Systematic Undercounting of Overt Hepatic Encephalopathy Hospitalizations Identified by Using Hospital-administered Medication Data

#042270

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Introduction

- Overt hepatic encephalopathy (OHE) is a serious neurological complication of cirrhosis, and OHE hospitalizations are burdensome for patients, caregivers, and the healthcare system[1]
- The absence of an OHE-specific diagnosis (dx) code may lead to an underestimation of the burden of OHE hospitalizations

Objectives

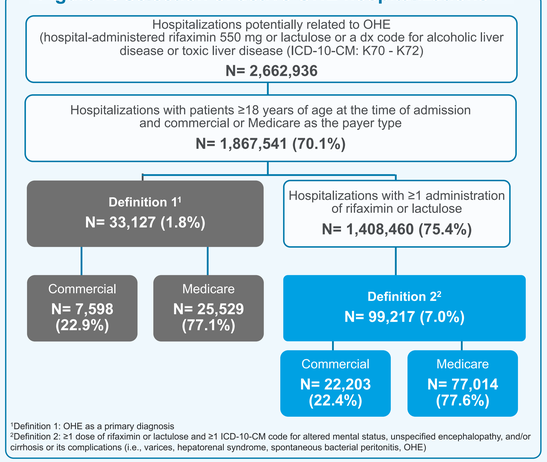
- To define an active OHE hospitalization using inpatient variables
- To describe the burden of an OHE hospitalization among commercial and Medicare-insured adults, separately, in the United States (US)

Methods

- Adults (≥18 years) were identified from PINC AI™ Healthcare Database, a large, United States, hospital-based database (PHD; Oct, 2015– Jun, 2022)
- Active OHE hospitalizations were classified into two definitions:
  - **Definition 1**
    - Had OHE as a primary dx
  - **Definition 2**
    - Had ≥1 dose of rifaximin or lactulose and
    - Had ≥1 International Classification of Disease 10th edition, Clinical Modification (ICD-10-CM) code for altered mental status, unspecified encephalopathy, and/or cirrhosis or its complications (i.e., varices, hepatorenal syndrome, spontaneous bacterial peritonitis, OHE)[1]
- Hospitalization and hospital characteristics, as well as hospital billing charge were reported among each definition separately, and for commercial and Medicare-insured patients, separately
- Means, standard deviations, and medians were reported for continuous variables and frequency counts and percentages were reported for categorical variables

[1]ICD-10-CM codes – *Altered mental status*: R41.82; *unspecified encephalopathy*: G93.40, G93.41, G93.49; *cirrhosis*: K70.3, K71.7, K74.6, K74.3, K74.4, K74.5, K74.60; *varices*: I85, I86.4; *hepatorenal syndrome*: K76.7, K91.83; *spontaneous bacterial peritonitis*: K65.2; *OHE*: K72.01, K72.11, K72.90, K72.91, K70.41, K71.11

Figure 1. Selection of active OHE hospitalizations



[1]Definition 1: OHE as a primary diagnosis
[2]Definition 2: ≥1 dose of rifaximin or lactulose and ≥1 ICD-10-CM code for altered mental status, unspecified encephalopathy, and/or cirrhosis or its complications (i.e., varices, hepatorenal syndrome, spontaneous bacterial peritonitis, OHE)

