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Environmental assessment tools for research

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Session Objectives

- Provide overview of elements to include in an assessment of the research mission
- Understand the necessary components to successfully complete an internal and external assessment of the research environment
- Identify publically available data and its use in your comparative assessments
- Understand how the data can provide insight into future performance and ongoing measurement
- Highlight options to assess future trends

Four Simple Questions

Where is the Organization Today?	Where Should the Organization Be in the Future?	How Should the Organization Get There?	Is the Organization Getting There?

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Elements of a Strategic Plan

- Internal assessment
- External assessment

Environmental Assessment Components

INTERNAL ASSESSMENT

- Trends in research and funding (by department)
- Technology Transfer
- Facilities and technology (including IT)
- Infrastructure – supporting units
- Strengths and weakness of key departments/units and the organization
- Quality indicators
  - Employee satisfaction
  - Prestigious positions/awards
  - Leadership in external organizations

EXTERNAL ASSESSMENT

- Research funding trends
- Pharmaceutical / technological trends
- Economic development (new partnerships, spin-outs, etc.)
- Demographic trends
- Key competitors
- Financial trends and portfolio diversity
- Opportunities/threats to programs

Critical Components of an Environmental Assessment

Data

- ✓ **examined** at a detailed level, but
- ✓ **presented** in summary fashion
- ✓ with minimal impact on strategic situation of the organization should be **excluded**

Assessment that tells a story

- ✓ does not just present a series of factoids
- ✓ does not just show how much analysis has been conducted

Conclusion that narrows various strategic options

Strengths, Weaknesses, Opportunities, Threats (SWOT)

STRENGTHS Current advantages **Build** **Leverage** **Maintain**	**WEAKNESSES** Current deficiencies **Remedy** **Eliminate**
OPPORTUNITIES Known possibilities to strengthen and/or improve your program **Prioritize** **Maximize**	**THREATS** Possible external events that could harm your program **Counter** **Reduce**

Resource: **Templates on AAMC GIP website**

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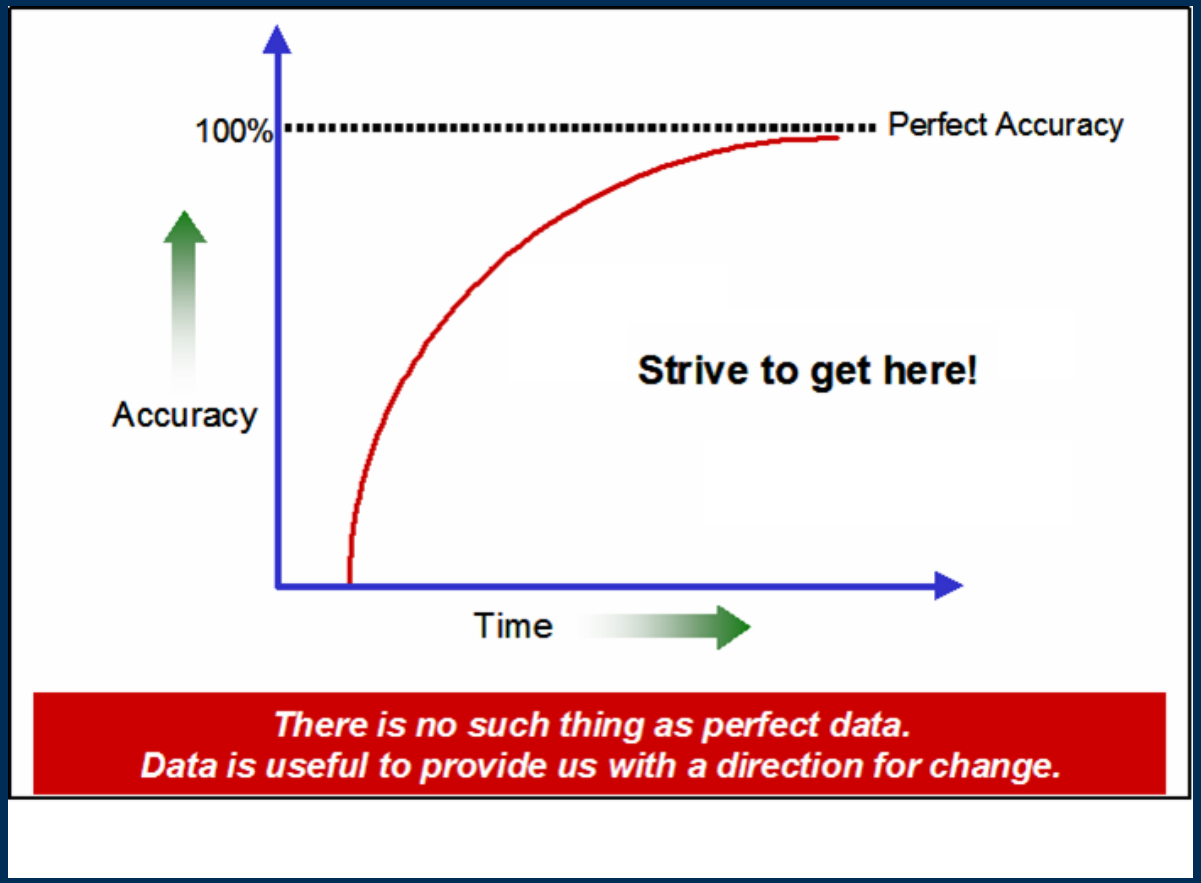
Examples of Conclusions and Implications

Key Conclusions	Implications
1. Strong "market" position in all missions: • NIH funding • US News school rankings • Clinical areas of excellence rankings	• Less strategic advantage to be gained by increasing rankings (except in some key clinical areas and Departments) • Risks of a perceived "declining position" are a greater threat
2. Flat research funding from traditional sources: • NIH budget is anticipated to remain flat and the focus on translational/ multidisciplinary research will continue • Clinical research is an opportunity for growth, but not a traditional focus	• Need to be prepared to compete for multidisciplinary projects ○ consider new funding sources (such as development of intellectual property) ○ maximize research efficiency • Competition for strong faculty may increase

Word of Caution

"Perfect is the Enemy of Good!"



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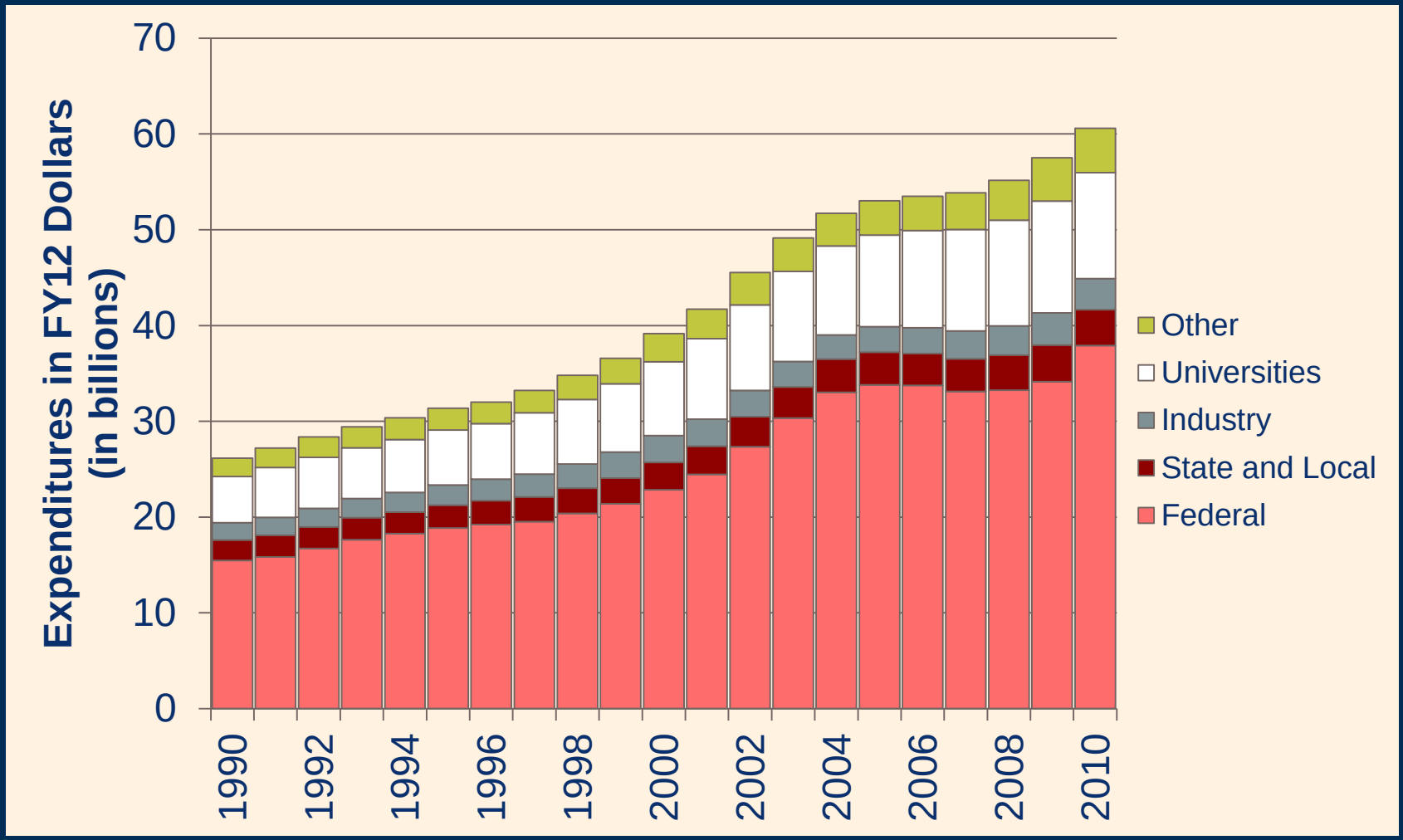
Macro Trends

