Cracking the Code:

A Systems Approach to Cardiopulmonary Resuscitation Management

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Objectives

- Define resuscitation quality metrics
- Utilize a data-driven program management strategy
- Transform opportunities for improvement into action items
- Identify and mitigate failure to rescue events

Joint Commission Requirements

R³ Report | Requirement, Rationale, Reference

A complimentary publication of TheJoint Commission

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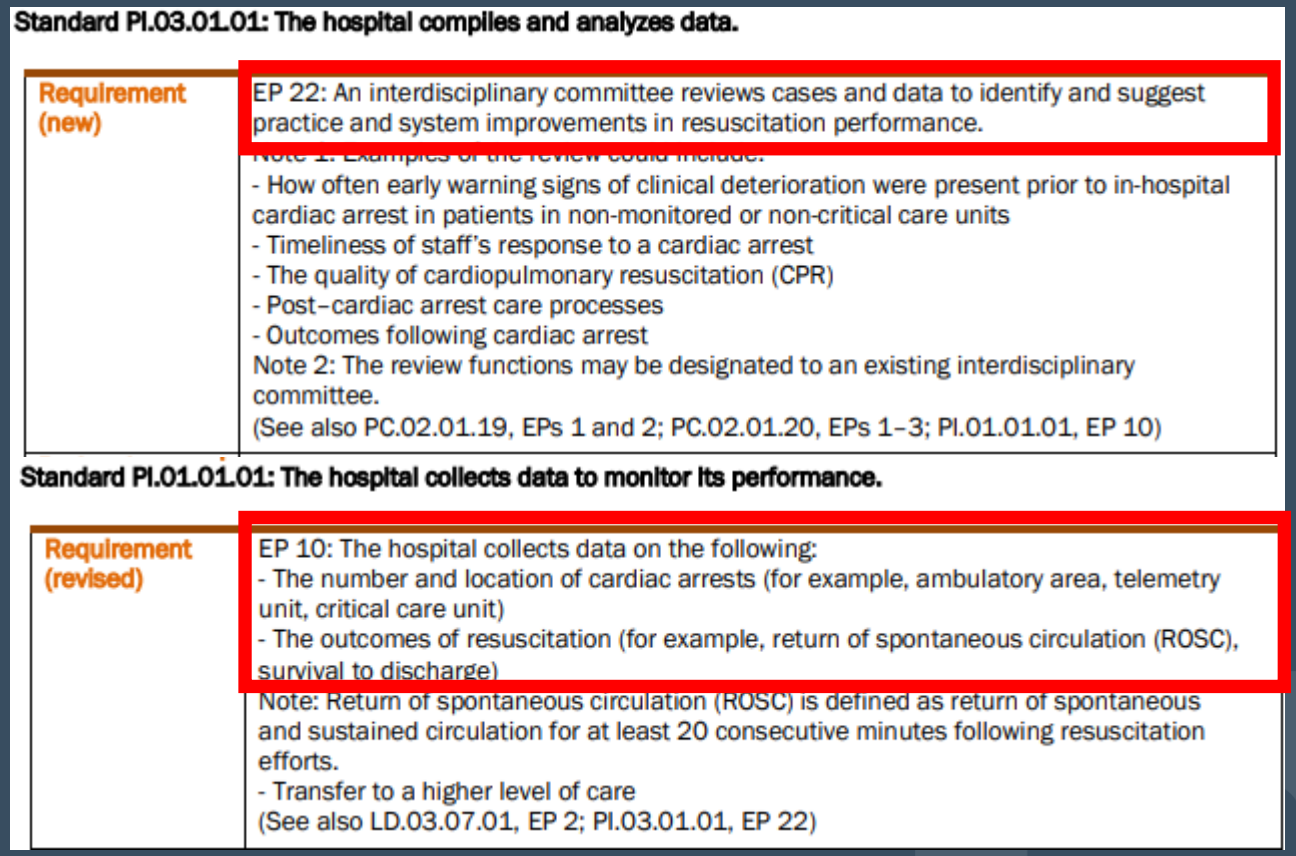
Published for Joint Commission–accredited organizations and interested health care professionals, *R3 Report* provides the rationale and references that The Joint Commission employs in the development of new requirements. While the standards manuals also may provide a rationale, *R3 Report* goes into more depth, providing a rationale statement for each element of performance (EP). The references provide the evidence that supports the requirement. *R3 Report* may be reproduced if credited to The Joint Commission. Sign up for email delivery.

Resuscitation Standards for Hospitals

Effective January 1, 2022, new and revised requirements related to resuscitation care will be applicable to Joint Commission-accredited hospitals and critical access hospitals (CAHs). The requirements aim to strengthen resuscitation and post-resuscitation care processes in hospitals and CAHs by bringing the standards in closer alignment with contemporary guidelines and evidence.

Despite improvements in resuscitation outcomes nationally over the past two decades, survival after in-hospital cardiac arrest varies widely across and within hospitals. The revised standards on resuscitation care address several interlinked factors that have been cited as critical to resuscitation performance; namely, the quality of hospital personnel training, adherence to evidence-based protocols, collection of data, and the implementation of internal quality control and case review mechanisms. Overall, the revised standards are intended to reduce unnecessary variations in practice and encourage hospitals to adopt a more proactive and responsive approach to resuscitation and post-resuscitation care to maximize patient survival with the best possible neurological outcomes.



Standard PI.03.01.01: The hospital compiles and analyzes data.

Requirement (new)	EP 22: An interdisciplinary committee reviews cases and data to identify and suggest practice and system improvements in resuscitation performance. Note 1: Examples of the review could include: - How often early warning signs of clinical deterioration were present prior to in-hospital cardiac arrest in patients in non-monitored or non-critical care units - Timeliness of staff's response to a cardiac arrest - The quality of cardiopulmonary resuscitation (CPR) - Post–cardiac arrest care processes - Outcomes following cardiac arrest Note 2: The review functions may be designated to an existing interdisciplinary committee. (See also PC.02.01.19, EPs 1 and 2; PC.02.01.20, EPs 1–3; PI.01.01.01, EP 10)

Standard PI.01.01.01: The hospital collects data to monitor its performance.

Requirement (revised)	EP 10: The hospital collects data on the following: - The number and location of cardiac arrests (for example, ambulatory area, telemetry unit, critical care unit) - The outcomes of resuscitation (for example, return of spontaneous circulation (ROSC), survival to discharge) Note: Return of spontaneous circulation (ROSC) is defined as return of spontaneous and sustained circulation for at least 20 consecutive minutes following resuscitation efforts. - Transfer to a higher level of care (See also LD.03.07.01, EP 2; PI.03.01.01, EP 22)

https://www.jointcommission.org/-/media/tjc/documents/standards/r3-reports/r3-report_resuscitation_hap_final_.pdf

Primary Service Objectives

Optimize Resuscitation Outcomes

3 Continents, 4 Countries, 17 US Inpatient Facilities, 300+ Outpatient Locations at CCF

ELiMINATE Failure to Rescue Events

Avoidable cardiac arrest from a medical or surgical condition

Why Organize Resuscitation As A System?

