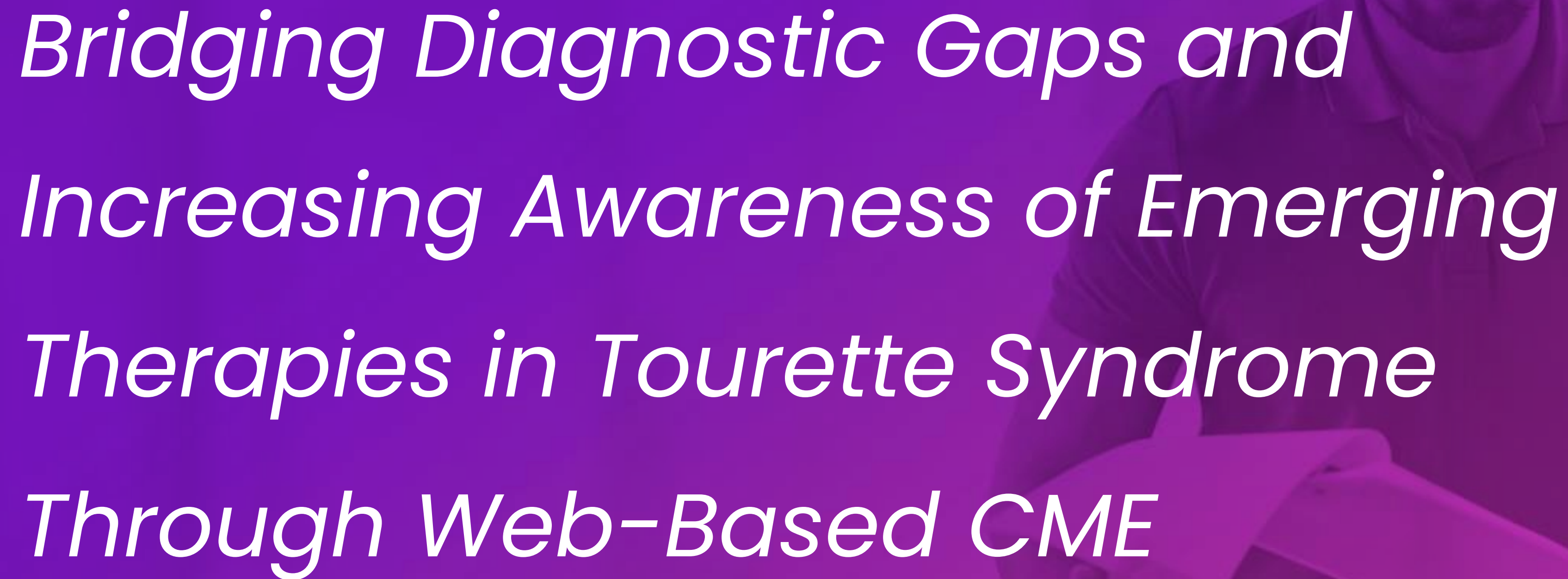

Bridging Diagnostic Gaps and Increasing Awareness of Emerging Therapies in Tourette Syndrome Through Web-Based CME

Authors: **Carole Drexel, PhD;[1] Donald L. Gilbert, MD, MS;[2] Erica L. Greenberg, MD[3]**

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Disclosures

Carole Drexel, PhD: Nothing to disclose

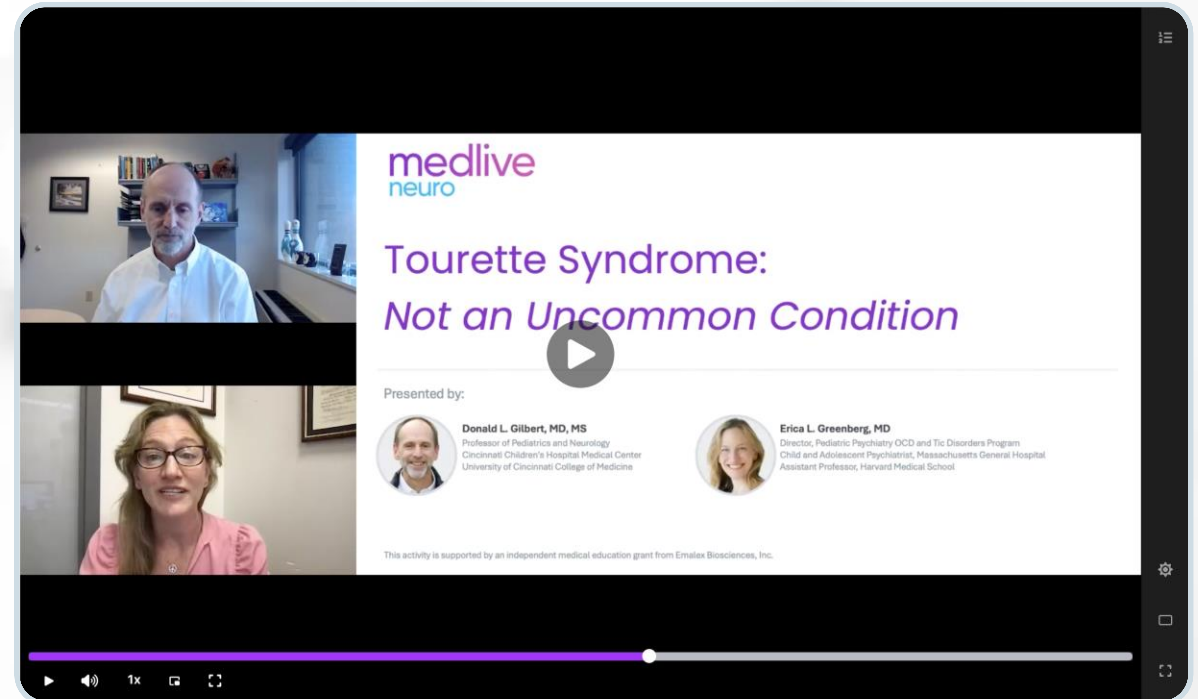
Donald L. Gilbert, MD, MS: *Consultant, Advisor, Speaker:* Emalex Biosciences, Illumina, Noema, PTC Therapeutics, Synendos Therapeutics, Vima Therapeutics; *Researcher:* Emalex Biosciences, Neurocrine Biosciences, PTC Therapeutics, Quince Therapeutics; *Royalties or Patent Beneficiary:* Elsevier, Wolters Kluwer

