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The Effects of Harm Events on the Rate of 30-day Readmissions in Surgical Patients

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THE EFFECTS OF HARM EVENTS ON THE RATE OF 30-DAY READMISSIONS IN SURGICAL PATIENTS

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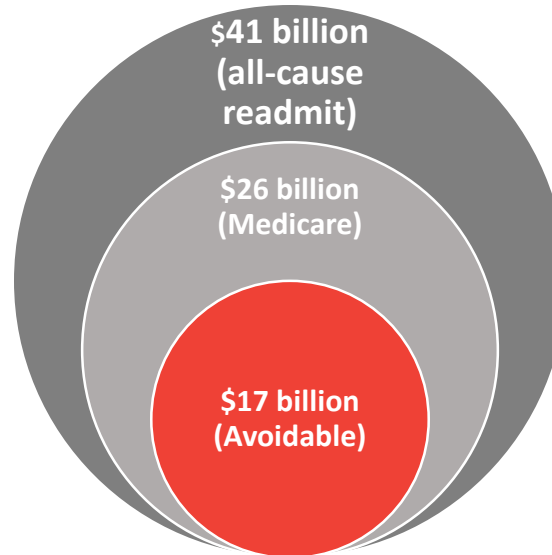
DISCLOSURES

I do not have any relevant financial relationship(s) with any commercial interest that pertains to the content of my presentation.



BACKGROUND

- Hospital readmission rates have been used as a quality benchmark for health systems, but also as a means to bend the healthcare cost curve.



CMS Financial Penalties



- Readmissions are an increasingly important for improvement.
 - Identification of factors associated with readmission is critical to predict high-risk patients for early interventions.
 - Adverse safety events could place a burden on patients and cause readmissions^[1,2].



BACKGROUND



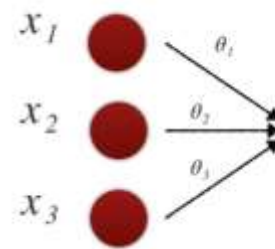
- “**No Harm Campaign**” innovative approach from Henry Ford Health System (HFHS):
 - Highlighted harmful events
- HFHS e-harm measuring system
 - Over time, harms were labelled electronically, also updated automatically within 24 hours
 - Harms occurring during an inpatient stay can improve our understanding of downstream adverse occurrences (e.g. readmission, mortality, etc.)

OBJECTIVES

- Objective 1:



- Objective 2:



y



Prediction Model



- Hypothesis:

- Inpatient harm events increase the likelihood of readmission in surgical patients.

METHODS

Data

- Henry Ford Health System inpatient registry (year 2015-2017) for all hospitals
- Surgical Cohort: 37,566 out of total 105,143 encounter CSNs
 - Exclusion: expired patients

Variable

- 30-day HFHS readmission
- 23 harm events with converted binary codes
- Others: age, gender, race, and facility (5 hospitals)

Statistical Analysis

- Descriptive analysis
- Uni-variable/Multi-variable analysis using logistic regression (R software)

