

ASSESSMENT AND TREATMENT OF  
ATTENTION-DEFICIT/  
HYPERACTIVITY DISORDER AND  
LEARNING DISORDERS IN  
PEDIATRIC SETTINGS

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# Disclosure



The presenters have no financial relationship to this program.

# Objectives

At the end of this presentation, participants will be able to:

1. Apply DSM-5 criteria for ADHD and Learning Disorders to assessment and diagnosis.
2. Distinguish ADHD and learning disorders from co-existing conditions to formulate clinical hypotheses.
3. Incorporate empirically-supported treatment options in the management of ADHD and learning disorders.

# ADHD Facts

- Prevalence rate of 5% among children
- Male : female ratio is 3 to 1
- ADHD has been found across socioeconomic levels, cultures, and countries
- Age of onset is usually early childhood, with a peak at ages 3-4
- Often identified in early elementary school
- Lifespan disorder - 2.5% of adults
- ADHD is both familial and heritable

# ADHD Facts cont.

- Several known environmental correlates of ADHD
  - Low birth weight
  - Maternal smoking during pregnancy
  - Fetal alcohol exposure
  - Environmental lead
  - Pediatric head injury
- Heritability of ADHD
  - ADHD elevated in 1<sup>st</sup> degree biological relatives of individuals with ADHD
  - Substantial heritability

# DSM-V Diagnostic Criteria

## □ Inattention (at least 6 symptoms)

- Fails to give close attention to details or makes careless mistakes in schoolwork, work, etc.
- Difficulty sustaining attention
- Does not seem to listen when spoken to directly
- Does not follow through on instructions and fails to finish schoolwork, chores, etc.
- Difficulty organizing tasks and activities
- Avoids tasks requiring sustained mental effort
- Loses things necessary for tasks or activities
- Easily distracted by extraneous stimuli
- Forgetful in daily activities

# ADHD Diagnostic Criteria (cont.)

- Hyperactivity-Impulsivity Symptoms (at least 6 symptoms)
  - Difficulty playing or engaging in activities quietly
  - Always "on the go" or acts as if "driven by a motor"
  - Talks excessively
  - Blurts out answers
  - Difficulty waiting in lines or awaiting turn
  - Interrupts or intrudes on others
  - Runs about or climbs inappropriately
  - Fidgets with hands or feet or squirms in seat
  - Leaves seat in classroom or in other situations in which remaining seated is expected

# ADHD Diagnostic Criteria (cont.)

- Symptoms present prior to age 12
- Clinically significant **impairment** in social or academic/occupational functioning
- Some symptoms that cause impairment are present in **2 or more settings** (e.g., school/work, home, recreational settings)
- Not due to another disorder (e.g., Autism, Mood Disorder, Anxiety Disorder)



# Subtypes

- Combined presentation
  - ▣ Clinical levels of both inattention and hyperactivity/impulsivity
  - ▣ Most common subtype
- Predominantly Inattentive presentation
  - ▣ Clinical levels of inattention only
  - ▣ Often not identified until middle school
  - ▣ Sluggish cognitive tempo
- Predominantly Hyperactive/Impulsive presentation
  - ▣ Clinical levels of hyperactivity/impulsivity only
  - ▣ More common among very young children prior to school entry

# Associated Problems

- Peer problems
  - Inattentive symptoms → ignored
  - Hyperactive/impulsive symptoms → actively rejected
  - Not deficient in social reasoning/understanding, but rather the **execution** of appropriate social behavior
- Family dysfunction/parental issues
  - No clear causal relationship between family problems and ADHD
  - Family problems can impact the severity and developmental course/outcomes of ADHD
- Self-esteem
  - Low self esteem associated with comorbid depression



# Assessment of ADHD

# Overview of Assessment

- Structured clinical interview with parent(s)
- Teacher- and parent-completed questionnaires
- Testing:
  - IQ
  - Achievement
  - Executive Functioning
- Behavioral observations at home and school
  
