

# NIH at the Crossroads: Strategies for the Future

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# NIH Budget Facing a “Perfect Storm” in 2006



- Federal & Trade Deficits
- Defense and Homeland Security needs
- Katrina
- Pandemic flu
- Post- Doubling effects
- Physical Sciences focus
- Biomedical research inflation- 3 to 5%



*Competition for funds from the NIH and other sponsors, intensifying year by year, now stands at an unprecedented level, and shows no sign of abating. Never before have so many established investigators faced so much uncertainty about their longevity as active scientists. Never before have so many novices faced so many disincentives to entering or continuing a research career.*

Dr. William F. Raub, NIH Associate Director for Research and Training, strategy paper, 1982





# What Is Really Happening?

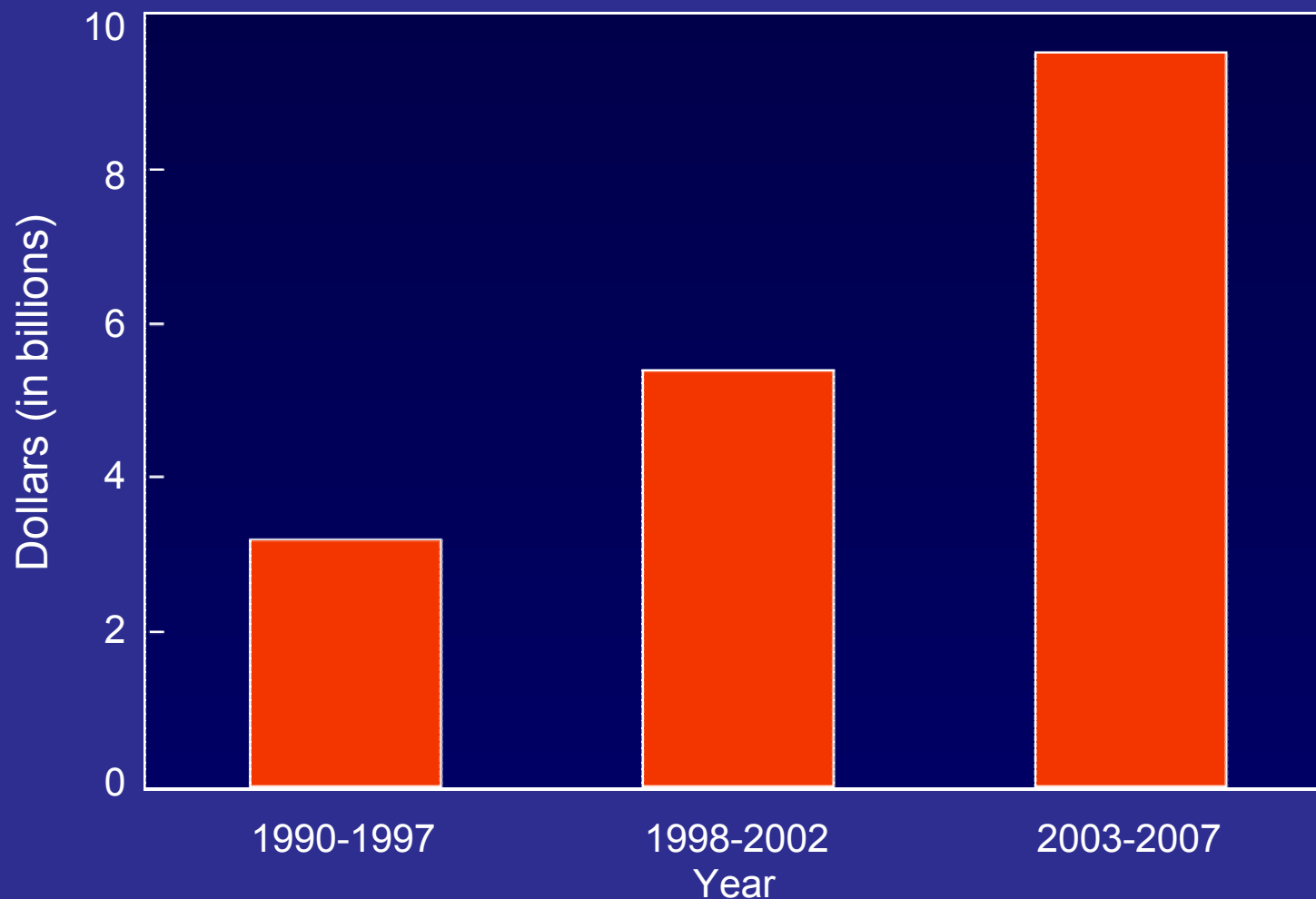
## 3 Fundamental Drivers

- Large capacity building throughout U.S. research institutions and increase in number of new faculty
- Appropriations below inflation after 2003
  - Increases of 3 % in '04, 2% in '05 and 0% in 06
  - Biomedical Inflation in 2004 was ~ 5%
- Budget cycling phenomenon





# Investment in Research Facilities at U.S. Medical Schools



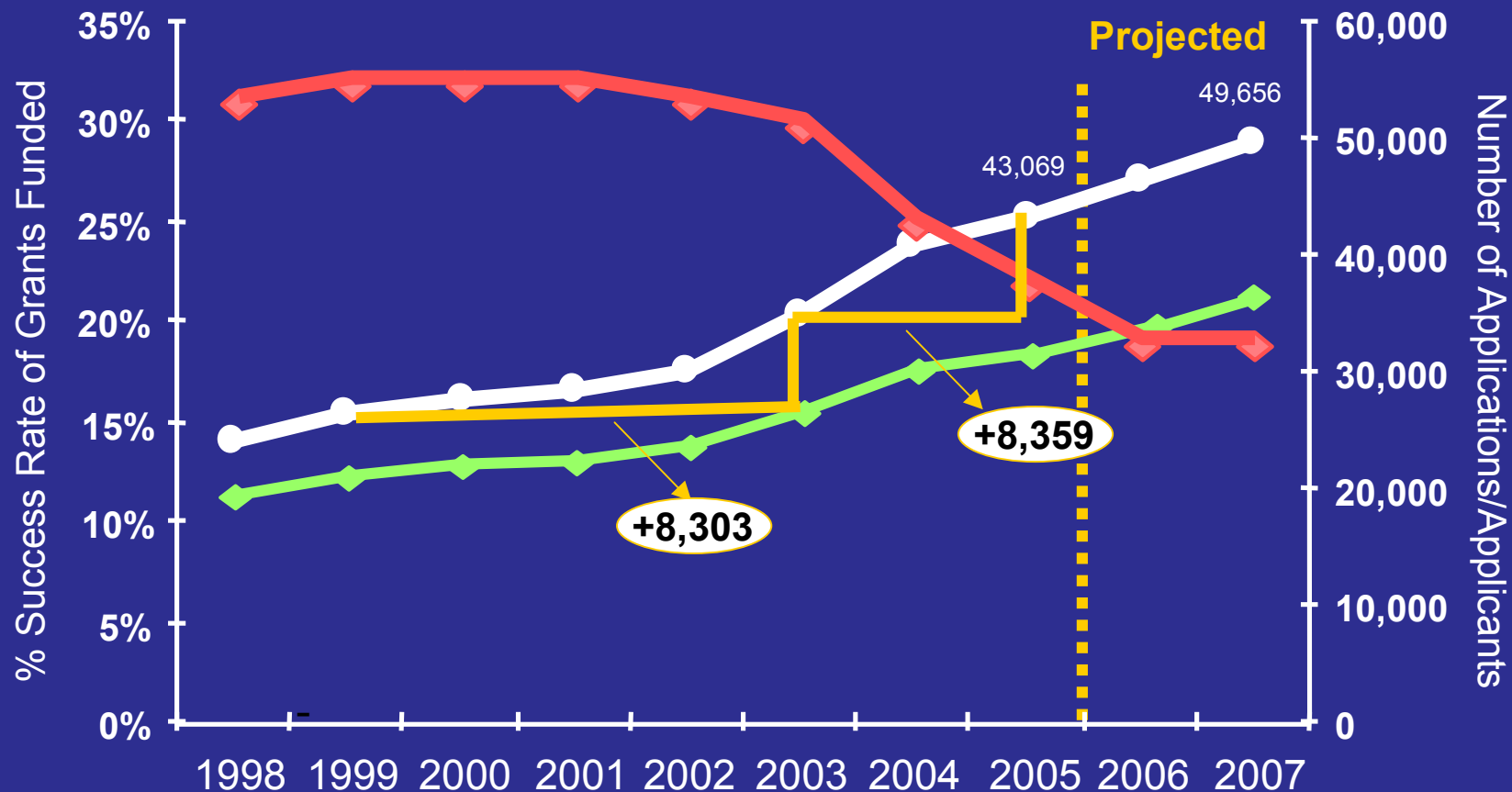
AAMC – Survey of Research Facility Investments (99 of 125 AAMC Member Schools)  
\* Data Based on AAMC Faculty Roster





