Update from NIMH

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MISSION

To transform the understanding and treatment of mental illnesses through basic and clinical research, paving the way for prevention, recovery, and cure.

www.nimh.nih.gov

Research = Hope

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About the NIMH

- The National Institute of Mental Health (NIMH) is the lead federal agency for research on mental illnesses.

- NIMH supports more than 3,000 research grants and contracts at universities and other institutions across the country and overseas.

- NIMH intramural research programs support approximately 600 scientists working on the NIH campuses.

Burden of Mental Illness – U.S. DALYs

Cumulative U.S. DALYs for the Leading Disease/Disorder Categories by Age (2015)

Data Courtesy of IHME
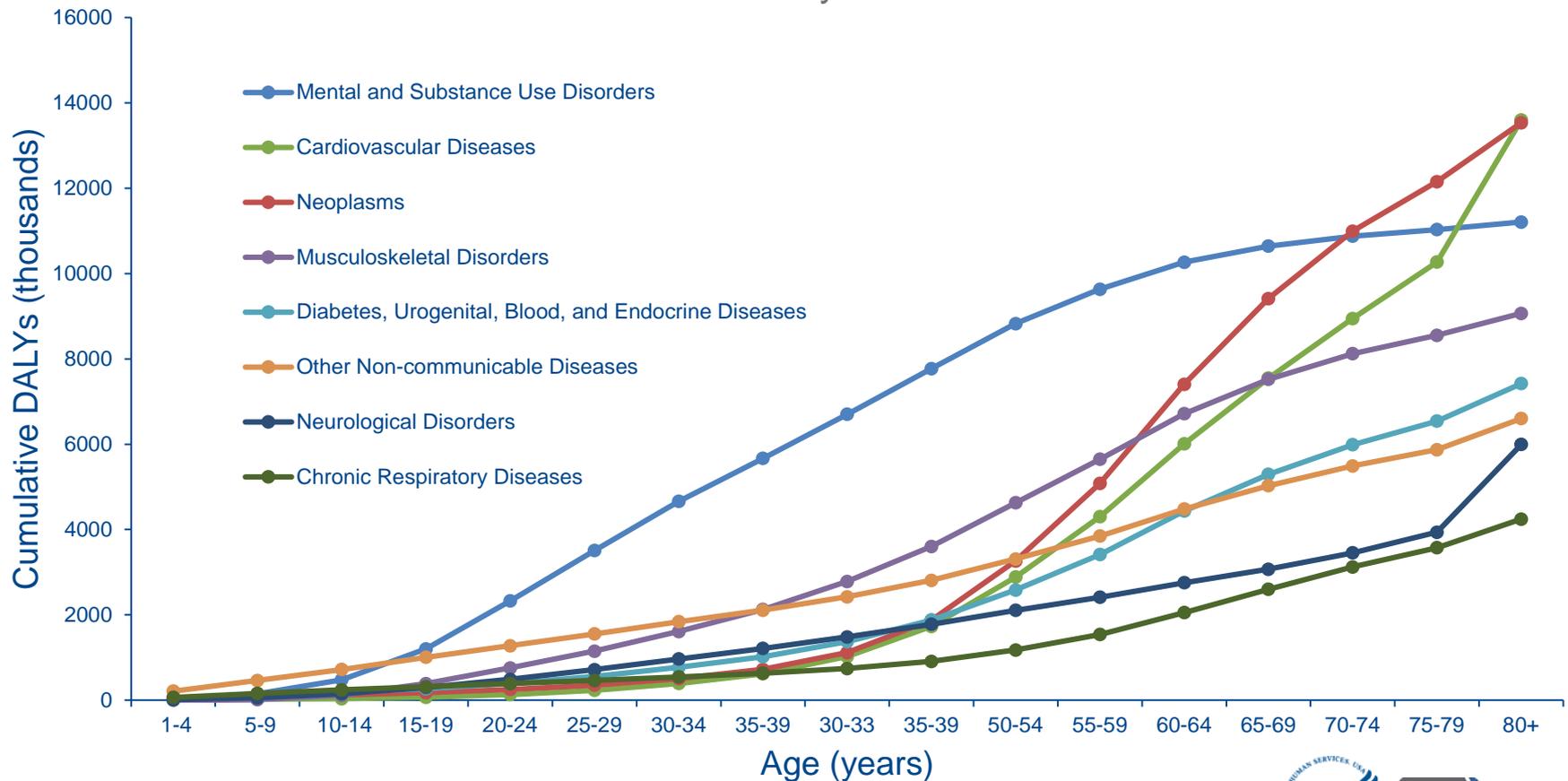
Agenda

- NIMH Strategic Research Priorities

- Neurodevelopmental Perspective

- Early Identification and Intervention Across the Lifespan

- Challenges and Opportunities

NIMH Strategic Plan for Research

| Objective 1: | Define the mechanisms of complex behaviors |

| Objective 2: | Chart mental illness trajectories to determine when, where, and how to intervene |

| Objective 3: | Strive for prevention and cures |

| Objective 4: | Strengthen the public health impact of NIMH-supported research |

