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EDITED BY
Urs Fisch,
University Hospital of Basel, Switzerland

REVIEWED BY
Ruba Al-Ramadhani,
University of Pittsburgh Medical Center, United States
Clemens Lang,
Vienna Health Care Group, Austria

*CORRESPONDENCE
Zhenlong Zhang
simon.vane@163.com

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Report-derived interictal epileptiform discharge burden is associated with 7-day antiseizure medication decisions after pediatric video electroencephalography

Fengming Zhu, Weidong Xu, Yun Gao, Shumin Kang and Zhenlong Zhang*

Department of Pediatrics and Pediatric Neurology, The First People's Hospital of Zhangjiagang City, Zhangjiagang Hospital Affiliated to Soochow University, Zhangjiagang, Jiangsu, China

Objective: To determine whether a three-level interictal epileptiform discharge (IED) burden abstracted from qualitative wording in issued pediatric video electroencephalography (VEEG) reports, rather than directly measured spike frequency, was associated with antiseizure medication (ASM) decisions within 7 days.
Methods: This single-center retrospective cohort included 216 VEEG report episodes from 181 children. Two reviewers independently classified each report as showing no, low, or moderate-to-high IED burden while unaware of the standardized 7-day outcome; disagreements were adjudicated. We separately analyzed a diagnostic/initiation cohort for new ASM initiation and an established-epilepsy cohort for exploratory treatment intensification. Associations were assessed using exact and trend tests and logistic regression with patient-clustered robust standard errors.
Results: Agreement was 211/216 (97.7%); linear-weighted Cohen κ was 0.975 (patient-clustered bootstrap 95% CI 0.947–0.995). The diagnostic/initiation cohort comprised 113 reports from 112 children, with 36 new ASM initiations. Initiation rates were 13.0%, 42.9%, and 70.0% for no, low, and moderate-to-high burden, respectively (trend $p < 0.001$). The adjusted odds ratio per higher burden grade was 2.89 (95% CI 1.58–5.30; $p < 0.001$). The established-epilepsy cohort comprised 103 reports from 76 children, with 13 intensification events. Moderate-to-high burden versus none/low yielded an odds ratio of 4.73 (95% CI 1.31–17.08; $p = 0.018$), but complementary analyses were not statistically significant.
Conclusion: Report-derived IED burden showed a strong graded association with new ASM initiation within 7 days. The treatment-intensification finding was exploratory. These data describe prescribing context and do not establish causality, treatment benefit, or an IED-based treatment threshold.

KEYWORDS
antiseizure medication, children, clinical decision-making, interictal epileptiform discharges, retrospective cohort, video electroencephalography

Introduction

Children referred for video-electroencephalography (VEEG) commonly present with paroxysmal events whose clinical descriptions do not reliably distinguish epileptic seizures from nonepileptic phenomena. Long-term video-EEG monitoring can link behavior to electrographic activity, characterize epilepsy, identify nonepileptic events, and provide information that informs treatment. International guidance therefore places long-term video-EEG monitoring within the diagnostic and management pathway for epilepsy, while also acknowledging that high-level evidence connecting monitoring to longer-term outcomes remains limited (1). In pediatric cohorts, monitoring frequently changes or refines diagnosis (2–4), and medication adjustments have also been reported (2, 4). These observations establish the clinical utility of VEEG, but they do not identify which components of the issued report most strongly accompany a near-term prescribing decision.

Previous studies have often summarized the downstream consequence of prolonged EEG as a broad "change in management". Video-ambulatory EEG has been associated with antiseizure medication (ASM) introduction or dose increase, and ambulatory EEG can affect decisions in resource-constrained practice (5, 6). In acute inpatient settings, continuous EEG has also changed medication prescribing, although many such decisions followed the detection of electrographic seizures (7). These results cannot be assumed to represent the role of interictal findings in routine pediatric care. They also combine decisions that arise in different clinical pathways, such as beginning treatment in a child undergoing diagnostic evaluation and increasing an existing dose in a child with established epilepsy. A fixed interval anchored to the issued report may more closely describe the immediate decision context than an unspecified follow-up period.

Interictal epileptiform discharges (IEDs) have recognized diagnostic and prognostic value. A recent IFCN–ILAE systematic review found that IEDs after a first unprovoked seizure were associated with a higher risk of recurrence, with a stronger pooled association in children than in adults (8). Recurrence analyses commonly operationalize IEDs as present versus absent (8). In contrast, electroencephalographers routinely communicate frequency and abundance. The SCORE framework and international EEG terminology make report features suitable for structured capture and include frequency descriptors as part of standard reporting (9–11). In a survey of 32 referring physicians, approximately one-third reported reading only the EEG conclusion. This finding underscores the clinical relevance of conclusion wording (12). Operational criteria can support accurate identification of IEDs (13), but neither structured reporting nor a frequency descriptor automatically establishes that the discharges themselves should be treated. Evidence remains insufficient to recommend treating asymptomatic epileptiform discharges in isolation (14). In one adult cohort with drug-resistant temporal lobe epilepsy, interictal spike density showed only a weak correlation with clinical seizure frequency (15).