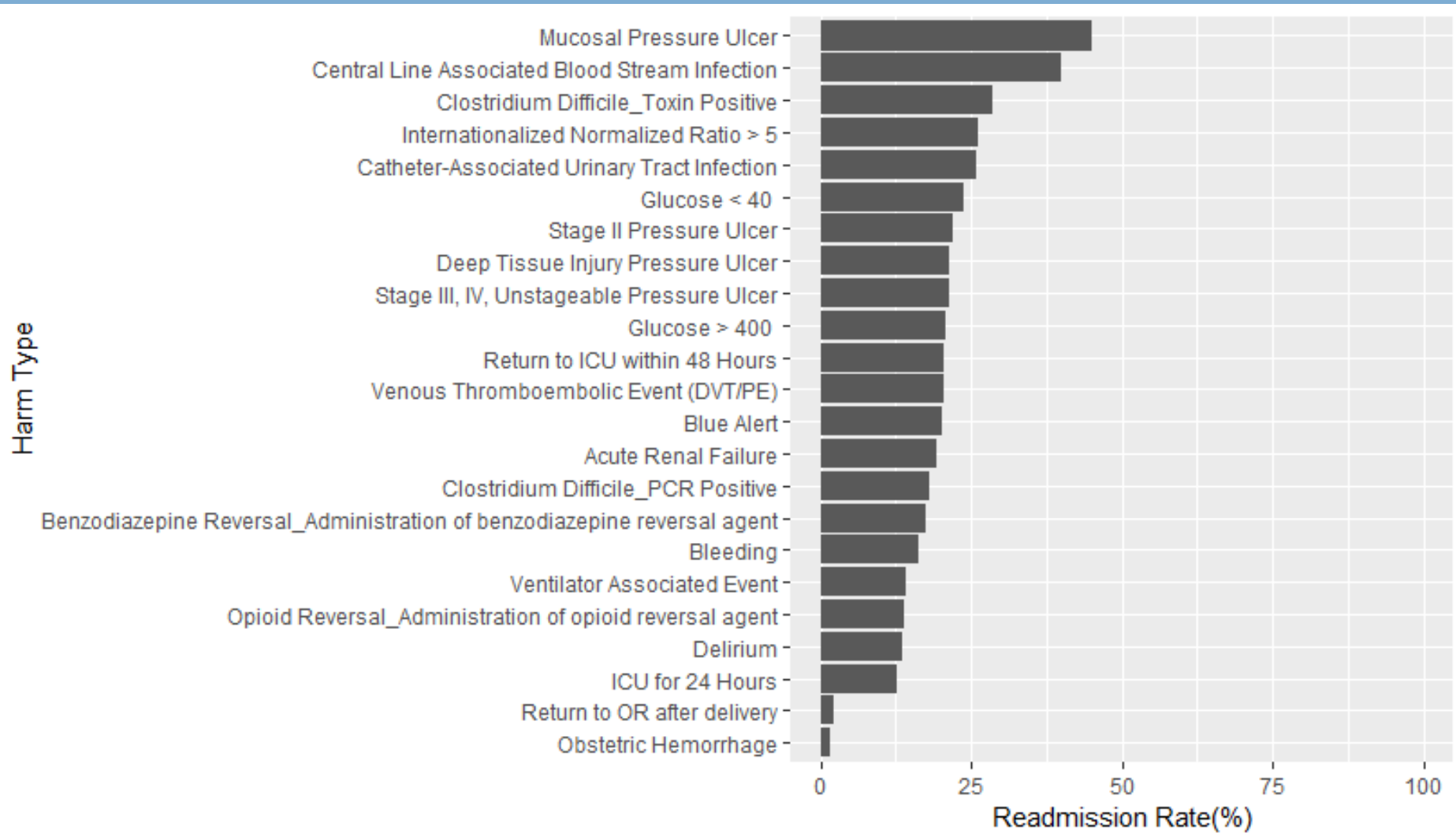


RESULTS – PATIENT CHARACTERISTICS

Total N = 37,048	No Readmission N1 = 34,161 (92.2%)	Readmission N2 = 2,887 (7.8%)	<i>p-value</i>
Facility, n (%)^[2]			<0.001^[3]
Hospital 1	13,979 (89.8)	1,595 (10.2)	
Hospital 2	8,074 (94.1)	502 (5.9)	
Hospital 3	6,374 (94.6)	364 (5.4)	
Hospital 4	4,833 (93.2)	353 (6.8)	
Hospital 5	901 (92.5)	73 (7.5)	
Hispanic/Latino	1,143 (93.6)	78 (6.4)	
Non-Black & Non- Hispanic/Latino	25,457 (92.6)	2,048 (7.4)	



RESULTS – HARM EVENTS



<i>Harm Type</i>	Unadjusted		Adjusted (Age, Gender, Race, Facility)	
	<i>OR</i>	<i>p-value</i>	<i>OR</i>	<i>p-value</i>
Mucosal Pressure Ulcer	9.71	<0.001	3.15	0.019
Central Line Associated Blood Stream Infection	7.9	<0.001	NA	NA
Clostridium Difficile – Toxin Positive	4.75	<0.001	2.96	0.014
Internationalized Normalized Ratio > 5	4.17	<0.001	1.62	0.234
Catheter-Associated Urinary Tract Infection	4.12	<0.001	1.5	0.267
Glucose < 40	3.72	<0.001	2.32	<0.001
Stage II Pressure Ulcer	3.42	<0.001	1.36	0.071
Deep Tissue Injury Pressure Ulcer	3.24	<0.001	1.48	0.077
Stage III, IV, Unstageable Pressure Ulcer	3.23	<0.001	1.3	0.415
Glucose > 400	3.14	<0.001	2.27	<0.001
Return to ICU within 48 Hours	3.1	<0.001	1.56	0.065
Venous Thromboembolic Event (DVT/PE)	3.08	0.001	1.82	0.001
Blue Alert	3.03	<0.001	NA	NA
Acute Renal Failure	3.01	<0.001	1.91	<0.001
Bleeding	2.39	<0.001	1.58	<0.001
Delirium	1.96	0.001	1.09	0.333
Obstetric Hemorrhage	0.2	<0.001	NA	NA



RESULTS – PREDICTION MODEL

AUC: Area Under the Curve

0.5 – Chance

1.0 – Perfect

AUC = 0.66

Significant
Harm Events
+ Age, Gender,
Race, Facility

AUC = 0.70

+ Social determinate
of health (SDOH)
+ Discharge
disposition
+ Charlson
comorbidity score

AUC = 0.73

+ Brief
texts
(*ICD-10*,
MS-DRG,
and *APR-
DRG*)

AUC ↑



CONCLUSIONS

- Harm events were independent predictors for 30-day readmission
- Using harm events, we developed a prediction model to predict readmission
- