NICHD's Strategic Priorities

Council of Councils

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NIH *Eunice Kennedy Shriver* National Institute of Child Health and Human Development

Talk Outline

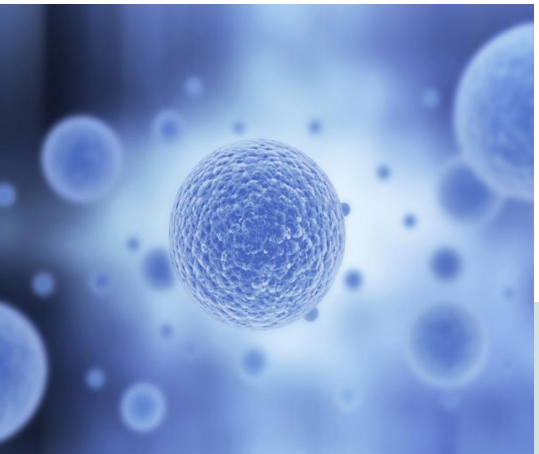
- NICHD Overview
- Women's Health "Below the Belt"
- Pediatric Research
- Rehabilitation Research
- Research with Partners Across NIH
  - Maternal Mortality (IMPROVE Initiative)
  - Down Syndrome (INCLUDE Program)
  - Pain and Substance Use (HEAL)

NICHD Overview

NICHD Mission and Vision Statements

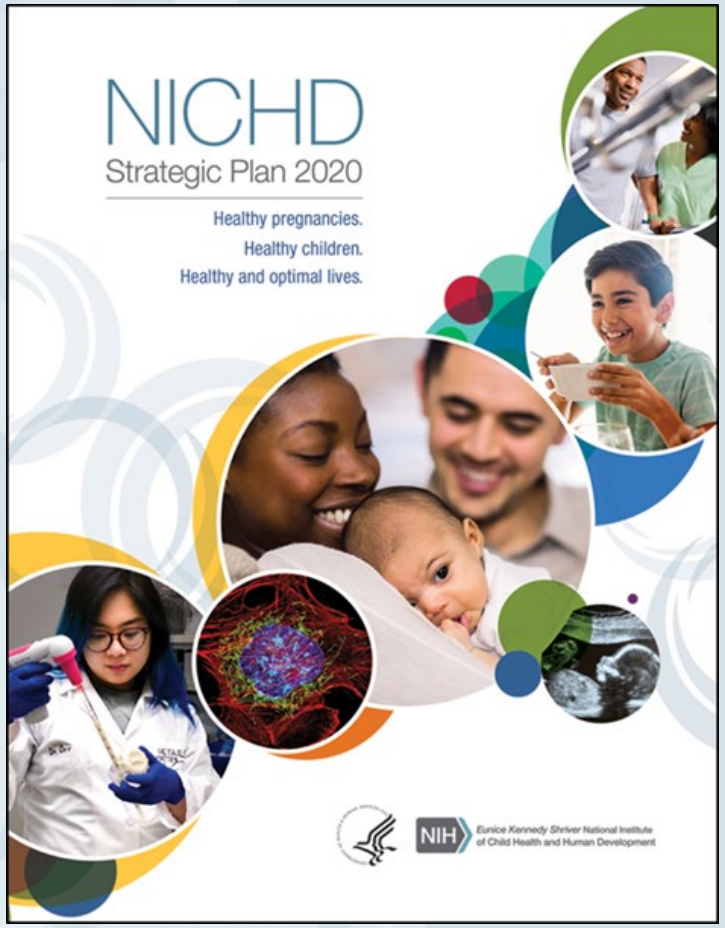
Lead research and training to understand human development, improve reproductive health, enhance the lives of children and adolescents, and optimize abilities for all.

Healthy pregnancies. Healthy children. Healthy and optimal lives.





