



# Thirty-day Readmissions due to *Clostridium difficile* Infection - What Do We Know?



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## ABSTRACT

**Background:** Through Value Based Purchasing (VBP), CMS has begun to decrease payments to hospitals with excessive 30-day readmissions. VBP will soon also link payments to care reliability performance which can have major implications to hospitals. We sought to identify *Clostridium difficile* Infection (CDI) as a cause of increased LOS and 30-day readmission at a tertiary care center.

**Methods:** Discharge data from 5 hospitals were analyzed between January 1, 2012 through December 31, 2012 at a tertiary care health system in the metropolitan Detroit Area. All inpatients discharged from any of the 5 hospitals during the study period with a diagnosis of *Clostridium difficile* enterocolitis ICD9 008.45 code were included in the analysis. A comparison was made between all cause 30-day readmissions (All-RA) vs. 30-day readmissions attributable to CDI (CDI-RA). An additional analysis was performed to compare average all cause length of stay (ALL-LOS) for 30-day readmissions and days to readmission (ALL-DR) vs. average length of stay (CLOS) and days to readmission (CDI-DR) for the 30-day readmissions attributable to CDI.

**Results:** There were a total of 70,821 patients discharged from the selected hospitals during the 12 month study period. A total of 732 discharges had a diagnosis of CDI. The ALOS for all patients was 4.45 days and ALOS for CDI patients was 10.86 days in the initial admission. The Average cost per patient for all cause admission was \$11,516 compared to \$25,880 for CDI admission. The total All-RA was 7366(10.4%) during the study period, CDI-RA accounted for 188 patients(2.5%) and out of these 78(41.5%) were readmitted with CDI. For both populations, the average ALL-DR and CDI-DR was 12.38 and 10.65 days respectively. The LOS for all cause readmissions was 8.31 days and LOS for readmissions with CDI was 8.97 days respectively.

**Conclusions:** Patients with CDI on an average had 6.41 days greater LOS compared to all cause admissions leading to greater hospital costs. CDI-RA accounted for 2.5% of the total readmissions during the study period. CDI related readmissions occurred on an average 1.73 days earlier than all cause readmissions but had similar LOS as compared to ALL-RA. A reduction in hospital onset CDI and readmission secondary to CDI can provide tremendous cost savings. This calls for better infection control and antibiotic stewardship measures to CDI related readmissions.

## BACKGROUND

- *Clostridium difficile* causes a serious diarrheal infection associated with antibiotic use in hospitals.
- As per CDC, *C. difficile* infection (CDI) causes 250,000 hospitalization, 14,000 deaths and at least \$1 billion in excess medical costs per year in United States.
- Through Value Based Purchasing (VBP), CMS has begun to decrease payments to hospitals with excessive 30-day readmissions.
- Given the fact that CDI is a recurrent disease, it will account for a large number of 30 day readmissions and a huge health care expenditure.
- Hence we sought to understand the epidemiology of CDI as a cause of 30 day readmissions including costs & LOS as compared to all cause readmissions.

## METHODS

- Discharge data were analyzed using 'Premier Quality Advisor' database between January 1, 2012 through December 31, 2012 at a tertiary care health system in the metropolitan Detroit Area.
- All inpatients discharged from the 5 selected hospitals during the study period with a diagnosis of *Clostridium difficile* enterocolitis ICD9 008.45 code were included in the analysis.
- Following comparison were made:
  - ❖ All cause 30-day readmissions (All-RA) vs. 30-day readmissions attributable to CDI (CDI-RA).
  - ❖ Average all cause length of stay (ALL-LOS) for 30-day readmissions and days to readmission (ALL-DR) vs. average length of stay (CLOS) and days to readmission (CDI-DR) for the 30-day readmissions attributable to CDI.

