



The Relative Importance of Vital Signs in Campus-Based Emergency Services

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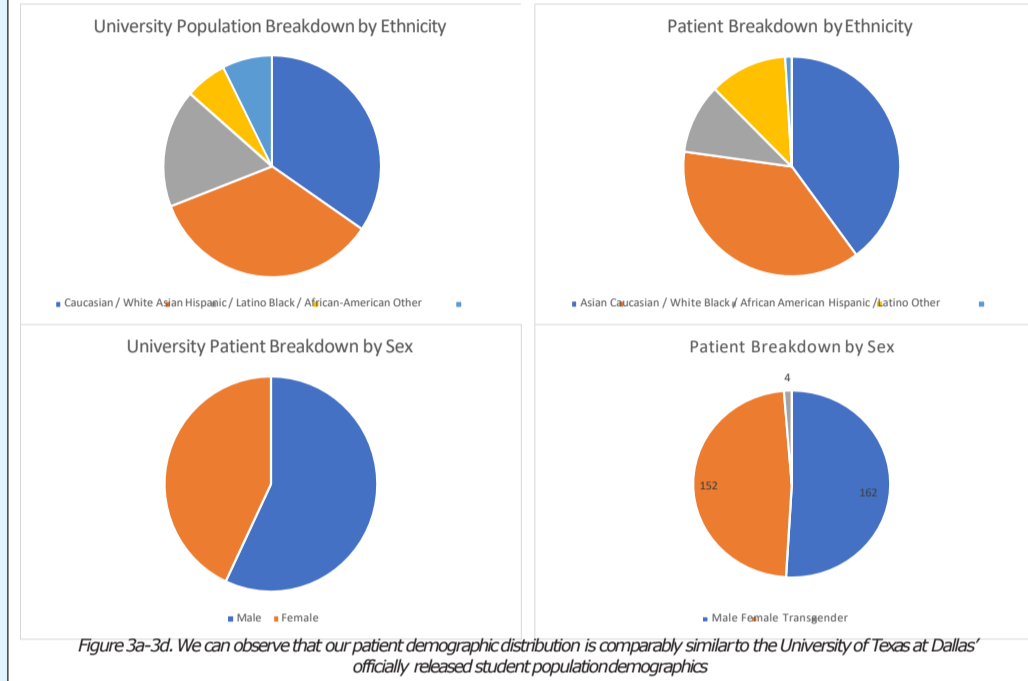
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ABSTRACT

One of the most important decisions a first-responder agency operating under Basic Life Support (BLS) jurisdiction can make is determining whether a medical emergency can be managed at the BLS level, or if additional resources must be requested in the form of Advanced Life Support (ALS) to facilitate transport to a hospital. This is particularly important in collegiate agencies, as not all may have the means or equipment to transport ALS patients. Studies show that ALS is beneficial in certain scenarios that BLS providers cannot treat effectively such as epileptic episodes or respiratory distress¹. This decision on whether to upgrade to ALS is based on several factors: patient demographics, the acuity and severity of the medical complaint, and provider-obtained metrics of health. In this study, we examined the vital signs of patients (n=357) at the University of Texas at Dallas, obtained by providers from the University Emergency Medical Response (UEMR) agency, and compared them to the established agency and local standards of upgrading to ALS. Compared to the national refusal rate of 5.1%, the refusal rate of UEMR is approximately seven times higher, which may be explained by the unique patient demographics found on college campuses. Through mono- and bi-factor analysis, we determined that there is a negligible correlation between the presence of abnormal vital(s) and ALS upgrade for a collegiate Emergency Medical Service (EMS) organization. Per UEMR Protocols, only 42% of patients presenting with an abnormal heart rate with normal rhythm, and 38% presenting with abnormal blood pressure, were upgraded to ALS, while only a slightly fewer number (~30%) were upgraded without abnormal vital indication. Furthermore, our research showed that out of all medical calls a provider did determine that ALS upgrade was required, only 31% of those patients presented with abnormal vitals, compared to about 24% of patients that presented with similarly abnormal vitals but were determined not to require an ALS upgrade. Due to the unique demographics and socioeconomic factors prevalent in a college patient population, this discrepancy, in contrast to traditional rural and urban EMS programs, indicates the changing role of vital signs as a diagnostic tool, rather than an inflexible reference point. Additionally, an internal poll of the UEMR members found that only 12% of providers have more than three years of experience and 21% having significant patient care experience outside of the organization itself. Inexperience tends to manifest in increased reliance on established protocols rather than a more holistic overview of the patient. This highlights the need for collegiate EMS organizations that have not yet reached internal ALS-transport capacity, to further examine vital sign assessments, and their inherent limitations against a general population, which is necessary to create and enforce effective healthcare protocol prior to and in the transference of medical care.

