Attention Deficit Hyperactivity Disorder
Child/ Adolescent/ Adult

Daniel G. Orr, MD
All the following medications have shown efficacy in the treatment of ADHD except:

A. Guanfacine ER
B. Lisdexamfetamine
C. Amitriptyline
D. Modafinil
E. Bupropion
Question 2

Co-Morbid disorders associated with ADHD include:

A. Substance Abuse
B. Smoking
C. Depression
D. Oppositional Defiant Disorder
E. Tic Disorders
Question 3

Which statement is False?

A. ADHD is over diagnosed.
B. ADHD is under diagnosed.
C. Adult ADHD generally is de novo without childhood deficits.
D. Inattentive subtype ADHD is more common in girls than boys.
E. Inattentive subtype ADHD is common in Adults.
Question 4

Which statements are True about ADHD:

A. Divergence of a patient’s stimulant medication is common.
B. 33% of all ADHD patients abuse their medication.
C. ADHD is best treated with a combination of medication and support/counseling for school/ work/ and socially.
D. ADHD is one of the most common statistically heritable psychiatric disorders.
ADHD
What is it?

Disease
Disorder
Syndrome
Variant of normal brain function
Neurologic disorder
Behavioral disorder
Personality type
<table>
<thead>
<tr>
<th>ADHD Labels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad Kids</td>
</tr>
<tr>
<td>Lazy</td>
</tr>
<tr>
<td>Stupid</td>
</tr>
<tr>
<td>Unmotivated</td>
</tr>
<tr>
<td>Irresponsible</td>
</tr>
<tr>
<td>Defiant</td>
</tr>
<tr>
<td>Doesn’t Listen</td>
</tr>
<tr>
<td>Absent Minded</td>
</tr>
<tr>
<td>Daydreamers</td>
</tr>
<tr>
<td>Immature</td>
</tr>
<tr>
<td>Wild</td>
</tr>
<tr>
<td>“Just a boy”</td>
</tr>
<tr>
<td>Doesn’t care</td>
</tr>
</tbody>
</table>
ADHD
DSM - 5

Symptoms occur in two or more settings and interfere or reduce quality of function.

Do not occur exclusively or better explained by another psychiatric or learning disorder.
ADD/ADHD
DSM - 5

Persistent Inattention and/or Hyperactivity/Impulsivity that interferes with functioning and development.

Six or more symptoms of Inattention and/or Hyperactivity/Impulsivity for more than six months.

Symptoms present before age 12 yrs.
ADHD
DSM-5

Children under 17 yrs.: 6 - 9 symptoms

Adults: 5 – 9 symptoms
ADHD Symptoms

Functional impairment must be evidenced across multiple settings i.e. School/Work/Home and be developmentally relevant.

Hyperactivity and Impulsivity are frequent symptoms seen in childhood whereas Inattention often becomes the predominant symptom in adults.
ADHD
Symptoms

Symptoms generally noticed before age 12 yrs.

Residual symptoms often persist into adulthood.

As age progresses symptoms and function may improve but generally not to the level of an individual who does not suffer with ADHD.
ADHD
Through the Life Cycle

As the brain develops throughout childhood and adolescence there is an increase in control of behavior with less overt impulsivity and hyperactivity.

There is an increasing adaptation in adulthood with the development of internal and external strategies to help compensate for these deficits.
ADHD

Are there degrees of ADHD?

MILD: Does not impair normal functioning in academic, vocational or social situations.

MODERATE: Moderate impairment in these settings.