# New Grant Applications, Applicants and Success Rates

*During and After Doubling Period*



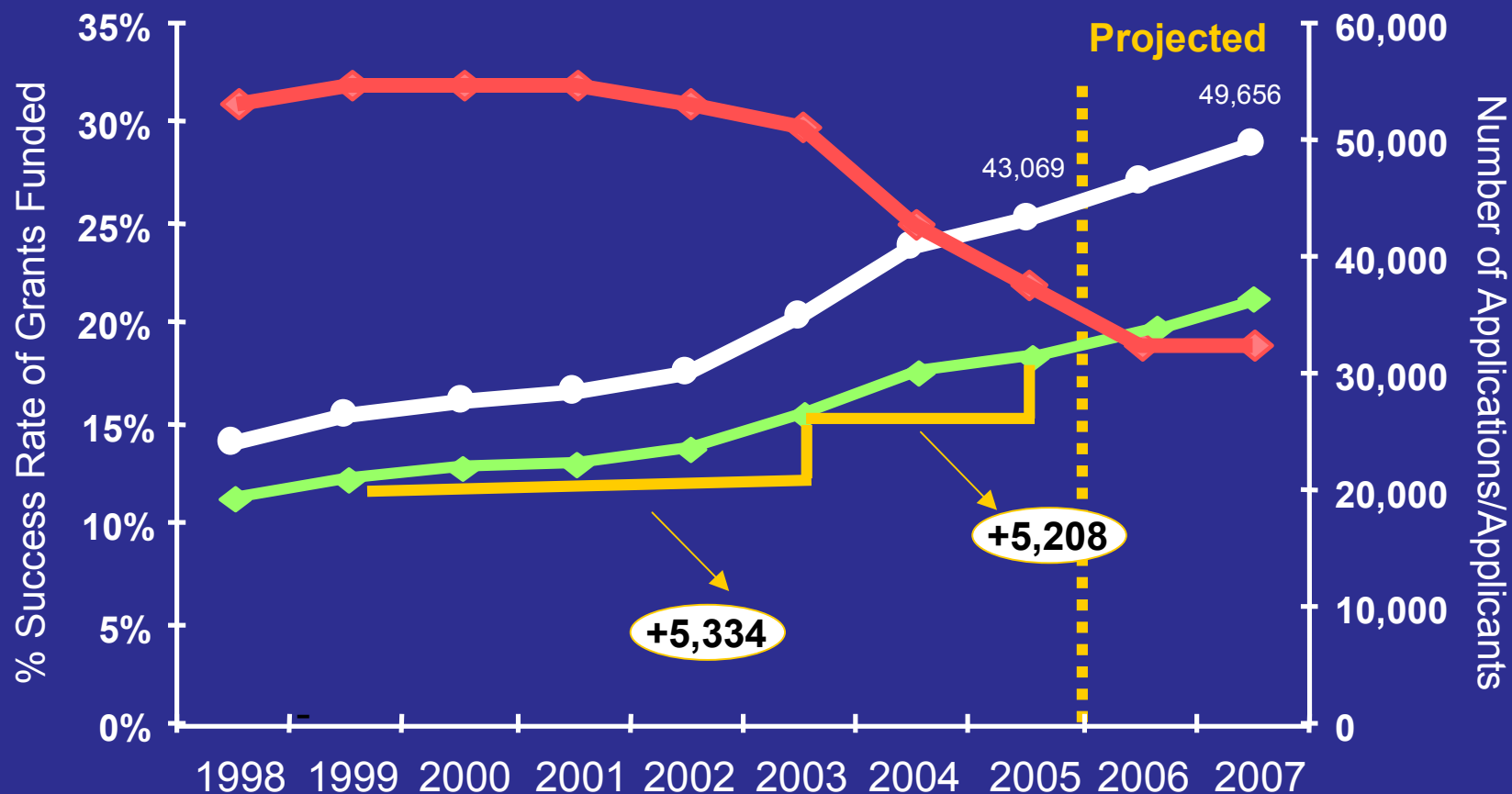
—◆— Success Rates      —●— Applications      —◆— Applicants





# New Grant Applications, Applicants and Success Rates

*During and After Doubling Period*



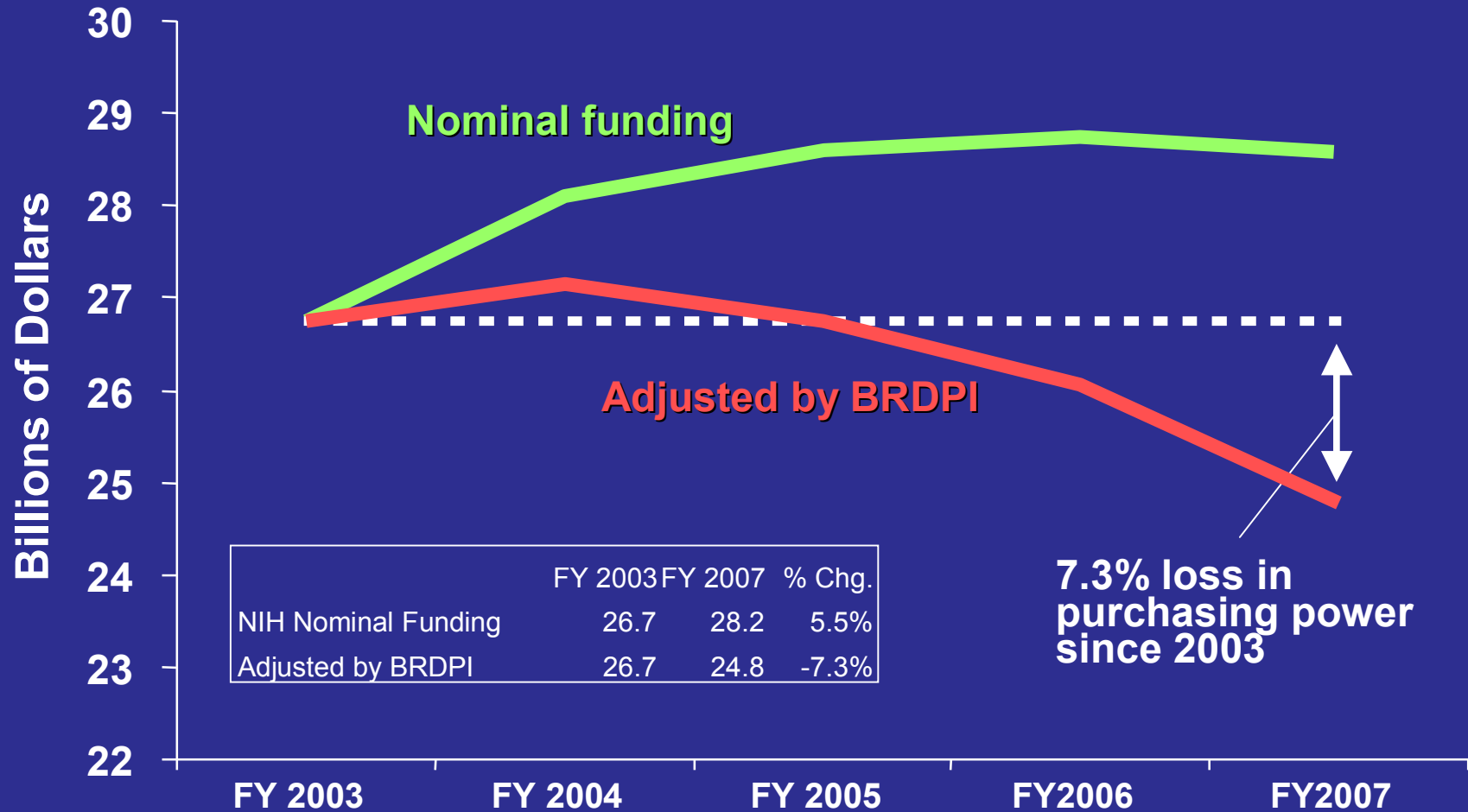
—◆— Success Rates      —●— Applications      —◆— Applicants





