


26<sup>th</sup> Annual General Pediatric Review & Self-Assessment

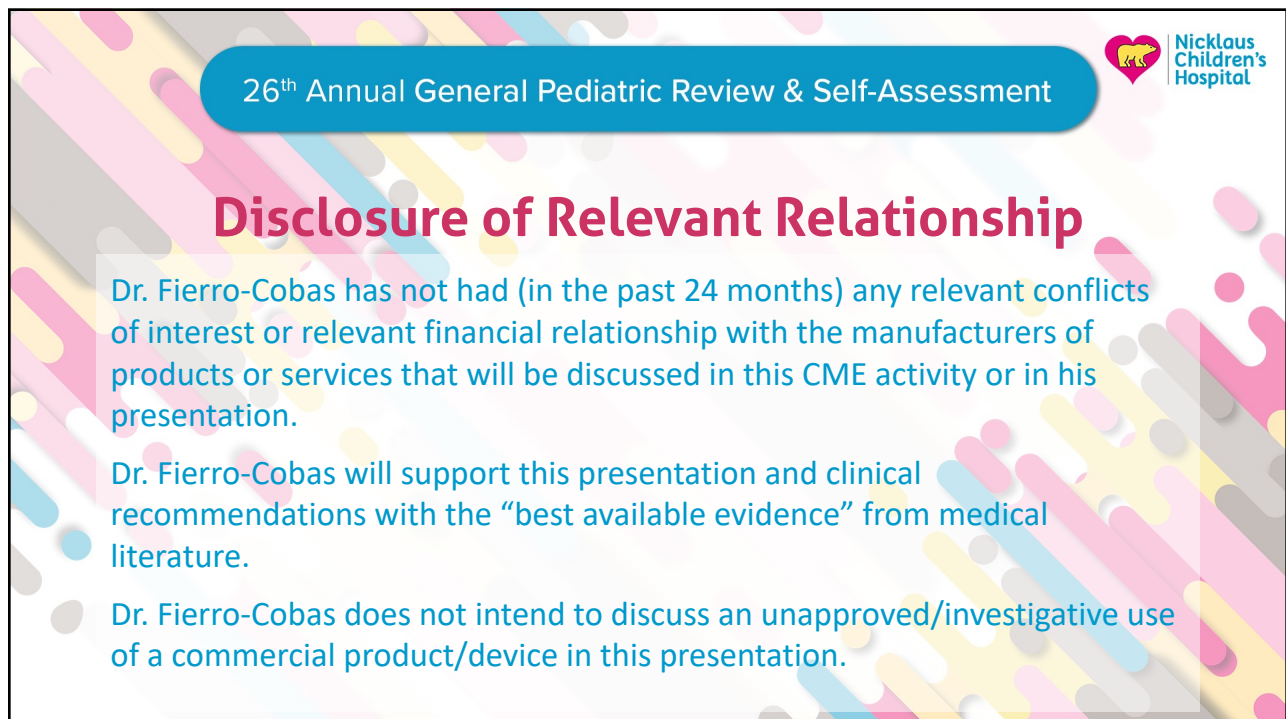


# DEVELOPMENT


## Victoria Fierro-Cobas, MD, FAAP

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Miami, FL

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26<sup>th</sup> Annual General Pediatric Review & Self-Assessment



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Victoria Fierro, MD, FAAP.  
Behavioral Developmental Pediatrics

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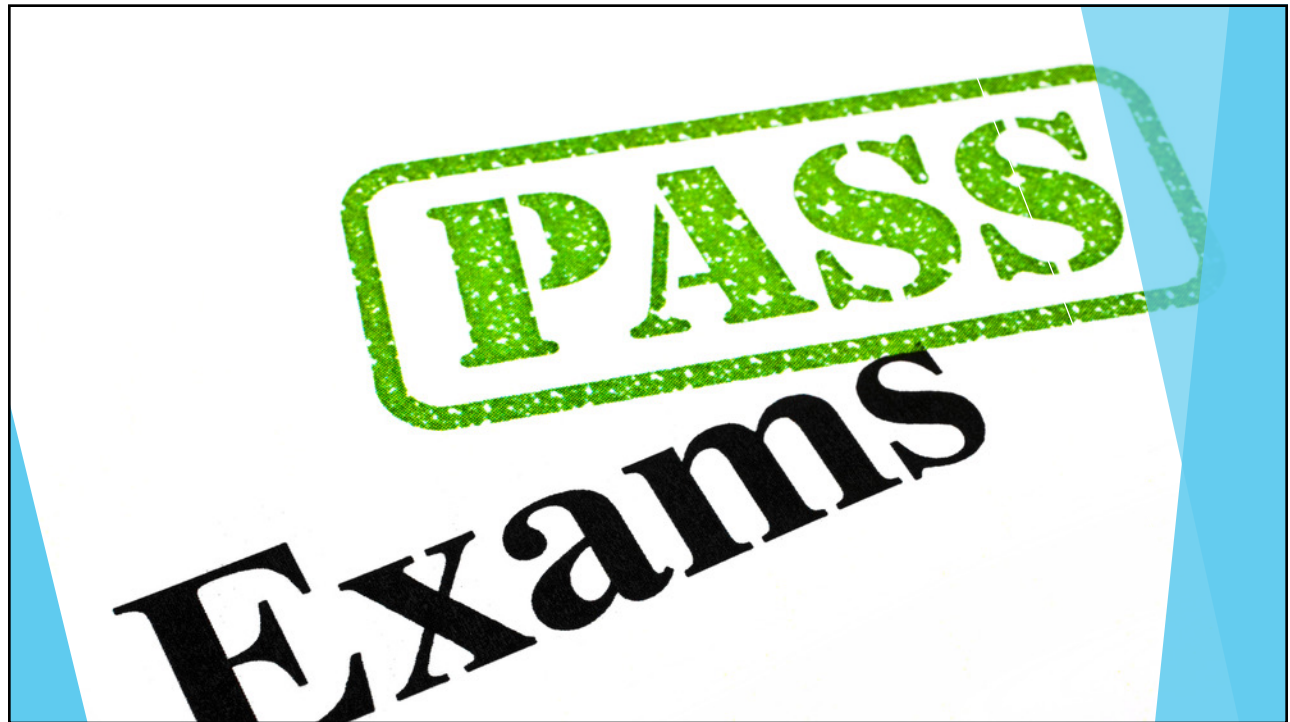
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## Objectives

- ▶ Describe normal child development and age-appropriate milestones.
- ▶ Have a basic knowledge of how to identify, diagnose and treat various developmental disorders.
- ▶ Recognize and evaluate common mental health disorders and initiate therapeutic intervention.

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# Developmental Behavioral Pediatrics

## Defining Developmental-Behavioral Pediatrics

Carol C. Weitzman, MD,<sup>1</sup> Rebecca A. Baum, MD,<sup>2</sup> Jill Fussell, MD,<sup>3</sup> Damon Korb, MD,<sup>4</sup> Laurel K. Leslie, MD, MPH,<sup>5†</sup> Adiaha I.A. Spinks-Franklin, MD, MPH,<sup>6</sup> Robert G. Voigt, MD<sup>7</sup>

**abstract**

There is an insufficient number of specialty developmental-behavioral pediatrics (DBP) physicians, despite nearly 25% of children and adolescents having a developmental, learning, behavioral, or emotional problem. In the nearly 20 years since becoming a board-certified subspecialty, the definition of DBP clinical practice remains somewhat unclear. This lack of clarity likely contributes to recruitment challenges and workforce issues, and limited visibility of DBP among parents, other professionals, payors, and administrators. Defining DBP is therefore an important step in the survival and growth of the field. In this paper, we describe the methodology used to develop this definition along with the origins of DBP, the persistent challenges to defining its scope, what training in DBP involves, and what distinguishes DBP from other overlapping fields of medicine. We propose the following definition of DBP: developmental-behavioral pediatrics (DBP) is a board-certified, medical subspecialty that cares for children with complex and severe DBP problems by recognizing the multifaceted influences on the development and behavior of children and addressing them through systems-based practice and a neurodevelopmental, strength-based approach that optimizes functioning. Developmental behavioral pediatricians care for children from birth through young adulthood along a continuum including those suspected of, at risk for, or known to have developmental and behavioral disorders.