- No medical screen, cognitive test, or brain imaging technique can detect ADHD

# Testing Domains

	Rating Scales	Observations	Standardized Tests	Qualitative Report
General Intelligence			<b>x</b>	
Academic Achievement			<b>x</b>	<b>x</b>
Language		<b>x</b>	<b>x</b>	<b>x</b>
Memory		<b>x</b>	<b>x</b>	<b>x</b>
Attention	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
Executive Function	<b>x</b>	<b>x</b>	<b>x</b>	
Fine and Gross Motor Skills		<b>x</b>	<b>x</b>	
Visual Perceptual		<b>x</b>	<b>x</b>	
Social Skills/Reciprocity	<b>x</b>		<b>Tasks</b>	<b>x</b>
Emotional Functioning	<b>x</b>	<b>x</b>	<b>Projectives</b>	<b>x</b>
Adaptive/Self-Care Skills	<b>x</b>		<b>Interview</b>	<b>x</b>

# Objective Ratings

## □ Rating Scales

- Child Behavior Checklist or Teacher Report Form – general
- Behavior Assessment System for Children – general
- Conners (parent and teacher) – ADHD specific
- SWAN ADHD Rating Scale – ADHD specific
- Behavior Rating Inventory of Executive Function (BRIEF) – executive functioning

## □ Observations

- Physical appearance, social presentation, understanding and use of language, effort, persistence, and impulse control, affect and emotion regulation, observations related to particular tests (e.g. careless errors on math tests)

# Testing

## □ General Intelligence

### ▣ Wechsler Intelligence Scale for Children – 5<sup>th</sup> Ed.

- Verbal Comprehension Index

- Visual Spatial Index

- Fluid Reasoning Index

- **Working Memory Index**

- **Process Speed Index**

## □ Sustained Attention

### ▣ Continuous Performance Task

- Conner's Continuous Performance Test (CPT-3)

# Testing cont.

## □ Executive Functions

- Umbrella term referring to different abilities such as: planning, working memory, attention, inhibition, self-monitoring, self-regulation initiation
- DKEFS (8-89)
- NEPSY-2 (3-16)

## □ Learning/Achievement

- To be discussed...





# Treatment of ADHD

# Well-Established ADHD Treatments

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- Medications
- Behavioral Interventions
  - ▣ Behavioral parent training
- School accommodations and interventions

# Medication: Stimulants

- Most well-researched, effective, and commonly used medication treatment for ADHD
  - Methylphenidate (Ritalin, Concerta, and Metadate)
  - Dextroamphetamine (Adderall)
- These medications reduce ADHD symptoms by:
  - Blocking the reuptake of norepinephrine (NOR) and dopamine (DOP) and facilitating their release
  - Enhancing NOR and DOP availability in certain brain regions: PFC and basal ganglia

# Stimulants

- Research has shown that stimulants:
  - Are highly effective in reducing ADHD symptoms in the short term
  - Decrease disruption in the classroom
  - Increase academic productivity and on-task behavior
  - Improve teacher ratings of behavior
- Common side effects: insomnia, decreased appetite
- Strattera (atomoxetine)
  - A non-stimulant alternative that works well for some children
  - Has not been studied as long or as intensively as the stimulants
  - Smaller effect size relative to the stimulants

# Limitations of Stimulants

- Individual differences in response
  - ▣ Not all children respond (approximately 80%)
- Does not address family problems
- No long-term effects established
- Long-term use rare (e.g., medication holidays)
- Some families are not willing to try medication

# Behavioral Therapy

- Learn or strengthen positive behaviors and eliminate unwanted or problem behaviors
- **Parent training:** parents learn new skills or strengthen their existing skills to teach and guide their children and to manage their behavior
  - Strengthens relationship between the parent and child
  - Decreases children's negative or problem behaviors
- **Behavior therapy with children:** child to learn new behaviors to replace behaviors that don't work or cause problems. Child learns to express feelings in ways that does not create problems for the child or other people

# Evidenced-Based Programs

- Programs for parents of young children with ADHD that reduce symptoms and problem behaviors related to ADHD
  - ▣ Triple P (Positive Parenting Program)
  - ▣ Incredible Years Parenting Program
  - ▣ Parent-Child Interaction Therapy
- For older school-aged children
  - ▣ Parent training and individual therapy
  - ▣ Social skills training
  - ▣ Organizational skills training

