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### Abuse and Misuse of Stimulants for ADHD

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# Abuse and Misuse of Stimulants for Attention Deficit Hyperactivity Disorder

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# Disclosures

The author of this presentation has no relevant financial or non-financial relationships in the products described and reviewed in this presentation.



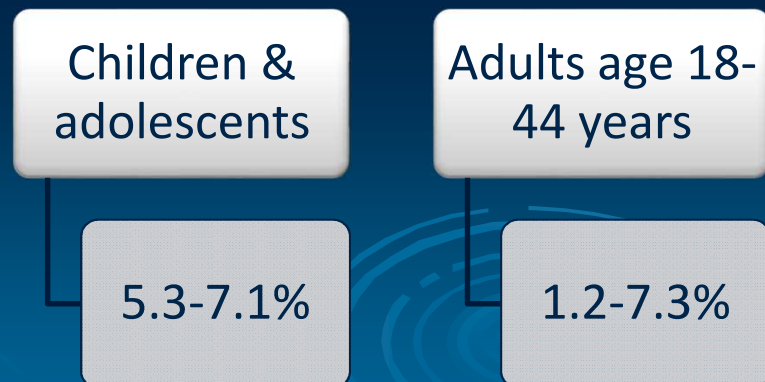
# Objectives

1. Compare & contrast the clinical manifestations and criteria for diagnosis of ADHD in adults & children.
2. Review treatment options for adults with ADHD.
3. Differentiate between abuse & misuse of medications.
4. Identify risk factors which may predispose adults to abuse & dependence to stimulant therapy for ADHD.
5. Discuss strategies for preventing misuse & abuse of stimulants.



# ADHD Overview

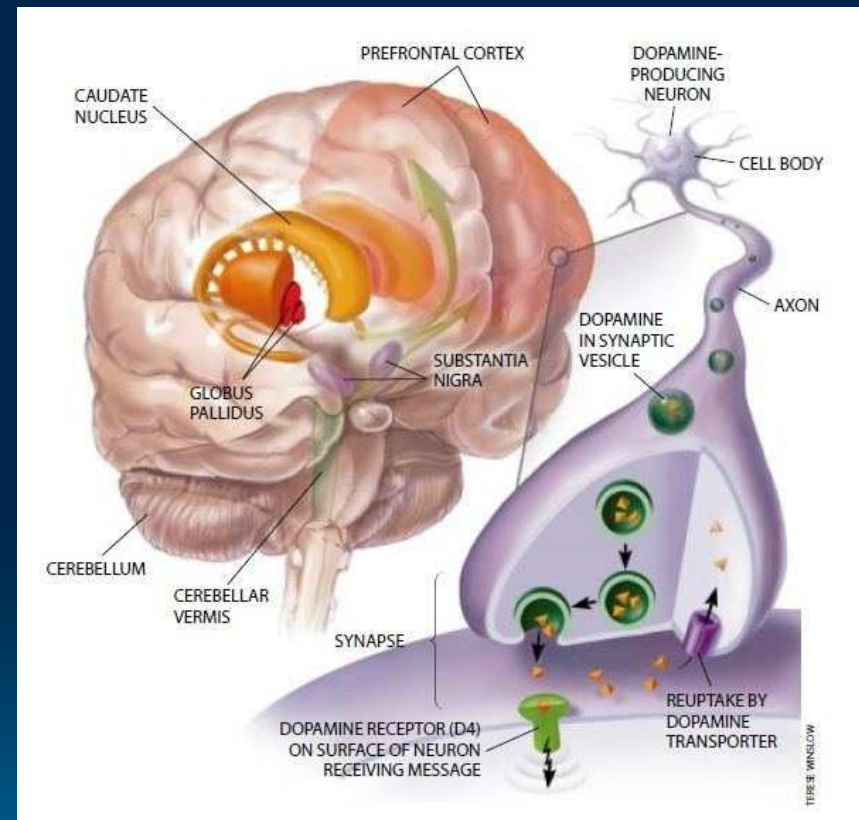
- Most common neurodevelopmental disorder seen in children & adolescents
- Often persists into adulthood (~50%)
  - Among these → 90% are underdiagnosed & undertreated
- Associated with social, academic & economic limitations
- ↑ risk for SUD in adolescents & adults with ADHD
- Estimated worldwide prevalence:





# Pathophysiology

- Exact pathogenesis unknown
- Complex, multifactorial disorder
- Disrupted DA & NE neurotransmission appears to play an important role





# Comorbidities





# Clinical Manifestations

**Inattention**

**Impulsiveness**

**Hyperactivity**



**More prominent  
in adults**







# Differential Diagnoses

## Medical Conditions

- Hearing impairment, thyroid disease, lead toxicity, hepatic disease, sleep apnea & drug interactions

## Psychiatric Conditions

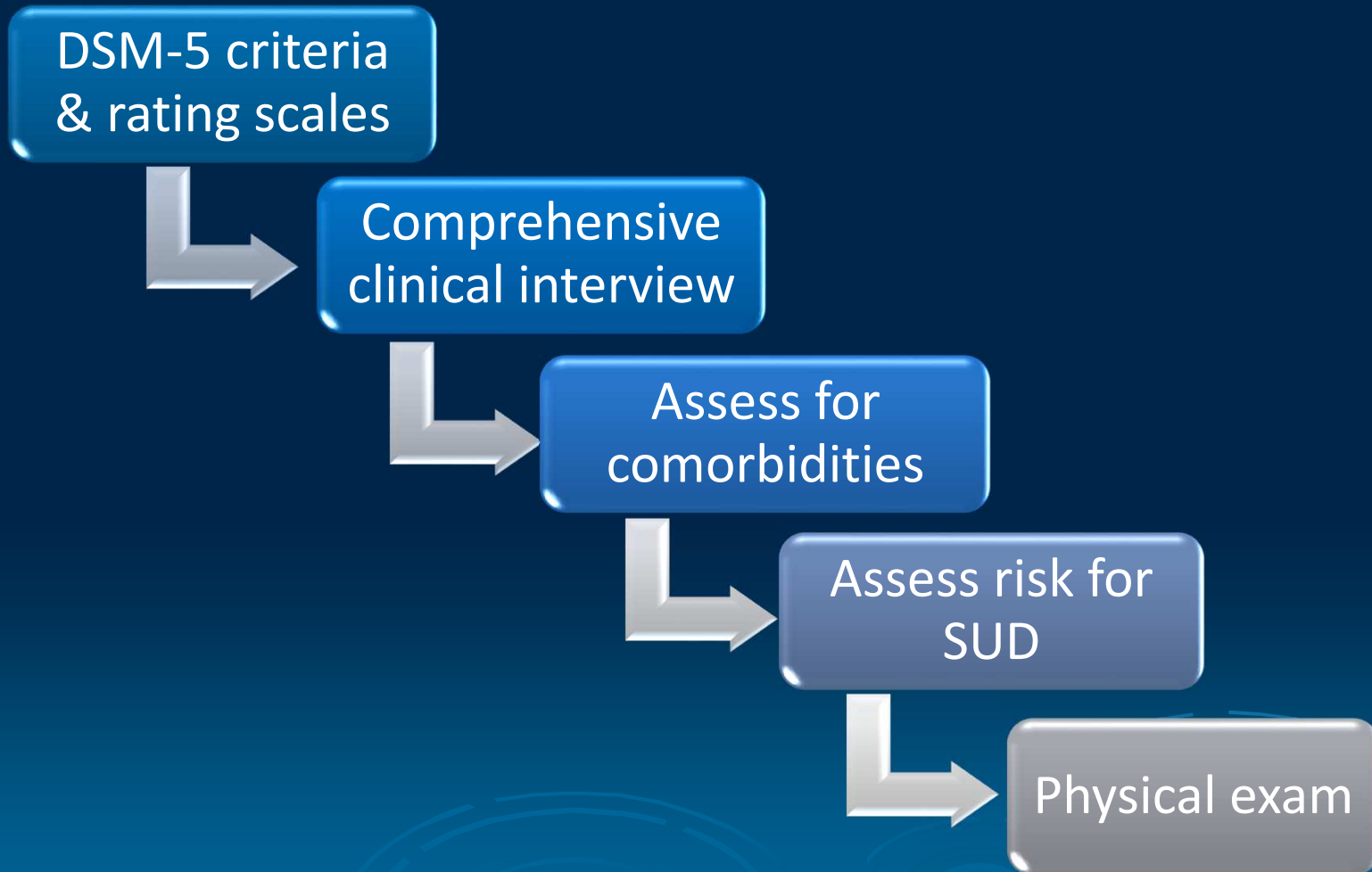
- Anxiety, depression, mood disorders, obsessive-compulsive, **SUD**, bipolar disorder, antisocial personality & learning disorders