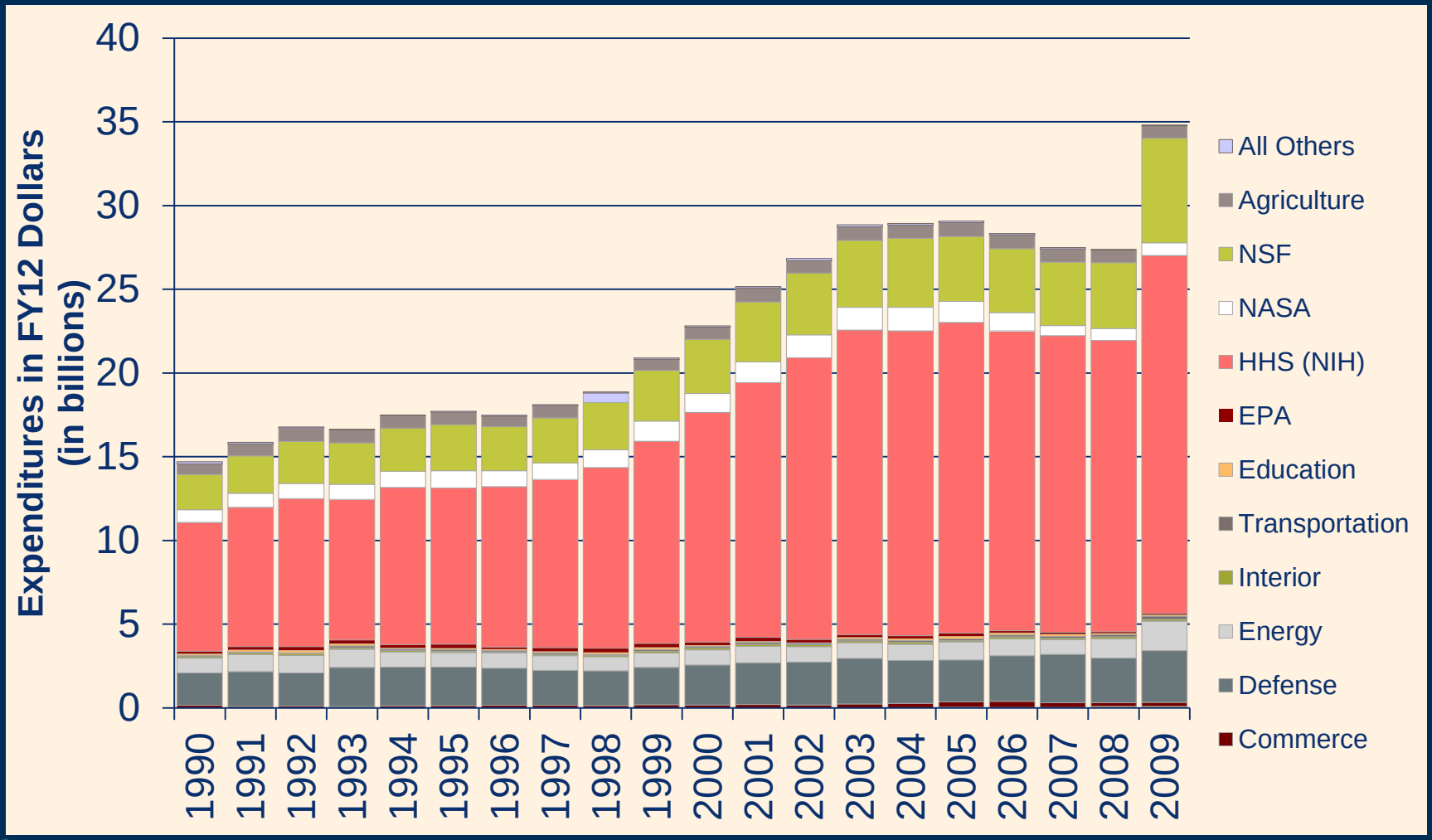
Sources of Information

University R&D Funding by Source



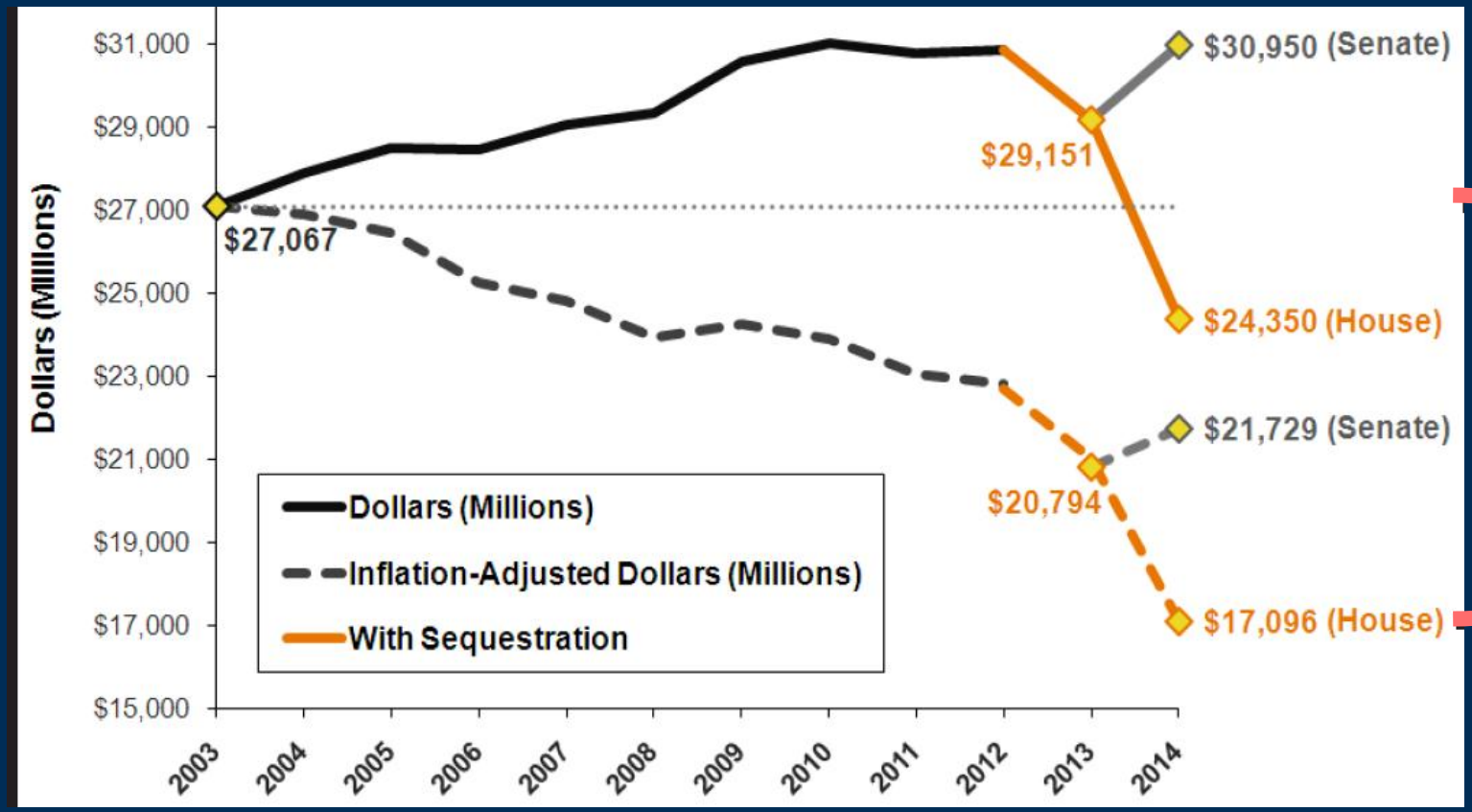
Sources: AAAS Budget & Policy Program and National Science Foundation's National Center for Science and Engineering Statistics

University R&D Funding by Federal Agency



Sources: AAAS Budget & Policy Program and National Science Foundation's National Center for Science and Engineering Statistic

NIH Appropriation in Current and Constant $ with Sequestration and FY14 House & Senate Budgets*



*Based on the FY 2014 302(b) allocations approved by the House Appropriations Committee and the Senate FY 2014 LHHS appropriations bill

