National Collaborative for Bio-Preparedness

Charles B. Cairns, MD, FACEP, FAHA
Professor & Chair
Department of Emergency Medicine
University of North Carolina
Chapel Hill
Disclosures

This material based upon work supported by the U.S. Department of Homeland Security under Grant Award Number DHS-10-OHA-122-001
Opportunities in Emergency Care:

Timing, severity and acuity of disease and treatment
Benefits of Lytic Therapy are Time Dependent
Mortality reduction versus treatment delay


35 day mortality

Absolute benefit per 1000 patients treated

Treatment delay (hours)
Randomized trials of rtPA for Ischemic Stroke

Goldstein L B Circulation 2007;116:1504-1514
Emergency Care Regionalization

Right Care at Right Place at Right Time
North Carolina – Heart Disease Death Rates
Total population, Ages 35+, 2000-2006

Source: CDC, 2011
Reperfusion of Acute Myocardial Infarction in North Carolina Emergency Departments (RACE)

Assessment of Temporal Trends in Mortality With Implementation of a Statewide ST-Segment Elevation Myocardial Infarction (STEMI) Regionalization Program

Seth W. Glickman, MD, MBA, Melissa A. Greiner, MS, Li Lin, MS, Lesley H. Curtis, PhD, Charles B. Cairns, MD, Christopher B. Granger, MD, Eric D. Peterson, MD, MPH

All ages – RACE vs non-RACE

Medicare – RACE vs non-RACE

NQF Regionalization of Emergency Care

Episode of Care: Acute Myocardial Infarction

**Phase 1**
- Presence of a Regional STEMI destination with cath lab and ICU
- Presence of EMS Triage and Destination Protocols for STEMI
- Presence of Communication Technology for use between EMS, ED, Cardiology

**Phase 2**
- Identification of STEMI by EMS Personnel
- Care Process Measures
- Timeliness Measures
- EMS - ED - Cath Lab Communication
- Standards of care and specialty care coordination

**Phase 3**
- Post PCI ICU care
- Care Coordination measures
- Communication between providers

Feedback:
- Ensure closed loop communication such that the system learns from itself
- Ensure that data informs the system in order to facilitate system improvement as well as prevention of further episodes.

End of Episode
Evaluation of Patient-Oriented Outcomes:
- Neurologically Intact Survival to Discharge
- Functional Status

Appropriate Times Throughout Episode
- Assessment of Patient Oriented intermediate outcomes, if valid to evaluate the performance of the system.
- Ensure measurement of transitions between units of service
- Emphasize appropriate measurement to facilitate comparison across similar regionalized systems in different organizations

Clinical Episode Begins: Patient has symptoms, calls 911
Every minute counts when public health is at risk.

Federal and state agencies recognize the urgent need to accurately detect and rapidly analyze biological hazards to ensure public health and safety.

**National Collaborative for Bio-Preparedness (NCB-Prepared)**

responds to this need with a comprehensive system that both improves surveillance, awareness and responsiveness to emergent threats, and supports better care and health outcomes for all Americans.

Bio-security depends on bio-preparedness.
NCB-P Project Goals

- Earlier recognition of outbreaks
- Augment bio-surveillance
- Improve situational awareness
- Better inform decision makers
- Provide insight into the quality of care and management systems.
Interventional vs. Investigational Approach

Typical Bio-surveillance = *investigational*

NCB-P Bio-Preparedness = *interventional*

*Intervention* involves *action*.

*Action* must be *timely* to be *effective*.
Across Data and Time

Incident

Data Generated by the Incident

Poison Data
EMS Data
Google Flu
911 Data
ED Data
Food Safety
ED Data

Analytics & Visualization

Daily

Periodic

NBIC Feeds
ProMED
SMARTT
Healthcare Infrastructure
Flood Plain

Analytics & Visualization

Visualization
Health Data Timeliness

<table>
<thead>
<tr>
<th>Time from Event</th>
<th>Time to Data Availability</th>
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<tbody>
<tr>
<td>Minutes</td>
<td>Months</td>
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- **Federal**
  - 911 Data: 1 to 22 hours
  - CPC Data: 1 to 22 hours
  - EMS Data: 1 to 22 hours

- **State**
  - ED Data: 24 hours to months to years
  - Lab Data

- **Local**
  - Hospital Data

NCP Preparted
Analytics
Reactive vs. Proactive

What’s the best that can happen?
What will happen next?
What if these trends continue?
Why is this happening?
What actions are needed?
Where exactly is the problem?
How many, how often, where?
What happened?

Degree of Intelligence
Situational Awareness

Existing process
Current NCBP
NCBP 3 Year Goal
NCB-P combines data collection, analytics, and visualization capabilities to create user-specific insights for decision makers.
Street-Level View
Influenza 2012-2013: A Successful Prediction

- NCB-P demonstrated success predicting the 2012-2013 flu season
- On September 1, 2012, NCB-P alerts revealed a rising concern about the flu after analyzing unusual activity with Google Flu Search Data
- On September 23, 2012, a TAP alert was generated in North Carolina from EMS data and reported to NBIC
- On December 3, 2012, the CDC released a flu warning
- NCB-P was able to predict the flu outbreak 90 days before CDC alert
H7N9: The next pandemic flu?

United States
Critical Illness and Injury Trials Group
Program for Emergency Preparedness
(USCIITG-PREP)

Blum et al, Chest 2013