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
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)

- Intramural Research: 14%
- Contracts: 10%
- Training: 2%
- Other Research: 2%
- Cooperative Clinical: 3%
- Careers: 3%
- Centers: 5%
- SBIR/STTR: 3%
- RMS: 5%
- RPG: 53%
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 Research Portfolio
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

- Typical child development: $174 million
- Congenital anomalies: $65 million
- Depression: $19 million
- Infectious diseases: $150 million
- Maltreatment: $10 million
- Mental illness: $25 million
- Obesity: $59 million
- Preterm birth: $137 million
- Rare diseases: $101 million
- SIDS/SUID: $7 million
- Unintentional injury: $36 million
- Violence: $35 million

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 Pediatric Research Portfolio by Broad Scientific Domain, FY 2017

- Basic: $386
- Population: $137
- Screening and diagnosis: $158
- Biomedical interventions: $222
- Behavioral interventions: $298

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

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

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 Pregnancy and Maternal Health 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 Pregnancy and Maternal Health 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 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

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.
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)**
- Median RCR = 1.27
- Top 10% Citations = 20%

**DIR (2014-2017)**
- Median RCR = 1.47
- Top 10% Citations = 28%

**DIPHR (2012-2015)**
- Median RCR = 1.78
- Top 10% Citations = 22%

Source: Analysis by NICHD SPPEB
Median RCR for R01 Grants Across NIH ICs 2006-2015

Source: NIH Library

Source: NIH Library

Categories are derived from Web of Science designations based on journal of publication.
Technology Development: Patents

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

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

<table>
<thead>
<tr>
<th></th>
<th>MFMU</th>
<th>PHACS</th>
<th>CPCCRN</th>
<th>NRN</th>
<th>PFDN</th>
<th>RMN</th>
</tr>
</thead>
<tbody>
<tr>
<td># of publications cited in guidelines</td>
<td>90</td>
<td>9</td>
<td>14</td>
<td>77</td>
<td>33</td>
<td>15</td>
</tr>
<tr>
<td>% of publications cited in guidelines</td>
<td>25.6%</td>
<td>6.9%</td>
<td>11.6%</td>
<td>16.1%</td>
<td>25.8%</td>
<td>18.1%</td>
</tr>
<tr>
<td>% of publications cited in &gt;1 guideline</td>
<td>13.4%</td>
<td>1.5%</td>
<td>4.1%</td>
<td>7.9%</td>
<td>14.8%</td>
<td>12.0%</td>
</tr>
</tbody>
</table>
Questions?
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

- **K12**: 26%
- **K23**: 17%
- **T32**: 32%
- **K99**: 6%
- **K24**: 3%
- **K25**: 0%
- **K21**: 5%
- **K01**: 5%
- **F32**: 5%
- **F31**: 2%
- **F30**: 1%

Not included:
- R25: $3.3M
- LRP: $5.4M
Subsequent Application and Funding Rates for MD-only K and K12 Scholars Supported in 1999-2001

n=143

**Scholar Application Rate**

- K12 only: 60
- K08, K23: 88
- Both: 82

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

**Scholar Funding Rate**

- K12 only: 33
- K08, K23: 60
- Both: 67

*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
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?