

## ADHD in a Nutshell

Dr. Stephen A Meyers DO, FAAP  
1600 John Adams Parkway, Suite 100  
Idaho Falls, ID 83401

## Objectives

- To understand:
  - Historical Perspective of ADHD
  - How ADHD is Diagnosed
  - Executive Functioning Aspects of ADHD
  - Comorbidity / Long Term Risks
  - Interventions/ Components of Treatment

## 1) Historical Perspectives

## Historical Timeline

- 1798 – Alexander Crichton
- 1902 – George Sill
- 1918 – Swine Flu Epidemic
- 1960's – “Minimal Brain Damage” Dx
- 1980 – DSM III Criteria (“ADD”)
- 1987 – ADD became ADHD
- 1994 – DSM4 Criteria Revision
- 1990's – Barkley on Executive Functioning

## Sir Alexander Crichton

- "In this disease of attention, if it can with propriety be called so, every impression seems to agitate the person, and gives him or her an unnatural degree of mental restlessness. People walking up and down the room, a slight noise in the same, the moving of a table, the shutting a door suddenly, a slight excess of heat or of cold, too much light, or too little light, all destroy constant attention in such patients, inasmuch as it is easily excited by every impression."
- "Every public teacher must have observed that there are many to whom the dryness and difficulties of the Latin and Greek grammars are so disgusting that neither the terrors of the rod, nor the indulgence of kind intreaty can cause them to give their attention to them."

## Sir George Sill

- He described 43 children who had serious problems with sustained attention and self-regulation, who were *often aggressive, defiant, and resistant to discipline, excessively emotional or passionate, which showed little inhibitory volition, had serious problems with sustained attention and could not learn from the consequences of their actions; though their intellect was normal.*
- He wrote "I would point out that a notable feature in many of these cases of moral defect without general impairment of intellect is a quite abnormal incapacity for sustained attention. There is a defect of moral consciousness which cannot be accounted for by any fault of environment".
- "Another boy, aged 6 years, with marked moral defect was unable to keep his attention even to a game for more than a very short time, and as might be expected, the failure of attention was very noticeable at school, with the result that in some cases the child was backward in school attainments, although in manner and ordinary conversation he appeared as bright and intelligent as any child could be."

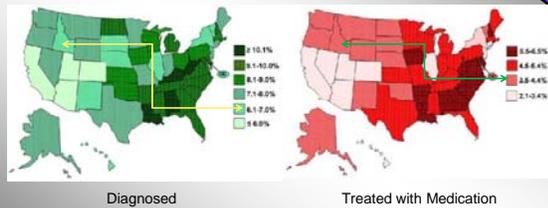
## CDC Definition of ADHD

- A neurobehavioral disorder characterized by:
  - pervasive inattention and/or hyperactivity-impulsivity
  - **and** resulting in significant functional daily impairment.

## Few Facts

- Up to 7% of children; 3 to 4% of adults
- Only 10% of 10 million adults treated
- More common in males
- All levels of intelligence (IQ)
- All levels of socioeconomic status
- Family genetic transmission: 91%
- Inheritance not specific to subtype