SEVERE: Marked impairment in these settings.
ADHD
Statistical Links

Brain structure / Functional abnormalities
Family / Genetic factors
Prenatal / Perinatal factors
Maternal smoking and alcohol use
Neurotoxins
Psychosocial stressors and combined factors
Heritability of ADHD:

50% - 75% rate in 1st degree relatives:

Parents
Children
Siblings
ADHD
Epidemiology

Prevalence:

5% - 9% School Age Children
Diagnosed: Boys > Girls
Girls: Inattentive Type > Mixed > Hyperactive

4% - 6% Adults
Adults: Inattentive Type > Mixed > Hyperactive
ADHD
Epidemiology

High Rates ADHD in those Incarcerated:

45% Male youth offenders
30% Adult offenders
10% Female offenders

Note: ADHD is both over diagnosed as well as under diagnosed!
**ADHD Circuitry**

At least four sub-circuits of the Cortico-Striatal-Thalamic-Cortical (CSTC) tracts show altered function in ADHD:

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior Cingulate Cortex</td>
<td>Selective Attention Dysfunction</td>
</tr>
<tr>
<td>Dorsolateral Prefrontal Cortex</td>
<td>Sustained Attention Dysfunction</td>
</tr>
</tbody>
</table>
ADHD Circuitry

Prefrontal Motor Cortex  Hyperactivity
Orbitofrontal Cortex  Impulsivity
ADHD

Primary clinical symptoms:

- Inattention
- Hyperactivity
- Impulsivity

Subtypes:

- Predominantly Hyperactive
- Predominantly Inattentive
- Mixed: Hyperactive and Inattentive
ADHD
Inattention Deficits

Poor sustained attention
Careless errors
Does not listen
Hard to finish tasks
Forgetful
Difficulty prioritizing
Avoids tasks requiring sustained mental attention

Paying attention to details
Easily distracted
Lacks follow through with instructions
Difficulty organizing
Loses important items
Poor concentration
ADHD
Hyperactivity / Impulsivity

Fidgeting/Tapping/Squirming
Not able to stay seated
Runs and climbs excessively
“On the go”/ Driven by motor
Talks excessively
Blurts out answers
Finishes peoples sentences
Difficulty waiting turn

Interrupts / Intrudes in others conversations or games etc.
Drives too fast
Impulsive job changes
ADHD

Pre School:
  Behavioral Disturbances
  Hyperactivity

School Age:
  Behavioral Disturbances
  Academic Problems
  Difficulty with Social Interactions
  Self Esteem Issues
ADHD
Frequent Associations
Adolescents:

- Academic Problems
- Difficulty with Social Interactions
- Self Esteem Issues
- Legal Issues
- Smoking
- Frequent Injuries / Accidents
- Substance Abuse
ADHD Symptoms

College Age:

- Academic Failure
- Occupational Difficulties
- Self Esteem Issues
- Relationship Problems
- Substance Abuse
- Injuries /Accidents
- Legal Issues
ADHD Symptoms

Adults:
- Occupational Failure
- Self Esteem Issues
- Relationship Problems / Marital Problems
- Injuries / Accidents
- Substance Abuse
- Legal Issues
ADHD

Co-morbidity

Co-morbid disorders are commonly seen with ADHD.

Presence of Co-morbid Disorders often prevent the correct diagnosis of ADHD by masking or resembling the symptoms of ADHD.
<table>
<thead>
<tr>
<th>Disorder</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Disorders</td>
<td>25%</td>
</tr>
<tr>
<td>Mood Disorders</td>
<td>20%</td>
</tr>
<tr>
<td>Anxiety Disorders</td>
<td>30%</td>
</tr>
<tr>
<td>Substance / Alcohol Abuse</td>
<td>15% - 30%</td>
</tr>
<tr>
<td></td>
<td>Adolescents</td>
</tr>
<tr>
<td></td>
<td>35% - 55%</td>
</tr>
<tr>
<td></td>
<td>Adults</td>
</tr>
<tr>
<td>Cigarette Smoking</td>
<td>20%</td>
</tr>
</tbody>
</table>
ADHD Comorbidities

Oppositional Defiant Disorder (ODD)  40%
Conduct Disorder                        20%
Tic Disorders (simple or complex)     5% - 20%
ADHD
Developmental History (adults)

