Advances in Brain Treatment

Innovations in the Prevention and Treatment of Stroke, Dementia, Alzheimer's and Traumatic Brain Injury

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5.02.2017

DISCLAIMER

The information contained in this presentation is not intended as a substitute for professional medical advice, diagnosis or treatment.
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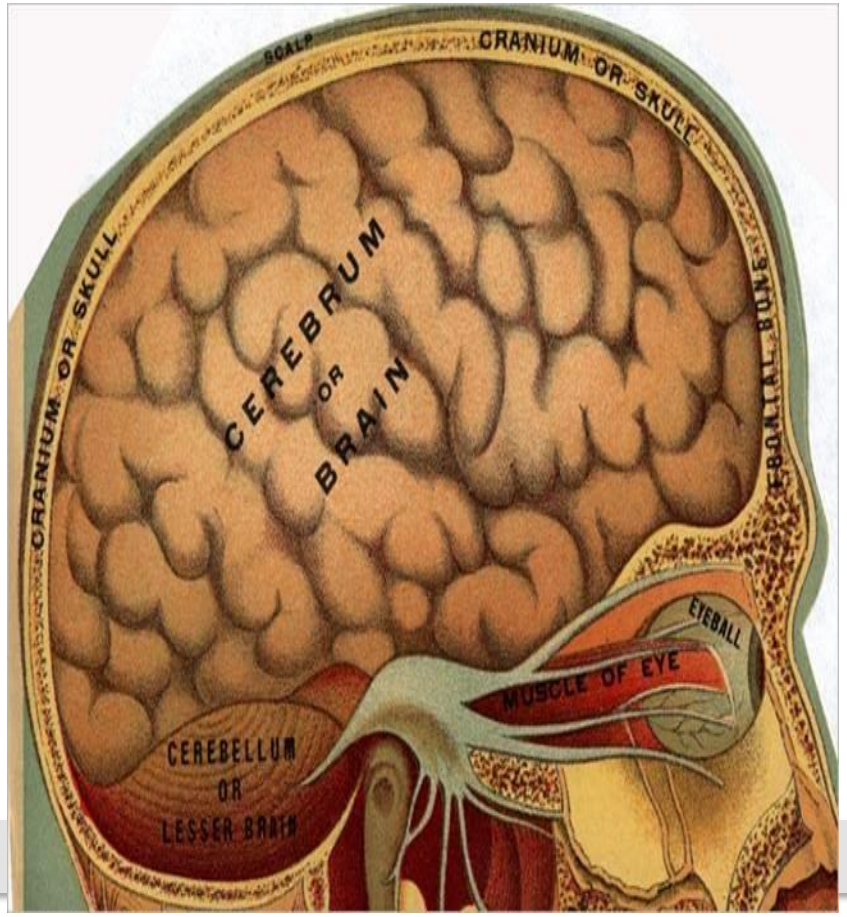
The Final Frontier

AMAZING THINGS ARE HAPPENING HERE



Neurology Scope of Practice

"disorders of brain, spine, muscles, and nerves"

Aging and Memory Loss
Critical Care Neurology
Epilepsy and Clinical Neurophysiology
    EEG & Evoked Potentials
General Neurology
Headache and Facial Pain
Hospitalist Neurology
Movement Disorders
    Botox therapies
Multiple Sclerosis & Neuro-Immunology
Neuromuscular Disorders
    Nerve conductions
    Electromyography
    Autonomic function
Neuro-Ophthalmology
Neuropsychology
Neurostimulation
Oncology
Sleep-Wake Disorders
Stroke and Cerebrovascular Diseases
Trauma and Concussion

World Health Organization

Of the ten most important global health challenges identified by the WHO, four of them are “brain” related.

Stroke

Dementia

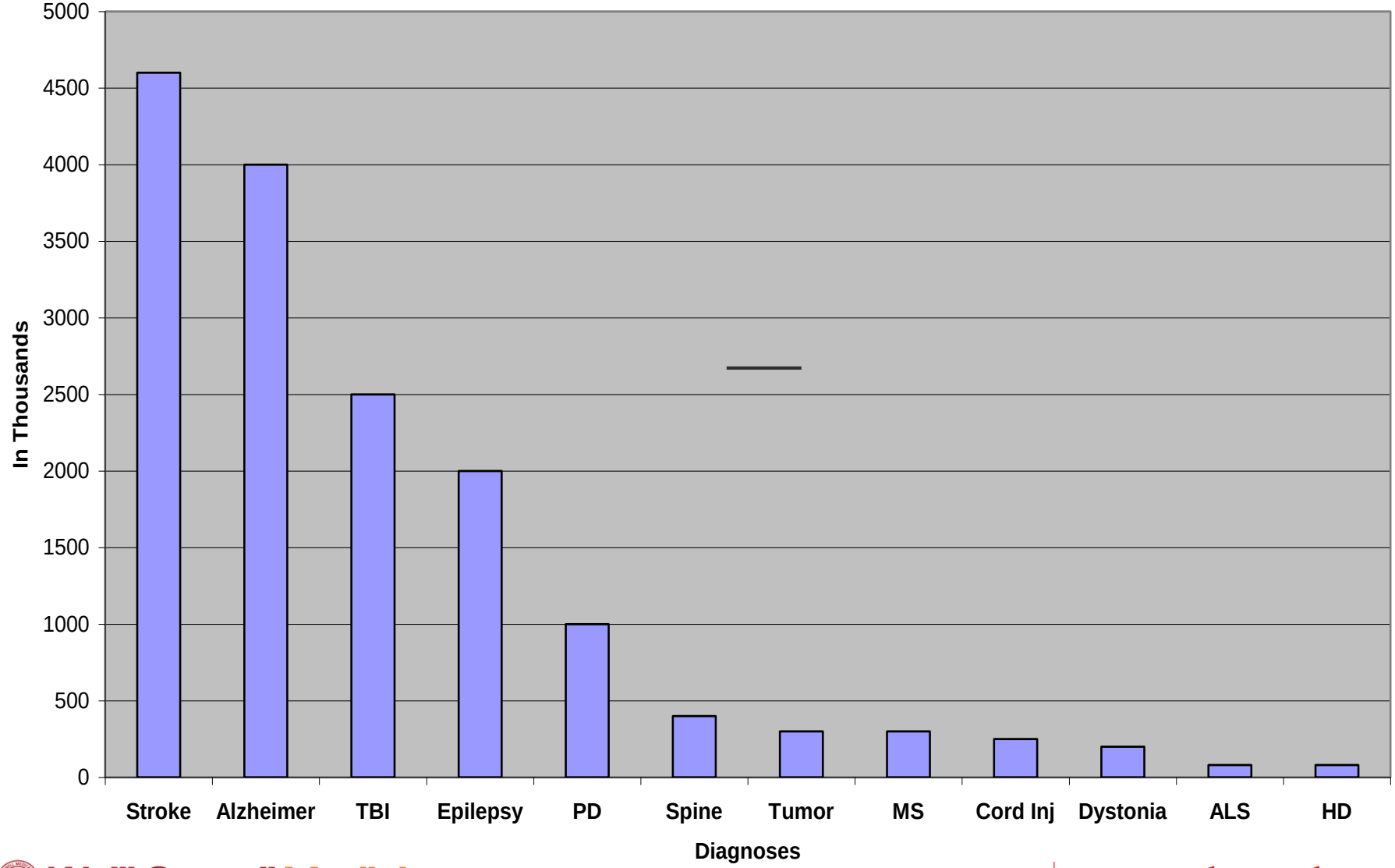
Traumatic Brain Injury

Depression

Global Burden of Disease

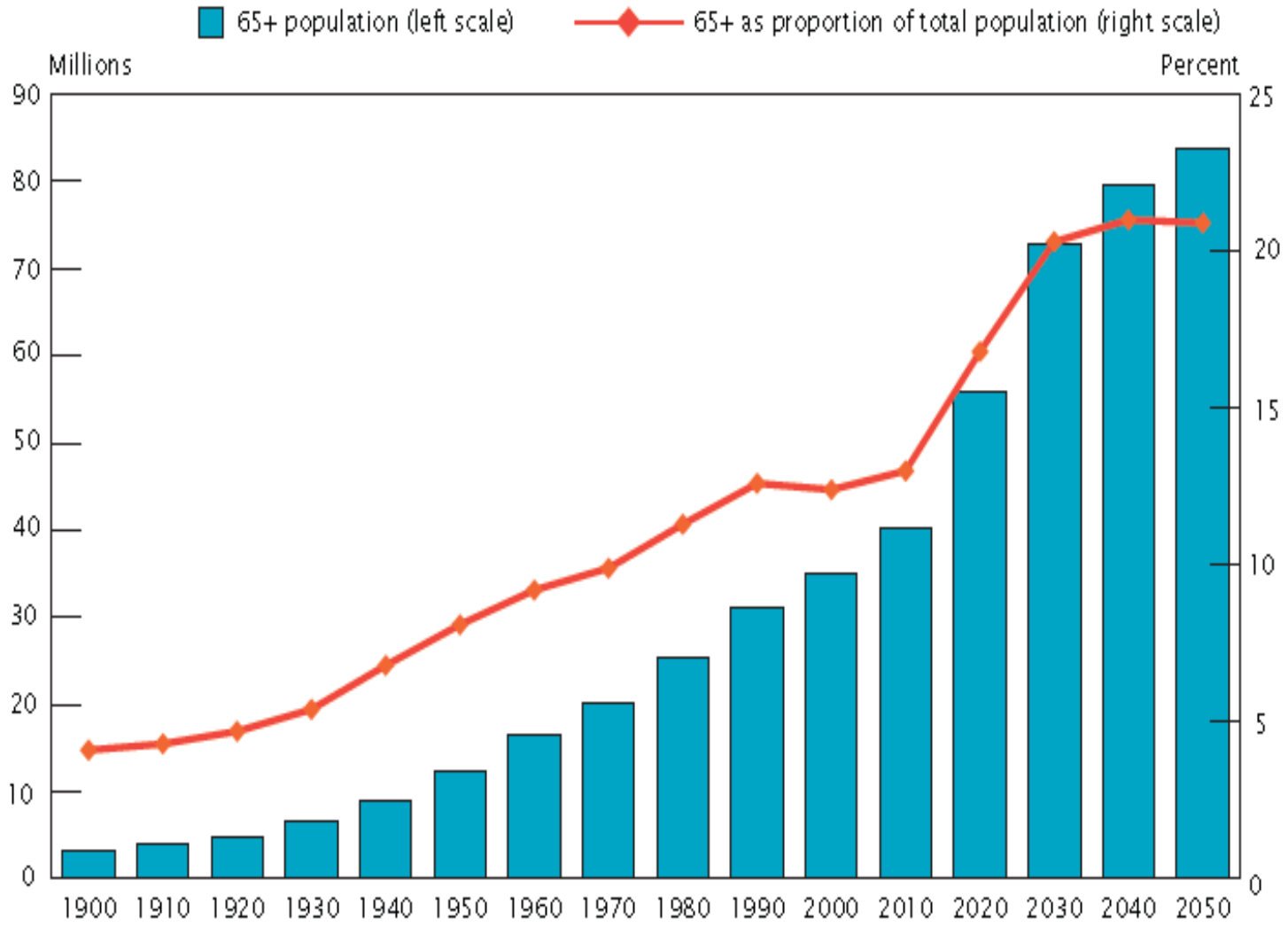
Deaths (*Top Ten*)	**Disability**
Ischemic Heart Disease	**Low Back Pain**
Stroke	**Major Depression**
Lung Cancer	Musculoskeletal Disease
Alzheimer's & other dementia	**Neck Pain**
COPD	**Anxiety Disorders**
Diabetes mellitus	COPD
Pneumonias	Drug abuse
Colorectal Cancer	Diabetes mellitus
Kidney Disease	Osteoarthritis
Other Cardiovascular	Asthma

Neurological Disorders in the U.S.



Aging U.S. Population

Age 65 years and older



The Baby Boomers

Every day, until the year 2030,

10,000 Baby Boomers will turn 65.