## RESULTS

Table 1: Initial Admission Data

Variable	All Cause Discharges	CDI Discharges
Number of Patients (%)	70,821	732 (1.03%)
Average Length of Stay (days)	4.45	10.86
Average Total Cost/Case (\$)	11,516	25,880

Table 2: Readmission Data (RA)

Variable	All Cause RA	CDI RA
Number of readmissions (%)	7366	188 (2.5%)
Average LOS (days)	8.31	8.97
Time to readmissions (days)	12.38	10.65

## RESULTS

Fig. 1: Average Length of Stay

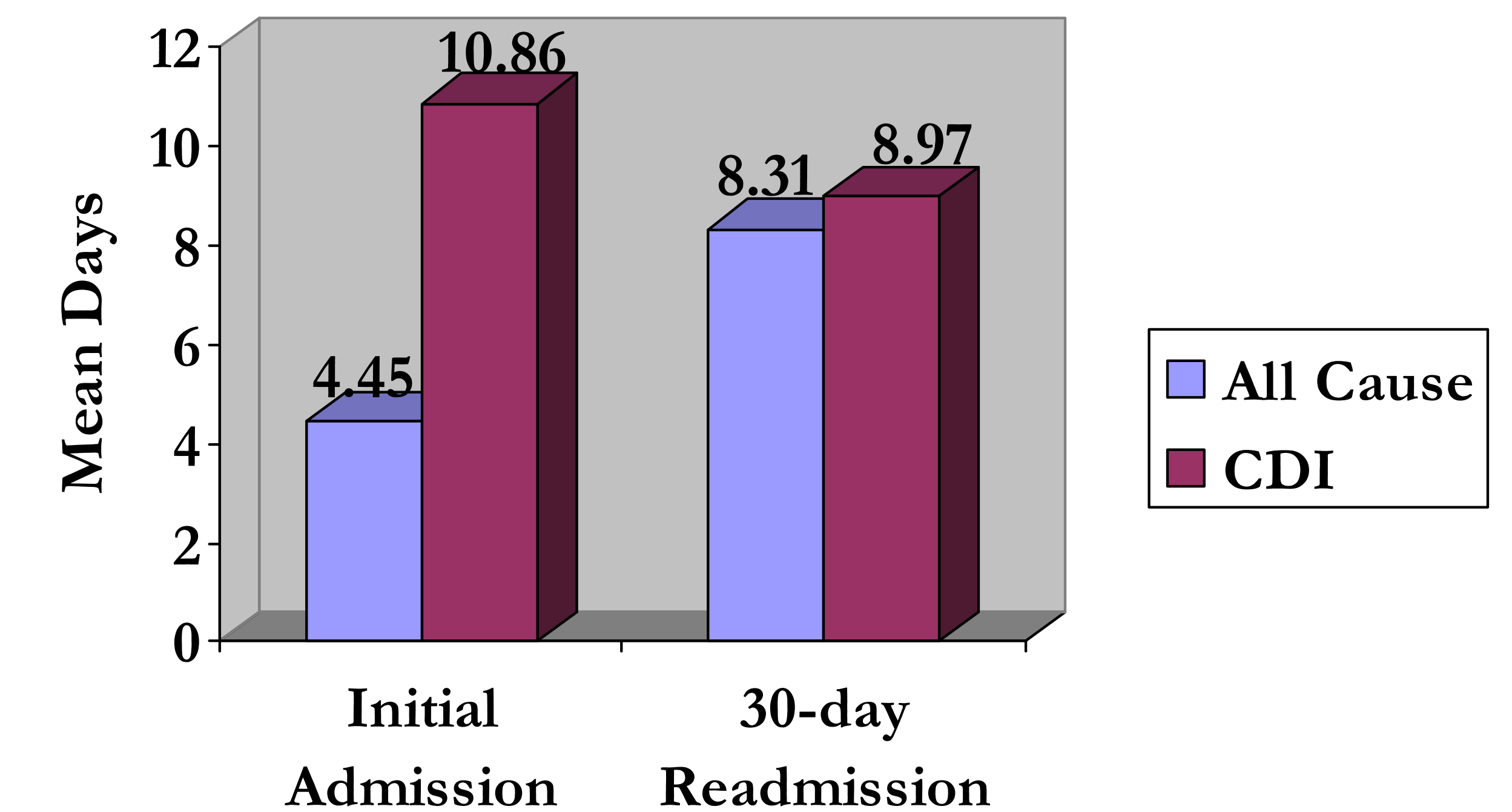
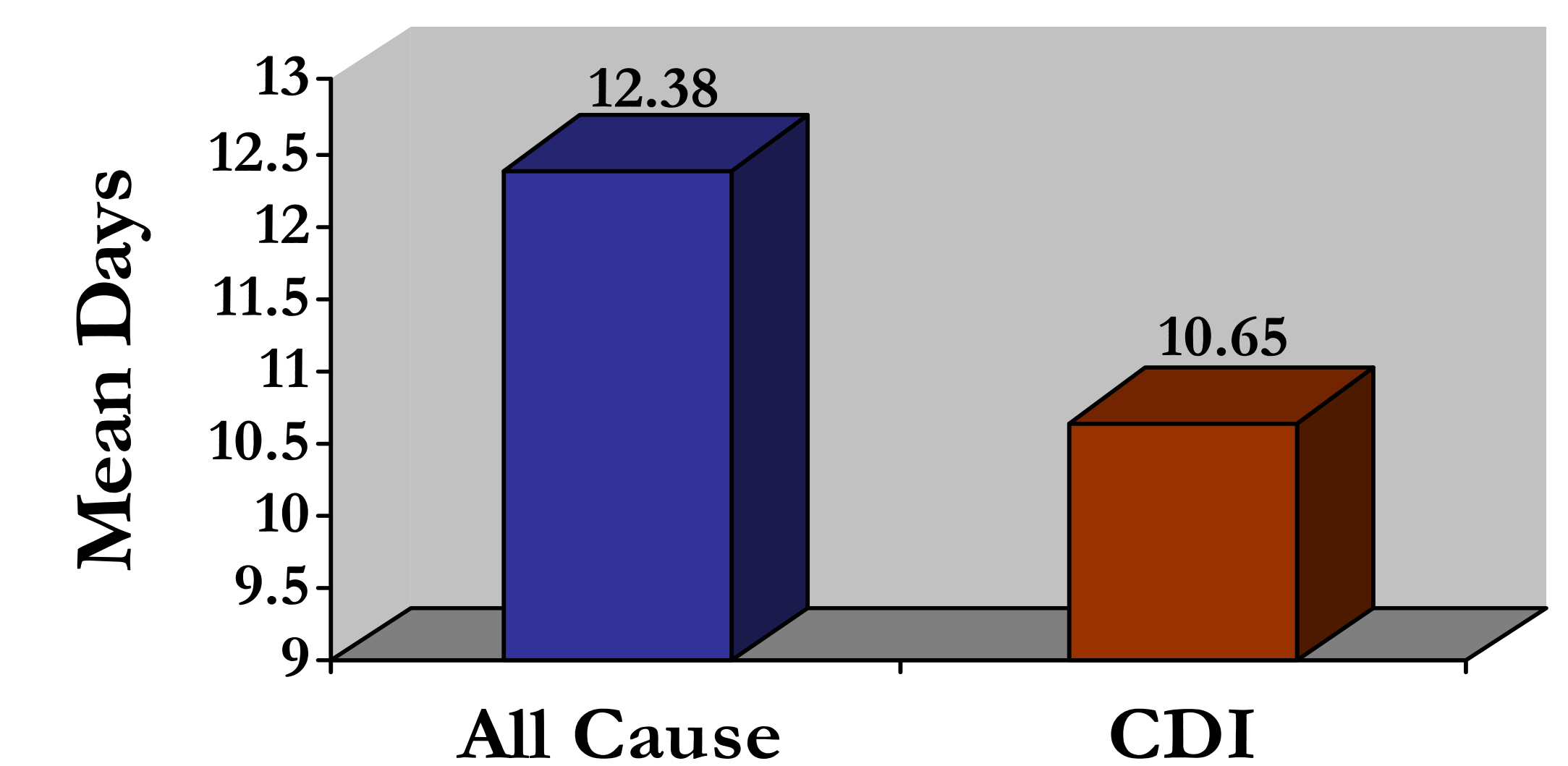


Fig. 2: Time to Readmission



## CONCLUSIONS

- ❖ During initial admission, patients with CDI had on an average 6.41 days longer LOS compared to all cause admissions.
- ❖ The average cost per case was more than double in patients with CDI as compared to all cause discharges.
- ❖ CDI-RA accounted for 2.5% of the total readmissions during the study period.
- ❖ CDI-RA occurred on an average 1.73 days earlier than all cause readmissions.
- ❖ CDI readmission had similar LOS as compared to ALL-RA.
- ❖ A reduction in hospital onset CDI and readmission secondary to CDI can provide tremendous cost savings.