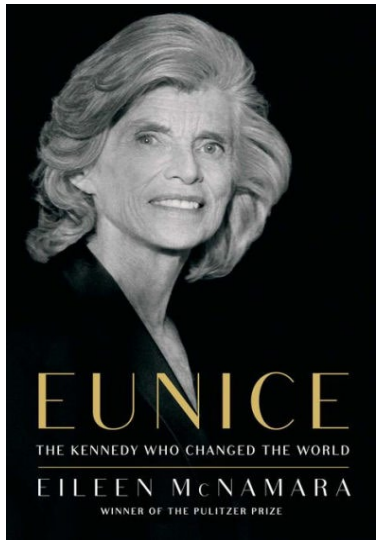
Refresh coming in 2025!



NICHD Strategic Plan 2020 Research Themes

- Understanding the Molecular, Cellular, and Structural Basis of Development
- Promoting Gynecologic, Andrologic, and Reproductive Health
- Setting the Foundation for Healthy Pregnancies and Lifelong Wellness
- Improving Child and Adolescent Health and the Transition to Adulthood
- Advancing Safe and Effective Therapeutics and Devices for Pregnant and Lactating Women, Children, and People with Disabilities

NICHD's Research Portfolio



Eunice Kennedy Shriver

National Institute of Child Health and Human Development

~55% Pediatrics

~30% Reproductive Health

~15% Intellectual and Developmental Disabilities and Rehabilitation

Women's Health "Below the Belt"

Gynecologic Health and Disease

Contraception Research

Fertility and Infertility

Pregnancy and Perinatology

Maternal and Pediatric Infectious Disease

Obstetric and Pediatric Pharmacology and Therapeutics

Population Dynamics

Human Placenta Project

- Placental health affects brain development and lifetime health
- Developmental origins of health and disease
  - Harmful exposures early in life may increase risk of disease later in life
- **Human Placenta Project Goals**
  - Understand all stages of placental development, function, and structure
    Develop clinically useful tools to help guide care for pregnant persons
- **Accomplishments**
  - **Enhanced imaging** (MRI and ultrasound) to enable a more detailed view of placental structure and of blood, oxygen, and nutrient flow
  - **Placental biomarkers** in maternal blood that reflect the health and function of the placenta
  - **Safe, noninvasive, and real time**

Demand for Innovation in the Diagnosis of Endometriosis

- Despite affecting ~1 in 10 women, endometriosis is difficult to diagnose in part due to wide-ranging symptomatology that overlaps with other conditions
- Currently no reliable blood test or other non-invasive diagnostics
  - Gold standard diagnosis depends on laparoscopic visualization
  - Instead, clinicians rely on medical history, physical exam, and imaging
    - These tests cannot detect many forms of endometriosis, especially in smaller lesions
- **Innovation gap - develop reliable, non-invasive tests that enable early and accurate endometriosis diagnosis and treatment**