(www.pewresearch.org)

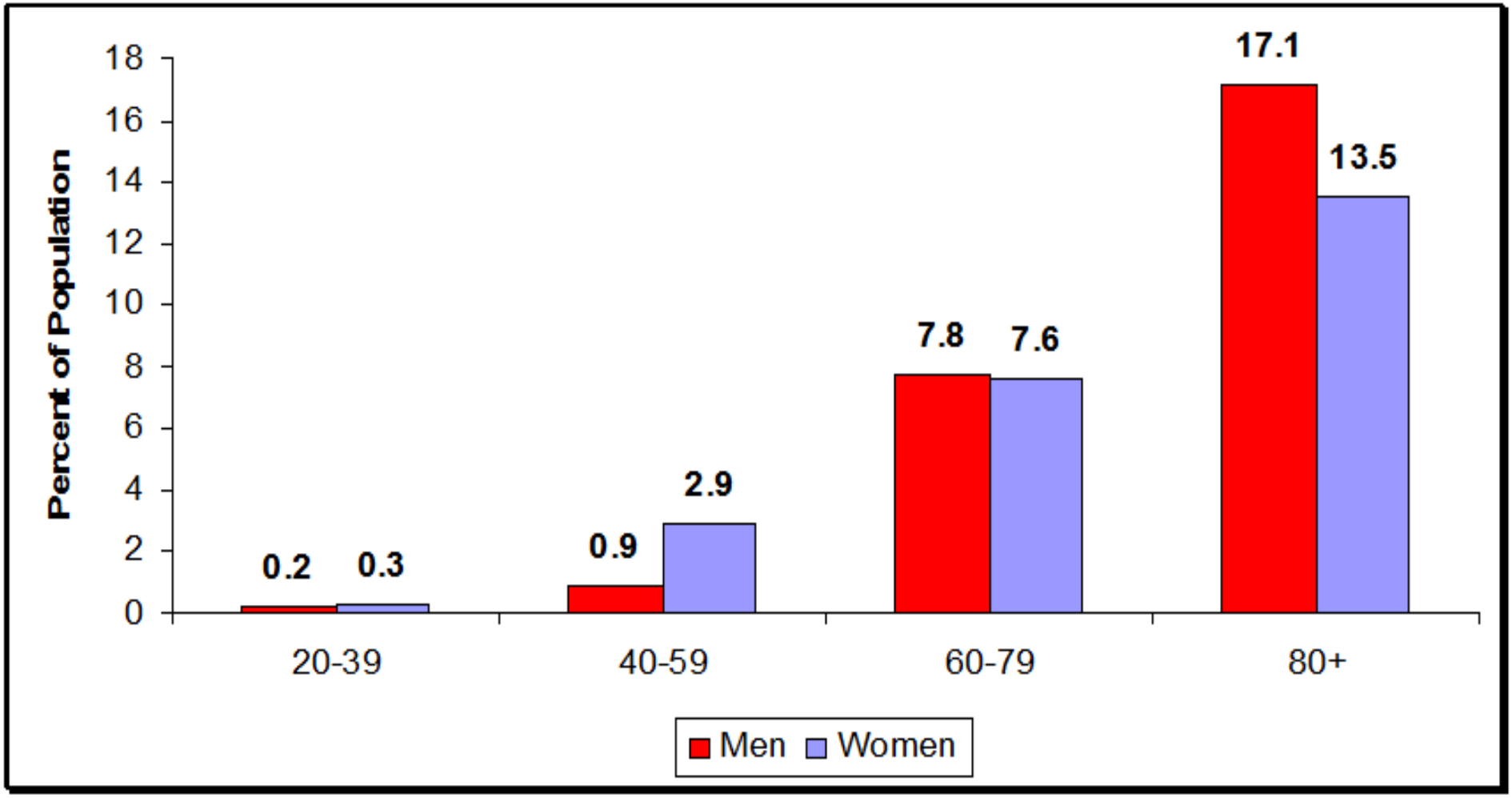
STROKE in the US - 2016

- 795,000 people suffer a new or recurrent stroke each year
  - On average, someone suffers a stroke every 40 seconds

- Stroke is the 5th leading cause of death
  - There are 137,000 stroke deaths each year
  - On average, every 4 minutes someone dies of stroke
  - In **New York**, stroke is the **4th** leading cause of death

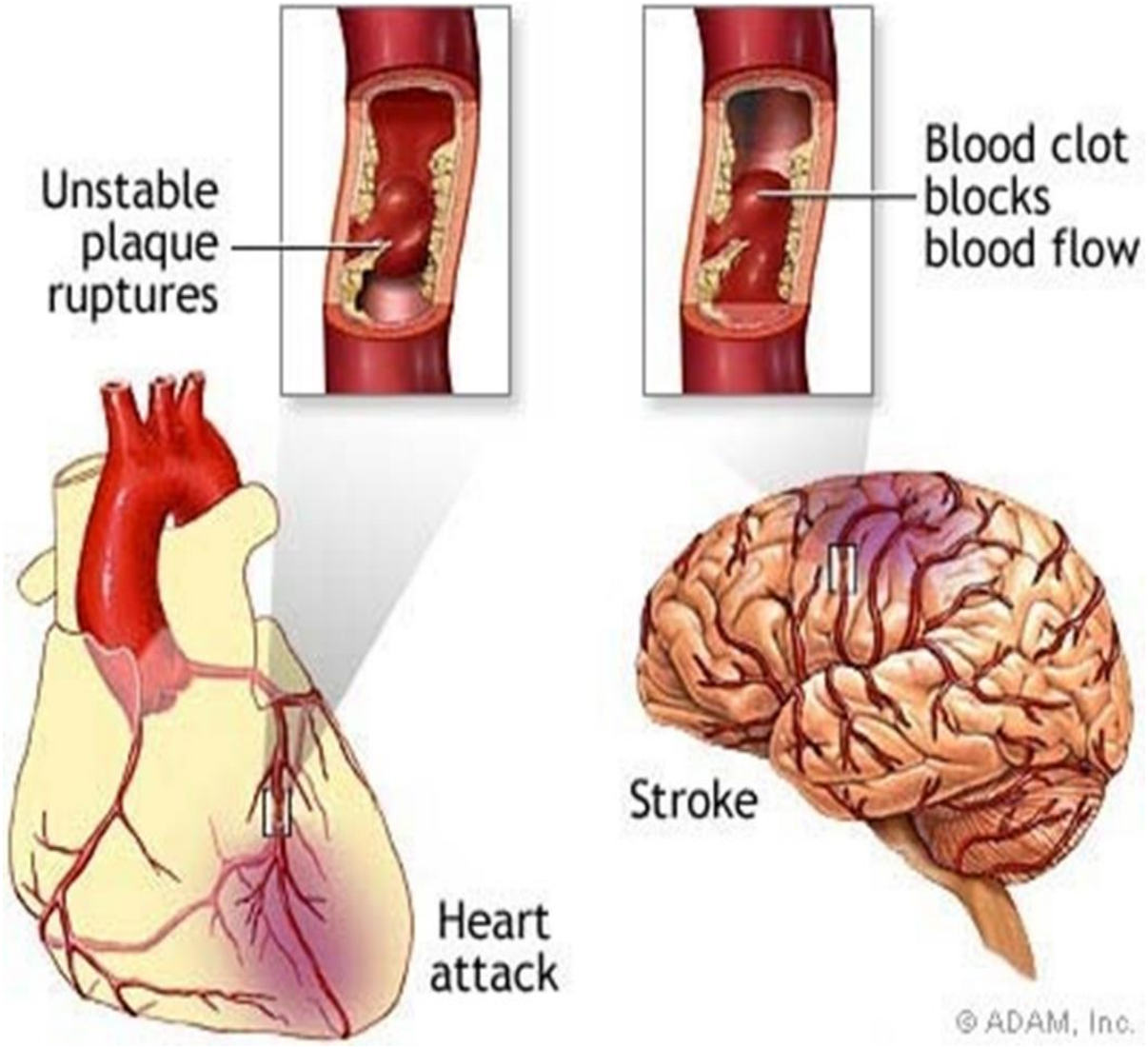
- Stroke is a leading cause of adult disability

- There are approximately 7,000,000 stroke survivors

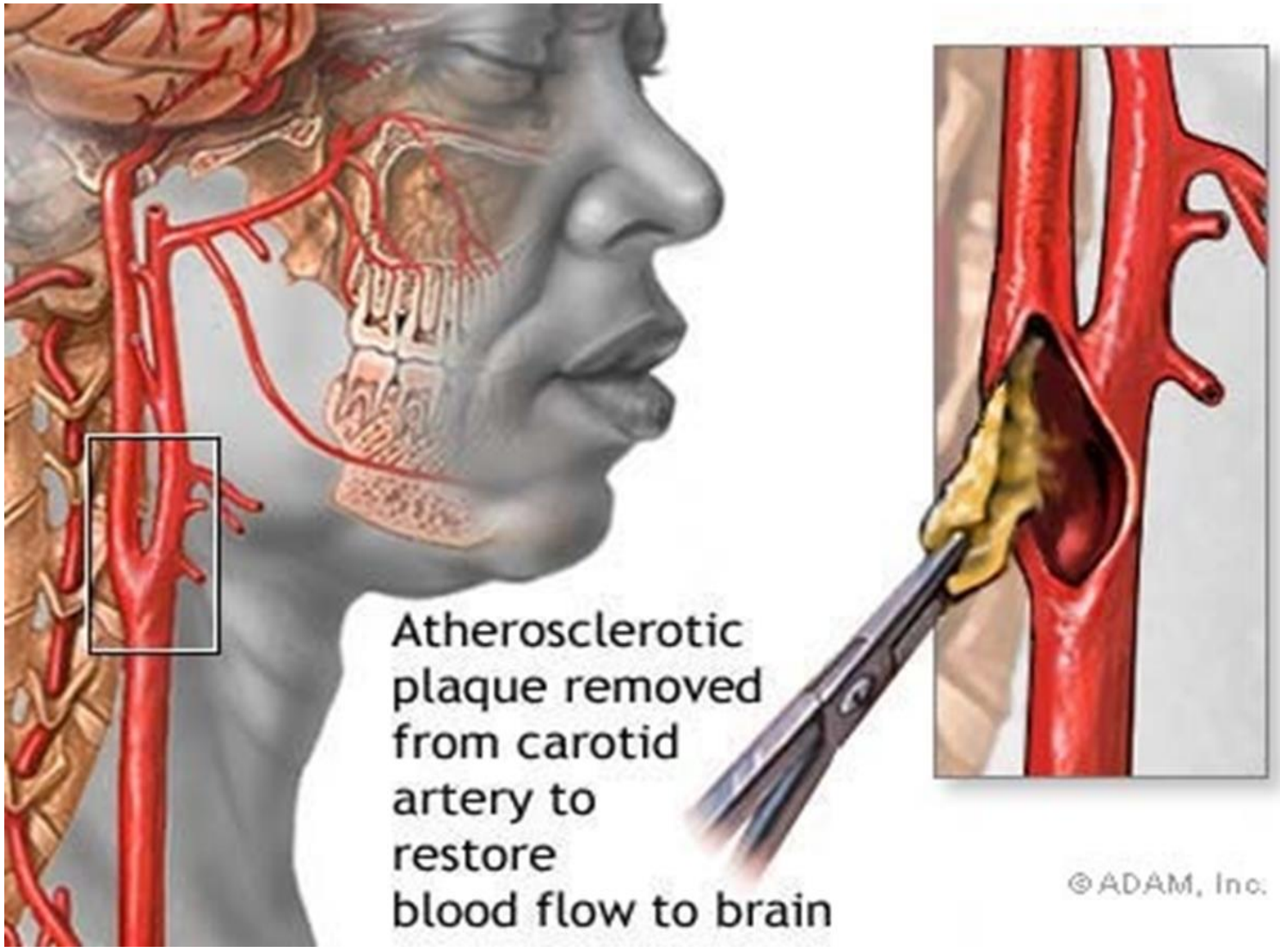


Prevalence of stroke by age and sex (NHANES: 2005-2006)

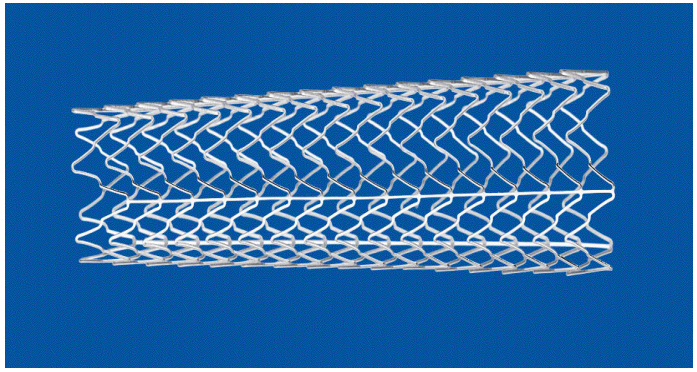
Middle cerebral artery infarction


Unstable plaque ruptures
Blood clot blocks blood flow
Heart attack
Stroke
© ADAM, Inc.