Were you a very active child?
Did parents and/or teachers complain you were difficult?
Are you accident prone?
How did you do academically?
Did you ever fail a grade?
Were you ever labeled as having a learning disability?
Did you need special help at school?
Were you ever suspended or expelled?
Were you an underachiever?
Was your performance at school variable or unpredictable?
ADHD
Adult Questionnaire

Do you have problems with rage attacks?
How many jobs have you had?
How many times have you been fired? Why?
What kinds of things give you problems at work?
Do you have trouble living with others?
How many car accidents have you had?
How many traffic tickets or speeding tickets?
Have you had problems parenting in the way you’d like?
What do you enjoy doing with your spare time?
Do you have trouble with money? Housework? Being ontime?
Do you feel addicted to anything? Gambling? Computers? Games?
ADHD Screening and Rating Scales

Presently there are no lab tests or imaging studies to diagnose ADHD

Symptoms assessed in more than one setting:
- Home
- School
- Work

Screenings / rating scales performed by:
- Patient
- Teacher
- Parent
- Spouse
ADHD
Screening Tools

Conner’s
Vanderbilt
Wender (Child and Adult forms)
Adult Self Report Rating Scale (NYU)
CAARS (Adult)
Multiple Others

*There is no diagnostic test for ADHD*
ADHD Medications

Established Treatments

Psychostimulants (1\textsuperscript{st} line)
- Atomoxetine (1\textsuperscript{st} line)
- Bupropion (2\textsuperscript{nd} line)
- Guanfacine extended release (Intuniv) and Clonidine extended release (Kapvay) (2\textsuperscript{nd} line) for age 6-17

Tricyclic antidepressants (TCAs: 3\textsuperscript{rd} line)

Probable Efficacy

Modafinil
ADHD Psychostimulants

Mechanism of Action:
Increases pre-synaptic release of Dopamine and Norepinephrine in key areas of the brain in particular the frontal and prefrontal lobes.

Inhibits the reuptake of Dopamine and Norepinephrine in key areas of the brain.
ADHD
Psychostimulants

70% - 85% Response rate.
Individual response may vary between the different classes of stimulants.

Rule of 3rds
1/3 respond better to amphetamines
1/3 respond better to methylphenidates
1/3 respond about equally to either
ADHD
Psychostimulants (Pro’s)

Rapid response:
Response within 1-2 hrs. after ingesting but
duration of action short lived particularly with IR
forms and often require BID or TID dosing.
Lisdexamfetamine may last up to 10 – 12 hrs.
ADHD
Psychostimulants (Pro’s)

Improves:
- Focus
- Concentration
- Attention Span

Reduces:
- Hyperactivity
- Impulsivity
- Fidgeting
ADHD
Psychostimulants (Con’s)

- Irritability
- Headache
- “Zoned Out” effect
- Sleep Problems
- Diversion
- Slowed height rate
- Sudden cardiac death
- Stomachache
- Dysphoria
- Appetite suppression/ weight loss
- Short lived with IR forms
- Abuse potential
- Tic’s
- Psychosis/ Hallucinations
ADHD
Psychostimulants (Cons)

Height:
Rate of growth may be slowed but ultimate adult height does not seem to be effected.

Addiction and abuse:
Less likely with ADHD treated individuals.
More likely when diverted to their friends.
Lisdexamphetamine may be harder to abuse.
Concerta may be harder to abuse.
ADHD
Psychostimulants (Con’s)

Tics:

5% - 20% of school age children with ADD/ADHD will experience simple or complex tics prior to initiating any stimulant medicine.

9% will develop transient stimulant induced tics.

< 1% will develop chronic stimulant induced tics.
ADHD

Tics

Tics are usually transient
Rarely do patients develop a chronic tic disorder
When tics do occur or are worsened:
  Decrease dose
  Switch to another stimulant
  Add adjunctive drug to treat tics such as clonidine/guanfacine
Try non-stimulant medication:
  Atomoxetine, Intuniv, Kapvay
  Modafinil
ADHD
Psychostimulant (Cons)

Sudden Cardiac Death:
Most cases seen in individuals with pre-existing cardiac conduction abnormalities.
Inquire about history of tachycardia, syncope, family history of sudden cardiac death, and cardiac work up.

Psychosis/ Hallucinations:
Only about 30 cases reported.
ADHD Medications

Dose: start low, go slow, and keep going until you can determine optimal risk/benefit ratio

Measure outcome: continue to use ADHD rating scales with the patient as a psychoeducational tool

Teach patients to find observational anchors they can use to
ADHD
Immediate/Extended/Combination

Know when patient “needs” the psychostimulant (i.e.)
Mornings and Afternoons for school/work
Afternoons and evenings for homework and peer relations
Weekends

Patient and parent (for children) preferences for specific formulations.

Train parents to observe efficacy and side throughout the day.
ADHD
Stimulants

Common Errors in Dosing:

Failure to increase dose slowly to maximum if no side effects.
Beginning with a dose that is too high. “Start low and go slow.”
Not assessing the duration of action (may need multiple doses esp. with IR form)
Failure to use another psychostimulant if the first or second trial fails.
Failure to use input from school/home.
ADHD Medications

Stimulants:
- Methylphenidates
- Amphetamines

Non stimulants:
- Atomoxetine
- Bupropion
- Modafinil
- Armodafinil
Most adults will tolerate larger doses than children:

- 60 – 80 mg Amphetamine
- 70 mg Lis-dexamphetamine (Vyvanse)
- 80 – 100 mg Methylphenidate
- 120 mg Atomoxetine
<table>
<thead>
<tr>
<th></th>
<th>Duration</th>
<th>Methylphenidate (d,l)</th>
<th>Ritalin (d,l)</th>
<th>Methylin (d,l)</th>
<th>Focalin (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate Release (IR)</td>
<td>2-4 hrs.</td>
<td>Methylphenidate</td>
<td>Ritalin</td>
<td>Methylin</td>
<td>Focalin</td>
</tr>
<tr>
<td>Sustained Release (SR)</td>
<td>4 hrs.</td>
<td>Methylphenidate (SR)</td>
<td>Ritalin (SR)</td>
<td>Methylin (SR)</td>
<td></td>
</tr>
</tbody>
</table>
# ADHD Stimulants (Methylphenidates)

<table>
<thead>
<tr>
<th>Form</th>
<th>Age</th>
<th>Duration</th>
<th>Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic/Ritalin/Methylin IR (d,l)</td>
<td>6 yrs.</td>
<td>2-4 hrs.</td>
<td>BID</td>
</tr>
<tr>
<td>Focalin IR (d)</td>
<td>6 yrs.</td>
<td>4-6 hrs.</td>
<td>BID</td>
</tr>
<tr>
<td>Generic SR / Ritalin SR SR</td>
<td>6 yrs.</td>
<td>4-6 hrs.</td>
<td>BID</td>
</tr>
<tr>
<td>Methylin SR / Metadate ER SR</td>
<td>6 yrs.</td>
<td>4-6 hrs.</td>
<td>BID</td>
</tr>
<tr>
<td>Form</td>
<td>Age</td>
<td>Duration</td>
<td>Dosing</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------</td>
<td>----------</td>
<td>--------</td>
</tr>
<tr>
<td>Metadate CD</td>
<td>6 yrs.</td>
<td>8 hrs.</td>
<td>1/day</td>
</tr>
<tr>
<td>Ritalin LA</td>
<td>6 yrs.</td>
<td>8 hrs.</td>
<td>1/day</td>
</tr>
<tr>
<td>Concerta</td>
<td>6 yrs.</td>
<td>12 hrs.</td>
<td>1/day</td>
</tr>
<tr>
<td>Quillivant XR</td>
<td>6 yrs.</td>
<td>12 hrs.</td>
<td>1/day</td>
</tr>
<tr>
<td>Daytrana patch</td>
<td>6 yrs.</td>
<td>12 hrs.</td>
<td>1/day</td>
</tr>
<tr>
<td>Focalin XR (d)</td>
<td>6 yrs.</td>
<td>8-10 hrs.</td>
<td>1/day</td>
</tr>
</tbody>
</table>
## ADHD Stimulants (Methylphenidates)