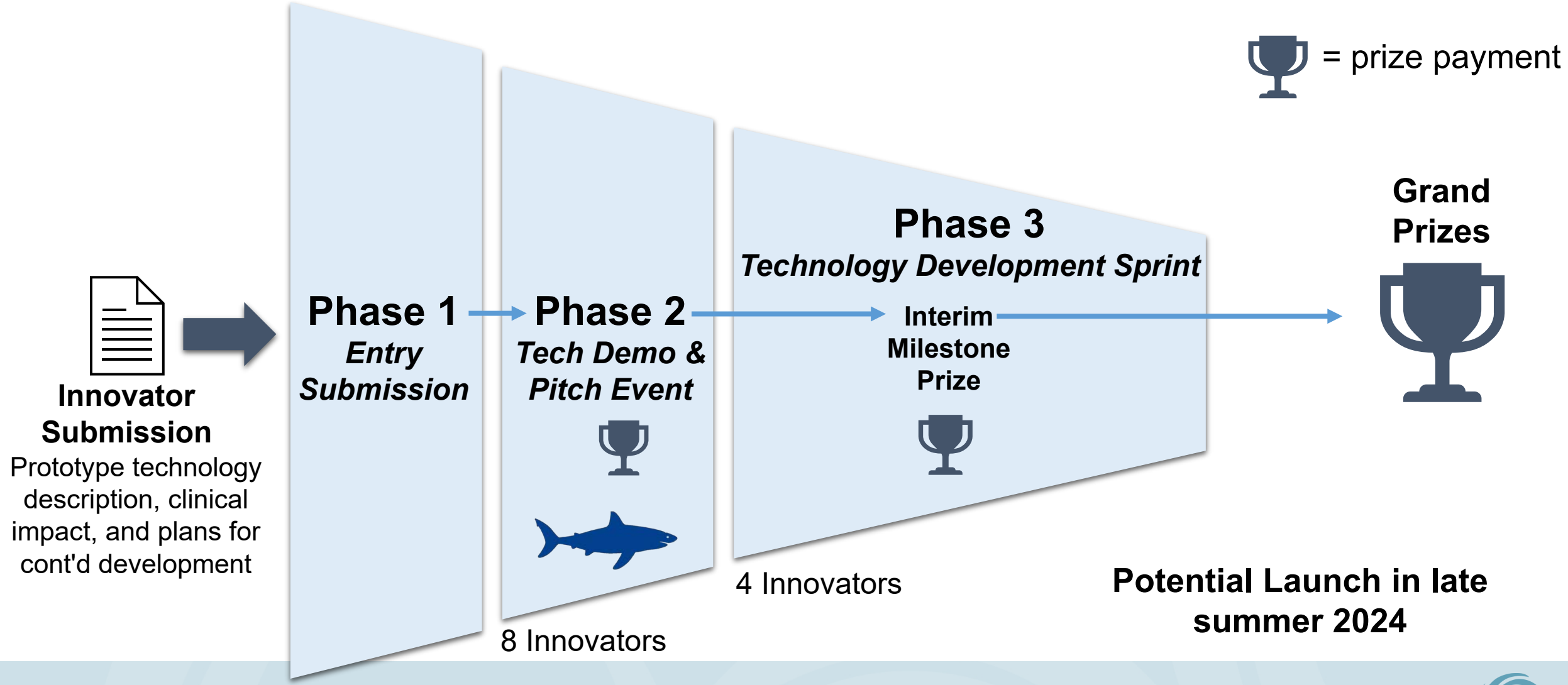
RADx® Tech ACT ENDO Challenge

Advancing Cures and Therapies and ending ENDOmetriosis diagnostic delays (ACT ENDO)

- **Problem**: Despite the prevalence and severe impact of this disorder on quality of life, diagnosis can be delayed up to 10 years
- **Solution**: NICHD, in partnership with NIBIB, will leverage the Rapid Acceleration of Diagnostics Technology (RADx® Tech) "innovation funnel" program
  - Accelerate the time to diagnosis, eliminate invasiveness of current techniques, and/or improve accessibility, safety, convenience, and costs of diagnosis
- **Approaches** (not exclusive):
  - Utilize new or existing biomarkers from serum, saliva, or menstrual effluent
  - Distinguish between benign and malignant endometriosis
  - Utilize epigenetic or genomic data with machine learning to diagnose early disease states

RADx® Tech ACT ENDO

Rapidly de-risk and validate technologies with stage-gated, milestone-based cash prize awards



Task Force on Research Specific to Pregnant and Lactating People (PRGLAC) Recommendations

- Change the existing culture: Protect pregnant people *through* research instead of *from* research
- **Research**
  - Include pregnant and lactating people in clinical research (protocols and study designs)
  - Increase research on safety and efficacy of therapeutics used by pregnant and lactating people
  - Develop programs to drive discovery and development of therapeutics
    - Include new therapeutics for conditions specific to pregnant and lactating people
- **Workforce**
  - Expand workforce of clinicians and researchers with expertise in obstetric and lactation pharmacology and therapeutics

All 15 recommendations and full Task Force report are available online:
https://www.nichd.nih.gov/About/Advisory/PRGLAC

NICHD Research Focused on Pregnant and Lactating People

- **Maternal and Pediatric Precision in Therapeutics (MPRINT) Hub**
  - Expand research on safe and effective therapies for pregnant and lactating people