FASEB
Federation of American Societies for Experimental Biology

Resource: **Sequestration Fact Sheet 09/11/13**

Source: **Federation of American Societies for Experimental Biology**

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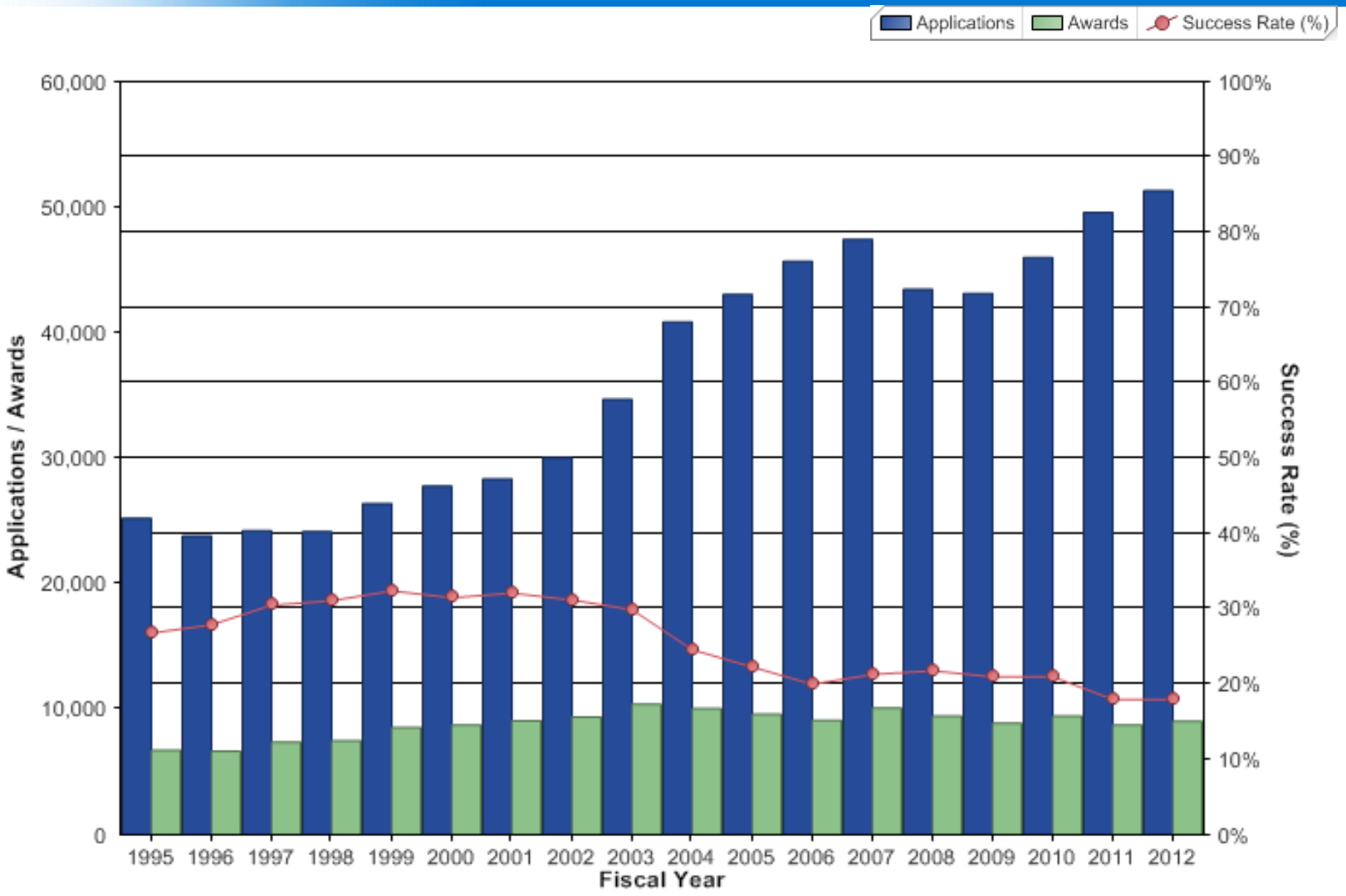
Forecasting the Funding Future

Estimated Distribution of US R&D Funds in 2013

Source of R&D Funds to Academia	Billions of Current US Dollars	Estimated % Change from FY12
Federal Government	$41.3	-0.8%
Industry	$3.3	1.6%
Academia	$12.6	2.1%
Other Government	$4.4	2.0%
Non-Profit	$5.1	4.2%
Total	$66.6	0.4%

Source: Batelle R&D Magazine

Research Project Grants
Applications, awards, and success rates



NIH RPG Success Rates Are Available by SOM Department

Office of Research Information Systems (ORIS) /Office of Statistical Analysis and Reporting (OSAR)/ www.report.nih.gov

Table #208

NIH RESEARCH PROJECT GRANTS[1]

Competing Applications, Awards, and Success Rates
by Medical School Department Name
Fiscal Years 2003 - 2012

Excludes awards made with American Recovery and Reinvestment Act (ARRA) funds.

Select AutoFilter to view totals or change display criteria.

Fiscal Year	Medical School Department Name	Number of Applications Reviewed	Number of Applications Awarded[2]	Success Rate[3]
2012	ANATOMY/CELL BIOLOGY	866	214	24.7%
2012	ANESTHESIOLOGY	324	68	21.0%
2012	BIOCHEMISTRY	1,340	279	20.8%
2012	DERMATOLOGY	185	35	18.9%
2012	EMERGENCY MEDICINE	77	9	11.7%
2012	FAMILY MEDICINE	161	19	11.8%
2012	GENETICS	777	169	21.8%

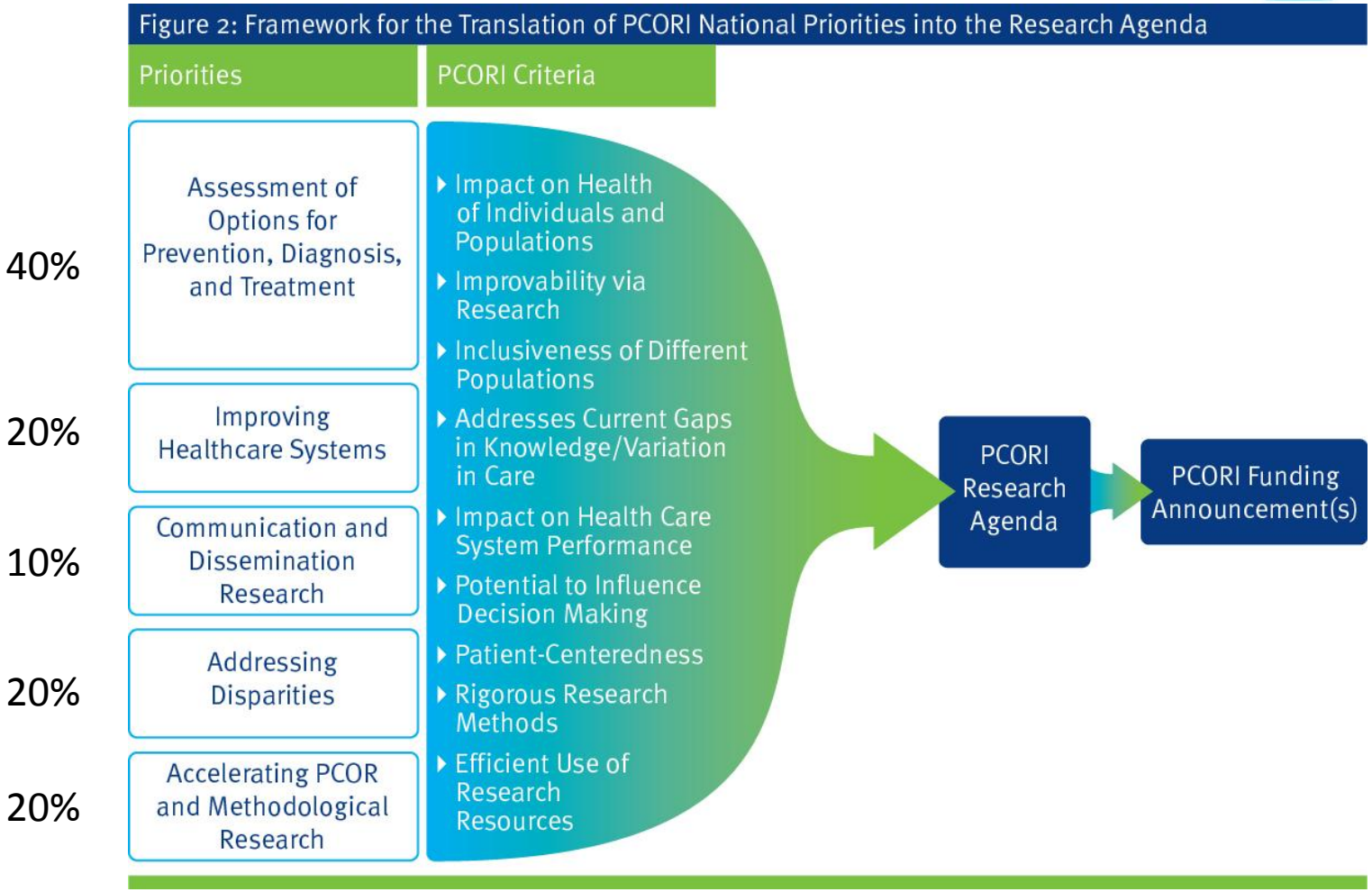
New Federal Opportunities: Health Services Research

Centers for Medicaid and Medicare Services

development and testing of innovative health care payment and service delivery models

The CMS Innovation Center

The Center for Medicare & Medicaid Innovation (the Innovation Center) with CMS supports the development and testing of innovative health care payment and service delivery models.



