Reinventing regionalization

Brendan G. Carr, MD MS
University of Pennsylvania

Ricardo Martinez, MD
Emory University
Disclosures

• Carr
  – Federal research funding
    • AHRQ, NICHD, CDC, NINDS
  – Foundation research funding
    • NRCPR/GWTG
  – ASPR Policy Research Fellow
    • IPA in process

• Martinez
  – Former President, Schumacher Group Division East
  – Chairman, Medical Sports Group
What is regionalization?

- the organization of a system for the delivery of health care within a region to avoid costly duplication of services and to ensure availability of essential services.
  
  – Mosby’s medical dictionary
What is regionalization?

- The purpose of regionalization is to concentrate limited or expensive health care services locally within an area while dispersing primary and secondary care more broadly.

- The Parkland plan
What is regionalization?

• A method of providing high-quality, cost-efficient health care to the largest number of patients, by sharing information, avoiding duplication of services, improving resource allocation, and capitalizing on economies of scale.
Overview

- The Trauma System
- Volume & Outcome
- Time & Outcome
- The Emergency Care “System”
- Taking it to scale
- Reinventing regionalization
- Where are we now?
Accidental Death & Disability

“The patient must be transported to the emergency department best prepared for his particular problem...Hospital emergency departments should be surveyed...to determine the numbers and types of emergency facilities necessary to provide optimal emergency treatment for the occupants of each region....”

IOM – 1966
System - A complex unit formed of many often diverse parts subject to a common plan or serving a common purpose
FIELD TRIAGE DECISION SCHEME:
THE NATIONAL TRAUMA TRIAGE PROTOCOL

1. \( \text{Glasgow Coma Scale} < 8 \) or \( \text{Bradycardia} \) or \( \text{Hypothermia} \) or \( \text{Intravascular volume} < 2000 \text{ml} \) or \( \text{CPP} < 60 \text{mmHg} \) or \( \text{DO2} < 600 \text{mmHg} \) or \( 
\text{Paco2} > 60 \text{mmHg} \) or \( \text{Baseline PO2} < 60 \text{mmHg} \) or \( \text{Abnormal CO2 response} \) or \( \text{Intracranial hypertension} \) or \( \text{Acute neurologic injury} \) or \( \text{Active hemorrhage} \) or \( \text{Acute peritonitis} \) or \( \text{Major exsanguination} \) or \( \text{Prolonged time to resuscitation} \) or \( \text{Massive transfusion} \)

2. \( \text{Intracranial hypertension} \) or \( \text{Active hemorrhage} \) or \( \text{Acute peritonitis} \) or \( \text{Massive transfusion} \)

3. \( \text{Massive transfusion} \)

4. \( \text{Massive transfusion} \)

5. \( \text{Massive transfusion} \)

When in doubt, transport to a trauma center.

For more information, visit www.trauma.org/traumatriage.
## National Inventory of Hospital Trauma Centers

### Table 1. Trauma Centers by State or Regional Designation/Certification and ACS Verification Status by Level of Trauma Care

<table>
<thead>
<tr>
<th>Level of Center</th>
<th>Designated or Certified by State or Region</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not ACS Verified</td>
<td>ACS Verified</td>
<td>ACS Verification Only</td>
<td>All Centers</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>101</td>
<td>48</td>
<td>41</td>
<td>190</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>183</td>
<td>51</td>
<td>29</td>
<td>263</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>236</td>
<td>8</td>
<td>7</td>
<td>251</td>
<td></td>
</tr>
<tr>
<td>IV and V</td>
<td>450</td>
<td>0</td>
<td>0</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>970</td>
<td>107</td>
<td>77</td>
<td>1154</td>
<td></td>
</tr>
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</table>

Abbreviation: ACS indicates American College of Surgeons.
Access to trauma care

Figure 1. Areas of the United States With Access to Level I or II Trauma Centers by Ambulance or Helicopter