- **Commonly Used Drugs During Lactating and infant Exposure (CUDDLE) Study**
  - Inform safe medication dosing levels that are safe for mother and infant while breastfeeding
  - New drugs added to the study in 2023, including amoxicillin, buprenorphine, and hydrocodone

NICHD Research Networks for Maternal and Neonatal Health

- **Maternal Fetal Medicine Units Network** conducts clinical trials to assess interventions to improve maternal and infant health
- **Neonatal Research Network** investigates the safety and efficacy of treatment and management strategies for newborn infants
- **Global Network for Women's and Children's Health Research** partners foreign and U.S. investigators to conduct clinical trials in resource-limited countries

A-PLUS (Azithromycin-Prevention in Labor Use Study) Trial

- Research supported by **NICHD's Global Network** and (the former) Bill and Melinda Gates Foundation
- Tested whether single oral 2-gram dose of the inexpensive antibiotic azithromycin could reduce postpartum sepsis and death
- Enrolled more than 29,000 women in seven low- and middle-income countries
- **Study stopped early due to clear maternal benefit**
- **Results: Single dose azithromycin can reduce by one-third the risk of postpartum sepsis and death**
  - Did not reduce the risk of stillbirth, newborn sepsis or newborn death

Tita ATN, Carlo WA, et al. NEJM. (2023)

Pediatric Research

Developmental Biology and Congenital Anomalies

Child Development and Behavior

Intellectual and Developmental Disabilities

Pediatric Growth and Nutrition

Pediatric Trauma and Critical Illness

Maternal and Pediatric Infectious Disease

Obstetric and Pediatric Pharmacology and Therapeutics

Population Dynamics

NICHD Research on Intellectual and Developmental Disabilities

- ***Eunice Kennedy Shriver* Intellectual & Developmental Disabilities Research Centers**
  - 15 research centers across the U.S.; include infrastructure and research projects
- **NICHD autism research** includes genetics, neurodevelopment, screening, interventions, and infrastructure
  - Autism Centers of Excellence (ACE)
    - Collaboration between NIMH, NICHD, NIDCD, NIEHS, NINDS
    - Supports research on diagnosis, causes, interventions for ASD and services for people with ASD through the lifespan
    - Nine awards for ACEs in 2022; $100M over 5 years

Understanding How Technology and Digital Media (TDM) Affects Child Development

- $15M in FY23 budget to investigate effects of TDM on infant, child, and adolescent development
- NICHD awards focus on:
  - Novel technology to objectively monitor **preschool-age** children's digital media use
  - Characterizing use of digital media among children (**ages 1 to 8**); examining associations with development of emotional regulation and social competence
  - Characterizing complex relationships between social media content, behaviors, brain activity, health, and well-being during **adolescence**
- NICHD-NIMH Workshop: Impact of Technology and Digital Media on Child and Adolescent Development and Mental Health (April 4-5, 2024)
  - Current state and future directions for research on the positive and negative effects of TDM on the development and mental health outcomes of children

NIH Pediatric Research Consortium (NPeRC)

- Established in 2018 to increase collaboration and coordination of pediatric research across NIH
- Focus areas thus far include:
  - **Pediatric pain research**
    - Collaboration with HEAL initiative
  - **Pediatric medical devices**
    - Public-private partnership
  - Transition from adolescent to adult healthcare
    - Workshop and NOSI
  - COVID-19
    - Funding for pediatric research
  - Pediatric clinical trials
  - Pediatric research workforce