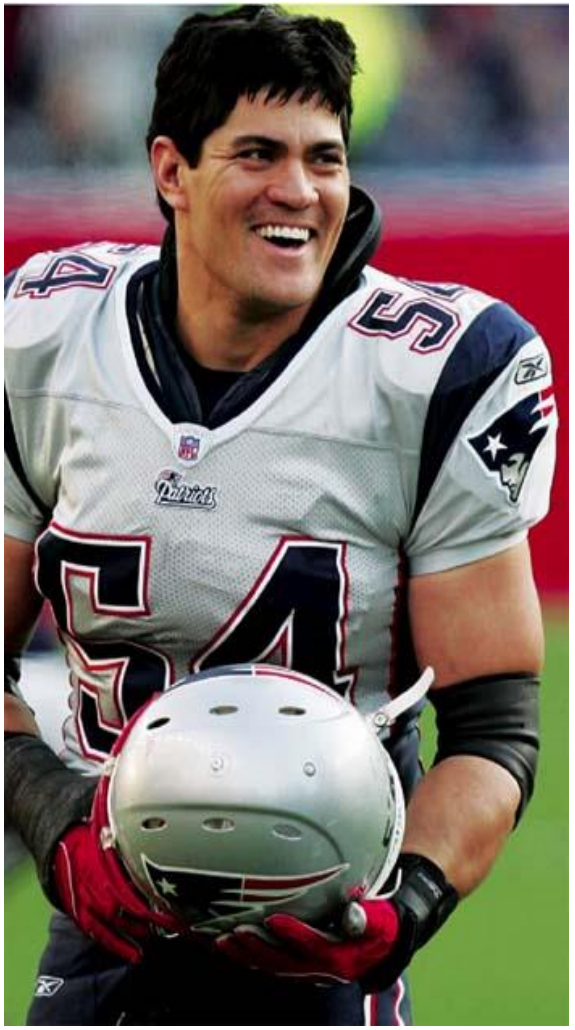
Carotid Artery Atherosclerosis


Atherosclerotic plaque removed from carotid artery to restore blood flow to brain
©ADAM, Inc.

Carotid Stent



At Risk for Stroke?



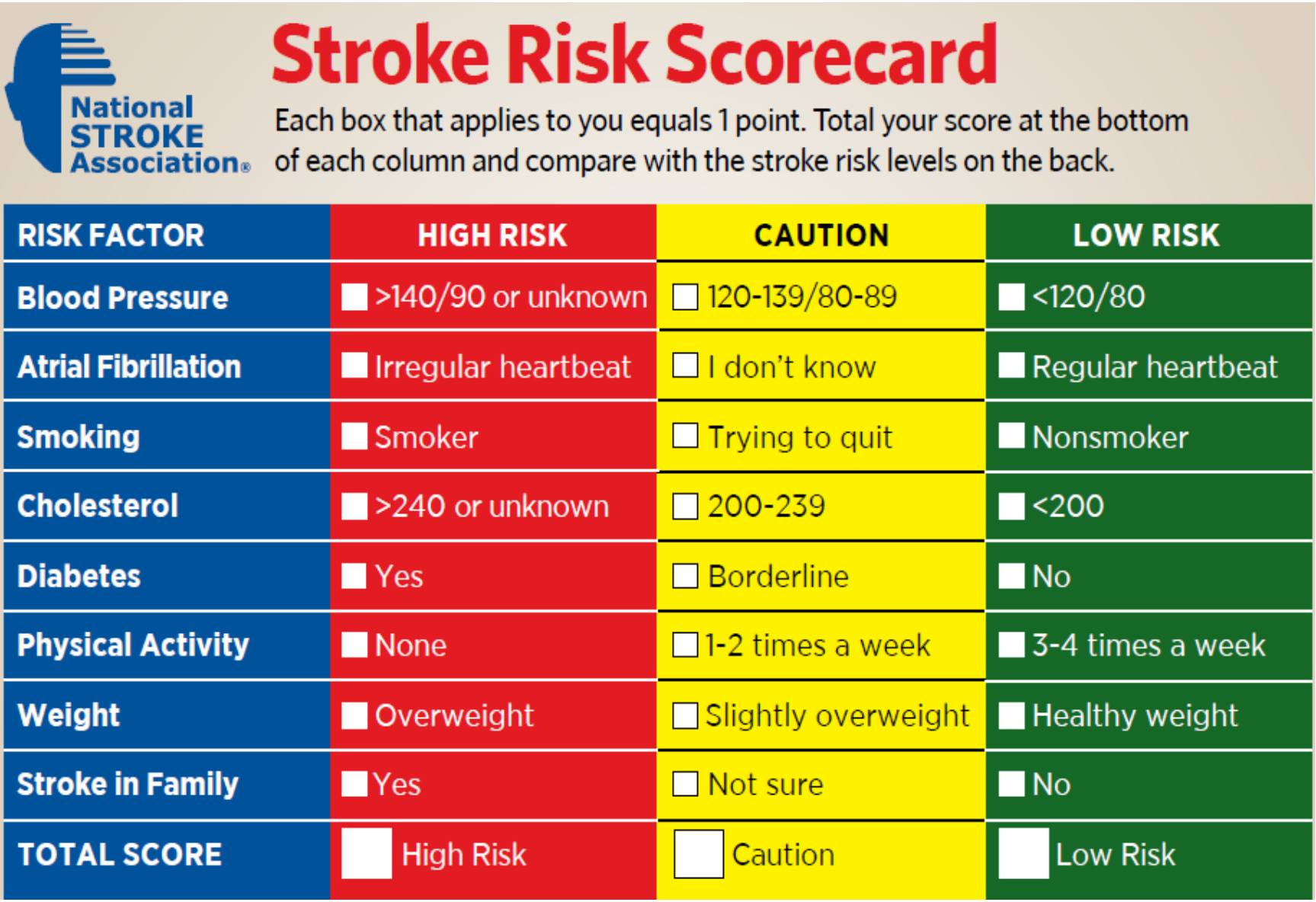
Stroke Can Be Prevented!

With current knowledge and technology we **CAN** prevent 80 percent of all strokes.

This includes strokes from aneurysms, vascular malformations, cardiac embolism, and atherosclerosis.

Modifiable Risk Factors for Stroke

- Previous Stroke or TIA
- Hypertension
- Cardiac Disease
- Diabetes and Glucose Metabolism
- Hypercholesterolemia
- Carotid Artery Disease
- Cigarette Smoking
- Lifestyle Factors *(obesity, physical inactivity, diet, illicit drug use, emotional stress)*
- Oral contraceptives


National STROKE Association®
Stroke Risk Scorecard
Each box that applies to you equals 1 point. Total your score at the bottom of each column and compare with the stroke risk levels on the back.
RISK FACTOR
HIGH RISK
CAUTION
LOW RISK
Blood Pressure
>140/90 or unknown
120-139/80-89
<120/80
Atrial Fibrillation
Irregular heartbeat
I don't know
Regular heartbeat
Smoking
Smoker
Trying to quit
Nonsmoker
Cholesterol
>240 or unknown
200-239
<200
Diabetes
Yes
Borderline
No
Physical Activity
None
1-2 times a week
3-4 times a week
Weight
Overweight
Slightly overweight
Healthy weight
Stroke in Family
Yes
Not sure
No
TOTAL SCORE
High Risk
Caution
Low Risk

Milestone – 1995

NINDS rt-PA Stroke Study N Engl J Med

- 624 patients treated with 0.9 mg/kg/hour
- Treated in less than three hours; ½ less than 90 minutes
- t-PA group: 31-50% complete recovery
- Control: 20-38% complete recovery
- ICH: 6.4% v. 0.6%
- Mortality: 17% v. 20%

Odds Ratio for Good Outcomes After Intravenous rTPA (Lees, Lancet, 2010)

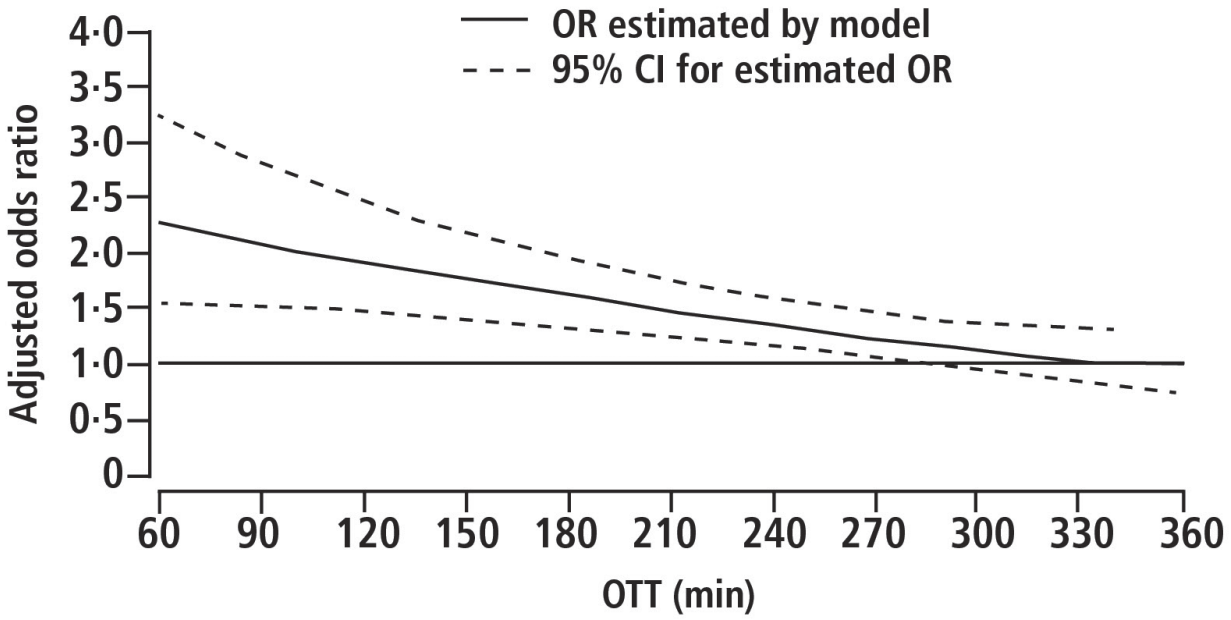
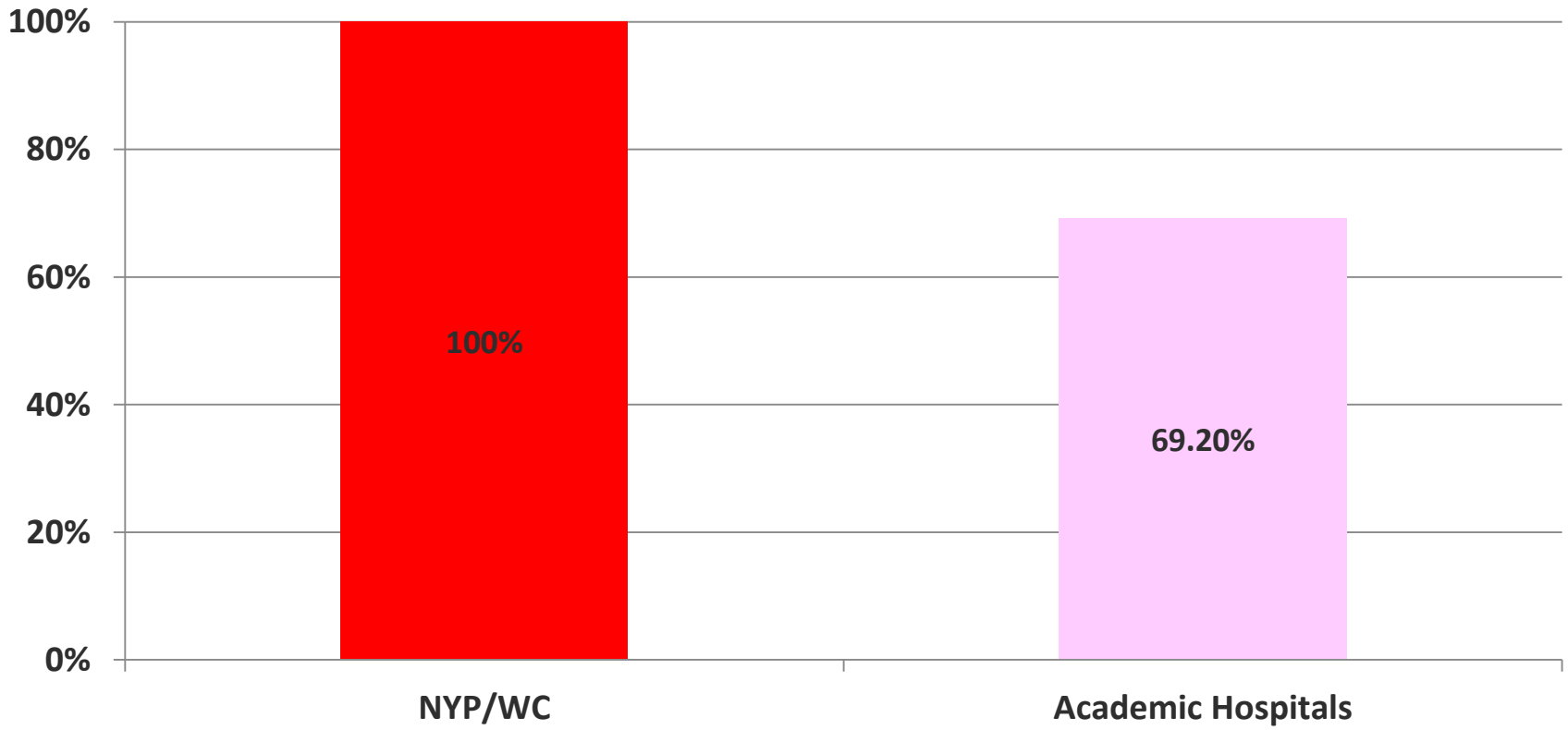