Access to Level I or II Trauma Centers

Within 45 min

Within 60 min
The Trauma Model - Outcomes

A National Evaluation of the Effect of Trauma-Center Care on Mortality

Table 4. Adjusted Case Fatality Rates and Relative Risks of Death after Treatment in a Trauma Center as Compared with Treatment in a Non–Trauma Center.*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Weighted No. of Patients</th>
<th>Death in Hospital</th>
<th>Death within 30 Days after Injury</th>
<th>Death within 90 Days after Injury</th>
<th>Death within 365 Days after Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall population</td>
<td>15,009</td>
<td>7.6</td>
<td>7.6</td>
<td>8.7</td>
<td>10.4</td>
</tr>
<tr>
<td>Trauma center (%)</td>
<td></td>
<td>7.6</td>
<td>7.6</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td>Non–trauma center (%)</td>
<td></td>
<td>9.5</td>
<td>10.0</td>
<td>11.4</td>
<td>13.8</td>
</tr>
<tr>
<td>Relative risk (95% CI)</td>
<td></td>
<td>0.80 (0.66–0.98)</td>
<td>0.76 (0.58–1.00)</td>
<td>0.77 (0.60–0.98)</td>
<td>0.75 (0.60–0.95)</td>
</tr>
</tbody>
</table>
Overview

• The Trauma System
• **Volume & Outcome**
• Time & Outcome
• The Emergency Care “System”
• Taking it to scale
• Reinventing regionalization
• Where are we now?
Regionalization of Surgical Care

12 surgical procedures
- CABG, AAA, TURP, etc.
- 1500 hospitals

Procedures Mortality =

Abstract

Regionalization of Surgical Care

This study examines mortality rates for 12 surgical procedures of varying complexity in 1998 hospitals to
determine whether there is a relation between a hospital's surgical volume and its surgical mortality. The
mortality of open-heart surgery, vascular surgery, transurethral resection of the prostate, and coronary bypass
gerisions may reflect the effect of volume or experience on mortality, or referrals to institutions with better
outcomes. As a number of other factors, such as patient selection. Regardless of the explanation, these
data support the value of regionalization for certain operations.
The Volume-Outcome Relationship

One Hundred and Forty-Five Consecutive Pancreaticoduodenectomies Without Mortality

John L. Cameron, M.D., Henry A. Pitt, M.D., Charles J. Yeo, M.D., Keith D. Lillemoe, M.D., Howard S. Kaufman, M.D., and JoAnn Coleman, R.N.

From The Department of Surgery, The Johns Hopkins Medical Institutions, Baltimore, Maryland
Relation Between Hospital Primary Angioplasty Volume and Mortality for Patients With Acute MI Treated With Primary Angioplasty vs Thrombolytic Therapy

Adjusted OR Death

Adjusted Odds of Death

Cath Volume

Low  Medium  High
Regionalized Elective Care

- CABG (public reporting)
- Neonatal ICU (high risk pregnancy)
- Cardiac Care Center
- Cancer Centers
- Vascular Surgery (Leapfrog Group)
- ICU care (Leapfrog Group)
MORE EXPERIENCE MEANS BETTER RESULTS

WE ARE MEDICINE.

UNIVERSITY OF PENNSYLVANIA HEALTH SYSTEM

Hospital of the University of Pennsylvania
Penn Presbyterian Medical Center
Pennsylvania Hospital
pennhealth.com
Overview

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<td>1.61</td>
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Door-to-Balloon Time
Early stroke treatment associated with better outcome

The NINDS rt-PA Stroke Study

J.R. Marler, MD; B.C. Tilley, PhD; M. Lu, PhD; T.G. Brott, MD; P.C. Lyden, MD; J.C. Grotta, MD; J.P. Broderick, MD; S.R. Levine, MD; M.P. Frankel, MD; S.H. Horowitz, MD; E.C. Haley, Jr., MD; C.A. Lewandowski; and T.P. Kwiatkowski, MD, for the NINDS rt-PA Stroke Study Group*
# EARLY GOAL-DIRECTED THERAPY IN THE TREATMENT OF SEVERE SEPSIS AND SEPTIC SHOCK

**EMANUEL RIVERS, M.D., M.P.H., BRYANT NGUYEN, M.D., SUZANNE HAVSTAD, M.A., JULIE RESSLER, B.S., ALEXANDRIA MUZZIN, B.S., BERNHARD KNOLBICH, M.D., EDWARD PETERSON, PH.D., AND MICHAEL TOMLANOVICH, M.D., FOR THE EARLY GOAL-DIRECTED THERAPY COLLABORATIVE GROUP**

