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Health Care Providers' Attitudes and Knowledge Related to Tic Disorder Identification and Treatment

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Abstract

Objective: Our study assessed child-serving health care providers' attitudes and knowledge related to identification and treatment of tic disorders including Tourette syndrome (TS), among children.

Methods: We analyzed cross-sectional data from the 2022 Fall DocStyles, a web-based survey of health care providers. The analytic sample included 1058 child-serving providers (403 family practitioners, 232 internists, 251 pediatricians, and 172 nurse practitioners or physician assistants). We calculated point prevalence estimates and 95% confidence intervals and used χ^2 tests to statistically test differences by provider type and metro status of practice setting.

Results: Less than two-thirds of providers (62.4%) considered evaluation of tics as their role, less than half (40.8%) considered diagnosis of tic disorders their role, and around one-fourth considered treatment of patients with tic disorders to be their role (27.3%). Lack of knowledge of tics/TS and lack of comfort evaluating patients for tics and tic disorders were the most often reported barriers to identification and diagnosis for most provider types, and across practice metro status categories. Online training was the most preferred source of information about tics and tic disorders overall and for each provider type.

Conclusion: These findings support previous reports indicating challenges in health care provider comfort and knowledge in identifying and diagnosing tic disorders, and the need for more education opportunities around evaluation and diagnosis. Communication and training to support the needs of child-serving providers could improve the access to care for children with tics and tic disorders.

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Index terms:

healthcare providers; tic disorders; Tourette syndrome

Persistent tic disorders, including Tourette syndrome (TS), are characterized by the presence of tics, which are “sudden, rapid, recurrent, nonrhythmic, motor movements or vocalizations” for at least a year.¹ Approximately 1 in 50 children aged 5 to 14 years have TS or another persistent tic disorder. However, it is estimated that half of the children who meet diagnostic criteria for TS are undiagnosed.² Lower prevalence estimates of diagnosed TS among racial and ethnic minorities suggest disparities in diagnosis,³ which may be related to lack of access to health care providers with knowledge of tic disorders. In a 2014 survey of parents, half of the children with TS saw 3 or more health care providers before receiving a diagnosis.⁴

Tic disorders begin in childhood and can significantly affect children’s mental health and well-being; they are associated with problems with social skills, family and peer relationships, school problems, lower quality of life, and suicidal ideation.^{3,5–7} Most children with tic disorders have a co-occurring mental, behavioral, or developmental disorder, with attention-deficit/hyperactivity disorder, anxiety disorders, and obsessive-compulsive disorder (OCD) among the most common.^{7–9} In addition to contributing to the impact of tic disorders, co-occurring disorders may also complicate diagnosis and management as symptoms may overlap, particularly between TS and OCD.¹⁰

Evidence-based treatments for tic disorders including TS include behavior therapy and medications. In a 2019 evidence review, there was high confidence in effectiveness of treatment with Comprehensive Behavioral Intervention for Tics,⁹ which includes habit reversal therapy.¹¹ In addition, there was moderate confidence in treatment with antipsychotics including haloperidol, risperidone, and aripiprazole, as well as tiapride, a dopamine D2 and D3 receptor antagonist, and clonidine, an antihypertensive, to reduce tic severity.⁹

Tic disorders are often diagnosed and treated by neurologists, psychiatrists, and psychologists.^{8,12,13} However, the United States is facing shortages of psychologists,¹⁴ child neurologists, and child psychiatrists.^{15,16} Shortages of health care providers generally and mental health care providers specifically are greater in rural compared with urban areas.¹⁷

Child-serving providers (e.g., providers who serve children aged 17 years or younger in their practice) can help fill gaps in care and improve identification of tics and tic disorders, provide psychoeducation about tics and tic disorders for the family, assess impairment related to tics and interest in treatment, and provide information on treatment options.¹⁸ However, 3 studies published between 2004 and 2008 suggest that pediatricians and other health care providers in the United States may lack the knowledge and comfort needed to support children with tics.^{19–21} In a nationwide mail survey, pediatricians reported a low average level of comfort in the management of tics or TS and that their training was “less than adequate” in preparing them for managing tics or TS. They also rated tics/TS as one

of the least relevant conditions for their practice based on their frequency of seeing patients with these conditions in their practice.²⁰

Similarly, in a mail survey, physicians and psychologists demonstrated a lack of knowledge about characteristics of tics and tic disorders.¹⁹ On a knowledge assessment, the average score was 77%, which did not differ between physicians and psychologists; however, just over half of the providers (52%) knew the diagnostic criteria for TS, and nearly half (46%) reported (incorrectly) that tic severity increased in adulthood. In a third survey, 49% of pediatricians and 59% of family practice physicians prescribed antipsychotics, although only 11% of pediatricians and 14% of family medicine physicians reported that they were comfortable doing so.²¹

The objective of our study was to assess child-serving health care providers' attitudes and knowledge related to identification and treatment of tic disorders among children through the 2022 Fall DocStyles Survey. We also assessed child-serving health care providers' preferences for receiving information to learn more about tics and tic disorders. The information from these analyses can be used to better tailor future health education and communication activities to the current needs and preferences of health care providers.

