

Sarah M.L. Wilson,¹ Mary Kay Koenig,¹ Debopam Samanta,² Darcy A. Krueger,³ Shelly Meitzler,⁴ Carly Kaye,⁴ Sherry R. Danese,⁵ Timothy B. Saurer,⁶ Kelly C. Simontacchi,⁶ Karthik Rajasekaran⁶

¹The University of Texas Health Science Center at Houston, Houston, TX, USA; ²University of Arkansas for Medical Sciences, Little Rock, AR, USA; ³Cincinnati Children's Hospital Medical Center, University of Cincinnati College of Medicine, Cincinnati, OH, USA; ⁴TSC Alliance, Silver Spring, MD, USA; ⁵Outcomes Insights, Ventura, CA, USA; ⁶Jazz Pharmaceuticals, Inc, Palo Alto, CA, USA

Background

- Tuberous sclerosis complex (TSC) is a neurocutaneous disorder, characterized by the formation of hamartomas in multiple organs, including the brain, skin, heart, eyes, kidneys, lungs, and liver.^{1,2}
- More than 90% of people with TSC have TSC-associated neuropsychiatric disorders (TAND), characterized by behavioral, psychiatric, intellectual, academic, neuropsychologic, and psychosocial problems.³⁻⁵
- The plant-derived, highly purified pharmaceutical formulation of cannabidiol (CBD) is approved in the United States (US) for the treatment of seizures associated with Lennox-Gastaut syndrome, Dravet syndrome, and TSC in patients aged ≥1 year.⁶
- BECOME-TSC (**BE**havior, **CO**gnition, and **MO**re with **E**pidiolex[®] in TSC) is an ongoing cross-sectional survey to quantify the real-world impact of CBD on seizure and nonseizure outcomes in people with TSC.
 - This poster presents the nonseizure outcomes (seizure outcomes will be presented in Poster P8.1-005).

Objective

- To present caregiver-reported nonseizure outcomes following initiation of CBD treatment in people with TSC.

Methods

- Using electronic health records, healthcare providers at TSC centers in the US identified people with TSC who were treated with CBD (Epidiolex[®], 100 mg/mL oral solution) for ≥6 months.
- Caregivers of these people completed an online survey, consisting of multiple choice and rank order questions, based on the TAND questionnaire,⁷ other validated measures, and previous caregiver reports.
- Respondents compared the past month to the period before CBD initiation and rated their impression of change using a symmetrical 5- or 7-point Likert scale (from worsening to improvement) depending on the domain.
- 'Don't Recall' or 'Not Applicable' responses were excluded.
- Continuous variables were summarized as means, medians, and ranges, and categorical variables as frequency distributions and percentages.
- CBD-associated adverse events, which can include transaminase elevations, somnolence, decreased appetite, diarrhea, pyrexia, vomiting, fatigue, rash, sleep disorders, and infections, were not assessed.
- The survey was conducted with caregivers of people taking Epidiolex[®], and the results do not apply to other CBD-containing products.

Results

- At the time of analysis, 17 caregivers had completed the survey.

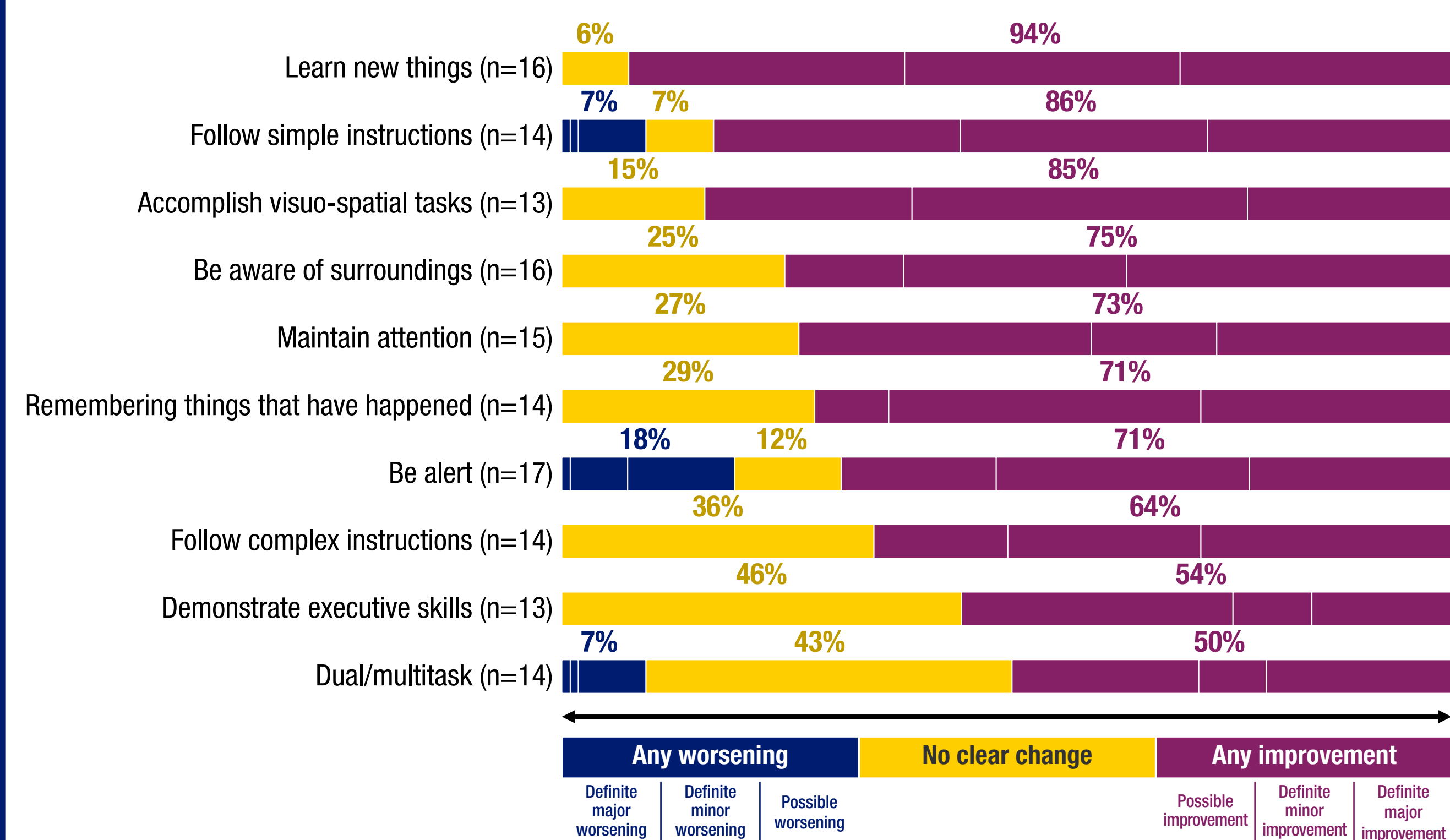
Table 1. Characteristics of patients

	Patients (N=17)
Age, years, mean (SD)	14.6 (8.1)
Number of ASMs before CBD initiation, median (Q1, Q3)	4 (2, 5)
Most common concomitant (≥30%) ASMs, n (%)	
Everolimus	6 (35)
Most common co-occurring conditions, n (%)	
Developmental delay	12 (71)
Autism spectrum disorder	11 (65)
Anxiety disorder	5 (29)
Attention deficit hyperactivity disorder	5 (29)
Intellectual disability, n (%)	
Severe-profound	11 (65)
CBD dose at the time of survey, mg/kg/day, median (Q1, Q3)	21 (15, 23)

ASM, antiseizure medication; CBD, cannabidiol; Q1, first quartile; Q3, third quartile.

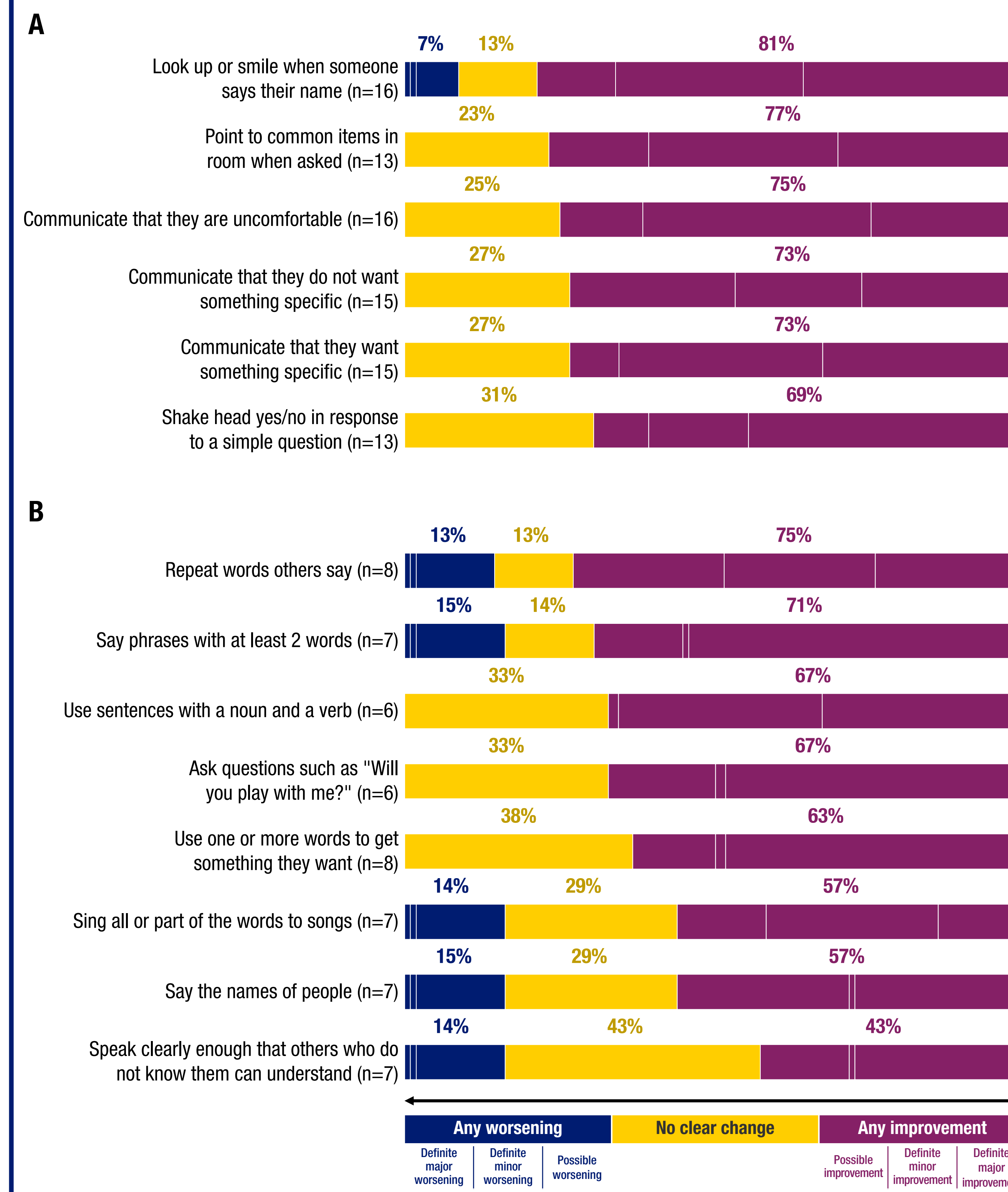
- Among respondents, 59% reported that the patient had a history of infantile spasms.

Figure 1. Alertness, cognition, and executive function – change in ability to



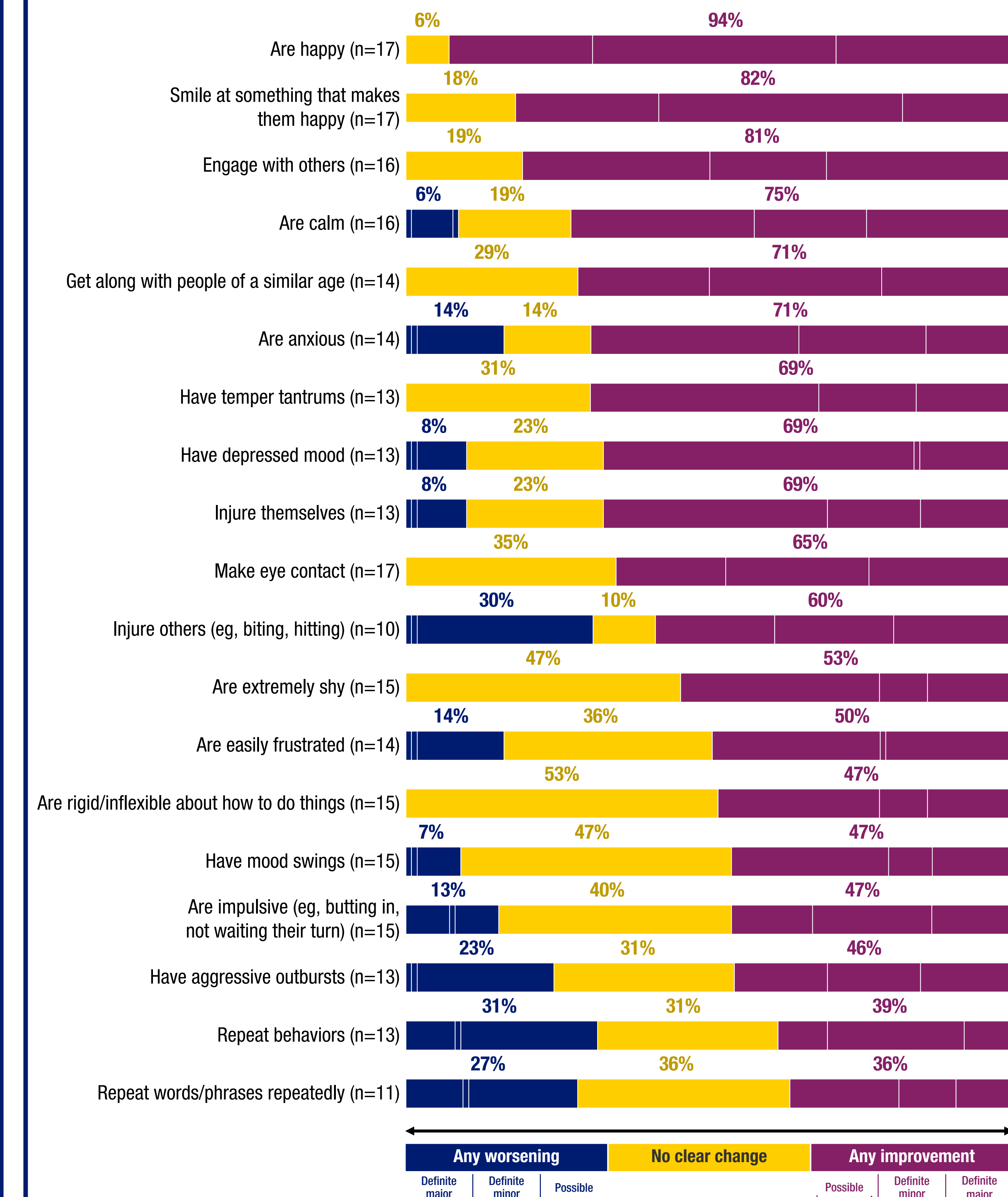
- At least 75% of the respondents reported improvements in the patient's ability to learn new things, follow simple instructions, and accomplish visuo-spatial tasks in the alertness, cognition, and executive function domain.

Figure 2. Language and communication in (A) all patients and (B) patients with verbal abilities (few/minimal words or fluent verbal language) – change in ability to



- Among all patients, the most frequently reported improvements in the communication domain were in ability to look up or smile when someone says their name (81%); among verbal patients, repeating words others say was the most frequently reported (75%).

Figure 3. Emotional and social functioning – change in how often they



- The most frequently reported improvement in emotional and social functioning was how often patients were happy (94%).

Conclusions

- In this preliminary analysis of the ongoing BECOME-TSC survey:
 - Most caregivers reported improvements in the cognition, emotional functioning, and communication domains.
 - A total of 94% of caregivers reported planning to continue CBD and gave reduced seizure frequency, reduced seizure severity/duration (seizure outcomes Poster P8.1-005), and improved cognition as the most common reasons for continuation.
 - Limitations of the study include retrospective caregiver accounts and selection bias due to study design as well as a small sample size in this preliminary analysis. Adverse effects were not assessed and the effect of concomitant antiseizure medications was not considered in this analysis.
 - Most caregivers of people with TSC reported improvement in TAND-related nonseizure outcomes since initiating CBD.

References: 1. Northrup H et al. *Pediatr Neurol*. 2021;123:50–66. 2. Curatolo P et al. *Lancet*. 2008;372:657–668. 3. Vancooster S et al. *J Neurodevel Disord*. 2022;14:13. 4. Zöllner JP et al. *Orphanet J Rare Dis*. 2020;15:23. 5. de Vries PJ et al. *J Neurodev Disord*. 2023;15:32. 6. Jazz Pharmaceuticals. Epidiolex[®] (cannabidiol) oral solution [prescribing information]. 2023. [https://www.epidiolex.com/sites/default/files/pdfs/1120/EPX-03645-1120_EPIDIOLEX_\(cannabidiol\)_USPI.pdf](https://www.epidiolex.com/sites/default/files/pdfs/1120/EPX-03645-1120_EPIDIOLEX_(cannabidiol)_USPI.pdf). 7. de Vries PJ et al. *Pediatr Neurol*. 2015;52:25–35.

Acknowledgments: Writing and editorial assistance was provided to the authors by Isaac Dripps, PhD, and Dena McWain of Ashfield MedComms, an Inizio company, and funded by Jazz Pharmaceuticals, Inc.

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

Disclosures: This poster presents an update of the data previously presented at The American Epilepsy Society Annual Meeting (AES), 2023. All authors met the ICMJE authorship criteria and had full access to relevant data. Neither honoraria nor payments were made for authorship. **SMLW, MKK, DS, DAK, SM, CK, SRD** have consulted for, conducted studies funded by, or received honoraria for services provided to Jazz Pharmaceuticals, Inc; **TBS, KCS, and KR** 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 years of age.

