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PSYCHIATRY ACADEMY

ADHD and Tics

March 28, 2026
Child and Adolescent Psychopharmacology

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Disclosures

My spouse/partner and I have the following relevant financial relationship with a commercial interest to disclose:

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- American Academy of Child and Adolescent Psychiatry: Honoraria
- American Physicians Institute: Honorarium
- Duke University: Honorarium
- Emalex: Research Support
- Florida Department of Health: Children's Medical Services: Contract
- Galen Mental Health: Advisory Board
  Mount Sinai West: Honorarium
- New Venture Fund: Research Support
- NIMH/NINDS: Research Support
- Noema: Research Support
- Talkiatry: Honorarium
- Tetra: Research Support
- Tourette Association of America: Scientific Advisory Board; TAA-CDC Partnership
- University of Cincinnati: Honorarium
- University of Texas: Honorarium
- Zynerba: Research Support

- ***Off-label indications will be discussed***

"Young man, go to your room and stay there until your cerebral cortex matures."

WEDNESDAY JUNE 18

ADHD, Tics and Tourette's Disorder
Learning Objectives

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- At the end of this session, the participant should be able to:
- 1) Describe what is known about **boundaries and overlapping phenomenology of** ADHD and tic disorders, including Tourette's Disorder (TD)
- 2) Discuss the importance of **disentangling ADHD and tic symptoms**, as this may help guide treatment
- 3) Interpret relevance of these findings **for application to treatment of patients** with ADHD and tic disorders

"I need you to line up by attention span."

THURSDAY
MAY 15

ADHD and TD/Tic Disorders: Neurocircuitry

(Leckman, J. et al; JCAP, 2010; 20 (4); 237-247;
Robertson, M. Nature Reviews; 2017 (3); 1-20; Malhany, N. et al Eur J Pediatr 2015; 174; 279-288)

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- **Inhibition**: core deficit in both disorders; thought to result from fronto-striatal and frontal-parietal network dysfunction in **Cortical-Striatal-Thalamic-Cortical (CSTC)** tracts**.**
- **ADHD:** Imaging studies: Reductions in total cerebral volume, PFC, BG, dACC, CC, and cerebellum reported in ADHD patients are consistent with **fronto-striatal models**. Some studies also showed reduction in right cerebral volume, and right caudate nucleus in ADHD.
- **TD:** Mixed results; reduced caudate nucleus volume frequently reported.
- Individuals with TD+ADHD have smaller caudate nuclei.
- **TD+ADHD:** hyper-functioning/overactive circuits in BG in TD result in motor/cognitive/emotional disinhibition, worsened by frontal hypo-activity in ADHD.
- **Both TD and ADHD** tend to improve with time, which may be a result of increased myelinization of prefrontal regions.

Additive and Interactive Effects of Attention-Deficit/Hyperactivity Disorder and Tic Disorder on Brain Connectivity

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(Jurgiel, J., Miyakoshi, M., Dillon, A., Piacentini, J., & Loo, S. K. (2023). Additive and interactiv effects of attention-deficit/hyperactivity disorder and tic disorder on brain connectivity. Biologic Psychiatry: Cognitive Neuroscience and Neuroimaging, 8(11), 1094–1102. https://doi.org/10.1016/j.bpsc.2022.10.003)

Figure 1. Resting-state connectivity by diagnosis. Attention-deficit/hyperactivity disorder (ADHD) diagnosis was associated with lower resting-state information flow among posterior and occipital-frontal connections, while persistent tic disorder (PTD) diagnosis was related to higher left postcentral to precuneus connectivity. Lower connectivity in ADHD and PTD groups from the left occipital cortex to the right precuneus compared with healthy control subjects (HCs) was common in both disorders. Visualization was created using BrainNet Viewer (47). L, left; R, right; Sup, superior.

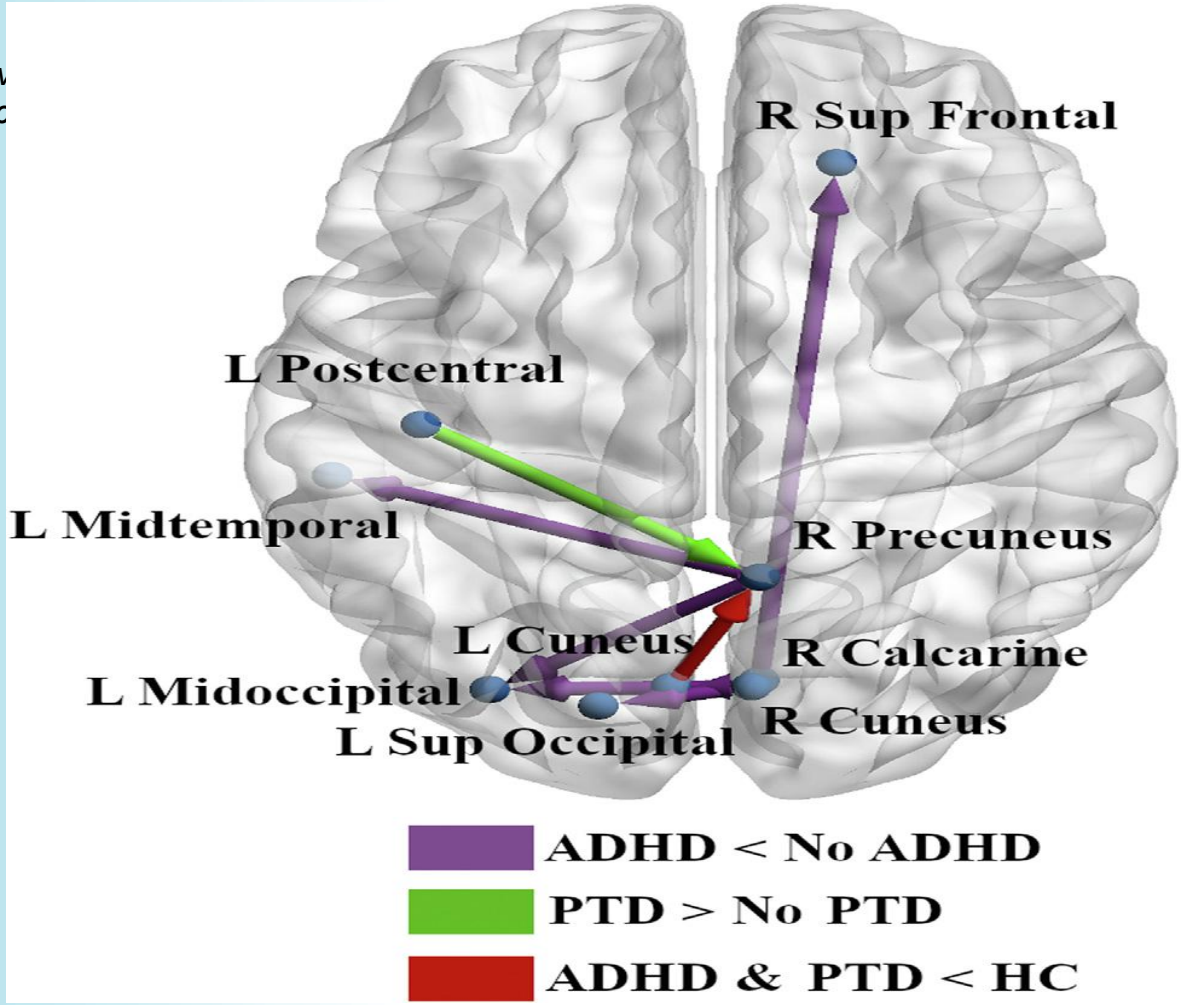

Table 3 Main brain regions implicated in the pathogenesis of TS and ADHD

Brain areas	TS	ADHD	Ref.
Prefrontal areas	+	+	[19, 29, 56]
Inferior frontal gyrus	+	+	[100]
Sensorimotor areas	+	+	[19, 29, 55]
Anterior cingulated cortex	+	+	[19, 29, 55]
Posterior cingulated cortex	+	+	[91]
Basal ganglia	+/−	+	[19, 29, 73]
Cerebellum	−	+	[29]

