

Enhancing Pre-hospital & ED Stroke Systems of Care

Access and Treatment

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Disclosure Information

■ Financial

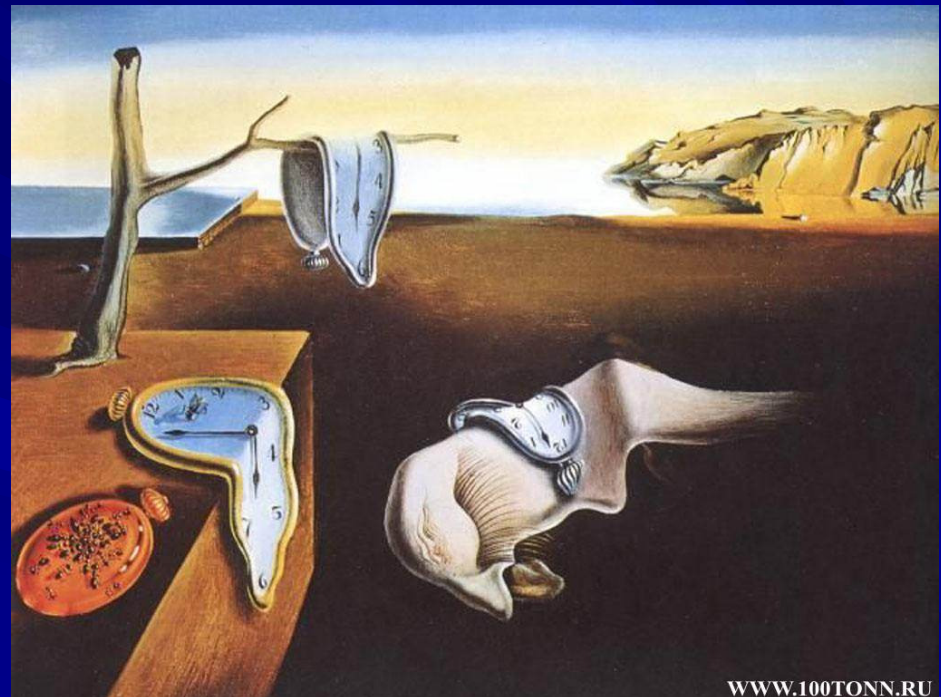
- NIH, Clinical Trial to Increase tPA Use in Stroke
 - (NIH RO1 NS050372, Principal Investigator)
- Michigan Department of Community Health

■ Unlabelled/Unapproved Uses

- None

Time Elements of Acute Stroke Care

- Patient recognition
- Transport time
 - Distance
 - EMS Efficiency
- ED evaluation
- Definitive treatment



Limited Hospital Availability



- Specialized resources required for endovascular therapy
- Hospital / ED overcrowding or diversion
- Limited numbers of optimized systems for IV tPA use

Fatal Blockages

Stroke Victims
Are Often Taken
To Wrong Hospital

Outdated Ambulance Rules,
Inadequate ERs Make
Dangerous Ailment Worse

Lessons From Trauma Centers

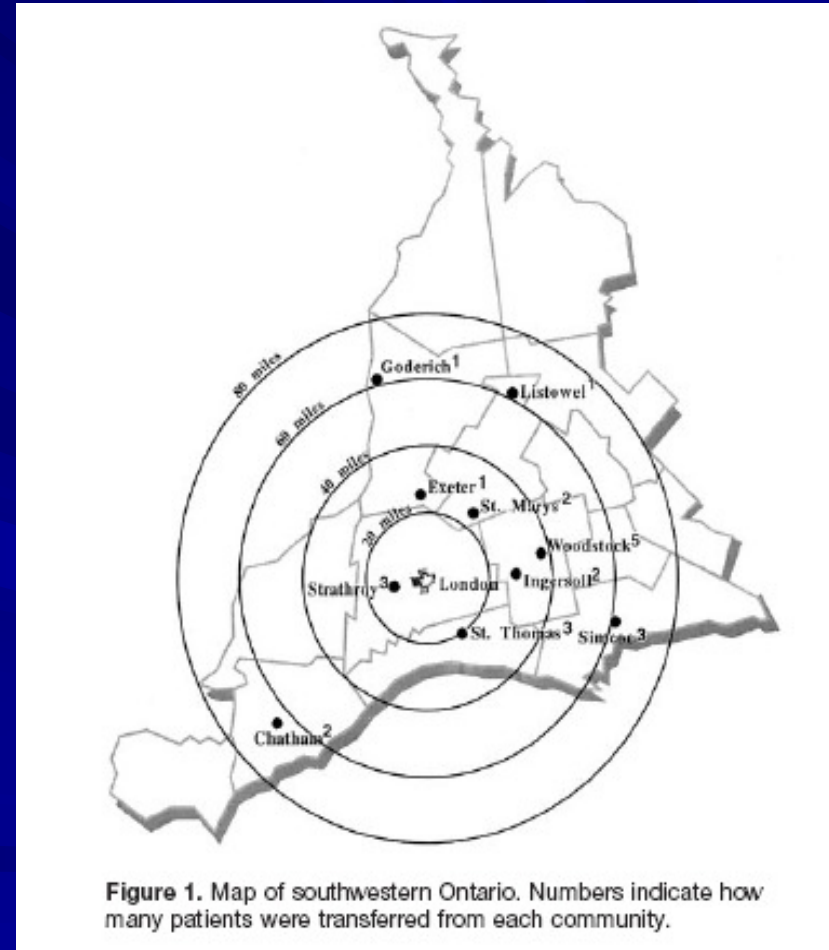
By THOMAS M. BURTON
May 9, 2005; Page A1

