

*The Next Frontier:
Mapping the Brain
Curing Brain Disorders*



Burden of Disease: Lead Contributing Disease Categories to DALYs

1. Neuropsychiatric Disorders

2. Cardiovascular Diseases

3. Malignant Neoplasms

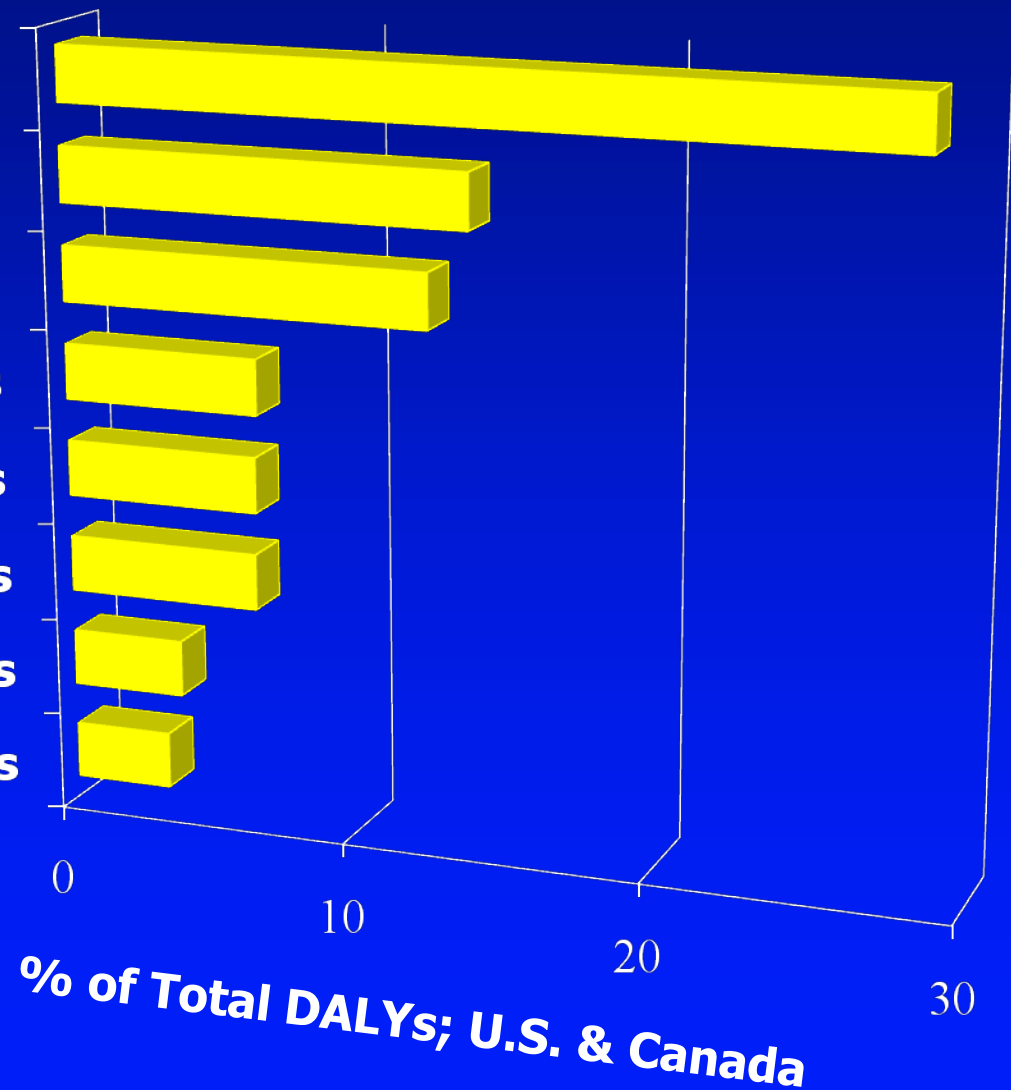
4. Unintentional Injuries

5. Sense Organ Disorders

6. Respiratory Diseases

7. Musculoskeletal Diseases

