

Concept Clearance for ECHO Pediatric Cohorts Program Renewal

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Environmental influences on Child Health Outcomes (ECHO)

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ECHO Cohort Concept Clearance Summary

Title: Concept Clearance for the Environmental influences on Child Health Outcomes (ECHO) Program – Pediatric Cohorts Renewal (2023-2029; Mechanism UG3/UH3, U2C, U54)

Renewal Purpose: Extend and expand the ECHO Cohort, a nationwide consortium, to further investigate the roles of a broad range of early exposures from society to biology, including the preconception period, on ECHO's five key child health outcomes among diverse populations

Funding: \$165M/year – Contingent upon continued Congressional appropriation

Anticipated Number of Awards: ~50 Cohort Study Sites, Coordinating Center, Data Science Center, Measurement Core, Laboratory Core

Project Period: 7 years

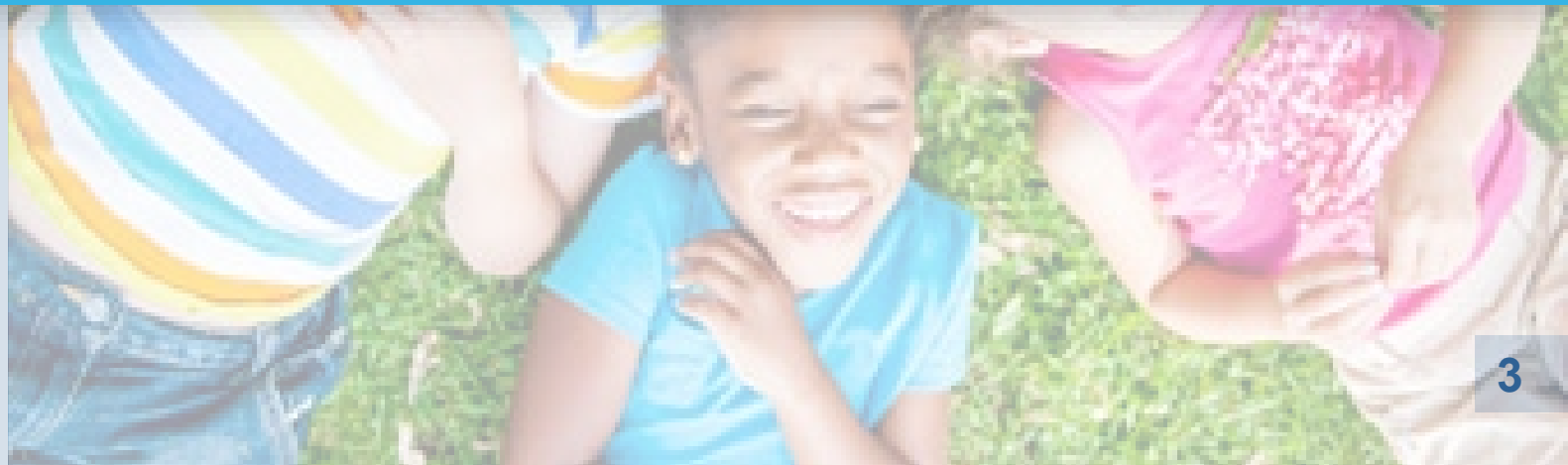
Council Action: Vote for continued support