Erica L. Greenberg, MD: *Consultant, Advisor, Speaker:* Emalex Biosciences

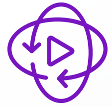
Background

Tourette syndrome management remains inherently complex and largely experience-driven, particularly in the setting of comorbidities.

Goals: To evaluate the impact of a multi-format continuing medical education (CME) curriculum designed to improve diagnostic accuracy, clinical recognition, and understanding of evolving therapeutic strategies in Tourette syndrome



Materials and Methods



Educational Interventions

2 video activities

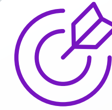
Nov 2025 - Nov 2026

2.0 CME credits

2 long-form videos

Pediatricians, pediatric neurologists, and pediatric psychiatrists

7 x 2 min micro-learning videos pushed to NPI-verified pediatricians, pediatric neurologists, and pediatric psychiatrists via LinkedIn



Learning Objectives

1. Summarize the characteristics of manifestations of TS to differentiate it from other tic disorders
2. Discuss the limitations of current management options for TS in the context of comorbidities and risk of adverse effects from drug therapy
3. Summarize the current understanding of the pathophysiology of TS and the role of central D1 receptors
4. Discuss safety and efficacy data on emerging agents for TS

Outcome Measurements and Analytics

- Knowledge (MCQ)
- Competence (case-based questions)
- Self-reported attitudes, barriers, and practice changes
- Analysis of pre/post-activity comparisons
- Chi-square test for aggregate pre- vs post-activity comparisons

Improving Diagnosis and Management of Tourette Syndrome: *Multidisciplinary Partnerships and Emerging Agents*

Program Overview

Two, certified (2.0 total credit) live and online enduring, video-based, CME activities

Launch dates:

- November 5, 2025 (link)
- November 12, 2025 (link)

Intended for pediatricians, pediatric neurologists, and pediatric psychiatrists

Targeted microlearning videos via IQVIA/LinkedIn

Faculty:

Donald L. Gilbert, MD, MS
Professor of Pediatrics and Neurology
Cincinnati Children's Hospital Medical Center
University of Cincinnati College of Medicine

Erica L. Greenberg, MD
Pediatric Psychiatry OCD and Tic Disorders Program, Director
Child and Adolescent Psychiatrist, Massachusetts General Hospital (Mass General Brigham)
Assistant Professor, Harvard Medical School

Learning Objectives

Activity #1: *Tourette Syndrome: Not an Uncommon Condition*

1. Summarize the characteristics of manifestations of Tourette syndrome to differentiate it from other tic disorders
2. Discuss the limitations of current management options for Tourette syndrome in the context of comorbidities and risk of adverse effects from drug therapy

Activity #2: *Beyond D2 Antagonism to Address Unmet Needs in Tourette Syndrome*

1. Summarize the current understanding of the pathophysiology of Tourette syndrome and the role of central D1 receptors
2. Discuss safety and efficacy data on emerging agents for Tourette syndrome

Outcomes Methodology

- Registered CME learners (demographics)
- Pre/Post (knowledge, competence)
- Pre/Post/Polling (attitudes, barriers)
- Evaluation (satisfaction, intended practice changes)

Long-form Education & Microlearning Snapshots

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Patient Vignette

Audience Polling Question

Symptom Severity Across Age

Audience Goals

Category	Goal (across both activities)	Current Status (as of 03/13/26)		% to goal (4 months post-launch)
		Activity 1	Activity 2	
CME Live Participant	167	56	51	**64%**
CME Enduring Participant	1,833	869	505	**75%**
Microlearners	6,000	1,575	9,407	**137%**
All Learners	--	738 (613 Completers)	403 (345 Completers)	--
Intended Learner	--	268 (207 Completers)	157 (124 Completers)	--

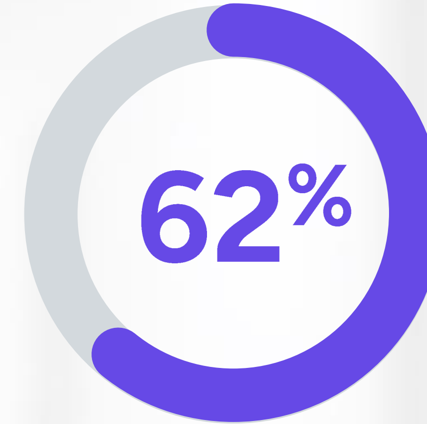
Definitions:

- Participant = view education front matter (ie, email or landing page)
- CME Live = unique participants on launch date
- CME Enduring = unique participants any day after launch date up until expiration date
- Learner = completed CME pre-test and initiated education video
- Completer = finished post-test
- Microlearner = NPI-verified specialists who viewed an entire microlearning video – posted on Linked In