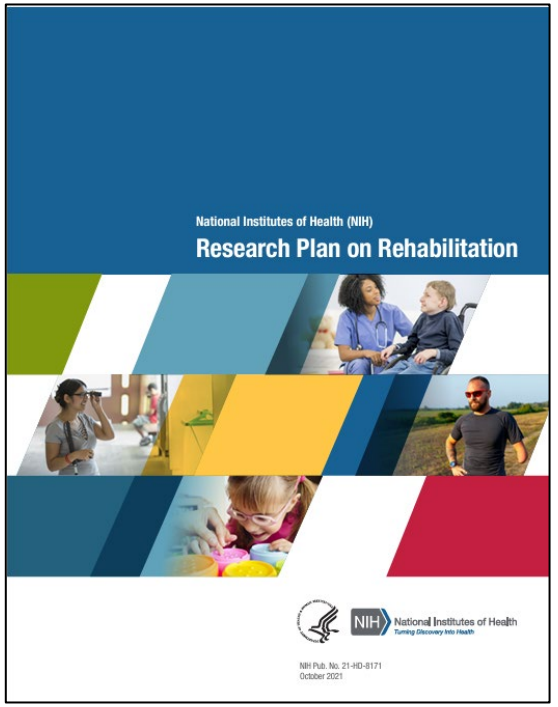
Vision for Pediatric Research at the NIH Clinical Center

- Working group identified scientific areas where NIH could make the **biggest impact on pediatric research** leveraging the **unique resources of the NIH Clinical Center**
- Need cross-cutting infrastructure enhancements to increase efficiency
- Scientific priorities include:
  - Natural history studies to support research on the continuum from diagnosis to treatment
  - Conducting gene therapy, CAR-T, and other cell therapy studies
  - Precision medicine pharmacological interventions in rare, non-malignant diseases
  - Pharmacokinetic and pharmacodynamic studies to improve use and dosing
  - Developing a cohort of all pediatric patients at the CC to measure physical and mental health and disease across disorders
  - Deeply phenotyped pediatric cohort to establish a standard set of control samples
  - Increasing support for research studies in pregnant and lactating people

Rehabilitation Research

National Center for Medical Rehabilitation Research (NCMRR)

- Fosters scientific knowledge needed to **enhance the health, productivity, independence, and quality of life of people with physical disabilities**
- Collaborates with many other government agencies and organizations to help advance medical rehabilitation research and care
- Supports research through research grants, training and career development activities, small business and technology grants, and research infrastructure



Key Features and Priorities for NCMRR

- NICHD co-chairs NIH-wide Medical Rehabilitation Coordinating Committee, which includes all ICs that fund rehabilitation research
- Supports full range of rehabilitation research in adults and children, including:
  - Adaptation and Plasticity
  - Device and Technology Development
  - Rehabilitation Diagnostics and Interventions
  - Health Services Research
  - Environmental Factors
  - Management of Secondary Conditions
- Recent activities
  - Ableism in Medicine and Clinical Research Workshop (April 2023):
    - Ableism as a barrier to care and contributor to health disparities
    - Ableism in scientific workforce and graduate education system
    - Accessibility in biomedical and behavioral research
    - Research needed to address barriers
  - Ableism: Understanding & Mitigating Health Disparities experienced by People with Disabilities (RFA-HD-24-007) – awards June 2024

Research with Partners Across NIH

Implementing a Maternal health and PRegnancy Outcomes Vision for Everyone (IMPROVE)

