Intellectual Disability (aka: Mental Retardation)

Intellectual disability is a disability characterized by significant limitations both in intellectual functioning and in adaptive behavior as expressed in conceptual, social, and practical adaptive skills. This disability originates before the age of 18.

2007, 2008 AAIDD

Discussion of the AAIDD Definition

- An extended discussion is found in the following article written by the AAIDD Terminology and Classification Committee.

Schalock, R. L. et al. (2007, April). The renaming of mental retardation: Understanding the change to the term intellectual disability. *Intellectual and Developmental Disabilities, 45,* 116-124.

AAIDD Definition of ID AAIDD, 2007

- Assumptions essential to the application of the AAIDD definition.
  - Limitations in present intellectual and adaptive behavior functioning within the context of the individual's age, peers, and culture
  - Account for the individual's cultural and linguistic differences as well as communication, sensory, motor, and behavioral factors
  - Recognize that limitations often coexist with strengths within an individual
  - Describe limitations so that an individualized plan of needed supports can be developed
  - Provide appropriate, personalized supports to improve the functioning of a person with intellectual disability

Helpful Resource

Brothwick-Duffy, S., Buntix, W., Luckasson, R., Schalock, R. L., Snell, M., Tasse, M., & Wehmeyer, M. L. (2007). *User's guide: Mental retardation: Definition, classification, and systems of supports* (10th ed.). Washington, DC: American Association on Intellectual and Developmental Disabilities

http://bookstore.aaidd.org/BookDetail.aspx?bid=61

The Power of the Developmental History

- Referring concerns for Jackie (age 9, second grade)
  - Good interpersonal skills
  - Below grade level achievement
    - Retained in Kindergarten
    - Reading at early first grade level
    - Doesn't understand basic math concepts
    - Extreme difficulty writing

The Power of the Developmental History

- Pregnancy
  - Full term (with prenatal care)
  - Birth weight 7 pounds
  - Cord wrapped around neck at birth
- Developmental history
  - Spoke first word at 18 months
  - Combined words at 3 years
  - Walked at 21 months
- Family history
  - Parents are professionals (lawyer and doctor)
  - A very enriched home environment

What initial hypothesis would you develop?

What additional questions should be asked?

Causes of ID www.thearc.org

- Genetic conditions
  - E.G., Down, Fragile X, PKU
- Problems during pregnancy
  - E.G., Maternal substance abuse, malnutrition, toxoplasmosis, cytomegalovirus, rubella, syphilis, HIV
- Problems at birth
  - Prematurity and low birth weight more often than any other factor correlate with the problems associated with brain injury.

Causes of ID www.thearc.org

- **Problems after birth**
  - E.G., Whooping cough, chicken pox, measles, meningitis, encephalitis; traumatic brain injury (TBI); lead, mercury and other environmental toxic exposures.
- **Poverty and cultural deprivation**
  - Due to malnutrition, disease causing conditions, inadequate medical care, environmental hazards, environmental under-stimulation

Causes of MR

UNITED STATES National Library of Medicine

- Biomedical
  - Online Multiple Congenital Anomaly / Mental Retardation MCA/MR) Syndromes©
  - http://www.nlm.nih.gov/mesh/jablonski/syndrome_title.html
  - By Stanley Jablonski
  - A database of structured descriptions of congenital abnormalities associated with mental retardation.
  - This online resource has been developed to facilitate the identification and differentiation of syndromic entities.

Causes of ID

- Three major known causes
  - Down syndrome
  - Fetal alcohol syndrome
  - Fragile X syndrome

Levels of ID

- Mild
- Moderate
- Severe
- Profound

The following two slides were adapted from:
Kenny T. J., Clemmens, R.L., (1997). Mental retardation. In R. A. Hoekelman (Ed.), *Primary pediatric care* (p. 410). St. Louis, M0: Mosby.

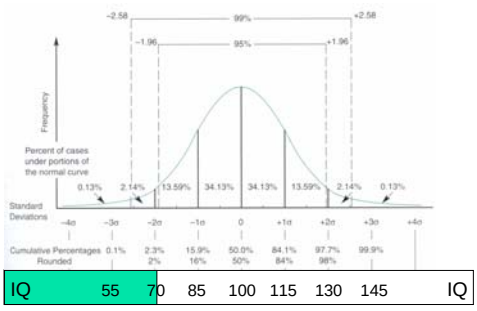
Level/ IQ Range	Preschool Ability	School Age Ability	Adult Age Ability
Mild 52-68	Can develop social and communication skills; muscle coordination is slightly impaired; often not dx until a later age	Can learn up to about the 6th grade level by late teens; can be guided toward social conformity; can be educated	Usually achieves enough social/ vocational skills for self support, may need guidance and assistance during times of sig. stress.
Moderate 36-51	Can talk or learn to communicate; social awareness is poor; muscle coordination is fair; profit from training in self-help.	Can learn some social and occupational skills; progression beyond 2nd-grade level in schoolwork is unlikely; may learn to travel alone in familiar places	May achieve self-support by performing unskilled or semiskilled work under sheltered conditions; need supervision and guidance when under mild stress.