8. Digestive Diseases

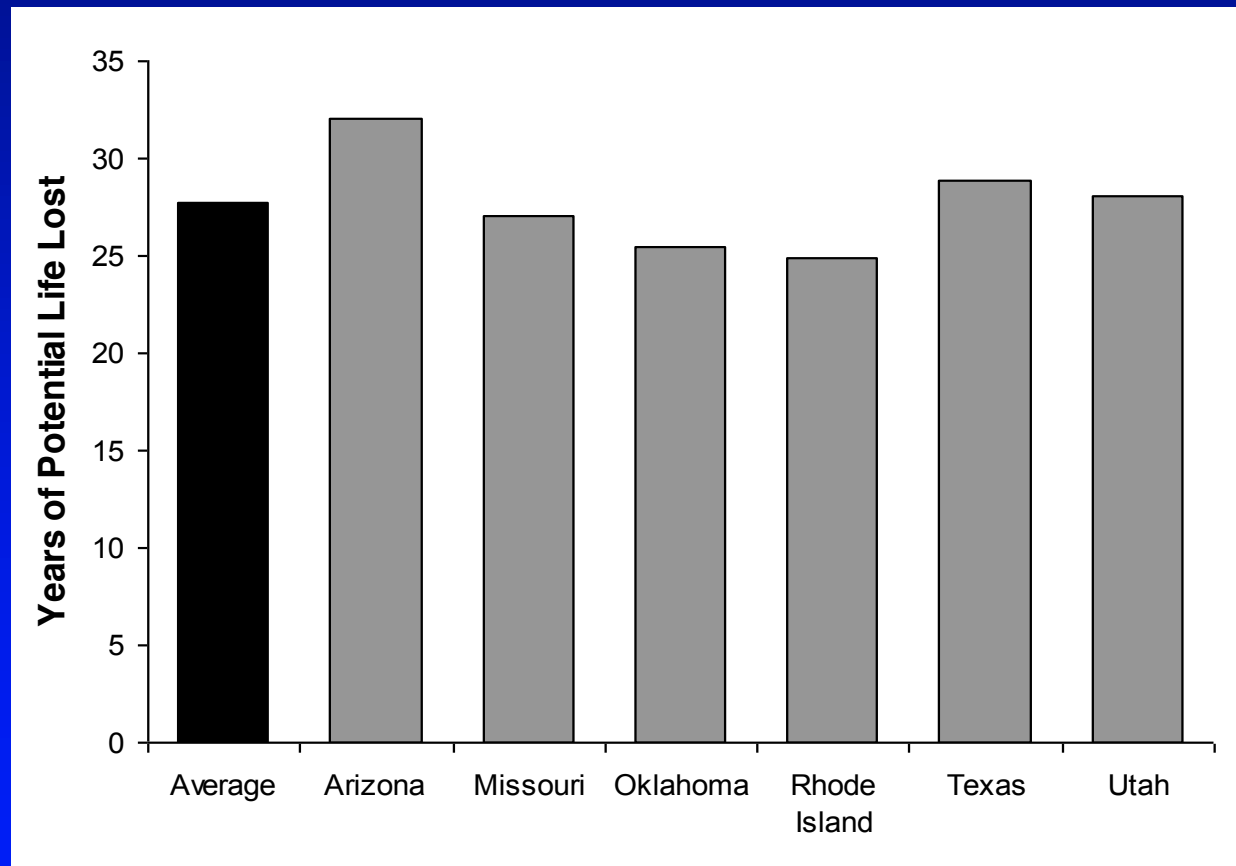


Mental Disorders: Mortality

- Over 34,000 suicides per year in the U.S. (CDC 2007)
 - 90% related to mental illness
- For context:
 - 33,000 traffic fatalities
 - 18,000 homicides
 - 20,000 AIDS deaths

Public Health Impact: Early Mortality in Individuals with Major Mental Illness (MMI)

