Among patients without diabetes (non-DM), there was a linear relationship between stroke severity (NIHSS) at presentation and glucose level; the higher the glucose level, the higher NIHSS (worse stroke severity); $p<0.0001$, R-square 25.7%. There was no significant relationship between blood glucose and stroke severity among diabetic patients; $p=0.298$, R-square 2.4%.

In non-DM patients, hyperglycemia was associated with death within 7 days and within 1 month; $p<0.0001$. In addition, there was a positive linear relationship between glucose level at presentation and modified Rankin score (mRS) at discharge among non-DM patients; the higher the glucose level, the higher the mRS (worse functional outcome); R-square 22.6%, $p<0.0001$.

Although hyperglycemia was associated with death within 7 days ($p=0.034$) and within 1 month ($p=0.022$) in diabetic patients, this association was not as strong as that seen among non-DM patients. However, among diabetic patients, there was no relationship between glucose level at presentation and mRS at discharge; R-square 5.3%, $p=0.119$.

In logistic regression model, after adjustment for stroke severity and age, glucose was an independent predictor of death within 7 days ($p<0.0001$), death within 1 month ($p<0.0001$) and poor functional outcome ($p<0.0001$) in non-DM patients. However, among diabetic patients, glucose was not an independent predictor of death within 7 days ($p=0.20$), death within 30 days ($p=0.20$) and functional outcome ($p=0.38$).

Conclusion: Hyperglycemia at presentation was associated with increased 7-day and 1-month mortality regardless of diabetic status in the univariate analyses. However, after adjustment by age and NIHSS, glucose was an independent predictor of death in non-DM patients only. Hyperglycemia at presentation is associated with worse stroke severity at presentation and worse functional outcome at discharge in non-diabetic patients only.

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### 233 Screening Electroencephalograms Are Feasible and Identify Potential Subclinical Seizure Activity in Emergency Department Patients

**Bastani A, Young E, Hunt-Walch R, Kayiali H/Troy Beaumont Hospital, Troy, MI; Cleveland Medical Devices, Cleveland, OH**

**Background:** Seizures account for 1 million emergency department (ED) visits annually. Due to the cost and expertise required to interpret and perform an electroencephalogram (EEG) the majority of hospitals cannot provide EDs with EEG coverage. Supported by the National Institute of Health initiative PA-04-006, a portable, wireless multi-channel EEG device, the Crystal Monitor, was developed to provide emergency physicians access to a screening EEG during the ED visit. The Crystal Monitor generates a 20-minute screening EEG utilizing an abbreviated montage to minimize set-up time. The EEG data is then digitized allowing a neurologist anywhere in the world with Internet access to review the EEG and provide an interpretation.

**Study Objective:** To evaluate the feasibility and utility of screening EEGs on patients presenting to the ED with potential seizure activity.

**Methods:** We conducted a prospective observational study on patients presenting to the Troy Beaumont ED between March 2004, and March 2009. Troy Beaumont is a 279-bed community hospital with a yearly ED census of 70,000 patients. Adult patients (age $\geq$ 18 years) with a preliminary diagnosis of syncope, potential partial-complex- or generalized seizure disorder, head injury with prolonged symptoms or acute undiagnosed altered mental status were eligible for enrollment. Those patients with a confirmed non-neurologic diagnosis for their presenting complaint were excluded. Eligible patients were then asked to complete an informed consent and had a screening EEG performed by a trained ED research assistant during the ED stay. The EEG data was then password protected and transmitted over the Internet for interpretation by the study neurologist. The emergency physicians were blinded to the result; therefore, neither specific care nor follow-up EEG was mandated by inclusion into the trial. Our primary outcome measures were EEG quality and EEG diagnosis as reported by the study neurologist. EEG Quality was evaluated using the following criteria: 1 = poor quality/interpretable, 2 = fair quality/acceptable, 3 = good quality/acceptable or 4 = excellent quality/acceptable. Descriptive statistics were utilized to analyze the data.

**Results:** A total of 227 patients were enrolled of which 47.6% were female with a mean age of 55.7 years. The indications for a screening EEG were: 1) a witnessed or suspected seizure disorder 68.2% (155/227), 2) syncope 22.9% (52/227), 3) altered mental status 7.5% (17/227), and 4) head injury with prolonged symptoms 1.3% (3/227). EEG quality was acceptable in 92.5% of patients (See Table #1). The EEG interpretation for all acceptable EEGs was: 1) normal in 64.9% (135/208), 2) identified generalized or focal slowing in 23.6% (49/208), and 3) identified epileptogenic foci in 11.5% (24/208) of patients.

