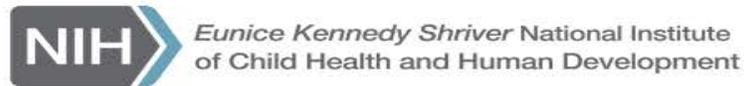# NICHD Strategic Planning:
Context and Background

Sarah L. Glavin, Ph.D.
NICHD Office of Science Policy, Reporting, and Program Analysis

Presentation Overview

- Setting the Stage: Resources and Congressional Mandates
- Strategic Planning Informed by Evidence
  - NICHD Research Portfolio
  - Impact of NICHD Research

Listening Session 2: Scientific Foci

- Training and Career Development
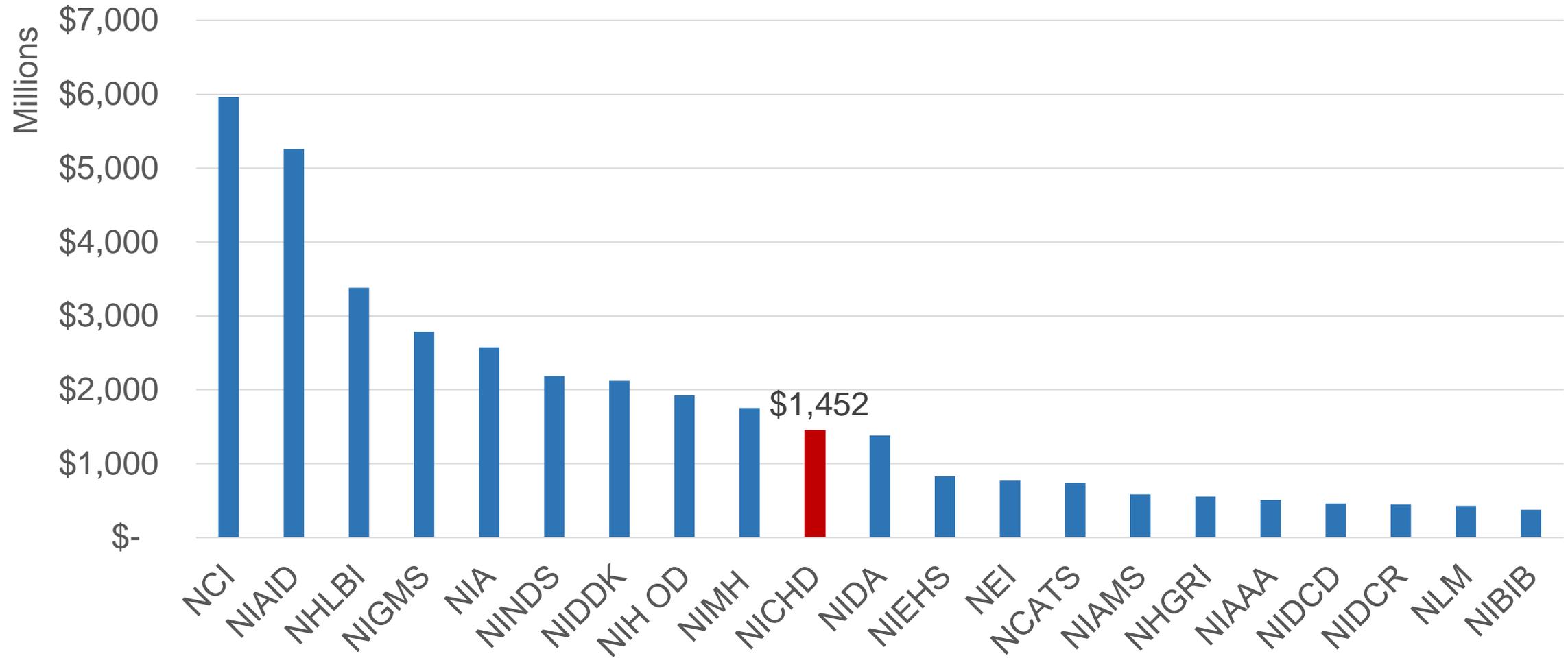- Research Infrastructure
- Partnerships and Collaborations

Listening Session 3: Training, Partnerships, and Infrastructure

Setting the Stage:
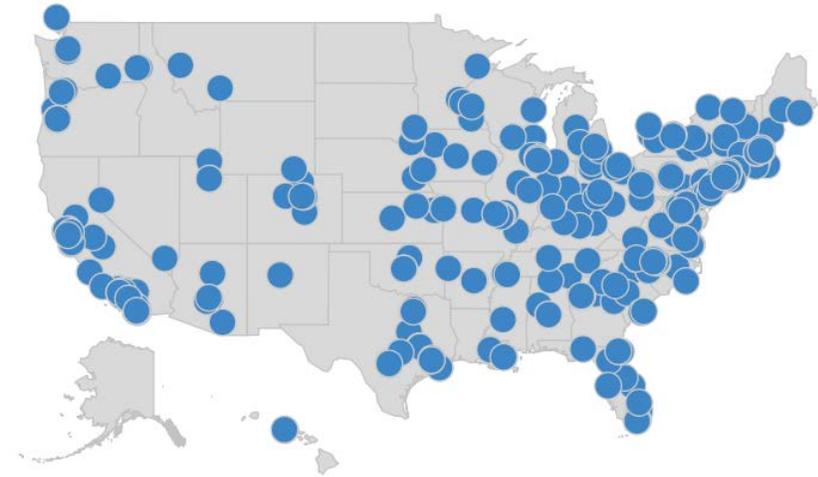# Resources and Congressional Mandates

NIH 2018 Appropriations, by NIH IC

NICHD Intramural and Extramural Research
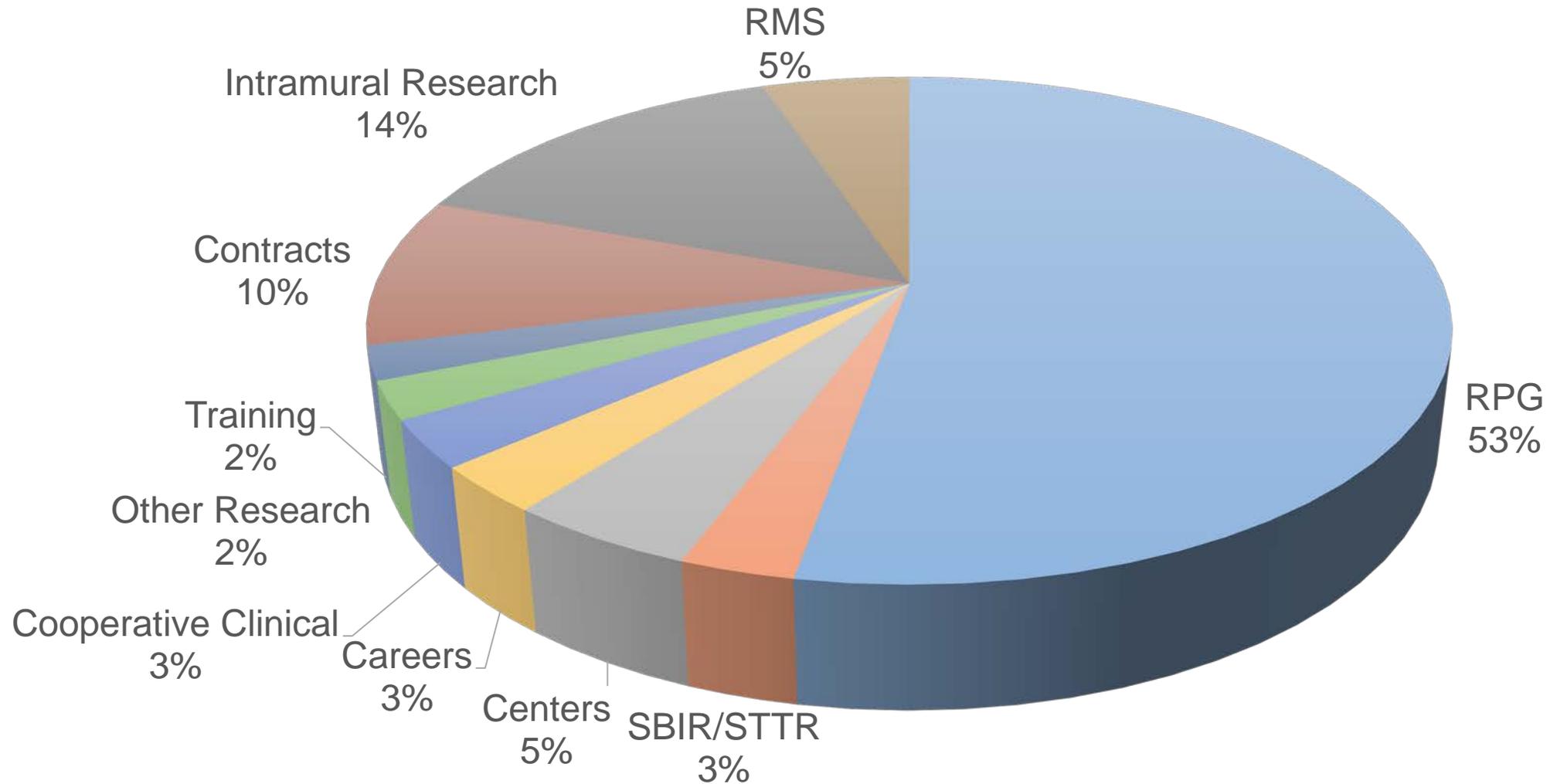

