

Optimizing Medical Emergency Response Performance Through a Quality Improvement Process

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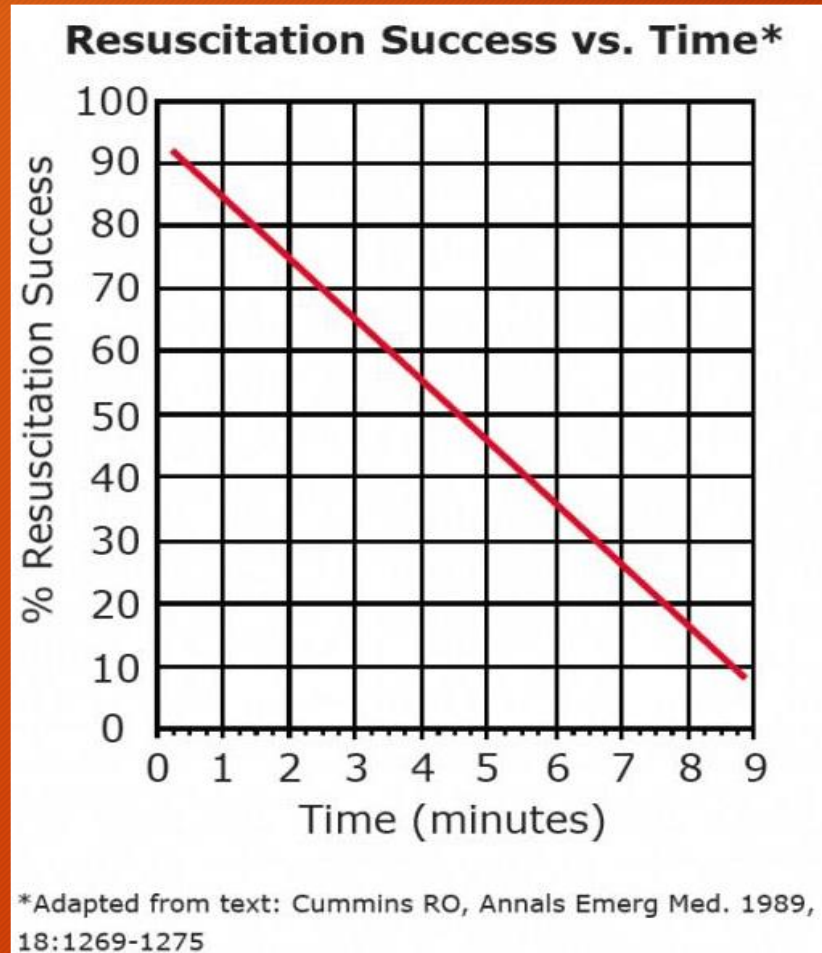
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Learning Objectives

- Identify key elements of an emergency response
- Apply quality improvement to the emergency response performance
- Examine the post-emergency response debrief process and identify its benefits

Who cares about medical emergencies?



What is a medical emergency?

- An illness, injury, symptom or condition so serious that a reasonable person would seek care right away to avoid severe harm.
 - Healthcare.gov, USDHHS
- “Any condition perceived by the prudent layperson, or someone on his or her behalf, as requiring immediate medical or surgical evaluation and treatment.”
 - American College of Emergency Physicians
- A medical or behavioural condition, the onset of which is sudden and manifests itself by symptoms of sufficient severity, including severe pain, such that a prudent lay person could reasonably expect the absence of immediate medical attention to result in:
 - (1) placing the health of the afflicted person with such a condition in serious jeopardy;
 - (2) serious impairment to the person’s bodily functions;
 - (3) serious dysfunction of any bodily organ or part; or
 - (4) serious disfigurement.
- Segen's Medical Dictionary. © 2012

What is a medical emergency? Virginia

Virginia 12 VAC 30-120-360:

Medallion II Medicaid Managed Care
Definitions.

