Childhood Development

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Objectives

- **Review typical development including new CDC milestones**
- **Discuss some medical, environmental and social conditions that may negatively influence development**
- **Discuss interventions that have the potential to improve development**

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Developmental Milestones

- **Behaviors and physical skills seen in infant and children as they grow and develop**
    - **Crawling**
    - **Walking**
    - **Smiling**
    - **Talking**
- **There are normal ranges in which children reach these milestones**
    - **Every child is different**
- **Pediatricians routinely assess childhood development with very well-child visit**

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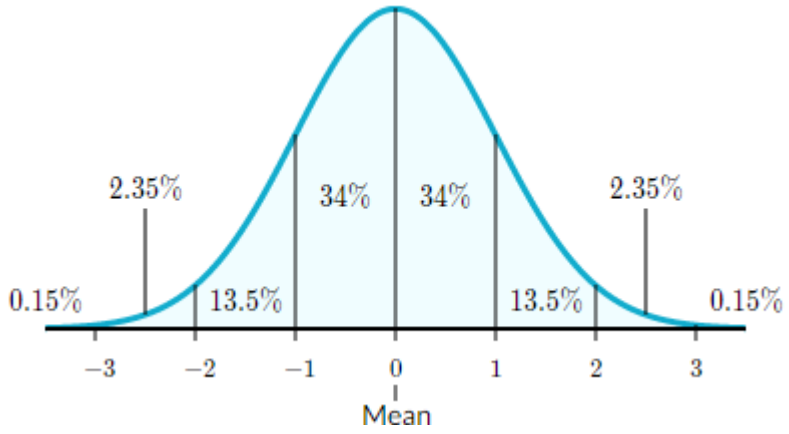
Childhood Development

- **What is typical?**
- **What do parents want to know after a high-risk birth?**



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Pediatric Primary Care

- **Used by almost all families (Pediatricians/Family Practice)**
- **Assess development**
- **Provides opportunity to:**
  - **Refer for mor in depth evaluation**
  - **Connect families to needed services**

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Pediatric Primary Care

- **Developmental surveillance**
  - **Lists of Milestones-Newly Developed by CDC and AAP**
  - **Physical Exam**
- **Formal screening**
  - **AAP recommends formal developmental and behavioral screening at 9, 18 and 30 months**
  - **AAP recommends formal autism screening at 18 and 24 months**

Categories of Development

AAP/CDC Pediatrics January 2022

Developmental Monitoring and Screening | CDC

- **Social emotional**
- **Language Communication**
- **Cognitive**
- **Motor**

- **Milestones are included at the age most (75%) children would be expected to demonstrate**

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Learn the Signs Home

Milestones

2 months
4 months
6 months
9 months
1 year
15 months
18 months
2 years
30 months
3 years
4 years
5 years

Milestone Tracker App

CDC's Developmental Milestones

Español (Spanish)

CDC's milestones and parent tips have been updated and new checklist ages have been added (15 and 30 months). Due to COVID-19, updated photos and videos have been delayed but will be added back to this page in the future. For more information about the recent updates to CDC's developmental milestones, please view the *Pediatrics* journal article describing the updates.

Skills such as taking a first step, smiling for the first time, and waving "bye bye" are called developmental milestones. Children reach milestones in how they play, learn, speak, act, and move (crawling, walking, etc.).

Click on the age of your child to see the milestones:

- 2 months
- 4 months
- 6 months
- 9 months
- 1 year
- 15 months
- 18 months
- 2 years
- 30 months

Important Milestones: Your Child By One Year

Español (Spanish)

CDC's milestones and parent tips have been updated and new checklist ages have been added (15 and 30 months). Due to COVID-19, updated photos and videos have been delayed but will be added back to this page in the future. For more information about the recent updates to CDC's developmental milestones, please view the *Pediatrics* journal article describing the updates.

How your child plays, learns, speaks, acts, and moves offers important clues about your child's development. Developmental milestones are things most children (75% or more) can do by a certain age.

Check the milestones your child has reached by the end of 1 year by completing a checklist with CDC's free *Milestone Tracker* mobile app, for iOS and Android devices, or by printing the checklist [1 MB, 2 Pages, Print Only] below. Take the checklist with you and talk with your child's doctor at every visit about the milestones your child has reached and what to expect next.

"Learn the Signs. Act Early." materials are not a substitute for standardized, validated developmental screening tools.

What most children do by this age:

Social/Emotional Milestones

- Plays games with you, like pat-a-cake

Language/Communication Milestones

- Waves "bye-bye"
- Calls a parent "mama" or "dada" or another special name
- Understands "no" (pauses briefly or stops when you say it)

Cognitive Milestones (learning, thinking, problem-solving)

- Puts something in a container, like a block in a cup

Concerned About Your Child's Development? Act Early.

You know your child best. Don't wait. If your child is not meeting one or more milestones, has lost skills he or she once had, or you have other concerns, act early.

Your baby at 12 months

Baby's Name _____ **Baby's Age** _____ **Today's Date** _____

Milestones matter! How your baby plays, learns, speaks, acts, and moves offers important clues about his or her development. Check the milestones your baby has reached by 12 months. Take this with you and talk with your baby's doctor at every well-child visit about the milestones your baby has reached and what to expect next.

What most babies do by this age:

Social/Emotional Milestones

- ☐ Plays games with you, like pat-a-cake

Language/Communication Milestones

- ☐ Waves "bye-bye"
- ☐ Calls a parent "mama" or "dada" or another special name
- ☐ Understands "no" (pauses briefly or stops when you say it)

Cognitive Milestones (learning, thinking, problem-solving)

- ☐ Puts something in a container, like a block in a cup
- ☐ Looks for things he sees you hide, like a toy under a blanket

Movement/Physical Development Milestones

- ☐ Pulls up to stand
- ☐ Walks, holding on to furniture
- ☐ Drinks from a cup without a lid, as you hold it
- ☐ Picks things up between thumb and pointer finger, like small bits of food

Other important things to share with the doctor...

- What are some things you and your baby do together?
- What are some things your baby likes to do?
- Is there anything your baby does or does not do that concerns you?
- Has your baby lost any skills he/she once had?
- Does your baby have any special healthcare needs or was he/she born prematurely?

You know your baby best. Don't wait. If your baby is not meeting one or more milestones, has lost skills he or she once had, or you have other concerns, act early. Talk with your baby's doctor, share your concerns, and ask about developmental screening. If you or the doctor are still concerned:

1. Ask for a referral to a specialist who can evaluate your baby more; and
2. Call your state or territory's early intervention program to find out if your baby can get services to help. Learn more and find the number at **cdc.gov/FindEI**.

For more on how to help your baby, visit **cdc.gov/Concerned**.

Don't wait.
Acting early can make a real difference!

CDC

Download CDC's free *Milestone Tracker* app

App Store Google Play

American Academy of Pediatrics
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Milestones Matter

Track your child's developmental milestones and try brain building tips to add learning to everyday moments!

Track Your Child's Development

Track how your child plays, learns, speaks, acts, and moves with CDC's *Milestone Tracker* app—and share all progress and any concerns with their doctor during well-child visits.
www.cdc.gov/MilestoneTracker

BY 18 MONTHS:
Points to show you something interesting

BY 12 MONTHS:
Plays games with you, like "peek-a-boo"

BY 6 MONTHS:
Laughs with you

BY 2 MONTHS:
Smiles at you

Brain Building Tip:

Powered by vroom

Suggested Age: 0 – 2 years

We're surrounded by words that are ready for reading. Try reading signs aloud to your child and talk to them about what they mean.

It doesn't matter if it's a book, magazine, or billboard – it all counts! Reading to your child, anywhere and everywhere, helps them develop a rich, diverse vocabulary. Find more tips at vroom.org.

Centers for Disease Control and Prevention
www.cdc.gov/ActEarly
1-800-CDC-INFO

Do you have concerns about how your child plays, learns, speaks, acts or moves? Visit www.cdc.gov/concerned and talk with your child's doctor.

CDC does not endorse private products, services, or enterprises. Vroom Tips are not a diagnostic tool.

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Communication and Language

	Age
Makes sound other than crying	2 months
Makes sound back when you talk	4 months
Blows raspberries	6 months
Waves bye-bye	12 months
Calls parent mama or dada	12 months
Two words together, like “more milk”	24 months
Sentences with ≥ 4 words	4 years

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Social and Emotional

	Age
Looks at your face	2 months
Smiles to get your attention	4 months
Laughs	6 months
Plays a game like patty cake	12 months
Claps when excited	15 months
Looks at your face to decide how to react to a new situation	24 months
Comforts others who are hurt	4 years

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Cognitive

	Age
Watches you as you move	2 months
Looks at hands with interest	4 months
Reaches to grab a toy	6 months
Looks for a toy that you hide	12 months
Tries to use things the right way like a phone, cup or book	15 months
Tries to use switches, knobs or buttons on a toy	24 months
Follows two step instructions, “put the toy down and close the door”	30 months
Names a few colors	4 years

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Motor

	Age
Holds head up on tummy	2 months
Holds head steady without support	4 months
Rolls from tummy to back	6 months
Sits without support	9 months
Pulls to stand	12 months
Walks holding on to furniture	12 months
Walks without holding on	18 months
Drinks from a cup	18 months
Uses a fork	3 years

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At Age Five

- Hops on one foo
- Counts to 10
- Answers simple
- Follow rules or

Your child at 5 years

Child's Name _____ Child's Age _____ Today's Date _____

Milestones matter! How your child plays, learns, speaks, acts, and moves offers important clues about his or her development. Check the milestones your child has reached by age 5. Take this with you and talk with your child's doctor at every well-child visit about the milestones your child has reached and what to expect next.

What most children do by this age:

Social/Emotional Milestones

- ☐ Follows rules or takes turns when playing games with other children
- ☐ Sings, dances, or acts for you
- ☐ Does simple chores at home, like matching socks or clearing the table after eating

Language/Communication Milestones

- ☐ Tells a story she heard or made up with at least two events. For example, a cat was stuck in a tree and a firefighter saved it
- ☐ Answers simple questions about a book or story after you read or tell it to him
- ☐ Keeps a conversation going with more than three back-and-forth exchanges
- ☐ Uses or recognizes simple rhymes (bat-cat, ball-tall)

Cognitive Milestones (learning, thinking, problem-solving)

- ☐ Counts to 10
- ☐ Names some numbers between 1 and 5 when you point to them
- ☐ Uses words about time, like "yesterday," "tomorrow," "morning," or "night"
- ☐ Pays attention for 5 to 10 minutes during activities. For example, during story time or making arts and crafts (screen time does not count)
- ☐ Writes some letters in her name
- ☐ Names some letters when you point to them

Movement/Physical Development Milestones

- ☐ Buttons some buttons
- ☐ Hops on one foot

Other important things to share with the doctor...

- What are some things you and your child do together?
- What are some things your child likes to do?
- Is there anything your child does or does not do that concerns you?
- Has your child lost any skills he/she once had?
- Does your child have any special healthcare needs or was he/she born prematurely?

You know your child best. Don't wait. If your child is not meeting one or more milestones, has lost skills he or she once had, or you have other concerns, act early. Talk with your child's doctor, share your concerns, and ask about developmental screening. If you or the doctor are still concerned:

1. Ask for a referral to a specialist who can evaluate your child more; and
2. Call any local public elementary school for a free evaluation to find out if your child can get services to help.

For more on how to help your child, visit **cdc.gov/Concerned**.

Don't wait.
Acting early can make a real difference!

CDC

Download CDC's free Milestone Tracker app

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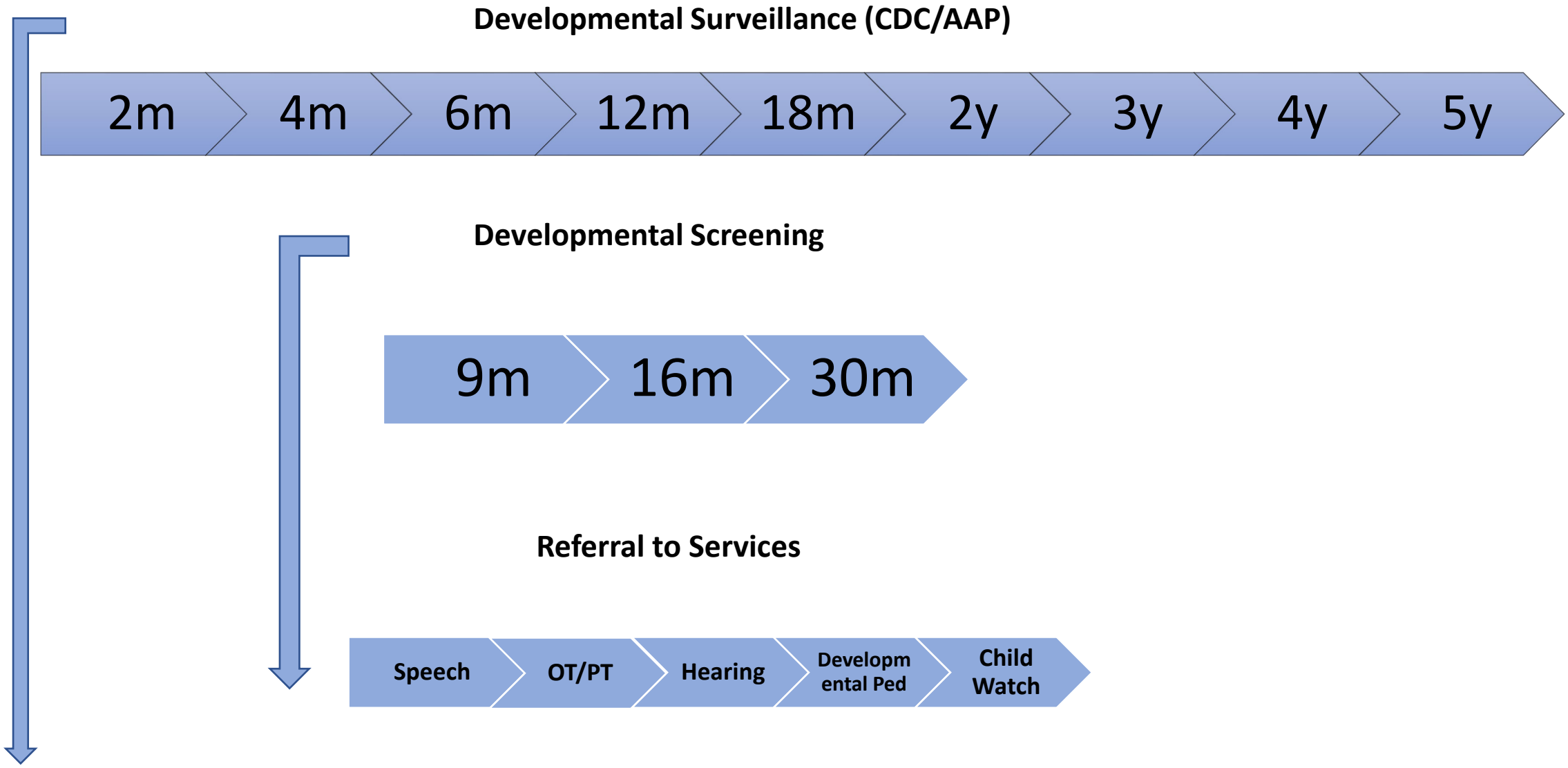