# Inflation Eroded Gains in NIH Funding

## Real and Nominal NIH Funding Levels Since 2003



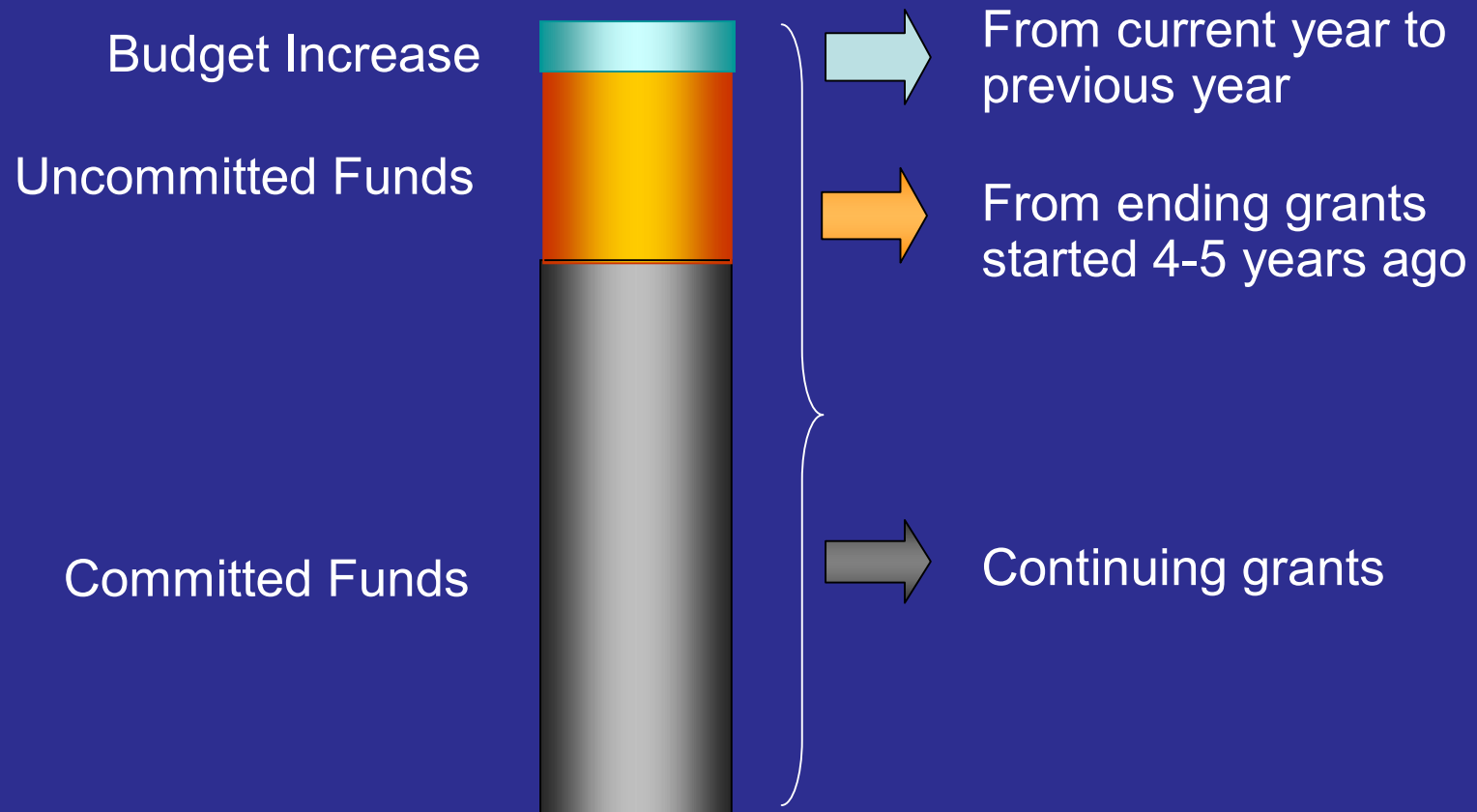
Note: BRDPI is the Biomedical Research and Development Price Index







# The Budget Cycling Phenomenon: *What Funds are Available in any One Year?*



**NIH Appropriations**





# NIH Congressional Appropriations

Billions of Dollars



**DOUBLING**





# The Bottom Line:

*Demand for Grants “Took Off” Just as NIH Budget Was “Landing!”*

Applications



Budget



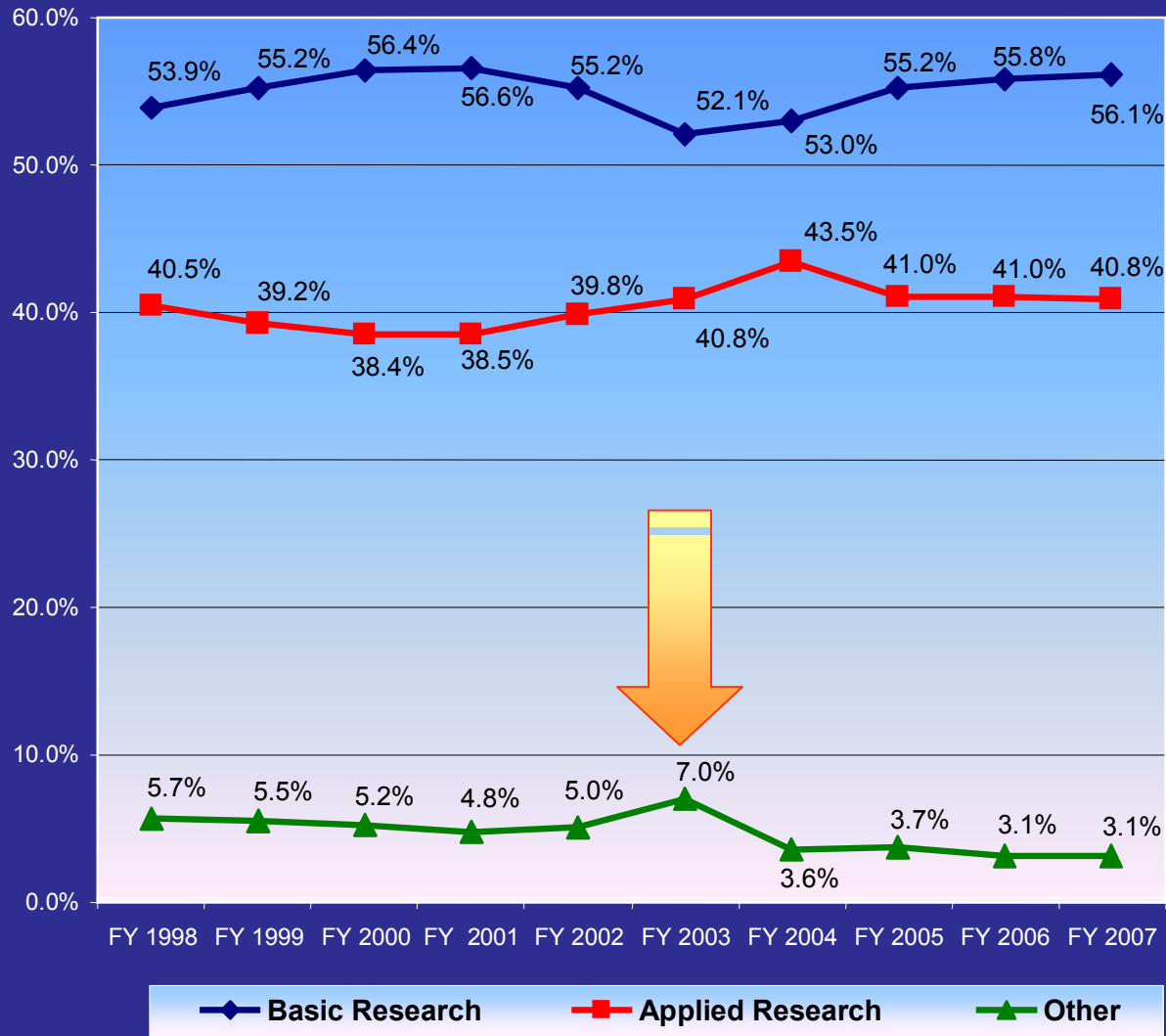
- Post doubling “boom” in applications has led to demand/supply imbalance
- NIH managed well despite small increases in 2004 (2.9%) and 2005 (2%) but flat 2006 made it difficult to adjust
- ~80% of success rate drop is due to increased demand for grants
- ~20% of drop is due to increased costs of grant and inflation effects.
- Budget cycling effect will improve demand vs supply of grants in 2007