“Emergency medical condition” means a medical condition manifesting itself by acute symptoms of sufficient severity (including severe pain) that a prudent layperson, who possesses an average knowledge of health and medicine, could reasonably expect the absence of immediate medical attention to result in the following:

- 1. Placing the health of the individual (or, with respect to a pregnant woman, the health of the woman or her unborn child) in serious jeopardy,
- 2. Serious impairment to bodily functions, or
- 3. Serious dysfunction of any bodily organ or part.

Virginia 12 VAC 30-120-260:

Medallion Medicaid Managed Care Definitions.

“Emergency medical condition” means a medical condition manifesting itself by acute symptoms of sufficient severity (including severe pain) that a prudent layperson, who possesses an average knowledge of health and medicine, could reasonably expect the absence of immediate medical attention to result in the following:

1. Placing the health of the individual (or, with respect to a pregnant woman, the health of the woman or her unborn child) in serious jeopardy;
2. Serious impairment to bodily functions; or
3. Serious dysfunction of any bodily organ or part.

Examples of Medical Emergencies: American College of Emergency Physicians

- “The following signs and symptoms and are not intended to represent every kind of medical emergency or substitute for medical advice from your physician, but rather to provide examples of common issues:”
- Difficulty breathing, shortness of breath
- Chest or upper abdominal pain or pressure lasting two minutes or more
- Fainting, sudden dizziness, weakness
- Changes in vision
- Difficulty speaking
- Confusion or changes in mental status, unusual behavior, difficulty waking
- Any sudden or severe pain
- Uncontrolled bleeding
- Severe or persistent vomiting or diarrhea
- Coughing or vomiting blood
- Suicidal or homicidal feelings
- Unusual abdominal pain

Examples of Medical Emergencies: Pennsylvania 55 Pa. Code § 1221.2

- Allergy Reactions, Acute (Except Allergy Tests)
- Appendicitis, Acute
- Asthma, Acute
- Breathing Difficulties or Shortness of Breath
- Bronchitis, Severe
- Bursitis, Severe Onset
- Chest Pain, Severe
- Choking
- Colitis
- Coma
- Convulsions and/or Seizures
- Cystitis Pyelitis
- Dermatitis or Hives (Resulting from Internal or Unknown Causes)
- Diabetic Coma
- Diarrhea, Severe
- Drug Reaction
- Earache, Severe
- Epistaxis (nosebleed)
- Fainting
- Fecal Impaction, Severe
- Food Poisoning
- Frost Bite
- Gall Bladder, Acute Attack
- Gastritis
- Gastro-intestinal Conditions Acute
- Glaucoma, Severe
- Headache, Severe
- Heart Attack, Suspected
- Hemorrhage
- Hysteria
- Insulin Shock (Overdose)
- Kidney Stones
- Suspected Maternity Complications
- Pain, Sudden or Severe Onset
- Pleurisy
- Pneumonitis
- Poisoning (including overdose)
- Pyelonephritis (Shock)
- Spasms, Cerebral or Cardiac
- Spontaneous Pneumothorax
- Stomach Pains, Severe
- Stroke
- Strangulated Hernia
- Sunstroke
- Swollen Ring Finger
- Tachycardia
- Thrombosis and/or Phlebitis
- Unconsciousness
- Urinary Retention, Acute
- Vision loss, Sudden Onset
- Vomiting, Severe

That's a lot! How can one possibly respond?

- Turn of the 20th Century - house calls!
- 1952 JAMA “What is a medical emergency?”
 - Organizing emergency medicine to replace urgent house calls
- 1966 “Accidental Death and Disability: The Neglected Disease of Modern Society”
 - Accidental injuries are the leading cause of death in the first half of life
 - Established EMS training and services
- Hospitals began to establish organized code teams to address in-hospital emergencies
 - But over several decades, there appeared to be no significant improvement in post cardiopulmonary arrest 1 year survival rates
 - Weil MH, Fries M. In-hospital cardiac arrest. *Crit Care Med* 2005;33 (12) 2825- 2830
- Medical Emergency Response Teams have since been developed to address within-healthcare facility emergency responses
 - with benefit to post-emergency clinical outcomes
 - Hunt EA, Zimmer KP, Rinke ML, et al. Transition From a Traditional Code Team to a Medical Emergency Team and Categorization of Cardiopulmonary Arrests in a Children's Center. *Arch Pediatr Adolesc Med*. 2008;162(2):117-122. doi:10.1001/archpediatrics.2007.33
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- What happens in corrections?
 - Differences with facilities that do and do not maintain 24 hour medical services
 - *We focus on facilities with 24 hour medical services*

What goes into an emergency response?