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School Readiness

- **Refers to a child being ready to make an easy and successful transition to school**
- **Includes academics, attention, concentration, physical skills**
- **Allows teachers to expand development, without these skill children fall further behind**

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School Readiness

Building Blocks

- **Self regulation-maintain and change emotions**
- **Receptive language-understanding**
- **Expressive language-using language**
- **Executive functioning-higher order reasoning and thinking**
- **Social skills**

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Difficulties if a Child is not Ready for School

- **Dislike of school**
- **Peer rejection**
- **Following instructions**
- **Poor academic outcome**
- **Anxiety with limitations**

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School Readiness

- School Readiness • ZERO TO THREE

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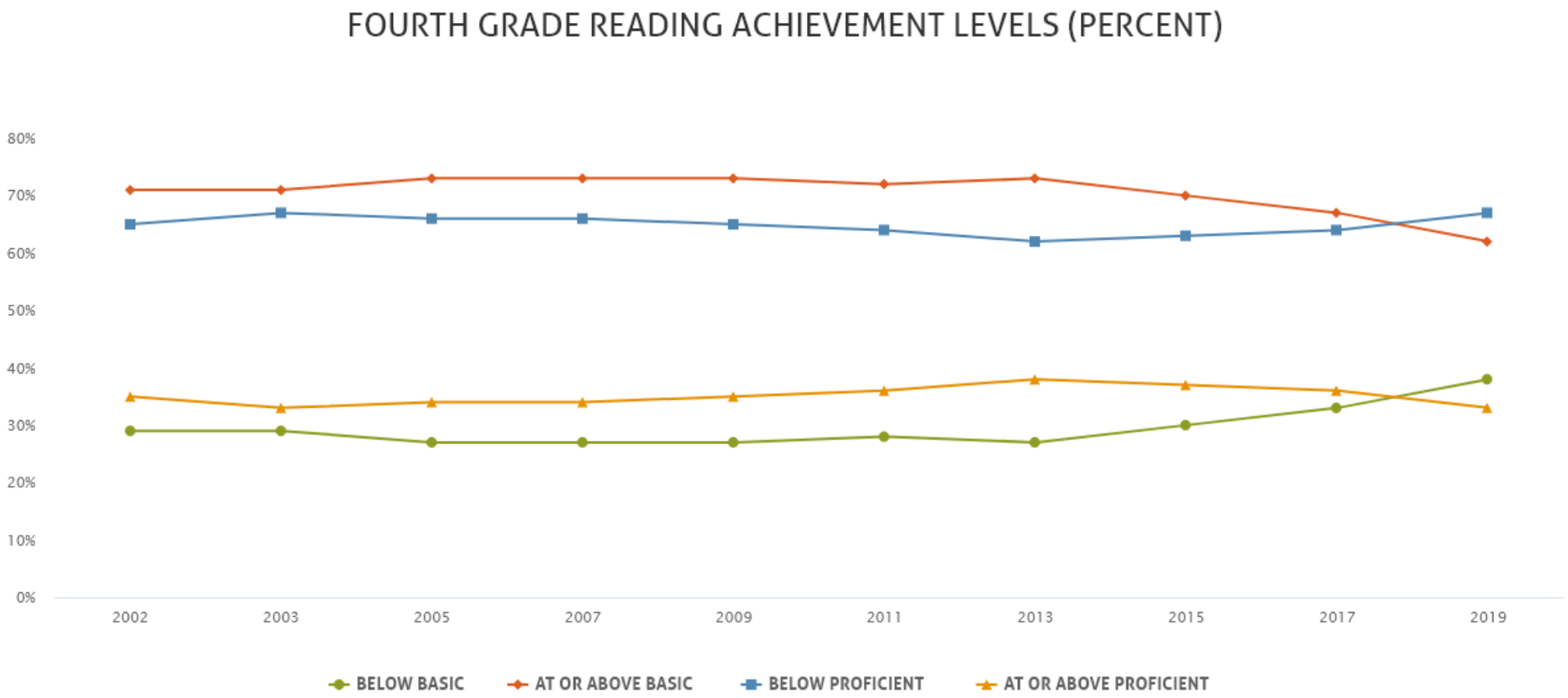
Delaware Fourth Grade Reading

Kids Count, Annie E. Casey Foundation



National KIDS COUNT from datacenter.kidscount.org

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Health and Development

- **Interactive and <u>adaptive</u> at multiple levels**
  - **Molecular**
  - **Cellular**
  - **Organ system**
  - **Behavioral**
- **Inherently plastic**
  - **Leads to a wide range of outcomes, positive and negative**
  - **Interaction between genetic predisposition and environment**

“Our experiences change our brain,” Kimberly Noble, MD, PhD

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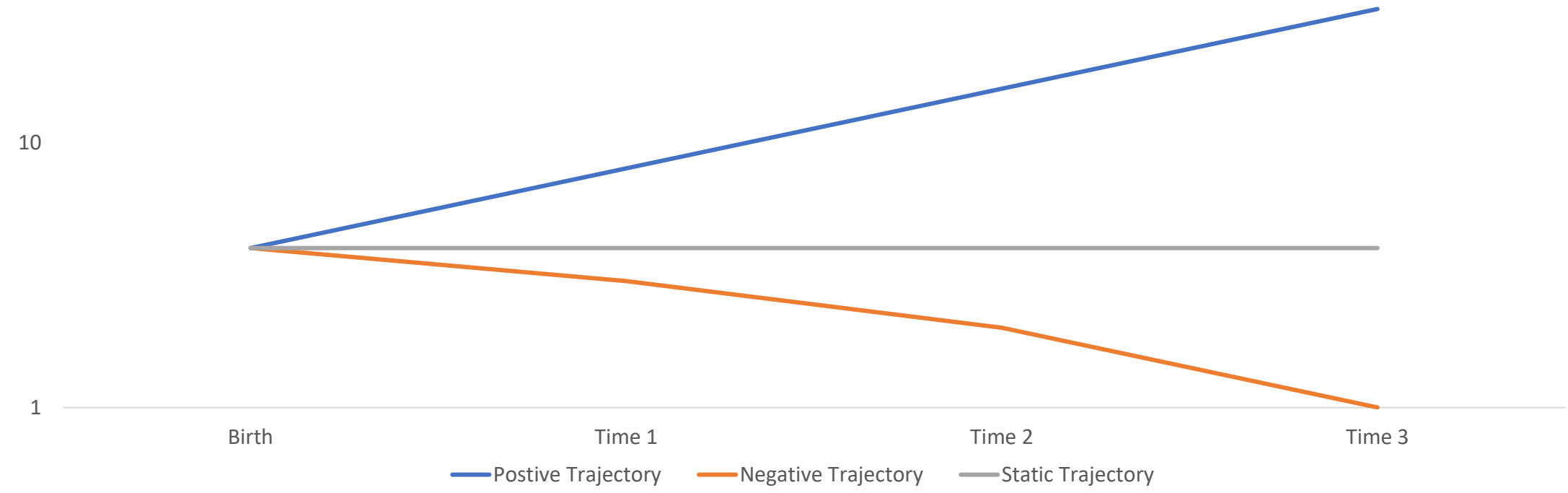
Developmental Trajectories

Genetic predisposition, wealth, education, parenting

Genetic predisposition, poverty, racism, parenting, toxic stress, premature birth, drug exposure



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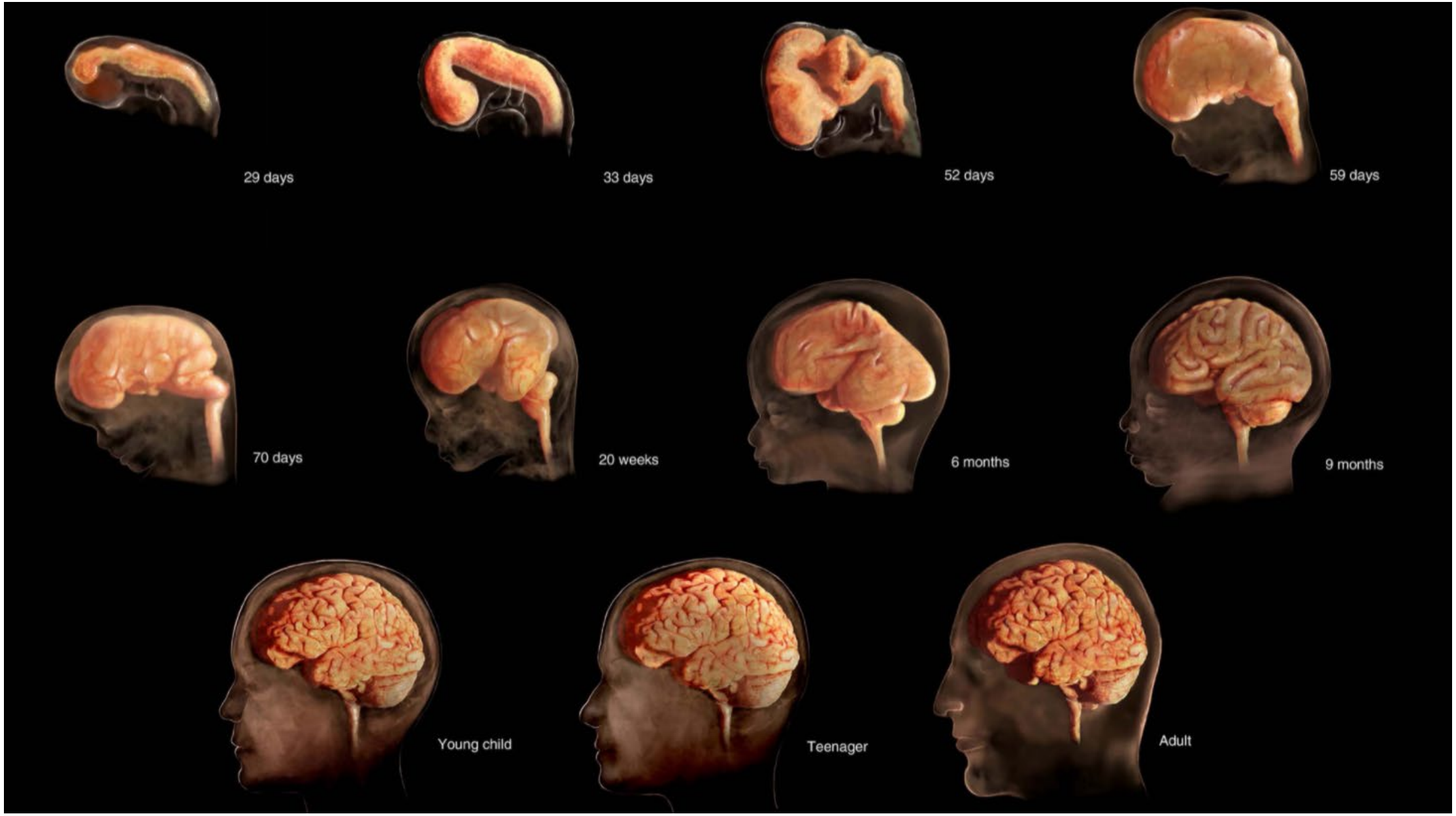

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Pediatric Developmental Disorders

- **Autism**
- **Trisomy 21**
- **Cerebral palsy**
- **Lead poisoning**

Autism

- Developmental disability that can cause significant social, communication and behavioral changes
- Can be detected at 18 months or younger, but by age 2 the diagnosis is reliable
- Early signs
  - Avoiding eye contact
  - Little interest in other children or caregivers
  - Limited display of language
- CDC estimates that 1 in 44 eight-year-old children have been diagnosed
  - 23/1000
  - 4x more common in boys than girls
- Cause remains unknown but some risks are known
  - Genes and other conditions such as Fragile X
  - Sibling with autism
  - Older parents
- No link to vaccines!

