

Review

TIC DISORDERS: SOME KEY ISSUES FOR DSM-V

John T. Walkup, M.D.,^{1*} Ygor Ferrão, M.D. M.Sc.,² James F. Leckman, M.D.,³ Dan J. Stein, M.B.,⁴ and Harvey Singer, M.D.⁵

This study provides a focused review of issues that are relevant to the nosology of the tic disorders and presents preliminary recommendations to be considered for DSM-V. The recommended changes are designed to clarify and simplify the diagnostic criteria, reduce the use of the residual category, tic disorder not otherwise specified, and are not intended to alter substantially clinical practice or the continuity of past and future research. Specific recommendations include: (1) a more precise definition of motor and vocal tics; (2) simplification of the duration criterion for the tic disorders; (3) revising the term “transient tic disorder” for those with tic symptoms of less than 12-month duration; (4) establishing new tic disorder categories for those with substance induced tic disorder and tic disorder due to a general medical condition; and (5) including a motor tic only and vocal tic only specifier for the chronic motor or vocal tic disorder category. Depression and Anxiety 27:600–610, 2010. © 2010 Wiley-Liss, Inc.

The tic disorders are childhood onset neuropsychiatric disorders commonly associated with other psychiatric disorders including attention deficit hyperactivity disorder and obsessive-compulsive disorder.^[1] Although the cause of the tic disorders is not known there have been substantial advances in our understanding of the phenomenology,^[2] epidemiology,^[3] genetics,^[4] pathophysiology,^[5,6] course,^[7] and treatment^[8,9] of these disorders since the last version of DSM was published.

The tic disorders were first included in DSM-III^[10] and there have been three important changes to the criteria in subsequent editions. In DSM-IV^[11] the age of onset was changed from before 21 years to before 18 years and an impairment criterion was added and required for diagnosis. In DSM-IV-TR^[12] the impairment criterion was removed, due to concerns regarding patients who had the cardinal features of Tourette's disorder (i.e. chronic motor and vocal tics), but who did not experience impairment.^[13,14]

This review focuses on nosological issues specific to revision of the tic disorder diagnostic categories and criteria for DSM-V in light of the clinical and research knowledge that has accumulated since the publication of DSM-IV. Although our understanding of the epidemiology, genetics, course, and treatment of the tic disorders has improved substantially since DSM-IV, the core phenomenology of the tic disorders as described over a century ago by Gilles de la Tourette is essentially unchanged.^[15] Recommendations for changes to the diagnostic criteria are intended to clarify and simplify the diagnostic criteria and are not

intended to alter substantially clinical practice or the continuity of past and current research.

¹Department of Psychiatry, Division of Child and Adolescent Psychiatry, Weill Cornell Medical College, New York, New York

²Department of Psychiatry, University of São Paulo Medical School, São Paulo, Brazil

³Yale Child Study Center, New Haven, Connecticut

⁴Department of Psychiatry, University of Cape Town, Cape Town, South Africa

⁵Department of Neurology, Division of Child Neurology, Johns Hopkins School of Medicine, Baltimore, Maryland

*Correspondence to: John T. Walkup, Division of Child and Adolescent Psychiatry, Weill Cornell Medical College, Box 140, 525 E. 68th Street, New York, NY 10065.

E-mail: j.walkup@med.cornell.edu

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CURRENT TIC DISORDER DIAGNOSTIC CRITERIA

There are four tic disorder diagnostic categories included in the DSM-IV-TR section of Disorders Usually First Diagnosed in Infancy, Childhood, or Adolescence:^[12] (1) Tourette's disorder (TD); (2) chronic motor or vocal tic disorder (CMVTD); (3) transient tic disorder (TTD); and (4) tic disorder, not otherwise specified (TDNOS) (Table 1). Diagnostic decisions for the tic disorders in DSM-IV-TR are based on the presence of motor and/or vocal tics, duration of tic symptoms, age of onset, and absence of any known cause such as a general medical condition or substance use. Other diagnostic schemas, such as ICD-10^[16] and those developed for genetic and epidemiological studies,^[17] will not be reviewed in detail here.

ISSUES TO BE ADDRESSED

1. Are any changes required to the definition of tics in criterion A of the current diagnostic criteria?

- Should vocalizations that are caused by muscle contractions be considered vocal tics or motor tics?
- Would it aid in the distinction of tics from stereotypies to remove the term "stereotyped" from the description of tics in Criterion A?
- Are wording changes needed to make Criterion A consistent in each of the tic disorder diagnoses?
- As both TD and CMVTD are chronic tic disorders should Criterion A for TD and CMVTD be changed to allow merging of these categories?
- Is there sufficient distinction between chronic motor tic disorder and chronic vocal tic disorder to justify making each a unique diagnostic category?

