# HOSPITAL COSTS ASSOCIATED WITH NEUROLOGIC ADVERSE EVENTS IN PATIENTS WITH DIFFUSE LARGE B-CELL LYMPHOMA: A STUDY BASED ON THE UNITED STATES NATIONAL INPATIENT SAMPLE

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## Background and Objective

#### Background

- Diffuse large B-cell lymphoma (DLBCL) is the most common type of non-Hodgkin lymphoma (NHL), accounting for approximately a quarter of newly diagnosed NHL cases each year. 1,2
- Treatment options for DLBCL have been quickly expanding, including conventional immunochemotherapy and new therapies, such as chimeric antigen receptor T (CAR-T) cell therapy. <sup>3</sup>
- All treatments are associated with different neurologic adverse events (NEAEs), which may increase healthcare utilization and costs.4-6
- Few studies have reported hospital costs of NEAEs in patients with DLBCL.

#### Objective

• This study aimed to estimate the hospitalization costs associated with NEAEs in patients with DLBCL.

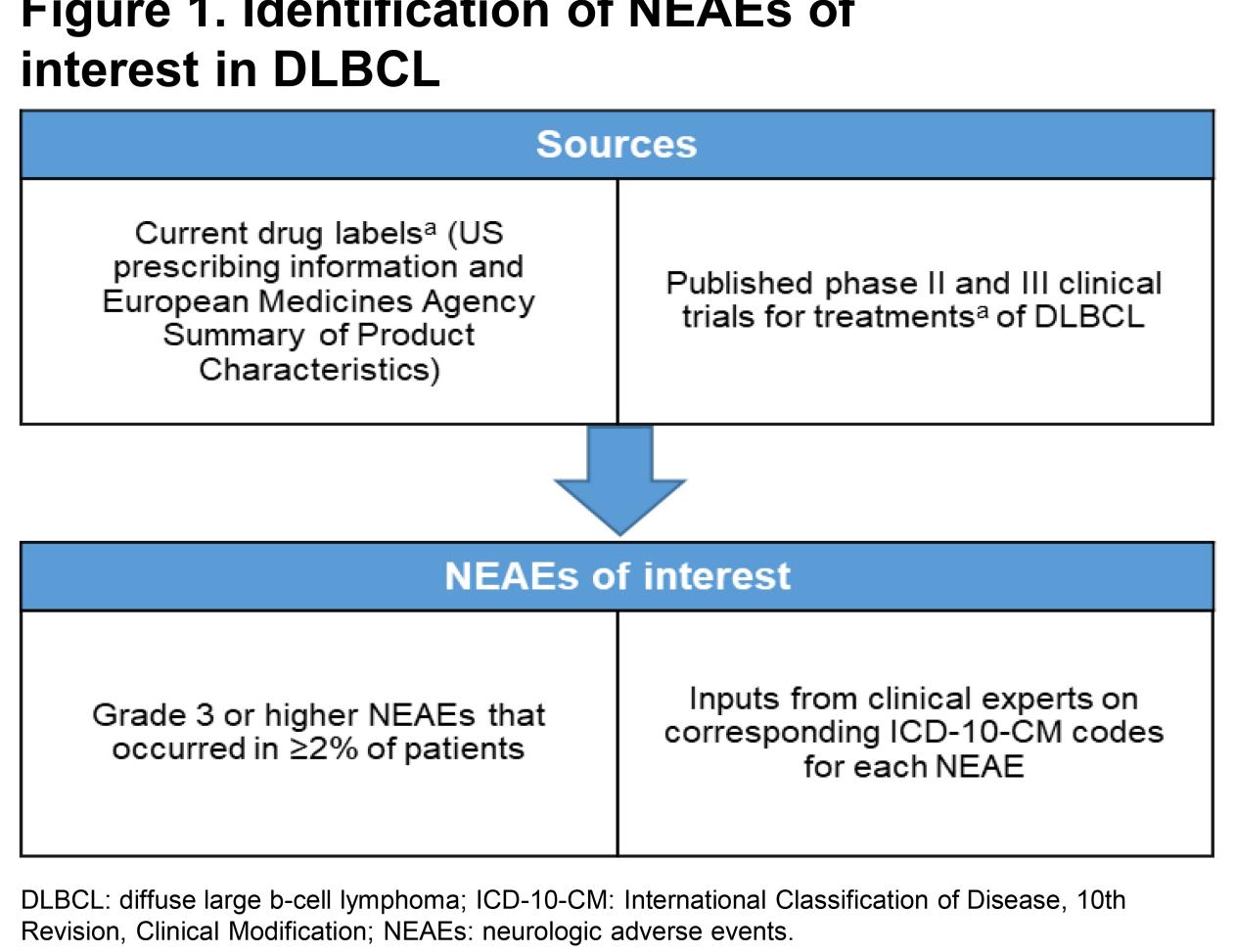
### Methods

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- Identification of NEAEs (Figure 1)
- National estimates of NEAE-related hospital length of stay (LOS) and costs
- 2016 data from the US National Inpatient Sample (NIS)\*
- NIS represents a 20% sample of discharges from US hospitals, which is weighted to provide national estimates.
- DLBCL hospital admissions with evidence of neurologic conditions (identified by primary and secondary discharge diagnoses) consistent with the NEAEs
- DLBCL admissions were identified based on ICD-10-CM code C83.3x in any diagnosis position among adult patients ≥18 years.
- Costs were estimated using hospital charges for each hospitalization and the cost-to-charge ratio for each hospital, both of which were included in the NIS.
- Statistical analysis
- Descriptive analysis weighted results reported

\* National Inpatient Sample (NIS), Healthcare Cost and Utilization Project (HCUP), Agency for Healthcare Research and Quality.