## US Prevalence (CDC 2003)



## 2) Diagnosis of ADHD

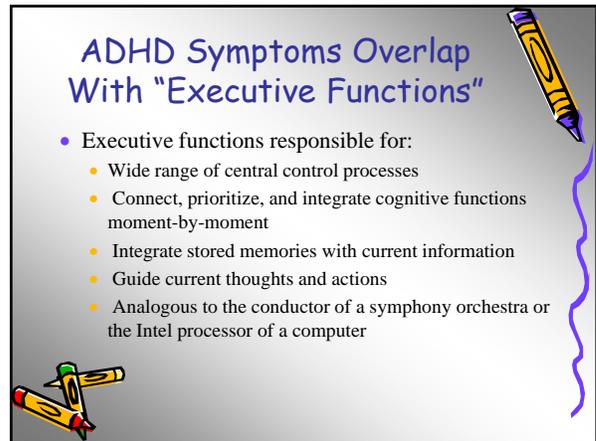
## Making a Diagnosis of ADHD

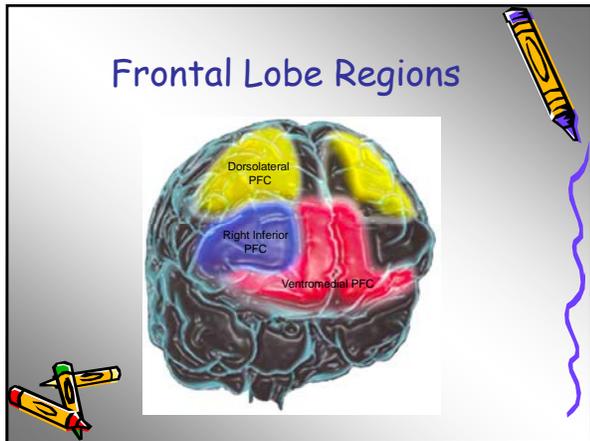
- Diagnosis based solely on DSM4 core criteria
  - Inattention
    - Can't sustain attention, easily distracted, disorganized, forgetful, careless mistakes, poor social awareness, etc.
  - Hyperactivity/Impulsivity
    - Constantly fidgeting, restless, "ready, fire, aim" behaviors, constantly touching, poor boundaries, "driven by a motor", constantly breaking things, etc.
  - Exclusion of any other comorbidity
  - Symptoms seen in more than one environment
  - Onset before age 7 years old \*

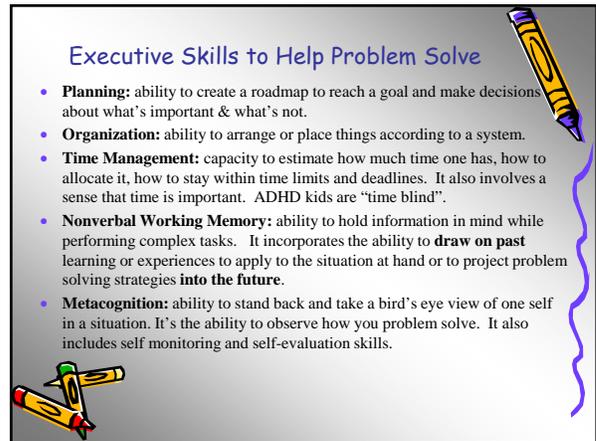
## 3 Sub-Types of ADHD

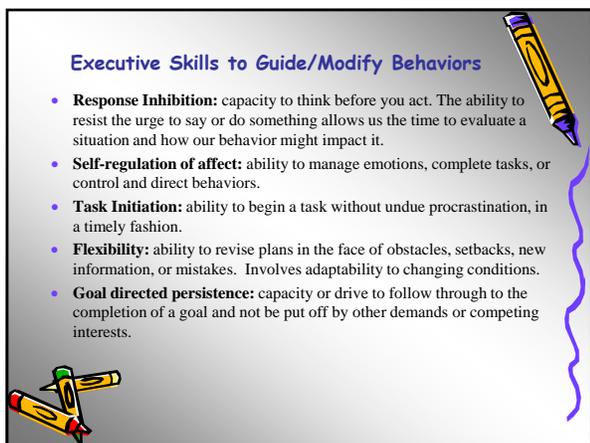


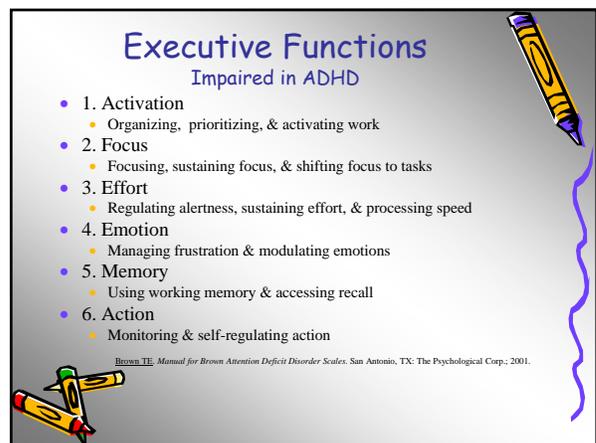
## 3) Executive Functioning

- ### ADHD Symptoms Overlap With "Executive Functions"
- Executive functions responsible for:
    - Wide range of central control processes
    - Connect, prioritize, and integrate cognitive functions moment-by-moment
    - Integrate stored memories with current information
    - Guide current thoughts and actions
    - Analogous to the conductor of a symphony orchestra or the Intel processor of a computer
- 

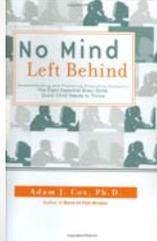
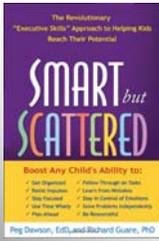


- ### Executive Skills to Help Problem Solve
- **Planning:** ability to create a roadmap to reach a goal and make decisions about what's important & what's not.
  - **Organization:** ability to arrange or place things according to a system.
  - **Time Management:** capacity to estimate how much time one has, how to allocate it, how to stay within time limits and deadlines. It also involves a sense that time is important. ADHD kids are "time blind".
  - **Nonverbal Working Memory:** ability to hold information in mind while performing complex tasks. It incorporates the ability to **draw on past** learning or experiences to apply to the situation at hand or to project problem solving strategies **into the future**.
  - **Metacognition:** ability to stand back and take a bird's eye view of one self in a situation. It's the ability to observe how you problem solve. It also includes self monitoring and self-evaluation skills.
- 

- ### Executive Skills to Guide/Modify Behaviors
- **Response Inhibition:** capacity to think before you act. The ability to resist the urge to say or do something allows us the time to evaluate a situation and how our behavior might impact it.
  - **Self-regulation of affect:** ability to manage emotions, complete tasks, or control and direct behaviors.
  - **Task Initiation:** ability to begin a task without undue procrastination, in a timely fashion.
  - **Flexibility:** ability to revise plans in the face of obstacles, setbacks, new information, or mistakes. Involves adaptability to changing conditions.
  - **Goal directed persistence:** capacity or drive to follow through to the completion of a goal and not be put off by other demands or competing interests.
- 

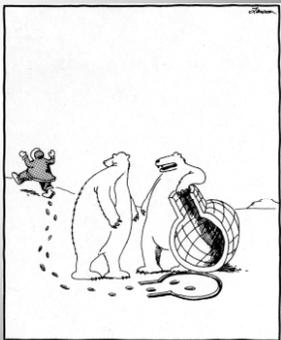
- ### Executive Functions Impaired in ADHD
1. Activation
    - Organizing, prioritizing, & activating work
  2. Focus
    - Focusing, sustaining focus, & shifting focus to tasks
  3. Effort
    - Regulating alertness, sustaining effort, & processing speed
  4. Emotion
    - Managing frustration & modulating emotions
  5. Memory
    - Using working memory & accessing recall
  6. Action
    - Monitoring & self-regulating action
- Brown TE. Manual for Brown Attention Deficit Disorder Scales. San Antonio, TX: The Psychological Corp.; 2001.
- 

## References to Review



## Most Consistent Neurocognitive Deficits in ADHD Children

- Poor vigilance
- Difficulties with organization & planning
- Difficulties with list learning & story recall
- Poor inhibition of impulse controls
- Slow speed of processing
- Poor working memory
- Motoric dysinhibition
- Poor emotional regulation
- Poor social recognition/awareness



"I lift, you grab ... Was that concept just a little too complex, Carl?"



"What are you gonna tell your Dad, Chuck?"

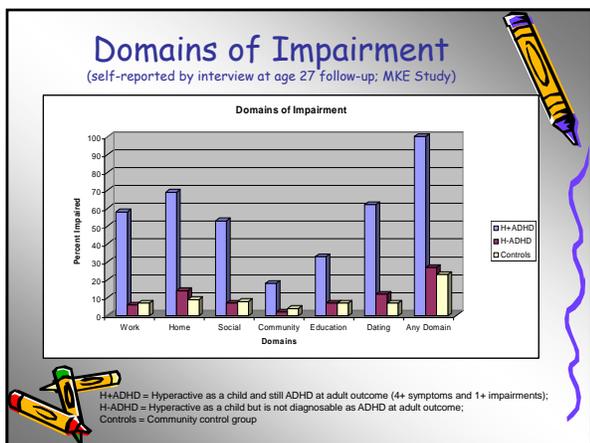
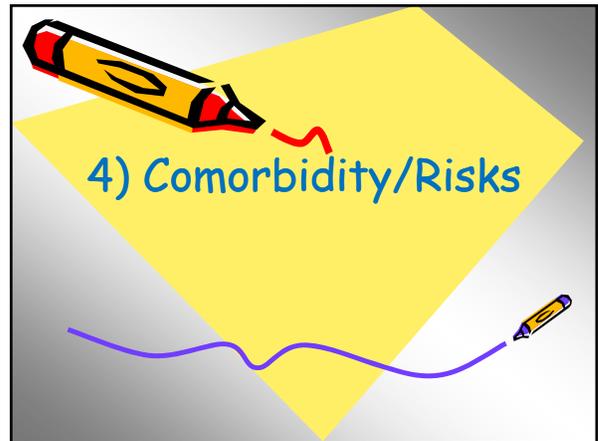
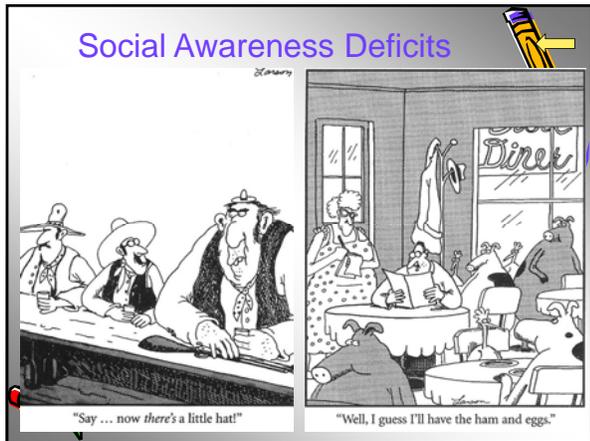


Professor Glickman, the lab practical joker, deftly places a single drop of hydrochloric acid on the back of Professor Bingham's neck.



"Lassie! Go get help! Get help, Lassie!"

My name's not "Lassie"



- 
- Impairments - Home Setting
- Constant forgetfulness/distraction (i.e.. chores)
  - Hectic morning schedules to get kids out the door
  - Requires a lot of parent supervision
  - Homework procrastination
  - Argumentative with family members
  - Property destruction
  - Often late / Poor time awareness
  - Increased parent-child conflict & stress
  - More child noncompliance, hostility, disruption
  - Poorer sense of competence in parental role
  - Greater parenting stress and maternal depression
    - Especially problematic for ODD/CD subgroup

## Impairments - Social Settings

- Has to be in charge
- Jumps from activity to activity, peers tire of this
- "Speaks their mind"
- Jumps to often wrong conclusions
- Peer Relationship Problems (50-70%+)
- Less sharing, cooperation, turn-taking
- Intrusive, angry; reduced empathy and guilt
- More likely to be bullied and to be bullies in childhood
  - Most serious in ODD/CD subgroup
- More likely to be beaten up, mugged, or assaulted with a weapon by young adulthood