- initial evaluation, diagnosis, treatment, coordination of care among multiple clinicians or community resources, and disposition of any patient requiring expeditious medical, surgical, or psychiatric care.
 - <https://www.acep.org/patient-care/policy-statements/definition-of-emergency-medicine/>
- An emergency service is any health care service provided to evaluate and/or treat any medical condition such that a prudent layperson possessing an average knowledge of medicine and health, believes that immediate unscheduled medical care is required.
 - <https://www.acep.org/patient-care/policy-statements/definition-of-an-emergency-service/>

What goes into a good emergency response?

- "In this qualitative study of data collected from interviews with 158 key stakeholders at 9 Get With The Guidelines-Resuscitation hospitals, distinct differences were found in the organizational structure and function of rapid response teams.
- Top-performing hospitals feature rapid response teams with dedicated staff without competing responsibilities, serve as a resource for bedside nurses in surveillance of at-risk patients, collaborate with nurses during and after a rapid response, and can be activated by a member of the care team without fear of reprisal."
 - Dukes K, Bunch JL, Chan PS, et al. Assessment of Rapid Response Teams at Top-Performing Hospitals for In-Hospital Cardiac Arrest. *JAMA Intern Med.* 2019;179(10):1398-1405. doi:10.1001/jamainternmed.2019.2420
- *ACA standards require a four-minute response to life- or limb-threatening medical emergencies.*

Summary: Characteristics of Good Response

- Dedicated Staff
- Response is Primary Responsibility
- Resource for At-Risk Patients
 - be proactive
- Can be activated by any concerned member
- Collaborate before and after event
 - Not just nursing but correctional staff!
- With skill and timeliness...
- Evaluate
- Diagnose
- Treat
- Coordinate
- Transfer
- What else???
 - Maintain safety
 - Train, restock and maintain
 - Reflect
 - Monitor Outcomes

Who responds?

- **Emergency Medical Responders** provide immediate lifesaving care to critical patients who access the emergency medical services system. EMRs have the knowledge and skills necessary to provide immediate lifesaving interventions *while awaiting additional EMS resources to arrive*.
 - National Registry of Emergency Medical Technicians, <https://www.nremt.org/EMR/Certification>, last accessed April 3, 2022
- In corrections - primarily nursing
 - Although other BLS or ACLS certified staff may also respond and assist
- We focus on a nursing model, as this is most consistent with the 24 hour medical staffed facility

Medical Emergencies in the United States: Emergency Department Visits, 2018

- Number of visits: 130.0 million
- Number of injury-related visits: 35.0 million
- Number of visits per 100 persons: 40.4
- Number of emergency department visits resulting in hospital admission: 16.2 million
- Number of emergency department visits resulting in admission to critical care unit: 2.3 million
- Percent of visits with patient seen in fewer than 15 minutes: 43.5%
- Percent of visits resulting in hospital admission: 12.4%
- Percent of visits resulting in transfer to a different (psychiatric or other) hospital: 2.3%
- Source: National Hospital Ambulatory Medical Care Survey: 2018 National Summary Tables, table 1, 4, 14, 24, 25

But what about calls for emergency response services in the United States?

- Four categories of patient acuity: lower acuity, emergency, critical, and dead without resuscitation efforts - National Highway Transportation and Safety Administration (NHTSA, 2005)
- Lower acuity patient: “presents with symptoms of an illness or injury that have a low probability of progression to more serious disease or development of complications.”
- Emergent patient: “presents with symptoms of an illness or injury that may progress in severity or result in complications with a high probability for morbidity if treatment is not begun quickly”
- Critical patient “presents with symptoms of a life threatening illness or injury with a high probability of mortality if immediate intervention is not begun to prevent further airway, respiratory, hemodynamic and/or neurologic instability.”