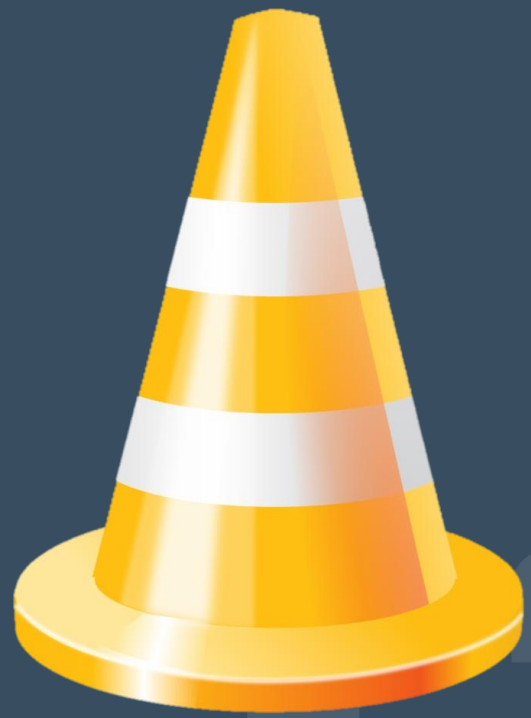
- Establish chain of command
- Reporting Structure
- Content Expertise
- Practice Standardization
- Data Leveraging

Leadership Structure

- Centralized Administration
  - Resuscitation Advisory Council
    - Multispecialty Physicians, Advanced Practice Providers, Nursing, Respiratory Therapy, Pharmacy
    - Relationship with Quality, Clinical Risk, and Legal
    - Policies, metrics, equipment standardization
- Local Ownership
  - Daily administration
  - Event review
  - Quality Metrics
  - Team Management

Resuscitation Challenges

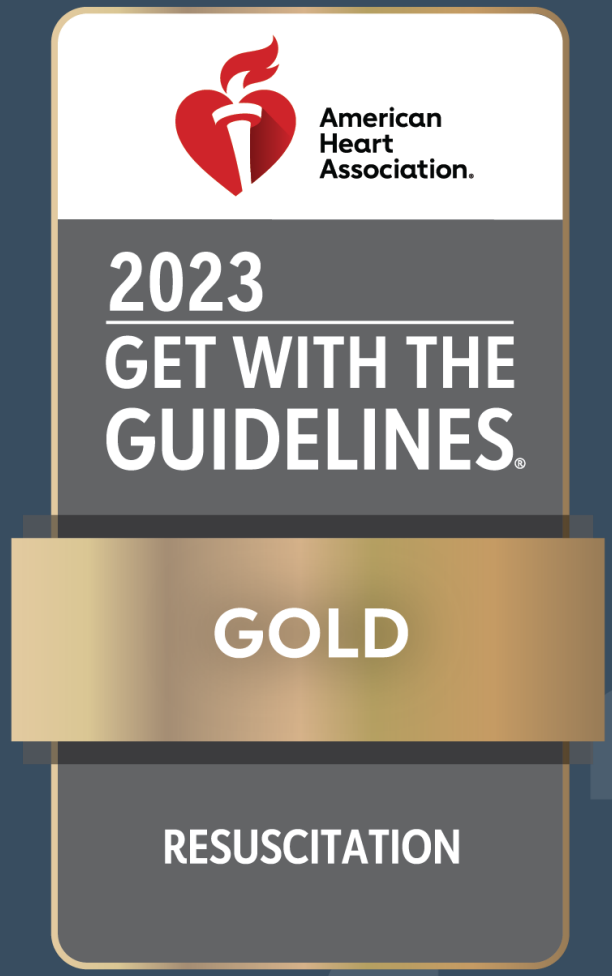
- Organization
  - Vision
  - Prioritization
  - Funding
- Program
  - Leadership
  - Oversite
  - Expectation ambiguity
  - Communication
- Site
  - Culture
  - Education
  - Resources
- Individual
  - Engagement
  - Knowledge
  - Pride
  - Fear



Resuscitation Quality

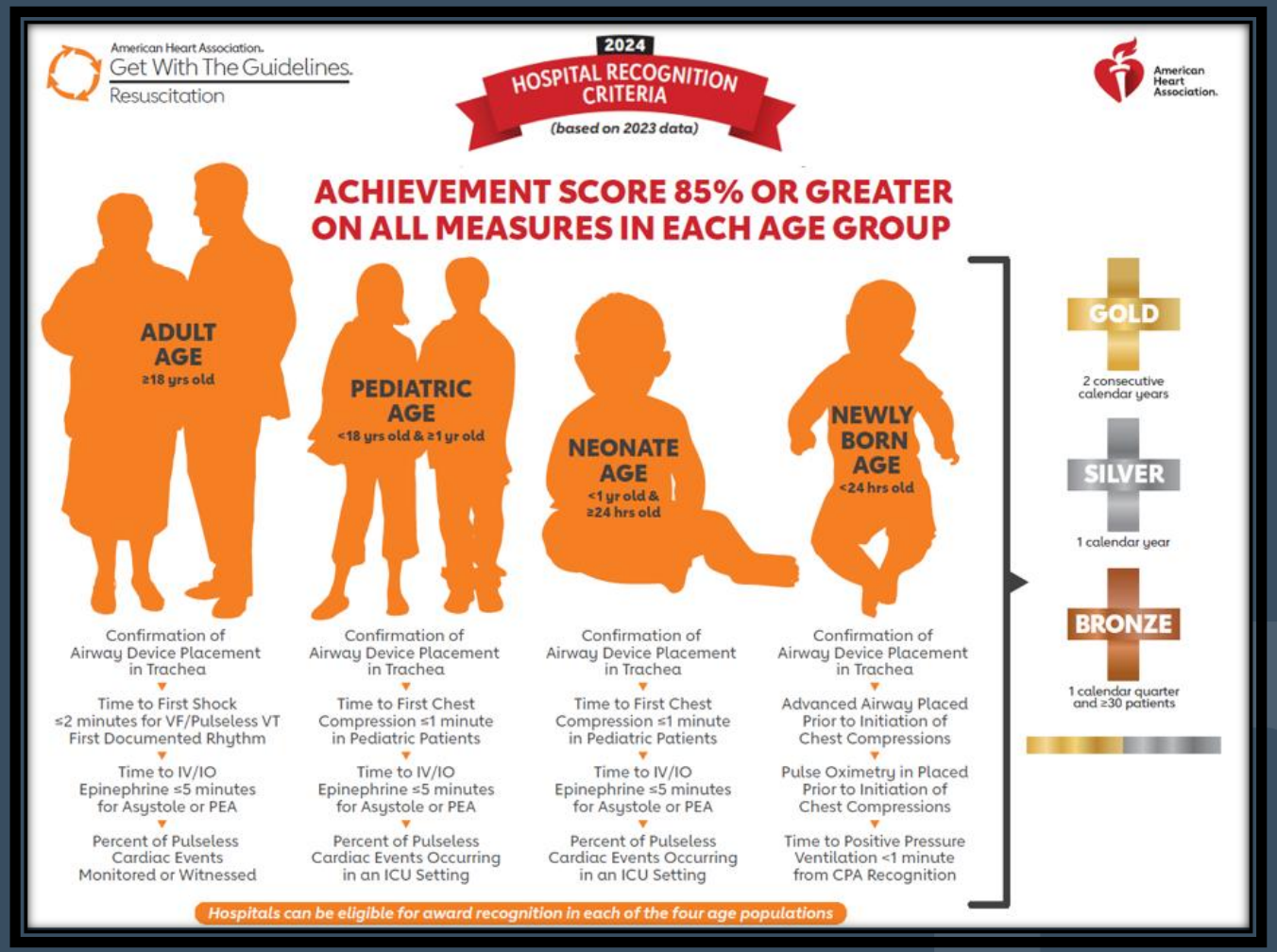
Defining Resuscitation Quality

- American Heart Association Get with the Guidelines for Resuscitation (AHA GWTG – R)
- Return of Spontaneous Circulation (ROSC)
- Survival to Discharge
- Event rates per 1000 patient days
- Failure to Rescue