METHODS

Data and Study Design

We analyzed cross-sectional data from the 2022 Fall DocStyles, a web-based survey of health care providers developed and fielded twice per year by Porter Novelli, with input and support from governmental agencies, corporations, and nonprofits.²² DocStyles survey respondents are drawn from the Sermo's Global Medical Panel²³ and compensated \$20 to \$100 dependent upon the number of questions asked of their specialty. Target quotas were set at 1000 family practitioners or internists and 250 each of pediatricians, obstetricians/gynecologists (OBs/GYNs), and nurse practitioners or physician assistants. Of 2669 providers invited to participate in the 2022 Fall DocStyles, 1755 completed the survey, including 545 who identified themselves as internists, 457 as family practitioners, and 251 each as pediatricians, OB/GYNs, and nurse practitioners or physician assistants. Response rate to the survey differed by provider type and included 65% of primary care providers (internists and family practitioners), 68% of nurse practitioners and physician assistants, and 76% of pediatricians. To protect respondent confidentiality, no individual identifiers were included in the database.²²

Survey Questions

The DocStyles survey includes questions on providers' demographic characteristics, practice setting, and years in practice, as well as a range of health topics. The 2022 Fall DocStyles had a total of 109 questions, including an 8-item module to assess provider attitudes, barriers, and knowledge related to identification and treatment of tic disorders, including Tourette syndrome (TS), as well as preferred sources of information on tics and tic disorders. All questions and response options included in the tic disorder module are provided as Supplemental Digital Content 1, <http://links.lww.com/JDBP/A484>.

Analytic Sample and Analysis Methods

Owing to the focus of this study, we excluded OB-GYNs ($n = 251$) and providers of any other type who reported that they do not ever see children aged 17 years or younger ($n = 446$; 313 internists, 54 family practitioners, and 79 nurse practitioners or physician assistants). These exclusions resulted in an analytic sample of 1,058, including 403 family practitioners, 232 internists, 251 pediatricians, and 172 nurse practitioners or physician assistants, hereafter referred to collectively as child-serving providers.

We calculated point prevalence estimates and Clopper Pearson 95% confidence intervals (CIs) to describe demographic and practice characteristics of the sample, examine responses to 4 TS knowledge assessment questions by individual question and percentage correct (0%–25%; 50%, 75%, and 100%), and to assess provider preferences for receiving information about tics and tic disorders, overall and stratified by provider type. We examined responses to questions about providers' attitudes, barriers, and knowledge regarding identification, diagnosis, and treatment of tics and tic disorders by calculating point prevalence estimates and 95% CIs, overall and stratified by provider type and metro status. For all items in the tic disorders module, we used χ^2 tests to assert differential responses across subgroups in stratified analyses (statistical significance at $p < 0.05$). All analyses were conducted using Stata 17 (Stata Statistical Software: Release 17. College Station, TX: StataCorp LLC, 2021).

RESULTS

More than half of participating child-serving providers overall, including a majority in each provider group (internists, family practitioners, pediatricians, and nurse practitioners or physician assistants), practiced in a group outpatient practice or clinic, were younger than 50 years of age, and were non-Hispanic White (Table 1). Most providers overall were male, and a majority practiced in a suburban setting, with some differences by provider type. For instance, around 3/4 of nurse practitioners or physician assistants were female, around one-half of pediatricians were female, and just over half of internists practiced in an urban setting.

Barriers to Identification and Diagnosis

Overall, knowledge of tics/Tourette syndrome (TS) was the most frequently reported barrier to identification and/or diagnosis of tics/tic disorders, reported by nearly 1 in 3 providers overall (31.4%; Table 2). When looking at the provider types separately, 3 of the 4 provider types reported knowledge more frequently than other barriers: family practitioners (37.2%), internists (31.0%), and nurse practitioners or physician assistants (39.0%). Pediatricians also noted knowledge as a barrier (17.1%), although they more often reported “family resistance to evaluation/referral” (20.3%), lack of time to evaluate patients (19.5%), and comfort level (19.5%) as barriers. Percentages of providers reporting knowledge as a barrier differed by metro status; significantly more providers in rural settings reported knowledge as a barrier (47.1%) than providers practicing in urban (31.4%) or suburban (28.0%) settings.

Comfort level evaluating patients with tic symptoms and lack of time to evaluate patients were also frequently reported as barriers. Overall, 28.8% of providers reported that comfort

level was a barrier to identification and/or diagnosis of tics/tic disorders, ranging from 19.5% for pediatricians to 33.3% for family practitioners and 35.5% for nurse practitioners or physician assistants. Over 1 in 4 providers (26.4%) reported lack of time to evaluate patients as a barrier, with significant differences by provider type, ranging from 19.5% among pediatricians to 30.5% among family practitioners.

One of the least frequently reported barriers to identification and diagnosis, “I don’t have anyone to refer the patient,” was reported by fewer than 1 in 10 practitioners overall (7.2%) with no significant differences by provider type or provider metro status. Similarly, fewer than 1 in 10 providers overall (6.6%) reported “inability to bill for this type of evaluation” as a barrier, but there were significant differences by provider type, ranging from 2.0% of pediatricians to 12.1% of internists reporting billing as a barrier.

