



Impact of Federal Research Funding on Institutions of Higher Education

Michael Crair, Ph.D.

William Ziegler III Professor of Neuroscience,
Ophthalmology & Visual Science

Vice Provost for Research

Yale University

Agenda



- Introduction
- Research and Development (R&D) Funding Landscape
- Federal Funding Sources
- Facilities and Administrative (F&A) Costs
- Research at Yale
- Summary

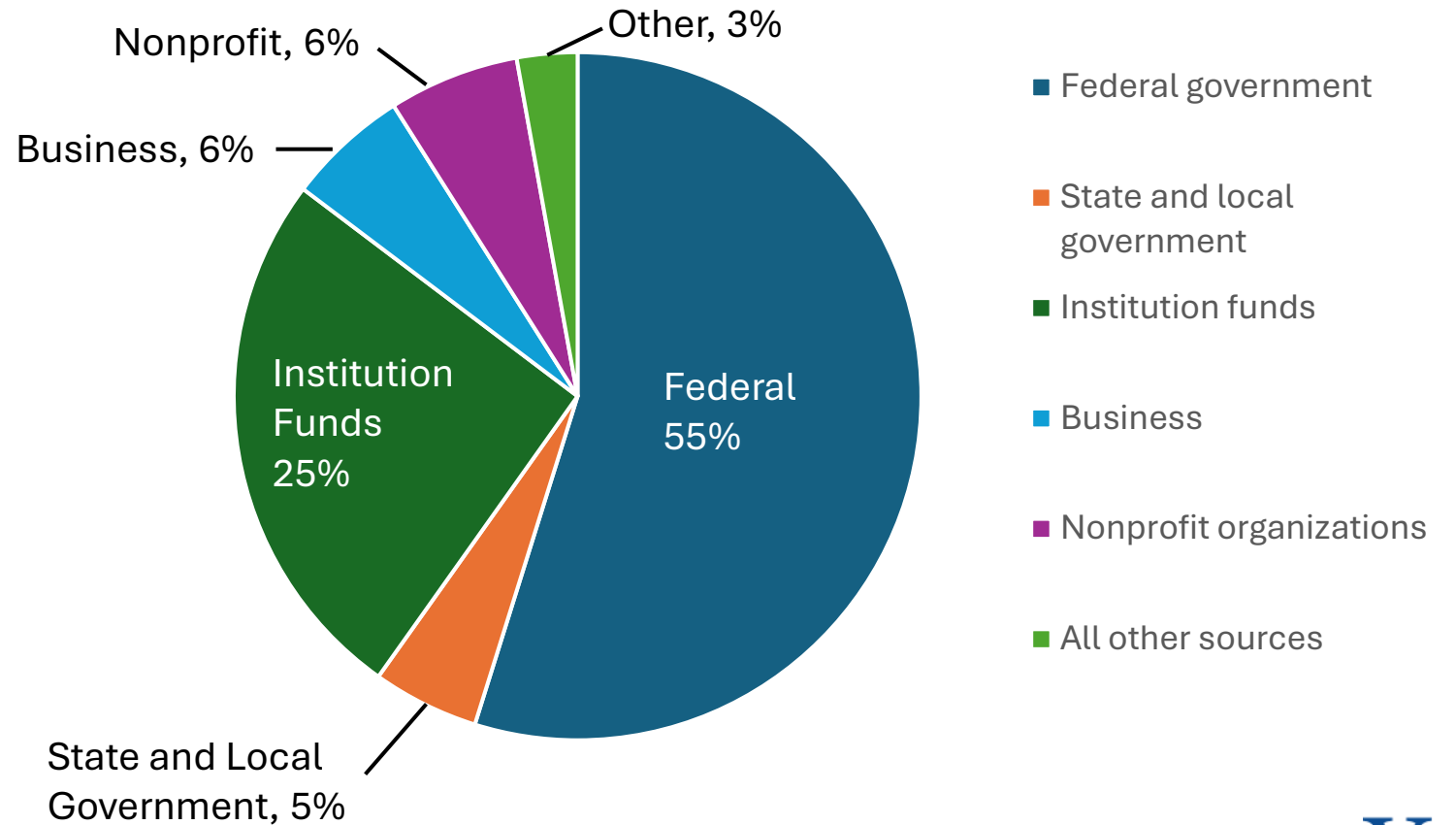
Social Contract for Research

Where does research funding at institutions of higher education come from?