Emergency Response Calls are emergencies, right?

- Fire department calls for medical aid increased from 15.8 million requests in 2008 to 23.6 million in 2018 (National Fire Protection Association)
 - EMS responses have increased an average of 5.1% annually since 2000
 - People are requesting EMS far more now than in the past and for reasons that cannot be explained by population growth alone
 - the increase in EMS responses do not appear to be the result of an increasing number of ill or injured persons in need of emergency treatment
 - It appears lower acuity patients increasingly rely on EMS to fill gaps in existing systems of care.
-
- Jones, Jason, "Non-Emergency Utilization of EMS: Contributing Factors and Strategies to Promote Effective Care with Appropriate Resources" (2020). Capstone Experience. 128. https://digitalcommons.unmc.edu/coph_slce/128

Emergency Response Calls are emergencies, right?

- National Emergency Medical Services Information System
 - 2017 - 2020, 81.6 million incidents recorded
- Emergent or higher acuity: 18.9%
 - 15.4% Emergent
 - 3.0% Critical
 - 0.5% dead upon EMS arrival
- 40.6% lower acuity
- 40.5% “not applicable” or “not reported”
 - Generally did not require transport or reflected challenges to acuity classification
- Lower acuity during this period increased from 38% to 42% annually
- The overall impression is that the system is disproportionately occupied by non-emergency requests for service

Our history

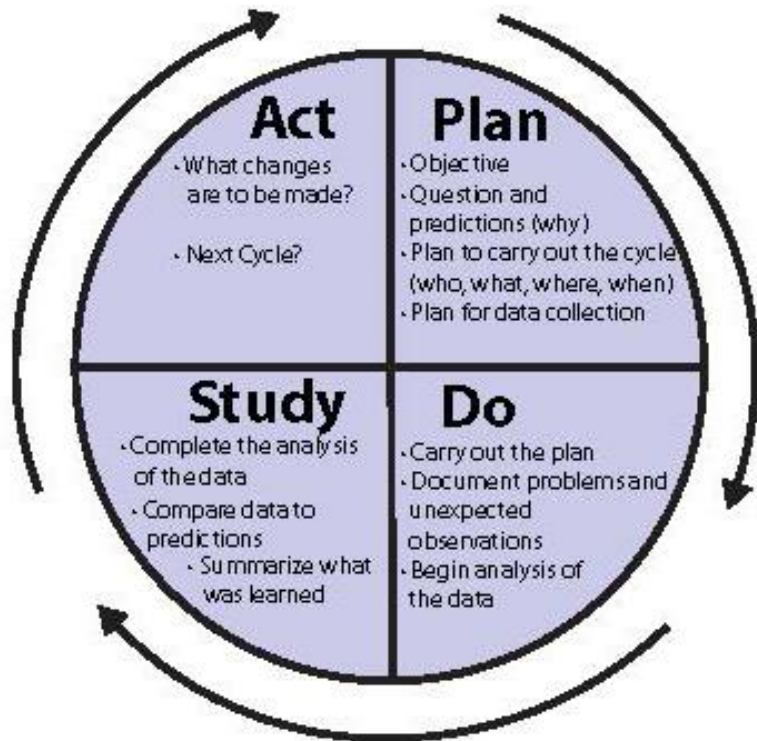
- Response Model in January 2019
 - Urgent Care Nurses Respond
 - But not clearly tapped when coming on post
 - Centralized Resources in Medical Building brought to patients
 - Limited Coordination of Security and Medical
 - Call by radio to central security and then overhead page
 - No specific training beyond orientation and routine BLS
- Where did we start?
- Dedicated Staff **NO**
- Response is Primary Responsibility **NO**
- Resource for At-Risk Patients
 - be proactive **NO**
- Can be activated by any concerned member **YES**
- Collaborate before and after event **NO**

