ECHO

Environmental influences On Child Health Outcomes

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Council of Councils
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Key Takeaways From Today

1. ECHO is a Flagship NIH Pediatric Research Program

   -What is the ECHO Program?

2. The ECHO Program is a National Research Resource, providing access to its data and biospecimens

   –What ECHO resources are available?

3. ECHO science translates its science to inform programs, practices, and policies

   –Looking to the future

What is the NIH ECHO Program?



What if every child had the chance to grow up healthy?




...A good start to life can last a lifetime and over generations...

To do so, we need to understand potential risks & resiliencies…

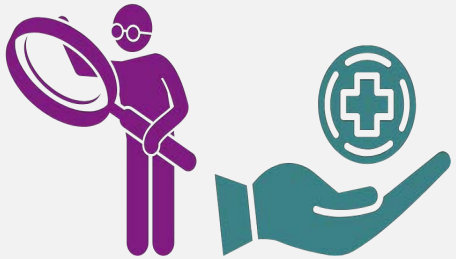
…and evaluate modifying them



…ECHO is uniquely positioned to do this



looks at the **whole child**, not just one disease at a time



addresses what factors affect child health—**observational research,** and ways to enhance it—**intervention research**



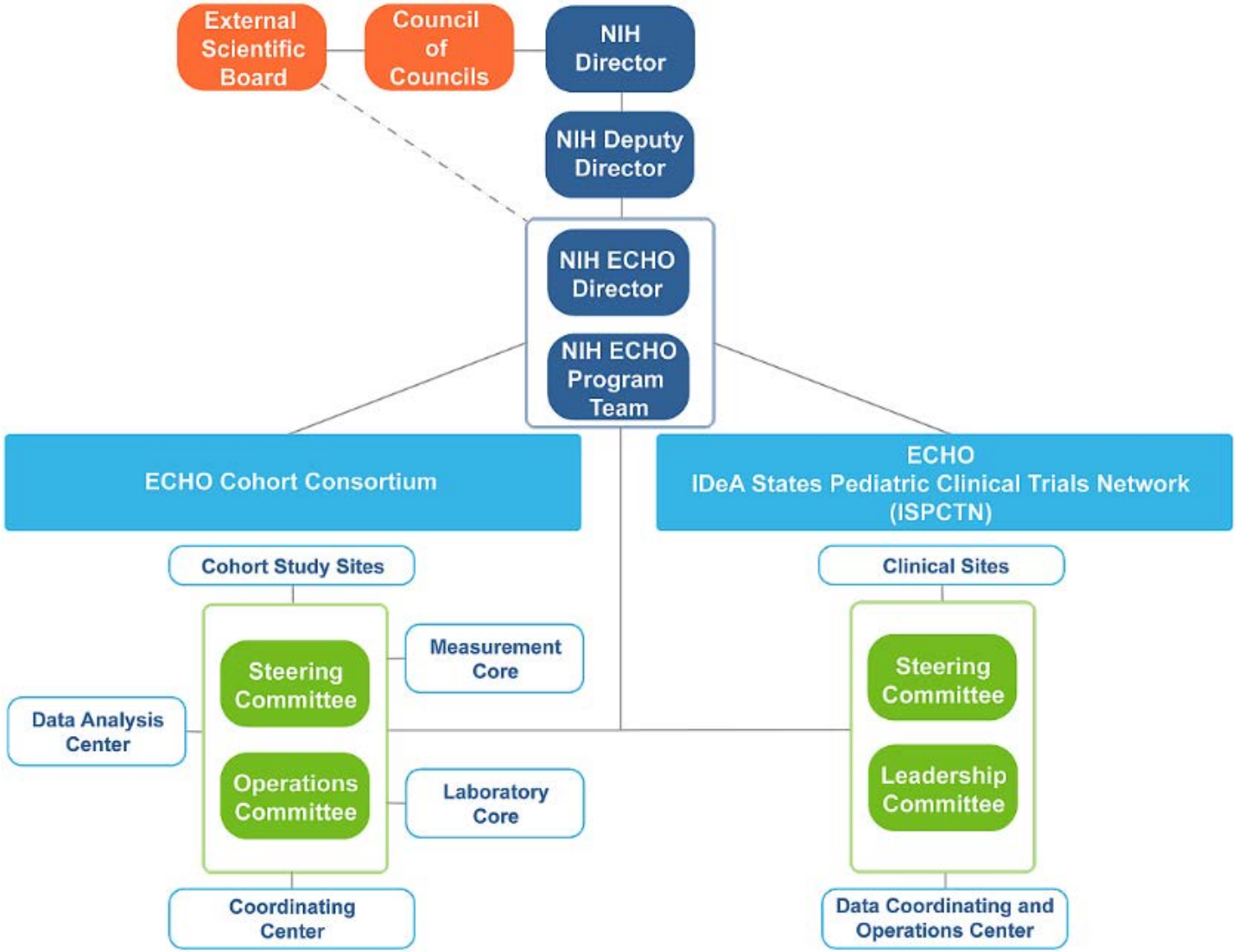
informs **policies**, **practices**, **programs**

ECHO Authorization

ECHO fulfills 2 Congressional mandates

- **H.R.4365 Children's Health Act** - that NIH continue a large-scale, long-term research study to investigate a broad array of early environmental factors influencing child health
  - NIH complies with the Children's Health Act of 2000 through the ECHO Cohort.
- **H.R.225 - Pediatric Research Initiative** - that NIH has a network dedicated to pediatric diseases
  - The ECHO IDeA States Pediatric Clinical Trials Network (ISPCTN) fulfills intention of the National Pediatric Research Network Act of 2013, which the 21st Century Cures Act made mandatory in 2016.

