substance addiction/abuse process are areas that strongly influence behavior in emergency physician. Future addiction education or SBIRT implementation efforts can be informed by this knowledge.

### 415 Multiple Hospital Emergency Department Visits Among "Frequent Flyer" Patients With a Psychiatric-Associated Discharge Diagnosis

Brennan JJ, Chan TC, Killeen JP, Castillo EM, Vilke GM/University of California, San Diego, San Diego, CA

**Study Objectives:** As fiscal resources continue to shrink and emergency department (ED) crowding increases, communities need to better pool resources to optimally improve care of a region's patients. One issue is that of so-called "frequent flyers," who disproportionately utilize acute service resources and many of whom are seen for psychiatric issues. The purpose of this study is to evaluate the pattern and frequency of ED utilization among individual patients with and without psychiatric-related complaints.

**Methods:** This is a retrospective multi-center cohort study of hospital ED visits from all 18 non-military, acute care hospitals serving the metropolitan San Diego region (population 3.2 million) between 2008 and 2010 using data submitted to the California Office of Statewide Health Planning and Development (OSHPD). Patients included in the inpatient (IP) discharge dataset who were admitted from an ED were extracted and merged with the ED discharge dataset to construct a complete ED utilization database. Patients without a valid patient identifier were excluded. Psychiatric-related visits were defined as any of the following primary diagnoses codes 290-302, 306-316. Frequent users were defined as having 4 or more ED visits over any consecutive 12-month period, and were further defined by the number of psychiatric-related visits. Non-psychiatric frequent users were defined as frequent users with no psychiatric-related diagnoses during the study period. Occasional psychiatric users were defined as frequent users with one to 3 psychiatric-related visits in a 12-month period. Frequent psychiatric users were defined as frequent users with 4 or more psychiatric-related visits in a 12-month period. Demographics and patterns of use were identified for non-psychiatric users, occasional psychiatric users, and frequent psychiatric users. Comparisons between groups were made and differences in proportions and 95% CI are presented.

**Results:** During the study period there were 925,719 patients seen in an ED with 2,016,537 total visits. A total of 78,902 (8.5%) of these patients had >4 visits, which accounted for 696,276 (34.5%) of all visits. Among these patients with >4 visits, 64,066 (81.2%) were non-psychiatric users, 12,397 (15.7%) were occasional psychiatric users, and 2,439 (3.1%) were frequent psychiatric users. Frequent psychiatric users were younger, male, and more likely to be admitted into an inpatient service, and leave the ED against medical advice. Compared to non-psychiatric users, a significantly higher percentage of occasional psychiatric users and frequent psychiatric users patients visited more than 5 hospitals (2.1% versus 8.5%, difference = 6.4%, 95% CI = 5.9, 6.9; and 2.1% versus 27.4%, difference = 25.4%, 95% CI = 23.6, 27.2, respectively). The difference between occasional psychiatric users and frequent psychiatric users was also significant (8.5% versus 27.4%, difference = 19.0%, 95% CI = 17.1, 20.9).

**Conclusion:** Occasional psychiatric users and frequent psychiatric users tend to visit more hospitals compared to non-psychiatric users. Regional approaches to

managing patients with psychiatric diagnoses may be helpful to improve patient care and resource utilization in this population.

## 416 The B52 Combination Is Not Frequently Used in Emergency Departments and Causes A High Proportion of Patients to Fall Asleep

Campillo A, MacDonald KS, Vilke GM, Wilson MP/UC San Diego, San Diego, CA; UC San Diego Health System, San Diego, CA

**Study Objectives:** Acute agitation is a common problem in emergency departments (EDs). Commonly used medications in the ED include first-generation antipsychotics (FGAs) such as haloperidol or droperidol. Anecdotally, one common practice within EDs is to administer a drug cocktail known as a B52. Traditionally it was named for "B"enadryl, "5" mg haloperidol and "2" mg of lorazepam, but has evolved to consist of 50mg of an anticholinergic, either haloperidol or droperidol, plus 2 mg of a benzodiazepine. Despite being often talked about, this regimen is surprisingly poorly described in the literature. Little is known about the ED prescribing patterns of these medications, the need for additional medications after this combination, or sedation in the patients who receive it.

**Methods:** This is a structured retrospective chart review of all ED patients treated with B52 therapy from 2004-2010 in 2 university EDs. B52 therapy was defined as a 3-medication combination of an anticholinergic, an FGA, and a benzodiazepine. Data included dose of medications, patient use of alcohol, need for restraints, and the proportion of patients noted as asleep or resting within 3 hours. If noted both before B52 administration and within 4 hours after, drops in systolic blood pressure, pulse rate, and oxygen saturation were also calculated within each patient as pre-dose-post-dose, then compared using an analysis of variance to investigate whether concurrent alcohol use caused further decrease in vital signs. For patients who received both lorazepam and diphenhydramine, an additional analysis using linear regression was performed to see if increasing amounts predicted larger drops in vital signs. Vital signs were further analyzed descriptively according to the proportion of hypotension or hypoxemia, defined as lowest blood pressure or oxygen saturation  $\leq 90$  after meds. Fisher's exact test was used to compare proportion of alcohol+ and alcohol- patients asleep after B52 therapy.

**Results:** Of 1253 cases of agitation treated with haloperidol or droperidol during the study period, 29 patients (2.3%) received B52 therapy. One patient who received simultaneous ziprasidone was excluded, leaving 28 cases available for analysis. The most frequent combination administered was IM haloperidol, lorazepam, and diphenhydramine. 9/28 patients (32%) ingested alcohol, with an average level of 211 mg/dl. 20/28 (71%) were placed into restraints at some point during the visit. Regardless of ETOH, 16/28 patients (57%) were sleeping within 3 hours after meds with no significant difference between the proportion of ETOH+ and ETOH- patients asleep after B52 ( $p=ns$ ). 18/28 patients (64%) had complete vital signs, with no effect of ETOH on drops in systolic blood pressure, pulse rate, or oxygen saturation ( $p=ns$ ). Larger doses of lorazepam or diphenhydramine had no effect on decreases in these same vital signs ( $p=ns$ ). No patient experienced hypotension or hypoxemia.

**Conclusion:** Despite the notion that B52 combination therapy is a popular in the ED, the use of this treatment is rare. Although the limited use of B52 makes it difficult to fully examine adverse effects, there appeared to be limited effects on vital signs in this small sample. However, the majority of patients fall asleep after administration, potentially hindering psychiatric evaluation.

## 417 Comparison of the Safety and Efficacy of Ketamine versus Olanzapine for Sedation of Violent Agitated Patients in a Community Emergency Department

Hibbs NT, Kirby SE, Seitz CS/Michigan State University, Lansing, MI

**Study Objectives:** To determine if ketamine is safe and effective in the sedation of acutely violent agitated patients in a community emergency department (ED).

**Methods:** We performed retrospective structured chart review of patients receiving parenteral ketamine or parenteral olanzapine for acute agitation in the ED from January 1, 2009 and December 31, 2010. A standardized abstraction form was used to collect data on patient demographics, time in ED, time to sedation, need for additional medications, substance abuse, adverse events, hourly vital signs for 3 hours after medication administration, head CT results, and disposition status. Bivariate

analysis was performed using Chi2 test. Trends in vital signs were evaluated with linear regression

**Results:** We reviewed 126 individual charts (54 ketamine, 72 olanzapine) that met inclusion criteria. Males consisted of 72.2 and 56.9% of each group, respectively. The majority of patients in each group tested positive for alcohol or drugs (87.0 versus 84.6%). A history of psychiatric illness was common in both groups (64.8 versus 75%). Ketamine had a significantly faster mean time to sedation (14.9 min versus 68 min,  $p < 0.0001$ ). Both groups had similar mean total time of sedation and time in the emergency department. Adverse events occurred at similar rates in each group (13.0 versus 11.1%). The most severe adverse events both occurred in the ketamine group where 2 subjects were intubated (one for decreased oxygen saturation and one for uncontrolled agitation). Decreased oxygen saturation and hypotension occurred at similar rates in each group (5.6 versus 8.3% and 5.6 versus 2.8%). Mean arterial pressures were calculated from hourly blood pressure readings and showed a downward trend in both groups ( $R^2 = 0.84$  versus 0.88). Mean arterial pressure, pulse rate, and oxygen saturation remained within normal ranges in both treatment groups and did not differ significantly. Both groups required similar amounts of additional medication (mean 0.96 and 1.2 additional medications to achieve sedation). Three patients (8.3%) in the olanzapine group were diagnosed with intracranial hemorrhage on head CT. Both groups had similar disposition proportions (admission, discharge, or transfer for psychiatric evaluation).