We therefore asked whether the intensity of interictal information already present in routine pediatric VEEG reports was associated with a short-term ASM decision. We reconstructed an ordinal, report-derived IED burden with three levels: none, low, and moderate-to-high. This is a classification of qualitative wording, not an objective spike-frequency measurement. The question was whether gradations in routine report language, beyond IED presence alone, accompanied different prescribing decisions. The primary hypothesis was that higher burden would be associated with new ASM initiation within 7 days in a diagnostic/initiation cohort. We separately examined whether moderate-to-high burden was associated with ASM treatment intensification in an established-epilepsy cohort. Treatment intensification included dose escalation, add-on therapy, or a switch intended to strengthen seizure control. This second analysis was considered exploratory because treatment decisions in established epilepsy are influenced by treatment history, seizure control, and tolerability. Moreover, the effects of prior ASM exposure on focal IED occurrence remain uncertain and incompletely characterized (16). The study was designed to evaluate prescribing behavior, not the clinical appropriateness or benefit of treatment. The 2014 ILAE practical definition permits a diagnosis of epilepsy after one unprovoked seizure when the estimated 10-year recurrence probability is at least 60%; an epileptiform EEG may inform, but does not alone establish, that threshold (17).

Materials and methods

Study design and setting

We performed a single-center retrospective observational cohort study using routinely collected pediatric clinical data and issued VEEG reports at the Department of Pediatrics and Pediatric Neurology, Zhangjiagang Hospital affiliated to Soochow University / The First People's Hospital of Zhangjiagang City, Jiangsu, China. The analytic period extended from 23 June 2022 to 25 May 2026. The analysis unit was a VEEG report episode. Different eligible reports from the same child were retained because each issued report could create a new clinical decision context; dependence between repeated episodes was addressed in regression analyses using patient-clustered robust standard errors.

The curated analytic database contained 216 eligible report episodes from 181 children. Eligibility required an issued VEEG report, the demographic and diagnostic fields needed for linkage, a completed blinded IED burden grade, and a standardized clinical decision that mapped to one of the two prespecified pathway-specific cohorts. All eligible episodes in the curated database were analyzed, and no *a priori* sample-size calculation was performed. The study is reported in accordance with the STROBE recommendations for observational studies (18).

VEEG acquisition and issued reports

All 216 report episodes used the same approximately 18-h VEEG acquisition scheme, equipment description, and activation workflow. Recordings were acquired using a Nihon Kohden 1200C system with scalp electrodes positioned according to the international 10–20 system, synchronized video, and inclusion of natural sleep. Hyperventilation and intermittent photic stimulation were performed when clinically feasible. The present analysis used the text of the formally issued report; raw EEG tracings were not re-read. Interictal report information was analyzed separately from any electrographic or electroclinical ictal event recorded during monitoring. Reports were interpreted and issued by physicians credentialed in EEG. Treatment initiation and adjustment decisions were made by senior pediatric neurology specialists

(associate chief or chief physicians), who were different clinicians from the report readers. Both inpatient and outpatient episodes were included. In routine practice the recording was read and the report issued on the day after monitoring ended, including after overnight monitoring.

Report-derived IED burden

Two reviewers independently graded the interictal portion of all 216 issued reports while unaware of the standardized 7-day clinical outcome. The grade was based on report language rather than direct spike counting. Grade 0, no IED burden, required no definite IED in the interictal report text. Grade 1, low burden, required definite IEDs that did not meet grade 2; typical Chinese descriptors included "occasional," "small amount," or "scattered." Grade 2, moderate-to-high burden, included language indicating greater abundance or persistence, such as "increased," "many," "large amount," or "continuous." Descriptions equivalent to "paroxysmal" or "in bursts" did not, by themselves, qualify as grade 2. The rule was intended as a pragmatic abstraction of communication intensity in routine reports and was not treated as equivalent to objective IFCN frequency cut-offs. The operational grading rules are summarized in Supplementary Table S1.

Inter-reviewer agreement was calculated from the two original independent ratings before consensus adjudication. We report exact agreement, unweighted Cohen κ, and linear-weighted Cohen κ; the 95% CI for the weighted κ was obtained from 5,000 patient-clustered bootstrap samples. Five disagreements underwent joint adjudication to generate the final consensus exposure used in outcome analyses. Consensus ratings were not fed back into the agreement calculation.

Seven-day clinical decisions and cohorts

The date of the issued VEEG report was time zero. The decision window extended from that date through day 7. The seven-day window was a pragmatic measure of near-term decisions after the formal report became available in this mixed inpatient and outpatient workflow; it was not intended to include all later outpatient decisions. Delayed follow-up beyond day 7 could therefore be missed. Clinical orders, progress notes, discharge summaries, and subsequent clinic records were reviewed to standardize pathway-specific decision categories. Treatment changes occurring before report issuance were excluded, even when documented in a later discharge summary. New ASM initiation meant that an ASM was started within the decision window during diagnostic evaluation. ASM treatment intensification applied to children with established epilepsy who were already receiving ASM and required at least one change intended to strengthen seizure control: dose escalation of an existing ASM, addition of another ASM, or a treatment-strengthening switch. Simple continuation, dose reduction, discontinuation, and switching solely for adverse effects or convenience without an intention to strengthen seizure control were not classified as treatment intensification.