ECHO Program Organization



The Nationwide ECHO Program

Mission

To enhance the health of children for generations to come



ECHO is dedicated to both

learning what factors affect child health
—**observational research**—

and

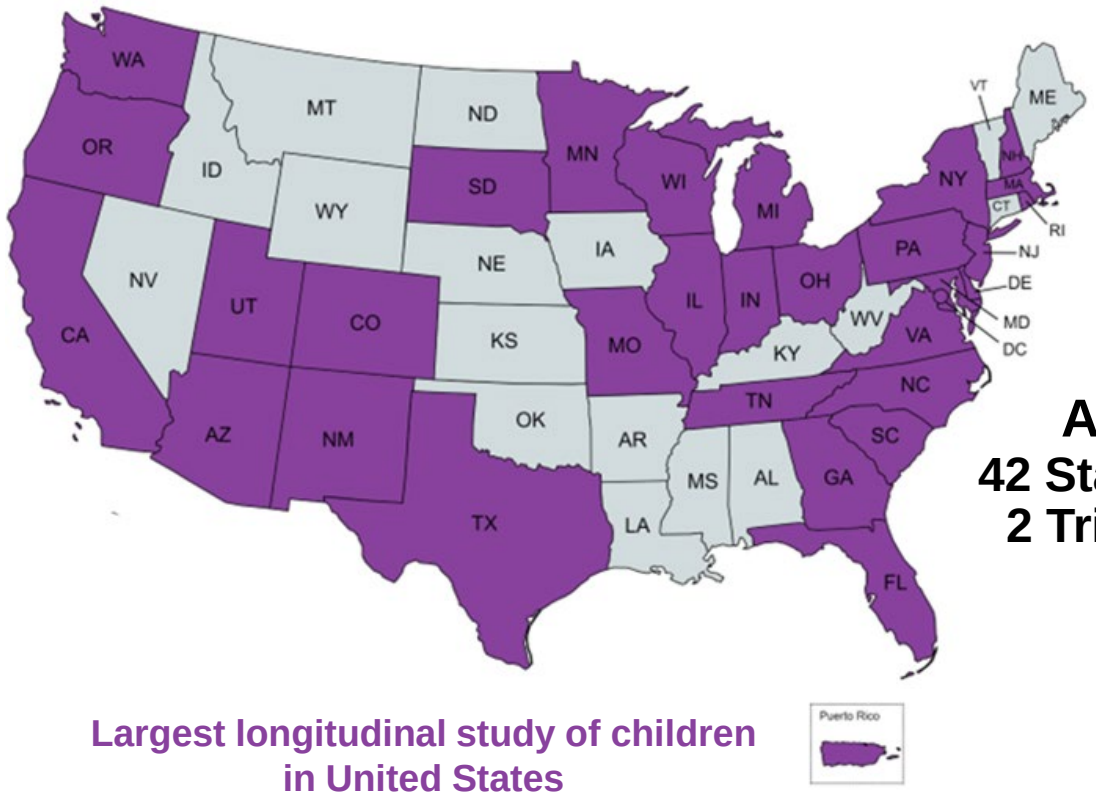
finding ways to enhance it
—**intervention research**—

5 Key Areas with High Public Health Impact

- **Pre, Peri, & Postnatal**
  Preterm birth, maternal depression
- **Upper & Lower Airway**
  Asthma, allergies
- **Obesity**
  And its consequences
- **Neurodevelopment**
  Autism, ADHD, mental health
- **Positive Health**
  Well-being

Observational & Intervention Research

ECHO Cohort

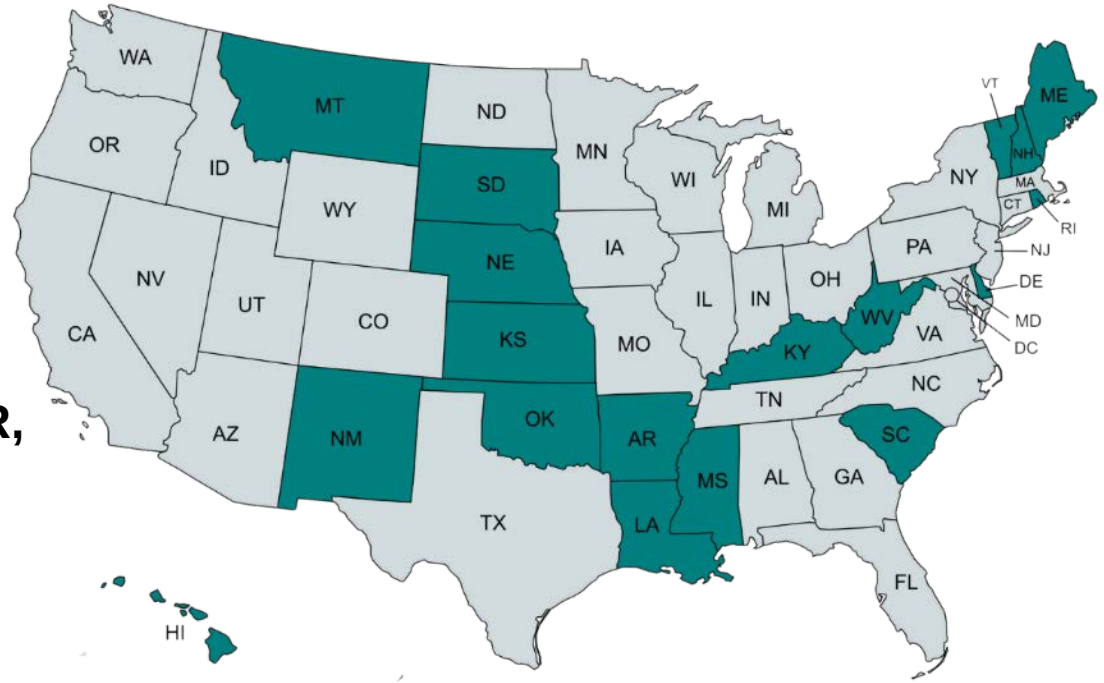


Largest longitudinal study of children in United States

Follows ~60,000 kids nationwide from before conception to 21 y

Awards in 42 States, DC, PR, 2 Tribal Nations

ECHO IDeA States Pediatric Clinical Trials Network (ISPCTN)



