

# TREATMENT OF ADHD



1. "Kids on Monkey Bars" by Fat Camera.; Google Stock Images.



2. "Teddybear" by Pixabay; Pexels.

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**U.B.C. / B.C. CHILDREN'S HOSPITAL**



# Kelty Mental Health Resource Centre

We help families across the province by:

- ▶ Helping with understanding and navigating the mental health system
- ▶ Listening and offering peer support, and
- ▶ Connecting families to resources and tools.





# Webinar Series & Recordings



**ADHD  
Webinar Series**

**FOR PARENTS & CAREGIVERS**

*brought to you in collaboration with the BC Children's Hospital  
Provincial ADHD Program*

**Practical Self-Regulation Tools**

**ADHD Basics**

→ **ADHD Treatment in Children & Youth** ←

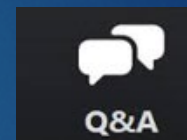
**Parenting a Child with ADHD**

**ADHD Goes to School**

For recordings, slides, and other resources visit:  
[keltymentalhealth.ca/ADHDWebinarSeries](https://keltymentalhealth.ca/ADHDWebinarSeries)

# Housekeeping

- ▶ Attendees are automatically muted & cameras are turned off.
- ▶ Please submit questions for the speakers through the “Q&A” icon.
  - ▶ you can ‘upvote’ questions that you want answered.
  - ▶ You can also submit questions anonymously.
- ▶ Please submit technical questions/comments through the “Chat” icon.
- ▶ At the end of the webinar, a survey will pop up for you to complete. The survey will also be sent to you in an email tomorrow.



NOTE: This information applies to the context in British Columbia. If you are in another jurisdiction please consult your local health authority for further information.



# Speaker



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**Psychiatrist**

**Provincial ADHD Clinic**

**UBC Clinical ASSISTANT PROFESSOR**

**Department of Psychiatry**

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# LAND ACKNOWLEDGEMENT

- ▶ I respectfully acknowledge that the the land I work on is the traditional territory of the Coast Salish peoples, including the Musqueam, Squamish, and the Tsleil-Waututh Nations.



# LEARNING OBJECTIVES

- ▶ 1. To look at all options for ADHD Tx. Best outcomes occur using both non pharmaceutical and pharmaceutical treatments.
- ▶ 2. To look at differences between short acting, intermediate acting and long acting stimulants.
- ▶ 3. To look at non stimulant medications.
- ▶ 4. To understand how treatment of other comorbidities can help improve ADHD treatments.
- ▶ 5. To discuss the neuroprotective effect on brain function of medications for complex ADHD.



# SOME ADHD TREATMENT CONSIDERATIONS...



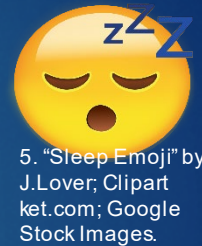
- 1 ADHD Kid ≠ Another ADHD kid.
- Parents know best....There is no right or wrong decision with regards to treating your child's ADHD with meds.
- Recovery from ADHD is not a race; it's a marathon...so pace yourself.
- Parental educational programs can help a child's ADHD dysfunction almost as much as ADHD medications. But this may not help at school...



# NON PHARMACOLOGIC TREATMENT OF ADHD

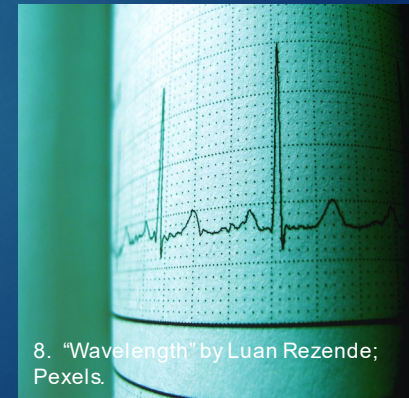
## ▶ PROVEN/EVIDENCE BASED

- ▶ 1. Parental education/intervention program
- ▶ 2. Sleep hygiene ± melatonin 2 hr before bed
- ▶ 3. Diet i.e. complex carb + protein, freq snacks, high fat dairy, Peditasure
- ▶ 4. Omega 3 fatty acids, 750-1000 mg daily
- ▶ 5. 30 min cardio exercise 4-5 X a week
- ▶ 6. Tutoring i.e. Orton Gillingham
- ▶ 7. School based/ “Real life” - Social skills training
- ▶ 8. School accomodations with IEP



# WHEN TO TRY MEDICATION











- ▶ Evidence of impairment, at home and at school
- ▶ Thorough evaluation for co-existing conditions
- ▶ No positive cardiac history/family history SCD/arrythmias
- ▶ Baseline assessment of side effects
- ▶ Everyone is well educated and prepared for the trial of medication