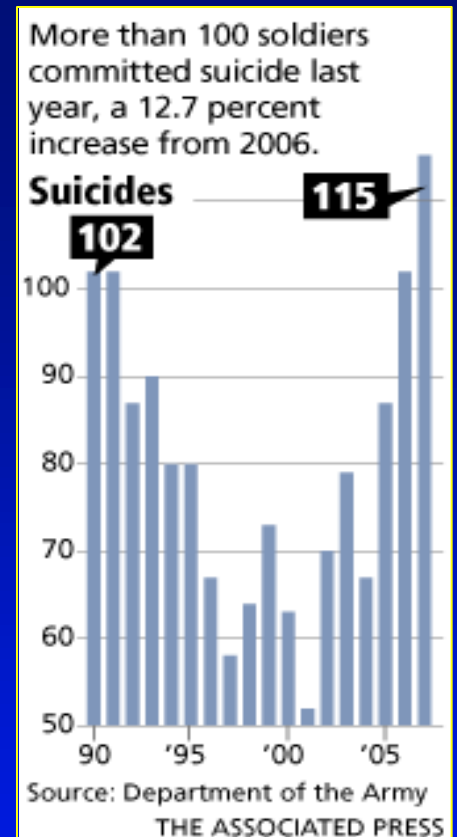
- Data from outpatient and inpatient clients diagnosed with MMI
- Average age at time of death : **56 years**
- Increased cardiovascular and pulmonary disease



The Wounds of War

2.1M (?) served - >300,000 (?) injured

- PTSD
- TBI
- Depression



140

We are losing more soldiers to suicide and high risk behaviors than combat

- Gen Peter Chiarelli, Vice Chief of Staff, US Army, 2010

Invisible Wounds of War

- Brain injuries – TBI, PTSD, Depression



Leads to collateral damage: addiction, high risk behaviors, family conflict

Solutions

- End the wars
- End the stigma
- Treat the injured
- Research – trauma, plasticity, recovery

A Moonshot for the Mind

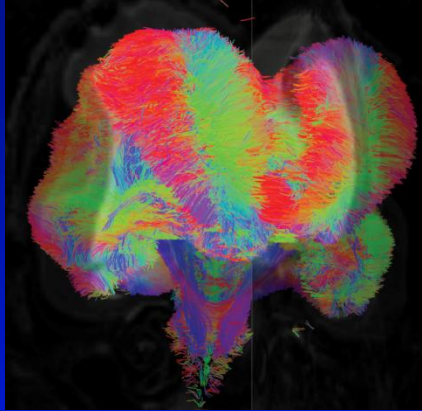
- Where do we need to go
- What do we need to get there
- Who will be the astronauts

An Earlier Challenge

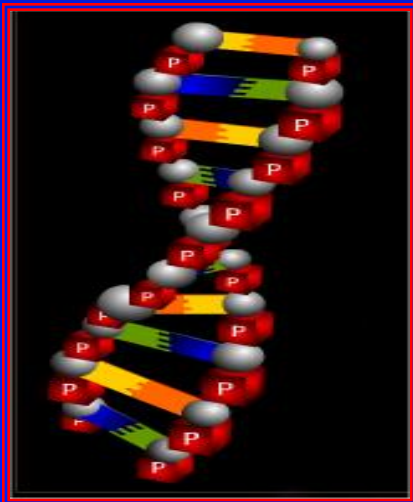
- Movie of JFK – May 1961



What do we need? Genomics

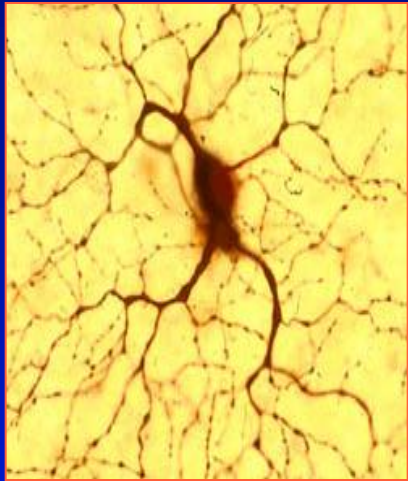


Human Brain Genome Atlas Project –
All the genes, all the areas
Across development, across gender



Brain Disorder Genome Project-
10,000 DNA samples for every common
brain disorder – sequence, epigenome
public access repository

