

## ABSTRACT (REVISED)

**Background:** The primary driver of costs for patients (pts) with candidemia (C) and invasive candidiasis without candidemia (IC) is hospital length of stay. Studies across multiple infections demonstrate that most clinically stable pts with modest diagnostic & therapeutic requirements can be safely discharged prior to actual hospital discharge day. Few studies have assessed if there is an opportunity to accelerate time to hospital discharge (HD) in pts with C/IC. This study sought to determine the proportion of US hospitalized adult pts with C/IC who received an echinocandin (EC) near HD & were potentially eligible for an earlier HD.

**Methods:** Design: Retrospective, multi-centered observational study using Premier Healthcare Database (1/2016-4/2019). Study criteria: hospitalized; age  $\geq$  18 years; *Candida sp.* on a culture consistent with C/IC;  $\geq$  3 days of an EC for C/IC; discharged alive; & received an EC near HD (-2 day to HD day). Pts were considered potentially dischargeable if they met the following 3 criteria & maintained these 3 criteria until HD: resided on a non-ICU hospital ward, taking any oral medications, & had no receipt of any diagnostic/therapeutic interventions (insertion of PICC lines were permitted). The difference in hospital days between first potentially eligible HD day & actual HD day was quantified. The proportion of pts that was potentially eligible for an earlier HD was examined overall & by Charlson Comorbidity Index (CCI), C/IC, & *Candida sp.*

**Results:** During study period, 1,599 pts received an EC  $\geq$  3 days for C/IC & were discharged alive. Of the 1,599 pts, 1,008 (63%) were on an EC near HD. For the 1,008 pts on an EC near HD, the mean (SD) age was 59 (16) years, 52% were male, 40% had a CCI  $\geq$  4, 35% were in the ICU on index C/IC culture day, & 64% had C vs IC. *C. glabrata* (31%) & *C. albicans* (31%) were the most frequent *Candida sp.* Of the 1,008 pts on an EC near HD, 38% were potentially dischargeable prior to actual HD day (Figure 1). The proportion of pts who were potentially eligible for HD at least 2 days prior to actual HD day did not vary by CCI score, C/IC, & *Candida sp.*

**Conclusions:** Our findings suggest that a high proportion of hospitalized pts with documented C/IC receiving an EC near the time of HD had modest diagnostic/therapeutic requirements prior to actual HD day and were potentially dischargeable prior to actual HD day regardless of CCI, infection type, or *Candida sp.*

## BACKGROUND

- Invasive candidiasis (IC), defined as *Candida sp.* infection in the bloodstream, heart, brain, eyes, bones, liver, spleen, kidneys, or other sterile sites, is a growing concern across US healthcare facilities (PMID: 26679628).
- Patients with IC have increased morbidity, mortality, and healthcare-associated costs (PMID: 16018429).
- While several factors contribute to the high attributable costs associated with C/IC, the primary driver is hospital room and board costs (PMID: 21591820).
- Studies across multiple infections demonstrate that most clinically stable patients with modest diagnostic, therapeutic, and monitoring requirements can be safely discharged prior to hospital discharge (HD) day (PMID: 22623629).
- Few studies have assessed if there is an opportunity to accelerate time to HD in hospitalized patients with C/IC as a measure to reduce healthcare costs.

## OBJECTIVES

- Determine the proportion of US hospitalized adult patients with C/IC who received an echinocandin (EC) near HD and were potentially eligible for an earlier HD.

## METHODS

### Study Design and Population

- Retrospective, multi-centered observational study of hospitalized adult patients in the Premier Healthcare Database

### Study Criteria

- Age  $\geq$  18 years old
- Inpatient hospitalization discharged between 1/2016 to 4/2019
- Identification of a *Candida sp.* on a clinical culture consistent with C/IC
- Receipt of  $\geq$  3 days of an EC starting on or after -2 days from index C/IC culture collection day
  - For patients with  $\geq$  1 admissions with C/IC and EC treatment, only the first admission was analyzed
- Discharged alive
- Received an EC near HD (-2 day to HD day)