Behavioral, developmental, and learning problems are common, affecting approximately 25% of children. A clear definition of the medical subspecialty of DBP by describing its origins, fellowship training, the

**Development**

**Behavior**

**Learning**

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Drs. Weitzman, Baum, Korb, Fussell, Leslie, Spinks-Franklin, and Voigt conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript, and all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

DOI: <https://doi.org/10.1542/peds.2021-054771>

Accepted for publication Jan 14, 2022

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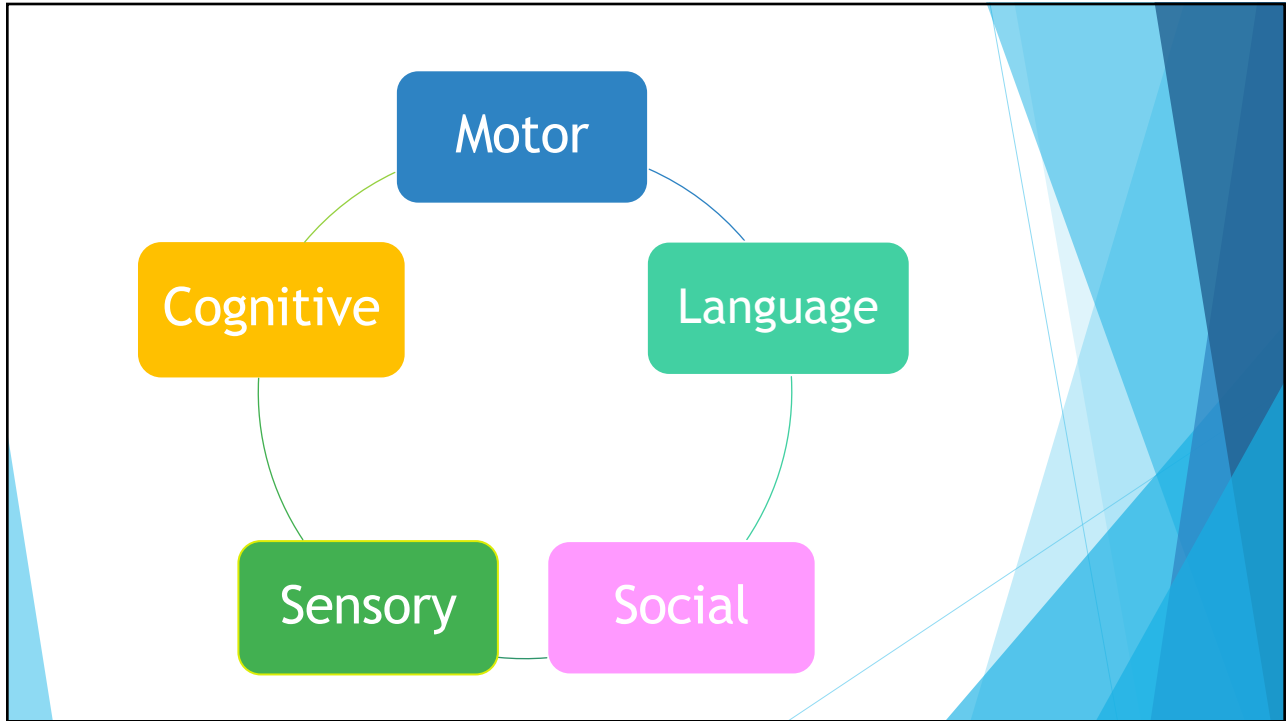
PEDIATRICS (ISSN Numbers: Print, 0031-4065; Online, 1098-4275).

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# Developmental milestones

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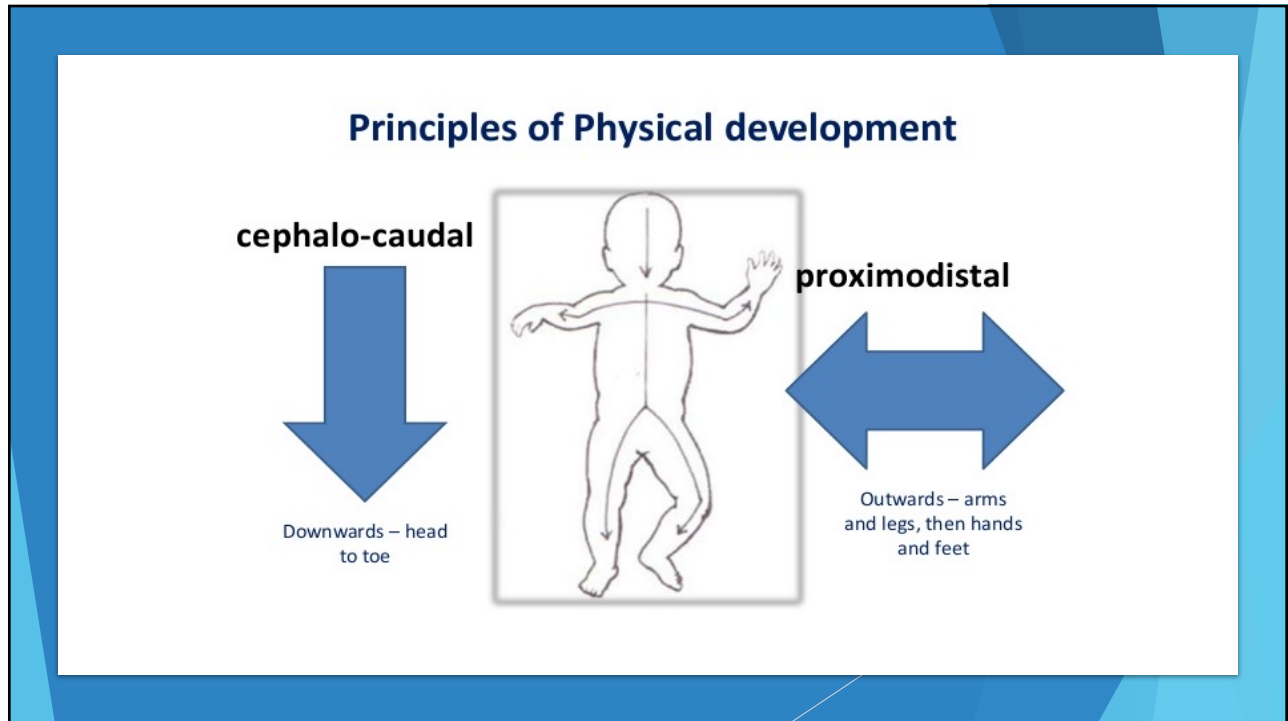
Delay

Deviation or deviance

Dissociation


TEST BEHAVIOR			
(Check boxes for 1st, 2nd, or 3rd test)			
<b>Typical</b>	1	2	3
<b>Yes</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>No</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Compliance</b> (See Note 31)	1	2	3
Always Complies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Usually Complies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rarely Complies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Interest in Surroundings</b>	1	2	
Alert	<input type="checkbox"/>	<input type="checkbox"/>	
Somewhat Disinterested	<input type="checkbox"/>	<input type="checkbox"/>	
Seriously Disinterested	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Fearfulness</b>	1	2	
None	<input type="checkbox"/>	<input type="checkbox"/>	
Mild	<input type="checkbox"/>	<input type="checkbox"/>	
Extreme	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Attention Span</b>	1		
Appropriate	<input type="checkbox"/>	<input type="checkbox"/>	
Somewhat Distractable	<input type="checkbox"/>	<input type="checkbox"/>	
Very Distractable	<input type="checkbox"/>	<input type="checkbox"/>	

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## Newborn reflexes

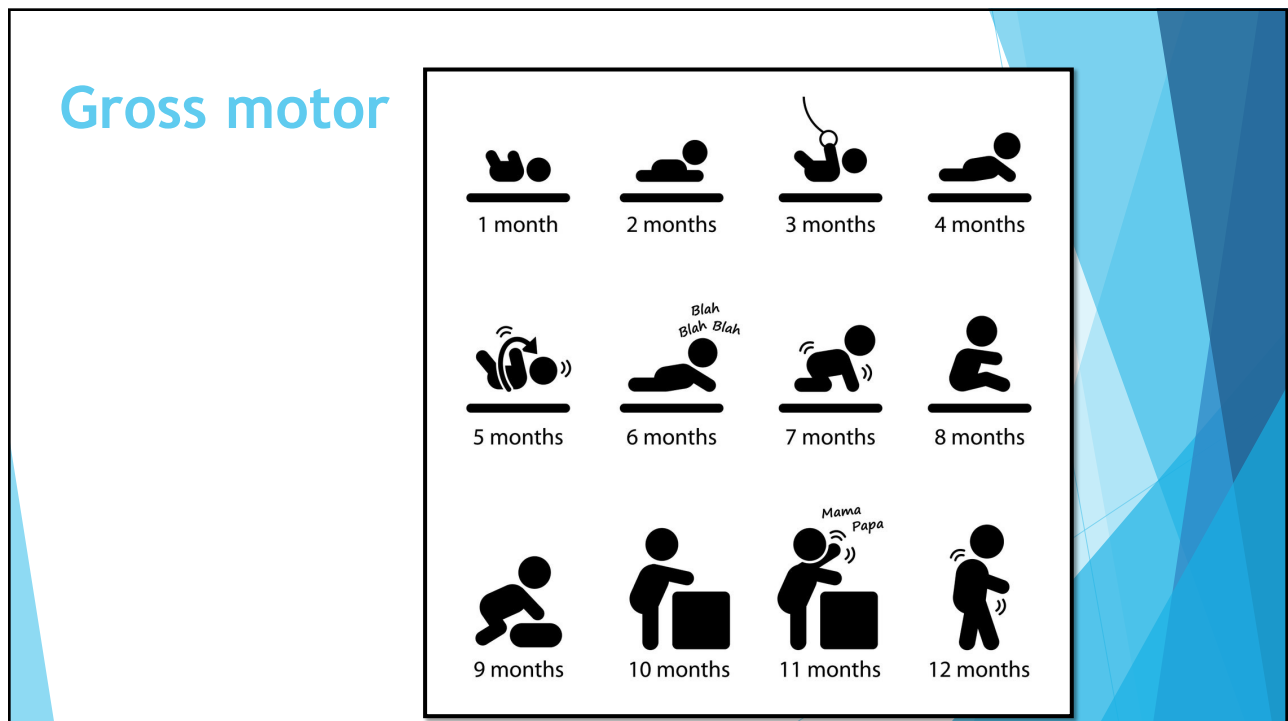


Reflex	Extinguished (m)
Stepping	1-4
Moro	2-6
Rooting	3-4
Palmar grasp	3-6
Tonic neck	5-7
Plantar grasp	9-12
Extensor plantar	9-24