# Behavioral Treatment Components

- Psychoeducation about ADHD
- Structure/routines
- Clear rules/expectations
- Attending/rewards
- Planned ignoring
- Effective commands
- Time out/loss of privileges
- Point/token system
- Daily school-home report card



# ADHD and the Classroom

- 504 Plan/Individualized Education Plan (IEP)
- Chadd.org – National Resource on ADHD
- Classroom tips:
  - Make assignments clear
  - Give positive reinforcement and attention to positive behavior
  - Make sure assignments are not long and repetitive.
  - Allow time for movement and exercise
  - Communicate with parents on a regular basis
  - Use a homework folder to limit the number of things the child has to track
  - Be sensitive to self-esteem issues
  - Minimize distractions in the classroom
  - Involve the school counselor or psychologist

# Comorbidity

- Over 50 % of people diagnosed with ADHD also have a secondary diagnosis
- Common co-occurring diagnoses:
  - Anxiety
  - Major depression
  - Conduct Disorder
  - Oppositional Defiant Disorder
  - Tourette Syndrome
  - Substance Abuse Disorder
  - Learning Disorders
- 20-25% of ADHD children meet criteria for a learning disorder



# Specific Learning Disorders (SLD)

# Objectives

- Discuss the diagnostic criteria, and screening & evaluation process of Specific Learning Disorders:
  - Reading, Mathematics, & Writing
- Discuss what school-based and community interventions and services are beneficial.

# DSM 5: Specific Learning Disorders

- A. Persistent (at least 6 months) difficulties learning and using academic skills, despite provision of interventions that target the difficulties (lists associated symptoms)
  
- B. Skills are substantially and quantifiably below those expected for the individual's chronological age, and cause significant interference with academic or occupational performance, or with activities of daily living, as confirmed by individually administered standardized achievement measures and comprehensive clinical assessment.
  - For individuals age 17 years and older, a documented history of impairing learning difficulties may be substituted for the standardized assessment.

# DSM 5: Specific Learning Disorders

- C. Learning difficulties begin during school-age years but may not become fully manifest until the demands for those affected academic skills exceed the individual's limited capacities
- D. Learning difficulties are not better accounted for by intellectual disabilities, uncorrected visual or auditory acuity, other mental or neurological disorders, psychosocial adversity, lack of proficiency in the language of academic instruction, or inadequate educational instruction.

# DSM 5 Specific Learning Disorders

- 315.00 (F81.0) With impairment in reading:
  - ▣ Word reading accuracy
  - ▣ Reading rate or fluency
  - ▣ Reading comprehension
- 315.2 (F81.81) With impairment in written expression:
  - ▣ Spelling accuracy
  - ▣ Grammar and punctuation accuracy
  - ▣ Clarity or organization of written expression
- 315.1 (F81 .2) With impairment in mathematics:
  - ▣ Number sense
  - ▣ Memorization of arithmetic facts
  - ▣ Accurate or fluent calculation
  - ▣ Accurate math reasoning

# DSM 5 Specific Learning Disorders

## □ Specify Severity

- Mild – difficulties in 1-2 academic domains, but able to compensate when provided accommodations/support
- Moderate – difficulties in 1+ academic domains, needs intensive specialized teaching to become proficient
- Severe – difficulties in several academic domains, needs ongoing intensive individualized and specialized teaching, still may not be able to complete all activities

Example Coding: 315.00 (F81.0) Specific Learning Disorder with Impairment in Reading, Moderate



# Differential Diagnosis

- Normal variations in academic attainment
- Intellectual Disability
- Learning difficulties due to neurological or sensory disorders
- Neurocognitive disorders
- ADHD

# Comorbidities

- Neurodevelopmental (ADHD, language/communication disorders, developmental coordination disorder, ASD, preterm/LBW children, prenatal nicotine exposure)
- Psychiatric (anxiety, depressive and bipolar disorders)
- Clinical judgment needed to judge which to diagnose, if not both