Nearly 1 in 3 providers overall (30.4%) reported “no barriers” to identification and/or diagnosis of tics/tic disorders. This response differed significantly by provider type with almost half of pediatricians (47.0%) reporting no barriers, compared with around 1 in 4 of the other provider types (range: 23.8%–26.7%).

Provider Role

Most providers (62.4%) and most often pediatricians (79.7%) considered evaluation of patients with tic symptoms as their role, but perceptions of roles differed according to provider type and metro status. For instance, 72.3% of rural providers reported evaluation of tics as part of their role compared with 63.2% of suburban and 58.2% of urban providers; just 49.6% of internists and 56.4% of nurse practitioners or physician assistants reported an evaluation role. Similarly, most (79.3% overall) stated their role was to refer patients to a specialist; this was reported most often by pediatricians (89.2%), nurse practitioners or physician assistants (82.0%), and family practitioners (80.1%). Internists reported a referral role less often (65.1%) than all other provider types. Over half of pediatricians (54.6%) reported diagnosing patients with tic disorders as part of their role, compared with 39.0% of family practitioners, 36.2% of internists, and 31.4% of nurse practitioners or physician assistants. Less than one-third (27.3%) reported their role was to treat tic disorders, including 29.5% of pediatricians.

When asked to select the 1 statement that was the most true for them about referral to behavior therapy for tic disorders, 1 in 5 providers overall selected the statement that they “do not know anyone to refer individuals with tic disorders for behavior therapy.” Overall, 61.9% of providers selected the statement that indicated they knew whom to refer individuals with tic disorders to for behavior therapy, including over 3/4 of pediatricians (76.1%) and just over half of other provider types (range: 52.9%–60.3%).

Knowledge Assessment

Most providers (61.7%) answered 1 or more of 4 true or false knowledge assessment questions incorrectly (Table 3). No significant differences in summary scores were observed by provider type or provider metro status. The question that was most commonly answered incorrectly queried diagnostic criteria, “to be considered for a diagnosis of Tourette syndrome (TS), a person must at least exhibit both multiple motor tics and one or more

vocal tics,” with only 65.9% of providers answering correctly that this statement was true. The question with the most correct answers was about co-occurring conditions among persons with TS (see Supplemental Digital Content 1, <http://links.lww.com/JDBP/A484>, for question text), with 91.9% of providers answering correctly. Responses to the false statement “Tics are primarily purposeful or intentional movements” significantly differed by provider type and metro status, with pediatricians and providers practicing in rural areas most often responding correctly (90.8% and 94.1%, respectively); no other significant differences by metro status were present for knowledge assessment questions or summary scores.

Provider Preferences for Receiving Information

Providers most often reported preference for receiving information about tics and tic disorders through online training (50.8%; Table 4). The next most preferred information source was online nontraining reference materials (40.4%). Significant differences by provider type were observed for information source preferences. For instance, 39.0% of pediatricians and 35.3% of internists preferred virtual grand rounds compared with 18.0% of nurse practitioners or physician assistants and 23.3% of family practitioners. In-person grand rounds were slightly less preferred overall but followed a similar pattern, with pediatricians and internists more often preferring this information source. Peer-to-peer coaching was the least preferred option with 16.7% of providers reporting this information source. Provider preferences for receiving information about tics and tic disorders did not differ significantly by metro status. Only 1 in 11 providers (9.2%) said that they did not need further information about tics and tic disorders.

DISCUSSION

There is a large proportion of children with Tourette syndrome (TS) who may be undiagnosed,² particularly among racial and ethnic minorities.³ The documented shortage of specialty care providers also contributes to underdiagnosis of TS.^{14–16} Our findings suggest that some child-serving providers working in nonspecialty settings might be missing opportunities in their practices to evaluate undiagnosed children with tic disorders. Although most providers in our survey considered evaluation of patients with tic symptoms to be their role as a provider (62.4%), around 1 in 3 of our sample of child-serving providers did not select evaluation of patients with tics as a role for someone in their position.

Approximately 13.4 million children live in areas designated as rural by the US Census,²⁴ and 60% of rural areas in the United States experience shortages of mental health care providers.¹⁷ In our survey, child-serving providers in rural areas were more likely to state their role was to evaluate patients with tic symptoms compared with providers in suburban and urban areas, yet fewer than half of rural providers considered diagnosis as their role, similar to providers practicing in urban and suburban areas. Rural providers were more likely than providers practicing in urban or suburban areas to report knowledge as a barrier to identifying and diagnosing tic disorders. Efforts to support rural providers with education efforts could be especially valuable for serving children in these areas of increased need.

Knowledge of tics/tic disorders and comfort evaluating patients with tics/tic disorders were the most often reported barriers to identification and diagnosis of tics and tic disorders

for most providers. Less than 10% of providers reported that they did not need further information about tic disorders, and our knowledge assessment affirmed the need for more training for most providers. These findings agree with those reported by Marcks et al.¹⁹ that found physicians and psychologists reported a lack of knowledge of the diagnostic criteria for TS. Together, these findings document challenges in health care provider comfort and knowledge in identifying and diagnosing tic disorders and the need for more educational opportunities.