Participants Demographics

12,463 Total Clinicians

- 107 live CME
- 1,374 enduring CME
- 10,982 micro-learning



of those who claimed CME credit identified as Tourette-syndrome treaters seeing an **average of 6 patients with Tourette syndrome each year (n=331)**

Degree*

93% MDs/DOs

2% NPs/PAs

2% RNs

3% Other

Specialty*

44% Pediatrics

36% Psychiatry

13% Pediatric Neurology

2% Primary Care

5% Other

*n=425

Curriculum Engagement and Highlights

Self Identified Challenges related to the management of Tourette syndrome

Most important challenge related to management of Tourette syndrome[2]:

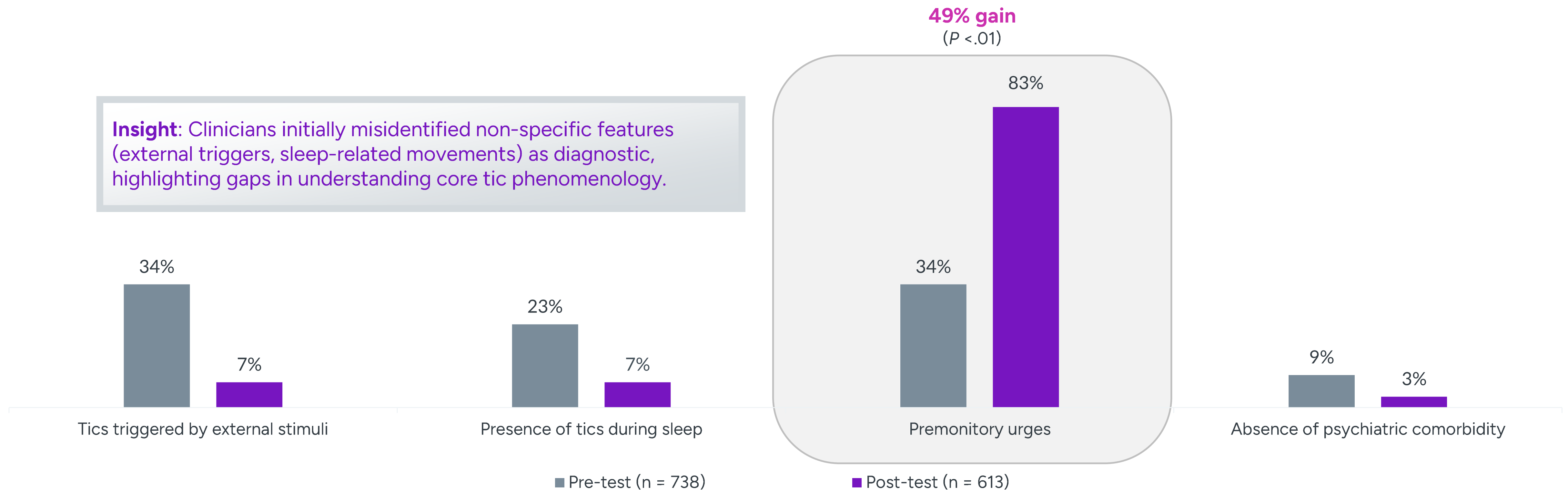
- Lack of familiarity with management guidelines (**21%**)
- Presence of comorbidities (e.g., ADHD, OCD, anxiety) (**18%**)
- Limited access to behavioral therapy (**15%**)
- Lack of familiarity with diagnostic criteria (**15%**)
- Concerns about treatment side effects or long-term management (**9%**)
- Limited access to specialists (**9%**)

Two-thirds of pediatricians (**68%**) report seeing patients with TS, only **9%** cite limited access to specialists as a major challenge

Learning Objective

Summarize the characteristic manifestations of Tourette syndrome to differentiate it from other tic disorders

An 8-year-old boy presents with frequent eye blinking, shoulder shrugging, and throat clearing. He reports an uncomfortable urge before tics. Mother reports movement-disrupted sleep that she attributes to the tics. She also believes that tics are triggered by loud noise or light. The patient has no significant past medical history. Which feature best supports the diagnosis of TS?