12



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Reflex	Develops (m)
Head righting	4
Lateral propping	6
Parachute	8-9

Postural reflexes

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## Gross motor

-  **15 months:** Takes a few steps on his own, squats, climbs
-  **18 months:** Walks without holding, walks upstairs holding and leading with 1 foot
-  **24 months:** Kicks a ball, runs, jumps off the ground with both feet
-  **30 months:** Walks upstairs alternating feet, holding to rail

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## Gross motor

-  **3 years:** pedals tricycle, broad jump, balances in 1 foot 3 seconds
-  **4 years:** hops in 1 foot, walks up stairs without rail
-  **5 years:** walks downstairs holding a rail alternating feet, hops in one foot 15 times, skips
-  **6 years:** bicycle without training wheels

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## Fine motor

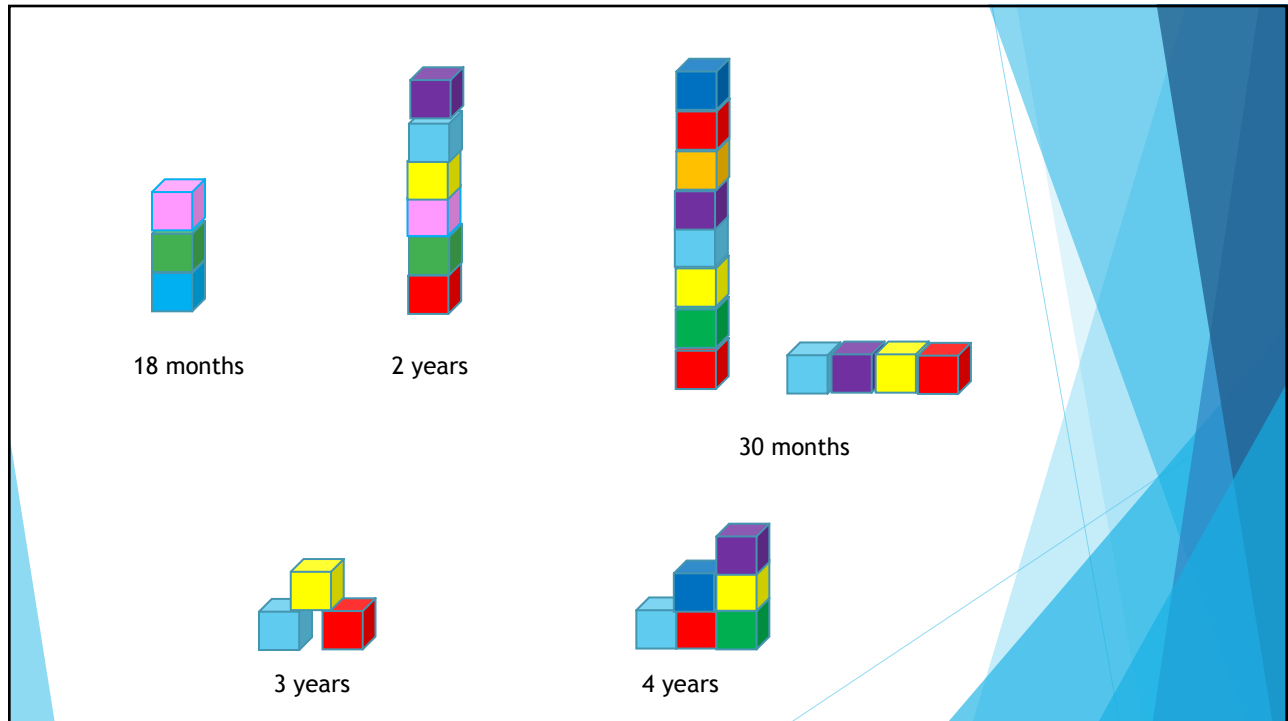
18

Age	Milestone
2 m	Opens hands briefly
4 m	Hands unfisted. Bidextrous reach. Uses her arm to swing at toys. Holds a toy when you put it in his hand. Brings hands to mouth and midline.
6 m	Unidextrous reach. Bangs objects at table. Transfers.
9 m	Bangs objects together. Probes with forefingers. "Rakes". Immature pincer grasp.
12 m	Mature pincergrasp. Releases intentionally (block in cup). Drinks from opened cup with help.
15 m	Uses fingers to feed herself some food. Places block inside and outside container.
18 m	Scribbles. Drinks from opened cup without help. Feeds self with fingers. Tries to use a spoon.

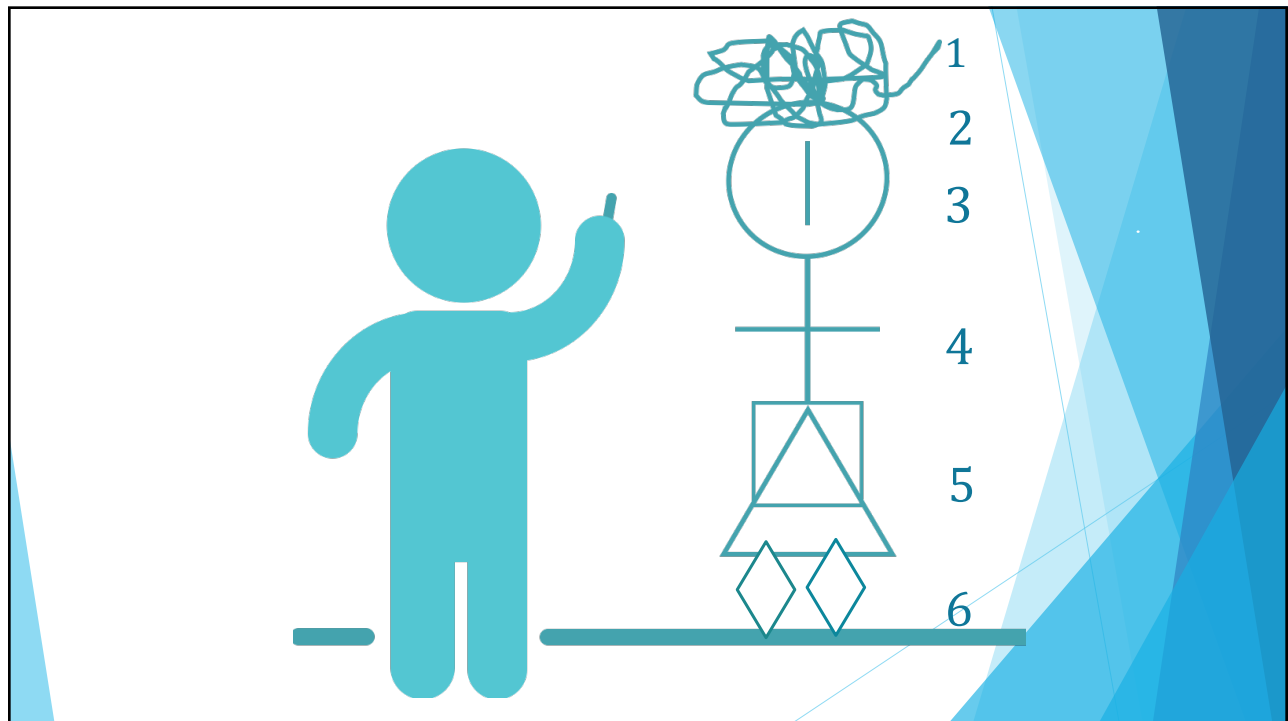
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$$\begin{array}{r} 3 \\ 5/4 \\ \hline 4 \quad 1/4 \end{array} +$$

23

Age	Milestone
2 y	Eats with a spoon.
30 m	Uses hands to twist things. Takes some clothes off by himself. Turns book page.
3 y	Strings items together. Puts on some clothes by himself. Uses a fork
4 y	Catches a large ball. Serves himself food or pours water. Unbuttons. Holds crayon or pencil between fingers and thumb.
5 y	Buttons some buttons. Writes first name.
6 y	Writes first and last names, ties shoelaces

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# Language Emotion Cognition