# Common Misperceptions



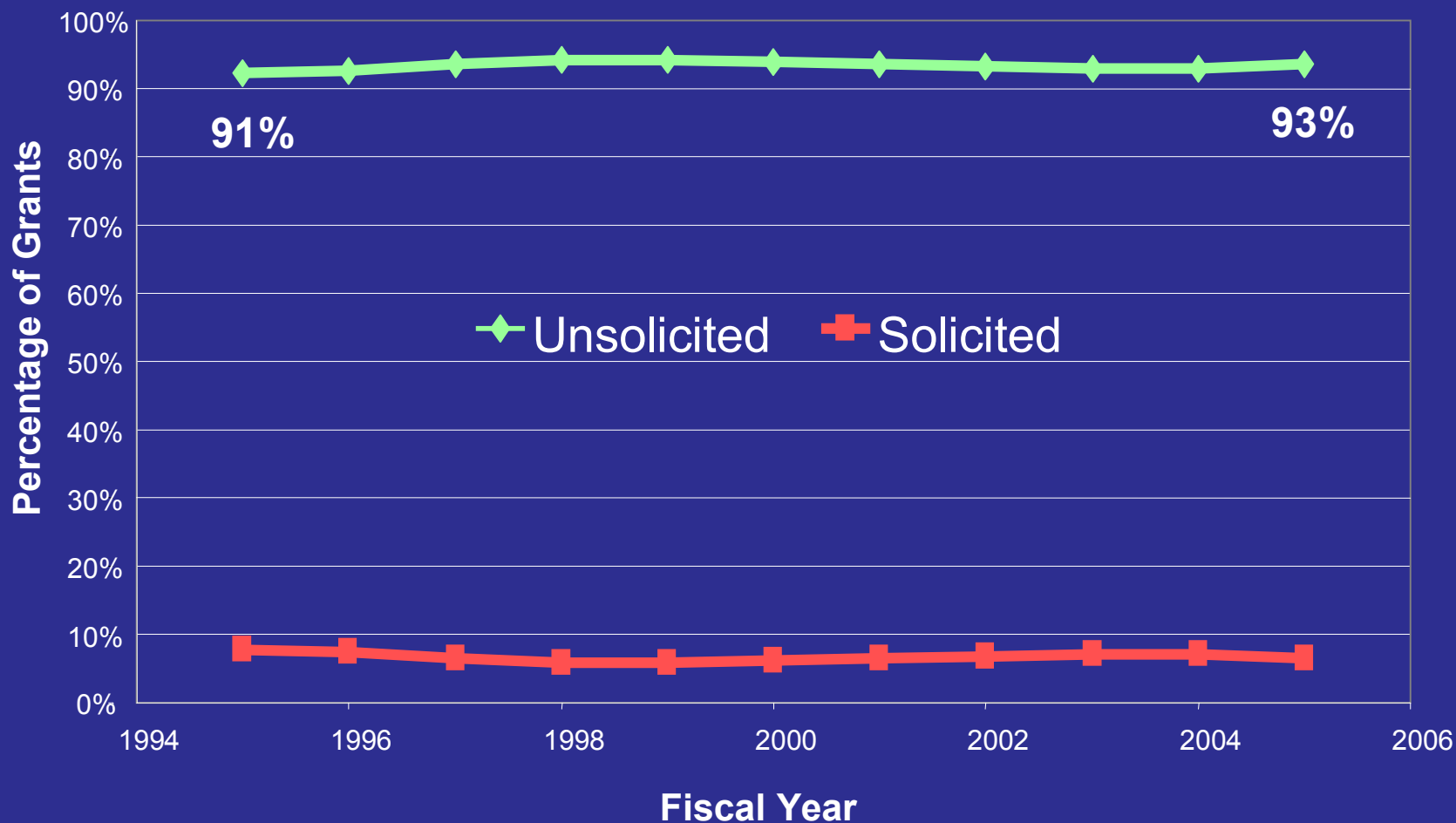


# Common Misperception: NIH is Over-Emphasizing Applied Research





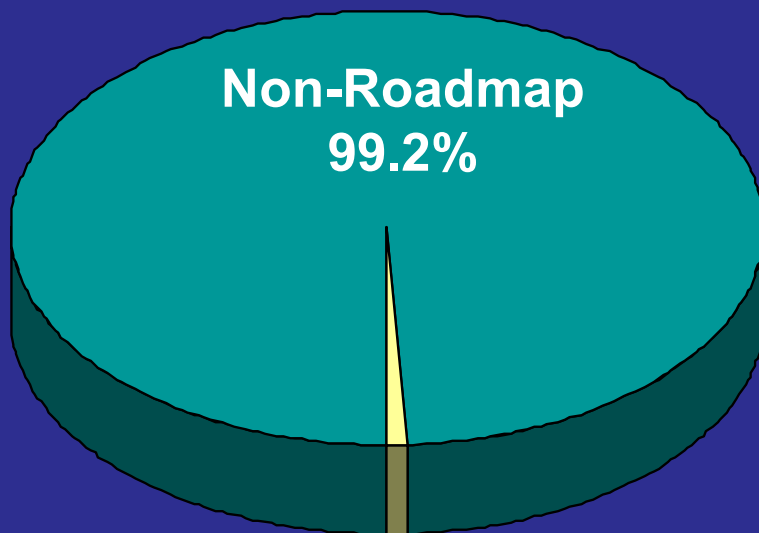
# Common Misperception: NIH Shifting Towards Solicited Research with too many RFAs





# Common Misperception: NIH Roadmap is Shifting Major Funds Away from Grant Pool

FY2005 Request = \$28.757B



Roadmap  
0.8%

- Developed to increase synergy across NIH
- Not a single initiative but over 345 individual awards in FY 2005, 133 institutions, 33 states:
  - 40% basic
  - 40% translational
  - 20% high risk





