Efforts to Improve Outcomes of In-Hospital Cardiac Arrest in the VA

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Disclaimer

• The views expressed are my own and do not necessarily represent the official views, position, or policy of the Department of Veterans Affairs, or the United States government.

• No additional disclosures
Objectives

- Importance of in-hospital cardiac arrest (IHCA) to VA
- Challenges and opportunities in the VA
- CART Program as a model
- Future of IHCA QA/QI in the VA (and elsewhere)
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What is the VHA?

• Largest U.S. integrated healthcare system
  – Serves 8.76 million Veterans annually
  – Over 1,700 sites of care

• Complex multimorbidity patients\(^1\)
  – Average of 3 chronic medical conditions
  – More than 1 in 4 with a disability

• High quality of care\(^2\)

VA Attention to IHCA

Prevalence and survival of IHCA varies within the VA

Graph 1: Prevalence of IHCA across hospital ranks
- X-axis: Hospital Rank
- Y-axis: Rate (per 1000 Admissions)
- Data points show an increasing trend in IHCA rates with higher ranks.

Graph 2: Survival rates of IHCA
- X-axis: Percent of IHCA Surviving to Discharge
- Y-axis: Number of Hospitals
- Bar graph indicates variability in survival rates across hospitals.
• VHA Directive 2008-063
  – Mandatory VHA policy

• Calls for IHCA data to be:
  – “aggregated, analyzed, compared internally over time and externally ...(benchmarking)”
  – “used to identify and implement desired changes”
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Challenges in the VA

National Directives ➔ Regional Implementation

VISN 1 alone has 11 medical centers

- Edith Nourse Rogers Memorial Veterans Hosp.
- Manchester VA Medical Center
- Providence VA Medical Center
- VA Boston Healthcare System, Brockton
- VA Boston Healthcare System, Jamaica Plain
- VA Boston Healthcare System, West Roxbury
- VA Central Western Massachusetts VA
- Connecticut Healthcare System, Newington VA
- Connecticut Healthcare System, West Haven VA
- Maine Healthcare System – Togus
- White River Junction VA Medical Center
Challenges in the VA

Data available vs. Data needed

**Available**
- Patient characteristics
  - Demographics
  - Comorbid conditions
- Vitals signs
- Laboratory
- Survival

**Needed**
- Resuscitation care
  - Witnessed or monitored
  - Time to therapies
- Resuscitation process
  - Team structure
  - Feedback/debriefing
- Health status outcomes
Opportunities in the VA

- Integrated healthcare setting
  - Network for dissemination of strategies that work

- Longitudinal data capture
  - Lower burden for data collection
  - Longitudinal outcomes assessment
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The CART Model

• The Problem
  – No QA/QI program for VA cath lab procedures
    • >50,000 procedures annually
    • Documentation in dictated or typed notes – adequate for clinical care, unable to leverage for QA/QI

• The Opportunity
  – Integrate with VA Electronic Health Record
    • Standardized data collection and clinical reporting
    • Support data collection for local and national QA/QI efforts
VA CART Program

- National clinical quality program for all VA cath labs
- Point-of-care data collection for all PCIs performed in the VA
- Linked to VA electronic health record and administrative data
# Typical QA/QI Programs vs CART

<table>
<thead>
<tr>
<th>Typical QA/QI</th>
<th>CART Program</th>
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<tbody>
<tr>
<td>• Data abstraction</td>
<td>• Point-of-care data</td>
</tr>
<tr>
<td>– Timely, costly</td>
<td>– Routine clinical care</td>
</tr>
<tr>
<td>• Retrospective</td>
<td>• Real-time</td>
</tr>
<tr>
<td>– Delayed feedback</td>
<td>– Rapid feedback</td>
</tr>
<tr>
<td>• Limited data linkage</td>
<td>• Longitudinal linkages</td>
</tr>
<tr>
<td></td>
<td>• Higher quality data(^1)</td>
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<tr>
<td></td>
<td>– Validity, completeness,</td>
</tr>
<tr>
<td></td>
<td>timeliness</td>
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CART Accomplishments and Future

- Standardized data capture
  - Supports benchmarking of cath lab procedures

- Major adverse events review
  - Real-time identification and review of care processes

- Proactive medical device surveillance
  - Unexpected device problems reviewed with FDA

- Future targets for QA and QI
  - Clinical decision support
  - Patient-reported health status capture
# CART - Resuscitation

