Impact of Improved Acute Ischemic Stroke Care on State Medicaid Budgets in Alabama and Kentucky

Stroke Belt Consortium 2012

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Disclosure and Acknowledgement

Page 2

Er Chen is an employee of Genentech, Inc.

Coauthors Zheng-Yi Zhou, Liangyi Fan, Jipan Xie, Eric Wu from Analysis Group, Inc. receiving research grant from Genentech, Inc.

Caption Here (10pt)

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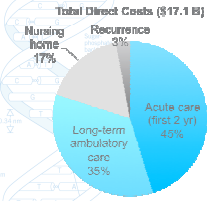
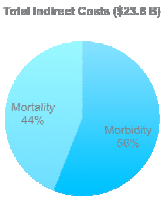
Cost of stroke in the US in 1990

Page 3

- Lifetime cost per person for stroke > $100,000
- Total costs for incident strokes $40.6 billion; direct costs 42%; long-term care 55% of direct costs
- These estimates predated IV-tPA use. Significant changes expected due to growing aging population and increased use of active interventions





Taylor T N et al. Stroke 1996;27:1459-1466

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IV-tPA Reduces Total Cost for Eligible Patients

Page 4

Cost-effectiveness of tissue plasminogen activator for acute ischemic stroke

S.C. Fagan, PharmD; L.B. Morgenstern, MD; A. Petitta, RPh, MBA; R.E. Ward, MD, MBA; B.C. Tilley, PhD; J.R. Marler, MD; S.R. Levine, MD; J.P. Broderick, MD; T.G. Kwiatkowski, MD; M. Frankel, MD; T.G. Brott, MD; M.D. Walker, MD; and the NINDS rt-PA Stroke Study Group*

IV-tPA was first shown to be cost-effective for AIS in an article in Neurology in 1998 by Fagan et al. The study showed the following:

"At 1 year there is a predicted cost saving of about $600,000 for 1,000 patients. The overall impact on both acute and long-term costs is a net decrease of over $4 million to the health care system" - **$600 at 1 yr and $4,000 over 30 yrs for each patient**

"The estimated impact (of IV-tPA) on long-term health outcomes is 363 life-years saved and 564 QALYs saved over 30 years for 100 patient" **- 3.63 LY and 5.64 QALY gain over 30 yrs for each patient**

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Cost Offset Associated with IV-tPA

Page 5

***Table 3** Disposition results from the NINDS rt-PA Stroke Trial*

	rt-PA, n = 312	Placebo, n = 312	*p* Value
Length of stay (initial hospitalization) (mean ± SD)	10.88 ± 10.04	12.41 ± 11.10	0.02
Disposition (initial hospitalization)*			0.002†
Home‡	151 (48)	112 (36)	
Rehabilitation unit	91 (29)	115 (37)	
Nursing home	22 (7)	39 (13)	
Dead	35 (11)	40 (13)	
Other facility	13 (4)	6 (2)	

Fagan SC et al. Neurology 1998; 50:883-890

Largely based on NINDS trial, cost effectiveness of IV tPA was realized through reduction in disability and long-term care.

"tPA use for eligible patients is a 'win-win' situation with improved patient outcomes and a net cost savings to the health care system."

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Key Challenges and Potential Legislative Impact

Page 6

- Timely diagnosis, rapid transportation, and adequate evaluation of patients with AIS are the major barriers for IV thrombolysis utilization.
- States can have substantial influence on acute stroke care through policies related to PSCs and EMS routing protocol.
- Understanding the potential impact of the state legislative efforts on the Medicaid spending have significant policy implications.

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Research Questions

Page 7

1. Will improved access to stroke care reduce Medicaid spending in a state?

1. What is the best way to improve access to stroke care from a state perspective, by state designation/ recognition of PSCs or by EMS routing protocols?

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Stroke Facts in Alabama and Kentucky Medicaid (2010)

Page 8

	Alabama	Kentucky
Medicaid Enrollees	1,015,576[1]	960,776[1]
Incidence of AIS among Medicaid population	17,265[2]	16,333[2]
Estimated Medicaid spending on stroke-related care	$219 million[2]	$208 million[2]
IV thrombolysis treatment rate among all AIS	<5%	
Proportion of patients treated at PSCs	20%[3]	
EMS routing protocol	No	No

1. www.medicaid.gov/Medicaid-CHIP-Program-Information/By-State/By-State.html
2. CDC. Chronic Disease Calculator
3. Mullen et al. doi: 10.1212/WNL.78.1_MeetingAbstracts. Neurology April 24, 2012

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Methods

Page 9

1. A long-term economic model was developed to estimate the impact of improved access to stroke care on Medicaid spending for AIS patients

1. Improved access to stroke care was defined in two scenarios and both were assumed to be associated with increased IV thrombolysis use
   - A hypothetical increase in the proportion of AIS patients treated at PSCs
   - Establishing EMS routing protocols

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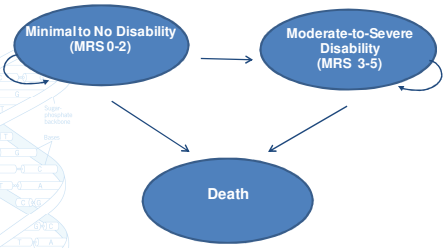
Methods Cont'd: Model Schema

Page 10



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Methods Cont'd: Key Model Assumptions