Because the standardized categories represented different clinical pathways, we formed two mutually exclusive cohorts (Figure 1). The diagnostic/initiation cohort included episodes classified as new ASM initiation, epilepsy excluded, or epilepsy not diagnosed; the binary primary outcome was new ASM initiation. The established-epilepsy cohort comprised episodes from children with established epilepsy receiving ASM; the binary exploratory outcome was treatment intensification as defined above. We did not combine the two outcomes because starting therapy during diagnostic evaluation and strengthening treatment in established epilepsy are clinically distinct decisions with different baseline risks.

The database did not retain a separate auditable date for every individual treatment decision. The 7-day variable therefore reflects the manually standardized record review and could not be independently recalculated from row-level decision dates during the present analysis. Cohort membership was also derived from the standardized pathway category, so inference is conditional on these pathway definitions.

Covariates

Age at the report date was calculated from date of birth and was analyzed continuously. Sex was recorded as male or female in the clinical source. A rule-based indicator of high clinical pretest probability was constructed from the free-text clinical diagnosis. Diagnoses containing terms for epilepsy, benign epilepsy with centrotemporal spikes, epilepsy abbreviations, absence events, convulsions, staring, or an EEG-related diagnostic concern were generally classified as high probability. Terms indicating febrile seizures, tic or attention-deficit disorders, syncope or dizziness, sleep disorders, arachnoid findings, or "under evaluation" were classified as low probability. This variable was an analytic proxy, not a prospectively collected clinician score and not a validated prediction instrument. Whether an electrographic or electroclinical ictal event occurred during VEEG was retained for description but was not included in the primary adjusted model because only 10 such events occurred in the full cohort. Baseline ASM load was the number of different ASMs taken immediately before VEEG, categorized as 0, 1, 2, or ≥3 from chart information and author review. All diagnostic/initiation reports were ASM-naive. For an exploratory established-epilepsy model, load was dichotomized as monotherapy versus polytherapy (≥2 ASMs) to limit model complexity.

Statistical analysis

Continuous variables are presented as medians and interquartile ranges (IQRs), and categorical variables as counts and percentages. For each cohort, we calculated outcome proportions and Wilson 95% confidence intervals (CIs) across the three IED burden grades. A two-sided Fisher–Freeman–Halton exact test assessed the overall 2×3 association. The Cochran–Armitage test with scores 0, 1, and 2 assessed an ordered trend.

For the primary diagnostic/initiation analysis, logistic regression modeled IED burden as an ordinal variable and adjusted for age, sex, and rule-based high clinical pretest probability. We also fitted a categorical model comparing low and moderate-to-high burden with no IED. The exploratory established-epilepsy models were intentionally parsimonious because only 13 treatment-intensification events occurred. We estimated an unadjusted ordinal association per burden grade, an any-IED versus no-IED association, and a moderate-to-high versus none/low threshold contrast. The low-burden group contained no treatment-intensification events, producing complete separation in a full three-category model; we therefore did not present an unstable multivariable categorical model.

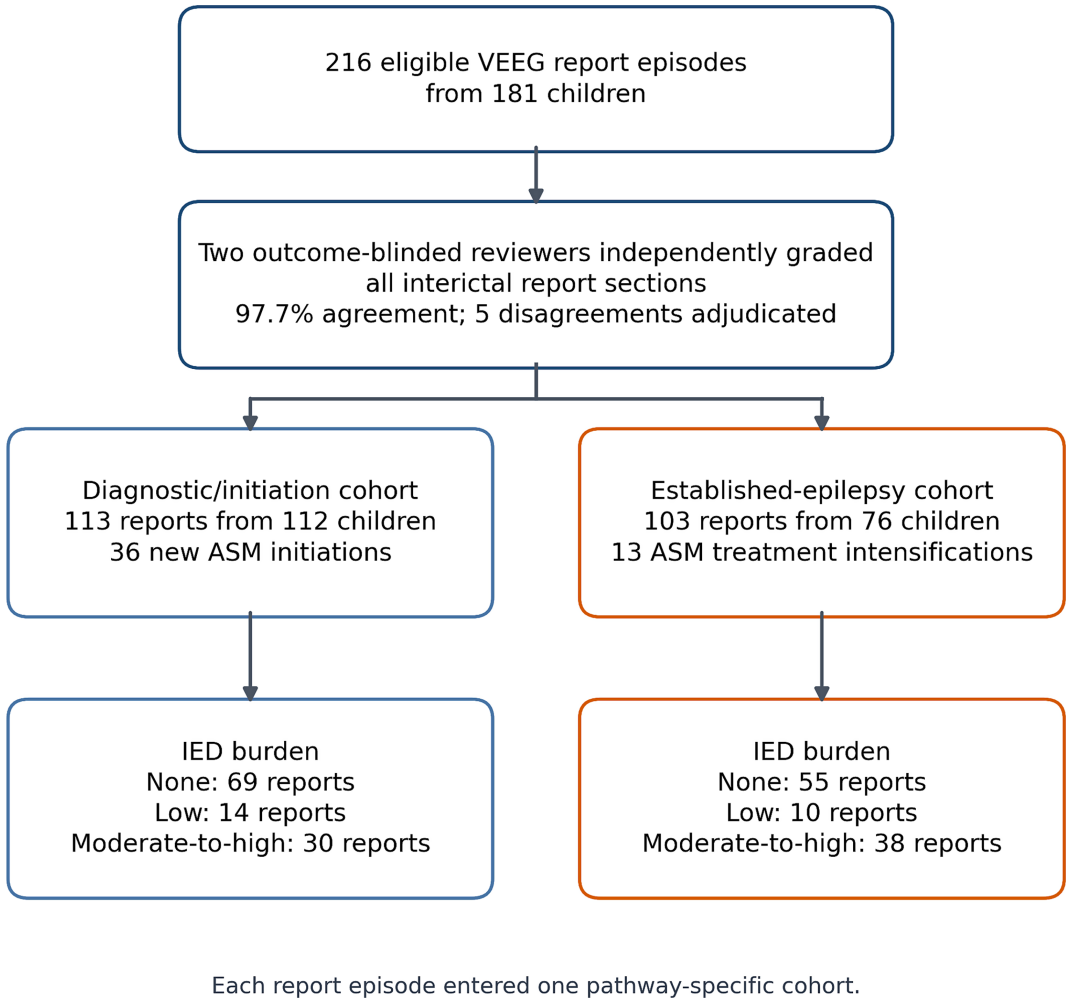


FIGURE 1
Cohort formation and pathway-specific cohorts. Each eligible VEEG report episode entered one mutually exclusive cohort according to its standardized clinical decision pathway. Repeated reports from the same child were retained; regression standard errors were clustered by child.

An additional exploratory established-epilepsy model adjusted the moderate-to-high versus none/low IED contrast for baseline polytherapy. To address the possible influence of captured seizures, we repeated the primary diagnostic/initiation trend test and adjusted model after excluding all reports with an EEG-correlated ictal event. All regression models used a sandwich covariance matrix clustered by child, with a finite-sample correction. Effect estimates are presented as odds ratios (ORs) with 95% CIs. Sensitivity analyses retained only the first or only the last eligible report for each child. We also calculated the apparent area under the receiver-operating-characteristic curve (AUC) for binary IED presence and for the three-grade score. These unvalidated in-sample AUCs were descriptive; no formal test of the small differences was performed. Five exploratory Fisher pairwise comparisons within each cohort were adjusted using the Benjamini–Hochberg false-discovery-rate procedure. All tests were two-sided with $\alpha = 0.05$.

The main analysis was implemented in Python 3.12.4 using pandas 2.2.3 and NumPy 2.2.0. Exact tests, trend tests, and clustered logistic models were independently recomputed in base R 4.4.2 from the final analysis data. Fourteen prespecified core numerical results agreed within the predefined tolerance. This was a cross-software numerical check, not an independent review of the study design or variable definitions.

Ethics approval

This retrospective study was approved by the Medical Ethics Committee of the First People's Hospital of Zhangjiagang City (approval No. ZJGYYLL-LW-2026-07-003).

Results

Cohort and report characteristics

The 216 VEEG report episodes came from 181 children. Of these children, 158 contributed one report, 17 contributed two, four contributed three, one contributed four, and one contributed eight. Median age at the report was 9.03 years (IQR 7.39–11.06; range 0.68–14.01), and 125/216 reports (57.9%) involved male patients. The rule-based high clinical pretest probability indicator was present in

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158/216 episodes (73.1%). An electrographic or electroclinical ictal event was recorded in 10/216 episodes (4.6%). Final consensus IED burden was absent in 124 reports (57.4%), low in 24 (11.1%), and moderate-to-high in 68 (31.5%).

The two reviewers assigned the same original grade to 211/216 reports (97.7%). The unweighted Cohen κ was 0.958, and the linear-weighted κ was 0.975 (patient-clustered bootstrap 95% CI 0.947–0.995). Five disagreements were adjudicated. All 216 final consensus grades linked one-to-one to the clinical database, with no mismatch in source row, EEG identifier, patient name, interictal report text, or text hash.

The diagnostic/initiation cohort included 113 reports from 112 children; the established-epilepsy cohort included 103 reports from 76 children (Figure 1). Compared with the diagnostic/initiation cohort, the established-epilepsy cohort had a higher proportion with rule-based high pretest probability (97.1% versus 51.3%) and a higher proportion with moderate-to-high IED burden (36.9% versus 26.5%) (Table 1). Captured ictal events remained uncommon in both cohorts. At VEEG, all 113 diagnostic/initiation reports involved no baseline ASM. In the established-epilepsy cohort, baseline load was one ASM in 93/103 reports (90.3%), two ASMs in 8/103 (7.8%), and ≥3 ASMs in 2/103 (1.9%); Table 1 also shows the distribution by IED grade.