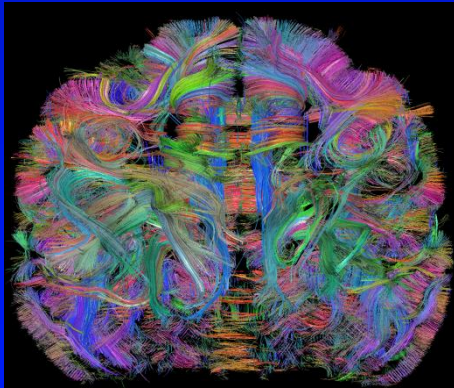
What do we need? Connectomics



Human Cellular Neuro-Taxonomy Project

Defining cell types in the human brain

Dictionary of transcriptional profiles



Human Connectome Project –

Quantitative maps of the wiring diagram

Variation across 1,000 individuals

What do we need? Clinical Resources



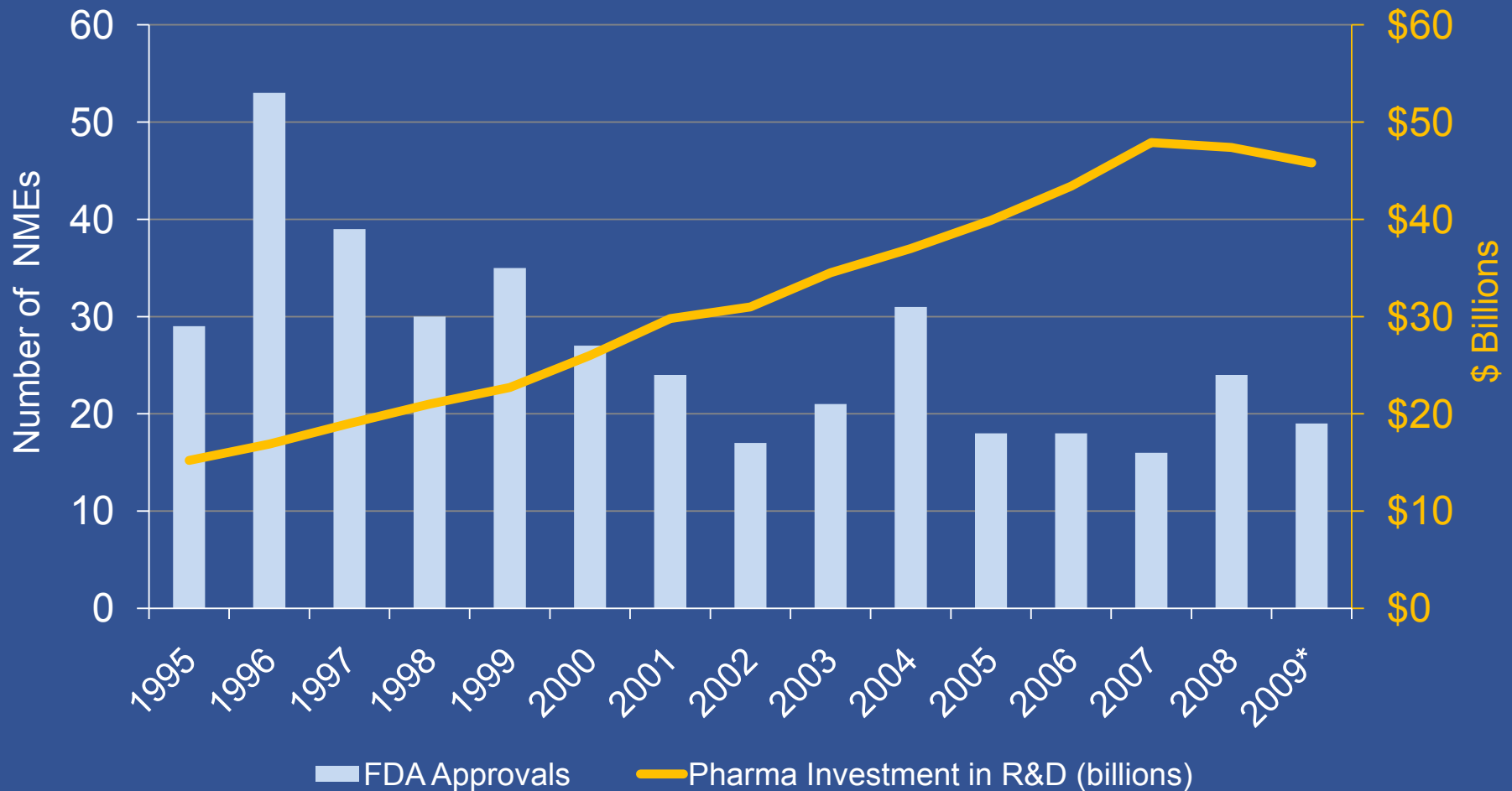
Standardized, Integrated
Clinical Data for Broad
Sharing



