A Retrospective Cross-sectional Analysis of In-hospital Falls in the largest private health care system across the Unites States

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Background

- Inpatient falls are the most common inpatient accident, occurring in 2% to 17% of acute care patients[1]
- Falls make up 70% of inpatient accidents; with 30% leading to physical injury and 4-6% leading to serious injury, including fractures and head injuries[2]
- The incidence of falls among hospital patients range from 2.3-7 falls per 1000 patient-days[1].
- Approximately 30% of these inpatient falls results in injury with approximately 4-6% resulting in serious injury [2]
- Because of falls, the cost of care for these patients is over $13,000 more when compared to patients who do not fall, and length of stay is approximately 6.3 days longer[3].

Objective

- The primary objective is to determine the most common predisposing factors to impatient falls in HCA Healthcare.
- No systemic analytic data that specifically applies to our hospital and similar hospitals across different states (under Health Care America) exists.
- We are conducting a retrospective cross-sectional analysis to determine the most common predisposing etiologies to inpatient falls in the HCA Healthcare.

Methods

- Deidentified data was collected for any patient that nursing staff documented a "fall" incident in the electronic medical records.
- Patients accounts were collected from 2018 – 2019
- Control group (non-fall patients) were age and sex matched against the fall population.
- Descriptive statistics was used for demographic and clinical information.

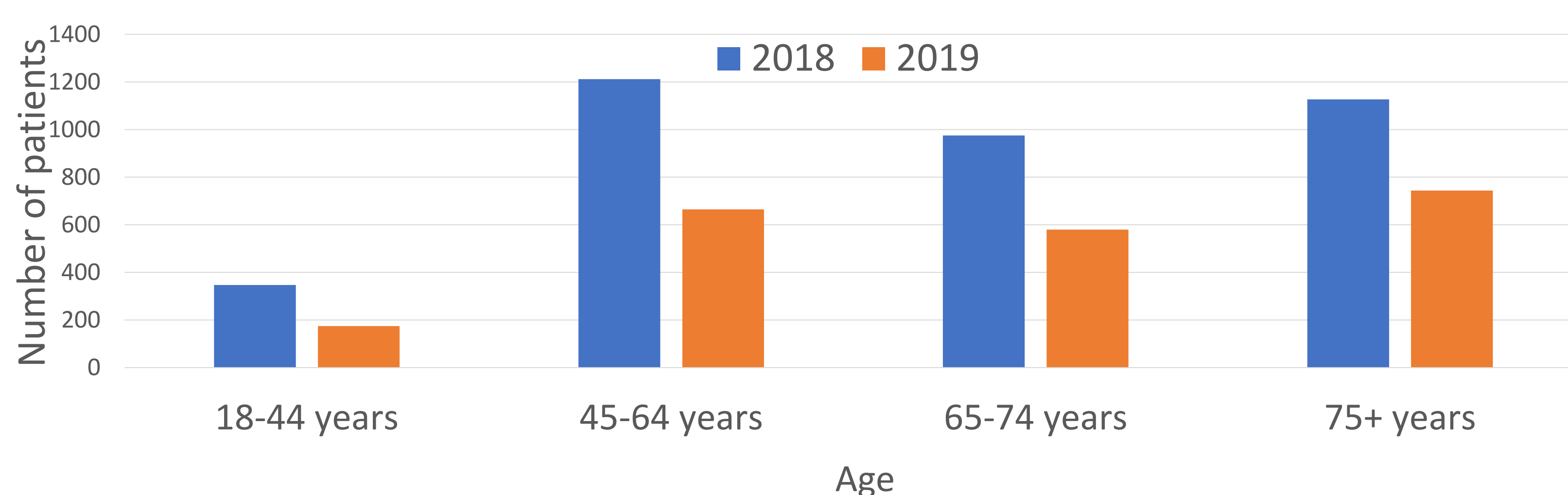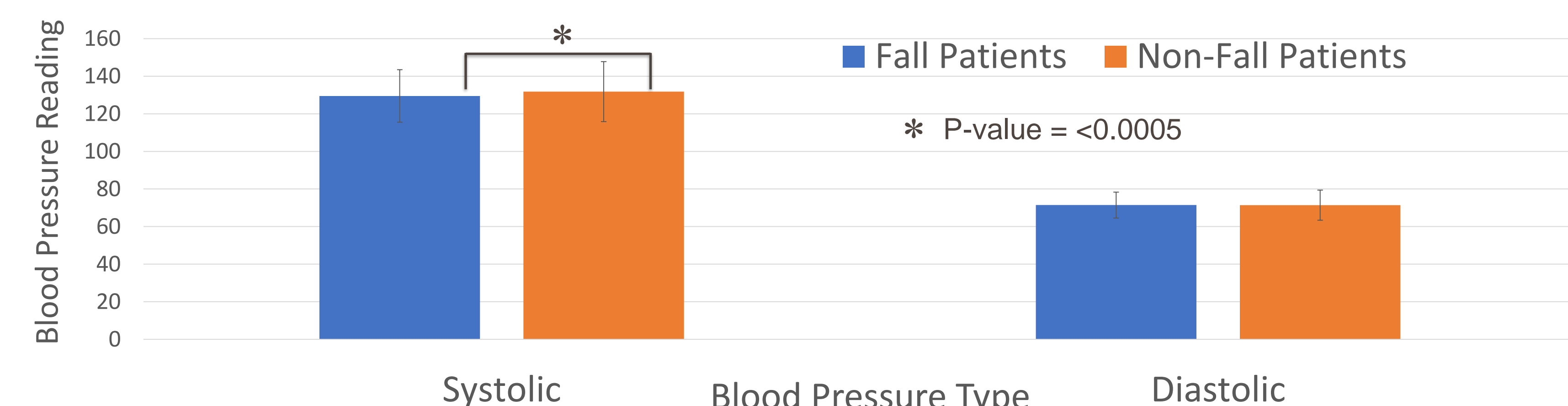### Figure 1: Trends from the total fall population of N = 5,824