Level/ IQ Range	Preschool Ability	School Age Ability	Adult Age Ability
Severe 20-35	Can say a few words; able to learn some self-help skills; have few or no expressive skills; muscle coordination is poor.	Can talk or learn to communicate; can learn simple health habits; benefit from habit training.	May contribute partially to self-care under complete supervision; can develop some useful self-protection skills in controlled environment
Profound Below 20	Extremely retarded; little muscle coordination; man need nursing care.	Some muscle coordination; unlikely to walk or talk	Some muscle coordination and speech; may achieve very limited self-care; need nursing care

Identifying ID

- Cognitive delay
  - IQ test results below 70 (- 2 SDs)
    - The ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly, and learn from experience.
- Adaptive behavior delay
  - Adaptive behavior scores below 70 (-2 SDs)
    - The ability to take care of one's self, get along with others, and communicate needs.

Identifying ID



Identifying ID

- The vast majority (87%) of children with mental retardation will be only mildly affected and their delays may not become readily apparent until they enter school.
- Discuss how it might make you feel to tell a parent that their child is mentally retarded.
- How might you go about doing so?
  - Delivering the hard news

Identifying ID

- Cognitive delay
  - Could an individual with an IQ of 74 be mentally retarded?
  - Could an individual with an IQ of 68 not be mentally retarded?
  - How will the individual with an IQ between 70 and 85 typically function?

Eligibility Language

Name appears to meet eligibility criteria as an individual with exceptional needs [according to the California Code of Regulations - Title 5, Division 1, Chapter 3, Handicapped Children, Article 3.1, Section 3030(h)]. **He/She** has significantly below average general intellectual functioning existing concurrently with deficits in adaptive behavior that adversely effects **his/her** educational performance.

AD/HD

EDS 248

Stephen E. Brock, Ph.D., NCSP, LEP

Introduction to AD/HD

- A neurobiological disorder that affects 3 to 7 percent of the general population (2.5 million school-age children).
- The exact cause of AD/HD is not known.
- Genetic, environmental, and neurological factors likely play a primary causal role.
- No single procedure will reliably diagnosis AD/HD.
- A variety of conditions may co-exist with and/or cause AD/HD symptoms.
- Diagnosis is time consuming.
  - Multi-procedure.
  - Multi-source.
  - Multi-disciplinary.

AD/HD Symptoms

- Diagnosis requires…
  - Six or more of nine symptoms of inattention.
  - Six or more of nine symptom of hyperactivity and impulsivity

Symptoms of Inattention

- Fails to give close attention to details/make careless mistakes.
- Difficulty sustaining attention.
- Does not seem to listen.
- Lack of follow through.
- Difficulty organizing tasks and activities.
- Avoids/dislikes tasks requiring sustained mental effort.
- Loses things.
- Easily distracted.
- Forgetful.

Symptoms of Hyperactivity/Impulsivity

- Fidgets with hands or feet.
- Difficulty remaining seated.
- Runs about/climbs excessively.
- Difficulty playing quietly.
- On the go. “Driven by a motor.”
- Talks excessively.
- Blurts out answers before questions are asked.
- Difficulty awaiting turn.
- Interrupts or intrudes on others.

Associated Features

- Vary according to age and development, but may include…
  - Low frustration tolerance
  - Temper outbursts
  - Bossiness
  - Stubbornness
  - Excessive and frequent insistence that request be met
  - Mood lability
  - Demoralization
  - Dysphoria
  - Rejection by peers
  - Poor self esteem

Source: DMS IV-TR (APA, 2000)

Associated Features

- May also include
  - Impaired academic achievement (especially among the predominantly inattentive type)
  - Peer rejection (especially among the hyperactive/impulsive type)
  - Poor achievement motivation
  - Family discord
  - Negative parent-child interactions

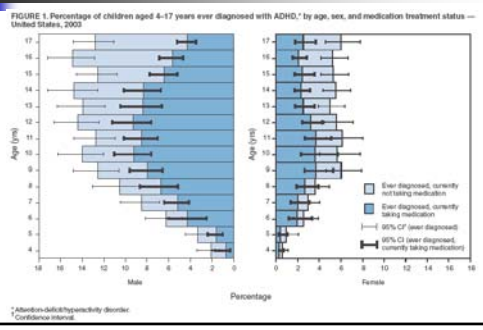
Source: DMS IV-TR (APA, 2000)

Associated Features

- "There are no laboratory tests, neurological assessments, or attentional assessments that have been established as diagnostic in the clinical assessment of AD/HD" (pp. 88-89).
- "There are no specific physical features associated with AD/HD, although minor physical anomalies (e.g., hypertelorism, highly arched palate, low-set ears) may occur at a higher rate than in the general population" (p. 89).

Source: DMS IV-TR (APA, 2000)

Prevalence of AD/HD in the USA



State	Diagnosed	State	Diagnosed	State	Diagnosed
US	7.74	Louisiana	10.31	Oklahoma	8.11
Alabama	11.09	Maine	7.92	Oregon	7.15
Alaska	7.07	Maryland	9.11	Pennsylvania	8.17
Arkansas	9.88	Massachusetts	8.51	Rhode Island	9.81
Arizona	5.89	Michigan	9.21	South Carolina	9.98
California	5.34	Minnesota	7.53	South Dakota	6.49
Colorado	4.95	Mississippi	9.59	Tennessee	9.87
Connecticut	7.38	Missouri	7.67	Texas	7.69
Delaware	9.74	Montana	7.09	Utah	5.49
Florida	9.21	Nebraska	6.39	Vermont	6.9
Georgia	9.37	Nevada	7.22	Virginia	9.28
Hawaii	6.14	New Hampshire	9.14	Washington	7.18
Idaho	6.38	New Jersey	7.22	Wash., DC	6.74
Illinois	6.32	New Mexico	6.1	West Virginia	10.08
Indiana	7.93	New York	6.27	Wisconsin	8.06

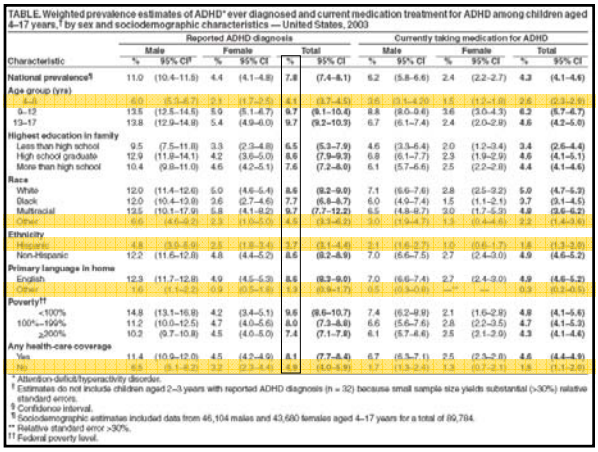


TABLE. Weighted prevalence estimates of ADHD* ever diagnosed and current medication treatment for ADHD among children aged 4–17 years,† by sex and sociodemographic characteristics — United States, 2003

Characteristic	Reported ADHD diagnosis: Male %	Male 95% CI§	Female %	Female 95% CI	Total %	Total 95% CI	Currently taking medication for ADHD: Male %	Male 95% CI	Female %	Female 95% CI	Total %	Total 95% CI
National prevalence¶	11.0	(10.4–11.5)	4.4	(4.1–4.8)	7.8	(7.4–8.1)	6.2	(5.8–6.6)	2.4	(2.2–2.7)	4.3	(4.1–4.6)
Age group (yrs)												
4–8	6.0	(5.5–6.7)	2.1	(1.7–2.5)	4.1	(3.7–4.5)	3.6	(3.1–4.2)	1.5	(1.2–1.8)	2.6	(2.3–2.9)
9–12	13.5	(12.5–14.5)	5.9	(5.1–6.7)	9.7	(9.1–10.4)	8.8	(8.0–9.6)	3.6	(3.0–4.3)	6.3	(5.7–6.7)
13–17	13.8	(12.9–14.8)	5.4	(4.9–6.0)	9.7	(9.2–10.3)	6.7	(6.1–7.4)	2.4	(2.0–2.9)	4.6	(4.2–5.0)
Highest education in family												
Less than high school	9.5	(7.5–11.8)	3.3	(2.3–4.8)	6.5	(5.3–7.9)	4.6	(3.3–6.4)	2.0	(1.2–3.4)	3.4	(2.6–4.4)
High school graduate	12.9	(11.9–14.1)	4.2	(3.6–5.0)	8.6	(7.9–9.3)	6.8	(6.1–7.7)	2.3	(1.9–2.9)	4.6	(4.1–5.1)
More than high school	10.4	(9.8–11.0)	4.6	(4.2–5.1)	7.6	(7.2–8.0)	6.1	(5.7–6.6)	2.5	(2.2–2.8)	4.4	(4.1–4.6)
Race												
White	12.0	(11.4–12.6)	5.0	(4.6–5.4)	8.6	(8.2–9.0)	7.1	(6.6–7.6)	2.8	(2.5–3.2)	5.0	(4.7–5.3)
Black	12.0	(10.4–13.8)	3.6	(2.7–4.6)	7.7	(6.8–8.7)	6.0	(4.9–7.4)	1.5	(1.1–2.1)	3.7	(3.1–4.5)
Multiracial	12.5	(10.1–17.9)	5.8	(4.1–8.2)	9.7	(7.7–12.2)	6.5	(4.8–8.7)	3.0	(1.7–5.3)	4.8	(3.6–6.2)
Other	6.6	(4.6–9.2)	2.3	(1.0–5.0)	4.5	(3.3–6.2)	3.0	(1.9–4.7)	1.3	(0.6–2.6)	2.2	(1.4–3.6)
Ethnicity												
Hispanic	4.8	(3.6–6.9)	2.5	(1.8–3.4)	3.7	(3.1–4.4)	2.1	(1.6–2.7)	1.0	(0.6–1.7)	1.6	(1.3–2.0)
Non-Hispanic	12.2	(11.6–12.8)	4.8	(4.4–5.2)	8.6	(8.2–8.9)	7.0	(6.6–7.5)	2.7	(2.4–3.0)	4.9	(4.6–5.2)
Primary language in home												
English	12.3	(11.7–12.8)	4.9	(4.5–5.3)	8.6	(8.3–9.0)	7.0	(6.6–7.4)	2.7	(2.4–3.0)	4.9	(4.6–5.2)
Other	1.6	(1.1–2.2)	0.9	(0.5–1.8)	1.3	(0.9–1.7)	0.5	(0.3–0.8)	—**	—	0.3	(0.2–0.5)
Poverty††												
<100%	14.8	(13.1–16.8)	4.2	(3.4–5.1)	9.5	(8.6–10.7)	7.4	(6.2–8.9)	2.1	(1.6–2.9)	4.8	(4.1–5.6)
100%–199%	11.2	(10.0–12.5)	4.7	(4.0–5.6)	8.0	(7.3–8.8)	6.6	(5.6–7.6)	2.8	(2.2–3.5)	4.7	(4.1–5.3)
≥200%	10.2	(9.7–10.8)	4.5	(4.0–5.0)	7.4	(7.1–7.8)	6.1	(5.7–6.6)	2.5	(2.1–2.9)	4.3	(4.1–4.6)
Any health-care coverage												
Yes	11.4	(10.9–12.0)	4.5	(4.2–4.9)	8.1	(7.7–8.4)	6.7	(6.3–7.1)	2.5	(2.3–2.8)	4.6	(4.4–4.9)
No	6.5	(5.1–8.2)	3.2	(2.3–4.4)	4.8	(4.0–5.9)	1.7	(1.3–2.4)	1.3	(0.7–2.1)	1.5	(1.1–2.0)

* Attention-deficit/hyperactivity disorder.
† Estimates do not include children aged 2–3 years with reported ADHD diagnosis (n = 32) because small sample size yields substantial (>30%) relative standard errors.
§ Confidence interval.
¶ Sociodemographic estimates included data from 46,104 males and 43,680 females aged 4–17 years for a total of 89,784.
** Relative standard error >30%.
†† Federal poverty level.

Prevalence of AD/HD Worldwide

- International data
  - Worldwide prevalence ranges from 3 to 9%
  - Differences are typically attributed to different AD/HD criteria

Country	Rate
New Zealand	6.7
Spain	8.0
Germany	9.6
Puerto Rico	9.5-16.1
Netherlands	7.8
London, GB	1.7
Manheim, GR	4.2
Brazil	5.8
Ontario, CD	6.3

Legal Issues and AD/HD

- Federal Law and Regulation
  - September 16, 1991, Joint Policy Memorandum
    - Office of Special Education and Rehabilitation Services
    - Office for Civil Rights
  - "Children with ADD who require special education … are presently eligible under the IDEA categories of "other health impairment," "specific learning disability," or "serious emotional disturbance."
  - "…children who do not require special education … may nevertheless be covered by the Section 504 regulations if their ADD substantially limits a major life activity, such as learning."

Legal Issues and AD/HD

- Federal Law and Regulation
  - April 29, 1993, Policy Memorandum
    - US Department of Education
    - Jeanette J. Lim, Acting Assistant Secretary for Civil Rights
    - Clarification of School Districts' Responsibilities to Evaluate Children with Attention Deficit Disorders (ADD)
    - Available
      - http://www.nichcy.org/pubs/otherpub/doeadd2.htm

Legal Issues and AD/HD

- Federal Law and Regulation
  - April 29, 1993, Policy Memorandum
    - It recently has come to our attention that many school districts and parents appear to be misinterpreting a statement contained in the September 16, 1991, memorandum concerning "Clarification of Policy to Address the Needs of Children with Attention Deficit Disorders within General and/or Special Education." This statement, on page 6 of the memorandum, concerns the responsibility of local education agencies (LEAs) to evaluate children suspected of having ADD. The statement reads as follows:

      "Under Section 504, if parents believe that their child is disabled by ADD, the LEA must evaluate the child to determine whether he or she has a disability as defined by Section 504."