(+) implicated region, (−) not implicated region, (+/−) findings contradictory

(El Malhany, N. at al. Tourette syndrome and comorbid ADHD: causes and consequences. 2015; Eur J Pediatr 174; 279-288)

Table 1 Pre-perinatal risk factors implicated in the pathogenesis of TS and ADHD

Pre-perinatal risk factors	TS	ADHD	Ref.
Alcohol during pregnancy	+	+	[78]
Smoking during pregnancy	+	+	[9, 53]
Prematurity	+	+	[36]
Low birth weight	+	+	[41]

(+) implicated factor

(El Malhany, N. at al. Tourette syndrome and comorbid ADHD: causes and consequences. 2015; Eur J Pediatr 174; 279-288)

Course of ADHD and Tic Disorders: What Happens to Tics in the Context of ADHD Over Time?

(Spencer, T. Biederman, J. Coffey, B. et al. Arch Gen Psych 1999, 56: 842-847)

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- **Design: Prospective ADHD Follow-up**
- **Objective**: To evaluate the prevalence and impact of tic disorders at baseline and at follow-up on the course of ADHD.
- **Methods**: N=128 boys with ADHD; N=110 controls.
- Duration of follow-up: 4 years; mean ages 9-13.
- **Results:**
  - ***Proportion of ADHD youth with tics: 34%***
  - ***Remission rate for tics over 4 years: 65%***
  - **Remission rate for ADHD: 20%**
- **Conclusion:** Tic remission rate is independent of ADHD.
- Tic disorders did not impact ADHD course.

Onset of ADHD and Tic Disorders in ADHD Probands

(Spencer, T. Biederman, J. Coffey, B. et al. Arch Gen Psych 1999, 56: 842-847)

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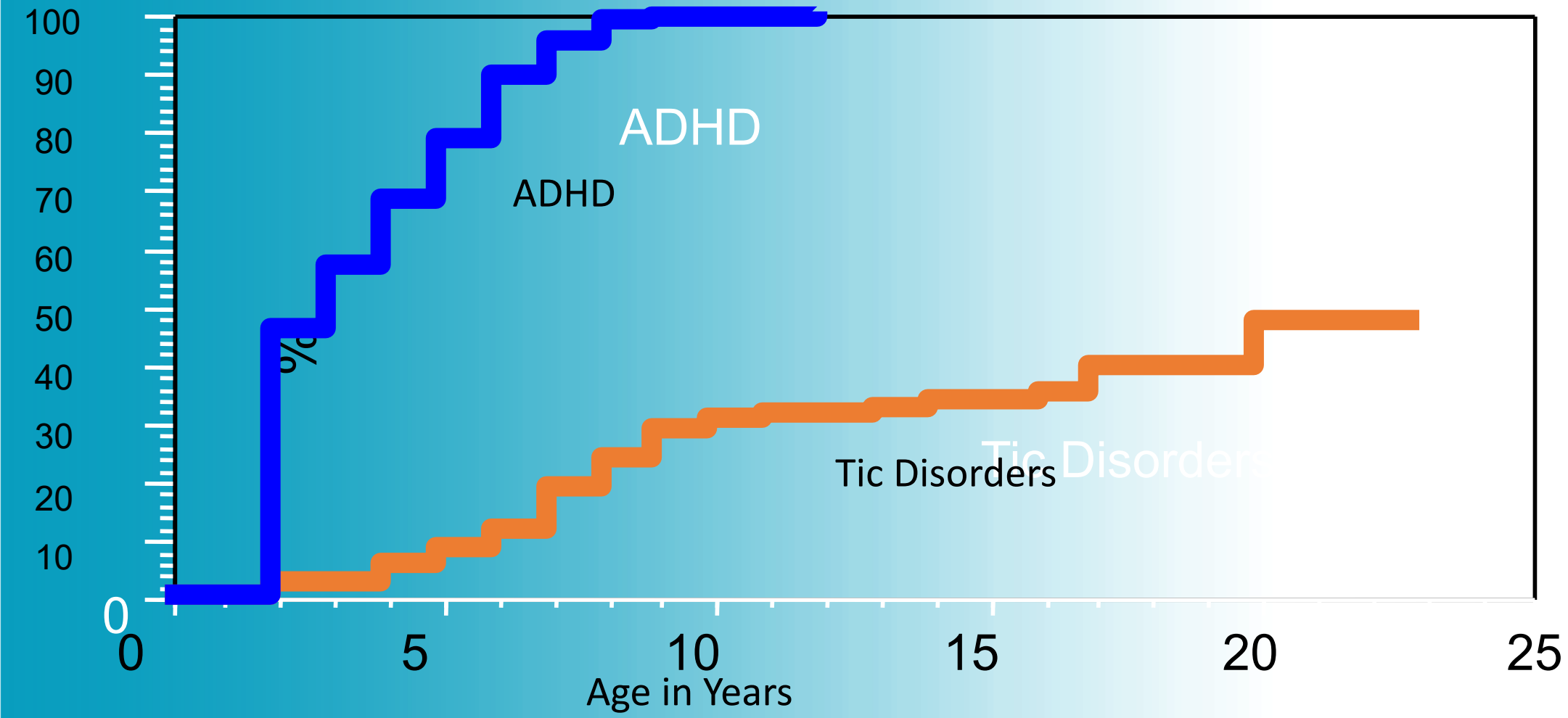

Offset of ADHD and Tic Disorders in ADHD Probands

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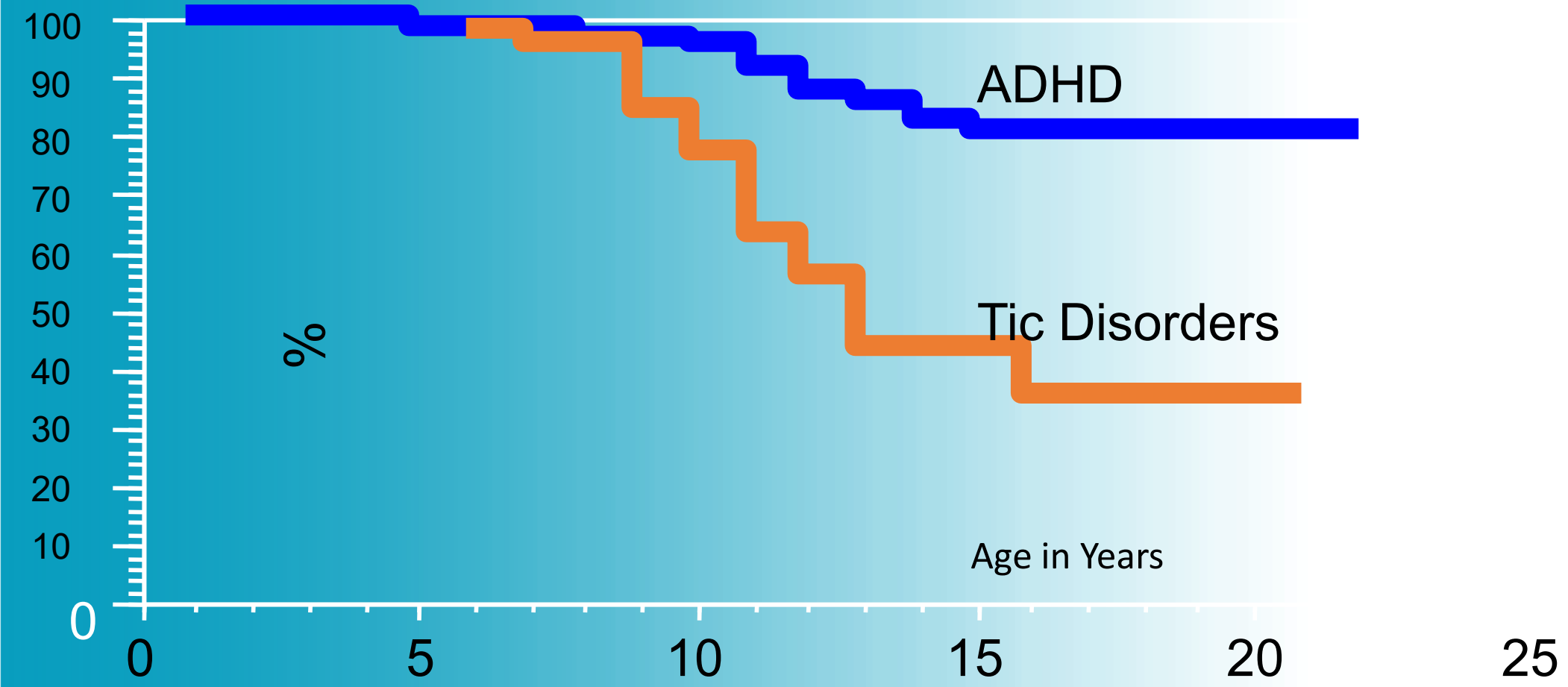

Academic, Interpersonal, Recreational, and Family Impairment in Children with Tourette Syndrome and Attention-Deficit/Hyperactivity Disorder

(Ricketts, E. J., Wolicki, S. B., Danielson, M. L., et al (2022).
Academic, interpersonal, recreational, and family impairment in children with Tourette syndrome and attention-deficit/hyperactivity disorder.
Child Psychiatry & Human Development, 53(1), 3–15. https://doi.org/10.1007/s10578-020-01111-4

Aim: Describes impairment in academic, interpersonal, recreational, and family financial or occupational domains across children in three groups: ever diagnosed with Tourette syndrome (TS), attention-deficit/hyperactivity disorder (ADHD), and both disorders.

Methods: In 2014, parents reported on impairment and diagnostic status of children aged 4–17 years (N=3,014).

Results: More children with ADHD (with or without TS) experienced impairment in overall school performance, writing, and mathematics, relative to children with TS but not ADHD. More children with TS and ADHD had problematic handwriting relative to children with ADHD but not TS. More children with TS and ADHD had problematic interpersonal relationships relative to those with ADHD but not TS. **Children with TS and ADHD had higher mean impairment across domains than children with either TS or ADHD.**

Conclusion: Findings suggest assessing disorder-specific contributions to impairment could inform targeted interventions for TS and ADHD.

Academic, Interpersonal, Recreational, and Family Impairment in Children with Tourette Syndrome and Attention-Deficit/Hyperactivity Disorder

(*Ricketts, E. J., Wolicki, S. B., Danielson, M. L., et al (2022).*

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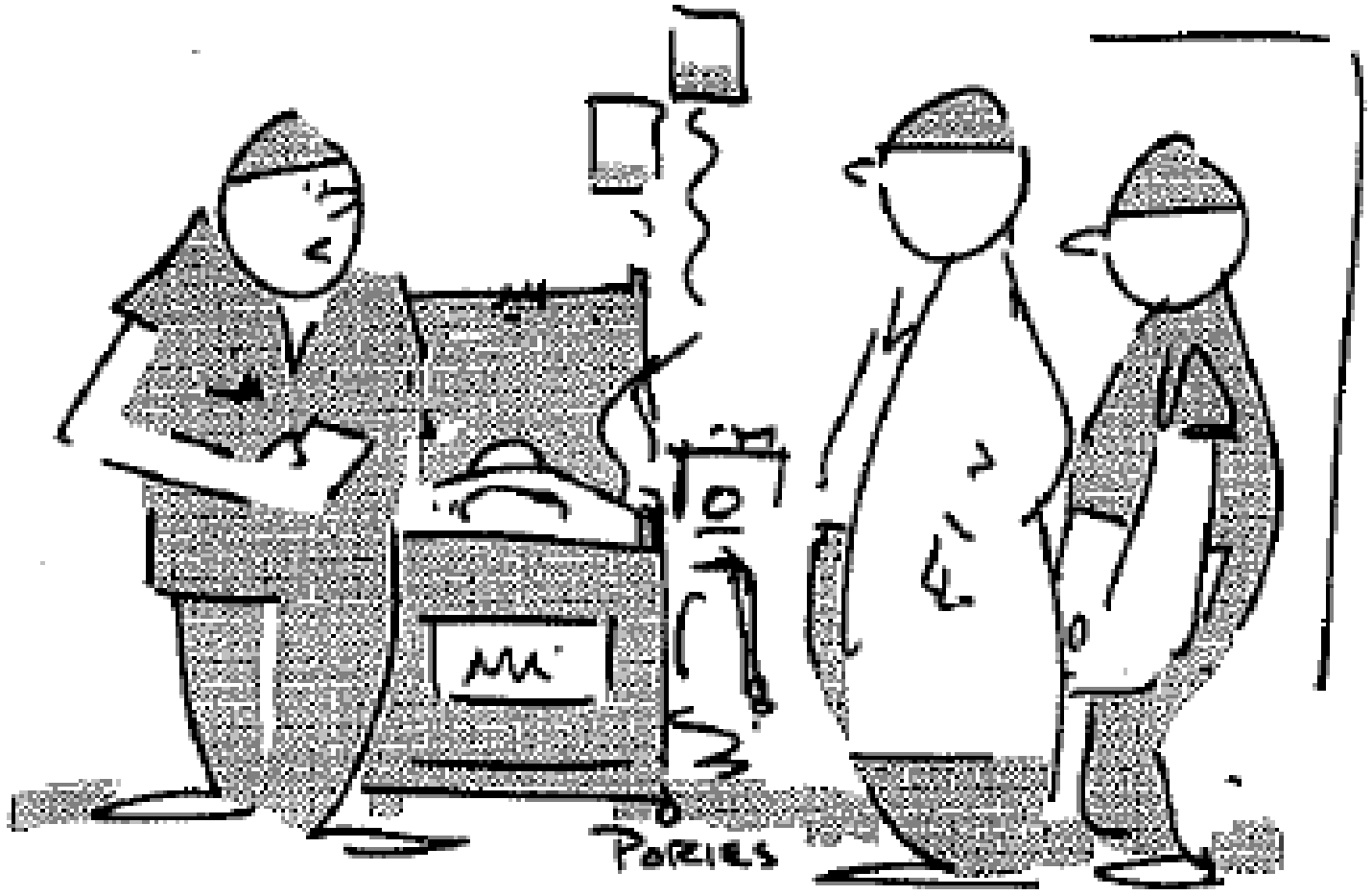
Table 4.

Overall Mean Impairment across Academic, Interpersonal, Recreational and Family Financial or Occupational domains among youth with Tourette syndrome (TS) and Attention-Deficit/Hyperactivity Disorder (ADHD) [a]

	TS-only (n=30) M (CI)	ADHD-only (n=2899) M (CI)	TS+ADHD (n=85) M (CI)	TS-only vs. ADHD-only *p*-value	ADHD-only vs. TS+ADHD *p*-value	TS-only vs. TS+ADHD *p*-value
Ever-diagnosed with TS and/or ADHD	1.4 (0.7–2.1)	1.9 (1.8–2.0)	2.5 (2.0–2.9)	0.21	<0.01	0.02
Current TS and/or ADHD [b]	1.7 (0.9–2.5)	2.0 (1.9–2.1)	2.6 (2.1–3.1)	0.45	<0.01	0.05
Mild current TS and/or ADHD [c]	1.8 (0.7–2.9)	1.6 (1.5–1.8)	2.1 (1.1–3.0)	0.74	0.33	0.70
Moderate/severe current TS and/or ADHD [d]	1.5 (0.8–2.2)	2.2 (2.1–2.3)	2.9 (2.5–3.3)	0.09	<0.01	<0.01



"After the lab studies, angiograms, MRI, and the full body CT scans, the physical examination revealed the knife in his back."

Diagnostic Evaluation: Tic Disorders and ADHD

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- **Diagnoses** of both disorders are made on basis of **classical history.**
- **Structured or semi-structured diagnostic interviews,** such as the DISC or K-SADS, can improve classification and assessment of comorbidity.
- **Standardized rating scales** have improved diagnostic reliability in research studies; helpful in clinical care.
- The **Yale-Global Tic Severity Scale (YGTSS**) (Leckman, Riddle, Hardin, Ort, Swartz, Stevenson, et al., 1989), the "gold standard," assesses domains of tic number, frequency, intensity, complexity and interference (0-50), and tic related impairment (0-50). The short **Tic Symptom Self Report** (TSSR) is derived.
- **SNAP, ADHD-RS and Conners** (Parent and Teacher) are helpful for quantitative evaluation of ADHD symptoms.
- ***Quantitative ratings of tics and ADHD can facilitate 1) disentanglement and 2) prioritization for overall treatment planning and use of targeted combined pharmacotherapy.***

TD/Tics and ADHD: Impact on Management

- **Tics:** Most patients with mild tic symptoms need only monitoring, education, and guidance. Those with moderate to severe symptoms will usually need treatment.
- ***ADHD**: Since ADHD symptoms are more likely to persist and cause significant functional impairment, treatment is recommended.
- **Comprehensive Behavioral Intervention for Tics (CBIT)** is established as **first line treatment** for tics. This may be particularly relevant to patients with tics and ADHD, since pharmacotherapy may be challenging. ADHD did not moderate response to CBIT. *(Sukholdosky, D. et al, Neurology, 2017)*
- **Pharmacotherapy for Tic Disorders and ADHD**:
- 1) stimulants
- 2) alpha agonists
- 3) atomoxetine
- 4) combinations

TD/Tics + ADHD: Treatment Overview

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- **Pharmacotherapy** is cornerstone.
- **Tics:** Most patients with mild tic symptoms need only monitoring, education, and guidance.
- ***ADHD**: Since ADHD symptoms are more likely to persist and cause significant functional impairment, treatment is usually necessary.
- **Behavioral treatment of tics (Comprehensive Behavioral Intervention for Tics (CBIT))** is now established.
- There are no published studies of comorbid ADHD and tic disorders of combination pharmacotherapy and behavioral treatment.

Modified Comprehensive Behavioral Intervention for Tics: Treating Children With Tic Disorders, Co-Occurring ADHD, and Psychosocial Impairment

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(*Greenberg,E. Albright,C. et al; Behav Ther; 2023 Jan;54(1):51-64.Epub 2022 Jul 20.DOI: 10.1016/j.beth.2022.07.007*)

- **Aim: T**o evaluate the feasibility, acceptability, and preliminary efficacy of a modified comprehensive behavioral intervention for tics (MCBIT) therapy for youth with chronic tic disorders (CTDs), co-occurring attention-deficit hyperactivity disorder (ADHD), and associated psychosocial impairment.

- **Methods:** Seventeen youth ages 10-17 with CTD and co-occurring ADHD were randomly assigned to the MCBIT group (n = 9) or to a control group where they received traditional comprehensive behavioral intervention for tics (CBIT) therapy (n = 8). Both groups received ten 55-minute weekly treatment sessions, and two 55-minute biweekly relapse prevention sessions. Sixteen of the 17 participants completed the study, and acceptability ratings in both treatment groups were high with no significant differences in expectation of improvement.

- **Results:** The MCBIT and CBIT groups in combination showed significant improvement in tic severity, ADHD symptom severity, and tic-related impairment. Group differences were not significant.

- **Conclusion:** MCBIT treatment is feasible and acceptable for youth with CTD and ADHD and is similarly well tolerated relative to traditional CBIT. Results were not sufficiently superior to recommend MCBIT over CBIT for this population..

Modified Comprehensive Behavioral Intervention for Tics: Treating Children With Tic Disorders, Co-Occurring ADHD, and Psychosocial Impairment

(*Greenberg,E. Albright,C. et al; Behav Ther; 2023 Jan;54(1):51-64.Epub 2022 Jul20.DOI: 10.1016/j.beth.2022.07.007*)

Table 1
Baseline Characteristics of the Patient Sample

Variable	Total ($n = 17$)			
	M	(*SD*)	%	(*n*)
Demographics				
Age, years, mean (*SD*)	13.2	(2.0)		
Age category child (vs. teenager), % (*n*)			29	(5)
Male gender, % (*n*)			82	(14)
Race, % (*n*)				
White			71	(12)
Asian			6	(1)
More than one race			18	(3)
Other			6	(1)
Household income, % (*n*)				
$25,000–$49,999			6	(1)
$50,000–$74,999			6	(1)
$100,000–$200,000			47	(8)
>$200,000			41	(7)
Psychiatric comorbidities				
DSM-5 Axis I diagnoses, % (*n*)				
ADHD, combined			59	(10)
ADHD, inattentive type			29	(5)
ADHD, hyperactive/impulsivity type			12	(2)
Obsessive-compulsive disorder			65	(11)
Anxiety disorder (generalized, social, separation, mixed)			47	(8)
Major depressive disorder/mood disorder (including dysthymia)			29	(5)
Oppositional defiant disorder			24	(4)
Any additional Axis 1 disorder (outside of TS/ADHD)			94	(16)
Current psychotropic medication use				
Any, % (*n*)			47	(8)
Alpha agonist, % (*n*)			29	(5)
Antidepressant, % (*n*)			29	(5)
Stimulant, % (*n*)			24	(4)
Mood stabilizer or anticonvulsant, % (*n*)			18	(3)
Antipsychotic, % (*n*)			12	(2)
Atomoxetine (ADHD medication), % (*n*)			6	(1)
Benzodiazepine, % (*n*)			6	(1)

Note. *M* = mean; *SD* = standard deviation; DSM-5 = *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*; ADHD = attention-deficit/hyperactivity disorder; TS = Tourette syndrome.