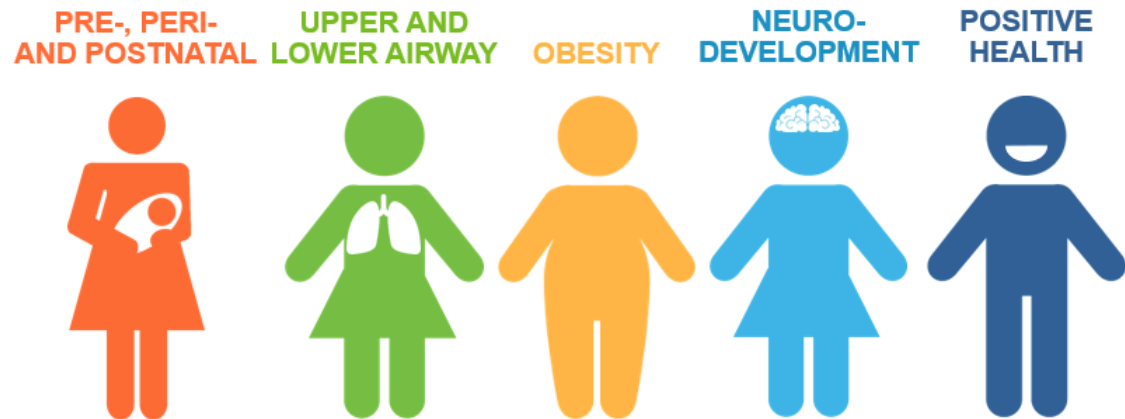
Background

ECHO Program 2016 - 2022



The Environmental influences on Child Health Outcomes (ECHO) Program

- Mission: Enhance the health of children for generations to come
- Goal: Understand effects of broad range of early environmental exposures on child health and development
- Approach: Nationwide observational study to inform solutions to five common pediatric outcomes with major public health impact



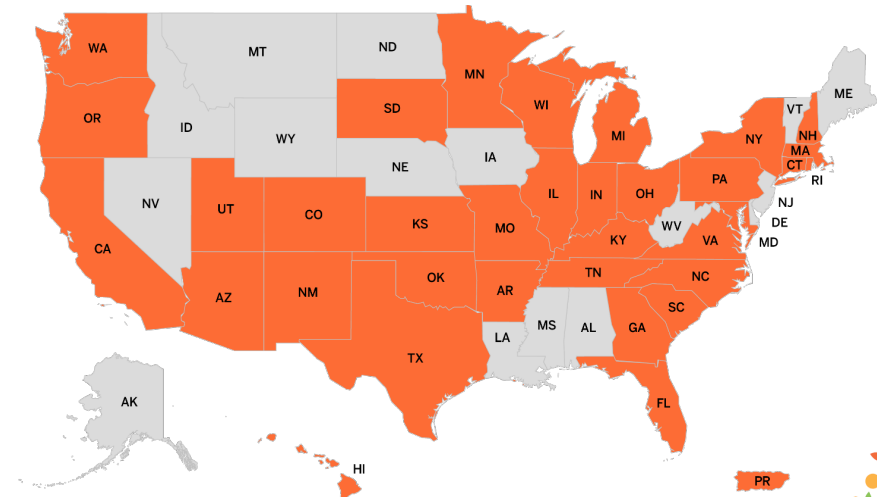
Learn more at echochildren.org



ECHO Cohort

- Integrates data from 72 longitudinal studies
- Diverse population of more than 50,000 kids plus family members
- 33 states, D.C., Puerto Rico
- Multidisciplinary, innovative methods

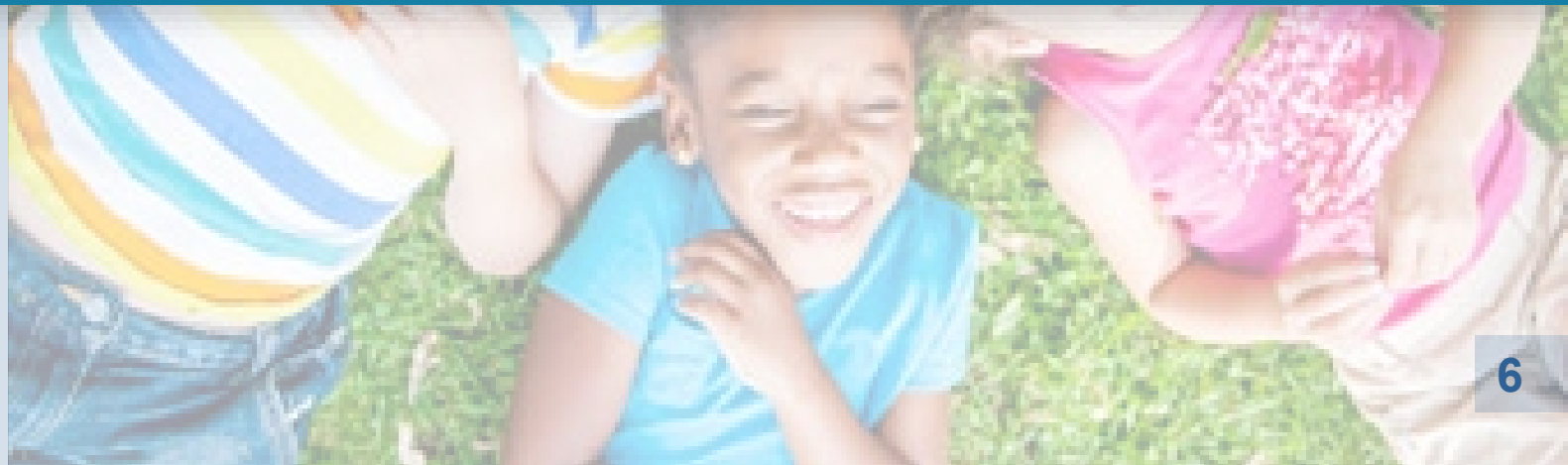
Unprecedented
Nationwide
Research
Resource