### Clinical Characteristics

- Demographics
  - Age and sex
- Clinical characteristics
  - Charlson Comorbidity Index (CCI index and individual conditions)
  - Hospital length of stay (LOS) prior to index C/IC culture collection day
  - Residence in ICU on index C/IC culture collection day
  - Infection type (C vs IC)
  - Candida sp.* on index culture
  - Timing of EC in relation to index C/IC culture and EC treatment duration.
  - Discharge Location

### Primary Outcome (Hospital Discharge Criteria)

- Patients were considered potentially dischargeable if they met the following 3 criteria & maintained these 3 criteria until HD
  - Resided on a non-ICU hospital ward
  - Received an EC near HD (-2 day to HD day)
  - Taking any oral medications
  - No receipt of any diagnostic/therapeutic interventions
    - Insertion of PICC lines were permitted

### Hospital Discharge Analysis Plan

- The difference in hospital days between first potentially eligible HD day & actual HD day was quantified.
- The proportion of patients that was potentially eligible for an earlier HD was examined overall & by CCI, C/IC, & *Candida sp.*

## RESULTS

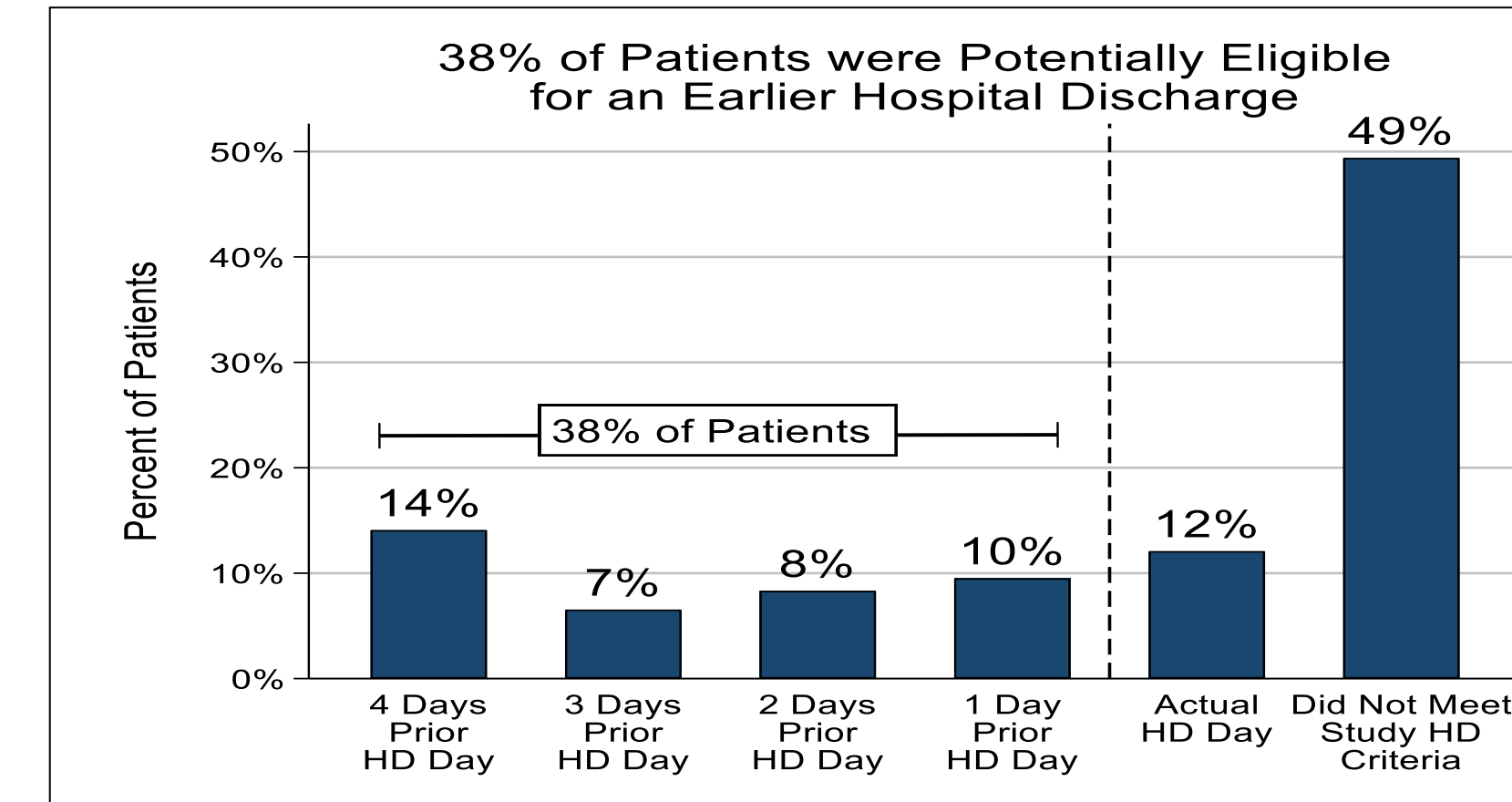
Table 1. Study Population Attrition Table