**The Question on Everyone's Mind:**  
*What are MY chances  
of being funded?*

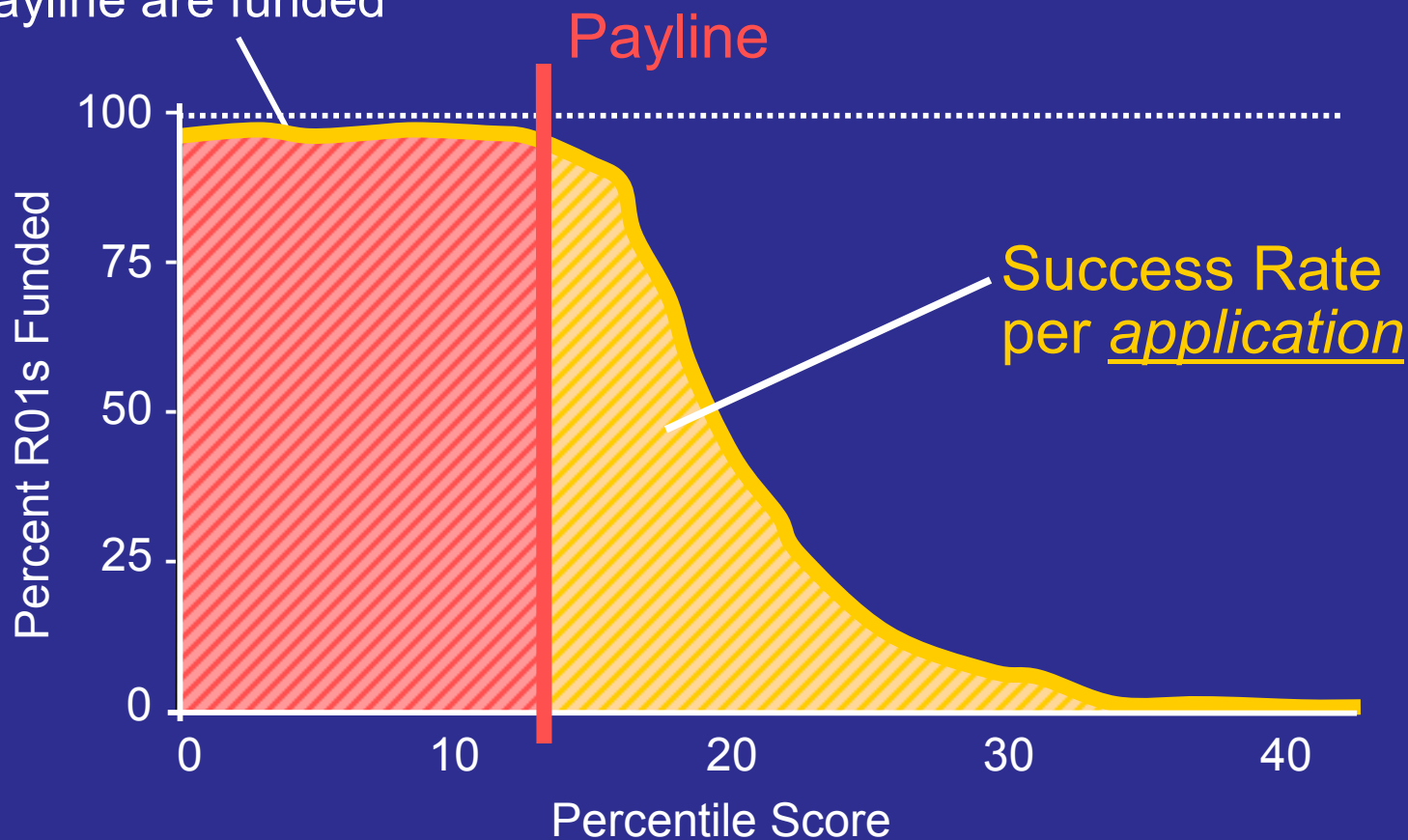






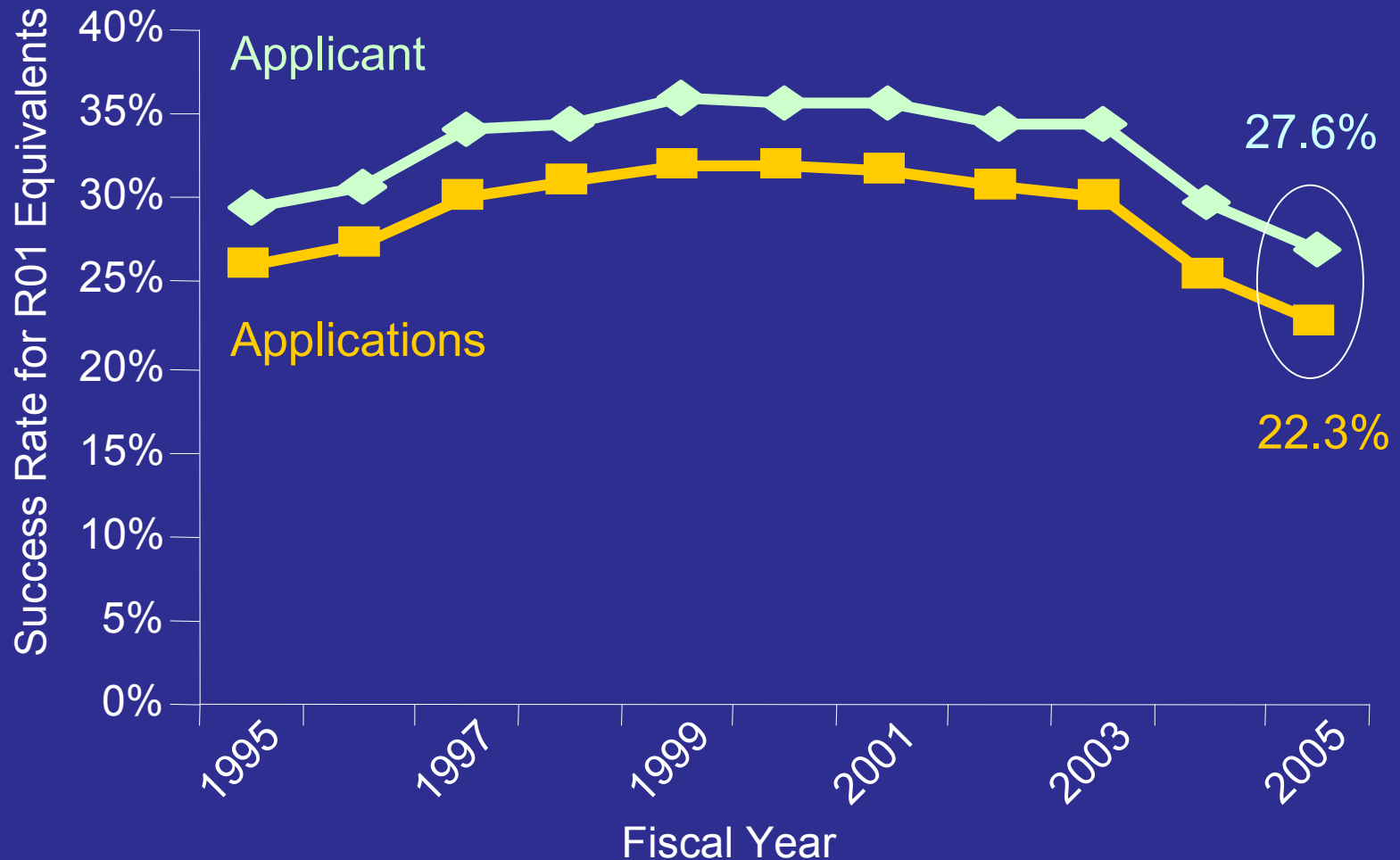
# Payline Is Not Funding Cut-off Line

>99% of grants under the payline are funded





# Success Rate per Application Understates Funding Rate per Applicant





# Where Do We Go From Here?





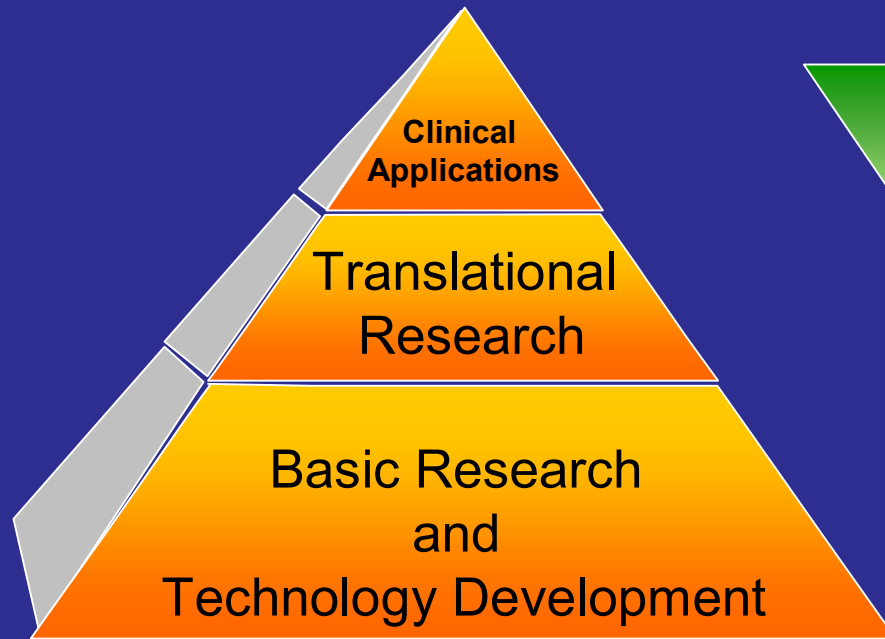
# NIH Must Develop Adaptive Strategies: Key Principles

- Protect core values and mission: *Discovery and New Knowledge*
- Protect the future: New Investigators
  - Pathway to Independence Program
  - Institutes and Centers efforts to assist new investigators
- Manage the key drivers
  - Supply/demand of grants
- Proactive communications
  - A unified message about value of NIH's investment and need for sustainability
- Promote NIH's vision for the future