Intramural research

- ~940 employees
- 73 PIs
- 295 trainees
- >70 clinical protocols
  - 2/3 at NIH, 1/3 in Detroit or elsewhere

Extramural research

- 4,874 new competing applications, 898 new competing grants
- 2,578 funded grants (new and continuing combined)
- 2,783 PIs (321 ESIs)
- 442 funded institutions

NICHD FY 17 Actual Expenditures by Budget Mechanism ($1.37B total)

Select Congressional Mandates and NICHD Research

- Autism
- Birth defects/congenital anomalies
- Contraception and infertility
- Down syndrome
- Fragile X
- Intellectual and developmental disabilities
- Intramural obstetrics-gynecology research

- Medical rehabilitation
- Muscular dystrophy
- Newborn screening
- Pediatric pharmacology
- Pediatric research training
- Population health
- Prevention research
- Sudden Infant Death Syndrome (SIDS)

https://www.nichd.nih.gov/about/org/od/olpp/UScode

Strategic Planning Process Informed by Evidence

- NICHD portfolio analyzed in four independent ways
  - Portfolio analysis
  - Bibliometrics
  - Large extramural program impact analysis (in process)
  - Additional bibliometric analysis: clinical and technology impact (pending)

NICHD Portfolio Analysis, FY 2017 (includes both intramural and extramural)

- Scientific Domains
  - Basic sciences
  - Population sciences and epidemiology
  - Screening and diagnosis
  - Biomedical interventions
  - Behavioral interventions

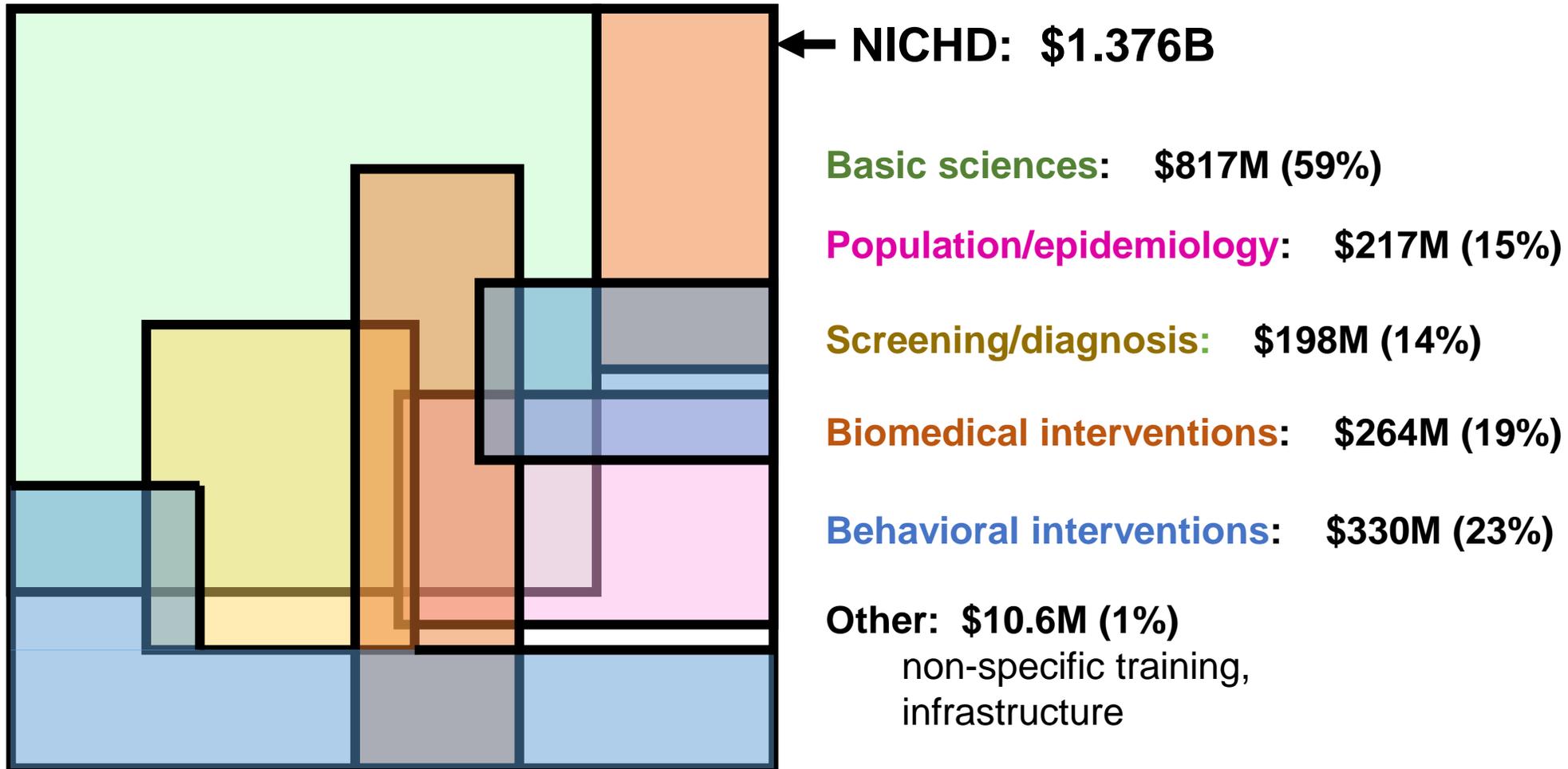- Public Health Domains
  - Pediatrics
  - Gynecology and reproductive health
  - Pregnancy and maternal health
  - Intellectual, developmental, learning, and physical disabilities

- Subcategories within these broad domains
- All categories are *not mutually exclusive*
- Data Sources:
  - NIH Research, Condition, and Disease Categories (RCDC)
  - NICHD Child Health Information Retrieval Program (CHIRP)

NICHD Spending by Scientific Domain, FY 2017

← **NICHD: $1.376B**

Basic sciences: **$817M (59%)**

Population/epidemiology: **$217M (15%)**

Screening/diagnosis: **$198M (14%)**

Biomedical interventions: **$264M (19%)**

Behavioral interventions: **$330M (23%)**

Other: $10.6M (1%)
non-specific training,
infrastructure

Source: NICHD Child Health Information Retrieval Program, NICHD's internal scientific coding system.

NICHD Spending by Broad Public Health Category, FY 2017

← NICHD: $1.376B

Pediatrics: **$761M (55%)**

Gynecology and reproductive: **$207M (15%)**

Pregnancy and maternal: **$197M (14%)**

Intellectual, developmental, learning, and physical disabilities: **$249M (18%)**

Other: $101.1M (7%)
$48.9M other basic research
$21.4M other population sciences
$9.4M other clinical research
$3.8M miscellaneous
$4.8M acute rehabilitation
$12.8M infrastructure and other

Source: NIH Research, Condition, and Disease Categories (RCDC) system.
Data for Intellectual, Developmental, Learning and Physical Disabilities are unofficial and have not been fully validated through the RCDC process.