NIMH Strategic Plan for Research
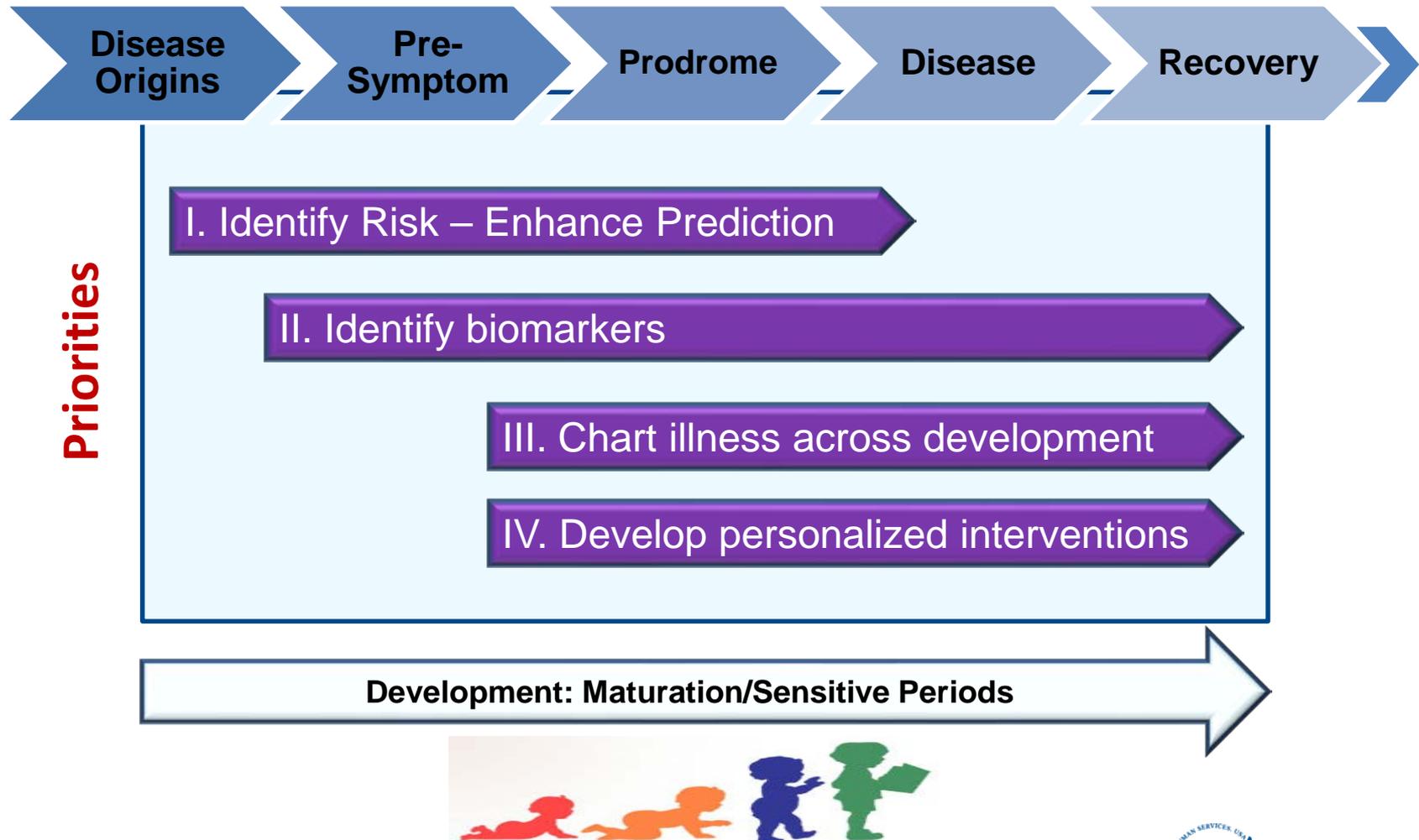
Disease Origins → Pre-Symptom → Prodrome → Disease → Recovery

Priorities

I. Identify Risk – Enhance Prediction

II. Identify biomarkers

III. Chart illness across development

IV. Develop personalized interventions

Development: Maturation/Sensitive Periods

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- **Neurodevelopmental Perspective**

- Early Identification and Intervention Across the Lifespan

- Challenges and Opportunities

(Neuro)developmental Perspective

Early & Differential Onset

Roots in Neurodevelopment

Early insult alters trajectories

Early interventions improve outcomes

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Psychiatric Disorders Onset During Childhood and Adolescence

Casey et al. *Biol Psychiatry,* 2014
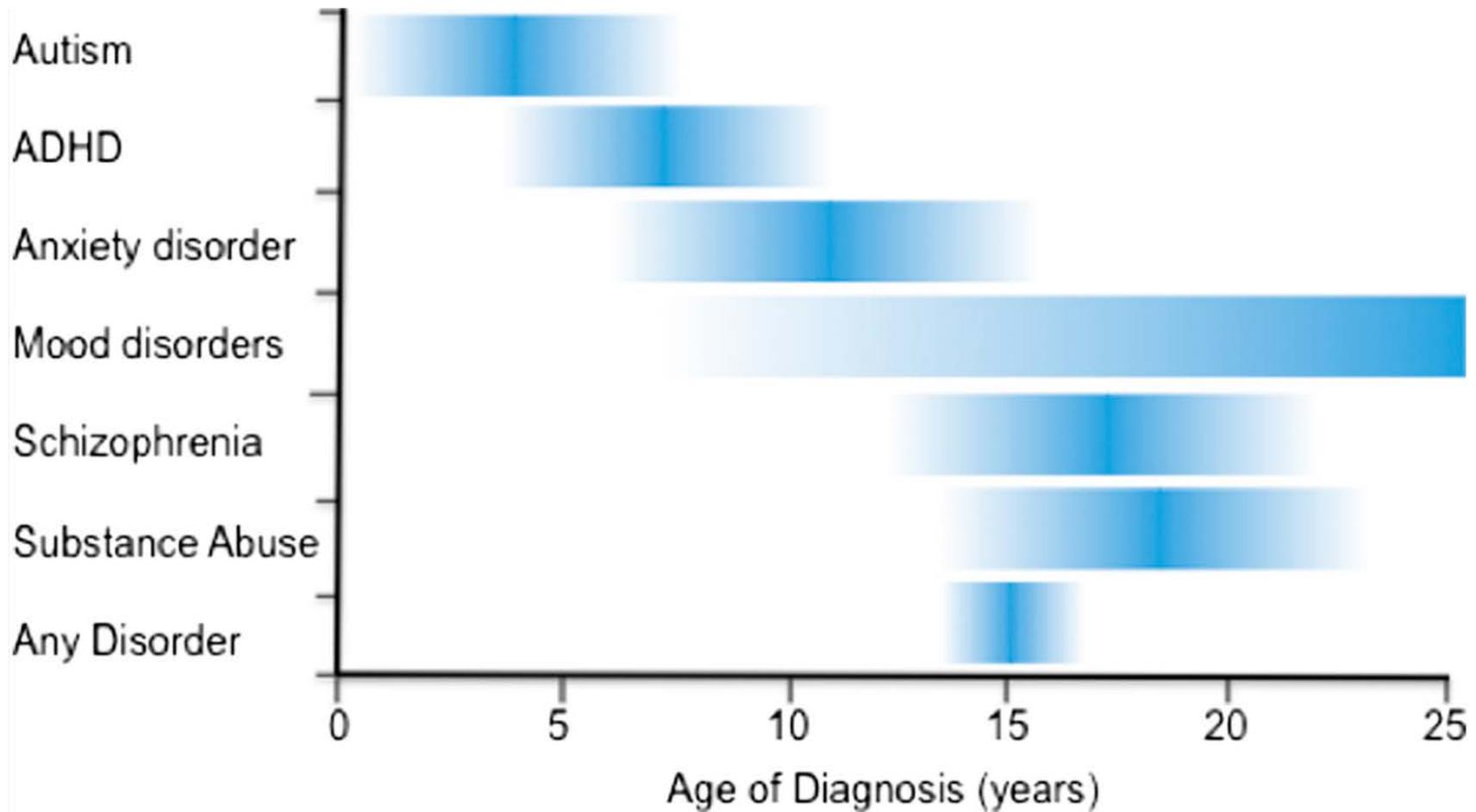
Neurodevelopmental Roots and Risk