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Modified Comprehensive Behavioral Intervention for Tics: Treating Children With Tic Disorders, Co-Occurring ADHD, and Psychosocial Impairment

(Greenberg,E. Albright,C. et al; Behav Ther; 2023 Jan;54(1):51-64.Epub 2022 Jul20.DOI: 10.1016/j.beth.2022.07.007)

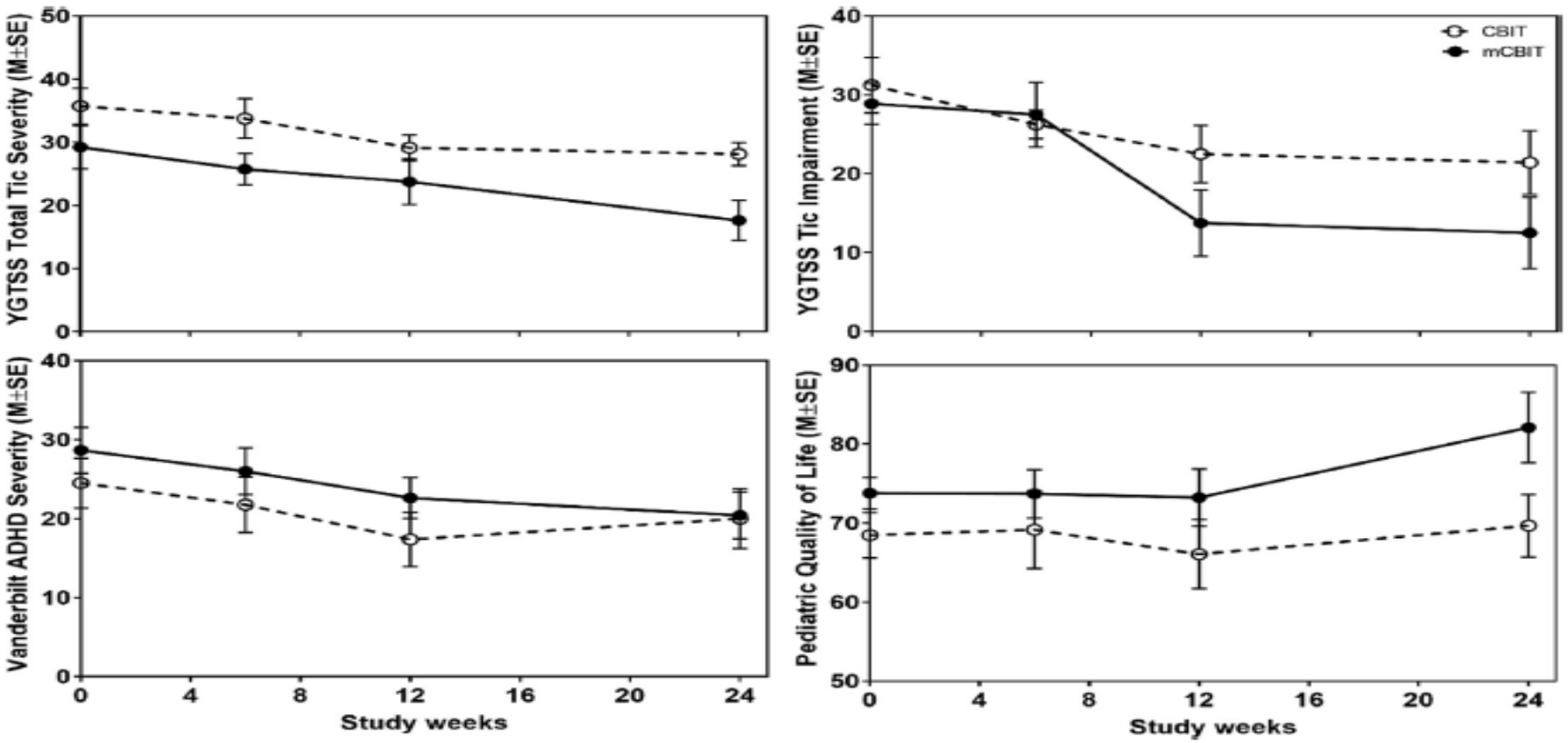

FIGURE 2 Changes in secondary outcomes during treatment (Weeks 1–12) and follow-up (Week 24) in the comprehensive behavioral intervention for tics (CBIT) and modified CBIT (MCBIT) treatment groups. The secondary outcome measures were tic symptom severity and tic impairment, as measured by Yale Global Tic Severity Scale (YGTSS); attention-deficit/hyperactivity disorder (ADHD) severity, as measured by the National Institute for Children's Health Quality (NICHQ) Vanderbilt Assessment Scales (VAS); and youth quality of life, as measured by the Pediatric Quality of Life Inventory—Child or —Teen Version (PedsQL). For all scales except quality of life, higher scores indicate worse symptoms.

Pharmacological Interventions for Attention-Deficit/ Hyperactivity Disorder in Children and Adolescents with Tourette Disorder: A Systematic Review and Network Meta-Analysis

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(Farhat, L., Behling, E., Landeros-Weisenberger, A., & Macul, P. (2024). Pharmacological interventions for attention-deficit/hyperactivity disorder in children and adolescents with Tourette disorder: A systematic review and network meta-analysis. Journal of Child and Adolescent Psychopharmacology, 34(4), 229–242. https://doi.org/10.1089/cap.2024.0049)

Abstract

Objective: To evaluate the comparative efficacy of pharmacological interventions for children and adolescents with a dual diagnosis of persistent tic disorders or Tourette disorder and attention-deficit/hyperactivity disorder (TD + ADHD).

Methods: We searched CENTRAL, Embase, PubMed, PsycInfo, Web of Sciences, ClinicalTrials.gov, and WHO ICTRP up to September 2023 to identify double-blinded randomized controlled trials (RCTs) assessing pharmacological interventions for children and adolescents with TD + ADHD. Outcomes were change in ADHD symptoms (primary) and tics (secondary) severity. Standardized mean difference (SMD) was calculated and pooled in random-effects network meta-analysis. The Confidence in Network Meta-Analysis framework was adopted to determine certainty of evidence.

Results: We included 8 RCTs involving 575 participants. Network meta-analyses demonstrated that α2 agonists (SMD, 95% confidence interval [CI] ADHD: –0.72 [–1.13 to –0.31]; TD: –0.70 [–0.96 to –0.45]) and stimulants + α2 agonists (ADHD: –0.84 [–1.54 to –0.13]; TD: –0.60 [–1.04 to –0.17]) were more efficacious than placebo for ADHD symptoms and tics severity. Stimulants alone were more efficacious than placebo for ADHD symptoms severity only, but they did not worsen tics (ADHD: –0.54 [–1.05 to –0.03]; TD: –0.22 [–0.49 to 0.05]). There were no significant differences between any pairs of medications that were found efficacious against placebo for ADHD symptoms or tics severity. Certainty in the evidence varied from low to very low.