American Heart Association
Get with the Guidelines—Resuscitation

- Four populations with recognition status
- Publicly available
- Broadly applicable and clearly defined
- Process metric
  - Not outcomes-based



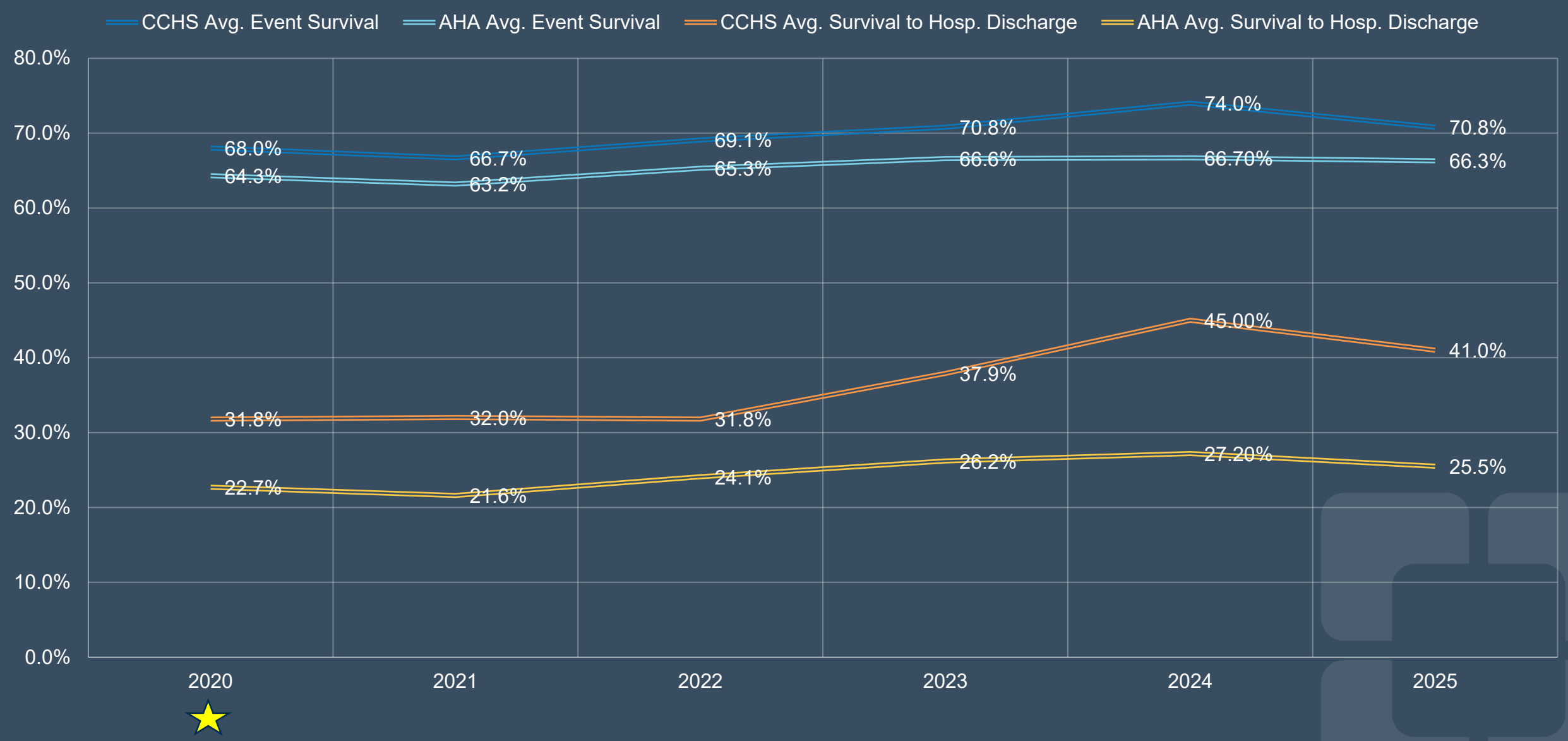
Return of Spontaneous Circulation (ROSC)

- ROSC National Average ~ 66%
  - “50,000-foot view”
  - Context needed:
    - Co-morbidities
    - Admission Diagnosis
    - Arrest Etiology

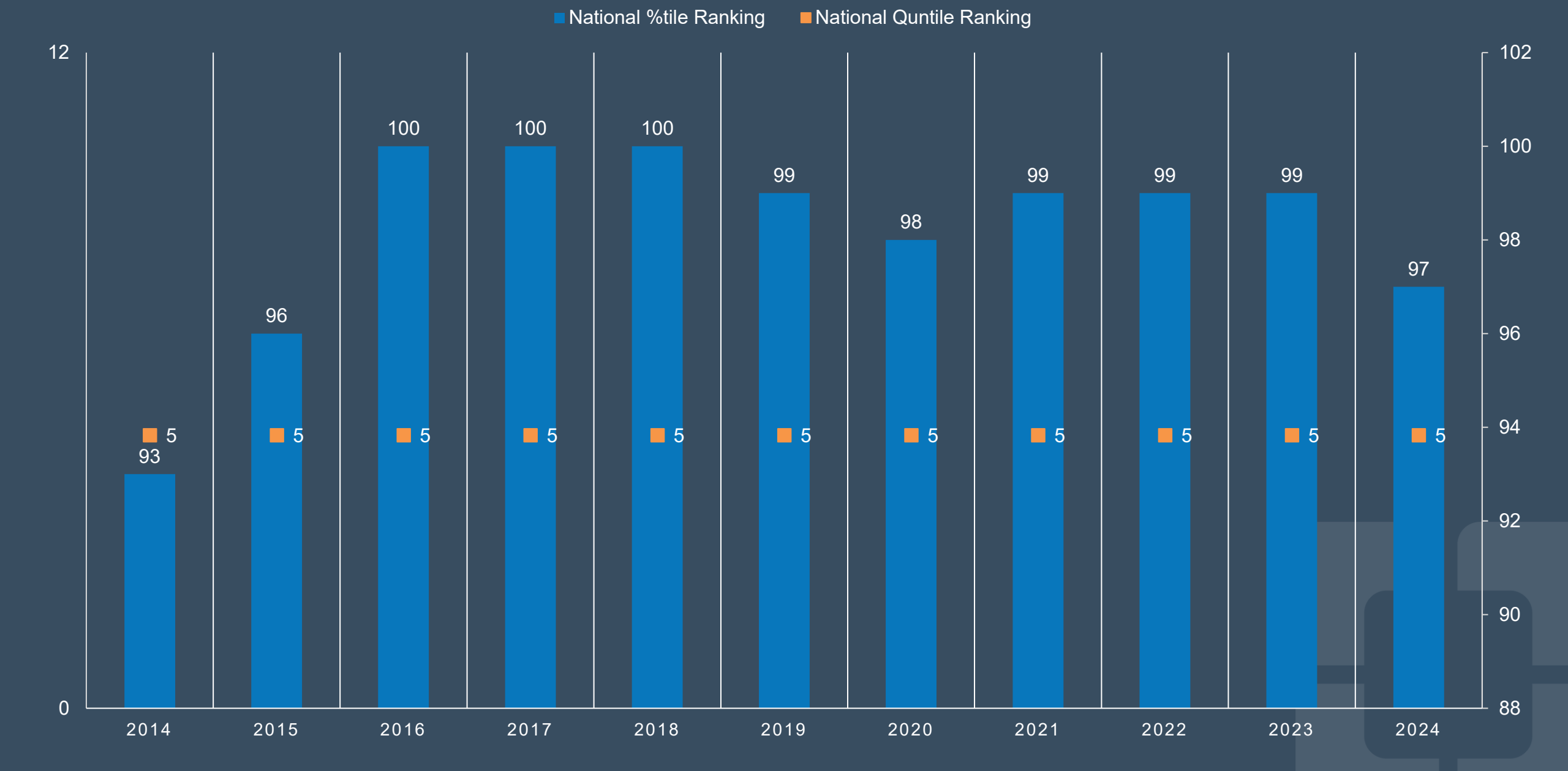
Survival to Discharge

- National Average ~ 27%
  - Event vs encounter survival
  - Impact of hospital transfer
  - Neurological condition not included