Concept: Hospital “Service Area”

■ *EMS Ground Systems*

- *Rural ground bypass*
- *Rural treatment and transfer*
- *Urban bypass*
- *Urban treatment and transfer*

■ *Patient self-arrival*



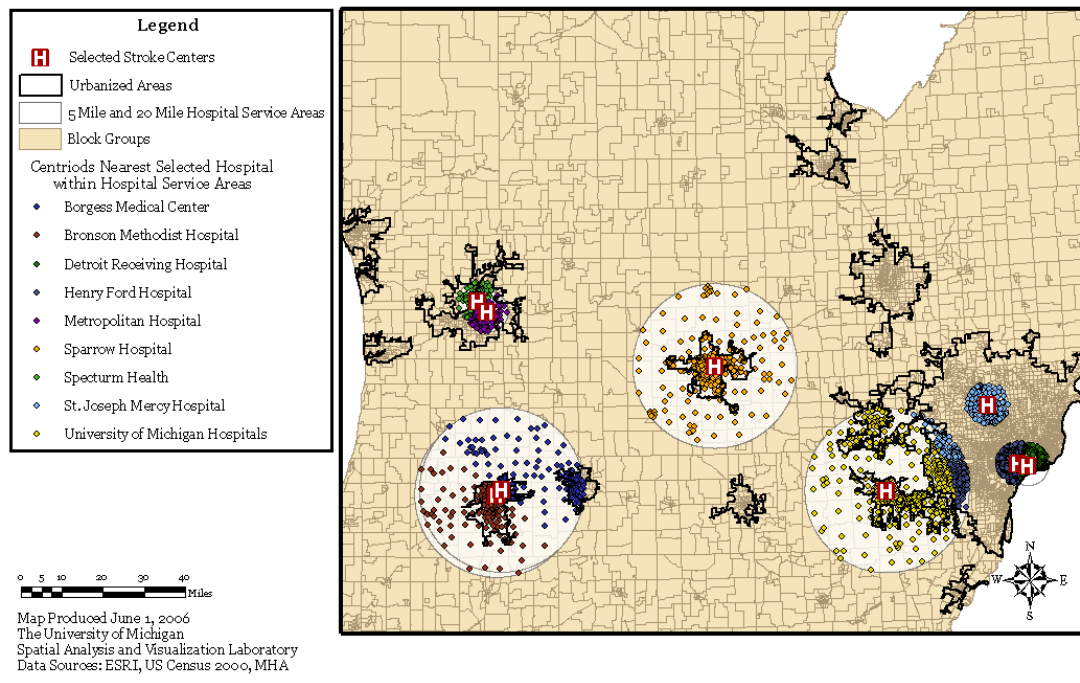
Merino JG, Silver B, Wong E, Foell B, Demaerschalk B, Tamayo A, Poncha F, Hachinski V: Extending Tissue Plasminogen Activator Use to Community and Rural Stroke Patients. *Stroke*. 2003;33:141-6.