New ASM initiation in the diagnostic/initiation cohort

Thirty-six of 113 report episodes were followed by new ASM initiation. The absolute initiation rate increased from 9/69 (13.0%; 95% CI 7.0–23.0) after reports with no IED burden to 6/14 (42.9%; 95% CI 21.4–67.4) after low-burden reports and 21/30 (70.0%; 95% CI 52.1–83.3) after moderate-to-high-burden reports (Figure 2A; Table 2). The overall 2 × 3 exact test yielded $p = 6.39 \times 10^{-8}$, and the ordered trend test yielded $p = 1.67 \times 10^{-8}$.

In the patient-clustered model adjusted for age, sex, and rule-based high clinical pretest probability, each one-grade increase in IED burden was associated with 2.89-fold higher odds of new ASM initiation (95% CI 1.58–5.30; $p < 0.001$). When burden was treated categorically, the adjusted OR versus no IED was 2.57 for low burden (95% CI 0.57–11.54; $p = 0.219$) and 8.41 for moderate-to-high burden (95% CI 2.48–28.51; $p < 0.001$) (Table 3; Figure 3). The wide CI for low burden reflected the small group size.

The apparent AUC was 0.765 for binary IED presence and 0.785 for the three-grade burden score, an absolute difference of 0.021. In sensitivity analyses, retaining only the first or the last eligible report per child yielded similarly strong ordered trends (both $p < 0.001$). Six EEG-related ictal reports were excluded from

TABLE 1 Characteristics of the full cohort and pathway-specific cohorts.

Characteristic	Full cohort (*n* = 216 reports)	Diagnostic/initiation cohort (*n* = 113 reports)	Established-epilepsy cohort (*n* = 103 reports)
Children, *n*	181	112	76
Age, years, median (IQR)	9.03 (7.39–11.06)	8.41 (6.52–10.24)	9.28 (8.27–11.38)
Male sex	125 (57.9%)	61 (54.0%)	64 (62.1%)
Rule-based high clinical pretest probability	158 (73.1%)	58 (51.3%)	100 (97.1%)
EEG-related ictal event during VEEG	10 (4.6%)	6 (5.3%)	4 (3.9%)
No IED burden	124 (57.4%)	69 (61.1%)	55 (53.4%)
Low IED burden	24 (11.1%)	14 (12.4%)	10 (9.7%)
Moderate-to-high IED burden	68 (31.5%)	30 (26.5%)	38 (36.9%)
Baseline ASM load: 0	113 (52.3%)	113 (100%)	0
Baseline ASM load: 1	93 (43.1%)	0	93 (90.3%)
Baseline ASM load: 2	8 (3.7%)	0	8 (7.8%)
Baseline ASM load: ≥3	2 (0.9%)	0	2 (1.9%)
Primary/pathway outcome events	—	36 new ASM initiations	13 ASM treatment intensifications

Values are *n* (%) unless otherwise specified. Percentages use report episodes as the denominator. Baseline ASM load refers to different ASMs being taken immediately before VEEG. IED, interictal epileptiform discharge; ASM, antiseizure medication; VEEG, video-electroencephalography.

Baseline ASM load by clinical cohort and report-derived IED burden					
Cohort and IED burden	Reports	0 ASMs	1 ASM	2 ASMs	≥3 ASMs
Diagnostic: no IED	69	69	0	0	0
Diagnostic: low	14	14	0	0	0
Diagnostic: moderate-to-high	30	30	0	0	0
Established: no IED	55	0	52	3	0
Established: low	10	0	10	0	0
Established: moderate-to-high	38	0	31	5	2

Counts are report episodes. Diagnostic denotes the diagnostic/initiation cohort; established denotes the established-epilepsy cohort.