Table 1. Time-to-treat impact on stroke outcomes

	Neurons lost[a]	Synapses lost	Accelerated aging
Per stroke	1.2 billion	8.3 trillion	36 yr
Per hour	120 million	830 billion	3.6 yr
Per minute	1.9 million	14 billion	3.1 wk
Per second	32,000	230 million	8.7 hr

Saver, Stroke, 2006

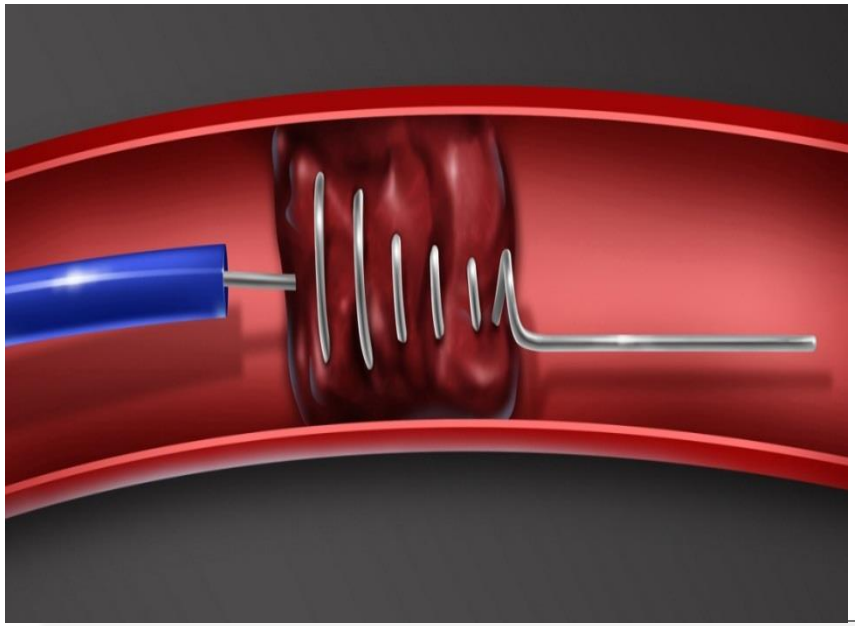
Percent of Patients Receiving tPA in 60 Minutes or Less: 2014