## Childhood Academic Impairments

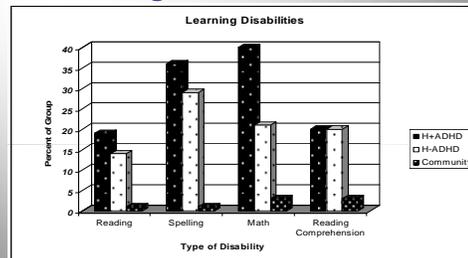
- Poor School Performance (90%+)
  - reduced productivity is greatest problem \*\*
  - accuracy is only mildly below normal (85%)
- Low Academic Achievement (10-15 pt. deficit)
  - May be deficient even in preschool readiness skills
- Learning Disabilities (24-70%)
  - Reading (8-39%); (effect size (ES) = 0.64) \*\*
  - Spelling (12-30%) (ES = 0.87)
  - Math (12-27%) (ES = 0.89)
  - Handwriting (60%+) \*\*
  - Reading, viewing, & listening comprehension deficits \*\*
    - Likely due to impact of ADHD on working memory

## Educational Outcomes

- More grade retention (20-45%; MKE: 42 vs. 13)
  - Pagani et al. (2001) & Hauser (2007) show retention is harmful
- More placed in special educational (25-50%)
- More are suspended (40-60%; MKE: 60 vs. 19) \*\*
  - Reflects disciplinary action; more associated with CD
- Greater expulsion rate (10-18%; MKE: 14 vs. 6)
- Higher drop out rate (23-40%; MKE 32 vs 0) \*\*
- Lower academic achievement test scores
- Lower Class Ranking (MKE: 66% vs. 53%)
- Lower GPA (MKE: 1.8 vs. 2.4)
- Fewer enter college (MKE: 22 vs. 77%) \*\*
- Lower college graduation rate (5-10 vs. 35%)

MKE = Milwaukee Young Adult Outcome Study

## Learning Disorders at Age 27



H+ADHD = Hyperactive as a child and still ADHD at adult outcome (4+ symptoms and 1+ impairments);  
 H-ADHD = Hyperactive as a child but is not diagnosable as ADHD at adult outcome;  
 Controls = Community control group

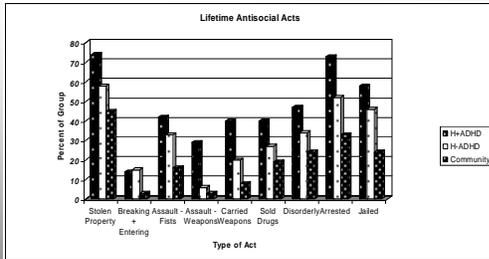
## Employment Problems

- Enter workforce at unskilled/semi-skilled level
- Greater periods of unemployment \*\*
  - at age 21 (22 vs. 7%)
  - At age 27 (25% currently ADHD, 9% for controls and no longer ADHDs)
- More likely to be dismissed or fired \*\*
  - 55% of ADHD cases vs. 23% of controls had been fired by age 27
  - Fired from 16% vs. 6% of all jobs held
- Change jobs more often
  - 2.6 vs. 1.4 times over 8-12 years since leaving high school
- More ADHD/ODD symptoms on the job
  - As rated by current supervisors
- Lower work performance ratings \*\* (lose 1 month of 12 in productivity)
  - As reported by current supervisors
- Lower job status rating and overall socio-economic status
  - By 30s, 35% may be self-employed (NY Study by Mannuzza et al.)

## Motor Vehicle Driving Risks

- Poorer steering, slower braking reaction time
- Rated by self, others, and driving instructors as using fewer safe driving habits
- More likely to drive before legally licensed \*\*
- More accidents (and more at faults) (2-3x risk)
  - % with 2+ crashes: 40 vs. 6
  - % with 3+ crashes: 26 vs 9
- More citations (Speeding - mean 4-5 vs. 1-2) \*\*
- Worse accidents (\$4200-5000 vs \$1600-2200) \*\*
  - (% having a crash with injuries: 60 vs 17%)
- More Suspensions/Revocations (Mean 2.2 vs 0.7)
  - (% suspended: 22-24 vs. 4-5%)
- Greater adverse impact of alcohol on driving