# Specific Learning Disorders

- **Reading**
- **Mathematics**
- **Writing**

# Reading Disability Facts

- Prevalence is approximately 9%, depending on cutoffs (<SS=85 is common in literature)
  - ▣ About 1 out of 10 children
- More boys than girls (~1.5:1)
- Etiology is multifactorial
  - ▣ Genetic
  - ▣ Specific environmental effects
    - Instructional quality
    - Home language/literacy environment
  - ▣ esp. comorbid w SLD in written expression

# DSM 5 Specific Learning Disorder: Reading

- ▣ Inaccurate or slow and effortful word reading
  - Reads single words aloud incorrectly or slowly and hesitantly
  - Frequently guesses words
  - Has difficulty sounding out words
  
- ▣ Difficulty understanding the meaning of what is read
  - May read text accurately but not understand the sequence, relationships, inferences, or deeper meanings of what is read

# What is “Dyslexia”?

- Dyslexia associated with:
  - ▣ Difficulty with fluent and accurate word recognition
    - Problems with decoding
  - ▣ Difficulties with spelling
  - ▣ Usually reading comprehension not associated

# What ISN'T “Dyslexia”?

- NOT seeing words backwards
  - ▣ Dyslexia is not a vision impairment
- NOT letter reversals
  - ▣ This is quite common when children first learn to read and write

# Neuropsychology of Reading Disorder

## □ Deficits:

- Phonological Awareness - ability to manipulate and attend to individual sounds in words (phonemes)
  - How many sounds in “cat”? In “check”?
  - Say “split” - Now say “split” without the /p/.
  - Say “funny” backwards.
- Dysphonetic errors in spelling:
  - Dress = drst
- Phonologically-based speech errors
  - Volcano for tornado
- Rapid Naming deficits
  - Colors, objects, letters & numbers



# Screening

- What types of books is he/she reading?
- Difficulty with spelling?
- Difficulty learning letter names?
- Difficulty learning phonics (sounding out words)?
- Reading slowly?
- Reading below grade or expectancy level?
- Requiring extra help in school because of problems in reading and spelling?

# Evaluation:

- General Intelligence
  - Wechsler Intelligence Scale for Children – V Ed.
- Phonological Processing (CTOPP-2, TAPS-3)
  - Phoneme Awareness
  - Rapid Naming
- Academic Skills (WJ-IV, KTEA-3, WIAT-3, WRAT-4)
  - Timed word and nonword recognition
  - Spelling
  - Reading fluency
  - Reading Comprehension

# Recommendations & Interventions

- Individualized Education Program (IEP)
  - Provide explicit instruction in reading
    - Phonics-based approach
  - Drilling- practice, practice, practice
  - Grading-do not penalize for spelling errors
  - Extra time on assignments and tests
    - Instructions read out loud on tests
  - Audio books and assistive technology

# Specific Learning Disorders:

- ~~Reading~~
- **Mathematics**
- Writing

# Math Disability Facts

- Prevalence ranges from 3-11% depending on cutoffs (typical,  $SS=85$ ) and comorbidity.
- Etiology is multifactorial
  - Genetic
  - Specific environmental effects
  - Instructional quality
- Research shows comorbid with reading disorder. Children with reading disorder likely to have problems with math reasoning (story problems)
- Gender differences?
  - Girls had more math anxiety, but no difference in math performance

# DSM 5 Specific Learning Disorder: Mathematics

- Difficulties mastering number sense, number facts, or calculation
  - ▣ Has poor understanding of numbers, their magnitude, and relationships.
  - ▣ Counts on fingers to add single-digit numbers instead of recalling the math fact as peers do.
  - ▣ Gets lost in the midst of arithmetic computation and may switch procedures.
  
- Difficulties with mathematical reasoning
  - ▣ Has severe difficulty applying mathematical concepts, facts, or procedures to solve quantitative problems.