# Quick Guide to ADHD Medication in CANADA - February 2018



Medications available and illustrations of Tabs	Liberation mode (% immediate / delayed)	Particularities	Duration of action <sup>1</sup>	Starting Dose <sup>2</sup>	Dose titration as per product monograph
<b>Amphetamine-based psychostimulants</b>					
<b>Dexedrine®</b> Tablets 5 mg  <b>Dexedrine®</b> spansules 10, 15 mg 	(100/0) (50/50)	Pill can be crushed <sup>3</sup> Spansule	~ 4 h ~ 6 - 8 h	Tablets = 2.5 to 5 mg BID Spansules = q.d. 10 mg am	↑ 2.5 - 5 mg at weekly intervals; max. dose/day: (q.d. or b.i.d.) All ages = 40 mg
<b>Adderall XR®</b> Capsules 5, 10, 15, 20, 25, 30 mg 	(50/50)	Sprinkable Granules	~ 12 h	5 - 10 mg q.d. a.m.	↑ 5 mg at weekly intervals max. dose/day: Children = 30 mg Adolescents and Adults = 20 - 30 mg
<b>Vyvanse®</b> Capsules 10, 20, 30, 40 50, 60, 70* mg 	Prodrug	Capsule content can be diluted in water, orange juice and yogurt	~ 13 - 14 h	20 - 30 mg q.d. a.m.	↑ by clinical discretion at weekly intervals max. dose/day: All ages = 60 mg
<b>Methylphenidate-based Psychostimulants</b>					
<b>Methylphenidate short acting</b> Tablets 5 mg (generic) 10, 20 mg (Ritalin®) 	(100/0)	Pill can be crushed <sup>3</sup>	~ 3 - 4 h	5 mg b.i.d. to t.i.d. Adult: consider q.i.d.	↑ 5 mg at weekly intervals max. dose/day: All ages = 60 mg
<b>Biphentin®</b> Capsules 10, 15, 20, 30, 40, 50, 60, 80 mg 	(40/60)	Sprinkable Granules	~ 10 - 12 h	10 - 20 mg q.d. a.m.	↑ 5 - 10 mg at weekly intervals max. dose/day: Children and Adolescents = 60 mg Adults = 80 mg
<b>Concerta®</b> Extended Release Tabs 18, 27, 36, 54 mg 	(22/78)	Pill needs to be swallowed whole to keep delivery mechanism intact	~ 12 h	18 mg q.d. a.m.	↑ 9 - 18 mg at weekly intervals max. dose/day: Children = 54 mg Adolescents = 54 mg / Adults = 72 mg
<b>Foquest®</b> Capsules 25, 35, 45, 55, 70, 85, 100 mg 	(20/80)	Sprinkable Granules	~ 16 h	25 mg q.d. a.m.	↑ 10-15 mg in intervals of no less than 5 days Max. dose/day: Adults = 100 mg
<b>Non psychostimulant - Selective Norepinephrine Reuptake Inhibitor</b>					
<b>Strattera®</b> (Atomoxetine) Capsules 10, 18, 25, 40, 60, 80, 100 mg 	Not applicable	Capsule needs to be swallowed whole to reduce GI side effects	Up to 24 h	Children and Adolescents : 0.5 mg/kg/day Adults = 40 mg q.d. for 7-14 days	Maintain dose for a minimum of 7 - 14 days before adjusting: Children = 0.8 then 1.2 mg/kg/day 70 kg or Adults = 60 then 80 mg/day max. dose/day : 1.4 mg/kg/day or 100 mg
<b>Non psychostimulant - Selective Alpha-2A Adrenergic Receptor Agonist</b>					
<b>Intuniv XR®</b> (Guanfacine XR) Extended Release Tabs 1, 2, 3, 4 mg 	Not applicable	Pills need to be swallowed whole to keep delivery mechanism intact	Up to 24 h	1 mg q.d. (morning or evening)	Maintain dose for a minimum of 7 days before adjusting by no more than 1 mg increment weekly Max. dose/day: Monotherapy: 6-12 years = 4 mg, 13-17 years = 7 mg As adjunctive therapy to psychostimulants 6-17 years = 4 mg

Note: Illustrations do not reflect real size of pills/capsules. For specific details on how to start, adjust and switch ADHD medications, clinicians are invited to refer to the Canadian ADHD Practice Guidelines ([www.caddra.ca](http://www.caddra.ca)). <sup>1</sup> Pharmacokinetics and pharmacodynamic response vary from individual to individual. The clinician must use clinical judgement as to the duration of efficacy and not solely rely on reported values for PK and duration of effect. <sup>2</sup> Starting doses are from product monographs. CADDRA recommends generally starting with the lowest dose available. <sup>3</sup> Higher abuse potential. \* Vyvanse 70 mg is an off-label dosage for ADHD treatment in Canada. Document developed by Annick Vincent MD ([www.attentiondeficit-info.com](http://www.attentiondeficit-info.com)) and Direction des communications et de la philanthropie, Laval University.

# ADHD MEDICATIONS

- ▶ Stimulants and non stimulants (guanfacine XR, atomoxetine) most effective treatments for core ADHD symptoms
- ▶ Stimulants most well-studied medications in psychiatry (350+ studies)
- ▶ High safety ratings – safer than baby aspirin
- ▶ Over 90% of children will improve (50% will be in normal range)
- ▶ Can be used safely for years (compliance a problem in teens; 50% stop using after 3 years)



# CADDRA TREATMENT GUIDELINES 2017

## ▶ 1<sup>ST</sup> LINE

- ▶ All long acting stimulants (LAS) i.e. Concerta, Biphentin, Foquest, Adderral XR and Vyvanse

## ▶ 2<sup>ND</sup> LINE

- ▶ Short and intermediate acting stimulants
- ▶ atomoxetine
- ▶ guanfacine XR



9. "Google Android Robot with Pills" by Slon.pics; Google StockImages.