NICHD's Pediatric Research Portfolio by Condition, FY 2017

NICHD's Pediatric Research Portfolio by Broad Scientific Domain, FY 2017

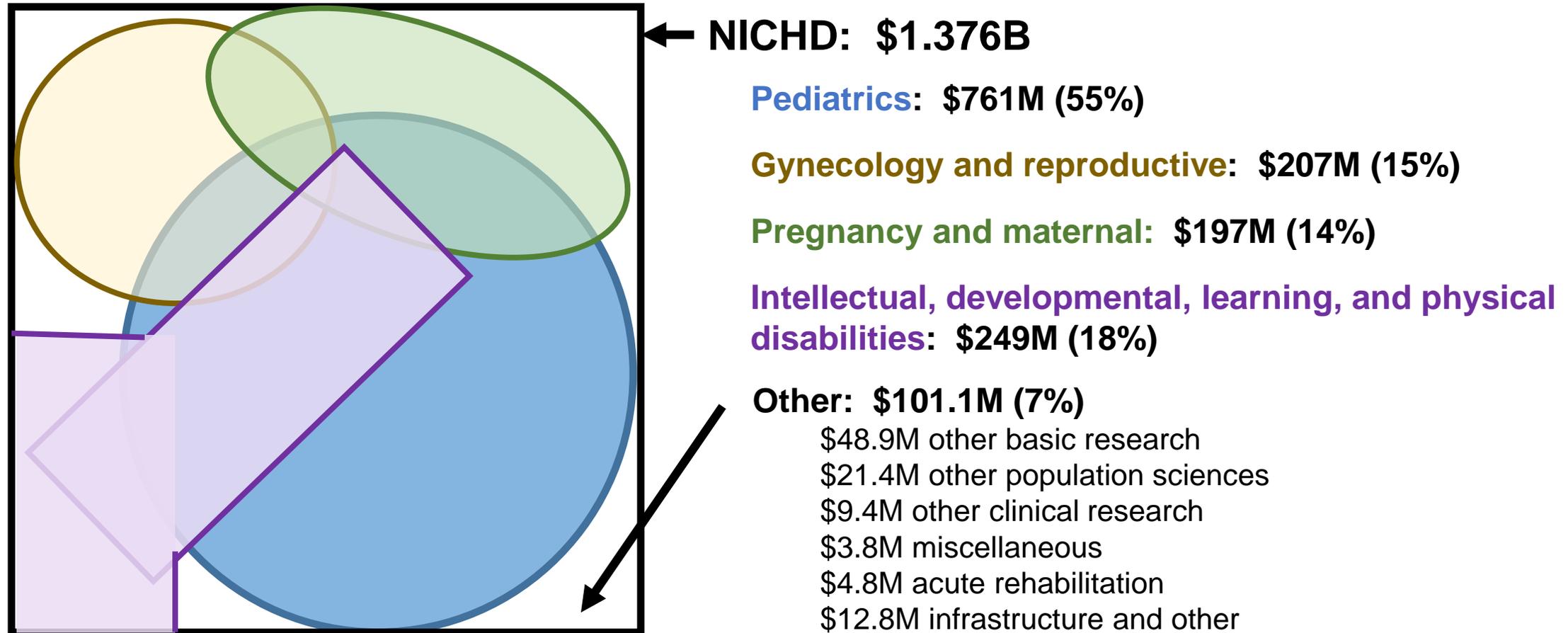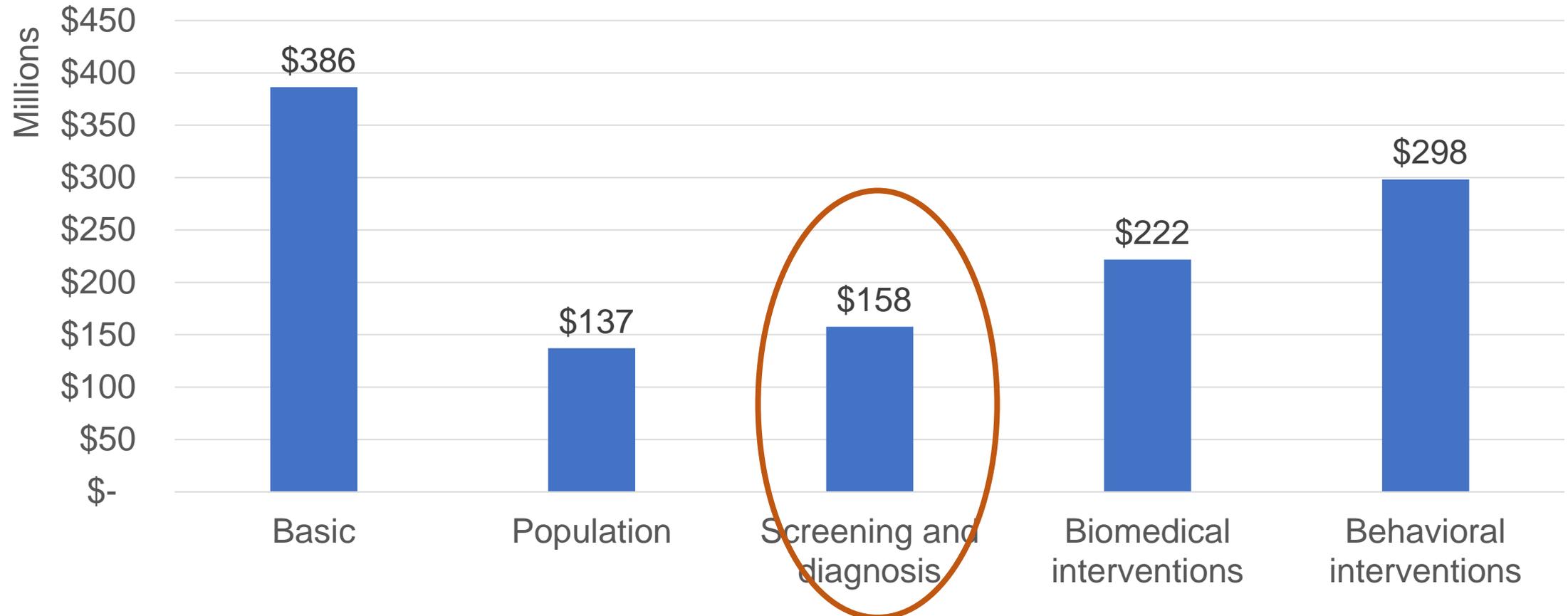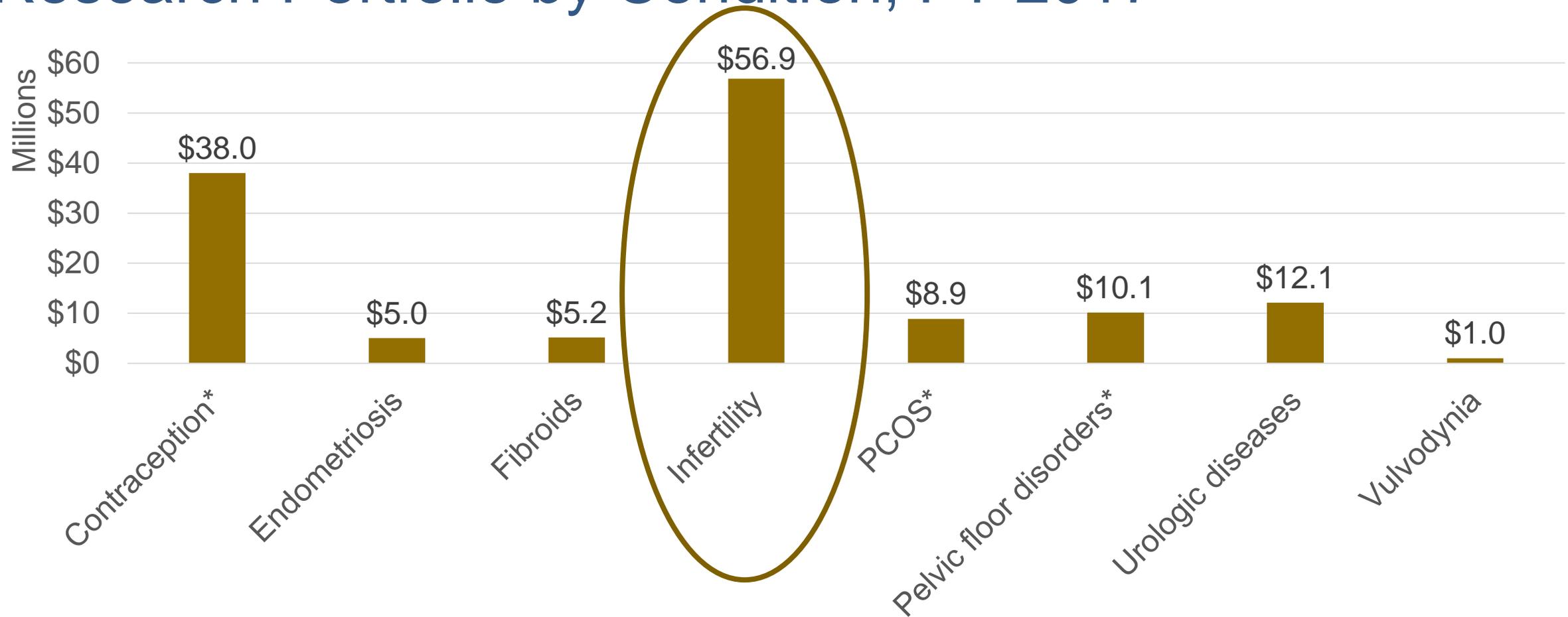Sources: NIH Research, Condition, and Disease Categories (RCDC) system and (*) NICHD Child Health Information Retrieval Program (CHIRP). Categories are overlapping and should not be added.