Outcomes 2019 – 2025



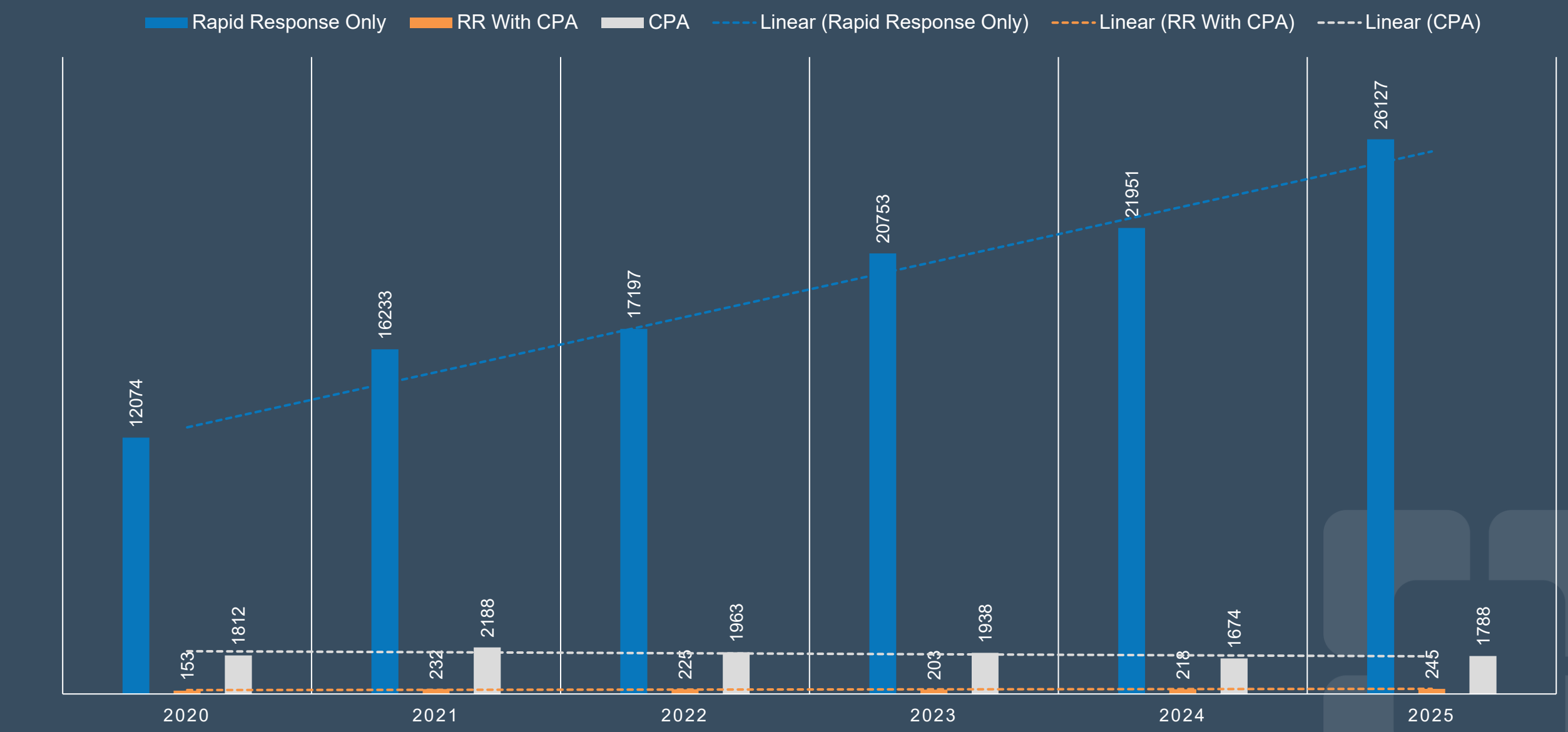
AMERICAN HEART ASSOCIATION RISK ADJUSTED SURVIVAL



