

Implementation of a Cardiogenic Shock Protocol and Data Review Process is Associated with Improved In-Hospital Survival

Adrienne Jones, MSN, Renee Swanson, MSN, Kateri Spinelli, PhD, Josh Remick, MD, Daniel Westerdahl, MD, Jill Gelow, MD, David Hotchkin, MD, Jason Wells, MD, Tim Lewis, MD, Robert Kim, MD, Jeff Robinson, MD, Roxanna Barr, PhD, Sarah Ramelli, MS, and Jacob Abraham, MD

Center for Cardiovascular Analytics, Research and Data Science (CARDS), Providence St. Joseph Health, Portland, OR



Background

Despite increasing use of mechanical circulatory support devices (MCS), cardiogenic shock (CS) mortality in hospitals remains persistently high, with worsening outcomes in later stages of CS. Delays in diagnosis and practice variation may contribute to in-hospital mortality.¹

Objective

To develop a CS protocol that promotes early CS recognition and rapid notification of a multi-disciplinary specialty team at 2 Providence hospital facilities (PSVMC, PPMC).

Methods

- Quality improvement initiative launched in June 2018 to identify, evaluate, treat and monitor outcomes for CS patients
- CS was defined by widely-accepted criteria.^{2,3}
- Team included advanced heart failure (AHF) physicians, hospitalists, interventional cardiologists (IC), ED physicians, intensivists, cardiac surgeons, MCS coordinator, STEMI coordinator and transfer center nurses
- A report was generated in the electronic medical record (EMR) to identify patients with shock in the problem list
- CS diagnosis was confirmed by chart review by a CS RN coordinator and adjudicated by an AHF cardiologist
- Clinical data points abstracted by CS RN coordinator and shared with multi-disciplinary specialty team
- Multiple care units were educated on the CS criteria and treatment protocol