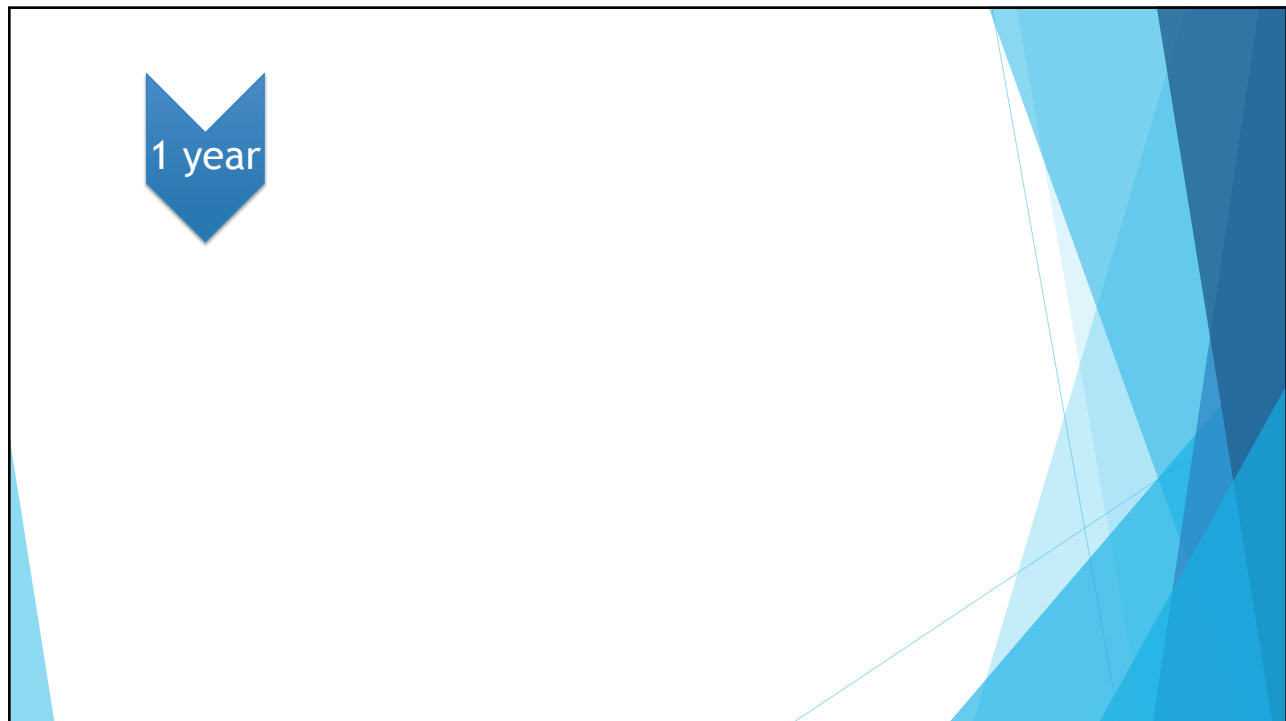
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AGE	EXPRESSIVE LANGUAGE	RECEPTIVE LANGUAGE
2 months	Makes sounds other than crying Coos (“oooo”, “aahh”)	Reacts to loud sounds Smiles
4 months	Coos back when you talk to him	Locates voice Chuckles
6 months	Blows “raspberries” Makes squealing noises and babbles	Takes turns making sounds Laughs
9 months	Repetitive nonspecific babbling Facial expressions	Lifts arms up to be picked up Stranger and separation anxiety Turns when name is called
12 months	Waves “bye-bye” Calls a parent “mama” or “dada” or another special name	Understands “no” Follows directions given with both a gesture and words

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Age	RECEPTIVE LANGUAGE	EXPRESSIVE LANGUAGE
15 months	3 words, besides “mama” or “dada” Points to ask for something Shows affection	Looks at a familiar object when you name it Follows one-step directions without any gestures
18 months	10-25 words	Identifies 2 - 4 body parts
24 months	2-word phrases Uses more gestures (blowing a kiss or nodding yes) Uses “I,” “me,” or “we”	Points to things in a book Follows 2 step commands Identifies 6 body parts Empathy
30 months	50 words, 2-word phrases with one action word Uses pronouns correctly Knows part of a song or rhyme	Names things in a book when you point and ask, “What is this?” Understands prepositions

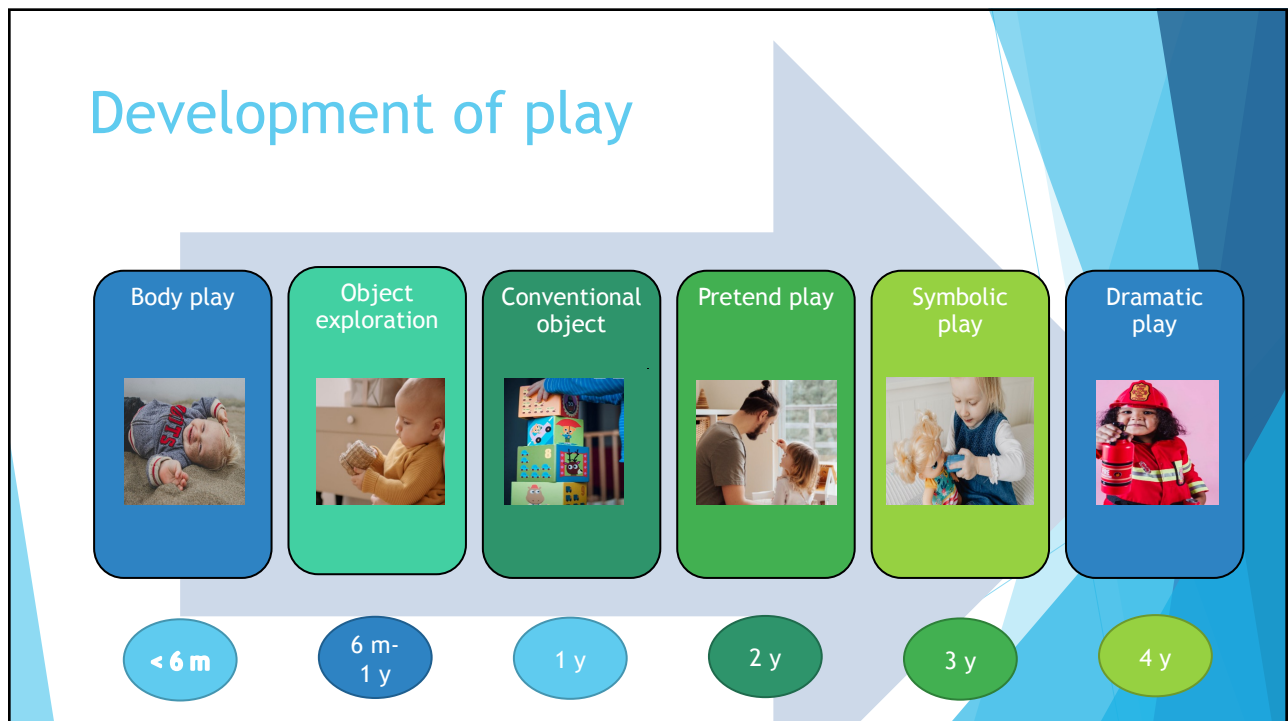
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AGE	EXPRESSIVE LANGUAGE	RECEPTIVE LANGUAGE
3 years	Two back-and-forth exchanges in conversation Asks "who," "what," or "where" questions	Says what action in a picture Identifies some colors Says first name
4 years	Asks "why" questions Talks about at least one thing that happened	Answers simple questions like "What is a coat for?" or "What is a crayon for?"
5 years	Tells a story she heard or made up with at least two events More than three back-and-forth exchanges Uses or recognizes simple rhymes	Answers simple questions about a story Counts to 10 Writes name Knows time words

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## MONITORING

### SURVEILLANCE

- ▶ Done in every well check up visit
- ▶ Flexible, longitudinal, continuous and cumulative
- ▶ Addresses concerns
- ▶ Obtains and documents developmental history
- ▶ Identifies risks and strengths

### SCREENING

- ▶ Done at particular encounters
- ▶ Uses a validated instrument
- ▶ Identifies an area of concern
- ▶ Does not result in a diagnosis

9 Months 18 Months 24 Months 30 Months

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## AAP and USTFPS recommendations:

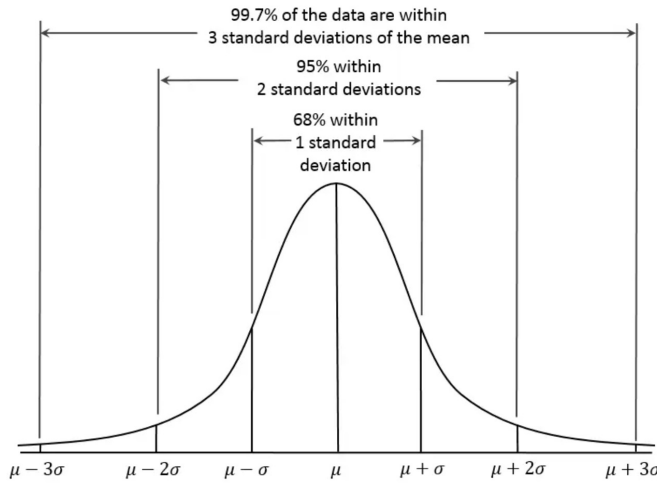
- ▶ Screening at 9, 18, and 30 m or if concerns
- ▶ ASD screening at 18 and 24 m
- ▶ Postpartum depression screening at 1, 2, 4, and 6 m
- ▶ Depression screening from 12 y/o

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Area Explored	Screening tool
Developmental	ASQ, PEDS, SWYC
Autism	CSBS, MCHAT, CAST, SCQ
Behavior	ASQ-SE, BITSEA, PSC, CBCL, SDQ
Mental health	PSQ-9 mod, PSQ-2, SCARED, Vanderbilt