18 states with low NIH funding

ECHO Cohort

Observational Research

ECHO Cohort

Overall Scientific Goal

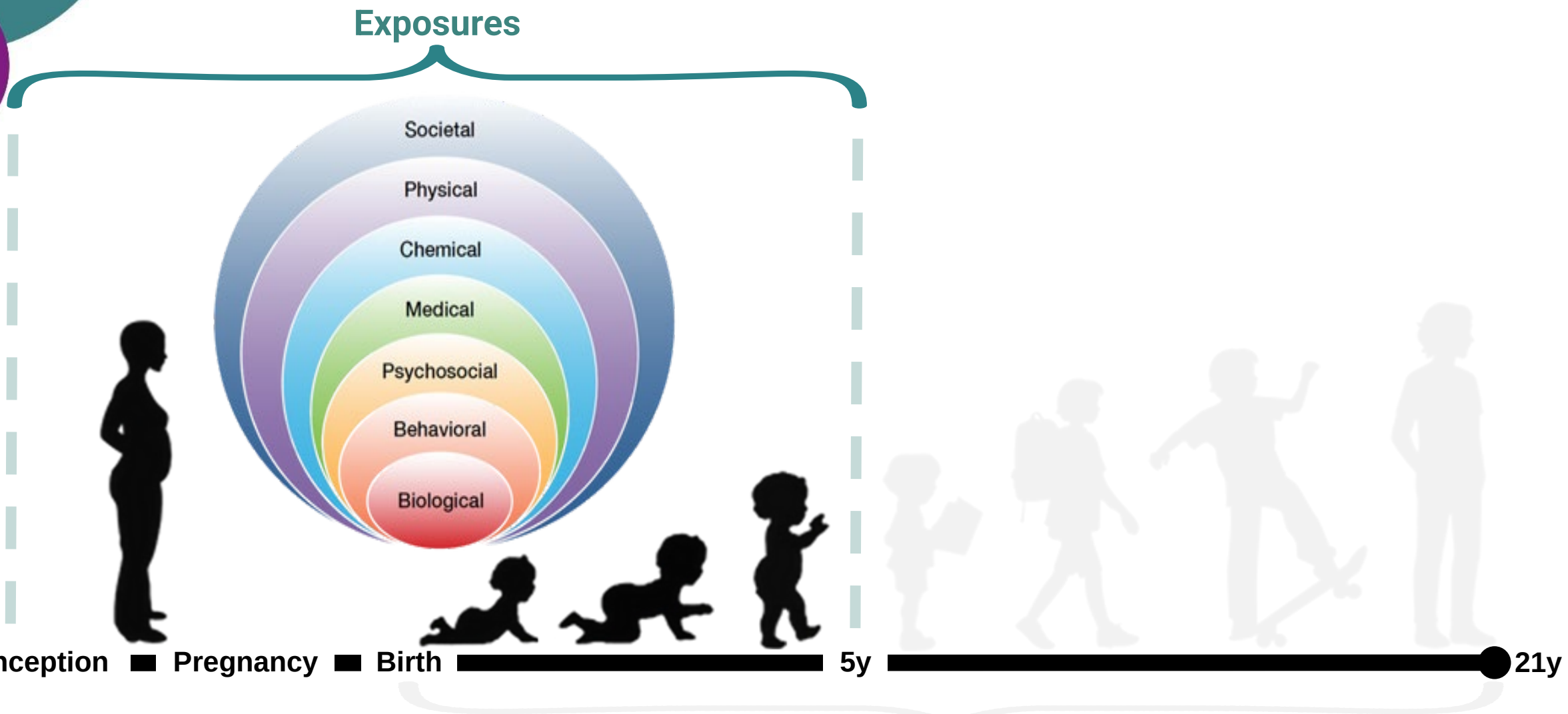
Answer **solution-oriented questions** about effects of broad range of **early environmental exposures** on **child health and development**



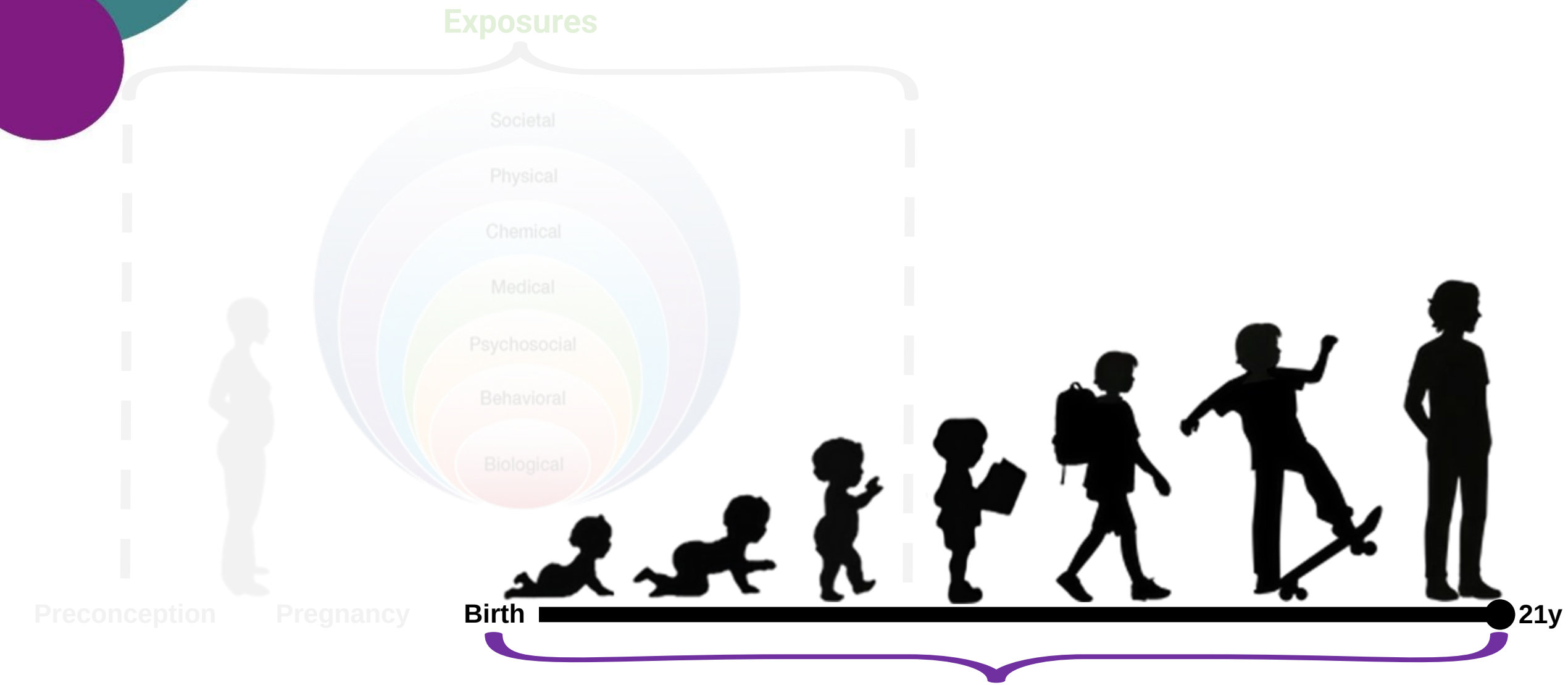
- **Following** ~30,000 existing kids
- **Recruiting** ~30,000 new pregnancies
  - Postpartum = **preconception**
    - Including partners when possible
- Rapidly expanding **data platform** & **biorepository**
  - **Harmonized data from** 170,000+ participants
    - from ~70 pre-existing, ongoing **longitudinal maternal-child studies**
  - Data going back **30+ years**, and going forward