Conclusions: Stimulants are efficacious for ADHD symptoms severity and do not increase tics severity in TD + ADHD. α2 agonists are efficacious for both ADHD symptoms and tics severity in TD + ADHD. These findings should inform guidelines and help guide shared decision-making to choose a medication for children with TD + ADHD.

Keywords: Tourette syndrome, attention-deficit/hyperactivity disorder, clinical trials, network meta-analysis, methylphenidate

Pharmacological Interventions for Attention-Deficit/ Hyperactivity Disorder in Children and Adolescents with Tourette Disorder: A Systematic Review and Network Meta-Analysis

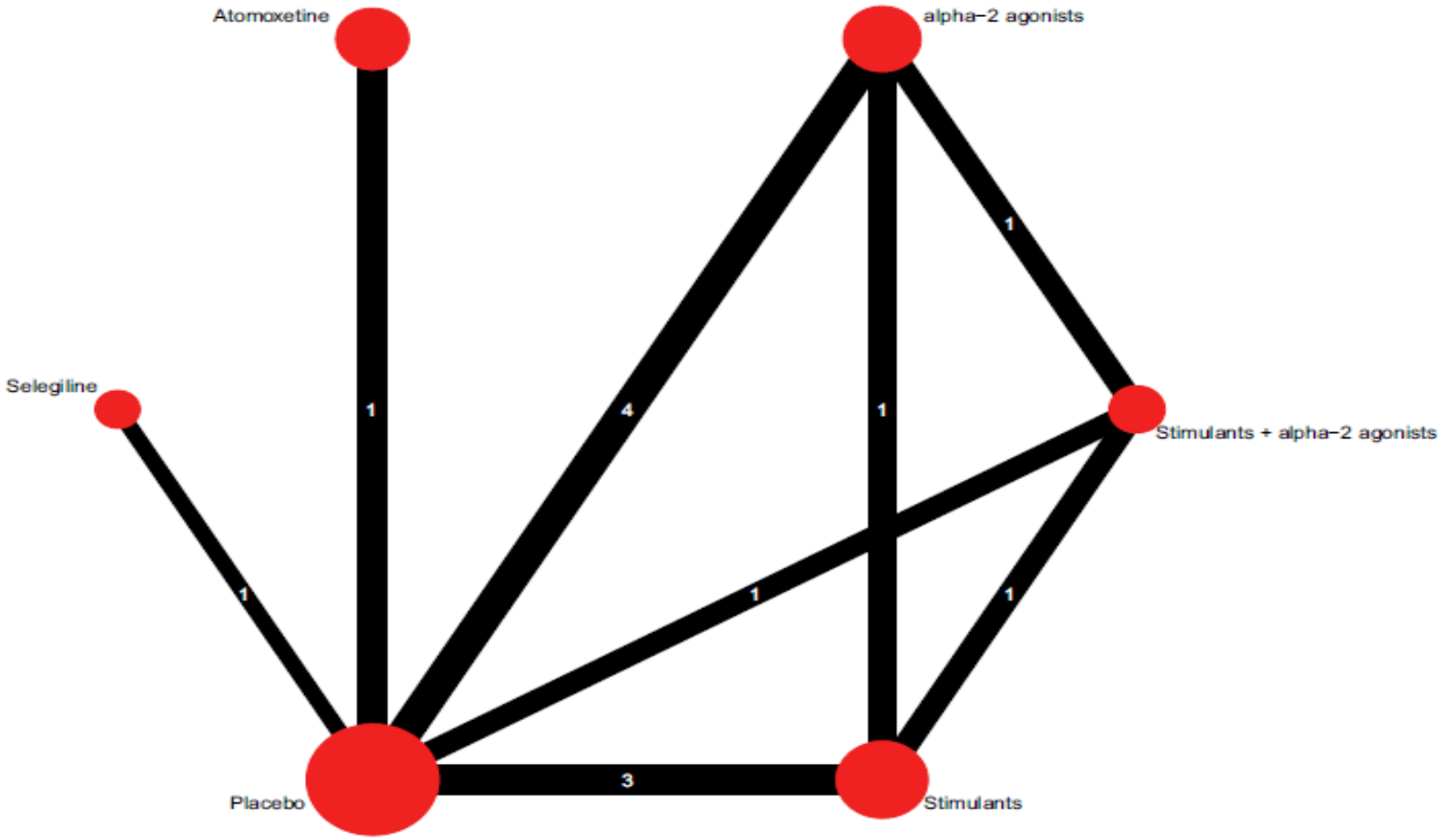

FIG. 2. Network plot for tics severity. The size of nodes is proportional to the number of participants that received that treatment. The number of studies for each comparison is illustrated in the line, and its thickness is proportional to the precision of the direct estimate for that comparison. The network plot for ADHD symptoms severity is identical, although there are two (instead of three) RCTs for the comparison between stimulants and placebo. ADHD, attention-deficit/hyperactivity disorder; RCTs, randomized controlled trials.

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Farhat, L., Behling, E., Landeros-Weisenberger, A., & Macul, P. (2024). Pharmacological interventions for attention-deficit/hyperactivity disorder in children and adolescents with Tourette disorder: A systematic review and network meta-analysis. Journal of Child and Adolescent Psychopharmacology, 34(4), 229–242. https://doi.org/10.1089/cap.2024.0049

Pharmacologic Treatment of Comorbid Attention-Deficit/Hyperactivity Disorder and Tourette and Tic Disorders

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(Jaffe, R. J., & Coffey, B. J. (2022). Pharmacologic treatment of comorbid attention-deficit/hyperactivity disorder and Tourette and tic disorders. Child and Adolescent Psychiatric Clinics of North America, 31(3), 469–477. https://doi.org/10.1016/j.chc.2022.03.004)

KEYWORDS

• ADHD • Tics • Stimulants • α-Agonists • Tourette

KEY POINTS

- There is a bidirectional relationship between ADHD and tic disorders.
- A comprehensive medical and psychiatric evaluation is essential to treatment.
- Stimulants are the first-line pharmacotherapy to treat ADHD in patients with tic disorders.
- α-Agonists are added to simulants or used as monotherapy to treat ADHD and tics.

Meta Analysis: Risk of Tics Associated with Stimulant Use in Randomized, Placebo-Controlled Trials

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(Cohen, S. Mulqueen, J. Ferracioli-Oda, E. Stuckelman, Z. Coughlin, C, Leckman, J. Bloch, M. JAACAP; 2015; 54(9); 728-736)

Design: Meta-analysis of RCTs of stimulants in treatment of ADHD

Results: N=22 studies with 2385 children with ADHD.

New onset or worsening of tics were commonly reported with stimulants (5.7%) and placebo groups (6.5%).

Risk of new onset or tic worsening associated with stimulants was similar to that of placebo (risk ratio=0.99, p=.962).

Stimulant type, dose, duration and age did not affect risk.

Cross over studies were associated with a significantly greater risk than parallel group trials.

Conclusion: There is no evidence for support of an association between new onset or worsening of tics with stimulant use in patients with ADHD.