Figure 2: Average of blood pressures taken during that patient's admission

Results

Table 1: Demographics of the Population

| Variable	Fall Patients (N = 5,824)	Age and Sex Matched Non-Fall Patients (N = 5,824)	Test for Significance
Age (mean, SD)	66.23, 15.00	66.23, 15.00	P-value = 1.000
Sex	2,988 M / 2,836 F	2,988 M / 2,836 F	P-value = 1.000
BMI (mean, SD)	28.78, 7.58	29.06, 7.48	P-value = 0.0424
Race/Ethnicity	4,134 White 805 Black 640 Hispanic 149 Other 96 Asian	4,005 White 827 Black 781 Hispanic 137 Other 74 Asian	P-value = 0.0006
Insurance	4,382 Medicare or Medicaid 943 Private 276 Other 223 No Insurance	4,307 Medicare or Medicaid 870 Private 264 Other 383 No Insurance	P-value = <.0001
CCI (mean, SD)	5.03, 2.76	4.62, 2.96	P-value = <.0001
Length of Stay (mean, SD)	15.21, 11.58	5.00, 5.74	P-value = <.0001
Mortality	26 (0.45%)	118 (2.03%)	P-value = <.0001
Marital Status	2,738 Married 1,386 Single 921 Widowed 575 Divorced 204 Other/Unknown	2,668 Married 1,447 Single 894 Widowed 618 Divorced 197 Other/Unknown	P-value = 0.3677

Figure 3: Association with medications received
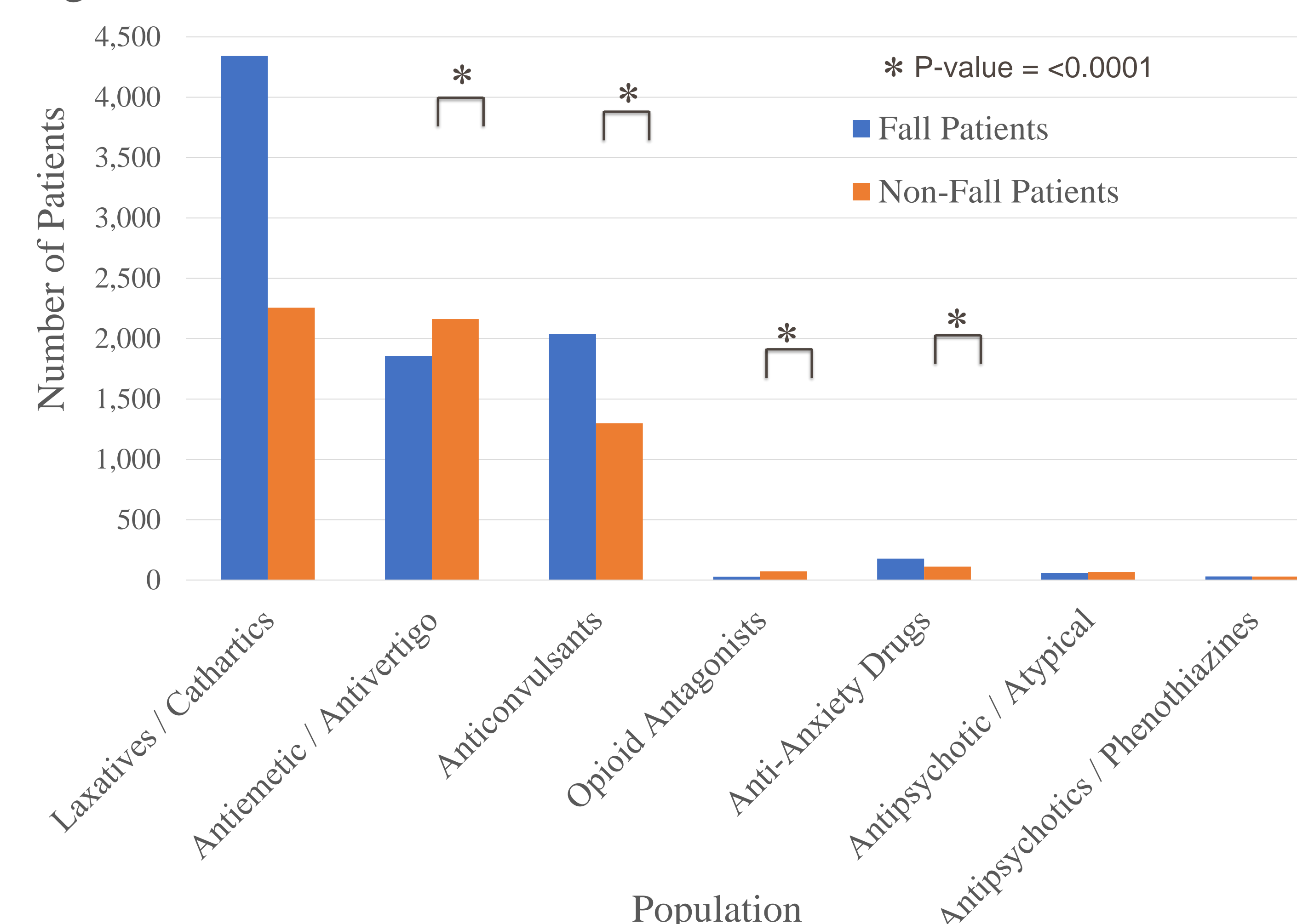
Table 2. Charlson Comorbidity Index Comorbidities (CCI)