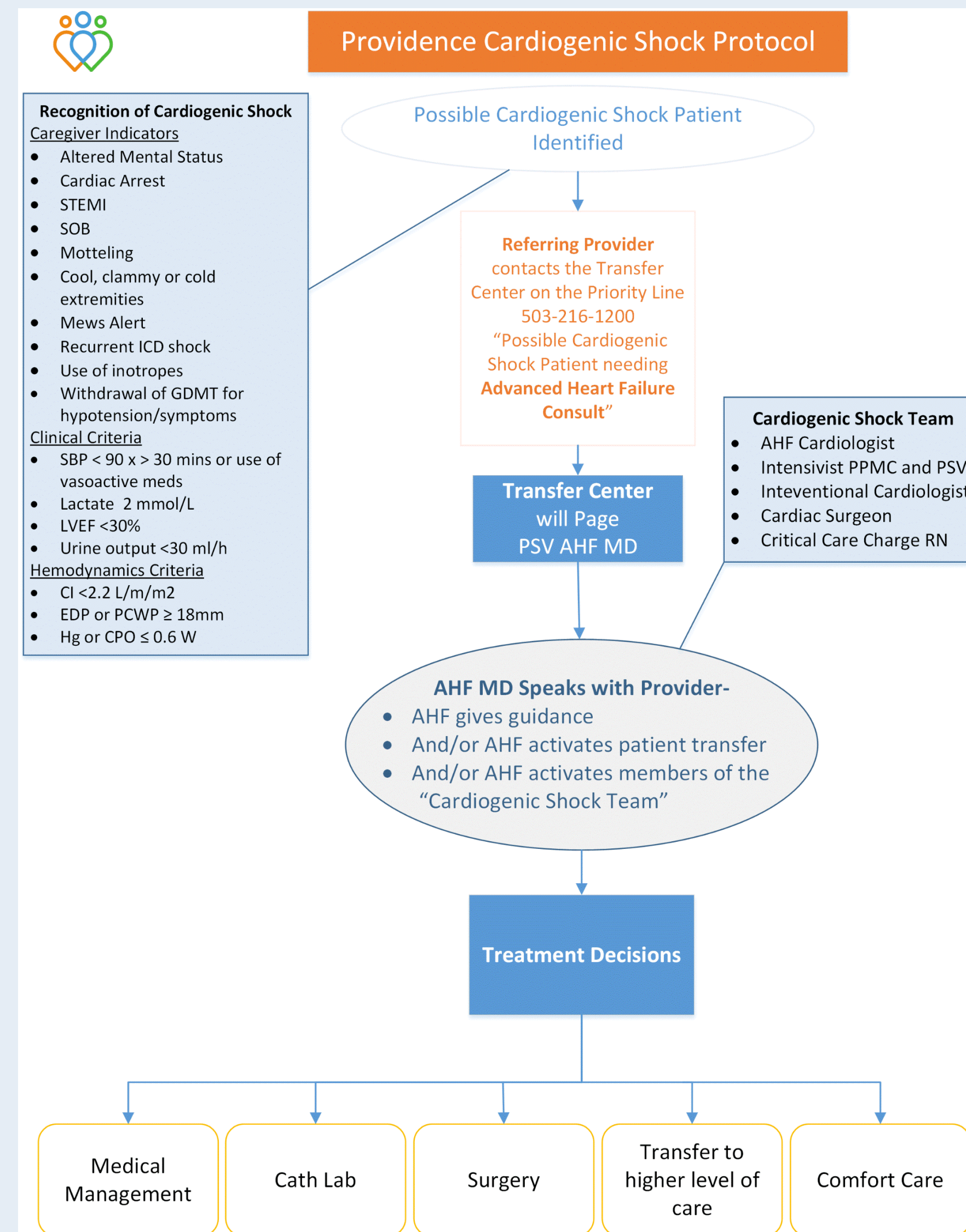
Cardiogenic Shock Collection Form

DOS: Cardiogenic Shock Team Activation Type:									
Patient Name		DOB	MRN	Complaint	Etiology		RM		
NAME	Date	Time	MOA		NAME	Date	Time	Device	
Transfer MD:				Arrival Hospital					
PPMC ED MD:				Transfer Center					
PSV ED MD:				Receiving Hospital					
Page Shock MD				CVL Activation					
Admitting MD				Arrives to CVL					
HF MD:				Device					
Cardiologist				Device					
IOC:				Device					
Surgeon:				Device					
Palliative Care:				CVL Team:					

Additional variables collected: Echo/EF, EKG, labs, VS, drips, heart cath, & cardiac arrest data

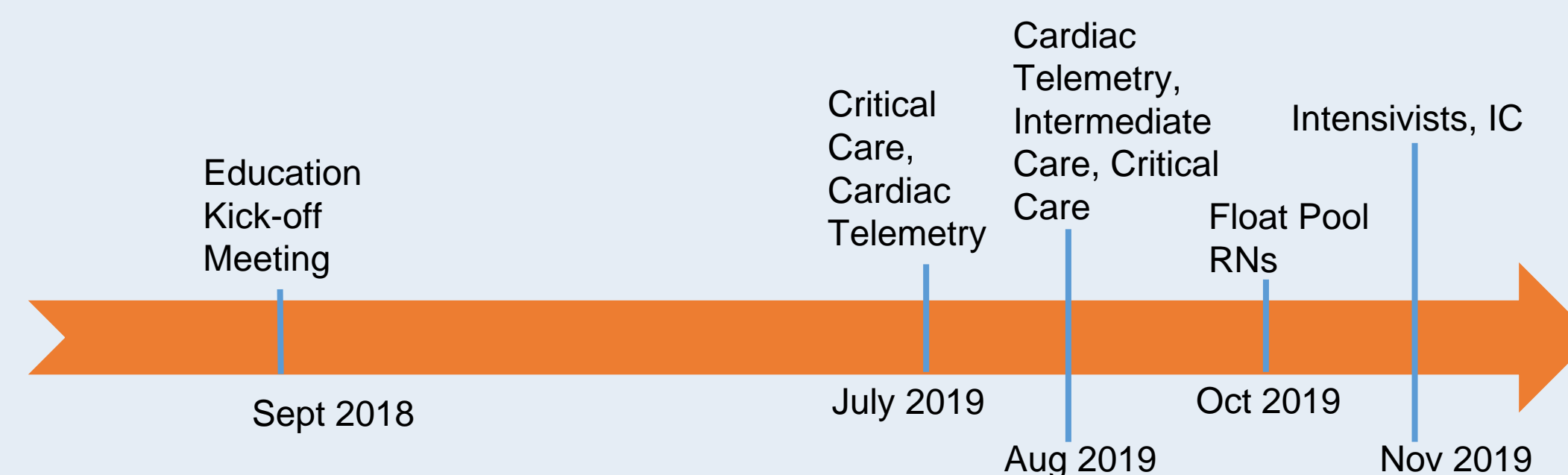
CVL = cardiovascular lab, DOB = date of birth, ED = Emergency Department, HF = heart failure, IOC = interventionalist on call, MOA = mode of arrival, MRN = medical record number, PPMC = Providence Portland Medical Center, PSV = Providence St. Vincent Medical Center, RM = room