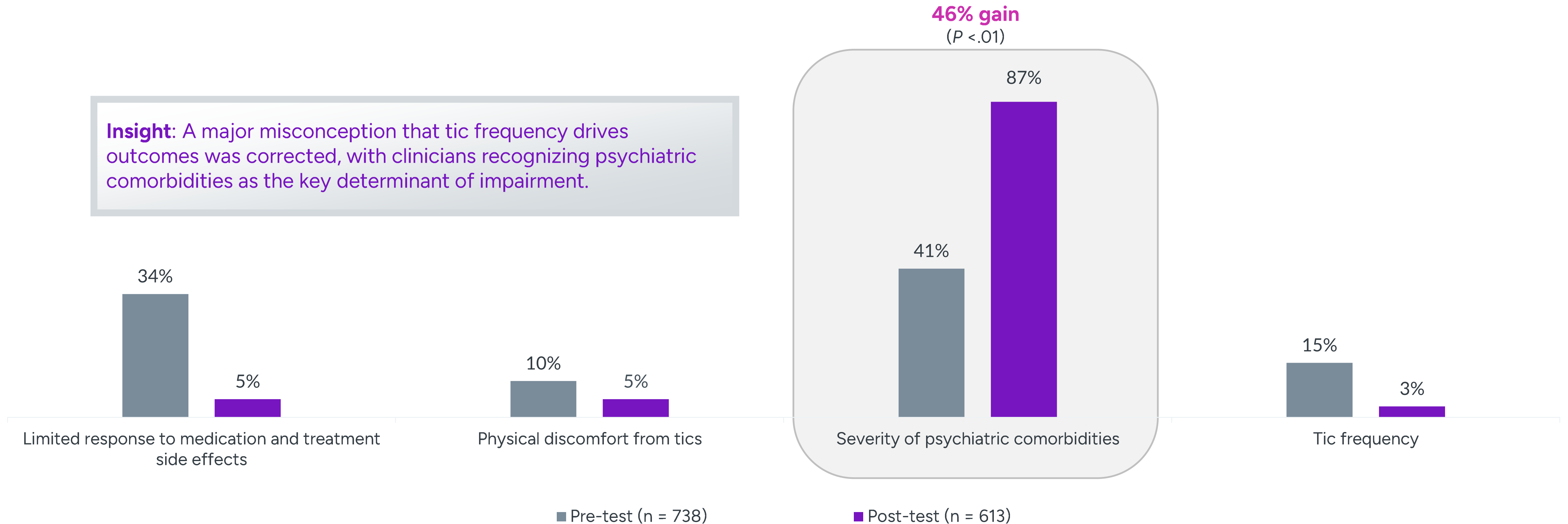


First attempt, post-test data (all learners)

Learning Objective

Discuss the limitations of current management options for TS in the context of comorbidities and risk of adverse effects from drug therapy

Which factor has been shown to be the strongest independent predictor of functional impairment and poor psychosocial outcomes for individuals with TS and their families?



First attempt, post-test data (all learners)

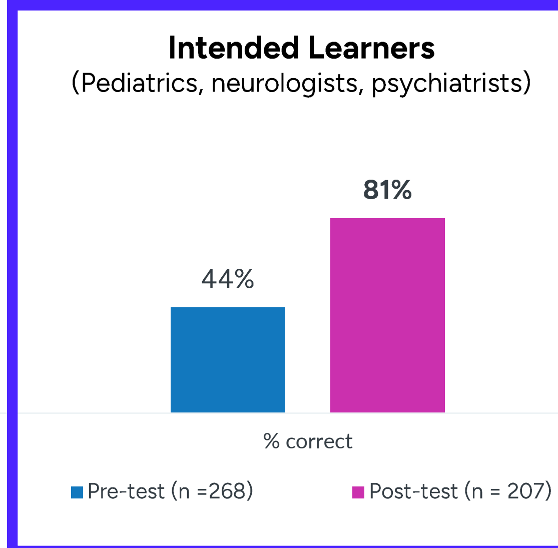
Activity #1

Tourette Syndrome: *Not an Uncommon Condition*

77% of learners completed the activity[2]

72% see an average **7** patients with Tourette syndrome per year[3]

Average score (% correct) on 4-item test linked to learning objectives



48% intend a clinical practice change, including:[3]
(multi-select)

- Apply latest guidelines for TS (53%)
- Choice of treatment/management approach (35%)
- Change in current practice for referral (25%)
- Change in pharmaceutical therapy (22%)
- Change in non-pharmaceutical therapy (18%)
- Change in differential diagnosis (12%)
- Change in diagnostic testing (9%)

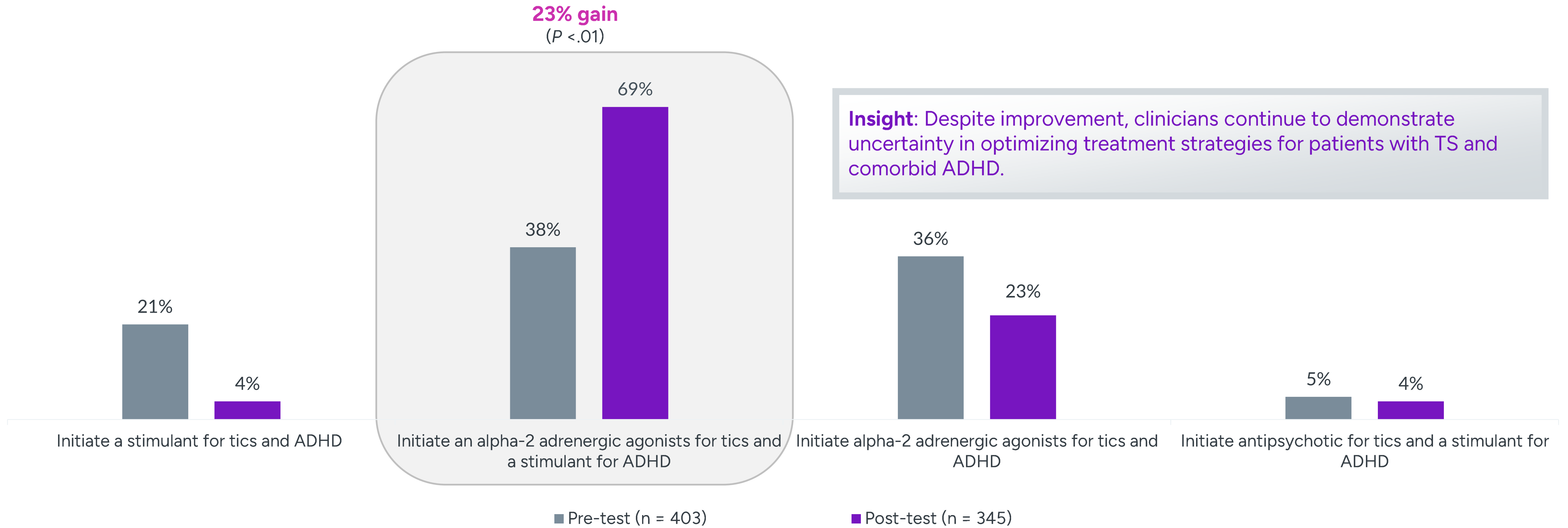
65% use a standardized clinical scale, such as the Yale Global Tic Severity Scale (YGTSS) when evaluating the severity of tics in a patient with TS[2]