Rutten, *Schiz Bull*, 2009
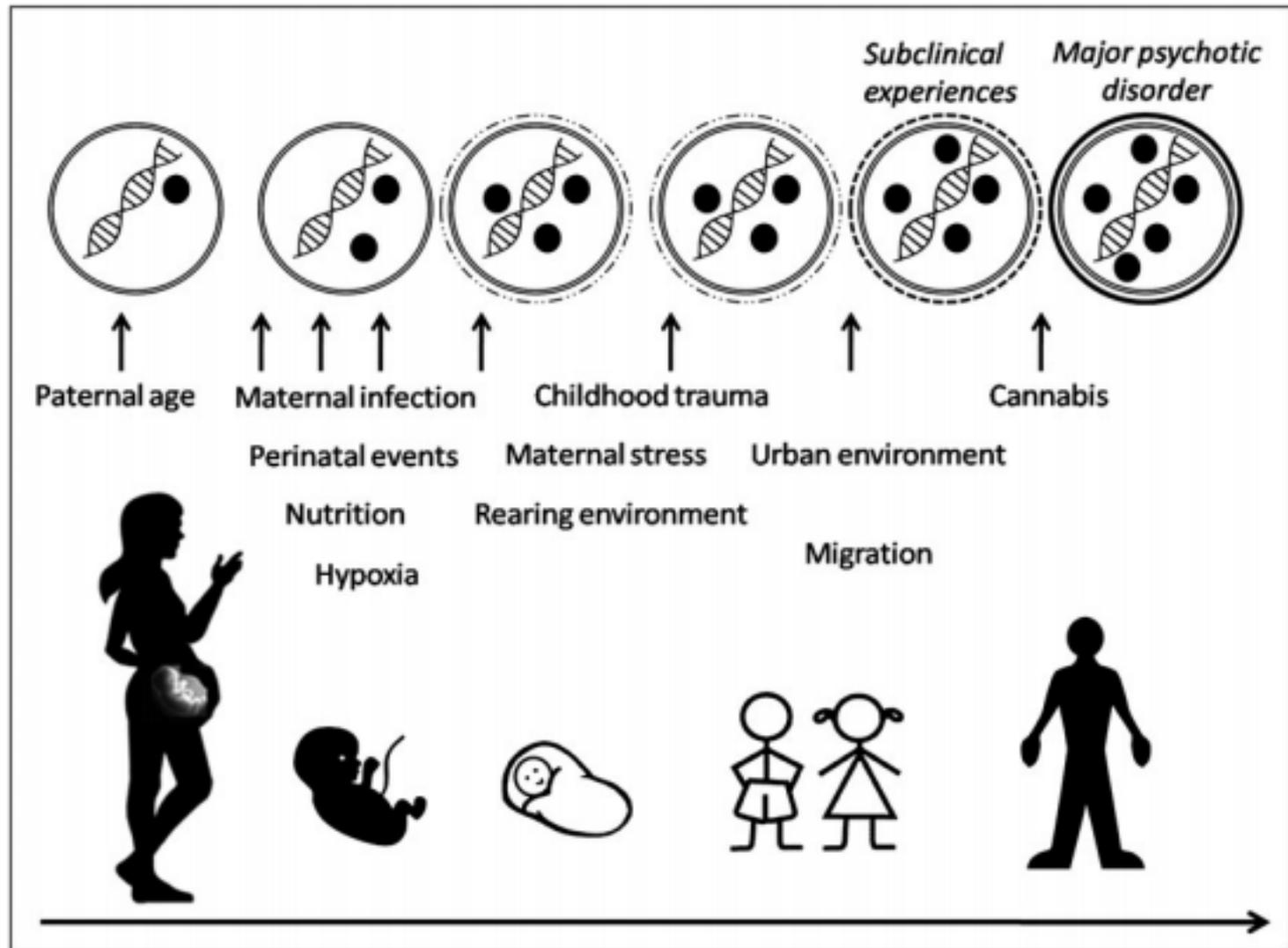
Early Trajectories Predict ASD