Cardiogenic Shock Protocol



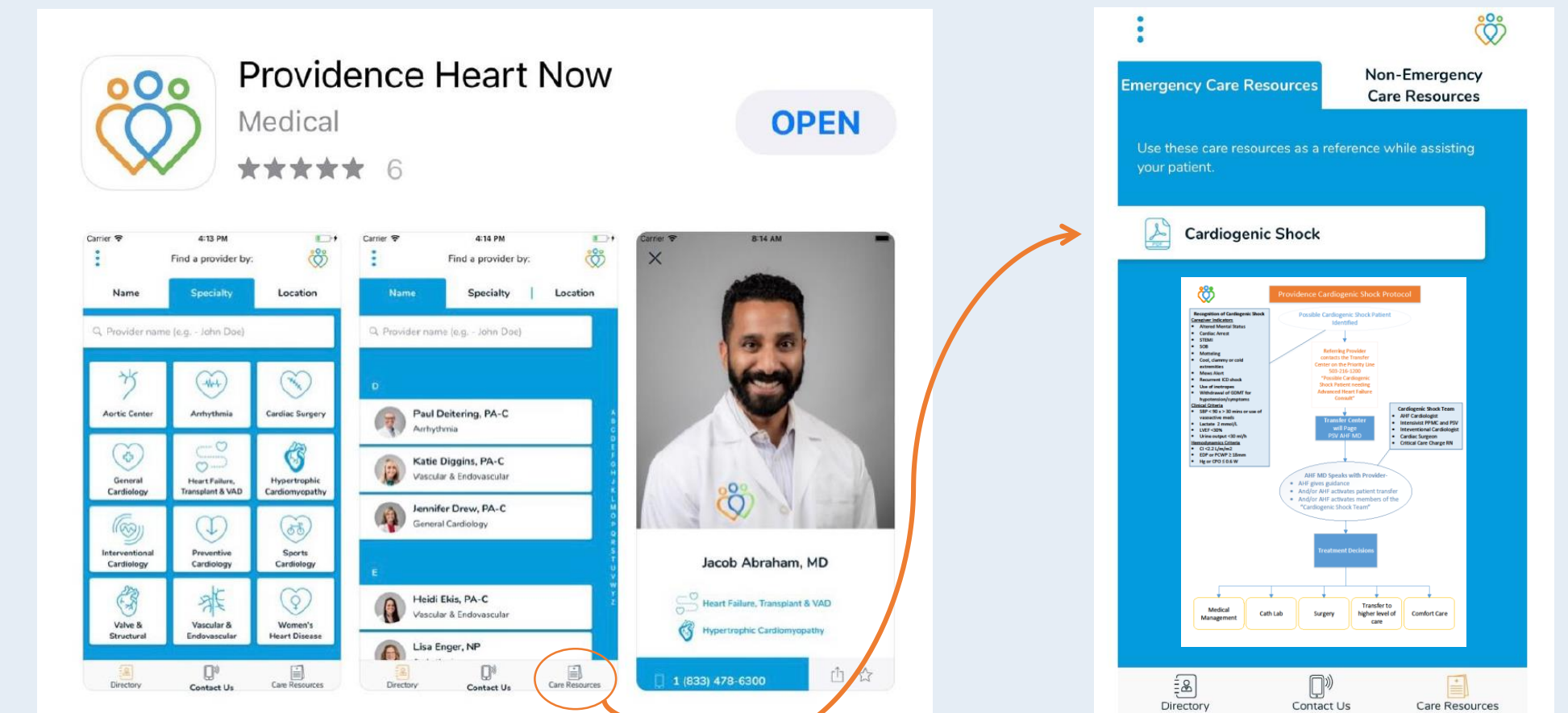
Education

- Multiple presentations at both facilities delivered by CS RN coordinator
- Discussion of protocol, CS stages, and treatment options