NICHD's Gynecology and Reproductive Health Research Portfolio by Condition, FY 2017

Bar chart titled "Millions" on the y-axis (ranging from $0 to $60):
- Contraception*: $38.0
- Endometriosis: $5.0
- Fibroids: $5.2
- Infertility: $56.9 (circled)
- PCOS*: $8.9
- Pelvic floor disorders*: $10.1
- Urologic diseases: $12.1
- Vulvodynia: $1.0

Sources: NIH Research, Condition, and Disease Categories (RCDC) system and (*) NICHD Child Health Information Retrieval Program (CHIRP). Categories are overlapping and should not be added.
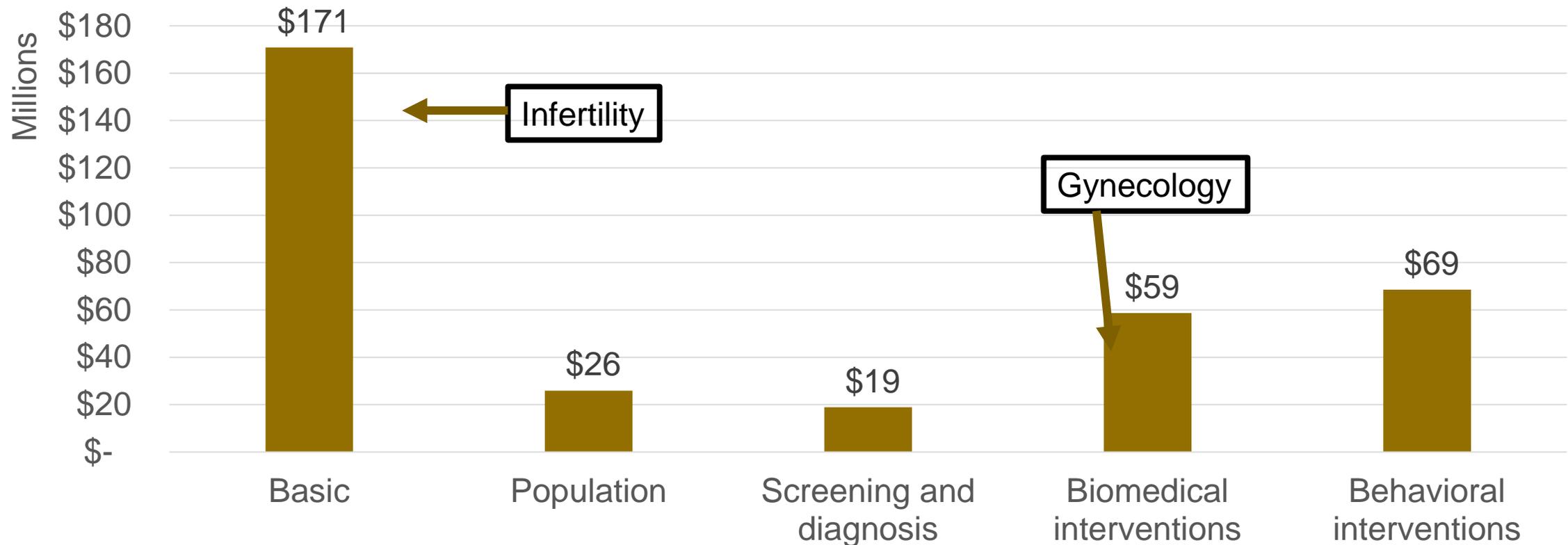
NICHD's Gynecology and Reproductive Health Research Portfolio by Broad Scientific Domain, FY 2017

Millions

$180
$160
$140
$120
$100
$80
$60
$40
$20
$-

$171

Infertility

Gynecology

$59

$26

$19

$69

Basic   Population   Screening and diagnosis   Biomedical interventions   Behavioral interventions

NICHD's Pregnancy and Maternal Health Research Portfolio by Condition, FY 2017

NICHD's Pregnancy and Maternal Health Research Portfolio by Broad Scientific Domain, FY 2017

NICHD's Intellectual, Developmental, Learning, and Physical Disabilities Research Portfolio by Condition, FY 2017