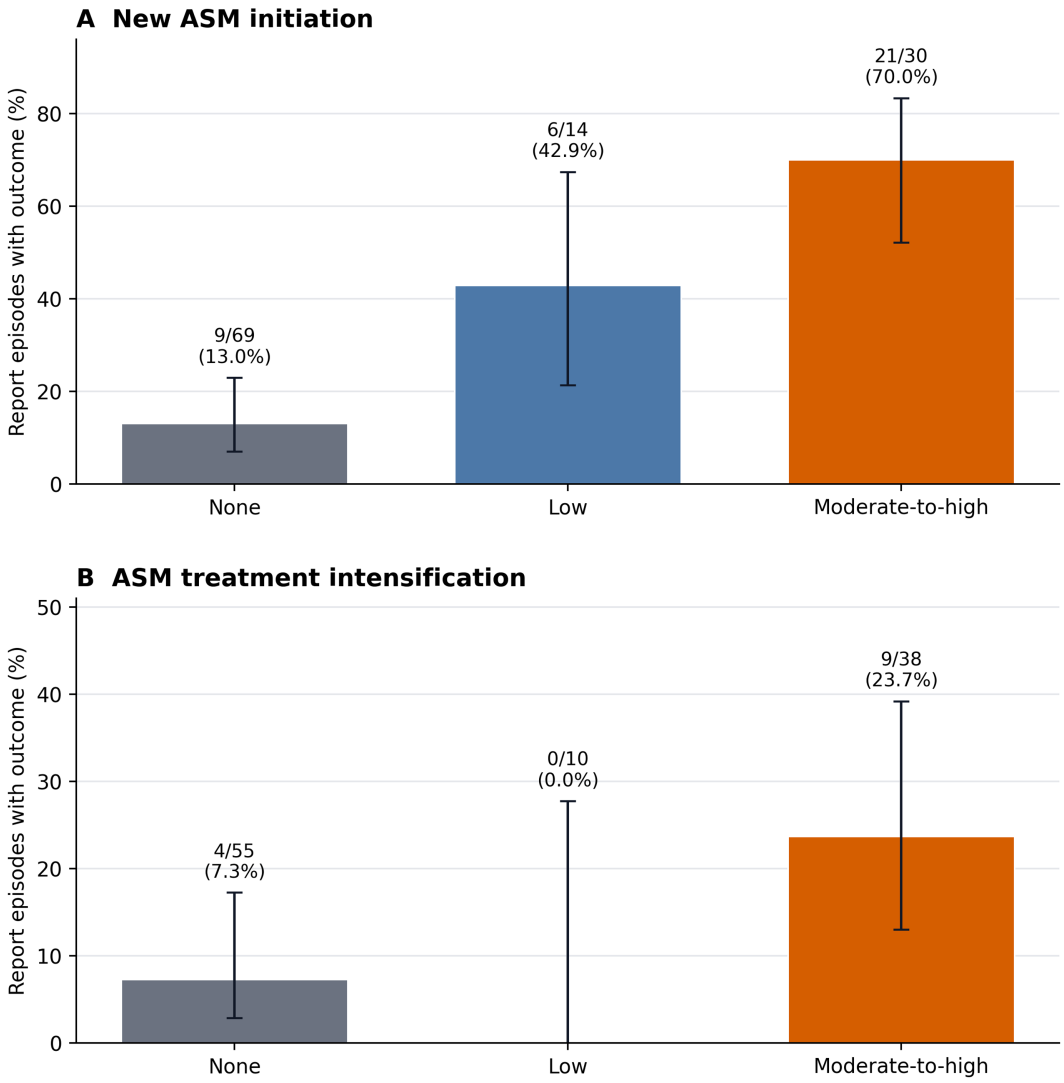


FIGURE 2
Seven-day medication decisions by report-derived IED burden. Bars show observed proportions and error bars show Wilson 95% confidence intervals. **(A)** Shows new ASM initiation in the diagnostic/initiation cohort. **(B)** Shows ASM treatment intensification in the established-epilepsy cohort. The panels represent different clinical questions and should not be combined into one outcome.

the diagnostic/initiation cohort in an additional analysis. Among the remaining 107 reports, 30 new ASM initiations occurred; rates by no, low, and moderate-to-high IED burden were 9/69 (13.0%), 6/14 (42.9%), and 15/24 (62.5%). The adjusted patient-clustered OR per higher burden grade was 2.52 (95% CI 1.36–4.68; $p = 0.003$).

ASM treatment intensification in the established-epilepsy cohort

Thirteen of 103 report episodes were followed by ASM treatment intensification. The intensification rate was 4/55 (7.3%; 95% CI 2.9–17.3) for no IED burden, 0/10 (0%; 95% CI 0–27.8) for low burden, and 9/38 (23.7%; 95% CI 13.0–39.2) for moderate-to-high burden (Figure 2B; Table 2). The overall 2×3 exact test gave $p = 0.053$, whereas the ordered trend test gave $p = 0.024$.

In a patient-clustered ordinal model, the OR per one-grade higher IED burden was 2.08 (95% CI 1.01–4.25; $p = 0.046$). Any IED versus no IED yielded an OR of 2.94 (95% CI 0.80–10.77; $p = 0.103$). The exploratory threshold contrast of moderate-to-high burden versus none/low yielded an OR of 4.73 (95% CI 1.31–17.08; $p = 0.018$). In the corresponding Fisher comparison, the nominal p value was 0.014 and the Benjamini–Hochberg-adjusted p value was 0.070. The apparent AUC was 0.629 for binary IED presence and 0.668 for the three-grade score, an absolute difference of 0.038. Baseline polytherapy (≥2 ASMs) was present in 10 reports, including three intensification events. In an exploratory model adjusting the moderate-to-high versus none/low contrast for polytherapy, the OR was 4.17 (95% CI 1.07–16.33; $p = 0.040$). This estimate remains imprecise because of sparse events.

The patient-level sensitivity analyses were less stable. After retaining only the first eligible report from each child, 13 treatment-intensification events remained among 76 children and the trend p value

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TABLE 2 Seven-day medication decisions by report-derived IED burden.

Cohort and IED burden	Events/reports	Event rate (95% CI)	Overall exact *P*	Trend *P*
Diagnostic/initiation			6.39×10^{-8}	1.67×10^{-8}
No IED	9/69	13.0% (7.0–23.0)		
Low	6/14	42.9% (21.4–67.4)		
Moderate-to-high	21/30	70.0% (52.1–83.3)		
Established epilepsy			0.053	0.024
No IED	4/55	7.3% (2.9–17.3)		
Low	0/10	0% (0–27.8)		
Moderate-to-high	9/38	23.7% (13.0–39.2)		

The diagnostic/initiation outcome is new ASM initiation; the established-epilepsy outcome is treatment intensification. Confidence intervals are Wilson intervals. The overall *p* value is from the two-sided Fisher–Freeman–Halton exact test; trend *p* is from the two-sided Cochran–Armitage test with scores 0, 1, and 2.