      A similar version of this statement is contained in the Questions and Answers Handout (Handout) on ADD, entitled "OCR Facts: Section 504 Coverage of Children with ADD." The Handout was attached to a model technical assistance (TA) presentation on ADD, disseminated to Regions on October 31, 1991, and is used as a TA resource.

Legal Issues and AD/HD

- Federal Law and Regulation
  - April 29, 1993, Policy Memorandum (continued)
    - The intent of this statement was to reaffirm that children suspected of having ADD and believed (by the LEA) to need special education or related services would have to be evaluated by the LEA pursuant to Section 504. These children are afforded protection and rights as any other children with disabilities under Section 504. This statement was necessary since many school districts, prior to issuance of the September 21, 1991, memorandum, held the position that they were not obliged to evaluate any child suspected of having ADD since it was not a disability specifically listed in the Individuals with Disabilities Education Act.

Legal Issues and AD/HD

- Federal Law and Regulation
  - April 29, 1993, Policy Memorandum (continued)
    - To our dismay, this statement has been interpreted to mean that school districts are required to evaluate every child suspected of having ADD, based solely on parental suspicion and demand. This was not the intent of the statement. Rather, under Section 504, if parents believe their child has a disability, whether by ADD or any other impairment, and the LEA has reason to believe the child needs special education or related services, the LEA must evaluate the child to determine whether he or she is disabled as defined by Section 504. If the LEA does not believe that the child needs special education or related services, and thus refuses to evaluate the child, the LEA must notify the parents of their due process rights.

Legal Issues and AD/HD

- California Education Code Section 56339
  - (a) A pupil whose educational performance is adversely affected by a suspected or diagnosed attention deficit disorder or attention deficit hyperactivity disorder and demonstrates a need for special education and related services by meeting eligibility criteria specified in subdivision (f) or (i) of Section 3030 of Title 5 of the California Code of Regulations or Section 56337 and subdivision (j) of Section 3030 of Title 5 of the California Code of Regulations for the federal Individuals with Disabilities Education Act (20 U.S.C. Sec. 1400 and following) categories of "other health impairments," "serious emotional disturbance," or "specific learning disabilities," is entitled to special education and related services.

Legal Issues and AD/HD

- California Education Code Section 56339
  - (b) If a pupil with an attention deficit disorder or attention deficit hyperactivity disorder is not found to be eligible for special education and related services pursuant to subdivision (a), the pupil's instructional program shall be provided in the regular education program.

Legal Issues and AD/HD

- California Education Code Section 56339
  - (c) It is the intent of the Legislature that local educational agencies promote coordination between special education and regular education programs to ensure that all pupils, including those with attention deficit disorders or attention deficit hyperactivity disorders, receive appropriate instructional interventions.

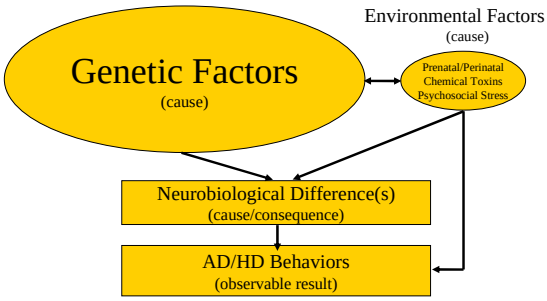
Legal Issues and AD/HD

- California Education Code Section 56339
  - (d) It is further the intent of the Legislature that regular education teachers and other personnel be trained to develop an awareness about attention deficit disorders and attention deficit hyperactivity disorders and the manifestations of those disorders, and the adaptations that can be implemented in regular education programs to address the instructional needs of pupils having these disorders.

Etiology of AD/HD

- Genetics (cause)
  - Plays a significant role, but does not account for all cases of AD/HD.
- Environment (cause)
  - Pre- and Postnatal factors
  - Chemical Toxins
  - Psychosocial stressors
- Neurobiological Differences (consequence)

Etiology of AD/HD



Etiology of AD/HD: Genetic Factors

- "Research shows that ADHD tends to run in families, so there are likely to be genetic influences. Children who have ADHD usually have at least one close relative who also has ADHD. And at least one-third of all fathers who had ADHD in their youth have children with ADHD. Even more convincing of a possible genetic link is that when one twin of an identical twin pair has the disorder, the other is likely to have it too" (NIMH, 2000).

Etiology of AD/HD: Heritability

- Twin studies reveal that AD/HD is highly heritable.
- Spencer et al.'s (2002) review suggests a heritability of 0.75.
  - 0 means there is no genetic input.
  - 1 means the disorder is completely determined by genetics.
- In other words, approximately 75% of the etiologic contribution of AD/HD is genetic!