Practical Tips on Treating ADHD and Tics/TD with Stimulants

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- **Methylphenidates (MPH)** are recommended.
- For children, MPH can be initiated at 5 mg (or equivalent) and titrated upward gradually.
- For adolescents, MPH can be initiated at 10 mg (or equivalent) and titrated upward gradually.
- For tic increase with upward titration: if ADHD symptoms have improved, hold the dose and monitor, or temporarily reduce the dose and re-titrate.
- There are no controlled trials of extended-release stimulants, but they may be less likely than IR to be associated with tic increase that occurs in some children
- Guanfacine or clonidine can be added if the tic increase is sustained.

ADHD, Stimulants and Tics: What Clinical Data is Needed to Weigh Risks and Benefits in Individual Patients?

To what degree is the **ADHD associated with distress and/or impairment** in the child or adolescent?

Important factors in the clinical history:

Age of child?

Prior treatments?

History of tics?

Family history of tics, Tourette's Disorder and/or Obsessive-Compulsive Disorder?

Previous exposure to stimulants? If so, what class (amphetamines or methylphenidate) and what response?

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Extended-Release Guanfacine (GXR) Does Not Show a Large Effect on Tic Severity in Children with Chronic Tic Disorders (CTD)

(*Murphy T., Fernandez T., Coffey, B. et al. JCAP; 27 (9); 2017; 762–770)*

Methods: 8-week RCT in N=34 youth ages 6 to 17 years (mean = 11.1) with CTD.

Results: There was no significant difference in tic reduction from baseline to endpoint on the YGTSS total tic score: 26.3 to 23.6 in GXR and 27.7 to 24.7 in PBO, p = 0.08, or the CGI-I response rate between GXR and PBO (19% [3/16] vs. 22% [4/18], p = 1.0).

Mean final daily dose of GXR 2.6 mg. (n = 14)
Response was not moderated by ADHD diagnosis.

Conclusion: This study does not support the use of extended release guanfacine in treatment of CTD.

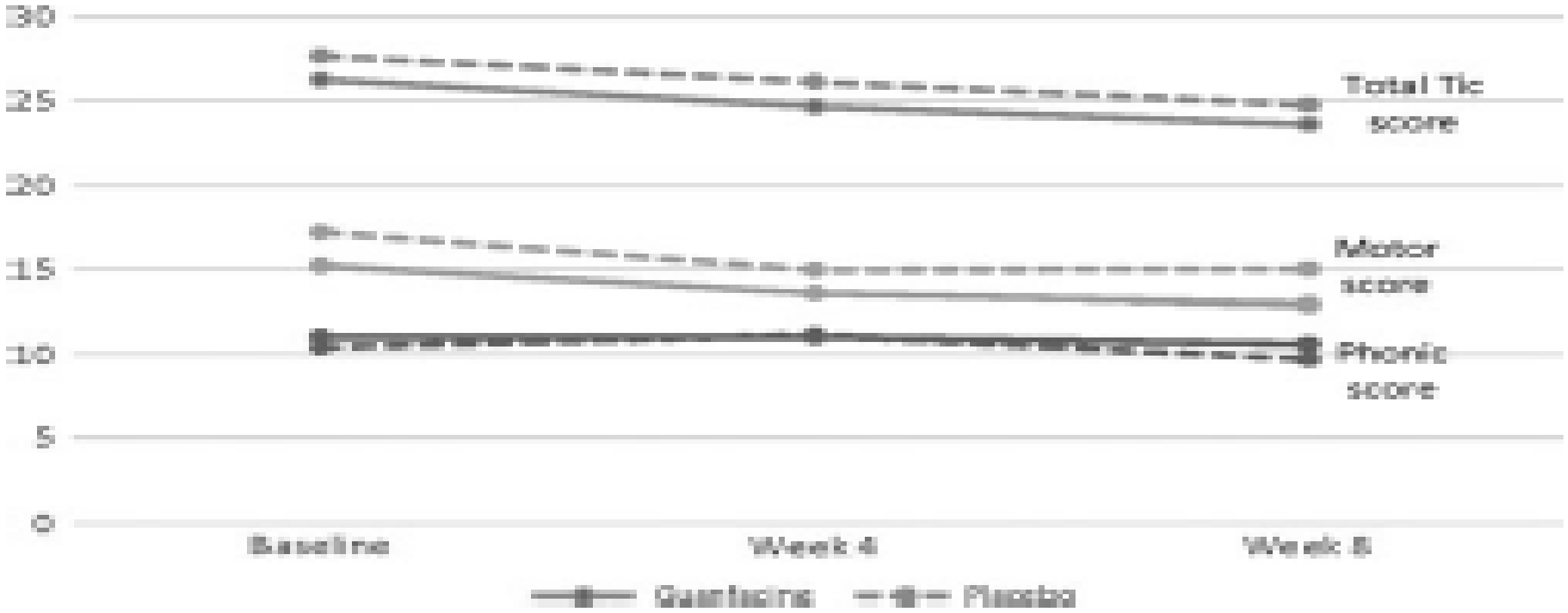

FIG. 2. YGTSS total score, motor, and phonic; guanfacine versus placebo. YGTSS, Yale Global Tic Severity Scale.

Atomoxetine Treatment in Children and Adolescents with ADHD and Comorbid Tic Disorders

(Allen, A. Kurlan, R. Gilbert, D. Coffey, B. et al Neurology 2005; 65; 1941-1949)

