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Development of a Model to Compare Emergency Chemical Decontamination Methods

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cost or lack of trained personnel (35%). 72% of non-users indicated they had no future plans for adoption.

**Conclusion:** Although considered standard of care by the scientific community, therapeutic hypothermia in cardiac arrest patients remains rarely utilized by most EDs throughout Arizona. Barriers to use include inadequate education regarding the benefits of hypothermia, perceived cost, and lack of training in implementation.

## 10 EMS Patients Receive More Rapid Care than Ambulatory Patients for Acute Stroke

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**Background:** It has been demonstrated that the majority of pre-hospital delay occurs from the time of onset of acute stroke (CVA) to the time of the patient's actual decision to seek care. What is less clear is the role of the emergency department (ED) care providers on the pace of the patient's care in the setting of CVA.

**Objective:** To study the effect of EMS transport on the pace of care of providers in the ED.

**Methods:** Retrospective chart review of four months of patients with a final ED diagnosis of CVA. Demographic data as well as time to order and time to administration for CT head, aspirin, and neurology consult were examined and compared for patients who presented via EMS vs. those who walked into the ED. Comparisons of the medians (in minutes) were done for each variable examined. We also calculated the odds for CT done in less than one and two hours from arrival.

**Results:** Forty-three patients received the final diagnosis of CVA during the four-month period. EMS transported 19 of these (44%). EMS patients had a CT ordered more rapidly (52 vs. 108 minutes), and a neurologist called more quickly (90 vs. 469 minutes) than the ambulatory patient. The EMS patients had an OR of receiving a CT of the head within one hour of 3.09 (95%CI: 0.64,15) and an OR = 3.33 (95%CI: 0.86, 13) within two hours. None of the differences were statistically significant for either the ordering of the therapies or their administration.

**Conclusion:** In this facility, it appeared that there was a trend to treat patients with CVA who presented via EMS more rapidly than those who walked in. It is unclear the effect this had on outcome.

## 11 Incidence of Hypokalemia in Patients Presenting to the Emergency Department with Diabetic Ketoacidosis

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**Background:** Hypokalemia is reported to occur in approximately three to four percent of patients with DKA. To prevent complications of severe hypokalemia, the American Diabetes Association (ADA) treatment guidelines recommend ensuring that serum potassium levels are > 3.3 mEq/L prior to initiation of insulin in the treatment of DKA.

**Objective:** To assess the incidence of hypokalemia in patients presenting to the ED with hyperglycemia with or without DKA.

**Methods:** This was a multicenter retrospective study at three urban academic EDs with a combined annual adult census of 150,000. Charts of patients who presented to the ED between January and December 2005 with hyperglycemia (defined as serum glucose > 200 mg/dL) or DKA (defined in accordance with ADA guidelines as serum glucose > 250 mg/dL, serum bicarbonate < 18 mEq/L or anion gap > 15, and evidence of ketonemia or ketonuria) were reviewed. Initial lab values on presentation were assessed for the incidence of hypokalemia.

**Results:** 800 patients (461 with DKA) were diagnosed with hyperglycemia. The mean potassium level was 4.7 mEq/L (range 3.3 to 8.1, SD +/- 0.8). For those patients diagnosed with DKA, the mean potassium level was 4.9 mEq/L (range 3.3 to 7.5, SD +/- 0.8). Only two cases of serum potassium < 3.5 mEq/L (both 3.3) were found in our DKA patients (incidence of 0.4 percent).

**Discussion:** Our results suggest that the incidence of hypokalemia in ED patients with DKA may be far less than three to four percent. As the demographics of DKA are changing (e.g. increasing numbers of older patients, patients with renal disease, and patients with congestive heart failure), our ability to depend on IV fluids alone as the initial therapy in DKA may be diminishing. Today's DKA patients may be less likely to tolerate large fluid loads and are potentially more prone to hyperkalemia. The benefits of early insulin administration may outweigh the risk of causing severe hypokalemia.

**Conclusion:** The incidence of hypokalemia among hyperglycemic patients presenting to the ED with or without DKA appears to be less than prior estimates. Further research is needed to better determine the risks and benefits of administering insulin before obtaining serum potassium values.

## 12 Development of a Model to Compare Emergency Chemical Decontamination Methods

Richard N. Bradley, MD; Ester N. Huff.