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### 234 Comparison of Blunt Versus Sharp Spinal Needles Used in the Emergency Department in Rates of Post-Lumbar Puncture Headache

**Torbati S, Katz D, Siika P, Younessi S/Cedars-Sinai Medical Center, Los Angeles, CA**

**Study Objectives:** To compare rates of post-lumbar puncture headache (PLPHA) in patients undergoing a diagnostic lumbar puncture (LP) in the emergency department (ED) with blunt versus sharp spinal needles of the similar size.

**Methods:** This was a retrospective review of consecutive series of adult patients undergoing LP in the ED of a quaternary (Level I Trauma) medical center staffed with full time emergency physicians between April 2008 and February 2009. As part of a performance improvement project, physicians were encouraged to use blunt spinal needles and had both 22 g blunt (Guerin Mars®) and 22 g sharp (Quinke) needles available in their LP kits. Primary outcome was the incidence of PLPHA in patients having a lumbar puncture with either blunt versus sharp needles. Secondary outcome was LP procedural failure rates defined as the inability to obtain cerebrospinal fluid with the use of the first LP needle chosen by the emergency physician. PLPHA was defined as a new or different headache worsened by sitting and standing, improved when supine, which developed within 24–72 hours of the LP. Inpatient records were reviewed to determine the presence of PLPHA for admitted patients. Outpatient records and phone follow-up data obtained within 3 weeks of ED visit was used to determine presence of PLPHA for patients discharged home. Fisher test was used to detect differences between the groups.

**Results:** Three hundred seventeen consecutive adult patients, ranging from 18 to 95 years of age, had diagnostic LPs during the study period, 56.8% of whom were female and 43.2% male. The major indications for the LP were to evaluate for meningitis and/or subarachnoid hemorrhage (94%). Blunt LP needles were used to obtain CSF in 45.4% and sharp needles in 54.6% of the patients. Follow-up was available for 92% of the study group. PLPHA was reported in 4.48% of patients in whom a blunt LP needle was used compared with 11.32% of those with sharp needles ($p=0.017$). Procedural failure rate was 26.3% for the blunt needles versus 9.4% for the sharp needles ($p<0.0001$).

**Conclusion:** Use of blunt LP needles was associated with reduced rates of PLPHA and higher rates of procedural failure compared with sharp LP needles of similar size in an ED setting. The reduced rates of PLPHA with the blunt LP needle support existing literature in non-ED setting recommending its use whenever feasible.

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### 235 Can We Defer a Type and Screen for Pregnant Patients With Vaginal Bleeding Who “Know” Their Blood Type?


**Study Objective:** Pregnant women with vaginal bleeding often require Type and Screen testing for Rh positivity. We sought to determine if there is a subset of pregnant women presenting to the emergency department who reliably know their blood type and for whom a type and screen could safely be omitted/deferred in the emergency department (ED).

**Methods:** This was a prospective, convenience sample cohort study at 2 associated urban academic centers from Jan 2007 through Jun 2008 with an annual ED census of 150,000 patients. Pregnant patients who had a Type and Screen obtained as part of their ED evaluation and were capable of consent were enrolled by trained research associates working in the ED approximately 16 hours per day during

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**Table #1. Screening EEG Quality**

<table>
<thead>
<tr>
<th>EEG Quality</th>
<th># of Screening EEGS (227)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent Quality/Acceptable</td>
<td>50 (22.0%)</td>
</tr>
<tr>
<td>Good Quality/Acceptable</td>
<td>98 (43.2%)</td>
</tr>
<tr>
<td>Fair Quality/Acceptable</td>
<td>60 (26.4%)</td>
</tr>
<tr>
<td>Poor Quality/Uninterpretable</td>
<td>19 (8.3%)</td>
</tr>
</tbody>
</table>
variability exists between different physicians. Patients with abdominal pain comprised physician behavior. Most cases have some component of delayed decisionmaking, from 0.6% to 8.8%. The single most important patient-related factor was a chief volume, the individual rate of prolonged LOS between different attendings ranged greater than 2 hours were found in 14% of cases. When normalized for patient completed evaluation (27%), serial workup (32%). Only 34 (20%: 95% CI 15–27) than 360 minutes to be discharged from the emergency department. The door-to-doc decisions that could have been made earlier.

Study Objective: The past decade has seen increased emphasis placed upon process management and many emergency departments have begun to focus on process times in an effort to improve patient satisfaction. More recently, as fewer process management and many emergency departments have begun to focus on process times in an effort to improve patient satisfaction. More recently, as fewer process management and many emergency departments have begun to focus on process times in an effort to improve patient satisfaction. More recently, as fewer process management and many emergency departments have begun to focus on process times in effort to improve patient satisfaction.