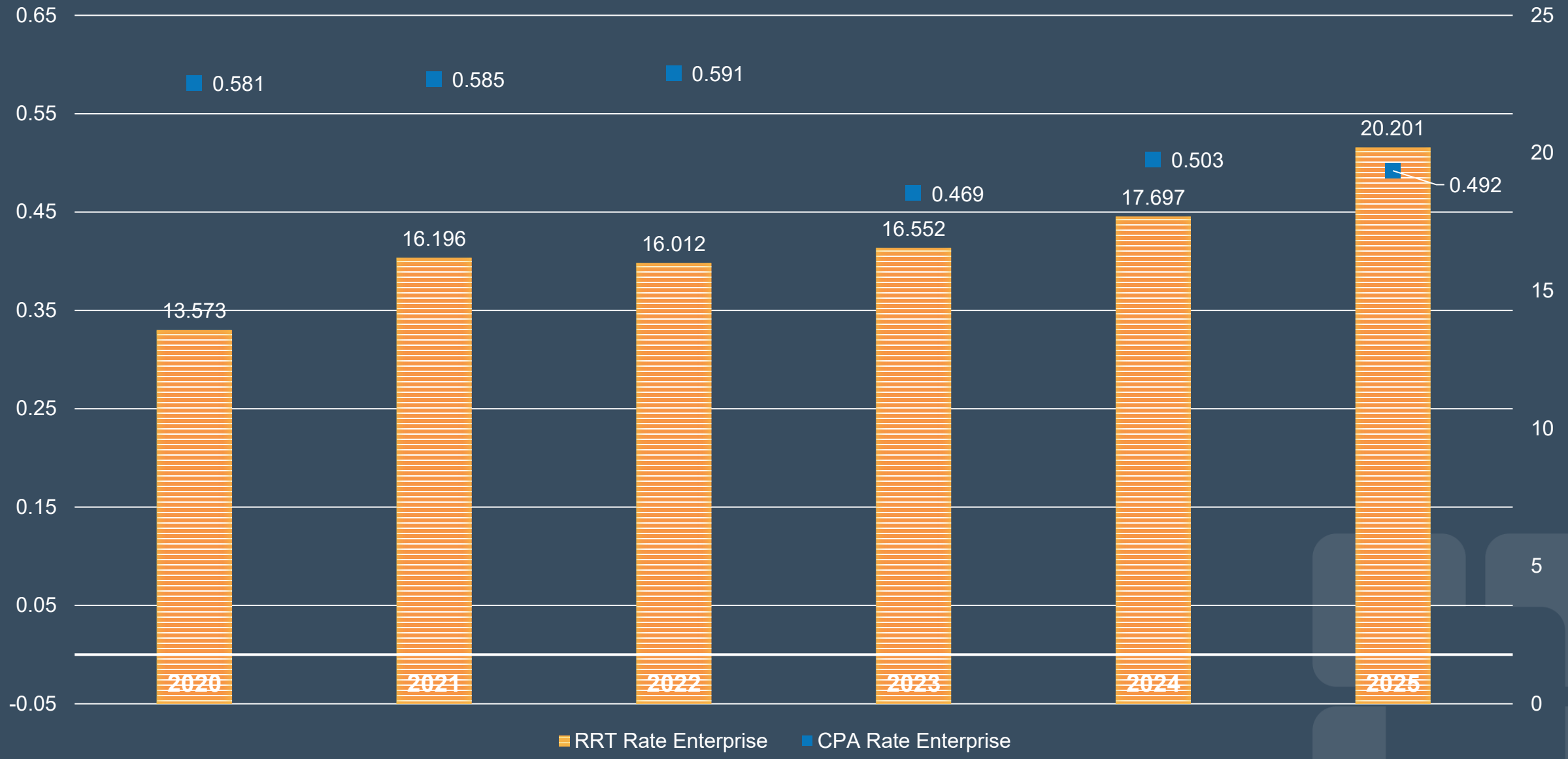
Event Volumes and Rates

- Unadjusted Event Volume
  - Code to Rapid Response Ratio
  - Culture dependent
  - Coarse measure
  - Link to outcomes?
- Events per 1000 patient days
  - No set standard
  - Quasi-normalization
  - Program comparisons
  - Interpretations?

CCHS Event Volumes 2020 – 2025



Enterprise Regular Nursing Floor Event Rates Comparison



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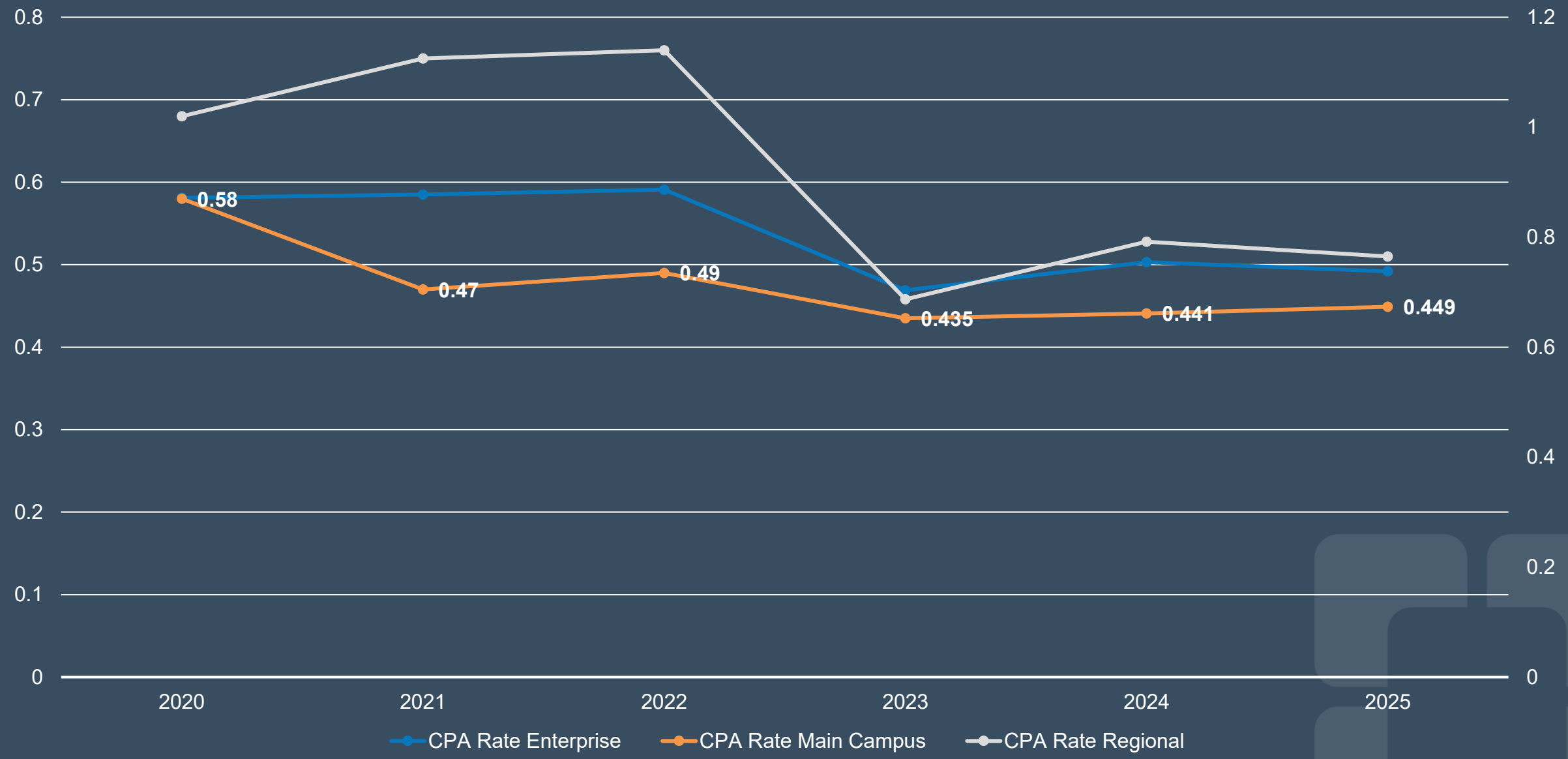