<table>
<thead>
<tr>
<th>IR/SR/ER Forms</th>
<th>Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generic/Ritalin/Methylin</strong></td>
<td>(C) 2mg-4mg/Kg/day Max 60mg/day</td>
</tr>
<tr>
<td></td>
<td>(A) Start 20mg-30mg/day Max 60mg/day</td>
</tr>
<tr>
<td><strong>Focalin</strong></td>
<td>(C) 1mg-2mg/Kg/day Max 30mg/day</td>
</tr>
<tr>
<td></td>
<td>(A) Start 10mg-15mg/day Max 30mg/day</td>
</tr>
</tbody>
</table>
# ADHD Stimulants (Methylphenidates)

<table>
<thead>
<tr>
<th>Long Acting Forms</th>
<th>Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ritalin LA</td>
<td>Start 20mg/day</td>
</tr>
<tr>
<td></td>
<td>Max 60mg/day</td>
</tr>
<tr>
<td>Metadate CD</td>
<td>Start 20mg/day</td>
</tr>
<tr>
<td></td>
<td>Max 60mg/day</td>
</tr>
<tr>
<td>Focalin XR</td>
<td>(C) Start 5mg/day</td>
</tr>
<tr>
<td></td>
<td>Max 30mg/day</td>
</tr>
<tr>
<td></td>
<td>(A) Start 10mg/day</td>
</tr>
<tr>
<td></td>
<td>Max 40mg/day</td>
</tr>
<tr>
<td>Concerta</td>
<td>Start 18mg/day</td>
</tr>
<tr>
<td></td>
<td>Max 72mg/day</td>
</tr>
<tr>
<td>Quillivant XR</td>
<td>Start 20mg/day</td>
</tr>
<tr>
<td></td>
<td>Max 60mg/day</td>
</tr>
<tr>
<td>Daytrana Patch</td>
<td>Start 10mg/day</td>
</tr>
<tr>
<td></td>
<td>Max 30mg/day</td>
</tr>
<tr>
<td>Brand</td>
<td>Formulations</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Ritalin/Generic</td>
<td>Tablets: 5mg/ 10mg/ 20mg</td>
</tr>
<tr>
<td>Methylin</td>
<td>Tablets / Chewable: 2.5mg/ 5mg/ 10mg</td>
</tr>
<tr>
<td></td>
<td>Solution: 5mg/tsp. and 10mg/tsp.</td>
</tr>
<tr>
<td>Methylin ER</td>
<td>Tablets: 10mg/ 20mg</td>
</tr>
<tr>
<td>Ritalin SR</td>
<td>Tablet: 20mg</td>
</tr>
<tr>
<td>Ritalin LA</td>
<td>Capsules: 10mg/ 20mg/ 30mg/ 40mg</td>
</tr>
<tr>
<td>Metadate ER</td>
<td>Tablet: 20mg</td>
</tr>
<tr>
<td>Metadate CD</td>
<td>Capsules: 10mg/ 20mg/ 30mg/ 40mg/50mg/ 60mg</td>
</tr>
</tbody>
</table>
# ADHD Methylphenidate Formulations

<table>
<thead>
<tr>
<th>Product</th>
<th>Formulations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focalin/Generic</strong></td>
<td>Tablets: 2.5mg/5mg/10mg</td>
</tr>
<tr>
<td><strong>Focalin XR</strong></td>
<td>Capsules: 5mg/10mg/15mg/20mg/25mg/30mg/35mg/40mg</td>
</tr>
<tr>
<td><strong>Quillivant XR</strong></td>
<td>Suspension: 25mg/tsp.</td>
</tr>
<tr>
<td><strong>QuilliChew ER</strong></td>
<td>Chewable: 20mg/30mg/40mg</td>
</tr>
<tr>
<td><strong>Concerta</strong></td>
<td>Capsules: 18mg/27mg/36mg/54mg</td>
</tr>
<tr>
<td><strong>Daytrana</strong></td>
<td>Transdermal Patch: 10mg/15mg/20mg/30mg</td>
</tr>
</tbody>
</table>