Methods: Between June 1, 2009 and September 27, 2009, we examined a consecutive, prospective cohort of pediatric patients at a suburban academic, level 1 pediatric trauma center. Time-stamped electronic medical records of all discharged patients with a length of stay (LOS) exceeding 6 hours were manually reviewed. LOS was defined as the time between arrival and discharge from the department. Admitted patients were excluded. Demographic data including diagnosis, physician provider, process intervals, and diagnostic studies were evaluated. Predetermined criteria defining physician inefficiency included: time between decisions or clinical events (90 minutes), delayed disposition (60 minutes after all clinical data or treatment completed), serial workup (secondary studies ordered after first round completed) decisions that could have been made earlier.

Results: Average discharge LOS for 7199 seen during the study period was 163 minutes. One hundred sixty-seven patients (2.3%: 95% CI 2.0–2.7%) required more than 360 minutes to be discharged from the emergency department. The door-to-doc interval was greater than 60 minutes in 56 (36%; 95% CI 29–44%) cases, while arrival to triage was greater than 30 minutes in only 11 (6%; 95% CI 4–12%) cases. Inefficiencies in care provided by the ED attendings contributed to prolonged patient stays in 110 (66%; 95% CI 52–67%) cases: delayed in decisionmaking (15%), decisions that could have been made earlier (22%), delayed disposition after completed evaluation (27%), serial workup (32%). Only 34 (20%; 95% CI 15–27) of prolonged LOS could be attributed to legitimate operation. Consultant delays of greater than 2 hours were found in 14% of cases. When normalized for patient volume, the individual rate of prolonged LOS between different attendings ranged from 0.6% to 8.8%. The single most important patient-related factor was a chief complaint of abdominal pain in 59 (35%; 95% CI 26–45%).

Conclusion: Excessive department throughput times can be objectively linked to physician behavior. Most cases have some component of delayed decisionmaking, serial evaluation, or inefficient response to clinical information. Significantly variability exists between different physicians. Patients with abdominal pain comprise a disproportionate number of prolonged stays.

236 An Analysis of Prolonged Length of Stay in a Pediatric Emergency Department

Method: Between June 1, 2009 and September 27, 2009, we examined a consecutive, prospective cohort of pediatric patients at a suburban academic, level 1 pediatric trauma center. Time-stamped electronic medical records of all discharged patients with a length of stay (LOS) exceeding 6 hours were manually reviewed. LOS was defined as the time between arrival and discharge from the department. Admitted patients were excluded. Demographic data including diagnosis, physician provider, process intervals, and diagnostic studies were evaluated. Predetermined criteria defining physician inefficiency included: time between decisions or clinical events (90 minutes), delayed disposition (60 minutes after all clinical data or treatment completed), serial workup (secondary studies ordered after first round completed) decisions that could have been made earlier.

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Conclusion: Excessive department throughput times can be objectively linked to physician behavior. Most cases have some component of delayed decisionmaking, serial evaluation, or inefficient response to clinical information. Significantly variability exists between different physicians. Patients with abdominal pain comprise a disproportionate number of prolonged stays.

237 Supplemented Triage and Rapid Treatment in the Emergency Department

Method: The present study was designed to assess the effect of a single intervention, namely a physician-led screening program (START) on standard performance measures of an urban, academic tertiary care emergency department. The START program complemented a triage nurse with an ED attending physician who initiated a diagnostic workup within one hour of patient arrival and selectively triaged patients to the most appropriate areas of the ED. These performance measures were quantified using standard operational metrics.

Methods: This before-and-after cohort study compared performance measures over two 3-month periods (September–November 2007 and September–November 2008). The 3-month identical blocks were chosen to avoid any seasonal effect. Data from an electronic patient tracking system (EDIS) were queried over 12982 patients in the pre-intervention period, and 14254 patients in the post-intervention period. The primary outcomes included: 1) the overall patient length of stay, 2) the length of stay for discharged patients (ie, not admitted to inpatient service), and 3) the percentage of patients who left without complete assessment (LWCA). Wilcoxon rank sum tests and Chi-squared tests were used to compare the differences between the two groups.

Results: In the post-intervention period, median overall ED LOS was decreased by 28 minutes (8%, 360 minutes pre-intervention, 332 minutes post-intervention, p < 0.0001). Median length of stay for patients discharged from the ED decreased by 23 minutes (7%, 318 minutes pre-intervention, 295 minutes post intervention, p < 0.0001). LWCA was decreased by 1.7% (4.1% pre-intervention, 2.4 % post intervention, p < 0.001).

Conclusions: In this before-and-after study, a physician-led screening program was associated with a 28-minute decrease in overall ED length of stay, despite an increase in ED patient volume. Over the period studied, this equates to an increased ED bed capacity of 73 bed-hours per day. In addition, ED LOS for discharged patients was decreased by 7%. Finally, the proportion of patients who LWCA was reduced by 1.7 %, or almost half. Since there were no other significant and identifiable operation changes in the ED between these two intake periods, it appears that this START intervention effected these improvements.