1. Intended Learners: pediatricians, pediatric neurologists, and pediatric psychiatrists
2. Intended Learners (n=268), Completers (n=207)
3. Intended Learner Evaluation data (n=203)

Learning Objective

Discuss safety and efficacy data on emerging agents for Tourette syndrome

When managing a child with TS and comorbid ADHD, which strategy is most appropriate?

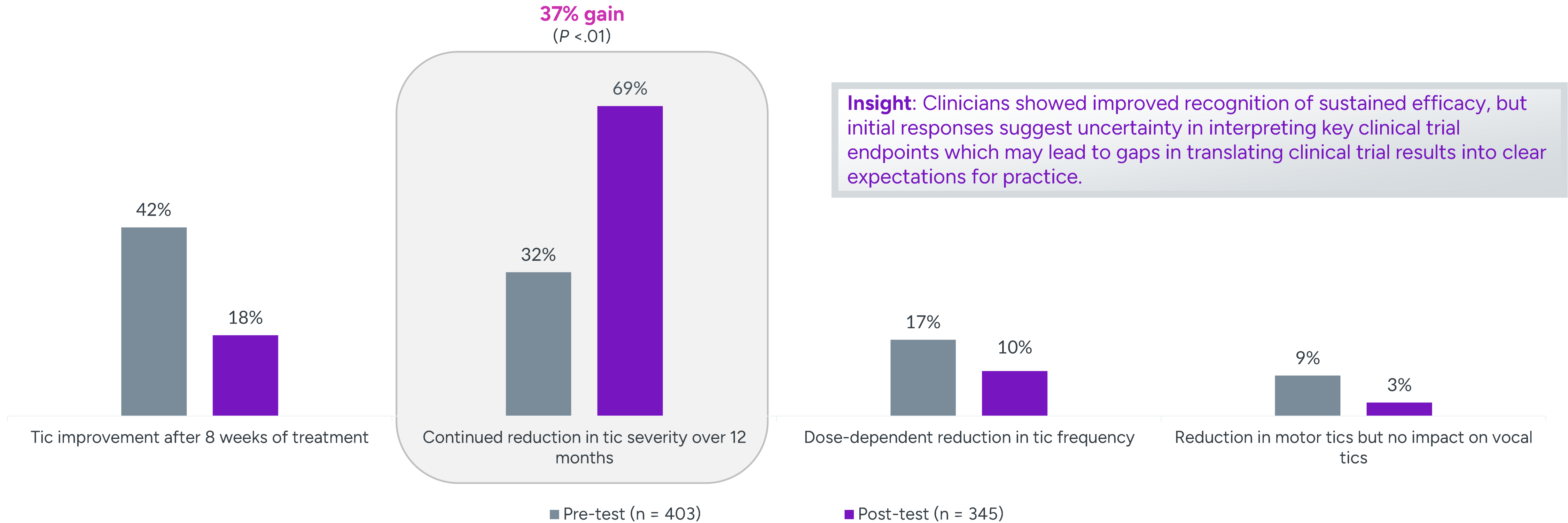


First attempt, post-test data (all learners)

Learning Objective

Discuss safety and efficacy data on emerging agents for Tourette syndrome

How did ecopipam impact tics in clinical trials of TS?



First attempt, post-test data (all learners)

Activity #2

Beyond D2 Antagonism to Address Unmet Needs in Tourette Syndrome

Included 9,407 microlearners

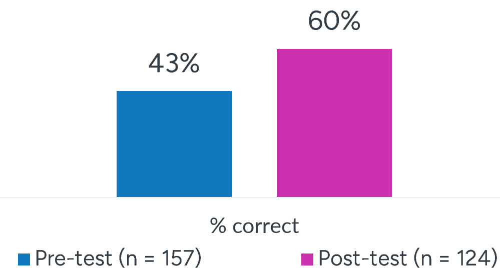
79% of learners completed the activity[2]

76% see an average **8** patients with Tourette syndrome per year[2]

Average score (% correct) on 3-item test linked to learning objectives

Intended Learners

(Pediatrics, neurologists, psychiatrists)



54% intend a clinical practice change, including:[3]
(multi-select)

- Apply latest guidelines for TS (**55%**)
- Choice of treatment/management approach (**44%**)
- Change in pharmaceutical therapy (**22%**)
- Change in current practice for referral (**13%**)
- Change in non-pharmaceutical therapy (**13%**)
- Change in differential diagnosis (**8%**)
- Change in diagnostic testing (**4%**)

Scenarios most likely to incorporate a selective D1 receptor antagonist for treatment of TS (if approved):[2]
(multi-select)

- For all patients who have not responded adequately to behavioral therapy (**41%**)
- After failed D2 antagonist trial (**34%**)
- In patients with comorbid ADHD or OCD and moderate to severe tic severity (**27%**)
- First-line drug therapy for all patients in conjunction with behavioral therapy (**27%**)
- After failed D2 antagonist and antipsychotic trials (**23%**)
- In patients with comorbid ADHD or OCD *independent* of tic severity (**10%**)