Sources: NIH Research, Condition, and Disease Categories (RCDC) system and (*) NICHD Child Health Information Retrieval Program (CHIRP). Categories are overlapping and should not be added.
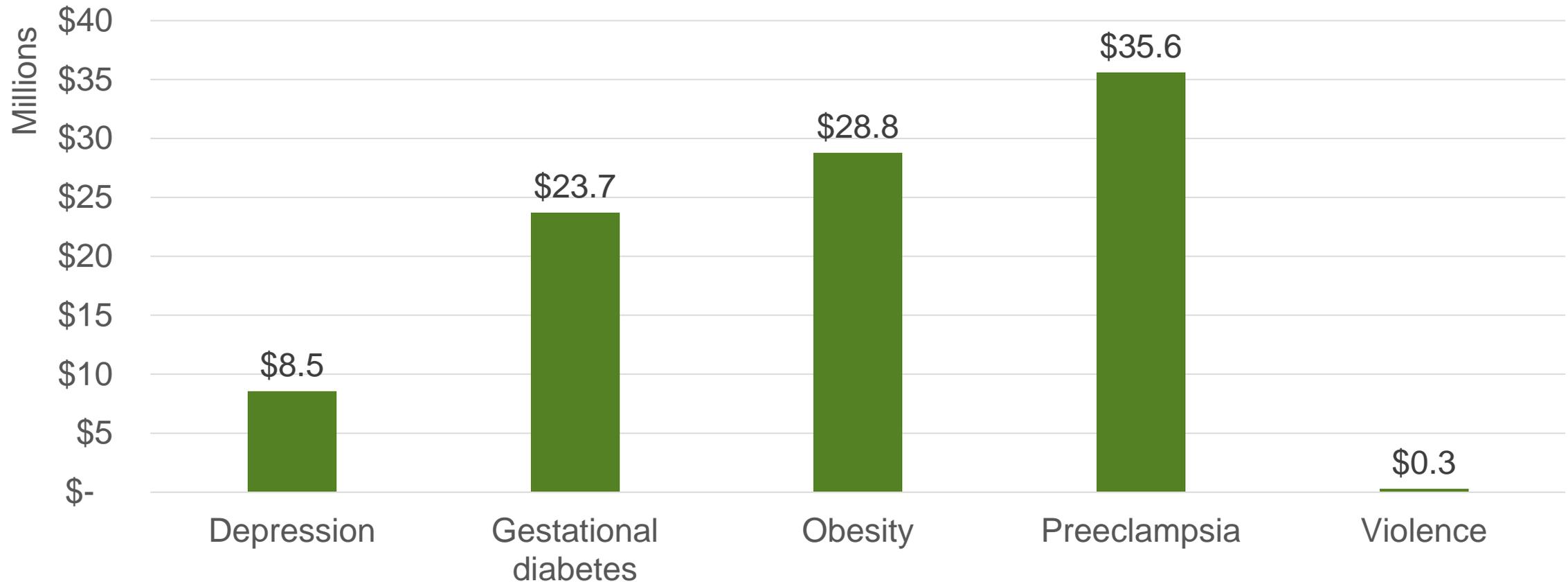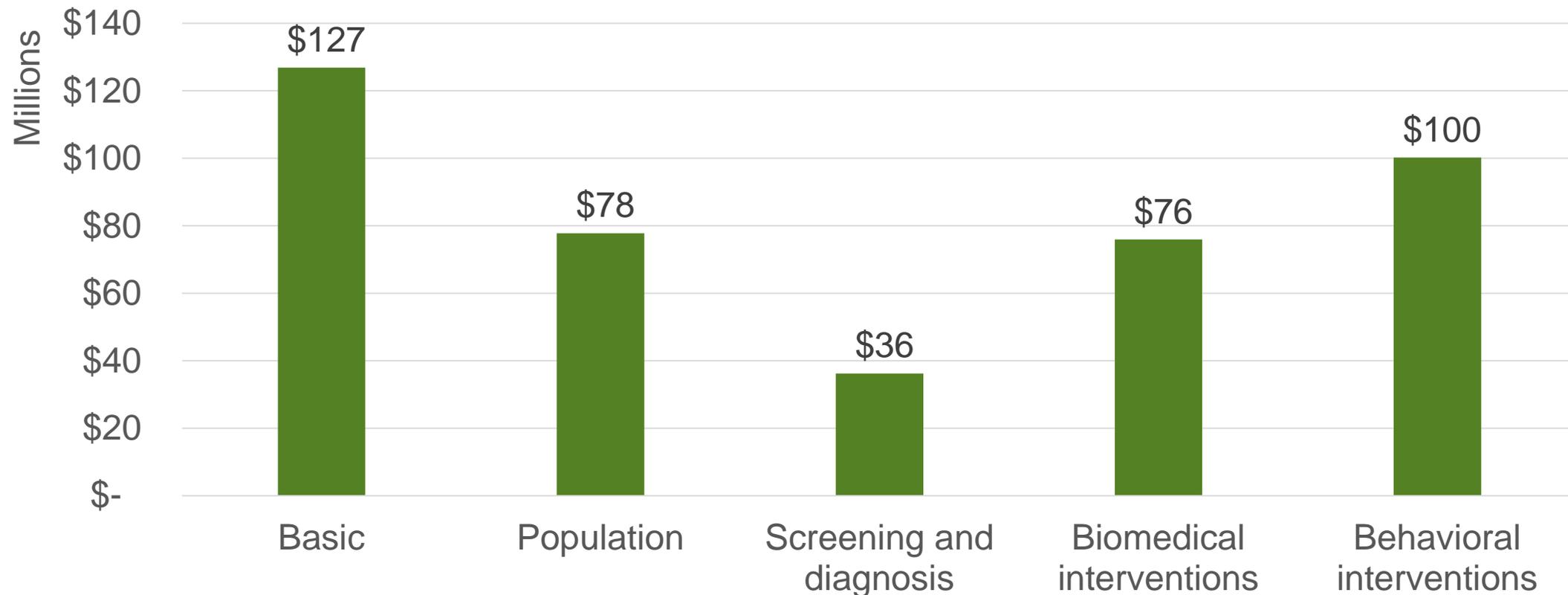
NICHD's Intellectual, Developmental, Learning, and Physical Disabilities Research Portfolio by Broad Scientific Domain, FY 2017
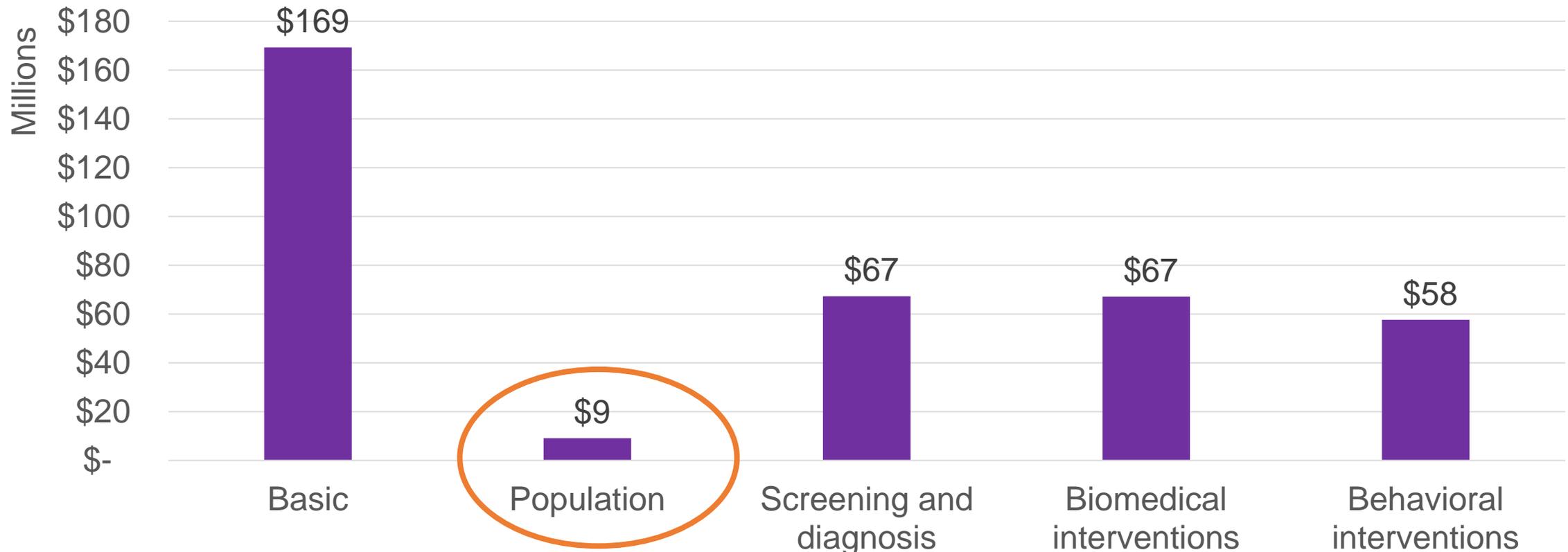
Impact of NICHD Research

Assessment of NICHD's Impact

- Publications
  - Major research topics and disciplines
  - Bibliometric measures
    - Number of publications
    - Relative Citation Ratio (RCR):
      - Designed to show impact of article **relative to** average NIH-funded paper. Score of 1.0 = average NIH paper
      - If a paper is never cited, it will have an RCR = 0
      - Designed to be field-normalized and time-independent
- Technological impact: patents
- Clinical impact: clinical guidelines

Median RCR Across NICHD (All publications)

DER (2014-2017)	DIR (2014-2017)	DIPHR (2012-2015)
Median RCR = 1.27	Median RCR =1.47	Median RCR = 1.78
Top 10% Citations = 20%	Top 10% Citations = 28%	Top 10% Citations = 22%