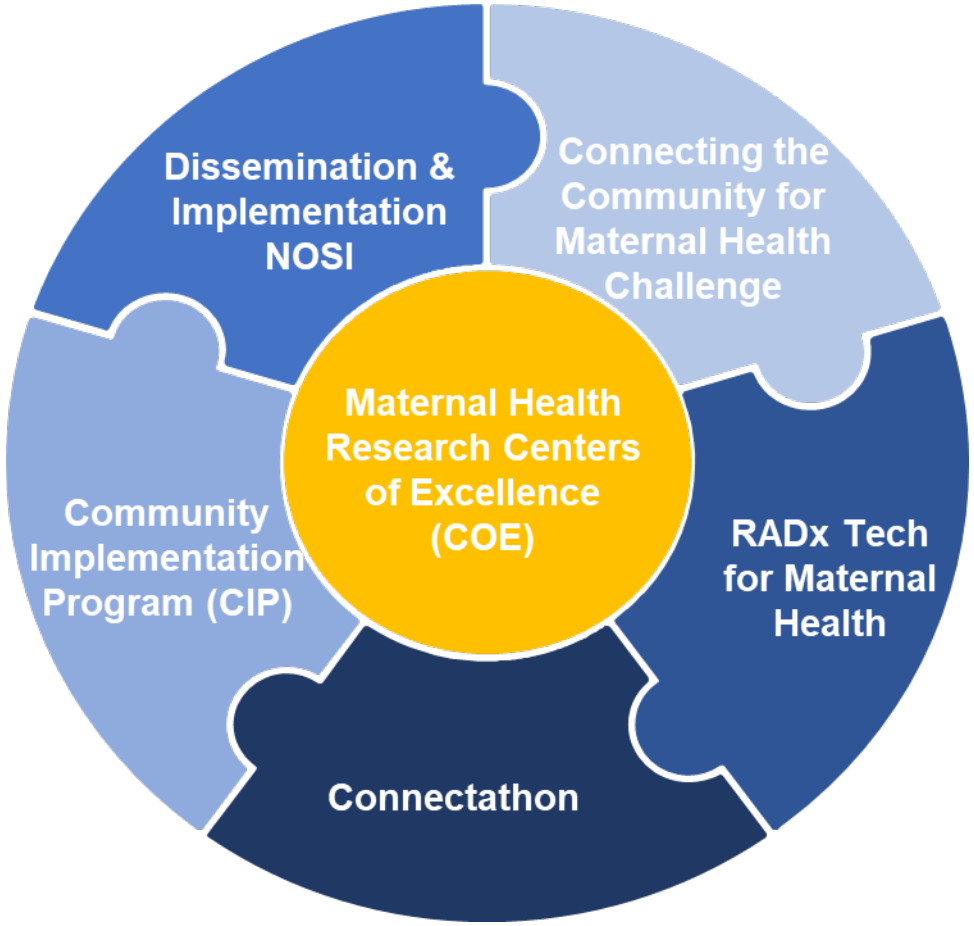
IMPROVE Initiative

- $40M appropriation to address maternal morbidity and mortality (MMM)
- Co-led by NICHD, NINR, and ORWH

- **Core Principles**:
  - **Reduce preventable causes of MMM**
  - **Community involvement**
  - **Implementation research**
  - **Addressing disparities**

Major IMPROVE Initiatives

- 10 Maternal Health Research Centers of Excellence
- Technology challenge for postpartum diagnostics and monitoring
- Building research infrastructure in communities
- Implementation research to increase intervention uptake in community settings
- Developing electronic health record standards for pregnancy to enable real-world research



INvestigation of Co-occurring conditions across the Lifespan to Understand Down syndrome (INCLUDE) Program

- Launched in 2018 to address critical health and quality of life needs for those with Down Syndrome (DS)
- Investigating conditions affecting individuals with DS and the general population
- Increase number of investigators/trainees studying DS
- Engage with those with DS and their families from diverse backgrounds
- Three components ($90M in FY23):
  - High-risk, high-reward **basic science** studies
  - Assemble a **large study cohort** of individuals with DS across the lifespan
  - Include individuals with DS in existing and future **clinical trials**