Mechanical Thrombectomy

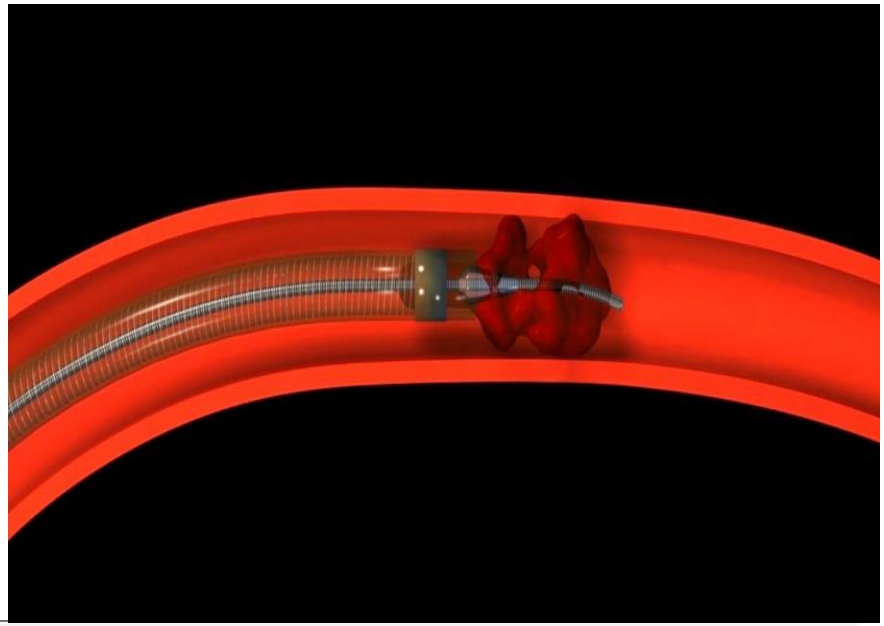
MERCI retriever
FDA Approved in 2004

Concentric Medical, Inc, Mountain View, California



Penumbra system
FDA Approved in 2008

Penumbra, Inc. Alameda, California



Milestone - 2015

International Stroke Conference

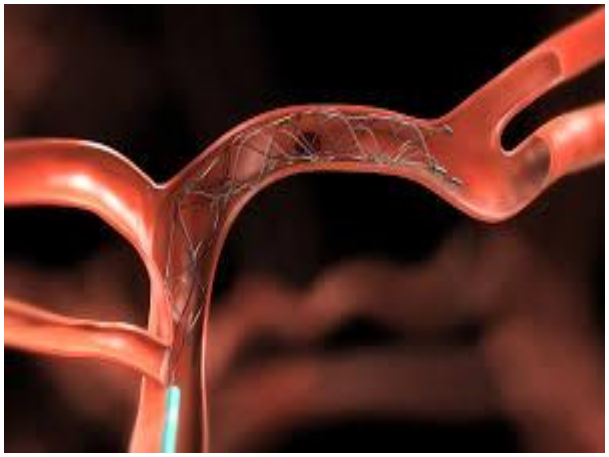
Five separate randomized trials

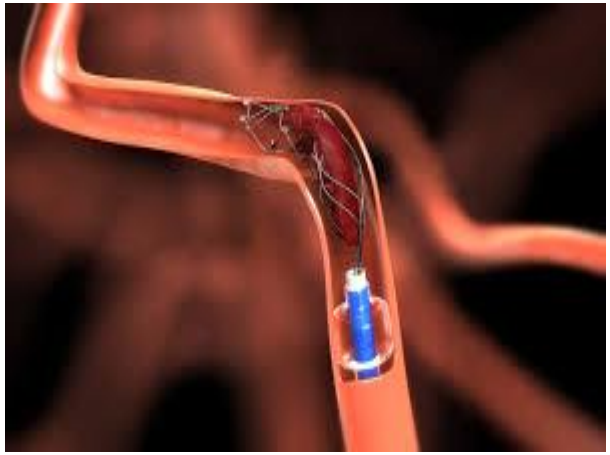
confirmed the added benefit of

endovascular clot extraction in

addition to IV rt-PA

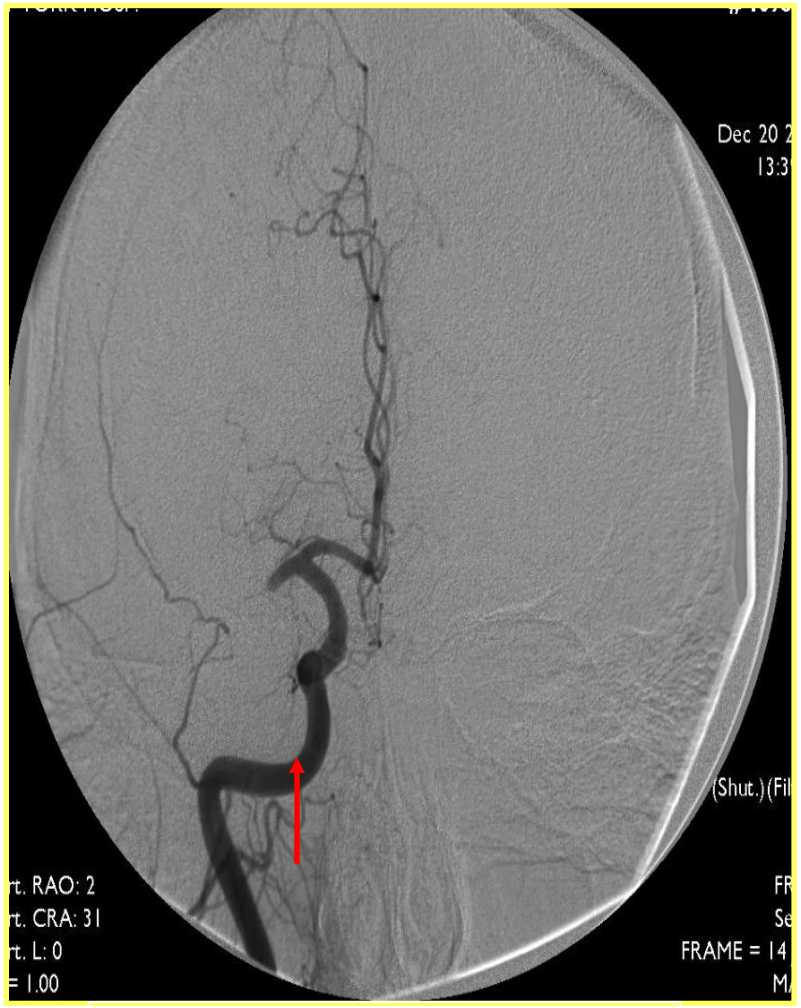
'Solitaire' Stent Retriever



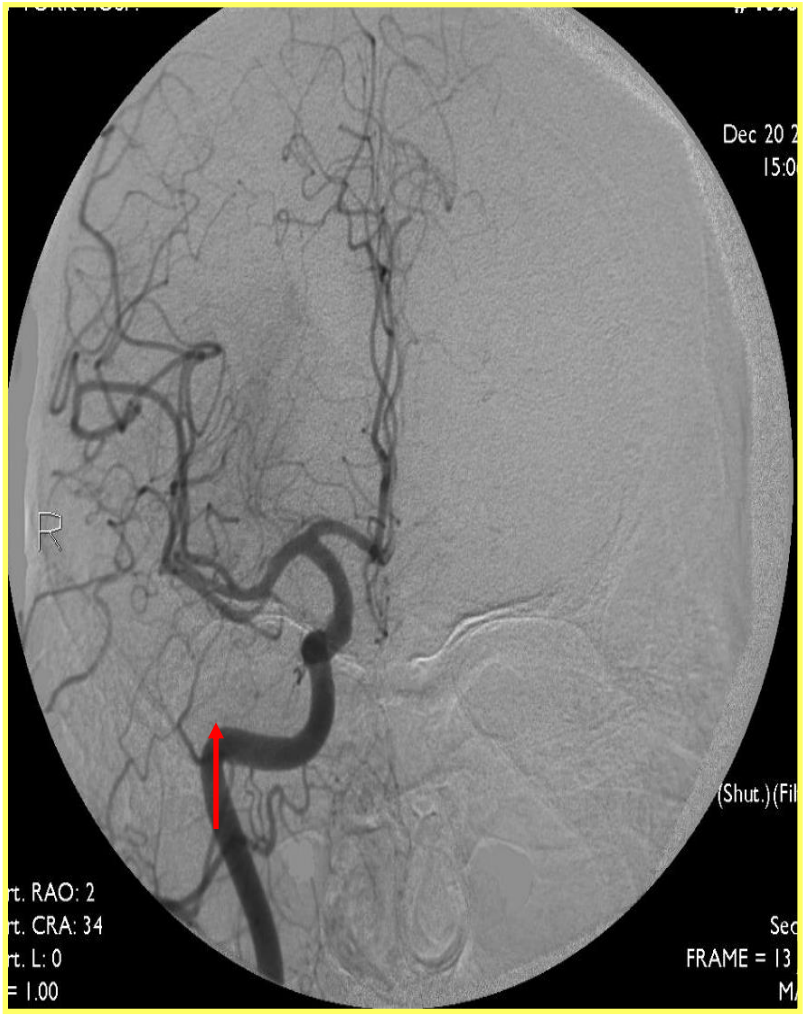


Intracranial Clot Extraction

Intra-Arterial Clot Removal



Angio Before



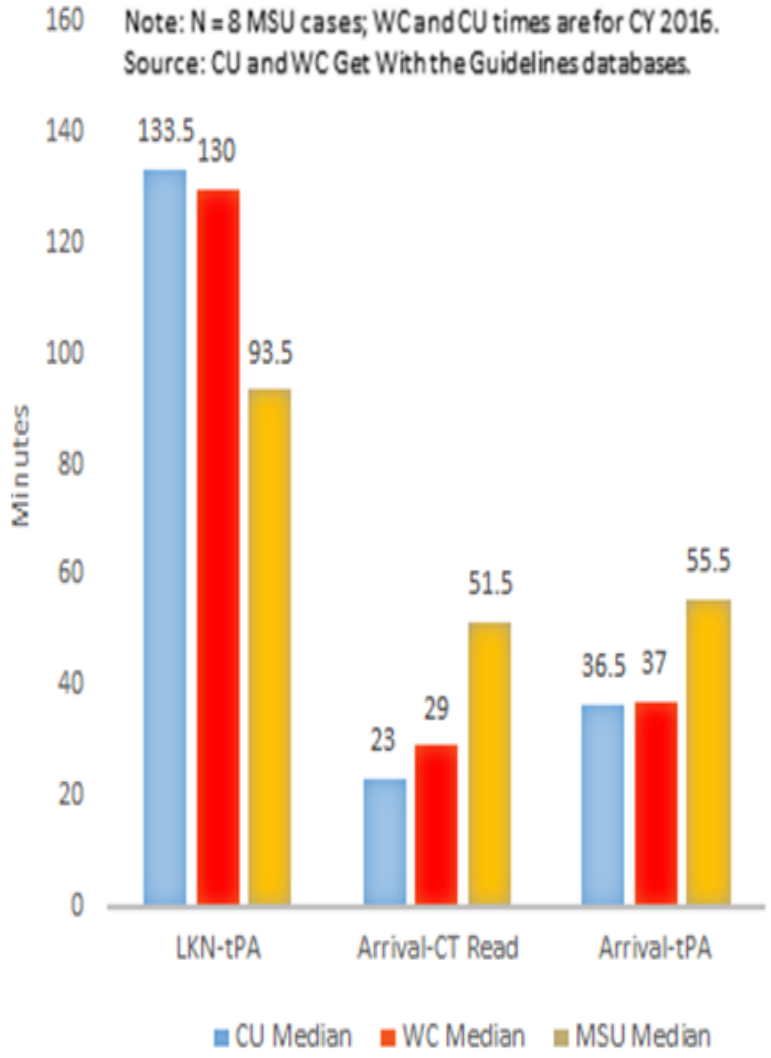
Angio After

New York Presbyterian Mobile Stroke Unit

Potential of the Mobile Stroke Unit

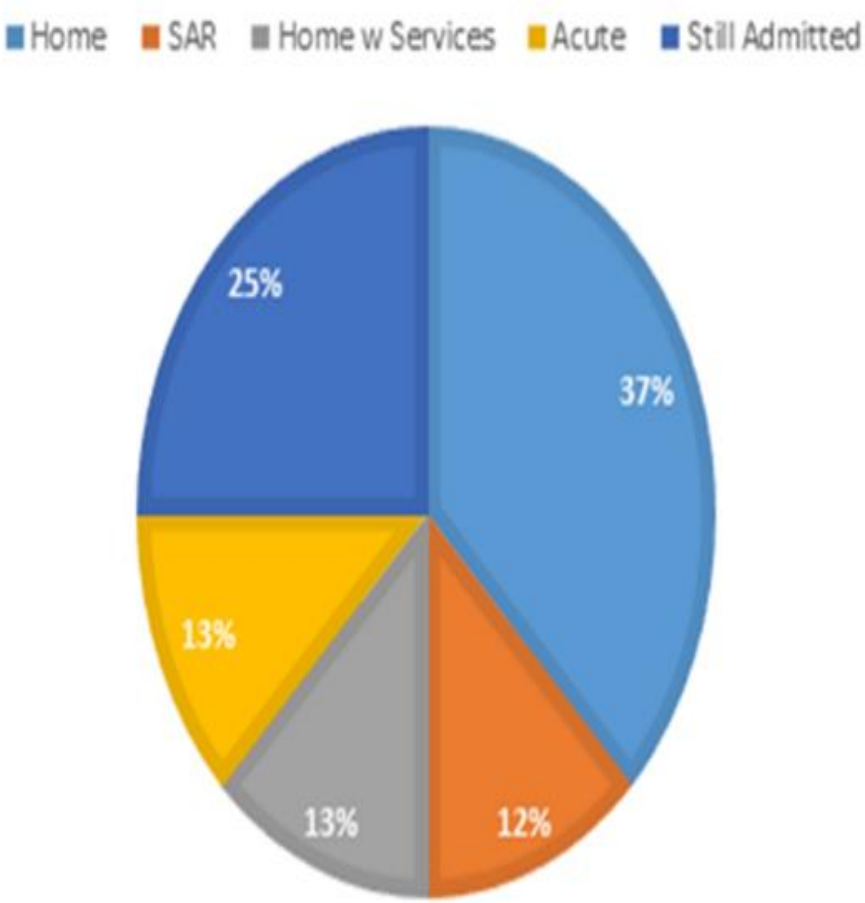
- Bring the physician expertise & diagnostic tools to the patient
- Initiate treatment at the scene
- Cut time to treatment
- Increase tPA delivery & access to endovascular therapy
- Increase chances for better neurologic outcomes

Median tPA-Related Time Metrics at NYP Oct-January 2017

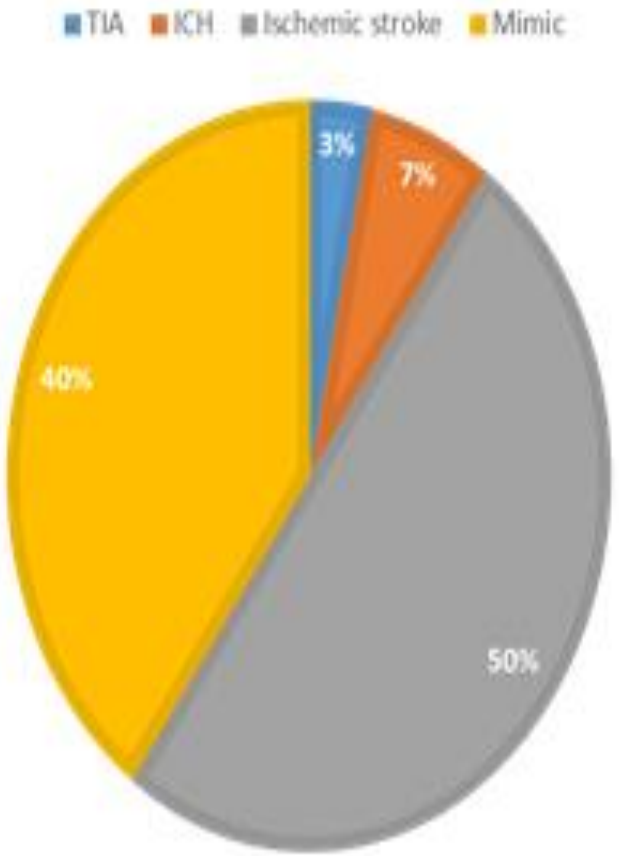


- Despite longer median arrival-to-CT and arrival-to-tPA times, MSU care results in faster symptom onset-to-tPA time.
- We expect times from arrival-to-CT and arrival-to-tPA to improve with more clinical experience on board the MSU.

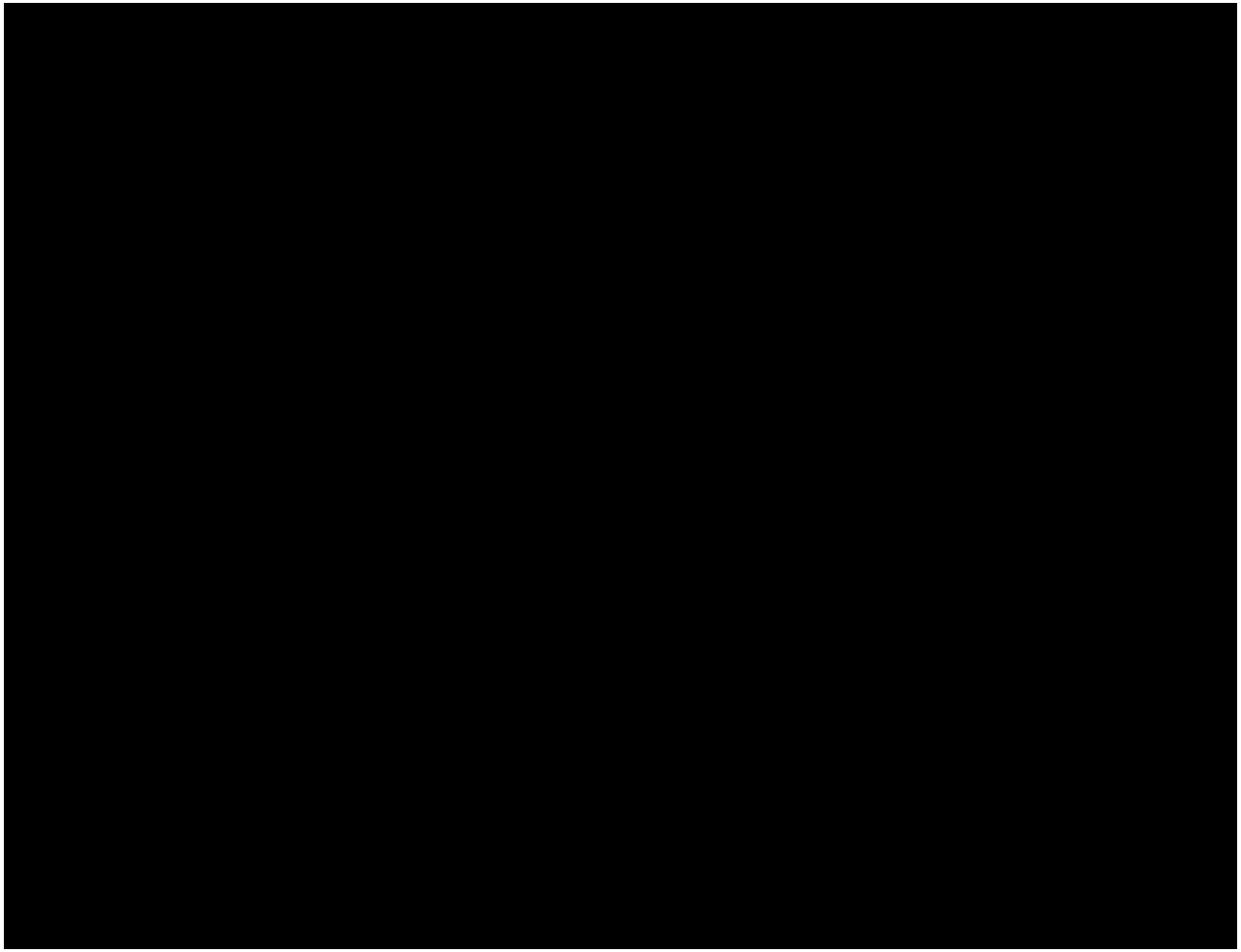
DISCHARGE DISPOSITION OF PATIENTS TREATED WITH T-PA ON THE MSU, OCT 2016 - JAN 2017 (N=8)



FINAL DIAGNOSIS OF PATIENTS TRANSPORTED ON MSU OCT 2016 - JAN 2017 (N= 30)