Accomplishments

ECHO Program 2016 - 2022



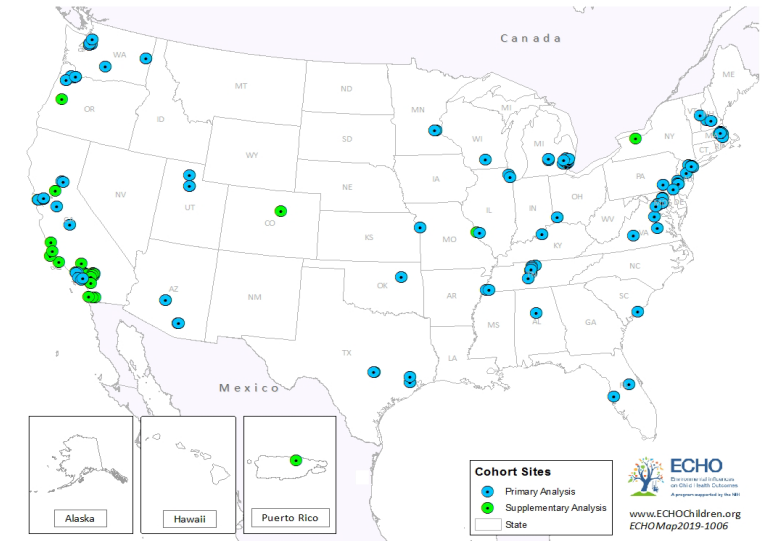
Accomplishments

- 1) High impact research
 - 800+ publications
- 2) National Data and Biospecimen Resource
- 3) Next Generation of Diverse Scientific Workforce