NDAR National Database
for Autism Research
Dedicated to enhancing collaboration in autism research

80% of
patients are
partners

Despite Greater Pharma R&D Investments, FDA Approvals of NMEs Declined

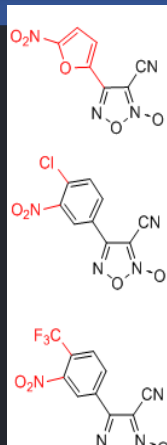


*Estimate

Glaxo tries biotech model to spur drug innovations. *Wall Street Journal*, July 1, 2010.

Sources: Pharmaceutical Research and Manufacturers of America; FDA

Cures Acceleration Network



Disease

Target ID

Assay Dev.

HTS

Probe to Lead

Pre-Clinical

FDA IND

Ph. 0

Ph. I

Ph. II

Ph. III

FDA Review

NIH Supported Basic Research

NIH Molecular Libraries Initiative

NIH TRND

NIH RAID

Pharma, Biotech, NIH Clinical Center, CTSA's

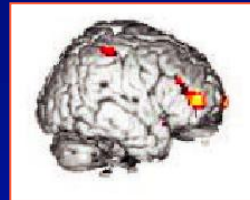
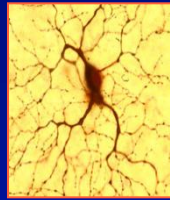
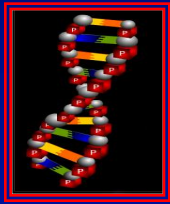
New NIH FDA Partnerships

What do we need? Clinicians



10,000 therapists trained
in CBT for PTSD/Dep,
to treat 300,000 patients

What do we need in 2010?



Molecule	Cell	System	Individual	Social
GWAS	Stem Cells	Electrode	Sensors	Web 2.0
Sequencing	Transcript	arrays	Eye gaze	Knowledge
Transgenics	profiles	Zebrafish	Cognitive	management
Epigenetics	Proteomics	Imaging	Tools	
Databases	Optical	ChR-2	Epidemiology	
	imaging	Databases		
	Databases			