Mobile Stroke Treatment Unit

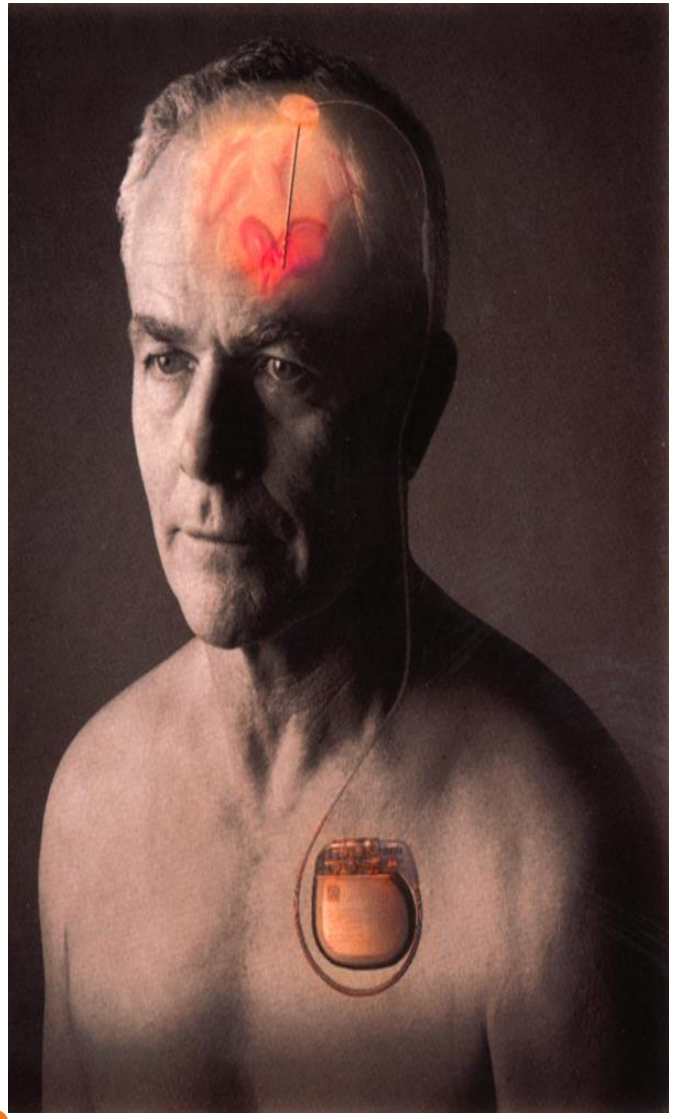


Paralysis Agitans (Parkinson's)

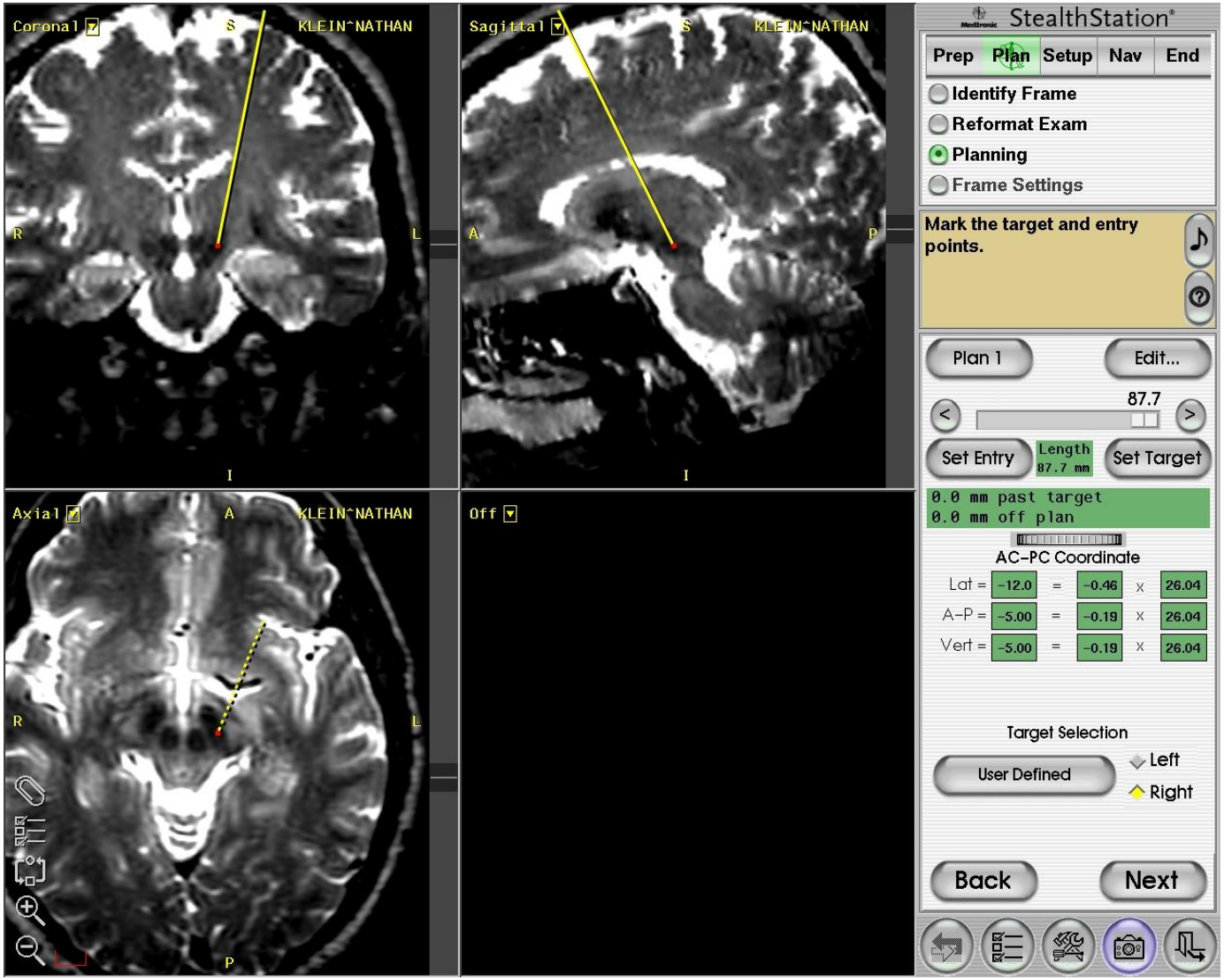
- Tremor
- Rigidity
- Bradykinesia
- Postural instability

Sir William Gowers -1886

Deep Brain Stimulation (DBS)



Preoperative Planning



Deep Brain Stimulation

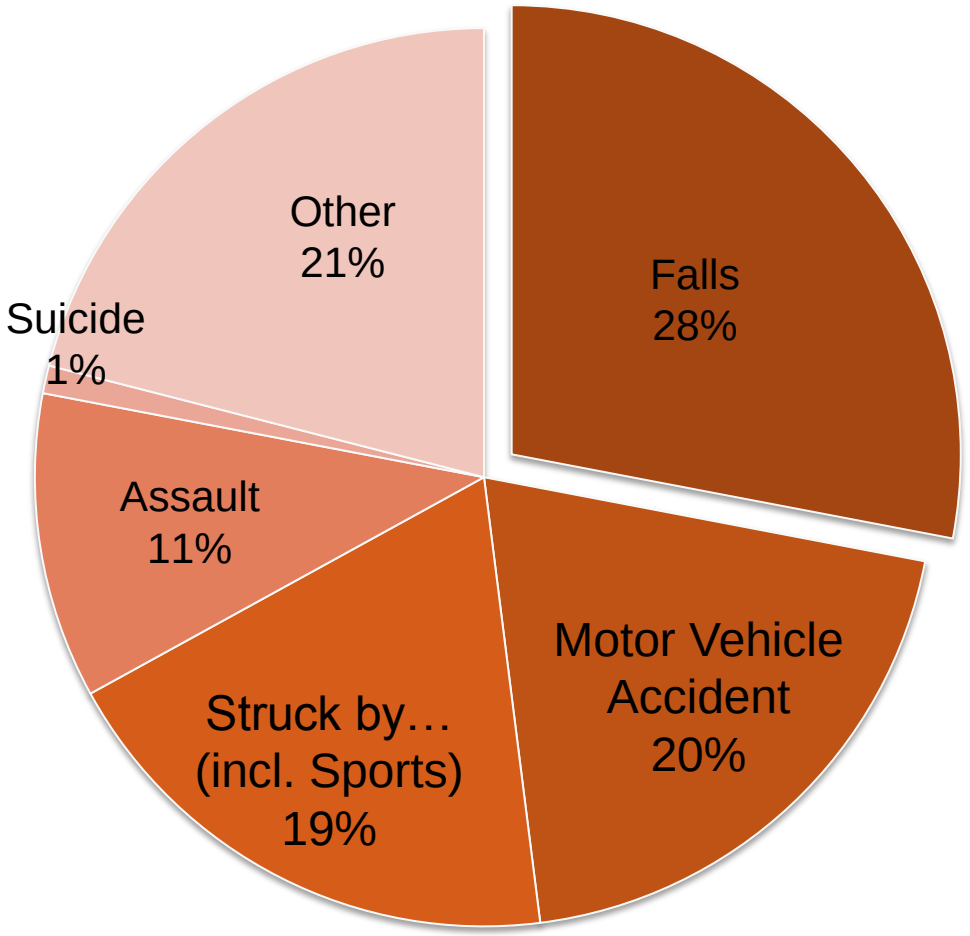
Parkinson's Disease

Dr. Claire Henchcliffe

Leading an international consortium to develop stem cell therapies for Parkinson's disease.

Traumatic Injuries

Major Causes of Traumatic Brain Injuries

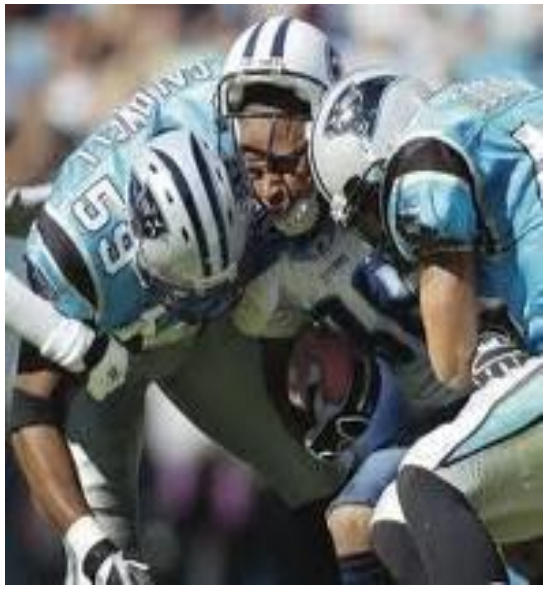


Source: National Center for Injury Prevention and Control, CDC

Critical Care/Systems Approach

- Brain
- Heart
- Respiratory
- Infection
- GI
- Renal
- Hematological
- Endocrine

The Future — PREVENTION !



The New York Times

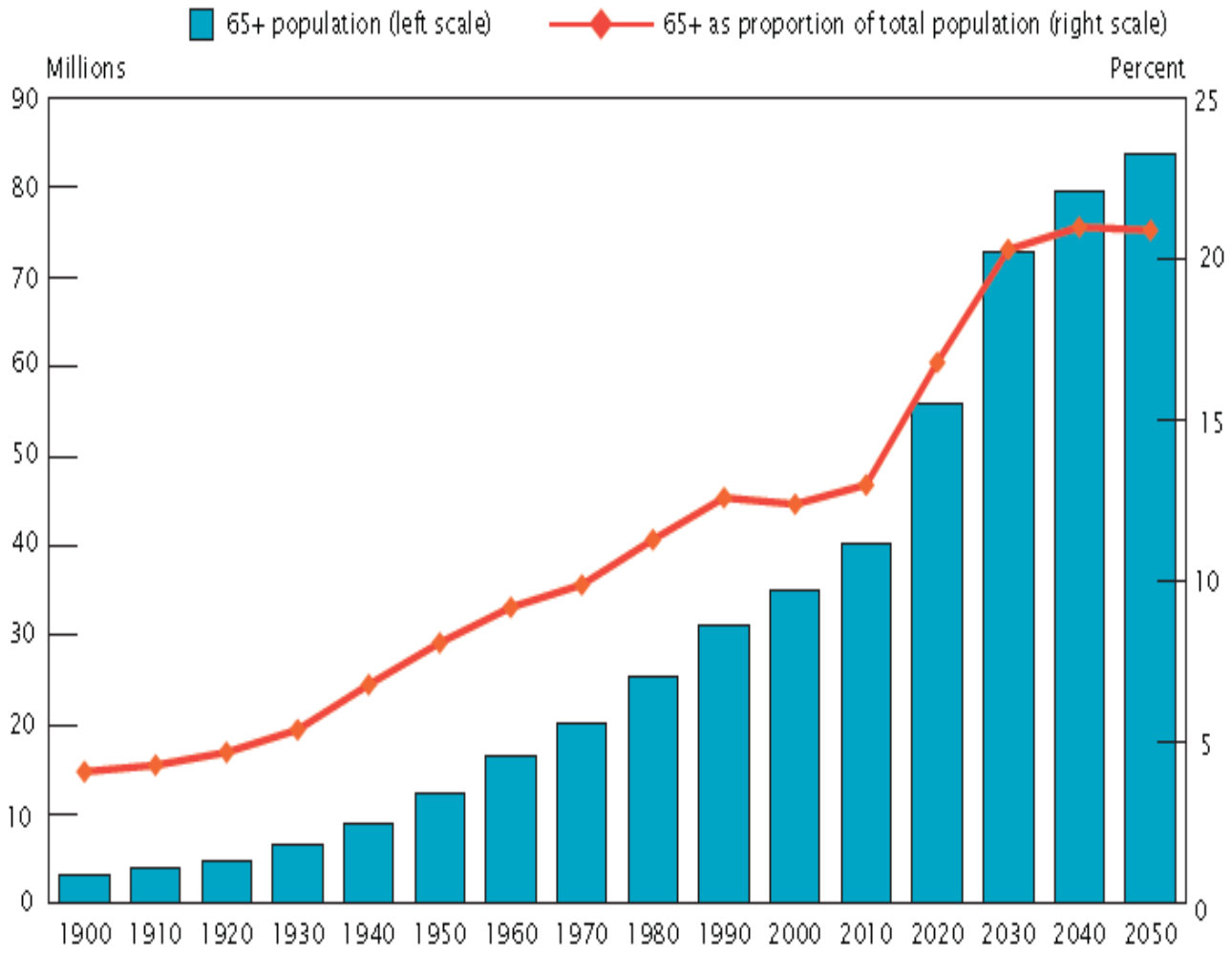
Dementia Care Cost Projected to Double by 2040

By PAM BELLUCK
Published: April 3, 2013

The most rigorous study to date of how much it costs to care for Americans with dementia found that the financial burden is at least as high as that of heart disease or cancer, and is probably higher. And both the costs and the number of people with dementia will more than double within 30 years, skyrocketing at a rate that rarely occurs with a chronic disease.