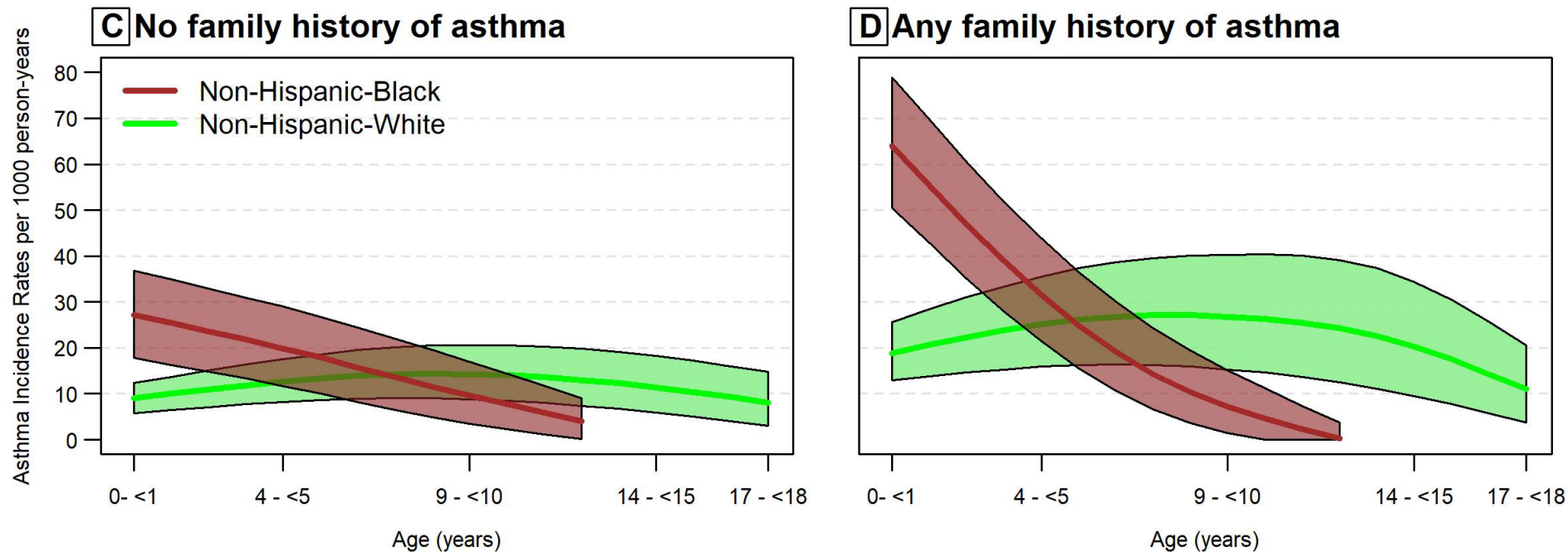


Racial Disparities in Incidence of Asthma

- Most research on frequency of asthma focuses on prevalence, not incidence
 - Incidence data can reveal more about etiology
- 31 ECHO cohorts, N = 12,471
- Non-Hispanic Black and White children only



Black children had higher asthma incidence rates than white children, But only in early childhood



- Implies developmental origins of racial disparities
- One potential explanation is air pollution



Air Pollution and Asthma

- An example of geospatial approach
- Childhood asthma related to prenatal air pollution exposure
 - Later pregnancy—critical period
 - Small particles—may lead to new regulations
 - May help explain early childhood racial differences in asthma incidence



Amplification of Social Inequalities in Response to COVID-19 Pandemic

Impact on child positive health outcomes

1. What is the impact of COVID-19-related **family hardships** on COVID-19 **acute stress**, and in turn how does **stress** affect child **well-being** (life satisfaction)?
2. To what extent can **social support** promote and protect child **well-being** amidst COVID-19 hardships and stress?

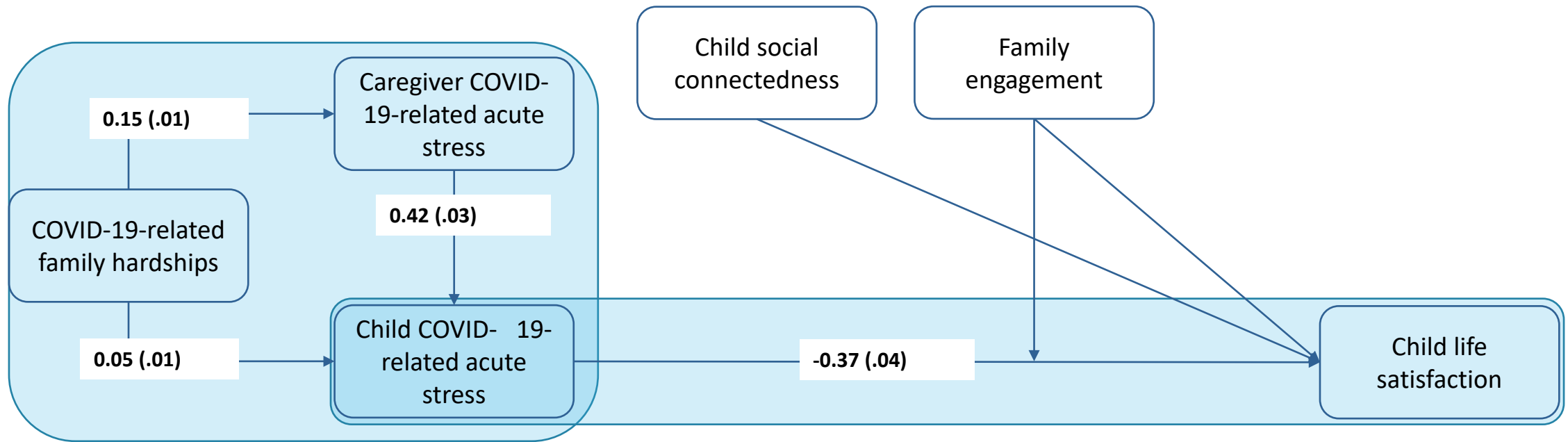


Participants

- Sample 1: Children, caregiver report
 - N = 977
 - Age 8.3 +/- 2.3 (range 2-12) years
 - 11 ECHO cohorts, 19 states
- Sample 2: Adolescents, self-report
 - N = 669
 - Age 16.4 +/- 1.0 (range 11-17) years
 - 5 ECHO cohorts, 17 US states



1. COVID-19-related family hardships contributed to caregiver and thus child stress, which, in turn, had an impact on child life satisfaction

