Economic Benefit of an Educational Intervention to improve tPA Use as Treatment for Acute Ischemic Stroke in Community Hospitals

Secondary Analysis of the INSTINCT Trial

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Disclosures

- Funding NIH NINDS
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- Financial conflicts of interest: none

Background

- INSTINCT
  - **IN**creasing **S**troke **T**reatment through **IN**terventional **C**hange **T**actics

- Trial Design
  - Prospective, cluster randomized controlled trial
  - Involves 24 acute care community hospitals in lower Michigan

University of Michigan Health System

Study Hospitals

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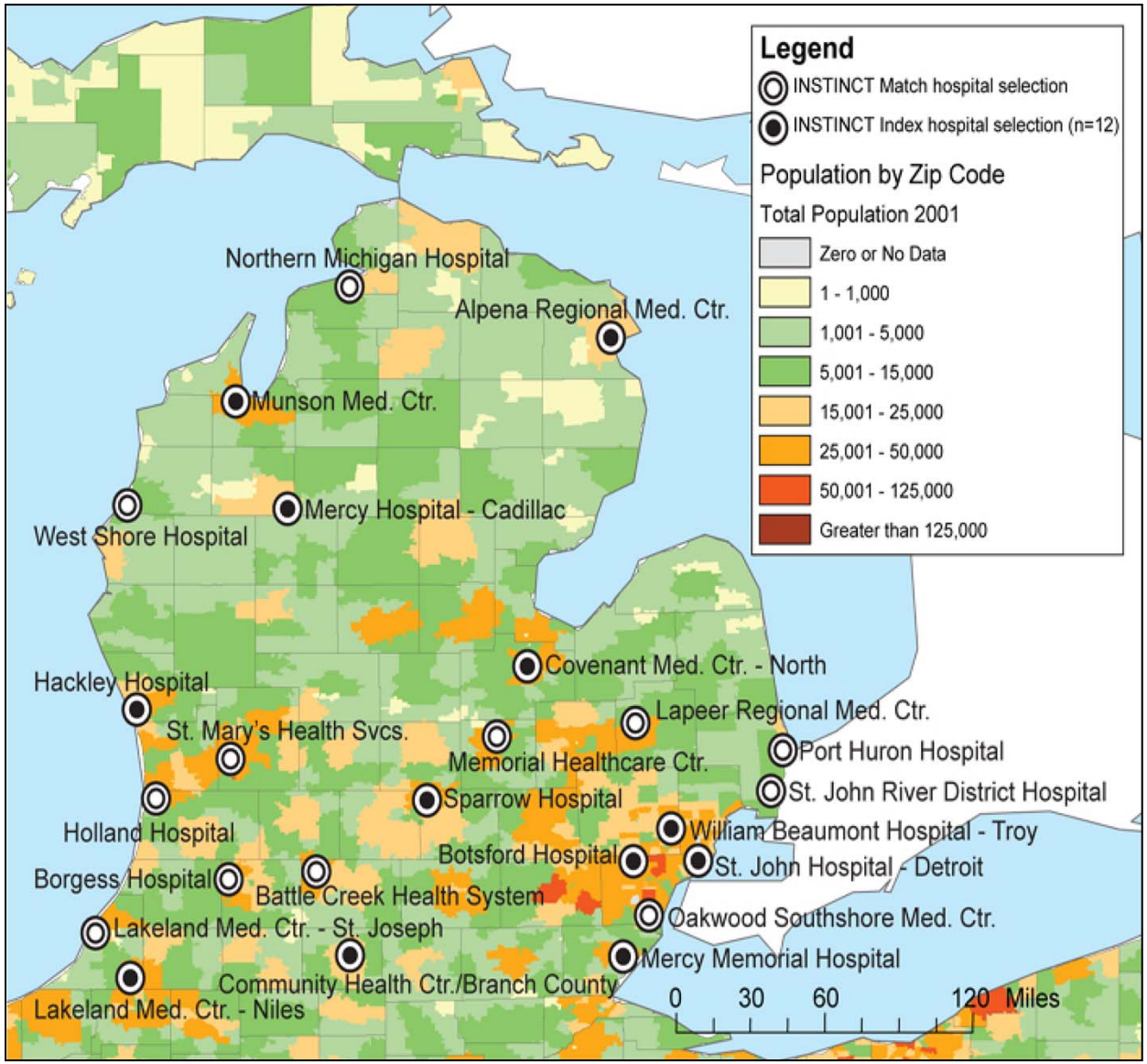
STROKE CARE EVERYWHERE