Problem

- Development of stroke centers by market forces may provide ineffective coverage

Selected Michigan Stroke Centers

9 Selected Michigan Stroke Centers
5 Mile Hospital Service Areas for hospitals in Urbanized Areas greater than or equal to 150 square miles
20 Mile Hospital Service Areas for all other hospitals
Block Group Centroids Closest to Each Selected Hospital within Hospital Service Areas
Census Designated Urbanized Areas and Block Groups also shown

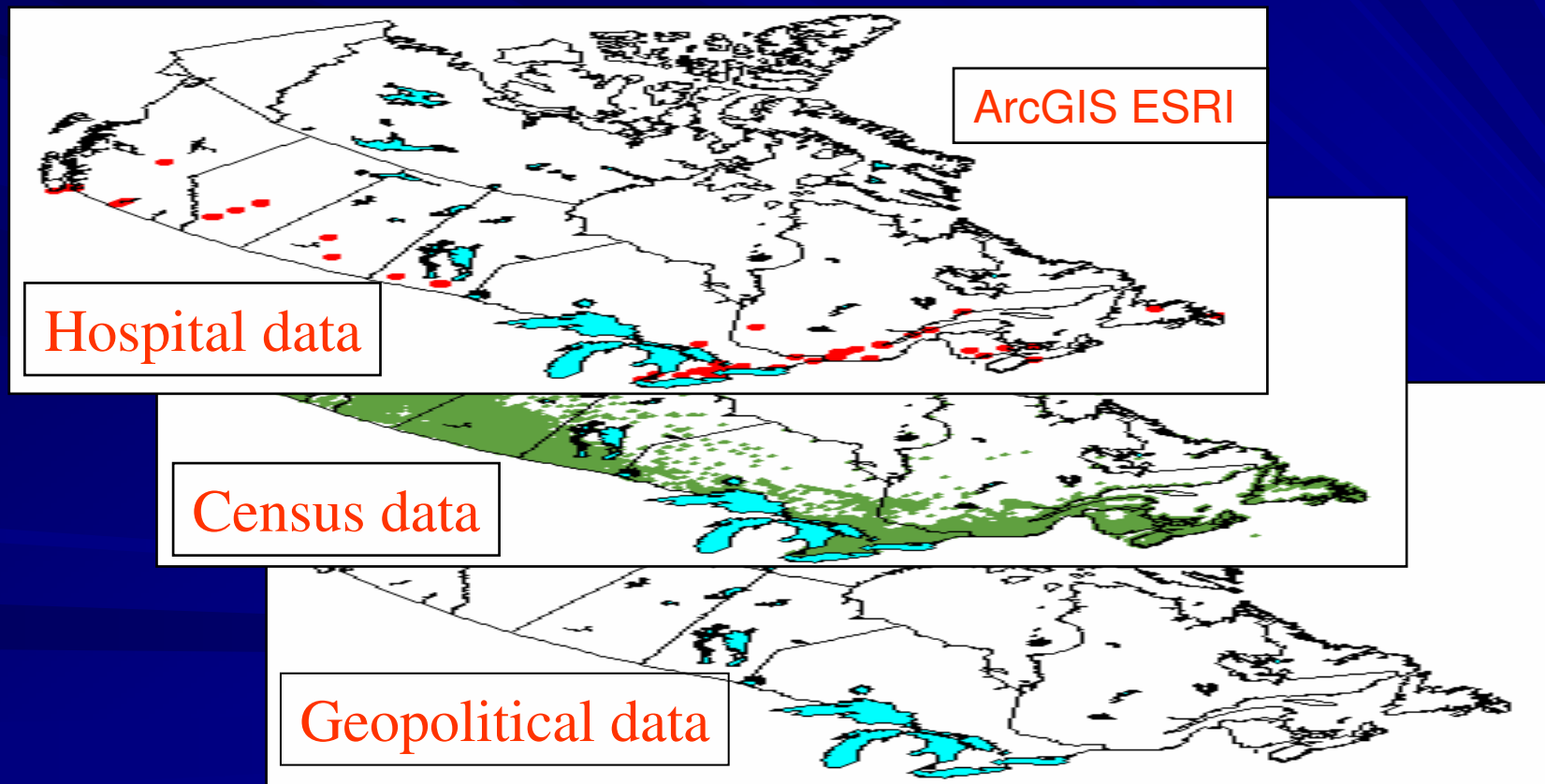


Use of GIS in Design of Statewide Stroke Systems

- Maximize population coverage with minimum resource use
- Models based on varying assumptions of EMS transport distances and treatment time windows
- Combine with stroke incidence data to project changes in patient referral and impact on hospital capacity