## Antisocial Activities (age 27)



H+ADHD = Hyperactive as a child and still ADHD at adult outcome (4+ symptoms and 1+ impairments);  
 H-ADHD = Hyperactive as a child but is not diagnosable as ADHD at adult outcome;  
 Controls = Community control group

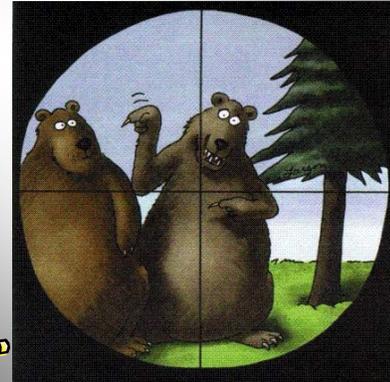
## Judicial Costs of ADHD (by age 21)

- ADHD children followed to young adulthood are more than twice as likely to be arrested as control children (48% vs. 20%)
- Mean judicial costs have been estimated to be \$8,814 per ADHD person vs. \$341 per control. Regression modeling placed the total criminal costs at \$37,830 per ADHD person having CD.

Data from the Milwaukee follow-up study as reported in the paper by Secnik, Swensen, Buesching, Barkley, Fischer, & Fletcher (submitted for publication).

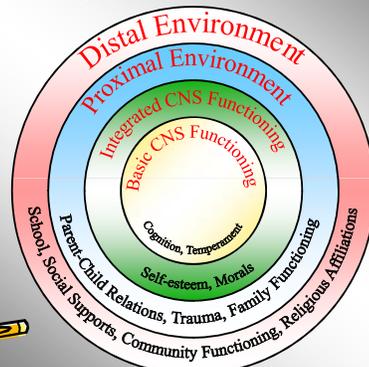
## Social & Lifestyle

- Fewer close friends; shorter duration of relations
- Rated by parents as more socially impaired
- Lower levels of marital satisfaction by both proband and partner
- Greater parenting stress in parental role
- Differences in leisure time use:
  - Spend more time talking on phone, watching TV and playing videogames, and socializing
  - Spend less time reading, getting adult education, and exercising



## 5) Interventions / Components of Treatment

## Understanding Strengths & Vulnerabilities



## Treatment Interventions

- Optimizing executive functioning as possible
  - Through medication interventions
  - “Scaffolding for weak areas of function”
- Interventions are focused towards the severity and specific nature of “impairments”.
- The question in treatment should be: “What specific concerns in this ADHD patient create obstacles in the person’s life.”
- We are NOT treating “ADHD”, but the life impairments secondary to ADHD.
- Don’t forget to treat comorbidity!
- **Medications!!!!**

## Conclusion

- The diagnosis of “ADHD” remains a clinical one
- There are NO diagnostic tests for “ADHD”
- “ADHD” belongs to a broader group of “Neurobehavioral Dysfunctions”
- Comorbidity is commonly seen AND increases with age!!!

## Conclusions

- ADHD is associated with numerous childhood and adult impairments in major life activities
- ADHD persists into adulthood in 65% to 86% of cases diagnosed in childhood
- ADHD is **more** impairing than most outpatient psychiatric disorders
- Interventions need to be started earlier, sustained longer across development, and target more domains than just education given the pervasive adverse impact of ADHD in other major life activities

## Advising Families of Uncooperative Adults

- Cease moral interpretations of patient’s behavior – acceptance of ADHD as a neuro-genetic disorder (frontal lobe syndrome) and patient as mentally ill
- Be a safety net (financial and otherwise)
  - Not enabling misconduct; instead you are keeping them from homelessness and worse
  - Health maintenance, medical & dental care
- Be ready to support them in constructive life activities (encouragement, therapy, medication, furthering education, job retraining, locating employment, drug detox., etc.)
- Avoid using your continued relationship to them as an ultimatum for change
- Stay involved in their lives – estrangement won’t help them – you can’t be a constructive influence if you have abandoned them

Dr. Russell Barkley PhD