TABLE 3 Logistic regression estimates for seven-day medication decisions.

Cohort and contrast	OR (95% CI)	*p* value	Adjustment
Diagnostic/initiation cohort			
Per one-grade higher IED burden	2.89 (1.58–5.30)	<0.001	Age, sex, rule-based high pretest probability
Low versus no IED	2.57 (0.57–11.54)	0.219	Age, sex, rule-based high pretest probability
Moderate-to-high versus no IED	8.41 (2.48–28.51)	<0.001	Age, sex, rule-based high pretest probability
Established-epilepsy cohort, exploratory			
Per one-grade higher IED burden	2.08 (1.01–4.25)	0.046	Unadjusted
Any IED versus no IED	2.94 (0.80–10.77)	0.103	Unadjusted
Moderate-to-high versus none/low	4.73 (1.31–17.08)	0.018	Unadjusted
Moderate-to-high versus none/low, exploratory	4.17 (1.07–16.33)	0.040	Baseline polytherapy (≥2 versus 1 ASM)

All models use patient-clustered robust standard errors. The established-epilepsy estimates are exploratory; only 13 treatment-intensification events occurred, and the low-burden group had zero events.

was 0.080. After retaining only the last report, 12 events remained among 76 children and the trend *p* value was 0.085. Together with the zero events in the ten low-burden reports, the wide confidence intervals, the nonsignificant overall exact test, and the multiplicity-adjusted pairwise result, these findings indicate that the treatment-intensification analysis is hypothesis-generating rather than confirmatory.

Discussion

The principal finding was a graded association between language-derived IED burden in issued VEEG reports and new ASM initiation within seven days. The association persisted after adjustment for age, sex, and a rule-based clinical-probability proxy, and after reports containing an EEG-related ictal event were excluded. These findings describe a short-term prescribing pattern. The established-epilepsy association with intensification was less secure: there were only 13 events, the low-burden group had no events, and the overall exact test, multiplicity-adjusted comparison, and patient-level sensitivity analyses were not significant. Adjustment for baseline polytherapy changed the exploratory high-versus-none/low OR from 4.73 to 4.17, but the confidence interval remained wide.

The clinical pathway makes a causal interpretation inappropriate. Symptoms and prior history influence referral for VEEG, the EEG recording, and how the credentialed reader phrases the report. The senior pediatric neurologist deciding treatment has access to that same clinical context as well as the report. Different physicians performed report interpretation and prescribing, but this separation does not make report wording an independent exposure. The observed association could reflect the report, the underlying EEG, clinical severity, or shared information not captured in the dataset. The strong inter-reviewer agreement shows that the wording can be graded reproducibly; it does not validate the grades against raw spike counts. The report-derived exposure may be useful for auditing routine communication, but it cannot be read as a biological dose or a treatment threshold.

The seven-day window was chosen to capture decisions close to the issued report in the local inpatient and outpatient workflow. A later outpatient visit may fall outside that interval. Although changes recorded before formal report issuance were excluded from the standardized outcome, exact report and decision timestamps were not retained for every episode in the analytic dataset. This limits independent verification of the timing and should be addressed prospectively.

Clinical value cannot be inferred from a prescribing decision alone. Therapeutic goals differ across syndromes, including conditions in which EEG improvement is a target. The study did not follow EEG normalization, seizure control, cognition, development, adverse effects, or quality of life, and it did not assess whether any individual prescription was appropriate. IEDs after a first unprovoked seizure may inform recurrence-risk assessment (8), but an epileptiform EEG alone does not establish the ILAE recurrence threshold (17). Evidence