Approximately one-fourth of providers in our survey across provider types considered treatment of their patients with tics to be their role as a provider. Previous studies have documented knowledge deficits in treatment of tics and tic disorders, including a study of medical students and physicians in Saudi Arabia where only 46% reported correctly that antipsychotics were an effective treatment and only 25% had heard of habit reversal therapy.²⁵ In the United States, a previous study reported that pediatricians were “less than comfortable” in the management of tics and TS.²⁰ As the management of tic disorders including TS can be time consuming and often requires additional education and training, providers may report discomfort with treatment due to these barriers. However, approximately 1 in 5 providers overall in our survey also stated they did not know whom to refer individuals with tic disorders to for behavior therapy, and fewer internists (65.1%) compared with other provider types (range: 80.1%–89.2%) considered referral to be their role. Therefore, in addition to education on evaluation and diagnosis, ensuring providers understand whom to refer patients with tics/tic disorders and strengthening networks of provider expertise may assist their patients’ receipt of treatment.

Availability of professional training opportunities could help address the knowledge gaps, including communication and training in evaluation of tics and diagnosis of tic disorders. Training about evidence-based management options for tics and tic disorders could particularly benefit child-serving providers, regardless of whether they are providing treatment as part of their role. Child serving clinician groups underscore both the need for more child-serving providers to identify and treat mental health problems in children and the need for more training for these providers.^{26,27} Communication and training efforts may be especially important in rural areas. More systemic health care transformation models²⁸ have been proposed to address the billing and time barriers also reported by child-serving providers in this study.

Across provider type and metro status, online training was the most preferred source of information about tics and tic disorders in our study, closely followed by online nontraining reference materials. The Centers for Disease Control and Prevention (CDC) collaborates with the Tourette Association of America to provide free trainings for health care providers about tic disorders including TS (<https://tourette.org/resources/provider-webinar-series/>). In a collaboration with the American Academy of Pediatrics and CDC, free online training with American Medical Association Physician’s Recognition Award Category 1 Credit™ (CE credit applies to pediatricians, nurse practitioners, and physician assistants) is available for courses on TS and other tic disorders through the PediaLink platform (<https://www.aap.org/Tourette-Syndrome-Course-Series>).

Limitations

The findings reported here are subject to at least 3 limitations. First, providers may perceive some responses to be more socially desirable than others, which could affect response choices. Second, the DocStyles survey respondents were drawn from an opt-in panel; therefore, these data may also be subject to self-selection. Information about survey nonrespondents was limited. Importantly, DocStyles data are not sampled or weighted to be nationally representative; therefore, the results cannot be considered generalizable to all US providers. In particular, there was limited racial and ethnic diversity of responders.

Finally, the structure of 2 of the questions limits their interpretation. The question on how providers prefer to receive information might not reflect how they best learn; responses might indicate information sources that are most convenient and not necessarily the most effective. Additional information could inform the best approaches to increasing knowledge and comfort about identifying and treating tic disorders among child-serving providers. The format of the question about what is most true for providers about behavior therapy referrals (Question 3, Supplemental Digital Content 1, <http://links.lww.com/JDBP/A484>) also limits inference about the percentage of providers who believe a statement is true; providers might think more than 1 answer is true for them but could only select one.

Strengths

Despite these limitations, this report has a number of strengths. First, our study is one of very few to report child-serving providers' perceived roles in evaluation, diagnosis, and treatment of tic disorders, providing needed information for educators and communicators on this subject. The ability to provide information on preferences for information and education about tics and tic disorders is also a strength, as preferences for receiving information change rapidly and the COVID-19 pandemic affected provider preferences for training and education.²⁹ The numbers of respondents, 1058 providers, also make our survey one of the largest studies to examine provider attitudes and knowledge about tics and tic disorders. To our knowledge, this is the only study to report this type of data by 4 different child-serving provider types and metro status. These data can inform how training and communication messages related to evaluation, diagnosis, and treatment of tics and tic disorders are developed and disseminated to effectively reach those with the greatest need.

CONCLUSION

Data suggest that TS generally, and among racial and ethnic minorities in particular, may be underdiagnosed,² potentially reflecting gaps in access to health care providers with knowledge of tic disorders. The findings reported here align with previously documented needs among child-serving providers and can inform the development of provider training materials and resources to address these needs. With additional training and additional systems-level supports, child-serving providers have the potential to provide needed support to improve identification and management of tics and tic disorders for children in the United States. Training that supports the needs of child-serving providers could help improve access to care for children with tics and tic disorders.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

