

Virtual ICU Support of ICU Boarders in ED

Steve Klahn, MBA, BSN, CCRN-K, FACHE, Ben Saldana, DO, FACEP,
Sarah Cammarata, MSN, RN-BC, CCRN, Melissa L. Gomez, MBA

Learning Objectives

- Compare traditional ways of supporting ICU boarders in academic medical center EDs with innovative virtual support models.
- Describe options for comprehensive patient management supported remotely through multiple tools.

Overview/Background

For many years at our nearly 1000-bed academic urban medical center hospital, any patients needing ICU level of care (LOC) while boarding in the ED were not treated by experienced ICU teams due to a lack of available resources to physically cover such a large geographic area and simple challenges with high-capacity constraints.

ICU boarders in the ED's are high risk for poor outcomes, so we designed a program to utilize existing Virtual ICU services to:

- Provide comprehensive consults (not simply episodic care) and monitoring services to manage patients while waiting for an ICU bed
- Evaluate patients for downgrade to a lower-level of care throughout ED stay
- Maximize external ICU patient transfer volume; many patients on waiting list at most times.
- Safely care for the critically ill patients boarding from a few hours to as long as several days in any of the 3 free-standing Emergency Care Centers (average of 60-70 patients per month from each ECC facility)

Planning/Research Methods

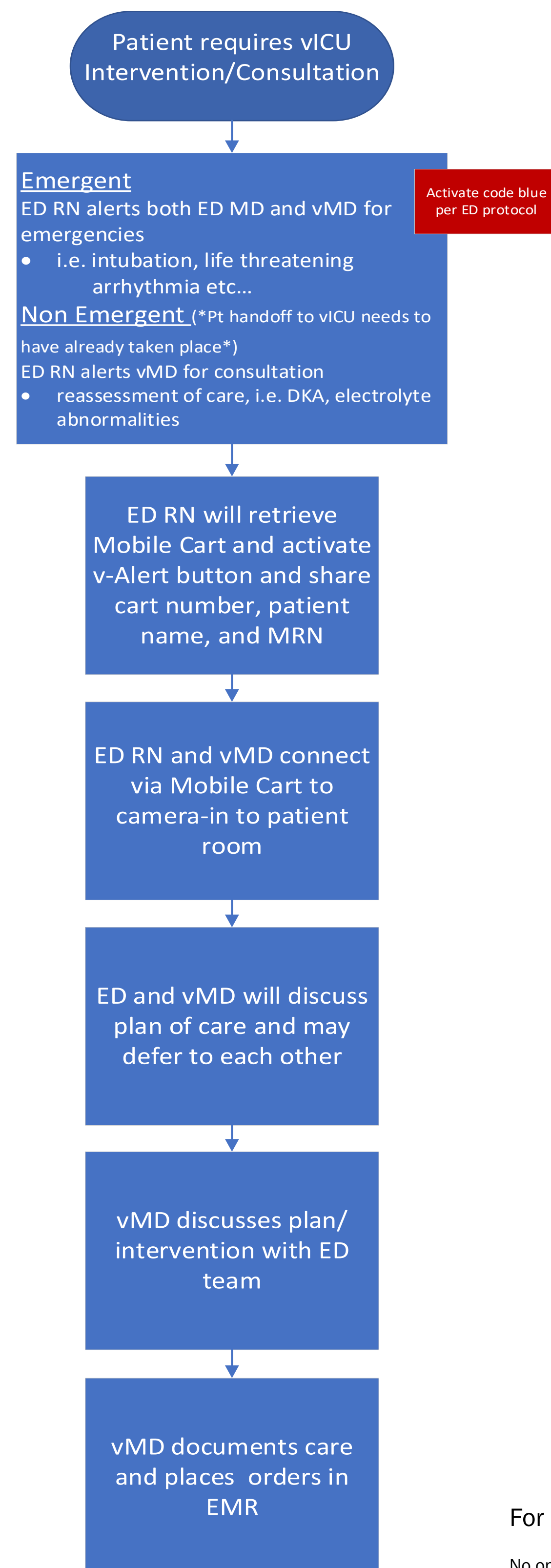
A collaborative team consisting of members from the Emergency Department, Telemedicine, ICU/IMU, Centralized Bed Management and Throughput Nurse Practitioners, completed a needs analysis of patients waiting in the ED for ICU/IMU beds. The group identified:

- Process to best progress the patient's plan of care
- Opportunities for downgrading patients
- Opportunities for partnering ED staff alongside staff with deeper critical care experience in order to better serve the patients boarding in the ED

Implementation Methods

- Standardized workflow between key players
- Align the Electronic Health Record (EHR) workflow for quick identification of qualifying ED patients (all ICU/ IMU patients with consults)
- EHR build for patient and data management
- Integration of virtual care carts

ED vICU Process



Outcomes/Results

Qualitative result:

- Data from survey showed patient, provider and staff experience have been very favorable.

Quantitative result:

- Earlier ICU intervention coordinated through the virtual team
- Downgrade admitting LOC as appropriate
- Shorter severity-adjusted ICU length-of-stay and maintenance of world-class severity-adjusted ICU mortality ratios.
- Incremental new patient volume from ICU length-of-stay (LOS) reduction and ICU downgrades

Feedback Excerpt

I had the opportunity to utilize the virtual ICU doctor and I was very impressed and grateful. I had an IMU patient with a potassium level of 1.6. The patient had multiple potassium drips and the ICU doctor helped me manage the medications, as well as placed orders for labs. The doctor was also available to assist me when the patient's heart rhythm would change in and out of AFib. He utilized the camera to watch the EKG rhythm. The system itself was simple to use and very convenient. The ED doctors were busy with multiple patients in the department and the virtual doctor was at my fingertip. This system will be an asset to ED nurses. The doctor was professional and was truly beneficial in the management of my patient. - ED RN

Case Study

A patient presented to the ED for sudden onset extremity pain and weakness. No spinal pathology found in brain MRI and instead lumbar puncture was recommended. vICU was consulted thereafter to assist in ED critical care. Given that the patient had atrial fibrillation, the vICU physician ordered a stat venous and arterial duplex of the lower extremities to rule out arterial thrombosis as a cause of the patient's symptoms. The study found severely reduced arterial perfusion and CT angiography confirmed a large acute occlusion of the aortoiliac system leading to bilateral lower extremity critical limb ischemia. The patient was emergently taken to the OR for thrombectomy and lower extremity fasciotomy. Pulses were restored and patient was transferred post op to CVICU where he stayed for 2 days and eventually discharged from acute floor to a rehabilitation facility.

For additional information, please contact Melissa Gomez at mlgomez2@houstonmethodist.org

No one in a position to control the content of this educational activity has relevant financial relationships with ineligible companies.

	Pre	Post
APACHE-IV ICU LOS Ratio	1.22	1.19
APACHE-IV ICU Mortality Ratio	0.22	0.22

	ICU LOS Reduction	Downgrades
Incremental Patient Volume	81	338
Annual Patient Revenue	\$810K	\$338K
Annual Combined	\$1.15M	



Future Actions

While the overall goal is to reduce or eliminate any boarding in the ED, this program has demonstrated clear value.

As we build our new EDs, we plan to hard wire Audio/Visual (AV) connections to patient areas to reduce mobile cart utilization. These new devices will allow for interdisciplinary connections seamlessly with ED patients.