Follows ~60,000 kids nationwide from before conception to 21 y

Early Exposures from Society to Biology



ECHO Cohort Outcomes—Birth to 21y



Select ECHO Cohort Findings



Wildfire Smoke Exposure and Pregnancy Outcomes



- Wildfire smoke exposure during pregnancy was linked to **higher risk of preterm birth**, especially in the Western U.S. and during severe or prolonged events
- Nearly all participants experienced some smoke exposure
- ***Protocol update:*** *Collection of real-time surveillance data on participants when nearby smoke events occur*

Sherris A, et al. Lancet Planet Health. 2025 Dec;doi:10.1016/j.lanplh.2025.101324

Social Media, Peer Relationships, and Adolescent Mental Health



- Greater social media use was associated with **poorer mental health**, particularly among adolescents with weaker peer relationships
- **Peer relationship quality** was a stronger predictor of mental health than social media use
- A **first-of-its-kind companion study** is underway among **pre-teen** participants

Blackwell C, et al. J Adolesc Health. 2025 Apr;doi: 10.1016/j.jadohealth.2024.12.003

Plastics Exposure During Pregnancy and Preterm Birth



- Higher prenatal exposure to **plastic-related chemicals (phthalates)** was linked to a **higher risk of preterm birth**
- Identifies a **common and preventable exposure** during pregnancy
- Demonstrates ECHO's ability to inform prevention through **large-scale population research**

Shiroshita A, et al. Environ Epidemiol. 2025 Dec;doi:10.1097/EE9.0000000000000443

ECHO Cohort

- **Largest U.S. longitudinal study of children**
  - ~60,000 active participants, data on 170,000+
  - Impressive retention rates
- **Comprehensive lifecycle approach**
  - Preconception to 21 years
- **Tribal engagement**
  - Two Tribal Nations
- **Established as a national research resource**
  - Data and specimens for scientific community
- **Fostering the next generation of investigators**
  - Opportunities and Innovation Fund
- **High productivity and early impact**
  - 2,100+ publications; Influence on programs, policies, and practice

ECHO IDeA States Pediatric Clinical Trials Network (ISPCTN)

Intervention Research

IDeA States Pediatric Clinical Trials Network (ISPCTN)



Program Goals

- Provide **access to state-of-the-art clinical trials** children in Institutional Development Award (IDeA) states
- Build **pediatric research capacity** in IDeA states

ECHO ISPCTN Clinical Trials

With **28% of participants from rural areas,** trials address issues that disproportionately affect **rural communities**

- Treatment of obesity
- Indoor air quality
- Opioid crisis

ISPCTN Trials

Neurodevelopment

ACT NOW Trials (3)

INTACT

RAMP

Talk with Me Baby

Obesity

iAmHealthy

PHITT

NOURISH

Upper & Lower Airway

BREATHE

VDORA1

Positive Health

MoVeUP

POPS

FAST KIDS

Pre, Peri, & Postnatal

Completed

Current

Future



Select ECHO ISPCTN Findings



Improving Infant Respiratory Health Through In-Home Air Filtration

Using HEPA units improved the quality of indoor air and may reduce respiratory symptoms and doctor visits among babies who had bronchiolitis

- Focused **cleaning the air where babies spend most of their time**
- High-quality clinical research **remotely and equitably**, making it easier for families in rural or underserved communities to participate.

Cowan et al., Trials 2024 Mar 20;25(1):197. doi: 10.1186/s13063-024-08012-0.



Transforming Care for Neonatal Opioid Withdrawal

Historically, there was no standard of care and treatment varied widely. These studies demonstrate **two safe, effective approaches**:

- **Eat, Sleep, Console:** Comfort- and family-based care helped babies go home about a week sooner and greatly reduced the need for medication.

Young et al., N Engl J Med. 2023 Jun 22; 388(25):2326-2337
Merhar et al., JAMA Pediatr. 2024 Aug 12; doi:10.1001/jamapediatrics.2024.2578
Devlin et al., JAMA Pediatr. 2024 Apr 15; doi:10.1001/jamapediatrics.2024.0544

- **Faster Weaning:** When babies need medication, lowering doses more quickly shortened treatment without added risks.

Laptook et al., j Pediatr. 2026 Jan 17:292:114992. doi: 10.1016/j.jpeds.2026.114992

Together, they **established clear standards of care** that improve outcomes and reduce opioid use in newborns.

ECHO ISPCTN

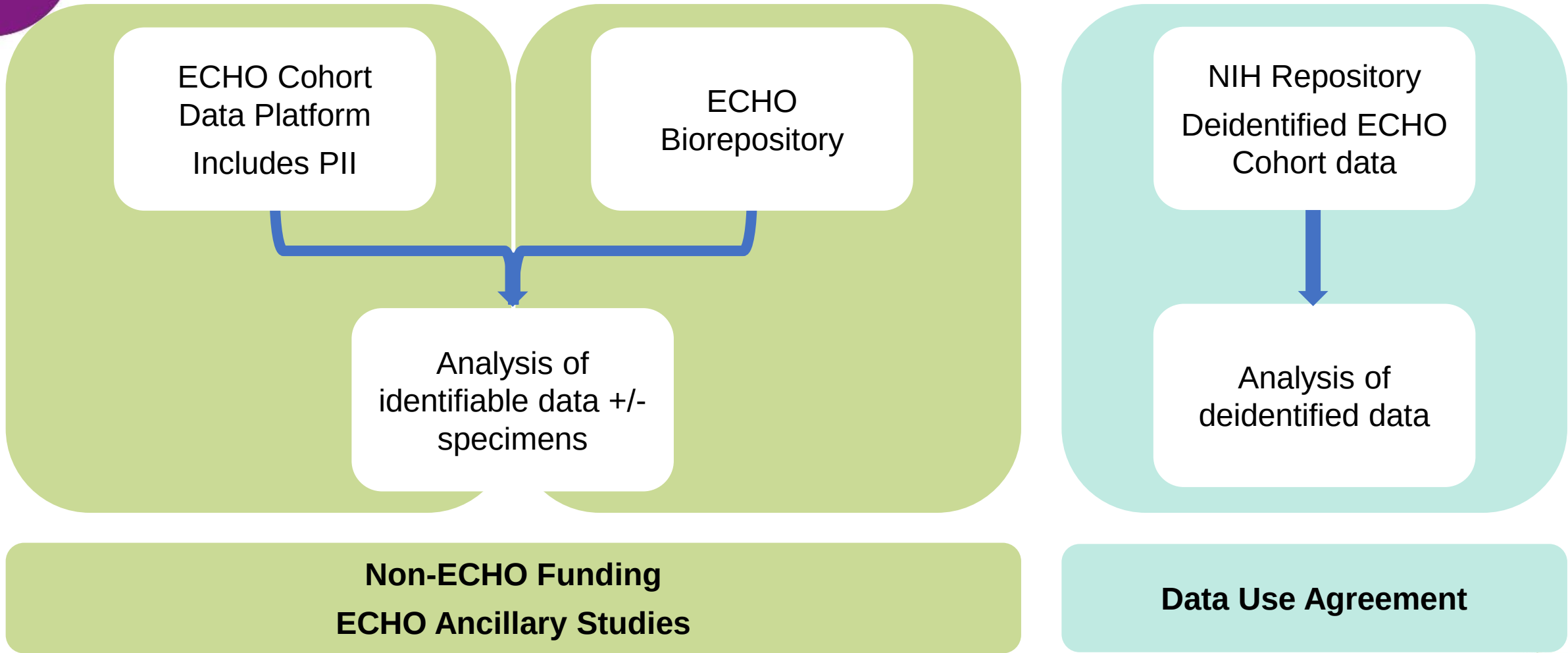
- **Mature INTERVENTION research program**
  - Built from scratch
  - Infrastructure now working well
  - Interdisciplinary collaboration via team science
- **One-of-a-kind national resource**
  - The **only** NIH clinical trials network dedicated to children in rural or underserved communities
  - Building capacity to conduct these trials
    - Fostering the next generation of investigators
- **Early impact**
  - Influence on policies and practice