2022 Fall DocStyles: Child-Serving Provider^a Characteristics

	Total N = 1058 % (95% CI)	Provider Type		Internist, N = 232 % (95% CI)	Pediatrician, N = 251 % (95% CI)	NP/PA, N = 172 % (95% CI)
		Family Practitioner, N = 403 % (95% CI)				
Main work setting						
Individual outpatient practice	14.7 (12.7–17.0)	13.9 (10.7–17.7)	18.1 (13.4–23.7)	10.8 (7.2–15.3)	18.0 (12.6–24.6)	
Group outpatient practice or clinic	71.5 (68.6–74.2)	82.6 (78.6–86.2)	59.5 (52.9–65.9)	70.9 (64.9–76.5)	62.2 (54.5–69.5)	
Inpatient practice	13.8 (11.8–16.0)	3.5 (1.9–5.8)	22.4 (17.2 –28.3)	18.3 (13.7–23.7)	19.8 (14.1–26.5)	
Metro status of work setting						
Urban	36.4 (33.5–39.4)	28.0 (23.7–32.7)	51.7 (45.1–58.3)	37.8 (31.8–44.2)	33.1 (26.2–40.7)	
Suburban	52.4 (49.3–55.4)	58.3 (53.3–63.2)	41.8 (35.4–48.4)	55.4 (49.0–61.6)	48.3 (40.6–56.0)	
Rural	11.2 (9.4–13.3)	13.6 (10.4–17.4)	6.5 (3.7–10.4)	6.8 (4.0–10.6)	18.6 (13.1–25.2)	
Sex						
Male	59.1 (56.0–62.1)	67.7 (62.9–72.3)	80.2 (74.5–85.1)	47.8 (41.5–54.2)	26.7 (20.3–34.0)	
Female	40.1 (37.1–43.1)	31.0 (26.5–35.8)	19.8 (14.9–25.5)	50.6 (44.2–56.9)	73.3 (66.0–79.7)	
Prefer to self-identify	0.9 (0.4–1.6)	1.2 (0.4–2.9)	0	1.6 (0.4–4.0)	0	
Age (yr)						
≤50	66.9 (64.0–69.8)	61.8 (56.8–66.6)	64.7 (58.1–70.8)	59.8 (53.4–65.9)	92.4 (87.4–95.9)	
>50	33.1 (30.2–36.0)	38.2 (33.4–43.2)	35.3 (29.2–41.9)	40.2 (34.1–46.6)	7.6 (4.1–12.6)	
Number of years practicing medicine						
<15	48.9 (45.8–51.9)	45.4 (40.5–50.4)	46.6 (40.0–53.2)	42.6 (36.4–49.0)	69.2 (61.7–76.0)	
≥15	51.1 (48.1–54.2)	54.6 (49.6–59.5)	53.4 (46.8–60.0)	57.4 (51.0–63.6)	30.8 (24.0–38.3)	
Number of pediatric patients seen in a typical week						
1–50	71.2 (68.3–73.9)	88.8 (85.3–91.7)	91.4 (87.0–94.7)	15.9 (11.6–21.1)	83.1 (76.7–88.4)	
≥51	28.8 (26.1–31.7)	11.2 (8.3–14.7)	8.6 (5.3–13.0)	84.1 (78.9–88.4)	16.9 (11.6–23.3)	
Approximate household income of majority of your patients						
<\$25,000	6.5 (5.1–8.2)	7.7 (5.3–10.7)	2.6 (1.0–5.5)	6.8 (4.0–10.6)	8.7 (5.0–14.0)	
\$25,000–\$49,999	25.7 (23.1–28.5)	26.1 (21.8–30.6)	26.3 (20.7–32.5)	24.7 (19.5–30.5)	25.6 (19.2–32.8)	
\$50,000–\$99,999	39.5 (36.5–42.5)	40.2 (35.4–45.2)	45.3 (38.7–51.9)	38.2 (32.2–44.6)	32.0 (25.1 –39.5)	
\$100,000–\$249,999	20.1 (17.8–22.7)	17.4 (13.8–21.4)	15.1 (10.7–20.4)	23.9 (18.8–29.7)	27.9 (21.3–35.2)	

	Total		Provider Type		Internist, N = 232 % (95% CI)	Pediatrician, N = 251 % (95% CI)	NP/PA, N = 172 % (95% CI)
	N = 1058 % (95% CI)	Family Practitioner, N = 403 % (95% CI)					
≥\$250,000	8.1 (6.6–9.9)	8.7 (6.1–11.9)	10.8 (7.1–15.5)	6.4 (3.7–10.1)	5.8 (2.8–10.4)		
Privileges at teaching hospital							
Yes	47.3 (44.2–50.3)	35.2 (30.6–40.1)	62.1 (55.5–68.3)	61.8 (55.4–67.8)	34.3 (27.2–41.9)		
No	52.7 (49.7–55.8)	64.8 (59.9–69.4)	37.9 (31.7–44.5)	38.2 (32.2–44.6)	65.7 (58.1–72.8)		
Number of practitioners in practice							
1–5	40.3 (37.3–43.3)	45.2 (40.2–50.2)	38.4 (32.1–45.0)	37.5 (31.4–43.8)	35.5 (28.3–43.1)		
6–15	35.9 (33.0–38.9)	32.5 (28.0–37.3)	29.3 (23.5–35.6)	41.0 (34.9–47.4)	45.3 (37.8–53.1)		
16–50	18.2 (16.0–20.7)	16.1 (12.7–20.1)	23.7 (18.4–29.7)	17.5 (13.0–22.8)	16.9 (11.6–23.3)		
>50	5.6 (4.3–7.1)	6.2 (4.1–9.0)	8.6 (5.3–13.0)	4.0 (1.9–7.2)	2.3 (0.6–5.8)		
Race							
Asian	20.6 (18.2–23.2)	21.8 (17.9–26.2)	29.3 (23.5–35.6)	19.9 (15.2–25.4)	7.0 (3.7–11.9)		
Black or African American	4.0 (2.9–5.3)	3.0 (1.5–5.1)	2.2 (0.7–5.0)	6.0 (3.4–9.7)	5.8 (2.8–10.4)		
White	66.6 (63.7–69.5)	65.5 (60.6–70.1)	56.0 (49.4–62.5)	68.9 (62.8–74.6)	80.2 (73.5–85.9)		
Two or more races	4.4 (3.3–5.9)	5.2 (3.3–7.9)	5.6 (3.0–9.4)	2.0 (0.6–4.6)	4.7 (2.0–9.0)		
Other race ^b	4.3 (3.2–5.8)	4.5 (2.7–7.0)	6.9 (4.0–11.0)	3.2 (1.4–6.2)	2.3 (0.6–5.8)		
Hispanic or Latino origin							
Yes	6.4 (5.0–8.1)	5.7 (3.7–8.4)	9.1 (5.7–13.5)	4.4 (2.2–7.7)	7.6 (4.1–12.6)		
No	93.6 (91.9–95.0)	94.3 (91.6–96.3)	90.9 (86.5–94.3)	95.6 (92.3–97.8)	92.4 (87.4–95.9)		

^aReports one or more patient with age less than or equal to 17 yr.

^bCombined AIAN and Native Hawaiian/PI into “other” due to cell sizes <30 (5, 3, respectively).

CI, confidence interval; NP, nurse practitioner; PA, physician assistant.

Table 2. 2022 Fall DocStyles: Provider Attitudes and Knowledge Related to Identification/Diagnosis of Tic Disorders by Provider Type and Metro Status

	Total N = 1058	Provider Type		Metro Status					χ^2 p^a	χ^2 p^a
		Family Practitioner, N = 403 % (95% CI)	Internist, N = 232 % (95% CI)	Pediatrician, N = 251 % (95% CI)	NP/PA, N = 172 % (95% CI)	Urban, N = 385 % (95% CI)	Suburban, N = 554 % (95% CI)	Rural, N = 119 % (95% CI)		
Which of the following are barriers to identification and/or diagnosis of tics/tic disorders?										
My comfort level evaluating these patients	28.8 (26.1–31.7)	33.3 (28.7–38.1)	26.3 (20.7–32.5)	19.5 (14.8–25.0)	35.5 (28.3–43.1)	<0.001	30.6 (26.1–35.5)	26.9 (23.2–30.8)	31.9 (23.7–41.1)	0.34
My knowledge of tics/Tourette syndrome	31.4 (28.6–34.3)	37.2 (32.5–42.1)	31.0 (25.1–37.4)	17.1 (12.7–22.4)	39.0 (31.6–46.7)	<0.001	31.4 (26.8–36.3)	28.0 (24.3–31.9)	47.1 (37.8–56.4)	<0.001
I don't have anyone to refer the patient to	7.2 (5.7–8.9)	8.7 (6.1–11.9)	8.6 (5.3–13.0)	3.6 (1.7–6.7)	7.0 (3.7–11.9)	0.07	7.3 (4.9–10.3)	6.5 (4.6–8.9)	10.1 (5.3–17.0)	0.39
Lack of time to evaluate the patient	26.4 (23.7–29.1)	30.5 (26.1–35.3)	26.7 (21.1–32.9)	19.5 (14.8–25.0)	26.2 (19.8–33.4)	0.02	26.8 (22.4–31.5)	26.2 (22.6–30.0)	26.1 (18.4–34.9)	0.98
Unable to bill for this type of evaluation	6.6 (5.2–8.3)	6.7 (4.5–9.6)	12.1 (8.2–17.0)	2.0 (0.6–4.6)	5.8 (2.8–10.4)	<0.001	4.9 (3.0–7.6)	8.1 (6.0–10.7)	5.0 (1.9–10.7)	0.12
Family resistance to evaluation/referral	19.8 (17.4–22.3)	17.6 (14.0–21.7)	22.4 (17.2–28.3)	20.3 (15.5–25.8)	20.3 (14.6–27.1)	0.52	19.2 (15.4–23.5)	21.5 (18.1–25.1)	13.4 (7.9–20.9)	0.13
No barriers	30.4 (27.7–33.3)	25.1 (20.9–29.6)	26.7 (21.1–32.9)	47.0 (40.7–53.4)	23.8 (17.7–30.9)	<0.001	29.1 (24.6–33.9)	31.9 (28.1–36.0)	27.7 (19.9–36.7)	0.51
What role (s) do you think someone in your position should play in the evaluation, diagnosis, and treatment of tic disorders?										
Evaluate my patients with tic symptoms	62.4 (59.4–65.3)	61.5 (56.6–66.3)	49.6 (43.0–56.2)	79.7 (74.2–84.5)	56.4 (48.6–63.9)	<0.001	58.2 (53.1–63.2)	63.2 (59.0–67.2)	72.3 (63.3–80.1)	0.02
Diagnose tic disorders/Tourette syndrome	40.8 (37.9–43.9)	39.0 (34.2–43.9)	36.2 (30.0–42.8)	54.6 (48.2–60.9)	31.4 (24.5–38.9)	<0.001	42.3 (37.3–47.4)	39.7 (35.6–43.9)	41.2 (32.2–50.6)	0.72
Treat patients with tic disorders	27.3 (24.6–30.1)	28.3 (23.9–33.0)	26.7 (21.1–32.9)	29.5 (23.9–35.5)	22.7 (16.6–29.7)	0.44	28.1 (23.6–32.8)	26.5 (22.9–30.4)	28.6 (20.7–37.6)	0.83
Refer patients to a specialist	79.3 (76.7–81.7)	80.1 (75.9–83.9)	65.1 (58.6–71.2)	89.2 (84.7–92.8)	82.0 (75.4–87.4)	<0.001	78.4 (74.0–82.4)	80.3 (76.8–83.6)	77.3 (68.7–84.5)	0.67
Other role not listed	1.8 (1.1–2.8)	1.2 (0.4–2.9)	1.3 (0.3–3.7)	0.8 (0.01–2.8)	5.2 (2.4–9.7)	0.003	2.6 (1.3–4.7)	1.4 (0.6–2.8)	0.8 (0.00–4.6)	0.30
No role	4.0 (2.9–5.3)	3.2 (1.7–5.5)	9.1 (5.7–13.5)	0.4 (0.00–2.2)	4.1 (1.7–8.2)	<0.001	3.9 (2.2–6.3)	3.8 (2.4–5.7)	5.0 (1.9–10.7)	0.81
Which one of the following statements is most true for you?										
I know who to refer individuals with	61.9 (58.9–64.8)	57.8 (52.8–62.7)	60.3 (53.7–66.7)	76.1 (70.3–81.2)	52.9 (45.2–60.5)	<0.001	61.3 (56.2–66.2)	63.2 (59.0–67.2)	58.0 (48.6–67.0)	0.38