## ▶ 3<sup>RD</sup> LINE

- ▶ clonidine
- ▶ atypical antipsychotics

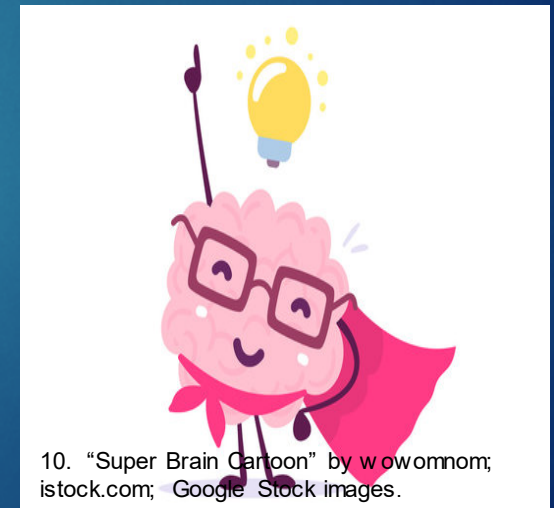
# STIMULANT POSITIVE EFFECTS

## Improves core symptoms:

- ↑ concentration & attention
- ↓ impulsivity & hyperactivity/restlessness
- ↑ working memory and internalized language

## Secondary effects:

- ↑ work productivity (accuracy)
- ↓ aggression & defiance (studies in children)
- ↑ handwriting & motor coordination
- ↑ self-esteem
- ↑ peer acceptance & interactions
- Better awareness of game in sports
- ↑ driving performance
- ↓ recreational substance abuse



10. "Super Brain Cartoon" by wowomnom; istock.com; Google Stock images.



# Stimulants: Common Myths

## Addictive When Used as Prescribed

No, must be inhaled or injected

## Greater Risk of Later Substance Abuse

No, 14 studies find no such result; a few also found decreased risk if continued through teens

## Over-prescribed

No, 4.3 % on medication vs. 5-6% prevalence

## Creates Aggressive, Assaultive Behavior

No, decreases aggression & antisocial actions

## Increased Risk of Seizures

Only at very, very high doses

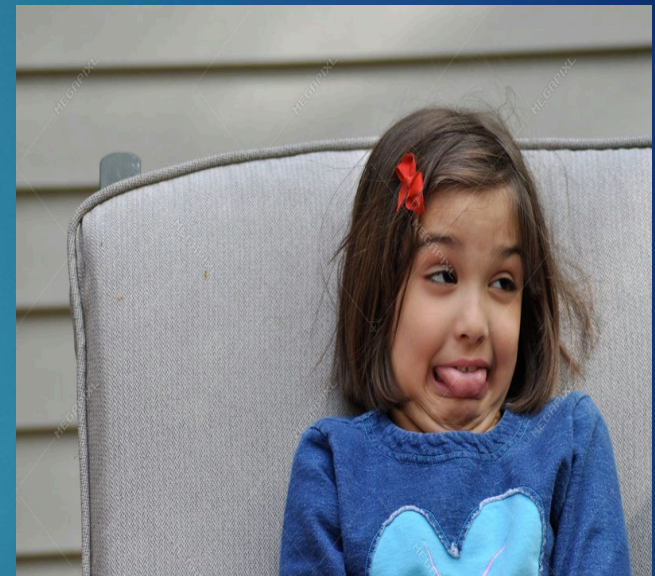
## Causes Tourette's Syndrome

Can increase pre-existing tics in 30% of cases; decreases in 35%

# STIMULANT SIDE EFFECTS

Dose responsive; most common:

- ▶ Insomnia (50% +)
- ▶ Loss of Appetite (50%+)
- ▶ Headaches (20-40%)
- ▶ Stomachaches (20-40%)
- ▶ Irritable, Prone to Crying (<10%)
- ▶ Nervous Habits & Mannerisms (<10%)
- ▶ Tics (<3%) & Tourette's (Rare)
- ▶ Mild Weight Loss (mean = 1-4 lbs.; transient)
- ▶ Small Effect on Height 1st year (about 1 cm)



11. "Yuck!" ID14343462, © Canettistock;  
megapixel.com; Google Stock Images.