Aging U.S. Population

Age 65 years and older



What is Dementia?

- **Loss of several cognitive domains that results in difficulties in maintaining independent activities of daily living.**
- **50% is Alzheimer's disease, 25% is Vascular, and 25% other causes.**
- **Most patients have MIXED forms.**

The New York Times

The Vanishing Mind

China, in a Shift, Takes On Its Alzheimer's Problem

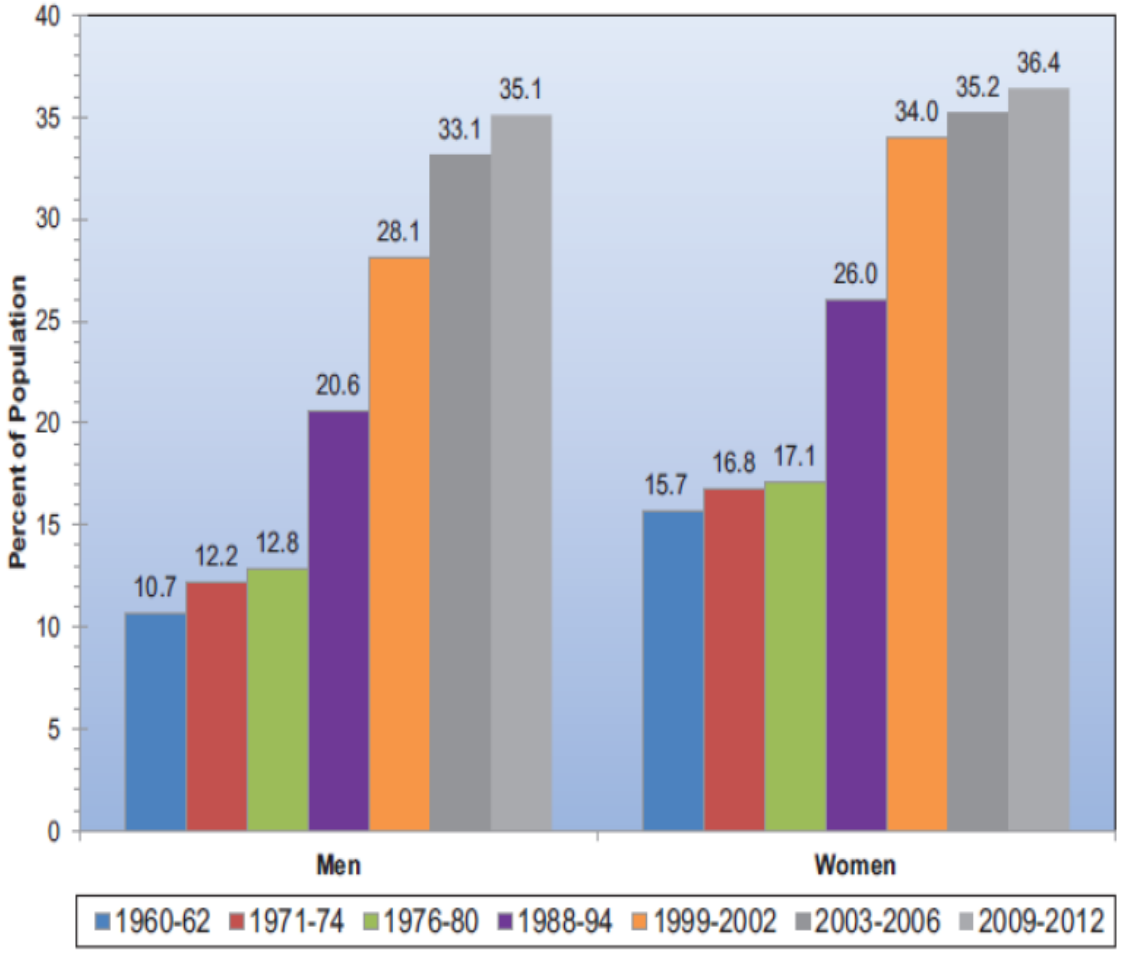
By DAVID BARBOZA

Published: January 12, 2011

Elimination of Cardiovascular Risk Factors

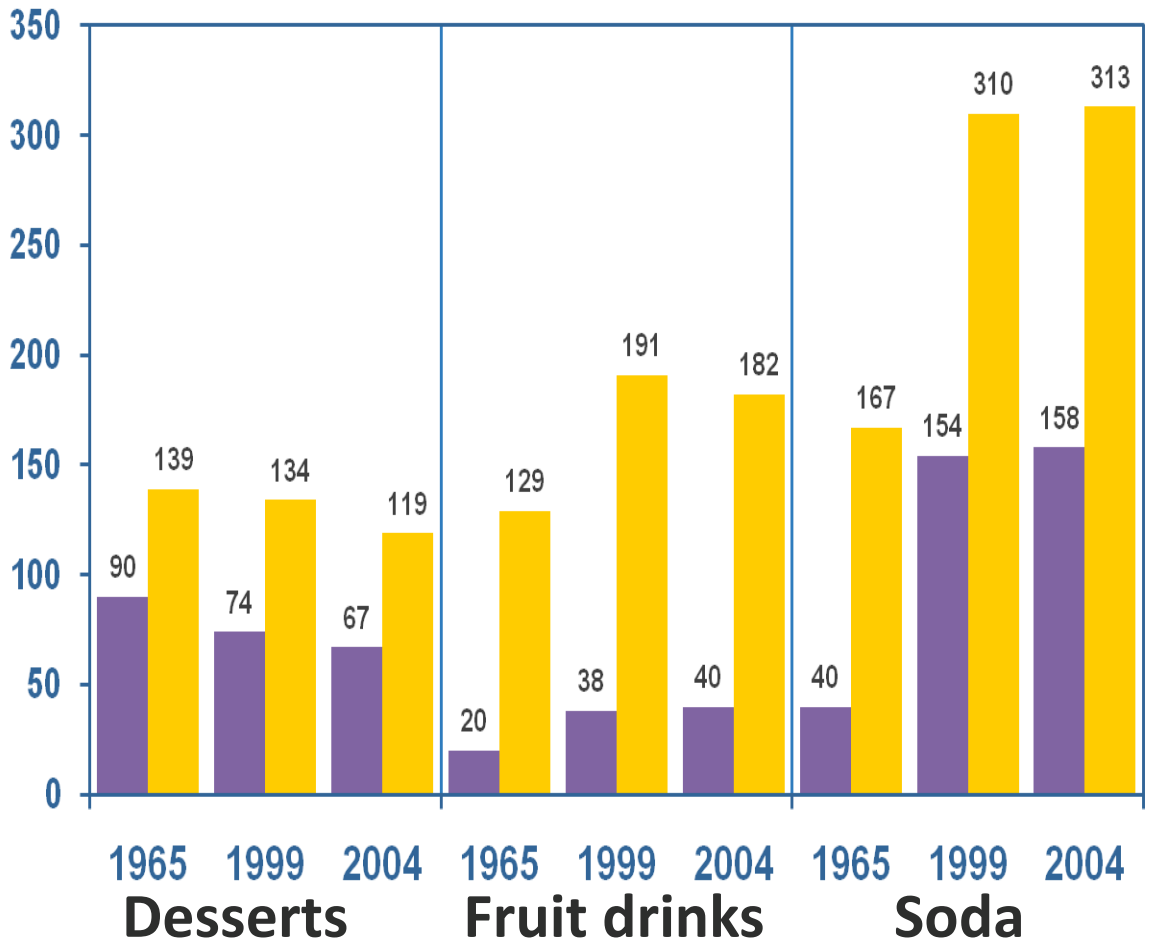
Reduces the risk of dementia in later life

Obesity in Adults 20-74 Years of Age



American Heart Association | American Stroke Association
life is why

Calories from Sugar in the U.S.



What About Diet?

Eat Food.
Not Too Much.
Mostly Plants.

(Michael Pollan, NY Times, Jan. 28, 2007)

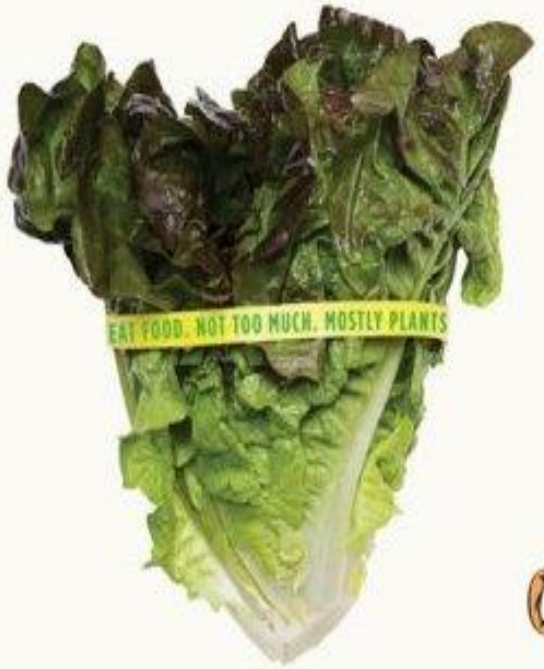
The Mediterranean Diet
delays onset of dementia by five years

(Scarmeas et al, NYP/CUMC,
Arch Neurol, 2009, 2010, 2015)

#1 NEW YORK TIMES BESTSELLER

IN DEFENSE OF FOOD

AN EATER'S MANIFESTO



MICHAEL POLLAN

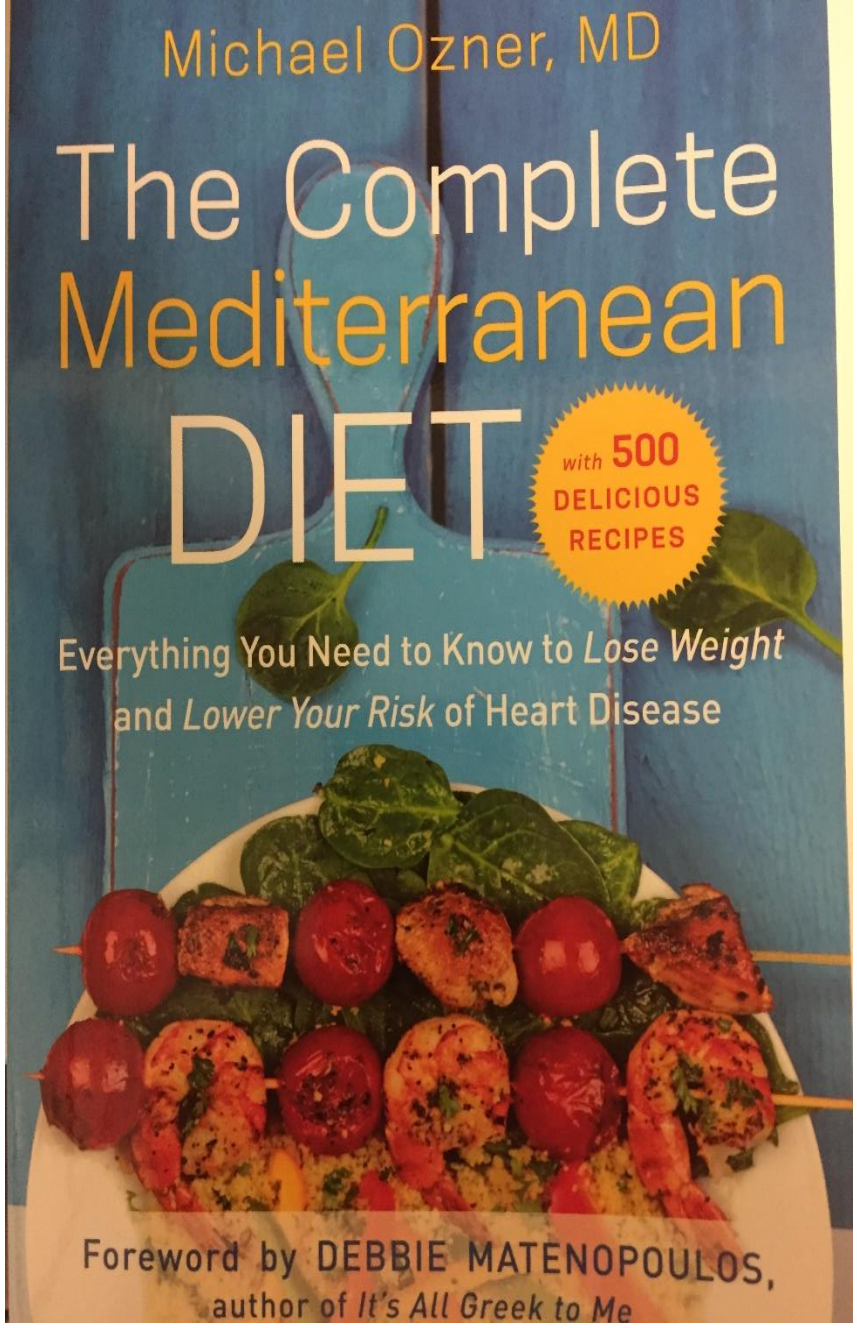
AUTHOR OF THE OMNIVORE'S DILEMMA

Relationship of Mediterranean Diet and Caloric Intake to Phenoconversion in Huntington Disease