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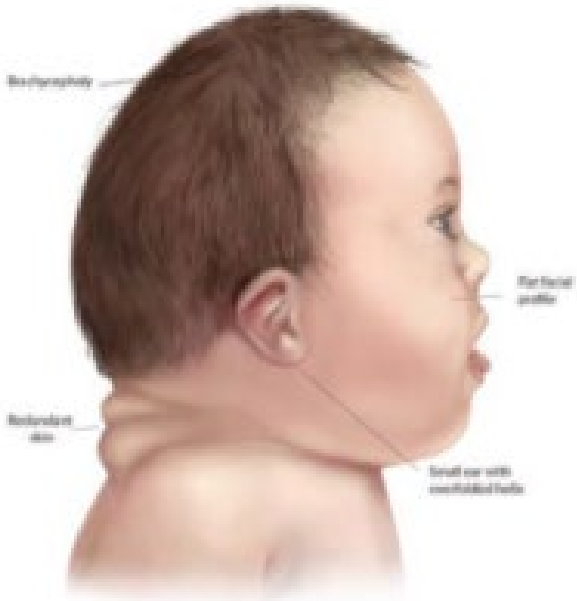
Trisomy 21 (Down Syndrome)

- **Extra chromosome 21, changes how the body and brain develop**
- **Typical facial and physical features**
  - **Short, web, neck**
  - **Tongue the protrudes**
  - **Single line across the palm**
  - **Low muscle tone**
- **Occurs in every 700 babies**
- **Women over age 35 at increased risk**
- **IQ is usually in the mildly to moderately low range and babies are slower to speak than typically developing children**



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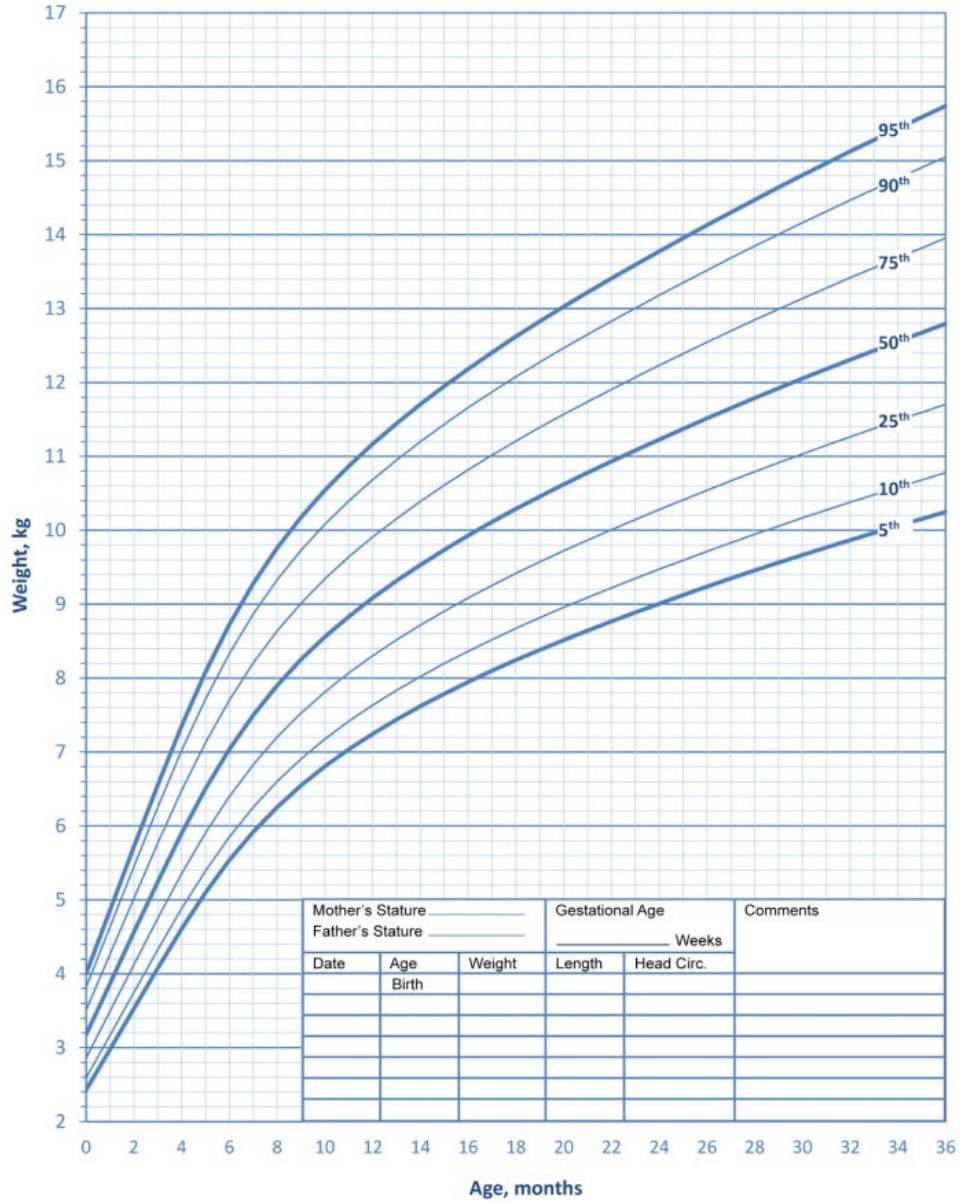
Growth Charts for Children with Down Syndrome
Birth to 36 months: Boys
Weight-for-age percentiles

Name _____

Record _____



Published October 2015.
Source: Zemel BS, Pipan M, Stallings VA, Hall W, Schgadt K, Freedman DS, Thorpe P. Growth Charts for Children with Down Syndrome in the U.S. Pediatrics, 2015.

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Cerebral Palsy

- **Physical disability that affects movement and posture, most common physical disability of childhood**
- **CP starts in area of brain that controls the ability to move muscles**
- **Some children also have cognitive delays and associated medical problems**
- **May be mild to severe**
- **Usually manifests as delay in motor milestones**
- **Does not get worse over time but usually not noticed or diagnosed right away**

What is Cerebral Palsy?

Cerebral palsy is a physical disability that affects movement and posture.

It is the most common physical disability in childhood.

You can help advance our knowledge and research into cerebral palsy by joining a Cerebral Palsy Register. Find out more at **worldcpday/cpregisters**

17 million
people with cerebral palsy worldwide

MOTOR TYPES

SPASTIC: 70-80%.
Most common form. Muscles appear stiff and tight. Arises from Motor Cortex damage.

DYSKINETIC: 6%.
Characterised by involuntary movements. Arises from Basal Ganglia damage.

MIXED TYPES:
Combination damage.

ATAXIC: 6%
Characterised by shaky movements. Affects balance and sense of positioning in space. Arises from Cerebellum damage.

PARTS OF THE BODY

Cerebral palsy can affect different parts of the body

QUADRIPLEGIA/ BILATERAL:

Both arms and legs are affected. The muscles of the trunk, face and mouth are often also affected.

DIPLEGIA/ BILATERAL:

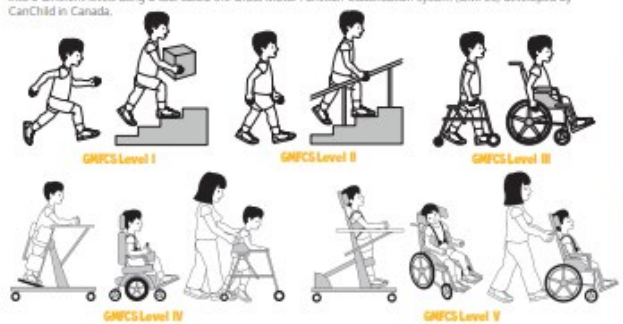
Both legs are affected. The arms may be affected to a lesser extent.

HEMIPLEGIA/ UNILATERAL:

One side of the body (one arm and one leg) is affected

GROSS MOTOR SKILLS

The gross motor skills (e.g. sitting and walking) of children and young people with cerebral palsy can be categorised into 5 different levels using a tool called the Gross Motor Function Classification System (GMFCS) developed by CanChild in Canada.



MANUAL ABILITY

At least two thirds of children with cerebral palsy will have movement difficulties affecting one or both arms. Almost every daily activity can be impacted.

ASSOCIATED IMPAIRMENTS

Children with cerebral palsy may also have a range of physical and cognitive impairments.

1 in 3 is unable to walk

1 in 4 is unable to talk

3 in 4 experience pain

1 in 4 has epilepsy

1 in 4 has a behaviour disorder

1 in 2 has an intellectual impairment

1 in 10 has a severe vision impairment

1 in 4 has bladder control problems

1 in 5 has sleep disorder

1 in 5 has saliva control problems

World Cerebral Palsy Day worldcpday.org

Proudly supported by The Allergan Foundation

WORLD CEREBRAL PALSY DAY
05.OCT.2016

References: Novak I, Hines M, Goldsmith S, Barclay R (2012). Clinical prognostic messages from a systematic review on cerebral palsy. Pediatrics. Nov;2012;130(5). Palisano R, Rosenbaum P, Walter S, Russell D, Wood E & Galuppi B (1997). Development and validation of a Gross Motor Function Classification System for children with Cerebral Palsy. Developmental Medicine and Child Neurology, 39, 214-223. CanChild Centre for Childhood Disability Research www.canchild.ca. Australian Cerebral Palsy Register Report 2010 www.cpregister.com

Lead Poisoning

- **Exposure to lead can cause:**
  - **Damage to brain and nervous system**
  - **Learning and behavior problems**
  - **Hearing and speech problems**
- **Difficult to diagnose, usually no immediate symptoms**
- **Most harmful when children < 6 years are exposed**
- **Exposure sources**
  - **Paint in homes built prior to 1978**
  - **Drinking water**
  - **Consumer products**
- **AAP recommends screening in children 12-36 months if 27% of housing built before 1950 or prevalence of blood lead concentration 10 µg/dl is 12% or greater**

Pediatrics. 2016;138(1). doi:10.1542/peds.2016-1493

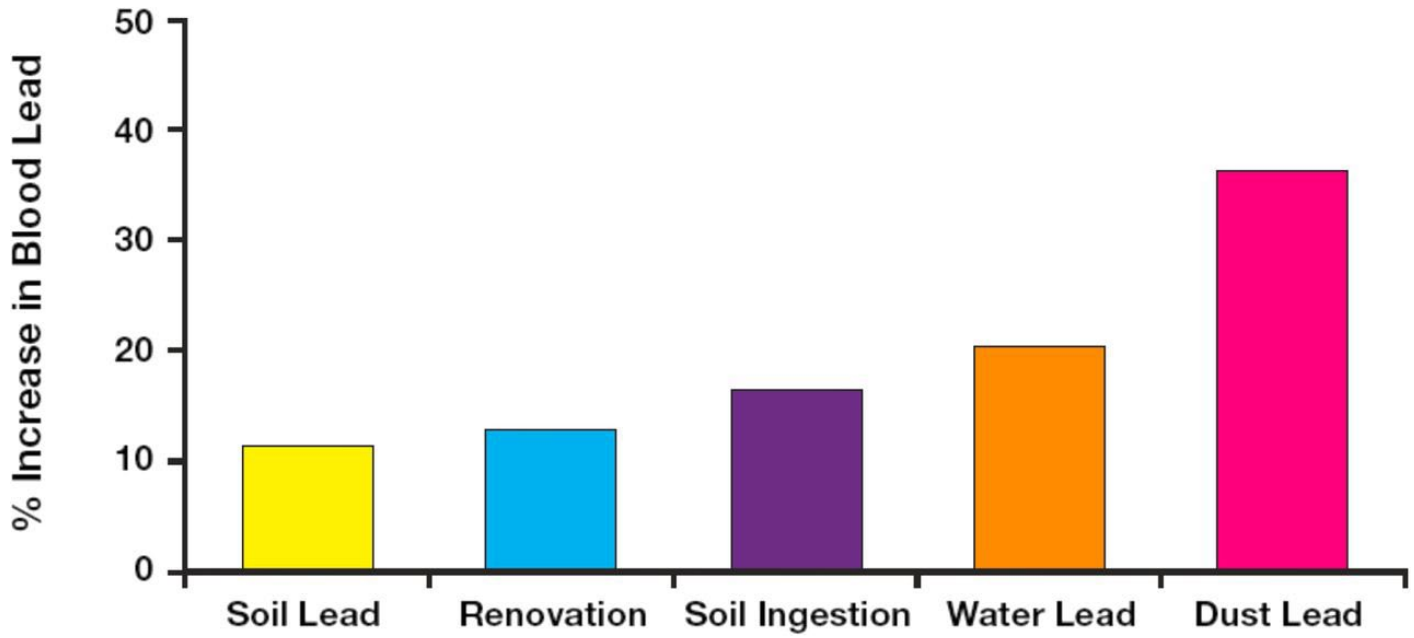


Figure Legend:

Contribution of lead exposure to children's blood lead concentrations. Adapted from Lanphear et al[31] and Spanier et al.[45]