Results

Figure 2. Hospitalization and hospital characteristics

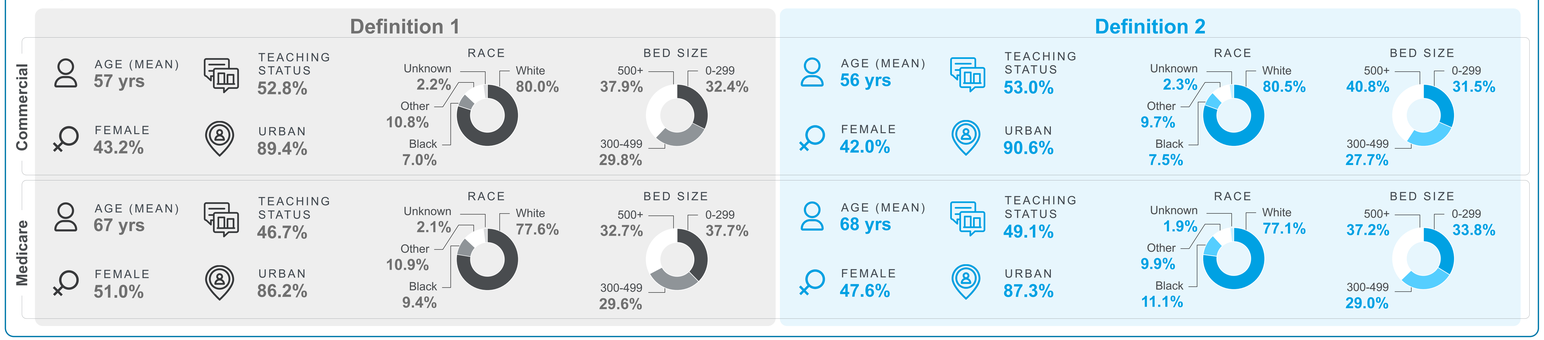


Figure 3. Hospital-administered medications (≥1 dose)