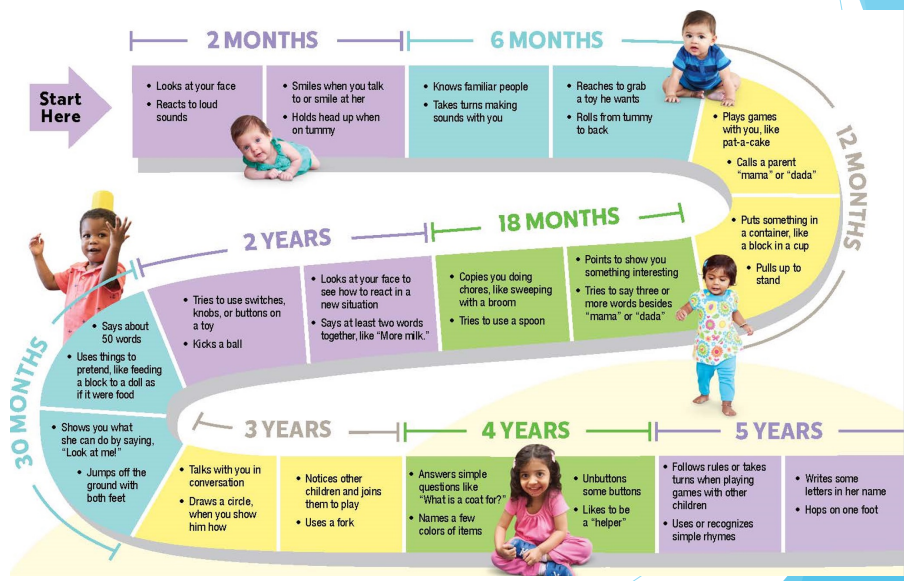
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## Developmental Delay: >1.5 or 2 ST below the mean



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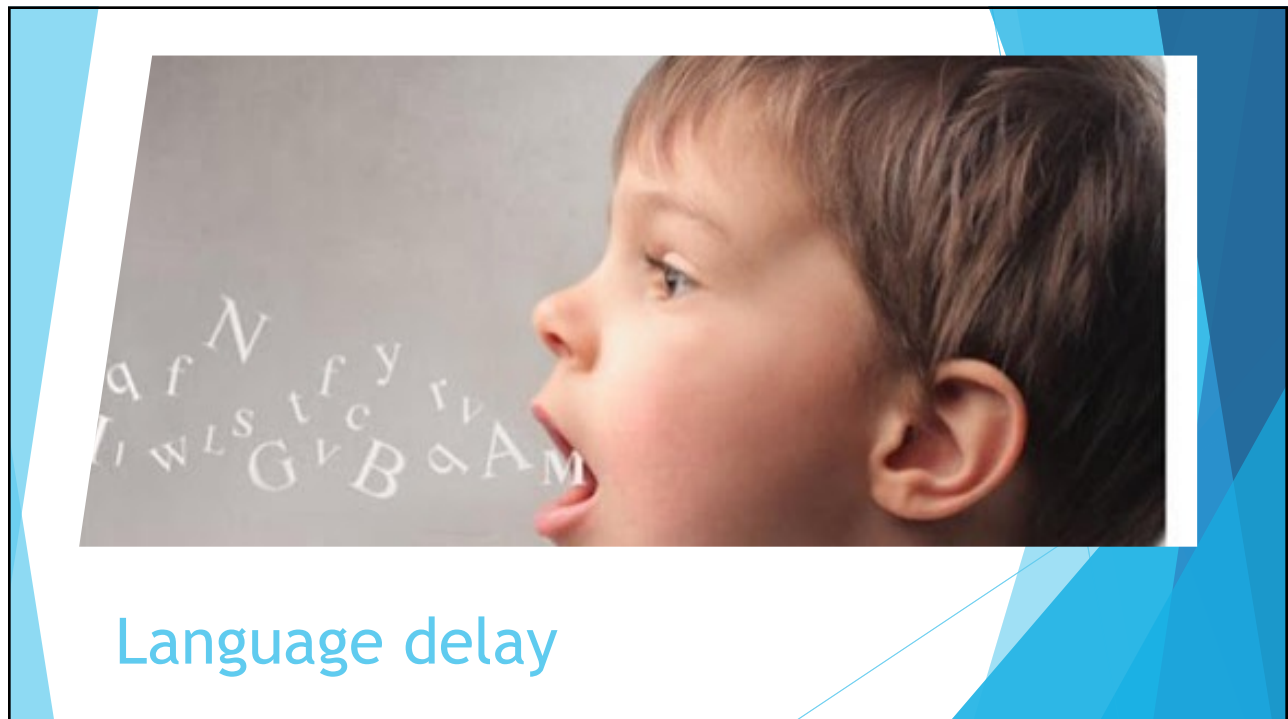
## DD > 25% less than expected



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	Cerebral Palsy	Intellectual Disability	Language disorder	Autism
Gross motor	DQ< 50	Normal or delayed	Normal or delayed	Normal or delayed
Language	Normal or delayed	DQ<70	Delayed	Delayed
Fine motor	Normal or delayed	DQ<70	Normal	Normal or delayed
Adaptive	Normal or delayed	Delayed	Normal	Normal or delayed
Social	Normal or delayed	Normal or delayed	Normal or delayed	Delayed

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Language delay

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## Language Delay

- ▶ 1:5 children are “late talkers”
- ▶ 50% of children delayed at 2 y/o remain delayed at 4 y/o
- ▶ Degree of impairment on dx does not correlate with prognosis
- ▶ Favorable prognosis:
  - ▶ Age 2 with appropriate receptive language and symbolic play

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## Misconceptions about language delay:

- ▶ Boys are delayed
- ▶ Second and third-born let their older siblings speak for them
- ▶ Children from bilingual households are significantly delayed

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## Etiologies

Social interaction	Verbal input	Hearing	Brain development	Oral mechanisms
Unsupportive	Inadequate	Impaired	Genetic or neurologic disorder	Abnormal structure or function
Child abuse or neglect, orphanage	Low SES, parent with limited education	Sensorineural hearing loss	ID, ASD	Cleft plate, velopharyngeal insufficiency

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## Hearing impairment



- ▶ Infants coo and begin to vocalize before 6 m
- ▶ Failure to develop “canonical babbling” by 11m
- ▶ Intervention before 6 m leads to better outcome
- ▶ Mean reading level of a high school senior with deafness: 4<sup>th</sup> grade

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## Fluency disorders (stuttering)

- ▶ Normal dysfluency of childhood : 2.5 to 4 y/o
- ▶ True stuttering:
  - ▶ 1% of school aged children
  - ▶ 3 times more frequent in boys
- ▶ Red flags:
  - ▶ At least 3 dysfluencies in 100 words of conversation
  - ▶ Begins after 3 years of age
  - ▶ Family history
  - ▶ Home environment with a low tolerance for stuttering or high pressure for verbal communication

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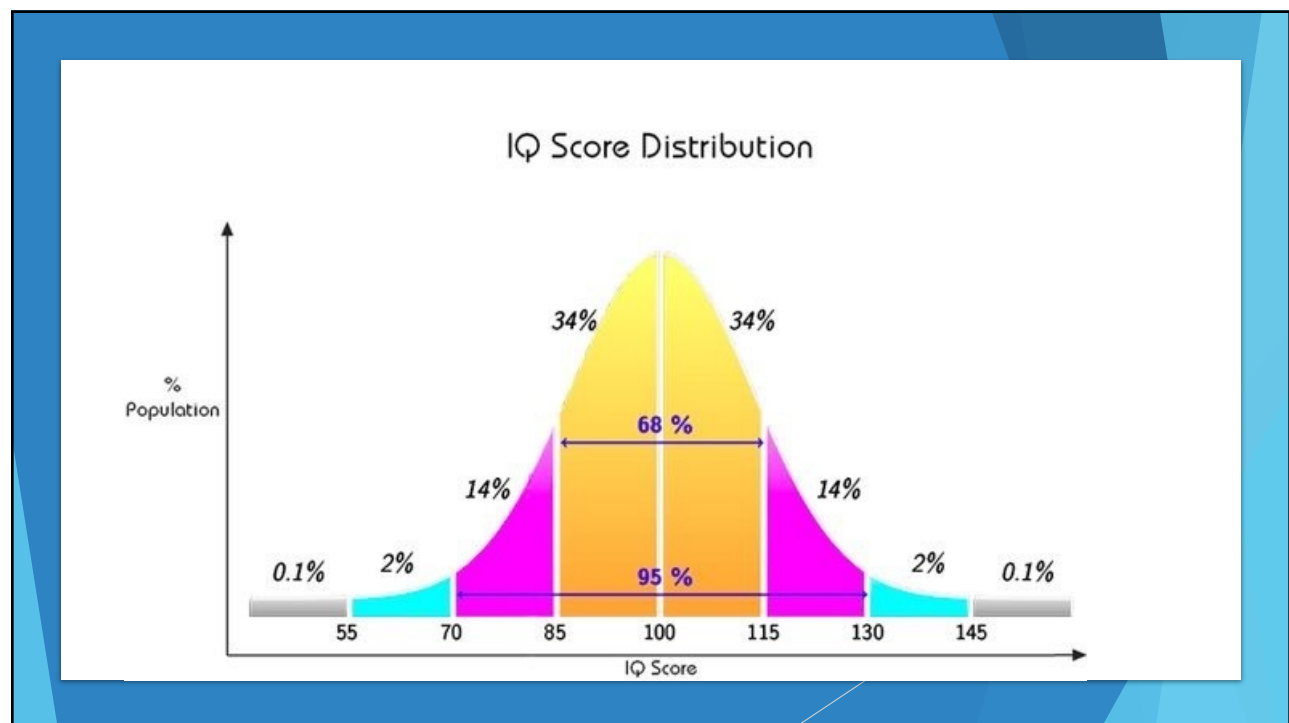
## Intellectual Disability