1. Intended Learners: pediatricians, pediatric neurologists, and pediatric psychiatrists
2. Intended Learners (n=157), Completers (n=124)
3. Intended Learner Evaluation data (n=124)

Pre and Post Activity Results

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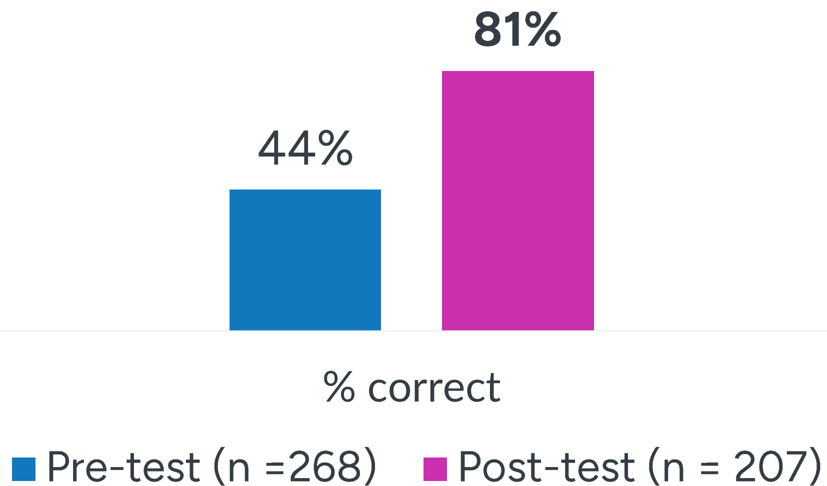
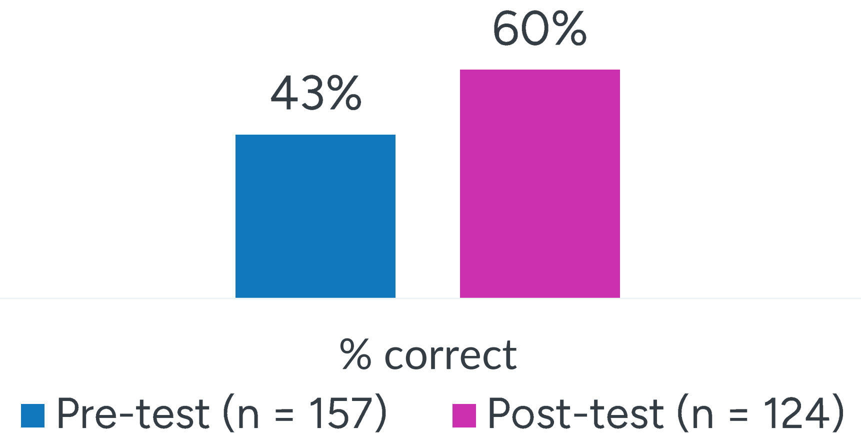
Education that empowers

Pre Post

Webinar 1



Webinar 2



Q-board Email and Current Status

Follow-Up Email

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Education that empowers

Thank you for watching
Tourette Syndrome: Not an Uncommon Condition.

Do you have questions or takeaways to share with your peers?

Continue the discussion by submitting your insights on our question-and-answer board.

Visit the Q&A Board

Here's what your peers found most valuable:

- **Diagnosis & clinical features:** Diagnosis of Tourette Syndrome (TS) requires ≥2 motor + ≥1 vocal tic for ≥1 year before age 18. Tics are sudden, stereotyped, often preceded by urges, and suppressible.
- **Impact of comorbidities:** TS is highly comorbid, especially with ADHD, OCD, and anxiety. Comorbidities drive impairment and contribute to elevated suicidality, highlighting limits of current treatments.
- **Treatment paradigm:** Comprehensive Behavioral Intervention for Tics is first-line; Medications include alpha-2 agonists (modest benefit) and D2-blocking antipsychotics, which may provide stronger tic reduction but are limited by metabolic, neurologic, and cardiac risks that require monitoring.
- **Shared decision-making:** Management depends on aligning clinical options with family and child priorities, focusing on how tics and comorbidities impact daily functioning.

Activity 1 Q-board

Weigh in — what's top of mind? Vote below!

Type your question... SUBMIT

- 11 — Safety considerations and monitoring ? concerns about adverse effects of pharmacologic therapy to best practices for managing suicidal ideation in youth with TS
- 9 — Distinguishing Tourette syndrome from other tic disorders or movement phenomena
- 9 — Best practices to monitor response to therapy and adjusting management over time
- 8 — Clinical reasoning behind treatment selection and sequencing in the context of severe psychiatric and neurologic comorbidities (OCD, anxiety, depression)

Activity 2 Q-board

Weigh in — what's top of mind? Vote below!

Type your question... SUBMIT

- 3 — Clinical considerations for monitoring mood, motivation, and suicidal ideation
- 2 — How emerging D1-receptor antagonists like ecopipam might interact with stimulant medications in patients with Tourette syndrome and comorbid ADHD
- 2 — How to stratify patients for newer agents
- 2 — Best practices for integrating behavioral therapy (CBIT) with new pharmacologic options

The ranking of the vote reflects both what is top of mind for clinicians and the effectiveness of the program in communicating key considerations when managing TS.