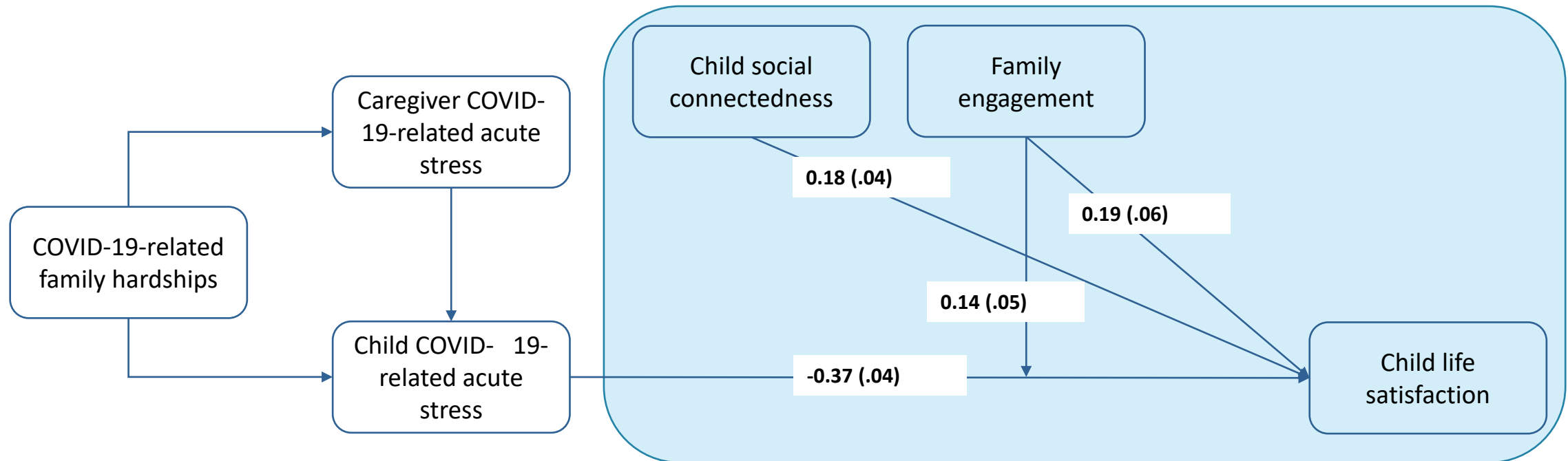


Amplification of Social Inequalities—1

- *COVID-19-related family hardships contributed to caregiver and child stress, which, in turn, had an impact on child life satisfaction.*
 - **Practical Consideration:** Use federal/state agencies to expand and develop upstream interventions targeting hardships.
 - E.g., Continue COVID-19 stimulus benefits for basic needs (rent, food, utilities) and household supplies among low-income families to reduce financial hardship.
 - **Practical Consideration:** Develop interventions that target both negative (stress) and positive (life satisfaction) psychological functioning.
 - E.g., mindfulness interventions decrease stress and can promote well-being



2. Social connection and family engagement can promote children's life satisfaction even amidst COVID-19 stress and hardships



Amplification of Social Inequalities—2

- *Social connection and family engagement can promote children's life satisfaction even amidst COVID-19 stress and hardships.*
 - **Practical Consideration:** Social prescribing, i.e., health professionals providing non-medical referrals that leverage local assets to promote social connectedness.
 - E.g., community arts activities, running and walking clubs, sports leagues
 - Outdoor nature-based social prescribing, particularly useful for social distancing.
 - **Practical Consideration:** Use well-child-care visits to foster family engagement strategies.
 - **Strategies:** Working together as a family to solve problems, identify family strengths, stay hopeful in difficult times.
 - **Tools:** Evidence-based Well Visit Planner® to open conversations with families and individualize engagement strategies.