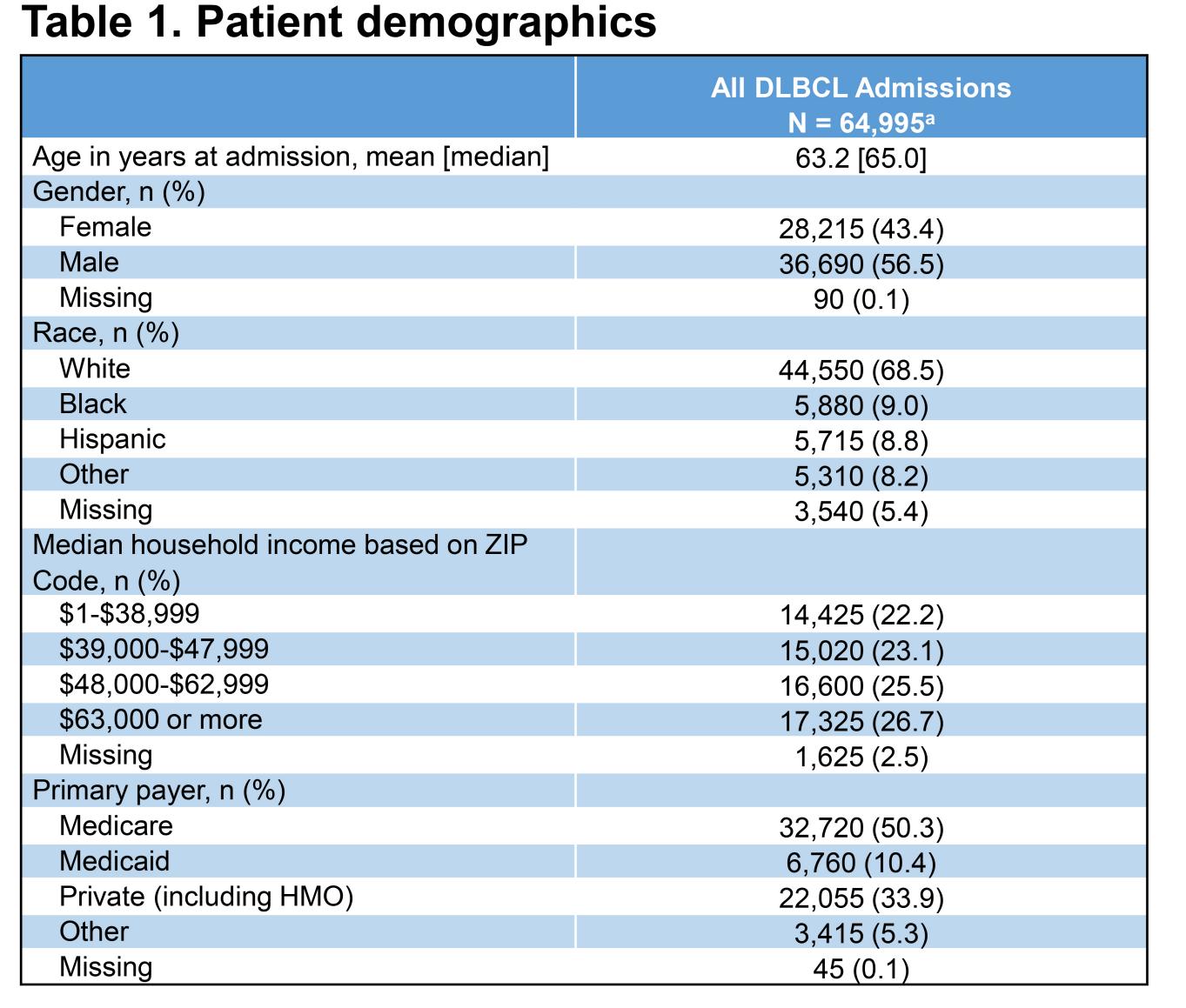
Figure 1. Identification of NEAEs of



Revision, Clinical Modification; NEAEs: neurologic adverse events. <sup>a</sup> CAR-T therapies: Kymirah and Yescarta; chemotherapies: dose-adjusted EPOCH-rituximab, dosedense CHOP 14 +/- rituximab, bendamustine +/- rituximab, brentuximab vedotin. DHAP +/- rituximab. GDP +/- rituximab, GemOX +/- rituximab, ICE +/- rituximab, lenalidomide +/- rituximab, oxaliplatin w/ROAD, rituximab.

#### Results

- Twenty-three NEAEs identified from drug prescribing information and clinical trials (Figure 2).
- Twenty were included in the NIS analysis based on availability of ICD-10-CM diagnosis codes and inputs from clinical experts.
- In 2016, there were 12,999 DLBCL hospitalizations in this sample representing 64,995 hospitalizations nationwide.
- Patients were predominantly older (mean age 63.2 years), male (56.5%), and white (68.5%). Half (50.3%) had Medicare (Table 1).
- Neurologic conditions of interest that occurred in ≥500 hospitalizations were: encephalopathy, followed by headache, cerebral edema, confusional state/disorientation, syncope, delirium, mental status changes/depressed level of consciousness, and aphasia (Figure 3).
- Hospitalization associated with abnormal motor activity and delirium had the longest LOS, followed by encephalopathy, agitation, cerebral hemorrhage, confusional state/disorientation, diplegia, and cerebral edema (Figure 3).



DLBCL: diffuse large b-cell lymphoma; HMO: health maintenance organization. <sup>a</sup> Weighted based on 12,999 hospitalizations.

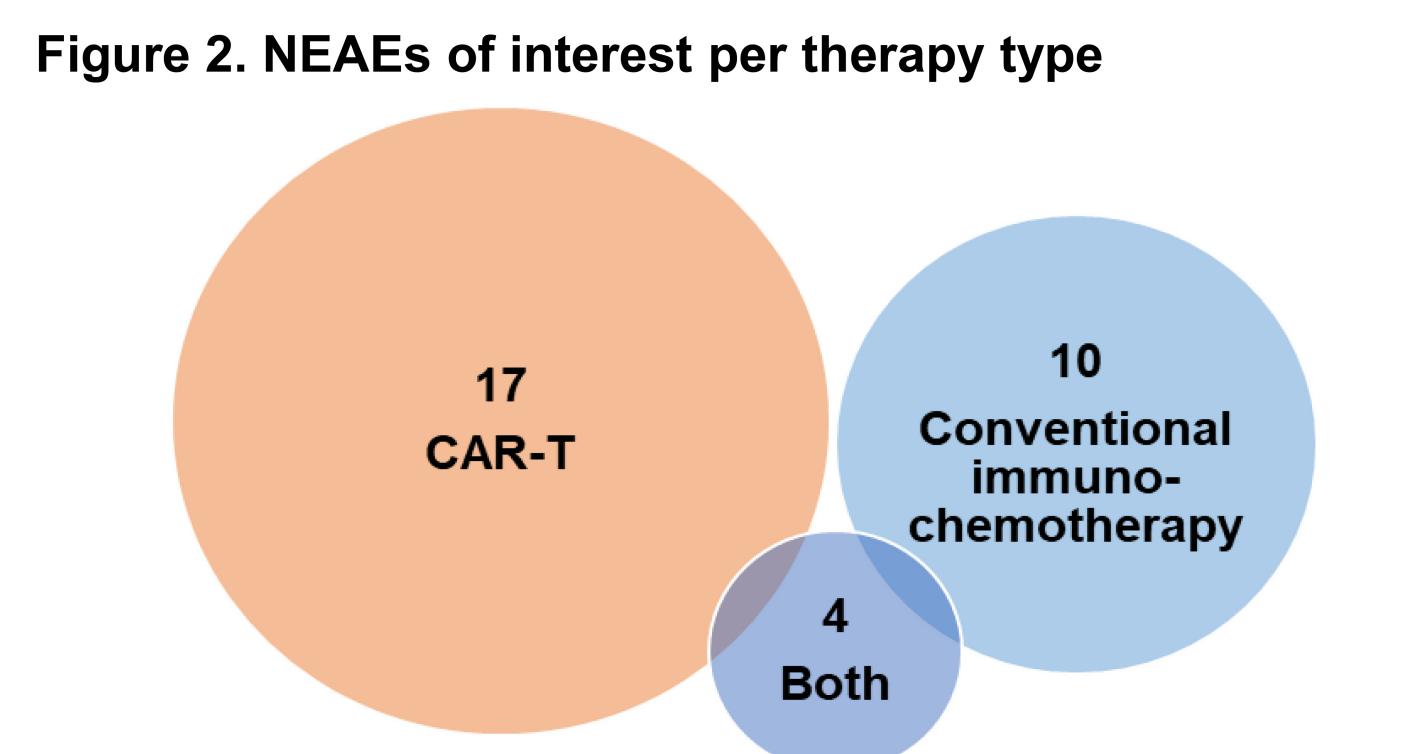