Representative Hospital Report Card

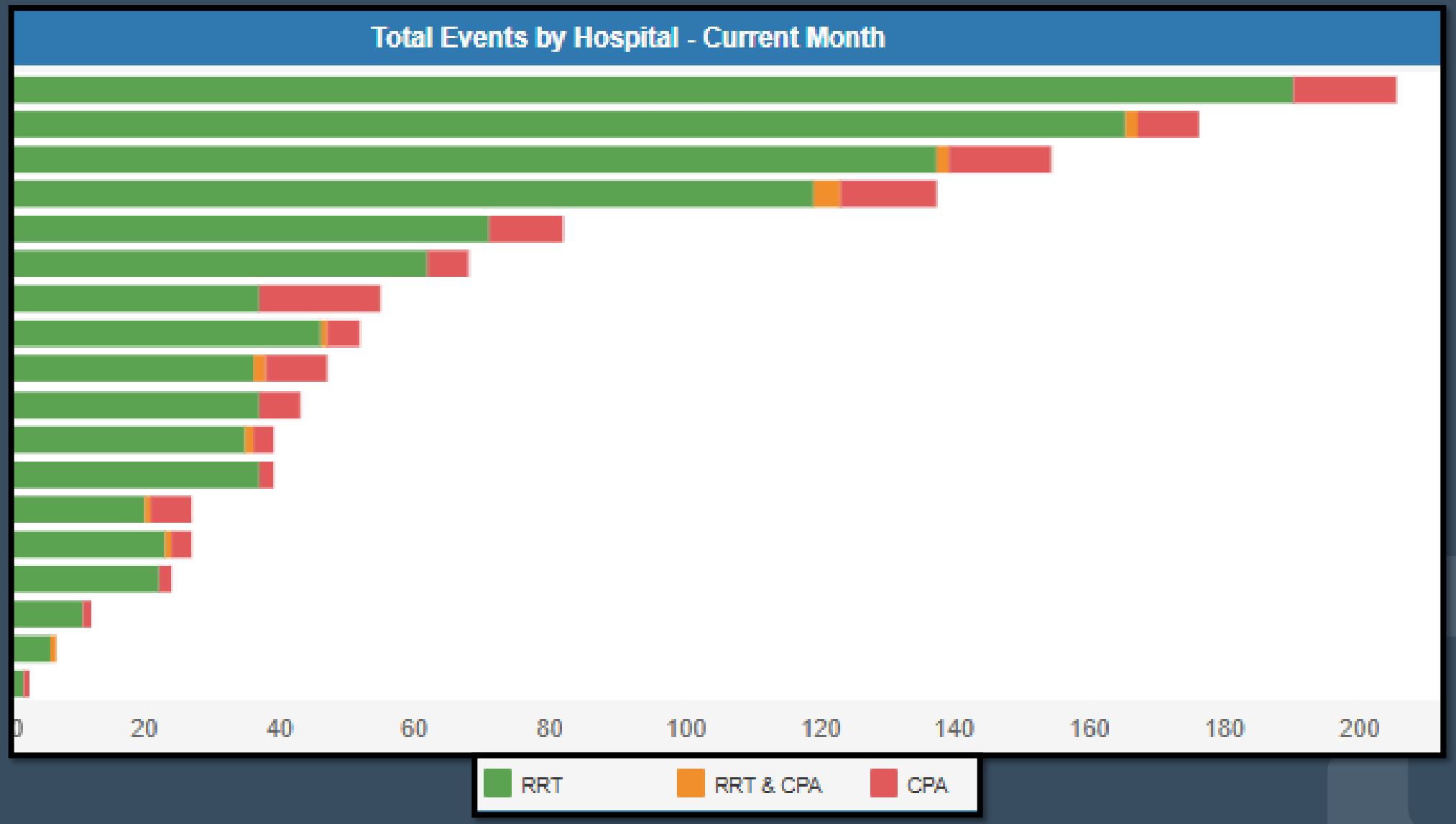
Objective	Key Result	Goal	2024	2025	2026 Apr YTD	2026 Status
Get With the Guidelines	Confirmation of Airway	>85%	62%	68%	67%	🔴
	Time to defibrillation <= 2 min	>85%	78%	81%	80%	🟡
	Time to first epi <= 5 min	>85%	96%	99%	98%	🟢
	Event monitored/witnessed	>85%	92%	99%	97%	🟢
Outcome Metrics	Event Survival	>66%	69% (133/192)	70% (105/149)	78% (91/116)	🟢
	RNF Event Survival	>66%	64% (47/73)	59% (22/37)	77% (27/35)	🟢
	Survival to Hospital Discharge	>25%	29% (47/161)	36% (43/119)	42% (36/86)	🟢
CPA Locations	Proportion of Codes in ICU	>66%	53% (81/154)	67% (72/108)	64% (61/96)	🟡
	Percentage of CPA events of all RNF events	<5%	5.80% (37/638)	3.20% (37/1158)	4.73% (35/739)	🟢
	RNF Event Rate/1000 Days	0.486	CPA Rate – 0.528 RRT Rate – 6.98	CPA Rate – 0.852 RRT Rate – 9.26	CPA Rate – 0.662 RRT Rate – 12.74	🟡

Make The System Work

Data Analytics

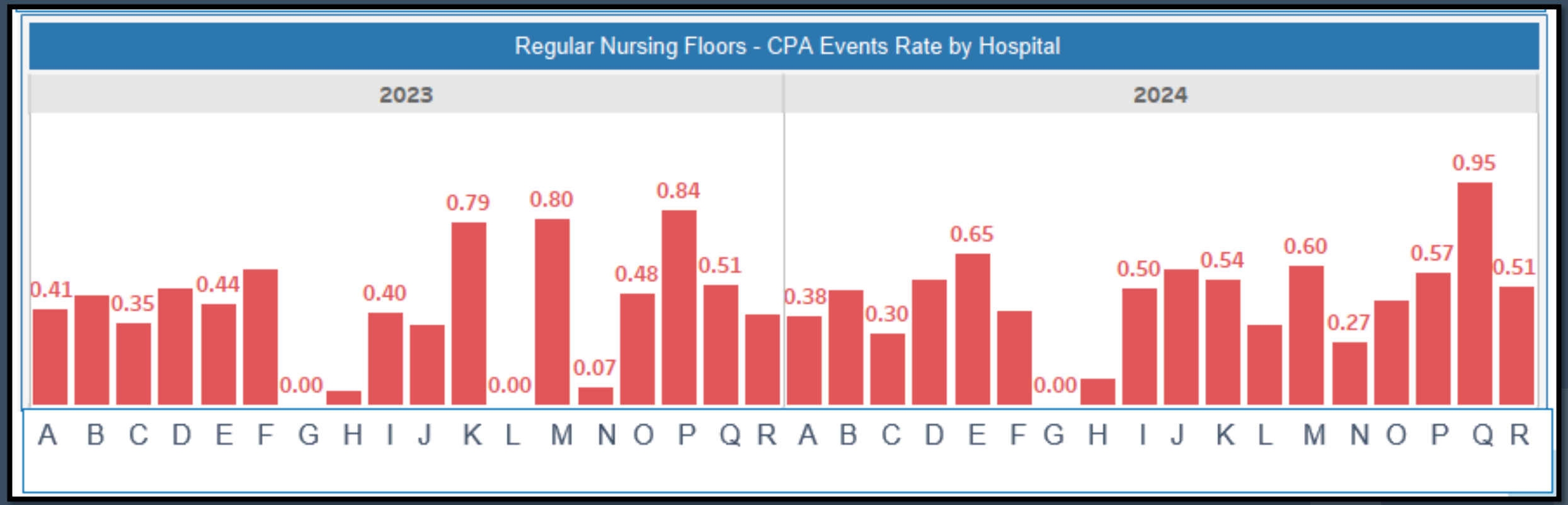
- Internal and external hospital comparisons drive quality improvement and resourcing
- Data collection and abstraction process
- Metrics
  - Volume
  - Situational Awareness
  - Outcomes
  - Process