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Total	Provider Type		Metro Status				$\chi^2 p^a$
	Family Practitioner; N = 403 % (95% CI)	Internist, N = 232 % (95% CI)	Pediatrician, N = 251 % (95% CI)	NP/PA, N = 172 % (95% CI)	Urban, N = 385 % (95% CI)	Suburban, N = 554 % (95% CI)	
N = 1058							Rural, N = 119 % (95% CI)
tic disorders to for behavior therapy	20.0 (17.7–22.6)	25.3 (21.1–29.9)	15.5 (11.1–20.8)	16.3 (12.0–21.5)	19.2 (13.6–25.9)	19.5 (16.3–23.0)	26.1 (18.4–34.9)
	I do not know anyone to refer individuals with tic disorders for behavioral therapy						
	Behavioral therapy is not applicable for tic disorder treatment	4.3 (3.2–5.8)	5.2 (3.3–7.9)	6.5 (3.7–10.4)	1.2 (0.1–4.1)	4.7 (3.1–6.8)	5.0 (1.9–10.7)
	Diagnosing or treating tic disorders is not in my scope of practice	13.7 (11.7–15.9)	11.7 (8.7–15.2)	17.7 (13.0–23.2)	26.7 (20.3–34.0)	12.6 (10.0–15.7)	10.9 (5.9–18.0)

^a χ^2 test for difference in proportion.
CI, confidence interval; NP, nurse practitioner; PA, physician assistant.

Table 3.

2022 Fall DocStyles: Percentage of Child-Serving Providers With Correct Responses to Individual TS Knowledge Assessment Questions and Composite Summary Scores by Provider Type