Remove patch after 9 hrs.
<table>
<thead>
<tr>
<th>DosingGeneric/Adderall</th>
<th>Form</th>
<th>Age</th>
<th>Duration</th>
<th>BID</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR (d,l)</td>
<td>3 yrs.</td>
<td>3-4 hrs.</td>
<td>BID</td>
<td></td>
</tr>
</tbody>
</table>

| Dexedrine tablets      | IR (d) | 3 yrs. | 3-6 hrs. | BID |

<table>
<thead>
<tr>
<th>Generic ER/Adderall XR (2 phase)</th>
<th>Long acting</th>
<th>6 yrs.</th>
<th>6-8 hr.</th>
<th>1/day</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Mixed Amphetamine XR (3 phase)</th>
<th>Long acting</th>
<th>13 yrs</th>
<th>14 hrs.</th>
<th>1/day</th>
</tr>
</thead>
</table>

| Dexedrine spansules | Long acting | 3 yrs. | 6-8 hrs. | 1 /day |

<table>
<thead>
<tr>
<th>Lisdexamphetamine</th>
<th>Long acting</th>
<th>6 yrs.</th>
<th>10-12 hrs.</th>
<th>1 /day</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Mixed Amphetamine XR (3 phase)</th>
<th>Long acting</th>
<th>13 yrs</th>
<th>14-16 hrs.</th>
<th>1 /day</th>
</tr>
</thead>
</table>
# ADHD

## Stimulants (Amphetamines)

<table>
<thead>
<tr>
<th>IR Forms</th>
<th>Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generic/Adderall</strong></td>
<td>3-6 yrs. Consult Psychiatry</td>
</tr>
<tr>
<td></td>
<td>&gt; 6 yrs. Start 5mg BID</td>
</tr>
<tr>
<td></td>
<td>(A) Start 5mg-10mg BID</td>
</tr>
<tr>
<td><strong>Dexedrine tabs</strong></td>
<td>3-6 yrs. Consult Psychiatry</td>
</tr>
<tr>
<td></td>
<td>&gt; 6 yrs. Start 5mg BID</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Long acting Forms</th>
<th>Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generic ER/Adderall XR</strong></td>
<td>&gt; 6 yrs. Start 10mg/day</td>
</tr>
<tr>
<td><strong>Amphetamine Salts (3 phase)</strong></td>
<td>&gt; 13 yrs.</td>
</tr>
<tr>
<td><strong>Dexedrine spansules</strong></td>
<td>As above for Dexedrine tablets</td>
</tr>
<tr>
<td><strong>Lisdexamphetamine</strong></td>
<td>&gt; 6 yrs. Start 30mg/day</td>
</tr>
</tbody>
</table>
### ADHD

**Amphetamine Formulations**

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Formulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adderall/ Generic</td>
<td>Tablets: 5mg/7.5mg/10mg/12.5mg/15mg/20mg/30mg</td>
</tr>
<tr>
<td>Dexedrine/ Generic</td>
<td>Tablets: 5mg/10mg</td>
</tr>
<tr>
<td>Adderall XR/ Generic</td>
<td>Capsules: 5mg/10mg/15mg/20mg/25mg/30mg</td>
</tr>
<tr>
<td>Dexedrine (SR) Spansule</td>
<td>Capsules: 5mg/10mg/15mg</td>
</tr>
<tr>
<td>Vyvanse</td>
<td>Capsules: 20mg/30mg/40mg/50mg/60mg/70mg</td>
</tr>
<tr>
<td>Mydayis</td>
<td>Capsules: 12.5mg/25mg/37.5mg/50mg</td>
</tr>
</tbody>
</table>
ADHD
Non-Stimulants

Atomoxetine (NRI) / Strattera

Potent NE reuptake inhibitor.
Enhances NE and DA transmission in frontal and prefrontal cortex.
Children 6 yrs. and older.
May take 6-8 weeks to see maximum effect.
ADHD
Non-Stimulants

Atomoxetine

Dose children < 70 kg.
Start 0.5 mg/kg/day
Max 1.4mg/kg/day or 100mg/day whichever is less.