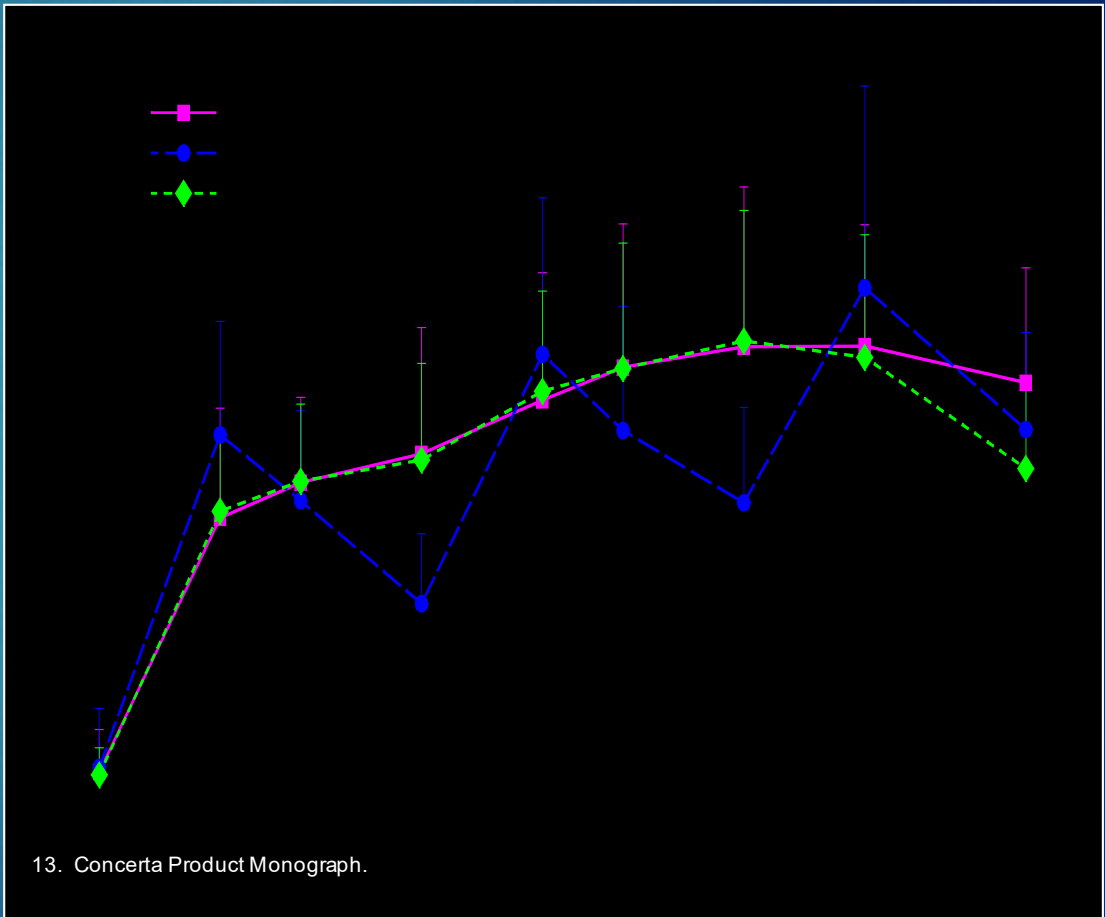
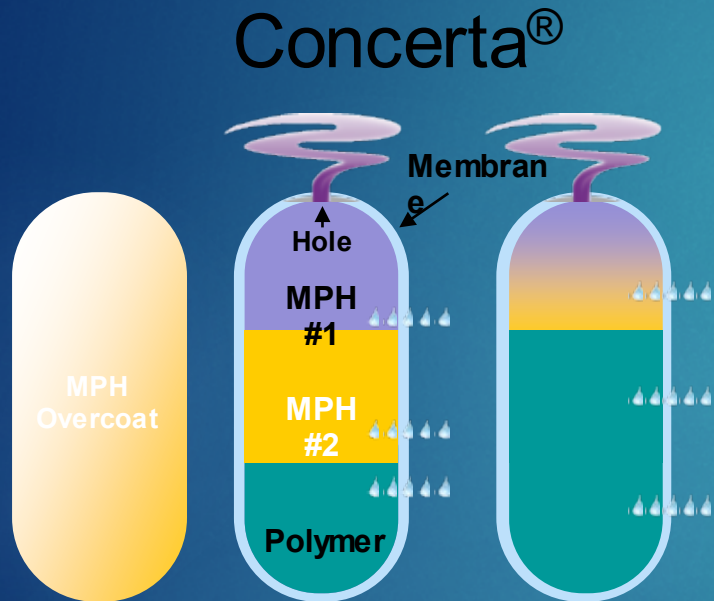
# ADVERSE SIDE EFFECTS

▪ <5% discontinue due to adverse events ie. Cardiac side effects, suicidal thinking (SI)... BUT don't be alarmed just yet. Usually SI is decreased with meds.



# Proof of product study:

PK profiles for OROS-MPH (Concerta®) and IR-MPH (Ritalin®)



# Biphentin®

## (CR Methylphenidate MLR™)



14. Biphentin Product Monograph.



# MANAGING SIDE EFFECTS

- ▶ Ensure compliance!!
- ▶ Adjust dose
- ▶ Check for rebound
- ▶ Assess for comorbidities and treat these
- ▶ Assess for substances, med diversion/abuse
- ▶ Psychosocial changes
- ▶ Improve sleep hygiene/Melatonin 2 hrs before bedtime
- ▶ Improve eating ie. Higher fat dairy, more protein, Pediasure,

# MEDICATIONS 2

- ▶ Non stimulants
  - ▶ Atomoxetine
  - ▶ Guanfacine XR
  - ▶ Clonidine IR
  - ▶ Risperidone



15. "Pillsin Dosette" by Polina Tankilevitch; Pexels.

# ATOMOXETINE SIDE EFFECTS

## ➤ Common side effects

Decreased appetite

Stomach upset, mild nausea

Headaches, drowsiness, dizziness

Potential for irritability

Energized feelings, nervousness

Increased heart rate

## ➤ Rare side effects

Liver dysfunction

Rash

Agitation and suicidal thinking



16. Atomoxetine Product Monograph.



# GUANFACINE XR

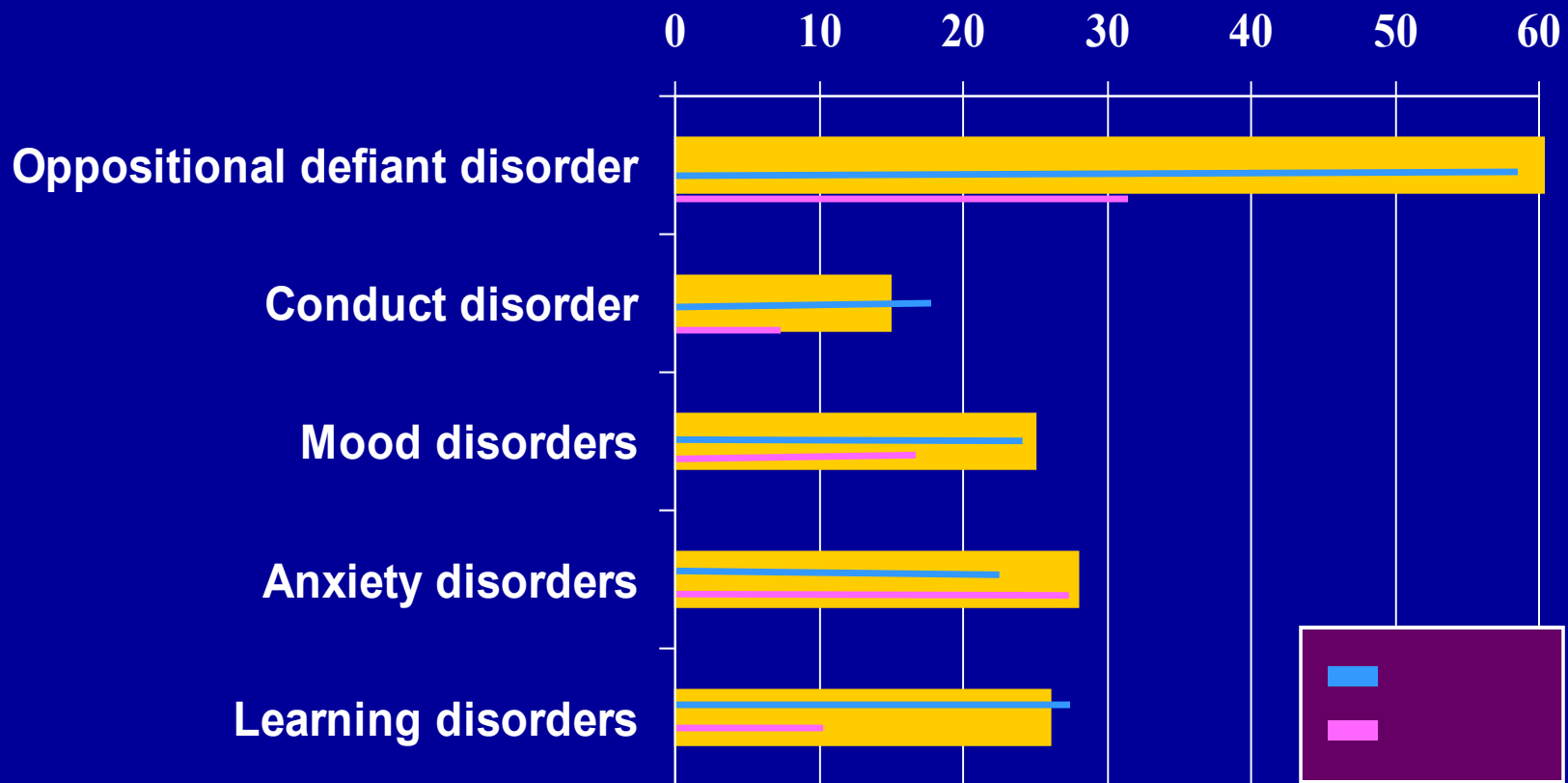
- ▶ ALPHA 2 AGONIST.
- ▶ Increases norepinephrine in the brain cells.
- ▶ Improves focus, emotional dysregulation, hyperactivity and impulsivity.
- ▶ Does NOT suppress appetite and does NOT worsen tics.
- ▶ Does NOT cause insomnia – in fact can cause some daytime sedation for the 1 to 2 days.
- ▶ Requires daily dosing; Requires 4 to 6 weeks to see full therapeutic effect.
- ▶ Uncommon side effects = dizziness, daytime sedation, low blood pressure.



# ADHD—Childhood

## Common Comorbid Diagnoses

Approximate Prevalence Rate in Children With ADHD (%)



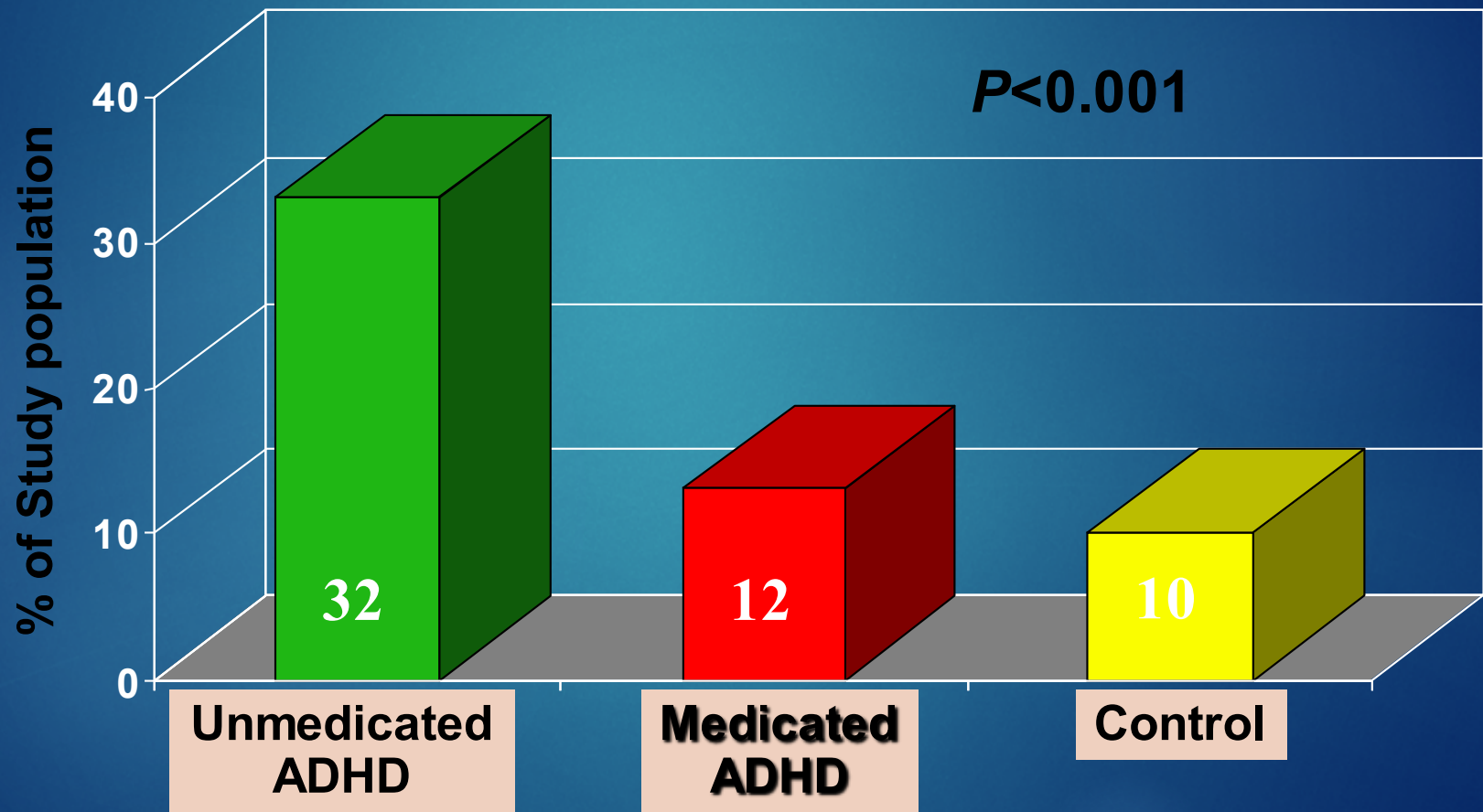


# TREATMENT OF ANXIETY ± DEPRESSION IN ADHD YOUTH

- ▶ For moderate to severe = use SSRI (fluoxetine, sertraline, or citalopram) and start very low and go slow + CBT.
- ▶ For mild to moderate, but ADHD med ≠ therapeutic dose or too many side effects from ADHD med = use SSRI and start very low and go slow + CBT.
- ▶ CBT options: Taming the Worry Dragons group (BCCH, some schools), Cool Kids group (CYMHT), indiv CBT (CYMHT, private).
- ▶ Mindfulness CBT new therapy for teens/adults.

# ADHD RX PREVENTS ADULT DRUG ABUSE

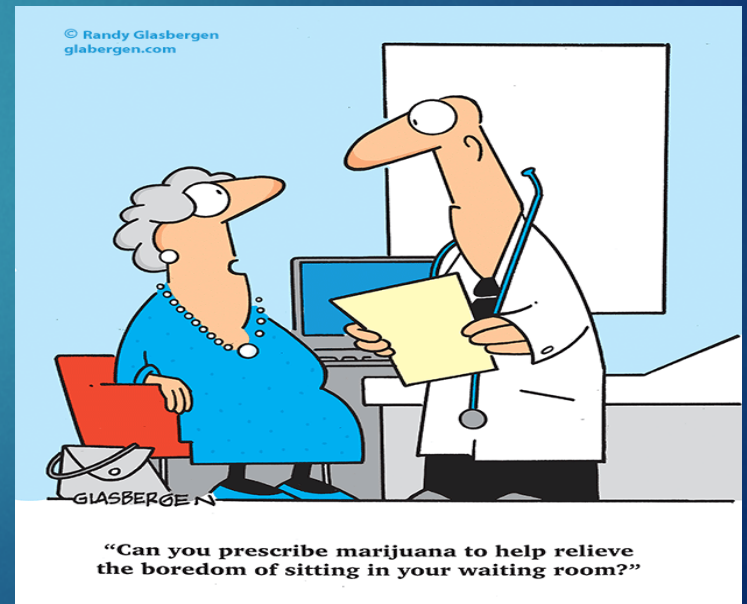
Effect of pharmacotherapy



Biederman, Wilens, Mick, et al. *Pediatrics*. 1999; 104:e20-e25.

