

# Descriptive Analysis of POCUS Cardiac Examinations in the Emergency Department

Erin Townsend DO, Aneesa Ali DO, Jillian Leibowitz DO, Lauren Lynch MD, Leandro Couto, Rafael Fernandes MS, Tyanna Middleton, Adam Singer MD, Daniel Singer MD



## Background

- Emergency clinicians are uniquely trained to perform Point-of-Care Ultrasound (POCUS) as part of rapid bedside evaluation during initial presentation in the Emergency Department (ED) (1)
- POCUS cardiac examination in the ED are frequently performed in the evaluation of undifferentiated patients presenting with symptoms such as chest pain, shortness of breath, or hypotension where rapid diagnostic guidance is essential. (2)
- Inpatient echocardiography is often performed for various indications such as valvular disease, volume assessment, unexplained hypoxia, or ongoing hemodynamic instability. These may or may not overlap with initial ED presentations. (3)
- There is limited data describing how POCUS exams performed in the ED influence the subsequent use, timing or findings of formal echocardiography during inpatient workup. This project aims to address that gap.

## Objectives

- Identify patient characteristics and demographics most often associated with the use of ED cardiac POCUS
- Describe the demographic patterns among patients undergoing ED cardiac POCUS
- Determine the most common clinical indication for cardiac POCUS use in the ED
- Assess prior echocardiogram access and its impact on ED decision making and utilization of cardiac POCUS in the ED
- Evaluate frequency of formal echocardiography utilization among admitted patients who underwent cardiac POCUS in the ED
- Examine admission/disposition distribution of patients who underwent cardiac POCUS in the ED

## Methods

### Study Design

- Retrospective Electronic Medical Record review
- Qpath E review of ED POCUS exams

### Patients and Setting

- ED Volume: approx. 130,000 adult and pediatric visits per year
- Patients who presented between January 1<sup>st</sup>, 2022 to December 31<sup>st</sup>, 2022 with POCUS Cardiac exam performed during ED visit

### Data Source and Collections

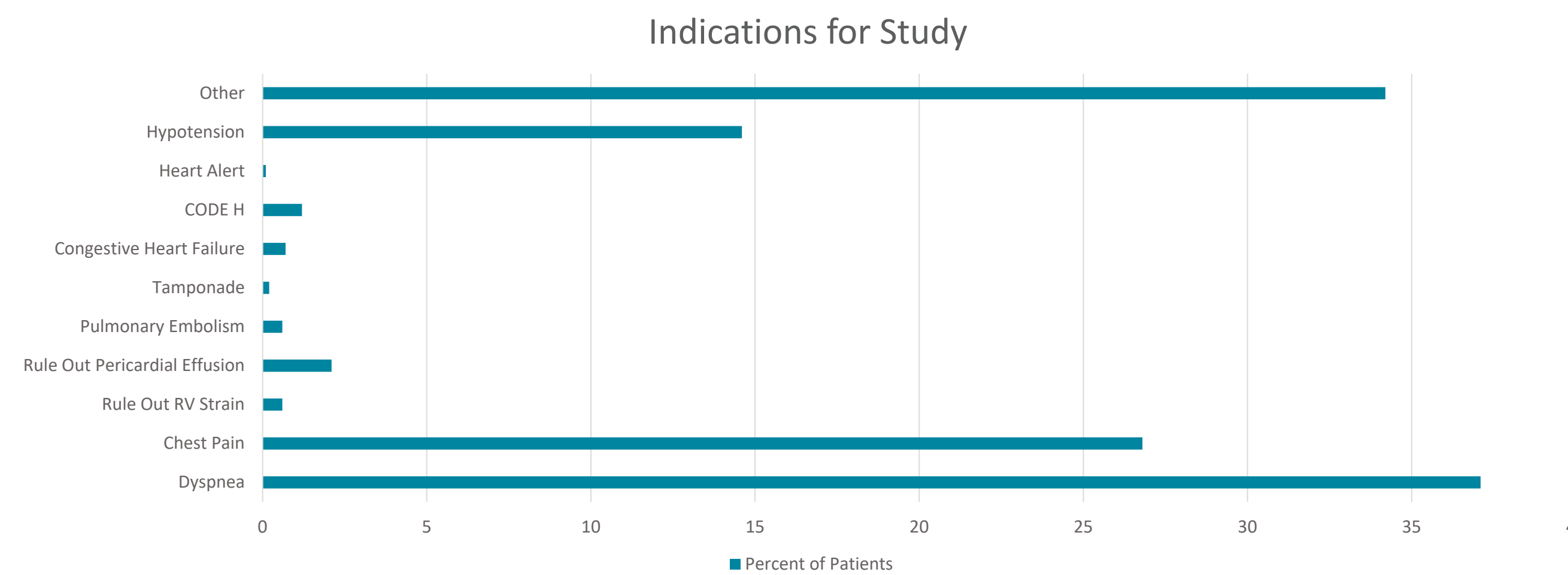
- 1362 patients enrolled in study
- 892 uploaded into Research Electronic Data Capture (REDCap)
- Discrepancy due to duplicates and incomplete data entry
- Patient Demographics, Comorbidities, Indication for ED POCUS, Additional ED POCUS, Disposition, Complete Echo & Cardiologist