**Conclusion:** Ketamine provides faster time to sedation than olanzapine but was associated with 2 severe adverse events in our study. Minor adverse events were similar in both groups. Need for additional sedative medications were similar in both groups. Ketamine may be a useful sedating drug for violent agitated patients in the ED, but caution must be exhibited regarding patient's ability to maintain their airway. Further studies are needed to determine which sedative is safest and most effective in this patient population.

## 418 A Comparison of Oral Aripiprazole and Oral Olanzapine Use in the Emergency Department

Lin GK, Vilke GM, Castillo EM, Chen N, Wilson MP/UC San Diego Health System, San Diego, CA

**Study Objectives:** Current expert consensus guidelines recommend oral second-generation antipsychotics such as aripiprazole or olanzapine as first-line treatments for agitation if patients can take medication. There is little previous work on oral olanzapine in the emergency department (ED) setting, and no previously published work on aripiprazole. We investigated the ED use of aripiprazole and olanzapine by comparing (1) the demographics of the patient populations; (2) each medication's frequency of use; and (3) effects on systolic blood pressure, pulse rate, oxygen saturations; and (4) need for repeat medication dose within 3 hours.

**Methods:** This is a structured retrospective chart review of all patient visits at 2 university EDs from 2005-2010 in which aripiprazole or olanzapine was given. Data included age, sex, amount of ingested alcohol, restraint use, need for additional calming medication within 3 hours, and length of stay. For patients with vital signs before and within 4 hours after meds, drops in systolic blood pressure, pulse rate, and oxygen saturation were calculated for each individual patient as pre-dose-post-dose, then analyzed using an ANCOVA with medication type and benzodiazepine use as factors, and dose in milligrams as the covariate. Chi-square was used to compare the proportion of patients with hypotension or hypoxemia, defined as lowest blood pressure or oxygen saturation of  $< 90$  after meds. Chi-square was also used to compare restraint use, rate of benzodiazepine use, and need for repeat medications between groups. Two-sample t-tests were used to compare age and amount of ingested alcohol.

**Results:** On 74 visits, 70 unique patients (50 male, 20 female) received oral aripiprazole and 375 unique patients on 397 visits (277 male, 98 female) received oral olanzapine during the study period. 44 aripiprazole visits and 219 olanzapine visits had vital signs before and within 4 hours after medication. In this subgroup, the average age (A: 41, O: 43) and rate of concurrent benzodiazepines (A: 5/44; O: 45/219) were similar ( $p=ns$ ). For olanzapine, restraint use was marginally more prevalent (A: 2/44, O: 30/219,  $p=.09$ ), the level of intoxication was significantly higher (A: 91 mg/dl, O: 170 mg/dl,  $p<.05$ ), and the need for additional calming medications was significantly more (A: 3/44, O: 45/219,  $p<.05$ ). This suggests that olanzapine is used for patients that are more agitated, while aripiprazole is given to patients with a mixture of depressive (23%), suicidal (53%), and psychotic (59%) symptoms. The mean length of stay was not significantly different ( $p=ns$ ).

When comparing pre- and post-dose vital signs in an ANCOVA, neither medication was associated with more significant changes in vital signs ( $p=ns$ ). 0/5

State from June 2010 through April 2012. All hospitals in the New York State American College of Emergency Physicians Research Consortium were invited to participate. The study consisted of 3 stages: In Stage 1, research interns or investigators approached a convenience sample of adult English-speaking visitors in each ED waiting area to complete an anonymous 9-question survey on health care issues. Questions were extracted from a national survey (Kaiser Family Foundation/Gallup Poll, 2007). In Stage 2, visitors were offered an informational brochure concerning local and national political topics affecting health care. In Stage 3, visitors were asked to sign a letter addressed to their local legislator in support of American College of Emergency Physician (ACEP) endorsed legislation or topics. Finally, all subjects were asked to indicate whether they wanted their letter to be sent.

