

## Background

- Among patients transported to the Emergency Department (ED) by EMS for syncope, the majority (>80%) do not suffer any serious adverse events (SAE) within 30-days, and >50% of patients will be diagnosed with vasovagal syncope, indicating over-utilization of EMS resources

## Objectives

- We sought to identify high-risk factors associated with SAE within 30-days of ED disposition

## Methods

- Study Design:** A prospective cohort study at 3 cities (5 EDs) from Feb 2012 to Feb 2013
- Inclusion criteria:** Adult (≥16 years) syncope patients transported by EMS to the ED
- Exclusion criteria:** Patients with prolonged loss of consciousness (LOC), change in mental status from baseline, LOC due to obvious seizure, alcohol/illicit drug use, and patients not transported to the ED by EMS
- Data collected:** Patient demographics, clinical variables obtained by EMS, EMS interventions, concerning symptoms, EMS ECG variables, and 30-day SAE as defined in the figure below

### Cardiac Outcomes

- Arrhythmias
- Myocardial Infarction
- Aortic Dissection

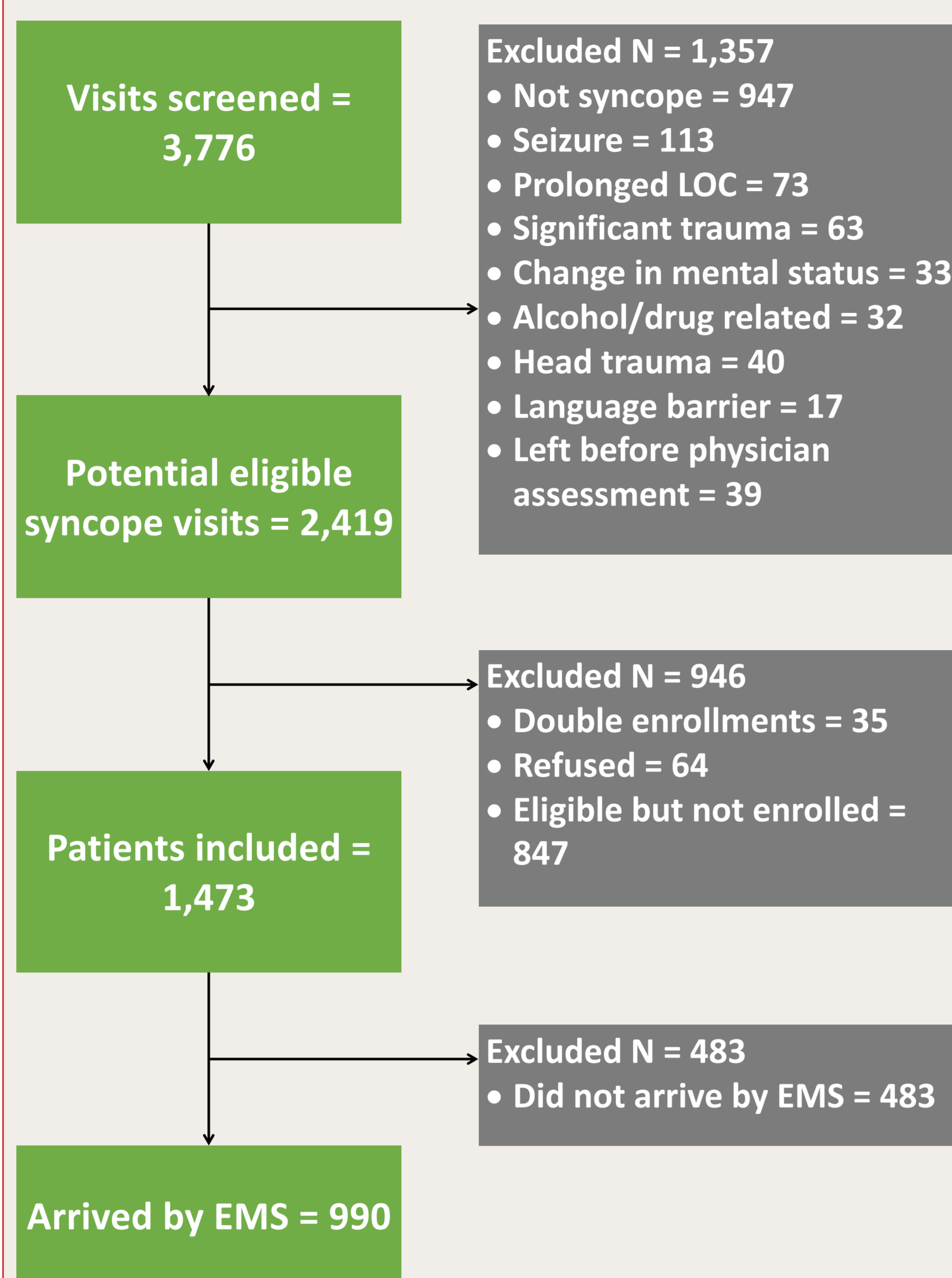
### Non-Cardiac Outcomes

- Pulmonary Embolism
- Severe Pulmonary Artery Hypertension
- Subarachnoid Hemorrhage
- Significant Hemorrhage

Death

- Analysis:** Univariate analysis was used to determine the strength of association between clinical variables and SAE within 30-days

## Patient Visit Flow



## Patient Characteristics

### Demographics

Age – Mean (SD), years	58.9 (23.1)
Age Range	16-101
Female (%)	543 (54.9)

### Medical History

Cardiac history	
Coronary artery disease	139 (14.0)
Valvular heart disease	63 (6.4)
Atrial fibrillation/flutter	31 (3.1)
Pacemaker	28 (2.8)
Cardiomyopathy	8 (0.8)
Ventricular arrhythmia	7 (0.7)
Hypertension	375 (37.9)
Syncope	120 (12.1)
Diabetes	113 (11.4)
Cerebrovascular disease	89 (9.0)
Seizure disorder	18 (18.2)