Etiology of AD/HD: Heritability

- The incidence of AD/HD in the parents of children newly diagnosed with AD/HD is 25% indicating a strong genetic predisposition (Biederman et al., 1990).
- Thus, a family history of AD/HD is an important variable to consider when diagnosing this disorder.

Etiology of AD/HD: Genetic Factors

- While genetic factors clearly help to explain a substantial amount of differences observed within the population of the behaviors that comprise AD/HD, they do not account for all symptom variance.
- Thus, other environmental factors, insults, and/or injuries have also been suggested to be possible etiological variables.

Etiology of AD/HD: Environmental Factors

- Pregnancy and Birth Complications
  - "large scale epidemiological studies have generally not found a strong association between pre- or perinatal adversity and symptoms of AD/HD once other factors are taken into account, such as maternal smoking and alcohol use …" (Barkley, 1998, p. 169).

Etiology of AD/HD: Environmental Factors

- Environmental Toxins linked to AD/HD
  - Elevated body lead burden (usually from lead based wall paint)
  - Prenatal exposure to alcohol
  - Prenatal exposure to tobacco smoke
    - Goldstein & Goldstein (1998)
    - Mick et al. (2002)

Etiology of AD/HD: Environmental Factors

- Psychosocial Stressors
  - "Some investigators have noted that the severity of ADHD has been associated with family stressors and psychosocial adversity. Although it is not clear that psychosocial adversity can cause ADHD per se, symptom severity does seem to be related to indices of stress and social adversity in the families of these children" (Jensen, 2000, p. 564).

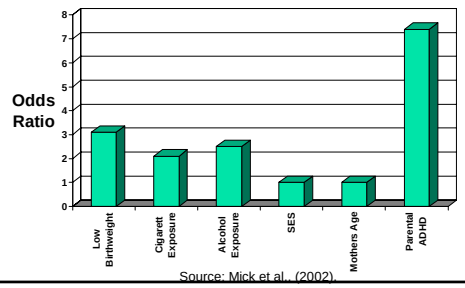
Etiology of AD/HD: Environmental Factors

- Psychosocial Stressors
  - Family Environment
    - Marital discord, family size, paternal criminality, maternal mental disorder, and foster care placement are risk factors (Biederman et al., 1995)
    - However, the link between adverse family and perinatal factors with hyperactivity is weak (Goodman & Stevenson, 1989)

Etiology of AD/HD: Environmental Factors

- Neurological Injury or Acquired (Traumatic) Forms of AD/HD
  - Approx. 20% of children with severe traumatic brain injury have been reported to have subsequent onset of substantial symptoms of impulsivity and inattention.
    - AD/HD itself may be a risk factor for traumatic brain injury, so genetic and brain injury causes may not be independent.

Prenatal and Postnatal Risk Factors



Source: Mick et al., (2002).

Prenatal and Postnatal Risk Factors

- Birth weight
  - Extremely Low Birth weight (<1000 grams/2.2 lbs)
    - Three fold increased risk of AD/HD (Teplin et al., 1991)
  - Very Low Birth weight (<1500 grams/3.3 lbs)
    - 47% have poor attention span (The Scottish Low Birth weight Study, 1992)
    - 23% have AD/HD (vs. 6% with normal birth weight, Botting et al., 1997)
  - Low Birth weight (<2500 grams/5.5 lbs)
    - AD/HD children 3.1 times more likely to be born weighing 5.5 lbs. or less.
    - By itself accounts for 13.8% of AD/HD cases (Mick et al., 2002)
  - However, most children with AD/HD don't have a low birth weight (APA, 2000).

Prenatal and Postnatal Risk Factors

- Prematurity
  - Even mild prematurity has negative consequences that include increased risk for AD/HD.
  - Cherkes-Julkowski (1998) report that among a group of children born on average 49 days early with a birth weight of 4.14 lbs., 75% had by grade 5 at least one learning problem including AD/HD.

Prenatal and Postnatal Risk Factors

- Prenatal Material Smoking
  - Associated with higher teacher and material ratings of AD/HD behaviors (Fergusson et al., 1993)
  - Proposed mechanisms
    1. Maternal smoking leads to fetal hypoxia (Longo, 1989)
    2. Nicotine causes disturbances to the dopamine systems in the prefrontal cortex (Fung & Lau, 1989)

Prenatal and Postnatal Risk Factors

- Prenatal Material Drinking
  - Among children who did not have FAS, children diagnosed with AD/HD were 2.5 times more likely than children without AD/HD to have been exposed to alcohol in utero (Mick et al., 2002)
- Attention-Deficit/Hyperactivity Disorder Diagnostic Evaluation, Health, Family, Developmental, & Behavioral History Interview Form

Etiology of AD/HD: Combined Factors

- A number of risk factors have now been associated with AD/HD, no factor or any combination is sufficiently explanatory to account for all AD/HD cases.
- In fact, many children suffer similar difficulties are exposed to comparable levels of such risk factors and do not develop AD/HD.
- It may require a combination of some trauma, toxic exposure, or subtle form of brain insult, coupled with a certain pattern of susceptibility genes, for the full syndrome to emerge.