Recognition and Diagnosis Improved, Management Remains Complex

- Strongest improvements in diagnosis, clinical recognition, and pathophysiology (>40%)
- Moderate gains in emerging therapies (>30%)
- Lowest gains in understanding of treatment limitations and disease burden (30%)
    - Difficulty selecting and sequencing therapies when ADHD, OCD, anxiety coexist
    - Ongoing uncertainty in longitudinal care strategies

Foundational knowledge achieved, setting the stage for mechanism-based therapeutic discussions in future education

Remaining needs:

- Clarify the place of emerging agents in evolving treatment algorithms
- Continued need to reinforce holistic, patient-centered management in the context of comorbidities and disease burden

Changes in Knowledge and Competence

	Area evaluated	Pre (n)	Post (n)	∆	*P* value
Multiple-choice knowledge questions	Diagnostic criteria	50% (738)	94% (613)	+44%	0.01
	Complexity of current management in the presence of psychiatric comorbidities	30% (738)	62% (613)	+32%	0.01
	Psychiatric comorbidities as predictor of functional impairment	41% (738)	87% (613)	+46%	0.01
	Pathophysiology and D2 role	51% (403)	93% (345)	+42%	0.01
	Clinical trials with ecopipam (efficacy outcome)	32% (403)	69% (345)	+37%	0.01
Case-based competence questions	Diagnosis	34% (738)	83% (613)	+49%	0.01
	Management decision in the presence of comorbid ADHD	38% (403)	69% (345)	+31%	0.01

Strongest improvements in diagnosis, clinical recognition, and pathophysiology (>40%)

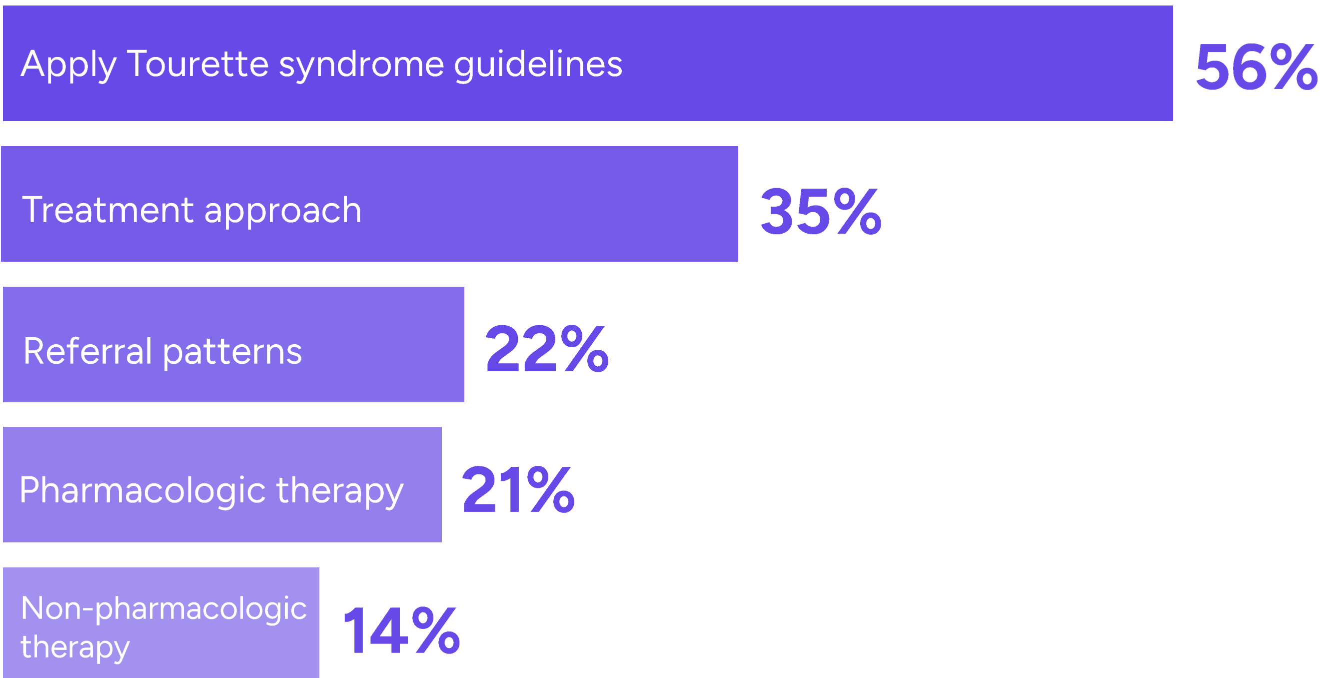
Moderate gains in emerging therapies (>30%)

Lowest gains in understanding of treatment limitations (~30%)

- Difficulty selecting and sequencing therapies when ADHD, OCD, anxiety coexist
- Ongoing uncertainty in longitudinal care strategies