Inclusion/Exclusion Criteria	Sample Size
Patient admitted on 1/2016 to 12/2019	10,656,131
Patients $\geq$ 18 years	10,351,085
Patient is an Inpatient	2,216,180
<i>Candida sp.</i> on a clinical culture consistent with documented C/IC	4,340
Patient had at least 1 day of EC starting on or after -2 days from the index date	2,563
Three or more consecutive days of EC starting on or after -2 days from index C/IC culture collection day	1,916
First C/IC admission among patients with multiple inpatient admissions with a documented C/IC	1,865
Discharged alive	1,599
Received an EC within Day 2 of HD	1,008

Table 2. Baseline Characteristics of Treatment Groups

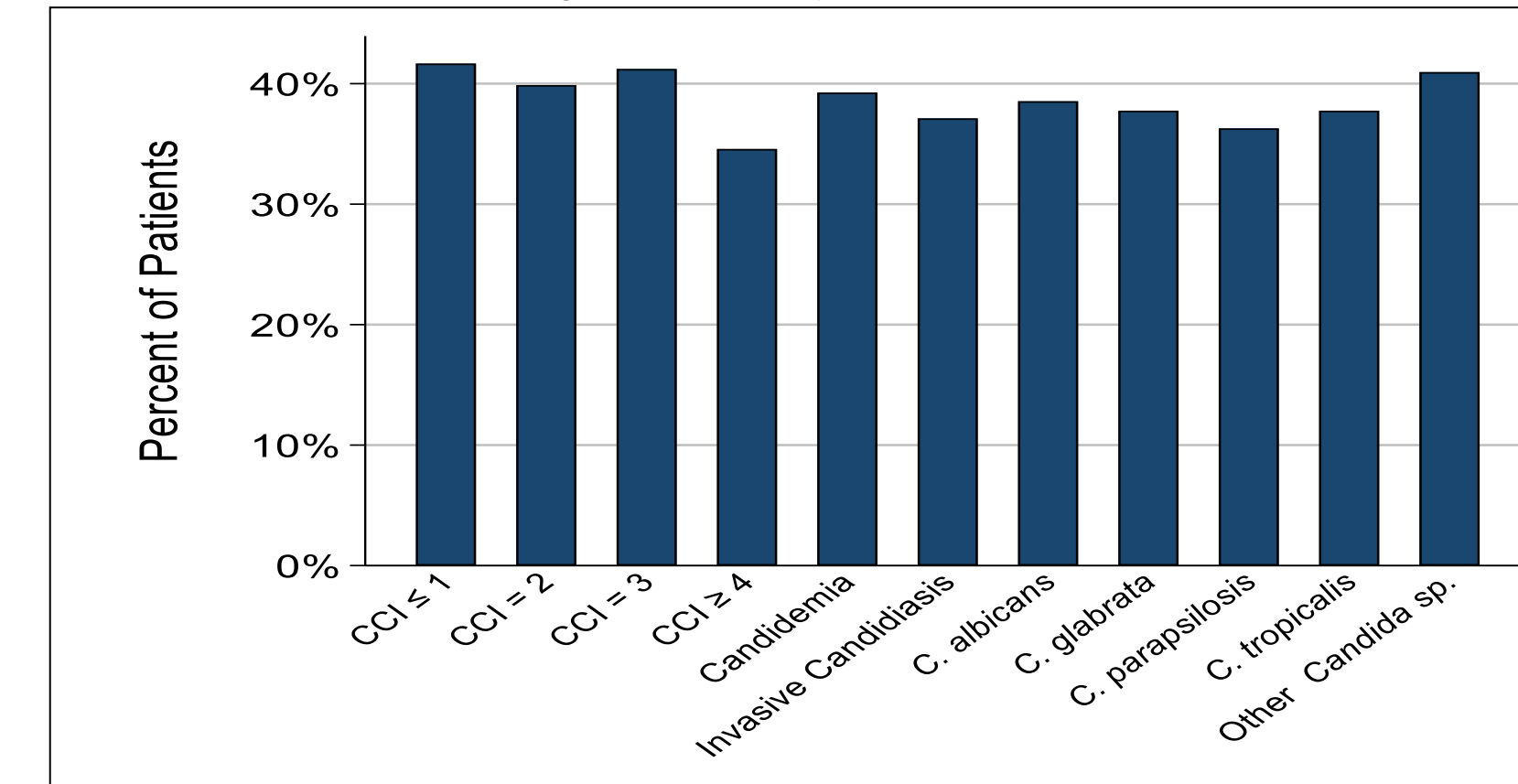
Demographics and Baseline Covariates	Discharged Alive N = 1,599	Discharged Alive and on an EC $\leq$ 2 days of HD N = 1,008
Age (Mean, SD)	58 (16)	59 (16)
% Male	814 (51%)	520 (52%)
CCI (Mean, SD)	3.3 (2.6)	3.2 (2.6)
Hospital LOS prior to index C/IC day	7.1 (10.0)	5.7 (7.6)
Residence in ICU on index C/IC day	634 (40%)	353 (35%)
Candidemia	1039 (65%)	647 (64%)
<i>Candida sp.</i>		
<i>C. albicans</i>	580 (36%)	314 (31%)
<i>C. glabrata</i>	455 (28%)	339 (34%)
<i>C. parapsilosis</i>	195 (12%)	124 (12%)
<i>C. tropicalis</i>	155 (10%)	98 (10%)
Other <i>Candida sp.</i>	298 (19%)	188 (19%)
Receipt of EC $\leq$ 5 days of index C/IC day	1504 (94%)	942 (93%)