Etiology of AD/HD: Neurobiology

- The effect of a certain combination of trauma, toxic exposure, or subtle form of brain insult, coupled with a certain pattern of susceptibility genes, is suggested to be the cause of neurobiological changes.
- According to the National Institute of Mental Health, AD/HD is a “chronic neurobiologic” disorder (NIMH, 2000).

Etiology of AD/HD: Neurobiology

- The available research data has been fairly consistent in implicating neurological factors as playing an important causal role in the behavioral manifestations of AD/HD.

Etiology of AD/HD: Neurobiology

- Neuropsychological Studies
  - Disinhibition of behavioral responses (or impulse control) and difficulties with working memory, planning, verbal fluency, perseveration, motor sequencing, and other frontal lobe functions are common among children with AD/HD.
  - The totality of findings in this area is impressive in "suggesting that dysfunction of the prefrontal lobes (inhibition and executive function deficits) is a likely basis for explaining ADHD" (Barkley, 1998, p. 165).

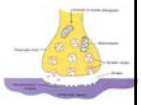
Etiology of AD/HD: Neurobiology

- Neurotransmitter Deficiencies
  - In 1937 Bradley identified a group of children whose impulsive aggressive behaviors where improved by treatment with amphetamines.
  - The paradox that CNS stimulants would decrease activity levels and increase attention span stimulated research that formed the foundation for our understanding of AD/HD as having a neurochemical basis.

Source: University of Virginia, Children's Hospital, http://www.healthsystem.virginia.edu/internet/pediatrics/hcp/adhdetiology.cfm

Etiology of AD/HD: Neurobiology

- Neurotransmitter Deficiencies
  - The exact mechanism of action of AD/HD medications (e.g., Stimulants, clonidine, and tricyclic antidepressants) is unknown but presumably they exert their effects through modulation of neurotransmitters.
  - AD/HD medications affect Dopamine, noradrenaline and serotonin levels in the central nervous system.



Source: University of Virginia, Children's Hospital, http://www.healthsystem.virginia.edu/internet/pediatrics/hcp/adhdetiology.cfm

Etiology of AD/HD: Neurobiology

- Neurotransmitter Deficiencies
  - The available data suggests that no single neurotransmitter deficiency completely explains how the range of medications which improve AD/HD symptoms.
  - The single neurotransmitter concept is refuted by the inability of specific medications known to modulate individual neurotransmitters to improve symptoms. It is possible that AD/HD is due to imbalance of multiple inter-related neurotransmitters.

Source: University of Virginia, Children's Hospital, http://www.healthsystem.virginia.edu/internet/pediatrics/hcp/adhdetiology.cfm

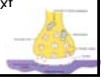
Etiology of AD/HD: Neurobiology

- Neurotransmitter Deficiencies
  - Pharmacokinetic studies have yielded additional evidence that medications used to improve attention exert their effects by modulating the release and level of neurotransmitters in the CNS.

Source: University of Virginia, Children's Hospital, http://www.healthsystem.virginia.edu/internet/pediatrics/hcp/adhdetiology.cfm

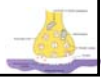
Etiology of AD/HD: Neurobiology

- How Ritalin Works (Volkow, 2001)
  - Ritalin works by increasing levels of the neurotransmitter, dopamine, in the brain. In doing so it stimulates attention and motivation circuits (increasing the ability to focus and remain on-task).
  - Prior studies had suggested that Ritalin interfered with the reuptake (or recycling) of dopamine within the brain by blocking dopamine transporters (Solanto, 1998).
    - These prior studies, however, made use of much higher doses of Ritalin that would be used therapeutically.
  - Using a PET scan, researchers studied dopamine levels in 11 normal male subjects. Over two sessions, the volunteers were each given a dose of Ritalin (calculated using their body weight to correspond to the doses given to children with ADHD) or a placebo. Next while their brains were scanned to record dopamine levels.



Etiology of AD/HD: Neurobiology

- How Ritalin Works (Volkow, 2001)
  - The results showed that brain dopamine levels increased significantly approximately 60 minutes after ingestion of the drug as compared to the placebo.
  - Researchers suggested that Ritalin also suppresses "background" firing of neurons not associated with task performance, allowing the brain to transmit a clearer signal.
  - "We hypothesize that we will find that ADHD sufferers have decreased function of dopamine circuits and are therefore easily distracted," she said. "The effect of Ritalin should be to normalize these levels, allowing them to focus and pay attention."