Our history

- Emergency Response Times
 - Imprecise reporting in prior administrations (average time per call)
 - Actual Data - high frequency of calls over 4 minutes
- 3.7 fold increased risk of an emergency response time exceeding 4 minutes on evening versus daytime shifts
- 3.6 fold increased risk of response time exceeding 4 minutes on weekend versus weekday shifts
 - both statistically significant based on information from January through March, 2019

Facility Approach to Improving Response Times and Outcomes

The PDSA Cycle for Learning and Improving



- How does this correspond to routine operations?
- Plan: Clinical Operations Team
- Do: Treatment/Urgent Care Group and Stakeholders
- Study: CQI Committee Team
- Act: Medical Leadership Team

Root Cause Analysis and Performance Management Plan for occurrences outside target

What interventions were made?

- First PDSA Iteration:
- Specific designation of a named nurse of the emergency response call as a runner per shift rather than allow assignment to vary per the baseline model
- From April 18, 2019 through June 30, 2019, the target facility experienced 203 total emergency response calls for which 8 (3.9%) exceeded 4 minutes
- Comparison versus January - March 2019 prior rate of 9.5% is not statistically significant ($p=0.08$, z-score of two proportions)
 - but represents a 3-fold decrease from prior practice and an operationally relevant decline favoring adoption of the current practice
 - the shift difference in exceedances (>4 minutes per call) was reduced to statistical insignificance for both evening versus day (2 of 94 calls [2.1%] and 6 of 109 calls [5.5%] respectively, $p=0.22$) and weekend versus weekday shifts during this period (3 of 41 calls [7.3%] and 5 of 162 [3.1%] calls, respectively, $p=0.22$)

Subsequent Interventions resulting from PDSA cycling

- Designated Runner identified at each shift
 - Team designations and backup teams identified and documented at each shift
- Create secondary and tertiary teams
- Gurneys, AEDs, equipment in every residence hall
- Additional Jump bag supplies
- Multiple jump bag kits
- Request for medical assistance communication training
- Added nursing and correctional officer training in medical emergencies and management
- Meet with local EMS at routine intervals
- Pill line and count observation of patient status to pre emptively undertake assessments to prevent calls for emergency services
- COVID brought nursing to stations within each building to reduce cross contamination
- Camera review of timeliness and coordination

The role of the post-response debrief

- Observation that we did not collaborate after the event
- Review of post-emergency response processes in other settings included team debriefs noted to facilitate improvement in several areas
 - Identify issues and challenges that arose before, during, and after responses
 - Enhance communication and coordination
 - Facilitate stress management for intense events
- Adopting modification of the “Debriefing In Situ Conversation after Emergent Resuscitation Now” Tool, Mullan et al, 2013
 - Modified for correctional setting
 - Implemented by team lead following completion of the event
 - Involves all members who participated in the response

The role of the post-response debrief

Emergency Response Debrief Tool

CONFIDENTIAL: This form that is confidential and intended for educational and quality improvement purposes. Not for distribution or disclosure. DO NOT PLACE ORIGINAL OR COPY INTO MEDICAL RECORD.

Event Time: ____ Date: ____/____/____

Event Location: _____

PATIENT Name: _____

Number: _____

Housing Assignment: _____

Event Attendees (write in initials):

	Treatment	Pill Line	Infirmary	Intake	Building 8	Admin	Acute	Other
RN								
MD/DO								
NP/PA								
LPNCNA								
Other								

Patient: ☐ Managed On Site

☐ Transport to Treatment

☐ Transfer from Site

Outcome: ☐ Resolved during response

☐ Resolved following Response

☐ Expired

☐ Pending

Event Debriefed: ☐ Yes ☐ No

Debrief Time: ____:____

Date: ____/____/____

If No, why not (no time, team dispersed, etc.): _____

Debrief Attendees (write in initials):

	Treatment	Pill Line	Infirmary	Intake	Building 8	Admin	Acute	Other
RN								
MD/DO								
NP/PA								
LPNCNA								
Other								