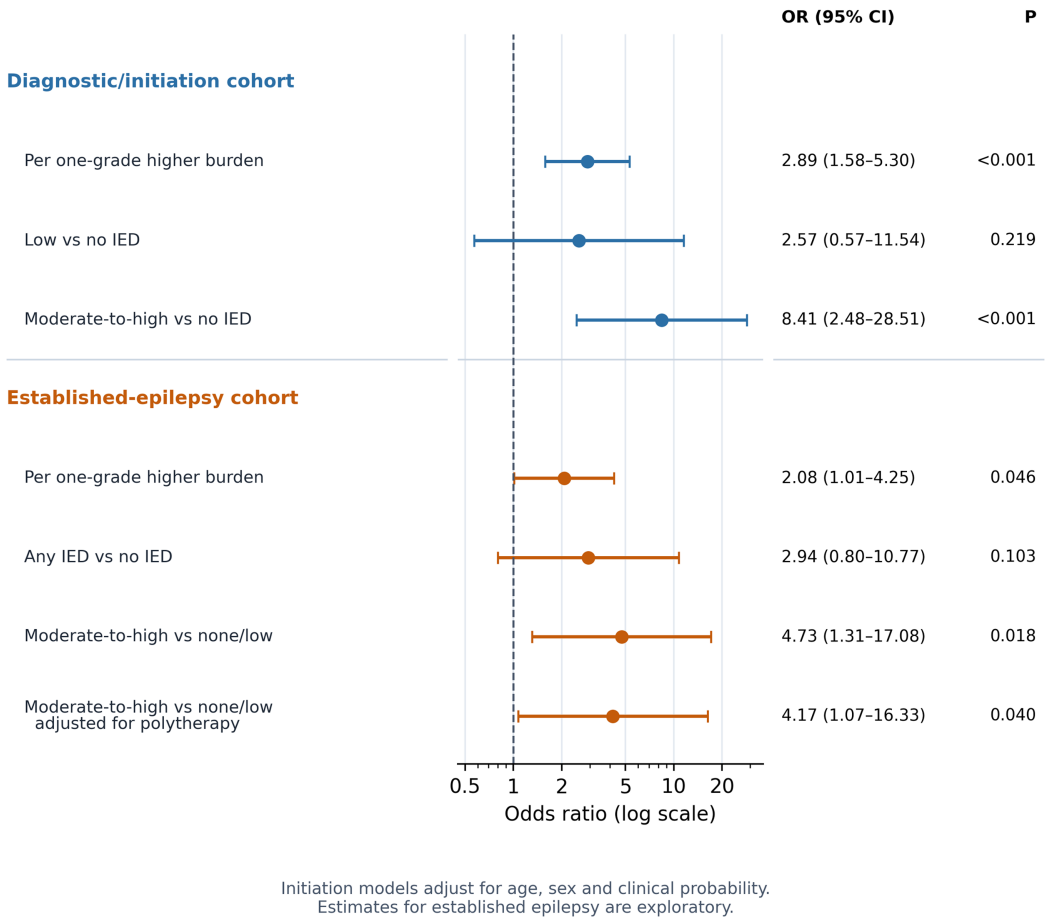


FIGURE 3
Regression estimates for seven-day antiseizure medication decisions. Points show odds ratios and horizontal lines show patient-clustered 95% confidence intervals on a logarithmic scale. Diagnostic/initiation estimates adjust for age, sex, and a rule-based clinical-probability proxy. Established-epilepsy estimates are exploratory; the final contrast additionally adjusts for baseline polytherapy (≥2 versus 1 ASM). Models represent distinct contrasts and should not be interpreted as independent tests of one treatment threshold.

is insufficient to recommend treating asymptomatic IEDs in isolation (14). The study also lacks a routine outpatient EEG comparison group, so it cannot estimate any incremental benefit of VEEG-based management over ordinary EEG.

Other limitations include the single-center retrospective design, selection into VEEG, repeated monitoring in some children, and incomplete measurement of seizure history, ASM dose and adherence, syndrome, imaging, and clinician preferences. Children with more severe disease or higher baseline ASM load may have undergone repeat VEEG more often, potentially overrepresenting these clinical profiles among report episodes. Patient-clustered standard errors account for within-child correlation but do not remove this potential selection bias. Baseline ASM count was reconstructed, but medication exposure could affect both IED expression and the chance of further intensification (16, 19, 20); serum concentrations were unavailable. The clinical-probability covariate was derived from diagnostic text rather than a prospective assessment. The intensification analysis is particularly sensitive to sparse events and should remain hypothesis-generating. A prospective study should retain exact timestamps, measure raw EEG burden alongside report wording, collect the full clinical decision context, compare an appropriate EEG pathway, and link prescribing to patient outcomes.

Conclusion

Higher report-derived IED burden was strongly associated with new ASM initiation within 7 days after pediatric VEEG in a diagnostic/initiation cohort. In established epilepsy, moderate-to-high burden showed an exploratory association with ASM treatment intensification, but the finding was weakened by sparse events, multiplicity-adjusted comparisons, and less stable patient-level sensitivity analyses. The findings support studying graded report language and the two decision pathways separately in future work. They do not establish that IED burden causes prescribing, that treatment intensification improves outcomes, or that moderate-to-high burden should serve as a treatment threshold.

Data availability statement

The analytic dataset contains potentially identifiable pediatric health information from clinical records and VEEG reports and cannot be made publicly available because of patient privacy and institutional and ethics restrictions. A deidentified data extract may be

provided upon reasonable request, subject to institutional and ethics approval. Requests to access the datasets should be directed to ZZ, simon.vane@163.com.

Ethics statement

The studies involving humans were approved by the Medical Ethics Committee of the First People's Hospital of Zhangjiagang City, Zhangjiagang, Jiangsu, China (Approval number: ZJGYYLL-LW-2026-07-003). The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

FZ: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Validation, Writing – original draft, Writing – review & editing. WX: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. YG: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Validation, Writing – original draft, Writing – review & editing. SK: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. ZZ: Supervision, Writing – review & editing.

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Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that Generative AI was used in the creation of this manuscript. During manuscript preparation, the authors used OpenAI Codex (OpenAI) to assist with language editing, document formatting. The authors reviewed and edited all AI-assisted output and take full responsibility for the final manuscript.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fneur.2026.1975177/full#supplementary-material

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