 PCORI's National Priorities for Research and Research Agenda (PDF) - May 21, 2012

New Federal Opportunities: Health Services Research

Agency for Healthcare Research and Quality

comparative effectiveness, prevention & care management, value, patient safety, health information technology, emerging issues

Department of Veterans Affairs

organization, delivery, and financing of health care to improve the quality and economy of care

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Assessing the Internal Environment

Considerations and Data Sources

Internal Assessment Categories

- Trends in research and funding (by department)
- Technology Transfer
- Facilities and technology (including IT)
- Infrastructure – supporting units
- Strengths and weakness of key departments/units and the organization
- Quality indicators
  - Employee satisfaction
  - Prestigious positions/awards
  - Leadership in external organizations

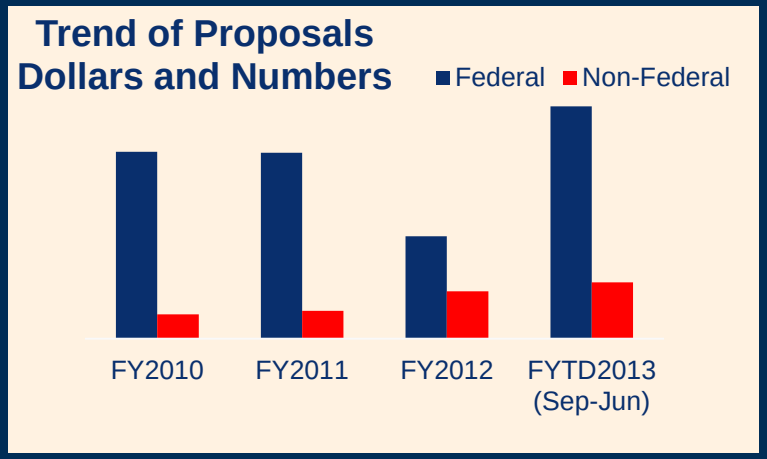
The Faculty

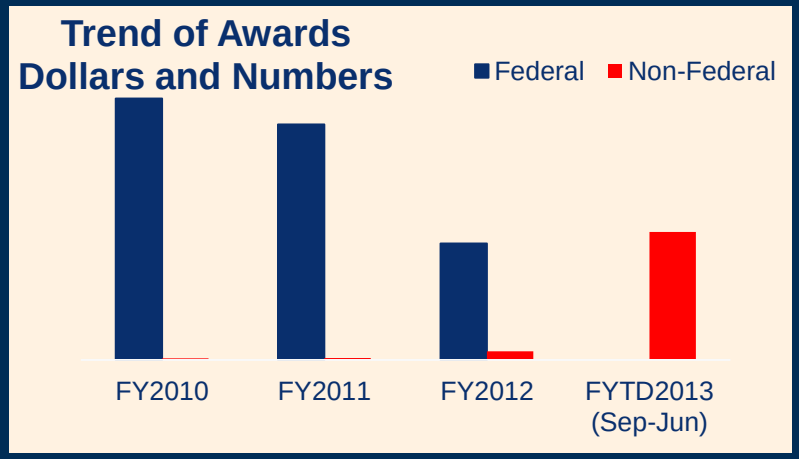
Indicator	Dept A	Dept B
Research Faculty Number		
Mix of PhDs / MDs / MD-PhD		
Funded Research Faculty		
PIs		
Average funding per research faculty		
Average # of proposals per research faculty		
Average age of funded faculty		
Faculty funded over X $ amount (heavy hitters)		
Average age of heavy hitters		
Gender mix		
Ethnicity mix		

Create a profile of faculty by department to begin to develop trends and assessment of potential risk points

The Faculty

The development of tools to assess sustainability of faculty funding is more important as funding pressures increase





Other Indicators of Impact Include Trends in:

- Publications
- Citations
- Philanthropy
- Tech Transfer
- Leadership
- Impact of research (H Index)
- Collaborations: Numbers of relationships with other departments / centers via publications or awards

Individual Faculty Recognition

Leadership

- Journal editors
- Symposium organizers
- Society or external organization officers

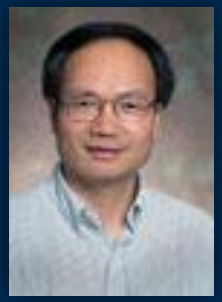
Prestigious Groups/Awards

- Faculty of 1000
- Institute of Medicine
- National Academy of Sciences
- Nobel Laureates
- Howard Hughes Investigators
- McArthur Awardees
- Lasker Foundation

Emory's Millipub Club: Authors of Papers with >1000 citations

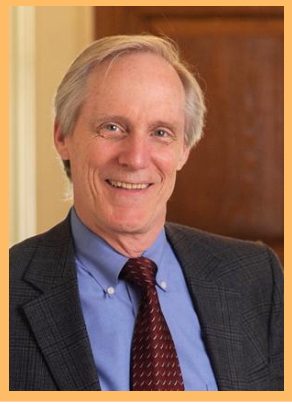





Scientist	# cites	Paper	Subject
Kathy Griendling	1409	1994 Circulation Res	Angiotensin II NADPH oxidase
	1351	2000 Circulation Res	NADPH oxidase
	1284	1996 J Clin Inves	Angiotensin II NADPH oxidase
	1101	1991 Nature	Identification of angiotensin II receptor
David Harrison	1284	1996 J Clin Inves	Angiotensin II NADPH oxidase
	1167	1993 J Clin Inves	Hypercholesterolemia & superoxides
	1100	2000 Circulation Res	Oxidative stress in cardiovascular disease
Steve Warren	1536	1991 Cell	Identification of Fragile X gene
	1123	1991 Cell	Triplet repeat of FMR1 causes disease
Wayne Alexander	1410	1994 Circulation Res	Angiotensin II NADPH oxidase
	1101	1991 Nature	Identification of angiotensin II receptor
Mike Frankel	3182	1995 NE J Med	TPA for acute ischemic stroke
Haian Fu	2926	1997 Cell	Role of Akt and BAD in apoptosis
Dean Jones	2714	1997 Science	Role of Bcl2 and cytochr C in apoptosis
Ray Dingledine	1755	1999 Pharmac Rev	Glutamate receptor ion channels
Steve Traynelis	1755	1999 Pharmac Rev	Glutamate receptor ion channels
David De Lurgio	1415	2002 New Engl J Med	Resynchronization in heart failure
Larry Phillips	1355	2004 JAMA	Estrogen trial in postmenopausal women
Andrew L Smith	1352	2002 New Engl J Med	Resynchronization in heart failure
Angel R Leon	1352	2002 New Engl J Med	Resynchronization in heart failure
Dan Sorescu	1351	2000 Circulation Res	NADPH Oxidase
John Altman	1239	1998 Immunity	CD8 T-cell activation in viral infection
Rafi Ahmed	1239	1998 Immunity	CD8 T-cell activation in viral infection
TJ Murphy	1101	1991 Nature	Identification of angiotensin II receptor
Paul Fernhoff	1058	1985 New Engl J Med	Retinoic acid embryopathy
Marla Luskin	1014	1993 Neuron	Postnatally generated neurons

UAB SOM's "NIH Heavy Hitters"
<2% PIs Bring in >20% of NIH Award $

	**Bob Kimberly** CTSA Director $7,730,696 **(5.2%)**		**Ed Partridge** CCC Director $7,361,871 **(5.0%)**
	**Mona Fouad** Minority Health Director $2,740,829 **(1.8%)**		**Michael Saag** CFAR Director $11,587,443 **(7.8%)**

Data analyzed from: NIH ExPORTER

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Financial Data

Extramural Support Trends

- External sponsor types and Awards Types
- Mix of awards and impact on IDCR (foundations, federal)
- Average award sizes and durations

Identification of Financial Sources and their Risks

- Extramural support
- Philanthropic support
- Industry
- Government support (state, federal)
- Institutional partners (healthcare delivery system, university)

Example of Research Score Card

- Track trends month to month, quarter to quarter
- Compare to prior years worth of data to normalize for timing issues (expenditures, types of awards, indirects, directs)

Total Awards (compared to prior year)			
	FY 13	FY 12	% Change
Department 1	$5,079,000	$1,819,000	179%
Department 2	$28,728,000	$24,476,000	17%
Department 3	$7,381,000	$6,533,000	13%
Department 4	$14,565,000	$15,055,000	-3%
Department 5	$50,309,000	$53,756,000	- 6%
Total	**$106,062,000**	**$ 101,639,000**	**4%**

Assessing Research Infrastructure

Grant Submissions

- What are your success rates?
- Is mentoring available for new investigators?
- Is there financial support for pilot data collection?

Robustness/Nimbleness of Research Administration

- How fast are your application/award turnaround times?
- Is there institutional support for large programs or centers that is meaningful?
- How service-oriented are your regulatory review offices?

Assessing Research Infrastructure

Space

- Is there enough? Is it the right type?
- What is the average age of plant? Is it good space?
- Is it well-utilized?

Specialized equipment/facilities

- Do you have what it is needed?
- What is the utilization?
- Is there appropriate scientific expertise?
- Is there adequate institutional support and financial management?
- Is there long-term planning – replacement, sundowning, expansion?