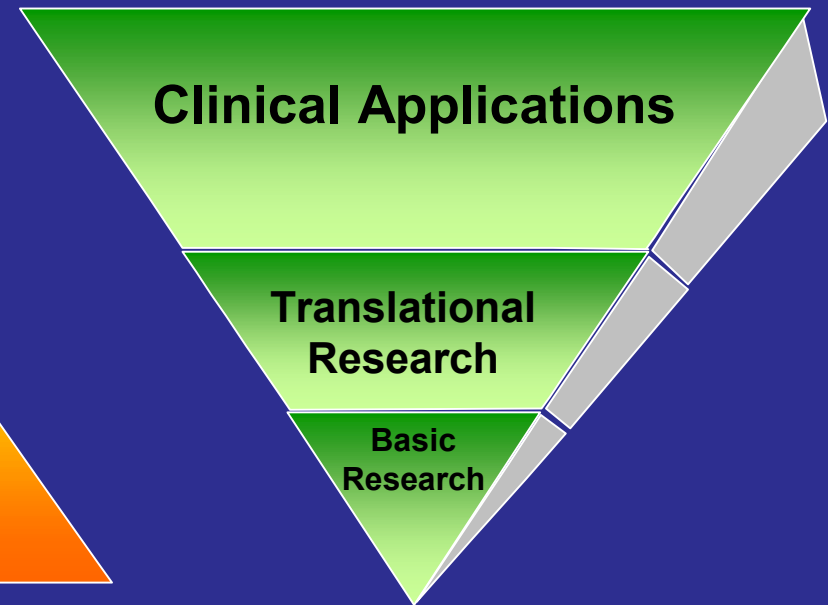




# Balanced National Biomedical Research Portfolio



**NIH**



**Private Sector**





# Protecting the Future: Pathway to Independence Award



## Enhanced Support for New Investigators- PATHWAY TO INDEPENDENCE AWARD

- Five years of support consisting of two phases
- Phase I provides 1-2 years of mentored support for advanced post doctoral fellows- 90k per year
- Phase II provides up to 3 years of independent RO1 equivalent research support- 250k per year





# Central Themes in NIH Communications: *A Vision for the Future and Congressional Hearings*





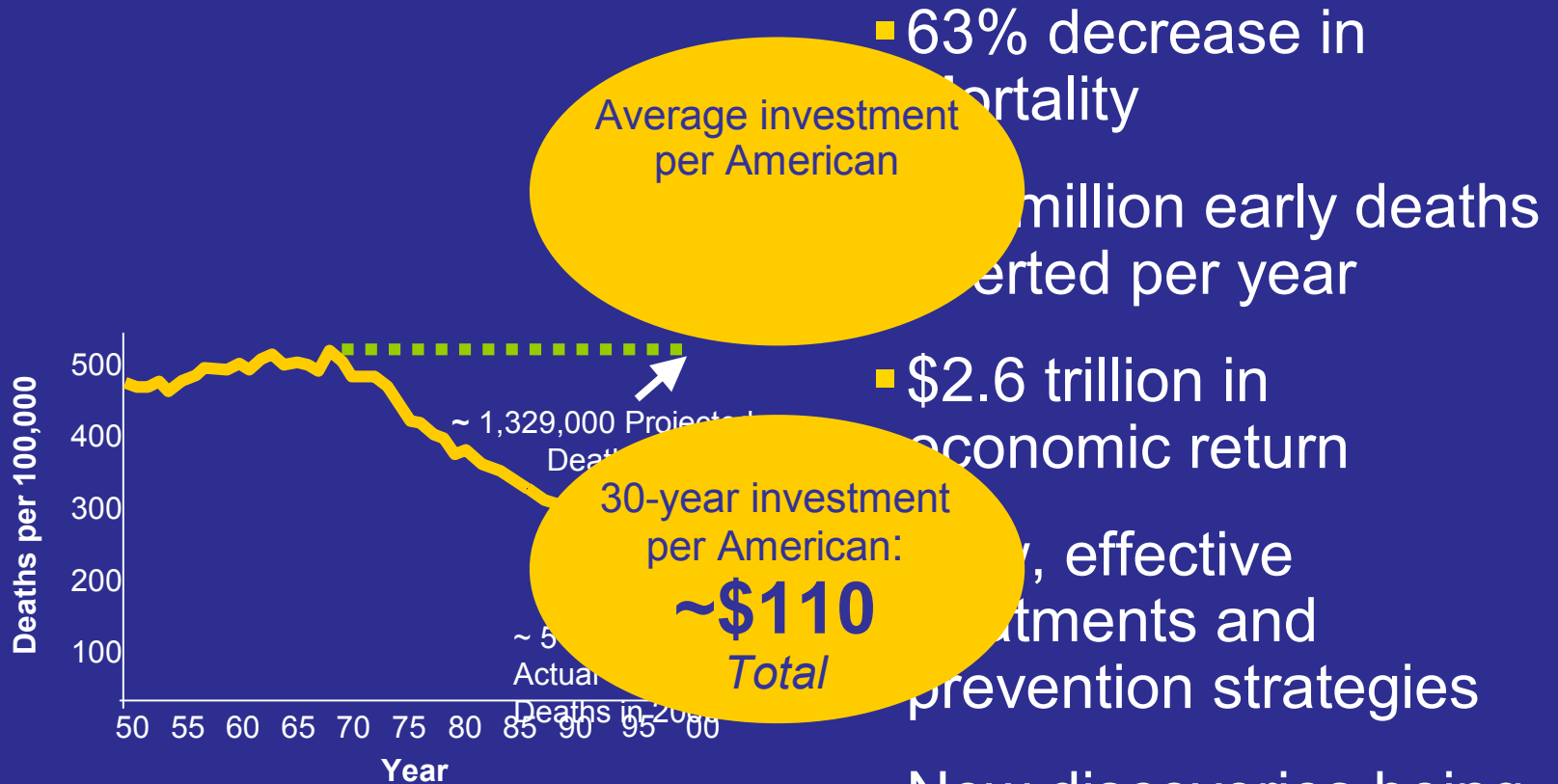
- What is the return on the American people's investment in the National Institutes of Health?
- What has the NIH budget doubling accomplished?
- What is the NIH strategy for the future?







