The Economics of Health Care for Stroke Patients

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Objectives

- Explain the financial impact of stroke at both the macro and micro levels.
- Discuss the financial value of stroke clinics.

Disclosure Information

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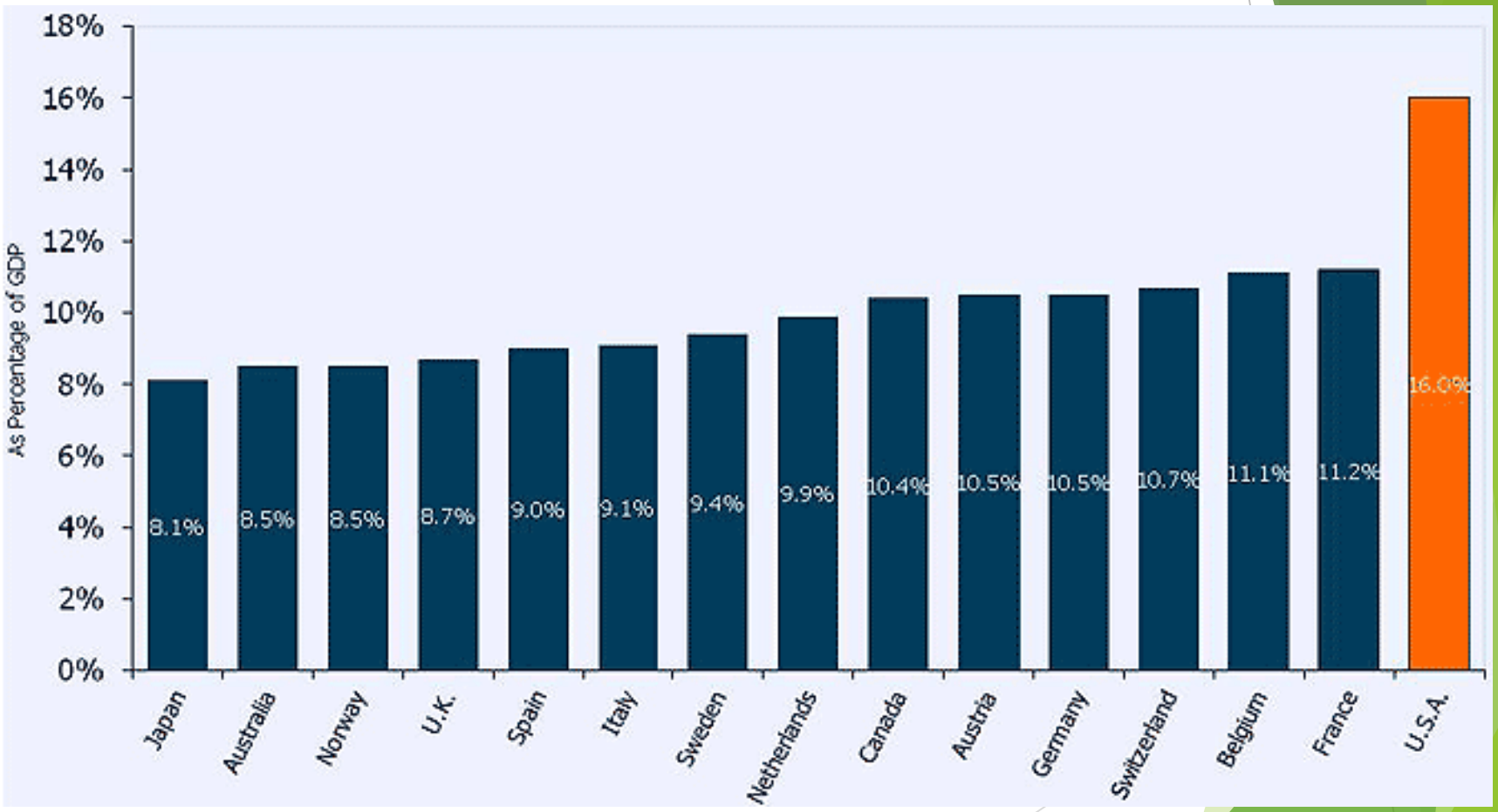
FINANCIAL DISCLOSURE: None