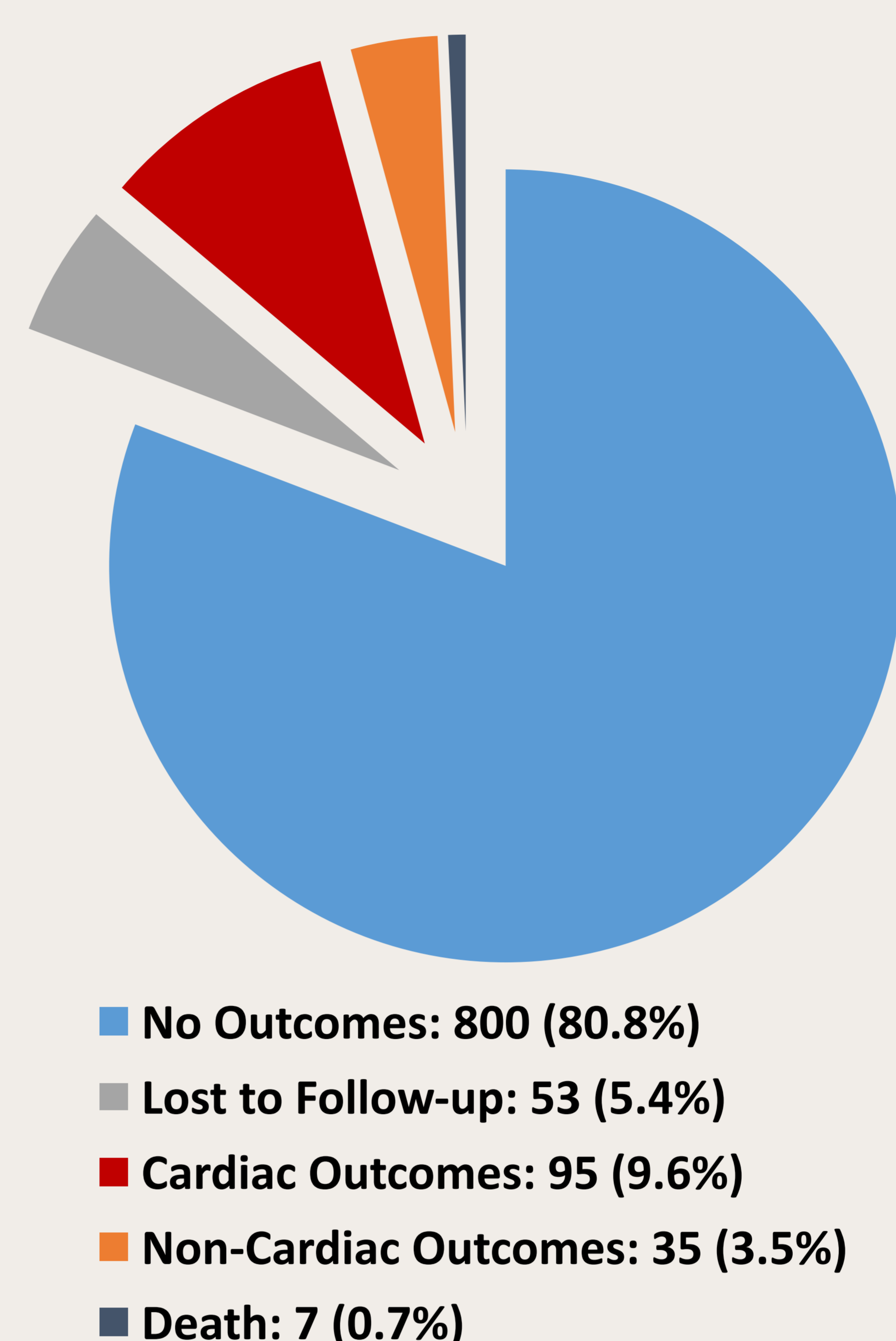
### Final Diagnosis in ED

Vasovagal syncope	505 (50.9)
Unknown cause	280 (28.3)
Cardiac syncope	114 (11.5)
Orthostatic hypotension	91 (9.2)

### Disposition

Hospitalized	166 (16.8)
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## 30 Day Outcomes



## Univariate Analysis

Clinical Variables	No SAE [N=800]	SAE [N=137]	p-value
<b>Continuous Variables:</b>			
Age (years)	57.9 (23.2)	70.9 (17.3)	0.0001*
First EMS Blood Pressure	121.6 (25.5)	126.1 (32.1)	0.0827
First EMS Heart Rate	79.4 (18.5)	81.4 (28.4)	0.4323
First EMS Oxygen Saturation	97.4 (2.8)	95.8 (6.6)	0.0068*
First EMS Respiratory Rate	17.2 (2.9)	18.0 (3.8)	0.0156*
<b>Categorical Variables:</b>			
Concerning Symptoms <sup>†</sup>	407	81	0.0741
Cardiac History <sup>‡</sup>	177	75	0.0001*
EMS Interventions <sup>§</sup>	92	26	0.0148*
EMS ECG Abnormalities <sup>  </sup>	192	82	0.0001*
<b>Categorization of Continuous Variables:</b>			
Age > 75 years old	251	70	0.0001*
<b>Abnormal Vital Signs by EMS</b>			
Any Systolic BP <sup>¶</sup> <90 mmHg or >180 mmHg	51	31	0.0002*
First Heart Rate <50 BPM or >110 BPM	72	34	0.0001*
First Oxygen Saturation <90%	13	7	0.0097*
First Respiratory Rate >22 per min	36	16	0.0008*
First Temperature <35 C or >38 C	27	3	0.9973