Background

- Trial Design
  - Hospitals were matched in pairs based on ED volume and stroke admissions
  - Randomly assigned to receive intervention vs. control:
    - Standardized barrier assessment
    - Interactive educational intervention
  - Goal
    - Improve appropriate tPA use in community EDs without dedicated stroke teams in lower Michigan

Objectives

1. Cost effectiveness of INSTINCT knowledge translation research program due to increased tPA treatments.

2. Would deploying the interactive educational intervention outside of the research realm be cost effective.

Methods

- Per-protocol analysis

	Intervention Sites	Control Sites
Hospitals	11	11
Total Stroke Patients	10,627	10,071
tPA Treated Patients	244	160
Fraction tPA Treated	2.30%	1.59%

- Net increase of tPA use – 0.71%

Methods

- Demographics

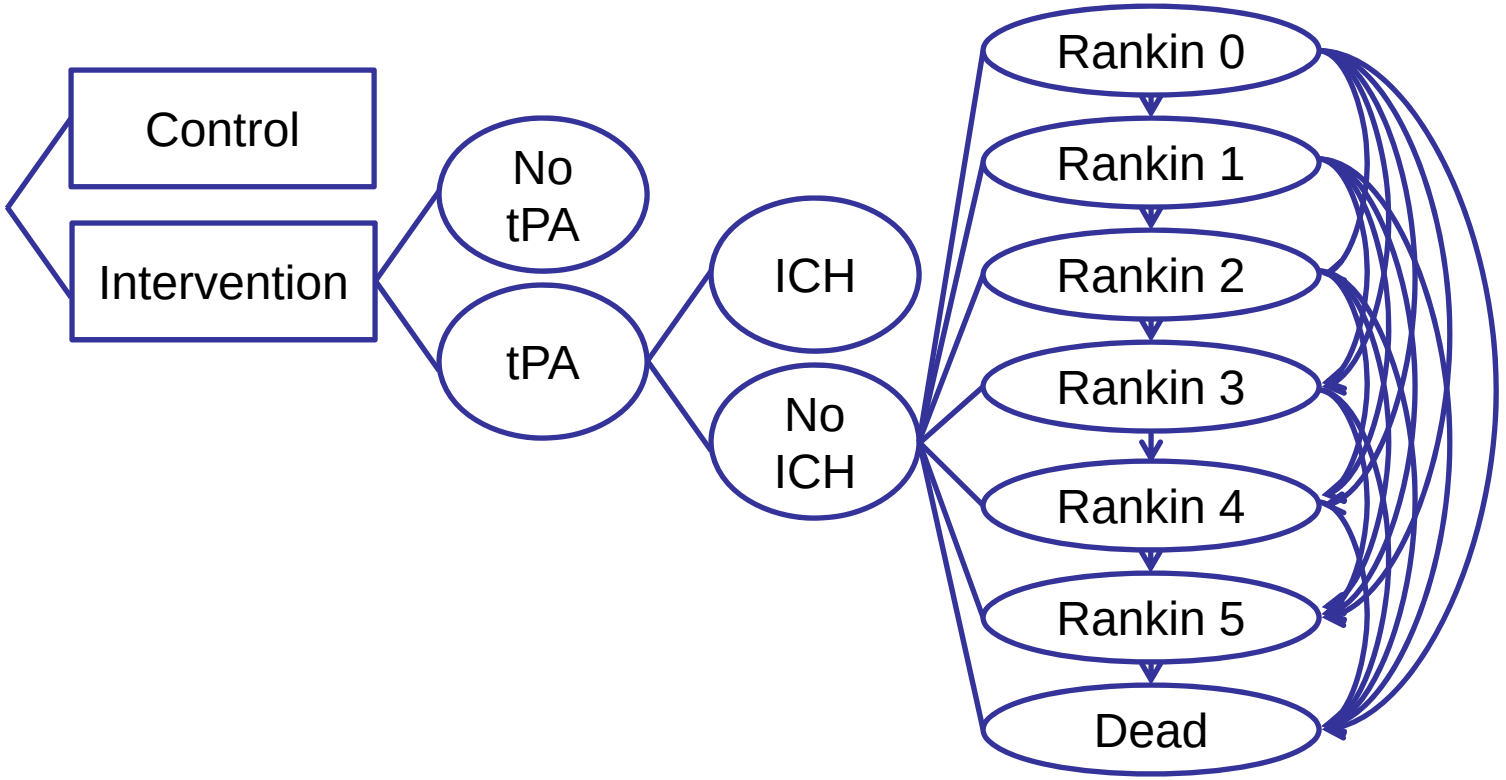
	Intervention Sites	Control Sites
Female	43%	52%
Prior Stroke	18%	19%
Age (years)	68.7	71
NIHSS	12.1	11.9

Methods

- Analytical Model
  - Long-term health and economic outcomes were predicted using a decision-analytic Markov model of progression of stroke patients.
    - Decision tree at hospital presentation
    - Mortality and mRS assigned based on tPA use
    - Patients enter Markov model that tracks mRS and mortality.