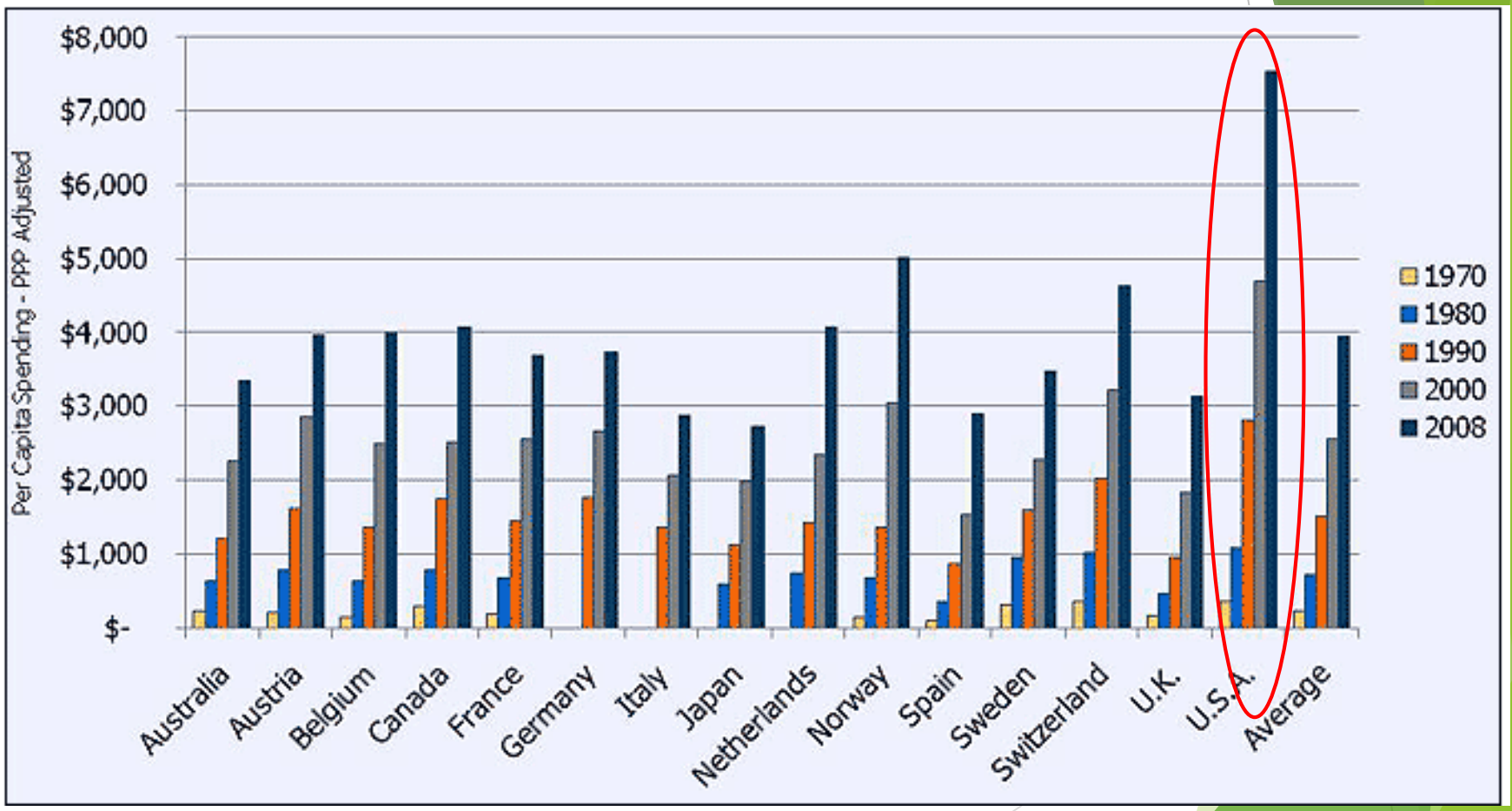
UNLABELED/UNAPPROVED USES DISCLOSURE: None