Debrief Leader: _____

Scribe: _____

ACTIVATION (were protocols followed appropriately):

Activated by floor team, announced via overhead and radios? ☐ Yes ☐ No

If no, please explain: _____

RESPONSE (were protocols followed appropriately):

Was there a delay in the Response Team arrival (> 4 Minutes) ☐ Yes ☐ No

If Yes, please explain: _____

Core Elements Reviewed ("+" if comments made; "-" if no comments identified; "NA" if not applicable):

Team Performance:	How did this go?					Areas for improvement identified	System issues identified
	Poor	-/+	OK	+/-	Well		
Leader was identified							
Leader was clear							
Communication was clear							
Communication was closed loop (reported when activity completed)							
Reports were in SBAR format							
Team knew what emergency was							
Team roles were assigned							
All team members fulfilled roles							
Crowd control managed							
Scene was orderly							
Medical interventions were appropriate							
Equipment was available and working							
Equipment was accessible							
Knowledge of equipment							
Use of appropriate equipment							
Medication was available							
Medication was accessible							
Knowledge of medications							
Use of appropriate medications							
Patient transport							
Other:							
Other:							
Overall							

List comments here:

♦ Other barriers that made it challenging (Explain what team thinks can be done to decrease barriers)?

Comments:

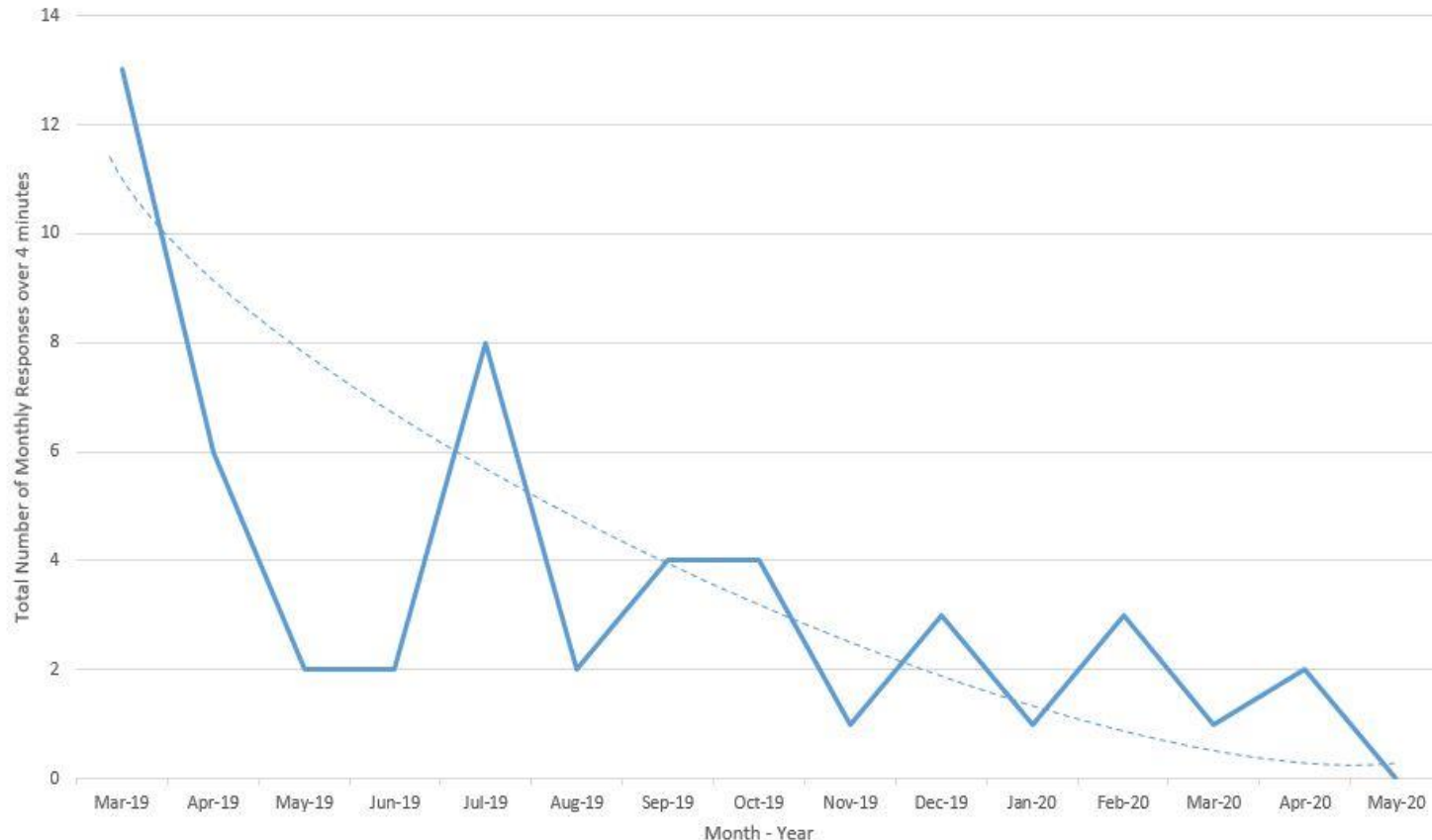
"I would like to close the debriefing by having each of you state one or two take-aways that will help you in the future".