Pediatrics. 2016;138(1). doi:10.1542/peds.2016-1493

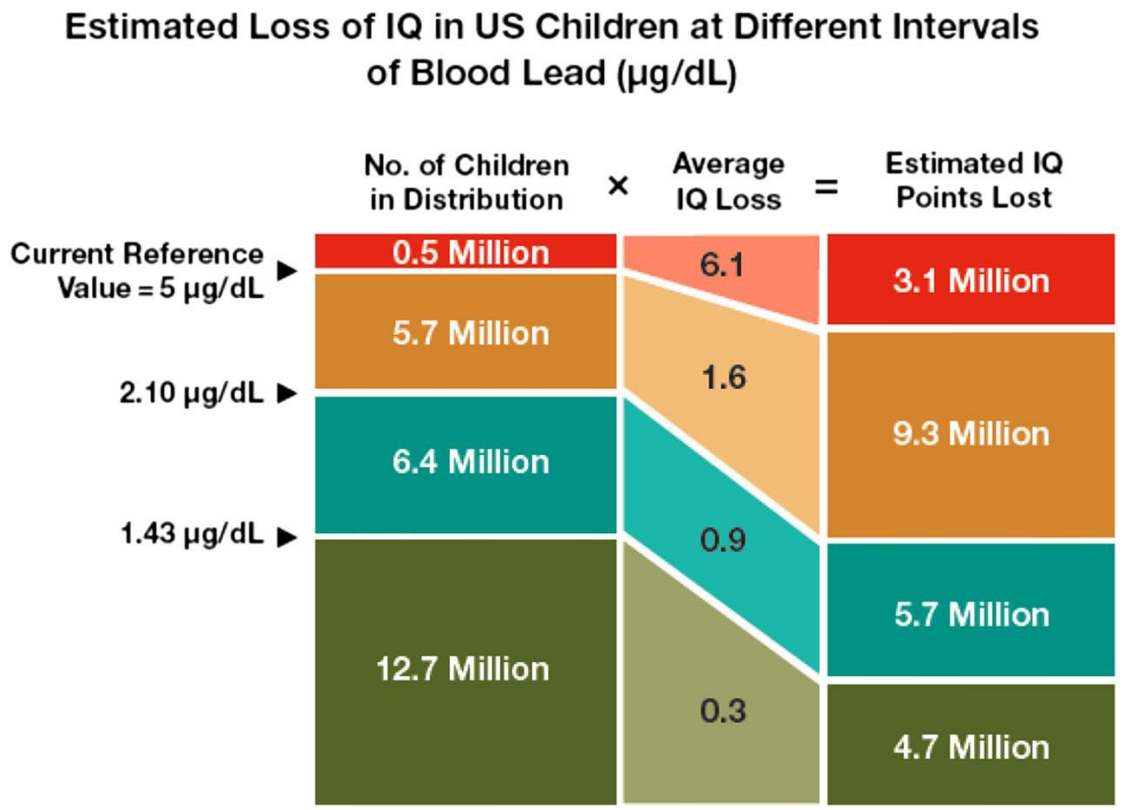
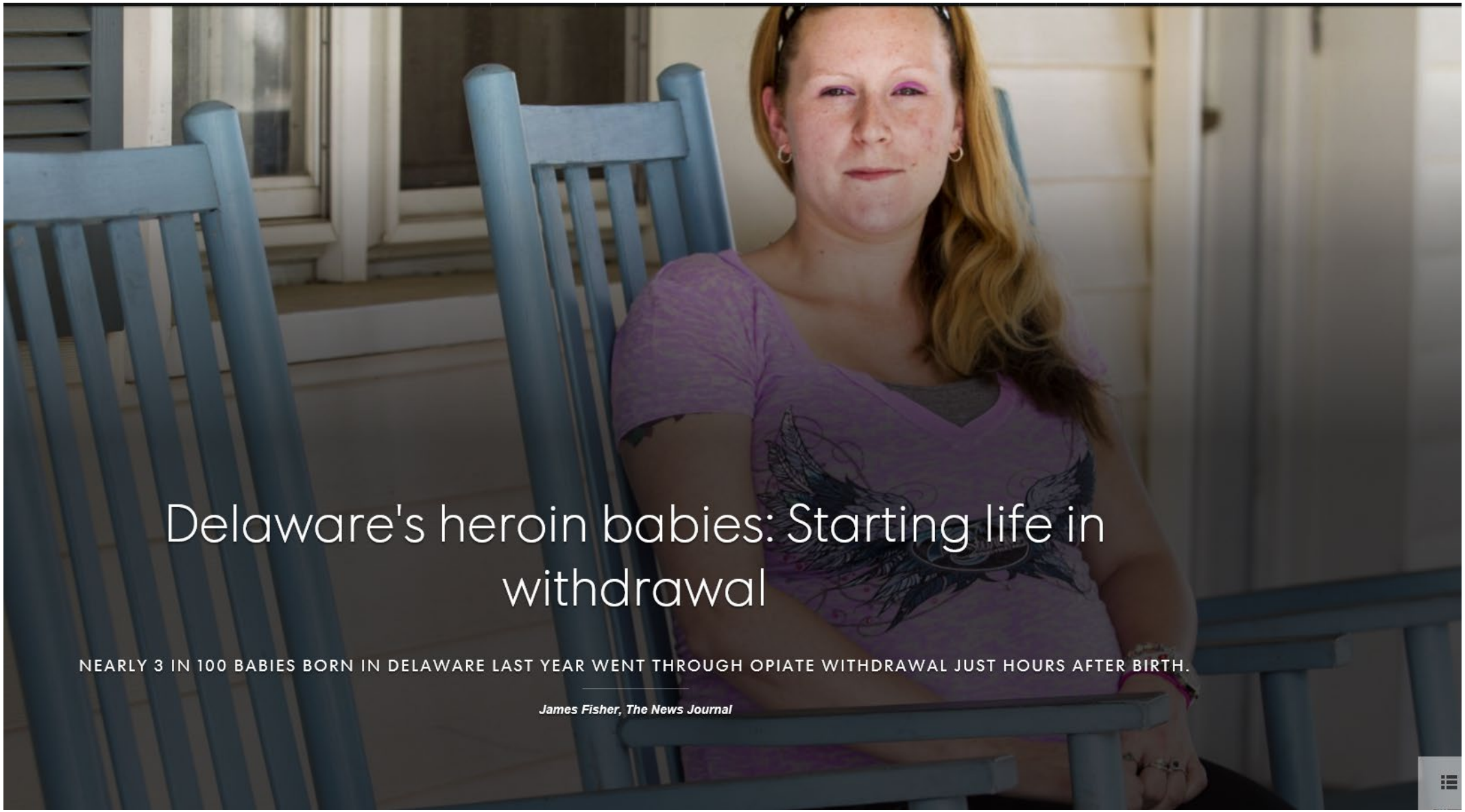


Figure Legend:

Prevention paradox. The majority of IQ points lost due to lead exposure occur in children who have low to moderate blood lead levels. Using the current reference value of 5 µg/dL, we will protect only 3.1 million IQ points (about 13% of the total). Adapted from Bellinger.[15]



November 2015

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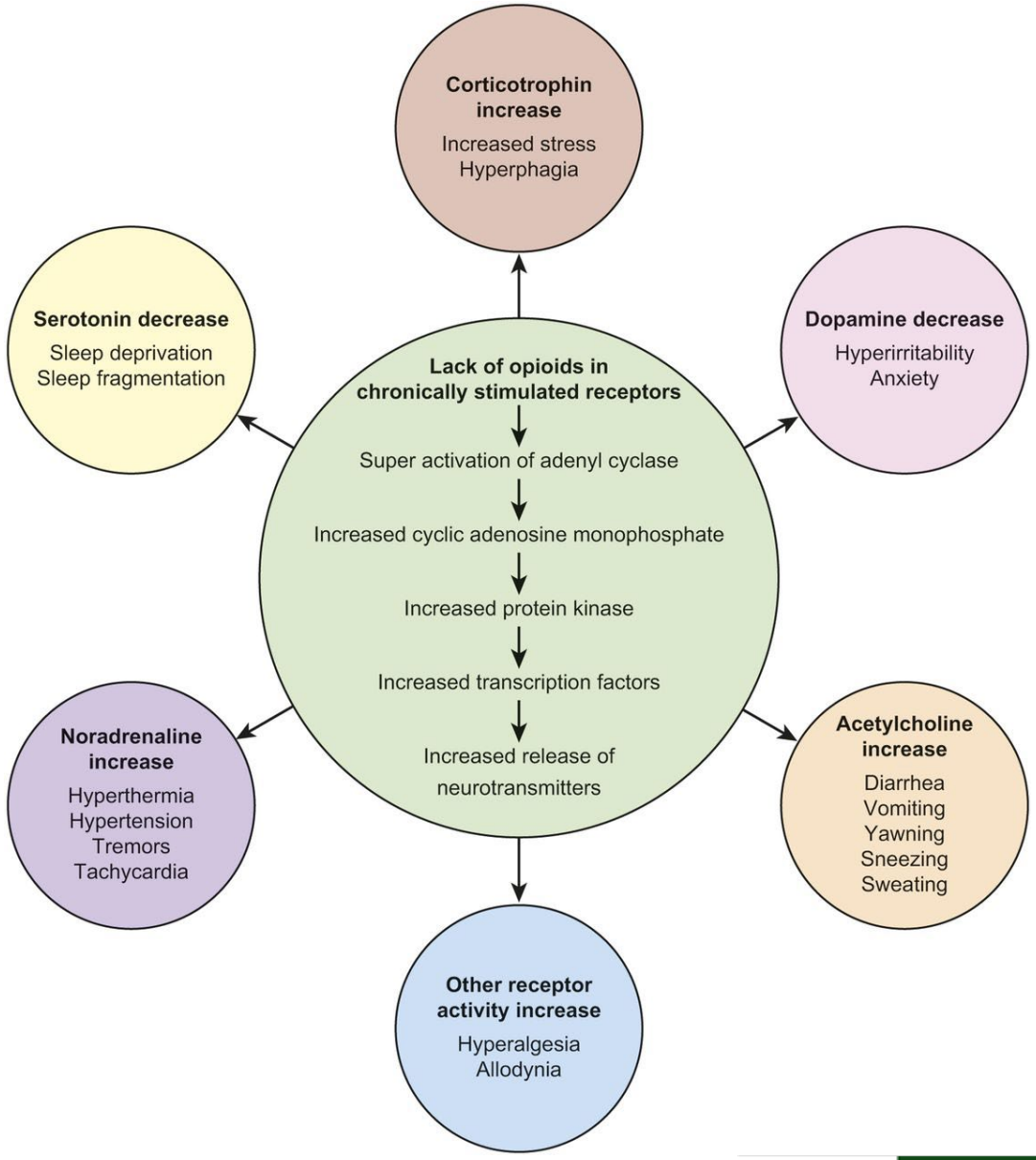
A schematic illustration of the mechanism of opioid withdrawal in neonates

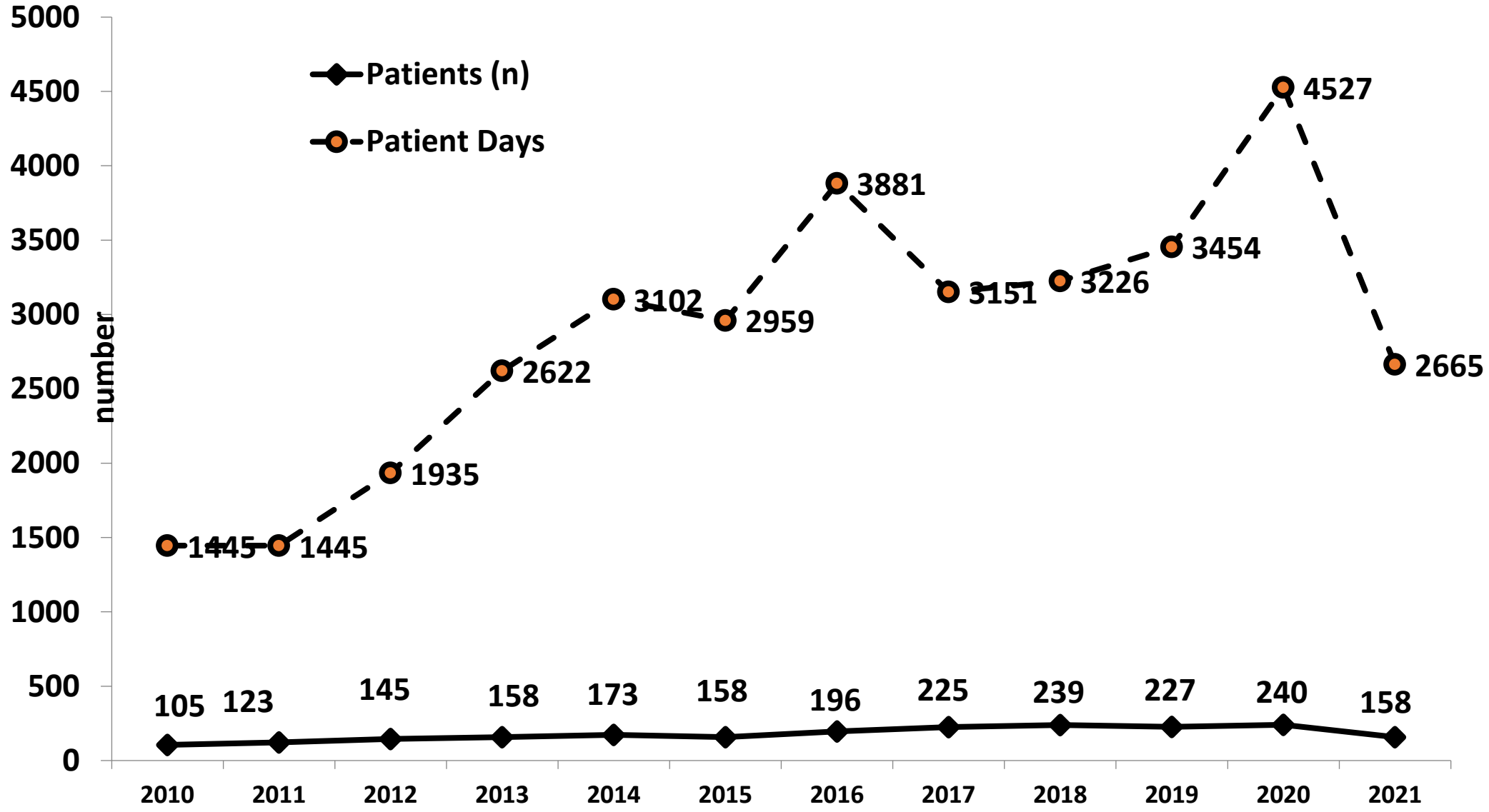


Kocherlakota P Pediatrics 2014;134:e547-e561

PEDIATRICS®

NOWS Patient Days

ChristianaCare 2010 -2021



Co-Dependency and NOWS

ChristianaCare 2014-2016 (n=371)

- **79% Tobacco**
- **18% Marijuana**
- **13% Cocaine**
- **8% SSRI**
- **10% Benzodiazepines**
- **1% ETOH**

(data are cumulative)

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Neurodevelopment with NOWS

- **Long-term studies difficult to tease out environmental effects (18 years) from direct drug in-utero effect (40 weeks) and use of other substances**
- **Concern for long term postnatal exposure to pharmacologic treatment**
  - **Morphine**
  - **Phenobarbital**
- **Need for comprehensive services for mother and baby**
  - **Social support**
  - **Parenting intervention**
  - **Maternal treatment**

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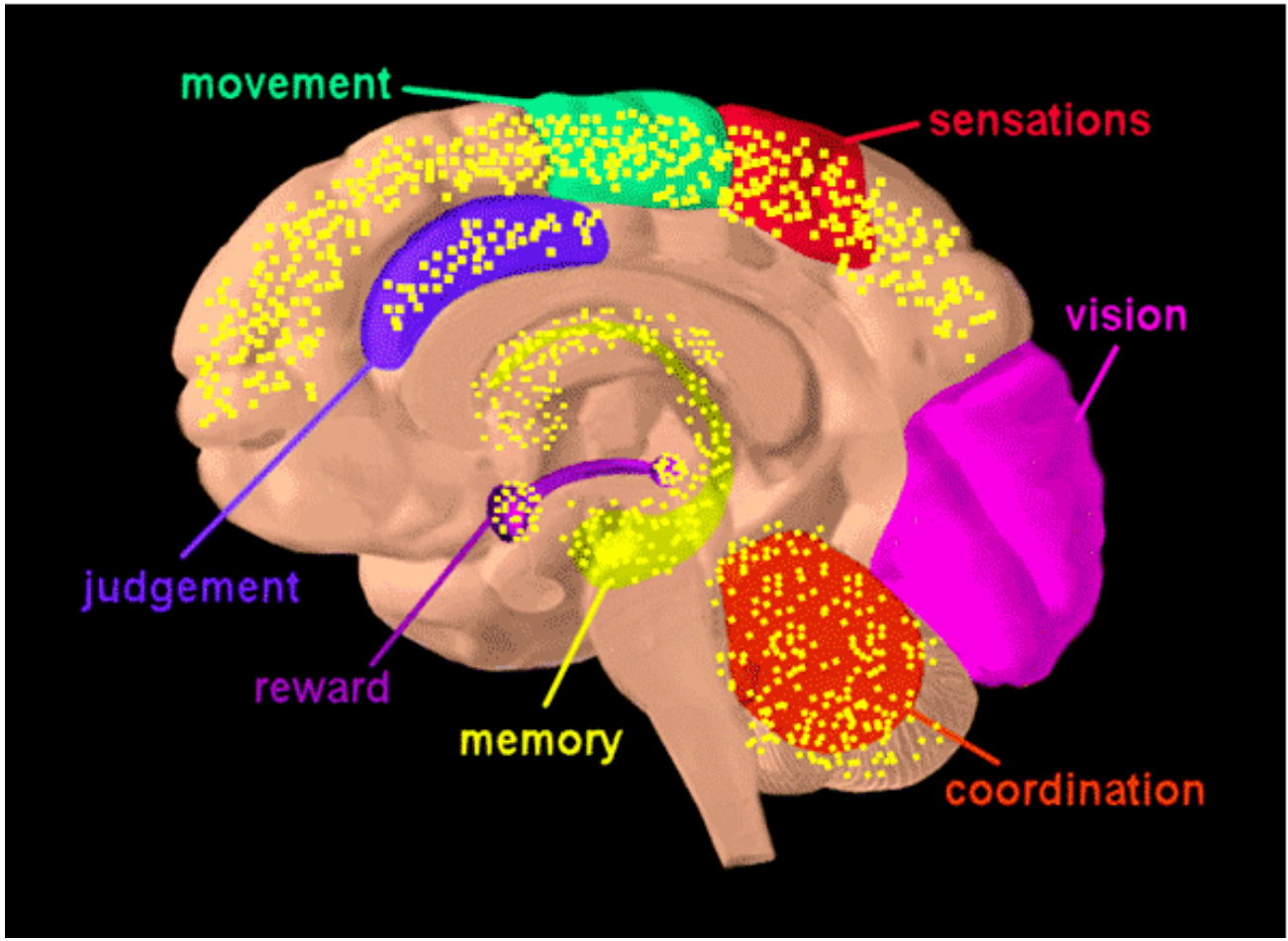
Concerns for Marijuana Use During Pregnancy and Development