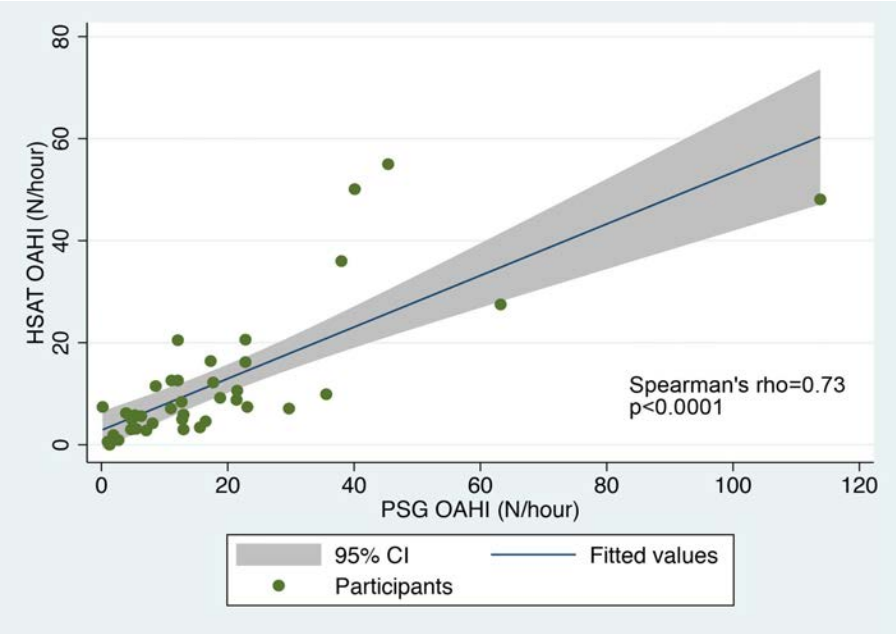
https://www.nih.gov/include-project

Selected Achievements from the INCLUDE initiative

- **Promising results from INCLUDE clinical trials:**
  - Treatment with JAK inhibitors can reduce interferon-based inflammation
    - Potential therapeutic benefits for autoimmune and other interferon related disorders common to people with DS
    - *Galbraith, et al. PMID: 37379383 DOI: 10.1126/sciadv.adg6218*
  - Combination of atomoxetine and oxybutynin (Ato-oxy) identified as a promising treatment for obstructive sleep apnea in children with DS in a randomized trial
    - *Combs, et al. PMID: 37555595 DOI: 10.5664/jcsm.10764*

Feasibility and performance of home sleep apnea testing in youth with Down syndrome

- Dearth of sleep laboratories suitable to assess obstructive sleep apnea (OSA) in youth with neurocognitive disabilities such as DS
- Tested feasibility, acceptability, and accuracy of in-home level II home sleep apnea testing (HSAT) versus polysomnography
- 43 participants (23 female) aged 6-25; 41 completed HSAT and 41 completed polysomnography; 40 underwent both tests
- Home sleep study determined to be well-tolerated, reliable, and generally preferable to hospital-based sleep studies to identify sleep apnea in individuals with DS



J. Clin. Sleep. Med. 2023 Sep 1;19(9):1605-1613. PMID: 37185265 doi: 10.5664/jcsm.10610.

INCLUDE Data Hub

- Cloud-based resource developed through the INCLUDE Data Coordinating Center
- Free access to large-scale data resources
- Capability to explore custom built cohort datasets based on participant, biospecimen, clinical, and ‘omics data
- Encourages collaboration
- Facilitates potential to uncover new insights into the biology of Down syndrome and co-occurring conditions
- **https://includedcc.org/**

74TB of data:

- 6500+ harmonized clinical profiles
- 2600+ genomes
- 400+ transcriptomes, proteomes, and metabolomes

- Animal model data coming soon!

Helping to End Addiction Long-term (HEAL) Initiative

- **Advancing Clinical Trials in Neonatal Opioid Withdrawal (ACT NOW)**
  - Eat, Sleep, Console clinical trial – keeps mother and baby together postpartum
    - Reduced hospital stay and need for medication among opioid-exposed infants
  - Shorten Pharmacologic Treatment of Children with NOWS
  - Longitudinal follow up studies are ongoing
- **Prescription After Cesarean Trial (PACT)**
  - Opioid Prescription Protocols at Discharge after cesarean delivery
- **Placental Research**
  - Opioid Exposure and Effects on Placental Function, Brain Development, and Neurodevelopmental Outcomes
- **Pediatric Pain**
  - HEAL KIDS Pain Acute Pain Clinical Trials – Launching July 2024

Summary

- NICHD engages in wide-ranging research focused on key populations: pregnant and lactating people, children, and people with disabilities
- NICHD leads research on gynecologic health, the placenta, maternal health, child development, and intellectual disabilities
- Partnering with many other ICOs helps further NICHD's mission and enables scientific discovery

Thank You!
Questions?