Representative Volume Metrics



Representative Situational Awareness Metrics

Representative CPA Rate Comparisons



Representative Outcome Metrics

Representative Process Metrics

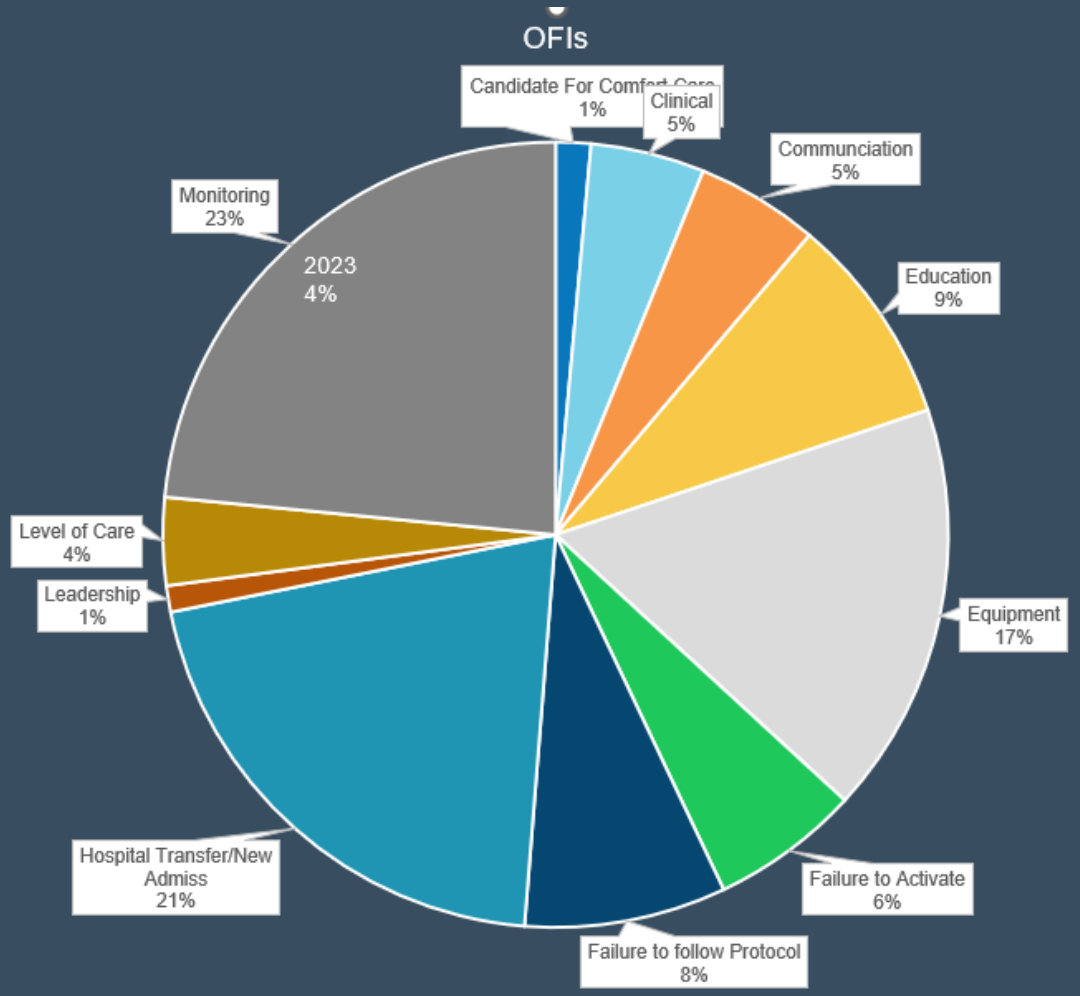
Code Review

Adjudication Standards

- Multidisciplinary review
  - Physician and Nurse components
  - **Preceding 24+ hours → post-code**
- Standardized work products
  - Probable Cause
  - Opportunities for Improvement (OFIs)
  - Action Items
  - Rescue Categorization

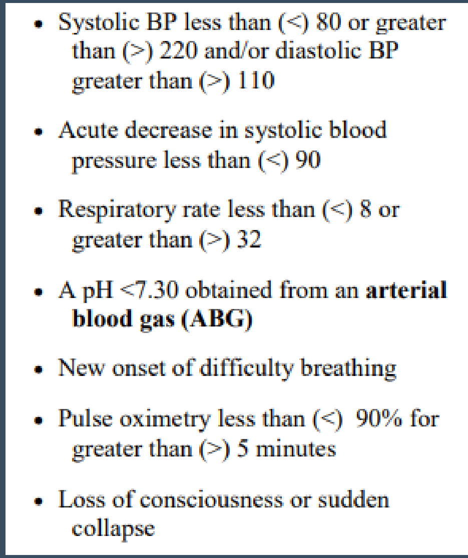
Opportunities For Improvement

- Identified for every code reviewed
  - Required work product
  - Develop action items
  - Case level vs aggregate
  - Not necessarily based off deficiencies

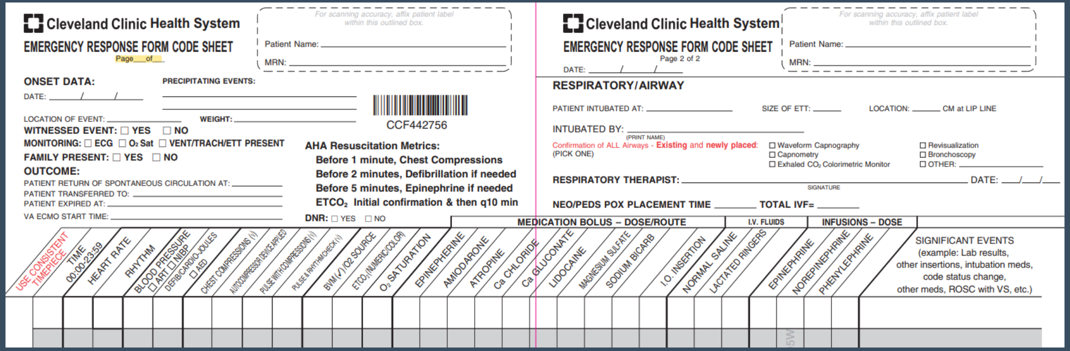


Documentation=58% of all cases

Standardization Initiatives



- Systolic BP less than (<) 80 or greater than (>) 220 and/or diastolic BP greater than (>) 110
- Acute decrease in systolic blood pressure less than (<) 90
- Respiratory rate less than (<) 8 or greater than (>) 32
- A pH <7.30 obtained from an **arterial blood gas (ABG)**
- New onset of difficulty breathing
- Pulse oximetry less than (<) 90% for greater than (>) 5 minutes
- Loss of consciousness or sudden collapse



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EMERGENCY RESPONSE FORM CODE SHEET
Page__of__

For scanning accuracy, affix patient label within this outlined box.
Patient Name:
MRN:

ONSET DATA:
DATE: __/__/__
PRECIPITATING EVENTS:
CCF442756
LOCATION OF EVENT:
WEIGHT:
WITNESSED EVENT: ☐ YES ☐ NO
MONITORING: ☐ ECG ☐ O_2 Sat ☐ VENT/TRACH/ETT PRESENT
FAMILY PRESENT: ☐ YES ☐ NO
OUTCOME:
PATIENT RETURN OF SPONTANEOUS CIRCULATION AT:
PATIENT TRANSFERRED TO:
PATIENT EXPIRED AT:
VA ECMO START TIME:

AHA Resuscitation Metrics:
Before 1 minute, Chest Compressions
Before 2 minutes, Defibrillation if needed
Before 5 minutes, Epinephrine if needed
$ETCO_2$ Initial confirmation & then q10 min
DNR: ☐ YES ☐ NO

USE CONSISTENT TIMEPIECE | TIME 00:00-23:59 | HEART RATE | RHYTHM | BLOOD PRESSURE ☐ ART ☐ NIBP | DEFIB/CARDIO-JOULES ☐ AED | CHEST COMPRESSIONS (√) | AUTOCOMPRESSOR DEVICE APPLIED | PULSE WITH COMPRESSIONS (√) | PULSE & RHYTHM CHECK (√) | BVM (√)/O2 SOURCE | $ETCO_2$ (NUMERIC/COLOR) | O_2 SATURATION

MEDICATION BOLUS – DOSE/ROUTE: EPINEPHERINE | AMIODARONE | ATROPINE | Ca CHLORIDE | Ca GLUCONATE | LIDOCAINE | MAGNESIUM SULFATE | SODIUM BICARB | I.O. INSERTION
I.V. FLUIDS: NORMAL SALINE | LACTATED RINGERS
INFUSIONS – DOSE: EPINEPHRINE | NOREPINEPHRINE | PHENYLEPHRINE
SIGNIFICANT EVENTS (example: Lab results, other insertions, intubation meds, code status change, other meds, ROSC with VS, etc.)