Dose adults
Start 40mg/day
Max 100mg/day
ADHD
Non-Stimulants

Atomoxetine

Do not use if severe cardiovascular disorder.
Do not use if closed angle glaucoma exists.
May increase HR and BP.
Reduce dose with decreased hepatic function.
Suicidality warning up to age 24 yrs.
Potent CYP 450 2D6 inhibitors may increase levels:
(Paroxetine/Fluoxetine/Quinidine)

Common Side Effects: Dizziness/ Drowsiness/ Dyspepsia/ Decreased appetite
ADHD
Non-Stimulants

Bupropion IR/SR/ER  (Wellbutrin) IR/SR/XL

Inhibits NE and DA reuptake.
May have use with co-morbid depression / substance abuse / smoking.
Not approved if < 18 yrs. but often used.
Off label use in ADHD.
Do not use in Bulimia/Anorexia/Seizure disorder/Alcoholism

Dose: Most often in ER/XL form 1/day
  (C) Max dose 300mg/day   (A) Max dose 450mg/day
ADHD Medications

Non stimulants:

Clonidine ER (Kapvay)
Guanfacine ER (Intuniv)

Non stimulants:

Tricyclic Antidepressants (TCA’s)
ADHD
Non-Stimulants

Clonidine ER/ Kapvay

- Alpha-2a agonist
- Monotherapy or adjunctive to stimulants.
- Approved 6yrs-17 yrs. Off label use in adults.
- Start 0.1mg/day in BID dosing. Max 0.4mg/day
- Monitor BP and HR for Hypotension and Bradycardia
- Caution: severe CAD/ recent MI/ Cerebral ischemia
- Common side effects: Drowsiness/ Dizziness/ Dyspepsia
- May have efficacy for Tics/ Tourette’s/ ODD/ Conduct disorder
- Taper slowly to avoid reflex hypertension.
ADHD
Non-Stimulants

Guanfacine ER/ Intuniv
Alpha-2a agonist
Monotherapy or adjunctive to stimulants
Approved 6 yrs-17yrs. Off label use in adults.

Start: 1mg/day Max. 4mg/day
Less Hypotension/ Bradycardia than clonidine/kapvay but monitor.

Caution: severe CAD/ recent MI/ Cerebral ischemia

Common side effects: drowsiness, dizziness, dyspepsia
May have efficacy for Tics/ Tourette’s/ ODD/ Conduct disorder

Taper slowly to avoid reflex hypotension
ADHD

Non-Stimulants

Tricyclic Antidepressants (TCAs)

3\textsuperscript{rd} or 4\textsuperscript{th} line

Efficacy shown for Imipramine, Desipramine, Nortriptyline

These TCA’s have strong NE activity.

Side effects and risks limit use.
ADHD

Non-Stimulants

Modafanil

Submitted to FDA in 2006 for Pediatric and Adult ADHD.

2 studies showed efficacy.

Rejected due to safety concerns of possible Stevens-Johnson Syndrome.
ADHD

Issues in pharmacologic management

What % of rx’s in mental health are not filled or taken improperly?

Why is psychological management important?

Ambivalence of both parent and child/teen regarding need for medication.

Inadequate parental surveillance of adherence.

Misunderstanding of doses, serum levels, and onset of effects. Internet information and misinformation.
ADHD

Issues in pharmacologic management

How do we explain the nature of their child’s illness?