Global Health Expenditures: % GDP



OECD, 2014: Billions

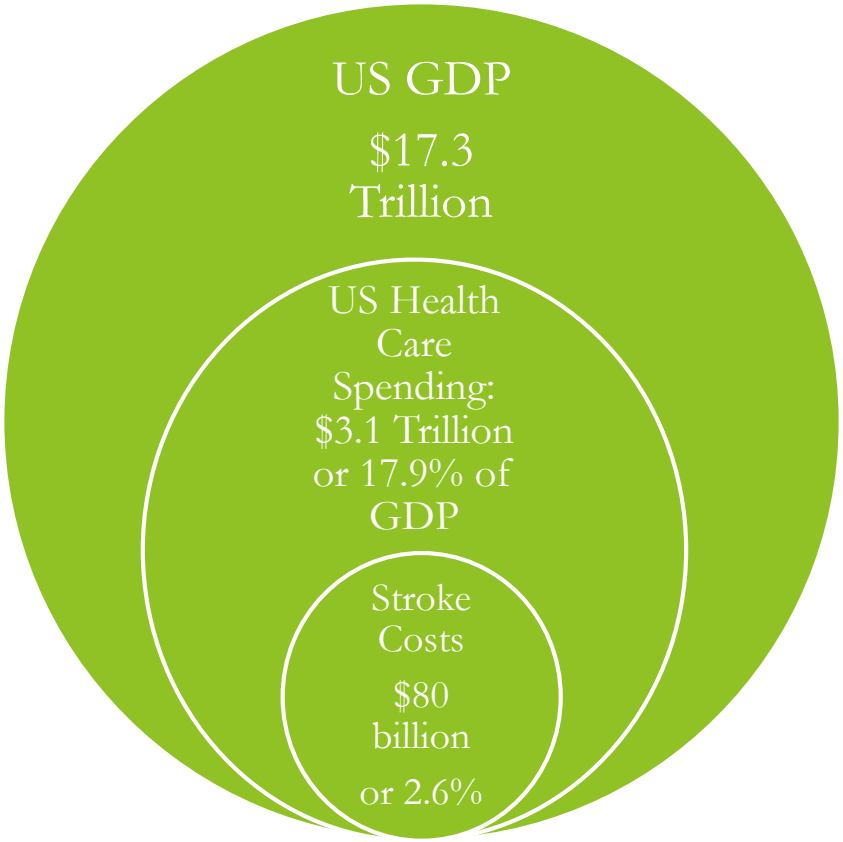
Global Health Expenditures: PC



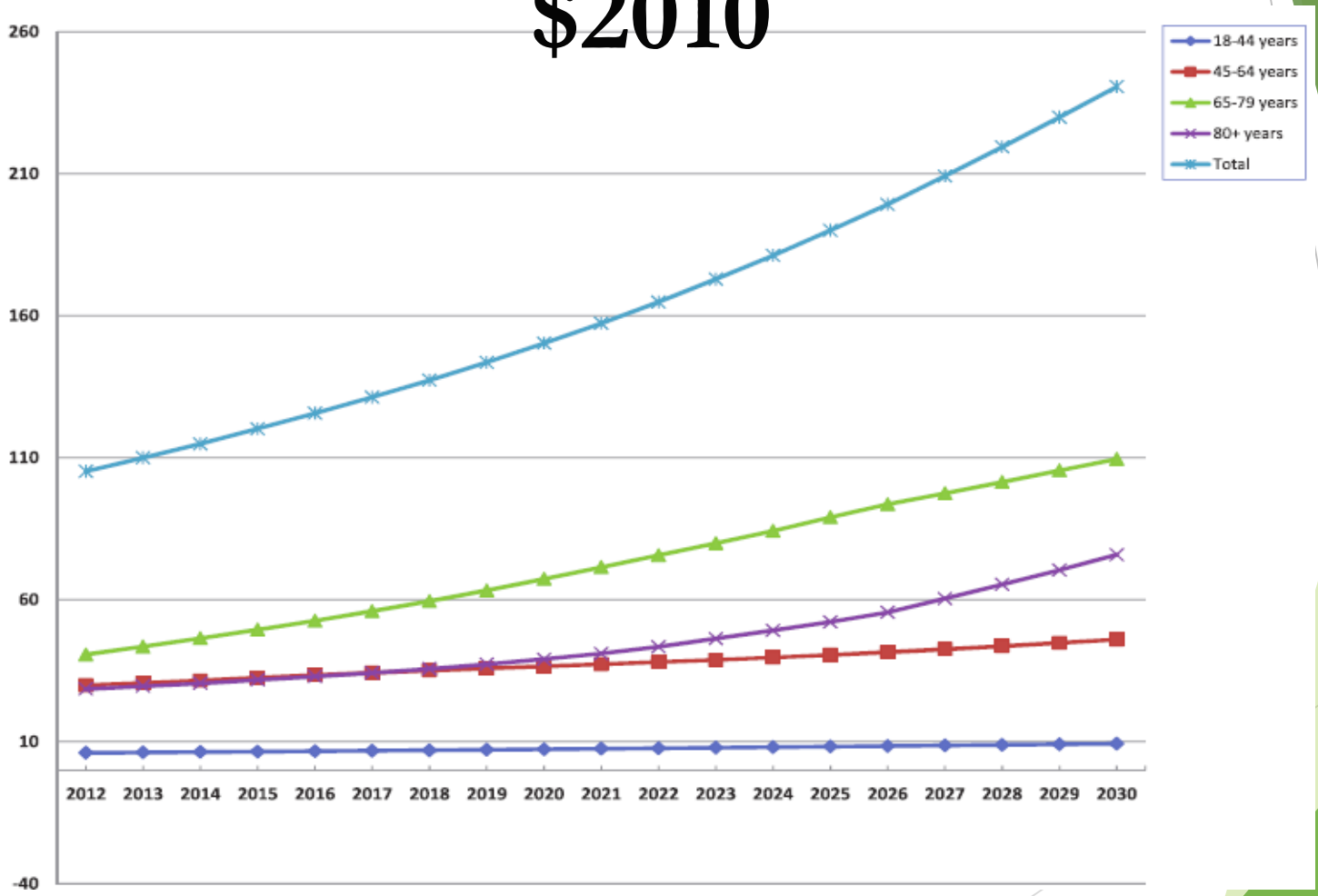
OECD, 2014: Billions

US Health Care Spending

US Health Care

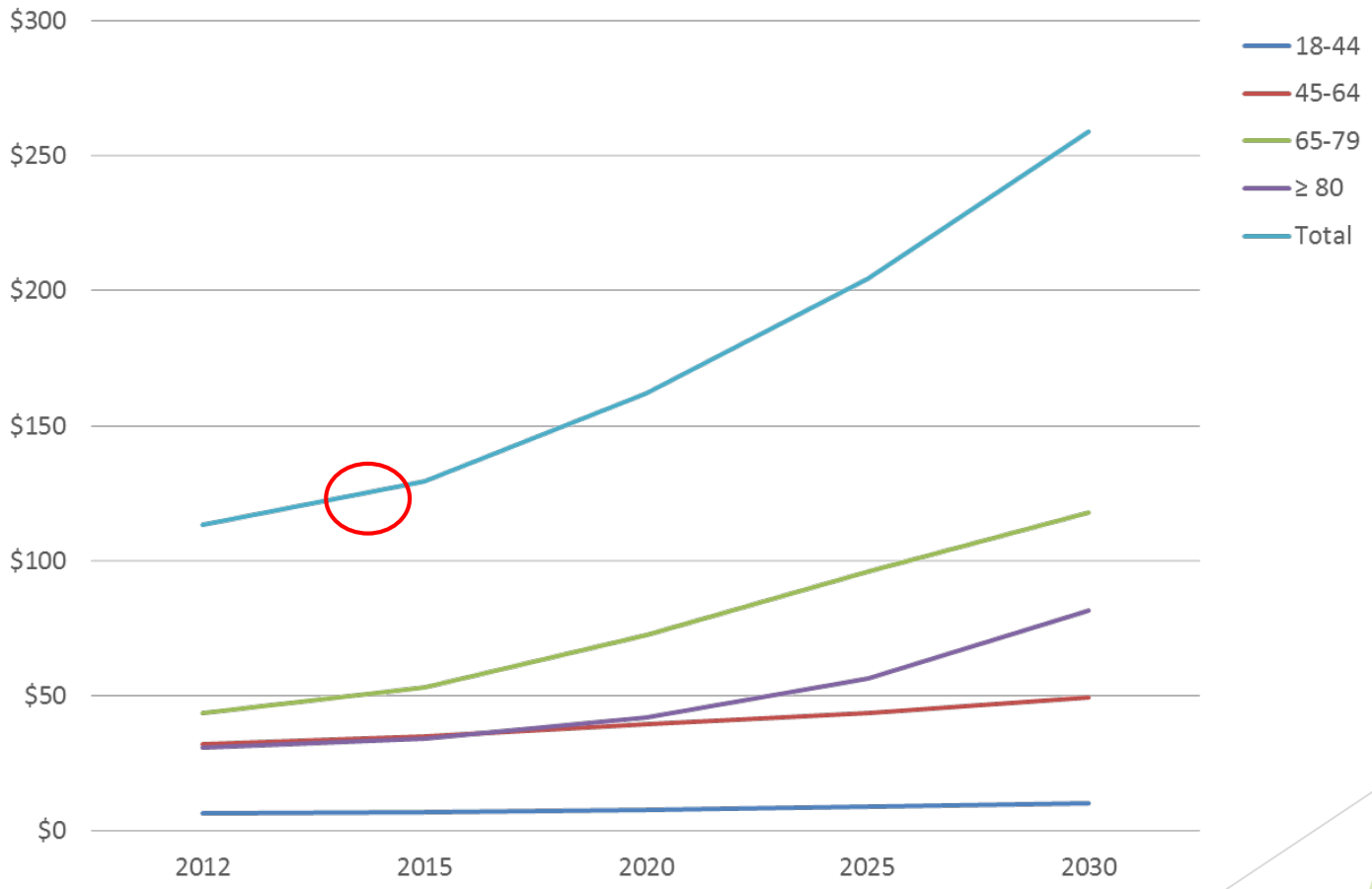


Stroke Projected Total Costs $2010



Ovbiagele, B. et al/ AHA?ASA policy statement 2014

Stroke Projected Total Costs $2014



Question

Why is stroke so expensive?

Epidemiology

- 795,000 new or recurrent strokes annually (NINDS, 2013)
- Prevalence- 2.8% (NHANES, 2013)

  -↑ older adults (18-44: 0.7%, ≥ 65: 8.4%)

  -AA

  -Lower education

  -Southeast US
- Mortality- 39.1/100,000 (NCHS, 2013)
- 2030- 29.5 % increase (AHA?ASA, 2013)

Morbidity

