

Tuberous Sclerosis Complex (TSC)–Associated Neuropsychiatric Disorders (TAND) Outcomes Following Adjunctive Cannabidiol (CBD) Treatment: 6-Month Intermediate Analysis of the EpiCom Trial

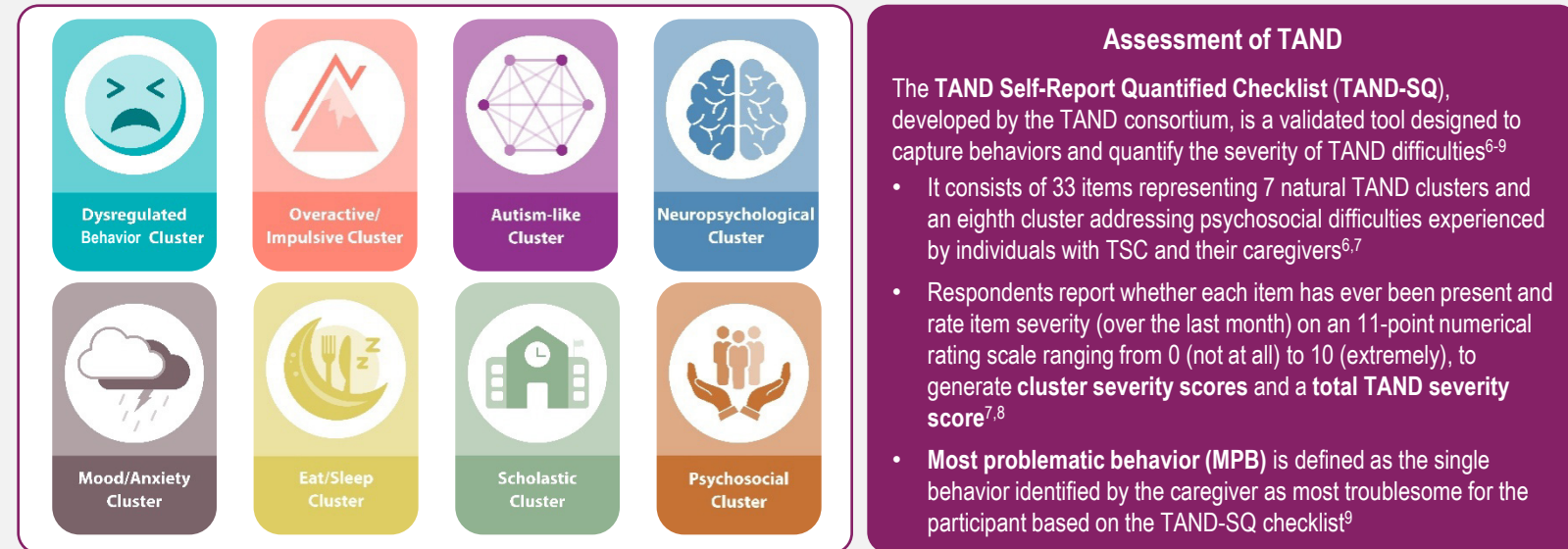
Agnies van Eeghen,^{1,2} Sarah M.L. Wilson,³ Stevie Roszkowski,⁴ Maria Dunaway-Bryant,⁵ Kasia Wajer,⁶ Teresa Greco,⁷ Joanne Stevens,⁵ Lisa Moore-Ramdin,⁶ Petrus J. de Vries⁸

¹Emma Center for Personalized Medicine, Emma Children's Hospital, Amsterdam University Medical Centers, Amsterdam, The Netherlands; ²Advismium, ³s Heeren Loo, Amersfoort, The Netherlands; ⁴Department of Pediatrics, Division of Child and Adolescent Neurology, McGovern Medical School, The University of Texas Health Science Center at Houston, Houston, TX, USA; ⁵Jazz Pharmaceuticals, Inc, Canton, MA, USA; ⁶Jazz Pharmaceuticals, Inc, Philadelphia, PA, USA; ⁷Jazz Pharmaceuticals, Ltd, London, UK; ⁸Jazz Pharmaceuticals, Inc., Gentium Srl, Villa Guardia, Italy; ⁹Center for Autism Research in Africa (CARA), Division of Child & Adolescent Psychiatry, University of Cape Town, Cape Town, South Africa

Introduction

- Approximately 90% of people with tuberous sclerosis complex (TSC) experience TSC-associated neuropsychiatric disorders (TAND; Figure 1), which substantially impact their quality of life. However, treatment options remain limited^{1,2}
- A plant-derived, highly purified pharmaceutical formulation of cannabidiol (CBD; Epidiolex® [US]/ Epidyolex® [EU]) is approved for the treatment of seizures associated with TSC^{3,4}
- Anecdotal reports from the TSC community of patients, caregivers, and healthcare professionals have suggested benefits with CBD treatment in behavioral (eg, calm or relaxed behavior) and neuropsychological symptoms (eg, increased attention span, awareness, and concentration)⁵
- EpiCom (Epilepsy Comorbidities; NCT05864846) is an interventional, multicenter, open-label, single-arm, phase 3a/4 study evaluating behavioral and other co-occurring outcomes following adjunctive CBD treatment in participants with TSC-associated seizures⁶

Figure 1. TAND clusters⁶



Objective

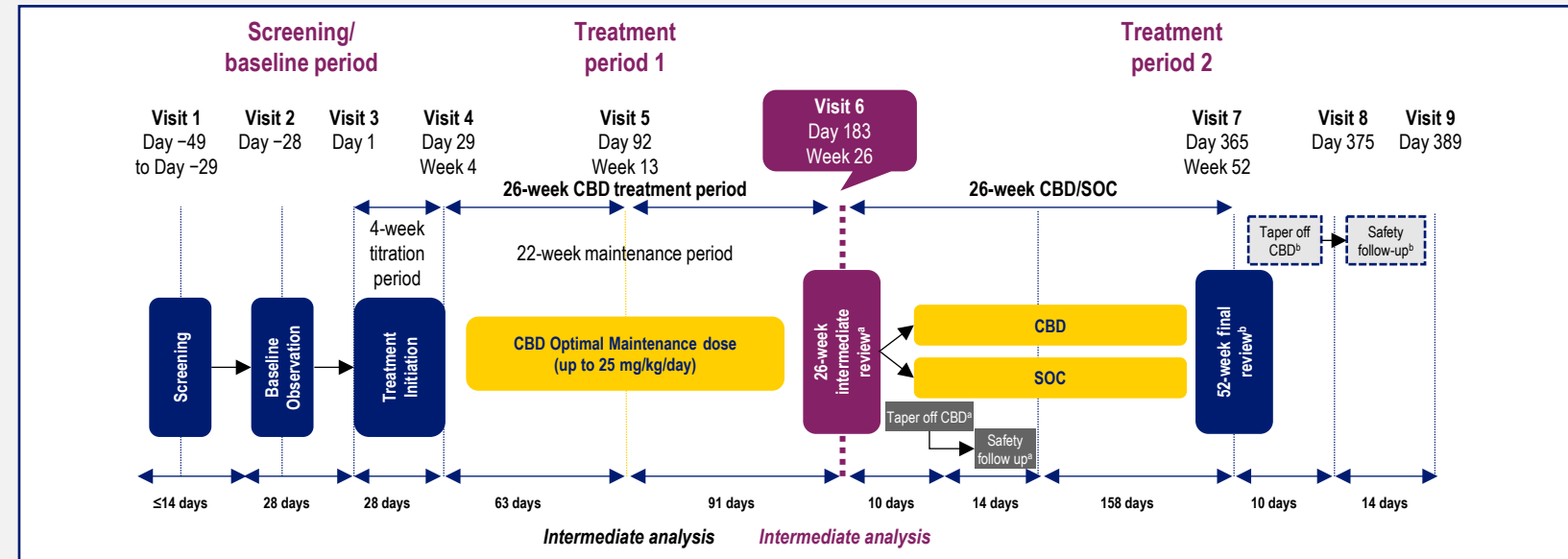
To investigate behavioral and other co-occurring outcomes after initiation of treatment with adjunctive CBD in patients with TSC-associated seizures. Here, we present the prespecified 6-month intermediate analysis of EpiCom

Methods

- Eligible participants aged 1 to 65 years⁶ with TSC-associated seizures and experiencing moderate/severe behavioral challenges on the Caregiver Global Impression of Severity (CareGI-S) scale were enrolled (Table 1)
- After a screening and baseline period of up to 49 days, participants receive CBD ≤25 mg/kg/day (based on response and tolerability) in addition to standard of care (SOC) for 26 weeks (Treatment period 1) (Figure 2)
 - The 26-week CBD treatment period includes a 4-week titration period and 22-week maintenance period
 - After 26 weeks on CBD + SOC, participants choose to continue either CBD with SOC or SOC alone for an additional 26 weeks (Treatment period 2)
- This 6-month intermediate analysis includes enrolled participants (n=79) who completed Treatment period 1 (Visit 6) as of April 2025 (n=28)
 - All enrolled participants received ≥1 dose of CBD and were included in the safety analysis set
 - ≥1 postbaseline assessment was available for 62 participants, who were included in the full analysis set
- Key endpoints evaluated at the 26-week intermediate analysis were:
 - MPB, TAND-SQ, Aberrant Behavior Checklist (ABC), CareGI-S, Clinician Global Impression of Severity (CGI-S), Child and Adult Behavior Checklist (CBCL/ABCL), seizure outcomes, treatment-emergent adverse events (TEAEs), and serious adverse events (SAEs)
 - Data were analyzed using standard descriptive statistics for continuous variables, including 95% CI for mean and median changes
- The EpiCom study was conducted with Epidiolex®/Epidyolex®, and results do not apply to other CBD-containing products, which are not FDA approved for the treatment of seizures associated with TSC

*Eligible participants were aged 2-65 years in the United Kingdom, Canada, and Poland.

Figure 2. Study design



*Participants who decide to discontinue CBD after the 26-week intermediate review visit but remain on study will form the SOC treatment arm. These participants will taper off CBD and complete a safety follow-up. *Participants who decide to discontinue CBD after the 52-week final review visit will taper off CBD and complete a safety follow-up. For participants who wish to remain on CBD after the study, the 52-week final review visit is the last study visit. CBD, cannabidiol; SOC, standard of care.

Table 1. Key inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> Confirmed diagnosis of TSC with a history of seizures Moderate/severe behavioral challenges (eg, aggression, impulsivity, temper tantrums, self-injury, and hyperactivity), with a most problematic behavior score of ≥6 on the TAND-SQ at baseline⁶ On ≥1 antiseizure medication Naïve to CBD or has been off CBD for ≥3 months before screening 	<ul style="list-style-type: none"> Any medical condition that could affect study outcomes Felbamate initiation within the year before screening Use of cannabis or cannabinoid-based products within the 3 months before screening Significant hepatic impairment and any history of suicidal behavior or ideation of type 4 or 5 as evaluated by the Columbia-Suicide Severity Rating Scale

*Based on the Likert scale: 1 = Very unimportant; 5 = Neither important nor unimportant; and 10 = Extremely important. CBD, cannabidiol; TAND, TSC-associated neuropsychiatric disorders; TAND-SQ, TAND Self-Report, Quantified Checklist; TSC, tuberous sclerosis complex.

Results

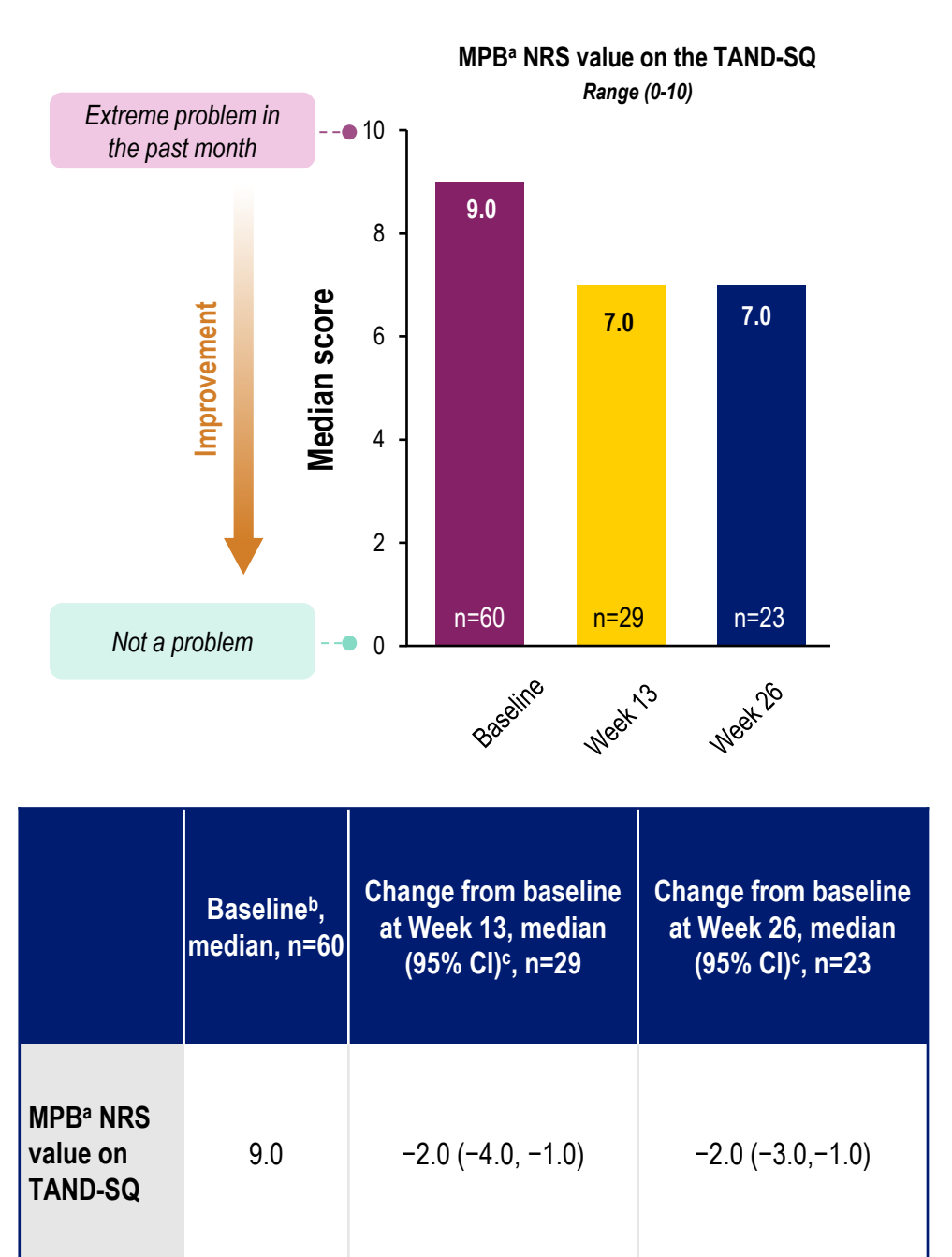
Table 2. Patient disposition and baseline characteristics

CBD (N=79)	
Age, years	
Mean (SD) ^a	18.5 (10.32)
Median (range)	16.0 (3–42)
Sex, n (%)	
Male	46 (58.2)
Female	33 (41.8)
Race, n (%)	
White	70 (88.6)
Asian	3 (3.8)
Black or African American	3 (3.8)
Declined to state	3 (5.3)
American Indian or Alaska Native	0
Native Hawaiian or other Pacific Islander	0
Multiple	0
Ethnicity, n (%)	
Hispanic or Latino	10 (12.7)
Not Hispanic or Latino	69 (87.3)
Number of participants reporting seizures within 12 months prior to screening, n (%) ^b	56 (70.9)
Average number of seizures per 28 days at baseline, mean (SD) ^b	20.4 (47.7)
Number of ASMs at baseline, median (range)	2 (0–6)
Most common baseline ASMs, n (%)	
Lamotrigine	24 (30.4)
Midazolam ^c	18 (22.8)
Clobazam	13 (16.5)
Valproic acid	13 (16.5)
Caregiver's view of intellectual disability, n (%) ^d	
Above average-normal intellect	7 (11.3)
Mild-moderate disability	21 (33.9)
Severe-profound disability	31 (50.0)
Did not state	3 (4.8)
Neuropsychiatric comorbidities, n (%)	
Autism spectrum disorder	47 (59.5)
Anxiety disorder	27 (34.2)
ADHD	21 (26.6)
Other psychiatric disorder(s)	11 (13.9)
OCD	8 (10.1)
Depression	4 (5.1)
Psychotic disorders, including schizophrenia	1 (1.3)

^an=37 were adults (≥18 years). ^bConsiders participants with any seizure type recorded within 12 months of screening. All participants had a history of seizures (but were not necessarily experiencing seizures) at the start of the study. The average number of seizures per 28 days at baseline is calculated from seizure diary records. ^cRescue medication. ^dn=62. ADHD, attention-deficit/hyperactivity disorder; ASMs, antiseizure medications; CBD, cannabidiol; OCD, obsessive-compulsive disorder.

- At the time of this analysis, 79 participants were enrolled; 39 had completed Week 13 and 28 were eligible for Week 26 analysis. 10 participants had discontinued the study
- Median (range) age was 16.0 (3–42) years, and 2.0 (0–6) antiseizure medications were being used at baseline (Table 2)
 - The most common concomitant antiseizure medications being used were lamotrigine (n=24 [30%]), midazolam (n=18 [23%]), clobazam (n=13 [17%]), and valproic acid (n=13 [17%])
- Half of the caregivers (50%) characterized their participants as having severe to profound intellectual disability, while a third of them (34%) reported mild to moderate disability
- The majority of participants reported ≥1 neuropsychiatric comorbidity at baseline, most commonly autism spectrum disorder (60%), anxiety disorder (34%), and ADHD (27%)

Figure 3. Change from baseline in Most Problematic Behavior (MPB)

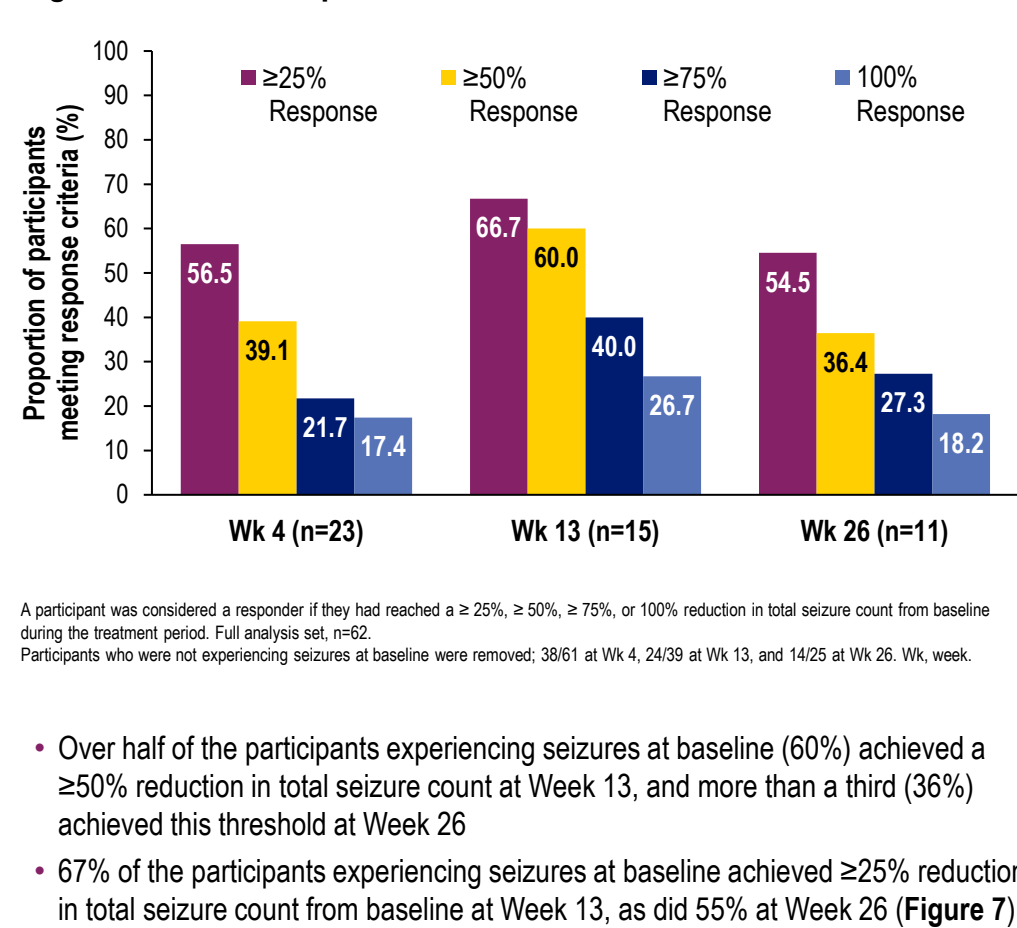


*MPB is a novel endpoint uniquely personalized to the patient and defined as the single behavior identified by the caregiver as most troublesome for the participant based on the TAND-SQ checklist. Behaviors are scored 0–10 (0 = not a problem; 10 = extreme problem in the past month). *At baseline, prospective participants must have had a MPB score of ≥6 (at least a moderate behavioral problem) on TAND-SQ to be eligible. *95% CI for the median change from baseline was calculated using the distribution-free method.

MPB, most problematic behavior; NRS, numerical rating scale; TAND, tuberous sclerosis complex-associated neuropsychiatric disorders; TAND-SQ, TAND Self-Report, Quantified Checklist.

- At baseline (n=60), the median MPB numerical rating scale (NRS) value was 9.0, suggesting severe TAND problems; aggressive outbursts (23%) and anxiety (11%) were the most identified MPBs at baseline
- At Week 26 (n=23), median (95% CI) change from baseline in MPB NRS was -2.0 ($-3.0, -1.0$), suggesting an improvement in behavioral outcomes from baseline (Figure 3)

Figure 7. Seizure response from baseline to Week 26

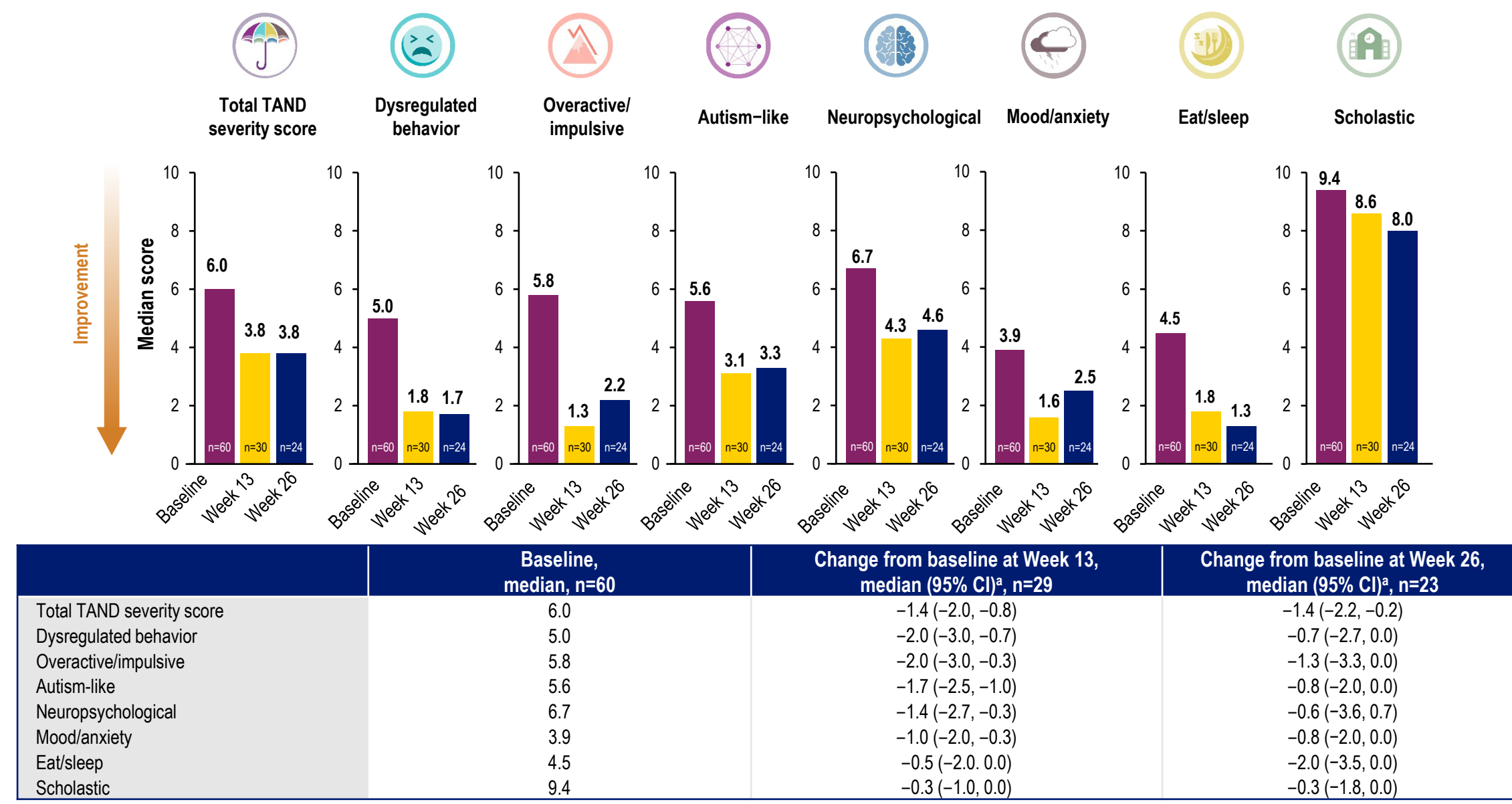


A participant was considered a responder if they had reached a ≥25%, ≥50%, ≥75%, or 100% reduction in total seizure count from baseline during the treatment period. Full analyses set, n=62.

Participants who were not experiencing seizures at baseline were removed: 38/61 at Wk 4, 24/39 at Wk 13, and 14/25 at Wk 26. Wk, week.

- Over half of the participants experiencing seizures at baseline (60%) achieved a ≥50% reduction in total seizure count at Week 13, and more than a third (36%) achieved this threshold at Week 26
- 67% of the participants experiencing seizures at baseline achieved ≥25% reduction in total seizure count from baseline at Week 13, as did 55% at Week 26 (Figure 7)

Figure 4. Change from baseline in TAND Self-Report, Quantified Checklist (TAND-SQ)

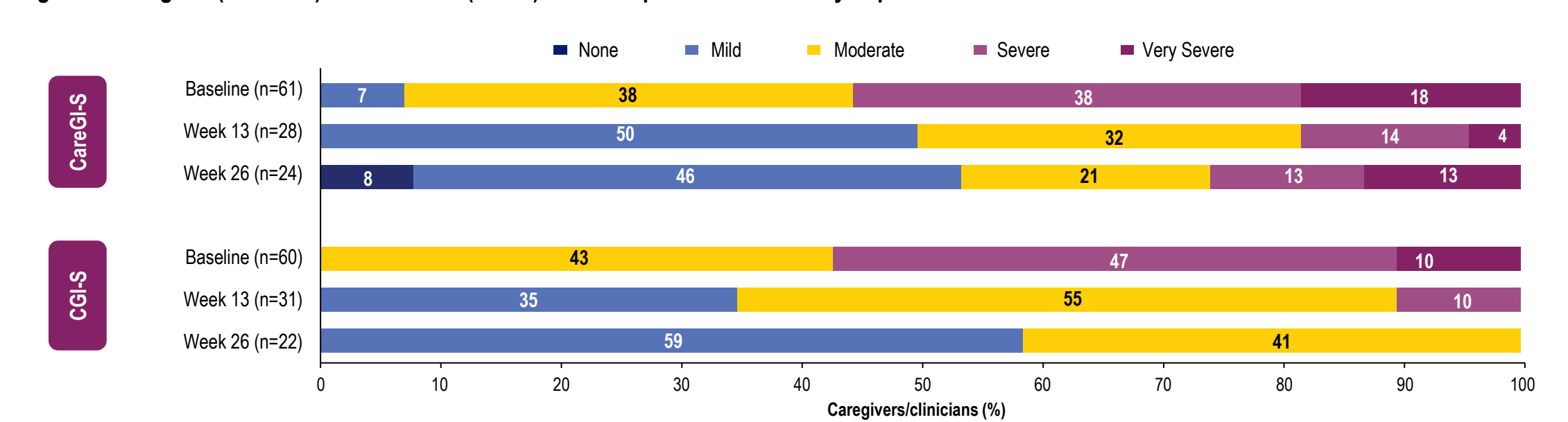


*95% CI for the median change from baseline was calculated using the distribution-free method. N numbers differ between the graph and table due to the potential for missing data at baseline and/or visits.

CI, confidence interval; TAND, tuberous sclerosis complex-associated neuropsychiatric disorders; TAND-SQ, TAND Self-Report, Quantified Checklist.

- Of the TAND-SQ cluster severity scores, the greatest reduction from baseline to Week 26 (median [95% CI]) was seen in eat/sleep (-2.0 [$-3.5, 0.0$]) and overactive/impulsive (-1.3 [$-3.3, 0.0$]) scores (Figure 4)

Figure 6. Caregiver (CareGI-S) and Clinician (CGI-S) Global Impression of Severity in problems with behavior



- Compared with baseline, smaller proportions of caregivers and clinicians rated behavioral problems as severe/very severe at Weeks 13 and 26, respectively (Figure 6)

Change from baseline in Child Behavior Checklist (CBCL)^a at Week 26

- At Week 26, improvements in scores from baseline were seen across several problem scales of the CBCL (Table S1)
- Among children attending school, the greatest improvement in score was seen in Aggressive Behavior syndrome scale (median [95% CI] -6.0 [$-8.0, 3.0$])

*CBCL is used for participants aged between 26 and ≤17 years. Higher score is indicative of a greater problem.

Change from baseline in Adult Behavior Checklist (ABCL)^b at Week 26

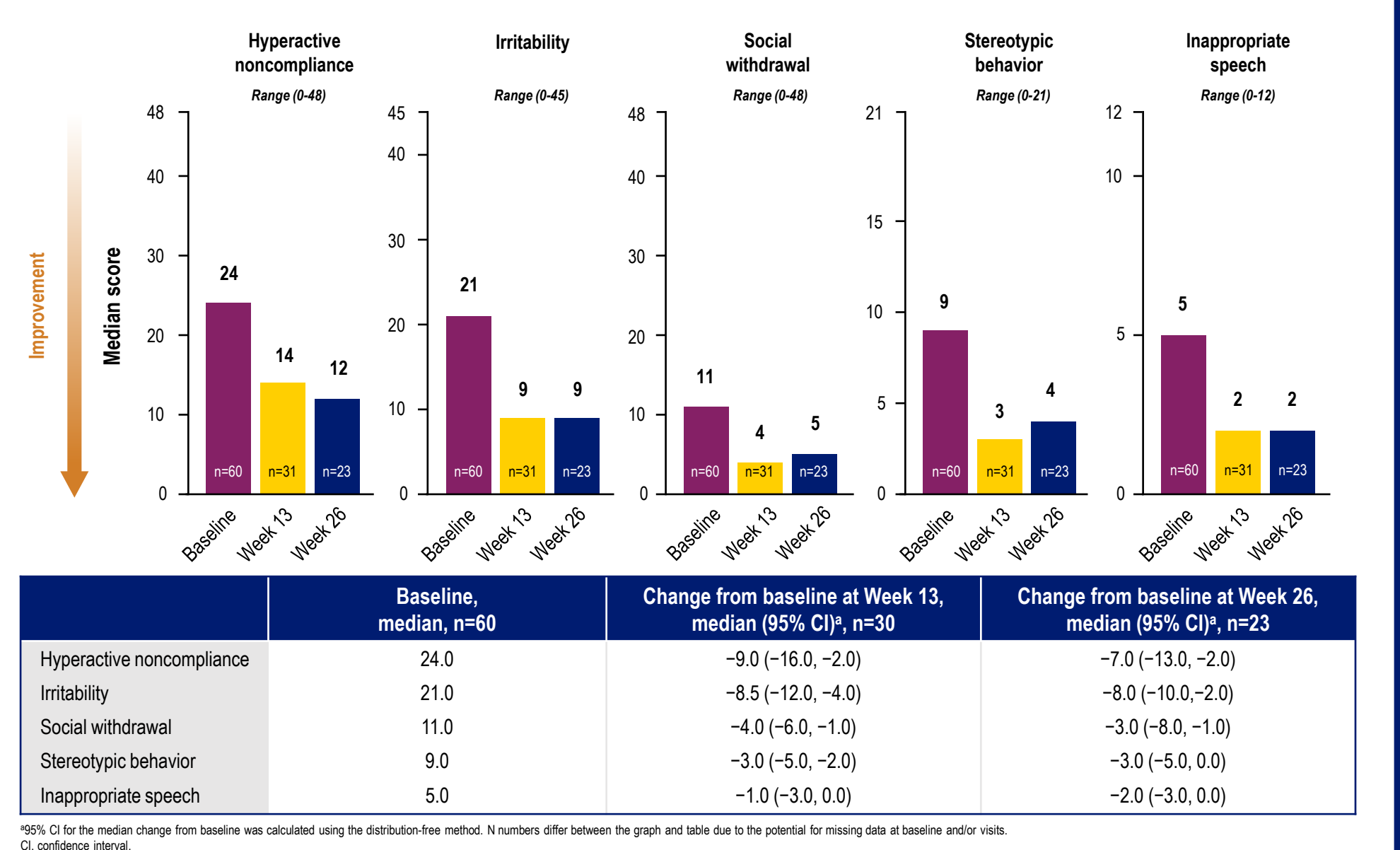
- At Week 26, improvements in scores from baseline were observed across most problem scales of the ABCL (Table S2)
- Among adults, the greatest improvement in scores were seen in Rule-breaking Behavior (median [95% CI] -3.0 [$-6.0, 1.0$]) and Other Problems^c syndrome scale (median [95% CI] -3.0 [$-7.0, 2.0$])

*ABCL is used for participants aged between ≥18 and ≤59 years. Higher score is indicative of a greater problem. ^cIncludes clinically relevant items that don't fit into the other defined syndrome scales such as (but not limited to) sleep disturbances, unusual thought patterns, repetitive behaviors, and emotional dysregulation.

Conclusions

- In this intermediate analysis, reductions in behavioral outcomes scores as measured on the TAND-SQ, ABC, CBCL, and ABCL were reported after 26 weeks of CBD initiation
- Additionally, reduction in severity of behavioral outcomes as measured on the CareGI-S and CGI-S scales were reported by caregivers and clinicians after 26 weeks

Figure 5. Change from baseline in Aberrant Behavior Checklist (ABC) subscales



*95% CI for the median change from baseline was calculated using the distribution-free method. N numbers differ between the graph and table due to the potential for missing data at baseline and/or visits.

CI, confidence interval.

- Among the ABC subscales, the greatest reduction from baseline to Week 26 was seen in irritability (-8.0 [$-10.0, -2.0$]) and hyperactive noncompliance (-7.0 [$-13.0, -2.0$]) scores (Figure 5)

Table 3. Safety outcomes

Participants with ≥1:	CBD (N=79)
TEAEs	49 (62.0)
Related TEAEs	34 (43.0)
TEAEs leading to CBD discontinuation ^a	11 (13.9)
Serious TEAEs ^b	6 (7.6)
TEAEs occurring in >15% of participants	
Diarrhea	19 (24.1)
Infections	18 (22.8)
Psychiatric disorders	13 (16.5)

^aSome patients may have had ≥1 TEAEs leading to CBD discontinuation. ^bSerious TEAEs that were considered treatment-related included hyperthermia and seizures (in the same patient), and suicidal ideation and hypokalemia in 1 patient each. 2 out of 3 patients discontinued – 1 due to suicidal ideation and 1 due to hypokalemia (n=1). 1 patient had their CBD dose reduced due to hyperthermia. All events were resolved.

AEs, adverse events; CBD, cannabidiol; TEAEs, treatment-emergent adverse events.

- TEAEs occurred in 49 (62.0%) participants, most commonly diarrhea, infections, and psychiatric disorders (Table 3)
- Serious TEAEs were reported in 6 (7.6%) participants; 4 AEs in 3 participants were considered treatment-related (resolved)

Retention

- At the time of this intermediate data analysis, the probability of participants remaining on CBD treatment at Week 26 was 86%; only 1 participant transitioned to SOC after 26 weeks of CBD treatment

Limitations

- This is an intermediate analysis of an open-label study that did not include a control group. Observed improvements may be confounded by potential regression to the mean, particularly given the smaller Week 26 sample size

- Safety profile was consistent with previous studies
- Participants currently enrolled in the study are continuing treatment through 52 weeks; final results are expected late in 2026

References: 1. Vanclooster S, et al. *J Neurodev Disord*. 2022;14(1):13. 2. de Vries PJ, et al. *J Neurodev Disord*. 2023;15(1):32. 3. US Food and Drug Administration. Epidiolex® Prescribing Information. 2025. Available from: https://www.accessdata.fda.gov/drugsatfda_docs/label/2025/211035s023bl.pdf. (Accessed September 25, 2025). 4. Epidiolex® 100 mg/ml oral solution: summary of product characteristics. https://www.ama.europa.eu/en/documents/product-information/epidyolex-epar-product-information_en.pdf. (Accessed October 29, 2025). 5. van Eeghen AM, et al. Poster presented at TSC International Research Conference, June 28–29, 2025, Bethesda, MD, USA (P.7). 6. TAND Consortium. <https://tandconsortium.org/about/ffsc>. (Accessed October 16, 2025). 7. Chambers N, et al. *Orphanet J Rare Dis*. 2025;20:304. 8. Heunis TM, et al. *Pediatr Neurol*. 2023;147:101–123. 9. van Eeghen AM, et al. *PLoS One*. 2025;20(6):e0324648.

Acknowledgments: Medical writing assistance was provided by Anur Sharma, PhD, on behalf of Syness Health, and funded by Jazz Pharmaceuticals, Inc., in accordance with Good Publication Practice (GPP) 2022 guidelines.

Support: The study was sponsored by Jazz Pharmaceuticals, Inc.

Disclosures: All authors met the ICMJE authorship criteria and had full access to relevant information. Neither honoraria nor payments were made for authorship. AvE has consulted for and received research support from Jazz Pharmaceuticals, Inc.; her institution has received research support from Jazz Pharmaceuticals, Inc., ForWisdom, and the European Commission/ERN ITHACA. SMLW has consulted for, conducted studies funded by, or received honoraria for services provided to Jazz Pharmaceuticals, Inc.

PJdV was a member of a study steering committee for three phase 3 trials in TSC sponsored by Novartis, was on the scientific advisory group of the TOSCA international disease registry sponsored by Jazz Pharmaceuticals, Inc., and hold stock and/or stock options in Jazz Pharmaceuticals, Inc. TJG, JS, SR, MDB, KW and LMR are employees of Jazz Pharmaceuticals, Inc. Epidiolex® is approved in the US for the treatment of seizures associated with Lennox-Gastaut syndrome, Dravet syndrome, or tuberous sclerosis complex in patients ≥1 year of age.



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Supplementary Material

Table S1. Change from baseline in Child Behavior Checklist (CBCL) at Week 26

Problem scale	Syndrome scale	Baseline (n=28), median	Week 26 (n=7), median	Change from baseline at Week 26 (n=7), median (95% CI) ^a
Internalizing	Anxious/Depressed	5.0	2.0	−2.0 (−4.0, 5.0)
	Withdrawn/Depressed	3.0	1.0	−1.0 (−4.0, 4.0)
	Somatic Complaints	2.0	2.0	0.0 (−4.0, 3.0)
	Total	9.5	10.0	−4.0 (−10.0, 6.0)
Externalizing	Aggressive Behavior	14.5	10.0	−6.0 (−8.0, 3.0)
	Rule-breaking Behavior	3.0	1.0	−1.0 (−3.0, 2.0)
	Total	18.0	11.0	−8.0 (−9.0, 5.0)
Other	Social Problems	8.0	4.0	−2.0 (−3.0, 4.0)
	Thought Problems	7.0	4.0	1.0 (−4.0, 7.0)
	Attention Problems	11.5	7.0	−2.0 (−6.0, 9.0)
	Other Problems	7.0	7.0	−1.0 (−5.0, 5.0)
	Other Total	36.0	21.0	−10.0 (−13.0, 25.0)
Total	Total	64.5	41.0	−12.0 (−31.0, 35.0)

CBCL is used for participants aged between ≥6 and ≤17 years. Higher score is indicative of a greater problem. ^a95% CI for the median change from baseline is calculated using the distribution-free method. CI, confidence interval.

Table S2. Change from baseline in Adult Behavior Checklist (ABCL) at Week 26

Problem scale	Syndrome scale	Baseline (n=28), median	Week 26 (n=15), median	Change from baseline at Week 26 (n=14), median (95% CI) ^a
Internalizing	Anxious/Depressed	4.5	2.0	−2.0 (−3.0, 2.0)
	Withdrawn	4.5	2.0	−1.0 (−4.0, 0.0)
	Somatic Complaints	2.5	2.0	0.0 (−4.0, 1.0)
	Total	11.0	6.0	−4.0 (−5.0, −2.0)
Externalizing	Aggressive Behavior	11.0	5.0	−2.0 (−5.0, 1.0)
	Rule-breaking Behavior	7.0	2.0	−3.0 (−6.0, 1.0)
	Intrusive	3.0	2.0	−1.0 (−2.0, 0.0)
	Total	22.0	8.0	−8.0 (−13.0, 3.0)
Other	Thought Problems	5.5	3.0	−1.5 (−4.0, 1.0)
	Attention Problems	10.0	10.0	−1.5 (−3.0, 1.0)
	Other Problems ^b	13.0	10.0	−3.0 (−7.0, 2.0)
	Other Total	29.0	21.0	−7.0 (−13.0, 3.0)
Total	Total	68.5	37.0	−15.0 (−28.0, 1.0)

ABCL is used for participants aged between ≥18 and ≤59 years. Higher score is indicative of a greater problem. ^a95% CI for the median change from baseline is calculated using the distribution-free method. ^bIncludes clinically relevant items that don't fit into the other defined syndrome scales such as (but not limited to) sleep disturbances, unusual thought patterns, repetitive behaviors, and emotional dysregulation CI, confidence interval.