# Neuropsychology of Math Disorder

- Preverbal numerical abilities
  - ▣ 'Number sense' that becomes subitizing
- Number (magnitude) representation problems
  - ▣ Symbol and word representation of underlying magnitude, speed of digit magnitude judgments
- Counting problems and speed
- Number fact storage problems
  - ▣ Learning and storing the solutions to math facts

# Screening

- Can she add, put together two sets of items and add them together?
- Can she subtract sets (5 balloons and you take away three, how many are left)?
- Does she recognize numbers and differentiate from letters?
- Does she understand place value (259, 9 are units, 5 is tens, 2 are hundreds)?
- Can she count by sets, (tens, twos, threes)? Does she have a sense of that, mainly 10 by 10s?
- Can she add, subtract, multiple, divide. Can she do it with single, double digits?
- Practical – can she count money? Can she make change?
- \*Use this information in relation to age- or grade-level expectations



# Evaluation:

- Intelligence testing
- Attention/Working memory and Executive Functioning
- Visual Spatial Skills
  - ▣ Judgment of line orientation
  - ▣ Visual motor
- Math Achievement
  - ▣ Math Fluency
  - ▣ Calculations
  - ▣ Applied Problems
- Math skills
  - ▣ Number sets

# Recommendations & Interventions

- Individualized Education Program (IEP)
  - Math instruction and remediation
    - Step by step procedures
    - Drilling
  - Extra time on tests and assignments
  - Use of graph paper to organize, draw picture representation of problem
  - For story problems
    - Help child learn the words associated with certain operations (“*How many more apples does Johnny have than Jenny?*” = subtraction)
    - Draw picture representations of problems
  - Lots of websites, tablet/phone apps to practice
  - Procedural vs Conceptual dichotomy- teach both

# Specific Learning Disorders:

- ~~Reading~~

- ~~Mathematics~~

- **Writing**

# Writing Disability Facts

- Prevalence rates of writing disorder vary from 6.9% to 14.7% depending on score cut-offs.
- Boys are 2 to 3 times more likely to be affected than girls.
- About 25% of children who have a writing disorder do not have a Reading Disorder.

# DSM 5 Specific Learning Disorder: Writing

- Difficulties with spelling
  - ▣ May add, omit, or substitute vowels or consonants.
  
- Difficulties with written expression
  - ▣ Makes multiple grammatical or punctuation errors within sentences.
  - ▣ Employs poor paragraph organization.
  - ▣ Written expression of ideas lacks clarity.

# Screening

- Can he write complete sentences?
- Can he write a narrative that has a sequence? Do ideas flow?
- Does he use punctuation appropriately?
- When he is writing a story, does he only write a few lines? Or is there a substantial story?
- Does he have trouble finishing tests because of writing too slowly?
- Does writing homework take more time than it should because it is more effortful?

# Evaluation:

- Intelligence testing
- Visual-motor processing
- Fine motor coordination and speed
- Written Expression
  - ▣ Spelling
  - ▣ Writing Fluency
  - ▣ Writing Samples

# Recommendations & Interventions

- Individualized Education Program (IEP)
  - Work on mechanics (e.g. rules of capitalization and punctuation), spelling, and higher-level writing skills (e.g. sentence structure and organization).
  - Provide extra time for completion of written tasks, and minimize written assignments to reduce frustration.
  - Use of oral expression/demonstration over written tests.
  - For older grades, copies of class notes
  - Use of multiple choice or true/false formats
  - Allow a word-processor to reduce the mechanics involved
  - Allow use of a spell-checker.
  - If fine motor weakness as well, occupational therapy



# Specific Learning Disorders:

• ~~Reading~~

• ~~Mathematics~~

• ~~Writing~~

# Factors to Consider

- Specific learning disorder is frequently but not invariably preceded, in preschool years, by delays in attention, language, or motor skills that may persist and co-occur with specific learning disorder.
  - ▣ Comorbidity
- Diagnostic criteria are to be met based on a clinical synthesis of the individual's history (developmental, medical, family, educational), school reports, and psychoeducational assessment.
- Associated with increased risk for suicidal ideation and suicide attempts in children, adolescents, and adults.

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