Summary

- ECHO is major investment—now paying off—in understanding early environmental influences on child health
  - 5 key pediatric health outcomes
  - Expanding research to look at most pressing child health topics
- ECHO Cohort filling evidence gaps on long-term influences of prenatal and early childhood factors on chronic disease and child health
  - Large, varied, nationwide
- ECHO ISCPTN is the only NIH clinical trial network focused on children from rural or underserved communities
- ECHO Science aligned with, and positioned to support, National priority areas
  - Including autism spectrum initiative
  - Data and specimens available to the broader scientific community

ECHO Resources

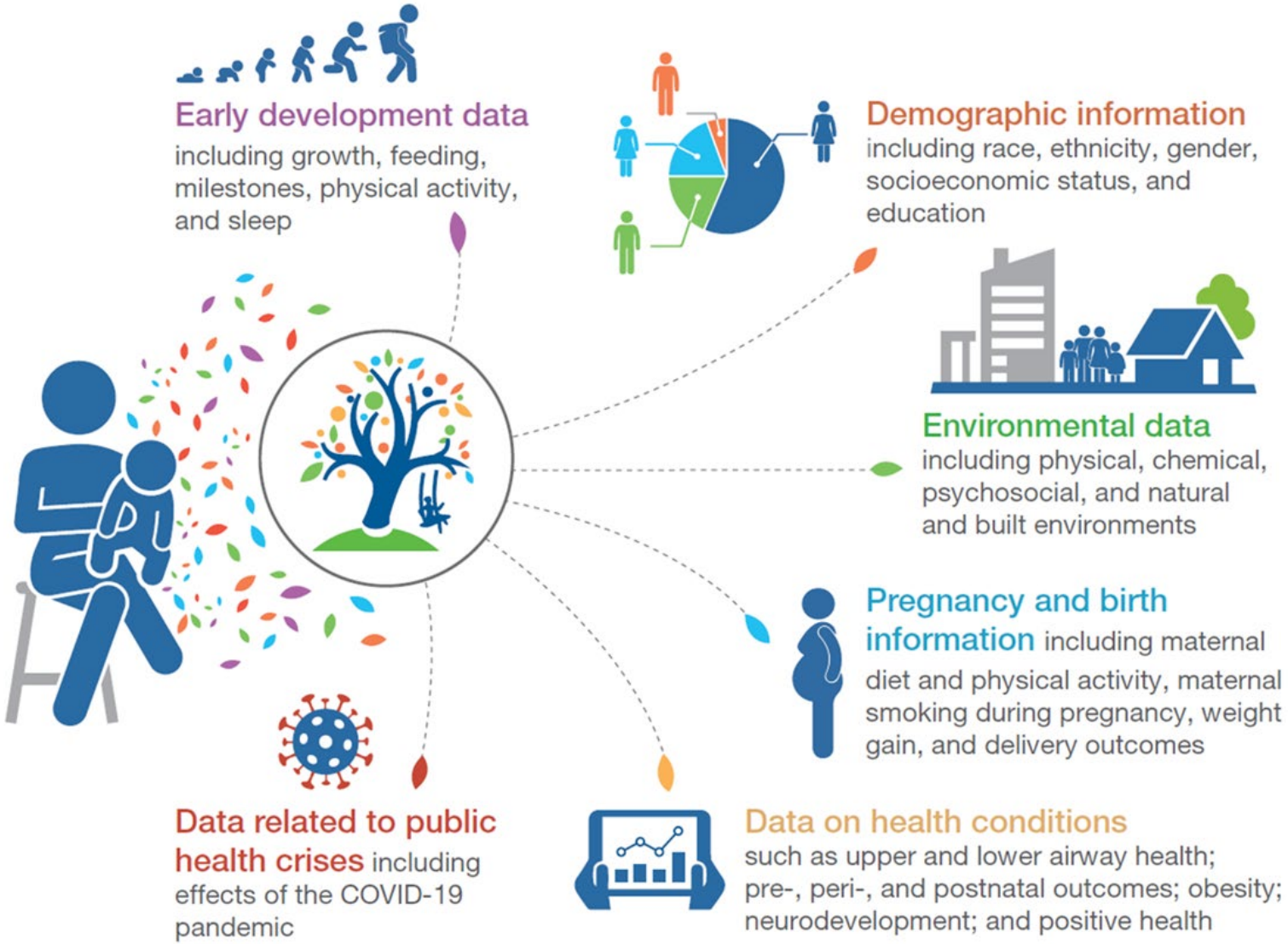
ECHO Cohort Data Available to Broad Scientific Community



ECHO Data for the Broad Scientific Community

Controlled-Access Public Use Database

- Deidentified data from 71,000+ participants
- 100+ registered users to date
- Grants for grad students and post-docs



ECHO Research Topics of National Interest on echochildren.org

ECHO Topics of Interest

AIR QUALITY
How indoor and outdoor air exposures may shape breathing, brain development, and birth outcomes