2. Are any changes required to Criterion B for any of the tic disorder diagnoses?

- There are three issues relevant to the duration criterion for TD, CMVTD and TTD.
 - Is the 12-month duration of symptoms appropriate for diagnosis?

TABLE 1. DSM-IV TR for the tic disorders

DSM-IV-TR Criteria 307.23 (Tourette's Disorder)

- A. Both multiple motor and one or more vocal tics have been present at some time during the illness, although not necessarily concurrently. (A tic is a sudden, rapid, recurrent, nonrhythmic, stereotyped motor movement or vocalization)
- B. The tics occur many times a day, (usually in bouts,) nearly every day or intermittently throughout a period of more than 1 year, and during this period there was never a tic-free period of more than 3 consecutive months
- C. The onset is before age 18 years
- D. The disturbance is not due to the direct physiological effects of a substance (e.g. stimulants) or a general medical condition (e.g. Huntington's disease or postviral encephalitis)

DSM-IV-TR Criteria 307.22 (Chronic Motor or Vocal Tic Disorder)

- A. Single or multiple motor or vocal tics (i.e. sudden, rapid, recurrent, nonrhythmic, stereotyped motor movements or vocalizations), but not both, have been present at some time during the illness
- B. The tics occur many times a day nearly every day or intermittently throughout a period of more than 1 year, and during this period there was never a tic-free period of more than 3 consecutive months
- C. The onset is before age 18 years
- D. The disturbance is not due to the direct physiological effects of a substance (e.g. stimulants) or a general medical condition (e.g. Huntington's disease or postviral encephalitis)
- E. Criteria have never been met for Tourette's disorder

DSM-IV-TR Criteria 307.21 (Transient Tic Disorder)

- A. Single or multiple motor and/or vocal tics (i.e. sudden, rapid, recurrent, nonrhythmic, stereotyped motor movements or vocalizations)
- B. The tics occur many times a day, nearly every day for at least 4 weeks, but for no longer than 12 consecutive months
- C. The onset is before age 18 years
- D. The disturbance is not due to the direct physiological effects of a substance (e.g. stimulants) or a general medical condition (e.g. Huntington's disease or postviral encephalitis)
- E. Criteria have never been met for Tourette's disorder or chronic motor or vocal tic disorder

Specify if:

Single Episode or Recurrent

DSM-IV TR Criteria 307.20 (Tic Disorder, Not Otherwise Specified)

This category is for disorders characterized by tics that do not meet criteria for a specific tic disorder. Examples include tics lasting less than 4 weeks or tics with an onset after age 18 years

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- Is the maximum 3-month tic-free interval in any 12-month interval critical to the determination of chronicity?
- Is a change needed for the duration criterion (Criterion B) in TTD?

3. Are any changes required to Criterion C for any of the tic disorder diagnoses?

- Is the 18-year maximum age of onset too old?

4. Are any changes required to Criterion D for any of the tic disorder diagnoses?

- Should prescription stimulant medication be used as an example of substances causing tics?
- Should the current exclusion criteria be retained?

5. Is any change required for Criterion E for CMVTD and TTD?

6. Is there a need for a clinical severity criterion or specifier?

- Should there be a clinical severity criterion or specifier for the tic disorders?

7. Does the Tic Disorder, Not Otherwise Specified category need revision?

- Should those with very short duration of tic symptoms be included in the proposed category of provisional tic disorder?
- Should adult onset cases continue to be included in TDNOS category?

8. Do tic disorder diagnostic criteria appear suitable from a developmental, gender, and cross-cultural perspective?

9. Are there subtypes of tic disorders supported by the literature that should be included in DSM-V?

- Is there substantial enough an evidence base for subtypes of tic disorders?

10. Is the current grouping of the tic disorders in DSM-IV-TR appropriate?

SIGNIFICANCE OF THE ISSUES

With respect to issues #1–7, the aim of the diagnostic criteria for tic disorders is to classify patients' symptoms accurately, so as to improve treatment. The diagnostic criteria also facilitate provider communication about the patient and allow research to be conducted to improve our understanding of the epidemiology, genetics, pathophysiology, course and prognosis, and management of tic disorders. Emphasis will be placed on addressing the shortcomings of the current criteria, and potential ways of addressing these.

With respect to issue #8, there is a great interest in reviewing the current DSM-IV-TR criteria to ensure that they fully account for any developmental variability in symptom presentation, and optimally reflect potential gender, racial or ethnic differences in symptoms, onset, and course.

With respect to issue #9, since DSM-IV-TR there has been a great deal of research on the phenomenology of tic symptoms, including factor analyses that suggest grouping of tic symptoms that may have utility in assessment, identifying patterns of co-morbidity or differences in course of illness, and treatment planning.