METHODS



Abnormal vitals are defined by local and agency protocols

Vital Type	Abnormal Ranges
Systolic/Diastolic Blood Pressure	<100 or >150 mmHg / >100 mmHg
Blood Oxygen Level	<94%
Resting Heart Rate	<50 or >110BPM
Resting Respiratory Rate	<12 or >24 BrPM
Blood Glucose Level	<70 mg/dL or >300mg/dL
Body Temperature	>101 °F

- n = 357
- All PCR data was collected from calls occurring from January 2019 - November 2019
- All vital signs were obtained by state- and nationally-certified EMS providers
- A majority of calls featured two or more providers
- A majority of calls featured vital signs being recorded 2-3 times; the average of these were taken and used

DISCUSSION/CONCLUSION

Different vital signs can be more or less indicative of upgrade

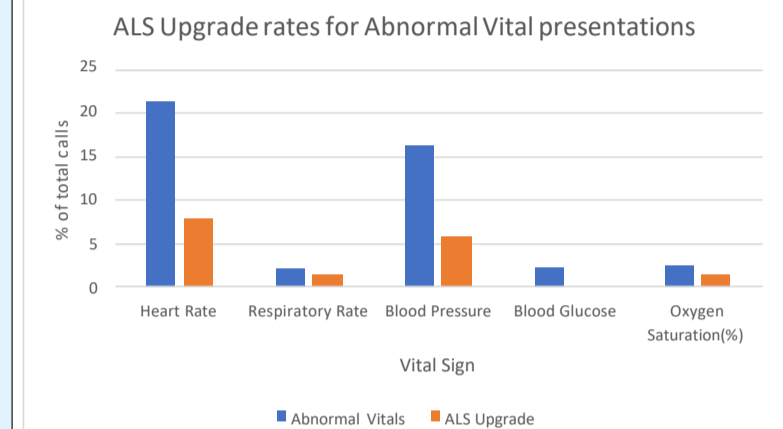


Figure 6. Out of the five commonly collected vital signs, we can see differences in both their incidence rates of abnormality that correspond to health trends prevalent through the greater United States.

THE TAKEAWAY

Vital signs can be and are a contributing factor to ALS upgrade in collegiate EMS BUT Other factors may play a more significant role in college-aged patient dispositions

INTRODUCTION

Collegiate EMS organizations differ in their focus and scope

- Younger patient populations (18-25 years)
- Different primary causes of death
 - Leading cause of death in EMS is cardiovascular-related events (MI, stroke)
 - Such events in college-aged populations are much rarer and correlate with pre-existing risk conditions (congenital, diabetes, etc.)²
- Different explanations for complaints
 - In older patients and smokers, respiratory distress usually manifests as chronic COPD exacerbation³
 - Whereas in younger patients, respiratory distress usually manifests as acute asthma⁴
- Different final patient dispositions
 - Within our agency, we observe that our refusal rate for patients is nearly 7x the national average (Figure 1)

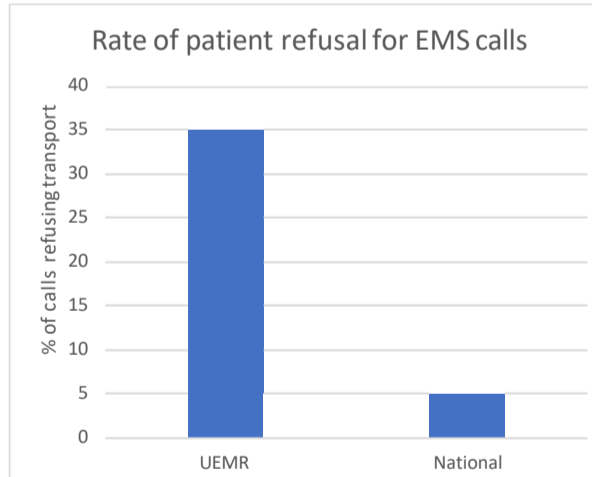


Figure 1. We hope to see this trend across other collegiate EMS organizations as well