Accomplishments

- 1) High impact research
- 2) National Data and Biospecimen Resource**
- 3) Next Generation of Diverse Scientific Workforce



Accomplishments: National Resource-Data Repository

- 97,000+ participants
 - 59,000 children with 27,000+ in active follow up
- Diversity of participants in race/ethnicity, age, socioeconomic status, geography
 - 45% Non-Hispanic White, 13% Non-Hispanic Black, 11% Non-Hispanic Other, 25% Hispanic, 6% Unknown/Not reported/Other
- Data Repository available to scientific community in two ways
 - Nearly anonymized, controlled access public use dataset @NICHD Data and Specimen Hub (DASH)
 - Data Platform and Enclave in highly secure cloud environment hosted by ECHO Data Analysis Center



Accomplishments: National Resource - Biorepository

- 42,000+ biospecimens so far
 - Blood
 - Breastmilk
 - Cord blood
 - Hair
 - Meconium/Stool
 - Nasal mucus
 - Placenta
 - Saliva
 - Toenails
 - Tooth
 - Urine



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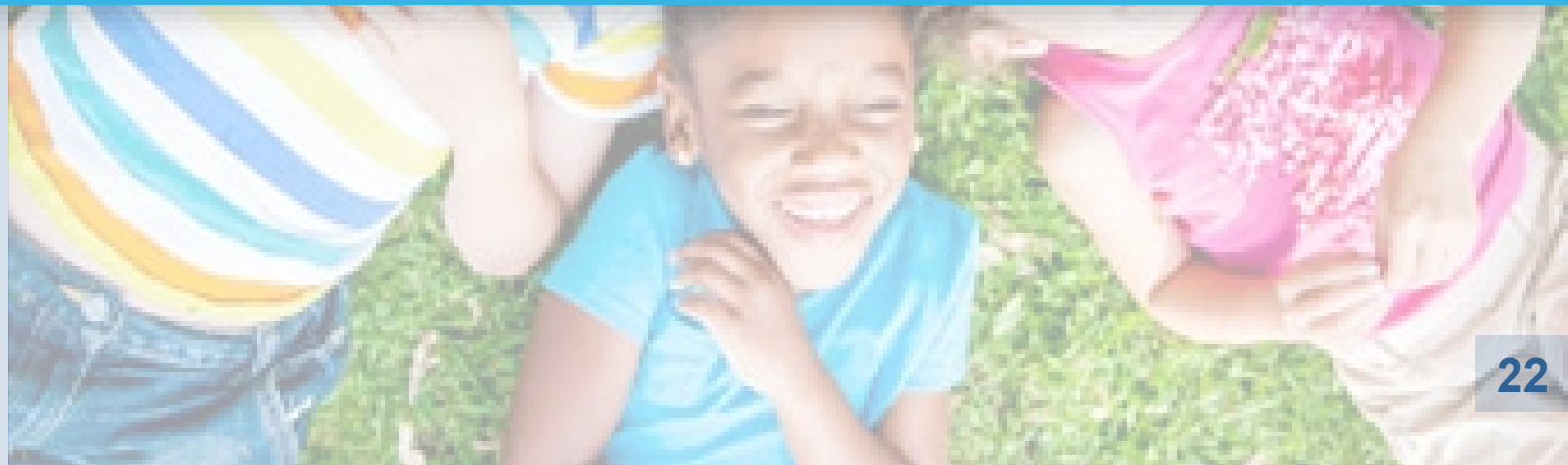
Accomplishments: Next Generation of Diverse Scientific Workforce

- Opportunities and Infrastructure Fund awards for early-stage investigators
 - 51 awardees
 - Includes investigators from disadvantaged backgrounds
 - Many innovations
 - Geospatial, AI/ML, new technologies, positive health, etc.
- Research Supplements to Promote Diversity
 - For pre- and post-docs
 - 15 awardees
 - Range of topics, including disparities, equity





Renewal of ECHO Cohort



What is the Future of ECHO?

2016-2022

<https://grants.nih.gov/grants/guide/rfa-files/RFA-OD-16-004.html>

To leverage and build upon existing cohort infrastructure to prospectively investigate the role of early life exposures and underlying biological mechanisms in childhood health and disease.

2023-2029

To extend and expand the ECHO Cohort to further investigate the roles of a broad range of early exposures from society to biology, including the preconception period, on ECHO's five key child health outcomes among diverse populations.