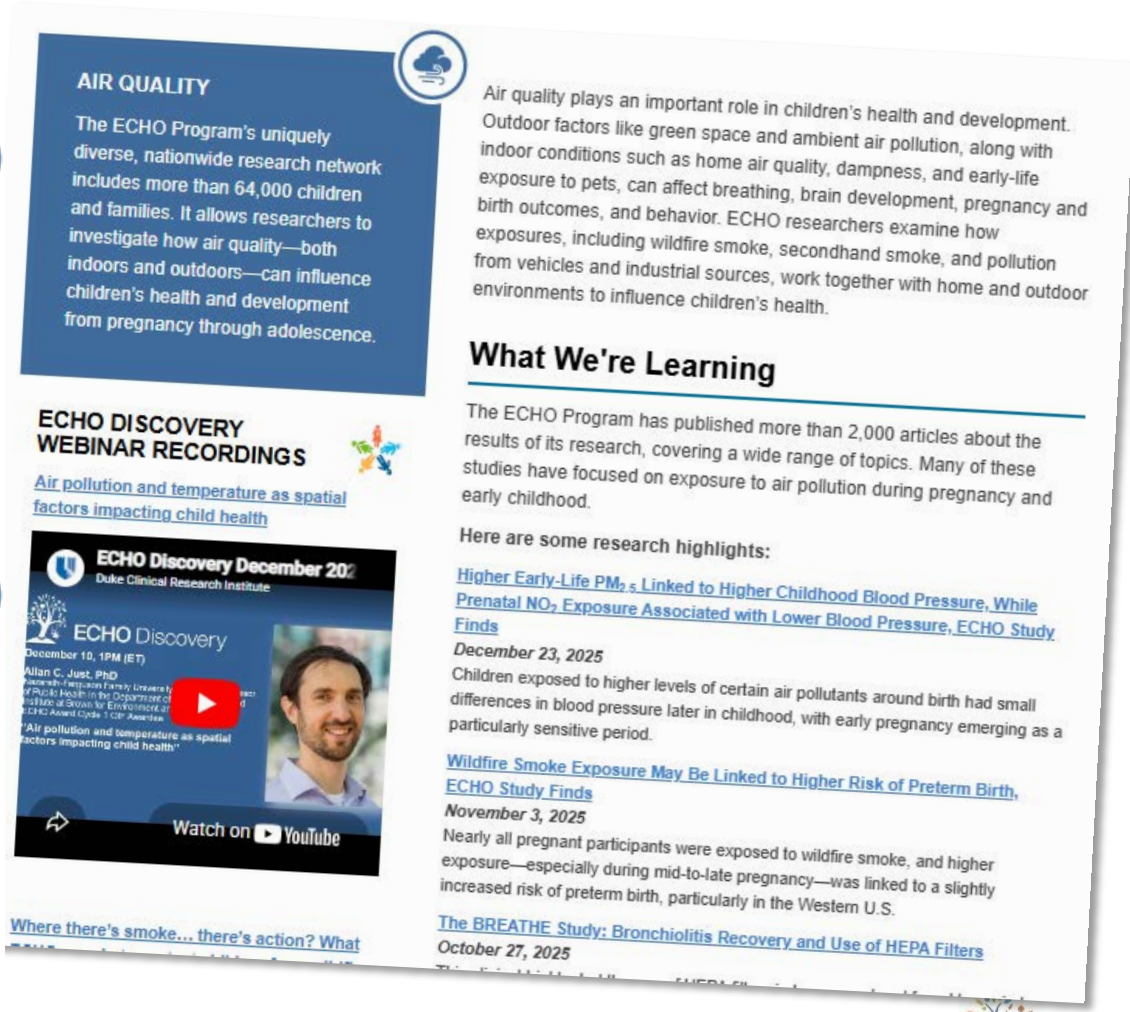
NEIGHBORHOODS
How neighborhood and social conditions such as safety, resources, and air quality can be tied to outcomes like obesity, asthma, and mental health

NUTRITION
How diet and access to healthy food can influence growth and development from pregnancy through childhood

CHEMICAL EXPOSURES
How everyday chemicals like PFAS, lead, phthalates, phenols, parabens, and others can affect children's growth and health

AUTISM
What prenatal diet, chemical exposures, and early-life conditions may reveal about autism risk

MEDIA USE
The ways digital media use and screen time may shape children's health and well-being



How ECHO aligns with other NIH Child Health Studies



ECHO and NIH child health studies

- NIH supports 2 other large-scale cohort programs addressing child health and development.
  1. ABCD (Adolescent Brain Cognitive Development Study)
  2. HBCD (Healthy Brain and Child Development Study)
- How ECHO Adds Unique Value
  - **Complementary, not duplicative.** Each program addresses distinct developmental windows, exposures, and outcomes
  - **Collaborative ecosystem.** Active coordination and data-sharing opportunities across programs
  - **Bridging research gaps**. ECHO spans multiple domains (prenatal → adolescence; environmental exposures → diverse health outcomes)

ECHO-ABCD-HBCD Programs
At-a-Glance

ECHO
Environmental influences on Child Health Outcomes
A program supported by the NIH





- Longitudinal study of **environment and child health outcomes**
- Early origins of common childhood conditions
- Participants:
  - Recruitment: Prenatal/preconception
  - Follow-up: to age 21 y
- 170,000+ participants, including ~60,000 active

- Longitudinal study of **adolescent brain development**
- Standards for normal brain development
- Participants:
  - Recruitment: age 9-10 y
  - Follow-up: adolescence and young adulthood
- 11,880 children

- Longitudinal study of **neurodevelopment from birth**
- Neuro- imaging & physiological assessments of infants
- Participants:
  - Recruitment: Prenatal
  - Follow-up: to age 9-10 y
- Expected recruitment of 7,500 mother-infant dyads

Tooth Workshop
ECHO-NIDCR-NICHD-NIDA-NIDDK-NIEHS



- **Purpose**: Guide most efficient use of deciduous teeth in studies like ECHO
- **Lessons**
  - Range of assays from least to most destructive
    - Morphology to metals to exposome
  - Need more information on how exposure manifests in tooth concentration
  - Can prioritize assays while awaiting more evidence
  - Working with NIDCR/others to coordinate strategy

Looking to the future



ECHO's Next 5 Years

ECHO Strategic Plans

2020-2024 Goals	2026-2030 Goals
Enhance Organizational Effectiveness	Enhance Organizational Effectiveness
Enable High-Impact Research	Enable High-Impact Research
Establish ECHO as a National Resource	Expand ECHO's Reach

- 2026-2030
  - *Expand* reach as national resource
    - Data and specimens for broad research community
    - Translating science to action
    - Aligning with national priorities

ECHO Highly Aligned with Public Health Priorities

Root causes of childhood chronic conditions

Exposures	Outcomes
Nutrition	Mental illness
Physical activities	Cancer
Healthy lifestyles	Asthma
Technology habits	Autism Spectrum
Environmental impacts	Autoimmune disease
Food quality and safety	Allergies
Drug quality and safety	Fatty liver disease
Chemical exposures	Diabetes
Electromagnetic radiation	Obesity
Corporate influence	ADHD