## CART-CPR

<table>
<thead>
<tr>
<th>CART-CPR</th>
<th>in use by Provider, Patient Care</th>
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<tbody>
<tr>
<td>File</td>
<td>Edit</td>
</tr>
<tr>
<td>SMITH, JOE B</td>
<td>123456789 1/1/50 58</td>
</tr>
<tr>
<td>New Report</td>
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### Chest Compressions and Defibrillation
- **Received chest compressions (>5 seconds) and/or defibrillation?**
  - **YES**
  - **NO**
- **Date/Time need for CPR and/or defibrillation recognized:**
  - **Date:**
  - **Time:**

### Event
- **Event:**
  - Witnessed (seen or heard)
  - Identified by Telemetry
  - Identified by Pulse Oximetry
  - Unwitnessed

### Hospital-wide "Code" Call
- **Was a Hospital-wide "Code" Called?**
  - **YES**
  - **NO**
- **Date/Time "Code" Team Arrived:**
  - **Event Area:** pulldown menu

### In-hospital Arrest
- **Immediate Cause(s) of In-hospital Arrest**
  - Arrhythmia
  - Pulmonary Embolism
  - Hypotension/Hypoperfusion
- **In-hospital Arrest**
  - Pulmonary Edema
  - Respiratory Insufficiency
  - Myocardial ischemia/infarction
- **Select all that directly contributed to arrest:**
  - Loss of mechanical airway
  - Acute Stroke
  - Airway obstruction
- **Hemodynamic Status at Time Arrest Recognized:**
  - Pulseless
  - Weak pulse prior to pulseless
  - Weak pulse, never pulseless
- **AED Utilized:**
  - **YES**
  - **NO**
  - Not documented

### Pulses
- **Pulseless Patient:**
  - **Date/Time CPR Initiated:** pulldown menu
  - **First Documented Pulseless Rhythm:**
    - Asystole
    - Pulsatile electrical activity (PEA)
    - Ventricular fibrillation
    - Other
  - **Patient with weak pulse:**
    - **Initial Rhythm:**
      - Accelerated idioventricular rhythm
      - Bradycardia
      - Sinus (includes sinus tachycardia)
      - Pacemaker
      - Supraventricular tachycardia
      - V-tach w/pulse

### Defibrillation and Shock
- **Did the Patient Ever Have Ventricular Fibrillation or Pulseless V-Tach?**
  - **YES**
  - **NO**
- **Defibrillation shock provided:**
  - **YES**
  - **NO**
  - **NO per advanced directive**
  - **Unknown**
  - **First Shock Delivered:** pulldown menu
  - **Type of defibrillator for first shock:** pulldown menu
  - **Date/Time of first shock:** pulldown menu
  - **Rhythm after first shock:** pulldown menu
  - **Total shocks:**

### Event Log
- **Event (1)**
- **Event (2)**
- **Response**
- **Background Data**
Summary Point #1

1. Support integrated data capture for IHCA as part of routine care delivery
   - Reduce data capture burden
   - Improve quality of data capture
   - Facilitate rapid feedback
What data do we REALLY need?

• GWTG-Resuscitation
  – 100s of data elements; hours per average chart
  – Many elements have never been applied to research or quality improvement efforts

• Revised Utstein Templates
  – Concise data capture
  – Focused on specific questions of interest
2. Identify the priority questions of interest for IHCA

- Recognize IHCA is different than OHCA
- Pre-arrest, resuscitation, and post-resuscitation care
- Training, code team structure, feedback
- Guide the critical data that needs collecting
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Learning Healthcare System

- Generating and using real-time knowledge to improve outcomes
- Engaging patients, families, and communities
- Achieving and rewarding high-value care
- Creating a new culture of care
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Generating and Using Real-Time Knowledge

- Transactional Quality Improvement
  - Closing the loop of data capture and quality improvement at the point-of-care

- Rapid Cycle Pragmatic Trials

- Organizational Culture
3. Apply the model of a learning healthcare system
   - Real-time access to knowledge
   - Rapid cycle pragmatic trials
   - Organizational structure and culture
Summary Recommendations

1. Support integrated data capture for IHCA as part of routine care delivery

2. Identify the primary questions of interest for IHCA

3. Apply the model of a learning healthcare system
Thank you

• VA CART Program
  – John S. Rumsfeld, MD, PhD

• VA Office of Analytics and Business Intelligence
  – Stephen D. Fihn, MD, MPH

• VA Resuscitation Education Initiative
  – Phil Hargreaves