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ACEP Report Card

<table>
<thead>
<tr>
<th>Category</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to Emergency Care</td>
<td>D-</td>
</tr>
<tr>
<td>Quality &amp; Patient Safety Environment</td>
<td>C+</td>
</tr>
<tr>
<td>Medical Liability Environment</td>
<td>C-</td>
</tr>
<tr>
<td>Public Health &amp; Injury Prevention</td>
<td>C</td>
</tr>
<tr>
<td>Disaster Preparedness</td>
<td>C+</td>
</tr>
<tr>
<td>Overall</td>
<td>C-</td>
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Future of Emergency Care

- establish a (new) lead agency for emergency and trauma care
- primary programmatic responsibility for the full continuum of emergency medical services and emergency and trauma care for adults and children, including medical dispatch, prehospital emergency medical services (both ground and air), hospital-based emergency and trauma care, and medical-related disaster preparedness. Congress should establish a working group to make recommendations regarding the structure, funding, and responsibilities of the new agency, and develop and monitor the transition. The working group should have representatives from key stakeholder groups, including but not limited to emergency medical dispatch, prehospital EMS, and hospital-based emergency and trauma care.
3.1: The Department of Health and Human Services and the National Highway Traffic Safety Administration, in partnership with professional organizations, should convene a panel of individuals with multiple primary focuses to develop evidence-based categorization systems for emergency medical services, emergency departments, and trauma centers based on adult and pediatric service capabilities.

3.5: Congress should establish a demonstration program, administered by the Health Resources and Services Administration, to promote coordinated, regionized, and accountable emergency care systems throughout the country, and appropriate $65 million over 5 years to this program.
IOM Recommendation: Regionalize emergency care
What is an Emergency Department?
A Profile of US Emergency Departments in 2001

Figure 1. Number of EDs by annual visit volume.
Emergency medicine organizations should “revise the classification of emergency departments . . . to reflect the level of care available . . . and indicate whether or not facilities are adequate . . . 24 hours a day.”
Emergency Care - Categorization

EMNet Classification System

**Level 1** continuous (24/7) on-site physician and 24/7 consults in medicine, surgery, orthopedics, ob/gyn, pediatrics, and anesthesia; specialty consults (eg, neurosurgery) in <1h

**Level 2** 24/7 on-site physician; consults in <1h

**Level 3** open 24/7 with a physician available to the ED from within hospital

**Level 4** open 24/7 with variable staffing

www.emnet-usa.org

Camargo et al, Acad EM 2007
Categorization, Designation, and Regionalization of Emergency Care: Definitions, a Conceptual Framework, and Future Challenges

Keith E. Kocher, MD, MPH, MPhil, David P. Sklar, MD, Abhishek Mehrotra, MD, Vivek S. Tayal, MD, Marianne Gausche-Hill, MD, and R. Myles Riner, MD

Figure 2. A scheme for the horizontal categorization of hospital ED services.
Pennsylvania & Wisconsin Emergency Departments

249/301 EDs (82.7% response rate)
Recommendations for the Establishment of Stroke Systems of Care: Recommendations From the American Stroke Association's Task Force on the Development of Stroke Systems


*Stroke* 2005;36;690-703; originally published online Feb 2, 2005;
DOI: 10.1161/01.STR.0000158165.42884.4F

Stroke is published by the American Heart Association. 7272 Greenville Avenue, Dallas, TX 75214
Copyright © 2005 American Heart Association. All rights reserved. Print ISSN: 0039-2499. Online ISSN: 1524-4628
Regionalization of Care for Acute Ischemic Heart Disease: A Call for Specialized Centers
Eric J. Topol and Dean J. Kereiakes
Circulation 2003;107;1463-1466
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The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/cgi/content/full/107/11/1463
Disease based regionalization?

Potential Value of Regionalized Intensive Care for Mechanically Ventilated Medical Patients

Jeremy M. Kahn1,2, Walter T. Linde-Zwirble3, Hannah Wunsch4, Amber E. Barnato5,6, Theodore J. Iwashyna7, Mark S. Roberts5,7, Judith R. Lave6, and Derek C. Angus8
Regional Systems of Care for Out-of-Hospital Cardiac Arrest: A Policy Statement From the American Heart Association


*Circulation* 2010;121;709-729; originally published online Jan 14, 2010;
DOI: 10.1161/CIR.0B013E3181CDB7DB
Circulation is published by the American Heart Association. 7272 Greenville Avenue, Dallas, TX 75231-4352
Copyright © 2010 American Heart Association. All rights reserved. Print ISSN: 0009-7322. Online ISSN: 1524-4539
The Emergency care “system”?
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30+% of STEMI patients get no reperfusion therapy
Early stroke treatment associated with better outcome

The NINDS rt-PA Stroke Study

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3% of ischemic strokes treated at TJC certified centers. 3-8.5% receive rt-PA.
# Early Goal-Directed Therapy in the Treatment of Severe Sepsis and Septic Shock

_Emanuel Rivers, M.D., M.P.H., Bryant Nguyen, M.D., Suzanne Havstad, M.A., Julie Ressler, B.S., Alexandria Muzzin, B.S., Bernhard Knoblich, M.D., Edward Peterson, Ph.D., and Michael Tomlanovich, M.D., for the Early Goal-Directed Therapy Collaborative Group*_

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</tr>
<tr>
<td>Causes of in-hospital death‡</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sudden cardiovascular collapse</td>
<td>25/119 (21.0)</td>
<td>12/117 (10.3)</td>
<td>—</td>
<td>0.02</td>
</tr>
<tr>
<td>Multiorgan failure</td>
<td>26/119 (21.8)</td>
<td>19/117 (16.2)</td>
<td>—</td>
<td>0.27</td>
</tr>
</tbody>
</table>
MILD THERAPEUTIC HYPOTHERMIA TO IMPROVE THE NEUROLOGIC OUTCOME AFTER CARDIAC ARREST

THE HYPOTHERMIA AFTER CARDIAC ARREST STUDY GROUP*

Figure 2. Cumulative Survival in the Normothermia and Hypothermia Groups. Censored data are indicated by tick marks.
26% of physicians have used hypothermia.
The New Jersey STEMI “system”

Figure 1. Mortality for Weekend versus Weekday Admissions According to Day of Admission, 1999–2002.
Variability in OHCA outcomes

Regional Variation in Out-of-Hospital Cardiac Arrest Incidence and Outcome

Survival after out of hospital Vfib arrest

% survival to discharge

City

Alabama, Dallas, Iowa, Milwaukee, Ottawa, Pittsburgh, Portland, Seattle, Toronto, Vancouver

Alabama: 0%
Dallas: 10%
Iowa: 20%
Milwaukee: 25%
Ottawa: 25%
Pittsburgh: 20%
Portland: 20%
Seattle: 40%
Toronto: 15%
Vancouver: 25%

Study: The Resuscitation Outcomes Consortium (ROC) in North America sites followed up to hospital discharge all cases (aged 0-108 years) of OHCA, personnel, did not have any indication of compression or chest depressions to determine rates
Fig. 3 Standardized probability of death by hospital type. Conditional standardization for male, 65 years old, living in the Northeast, for median income between 51st and 75th percentiles, for 2002. Inadequate population within small and medium rural teaching hospitals to generate estimate.
Regionalizing Emergency Care Workshop
Sept 10, 2009

• Broad-based stakeholders – private, fed/state/local government, Public health, academic.
• Little progress since 2006 Report.
• Looking for consensus and strategies to move regionalization forward
• Multiple views – modern and traditional
• Workshop report published in December, 2009
Where are we now?
Where do we want to go?
How will we get there?
When focus has its drawbacks....
Model Drives Adoption

• Driving force of regionalization since 1970’s:

– *Get the right patient to the right place at the right time*
Where are we now?