# Coronary Heart Disease



- 63% decrease in mortality

- 1.5 million early deaths averted per year

- \$2.6 trillion in economic return

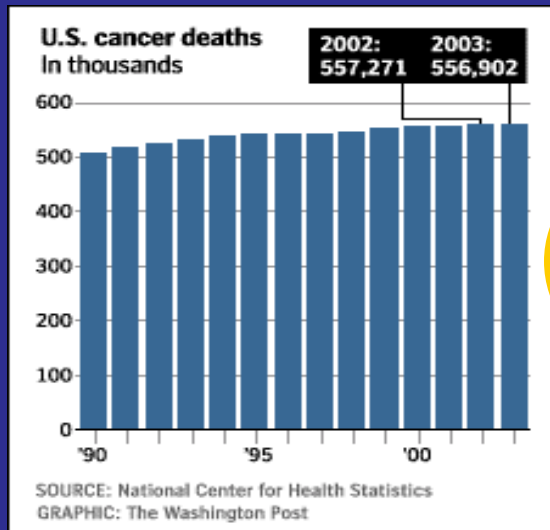
- Simple, effective prevention strategies

- New discoveries being developed with industry





# Cancer



- For the first time in recorded history, annual cancer deaths in the United States have fallen

Average investment per American

**~\$8.60**

*per year*

survivors

- Improved effectiveness of early detection and screening

30-year investment per American:

**~\$260**

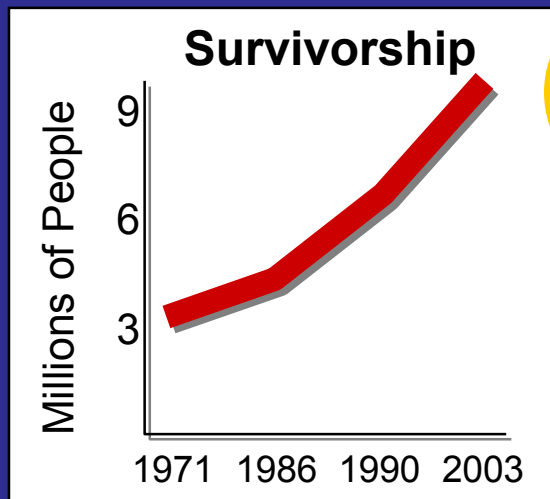
*Total*

has doubled, new

minimally invasive

options for cancer multiplied

- New drugs developed for cancer prevention





# New Discoveries Make it Possible to “Personalize” Cancer Treatment



*Identified 16  
informative  
genes*



*Test tumor  
samples for  
mutations in  
these genes*

## **Impact:**

**70,000 breast cancer patients *per year* may not have to undergo chemotherapy**

**Predict which patients need chemotherapy**





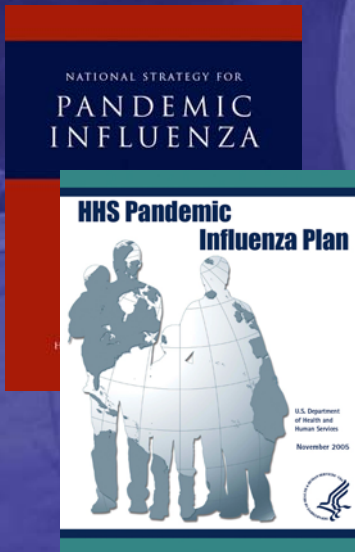
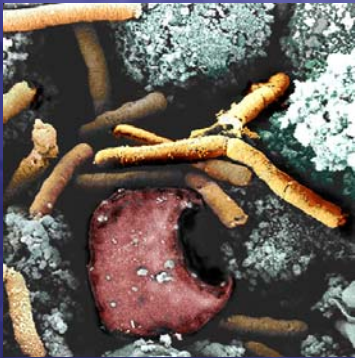
# A World Without a Strong NIH

*How would we face new threats?*





# Doubling the Budget Allowed NIH to Expand the Scope of its Mission

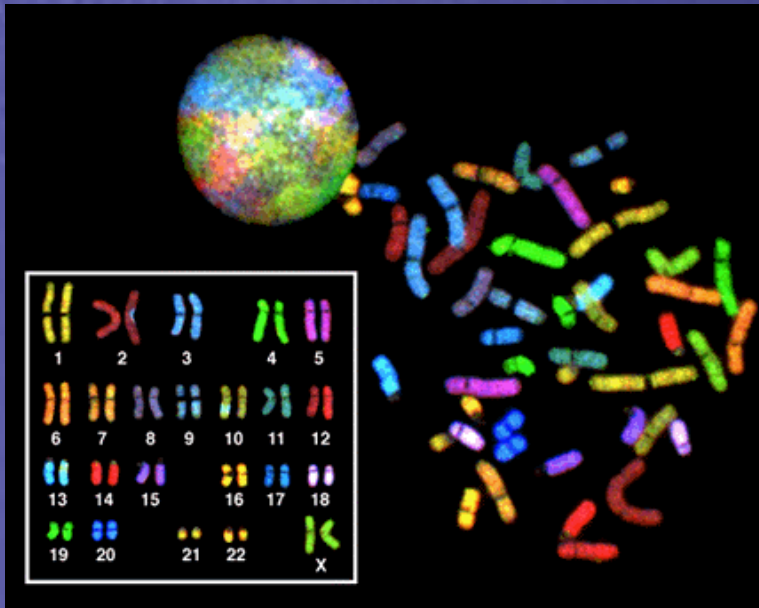


- **New Biodefense Mission**
  - Multiple countermeasures
- **New Vaccine Research Center**
  - Over 14 new vaccines
- **HHS Pandemic Flu Preparedness**
  - H5N1 Vaccines and Drugs
- **New fields of research:**
  - Genomics
  - Bioinformatics
  - Institute of Biomedical Imaging and Bioengineering





# Human Genome Project and HapMap: *The Foundation of a New Medical Era*



- New powerful DNA sequencing technologies
- **2007 Genes, Environment, and Health Initiative**
  - Identify roots of 10 most common diseases within 3 years
  - Devise new ways of monitoring personal environmental exposures
  - Guide new treatments