Results: Of the 6 hospitals that had initially agreed to participate, only 3 were able to obtain full approval. The main reason for non-participation was lack of administrative support. Of the 3 participating sites, a total of 1093 subjects were approached. In Stage 1, 715 subjects (65%) agreed to complete the survey. In Stage 2, 461 (42%) subjects were willing to review health care-related literature. In Stage 3, 359 (33%) were willing to sign a letter addressed to their local legislator and 348 (32%) subjects requested the letter to be sent.

Conclusion: Although administrative sensitivity to a political advocacy program may be perceived as a barrier, once in place, this program yielded significant participation from eligible visitors. Approximately one-third of visitors approached were willing to send a letter in support of ACEP endorsed legislation or policy to their legislator. EDs may be a reasonable location to implement a political advocacy program.

## 440 Frequent Users of the Emergency Department: Do They Make Visits That Can Be Addressed in a Primary Care Setting?

Liu SW, Nagurney JT, Chang Y, Smulowitz PB, Parry BA, Eatherson D, Yelibi C, Atlas SJ/Massachusetts General Hospital, Boston, MA; Beth Israel Deaconess Medical Center, Boston, MA

Study Objectives: In an effort to reduce health care costs, health care policy makers and health plan administrators have focused on emergency care use, especially frequent users of the emergency department (ED). While literature shows frequent users tend to be sicker and admitted more often, we sought to determine how frequent users differed from other groups in terms of their use of the ED for conditions that might be addressed in a primary care setting, as well as conditions that might have targeted interventions such as mental health, alcohol, and substance abuse. We hypothesized that frequent ED users were more likely to have visits for conditions potentially amenable to timely and effective primary care.

Methods: We retrospectively examined patient visits to an urban ED at an academic, tertiary care hospital. Frequent ED users were defined as having 5 or more visits between January 1 and December 31, 2010. Frequent users were compared to other patients in terms of demographics and frequency of hospital admission. To compare categories of diagnoses that might be addressed in a primary care setting, we used the Billings ED algorithm. Of the 4 categories of visits to the algorithm, we focused on visits categorized as non-emergent and those considered emergent, but primary care physician (PCP) treatable. We also examined visits associated with mental health, injuries, alcohol- and drug-related diagnoses. We calculated odds ratios for admission and visit category using generalized estimating equations that controlled for age, sex, ethnicity/race, insurance status, co-morbid conditions and ED shift at presentation.

Results: In our study, 2.1% of patients (1,360/65,149) were considered frequent users and accounted for 11.5% (10,172/91,198) of visits in 2010. Compared to non-frequent ED users, frequent users were older men insured by Medicare, Medicaid, and/or welfare. A higher percentage of visits by frequent users were admitted to the hospital (29.1% versus 26.0%,  $p < 0.0001$ ), and fewer were categorized as non-emergent (20.2% versus 22.3%,  $p < 0.01$ ) compared to non-frequent ED users. While there were no differences in emergent, PCP treatable visits, frequent ED users had higher mental health related (5.8% versus 3.9%,  $p < 0.0001$ ), drug related (0.7% versus 0.3%,  $p = 0.0004$ ), and alcohol-related visits (9.5% versus 1.6%,  $p < 0.0001$ ) but a lower percentage of injury-related visits (9.0% vs. 17.8%,  $p < 0.0001$ ).

After controlling for covariates, frequent ED users had lower odds of admission, [odds ratio (OR) 0.90 (95% CI 0.82-0.99)] and higher odds of the ED visit being related to mental health (OR 1.39, 95% CI 1.19-1.63), drug related (OR 2.14, 95% CI 1.49-3.07), and alcohol related visits (OR 4.92, 95% CI 4.21-5.75). There was no difference in the odds of a non-emergent ED visit.