Blood typing at the NIH, 1957

Higher Education R&D Expenditures



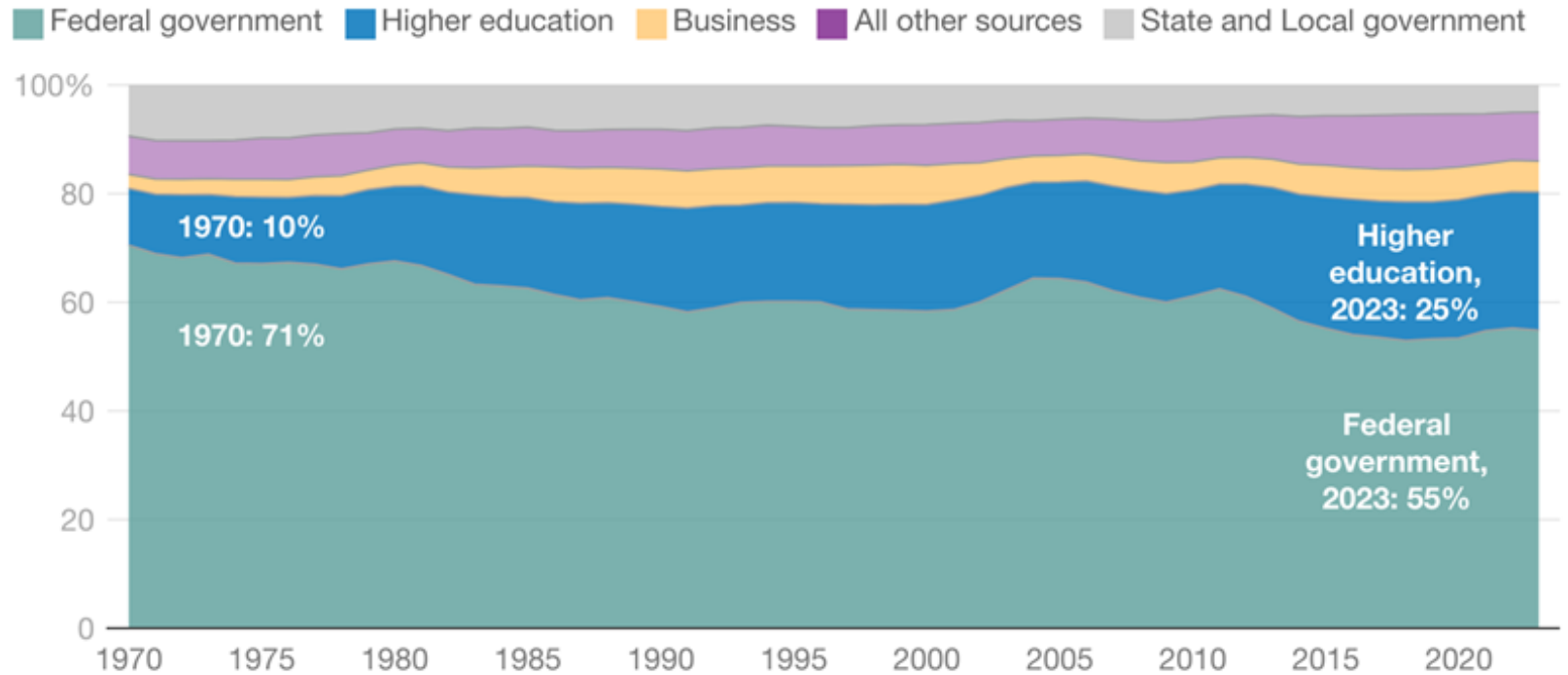
Source: NSF Herd data, FY23

Decline in Federal Funding for Research



Studying folic acid deficiency, 1954

Funding Sources for R&D Performed by Higher Education



Share of higher education R&D expenditures by funding source; 1970-2023

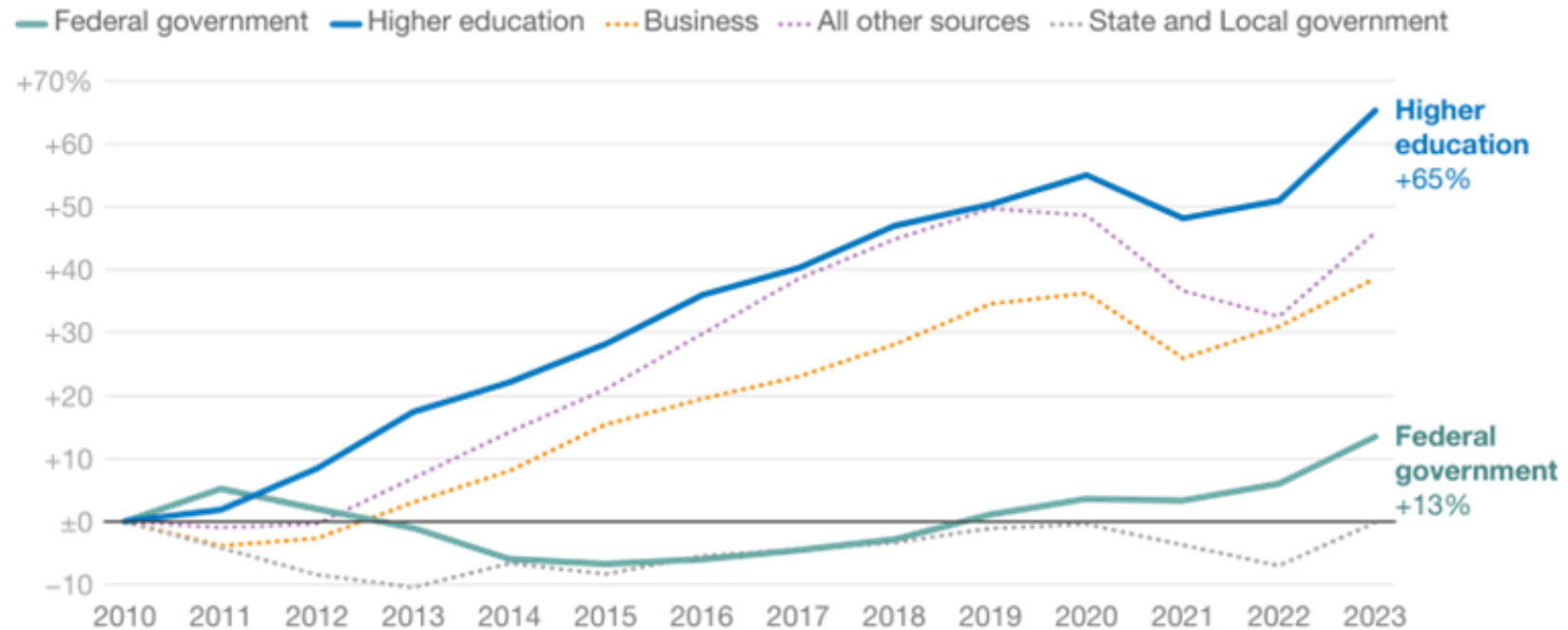