# Broadening the NIH Vision

**FY 2004**



## NIH Roadmap for Medical Research

- Involves entire NIH

**FY 2005**



## NIH Strategic Plan for Obesity Research

- Involves 19 Institutes and Centers

Image © Time magazine, June 2004

**FY 2006**



## NIH Neuroscience Blueprint

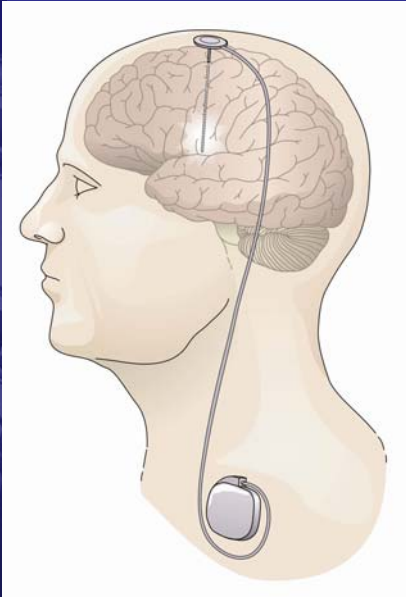
- Involves 15 Institutes and Centers





# Example of Interdisciplinary Research: *Deep Brain Stimulation Treatment for Parkinson's Disease*

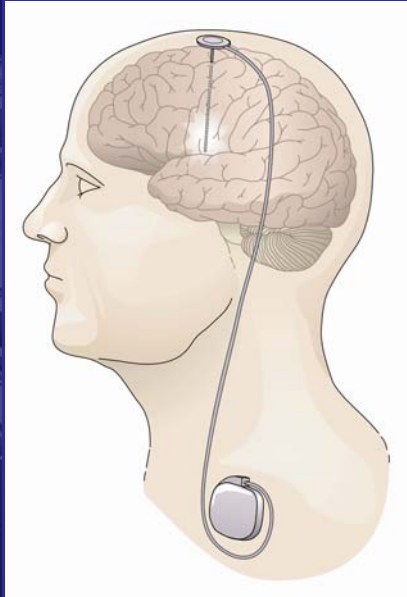
**Without** “Brain Pacemaker” Stimulation







# Example of Interdisciplinary Research: *Deep Brain Stimulation Treatment for Parkinson's Disease*



With “Brain Pacemaker” Stimulation





# Example of Interdisciplinary Research:

*Deep Brain Stimulation Treatment for Parkinson's Disease*





# With Doubling, NIH Expands Funding Across U.S.

## 3,114 New Technologies Brought to Market

By 185 US Research Institutions (1998-2004)

*Funding to Develop Technologies Provided by Both US Government and Private Industry*

## 4,543 New Companies Formed

Around Technologies from US Research Institutions (1980-2004)

*2,671 Companies Still in Operation as of 12/2004*





# America Is Living Longer And Healthier



Since 1982,  
disability rate for  
elderly Americans  
declined by 30%



In past 30 years,  
American life  
expectancy  
increased by ~6  
years

## ■ Improvements in:

– Recovery from heart  
disease, stroke

– Dementia, deafness

– Vision impairment

– Osteoporosis

– Bone and joint health

– New, more effective  
classes of drugs for  
arthritis

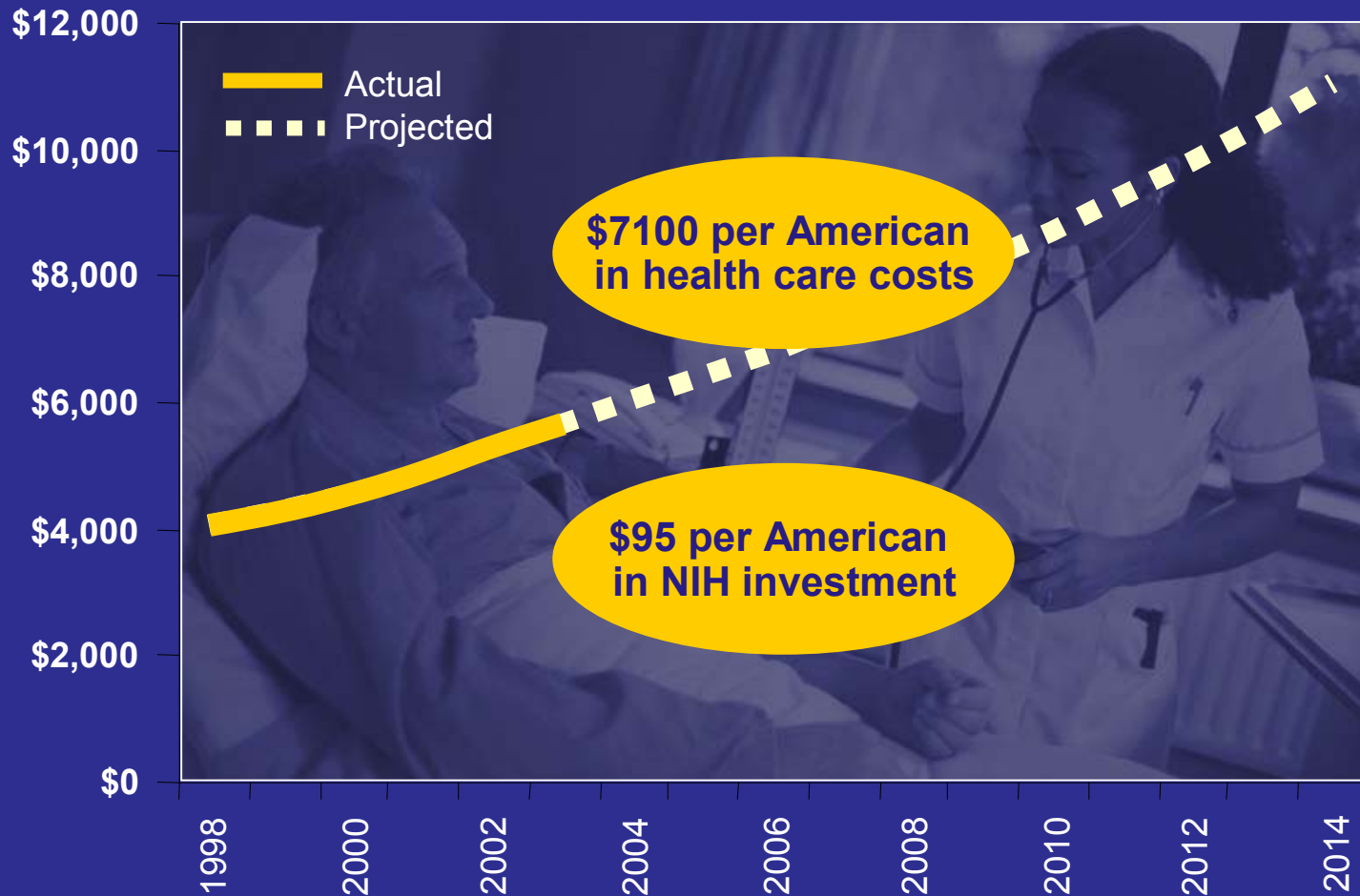
– Improvements in joint  
replacement  
technology





# Facing the Rising Challenge

## *U.S. Health Expenditures per capita*

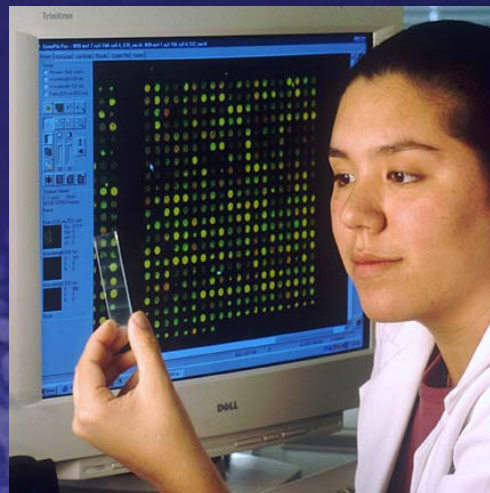


Source: <http://new.cms.hhs.gov/NationalHealthExpendData/downloads/nheprojections2004-2014.pdf>





# The Future Paradigm: *Transform Medicine from Curative to Preemptive*

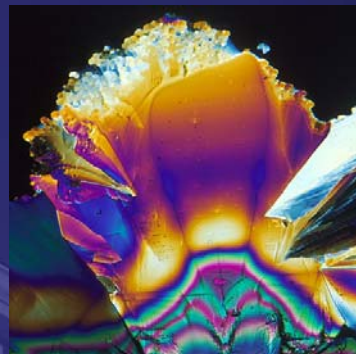


Predictive ↔ Personalized ↔ Preemptive



*Participatory*





# NIH *Transforming medicine and health through discovery*