- #1 leading cause of disability
- 50% some hemi paresis
- 30% walking assistance
- 46% cognitive deficits
- 19% aphasia
- 26% dependent ADLs
- 26% nursing home

- NHLBI's FHS, ischemic stroke survivors >65yoa, 6 mos post event

Financials

Average Charges	Average CMS Payment
$22.7K-$83.3K	**$3.9K- $16.5K**

MedPAR, 2011

Wang et al, 2006-2008

Ischemic: $18, 963 (±21K)

Hemorrhagic: $32,046 (±32K)

Other: $19,248 (±22K)

Rehabilitation

Table 2. Cost of stroke related to outpatient rehabilitation and medications the first year postdischarge from inpatient rehabilitation

	Mean	Median	Range[a]	25th percentile	75th percentile
Total					
Medication cost	$5,392	$4,990	$0–$21,387	$3,255	$6,482
Service cost	$11,689	$8,629	$0–$39,289	$3,314	$17,125
Total cost	$17,081	$14,085	$173–$47,372	$8,253	$22,451
Independent					
Medication cost	$5,208	$4,711	$0–$21,387	$3,251	$5,947
Service cost	$10,416	$6,611	$0–$39,289	$2,905	$14,647
Total cost	$15,624	$12,302	$4,352–$42,074	$7,743	$21,104
Modified dependence					
Medication cost	$5,968	$6,410	$50–$11,001	$4,040	$7,535
Service cost	$15,723	$15,576	$123–$38,915	$7,130	$21,489
Total cost	$21,691	$22,221	$173–$47,372	$12,063	$28,208
Dependent					
Medication cost	$5,627	$5,627	$5,225–$5,828	$5,426	$5,828
Service cost	$12,947	$12,947	$9,207–$16,686	$9,207	$16,686
Total cost	$18,574	$18,574	$15,035–$22,112	$15,035	$22,112

[a]One person reported no medication; other individuals reported no service utilization.