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**Background:** Many first responders plan to decontaminate people contaminated by hazardous substances by drenching the victims with water before removing their contaminated

clothing. We examined the possibility that this approach may actually increase skin contamination.

**Methods:** We experimented with various preparations of a non-toxic contamination simulant, Glow in the Dark Pigment (Risk Reactor, Huntington Beach, Calif.), until we found a reproducible model that reliably stained the surface of a hospital scrub shirt but did not cause significant soak-through and skin contamination. After developing the model, we applied the pigment to the subjects following our model. We confirmed the amount of skin contamination with a UV light. We then decontaminated subjects using a shower until their clothing was thoroughly saturated and evaluated the amount of contamination left on the clothing and on the skin using UV light.

**Results:** The optimal contamination model was one-half teaspoon of pigment and 15 milliliters of tap water. We had the most success when we applied the simulated contaminant by fingertip to the victim's shirt. We used this model with four different subjects and decontaminated them in a cold water shower, while fully clothed, until they were completely wet and dripping. In every case, pigment was left on the clothing even after decontamination. Additionally, while there was no pigment detectable on the skin before decontamination, we found significant amounts of pigment on the skin after decontamination. Showering the person while clothed spread the contaminants to not only the skin under the shirt but also to the lower extremities.

**Conclusion:** It may be unsafe to drench asymptomatic people who have been contaminated with a hazardous substance before removing their clothes. We have developed a model that investigators may use for further studies.

### 13 Does Acculturation Influence End-of-Life Treatment Preferences

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**Background:** Prior research has evaluated the willingness to accept or refuse life-sustaining therapy but have not included Spanish-speaking populations. These decisions in a clinical setting are often part of the advance directive discussion bringing the importance into the emergency department (ED). Health care disparities exist in this population, and best approaches to discussing end of life preferences are not clear.

**Objectives:** In this study we sought to identify healthcare decision-making patterns and the effect of acculturation in Latino patients.

**Methods:** This observational study used the WALT (Willingness to Accept Life Sustaining Treatment) survey to interview subjects at four outpatient clinics (geriatrics,

cardiology, HIV and oncology) that served patients with chronic, incurable illnesses. Subjects were asked hypothetical questions regarding their preferences for treatment selected against outcome and burden. The survey was administered in Spanish. This study was IRB approved.

**Results:** Two hundred and forty Latino subjects were surveyed, but three were excluded due to a lack of a medical diagnosis. The mean age of the subjects was 58. Seventy-seven percent of subjects were primarily Spanish speaking. Subjects spent a mean time in the USA of approximately 23 years. When measuring time in the US and country of origin there was no difference between groups in the decision making process.

**Conclusions:** Latino patients regardless of country of origin or time in the US were similar in acceptance or decline of life sustaining therapy. Future work should be done with focus groups to identify relevant cultural factors so that physicians can provide a culturally sensitive discussion of advance care plans. Limitations: There is always the potential for referral bias in that the patients willing to participate in the survey may have differed from the non-responders

### 14 The Epidemiology of Search and Rescue Incidents in the Grand Canyon National Park: Are Preventive Measures Making a Difference?

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**Introduction:** Grand Canyon National Park (GCNP) has more than four million visitors each year. Each year the park's Search and Rescue (SAR) office responds to more than 400 calls for help. In 1998 in response to this large number of incidents, the park employed a Preventive Search and Rescue (PSAR) program with the aim of decreasing the number of preventable incidents within its boundaries.

**Objectives:** The goals of this project are to create a comprehensive data base of GCNP SAR incidents that the park may continue to use and to quantify the effect that the preventive program has had on the number and types of these incidents.

**Methods:** We performed a retrospective review of GCNP SAR incident reports and corresponding emergency medical service reports from 1988 to 2005. For SAR incidents with multiple patients with different injury types, each patient was recorded as a discrete observation. For each observation 23 variables were recorded, including patient age and sex, type and geographical location of incident, mechanism and type of injury or illness, and extent and cost of SAR involvement. The data was compared using a tow-sample T-test.

**Results:** The data set includes 6843 SAR incidents ranging from 262 to 474 incidents per year. Visitation during this time ranged from 3.5 million to 4.9 million people per year.