Translating Neuroscience to Health

Discovery Technologies

Preventive interventions

Molecular diagnostics

Proteomics

Neuroimaging

Clinical genomics

Next-Gen Clin Trials
Early Interventions
POC Dx

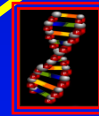
Strategic prevention
Cure Therapeutics

Personalized care

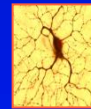
Biodiagnostics

Treatment of core pathology

Pathophysiology



Genes



Cells



Systems



Individual



Social

Diagnosis by symptoms

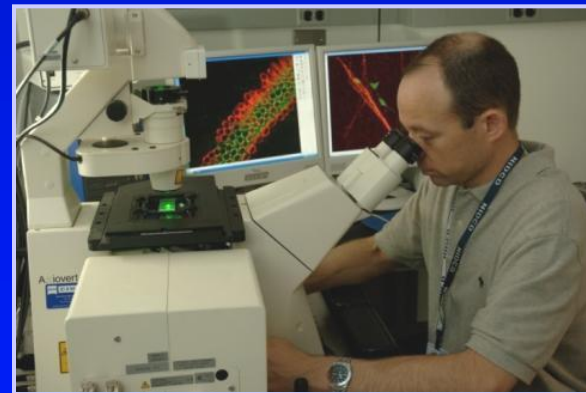
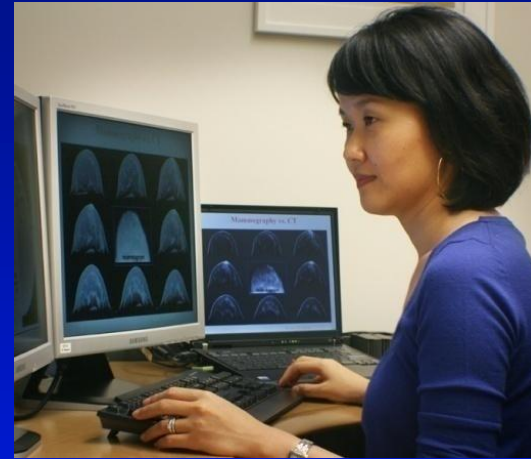
Treatment of episode

Dissemination Access Coordination
Translating Research to Practice

The Costs

The Costs of Not Doing This

Who will be the astronauts?



Patient Protection and Affordable Care Act

An Act

Entitled The Patient Protection and Affordable Care Act.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the “Patient Protection and Affordable Care Act”.

(b) TABLE OF CONTENTS.—The table of contents of this Act is as follows:

Sec. 1. Short title; table of contents.

TITLE I—QUALITY, AFFORDABLE HEALTH CARE FOR ALL AMERICANS

Subtitle A—Immediate Improvements in Health Care Coverage for All Americans

Sec. 1001. Amendments to the Public Health Service Act.

“PART A—INDIVIDUAL AND GROUP MARKET REFORMS

“SUBPART II—IMPROVING COVERAGE

“Sec. 2711. No lifetime or annual limits.

“Sec. 2712. Prohibition on rescissions.

“Sec. 2713. Coverage of preventive health services.

“Sec. 2714. Extension of dependent coverage.

“Sec. 2715. Development and utilization of uniform explanation of coverage documents and standardized definitions.

“Sec. 2716. Prohibition of discrimination based on salary.

“Sec. 2717. Ensuring the quality of care.

“Sec. 2718. Bringing down the cost of health care coverage.

“Sec. 2719. Appeals process.

Sec. 1002. Health insurance consumer information.

Sec. 1003. Ensuring that consumers get value for their dollars.

Sec. 1004. Effective dates.

Subtitle B—Immediate Actions to Preserve and Expand Coverage

Sec. 1101. Immediate access to insurance for uninsured individuals with a pre-existing condition.

Sec. 1102. Reinsurance for early retirees.

Sec. 1103. Immediate information that allows consumers to identify affordable coverage options.

Sec. 1104. Administrative simplification.

Sec. 1105. Effective date.

Subtitle C—Quality Health Insurance Coverage for All Americans

PART I—HEALTH INSURANCE MARKET REFORMS

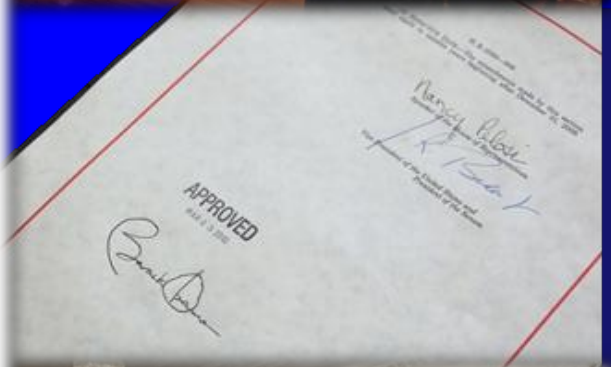
Sec. 1201. Amendment to the Public Health Service Act.

“SUBPART I—GENERAL REFORM

“Sec. 2704. Prohibition of preexisting condition exclusions or other discrimination based on health status.

“Sec. 2701. Fair health insurance premiums.

“Sec. 2702. Guaranteed availability of coverage.



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A Moonshot for Inner Space