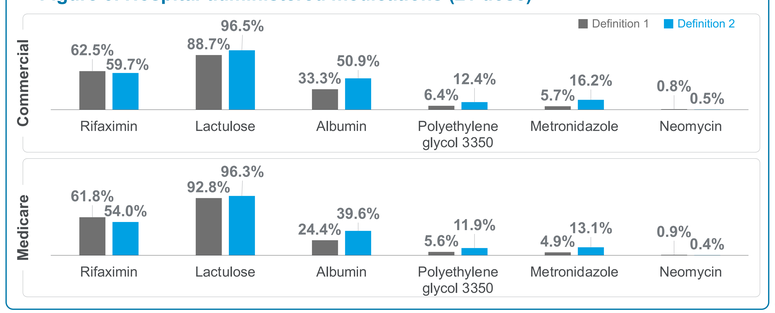


Figure 4. Rifaximin and lactulose

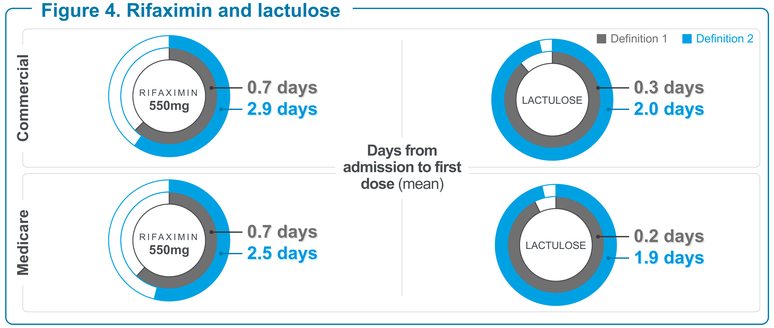


Figure 5. Length of stay

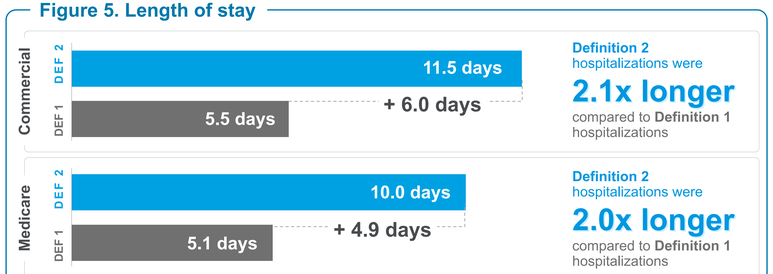


Figure 6. Hospital billing charge

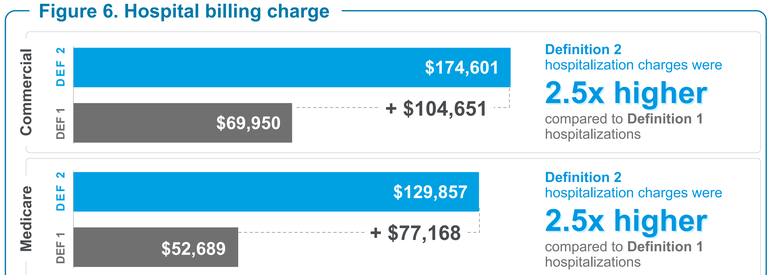


Table 1. Diagnoses related to OHE during hospitalization

	Definition 1[1] / Commercial N= 7,598	Definition 2[2] / Commercial N= 22,203	Definition 1[1] / Medicare N= 25,529	Definition 2[2] / Medicare N= 77,014
OHE	**7,598 (100.0%)**	**8,261 (37.2%)**	**25,529 (100.0%)**	**28,352 (36.8%)**
Diagnosis for any liver-related conditions (K7x)	7,598 (100.0%)	21,506 (96.9%)	25,529 (100.0%)	73,799 (95.8%)
Complications of cirrhosis	7,598 (100.0%)	12,641 (56.9%)	25,529 (100.0%)	38,305 (49.7%)
Cirrhosis	6,087 (80.1%)	17,786 (80.1%)	20,892 (81.8%)	62,080 (80.6%)
Ascites	3,393 (44.7%)	11,301 (50.9%)	8,858 (34.7%)	29,124 (37.8%)
Altered mental status	2,529 (33.3%)	6,273 (28.3%)	10,107 (39.6%)	22,875 (29.7%)
Portal hypertension	2,302 (30.3%)	7,235 (32.6%)	6,438 (25.2%)	19,315 (25.1%)
Unspecified encephalopathy	1,143 (15.0%)	17,713 (79.8%)	4,721 (18.5%)	61,808 (80.3%)
Constipation	454 (6.0%)	1,687 (7.6%)	1,516 (5.9%)	6,442 (8.4%)
Traveler's diarrhea	8 (0.1%)	0 (0.0%)	26 (0.1%)	0 (0.0%)

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Conclusions

- Compared to definition 1 for both commercial and Medicare-insured stays, active OHE hospitalizations for definition 2 were associated with:
  - Received more liver-related medications
  - Had longer time to first dose of rifaximin and lactulose
  - Had 2.0x longer length of stay and 2.5x higher billing charge
- Identifying OHE hospitalizations solely based on the presence of a primary diagnosis for OHE underestimates the rate, length of stay, and costs associated with OHE

Limitations

- This encounters-level claims-based study is subject to common limitations including coding inaccuracies and missing data
- Results pertain to an insured population and may not be representative of the US adults with no health insurance

References

1. Volk, M.L., Burne, R., Guérin, A., Shi, S., Joseph, G.J., Heimanson, Z., & Ahmad, M. (2021) Hospitalizations and healthcare costs associated with rifaximin versus lactulose treatment among commercially insured patients with hepatic encephalopathy in the United States, Journal of Medical Economics, 24:1, 202-211, DOI: 10.1080/13696998.2021.1877148

Sponsorship

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Disclosures

AJ has received consulting fees from Bausch Health Companies, Inc. PGS, JM, DC, KY, and AG are employees of Analysis Group, Inc., a consulting company that has provided paid consulting services to Bausch Health Companies, Inc., which funded the development and conduct of this study. ZH is an employee of Salix Pharmaceuticals. BB and AAD are employees of Bausch Health Companies, Inc. OO is a postdoctoral fellow with Rutgers Pharmaceutical Industry Fellowship Program. DB was a postdoctoral fellow with Rutgers Pharmaceutical Industry Fellowship Program at the time of study conduct. GJ was an employee of Bausch Health Companies, Inc at the time of study conduct.