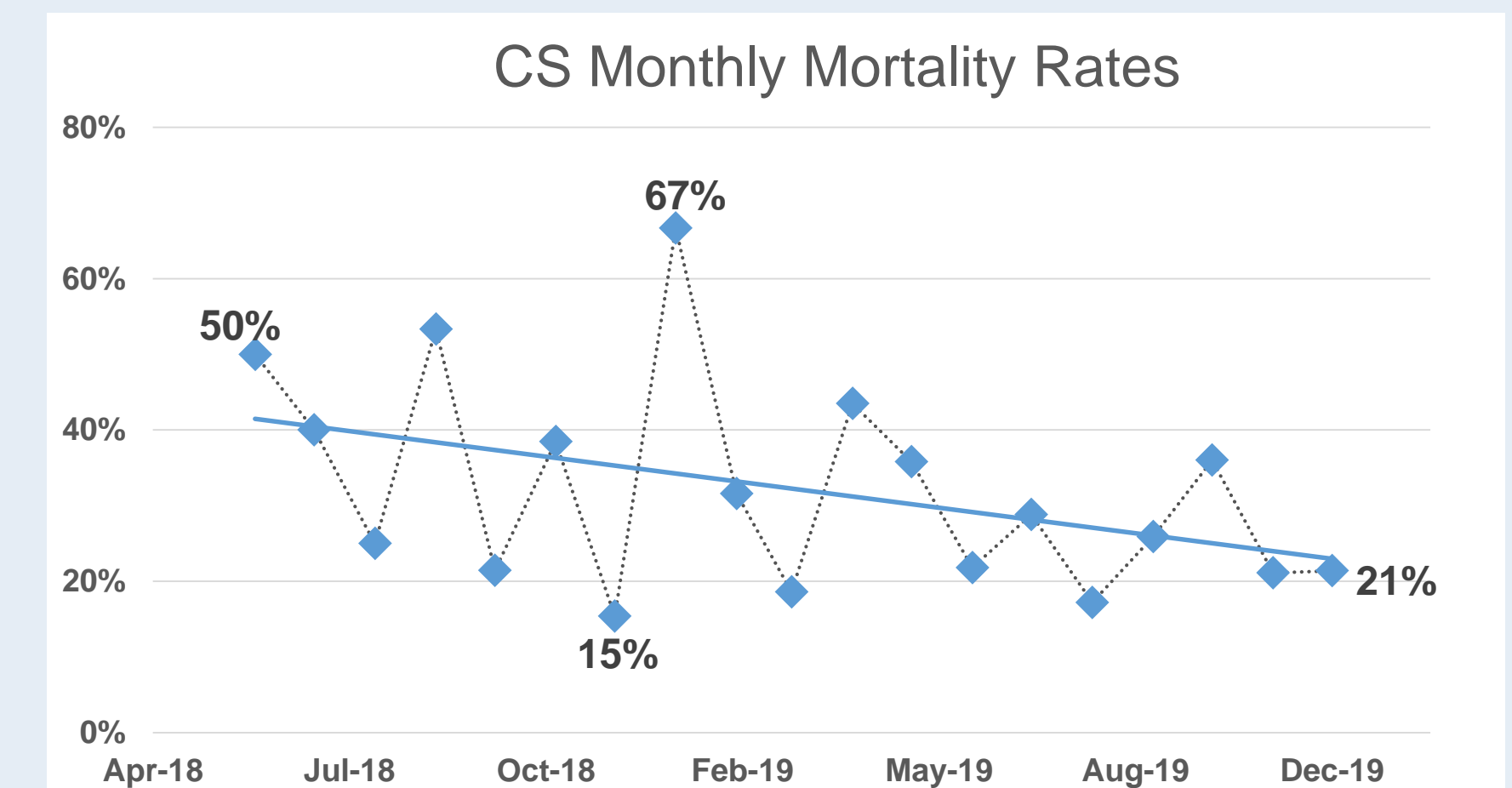
Dissemination of Shock Protocol

Providence Heart Now App with Cardiogenic Shock Protocol and Transfer Center contact phone number



Results

- Identification of CS patients grew from 4 patients at program start to >50 patients per month
- Volume increased by 257% from 2018 (146 cases, annualized volume based on June-Dec) to 2019 (521 total cases)
- CS in-hospital mortality rate decreased from 50% to 21% across the study period, an average of 1.0 percentage point decrease per month



Numeric values on the graph are mortality rates at the beginning and end of the study time period and the highest and lowest rates over the course of the study. Trend line $y = -0.0103x + 0.425$.

Conclusions

- Following implementation of a CS protocol at two hospitals in a large integrated health system, CS diagnosis increased and mortality decreased
- Ongoing work includes identifying CS diagnosis from discharge diagnosis, stratifying patients by shock stages, and improving the transfer process from other hospitals