EC duration (Mean, SD)	9 (8)	9 (8)
Discharge Location		
Home or Self-Care	315 (20%)	210 (21%)
Long-term care facility	376 (24%)	220 (22%)
Home Health Organization	370 (23%)	246 (24%)
Discharged to Hospice	136 (9%)	95 (9%)
Discharged to other location	402 (25%)	237 (24%)

Figure 1. Cumulative Percentage of Patients on an EC  $\leq$  2 Days of HD Who Were Potentially Eligible for an Earlier Hospital Discharge (n=1,008)\*



\*Number of Days a patient was dischargeable prior to actual hospital discharge day: first day on EC from HD in which the patient resided on a non-ICU ward, received any oral medications, an had no further diagnostic/therapeutic interventions.

Figure 2. Proportion of Patients on an EC  $\leq$  2 Days of HD Who Were Potentially Eligible for an Earlier Hospital Discharge (n=1,008) By CCI Score, C/IC, and *Candida sp.*



## CONCLUSIONS

- Over 60% of adult hospitalized patients with C/IC who received an EC and were discharged alive were on an EC near time of hospital discharge.
- Thirty-eight percent of hospitalized pts with C/IC receiving an EC near the time of HD were potentially dischargeable prior to actual HD day.
- The findings suggest that high proportion of C/IC patients who received an EC were potentially eligible for an earlier HD regardless of CCI, infection type, or *Candida sp.*