Extend and Expand ECHO Cohort

- Extend reach by following nearly 40,000 existing ECHO children and families
- Expand to include 20,000 women and partners recruited during pregnancy with follow-up of their children
 - Preconception pilot of 10,000 couples at moderate to high probability of subsequent pregnancy



New/expanded scientific opportunities

- Extend reach by following 40,000 existing ECHO children
- Expand to include 20,000 pregnancies with follow-up of children
- Combined strategies yield large, diverse cohort from preconception through adolescence



Potential new/expanded scientific opportunities

- Health disparities and health equity
 - Early origins of disparities, which widen from childhood onwards
- Social determinants of health
 - E.g., stress biology
- Natural experiments or health crises
 - COVID follow-up, ready for next crisis
- Exposure to novel chemicals
 - Pregnant women and children exposed to many uncharacterized
- Health trajectories
 - Identifying early critical periods
- Resilience, reversibility
 - Puberty as sensitive period
- Biological pathways
 - Epigenetics, metabolomics/exposomics
- Preconception exposures
 - Novel; includes social factors, behaviors, weight change, chemicals, etc.

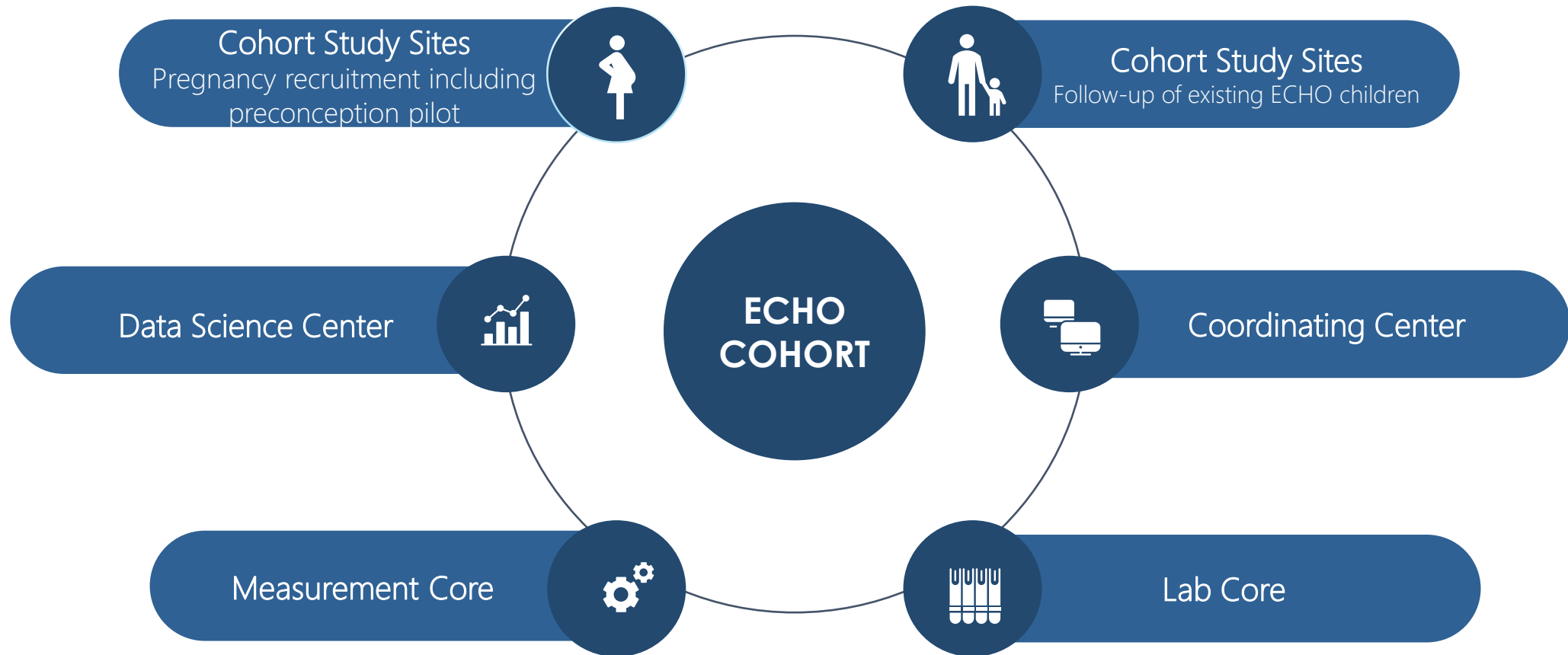


Cross-cutting Themes

- Diversity/Equity/Inclusion
 - Participants, workforce, science
- Science of Team Science
 - Multi-team consortium
- Solution-oriented Research
 - Informs programs, policies, practices
- Stakeholder Engagement
 - Front end and back end
- NIH Institute/Center/Office Collaborations
 - Trans-NIH working group, workshops, etc.
- Alignment with NIH Strategic Plan



ECHO Components



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