Source: NSF, National Center for Science and Engineering Statistics, Higher Education Research and Development (HERD) Survey, Table 1

Changes in R&D Expenditures



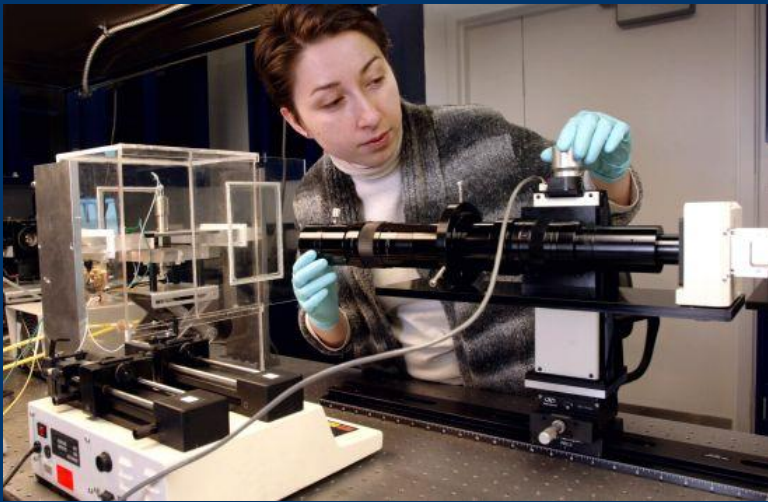
R&D Performed by Higher Education: Change since 2010 by Source of Funding

Percent change in real expenditures for higher education R&D expenditures by funding source since 2010.