• Current model:
  – Designed for low frequency, high impact events
  – Changed the world!
  – Led to many improvements in patient care!
  – Frustratingly low uptake in market
  – Current format may not meet emerging and future needs
- EM trained physicians
- Specialist consultants
- Interventions/equipment

- Non-EM physicians
- Scarcity of specialist
- Less resources
Acuity at Arrival (TRIAGE)

- Resuscitative 5.1%
- Emergent 10.8%
- Urgent 36.6%
- Semi-Urgent 22.0%
- Non-Urgent 12.1%
Most Frequent Chief Complaints

• Abdominal Pain
• Chest Pain
• Fever
• Headache
• Injury

High frequency, moderate impact
Financial “Health”

- Economics of Transfers
  - On patient
  - On local facility
  - On local providers
  - On community

Is this even measured??
TERTIARY/URBAN
- EM trained physicians
- Specialist consultants
- Interventions/equipment

SUBURBAN

SMALL SUBURBAN/LARGER RURAL
- Non- EM physicians
- Scarcity of specialist
- Less resources

SMALLER RURAL
ACCIDENTAL DEATH AND DISABILITY: THE NEGLECTED DISEASE OF MODERN SOCIETY

DIVISION OF MEDICAL SCIENCES
NATIONAL ACADEMY OF SCIENCES
NATIONAL RESEARCH COUNCIL
Attributes of Quality Health Care

- Patient-centered
- Safe
- Effective
- Efficient
- Timely
- Equitable

Can be measured at patient, provider, facility and systems level

“Crossing the Quality Chasm”
- Institute of Medicine, 2001
Six Redesign Imperatives

- Reengineered care processes
- Effective Use of Information Technologies
- Knowledge and skills management
- Development of effective teams
- Coordination of care across patient conditions, services, and sites of care over time
What is the “market” saying?

Maybe the model is wrong. Change the model!
Challenges

- Time, distance, geography
- Restricted access to information
- Workforce shortages – provider/caregivers
- Maldistribution of providers and resources
- Aging population
- Growth in patients with chronic disease
- Access to primary care limited
  - Stibiliy of supply
Opportunities

- Lots of redundancies and resources
  - Helicopters, beds, ICUs, specialties..
- Technologies can leverage our ability to scale cognitive resources and integrate others
- Move to electronic data, images and records
- Growth of high-speed data and voice connections/Internet
- Move toward quality and value-based payments
Resources

• Equipment/technology – \textit{fixed}
  – Move patient to

• Procedural skills – \textit{fixed}
  – Move patient to

• Cognitive skills – \textit{mobile}
  – Move to patient
Electronic Collaboration

Connecting... providers patients resources

“Integration and Collaboration”
Electronic Collaboration

- Patient care consultation
  - Real time and retrospective
- Patient Monitoring
- Imaging/ECG review and interpretation
  - Real time or asynchronous with care
- Education and training
- Transfer of care/treatment planning
Attributes of Quality Health Care

• Patient-centered
• Safe
• Effective
• Efficient
• Timely
• Equitable

"Crossing the Quality Chasm"
- Institute of Medicine, 2001

Can be measured at patient, provider, facility and systems level
Ch-ch-ch-changes...

• Driving system development, 1970s: 
  Get the right patient to the right place at the right time

• Driving system development for Integrated Networks of Emergency Care:
  Get the right resource to the right patient at the right place at the right time
Abundant Care Resources

Provider and Patient needs

TERTIARY/URBAN

SUBURBAN

SMALL SUBURBAN/LARGER RURAL

SMALLER RURAL
Extending the Reach

- Poison control
- Critical Care
- Radiology
- Neurology
- Cardiology
- Ob-Gyn
- Pediatrics
- Psychiatry
- Dermatology

Why not Emergency Medicine?
Just start in one spot...and grow...
The Winds of Change
## Ten Targets for Wireless Medicine