## Medications

- Anticonvulsants, antihistamines, caffeine, nicotine & steroids



# Diagnostic Approach





# DSM-5

## ➤ Symptoms divided into 2 domains:

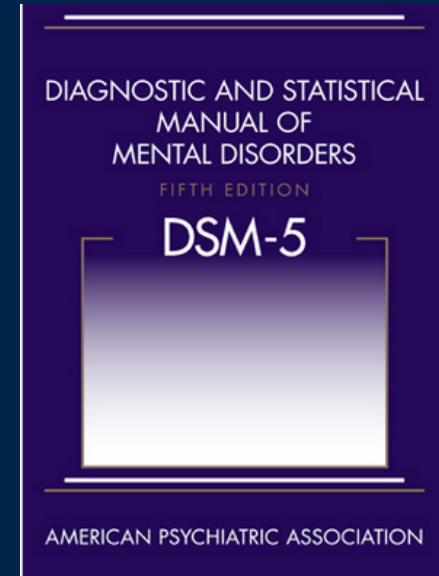
- Inattention
- Hyperactivity/Impulsivity

## ➤ Diagnosis requires:

- $\geq 6$  symptoms for children ages  $\leq 16$  or
- $\geq 5$  symptoms for ages  $\geq 17$
- Symptoms present for  $\geq 6$  months & inappropriate for developmental level

## ➤ Additional criteria:

- Several symptoms present before **age 12** & in  $\geq 2$  settings
- Evidence that symptoms interfere with social, academic or occupational functioning
- Symptoms not caused by other psychiatric disorder





# DSM-5: Inattention

Fail to pay close attention to details

Have difficulty sustaining attention

Easily distracted

Unable to follow instructions

Do not pay attention when someone is talking

Have difficulty organizing tasks or activities

Avoid/dislike tasks that require sustained mental effort

Lose things necessary for tasks or activities

Forgetful in daily activities



# DSM-5: Hyperactivity/Impulsivity

Fidget/tap hands or feet, or squirm in seat

Leave seat inappropriately

Run about or climb when not appropriate

“On the go” or act as if “driven by a motor”

Speak excessively

Unable to play quietly

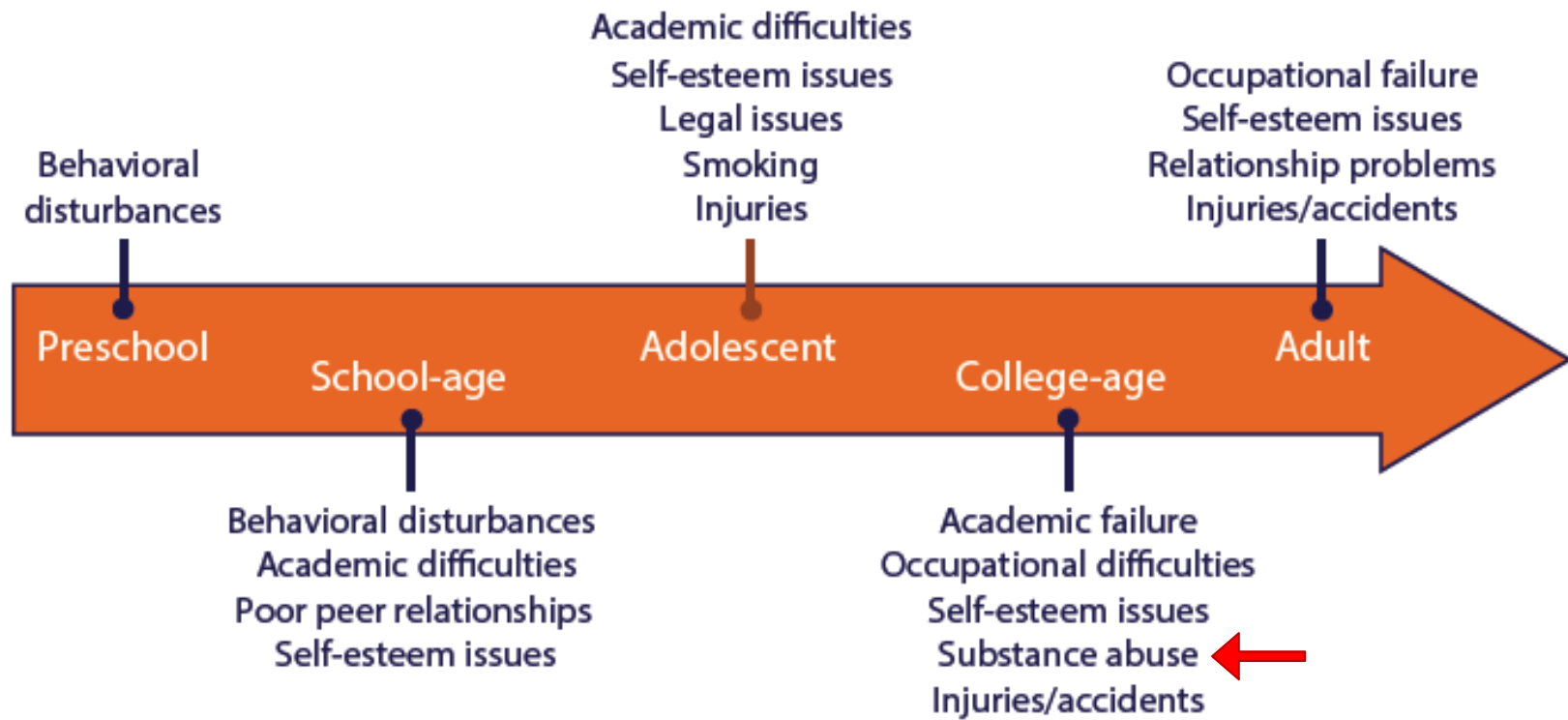
Blurt out answers

Have trouble waiting his/her turn

Interrupt or intrude on others



# Timeline: Functional Impairment





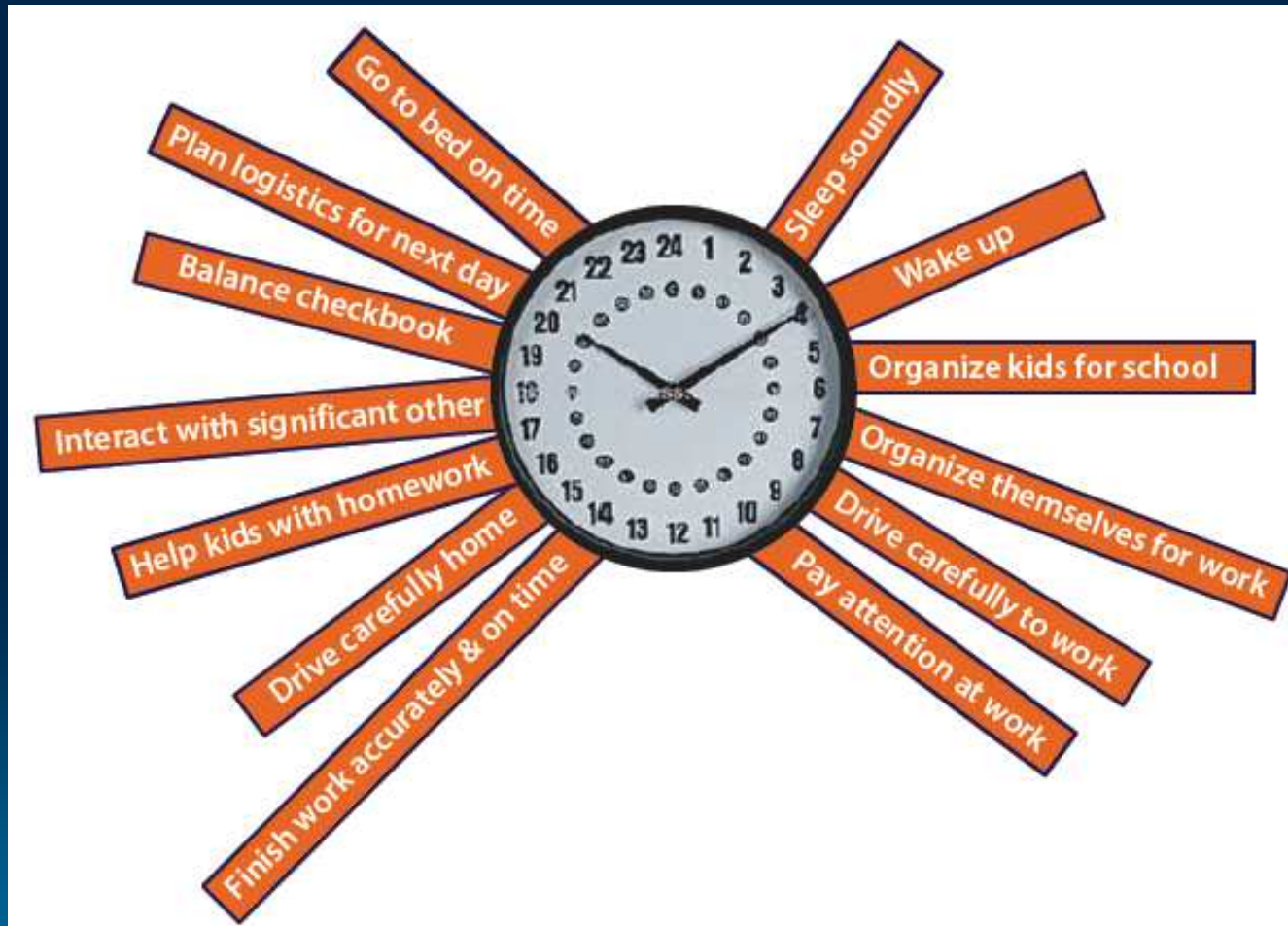
# Overall Impact: ADHD

- Poor academic performance
- Problems at work
- ↑ rates of unemployment
- Difficult or failed relationships
- Dangerous driving & motor vehicle accidents
- Delinquent behavior
- Impulsive sexuality
- Self-esteem issues
- ↑ rates of SUD





# Daily Challenges: Adult ADHD







# Consequences of Untreated ADHD

- Major depression & anxiety
- Bipolar disorder
- SUD ←
- Conduct disorder
- Oppositional-defiant disorder
- Antisocial personality
- Suicide

**Early treatment may ↓ negative outcomes**



# Treatment Options for Adults with ADHD



# Treatment Overview

Assessment & diagnosis

Identify patient & family needs

Establish treatment goals

Initiate treatment

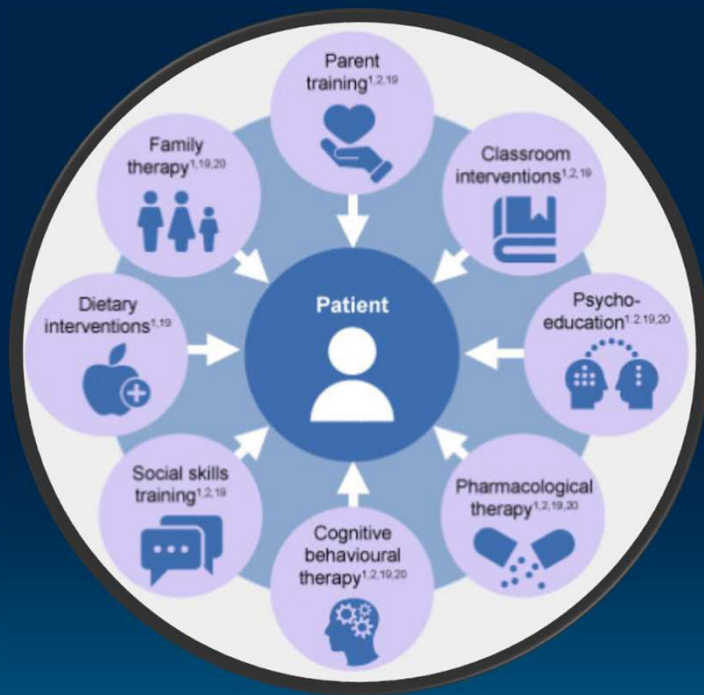
Treatment re-evaluation & monitoring



# Non-pharmacologic Treatment

## ➤ Options:

- Behavioral therapies (CBT)
- Psychoeducation
- Lifestyle & diet



## ➤ Helpful as *adjunct* to medication

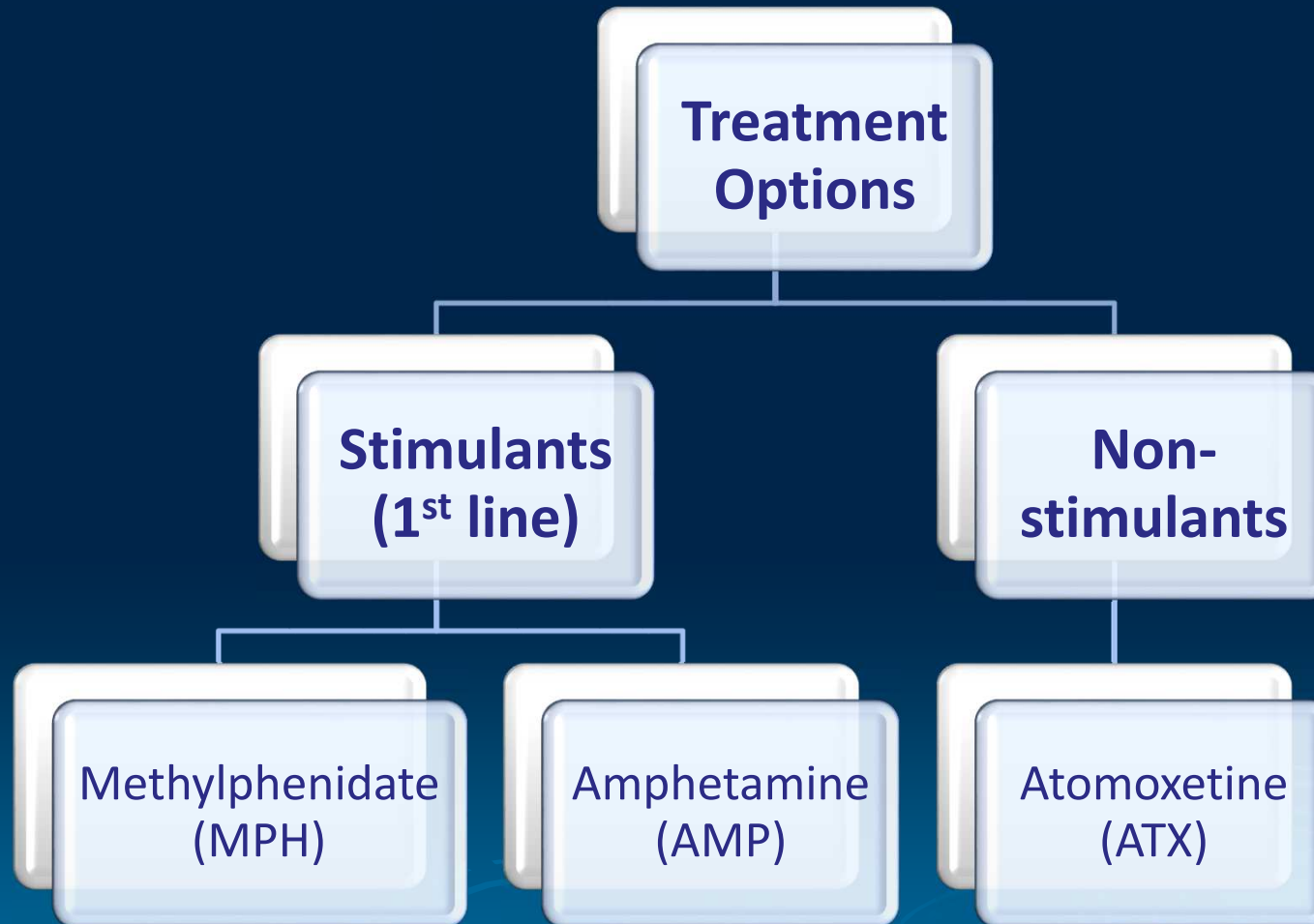
## ➤ Behavioral therapies may be better options for patients with comorbid ADHD & SUD

- May ↓ risk for misuse, abuse & diversion

## ➤ Future studies assessing multimodal treatment strategies are needed

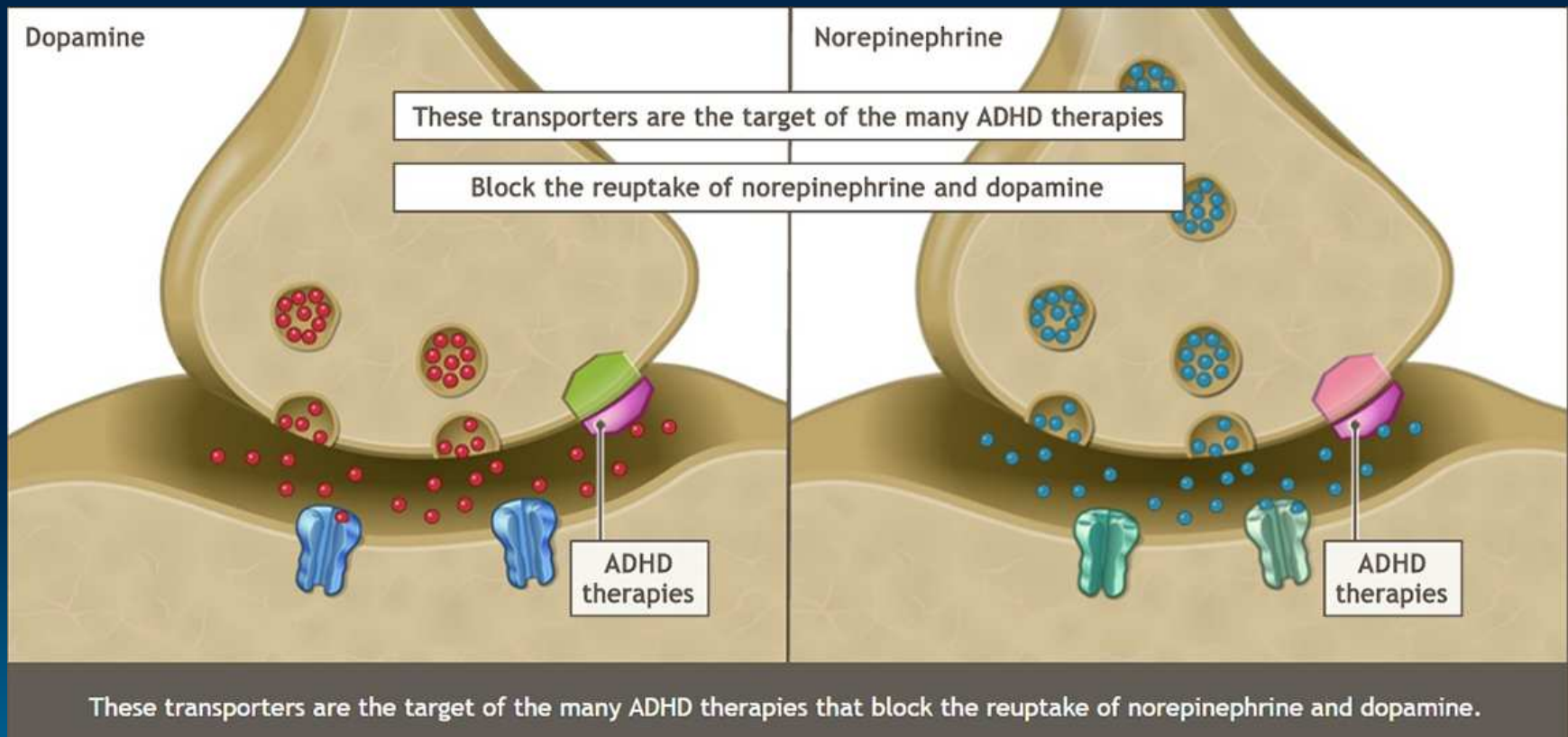


# Pharmacotherapy





# Stimulants: MOA





# Stimulants: Overview

- Safe & effective when used as prescribed
  - Appropriate use = *lower* risk for misuse of alcohol & other illicit drugs
- Rapid onset of action ( $\leq 1$  hr)
- Classified as **schedule II** by the FDA
  - High potential for abuse, which may lead to physiological and/or psychological dependence
- **Black Boxed Warning:**
  - Abuse & dependence (all stimulants)

AMPHETAMINES HAVE A HIGH POTENTIAL FOR ABUSE. ADMINISTRATION OF AMPHETAMINES FOR PROLONGED PERIODS OF TIME MAY LEAD TO DRUG DEPENDENCE AND MUST BE AVOIDED. PARTICULAR ATTENTION SHOULD BE PAID TO THE POSSIBILITY OF SUBJECTS OBTAINING AMPHETAMINES FOR NONTHERAPEUTIC USE OR DISTRIBUTION TO OTHERS, AND THE DRUGS SHOULD BE PRESCRIBED OR DISPENSED SPARINGLY.

MISUSE OF AMPHETAMINE MAY CAUSE SUDDEN DEATH AND SERIOUS CARDIOVASCULAR ADVERSE EVENTS.

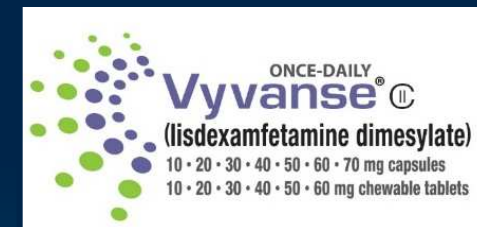




# Stimulants: Amphetamines

Medication	Dosage Form	Duration of Action
<b>MIXED AMPHETAMINE SALTS (MAS)</b> [Dextroamphetamine & amphetamine]		
Adderall <sup>®</sup>	Tablet	4-6 hrs
Adderall XR <sup>®</sup>	Capsule	8-12 hrs
Mydayis <sup>®</sup>	Capsule	≤ 16 hrs
<b>AMPHETAMINE SULFATE</b>		
Evekeo <sup>®</sup>	Tablet	4-6 hrs
Dyanavel XR <sup>®</sup>	Oral suspension	8-12 hrs
Adzenys XR <sup>®</sup>	ODT	10-12 hrs
Adzenys ER <sup>®</sup>	Oral suspension	10-12 hrs
<b>LISDEXAMFETAMINE (LDX)*</b>		
Vyvanse <sup>®</sup>	Capsule, chewable tablet	8-14 hrs

\*Pro-stimulant: Prodrug of dextroamphetamine



**Recent meta-analysis concluded AMP moderately more efficacious than MPH in reducing core ADHD symptoms**

Cortese S, et al. *Lancet Psychiatry* 2018; 5:727.

Lexi-Drugs. Lexicomp. Wolters Kluwer Clinical Drug Information, Inc. Hudson, OH. Accessed on December 20, 2018.

ODT: Orally disintegrating tablet  
AMP: Amphetamine  
MPH: Methylphenidate

[image](#)

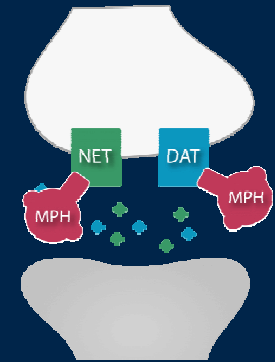
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# Stimulants: Methylphenidate



Medication	Dosage Form	Duration of Action
<b>METHYLPHENIDATE</b>		
<b>SHORT-ACTING</b>		
Ritalin <sup>®</sup>	Tablet	3-5 hrs
Methylin <sup>®</sup>	Oral Solution	3-5 hrs
<b>INTERMEDIATE-ACTING</b>		
Ritalin SR <sup>®</sup>	ODT	4-8 hrs
Metadate ER <sup>®</sup>	Tablet	6-8 hrs
Methylin ER <sup>®</sup>	Tablet	6-8 hrs
<b>LONG-ACTING</b>		
Cotempla XR <sup>®</sup>	ODT	8-12 hrs
Ritalin LA <sup>®</sup>	Capsule	8-12 hrs
Concerta <sup>®</sup>	Tablet	8-12 hrs
Aptensio XR <sup>®</sup>	Capsule	10-12 hrs
Quillivant XR <sup>®</sup>	Oral suspension	10-12 hrs
Daytrana <sup>®</sup>	Transdermal patch	10-12 hrs
Quillichew ER <sup>®</sup>	Chewable tablet	12 hrs
Jornay PM <sup>®</sup>	Capsule	12-14 hrs
<b>DEXMETHYLPHENIDATE</b>		
<b>SHORT-ACTING</b>		
Focalin <sup>®</sup>	Tablet	3-6 hrs
<b>LONG-ACTING</b>		
Focalin XR <sup>®</sup>	Capsule	8-12 hrs





# Stimulants: Adverse Effects & Monitoring

## Common Adverse Effects: (dose-dependent)

- ↓ appetite, weight loss, headache, insomnia, abdominal pain, nausea/vomiting, dizziness, nervousness, emotional lability

## Monitoring Parameters:

- **Prior to initiation:** Assess history and/or risk of abuse, cardiac history, consider obtaining ECG
- **After initiation:** Signs of misuse and/or abuse, BP, HR, chest pain, unexplained syncope, behavioral changes



# Stimulants: Benefits & Downfalls

## Benefits *(when used appropriately)*

- Improve *sustained, focused* attention (vigilance)
- May improve executive function
- May improve long-term retention of information
- Facilitate consolidation of information

## Downfalls

- May worsen *selective* attention & distractibility
- Do not improve (may impair) short-term acquisition of information and/or cognitive flexibility
- ***Not shown to improve learning & application of knowledge***



# Non-Stimulants: Overview

- Option for individuals who fail stimulant therapy or if stimulants contraindicated
- Recommended for patients with comorbid ADHD & SUD
- Less potential for abuse than stimulants
- Variable onset of action → 2-4 weeks





# Non-Stimulants: Atomoxetine (Strattera®)

- Only FDA-approved non-stimulant for treating adult ADHD
- **MOA:** Selective NE Reuptake Inhibitor (SNRI)
- Little to no abuse potential
- **Duration of action:** 24 hrs
- **Onset of action:** 1-2 weeks





# Non-Stimulants: Bupropion (Wellbutrin®)

- Off-label use
- **MOA:** relatively weak inhibitor of NE & DA reuptake
- Option for adults with comorbid ADHD & depression
- **Onset of action:** 1-2 weeks
- **Duration of action:** 12 hrs (SR) to 24 hrs (XL)

**Currently no direct comparisons of efficacy  
between bupropion & stimulants in adult  
ADHD**

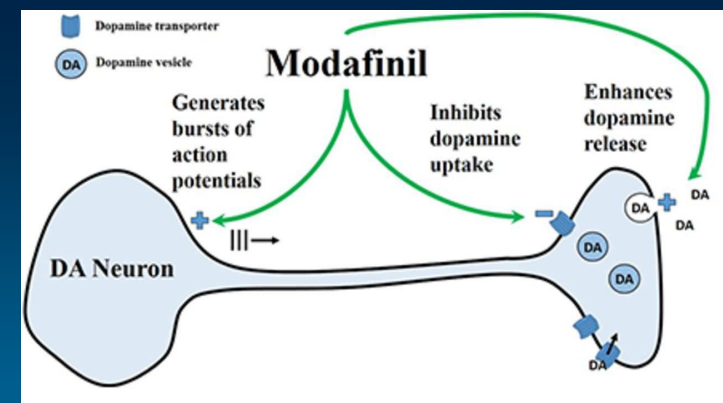




# Non-Stimulants: Modafinil (Provigil®)



- Off-label use
- **MOA:** Blocks DA transporters, significantly  $\uparrow$  DA in the brain
  - $\downarrow$  affinity for DA receptors compared to AMP
- Classified as **Schedule IV** by FDA
  - Lower potential for abuse than schedule III drugs; abuse may lead to limited physical or psychological dependence relative to schedule III drugs
- Appears to improve reaction time, logical reasoning & problem-solving







# Non-Stimulants: Other

## Alpha-2 Agonists

- Guanfacine (Intuniv<sup>®</sup>) & Clonidine (Kapvay<sup>®</sup>)
- FDA approved for treatment of ADHD in children ages 6-17
- *Efficacy, safety & tolerability in adult ADHD not well known*

## Antidepressants

- Nortriptyline (Pamelor<sup>®</sup>, Aventyl<sup>®</sup>)
- Desipramine (Norpramin<sup>®</sup>)
- Imipramine (Tofranil<sup>®</sup>)
- Venlafaxine (Effexor<sup>®</sup> & Effexor XR<sup>®</sup>)
- *Shown to be less effective & more poorly tolerated than stimulants*





# Misuse & Abuse of Prescription Stimulants



# Medication Misuse

## Misuse definition:

- Using a medication with a *therapeutic* intent but taking it inappropriately
  - *Use does not involve seeking psychotropic or euphoric effects*
- **Examples:**
  - Taking Rx medication without a Rx and/or for reasons other than prescribed, taking higher doses than prescribed, accepting or stealing Rx medication from a friend or relative
- Misuse ≈ Non-medical use
- Can *lead to* abuse & dependence



# Stimulant Misuse: Overview

- 2<sup>nd</sup> only to marijuana as most common form of illicit drug use
- Prevalence → 13-23% (17% on average)
  - Greatest risk among individuals 18 -25 years of age
- Per SAMHSA → ~ 15.4 million adults reported past-year use of Rx stimulants in 2015
  - ~4.8 million (30.9%) misused Rx stimulants at least once in the past year
- Individuals both with & without ADHD misuse Rx stimulants
- Common sources → friends & relatives

Smith SM, et al. *Pain*. 2013;154(11):2287-96.  
Lakhan SE, et al. *Brain Behav*. 2012;2(5):661-77.

Wilens T, et al. *J Am Acad Child and Adolesc Psychiatry*. 2006;45(2):149-157.

Kroutil LA, et al. *Drug Alcohol Depend*. 2006;84(2):135-43

Weyandt LL, et al. *Exp Clin Psychopharmacol*. 2016;24(5):400-414.

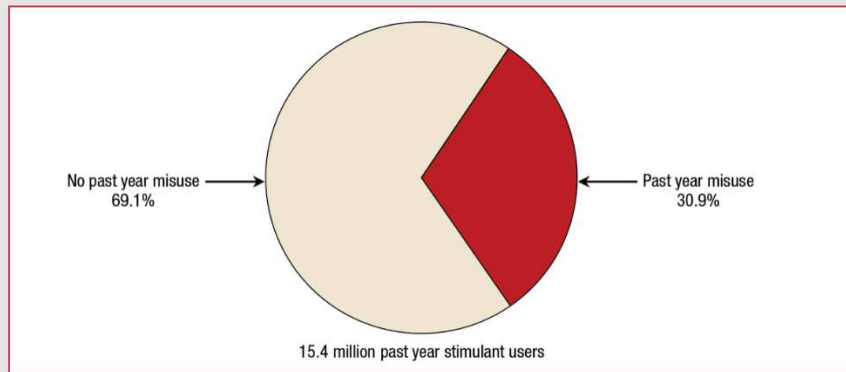
Lipari RN, et al. Why do adults misuse prescription drugs? National Survey on Drug Use and Health. Accessed December 21, 2018.

**SAMSHA:** Substance Abuse and  
Mental Health Services Administration



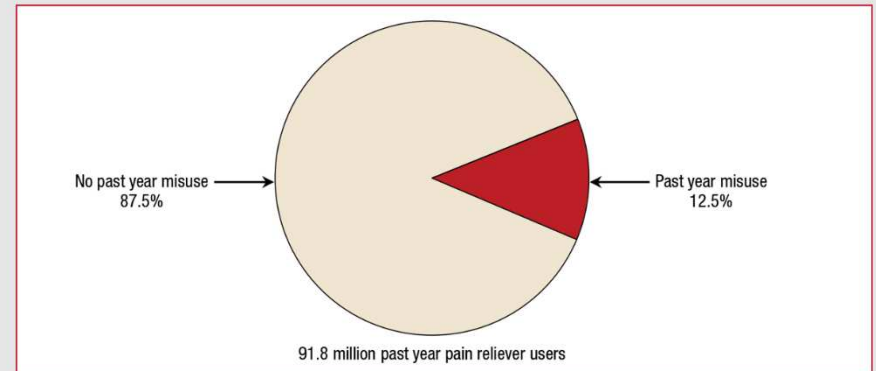
# Misuse Comparison

**Figure 5. Past year misuse of prescription stimulants among adults aged 18 or older: 2015**



Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2015.

**Figure 1. Past year misuse of prescription pain relievers among adults aged 18 or older: 2015**

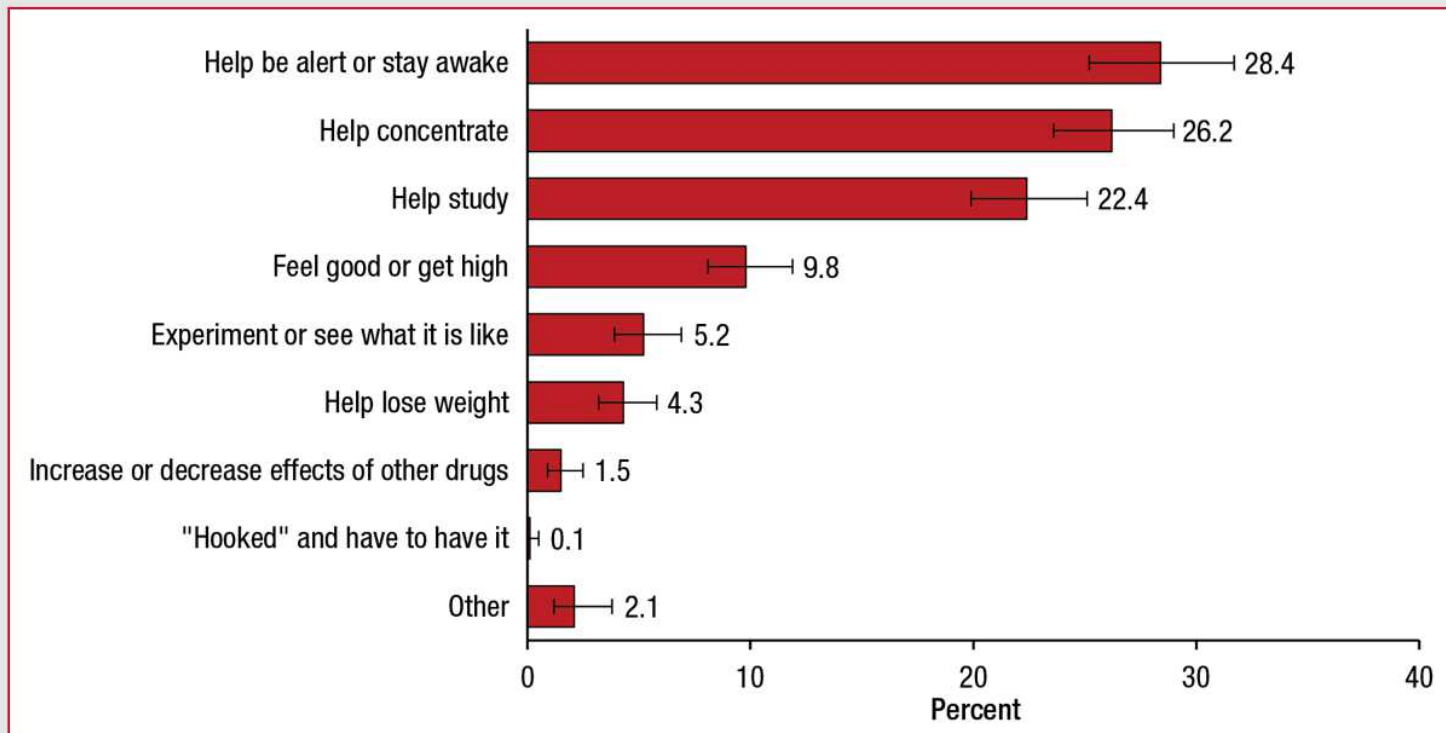


Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2015.



# Stimulant Misuse: Motives

**Figure 6. Main reasons for last episode of prescription stimulant misuse among past year misusers aged 18 or older: 2015**



Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2015.



# Stimulant Misuse: College Students

- Exact prevalence of ADHD among college students unknown
- Rates of misuse → 8-34%
  - Estimated lifetime prevalence → 5.3-55%
- ↑ rates of misuse among college students diagnosed *with* ADHD (43%) or those with Rx for stimulants (45.2%)
  - Highest rates among fraternity members (55%)
- **Risk factors:**
  - Male, Caucasian, member of fraternity/sorority, low GPA, illicit drug use
- Found to be ***negatively*** associated with academic performance (i.e. poorer study skills, skipping class, procrastination, lower GPA)

Lakhan SE, et al. *Brain Behav.* 2012;2(5):661-77.

Austic EA, Meier EA. *Drug Alcohol Depend.* 2015;152:224-9.

Benson K, et al. *Clin Child Fam Psychol Rev.* 2015;18(1):50-76.

Weyandt LL, et al. *Psychol Res Behav Manag.* 2014;7:223-49.

Arria AM, et al. *J Drug Issues.* 2008;38(4):1045-1060



# Stimulant Misuse: Graduate Health Care Students

- Lifetime prevalence of misuse:
  - Pharmacy students → 7%
  - Graduate health care students → 11%
  - Dental & dental hygiene students → 12.4%
- Medical students are a high risk population
  - Lifetime prevalence → 20%
  - Prevalence of use during medical school → 15%
  - Common motives → cognitive enhancement & staying awake

**High prevalence among medical students may influence future prescribing patterns & physician attitudes towards patients seeking Rx stimulants**



# Stimulant Misuse: Adults Outside University Setting

- Few studies have addressed the prevalence of Rx stimulant misuse among adults outside the university setting
- Reported lifetime prevalence → 7.1-29%
- ↑ rates reported among adults with Rx for stimulants
- 2006 - 2011:
  - Misuse of Rx stimulants by adults in general population ↑ by ~67%
  - ER visits ↑ by ~156%
  - Rx stimulants involved in ER visit:
    - **MAS** → 21%
    - **MPH** → 18.2%





# Diversion of Stimulants

## Diversion definition:

- The act of buying, receiving for free, trading or stealing a medication from an individual for whom it was prescribed.
- May begin in childhood, adolescence or young adulthood
- Reported lifetime diversion rates → **16-29%** of students with Rx for stimulants
- One study reported diversion in **23.3%** of middle/high school students & **54%** of college students





# Medication Abuse

## Abuse definition:

- Taking a medication for *non-therapeutic* purposes to obtain psychotropic or euphoric effects; often leads to addiction & dependence
  - **Addiction:** compulsive substance use despite personal harm or negative consequences
  - **Dependence:** associated with cravings, withdrawal symptoms and/or development of tolerance
  
- **Examples:**
  - Using medication to 'get high', exceeding recommended dose, continuing to take a medication after no longer needed (medically), compulsive use, not able to carry out normal daily activities

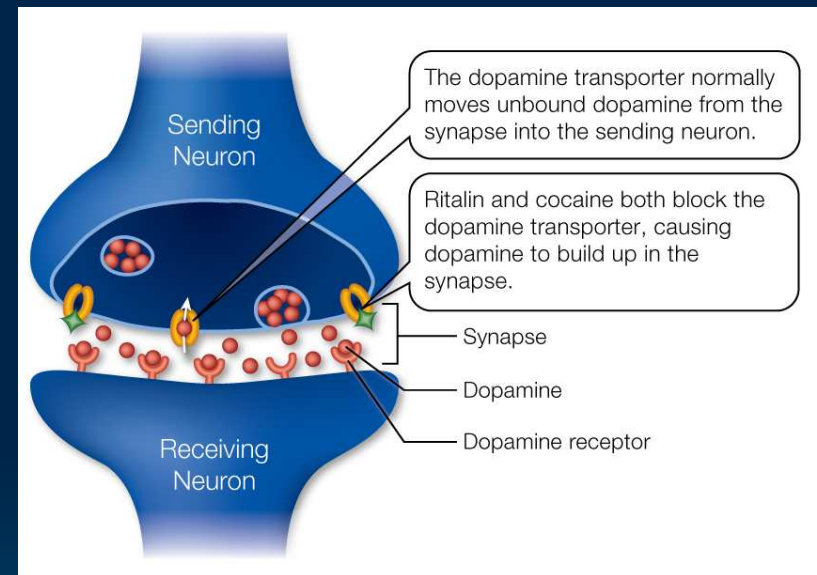


# Stimulant Abuse

➤ Approximately **80%** of Rx stimulant abusers → ages 12-25 years

➤ **Theory behind abuse:**

- Stimulants ↑ DA concentrations in the brain
  - DA is involved in reinforcement of rewarding behaviors
  - Presumed to mediate abuse potential



➤ **Influencing factors:**

- Dose, PK properties, route of administration, individual personality traits, context of use, concomitant psychiatric medications, co-morbid psychiatric disorders or concurrent illicit drug use



# Risk Factors for SUD in ADHD

Starting Rx  
stimulants later  
in course of  
ADHD

Severe ADHD

Antisocial  
personality  
disorders

Bipolar  
disorder

Eating  
disorders

Dropping out  
of school



# Does Stimulant Use Lead to SUD?

- Research shows that people of any age receiving Rx stimulants for ADHD are **not** at ↑ risk for SUD compared to the general population
- Rx stimulant use (specifically MPH) during childhood for ADHD does not appear to affect the risk of SUD in adulthood

One review showed  
↓ risk of SUD by  
~27%



Biederman J, et al. *Am J Psychiatry*. 2008; 165(5):597-603  
Mannuzza S, et al. *Am J Psychiatry*. 2008;165(5):604-609  
Kollins SH. *Curr Med Res Opin*. 2008;24(5):1345-1357  
Chang Z, et al. *J Child Psychol Psychiatry*. 2014;55(8):878-85.

SUD: Substance use disorder  
MPH: Methylphenidate

[image](#)



# Consequences of Stimulant Misuse & Abuse

## Adverse events:

- Heart failure
- Myocardial infarction
- Stroke
- Arrhythmias
- Cardiomyopathy
- Hypertension
- Seizures
- Paranoia
- Psychosis
- Sudden death

**Risk even higher when combined with other drugs or alcohol**



# Stimulant Overdose

## ➤ Signs & symptoms :

- Hyperthermia, agitation, tachycardia, hyperhidrosis, tachypnea, ↑ BP, palpitations, chest pain, mydriasis, restlessness, convulsions, seizures, psychosis, nausea, vomiting, abdominal pain

## ➤ Complications:

- Rhabdomyolysis, liver/kidney damage, cognitive deficit, death (rare)

## ➤ Inpatient Management:

- Mainly supportive care measures
- Activated charcoal or gastric lavage
- Benzodiazepines → for sedation or persistent seizures
- Antipsychotics → for agitation & psychosis
- Temperature control → within 15-20 minutes





# Preventing Misuse & Abuse: Role of Prescribers

- Prescribing physicians (major source for misuse & abuse)
  - Estimated 20% of individuals misusing Rx stimulants obtain them by fraudulently misrepresenting symptoms of ADHD to physicians
- Proper diagnosis & treatment of ADHD
  - Consider comorbidities & baseline risk for SUD
- Prescribe medications with ↓ potential for misuse & abuse
  - Pro-stimulant, LA Rx stimulant formulations, non-stimulants
  - Avoid IR & SA formulations in patients at ↑ risk for SUD





# Preventing Misuse & Abuse: Role of Prescribers (cont.)

- Educate patients on addictive nature of Rx stimulants
- Re-evaluate patients periodically for need to continue Rx stimulant treatment
  - Consider drug-free periods
- Regularly monitor adult use of Rx stimulants for ADHD
  - Check PDMP

## Interventions to minimize drug misuse based on patient risk stratification

### If at low risk for misuse

Education, including:

- Abuse potential
- Consequences of sharing or selling
- Interactions with illicit substances
- Safe storage

Check a prescription monitoring program, if available

### If at high risk for misuse

Education

Check prescription monitoring program

Use delayed-release preparations

Prescribe small quantities at a time

### If showing red-flag behavior<sup>a</sup>

Education

Check prescription monitoring program

Pill counts at each visit

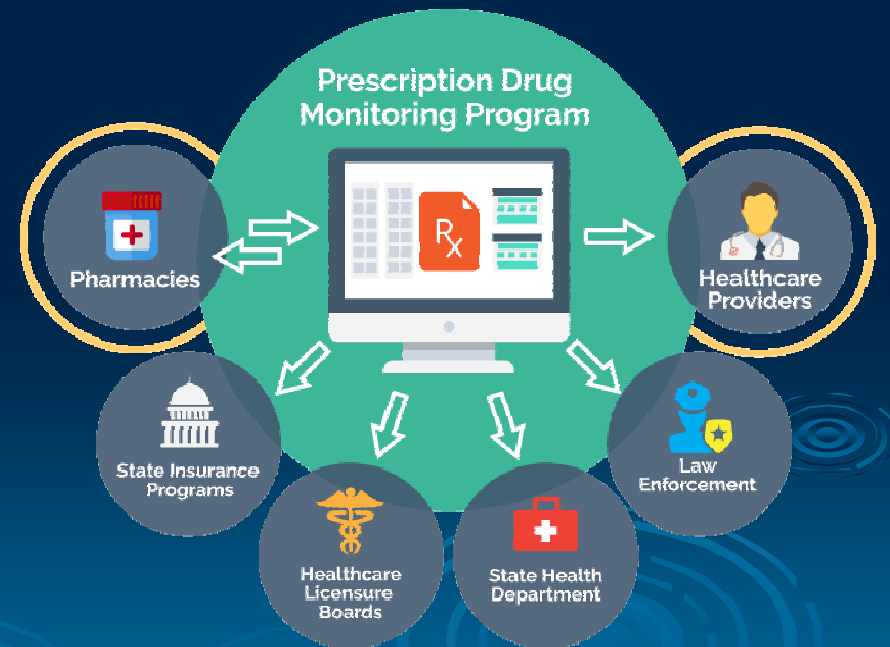
Urine drug screens

<sup>a</sup> Red-flag behavior: missed appointments, early refill requests, appearing intoxicated at visit, requesting dose increase.



# PDMPs

- State-run programs designed to encourage safer prescribing & prevent abuse of controlled substances
- Electronic monitoring of the prescribing and dispensing of controlled substances
- **E-FORCSE** = PDMP in Florida
- **House Bill 21**
  - Requires consultation of PDMP *prior to* prescribing or dispensing a controlled substance to a patient  $\geq 16$  years of age
  - Dispensing must be reported to database no later than close of next business day





# Preventing Misuse & Abuse: Role of Pharmacists

- **Counsel patients on:**
  - Using Rx stimulants only as prescribed
  - Health & legal risks associated with misuse & diversion of Rx stimulants (provide medication guides)
  - Importance of safe storage of medication
  - Dangers of co-ingestion of Rx stimulants with alcohol and/or other illicit substances
- Frequent monitoring to ensure appropriate use
  - Check PDMP
- Watch for ADHD medication shopping (i.e. overlapping prescriptions by  $\geq 2$  prescribers & filled at  $\geq 3$  pharmacies)



# Summary

- Failure to diagnose and treat ADHD in adults is linked to negative outcomes & ↑ risk for SUD
- Pro-stimulant (LDX) & LA Rx stimulant formulations less prone to misuse, abuse & diversion
- Non-stimulants are preferred options for ADHD patients at ↑ risk for SUD
- Future studies needed to assess prevalence & factors associated with adult Rx stimulant misuse outside the university setting
- **Prevention strategies are key!**



# True or False?

1. Clinical manifestations of ADHD are the same in both adults & children. **F**
2. Behavioral therapies, such as CBT, may be effective in preventing misuse & abuse of Rx stimulant medications in patients at ↑ risk for SUD **T**
3. Rx stimulant medications ↑ the activity of certain neurotransmitters, such as DA & NE. **T**





# References

- Epidemiology. ADHD Institute. <https://adhd-institute.com/burden-of-adhd/epidemiology>. Published January 2017. Accessed December 12, 2018.
- Jain R, Jain S, Montano CB. Addressing Diagnosis and Treatment Gaps in Adults With Attention-Deficit/Hyperactivity Disorder. *Prim Care Companion CNS Disord*. 2017;19(5)
- Martinez-raga J, Ferreros A, Knecht C, De alvaro R, Carabal E. Attention-deficit hyperactivity disorder medication use: factors involved in prescribing, safety aspects and outcomes. *Ther Adv Drug Saf*. 2017;8(3):87-99.
- Kollins SH. A qualitative review of issues arising in the use of psycho-stimulant medications in patients with ADHD and co-morbid substance use disorders. *Curr Med Res Opin*. 2008;24(5):1345-1357
- Attention-Deficit/Hyperactivity Disorder. National Institute of Mental Health. <https://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/index.shtml>. Accessed December 10, 2018.
- Post RE, Kurlansik SL. Diagnosis and management of Attention-Deficit/Hyperactivity Disorder in Adults. *Am Fam Physician*. 2012 May 1;85(9):890-896.
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders. Fifth Edition*. Washington, DC: American Psychiatric Association; 2013.
- Lakhan SE, Kirchgessner A. Prescription stimulants in individuals with and without attention deficit hyperactivity disorder: misuse, cognitive impact, and adverse effects. *Brain Behav*. 2012;2(5):661-77.
- Chang Z, Lichtenstein P, Halldner L, et al. Stimulant ADHD medication and risk for substance abuse. *J Child Psychol Psychiatry*. 2014;55(8):878-85.
- Prescription Stimulants. National Institute on Drug Abuse. <https://www.drugabuse.gov/publications/drugfacts/prescription-stimulants>. Published June 6, 2018. Accessed December 30, 2018.
- Wilens TE, Morrison NR. Substance-use disorders in adolescents and adults with ADHD: focus on treatment. *Neuropsychiatry* (London). 2012;2(4):301-312.
- Cortese S, Adamo N, Del Giovane C, et al. Comparative efficacy and tolerability of medications for attention-deficit hyperactivity disorder in children, adolescents, and adults: a systematic review and network meta-analysis. *Lancet Psychiatry* 2018; 5:727.
- Weyandt LL, Oster DR, Marraccini ME, et al. Pharmacological interventions for adolescents and adults with ADHD: stimulant and nonstimulant medications and misuse of prescription stimulants. *Psychol Res Behav Manag*. 2014;7:223-49.





# References

- Lexi-Drugs. Lexicomp. Wolters Kluwer Clinical Drug Information, Inc. Hudson, OH. Accessed on December 20, 2018.
- Advokat C. What are the cognitive effects of stimulant medications? Emphasis on adults with attention-deficit/hyperactivity disorder (ADHD). *Neurosci Biobehav Rev.* 2010;34(8):1256-66.
- Munro BA, Weyandt LL, Marraccini ME, Oster DR. The relationship between nonmedical use of prescription stimulants, executive functioning and academic outcomes. *Addict Behav.* 2017;65:250-257.
- Bagot KS, Kaminer Y. Efficacy of stimulants for cognitive enhancement in non-attention deficit hyperactivity disorder youth: a systematic review. *Addiction* 2014;109(4):547-557
- Smith SM, Dart RC, Katz NP, et al. Classification and definition of misuse, abuse, and related events in clinical trials: ACTION systematic review and recommendations. *Pain.* 2013;154(11):2287-96.
- Wilens TE, Adler LA, Adams J, et al. Misuse and diversion of stimulants prescribed for ADHD: a systematic review of the literature. *J Am Acad Child Adolesc Psychiatry.* 2008;47(1):21-31.
- Kroutil LA, Van brunt DL, Herman-stahl MA, Heller DC, Bray RM, Penne MA. Nonmedical use of prescription stimulants in the United States. *Drug Alcohol Depend.* 2006;84(2):135-43.
- Weyandt LL, Oster DR, Marraccini ME, et al. Prescription stimulant medication misuse: Where are we and where do we go from here?. *Exp Clin Psychopharmacol.* 2016;24(5):400-414.
- Lipari RN, Williams M, Van Horn SL. Why do adults misuse prescription drugs? National Survey on Drug Use and Health. [https://www.samhsa.gov/data/sites/default/files/report\\_3210/ShortReport-3210.html](https://www.samhsa.gov/data/sites/default/files/report_3210/ShortReport-3210.html). Published July 27, 2017. Accessed December 21, 2018.
- Austic EA, Meier EA. Peak ages of risk for starting nonmedical use of prescription stimulants. *Drug Alcohol Depend.* 2015;152:224-9.
- Benson K, Flory K, Humphreys KL, Lee SS. Misuse of stimulant medication among college students: a comprehensive review and meta-analysis. *Clin Child Fam Psychol Rev.* 2015;18(1):50-76.
- Arria AM, O'Grady KE, Caldeira KM, Vincent KB, Wish ED. Nonmedical use of prescription stimulants and analgesics: associations with social and academic behaviors among college students. *J Drug Issues.* 2008;38(4):1045–1060





# References

- Webb JR, Valasek MA, North CS. Prevalence of stimulant use in a sample of US medical students. *Ann Clinical Psychiatry*. 2013;25(1):27-32
- Darredeau C, Barrett SP, Jardin B, Pihl RO. Patterns and predictors of medication compliance, diversion, and misuse in adult prescribed methylphenidate users. *Hum Psychopharmacol*. 2007;22(8): 529–536.
- Chen LY, Crum RM, Strain EC, Alexander GC, Kaufmann C, Mojtabai R. Prescriptions, nonmedical use, and emergency department visits involving prescription stimulants. *J Clin Psychiatry*. 2016;77(3):e297-304.
- Rabiner DL. Stimulant prescription cautions: addressing misuse, diversion and malingering. *Curr Psychiatry Rep*. 2013;15(7):375
- McCabe SE, Knight JR, Teter CJ, et al. Non-medical use of prescription stimulants among U.S. college students: prevalence and correlates from a national survey. *Addiction* 2005;100:96–106.
- White BP, Becker-blease KA, Grace-bishop K. Stimulant medication use, misuse, and abuse in an undergraduate and graduate student sample. *J Am Coll Health*. 2006;54(5):261-8.
- Biederman J, Monuteaux MC, Spencer T, et al. Stimulant therapy and risk for subsequent substance use disorders in male adults with ADHD: a naturalistic controlled 10-year follow-up study. *Am J Psychiatry*. 2008; 165(5):597-603
- Mannuzza S, Klein RG, Truong NL, et al. Age of methylphenidate treatment initiation in children with ADHD and later substance abuse: prospective follow-up into adulthood. *Am J Psychiatry*. 2008;165(5):604-609
- Novak SP, Kroutil LA, Williams RL, Van Brunt DL. The nonmedical use of prescription ADHD medications: results from a national Internet panel. *Subst Abuse Treat Prev Policy*. 2007;2:32
- Modesto-lowie V, Chaplin M, Sinha S, Woodard K. Universal precautions to reduce stimulant misuse in treating adult ADHD. *Cleve Clin J Med*. 2015;82(8):506-12.
- E-FORCSE®, the Florida Prescription Drug Monitoring Program. Health Care-Associated Infections (HAI) | Florida Department of Health. <http://www.floridahealth.gov/statistics-and-data/e-forcse/laws-rules/index.html>. Updated November 8, 2018. Accessed December 17, 2018.
- Scott J. Florida's New Law on Controlled Substance Prescribing. [https://flmedical.org/Florida/Florida\\_Public/Docs/FMA-Opioid-HB21.pdf](https://flmedical.org/Florida/Florida_Public/Docs/FMA-Opioid-HB21.pdf). Accessed December 17, 2018.