Inaugural ECHO Science to Action Symposium



- **Purpose**
  - Bridge gap between cutting-edge child health research and actionable solutions to enhance kids' growth and development
- **Focus**
  - How early developmental influences affect children's health
    - Chemical exposures, social & neighborhood factors, community experiences
- **~1200 Attendees**
  - Academic – 42%
  - Medical/Professional/Advocacy Org – 33%
  - Government – 25%

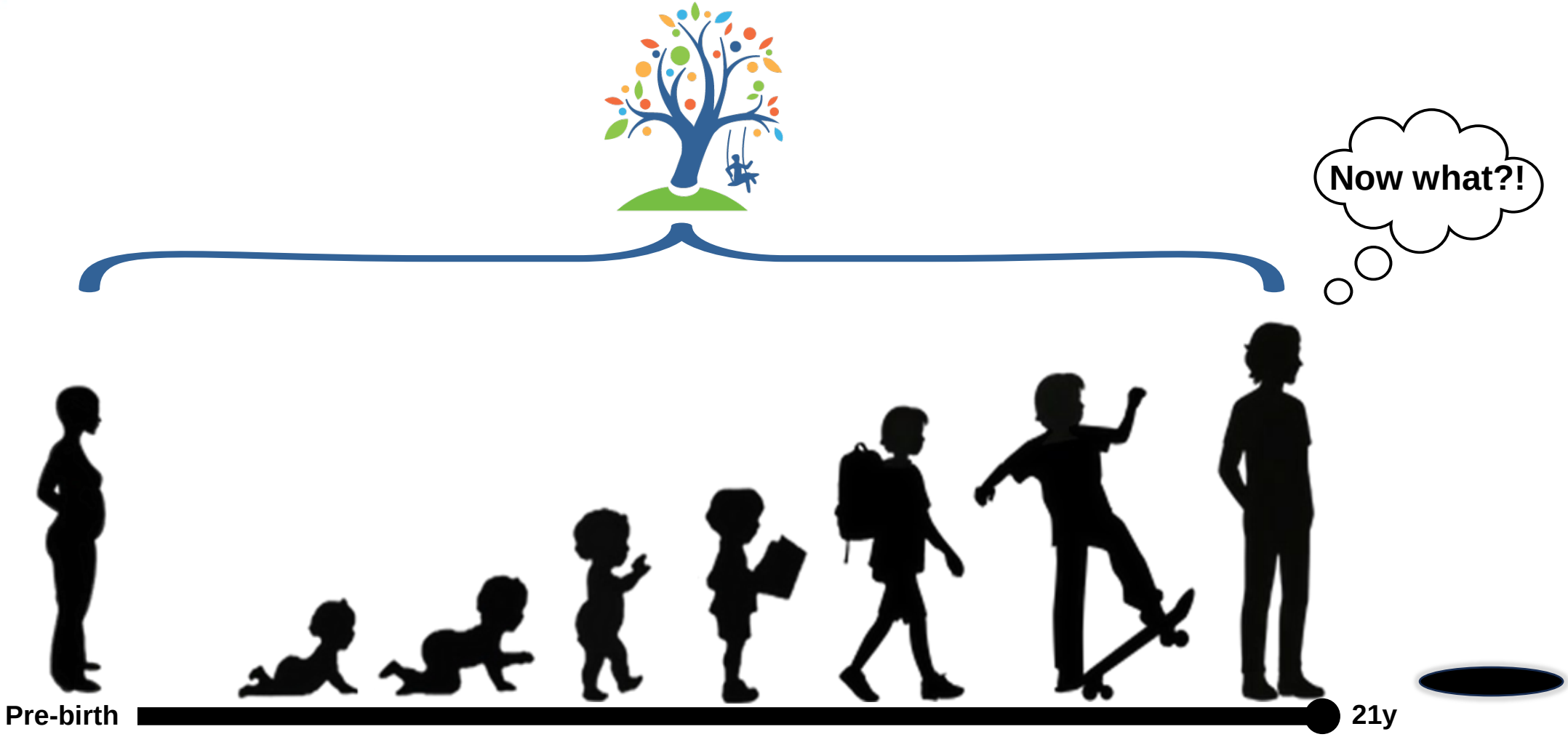
2nd ECHO Science to Action Symposium
May 6, 2026



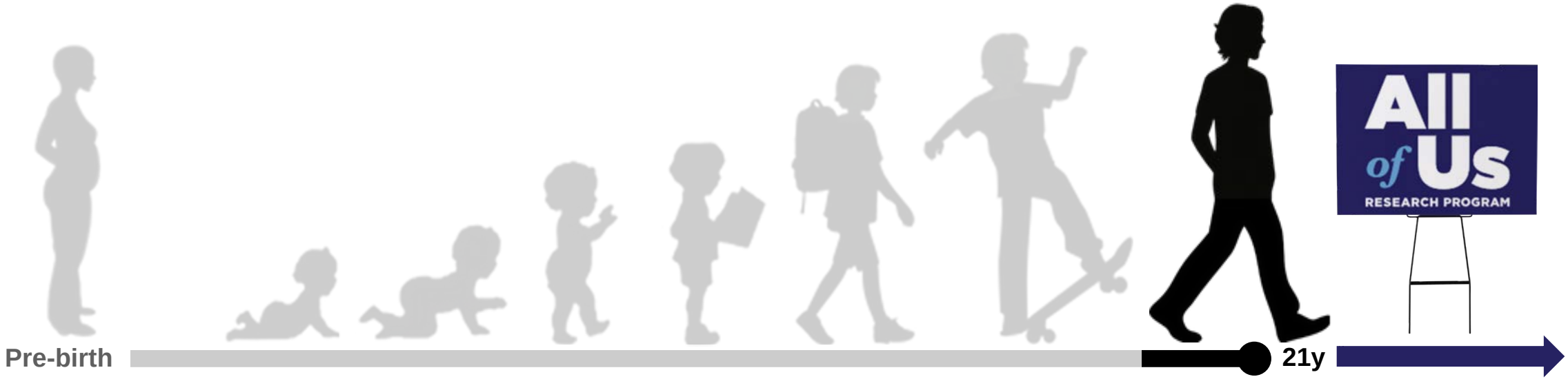
- **Foci: Plastics and Air Quality**
- **Keynote Addresses**
  - **Welcome:** Nsedu Witherspoon
    - Executive Director, Children's Environmental Health Network
  - **Closing:** Dr. Andrew Racine
    - President, American Academy of Pediatrics
- **Presentations, panel discussions, fireside chats, networking sessions**
  - Engage with organizations translating evidence into impact