Space Comparisons & Benchmarks
Alignment of $ and Square Feet

Potential areas of mismatch when comparing internal data sources or peers

- Core facilities
- Server farms
- Animal housing & procedure areas
- Clinical research vs bench research

Consider:

- MTDC expenditures/net square feet – excludes equipment, alterations, clinical care, etc.
- Different benchmark for **wet** vs **dry** research

Surveys and Interviews

Use Survey tools such as *Survey Monkey* to gather broad input on current needs and priorities

Stakeholder interviews – leaders, investigators, new investigators, new recruits

Goal is to gather input and understand where we are and what is needed to move the organization forward

Interviews or Survey Questions Research Priorities

Signature Programs

What 4 major research initiatives could differentiate us on the national or world stage?

Research Strengths

What 4 areas represent your research strengths? Consider critical mass, greatest activity, leading individuals.

Overlap with Peers

Which strengths are in the top 3 research priorities of our peers or the top institutions in the nation?

Strategic Partnerships

Are there collaborations or partnerships on, or off, campus that could promote or reinforce the research strengths or signature programs?

Other Questions for Your Stakeholders

1. What **will you do** to differentiate research activity at the SOM, local, & national levels?
2. What **barriers or limitations** exist for success and how do we overcome these?
3. What **assets** (talent, infrastructure, or core facilities) will be required to vault your SOM to the top 5 in 10 years?
4. What are some distinct mechanisms to encourage **cross-cutting faculty collaboration** on priorities?
5. How can we more fully **engage our community** in our research and enhance our 'return to the community'?

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Assessing the External Environment

What can you benchmark against and what comparative data are available?

External Data Types and Sources

Demographic

- AAMC Famous
- AAMC Organizational Characteristics Database

Awards/ Expenditures/ Rankings

- AAMC Medical School Profile System
- NIH ExPORTER
- NIH RePORT
- Blue Ridge Institute for Medical Research
- US News

Space

- AAMC GBA Metrics Survey (contact your GBA rep)

Tech Transfer

- AUTM Annual Licensing Survey
- US Patent and Trademark Office

Publications

- Google Scholar
- National Library of Medicine
- Web of Science, including the Science Citation Index and Social Science Citation Index

Who Should You Compare?

Manageable comparisons (~10 schools)

Familiarity – recent recruitments, networking

Similarity

- Faculty size
- Research intensity
- Organizational structure
- Geography - useful to study for collaborative opportunities

Peers for this Exercise
GIP Steering Committee SOMs

School	Ownership/ Control	Research Intensity*	Practice Plan Legal Structure	Hospital Relationship	Ownership of Integrated AMC
Alabama	Public	26	Separate Not-For-Profit Corp	Common	State
Arizona	Public	68	Separate Not-For-Profit Corp	Separate	Other Non-Profit
Chicago	Private	29	Owned by University or SOM	Separate	Other Non-Profit
Emory	Private	17	Owned by University or SOM	Common	Other Non-Profit
Mt. Sinai	Private	22	Owned by University or SOM	Separate	Other Non-Profit
Rochester	Private	33	Owned by University or SOM	Common	Other Non-Profit
UTMB (freestanding)	Public	50	Owned by University or SOM	Common	State
Wash U	Private	9	Owned by University or SOM	Separate	Other Non-Profit

*Based on federal expenditures

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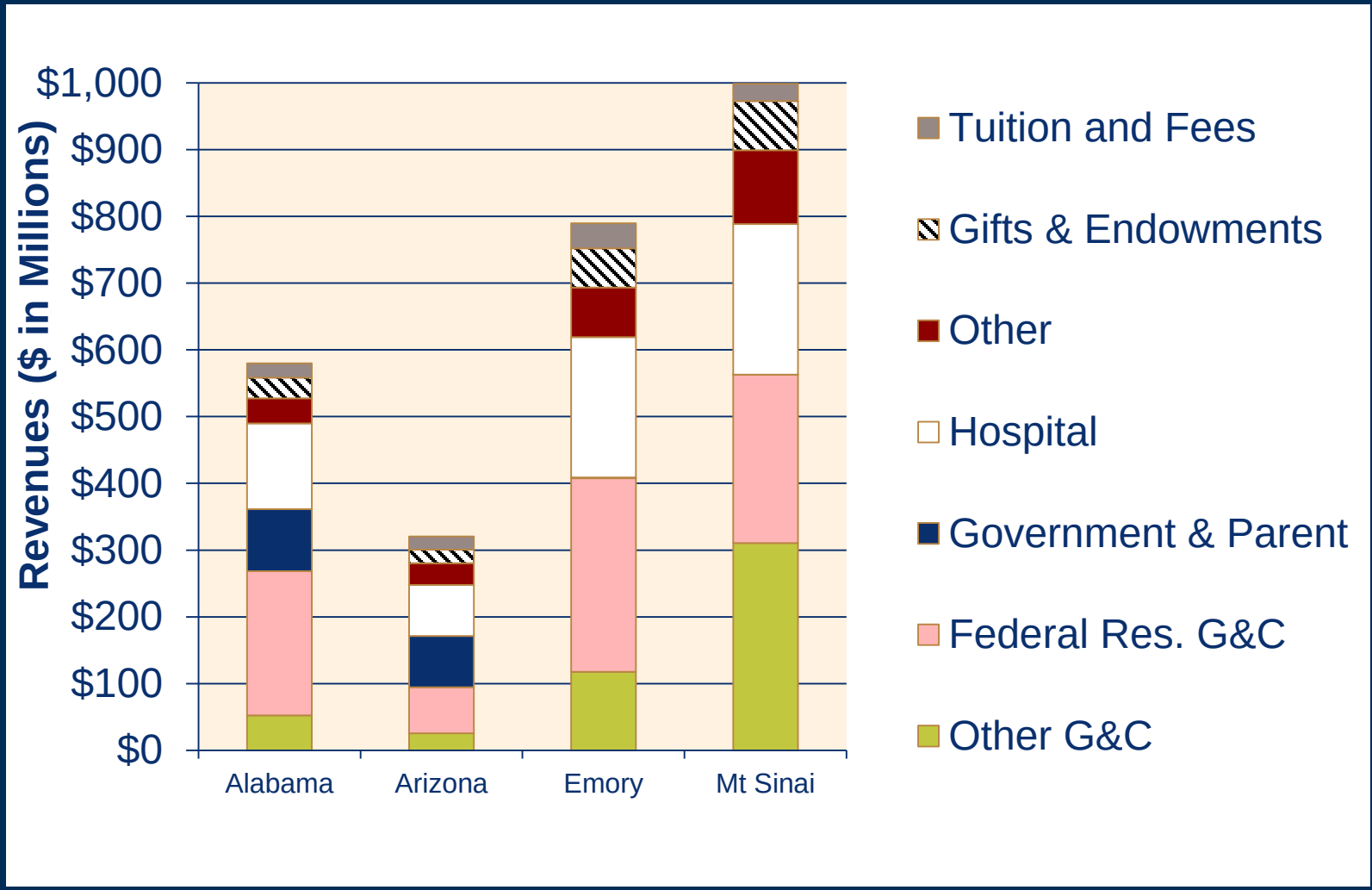
Extramural Support for Research

Show me the money

Comparison of 2012 Revenue Sources



Data Source: AAMC Medical School Profile System

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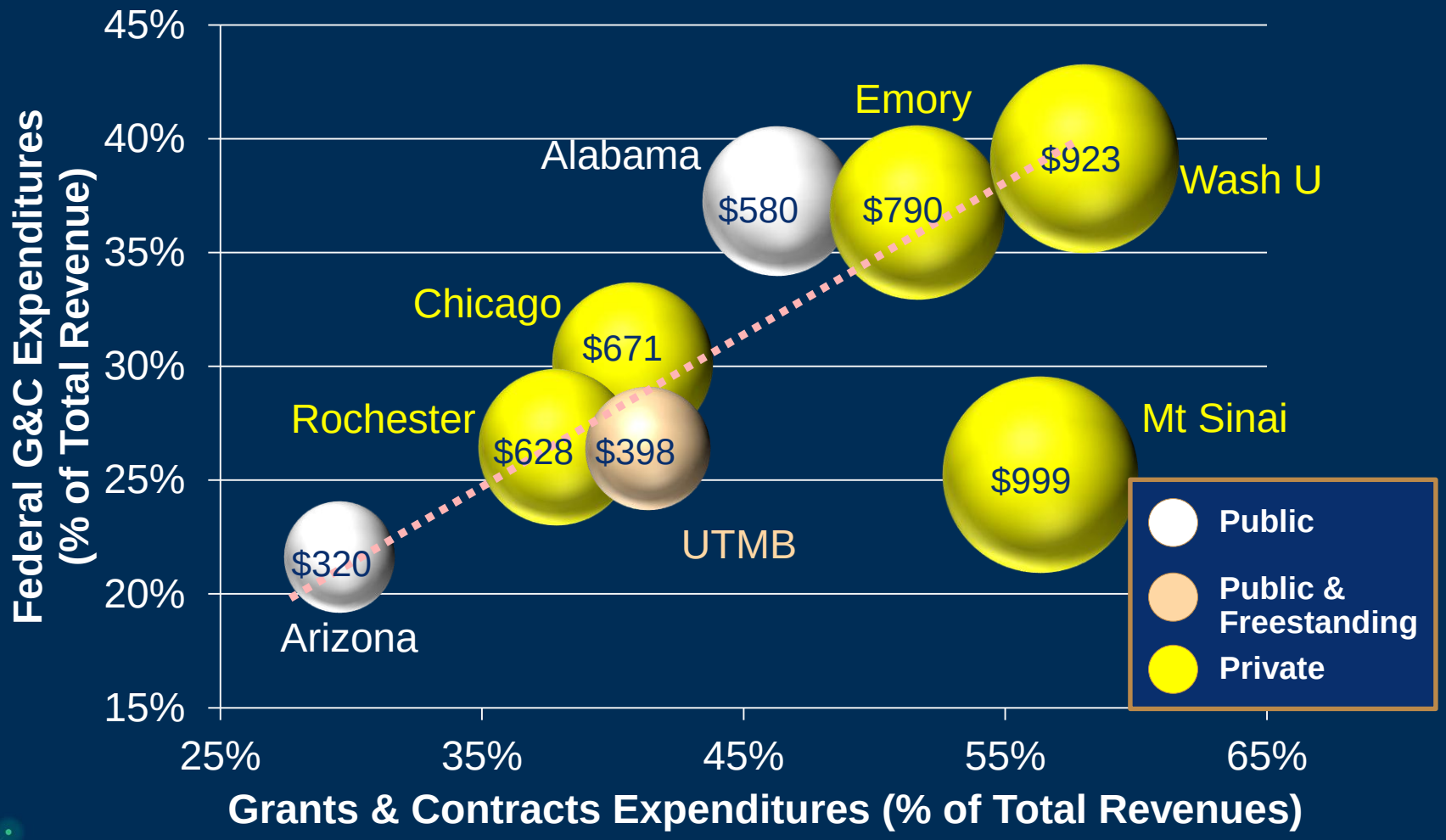
Grants & Contracts Expenditures