Karen Marder,MD, MPH; Yian Gu, PhD; Shirley Eberly, MS; Caroline M. Tanner,MD, PhD; Nikolaos Scarmeas, MD, MS; David Oakes, PhD; Ira Shoulson, MD; for the Huntington Study Group PHAROS Investigators

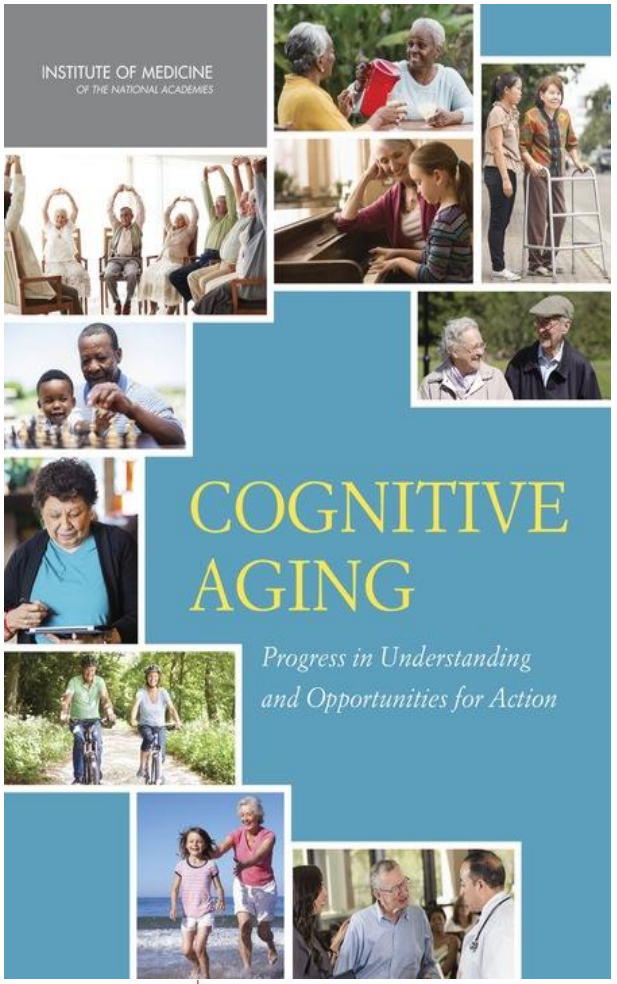
JAMA Neurology 2013

Dietary intervention can DELAY the onset of Huntington Disease


Michael Ozner, MD
The Complete Mediterranean DIET
with 500 DELICIOUS RECIPES
Everything You Need to Know to Lose Weight and Lower Your Risk of Heart Disease
Foreword by DEBBIE MATENOPOULOS, author of It's All Greek to Me

Institute of Medicine Recommends

- **Be physically active and intellectually and socially engaged**
- **Monitor medications**
- **Engage in healthy lifestyles and behavior**



Life's Simple 7 (www.heart.org)

Manage Blood Pressure

Control Cholesterol

Reduce Blood Sugar

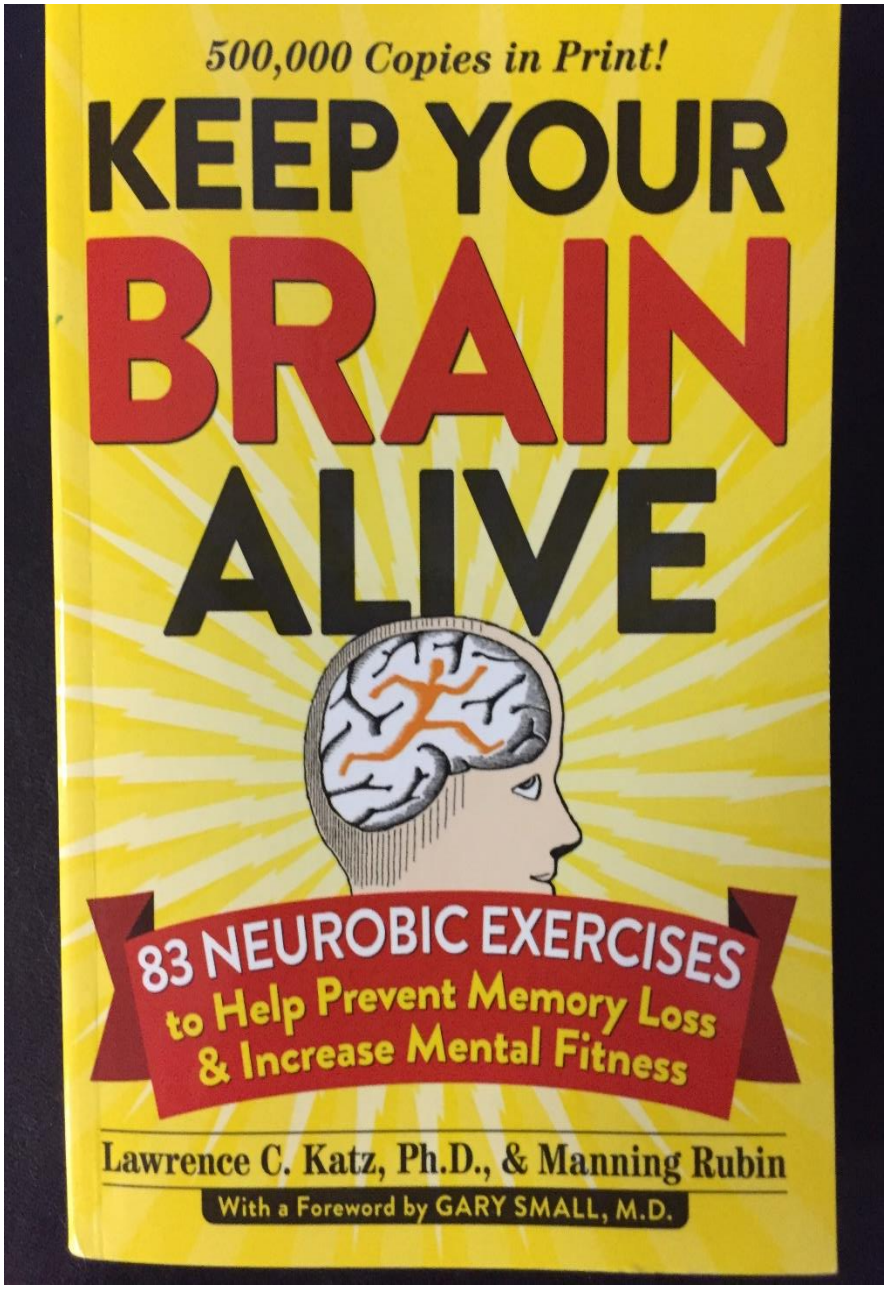
Get Active

Eat Better

Lose Weight

Stop Smoking

(Protect Against Head Injuries)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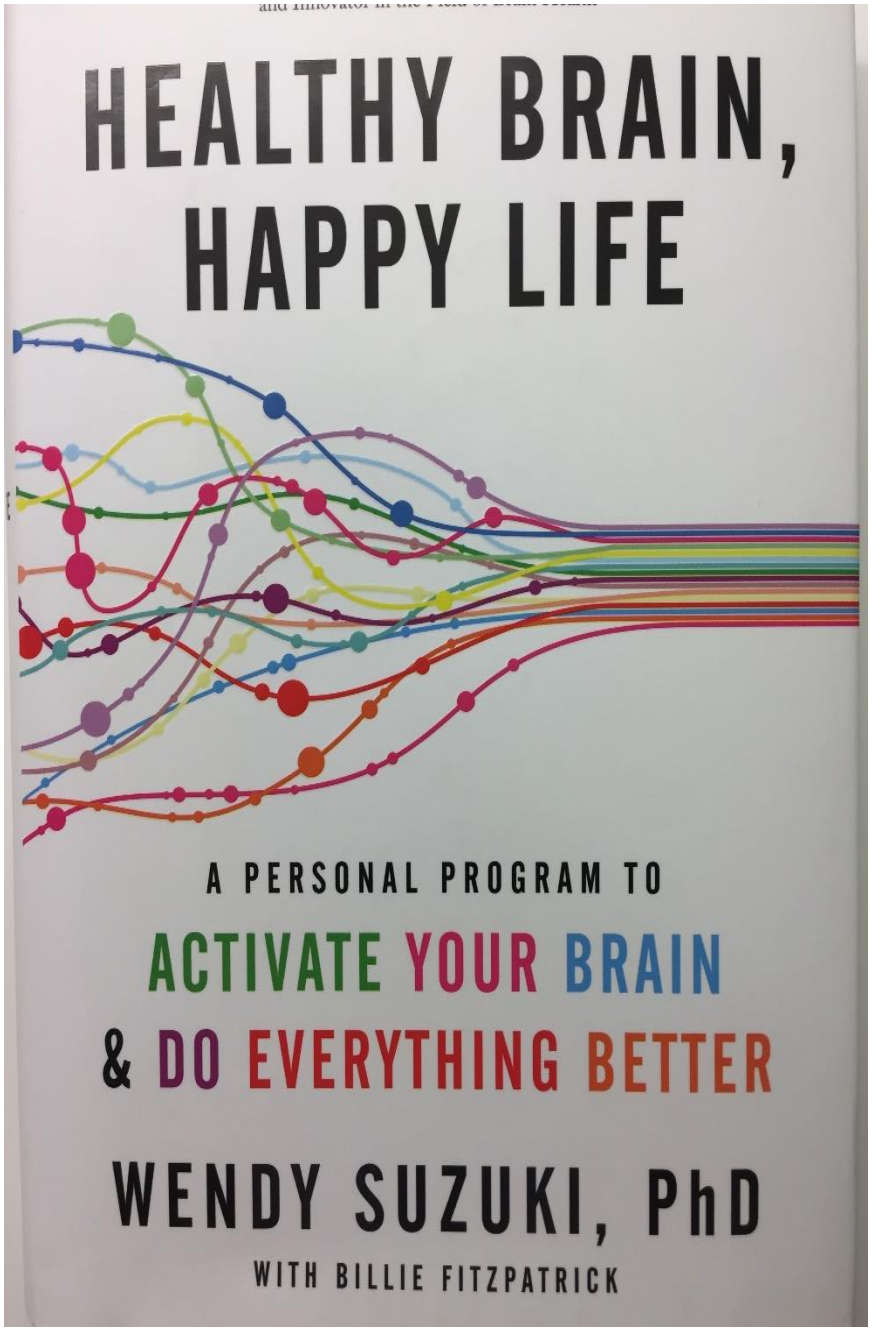
HEALTHY BRAIN,
HAPPY LIFE
A PERSONAL PROGRAM TO
ACTIVATE YOUR BRAIN
& DO EVERYTHING BETTER
WENDY SUZUKI, PhD
WITH BILLIE FITZPATRICK

Exercise Your Body
Exercise Your Mind

Feed Your Brain !

If I knew I was going to live this long,

I'd have taken better care of myself.

Mickey Mantle