Source: Analysis by NICHD SPPEB

Median RCR for R01 Grants Across NIH ICs 2006-2015
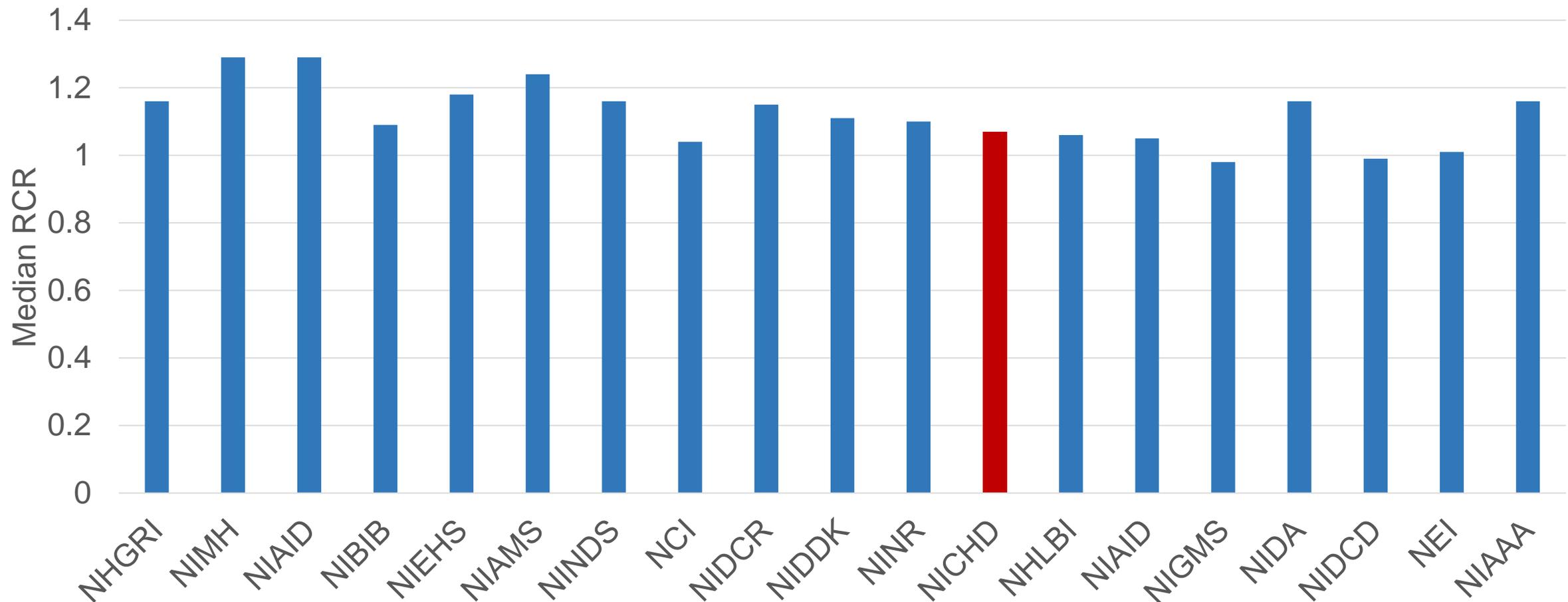
Major Research Disciplines Represented in NICHD R01 Publications (2006-2015)

Source: NIH Library

Categories are derived from Web of Science designations based on journal of publication.

Discipline	Value
Neurosciences	2211
Endocrinology and Metabolism	1899
Cell biology	1414
Developmental biology	1382
Reproductive biology	1273
Biochemistry and molecular biology	1211
Public, environmental and occupational health	1140
Genetics and heredity	1137
Psychology, developmental	1092
Obstetrics and gynecology	1035
Psychology, experimental	894
Pediatrics	882
Clinical Neurology	587
Psychiatry	531
Psychology, clinical	520
Psychology, multidisciplinary	448
Nutrition and Dietetics	446
Immunology	439
Psychology	427
Physiology	370
Psychology, educational	336
Pharmacology and Pharmacy	334
Infectious diseases	319
Radiology, nuclear medicine, and medical…	307
Rehabilitation	300
Medicine, research and experimental	232
Sports sciences	221
Sociology	210
Demography	199

Legend:
- Fundamental sciences
- Interventions
- Non-intervention social sciences

Technology Development: Patents

Number of patents that cited publications supported by NICHD R01 grants, by extramural branch, 2006-2015

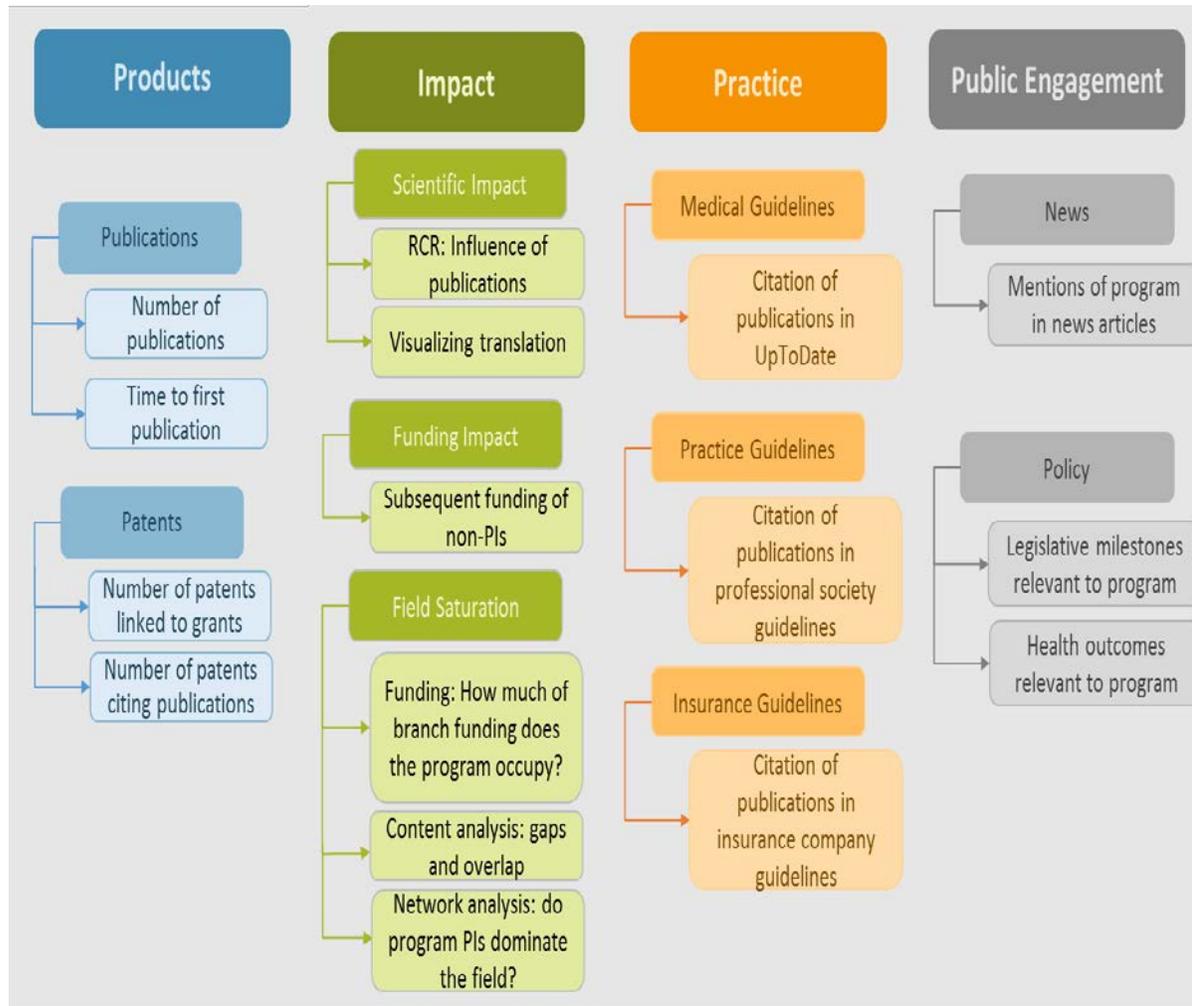| Branch	Patents supported
CDBB	73
CRB	32
DBSV	286
FI	747
GHDB	24
IDDB	396
MPID	33
NCMRR	143
OPPT	12
PDB	12
PGNB	225
PPB	199
PTCI	5
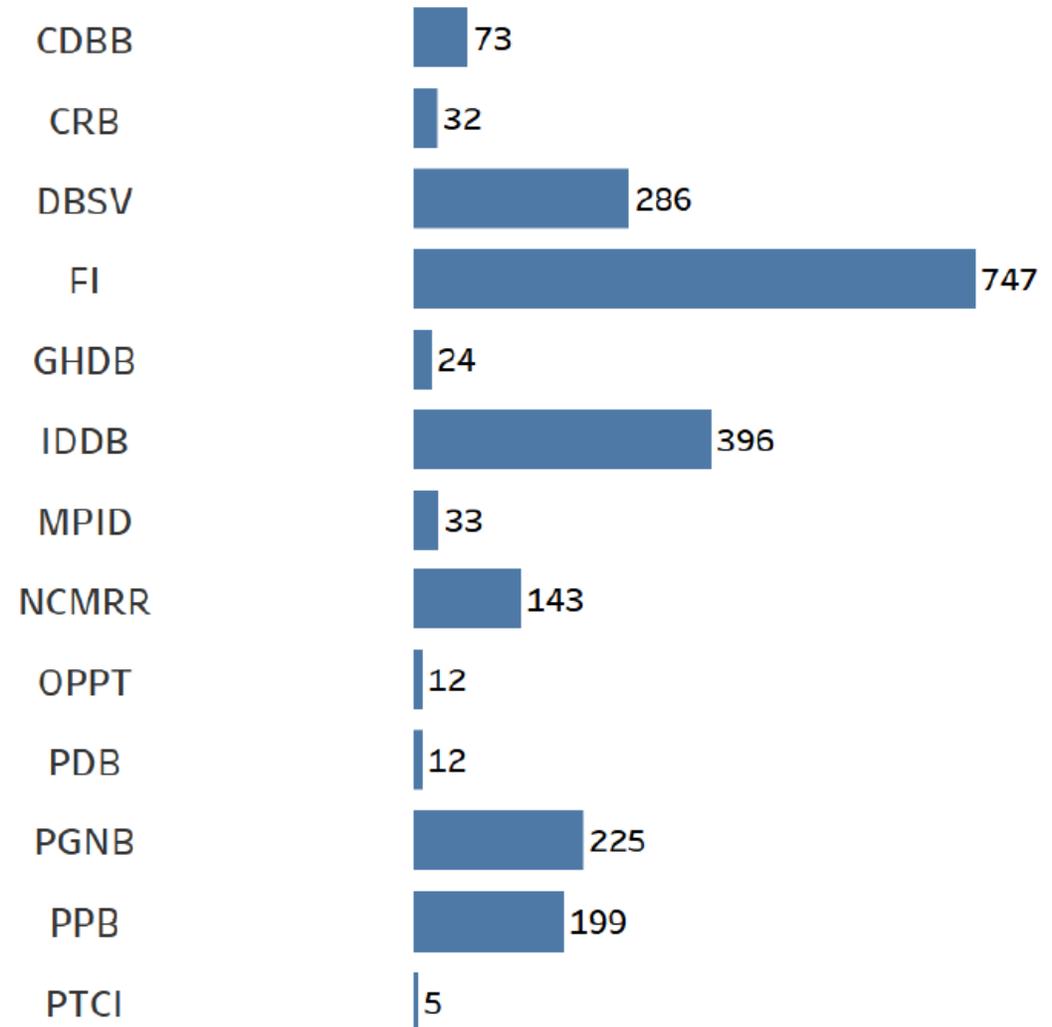
Source: NIH Library