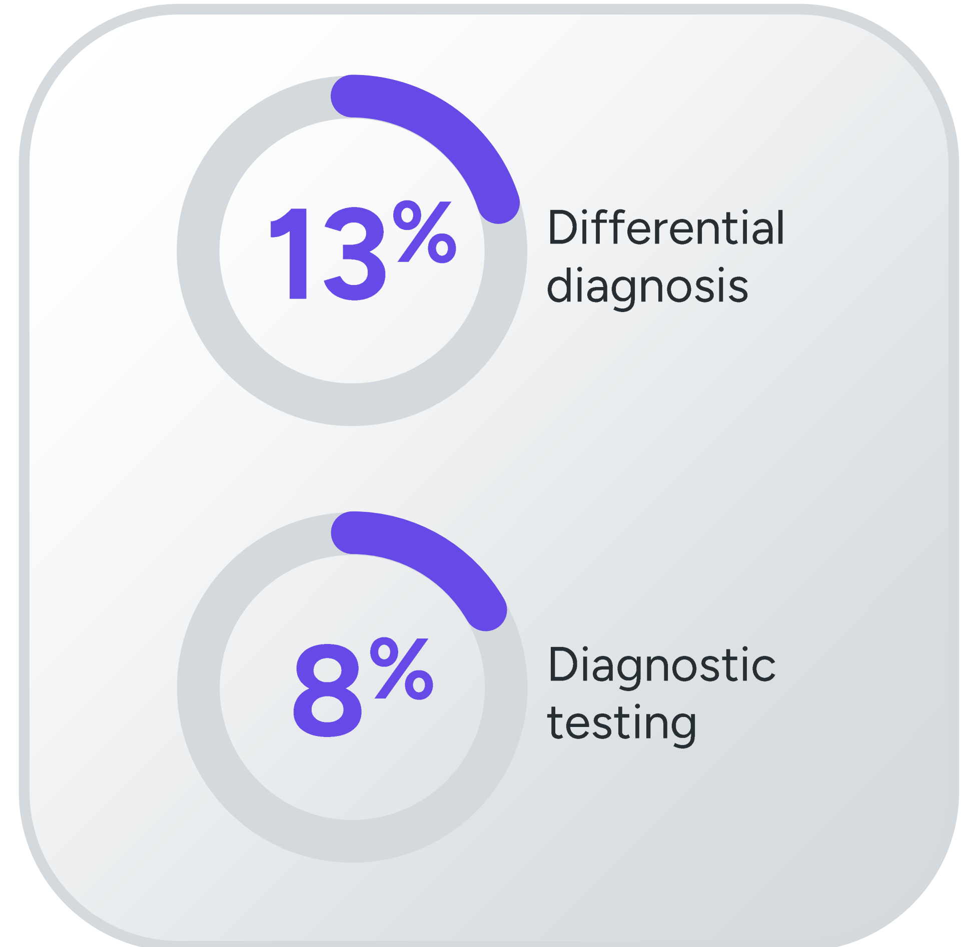
Practice Changes (Self-reported)

Management-related Changes*



Management changes reported 2-to-4× more often than diagnostic changes

Diagnostic-related changes*

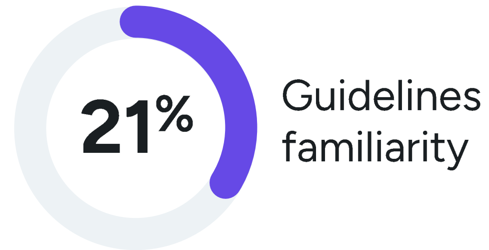


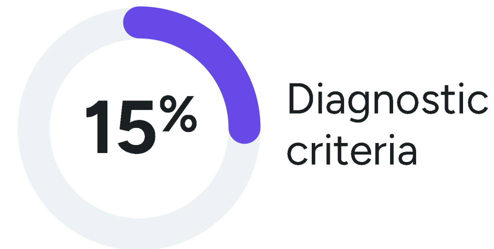
Among those who claimed CME credit, *n=331

Where Do Gaps Persist in Tourette Syndrome Management?

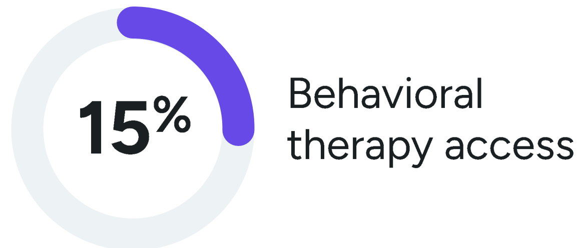
Key Gaps in TS Care Identified (n=425, self-reported)

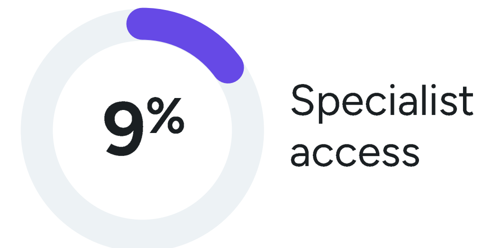
Clinical knowledge gaps



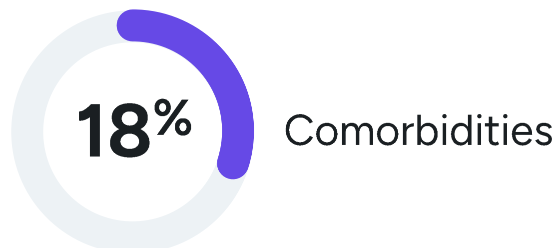


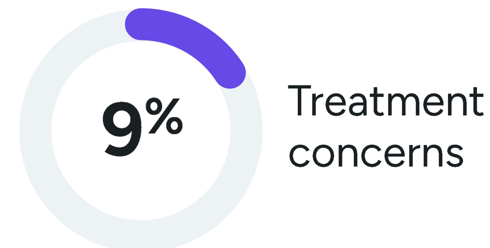
System level barriers





Clinical complexities





Conclusions

This large-scale, multi-format educational initiative improved clinician knowledge and diagnostic accuracy in Tourette syndrome.

Persistent gaps in treatment sequencing, comorbidity management, and integration of emerging therapies highlight the need for education focused on real-world clinical decision-making, rather than knowledge acquisition alone.

Tourette Syndrome Through Web-Based CME

Hvala

Carole Drexel, PhD;[1] Donald L. Gilbert, MD, MS;[2] Erica L. Greenberg, MD[3]