Mullaney MP, Hu Y, Swann SJ, Sokol A, Silbergleit R, Scott PA: Development of a Statewide Stroke Thrombolytic System: Use of Geographic Information System (GIS) Modeling to Enhance Acute Stroke Care. Poster ASA P16; 2006 International Stroke Conference, Orlando, FL

Geographic Information System (GIS) Analysis



Objective

- Identify minimum number of hospitals required to provide tPA access to >95% of MI population based on geographic and population coverage
- Estimate impact of localization of stroke care on patient volume at identified hospitals

Methods

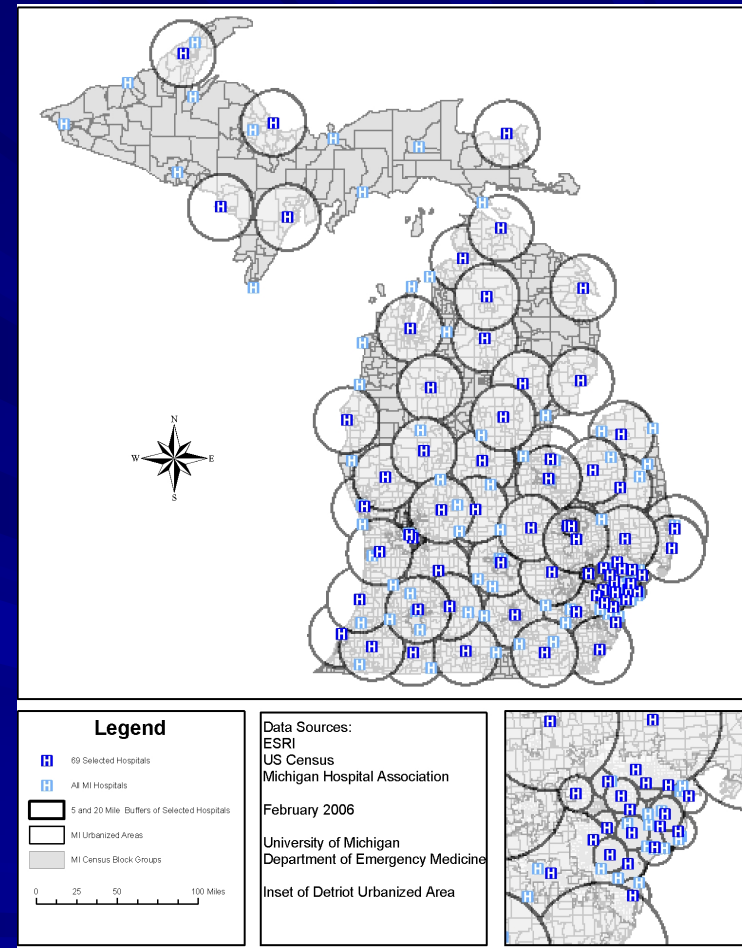
- All Michigan acute care hospitals eligible
- Sensitivity analysis for multiple estimates of hospital service area radii
- Sensitivity analysis for urban, non-urban, major metropolitan area effects
- Estimate demographic coverage of various at risk populations

Results

- 29 to 76 hospitals (of 146) needed for > 95% population coverage
- This range may be further narrowed to 44 to 76 hospitals by limiting hospitals to increases of 150% of 2003 stroke admits
- Model analyses were generally insensitive to the variables examined, with clustering of the number of stroke centers needed near the median

Results: Michigan

- Average 54 of 146 hospitals needed
- Average stroke patient volume increase: 27% to 411%
- Average patient distance to hospital: 6 to 14 miles