## Data Analysis

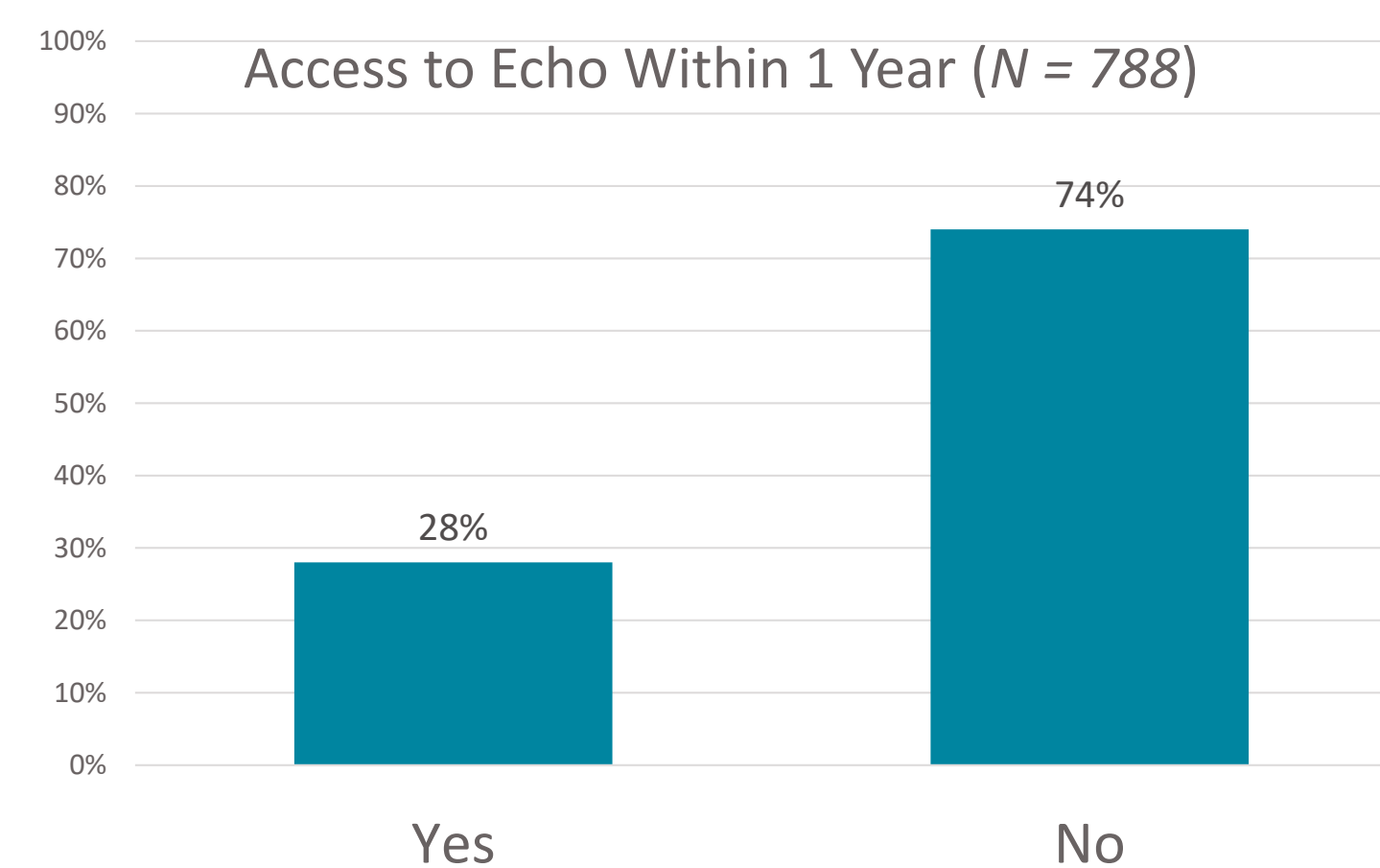
### Demographics (N = 892):