Page 11

	IV thrombolysis rate among all AIS
PSCs	6.5%[1]
non-PSCs	0.9%[1]
EMS routing to PSCs	10.5%[2]
Local services	2.5%[2]

	Nursing home admission rate
No disability (mRS 0-2)	5%[3]
Disability (mRS 3-5)	60%[3]

	Annual cost per nursing home admission
Alabama	$62,508[4]
Kentucky	$58,184[4]

1. Prabhakaran et al. *Stroke*. 2012;43:00-00.
2. Price et al *Expert Rev Neurother*. 2009;9:211-33.
3. Chambers et al Value Health. 2002;5:82-97
4. www.medicaid.gov/Medicaid-CHIP-Program-Information/By-State/By-State.html

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Methods Cont'd: Additional Model Assumptions

Page 12

Model input	Value
Outcomes of IV thrombolysis [1]	
With IV thrombolysis	
Minimal-to-no disability (mRS 0-2)	55%
Moderate-to-severe disability (mRS 3-5)	32%
Death (mRS 6)	13%
Without IV thrombolysis	
Minimal-to-no disability (mRS 0-2)	47%
Moderate-to-severe disability (mRS 3-5)	40%
Death (mRS 6)	13%
Annual rate of recurrent stroke [2]	
Within 1st year of newly diagnosed stroke	16%
Subsequent years	3%
Outcomes after recurrent stroke [1,3]	
Disability	47%
Death among stroke patients with minimal-to-no disability	13%
Death among stroke patients with moderate-to-severe disability	35%

1. Lees et al The Lancet. 2010;375:1695-1703.
2. Hardie et al Stroke. 2004;35(3):731-735.
3. Eriksson et al Cerebrovasc Dis. 2008;25(5):423-429.

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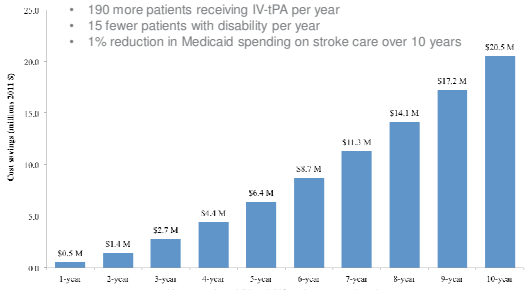
Results: Medicaid Savings associated with 20% increase in the Proportion of AIS Patients Treated at PSCs

Page 13

Alabama

- 190 more patients receiving IV-tPA per year
- 15 fewer patients with disability per year
- 1% reduction in Medicaid spending on stroke care over 10 years



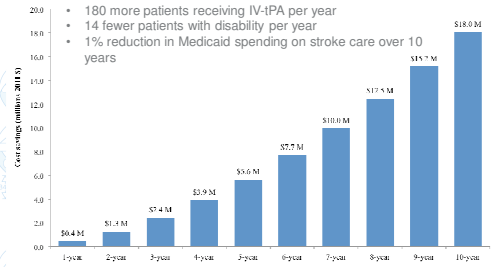
*Accounts for additional AIS patients treated each year

Results: Medicaid Savings associated with 20% increase in the Proportion of AIS Patients Treated at PSCs

Page 14

Kentucky

- 180 more patients receiving IV-tPA per year
- 14 fewer patients with disability per year
- 1% reduction in Medicaid spending on stroke care over 10 years



Accounts for additional AIS patients treated each year

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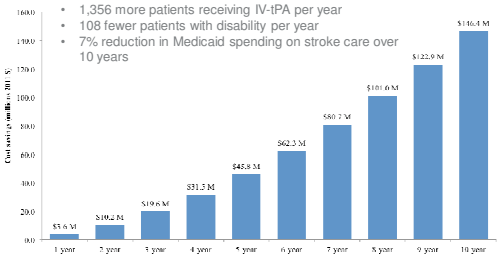
Results: Medicaid Savings Associated with Establishing an EMS Routing Protocol

Page 15

Alabama

- 1,356 more patients receiving IV-tPA per year
- 108 fewer patients with disability per year
- 7% reduction in Medicaid spending on stroke care over 10 years



*Accounts for additional AIS patients treated each year

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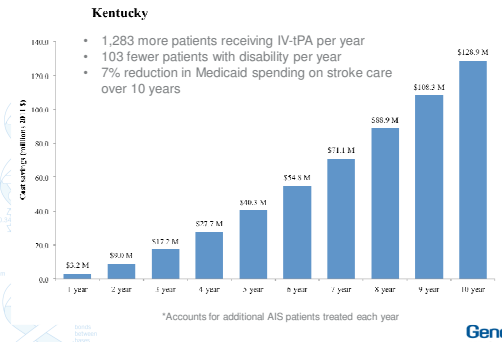
Results: Medicaid Savings Associated with Establishing an EMS Routing Protocol

Page 16



*Accounts for additional AIS patients treated each year

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Limitations

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- Model-based approach limited by the existing published literature
- Did not consider other benefits associated with increased access to stroke care (e.g., neurointerventions)
- Did not consider cost savings other than nursing home (e.g., hospitalization, rehabilitation, home health)

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Conclusion

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- State legislative policies to improve access to acute stroke care, particularly establishing transportation protocols, could have significant impacts on improving stroke outcomes and reducing Medicaid expenditure on stroke-related care.

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