- **Marijuana crosses the placenta and crosses into breast milk**
- **Marijuana contains almost 500 chemicals including THC**
- **Concern for long term development of brain including memory learning and behavior**



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Marijuana Use in Pregnant and Non-Pregnant Patients
Ko et al, AJOG, 2015

- **Source, National Survey of Drug Use and Health, 2007-2012**
- **3.9% (3.2-4.7%) of pregnant responders reported use in last month**
- **7.6% (7.3-7.9%) of non-pregnant female responders reported use in last month**
- **18.1% of pregnant users met criteria for abuse and dependence**

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Cannabis Use During the Perinatal Period (Colorado)

Crume et al, 2018, J Peds

- **Source Colorado PRAMS, 2015**
- **Self reported use any time during pregnancy: 5.7 ± 0.5%**
- **Early postnatal use in women likely to breast feed 5.0% (4.1-6.2%)**
- **Marijuana use associated with increased odds of low birth weight OR 1.5 (1.1-2.1)**
- **More prevalent with younger maternal age, lower education, Medicaid, lower income, white race**

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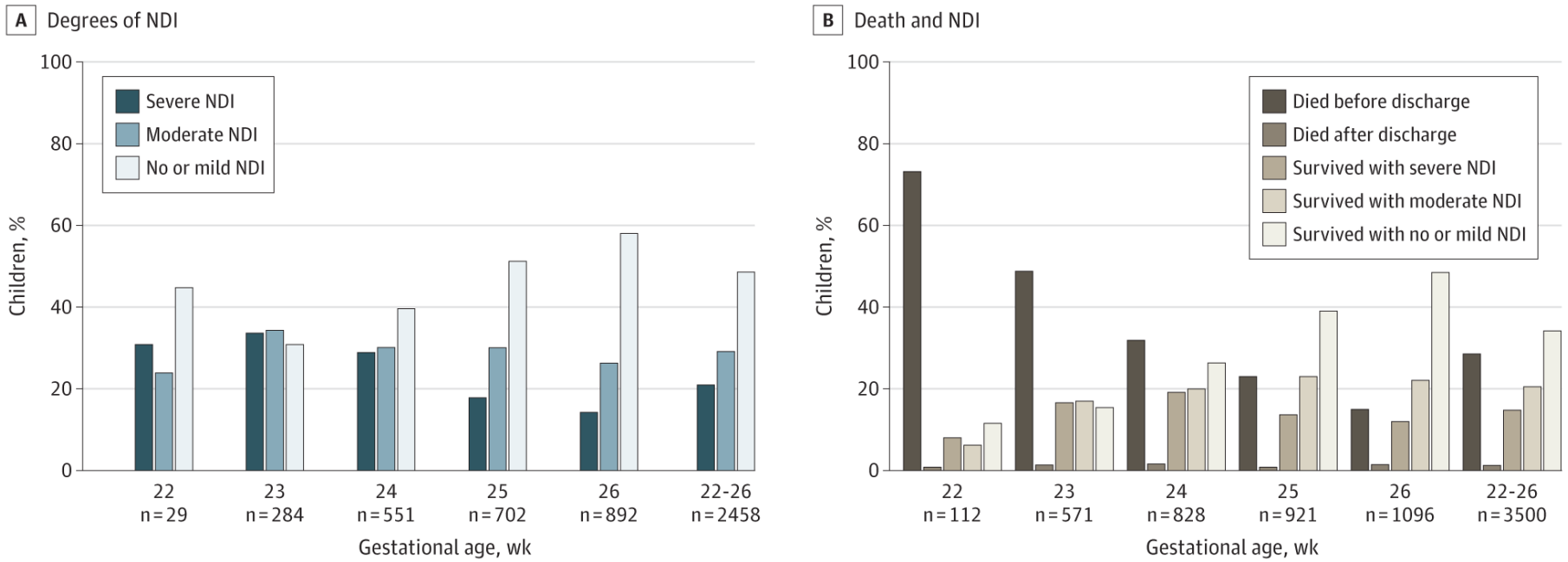
CLINICS
ADMISSIONS
AND
EMERGENCIES

From: **Mortality, In-Hospital Morbidity, Care Practices, and 2-Year Outcomes for Extremely Preterm Infants in the US, 2013-2018**

JAMA. 2022;327(3):248-263. doi:10.1001/jama.2021.23580



Neurodevelopmental Impairment at 22-26 Months' Corrected Age in Children Born at 22-26 Weeks' Gestational Age During 2013-2016A, Neurodevelopmental impairment (NDI) among 2458 children evaluated at 22-26 months' corrected age. Mild or no NDI was defined as a Bayley Scales of Infant and Toddler Development, Third Edition (Bayley-III) cognitive composite score of 85 or higher, a Bayley-III motor composite score of 85 or higher, and Gross Motor Function Classification System (GMFCS) level 0 or 1. Moderate NDI was defined as any of a Bayley-III cognitive composite score or motor composite score of 70 to 84 or GMFCS level 2 or 3. Severe NDI was defined by any of a Bayley-III cognitive composite score or motor composite score less than 70, GMFCS level 4 or 5, bilateral blindness, or severe hearing impairment (see Table 4 footnotes b and d for more details).

B, Death and NDI at 22-26 months' corrected age among children born at 22-26 weeks' gestational age who were actively treated at birth. Children born at 22-26 weeks' gestational age were eligible for a follow-up assessment at 22-26 months' corrected age. Proportions are shown for the 3500 children actively treated at birth who had died by 22-26 months' corrected age or were seen at follow-up and evaluated for NDI. Active treatment was defined as intubation, surfactant therapy, respiratory support, chest compressions, epinephrine, volume resuscitation, blood pressure support, or parenteral nutrition (see Table 4 footnotes b and d for more details).

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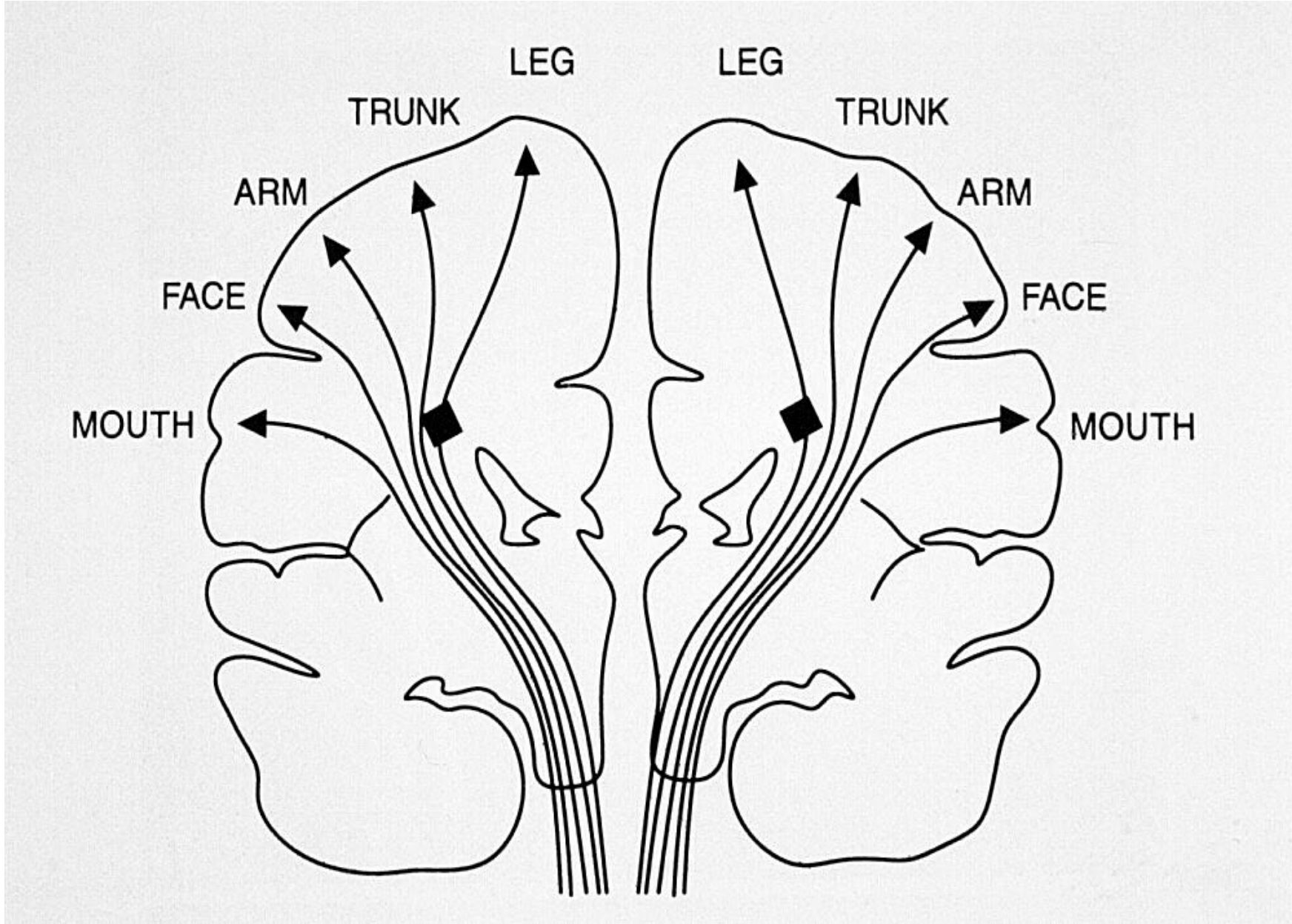