How can we develop a therapeutic alliance with patient and family?

How can we develop a supporting alliance with patient’s school and community?
ADHD Medications

Provide the patient with information on medication

Review the “Bio-Psycho-Social” nature of ADHD and any comorbid psychiatric disorders

Explore patient apprehensions such as: “This is a crutch,”

“...will change my personality”

Choose medications based on efficacy, duration of action, comorbidities, patient/family preference, family history, patient medication history, and risk of abuse.
Adult ADHD
Psychotherapies

Cognitive – Behavioral Therapy

Learning new strategies to compensate for deficit

Patient Empowerment:
ADD.org
CHADD.org
NAMI.org
Legal Rights of the Student and Obligations of Colleges (adapted from Robin, 1998)

- **Section 504 of the Rehabilitation Act of 1973**
  
  This spirit of the law entitles student to classroom modifications in the mainstream college classroom

- **Americans with Disabilities Act (1990): Prevents discrimination against students with ADHD**

- For excellent up-to-date discussions of special education laws: [www.schwablearning.org](http://www.schwablearning.org)
The PCP should obtain specific school history at each visit.

Inquire about strengths, challenges and school connections.

Ask about specific classroom modifications and whether a 504 or individualized education plan (IEP) exists.
Resources:

- www.chadd.org
- www.add.org
- Parents Helping Parents (www.php.com)
- NAMI (www.nami.org)
- www.aacap.org (Amer Acad of Child & Adol Psychiatry: Facts for Families)
- www.parentsmedguide.org (antidepressants)
All the following medications have shown efficacy in the treatment of ADHD except:

A. Guanfacine ER
B. Lisdexamphetamine
C. Amitriptyline
D. Modafinil
E. Bupropion
Co-Morbid disorders associated with ADHD include:

- A. Substance Abuse
- B. Smoking
- C. Depression
- D. Oppositional Defiant Disorder
- E. Tic Disorders
Question 3

Which statement is False?

A. ADHD is over diagnosed.
B. ADHD is under diagnosed.
C. Adult ADHD generally is de novo without childhood deficits.
D. Inattentive subtype ADHD is more common in girls than boys.
E. Inattentive subtype ADHD is common in Adults.
Question 4

Which statements are True about ADHD:

A. Divergence of a patient’s stimulant medication is common.
B. 33% of all ADHD patients abuse their medication.
C. ADHD is best treated with a combination of medication and support/counseling for school/ work/ and socially.
D. ADHD is one of the most common statistically heritable psychiatric disorders.
Answers

- Question 1: C
- Question 2: ABCDE
- Question 3: C
- Question 4: ACD
A 19 male patient of your whom you have seen since childhood complains of increased anxiety and an inability to stay focused on his classes at college. In high school he had been an A-B student and is now a freshman at Lafayette College where he is struggling to get C's and is failing one of his courses. He tells you that as an adolescent he waited until the night before to study for exams and do term papers and this never caused any problems.

You perform a PHQ, which is normal and a GAD which is moderately elevated. You perform an ADH Screen, which shows a lot of inattention but little hyperactivity. He tells that on occasionally he smokes marijuana to turn his mind off so he can sleep. But this is nothing new since he started doing this when he was 16. He is a member of the rugby team and they have an occasional beer party after a match whether they win or lose. He rarely has more than 2 beers at these events.

He is one of 4 children and a younger brother has been identified with ADHD. You do a cursory exam and labs and all findings are normal.

What are your next steps?
A 35 yr. old pharmaceutical representative who is notoriously late for her physician meetings and lunch dates is particularly anxious today since her district manager gave her one month to prove that she can be more organized and arrive at her meetings on time. She relates to you that her son was diagnosed with ADHD about 6 months ago and that she took one of her Adderall yesterday and for about 4 hrs. she felt more organized, focused and motivated. In fact, she even finished 6 of her reports during that time which she had been procrastinating for 2 wks. to get done. Presently she has no family physician and asks for your guidance.

What do you do?