Cleveland Clinic Health System
EMERGENCY RESPONSE FORM CODE SHEET
Page 2 of 2
DATE: __/__/__

For scanning accuracy, affix patient label within this outlined box.
Patient Name:
MRN:

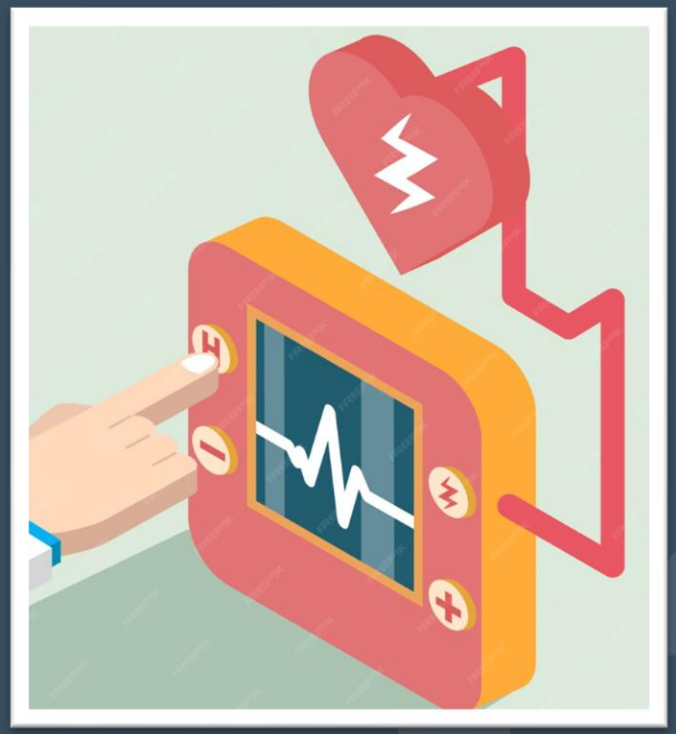
RESPIRATORY/AIRWAY
PATIENT INTUBATED AT: SIZE OF ETT: LOCATION: __ CM at LIP LINE
INTUBATED BY: (PRINT NAME)
Confirmation of ALL Airways - **Existing** and **newly placed**: (PICK ONE)
☐ Waveform Capnography
☐ Capnometry
☐ Exhaled CO_2 Colorimetric Monitor
☐ Revisualization
☐ Bronchoscopy
☐ OTHER:
RESPIRATORY THERAPIST: (SIGNATURE) DATE: __/__/__
NEO/PEDS POX PLACEMENT TIME __ TOTAL IVF= __

- Code Carts
  - 1 cart for Enterprise (~900)
- Activation Criteria
  - Same at all locations
- Documentation
  - Event Notes and Code Sheets

Education

Simulated Critical Events

- System Testing
  - Preparedness
  - Mock codes + task training
  - Equipment, protocols, and procedures
  - Latent risks and blind spots
- Individual Learning
  - General competency
  - Focused learning



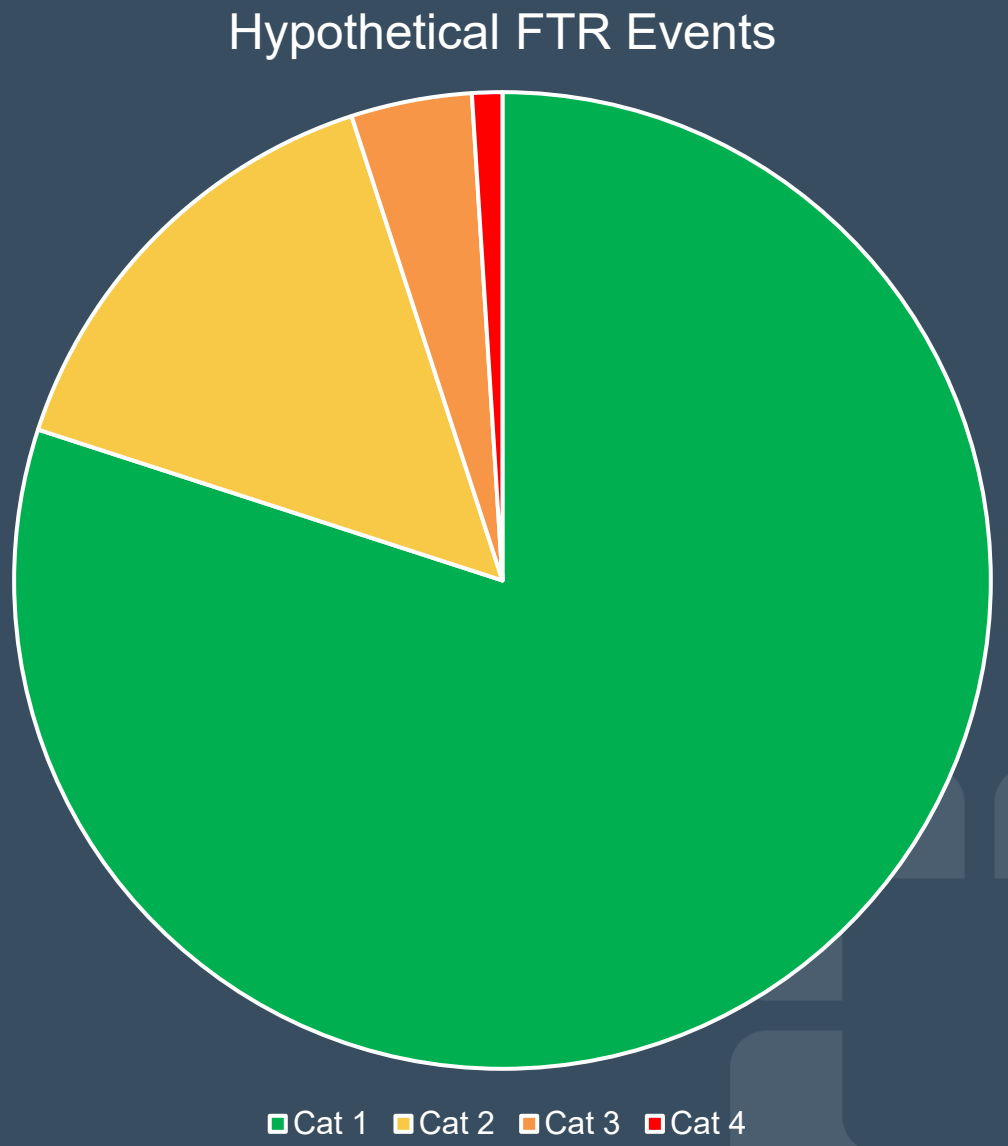
Failure to Rescue (FTR)

FTR Definition and Background

Failure to prevent an avoidable cardiac arrest or death from a medical or surgical condition

Rescue Categorization

- **Category 1**
  - Unavoidable
- **Category 2**
  - Delay in recognition or response with minimal clinical impact
- **Category 3**
  - Delay in recognition or response with significant clinical impact
- **Category 4**
  - Significant deviation in standard of care



Rescue Categorization Challenges

- Failure to identify clinical issues
  - Multidisciplinary input
- Disagreement
  - Leadership team review
- Unclear action plans
  - Standardized reporting and escalation pathways
- Culture of safety
  - 3rd party Critical Care leader participation

Adjudication Pathways

Category 1

Individual counseling

Unit education

Category 2

Individual counseling

Unit education

Additional mock codes

Continuous Improvement project

Physician and/or nursing Peer Review

Category 3

Physician and/or nursing Peer Review

Causal analysis

Safety Event Reporting System (SERS)

Notification to hospital quality, leadership, and clinical risk through SERS entry

Category 4

Immediate notification by CRRC/ROC to hospital quality, leadership, and clinical risk management.

SERS (if not already completed)

Role of the Caregiver

- Your help is needed!!!
  - Leadership
  - Committee membership
  - Content Expertise
  - Direct Patient Care

Future Directions

- Processes
  - Standardization
  - High reliability
- Team
  - ‘Right sizing’
  - Expanded competencies
- Technology
  - Remote physician support
  - Artificial Intelligence (risk stratification and monitoring)
  - Wearables

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Every life deserves world class care.