Knowledge Assessment Question (Correct Response)	Total N = 1058 % (95% CI)	Provider Type		Metro Status					
		Family Practitioner, N = 403 % (95% CI)	Internist, N = 232 % (95% CI)	Pediatrician, N = 251 % (95% CI)	NP/PA, N = 172 % (95% CI)	Urban, N = 385 % (95% CI)	Suburban, N = 554 % (95% CI)	Rural, N = 119 % (95% CI)	$\chi^2 p^a$
Compared with those in the general population, persons with Tourette syndrome are more likely to have a diagnosis of ADHD, OCD, anxiety, or learning disabilities (TRUE)	91.9 (90.1–93.4)	89.6 (86.2–92.4)	90.9 (86.5–94.3)	94.8 (91.3–97.2)	94.2 (89.6–97.2)	91.7 (88.5–94.2)	91.9 (89.3–94.0)	92.4 (86.1–96.5)	0.97
Intentionally suppressing tics can generally cause the tics to be worse after the effort to suppress is stopped (TRUE)	77.8 (75.2–80.3)	76.4 (72.0–80.5)	81.0 (75.4–85.9)	74.1 (68.2–79.4)	82.0 (75.4–87.4)	81.3 (77.0–85.1)	75.6 (71.8–79.1)	76.5 (67.8–83.8)	0.11
To be considered for a diagnosis of TS, a person must at least exhibit both multiple motor tics and one or more vocal tics (TRUE)	65.9 (62.9–68.7)	63.3 (58.4–68.0)	72.0 (65.7–77.7)	64.5 (58.3–70.5)	65.7 (58.1–72.8)	66.0 (61.0–70.7)	67.1 (63.1–71.0)	59.7 (50.3–68.6)	0.30
Tics are primarily purposeful or intentional movements (FALSE)	85.2 (82.9–87.2)	86.1 (82.3–89.3)	77.2 (71.2–82.4)	90.8 (86.6–94.1)	85.5 (79.3–90.4)	81.0 (76.8–84.8)	86.1 (82.9–88.9)	94.1 (88.3–97.6)	0.001
Composite summary score									
0%–25% questions answered correctly	2.1 (1.3–3.1)	3.2 (1.7–5.5)	3.0 (1.2–6.1)	0.4 (0.0–2.2)	0.6 (0.0–3.2)	2.1 (0.9–4.1)	2.2 (1.1–3.7)	1.7 (0.2–5.9)	0.96
50% questions answered correctly	13.3 (11.3–15.5)	15.4 (12.0–19.3)	12.9 (8.9–17.9)	13.5 (9.6–18.4)	8.7 (5.0–14.0)	13.0 (10.0–16.8)	13.2 (10.5–16.3)	15.1 (9.2–22.8)	
75% questions answered correctly	46.3 (43.3–49.4)	43.9 (39.0–48.9)	44.0 (37.5–50.6)	47.4 (41.1–53.8)	53.5 (45.7–61.1)	47.8 (42.7–52.9)	46.2 (42.0–50.5)	42.0 (33.0–51.4)	
100% questions answered correctly	38.3 (35.3–41.3)	37.5 (32.7–42.4)	40.1 (33.7–46.7)	38.6 (32.6–45.0)	37.2 (30.0–44.9)	37.1 (32.3–42.2)	38.4 (34.4–42.6)	41.2 (32.2–50.6)	

^a χ^2 test for difference in proportion.

ADHD, attention-deficit/hyperactivity disorder; CI, confidence interval; NP, nurse practitioner; OCD, obsessive-compulsive disorder; PA, physician assistant; TS, Tourette syndrome.

2022 Fall DocStyles: Child-Serving Provider Preferences for Receiving Information About Tic Disorders by Provider Type

Table 4.

	Total N = 1058 % (95% CI)	Provider Type	Metro Status					$\chi^2 p^a$	Rural, N = 119 % (95% CI)	$\chi^2 p^a$
		Family Practitioner, N = 403 % (95% CI)	Internist, N = 232 % (95% CI)	Pediatrician, N = 251 % (95% CI)	NP/PA, N = 172 % (95% CI)	Urban, N = 385 % (95% CI)	Suburban, N = 554 % (95% CI)			
In-person grand rounds	26.1 (23.5–28.8)	22.1 (18.1–26.5)	31.0 (25.1–37.4)	35.1 (29.2–41.3)	15.7 (10.6–22.0)	27.8 (23.4–32.6)	25.3 (21.7–29.1)	24.4 (17.0–33.1)	0.62	
Virtual grand rounds	28.8 (26.1–31.7)	23.3 (19.3–27.8)	35.3 (29.2–41.9)	39.0 (33.0–45.4)	18.0 (12.6–24.6)	31.4 (26.8–36.3)	28.5 (24.8–32.5)	21.8 (14.8–20.4)	0.13	
Peer-to-peer coaching	16.7 (14.5–19.1)	15.9 (12.5–19.8)	18.5 (13.8–24.1)	14.7 (10.6–19.7)	19.2 (13.6–25.9)	17.4 (13.7–21.6)	16.8 (13.8–20.2)	14.3 (8.5–21.9)	0.73	
Online nontraining reference materials	40.4 (37.4–43.4)	41.2 (36.3–46.2)							0.44	
Pamphlets/hand-copy handouts	21.6 (19.1–24.2)	23.3 (19.3–27.8)	22.0 (16.8–27.9)	17.1 (12.7–22.4)	23.3 (17.2–30.3)	39.2 (34.3–44.3)	39.7 (35.6–43.9)	20.2 (13.4–28.5)	0.85	
Online training	50.8 (47.7–53.8)	50.4 (45.4–55.4)	41.8 (35.4–48.4)	54.2 (47.8–60.5)	58.7 (51.0–66.2)	21.0 (17.1–15.5)	22.2 (18.8–25.9)	52.9 (43.6–62.2)	0.87	
I don't need further information	9.2 (7.5–11.1)	9.2 (6.5–12.4)	9.5 (6.0–14.0)	7.6 (4.6–11.6)	11.0 (6.8–16.7)	8.8 (6.2–12.1)	9.6 (7.2–12.3)	8.4 (4.1–14.9)	0.89	

^a χ^2 test for difference in proportion.

CI, confidence interval; NP, nurse practitioner; PA, physician assistant.