(Size of sphere correlates with 2012 Total Revenue $, value in millions)



Data Source: AAMC MSPS

Creating and Implementing Strategic Plans Workshop

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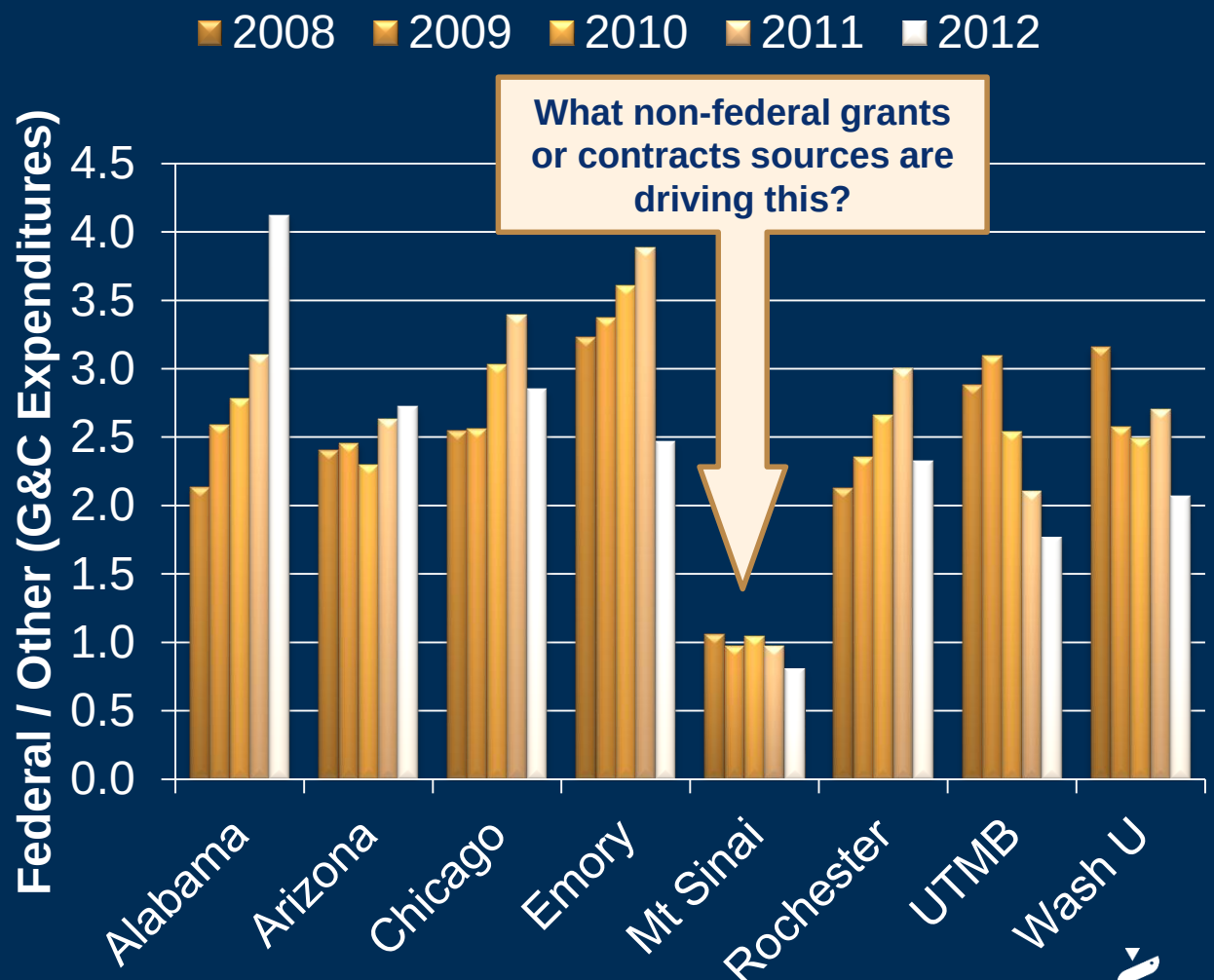
Grants & Contracts Expenditure Trends

Assessment Questions

How reliant are you on federal support?

What has changed in the last 5 years or last year?



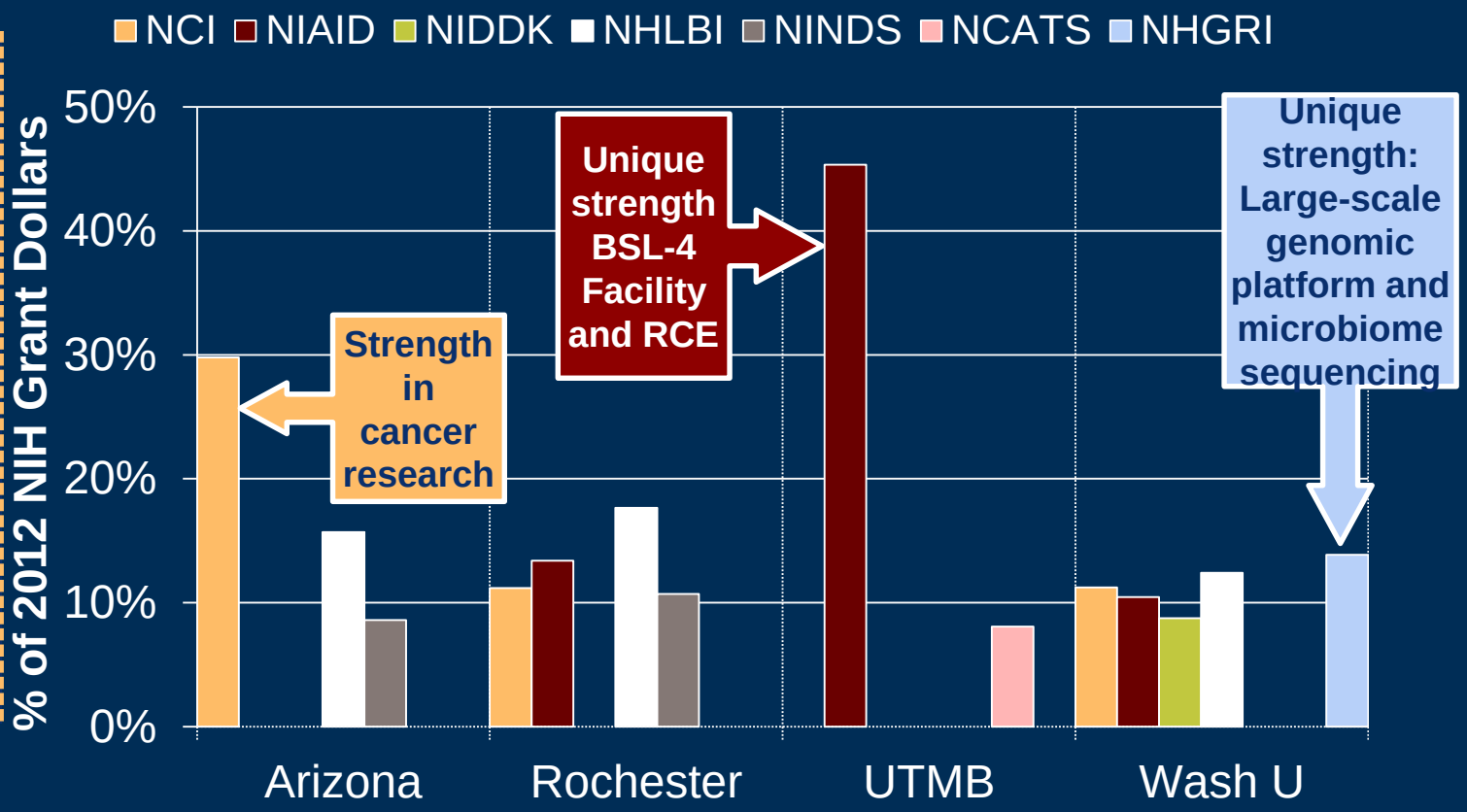
Data Source: **AAMC MSPS**

Identifying Strength: NIH Institutes Signature
(Institutes that comprise ≥50% of 2012 grant $)

Assessment Questions

Are we reliant on one or more NIH institutes for more than 50% of our support?