P value < 0.05: LR vs HR-ASD
0   0.01 0.02 0.03 0.04 0.05
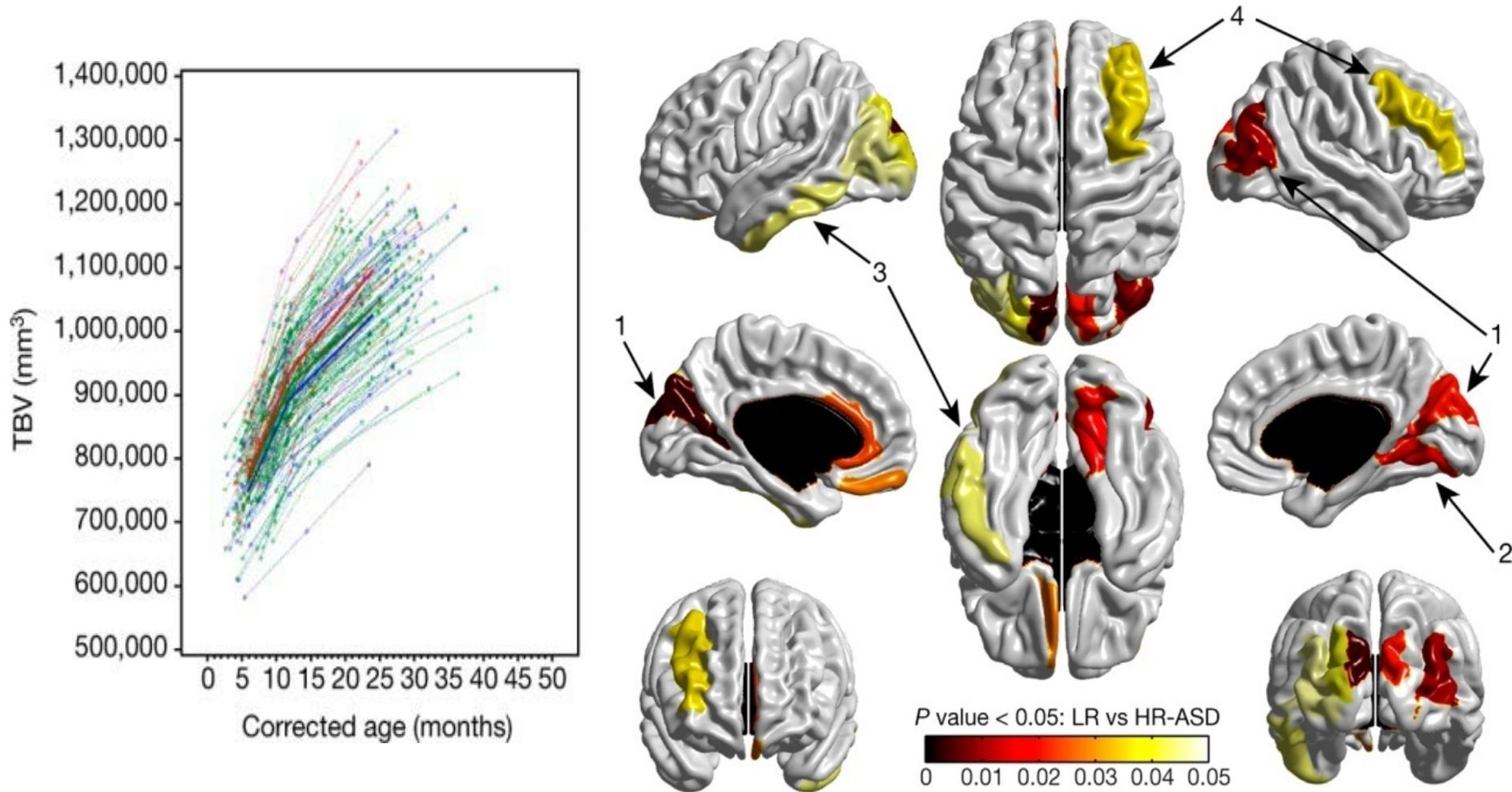
Hazlett, *Nature,* 2017

Children's Early Visual Behavior Predicts Autism
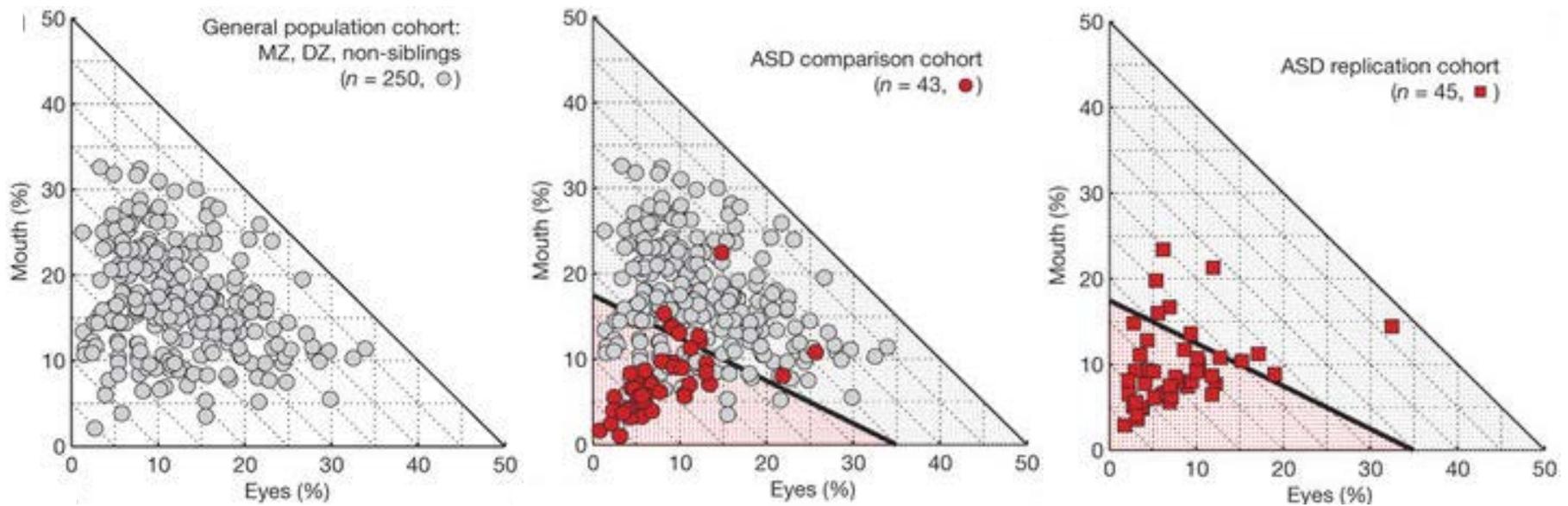
Constantino, *Nature*, 2017