Issue #10 addresses with which other disorders should the tic disorders be grouped. This is a particularly challenging issue facing DSM-V. How the tic disorders are grouped communicates how the field perceives the relationships between the tic disorders and psychiatric disorders in general, and has implications for patients, providers, and payers, and for advocacy that needs to be carefully considered. This issue will also be considered in more detail in a separate study in this issue (Phillips et al.).

SEARCH METHODS

A literature search was conducted using Web of Science, PubMed, Psycinfo, and other relevant databases. Documents from the DSM-V planning process (e.g. Research Agenda books, the Options Book, and planning conferences) and Reference sections of published articles were also examined. There was no time limit to the search. Search terms included "tic disorders," "tics," "Tourette disorder," "Tourette's disorder," "Tourette syndrome," "Tourette's syndrome," "Tourettes," "premonitory sensation," and "premonitory urge."

RESULTS

1. Are any changes required to the definition of tics in criterion A of the current diagnostic criteria?

- Should vocalizations that are result of motor tics be considered vocal tics or motor tics?

Motor tics of the diaphragm and oropharynx can result in simple vocalizations (e.g. grunting, snorting, and sniffing).^[18] Whether such simple sounds are considered motor or vocal tics have important implications for the tic disorder diagnoses. Retaining the motor and vocal tic distinction, is arguably in keeping with the descriptive approach in DSM-V. Changing diagnostic practice and reclassifying simple vocalizations as motor tics might be more accurate but such a change in diagnostic practice would result in significant discontinuity with historical diagnostic approaches in clinical and research practice. For example, individuals with simple vocalizations who currently carry the diagnosis of TD may no longer meet the diagnostic criteria for TD, and prevalence estimates from recent high-quality epidemiological studies^[3] using the current criteria may shift substantially. Furthermore, there is no evidence that such a change would improve the assessment or treatment of patients with tic disorders.

In addition to the historical precedent, and the descriptive nature of DSM, there is empirical data to support the distinction between motor and vocal tics. Specifically, factor analytic studies consistently identify motor and vocal tics as independent factors.^[19–22]

Epidemiological studies suggest that co-morbidity rates differ based on the presence chronic motor or chronic vocal tics. The presence of chronic vocal tics is associated with higher rates of co-morbidity than chronic motor tics (58% vs. 12%) as well as specifically higher rates of ADHD (33% vs. 12%) and OCD (8% vs. 0%).^[23]

Recommendation: We recommend continuing to identify vocalizations caused by motor tics as vocal tics.

- Would it aid in the distinction of tics from stereotypies to remove the term “stereotyped” from the description of tics in Criterion A?

Tics and stereotypies can be difficult to differentiate from each other. Both can have an onset in early childhood and can co-occur in the same child.^[24] In addition, complex tics may appear similar to stereotypies.^[24] Including the word “stereotyped” in the definition of a tic may contribute to the misclassification of stereotypies and tics. Given that there are other terms that can capture the repetitive nature of tics, eliminating the word stereotyped from the definition of a tic would remove one source of potential confusion. Although there are few other terms that capture the fact that tics are consistent both within a patient and across patients, removing the term “stereotyped” from the definition of a tic, using simpler and more descriptive language to define tics and providing examples of tics and stereotypies in the text, would address potential confusion and help clinicians in distinguishing these symptoms.

Recommendation: We recommend removing the term “stereotyped” from the definition of a tic in Criterion A, and providing detailed descriptions and examples of tics and stereotypies in the text on tic disorder and stereotypic movement disorder. See Criterion A tic definition below.

- Are wording changes needed to make Criterion A consistent in each of the tic disorders?

The definition of a tic that is used in Criterion A for TD, DMVTD, and TTD varies in its wording. The definition of a tic should be consistent across the tic disorders.

Recommendation: We recommend a consistent definition of tics in Criterion A for TD, CMVTD, and TD namely, “A tic is a sudden, rapid, recurrent, nonrhythmic, motor movement or vocalization.”

- As both TD and CMVTD are chronic tic disorders should Criterion A for TD and CMVTD be changed to allow merging of these categories?

Based on Criterion A, patients with chronic motor and vocal tics are diagnosed with TD, while those with chronic motor only or chronic vocal only are diagnosed with CMVTD. Eliminating the distinction between TD and CMVTD might potentially simplify diagnostic assessment by eliminating a distinction between the chronic tic disorders—TD and CMVTD. Although

research is lacking, there are likely few differences in neural substrates, genetic and environmental risk factors, course or treatment response that justify a major distinction between TD and CMVTD.^[25] In addition, some genetic^[26,27] and treatment studies^[28,29] combine TD and CMVTD.