Conclusion: Our study did not clearly demonstrate that frequent ED users were more likely to make non-emergent or emergent but potentially PCP treatable visits to

the ED. Our study did show that frequent ED users had higher odds of making mental health, drug-related, and alcohol-related visits. This may indicate that while a widespread, non-targeted approach to reducing ED visits by frequent users may not be productive. Policies targeting ED use by frequent users might instead consider focusing on management of mental health and substance abuse.

## 441 Non-Emergency Department Interventions to Reduce Emergency Department Utilization: A Systematic Review

Alqatari M, Morgan SR, Chang A, Pines JM/George Washington University, Washington, DC; Georgetown University, Washington, DC; University of Pennsylvania, Philadelphia, PA

Study Objectives: To conduct a systematic review of non-emergency department (ED) interventions (ie, insurance based, clinic based) aimed at reducing the use of EDs.

Methods: We reviewed any controlled or quasi-experimental study indexed in MEDLINE, Cochrane, OALster or Scopus from 1966-present that evaluated the effect of a non-ED intervention to reduce ED use. Studies were included if they had interventions administered outside of the ED, had a comparison group where ED use was an outcome, and were in English. Five categories of interventions were included: 1) education on appropriate medical care use for low-acuity conditions, 2) creation of additional capacity in non-ED settings (ie, expanded hours or same-day access), 3) managed care (ie, PCP capitation or gatekeeping), 4) out-of-hospital diversion, or 5) patient financial incentives (ie, copayments or deductibles). Two other interventions, telephone triage and case management were not included because recent systematic reviews have compiled the results of those topics. Full-text review was conducted with a specific focus on the reduction of ED use (if any), the impact on non-ED use, and any other objective health outcomes reported.

Results: 33 studies were included reporting data from 1986-2011.

Conclusion: There have been multiple studies exploring non-ED interventions in various populations across more than 2 decades. Reported interventions have been, in general, effective in reducing ED use with highly variable reduction rates. About half of the studies reported on non-ED use (ie, whether ED visits were replaced with non-ED visits), and less than half of those reported increased non-ED use with similarly wide variation. Only a minority of studies reported data on objective health outcomes, of those, 2 copayment studies showed significant effects on mortality in patients with lower copayments which were unexpected findings. Exploration of these interventions, along with others such as telephone triage and case management, may be helpful to groups wanting to reduce ED use in the context of cost reduction or payment reform.

Intervention	# studies	Effect on ED use	Range of ED change	Effect on non-ED use	Range of non-ED change	# studies reporting outcomes	Reported adverse effects
Education on healthcare use	6	4 decreased use; 2 no effect	26-500% decrease	4 reported data; 1 sig. reduced non-ED use	38% increase	2	None
Capacity increase in non-ED settings	5	3 decreased use; 2 no effect	13-52% decrease	4 reported data; all increased	6-102% increase	None	N/A
Pre-hospital diversion of low-acuity patients	2	1 decreased use; 1 no effect	16% decrease	2 reported data; all increased	15-78% increase	None	N/A
Managed Care (Capitation or Gatekeeping)	11	8 decreased use; 3 no effect	12-85% decrease	2 reported data; 2 not sig.	N/A	None	N/A
Patient financial incentives	9	5 decreased use; 3 no effect; 1 increase	8-66% decrease	4 reported data; 3 increased, 1 decreased	15-27% increase	2	1 higher death rate at \$1-\$5 copayments v. others; 1 lower mortality in copayment group v. control

## 442 Does Hospital Registration Accurately Record Race, Ethnicity and Language of Adult Patients Presenting to Emergency Departments? Implications for Health Disparity Research

Pringle K, Mohan S, Ranney M/Brown University/Rhode Island Hospital, Providence, RI; Alpert Medical School, Brown University, Providence, RI; Injury Prevention Ctr, Brown University/Rhode Island Hospital, Providence, RI

Study Objectives: Organizations like the US Dept of Health & Human Services, Centers for Disease Control & Prevention, and Institute of Medicine identified racial and ethnic health disparities as a priority issue. Aligning itself with these national organizations, the American College of Emergency Physicians challenged emergency