Early Interventions May Improve Outcomes

Dawson, et al., *Pediatrics*, 2010
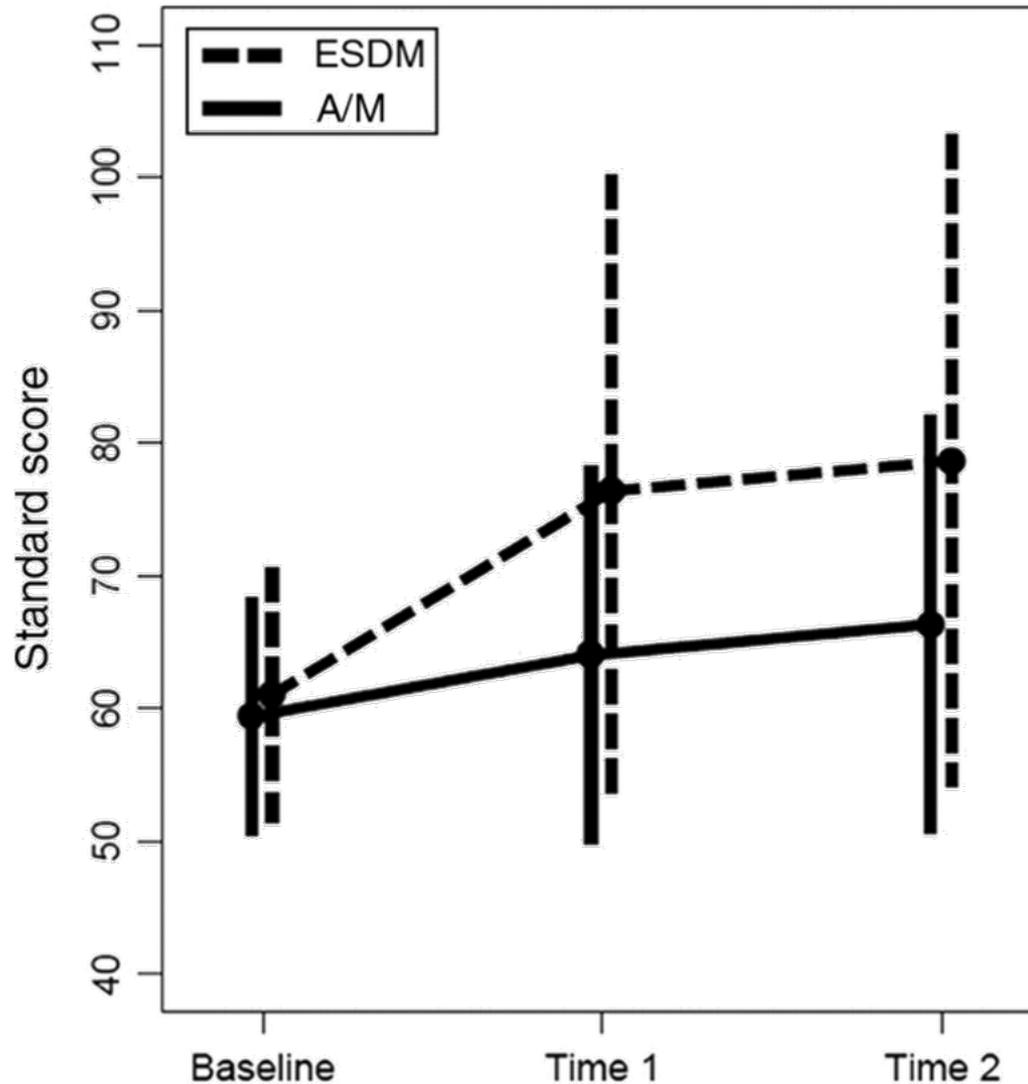
Autism Spectrum Disorder (ASD) Services Research Across the Lifespan (ServASD)

- ASD Screening, Evaluation and Engagement in Treatment and Services in the First Two Years of Life

- Pilot Studies on Services for Transition-Age Youth

- Pilot Studies on Services for Adults with ASD

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Universal Screening Plus Intervention Reduces Number of Suicide Attempts

Figure 2. Total Suicide Attempts per Participant by Phase
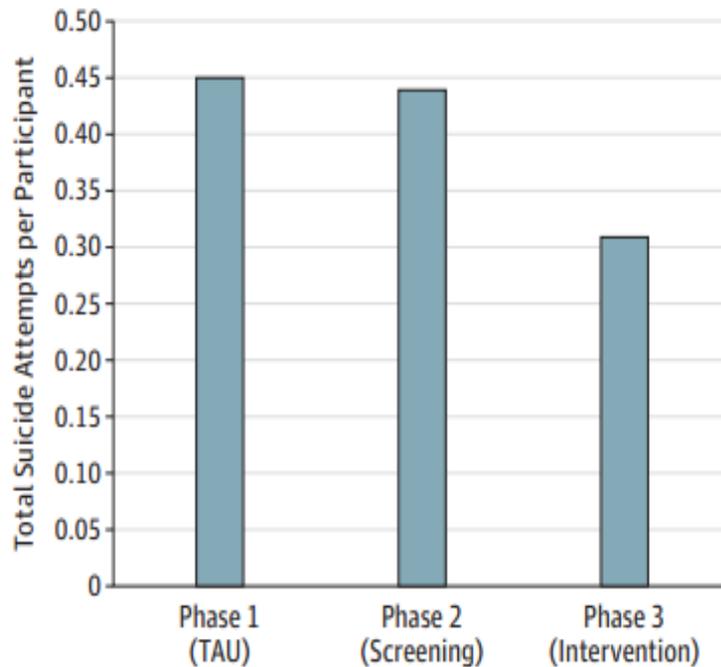
Figure 3. Proportion of Participants Who Did Not Make a Suicide Attempt Over Time