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## Intellectual Disability

- ▶ Deficits in intellectual functions
- ▶ Deficit in adaptive functioning
- ▶ Onset during the developmental period
  - ▶ Severity: mild, moderate, severe
  - ▶ Specifier: medical, genetic or environmental

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ID range	Academic/reading potential	Occupational potential	Independent leaving potential
Mild (55-70)	6 <sup>th</sup> grade	Intermittent support	Independent leaving with some community or social support
Moderate (35-55)	2 <sup>nd</sup> grade	Work with support (e.g., sheltered workshops)	Live in group homes or with parents or supervisors
Severe (20-35)	Self help skills, sight reading	Unlikely	Group home or with parents, extensively supported
Profound (<20)	Basic self help (feeding self), no reading	Not able	Pervasive support

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## Etiology

Infectious:

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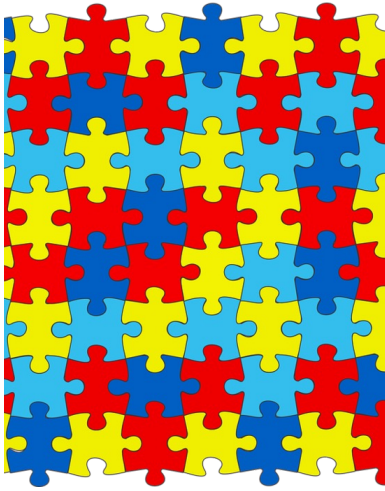
Autism Spectrum Disorder

Deficits in communication and social interaction

- Social-emotional reciprocity
- Non-verbal communication
- Developing, maintaining or understanding relationships

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## Autism Spectrum Disorder

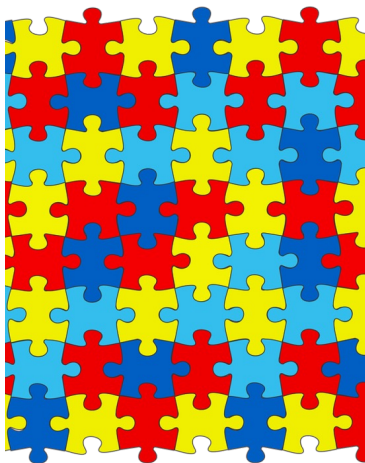


### Restricted, repetitive patterns of behavior, interests, or activities

- Stereotyped or repetitive movements, use of objects or speech
- Difficulties with transitions
- Restricted interests
- Hypo or hyperreactivity to sensory input

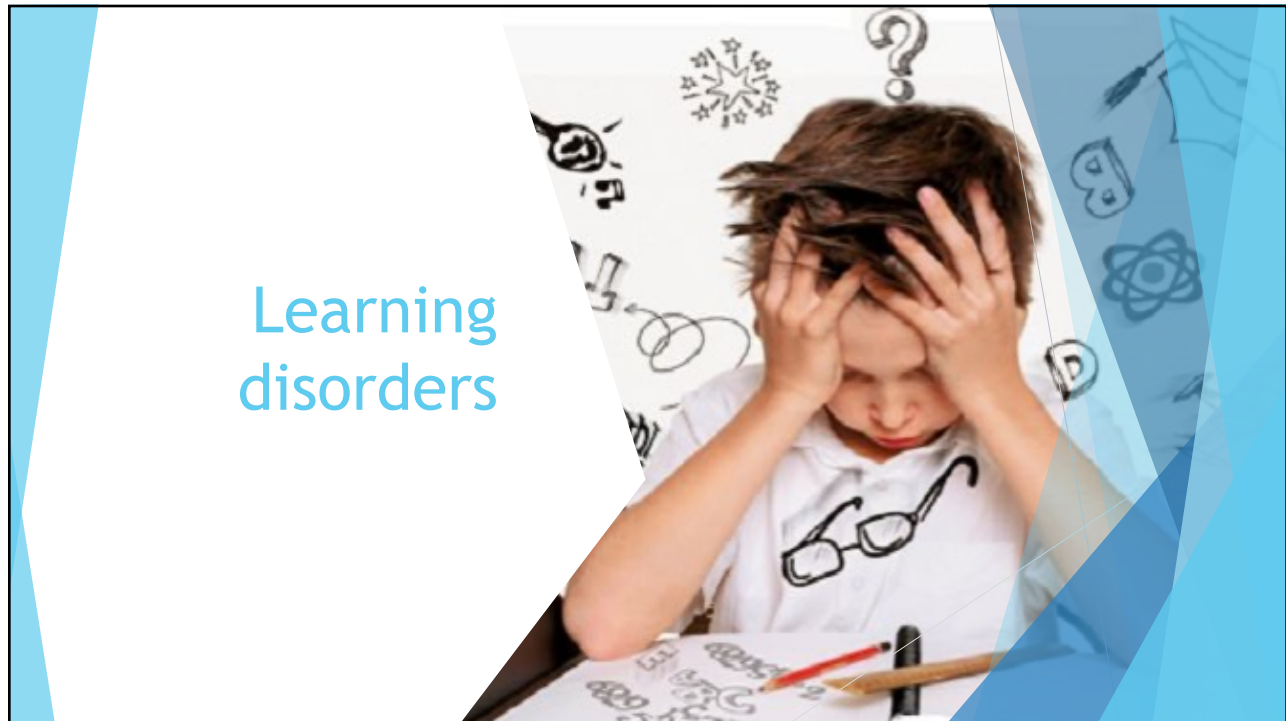
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## Autism Spectrum Disorder



- Presents in early development
- Causes significant impairment
- No other better explanation

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## Learning disorders

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A row of colorful binders (green, yellow, red, blue, black) is visible on the left side of the slide. The background features a blue geometric design on the right side.

## Diagnostic Criteria for LD

- ▶ A) Difficulties in at least one of these aspects for more than 6 months, despite the provision of extra help:
  - Reading
  - Understanding the meaning of what is read
  - Spelling
  - Written expression
  - Understanding number concepts, number facts or calculation
  - Mathematical reasoning

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## Diagnostic Criteria for LD

- ▶ B) The affected academic skills are substantially and quantifiably below expected
- ▶ C) Onset during school age
- ▶ D) Not due to other factors



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## Risk factors for LD:

- ▶ Family Hx of LD
- ▶ Prematurity
- ▶ Cyanotic congenital heart disease
- ▶ Toxic stress
- ▶ Genetic disorders:
  - ▶ Klinefelter syndrome
  - ▶ Turner syndrome
  - ▶ Velocardiofacial syndrome
  - ▶ Spina bifida with shunted hydrocephalus

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- Free appropriate public education
- Early intervention services under IDEA Part C : Infants and toddlers
- Special education and related services under IDEA Part B: 3 - 21 y



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## Rehabilitation Act of 1973, Section 504

- No otherwise qualified individual with a disability in the United States... shall, solely by reason of her or his disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance....”
- Accommodations
- Related aids and services: counseling, assistive technology

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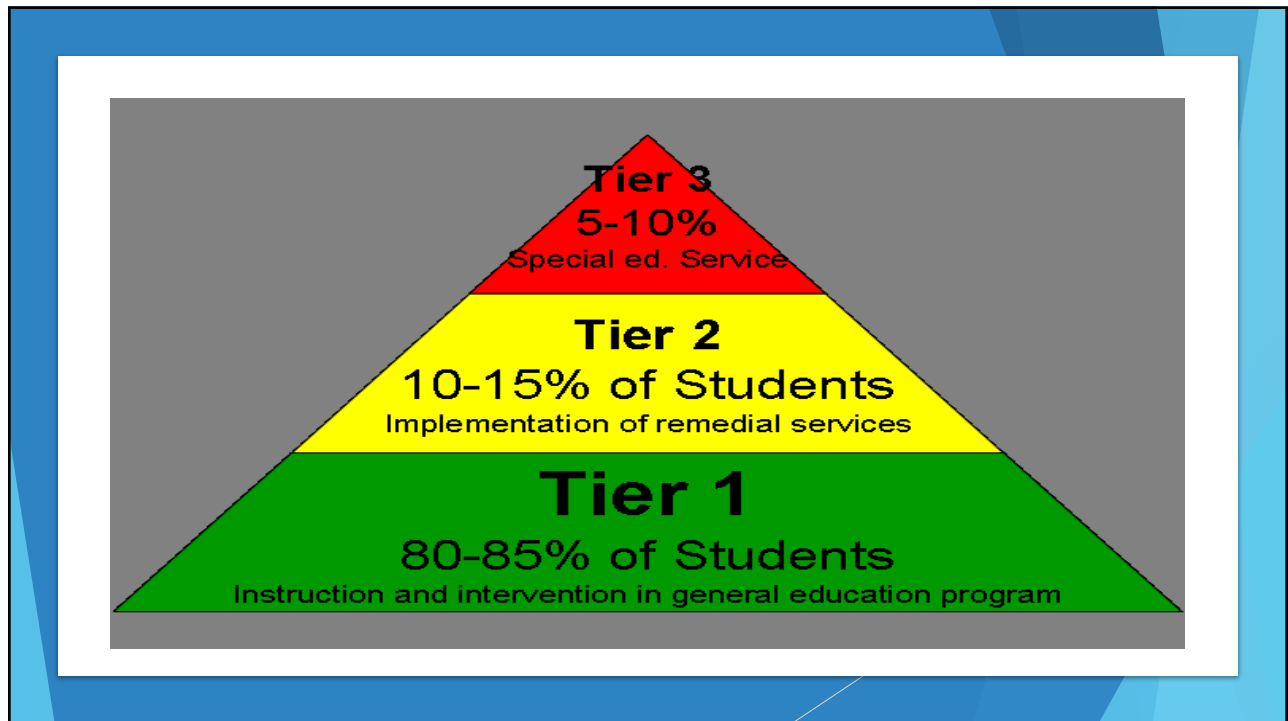
**Title II of  
the Americans  
with Disabilities  
Act of 1990**

No discrimination



The image contains six icons arranged in two rows of three. The top row icons are: a person with a cane (purple background), a person in a wheelchair (orange background), and a person with a hearing aid (green background). The bottom row icons are: a person with a hearing aid (teal background), a person with a hearing aid (blue background), and a hand pointing to a screen (orange background).