- Age & Gender:** Male (449, 50.3%), Female (443, 49.7%) with mean age of 63.57 and a median of 68
- Ethnicity:** Hispanic/Latino (113, 12.7%), Not Hispanic/Latino (750, 84.2%), Unknown/Not Reported (28, 3.1%)
- Race:** Caucasian (712, 79.8%), Unknown / Not Reported (90, 10.1%), Black or African American (59, 6.6%), Asian (22, 2.5%), More Than One Race (5, 0.6%), Native Hawaiian or Other Pacific Islander (3, 0.4%), American Indian/Alaska Native (1, 0.1%)
- Smoking and COPD History:** Current Smoker (91, 10.3%), Former Smoker (267, 30.3%), Never Smoker (454, 51.5%), Unknown (70, 7.9%), COPD (113, 12.7%)

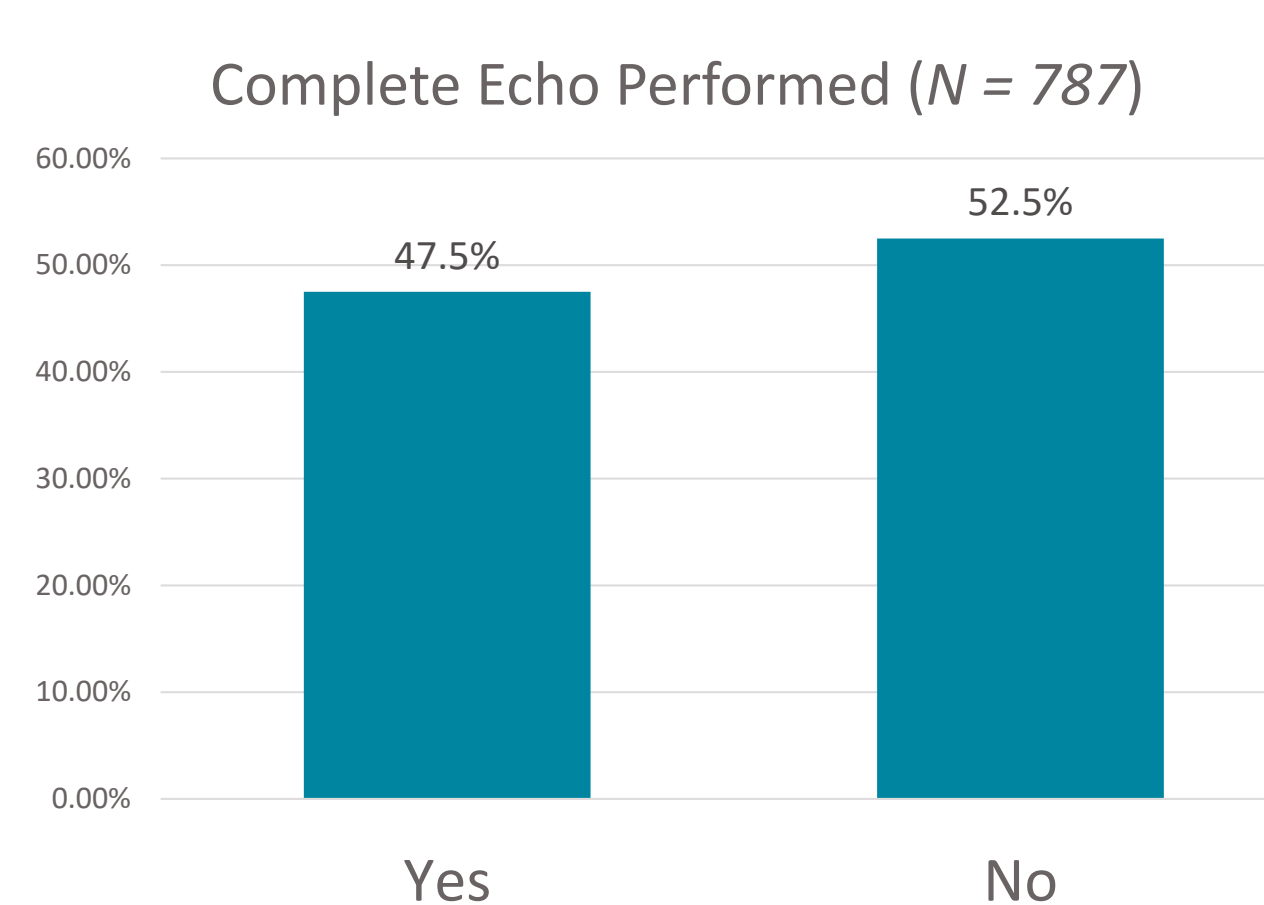
**Figure 1.** Indications for performing ED POCUS Cardiac exam as listed in Qpath E