# SO WHAT ABOUT BC BUD? IT'S NATURAL...

- ▶ No good scientific studies yet to show “Yay” or “Nay”.
- ▶ BC Bud is high in THC; decreases working memory and processing speed aka “ADHD-Like” effects.







19. "Binoid CBD Bottle" by Binoid CBD; Pexels.

# CBD OIL

- Cannibinol oil has low THC content, and has been shown in preliminary studies to have an anti- inflammatory effect. But no evidence that inflammation in ADHD.
- Don't have any replicated positive effect with ADHD kids.
- Effective dose also not determined yet.
- CBD oil can negatively interact with medications.

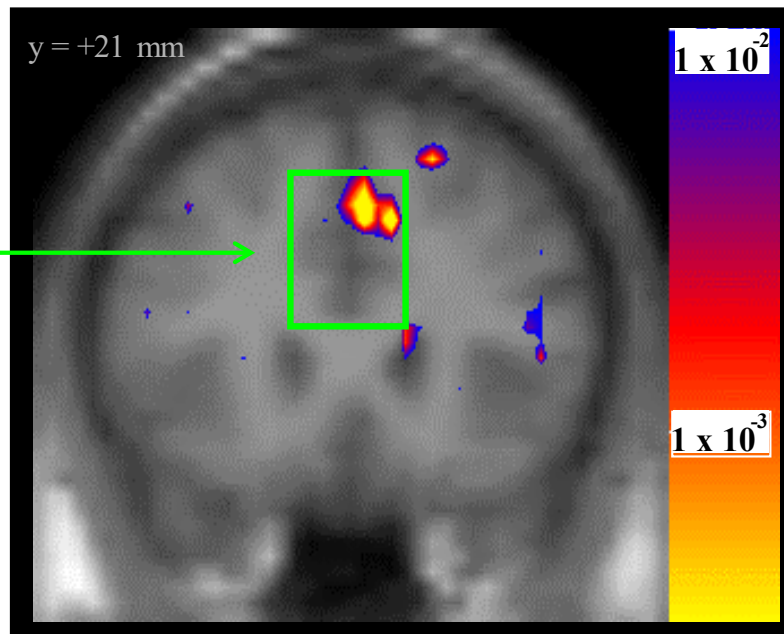
# THE NEUROPROTECTIVE EFFECT OF STIMULANTS

- ▶ Several studies now with long acting stimulants (LAS) which show normalization of frontal lobe function with ADHD youth
- ▶ Also see improved brain volumes in LAS Tx ADHD youth
- ▶ The LAS Tx ADHD youth brain scans were indistinguishable from the non ADHD kids

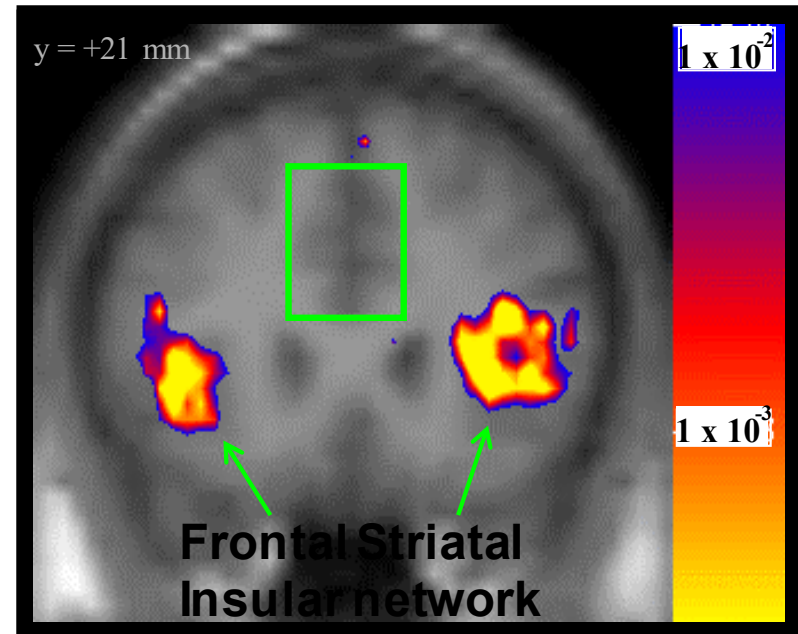
# Neuroimaging and ADHD

## Anterior Cingulate (Cognitive Division) Fails to Activate in ADHD

### Normal Controls



### ADHD



MGH-NMR Center & Harvard- MIT CITP Bush, et al. *Biol Psychiatry*. 1999;45:1542-1552.