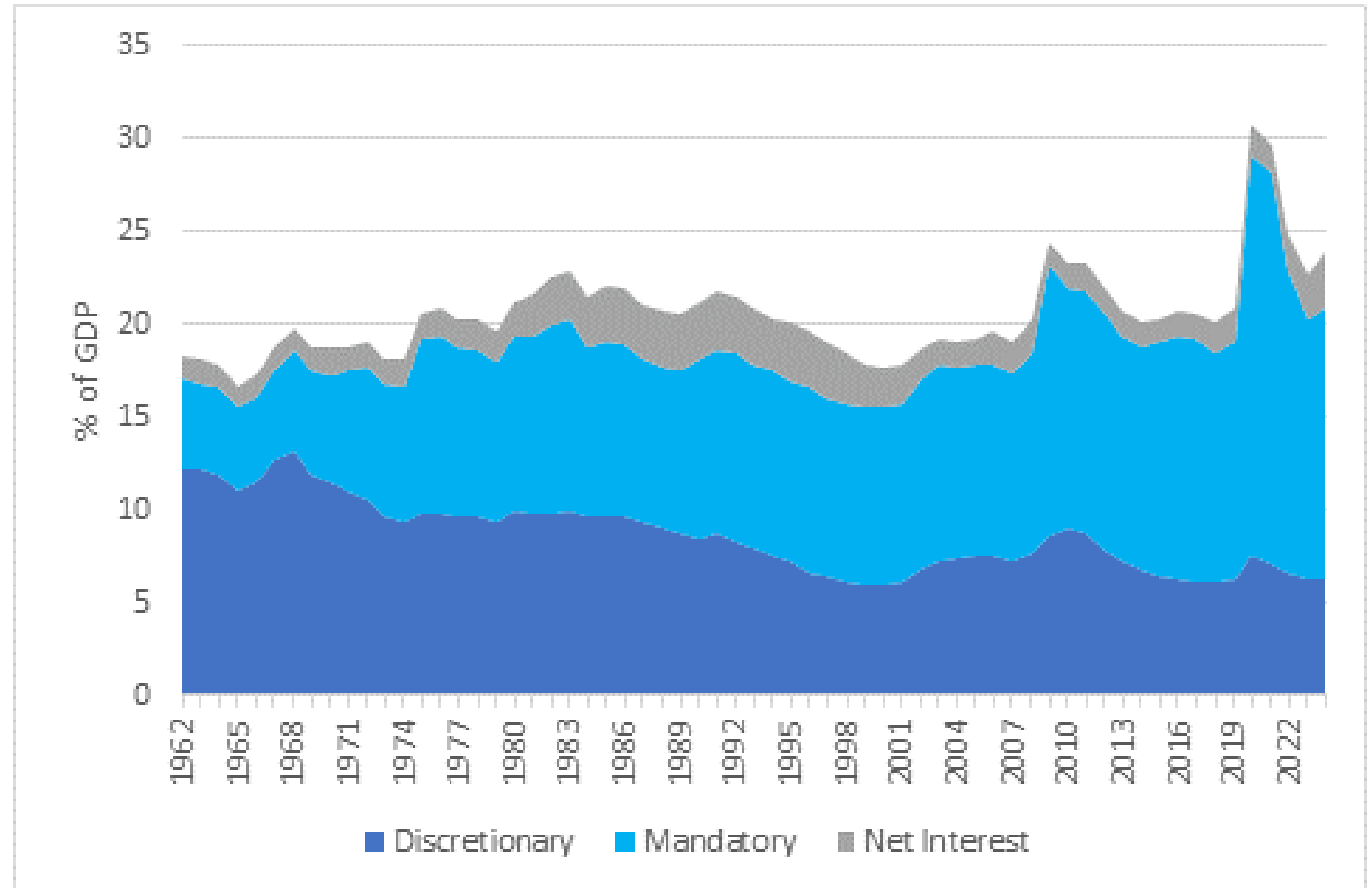
Source: NSF, National Center for Science and Engineering Statistics, Higher Education Research and Development (HERD) Survey, Table 1