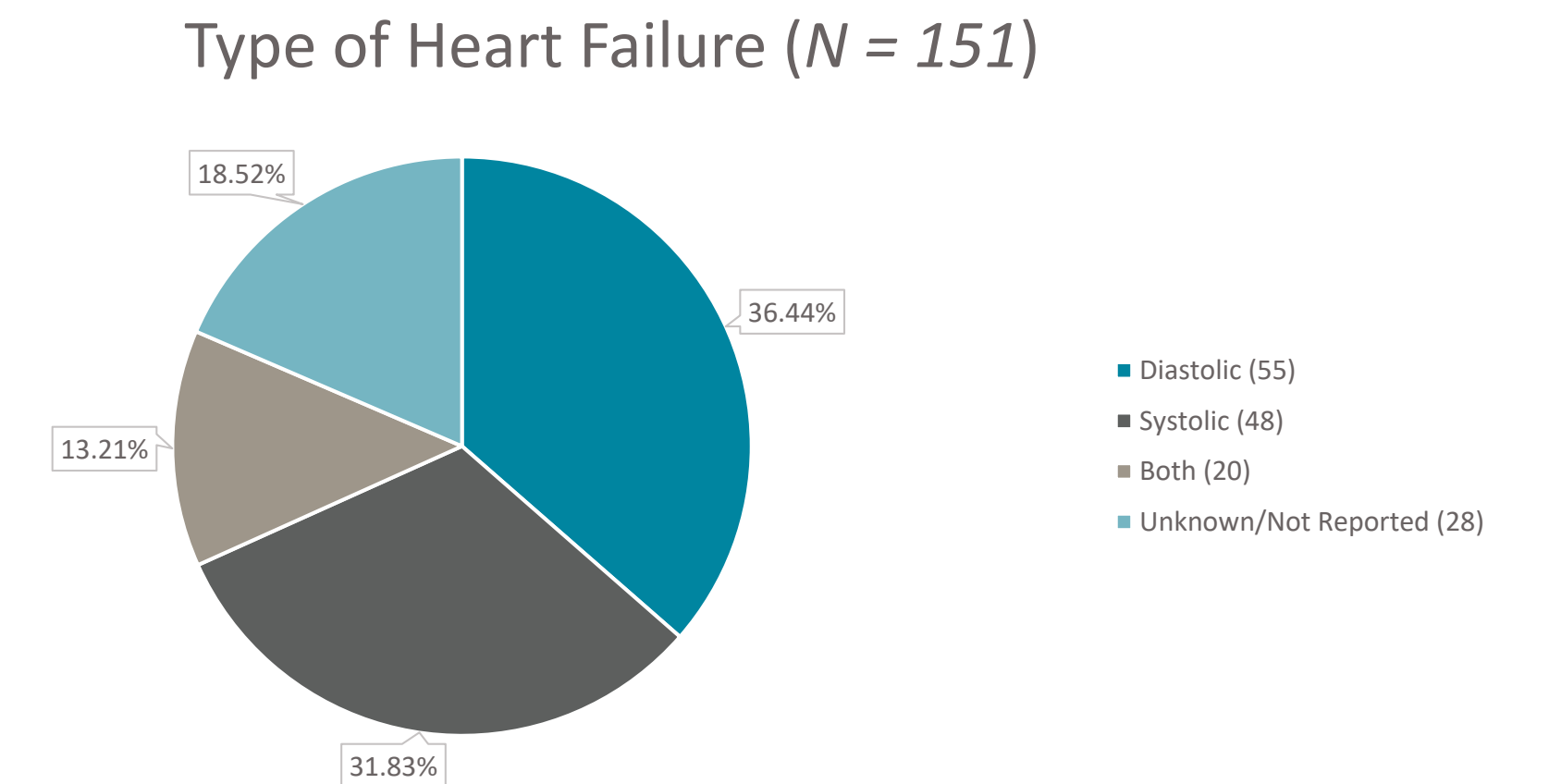
**Figure 2.** Chart review performed to determine if there was access to prior echocardiogram in EMR within 1 year of ED visit