Miller…ED-SAFE Investigators, *JAMA Psychiatry*, 2017
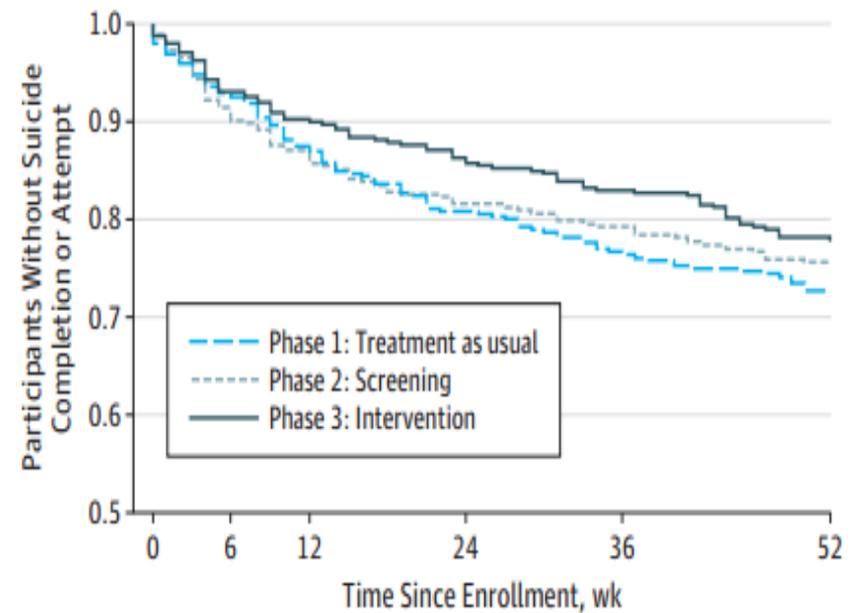
ServASD: Developmental Milestones

Age 15-17 →
- Increased independence
- Social relationships
- Work habits & problem-solving
- Future planning

Early 20s →
- Beginning work life
- Health & stress management
- Adult relationships
- Independent living
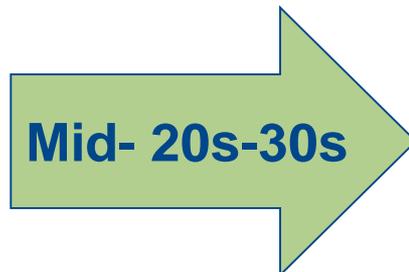
Mid- 20s-30s →
- Established friends & community
- Continued & new health management
- Long-term planning

http://www.cdc.gov/ncbddd/childdevelopment/positiveparenting/adolescence2.html
http://hubpages.com/health/Adult-Developmental-Stages-Adults-in-Their-20s

Structural Brain Abnormalities in Youth With Psychosis Spectrum Symptoms

Data from the Philadelphia Neurodevelopmental Cohort

Satterthwaite, et al., *JAMA Psychiatry*, 2016
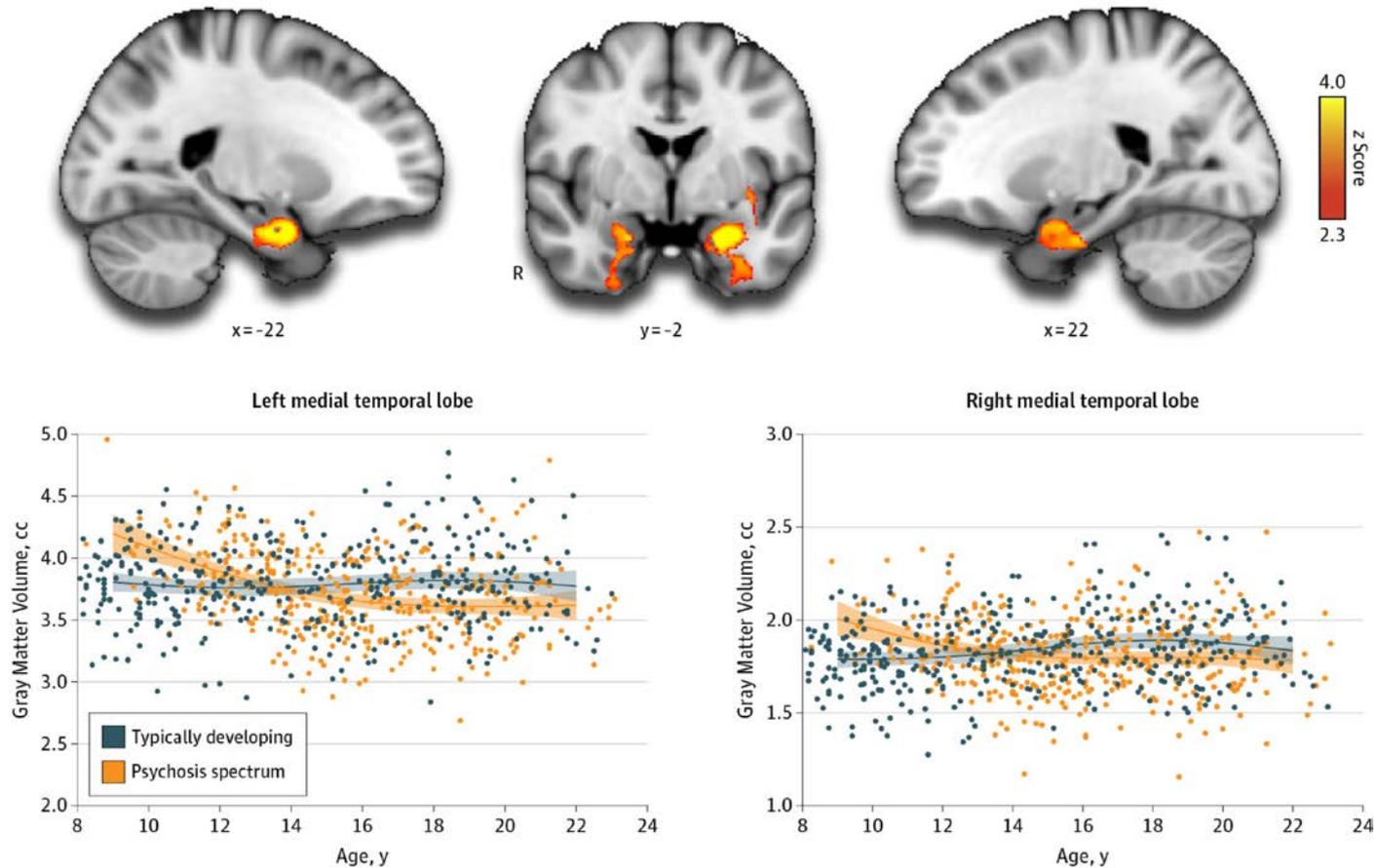
Recovery After an Initial Schizophrenia Episode (RAISE)