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## Interventions

- ▶ Psychoeducational evaluation:
  - ▶ Evaluate Capacity
  - ▶ Evaluate achievement
  
- ▶ Elaborate an Individual Educational Plan (IEP)
  - ▶ Alternative strategies to help learning (e.g. texts on tape, oral testing, word processors)
  - ▶ Different school placement setting
  - ▶ Behavioral interventions

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		Is the Therapy Effective?	
		Yes	No
Is the Therapy Safe?	Yes	Recommend	Tolerate
	No	Monitor closely or discourage	Discourage

## Alternative interventions

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## Infant and toddler “challenging” behaviors

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## Infantile Colic

- ▶ Crying increases progressively to a mean of 2.5 h/day during the 2<sup>nd</sup> month of life, decreases progressively after
- ▶ Colic: >3 h/day for > 3 days/week
- ▶ Temperament: difficult to sooth
- ▶ Empathize with parents and reassure
- ▶ Treatment:
  - ▶ Quietly held
  - ▶ Non-nutritive sucking
  - ▶ Left alone to sleep
  - ▶ White noise



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## Repetitive behaviors:

- ▶ Examples: body rocking, head banging or digit sucking
- ▶ Occur in most infants during the 1<sup>st</sup> year of life
- ▶ Help modulate arousal:
  - ▶ self calming during anxiety provoking situations
  - ▶ self stimulate during periods of low arousal
- ▶ Problematic if :
  - ▶ tissue damage
  - ▶ subjective distress for the child (not to the parent)

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## Finger sucking

- ▶ Onset in utero or few months old, peak at 18-21 months, resolution by 4 y/o
- ▶ Sequelae: dental problems, paronychia, deformities of fingers, stigma
- ▶ Avoid parental comments
- ▶ Child should be willing to partner in treatment
- ▶ Praise child for not sucking
- ▶ Use a device to remind:
  - ▶ Bandages or splints on the finger
  - ▶ Aversive taste treatments
  - ▶ Intraoral devices



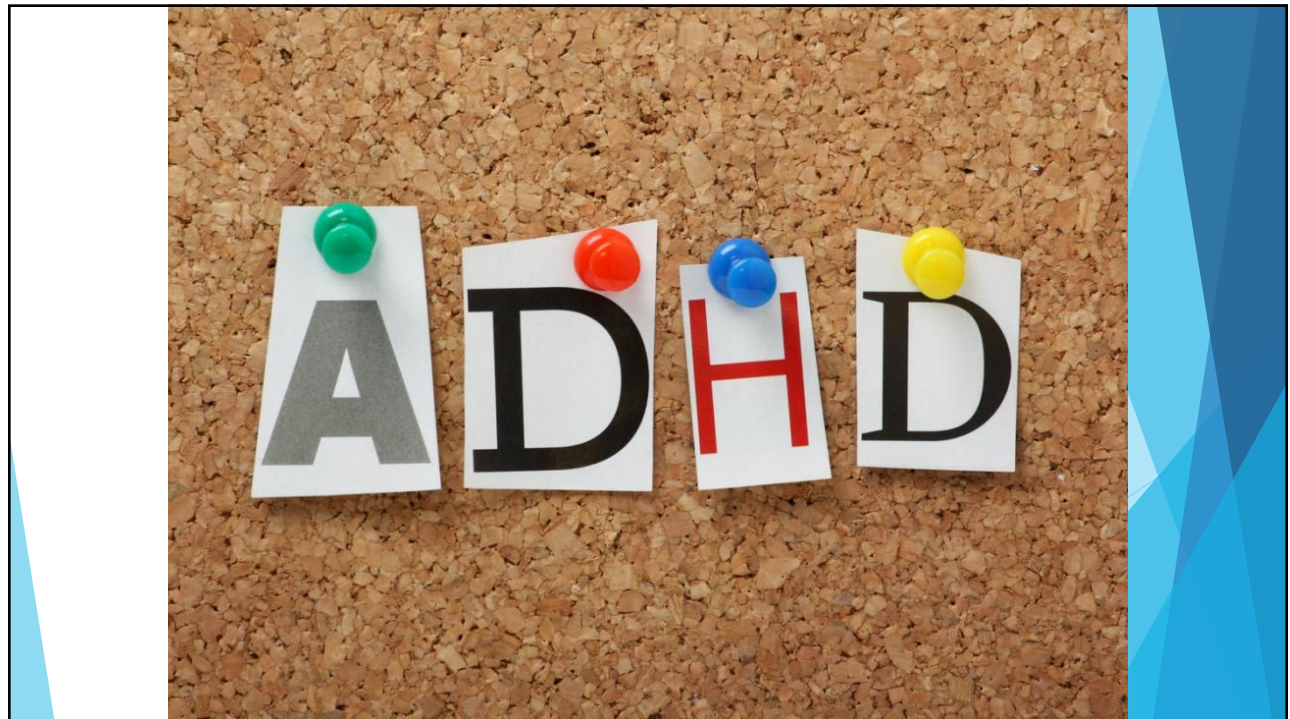
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## Breath holding spells



- ▶ Involuntary (reflexive) events/ Dysregulation of the autonomic nervous system
- ▶ Occur in response to an event that causes anger, frustration, fear, or minor injury
- ▶ Onset: 3-18 m/o
- ▶ Variable frequency
- ▶ Rarely persists beyond 7 y/o
- ▶ Evaluation
  - ▶ Typical presentation: check hemoglobin and iron levels
  - ▶ Not clear Hx: EKG, EEG, consider GERD
- ▶ Treatment:
  - ▶ Reassurance
  - ▶ Iron supplementation

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## Symptoms

### Hyperactive/impulsive

- ▶ Squirms and fidgets
- ▶ Cannot stay seated
- ▶ Runs/climbs
- ▶ On the go/driven by motor
- ▶ Talks excessively
- ▶ Cannot perform leisure activities quietly
- ▶ Blurts out answers
- ▶ Interrupts

### Inattentive

- ▶ Carelessness
- ▶ Difficulty sustaining attention
- ▶ Trouble following through
- ▶ Avoids tasks requiring mental effort
- ▶ Difficulty organizing
- ▶ Loses important items
- ▶ Easily distracted
- ▶ Forgetful
- ▶ Doesn't appear to listen



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## ADHD

- ▶ Symptoms present before 12 y
- ▶ Symptoms present > 6 months
- ▶ In 2 or more settings
- ▶ Significant difficulty in functioning
- ▶ Not attributable to something else



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## ADHD: Behavioral Parenting Training



- ▶ New Forest Parenting Program
- ▶ Triple P (Positive Parenting Program)
- ▶ Incredible Years Parenting Program
- ▶ Parent-Child Interaction Therapy

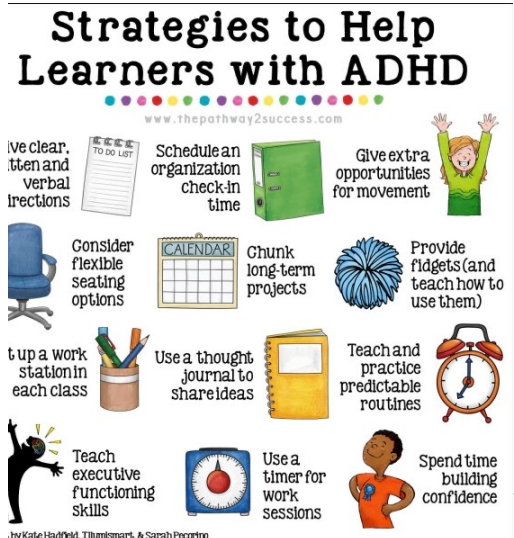
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## Behavioral Classroom management

- ▶ Plan 504
- ▶ IEP
- ▶ Skills training

### Strategies to Help Learners with ADHD

www.thepathway2success.com

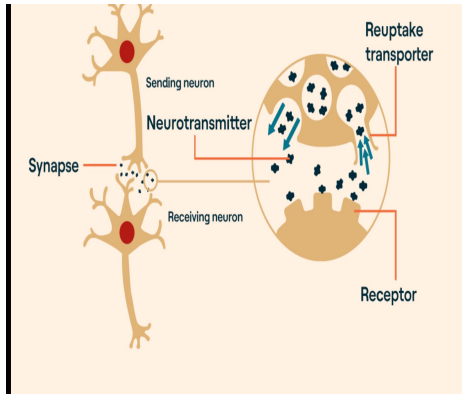


- Give clear, written and verbal directions
- Schedule an organization check-in time
- Give extra opportunities for movement
- Consider flexible seating options
- Chunk long-term projects
- Provide fidgets (and teach how to use them)
- Set up a work station in each class
- Use a thought journal to share ideas
- Teach and practice predictable routines
- Teach executive functioning skills
- Use a timer for work sessions
- Spend time building confidence

by Kate Hadfield, Tillamook, & Sarah Pecorino

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## Stimulants: Methylphenidate and Amphetamines



### ▶ Side effects:

- ▶ Most common: stomachache, headache (resolve after the first week)
- ▶ Decreased appetite, difficulty with sleep initiation, jitteriness.
- ▶ Growth retardation (adult height doesn't differ)
- ▶ Stimulant psychosis
- ▶ Most studies don't support association between use of stimulants and sudden death. Routine EKG is not indicated.