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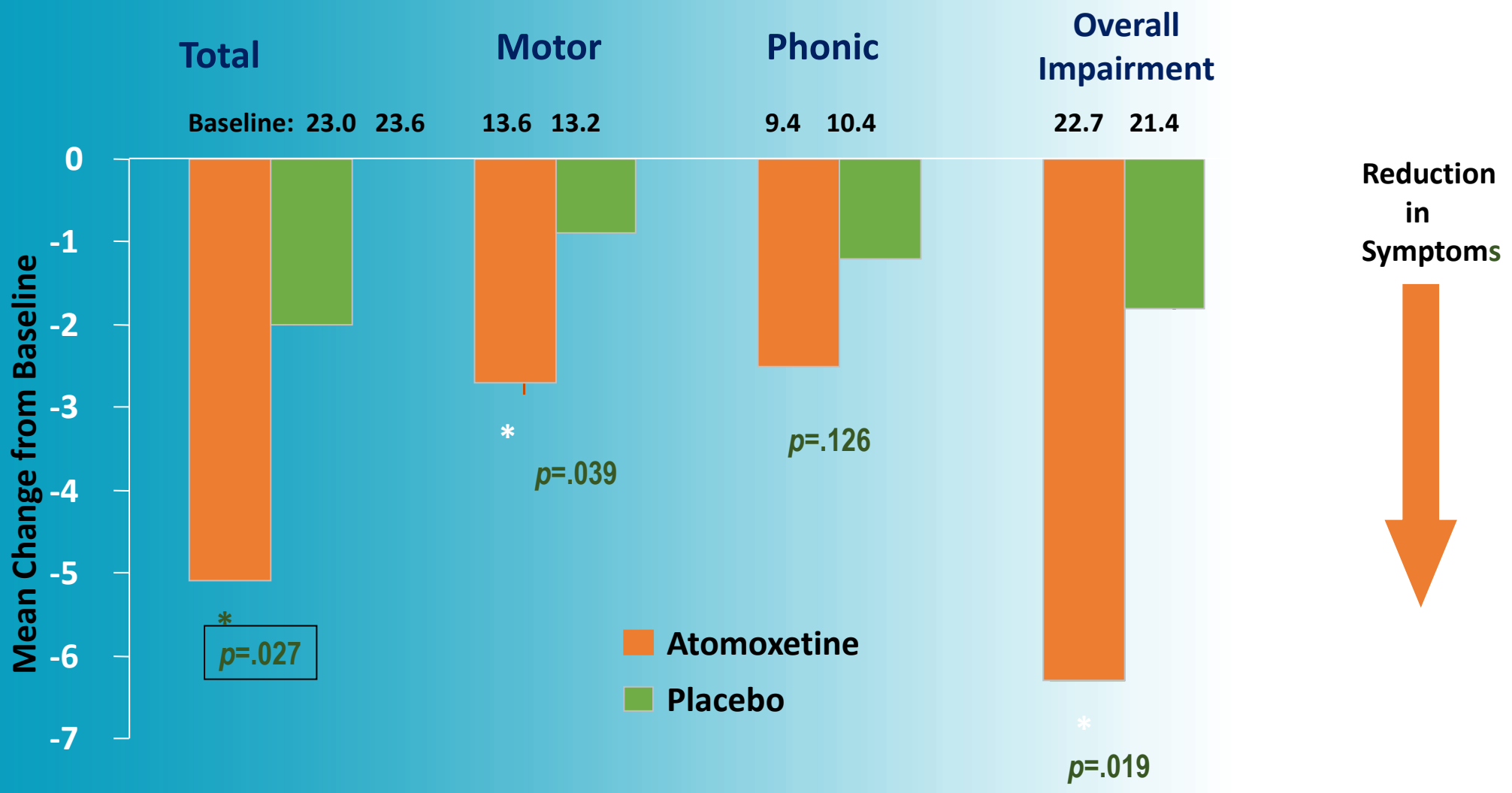
- **Study Design**: Randomized controlled trial; non-inferiority hypothesis.
- Subjects: Children and adolescents 7-17 years old and weighing 20 - 80 kg
- Met DSM-IV criteria for ADHD and had concurrent Tourette's Disorder or chronic motor tic disorder
- Two-week screening and washout period followed by a 3-week dose-titration phase and a 15-week acute treatment phase.
- Subjects were randomly assigned **to double-blind treatment with *either* placebo or atomoxetine (0.5 - 1.5 mg/kg/day)**

Yale Global Tic Severity Scale (YGTSS)
Tourette's subjects Only



Reduction in Symptoms

Evidence Based ADHD/Tics/TD Treatment Algorithm

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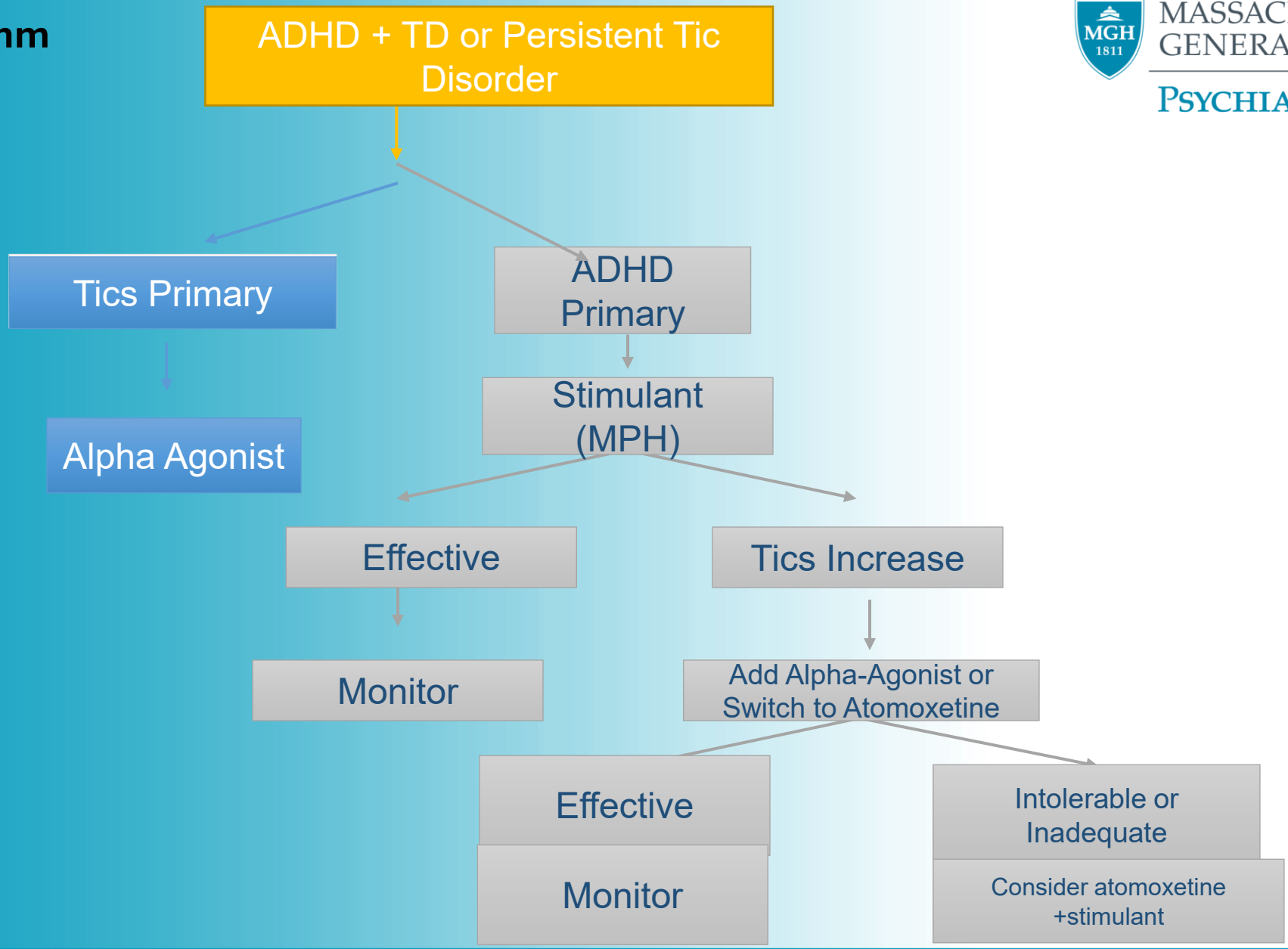

THE NEW YORKER

"If you're happy and you know it, stick with your dosage."

THURSDAY
SEPTEMBER 25

Summary: ADHD, Tics and Tourette's Disorder

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There is **bi-directional overlap of ADHD and Tic Disorders:** neurobiology, genetics and neurocircuitry, and phenomenology, including clinical course and psychiatric comorbidity.

ADHD symptoms tend to persist, but **tic symptoms** tend to remit over time.

Much of the **associated psychopathology (behavioral, emotional, neurocognitive**) in Tourette's Disorder is secondary to ADHD.

Children with **ADHD+CTD** are more likely to have higher rates and severity of psychopathology and reduced quality of life than those with either ADHD or CTD alone.

Tic and ADHD symptoms should be carefully **disentangled,** by severity and potential outcomes, for best management and intervention.

Behavioral treatment of tics is recommended as first line; **stimulants** can be used safely for ADHD and tics, but there are several other options, including atomoxetine, and combination treatment with alpha 2 agonists.

ADHD, Tics and Tourette's Disorder
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