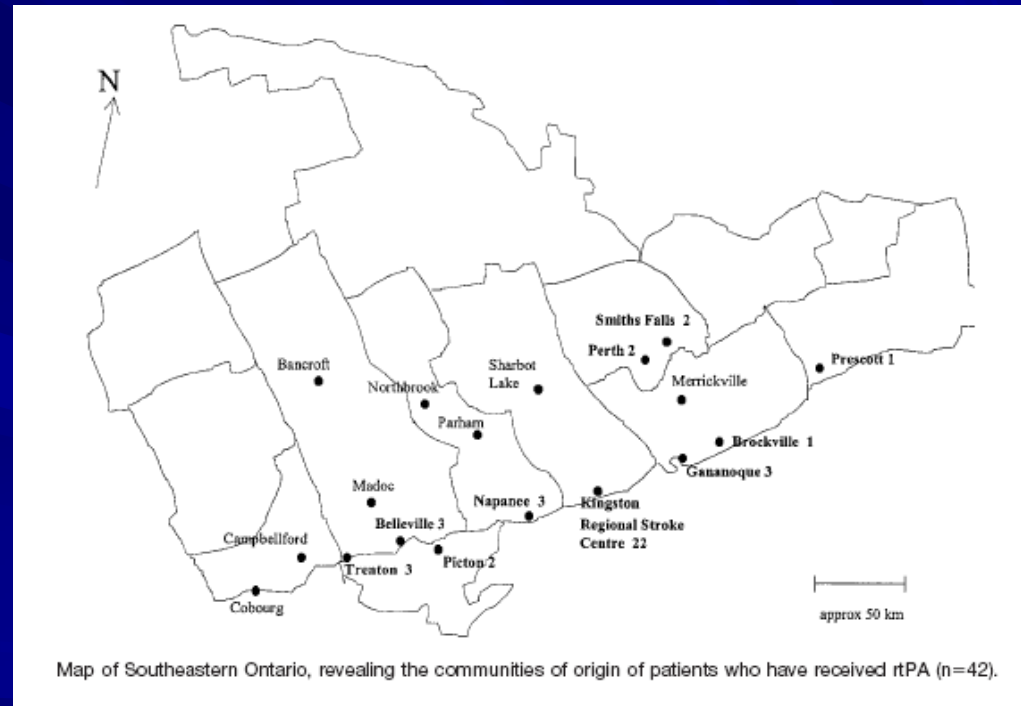
Mullaney MP, Hu Y, Swann SJ, Sokol A, Silbergleit R, Scott PA: Development of a Statewide Stroke Thrombolytic System: Use of Geographic Information System (GIS) Modeling to Enhance Acute Stroke Care. Poster ASA P16; 2006 International Stroke Conference, Orlando, FL

Results

- Identification of a specific hospital was, less robust across varying assumptions.
 - Identical hospitals selected in more than one analysis ranged from 14 to 20
- Demographic coverage
 - African American (Black) > 99% all models
 - Caucasian (White) > 94% all models

Impact of a Regional Approach to Acute Stroke Care

- 42 / 191 (22%) RASP activations received IV tPA
- 60% from remote sites
- Equivalent local / remote treatment rates
- **Need for repatriation protocols**



Riopelle RJ, Howse DC, Bolton C, Elson S, et al: Regional Access to Acute Stroke Intervention. Stroke. 2001;32:652-55.

Barriers to Achieving Broader Thrombolytic Access

- Scientific
- Political
- Administrative
- Communication

Implementation

- Michigan Stroke Initiative
- MDCH EMS Task Force
 - Regionalization of Acute Stroke Care
- Draft of legislation in progress
 - Joint effort MDCH/ASA/MSI

From Door to Needle



Increasing the Chance for Treatment

The Trial

- 24-hospital, randomized, controlled trial testing a multi-level, systems-based, educational intervention
- Intervention based on adult education and behavior change theory
- Tailored to local needs
- Based on clinical pilot data

Primary Aims

- To test whether hospitals receiving the educational intervention have a $\geq 4\%$ increase in appropriate tPA use compared to matched controls
- To test whether the intervention enhances EP knowledge, beliefs and attitudes regarding tPA use in stroke

What is the intervention?

- Stroke Champion development
- Site-specific Barrier Assessment
- Access to stroke evaluation/treatment tools
- Tailored CME addressing local barriers
- Mock Stroke Codes for ED / EMS
- Telephone stroke specialist access
- Critical Incident Defusing
- Targeted messaging and feedback

Outcome Measures

- tPA Use
- Safety
- Timeliness
- Changes in EP knowledge/attitudes

tPA Delivery Performance

- Baseline data
- Early intervention data
 - tPA Use
 - Safety
 - Timeliness
 - Changes in EP knowledge/attitudes



Conclusions

- Maximizing patient access to stroke care will require changes in EMS and inter-hospital transfer systems - and elimination of multiple barriers that currently exist.
- INSTINCT found broad EP support for use but focus groups reveal significant barriers remain:
 - Access to specialist resources
 - External barriers
 - Familiarity and awareness of treatment guidelines
- A regional approach to acute stroke care may serve to optimize patient access and care while minimizing infrastructure costs

Thank you

American Stroke
AssociationSM

A Division of American
Heart Association



Department of
Community Health



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