However, there are important disadvantages to eliminating the distinction between TD and CMVTD. There is an emerging literature that suggests that the presence of vocal tics in TD may be clinically meaningful. For example, impairment associated with TD appears to be greater than that for chronic motor tics only.^[30] As noted above, factor analytic studies of TD suggest the presence of vocalizations, especially complex vocalizations, to be an important phenotypic distinction to maintain.^[19–22,31,32] In addition, comorbidity patterns may differ between TD and CMVTD.^[33] Collapsing these diagnostic categories may therefore lead to important loss of information, and adversely impact assessment and treatment.

Recommendation: We recommend that the distinction between Tourette’s disorder and the chronic motor or vocal tic disorder be maintained.

- Is there sufficient distinction between individuals with chronic motor tics only and chronic vocal tics only to justify making each a unique diagnostic category?

Currently, patients with chronic motor tics only or chronic vocal tics only are diagnosed with chronic motor or vocal tic disorder. There may be advantages to create a new diagnostic category for patients with only motor tics or only vocal chronic tics. As noted earlier, vocal tics may reflect a different neurobiology and may potentially require different treatment. However, the prevalence of chronic vocal tic disorder is relatively low,^[23] and to date no study has suggested that motor or vocal tics should be treated differently. It is possible that those who report only vocal tics may in fact have motor tics upon examination as in clinical practice and in research it is common to observe tics in those who do not report any tic symptoms.^[34]

Recommendation: We recommend maintaining the current category of chronic motor or vocal tic disorder, but adding a motor tic only vs. vocal tic only specifier. This change in diagnostic practice may stimulate research into a small, but potentially meaningful subtype of tic disorder.

2. Are any changes required to Criterion B for any of the tic disorder diagnoses?

- There are three issues relevant to the duration criterion for TD, CMVTD, and TTD.
 - Is the 12-month duration of symptoms adequate for diagnosis?
 - Is the maximum 3-month tic-free interval in any 12-month interval critical to the determination of chronicity?
 - Is a change needed for the duration criterion (Criterion B) in TTD?

The 12-month minimum duration of symptoms is an arbitrary cut-off point. Yet, it is consistent with the term “chronic” and has historical precedent in DSM. Although 12 months of persistent symptoms may be considered a high threshold for chronicity, it assures that the chronic tic disorder diagnoses are only used for those with persistent tic symptoms. This is especially important given that up to a third of those with tics in childhood become tic-free or nearly tic-free in adulthood.^[35,36]

Although the minimum duration of tic symptoms that predicts a chronic course is not known,^[37] there could be value to a shorter duration criterion. A shorter duration criterion would allow more children to have the diagnosis and potentially increase referral for early interventions for the common and disabling co-occurring conditions. Also, such early diagnosis could increase referrals for promising low-risk behavioral interventions^[38,39] for these disorders.

Given the waxing and waning nature of the tic disorders, including a maximum tic-free interval is a way of making sure that those who are diagnosed with a chronic tic disorder have persistent and not transient symptoms. However, the duration of the tic-free interval in DSM is arbitrary,^[18] is not based on data, and is potentially more difficult to assess (i.e. based on a patient’s recall of tic-free periods) than the 12-month duration criteria. As noted above individuals are often unaware of their current tic symptoms,^[34,40] so that some individuals who report tic-free intervals may, when examined, not be tic free.

Given the 12-month minimum duration for TD and CMVTD there is a need for a diagnostic category for those with tic disorders of less than 12-months duration. Currently, the transient tic disorder (TTD) diagnosis is intended for those who have not had tics for the minimum 12 months necessary for a chronic tic disorder diagnosis. However, the current TTD category is awkward in its implementation. First, the term “transient” suggests that the tics have come and gone. For a youngster who presents with 6 months of tic symptoms, it is awkward to describe the child’s symptoms as transient when they are currently present and have been persistent for 6 months. Second, that same youngster does not actually qualify for a TTD diagnosis until evaluated again at 12 months where upon the youngster can get either a TTD diagnosis, if the tics went away, or a TD or CMVTD diagnosis, if the tics persist. The TTD, recurrent, category is similarly awkward to implement; for example, an 11-year-old patient with age of tic onset at 7 years who has multiple episodes of motor and vocal tics of less than 12 months duration and with greater than 3 month tic-free intervals will receive a diagnosis of TTD, recurrent. Clinically, this patient has chronic symptoms over a 4-year period. In clinical practice this patient would likely be considered to have chronic symptoms of Tourette’s disorder diagnosis, but under the current

criteria would only meet criteria for a transient tic disorder, recurrent.

Currently, those with tics of less than 4 weeks duration receive a TDNOS diagnosis. Again, the 4-week threshold is arbitrary, not based in data and it is unknown whether tics of less than one month’s duration predicts a transient course or not.

Recommendation: We recommend maintaining the 12-month duration criterion, eliminating the 3-month maximum tic-free interval, and changing the wording of the duration criterion for TD and CMVTD. The new wording would be “The tics may wax and wane in frequency but have persisted for more than 1 year since first tic onset.” Thus, chronicity would be determined by the duration of symptoms from first tic onset rather, rather than by persistence of symptoms over any arbitrary 12-month period.

We also recommend changing the name of the TTD diagnostic category to “provisional tic disorder” and revising its duration criterion. The use of the diagnosis “provisional tic disorder” seems more accurate than “transient tic disorder” for patients with ongoing tic symptoms of less than one-year duration since onset. The use of a “provisional tic disorder” diagnosis acknowledges that a patient presently has tics, but which have not been persistent for more than 12 months since first onset. To be consistent with the wording of the duration criterion for TD and CMVTD (i.e. Criterion B), the duration criterion for the provisional tic disorder category would be “The tics have been present for less than 1 year since first tic onset.”

We recommend that children with symptoms of less than 4 weeks also be given the provisional tic disorder diagnosis. This change would reduce the use of the residual category, TDNOS, for very new onset cases.

3. Are any changes required to Criterion C for any of the tic disorder diagnoses?

- Is the 18-year maximum age of onset too old?

In DSM-IV the maximum age of onset for the tic disorders was changed from 21 to 18 years. This change reflects multiple studies suggesting that the age of onset was in children and young adolescents.^[36] Also, age 18 corresponds to an accepted standard of when adulthood begins. This age of onset has been consistently used in DSM despite prior and current research, which suggests the age of onset for most affected individuals to be even earlier, prior to puberty.^[36,41] Given the precedent for the upper age limit of 18 years, the cultural acceptance of age 18 as the age of adulthood and the listing of the tic disorders in the section on Disorders Usually First Diagnosed in Infancy, Childhood, or Adolescence, having a generous age of onset criterion allows for inclusion of all typical and atypical cases that might have had tic onset in the mid to late teen years.^[41]

Recommendation: We recommend maintaining the age 18 years as the upper age limit of tic onset.

4. Are any changes required to Criterion D for any of the tic disorder diagnoses?

- Should prescription stimulant medication be used as an example of substances causing tics?

The current exclusion criterion excludes tics that clearly appear secondary to substance use (e.g. stimulants) or a general medical conditions. Although this exclusion is consistent with an anecdotal literature suggesting stimulant medication can cause new tic onset or an exacerbation of existing tics,^[42,43] and current product information for stimulant medications, it is not consistent with the current evidence base of stimulant treatment in children with tics and ADHD. Blinded clinical trials of stimulant medications for ADHD in children with tics suggest that stimulants are no more commonly associated with tics as an adverse event than placebo or clonidine.^[28] These data and other studies^[44-46] suggest that during well-supervised stimulant treatment of ADHD in children with tics, the rate of tic exacerbation associated with stimulant treatment is not higher than that observed with placebo or an active drug comparator.

Recommendation: We recommend removing the example of prescription stimulants medication from the exclusion criteria to make the diagnostic criteria consistent with the treatment evidence base for the stimulant treatment of ADHD in children with tic disorders. We also recommend using examples of illegal substances such as cocaine to highlight the potential adverse effects of drugs of abuse in people with tics.

- Should the current exclusion criteria be retained?

The current exclusion criterion assures that tic symptoms in those who are diagnosed with TD, CMVTD, or TTD are idiopathic as to cause and are not the result of a known medical cause or substance induced. There is a strong precedent to exclude from a tic disorder diagnosis (and any other psychiatric disorder) those whose symptoms appear to be attributable to an identifiable cause. However, caution is warranted in attributing a specific cause to tic onset or worsening as there is potential for a false attributions. Tics are common in childhood, tics wax and wane in severity and are responsive to environmental factors such as psychological stress or excitement, and thus may appear to come and go in response to environmental factors. For example, it is common in clinical practice for children and parents to attribute tic onset or worsening to a situation, event or environmental factor because of a close temporal association and a plausible mechanism (e.g. stress at school, excitement at an amusement park, etc.) The exclusion is not meant for such cases with a typical age of onset, pattern of symptoms, whose onset or worsening are temporally

associated with routine experiences of childhood. Rather the exclusion is meant to highlight those cases where tic onset or exacerbation is associated with unusual events, which directly affect central nervous system functioning, are temporally associated with tic onset and may have other atypical features. For example, most adult onset cases are readily attributable to medical condition, although the phenomenology of such secondary tics is not different than tics that are considered idiopathic and treatment of such secondary tics is similar to that for idiopathic tics.^[47]

Recommendation: We recommend retaining the current exclusion criterion for the tic disorders, but also recommend creating new categories in parallel with other DSM diagnoses for those tic disorders where there is a known cause. Tic disorders due to a misuse of an illegal substance (such as cocaine^[48]) should be classified as Substance (indicate the substance) Induced Tic Disorder and those tic disorders with a known medical cause (such as stroke, encephalitis, or head trauma^[48]) should be diagnosed with “Tic Disorder due to ...” (indicate the general medical condition).

5. Is any change required for Criterion E for CMVTD and TTD? Criterion E notes the hierarchical nature of the tic disorders such that those with a Tourette disorder history cannot be given subsequently a chronic motor or vocal tic disorder. We do not recommend a change to this criterion.

6. Is there a need for a clinical severity specifier?

- Should there be a clinical severity criterion or specifier for the tic disorders?

In DSM-IV, all the tic disorder diagnoses included a distress or impairment criterion that was required for diagnosis. This criterion was removed from the tic disorders in DSM-IV-TR as many individuals with chronic motor and/or vocal tics were not considered distressed or impaired and therefore could not be diagnosed with a tic disorder.^[13,14]

There are a number of factors that contribute to tic severity or impairment in patients with tic disorders.^[49,50] The person’s reaction to his or her tics, the family’s reaction, and the reaction of others at school or work place may all impact perceived severity or impairment and render such assessments highly variable and potentially unreliable. For example, clinical experience suggests that a child with mild tics in a hostile school environment may be more impaired, and perceived as having more severe symptoms than a child with more severe tics in an accepting school environment. Also, as many who come to clinical attention have tics and co-morbid conditions, parsing tic impairment and severity from severity and impairment associated with co-occurring conditions is difficult.

Recommendation: We do not recommend that severity or impairment be included as a criterion required for diagnosis. However, consideration should be given to develop criteria to specify a level of severity or impairment for those diagnosed with a tic disorder.

7. Does the Tic Disorder, Not Otherwise Specified category need revision? Currently, the TDNOS category is to be used (1) for those with very short duration of symptoms (i.e. less than 4 weeks); and (2) onsets of symptoms that occur after age 18 years.

- Should those with very short duration of tic symptoms be included in the new provisional tic disorder category?

There are no data to suggest that those with tics of less than 4 weeks duration are substantially different from those with tics greater than 4 weeks duration or that the phenomenology of the tics are different than those with tics of greater duration.

Recommendation: We recommend that those with any duration of tic symptoms of less than 12 months since tic onset be diagnosed with a provisional tic disorder. This will reduce the use of TD NOS for such new onset cases.

- Should adult onset cases continue to be included in TDNOS category?

Although the typical age of onset of the tic disorders is in the early childhood years, a number of case reports have documented the onset of tics in the adult years.^[47] First clinical presentations of tics in adulthood include those who have known of their lifetime history of tics, those who through careful evaluation are found to have a childhood onset, and those who appear to have an onset in adulthood.^[47] Of the cases with verified adult onset, most had an identifiable medical cause and very few were considered idiopathic. These idiopathic adult onset cases do not appear to differ from age-matched affected adults with childhood onset.^[47]

Recommendation: For those adult onset cases with an identifiable medical cause we recommend using the new category “Tic Disorder due to... indicate the medical condition” that would include motor and/or vocal tics of any age of onset (See proposed criteria). Idiopathic adult onset cases would continue to be diagnosed with TDNOS. This will eliminate the use of TDNOS for adult onset cases with an identifiable medical cause.

8. Do tic disorder diagnostic criteria appear suitable from a developmental, gender, and cross cultural perspective?

Although tics wax and wane in severity and tic symptoms can be highly variable within and across individuals, there are no data suggesting that the phenomenology or treatment of tics are different for

children, adolescents, or adults,^[9] for males and females or across cultures.^[51] However, some studies have found that girls may have different patterns of onset and course,^[52] co-morbidity,^[41] or neuroimaging findings.^[53]

Recommendation: We do not recommend any change in diagnostic criteria to specifically reflect developmental, gender, or cross-cultural issues.

9. Are there subtypes of Tic Disorders supported by the literature that should be included in DSM-V?

- Is there substantial enough an evidence base for subtypes of tic disorders?

A number of factor analytic studies have suggested that there are distinct symptom groupings which might have important implications for understanding the genetics and pathophysiology of the tic disorders and may also have implications for treatment.^[19–22] The results of these studies suggest that impairment associated with combined motor and vocal tics appears to be greater than with chronic motor tics alone, and supports the distinction of TD from CMVTD. Some studies have identified factors for simple tics and complex motor and vocal tics.^[21] Others have found complex motor, complex vocal tics, and simple motor and vocal tics to be important constructs.^[19] These studies combined suggest that simple and complex tics, and vocal tics appear to be unique constructs. Methodological differences and shortcomings including small sample sizes and varying sampling strategies (e.g. large kindreds, population isolates, and clinic populations) lessen enthusiasm for supporting diagnostic changes based on these studies. Also, a number of the factor analytic studies have included not just tic symptoms but symptoms of co-morbid conditions so that the factors are an amalgam of tic disorder and symptoms from other co-occurring disorders.

Ultimately subtyping the tic disorders would allow for the identification and assessment of distinct phenotypes for research studies, but even if validated such subtypes may not be useful for clinical purposes.

Recommendation: Given the lack of empirical support for specific subtypes and limitations of the factor analytic studies, we do not recommend creating subtypes of TS at this time. We believe this will not impact adversely on future research, given that the Methods section of these manuscripts provide adequate detail for replication. We also recommend that the accompanying text include a discussion of factor analytic studies and potential for subtyping in the future.

10. Is the current classification of the tic disorders appropriate?

In DSM-IV-TR the tic disorders are grouped with “Disorders Usually First Diagnosed in Infancy, Childhood, or Adolescence.”^[12] At the DSM-V Research Planning Conference on Obsessive–Compulsive

Spectrum Disorders in 2006,^[54] consideration was given to an OC Spectrum Disorders grouping (Please see Phillips et al., this issue for a complete discussion of this issue).

There are a number of reasons for and against grouping the tic disorders with other disorders, such as OCD, that are characterized by repetitive thoughts and behaviors. Tic disorders, OCD, and other candidate conditions for the OC Spectrum disorders are characterized by repetitive behaviors that are consistent within a patient and can be manifested similarly among patients.^[55] Although tics are readily distinguished from other repetitive behaviors, some complex tics can appear goal-directed and similar to compulsions. The tic disorders and obsessive-compulsive disorder are also similar in that patients describe internal experiences (i.e. obsessions in OCD and premonitory urges in the tic disorders) that can occur before or prompt a tic or compulsion.^[56] However, the internal experiences in OCD and the tic disorders are different as obsessions in OCD are often complex cognitions that included autonomic arousal, whereas patients with Tourette's disorder report more sensory experiences or urges and less cognitive symptoms.^[57-59] The tic disorders and OCD are commonly co-morbid with each other suggesting an etiological link,^[2] but some symptoms of OCD are more commonly co-morbid (e.g. sensory motor type, hoarding) with the tic disorders, whereas other OCD symptoms are not (e.g. contamination obsessions and compulsions).^[60] Both tic disorders and OCD have a childhood onset, but adult onset OCD (>18 years) is not uncommon,^[61,62] while adult onset for the idiopathic tic disorders is rare^[47] and exclusionary. The tic disorders characteristically have peak severity in childhood and improve into adulthood^[36] as do some forms of childhood onset OCD,^[63] but some with OCD have persistent and worsening symptoms into adulthood.^[63] Family genetic studies suggest higher than expected rates of OCD in families of those with tic disorders^[4] and higher than expected rates of tic disorders in families with OCD.^[61] Efforts to identify genes for TS and OCD have, however, been largely unsuccessful, and of the positive studies few have been positive for the tic disorders and OCD. Although the tic disorders and OCD likely involve cortical striatal loops, the neuroimaging findings report different patterns of abnormality in these patient groups and suggest the possibility of accounting for the phenomenological differences between the two disorders insofar as tic disorders involve brain regions and circuits consistent with the sensory and motor phenomena^[25] while OCD involves brain regions and circuits consistent with the involvement of more complex cognitions and behavior.^[64-67] Although co-morbid OCD, anxiety, and depression in tic disorder patients may respond to SRI treatments tics do not, but rather are responsive to dopamine blockers. OCD, however, is often responsive to the SSRIs, but not to monotherapy with anti-

psychotics. The addition of antipsychotics to SSRIs for treatment refractory OCD may be particularly useful in those with tic disorders, which in turn may reflect the efficacy of dopamine blockers for tic and tic-related OC symptoms (e.g. sensorimotor symptoms). To date treatment studies have not sufficiently evaluated the moderating effect of putative OCD and the tic disorder subtypes to identify those patients who either respond well or not to SSRIs or antipsychotics. Although behavioral treatments can be effective for both OCD and the tic disorders, their success may be related to their ability to disrupt negative reinforcement patterns that sustain and exacerbate both conditions and may not be due to direct effects on core underlying biological processes.^[68] Less is known about other important validators (i.e. biomarkers, temperamental and cognitive and emotional processing vulnerabilities) for the tics disorders and other potential OC spectrum conditions. Finally, an important difference between the tic disorders and OCD is the perception of the two by the public and the medical profession at large. Since Tourette's disorder was first described and especially since the mid 1960s when haloperidol was found to be effective, neurologists have been an important provider group. That tradition has led to the tic disorders being considered as a neurological disorder by primary care doctors, patients, and patient support groups. Other psychiatric disorders including OCD, although having a clear brain basis, have not been as consistently perceived by the public or nonpsychiatric medical professionals as neurological.

Recommendation: The grouping of the tic disorders needs to reflect scientific commonalities, historical precedent, and future clinical and investigative utility. If the section Disorders First Diagnosed in Infancy, Childhood and Adolescents is retained in DSM-V, then it would be reasonable to keep the tic disorders in this category. Including the tic disorders in a neurodevelopmental disorders category would also be appropriate. Including the tic disorders in a OC Spectrum category is not recommended at this time.

CONCLUSION

Although our understanding of the causes of the tic disorders requires much more research, the cardinal features of the tic disorders have been grounded in a clear understanding of the core phenomenological features (i.e. motor and vocal tics) for over a century. Consistency in diagnostic practice has likely been extremely helpful in the substantial increases in our understanding of the epidemiology, genetics, and neurobiological underpinning of these conditions over the past 30 years.

The goal of this review's recommendation is to maintain the focus on the cardinal features of the tic disorders, to clarify and simplify the diagnostic process, and reduce the use of the TDNOS category. Our recommendation for a common definition of a tic for

all the tic disorders eliminated inconsistency in the definitions in the current DSM. Removing the term “stereotyped” from the definition of a tic reduces the risk of mis-diagnosing tics as stereotypies and vice versa. Simplifying the duration criterion for the tic disorders will likely improve reliability, match current clinical practice, and reduce the number of individuals who will be diagnosed with TDNOS. The addition of new categories for drug-induced tic disorder and tic disorder secondary to medical conditions also will reduce the numbers of individuals diagnosed with TDNOS. The preliminary recommendations for tic disorder diagnostic criteria are presented below with the understanding that the final criteria as published in DSM-V may differ.

PROPOSED CRITERIA FOR THE ADULT AND CHILD ONSET TIC DISORDERS

DSM-V CRITERIA 30X.XX (TOURETTE’S DISORDER)

- A. Both multiple motor and one or more vocal tics are present at some time during the illness, although not necessarily concurrently. (A tic is a sudden, rapid, recurrent, nonrhythmic, motor movement or vocalization).
- B. The tics may wax and wane in frequency but have persisted for more than 1 year since first tic onset.
- C. The onset is before 18 years of age.
- D. The disturbance is not due to the direct physiological effects of a substance (e.g. cocaine) or a general medical condition (e.g. Huntington’s disease or postviral encephalitis).

DSM-V CRITERIA 30X.XX(CHRONIC MOTOR OR VOCAL TIC DISORDER)

- A. Single or multiple motor or vocal tic but not both have been present at some time during the illness. (A tic is a sudden, rapid, recurrent, nonrhythmic, motor movement or vocalization).
- B. The tics may wax and wane in frequency but have persisted for more than 1 year since first tic onset.
- C. The onset is before 18 years of age.
- D. The disturbance is not due to the direct physiological effects of a substance (e.g. cocaine) or a general medical condition (e.g. Huntington’s disease or postviral encephalitis).
- E. Criteria have never been met for Tourette’s disorder.

Specify:

1. Motor tics only
2. Vocal tics only

DSM-V CRITERIA 30X.XX PROVISIONAL TIC DISORDER

- A. Single or multiple motor and/or vocal tics (A tic is a sudden, rapid, recurrent, nonrhythmic, motor movement or vocalization).
- B. The tics have been present for less than 1 year since first tic onset.
- C. The onset is before 18 years of age.
- D. The disturbance is not due to the direct physiological effects of a substance (e.g. cocaine) or a general medical condition (e.g. Huntington’s disease or postviral encephalitis).
- E. Criteria have never been met for Tourette’s disorder or chronic motor or vocal tic disorder.

DSM-V CRITERIA 30X.XX TIC DISORDER NOT OTHERWISE SPECIFIED

This category is for disorders characterized by tics that do not meet criteria for a specific tic disorder because the movements or vocalizations are atypical in age of onset or clinical presentation.

DSM-V CRITERIA 30X.XX SUBSTANCE-INDUCED (INDICATE SUBSTANCE) TIC DISORDER

- A. Motor and/or vocal tics have been present at some time during the illness. (A tic is a sudden, rapid, recurrent, nonrhythmic, motor movement or vocalization).
- B. There is evidence from the history, physical examination, or laboratory findings of either (1) or (2):
 1. The symptoms in Criterion A developed during, or within 1 month of, substance intoxication or withdrawal
 2. Substance use is etiologically related to the disturbance

DSM-V CRITERIA 30X.XX TIC DISORDER DUE TO A GENERAL MEDICAL CONDITION

- A. Motor and/or vocal tics have been present at some time during the illness. (A tic is a sudden, rapid, recurrent, nonrhythmic, motor movement or vocalization).
- B. There is evidence from the history, physical examination, or laboratory findings that the disturbance is the direct physiological consequence of a general medical condition.

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