NICHD Extramural Impact Analysis: Large Programs

- Adaptive suite of metrics for analyzing large research programs in terms of
  - Research productivity
  - Scientific impact
  - Clinical practice
  - Public engagement
- Pending additional analyses and adding more programs

NICHD Large Extramural Programs: Impact on Practice Guidelines

	MFMU	PHACS	CPCCRN	NRN	PFDN	RMN
	Maternal Fetal Medicine Units	Pediatric HIV/AIDS Cohort Study	Collaborative Pediatric Critical Care Research Network	Neonatal Research Network	Pelvic Floor Disorders Network	Reproductive Medicine Network
# of publications cited in guidelines	90	9	14	77	33	15
% of publications cited in guidelines	25.6%	6.9%	11.6%	16.1%	25.8%	18.1%
% of publications cited in >1 guideline	13.4%	1.5%	4.1%	7.9%	14.8%	12.0%

Questions?

BREAK

Scientific Foci: Listening Session 2

1. What do you think are the five most important research priorities for NICHD over the next ten years?

2. What do you think is the single most important thing that NICHD could accomplish for the public, patients, and health care providers over the next five to ten years?

Training and Career Development
Research Infrastructure and Data Sharing
Partnerships

Training, Infrastructure, Partnerships: Questions

3. What types/areas of training are needed to prepare the next generation of scientific leaders?

4. What emerging technologies and technique do you feel will impact the types and methods of research conducted in the next ten years?

5. What do you think are the most important kinds of partnerships that NICHD must develop and maintain to achieve the priorities you have identified?

Training and Career Development: FY 2017

- Extramural:
  - ~ 6% of budget
  - ~ 1,026 trainees and career awardees
- Intramural:
  - ~ 265 trainees
- All levels from high school to early career researchers supported, but predoc, postdoc, and early career levels are most common
- Individual and institutional training programs
- Institutional training programs defined broadly by topic or by medical specialty

Extramural Training and Career Development Funding by Mechanism, FY 2017

F30 1%
F31 2%
F32 5%
K01 5%
K08 3%
K12 26%
K23 17%
K24 3%
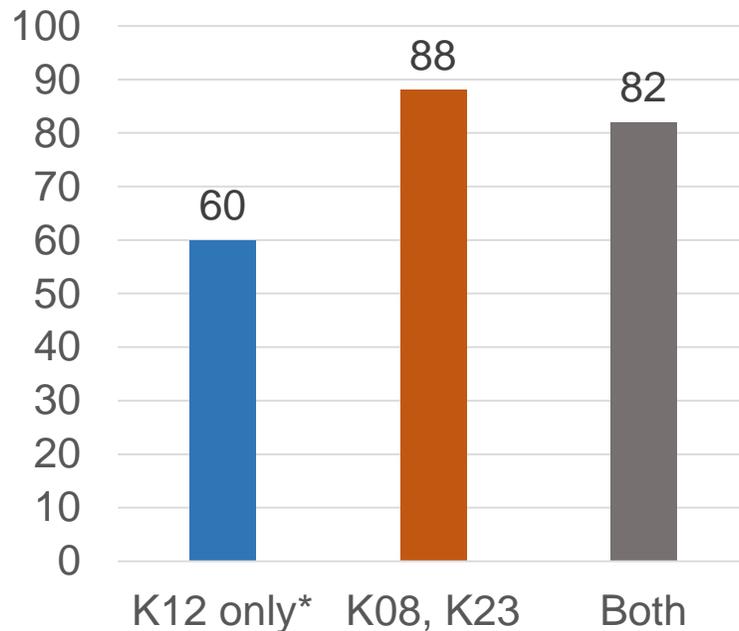K25 0%
K99 6%
T32 32%
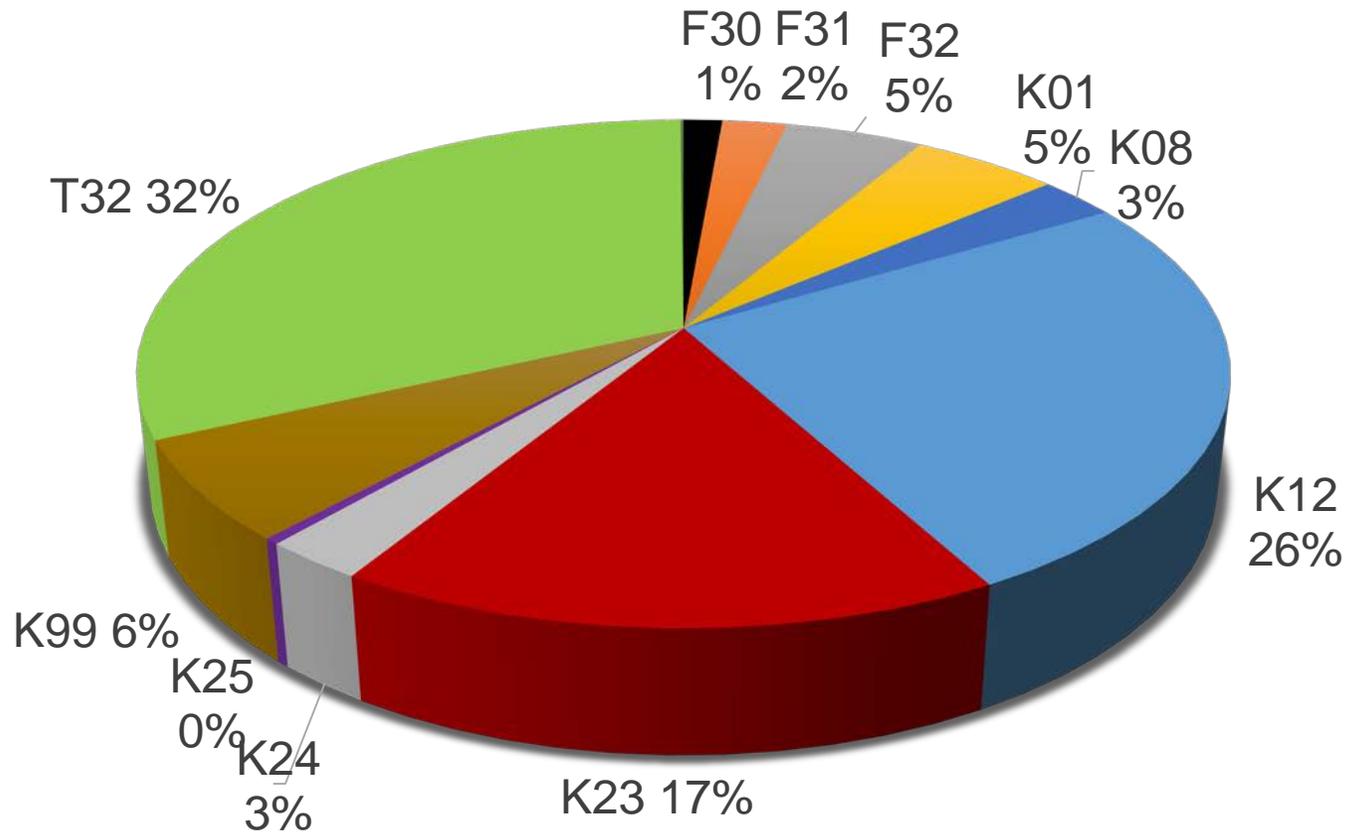
Not included:
R25: $3.3M
LRP: $5.4M