Newborn Right MCA Infarct

LMCA Infarct

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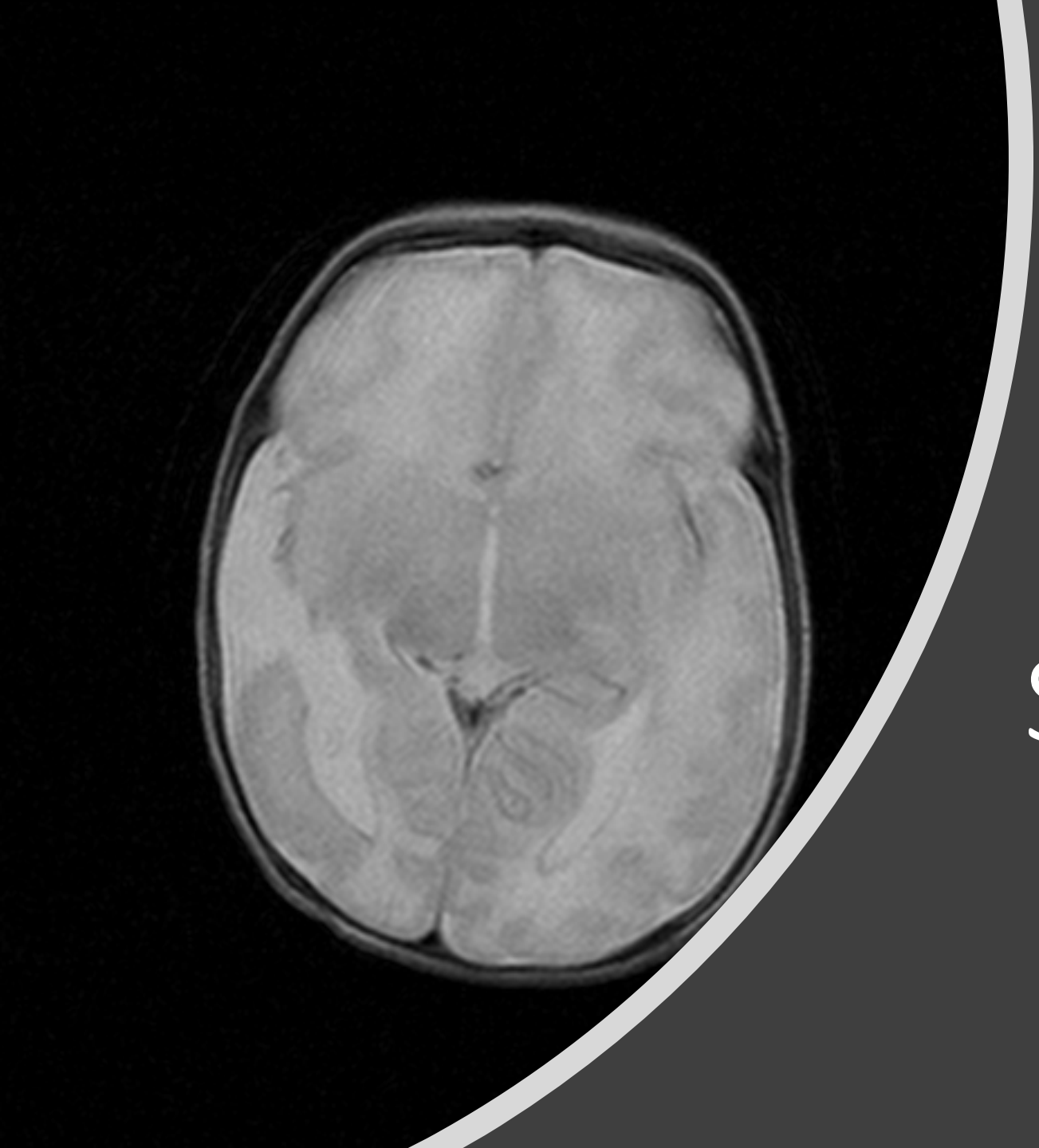
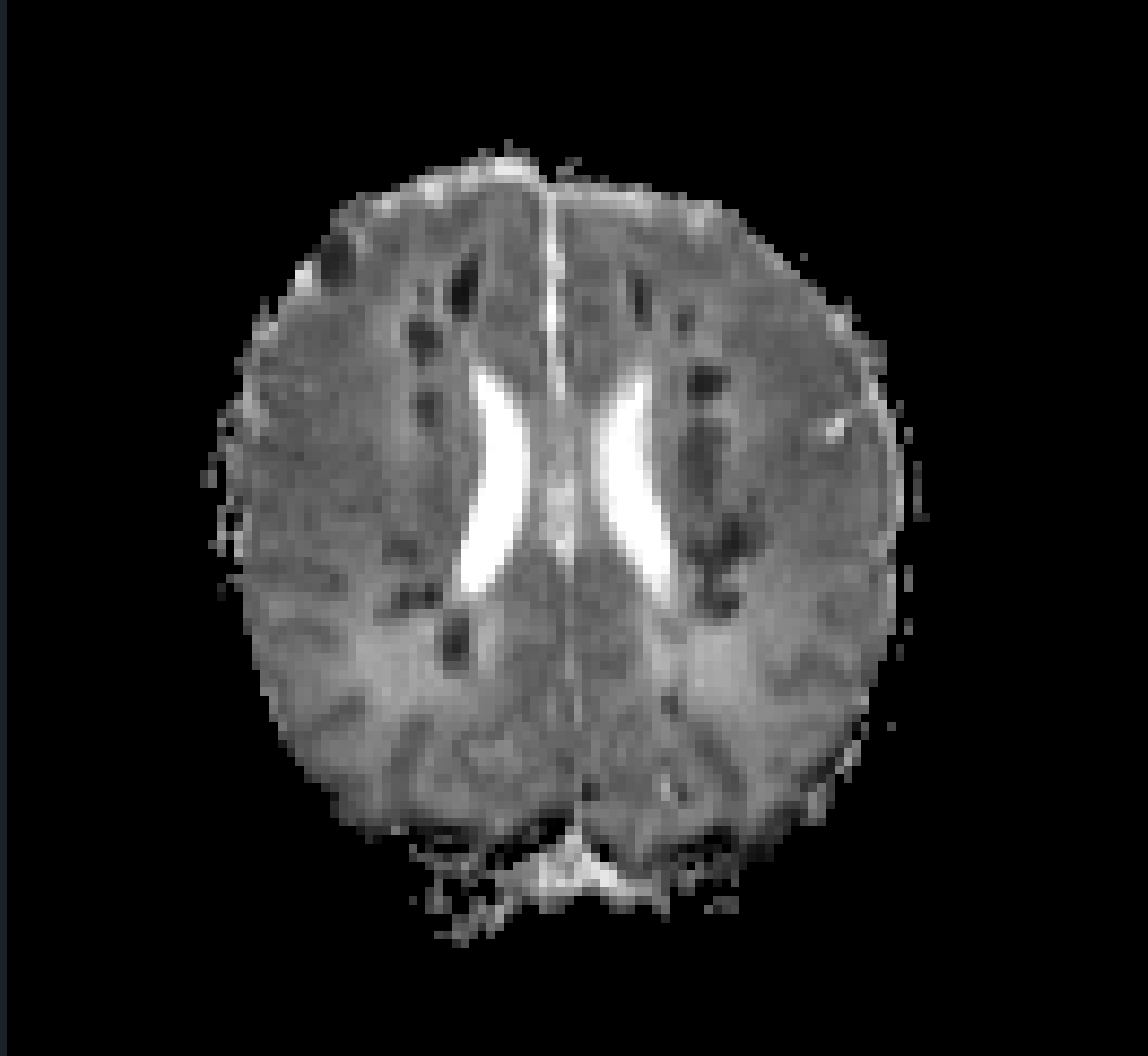
Holoprosencephaly, alobar



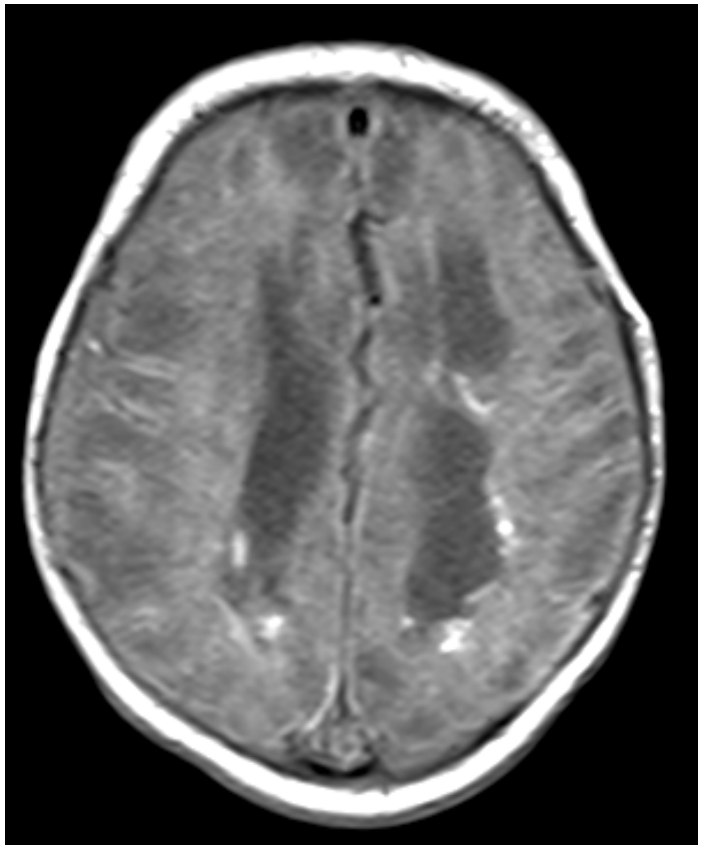
Schizencephaly

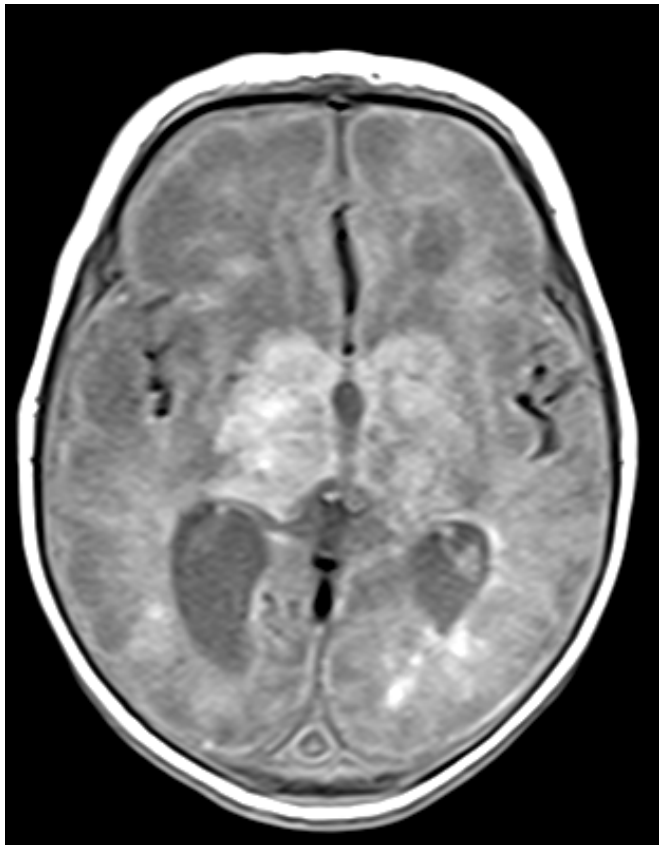
- **Occipital Encephalocele**

White matter
Injury on diffusion
Term, E Coli
Meningitis

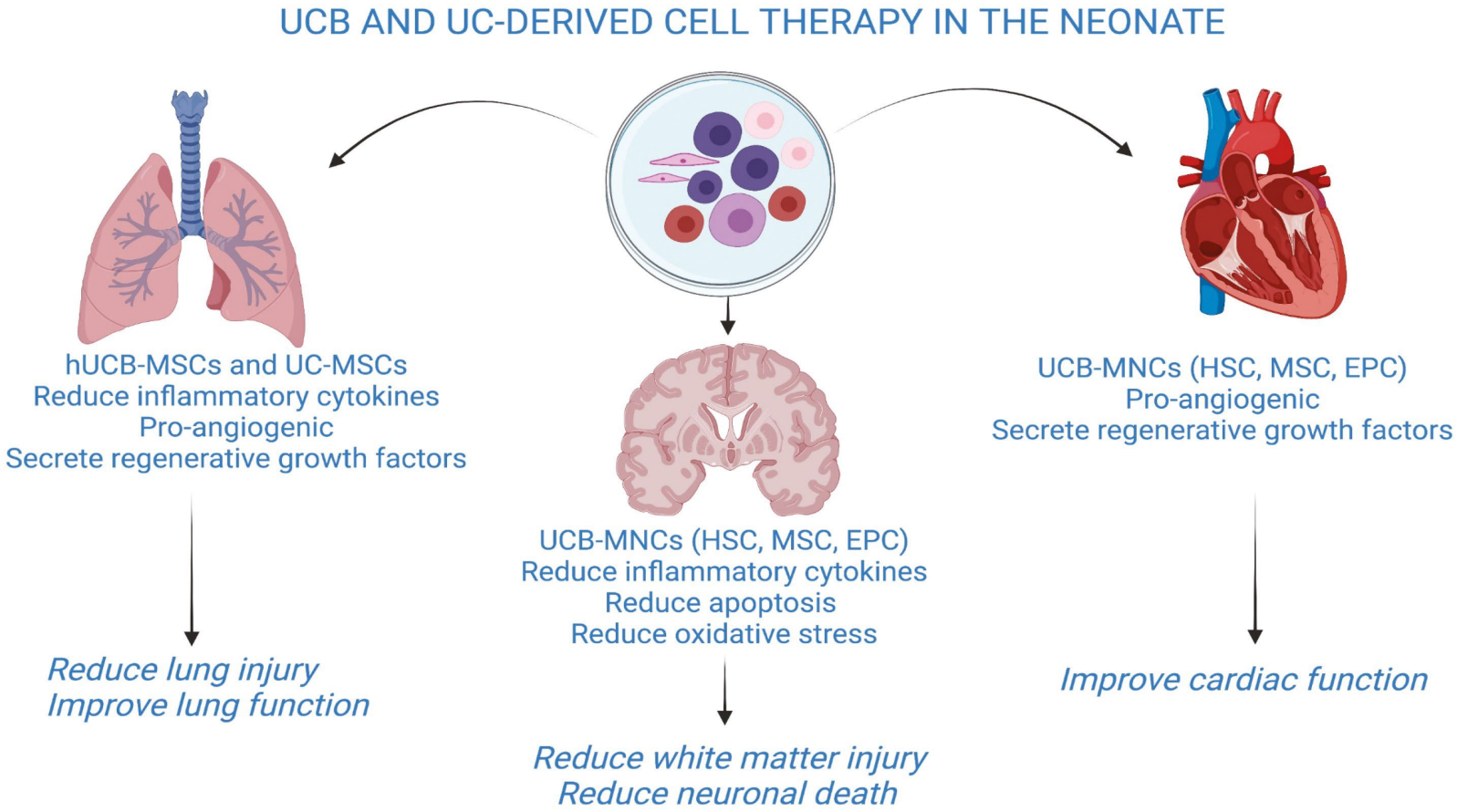


Seizures, calcification
? ZIKA





Graphical Abstract



Data from pre-clinical studies has suggested beneficial effects from umbilical cord blood and cord tissue-derived cell therapies for the neonatal lungs, heart and brain. This data has been translated into 12 early-phase clinical trials in neonates, totalling 206 infants worldwide. 24 further trials are registered for UCB and UC-derived newborn cell therapy. Created with BioRender.com

Stem Cells Transl Med, szab024, https://doi.org/10.1093/stcltm/szab024

Normal Stress Response

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Allostatic Load

- **Allostasis is the ability of an organism to achieve stability through change**
- **Allostatic load reflect the cumulative effect of experiences in daily life that evolve ordinary events**
- **When environmental stressors exceed individual ability to cope, they become damaging**
  - **Stress response is repeatedly activated, and buffering factors are not adequate**

Stress Response

- **Cortisol, epinephrine, nor-epinephrine**
- **Cytokines**
- **Brain is the control center that senses and regulates stress**

- **Short term benefits-stress response**
- **Long term harm-chronic disease from wear and tear on the body**

Racism Can Affect Physical and Mental Health

- **Institutional or structural racism**
- **Interpersonal racism**
- **Constant presence increases stress and allostatic load**

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Structural Racism

Residential Segregation

- **In the 100 largest US metropolitan areas in the US: 67% of Black, 58% of Latino, and 53% of Native American children reside in low or very low opportunity neighborhoods compared to 20% of white and Asian children**
- **Differences in neighborhood quality leads to adverse living conditions and concentrated poverty:**
  - **schools**
  - **grocery stores, availability of healthy foods**
  - **living conditions**
  - **access to health care**
  - **targeted advertising for tobacco and alcohol**
  - **gun violence**
  - **pollution**