Funding Landscape



Research funded by NSF led to the development of LASIK eye surgery

Federal Spending as a % of GDP



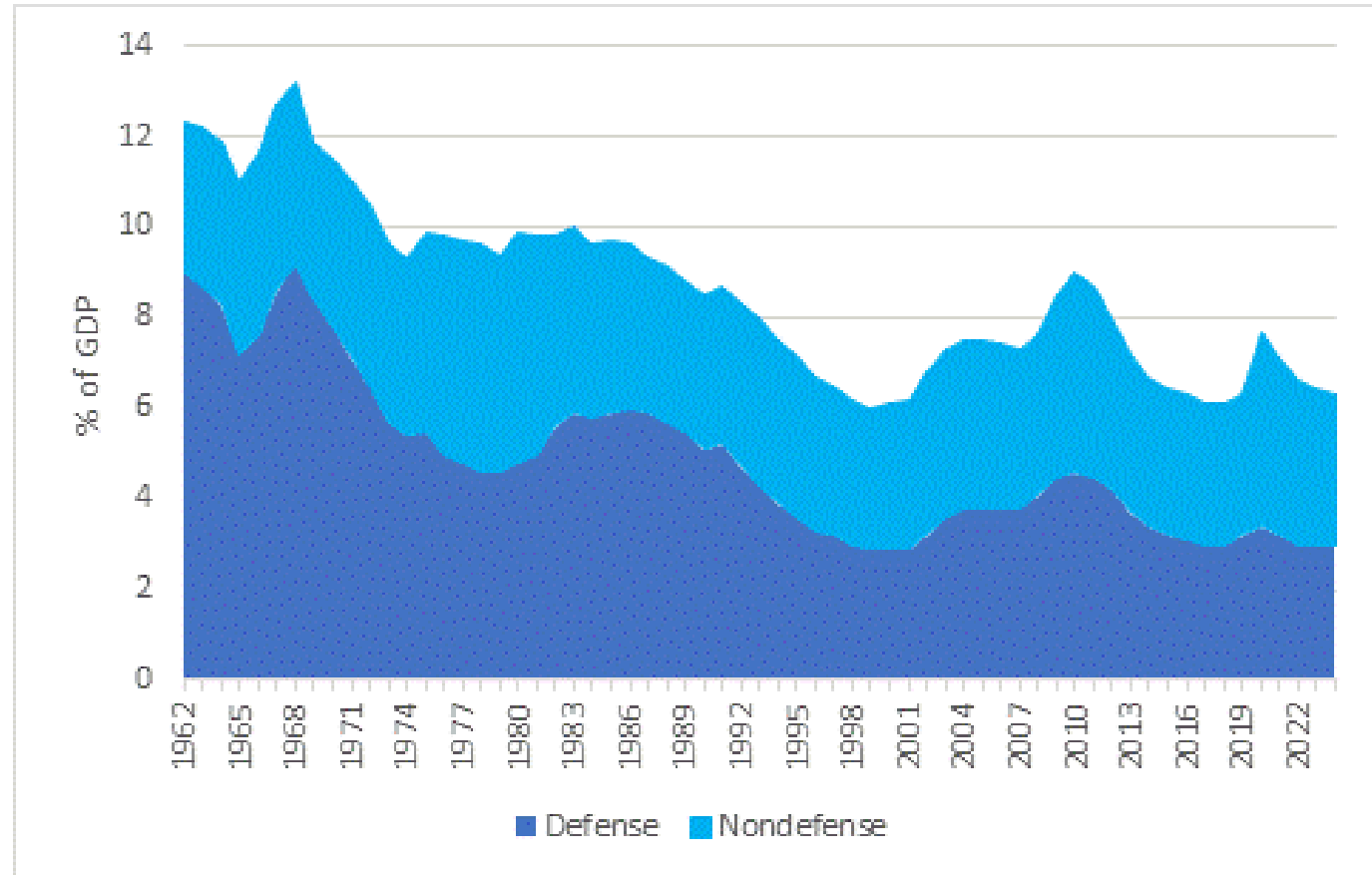
Sources: OMB, CBO.

Notes: Spending is measured by outlays.

R&D Funding Landscape



Discretionary Spending as a % of GDP



Sources: OMB, CBO.

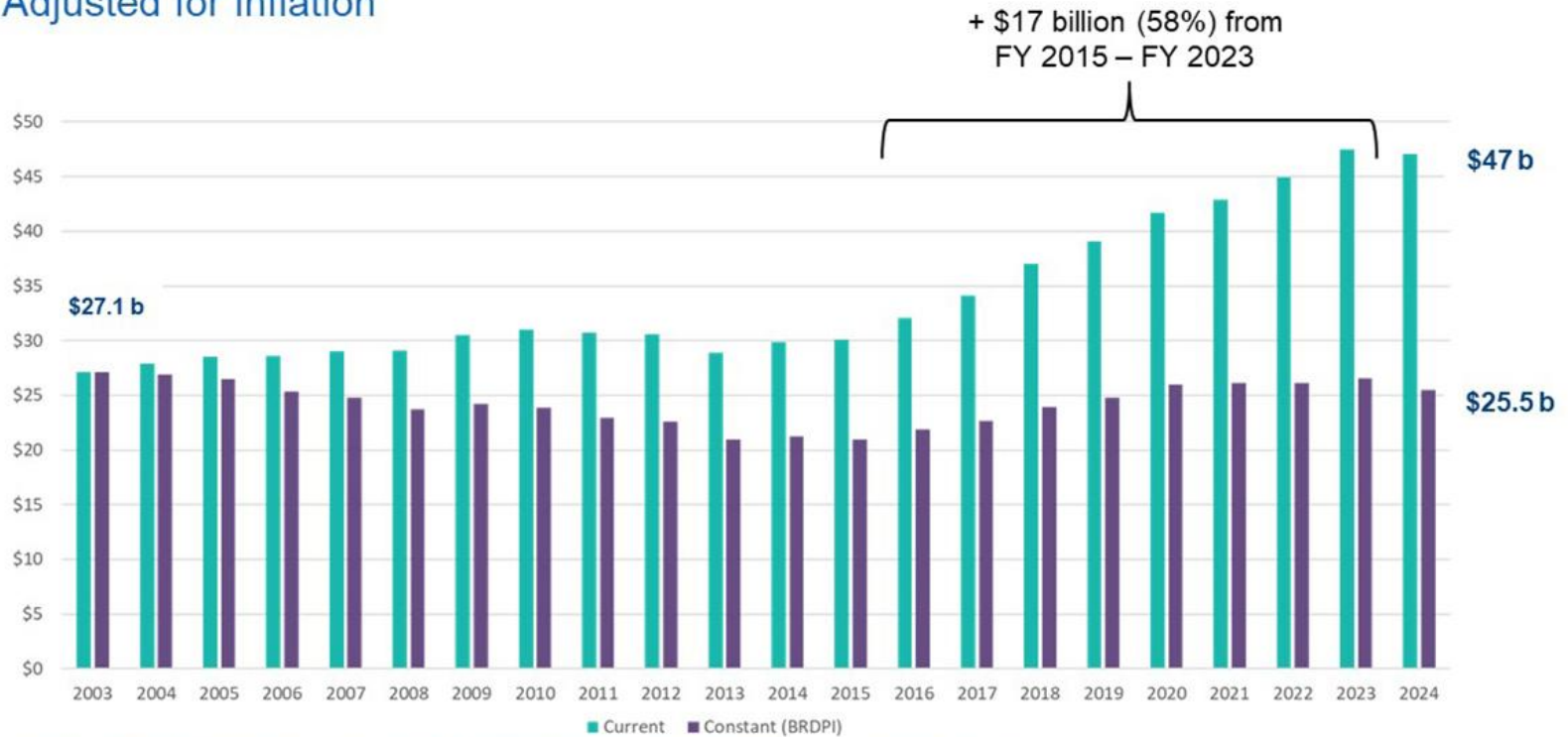
Notes: Spending is measured by outlays.