Of 990 patients, 800 did not have a SAE, 137 had a SAE, 53 were lost to follow-up. \*p<0.05 †Concerning symptoms include any cardiac, respiratory, neurological, gastrointestinal, musculoskeletal, or psychiatric symptoms that require further investigation or management. ‡Cardiac History includes any valvular heart disease, cardiomyopathy, congestive heart failure, coronary artery disease, ventricular arrhythmia, pacemaker, atrial fibrillation/flutter, non-sinus heart rhythm. §EMS interventions include any cardiac interventions/medications, non-cardiac interventions, medications for symptomatic treatment. ||EMS ECG Abnormalities include any arrhythmias, ischemic changes, abnormal waveforms, pacing. ¶BP = Blood Pressure

## Results & Conclusions

- We present the results of our study to identify high-risk factors associated with 30-day SAE
- Only 14.6% suffered an SAE within 30-days. 3.4% pre-hospital, 6.2% in ED, 5.0% after ED
- We identified the following predictor variables as high-risk factors for SAE within 30 days of EMS evaluation



## Future Directions

- Predictor variables that are reliable and strongly associated with SAE will be selected for multivariable analysis by logistic regression
- After multivariable analysis, we will use the results to derive a clinical decision tool to help EMS divert very low-risk syncope patients away from the ED to alternate pathways of care (e.g their GP or rapid access clinics) thus reducing both healthcare costs as well as EMS and ED burden
- We plan to validate this clinical decision tool across Canada

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