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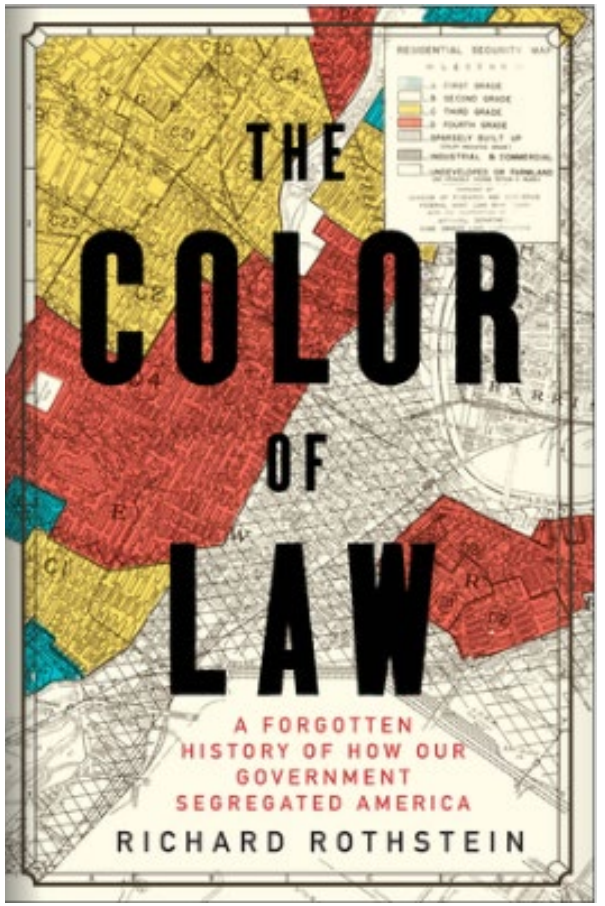
Specific Examples of Structural Racism that Have Shaped Communities

- **TVA no African American workers were permitted supervisory roles**
- **Redlining**
- **Restricted covenants**
- **White flight**
- **Tax over assessments in low-income African American neighborhoods**
- **Subprime loans**
- **Underfunded schools**
- **Criminal justice system**



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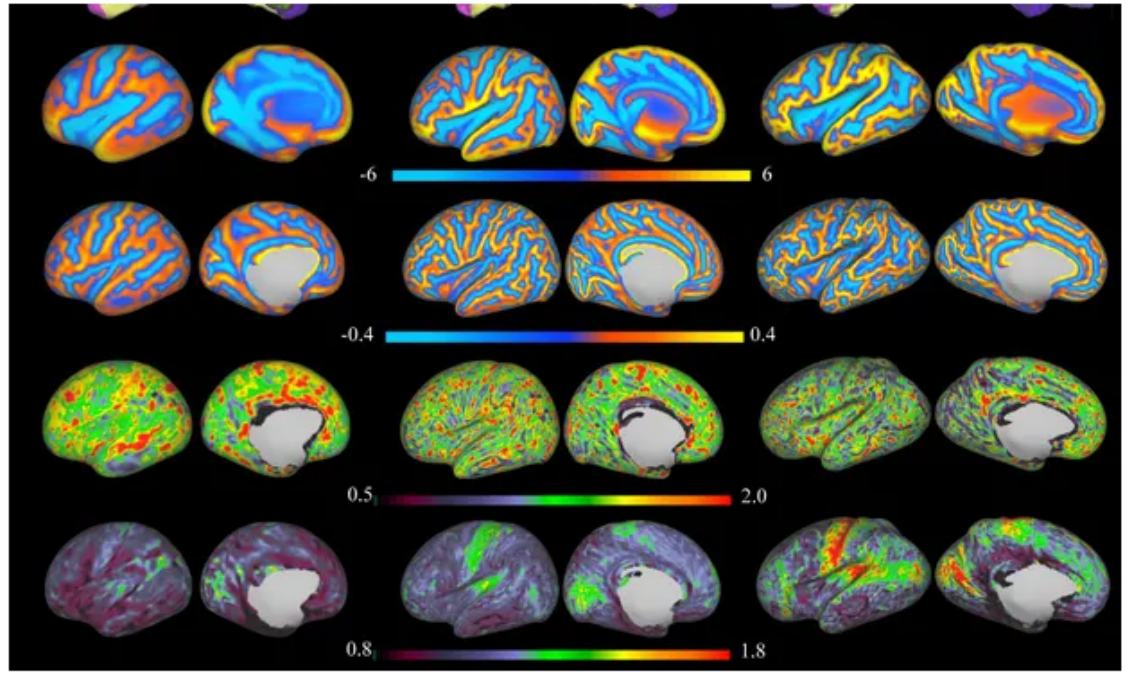
The neuroscience of inequality: does poverty show up in children's brains?

There is increasing evidence that growing up poor diminishes the physical development of a child's brain. A landmark US study is attempting to establish a causal link – and unlock new ways to help our poorest children

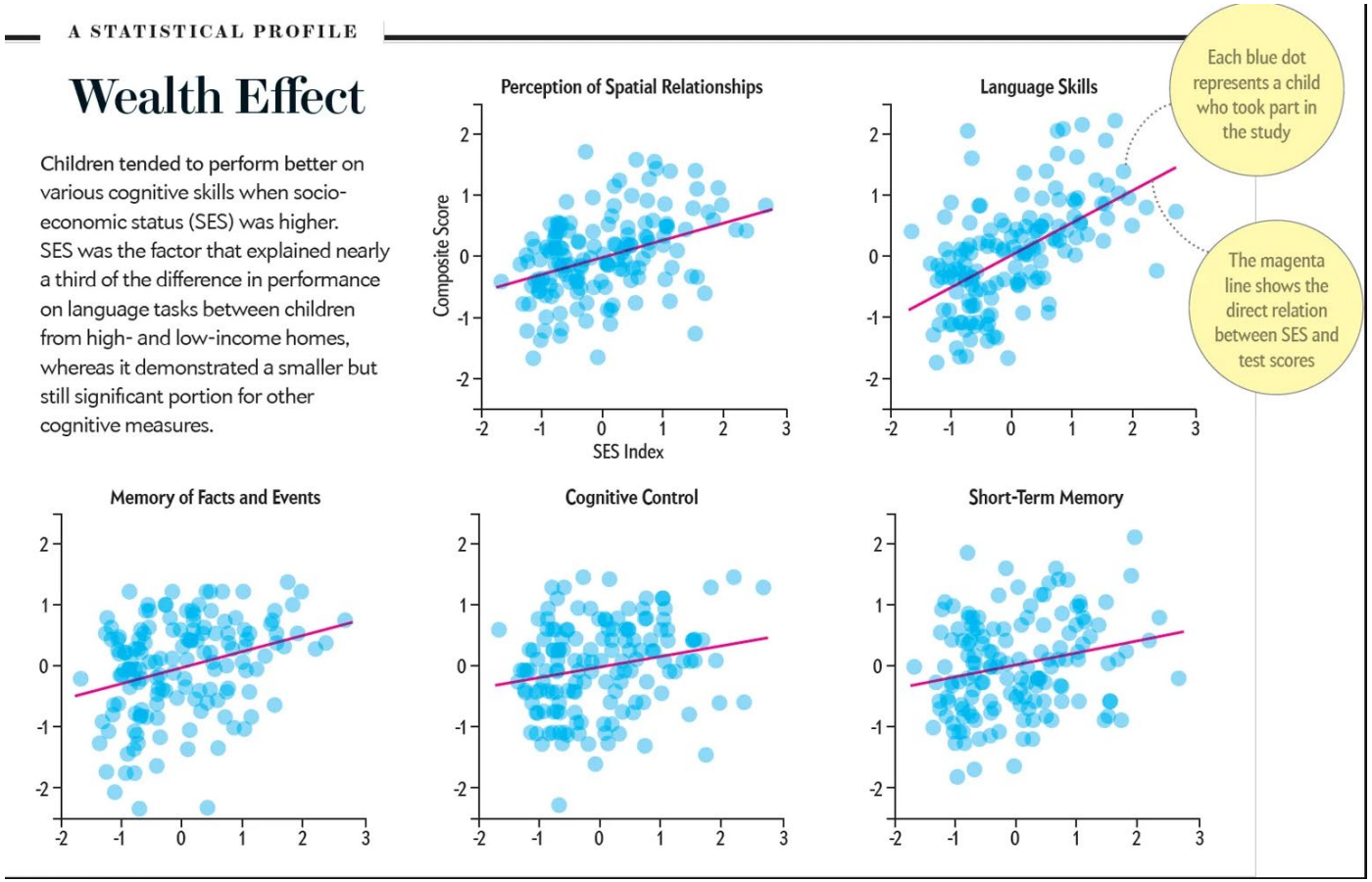


MRI brain scans of babies aged seven to nine months. Image: The Developing Human Connectome Project

With its bright colours, anthropomorphic animal motif and nautical-themed puzzle play mat, Dr Kimberly Noble's laboratory at Columbia University in New York looks like your typical day-care centre – save for the team of cognitive neuroscientists observing kids from behind a large two-way mirror.

The Neurocognition, Early Experience and Development Lab is home to

Poverty and Brain Development



- **Kids from poorer, less educated families have thinner regions of the prefrontal cortex**
- **Higher family incomes associated with larger brain surface area**
- **Children from household below federal poverty line had 8-10% less gray matter**

Noble, Developmental Science, 2007

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Poverty in Delaware

UD Center for Community Research and Service, 2021

- **Children are the most likely of any age group to experience poverty, five-year rate of 17.5%**
- **Black Delawareans are more than twice as likely to live in poverty than white Delawareans, 18.6% vs 9%**
- **Delaware's cities have the highest poverty rate, Wilmington 26%, Dover 24.4%**

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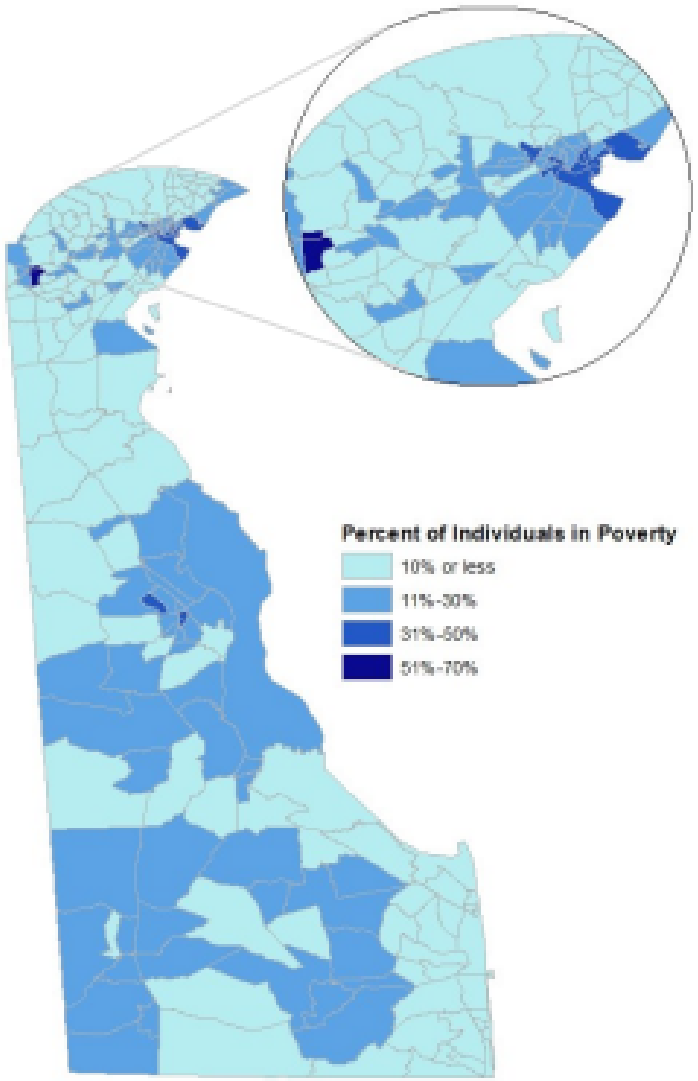
Percent of Individuals in Poverty by Census Tract

2015-2019 Average



Source: UD Center for Community Research & Service, 2021; data from the U.S. Census Bureau, 2015-2019 American Community Survey

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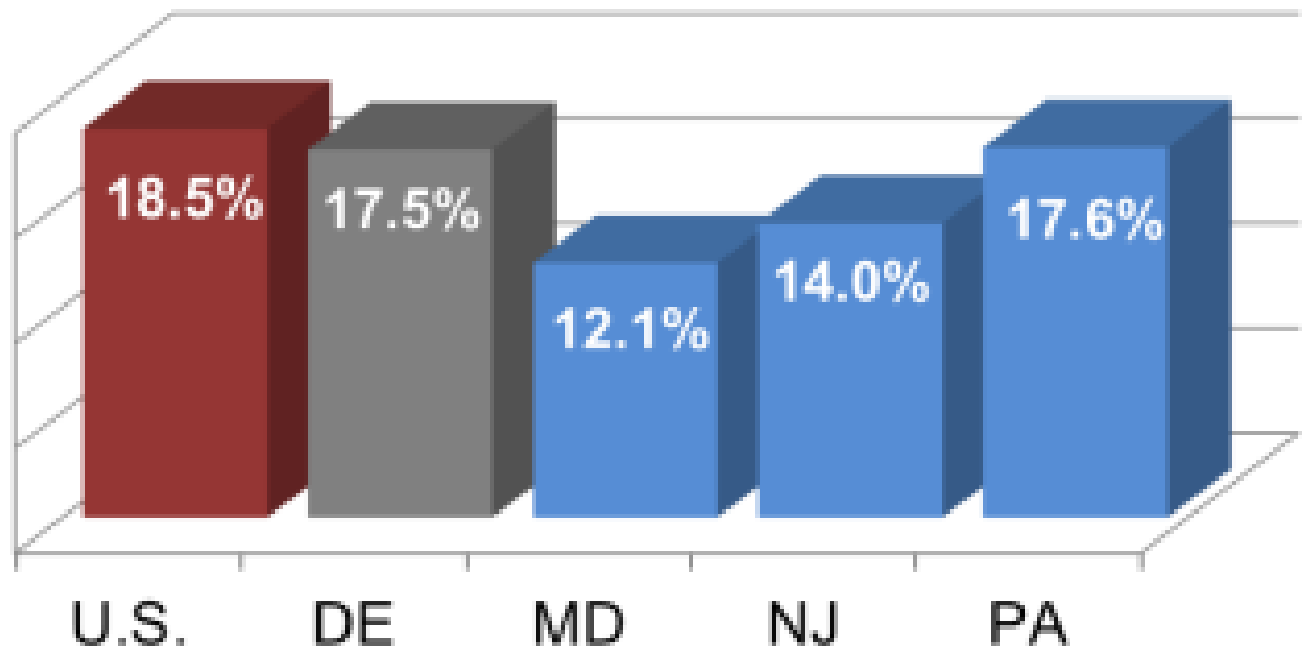
Child Poverty Rate: U.S., DE, and Region, Five Year Average, 2015-2019



Source: UD Center for Community Research & Service, 2021;
data from U.S. Census Bureau, 2015-2019 American Community Survey

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The News Journal 06/13/2012

CRIME

Teen fatally shot

Wilmington's 10th gunshot death of 2012 occurs in the afternoon outside shop

Mohammed Chowdhury, owner of Bill's Meat Market, cleans glass broken by gunfire that killed a teenager a few hours earlier Tuesday in front of his store, as a young boy approaches him and asks to purchase some doughnuts. THE NEWS JOURNAL/SUCHAT PEDERSON

By JESSE PAUL and TERRI SANGINITI

sidewalk. The Wilmington Fire Depart-

The Early Catastrophe

The 30 Million Word Gap by Age 3

By Betty Hart and Todd R. Risley

During the 1960's War on Poverty, we were among the many researchers, psychologists, and educators who brought our knowledge of child development to the front line in an optimistic effort to intervene early to forestall the terrible effects that poverty was having on some children's academic growth. We were also among the many who saw that our results, however promising at the start, washed out fairly early and fairly completely as children aged.