Methods

- Decision tree and model



Methods

- Outcomes data
  - Long-term outcomes data gathered from medical literature
- Cost-effectiveness data
  - Gathered from several pertinent studies on cost-effectiveness of tPA use.
- Costs of stroke care
  - Obtained from several databases (HCUPnet), market surveys, and studies of long-term care

Methods

- Rankin scores converted to QALYs using previously published studies.
- Used a societal perspective
  - Aggregated all health effects and costs regardless of payer
- Tracked health outcomes in terms of QALYs.

Methods

- Costs of intervention

	Research-based	Generalized
Grant Award	$3.158M	
Intervention		$567,801
Opportunity Costs (CME)	$126,502	$114,622
Total	$3.285M	$682,423

- Opportunity costs - lost productivity for medical providers (MD, RN, PA, Pharmacists).

Results

- Research-based Intervention

Direct Cost Saving	$545,000
Additional QALY	82.75
Net Cost	$2.74M
ICER ($/QALY)	33,105
Net Monetary Benefit	$1.4M

Results

- Generalized Intervention

Direct Cost Saving	$545,000
Additional QALY	82.75
Net Cost	$137,000
ICER ($/QALY)	1,655
Net Monetary Benefit	$3.9M

- Assumes similar intervention effectiveness and outcomes

Results

- One-way sensitivity analysis
  - Significant variables
    - Annual cost of nursing home
    - Age of patient at time of stroke
    - Fraction of patients receiving tPA