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## Non-stimulants

### NE reuptake inhibitor

(Atomoxetine and Viloxazine)

- ▶ Prefrontal cortex
- ▶ Not associated with tics
- ▶ Less sleep onset delay

### Alpha 2 Adrenergic agonists

(Clonidine and Guanfacine)

- ▶ Presynaptic, central acting
- ▶ Affects NE discharge rates in the locus coeruleus and indirectly the DA
- ▶ Counteracts delayed sleep initiation
- ▶ Effective in aggression and tics

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## Comorbid conditions

Condition	Coexisting with ADHD	Non-ADHD population
Oppositional Defiant Disorder	35%	2-16%
Conduct disorder	25%	6-16% (males);2-9% (females)
Anxiety disorder	25%	5-10%
Depressive disorder	18%	2% (child) , 5% (adolescent)
Learning disability	51% boys, 47% girls	14.5% boys, 7.7% girls

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## Externalizing behaviors: Disruptive Behavior Disorders

- ▶ Oppositional Defiant Disorder
- ▶ Conduct Disorder
- ▶ Intermittent Explosive Disorder
- ▶ Antisocial behaviors, delinquency  
(pyromania, kleptomania)

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## Internalizing behaviors

- ▶ Anxiety
- ▶ Depression

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## Anxiety Disorder

Prevalence: up to 8% of children and adolescents

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## Mood and affect disorders

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## Risk factors

- Family history
- Stressors: loss, abuse, neglect, trauma, divorce, death
- Coexisting disorder
- Medical illness (e.g. diabetes, asthma)
- Biological and sociocultural factor (e.g. gender dysphoria, sexual orientation)

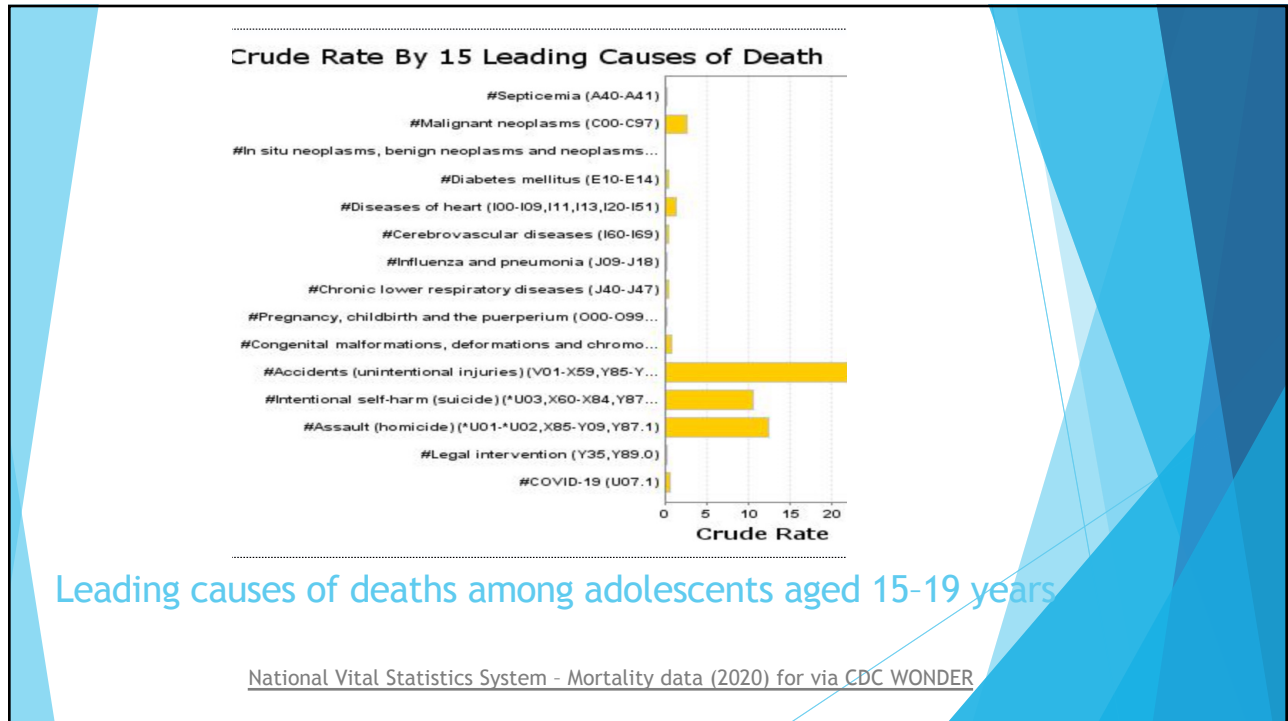
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## Treatment



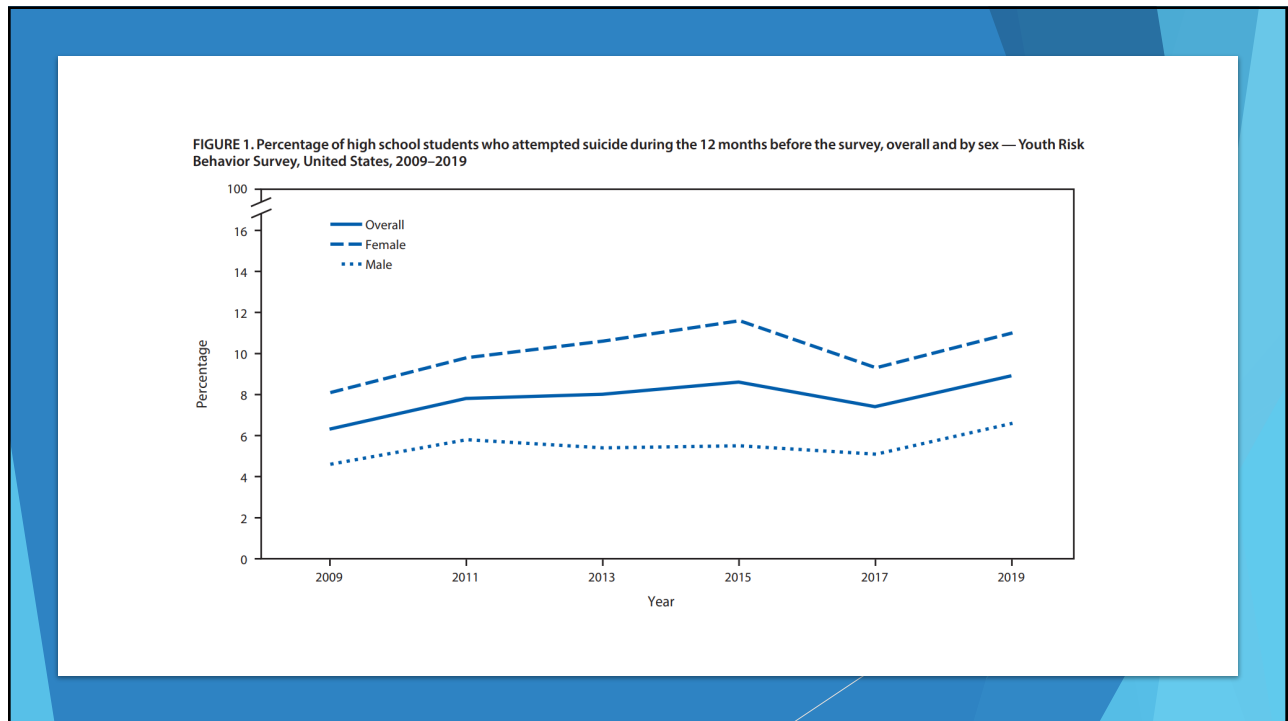
**Psychotherapy:**

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Leading causes of deaths among adolescents aged 15-19 years

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## Suicidal behavior



- ▶ Always screen for suicidality and establish a safety plan
  - ▶ Engaging a concerned 3<sup>rd</sup> party
  - ▶ Developing a plan for communication: give emergency numbers and contact
  - ▶ Remove firearms, knives/sharps, and other lethal means (alcohol, medications)
- ▶ Contracts are detrimental

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National Suicide Prevention  
Lifeline 1.800.273.TALK (8255)

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Questions?

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