Introduction:
More than 7-million transthoracic echocardiograms are performed annually in the US. These studies may reveal structural and functional cardiac abnormalities that inform clinical care in the intensive care unit. And yet, little is known about the epidemiology of baseline echocardiography, specifically among patients admitted to intensive care with sepsis.

Methods:
We studied electronic health records of 1,076,925 adult patients from 12 hospitals at UPMC from 2013 to 2014. Eligible patients were those with Sepsis-3 at presentation who required intensive care during hospitalization. Demographics, comorbidities, illness acuity, and baseline echo parameters (within 1-year prior to incident sepsis hospitalization) were abstracted. An abnormal echocardiogram was defined as LVEF<50%, LV diastolic dimension >6 cm, moderate/severe RV dysfunction, or moderate/severe valvular stenosis/regurgitation. We compared characteristics of patients who did and did not receive an echo, those with normal and abnormal studies, and patients stratified by in-hospital mortality.

Results:
Among 43,086 adults with sepsis, 8,077(18%) had baseline echocardiographic data within 1-year of admission, on average 131(SD 103) days prior to presentation. Most septic patients had abnormal echo studies(N=5782, 72%). Of those who died(2,666(6.2%)), 1,821(68.3%) had no echo data, 192(7.2%) had normal and 653(24.5%) had abnormal studies, compared to 40,420(93.8%) survivors of which 7,232(17.9%) had baseline echo, 2,298(5.7%) had normal, and 5,779(14.3%) had abnormal echocardiograms. Comparing deaths to survivors, reduced EF<39% (15.7% vs 12.6%, p=0.01), severe RV dysfunction (11.1% vs 8.4%, p=0.52), RV dilation (21% vs 17.2%, p<0.01) and severe tricuspid regurgitation (19.4% vs 13.1%, p<0.001) were more common among deaths.

Conclusion:
Most septic patients admitted to intensive care have abnormal baseline echocardiography. A reduced LV ejection fraction and severe right sided heart disease were more common among deaths than survivors.
Figure 1. Panel A. Patient Baseline Characteristics. Panel B. Chord Diagram Showing Abnormal Echocardiographic Parameters by Mortality. The ribbons connect from mortality status to individual echocardiographic abnormalities if the group mean is greater or lesser than the overall mean for the entire cohort. For example, patients who died (light blue) are more likely to have RV dysfunction, LV dysfunction, and tricuspid regurgitation but not aortic stenosis or mitral regurgitation.