The role of the post-response debrief

- Staff reported greater sense of teamwork with improved communication and collaboration in subsequent responses
- Staff identified common areas for improvement in responses
 - Recommendations for additional stock items in jump bags
 - Accessible and available equipment
 - Improvements in scene management
 - Crowd Control
 - Orderly Scene
- Continue to need to train on universal application of the tool
 - Non-emergency scenarios more likely to not have tool completed
- Provides real-time root cause analysis by participating staff - excellent opportunity for team engagement in the QI process

What happened?

Emergency Response Team Performance
Trend in responses Greater than 4 Minutes
March 2019 – May



- Where are we?
- Dedicated Staff **YES**
- Response is Primary Responsibility **YES**
- Resource for At-Risk Patients
 - be proactive **YES**
- Can be activated by any concerned member **YES**
- Collaborate before and after event **YES**

Sustained?

- In 2021, there were 406 requests for emergency medical responses and 403 (99.3%) occurred in 4 minutes or less (2020 - 96% to target)
- About 17% of requests met criteria as an emergency
 - Slightly lower but not statistically different than the 18.9% rate observed in the National Emergency Medical Services Information System study of most recently available data for the US in 2020
- There were no instances of a second request for medical assistance for any patient whose first call was deemed an emergency
- Reception patients require emergency transportation at a rate of 0.88 transports per 100 patient-months
 - Proactive assessment and management of conditions in this group averts subsequent need for emergent care

Sustained? Are we otherwise different?

- The most common reasons for transportation, comprising 77% of total transports, were altercations, accidents and injuries; pain of the abdomen/pelvis; to rule out cardiac conditions; and to rule out thromboembolism.
 - 2018 National Hospital Ambulatory Medical Care Survey suggest that among women age 15-64 years in the US, stomach/abdominal pain, cardiac complaints, and dyspnea and leg symptoms are all among the top ten diagnoses for emergency department visits.
- CHALLENGE: Our patients access facility outpatient services absent a copay at a rate 5 to 6-fold higher than similar aged women in the US based on 2016 US National Ambulatory Medical Care Survey data (1151.2 encounters/100 persons versus 277.9 encounters/100 persons, respectively)

What's next?

- Three minute response target?
- Utilize Written Complaints and Emergency Grievances to predict requests for medical emergency responses?
- Superutilizer clinic (disproportionate use of system by small number of patients)
- Patient Education?
- How about your facility?
 - Make it an annual target for quality improvement in 2022 or 2023?



Thank you!

- Facility Staff
 - Nurses
 - Medical Team
 - QI Committee
 - Facility Leadership and Operations
 - Security Partners
- Patients
- Other stakeholders and colleagues
 - Input from emergency medical staff, nursing home staff, community members, local EMS, academic experts, and others

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