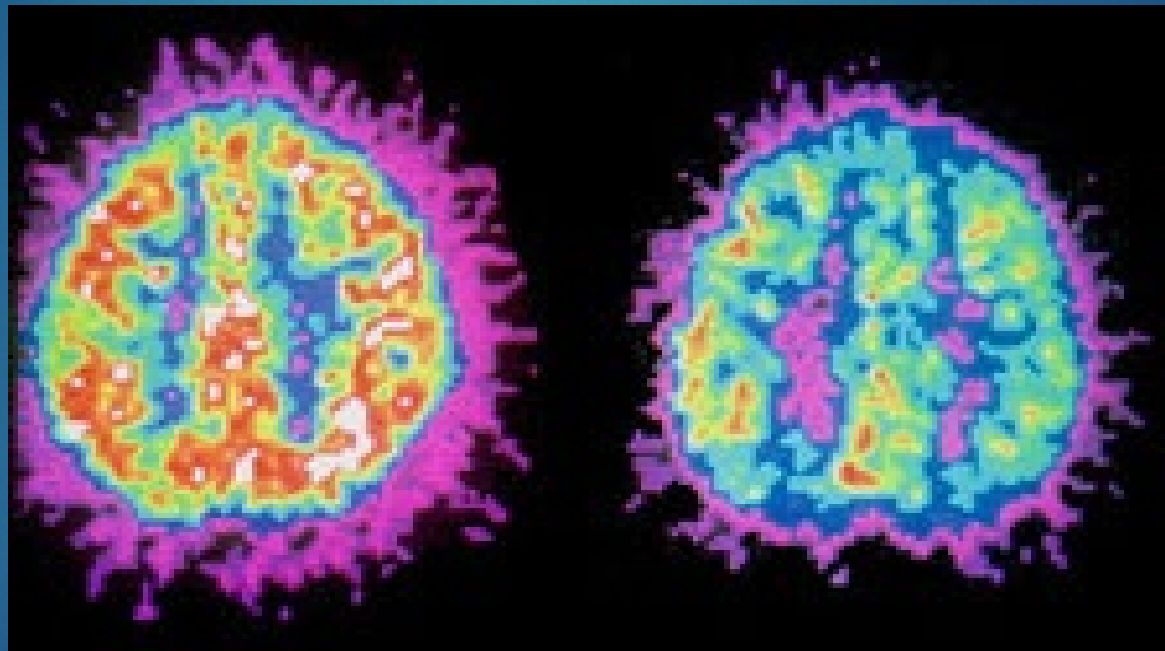


# Neuroimaging and ADHD

## Positron-emission tomography (PET) Scanning

No ADHD

ADHD



*Zametkin, et al. N Engl J Med. 1990;323:1361-1366.*

# CONCLUSIONS

- ▶ Treatment of Complex ADHD is multi faceted. For best outcomes, need to consider **both non pharmacologic and pharmacologic treatment**.
- ▶ The presentation of Complex ADHD changes overtime. Therefore the treatment must adjust accordingly.
- ▶ There are several excellent ADHD medications. Use of medications has been shown to be **neuroprotective**. ADHD stimulant medications are safer than taking a baby aspirin.



20. "Boy with Painted Hands" by Sharon McCutcheon; Pexels.

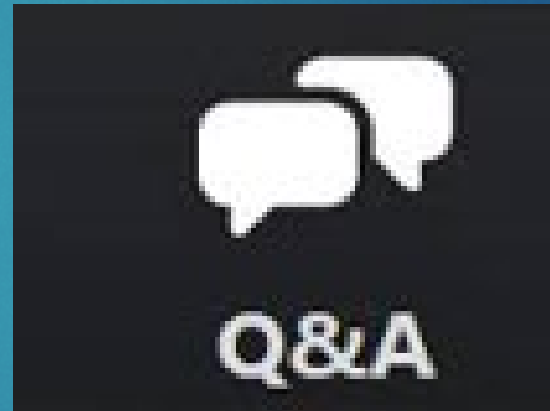
# EDUCATIONAL TOOLS FOR PARENTS

- ▶ Provincial ADHD Clinic  
Parent workshop and parent group
- ▶ ADHD Centre private clinic
- ▶ CADDAC/CHADD/CADDRA  
Parent Conferences
- ▶ ADHD Parent group thru  
CYMH teams if Vancouver  
resident
- ▶ Confident Parenting Thriving  
Kids telephone consultation
- ▶ [www.adhdcentre.ca](http://www.adhdcentre.ca)
- ▶ [www.caddac.ca](http://www.caddac.ca)
- ▶ [www.chaddcanada.com](http://www.chaddcanada.com)
- ▶ [www.caddra.ca](http://www.caddra.ca)
- ▶ Google “The Developing  
Brain” in New York Times
- ▶ YouTube – Dr. Russell Barkley
- ▶ YouTube – How to ADHD



# Questions for the speaker?

## Please use the “Q&A” icon



"Question mark made of puzzle pieces" by Horia Varlan is licensed under CC BY 2.0



# Thank-you for joining.

Contact the Kelty Mental Health Resource Centre:

e-mail: [kellycentre@cw.bc.ca](mailto:kellycentre@cw.bc.ca)

phone (toll-free): 1-800-665-1822



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