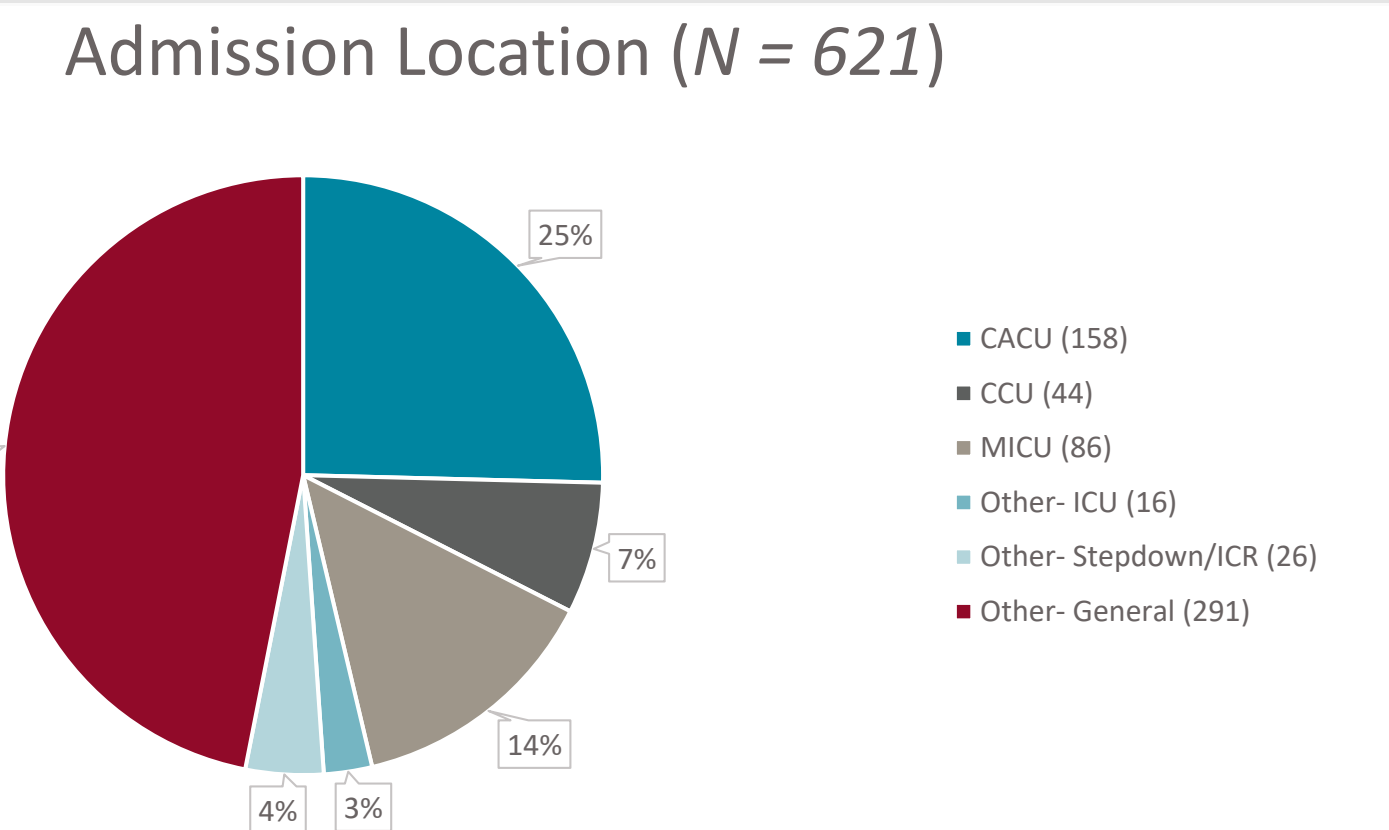
**Figure 3.** Number of admitted patients from study population who received complete echocardiogram while admitted



**Figure 4.** Distribution of Patients with Heart Failure by Type



**Figure 5.** Distribution of Admitted Patient by Inpatient Location



## Conclusions & Future Studies

- Cardiac POCUS in the ED was most commonly performed for hypotension, chest pain, and dyspnea.
- The majority of patients undergoing cardiac POCUS in the emergency department had not received an echocardiogram within the preceding year, indicating a lack of baseline cardiac data at the time of presentation. Consequently, cardiac POCUS is likely viewed as a valuable diagnostic tool to aid in distinguishing or excluding heart failure as the underlying cause of symptoms.
- Nearly half of patients who received a cardiac POCUS also underwent a complete echocardiogram during hospitalization, possibly indicating a role for confirmatory testing.
- It will be important to assess how cardiac POCUS influenced the management of patients who did not subsequently undergo inpatient echocardiography, and to determine what proportion of these individuals might have otherwise received such evaluation had they not received the initial ED POCUS.
- Almost half of patients admitted after an ED POCUS were ultimately cared for on GMF, suggesting these exams are influencing level of care of disposition
- Future studies should directly compare ED POCUS findings with inpatient complete echocardiograms, considering potential changes in cardiac findings due to ED interventions such as diuresis, BiPAP or other management strategies.

## References

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- Moore CL, Copel JA. Point-of-care ultrasonography. *N Engl J Med.* 2011;364(8):749-757. doi:10.1056/NEJMra0909487.
- Douglas PS, Chen J, Gillam LD, et al. Inpatient echocardiography use for common cardiovascular conditions. *Circulation.* 2018;137(17):1747-1757. doi:10.1161/CIRCULATIONAHA.117.032256.