Per Patient Costs

- Longer, Short term-

Table 3 Cost of hospitalization for stroke and first year follow-up costs (per patient per year)

Mean ± SD	Stroke cohort (N = 2180)	New stroke (N = 1808)	Recurrent stroke (N = 372)	Control cohort (N = 6540)
Index hospitalization costs	$15,888 ± $33,466*	$15,634 ± $27,536	$17,121 ± $53,693	$11,281 ± $29,052[a]
1-year follow-up costs				
Medical costs	$23,725 ± $58,227*	$22,099 ± $53,690	$31,625 ± $76,138	$5142 ± $16,619
Pharmacy costs	$2950 ± $3549*	$2937 ± $3577	$3014 ± $3416	$1388 ± $2302
Combined medical and pharmacy	$26,675 ± $58,605*	$25,036 ± $54,052	$34,639 ± $76,586	$6530 ± $17,167

Notes: All comparisons are relative to the control cohort and are computed by *t*-test. [a]Mean costs reported for 168 control subjects with a hospitalization on the index date. *$P < 0.001$.

- Longer term- Taylor et al, 1996: $90,981 ($1990)

  $163,432.37 ($2014) Ischemic stroke

Impact of ACA for individuals

- Decrease the # of uninsured
- Pre-existing condition denials- eliminated
- Insurers cannot no longer charge higher premiums for medical condition, age, gender, or occupation
- No lifetime nor annual services caps
- Tax credit for low/moderate income individuals/families that meet criteria
- Preventive care coverage/ no cost sharing

Impact of ACA for providers

- Decrease the # of uninsured
- Preventive services covered
- Reimbursement based on patient outcome, rather than volumes

Early Treatment

- Tele-medicine
  - Increases rt-PA administration & acute treatment options
  - Improves patient outcomes & satisfaction
- Cost: Technology dependent
  - Robot: $100K+ per unit
  - Face time: $0-$900 per unit
  - Computer screen interface: $20-$50K per unit

Early Treatment

- Pre-notification

  - Increases rt-PA administration & acute treatment options

  - EMS & patient & family satisfaction

- Cost: $0

  - EMS and ED staff education on pre-notification protocols

  - Annual education and quality monitoring follow up for certification requirements and inter-institutional collaboration initiatives.

Stroke Clinic

	Tier I	Tier II	Tier III
Use of existing facilities	√	√	
Build out new facilities			√
MD & MSW	√	√	√
RN	√		
NP, Pharm D, PM&R		√	√
Inpatient follow up	√	√	√
Rapid assessment of potential stroke		√	√
Cost	$0	$0+	$100K+

Potential Cost Savings

	Annual No. of Ischemic Strokes	Proportion of Ischemic Stroke Patients That Receive tPA (%)						
		Best Estimate of Cost Savings in First Year Post-Stroke (American $) and 95% CIs						
		2%	4%	6%	8%	10%	15%	20%
NATION								
United States	616 000	$7 392 000	$14 784 000	$22 176 000	$29 568 000	$36 960 000	$55 440 000	$73 920 000
Max Cost Saving		$43 Million	$86 Million	$129 Million	$171 Million	$214 Million	$322 Million	$429 Million
Possible Loss		$25 Million	$49 Million	$74 Million	$99 Million	$123 Million	$185 Million	$247 Million

Clinic Benefits

- ↑ Medication compliance and therapeutic range
- ↓ Mortality
- ↓ Morbidity
- ↑ Referrals to ancillary services
- ↑ Patient satisfaction
- ↓ Care costs

Stroke Clinic Benefits

- Tier I
  - Improved medication compliance and ancillary services referrals
  - Decrease 30 day readmissions
  - Possible decreases in mortality
- Tier II
  - Same as Tier I
  - Potential increase in stroke volume and decrease in stroke severity due to early identification of new cerebral events
  - Decrease strain on ED resources due to clinic diversion
- Tier III
  - Same as Tier II
  - Potential increase in community/academic standing and patient volumes associated with opening clinic event

Take Home

- US Health Care Spending is tremendous, especially compared to other OECD countries.
- Stroke Care is very expensive.
- ACA was enacted to improve care and curb spending growth.
- Providers must adapt to changing HC environment by courting patients with better stroke care service.

Questions