<table>
<thead>
<tr>
<th>Disease</th>
<th>No. Affected</th>
<th>Wireless Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alzheimer’s</td>
<td>5 M</td>
<td>Vital signs, location, activity, balance</td>
</tr>
<tr>
<td>Asthma</td>
<td>23 M</td>
<td>RR, FEV1, Air quality, oximetry, pollen count</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>3 M</td>
<td>Ultrasound self-exam ➔ Web</td>
</tr>
<tr>
<td>COPD</td>
<td>10 M</td>
<td>RR, FEV1, Air quality, oximetry</td>
</tr>
<tr>
<td>Depression</td>
<td>21 M</td>
<td>Med Compliance, Activity, Communication</td>
</tr>
<tr>
<td>Diabetes</td>
<td>24 M</td>
<td>Glucose, Hemoglobin A1C</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>5 M</td>
<td>Cardiac pressures, weight, BP, fluid status</td>
</tr>
<tr>
<td>Hypertension</td>
<td>74 M</td>
<td>Continuous BP, Med compliance</td>
</tr>
<tr>
<td>Obesity</td>
<td>80 M</td>
<td>Smart scales, Glucose, Caloric in/out, Activity</td>
</tr>
<tr>
<td>Sleep Disorders</td>
<td>40 M</td>
<td>Sleep phases, quality, apnea, vital signs</td>
</tr>
</tbody>
</table>
It’s all coming together

- Wireless sensors
- Pervasive connectivity
- 3G/4G secure networks
- Emerging standards
- Regulatory changes
- Increased funding and payments
- Health information exchanges
- Smart phones
- Clinical decision support
- GPS everywhere
Steps

• Categorize the ED’s, patients, and resources
• Change the driving goal of regionalization
• Match resources and needs
• Develop simple, understood model
• Deliver well-understood, reportable quality care measures

Measure monitor deliver improve
the name
– Integrated Networks of Emergency Care

the goals
– Get the right resource to the right patient at the right place at the right time

the rules
– Do the greatest good for the greatest number.
– Drive value thru measurable quality.
– Play with others – something for everyone.
– Do no harm to those in the network
The best way to predict the future... is to create it!
Overview

- EM in perspective
- Volume & Outcome
- Time & Outcome
- The Emergency Care “System”
- Taking it to scale?
- Reinventing regionalization

- Where are we now?
Regionalization is a paradigm that applies to the critically injured or highly technical complex patient who needs a level of technical expertise that is not available at an isolated local facility, but is available in a tertiary care setting. But a point of emphasis this morning was that regionalization needs to be a web, not a funnel...The idea of bi-directionality is very, very, important – regionalization must be a win-win proposition.

– Kellermann, IOM Regionalization Workshop
What is regionalization?

• "a euphemism for rural hospital closures."

» Dr. Karl Stobbe, president of the Society of Rural Physicians of Canada
Beyond Regionalization: Integrated Networks Of Care

June 2, 2010 Phoenix, AZ
A Quality framework?

- **Ambulatory Care Sensitive Conditions**
  - Conditions for which good outpatient care can potentially prevent the need for hospitalization, or for which early intervention can prevent complications or more severe disease.

- **Emergency Care Sensitive Conditions**
  - Conditions for which rapid diagnosis and early intervention in acute illness or acutely decompensated chronic illness improves patient outcomes.
Quality metrics for regional emergency care systems

- National Quality Forum & ECCC
- Environmental Scan
- Develop a framework for metrics to evaluate regionalized emergency care
  - Compliance with disease based time guidelines
  - The ability to match needs with resources
  - Efficiency of competing care delivery systems
Critical Access Hospitals

According to Iowa Hospital Association

Stroke Death Rates

Smoothed County Stroke Death Rates

Total Population
Ages 35 Years and Older

Age-Adjusted Average Annual Deaths per 100,000

<table>
<thead>
<tr>
<th>Number of Counties</th>
<th>61–113</th>
<th>114–123</th>
<th>124–133</th>
<th>134–146</th>
<th>147–241</th>
<th>Insufficient Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>638</td>
<td>654</td>
<td>641</td>
<td>610</td>
<td>557</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

*Stroke death rates are spatially smoothed to enhance the stability of rates in counties with small populations. See Appendix B for details.
Future Challenges

- Pre hospital vs. Interhospital transfer vs. ?
  - Longer prehospital times, re-arrest concern
- Triage rules
- Multidisciplinary buy-in (EM, cards, icu, neuro)
- ED/ICU crowding & hospital capacity
- Credentialing/Certification body
- Structure of the Network
- Move the patient…or move the knowledge?
- Integration with other diseases/systems