Vital signs are an important tool in determining ALS upgrade

- ALS upgrade depends on several factors
 - Patient demographics and wishes
 - Medical history related to complaint
 - Acuity and severity of complaint
 - Provider-obtained metrics of health
- Vital signs are quick and quantitative
 - However, vital signs are not always deterministic, especially with less-experienced providers
- Many agencies have upgrade requirements
 - Typical requirements may not always correspond appropriately with a college-aged population (Figure 2)

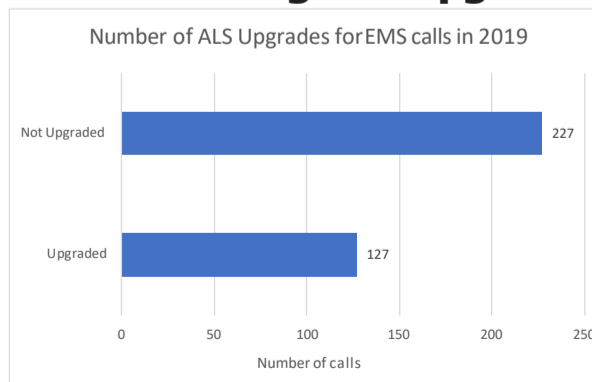


Figure 2. We can observe the 2:1 ratio of non-upgrade:upgrade for calls in our agency

RESULTS/DISCUSSION

There is a weak-to-nonexistent increase in ALS upgrade for patients with abnormal vital signs

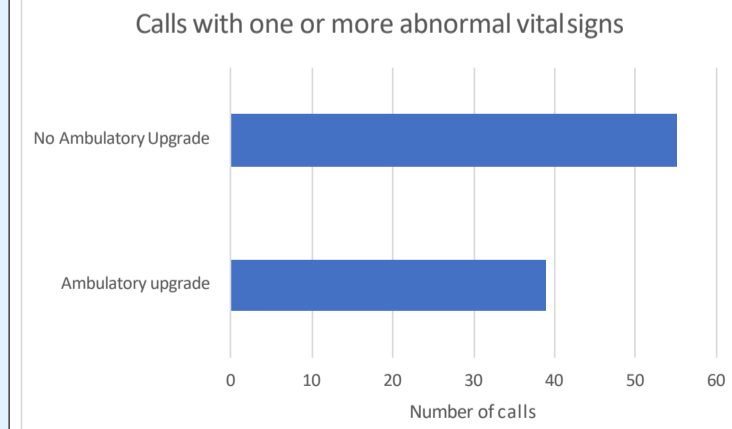


Figure 4. Surprisingly, the majority of calls that presented with abnormal vital signs were not upgraded to ALS, indicating provider discretion contrary to indicated metrics. This discretion has been observed in several studies where the more experienced a provider is, the less likely that they will be influenced by quantitative metrics such as vital signs and protocols over their own perception and experiences.⁵

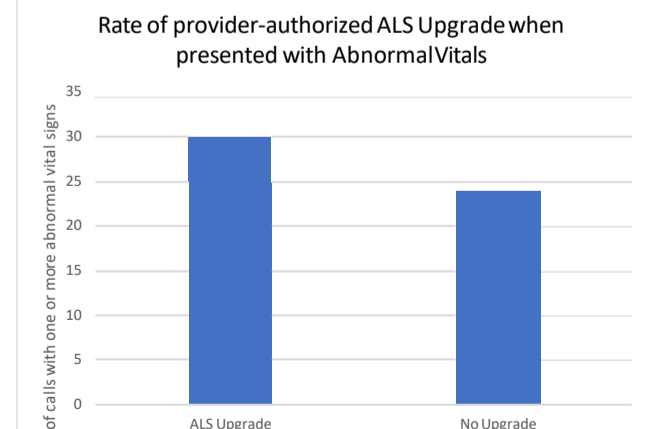


Figure 5. While we can observe a slight increase in ALS upgrade rates when presented with abnormal vital signs, the increase does not seem to be a significantly attributed to the vital signs themselves; rather, to the call scenarios that generate them

Contrary to our hypothesis that abnormal vital signs would be strong predictors of upgrades to ALS, it would instead appear that they are weak predictors of upgrade necessity for our patient population

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Our Goal

To determine the correlation between abnormal vital signs and ALS upgrade AND Which vital signs are most predictive for necessitating additional ALS resources