Partnering with All of Us Research Program

ECHO Child Participant Timeline



Opportunity for Participants: Continue Contributing to Life Course Research by Joining AoU



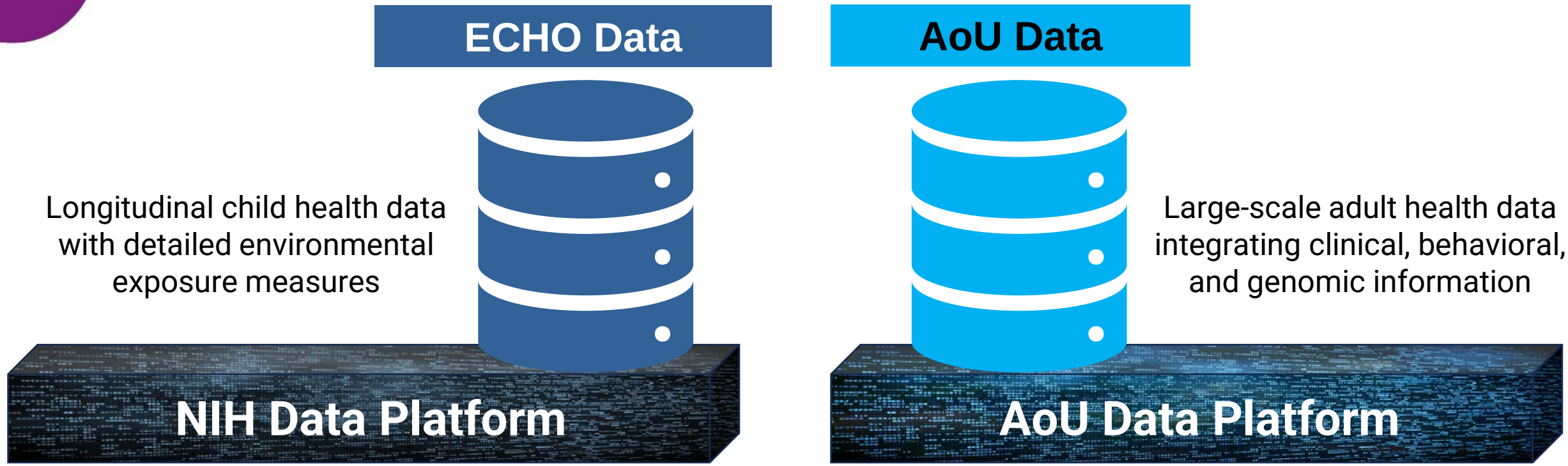
Opportunity for Research: Longitudinal data spanning the life course

Before birth - 21 years

21 and beyond



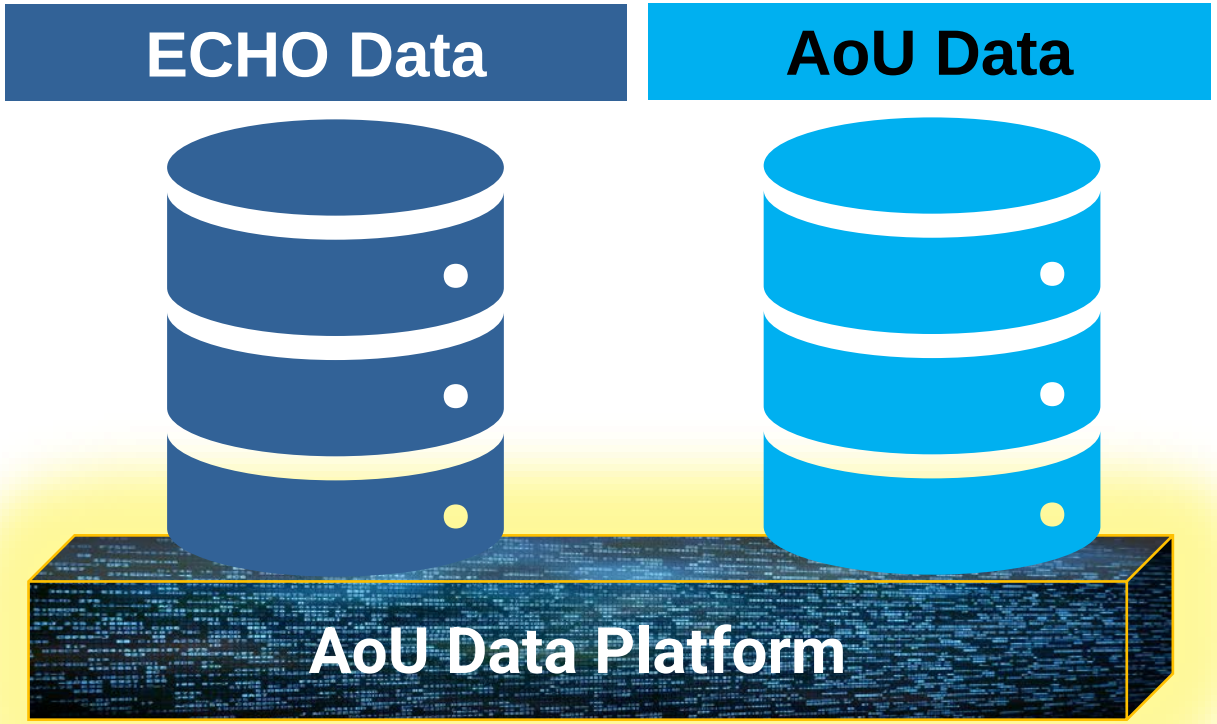
Fragmented Data Limits Life-Course Insight



Operating separately, these datasets limit our ability to understand health across the lifespan.

Integration Enables Earlier Prevention and Better Outcomes

- Integrating these datasets creates a unified national data resource providing a life-course view of health.
  - National Impact:
    - **Better outcomes:** Earlier detection and intervention
    - **Lower costs:** Prevention reduces long-term healthcare spending
    - **Greater ROI:** Maximizes value of existing federal data investments
    - **U.S. leadership:** Strengthens global leadership in biomedical research



Conclusions





ECHO can answer big questions about child health and chronic disease that no other US research program can address

Key Takeaways From Today

1. ECHO is a NIH Flagship Pediatric Research Program
2. The ECHO Program is a National Research Resource providing access to its data and biospecimens
3. ECHO science translates its science to inform programs, policies, and practice



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www.echochildren.org

Attend Science to Action Symposium

https://cvent.me/ZZ01Br

Leverage our Data

https://echochildren.org/echo-ancillary-studies

https://echochildren.org/dash

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