What unique strengths or programs do we have?



Data Source: NIH ExPORTER

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What About Rankings?

Blue Ridge Institute for Medical Research

- Unofficial NIH rankings for medical schools and medical school departments
- Spans 2006 to 2012
- Inconsistently includes (or excludes) R&D contracts
- May help (or hurt) with public reputation
- Surrogate measure of number of research faculty

US News Best Medical Schools: Research

- Considers NIH total dollar grants awarded and of grants per faculty member (0.15 each of the overall score)
- Controversial reputational ranking – is it the right focus for medical students?

Applied Research: Intellectual Property

Institution	Invention Disclosures	Licenses	Options	Patents Filed	U.S. Patents Issued
Alabama	112	34	1	89	10
Arizona	142	29	18	119	21
Chicago	98	22	2	34	14
Emory	244	41	3	172	19
Mt Sinai	69	24	1	92	11
Rochester	132	25	1	115	26
Wash U	143	40	6	80	22

Data Source: **Fiscal Year 2012 AUTM Licensing Survey**

"Bang for the Buck" Comparative Analyses

- Invention Disclosures / R&D Expenditures
- Institutional H-Index / R&D Expenditures
- Emory's "Bang for Buck" (H-Index / NIH $)
- Emory's "Impact Efficiency" (NIH PI / H-Index)

Institution	(A) H-Index	(B) NIH Funding ($ millions)	(C) Unique PIs	(D) Bang for Buck =A/B	(D) Impact Efficiency =C/A
Stanford	194	$1,789	619	0.108	3.2
Emory	139	$1,336	603	0.104	4.3
Baylor	140	$1,414	554	0.099	4.0

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Faculty Demographics

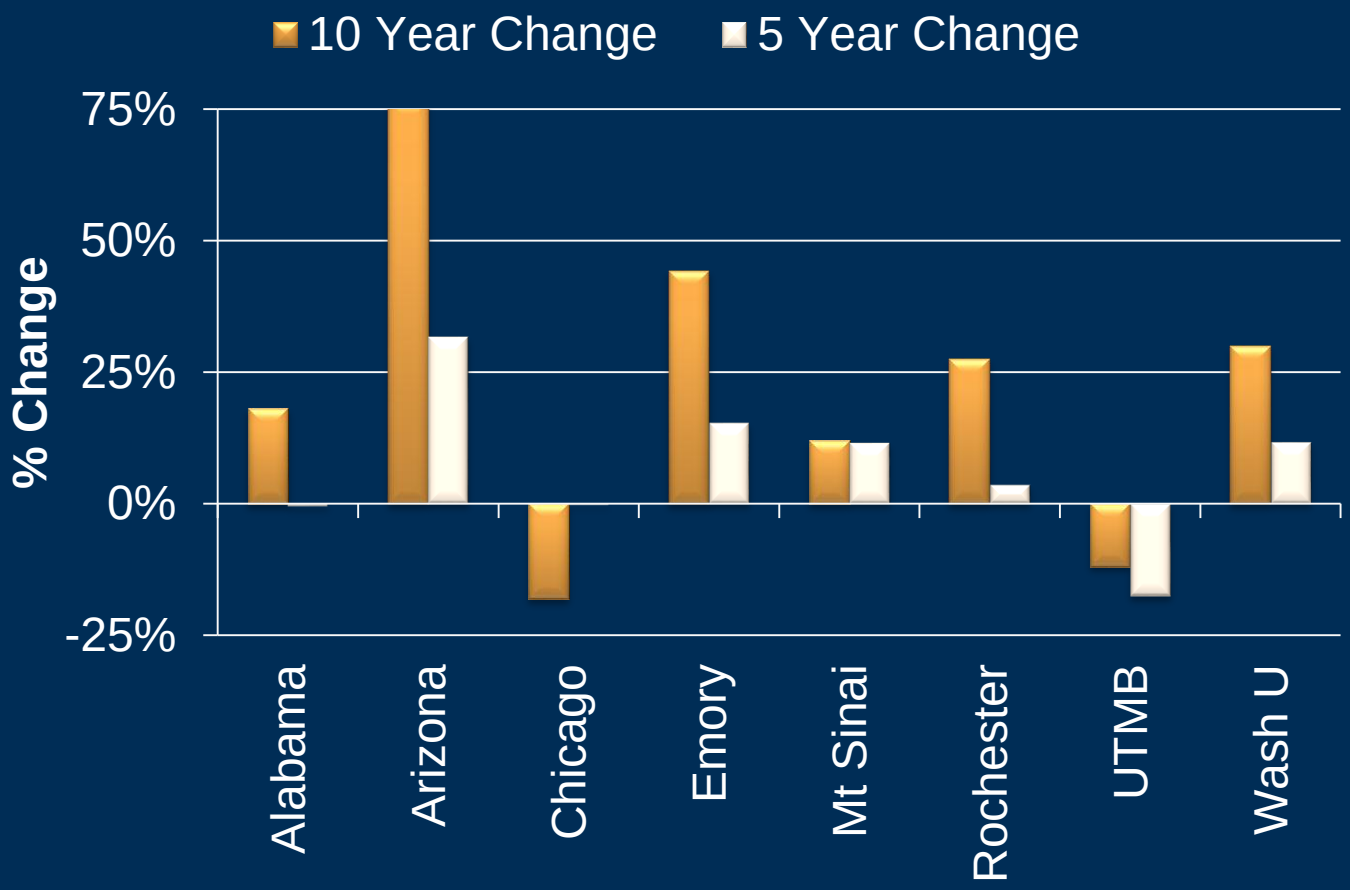
The Most Important Resource

Changes in Full-Time Faculty Number

Assessment Questions

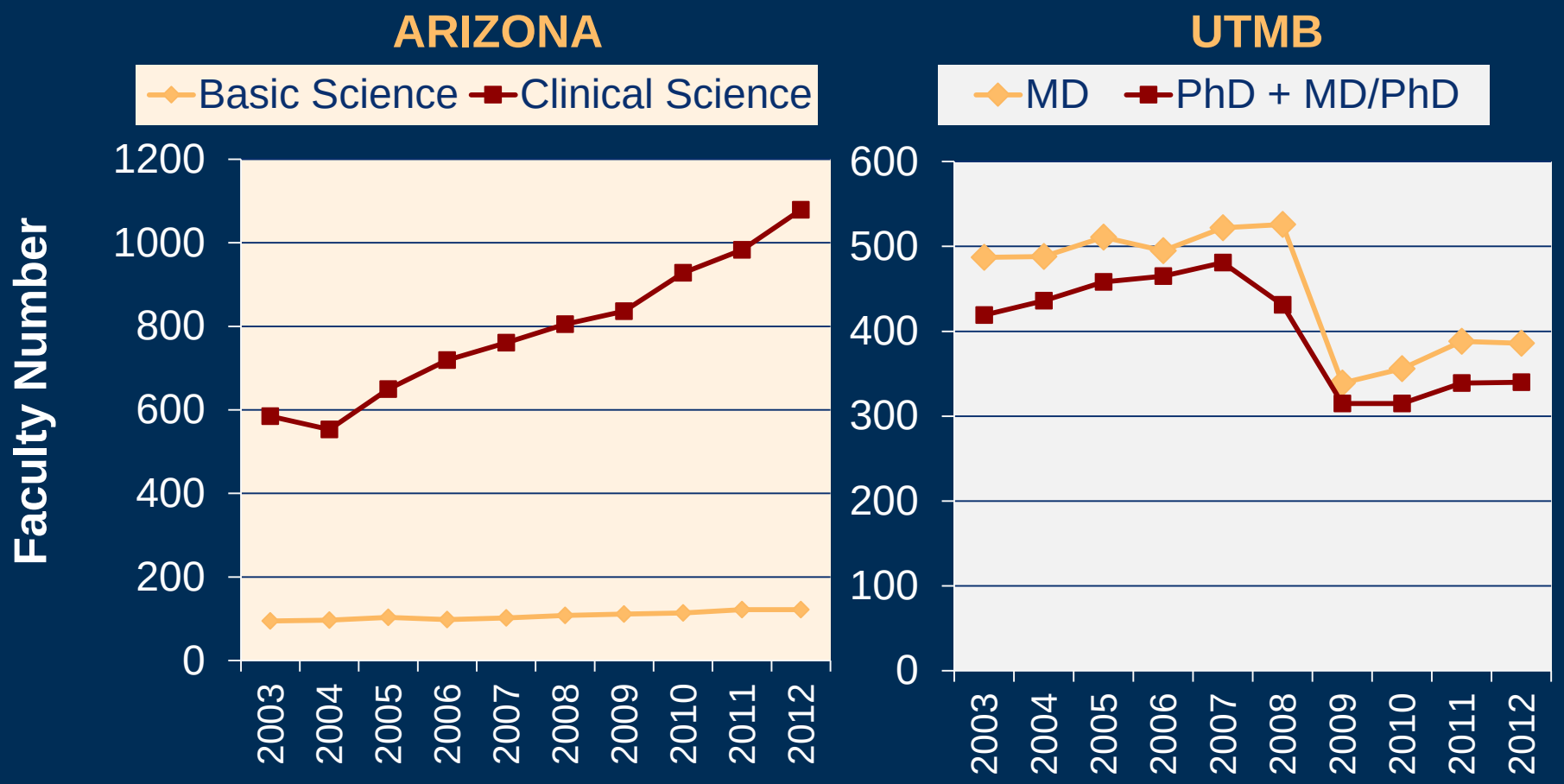
Has the faculty size changed?