Participants with shorter duration of untreated psychosis had greater improvement in quality of life and psychopathology over 2 years

Kane, et al., *Am. J. Psychiatry*, 2016
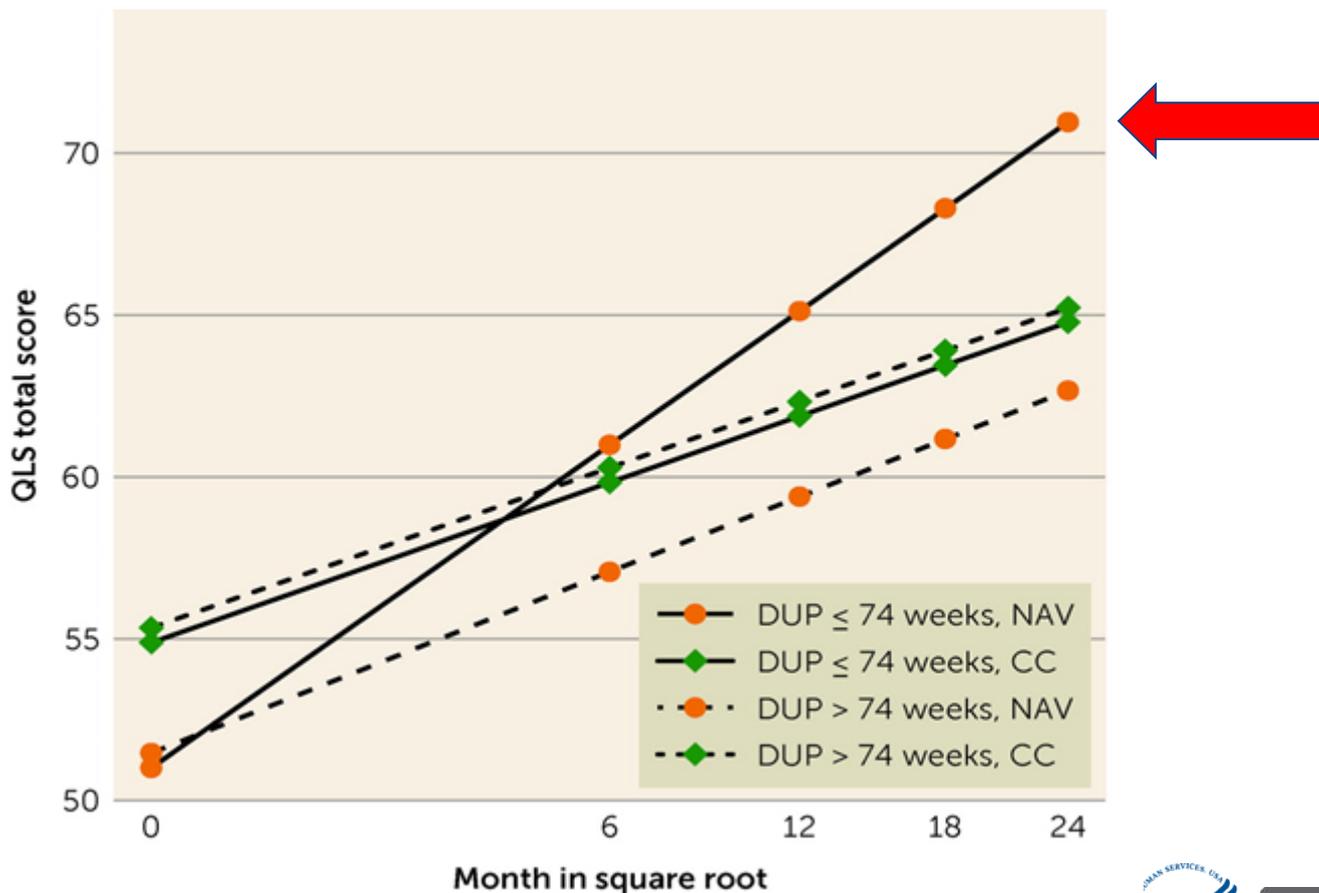
The Importance of Early Identification & Access to Services

Current Initiative:

> **Initiation of a Mental Health Family Navigator Model to Promote Early Access, Engagement and Coordination of Needed Mental Health Services for Children and Adolescents**
>
> **(PAR-18-428 & PAR-18-429)**

These announcements encourage research to develop and test the effectiveness and implementation of family navigator models to:

- Promote early access, engagement and coordination of treatment and services

- Specially address children and adolescents experiencing *early symptoms* of mental health problems

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- Early Identification and Intervention Across the Lifespan

- Opportunities in the Era of Big Data

Challenge: Non-linear, Non-uniform Changes Across the Lifespan

- Development is a non-linear, non-uniform, process
- Aging is a non-linear, non-uniform, process
- Environment changes, and it matters
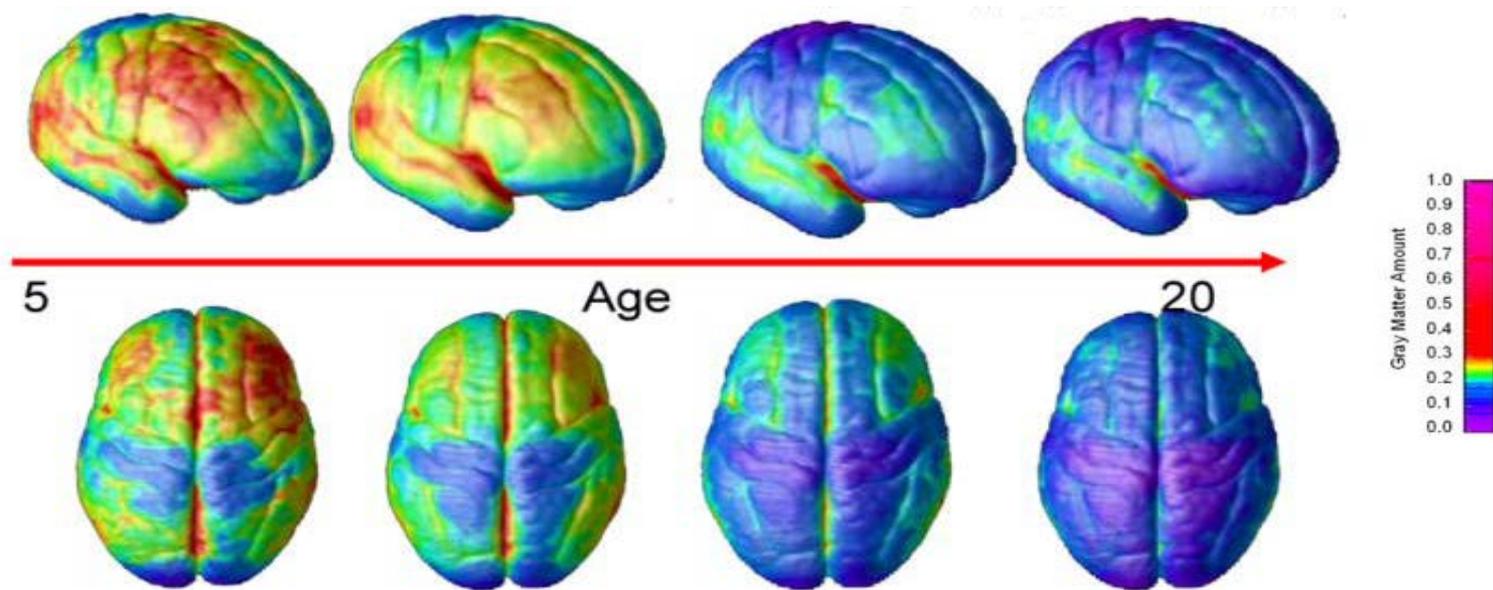
Gogtay and Thompson, *Brain Cogn*. 2010:
Adapted from Giedd et al. *Nature Neuroscience*, 1999

Human Connectome Project (HCP)

- Map the neural pathways that underlie human brain function

- Deciphering the brain's complex wiring system

  - Mapping the connectomes in over 1,000 healthy adults

  - Optimizing MRI technology for imaging brain structure

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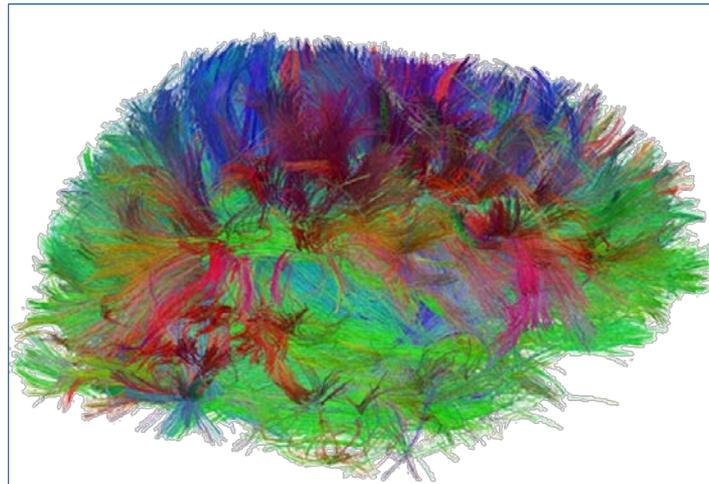
Lifespan Connectome

- **Baby Connectome:**
  - Ages 0-5 years; 500 participants; cross-sectional and longitudinal

- **Development Connectome:**
  - Ages 5-21 years; 1350 participants; cross-sectional and longitudinal

- **Young Adult Connectome (initial HCP)**
  - Ages 22-35; 1200 participants, twin pairs, siblings

- **Aging Connectome:**
  - Ages 36 – 100; 1200 participants

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Big Data Approaches

Adolescent Brain Cognitive Development (ABCD) Study

- Longitudinal study of ~10,000 children from ages 9-10 through early adulthood

All of Us Research Program

- Over 1 million participants; now Beta testing

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