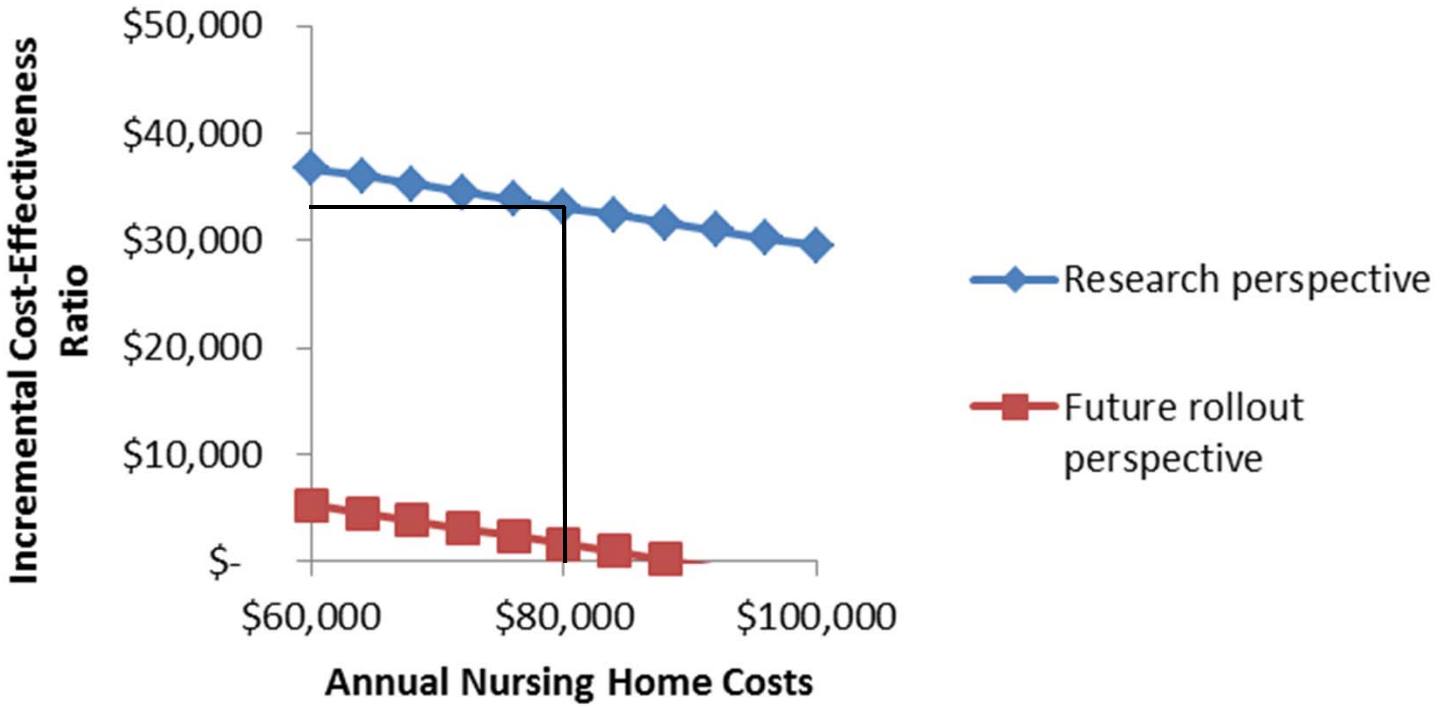
Results

- Variables

Annual inpatient rehab cost	Annual NH cost	Annual outpatient rehab cost	Annual stroke services
Hospitalization cost	ICH hospital costs	Subsequent stroke	Cost of tPA
Months in inpt rehab	Fraction d/c to NH	ICH without tPA	ICH with tPA
Age at time of stroke	Fraction receiving tPA with the intervention	Fraction receiving tPA without the intervention	Distribution of pts in 1st year by mRS without tPA
Distribution of pts in 1st year by mRS with tPA	Distribution of pts in 2nd year by mRS without tPA	Distribution of pts in 2nd year by mRS with tPA	Annual rate of stroke
RR to other cause mortality b/c of prior stroke	Discount rate	Time horizon	Distribution of health-related quality of life