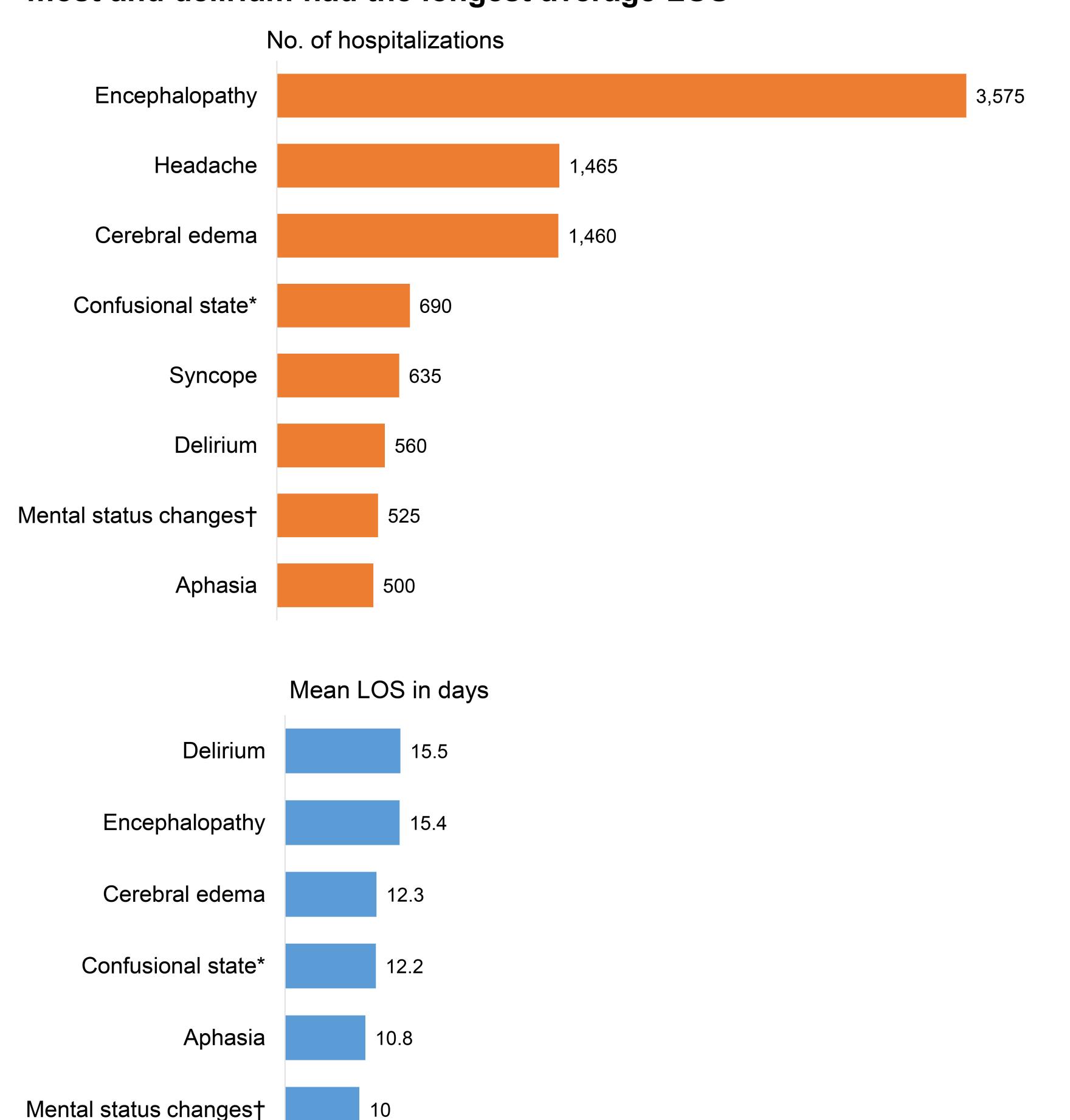