Diagnostic Criteria

- Symptom Duration
  - 6 months.
- Developmental Level
  - Inconsistent with…
- Symptom Impairment Onset
  - Age 7 years per DSM IV-TR.
  - Age 9 for inattentive type?
- Symptom Display
  - Multiple settings.
- Clinical Significance
  - The effect of symptoms on functioning.
  - Child & Adolescent Functional Assessment Scale
    - http://www.mhsip.org/library/pdfFiles/CHILDANDADOLESCENTFUNCTIONALASSESSMENTSCALE.pdf
- Differential Diagnosis
  - Rule out other explanations for symptoms.

AD/HD Diagnosis

- According to Pelham, Gabiano, and Massetti (2005):
  - "Because the definition of ADHD is currently a behavioral one based on the individual's functioning in daily life (APA, 1994), assessment procedures must focus on the observable behavior as reported by adults or otherwise measured in natural (home and classroom) and laboratory (clinic, analogue classroom) settings" (p. 451).

Differential Diagnosis

- Medical Conditions
  - Impairment of vision and/or hearing
  - Medication side effect(s)
  - Asthma (or reaction to asthma medications)
    - http://www.lungusa.org/site/pp.aspx?c=dvLUK9O0E&b=263990&printmode=1
  - Allergic rhinitis (or reaction to antihistamine)
  - Incontinence of urine or feces
  - Malnutrition (vitamin or metabolic deficiency)
  - Thyroid disorder
  - Lead toxicity

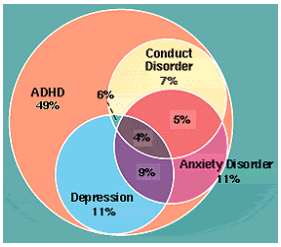
Differential Diagnosis

- Neurologic and Psychiatric Conditions
  - Learning disabilities
  - Tic disorder
  - Seizure disorder (or effect of antiepileptic)
    - http://www.epilepsy.ca/eng/content/antiepi.html
  - Mental retardation or intellectual precocity
  - Low developmental level.
  - Brain damage or injury
  - Sleep disorders (including sleep apnea and insomnia)
  - Oppositional Defiance and Conduct Disorders
  - Substance abuse
  - Anxiety
  - Depression (or Bipolar Disorder)
  - Obsessive-compulsive Disorder
  - Posttraumatic Stress Disorder

Differential Diagnosis

- Environmental Conditions
  - Improper or poor learning environment
  - Mismatched curriculum and child
  - Dysfunctional or stressful home
  - Poor parenting (inconsistent, punitive)
  - Neglect or abuse
  - Parental psychopathology
  - Low motivation.

Differential Diagnosis: Made Difficult by Comorbidity



"The highest comorbidity is between ADHD and disorders related to aggression (i.e., children with oppositional defiant disorder and conduct disorder) and learning problems, with much lower rates of comorbid internalizing problems" (Pelham et al., 2005, p. 452)

Chart shows percentages of attention deficit hyperactivity disorder cases in which other disorders were also present (co-morbidity). (By Leigh Coriale Design & Illustration from a chart by Drs. Biederman and Faraone.)
http://www.med.harvard.edu/publications/On_The_Brain/Volume5/Number1/ADD.html

Diagnostic Procedures: Survey of the Literature

- A variety of different procedures were identified.
- Most could be classified into one of six categories.
- Behavior rating scales, diagnostic interviews, behavioral observations, and laboratory/psychoeducational testing are the most frequently recommended.
- Medical evaluations and school record review were also recommended.

Diagnosis of AD/HD

- American Academy of Pediatrics (2000)
  - Clinical Practice Guideline: Diagnosis and Evaluation of the Child With Attention-Deficit/Hyperactivity Disorder
    - http://aappolicy.aappublications.org/cgi/reprint/pediatrics;105/5/1158.pdf
- American Academy of Child and Adolescent Psychiatry (1997)
  - Practice Parameters for the Assessment and Treatment of Children, Adolescents, and Adults with Attention-Deficit/Hyperactivity Disorder
    - http://www.aacap.org/clinical/parameters/fulltext/Adhd.doc

The Diagnosis of AD/HD: Conclusion

- Diagnosis is as much an art as it is a science.
- There is no single psychological or medical test.
- There are a number of conditions that generate AD/HD-like symptoms.
- Requires a multidisciplinary team, accessing multiple data sources, and using multiple assessment procedures.

Next Week

- Research normal adolescent development, and eating disorders and youth suicide.
- From independent research address the question: “What are the signs of suicidal ideation?”
- Continue to work on developmental & health history questionnaire.