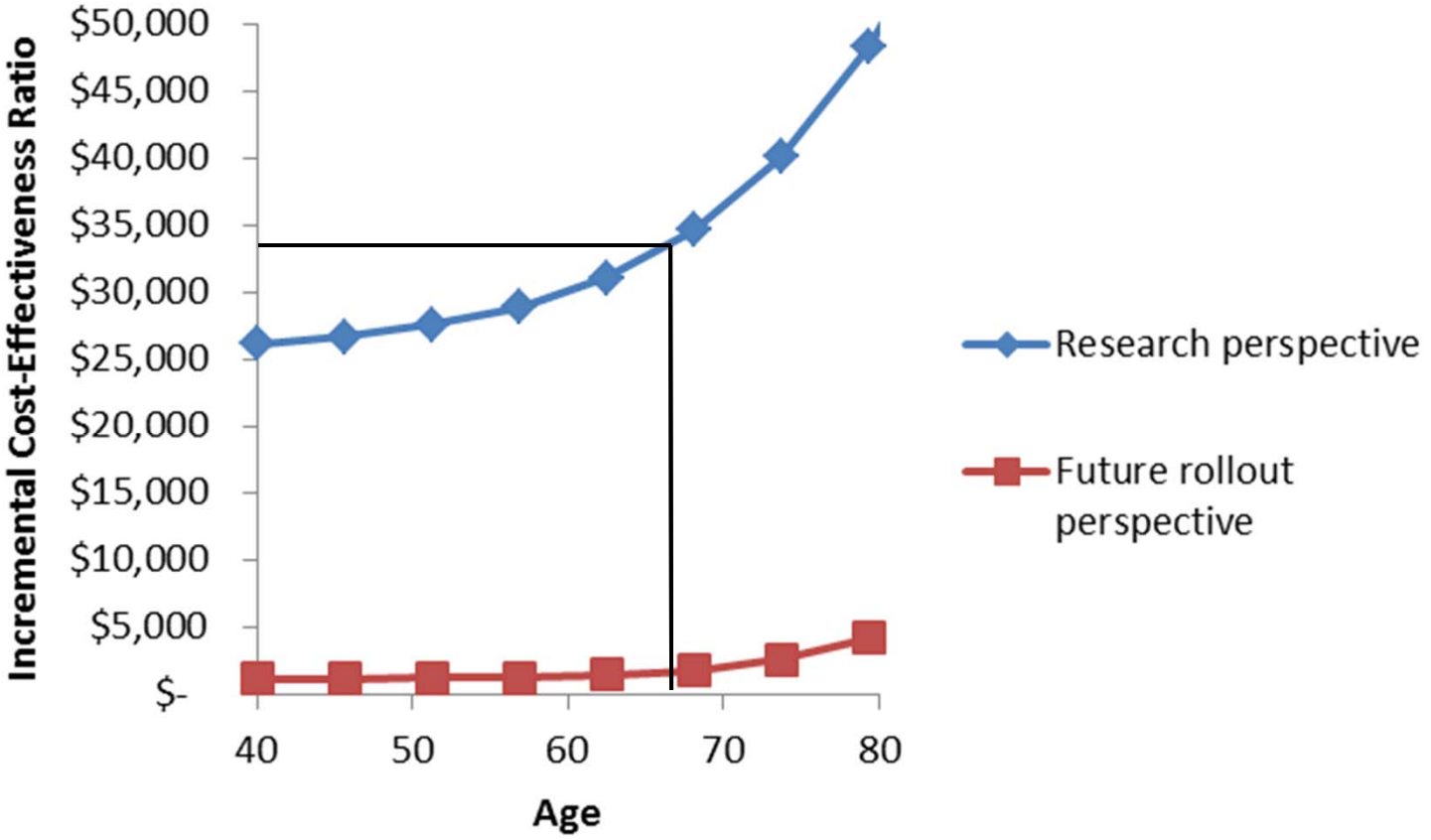
Results

- Sensitivity Analysis – NH Cost



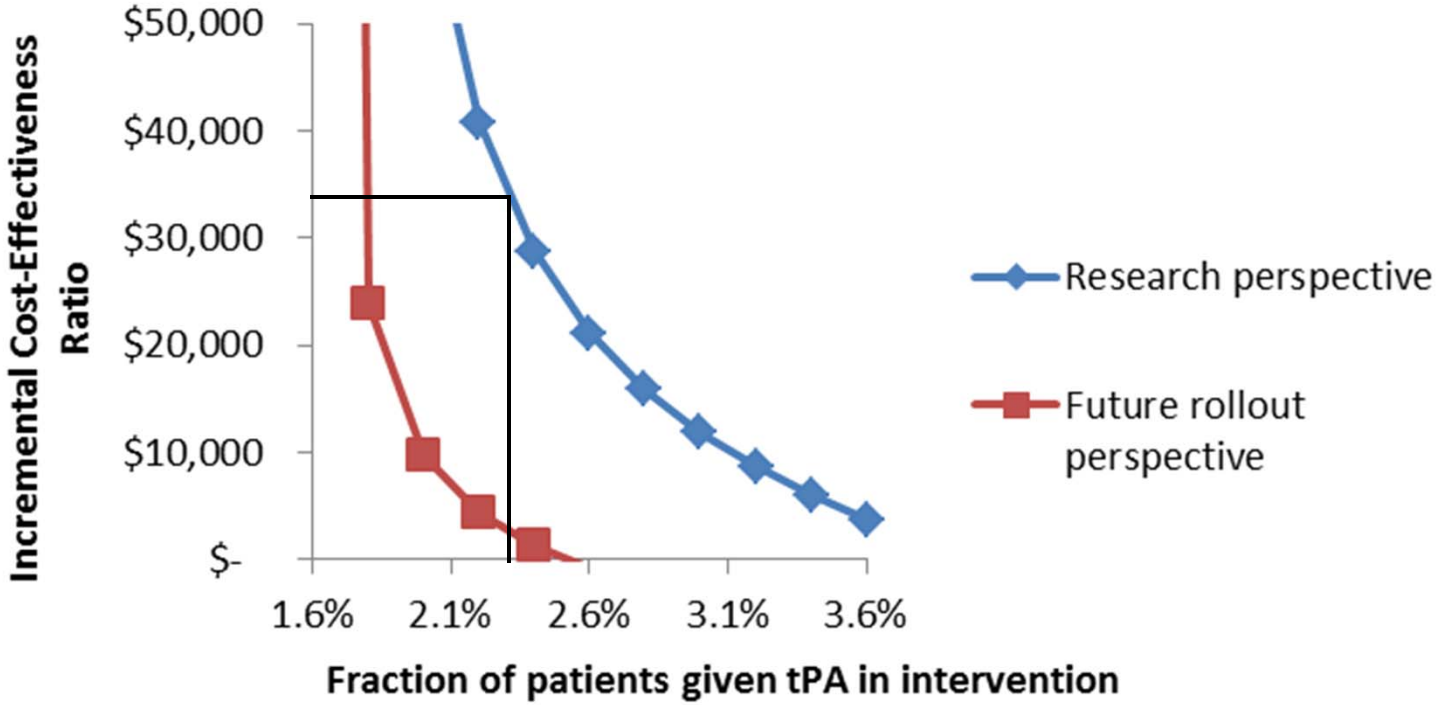
Results

- Sensitivity Analysis - Age



Results

- Sensitivity Analysis – Fraction Receiving tPA



Limitations

- Long-term health outcomes and costs projected using mathematical model
  - Consistent with other similar models
- Did not account for lost productivity
  - Leads to conservative outcomes

Conclusions

- Appropriate tPA administration in patients with AIS is highly cost effective
- Funds spent on the INSTINCT Trial are cost-effective and achieve good value
- Future deployment of similar interventions would cost less and achieve similar economic benefit.

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Questions/Discussion

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