Figure 3. Encephalopathy hospitalizations occurred the most and delirium had the longest average LOS‡

CAR-T: chimeric antigen receptor T; NEAEs: neurologic adverse events.

Syncope

Headache



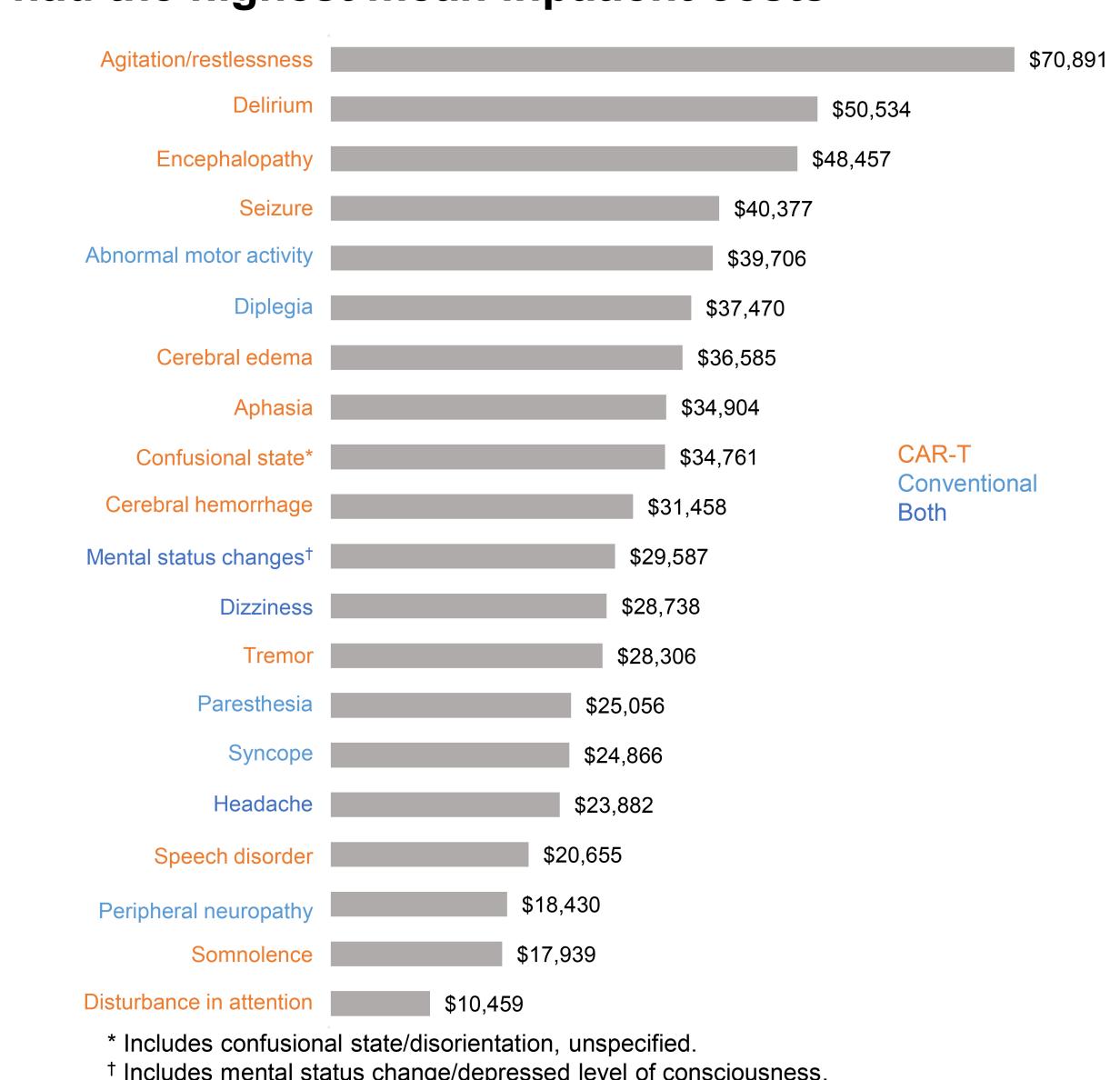
<sup>‡</sup> Only NEAEs with ≥500 hospitalizations shown.

Includes confusional state/disorientation, unspecified.

<sup>†</sup> Includes mental status change/depressed level of consciousness.

- Results The highest inpatient cost was for agitation/restlessness (mean \$70,891,
  - median \$18,155), followed by delirium (mean \$50,534, median \$30,726) and encephalopathy (mean \$48,457, median \$26,437) (means presented in Figure
  - Seizure, abnormal motor activity, diplegia, cerebral edema, aphasia, peripheral neuropathy, somnolence, and disturbance in attention were associated with mean costs of \$10,459 to \$40,377 (median \$10,168 to \$17,367).

#### Figure 4. Among the NEAEs, agitation/restlessness had the highest mean inpatient costs



### Conclusions

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- Hospitalization costs associated with neurologic conditions vary and may be substantial.
- Studies using patient-level databases are warranted to confirm the study results.

#### Limitations

• The NIS does not contain treatment information. Therefore, the relationship between treatments and NEAEs could not be confirmed.

### References

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### **Disclosures**

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