	Fall Patients	Non-Fall Patients	P-Value
Myocardial infarction	514	**637**	0.0001
CHF	1,325	1,392	0.1421
Peripheral vascular disease	529	554	0.4251
Cerebrovascular disease	**1,868**	506	<0.0001
Dementia	**600**	537	0.0492
COPD	1,299	**1,532**	<0.0001
Rheumatic disease	192	193	0.9587
Peptic ulcer disease	104	132	0.0656
Mild liver disease	278	268	0.6611
Diabetes without complications	**1,762**	1,485	<0.0001
Diabetes with complications	**1,283**	943	<0.0001
Paraplegia	**482**	154	<0.0001
Renal disease	**1,399**	1,305	0.0391
Malignancy	419	**485**	0.0223
Moderate/severe liver disease	109	91	0.1992
Metastatic solid tumor	171	152	0.2836
AIDS/HIV	15	25	0.1132

- **Fig 1** shows age group of fall and non-fall populations for 2018 and 2019.
- **Fig 2** shows average systolic and diastolic blood pressures during admission between fall and non-fall patients
- **Table 1** summarized the demographic, insurance type, length of stay, mortality, and marital status.
- There was statistically significant difference of falls in patients taking laxatives, anticonvulsants, and anti-anxiety, Interestingly non-fall patients were more likely to be taking antiemetics, opioid antagonists that reached statistical significance. **Fig 3**.
- **Table 2** represents the CCI values between fall and non-fall patients and the statistically significant values between the two populations.

Discussions

- The most common medications among patients within hospital falls was in the laxatives class. Considering widely used laxatives and cathartics among hospitalized patient, it is not clear if it is more common in patients with inpatient falls.
- The CCI is a statistically significant predictor for falls during admission.
- Lower systolic blood was statistically significant for patients who fell. Clinical significance is difficult to determine as the difference between fall and non-fall patients was 1 mmHg.
- Length of stay was was much longer in the fall population, but mortality was much higher is the non-fall population. Such a high mortality my artificially lower the non-fall population length of stay as a result of a type of selection bias.
- This data was drawn from nursing documentation which may be a sores of error and a limitation. Years prior to 2018 to be excluded due to the current nursing documentation requirements was not mandatory across the HCS system at that time.

Conclusion

- In conclusion, this data provides in-depth information on the inpatient falls population in the HCA Healthcare. It further provides, for the first time, information spanning a nation-wide population, and further provide target populations to further improve fall prevention.

References

1. Hitcho E, et al: Characteristics and circumstances of falls in a hospital setting. Journal of General Internal Medicine, 2004
2. Morse JM, Prowse MD, Morrow N, Federspeil G. A retrospective analysis of patient falls. Can J Public Health. 1985
3. Wong C, et al: The Cost of Serious Fall-Related Injuries at Three Midwestern Hospitals. The Joint Commission Journal on Quality and Patient Safety, 2011