In one planned intervention in Kansas City, Kans., we used our experience with clinical language intervention to design a half-day program for the Turner House Preschool, located in the impoverished Juniper Gardens area of the city. Most interventions of the time used a variety of methods and then measured results with IQ tests, but ours focused on building the everyday language the children were using, then evaluating the growth of that language. In addition, our study included not just poor children from Turner House, but also a group of University of Kansas professors' children against whom we could measure the Turner House children's progress.

All the children in the program eagerly engaged with the wide variety of new materials and language-intensive activities introduced in the preschool. The spontaneous speech data we collected showed a spurt of new vocabulary words added to the dictionaries of all the children and an abrupt acceleration in their cumulative vocabulary growth curves. But just as in other early intervention programs, the increases were temporary.

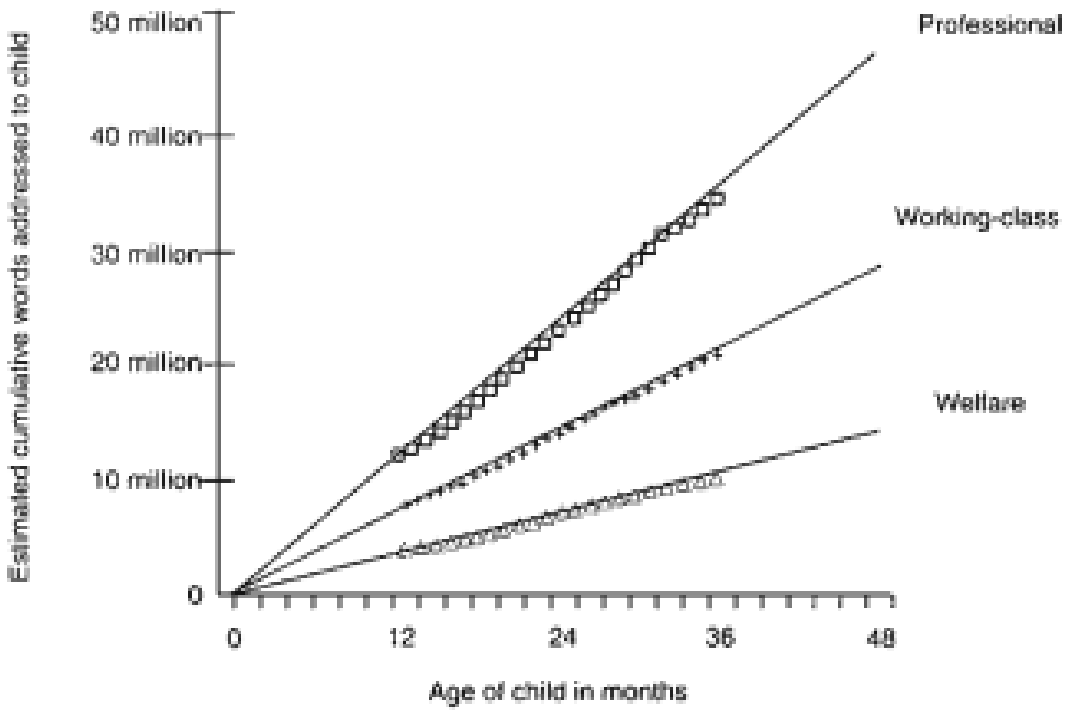
We found we could easily increase the size of the children's vocabularies by teaching them new words. But we could not accelerate the rate of vocabulary growth so that it would continue beyond direct teaching; we could not change the developmental trajectory. However many new words we taught the children in the preschool, it was clear that a year later, when the children were in kindergarten, the effects of the boost in vocabulary resources would have washed out. The children's developmental trajectories of vocabulary growth would continue to point to vocabulary sizes in the future that were increasingly discrepant from those of the professors' children. We saw increasing disparity between the extremes—the fast vocabulary growth of the professors' children and the slow vocabulary growth of the Turner House children. The gap seemed to foreshadow the findings from other studies that in high school many children from families in poverty lack the vocabulary used in advanced textbooks.

Rather than concede to the unmalleable forces of heredity, we decided that we would undertake research that would allow us to understand the disparate developmental trajectories we saw. We realized that if we were to understand how and when differences in developmental trajectories began, we needed to see what was happening to children at home at the very beginning of their vocabulary growth.

We undertook 2 ½ years of observing 42 families for an hour each month to learn about what typically went on in homes with 1- and 2-year-old children learning to talk. The data showed us that ordinary families differ immensely in the amount of experience with

Betty Hart is professor of Human Development at the University of Kansas and senior scientist at the Schiefelbusch Institute for Life Span Studies. Todd R. Risley is professor in the Department of Psychology at the University of Alaska Anchorage and director of Alaska's Autism Intensive Early Intervention Project. The two have collaborated on research projects for more than 35 years. This article is excerpted with permission from Meaningful Differences in the Everyday Experiences of Young American Children, © 1995, *Brookes; www.brookespublishing.com; 1-800-638-3775; $29.00.*

The Number of Words Addressed to Children Differs Across Income Groups



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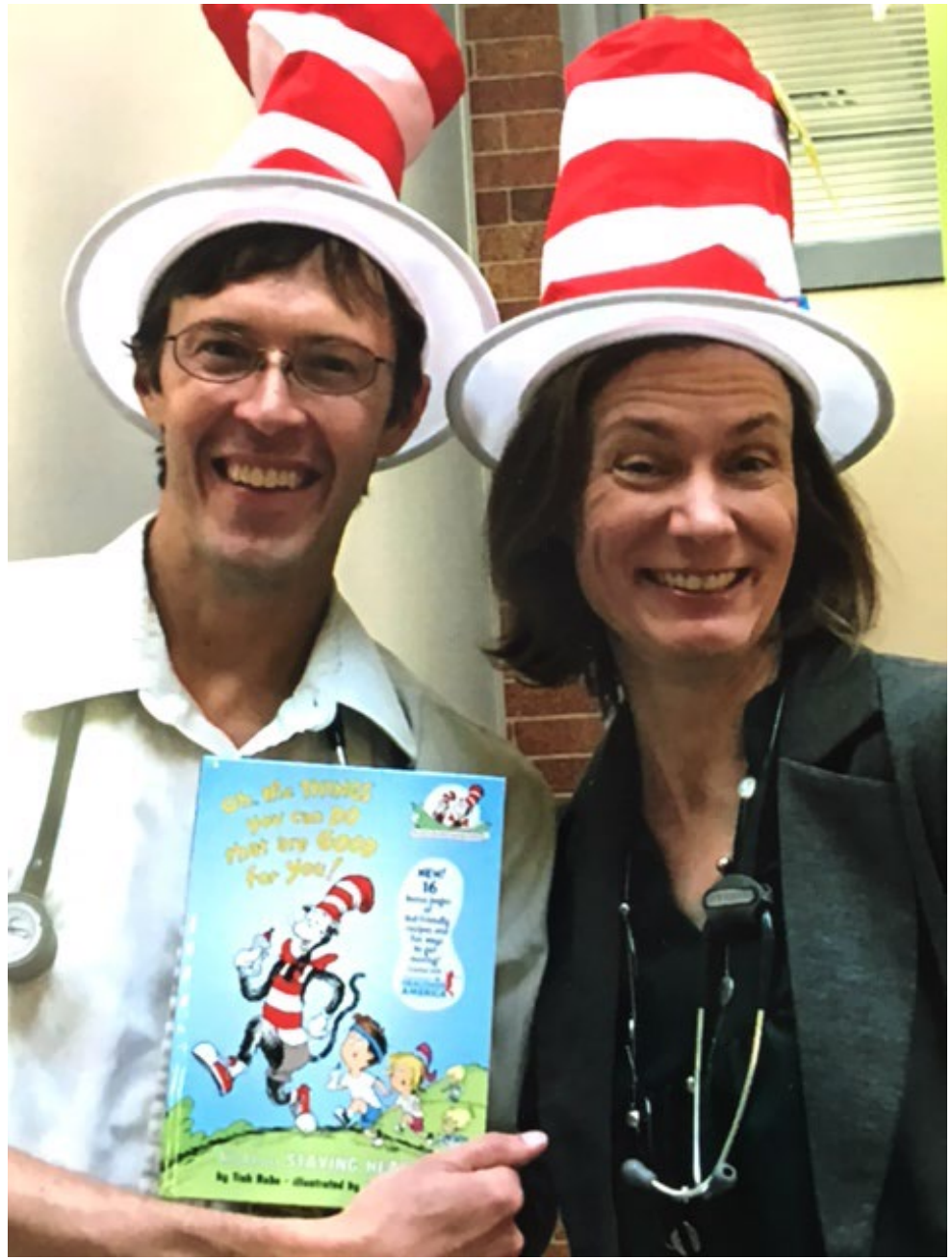

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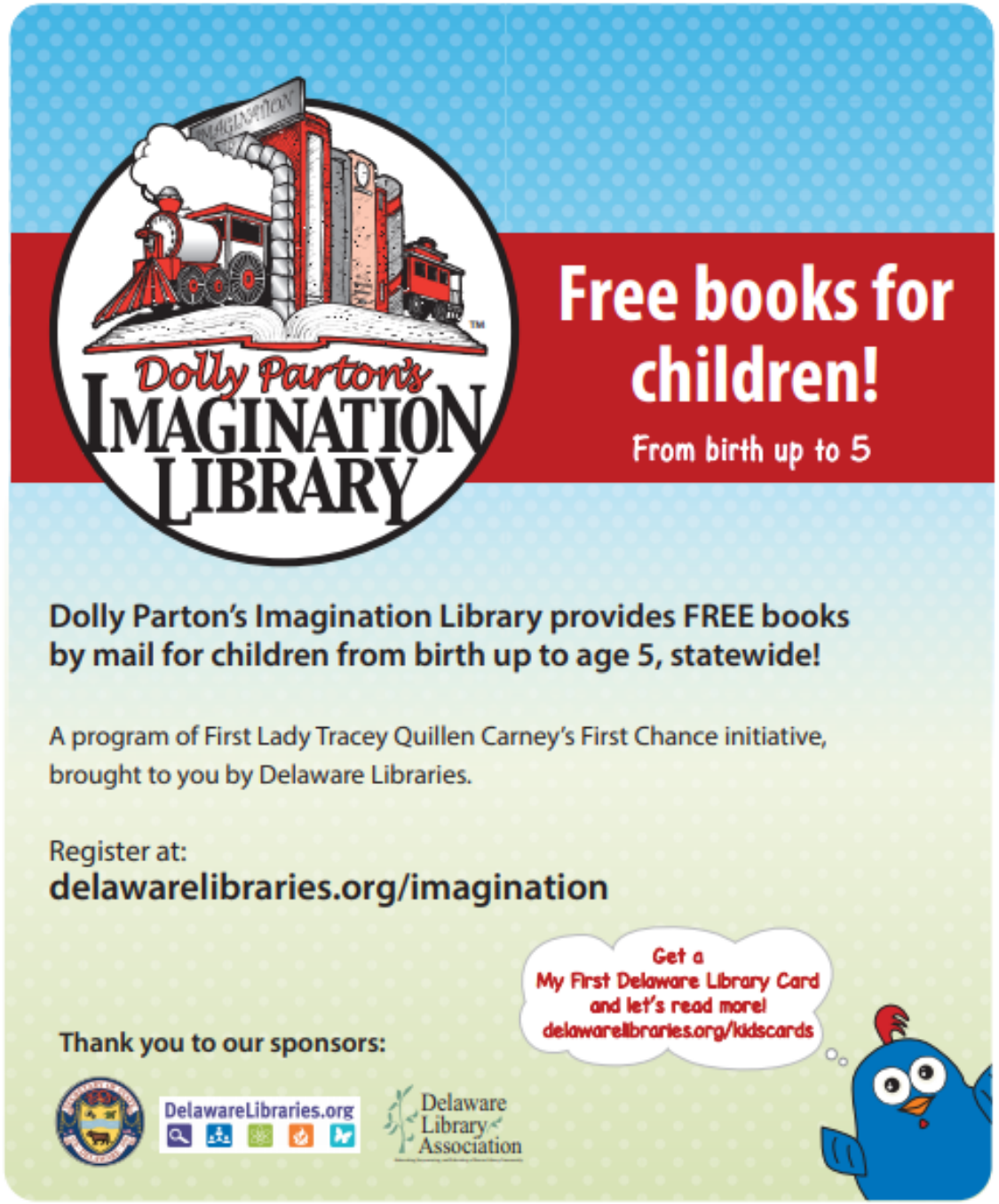

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Abecedarian Project

- **Provided early childhood education in early infancy until age 5 compared to a control group from 1972-1977, n=111**
- **Through age 15 IQ scores were higher in the treatment group**
- **Mothers of the treated group more likely to finish high school**
- **At age 30 the treated group was more likely to hold Bachelors Degrees, hold a job**
- **Those in the treatment group had lower obesity BP in mid 30s and lower risk for heart disease**

Conclusions

- **Important for parents and pediatricians to understand typical development**
- **Many factors influence trajectory of development**
  - **Newborn conditions (Down Syndrome)**
  - **Substance use**
  - **Premature birth**
  - **Poverty**
  - **Racism**
- **Some solutions are simple**
  - **Early childhood education**
  - **Reading**
- **Some solutions not so simple**
  - **Poverty**

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