NIH Funding



NIH funding has not kept pace with inflation

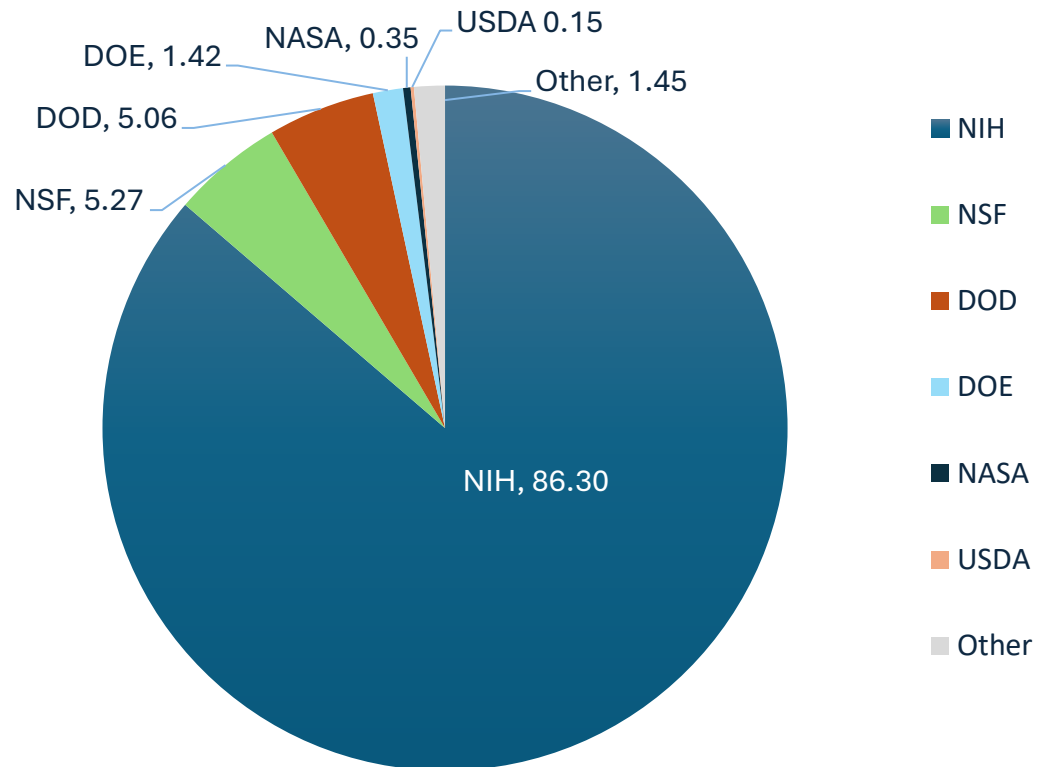
Adjusted for Inflation



Sources: NIH Office of Budget; White House Office of Management and Budget; P.L. 118-47. Updated 4/02/24.
Note: Funding levels do not include emergency supplemental funding.