F30   F31   F32   K01   K08   K12   K23   K24   K25   K99   T32   T35

Subsequent Application and Funding Rates for MD-only K and K12 Scholars Supported in 1999-2001

n=143

Scholar Application Rate
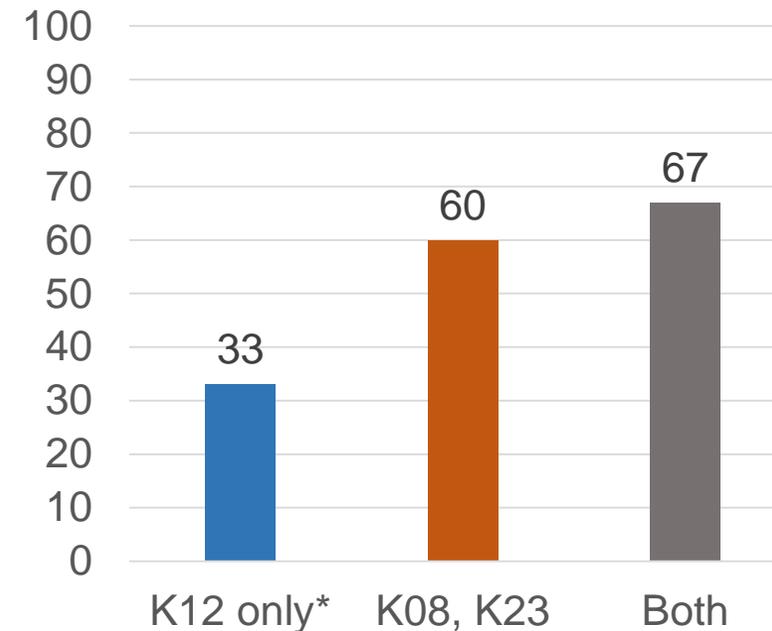

Scholar Funding Rate

*Significantly different from indiv K only
OR: 4.9, 95% *CI:* 1.8-13.6; Fisher's exact test: *p* < .001

*Significantly different from indiv K only
OR: 3.1, 95% CI: 1.5-6.3; Fisher's exact test: p = .001

Research Infrastructure and Data Sharing

- Research resources and infrastructure
  - Supported directly (special set aside programs) or indirectly (via research centers)
  - Animal research: zebrafish, drosophila, xenopus, mouse models
  - Biospecimen banks
  - Population centers
  - Medical rehabilitation
- Data sharing
  - Data sharing policy
  - Data Archiving and Specimen Hub (DASH)
  - Data Sharing for Demographic Research (DSDR)

Clinical Research Infrastructure

- Clinical research networks
  - Facilitated rapid response
  - Promoted collaborations
- NIH Clinical Center
  - NICHD protocols concentrate on pediatric rare diseases and endocrinology
  - Challenges/limitations
    - 13% of patients are <18, but no children < 3
    - No pregnant women
- Perinatology Research Branch (Detroit)

Partnerships

With whom do we partner?

- Trans-NIH
- Interagency
  - Other federal agencies (e.g. FDA, CDC, HRSA, DoD)
- Outside organizations
  - Nonprofit (professional societies, 501(c)3 organizations, foundations, universities, etc.)
  - For profit (pharma, industry)

What types of partnerships?

- Informal partnerships
- Interagency committees
- Material Transfer Agreements
- Cooperative Research and Development Agreements
- Clinical trial agreements
- Co-funding
- Gifts – donations and bequests
- Contractual agreements
- Memoranda of Agreement/Understanding

Select NICHD Collaboration Areas: Trans-NIH and Interagency

- Autism
- Birth defects
- Child health statistics
- Child maltreatment
- Disaster response
- Down syndrome
- Early learning
- Fetal alcohol syndrome
- Fragile X
- High risk adolescent behaviors
- HIV/AIDS
- Injury prevention
- Medical rehabilitation

- Muscular dystrophy
- Nutrition
- Obesity
- Pediatric pharmacology
- Pediatrics
- Pregnancy and medication
- Preterm birth
- Prosthetics
- Rare diseases
- SIDS/SUID
- Substance misuse/NOWS
- Traumatic brain injury
- Zika

Select Federal Partners (2016-2018)

- NIH
  - All NIH ICs
- Health and Human Services
  - 14 Operating divisions (e.g., CDC, FDA)
- Federal Departments
  - Agriculture
  - Defense
  - Education
  - Housing and Urban Development
  - Justice
  - State
  - Transportation
  - Veterans Affairs

- Federal Agencies
  - Environmental Protection Agency
  - National Endowment for the Arts
  - National Endowment for the Humanities
  - National Science Foundation
  - Office of Management and Budget
  - Office of National Drug Control Policy
  - Social Security Administration

Public-Private Partnership Examples

Mars-Waltham Foundation

- Memorandum of Understanding
- Supports research on human-animal interactions and health and development
- Helped establish/grow this nascent field by supporting workshops, funding opportunities

PregSource ®

- A crowd-sourced, interactive, platform to:
  - Detail the natural history – and variations - of human pregnancy
  - Provide accurate info about pregnancy from trusted sources
  - Let pregnant women know about opportunities to participate in targeted research
- 20 partner organizations

Brought to you by …

- NICHD Referral and Program Analysis Branch
- NICHD Science Policy, Planning, and Evaluation Branch
- NICHD Financial Management Branch
- NICHD Office of Legislation and Public Policy
- NICHD Division of Extramural Research
- NIH Library
- NIH Office of Extramural Research
- NIH Office of Portfolio Analysis
- NIH RCDC team

Questions?

Training, Infrastructure, Partnerships: Listening Session 3

3. What types/areas of training are needed to prepare the next generation of scientific leaders?

4. What emerging technologies and technique do you feel will impact the types and methods of research conducted in the next ten years?

5. What do you think are the most important kinds of partnerships that NICHD must develop and maintain to achieve the priorities you have identified?