What diversity subsets are we striving to attract and retain?



Data Source: AAMC MSPS

Full-Time Faculty by Dept or Degree Type



Data Sources: AAMC MSPS and AAMC FAMOUS

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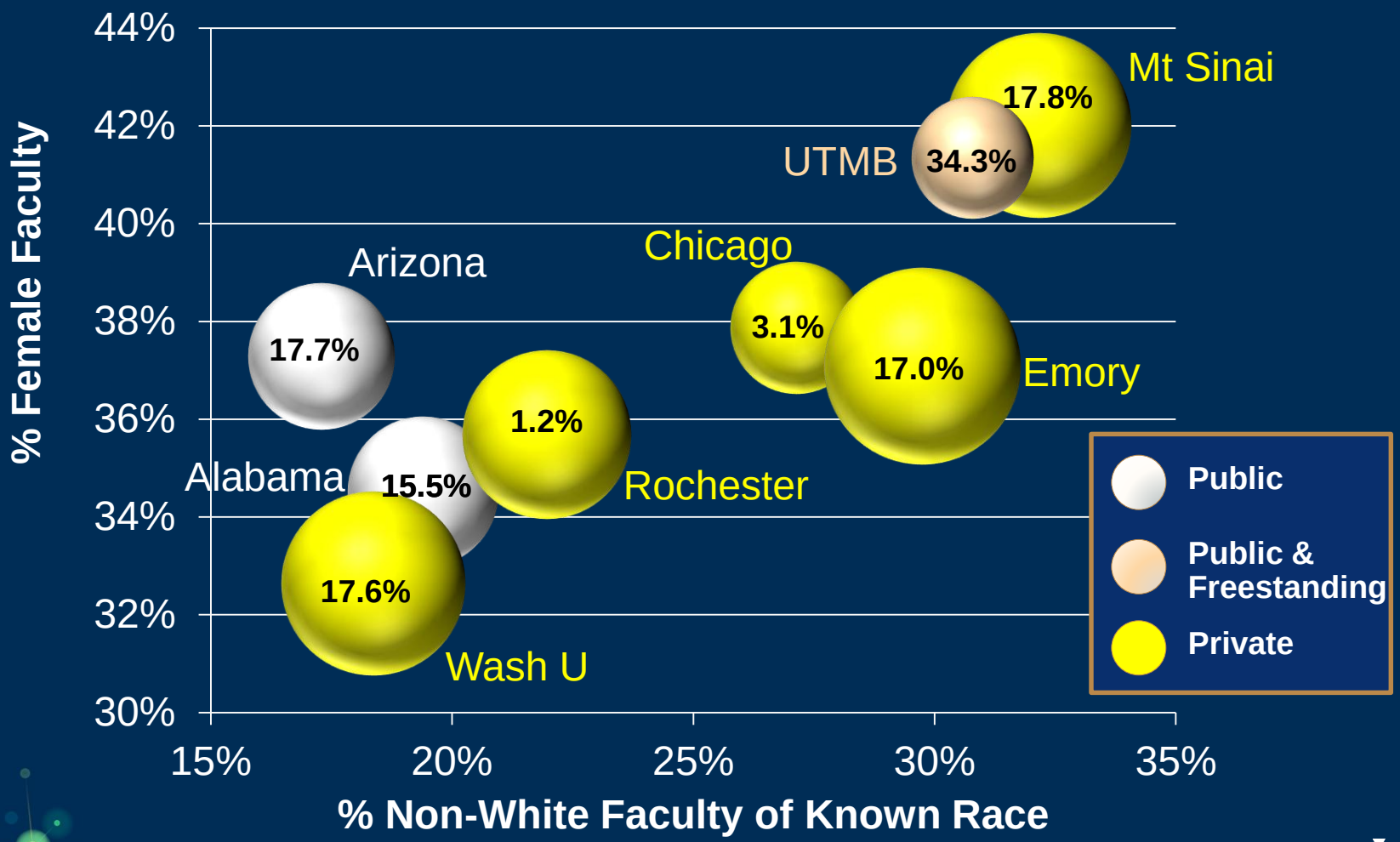
2012 Faculty Diversity

(size of sphere correlates with 2012 total faculty, value = % unknown race)



Data Source: AAMC FAMOUS

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Resources to Help Identify Opportunities and Future Trends

Opportunities & Threats

Prepared for the Future

Identifying Federal Research Opportunities

- AAAS R&D Budget & Policy Program
- NIH strategic plans
- NIH Common Fund
- National Science Foundation strategic plan
- Patient-Centered Outcomes Research Institute
- HHS Strategic Plan

Example of a 2014 NIH Common Fund Emerging Program

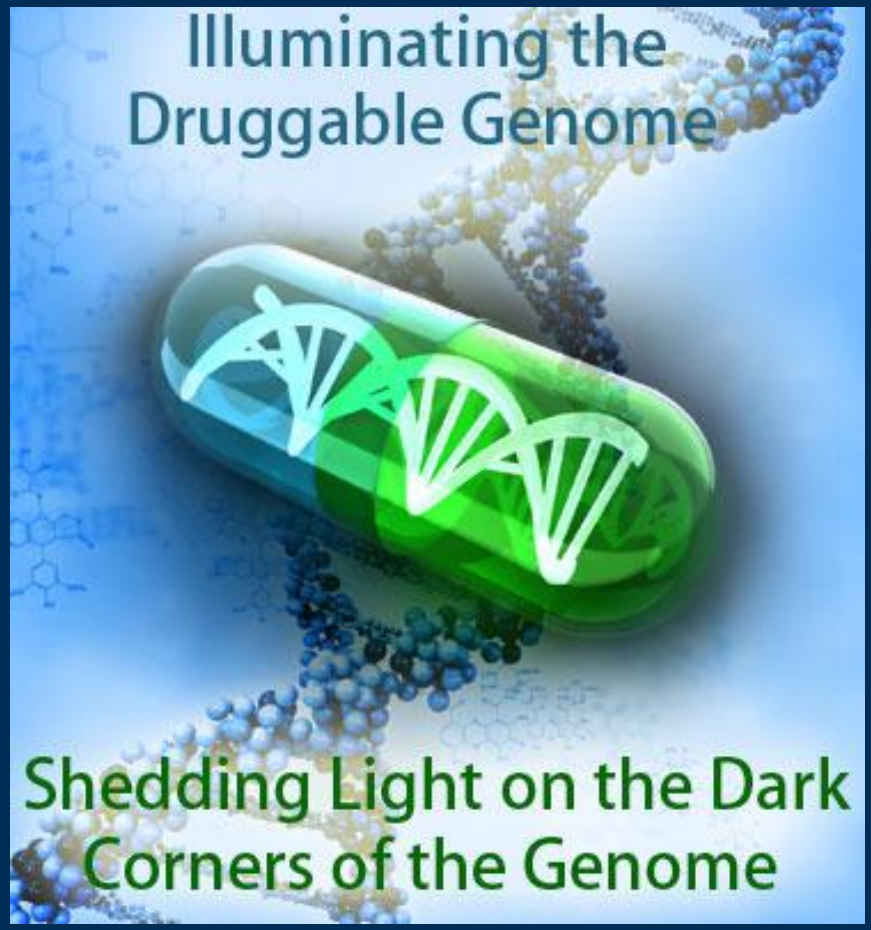
Goal: Increase understanding of poorly understood proteins within four of the most commonly drug-targeted protein families

- G-protein coupled receptors
- nuclear receptors
- ion channels
- protein kinases

3-year pilot phase:

Establish an integrated **Knowledge Management Center and web portal** for facile query and browsing tools for multiple data-sources

Technology development: adaptation of scalable assays and technologies to enable deep annotation of the Druggable Genome.



Source: **NIH Common Fund initiatives**

Future Opportunities: Federal Priorities for FY2015 R&D

"Grand Challenges" – high-risk, high-return research.

- Advanced manufacturing
- Clean energy technology and efficiency
- Climate change
- Information technology dealing with Big Data and cybersecurity
- National security
- Biological innovation and neuroscience
- STEM education

Sources: OMB FY2015 R&D Priorities Memo and AAAS R&D Budget and Policy Program

Forecasting Resources

Batelle Global R&D Funding Forecast

- The Uncertain State of U.S. R&D
- 2012 Global R & D Funding Forecast: Stable Growth of U.S. R & D

PharmaDeals Reviews

- Annual review of deal making – comes out in Jan or Feb

Tufts Center for Drug Development

- Outlook report – released in January

NIH Office of Budget

- Current Budget Year
- Budget Request

Summary

- The assessment is not limited by available data resources
- Engage diverse faculty in the conversation– people with different training, perspectives, careers will improve strategic thinking
- Being prepared for the future requires regular and frequent reassessment of internal and external information

Learn ● Serve ● Lead

Plan ● Listen ● Read