Federal R&D Expenditures at Yale University

Breakdown of R&D Expenditures by Specific Agency (% of Total RD Expenditures) for FY23



Federal R&D Expenditures

Agency	Total Federal R&D Expenditures (k\$)	% of Total Federal R&D Expenditures
NIH	639,636	86.30
NSF	39,036	5.27
DOD	37,473	5.06
DOE	10,539	1.42
NASA	2,624	0.35
USDA	1,146	0.15
Other	10,744	1.45
Total	\$741,198	

Yale is ranked 4th in the country in NIH funding

Understanding F&A ('Indirect') Cost Reimbursements



Facilities & Administrative ('Indirect') Cost Reimbursements

Direct Costs (Project-Specific Expenses)

- ✓ Costs that can be specifically attributed to a particular project
- ✓ Examples:
 - Salaries for research personnel
 - Lab supplies & equipment
 - Data storage and computing
 - Travel for research purposes

Facilities & Administrative (F&A) 'Indirect Costs' (Shared Research Expenses)

- ✓ Necessary **indirect** costs required to **support research**
- ✓ Examples:
 - Utilities (electricity, water, HVAC for research spaces)
 - Laboratory buildings & maintenance
 - Biosecurity and safety
 - IT security & administrative support
 - Regulatory Compliance (human subjects review boards, grant administration)

Key Takeaways

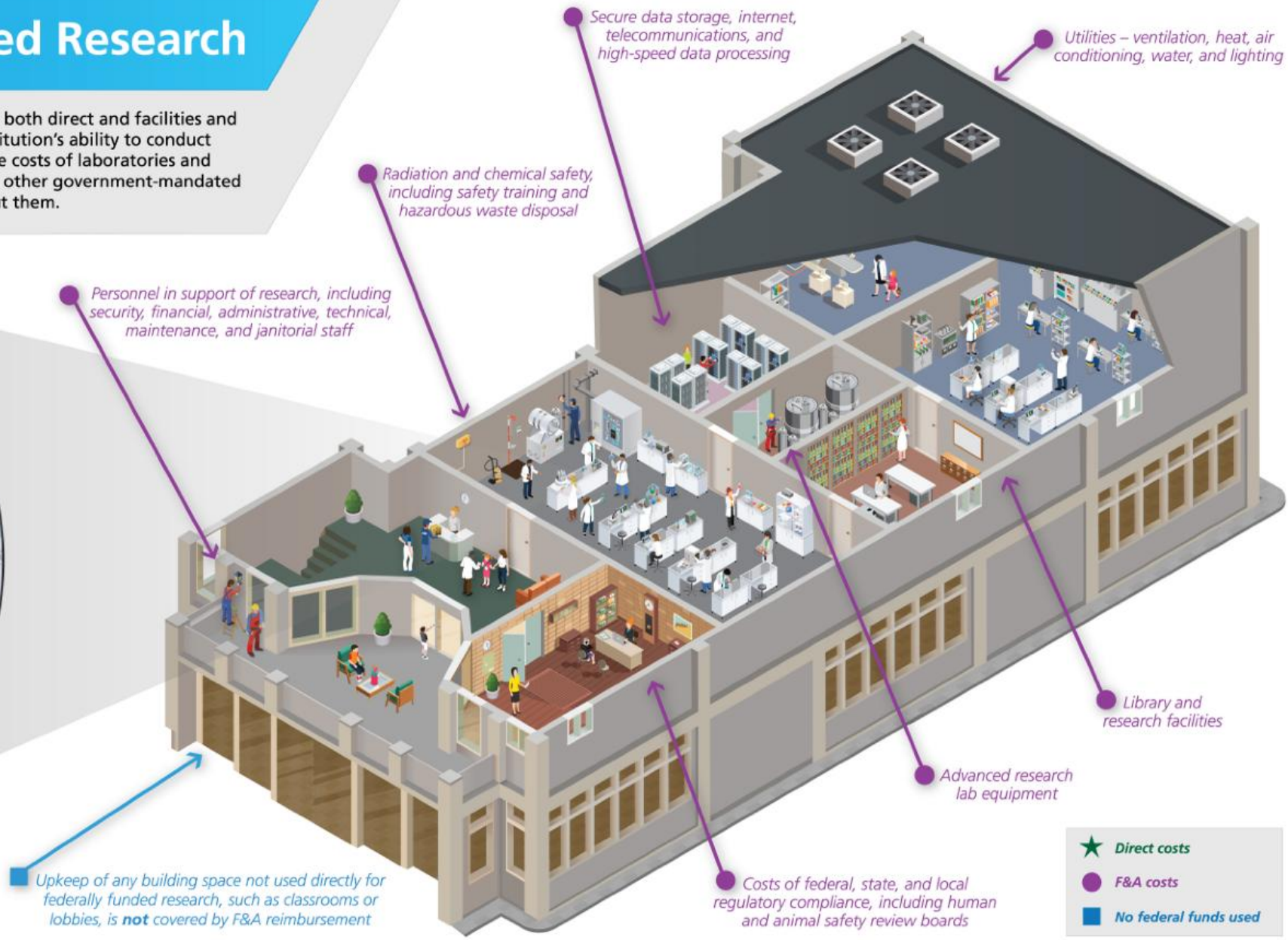
- ◆ Both Direct and F&A Costs Are Essential for Research Success.
- ◆ F&A Costs Are Not Profit—They Cover Real, Unavoidable Expenses of Doing Research.
- ◆ Institutions Cannot Conduct Federally Funded Research Without F&A Support.

Costs of Federally Sponsored Research

The total cost of federally sponsored research includes a combination of both direct and facilities and administrative (F&A) costs. Both types of expenditures are key to an institution's ability to conduct cutting-edge research. F&A consists of the construction and maintenance costs of laboratories and high-tech facilities; energy and utility expenses; and safety, security, and other government-mandated expenses. These costs are real and research cannot be conducted without them.



★ **Direct costs** - These expenses solely cover research and include lab supplies and equipment; salaries and stipends for researchers and graduate students; and travel costs for conducting and sharing research



Did you know....



- F&A recovery covers *actual* expenses incurred supporting federally funded research as determined through negotiations with the government. F&A expenses incurred are essential for research.
- F&A expenses are necessary for research efforts, such as building maintenance, utilities, compliance with federal regulations, lab safety, and the salaries of staff who provide essential clinical and laboratory services. These expenditures ensure that facilities remain operational and safe, allowing faculty and students to focus on research.
- Indirect costs support facilities and infrastructure at Yale that enable more than 38,000 patients to participate in over 2,000 research trials.
 - 280 of these trials are focused on cancer therapy, 80 involve mental health and behavioral care, and 50 are related to heart disease.
- Yale’s negotiated F&A rate with the U.S. Government is 67.5%, which reflects the highest rate we can receive.
- **Yale’s effective F&A rate was 44.8% for FY24** – for every federal dollar spent on direct research costs we receive 45 cents to cover indirect research expenses.
- Grants from private foundations often cap F&A rates at 15% or lower, however many “indirect costs” as defined by Uniform Guidance can be directly charged to foundations.
- While our endowment provides critical support for research, most of Yale’s endowment is legally restricted to specific uses such as financial aid, teaching, facilities and operations (i.e. dormitories and libraries), or other non-research specific purposes.

Where does a dollar of federal research funding go?

40 ¢

OF EACH DOLLAR IS FOR SHARED RESEARCH FACILITY & SUPPORT COSTS

- Operations & Maintenance 7¢
- Utilities 4¢
- Data Security 1¢
- Building Depreciation 5¢
- Interest 3¢
- Equipment 2¢
- Libraries/Journals 3¢

- General 3¢
- Sponsored Admin/Compliance 3¢
- Research Operations Support 9¢

60 ¢

OF EACH DOLLAR IS FOR DIRECT RESEARCH COSTS

- Researcher Salaries 28¢
- Employee Benefits 9¢
- Materials, Services and Travel 12¢
- Equipment 1¢
- Subcontracts 8¢
- All Other 2¢



Note: Based on a research grant which receives the 67.5% on campus organized research indirect cost rate. The average F&A rate received is 44.8% which would increase the direct amount per dollar.

But there's more...

- To support faculty and meet the shortfall of F&A cost reimbursements, Yale contributes \$433 million annually to research
 - This translates into 28 cents of every research dollar spent

Government and Other Extramural Sponsors

Yale



53¢ direct costs

19¢ F&A

28¢ University

Yale University
shares
\$433 million in
research
expenditures per
year

Areas at Risk when Institutions are Not Fully Reimbursed

Quality, reproducibility and compliance

- Sponsored research oversight
- Human subjects protection
- Animal welfare
- Conflict of interest management
- Biosecurity and safety
- Research compliance training

Faculty Support

- Recruitment/grant start up costs
- Bridge funding for gaps in grant funding
- Retention costs
- Graduate student support

Infrastructure

- Computer and IT infrastructure
- Support of core facilities/services
- Data management
- Costs of buildings and lab space



A specific research building example at Yale – The Anlyan Center (TAC)



The TAC building, opened in December 2002 within the University's medical school, plays a vital role in advancing research by integrating state-of-the-art facilities for both research and education. Designed to foster collaboration across diseases and departmental boundaries, it promotes interdisciplinary innovation, accelerating breakthroughs in medical science.

TAC Research:

- Immune system function, pathogen & cancer defense, autoimmune disorders
- Genetic basis of disease & treatment advancements
- Diagnosis & treatment of mosquito/tick-borne diseases (e.g., Lyme, West Nile)
- Causes & surgical treatments for congenital brain malformations & epilepsy
- Animal research core using CRISPR for disease models
- Advanced microscopes & cell sorting for single-cell disease studies
- Magnetic resonance research center for imaging & biochemical analysis (MRI, MRS)

The F&A funds ~\$22M annually:

- \$5M Building depreciation
- \$2M Equipment Depreciation
- \$6M Interest Expense
- \$9M Operations & Maintenance
- \$5M Utilities Costs
- \$4M O&M

TAC research building facts:

- 234k assignable square feet
- 143k square feet directly related to laboratories and other research spaces.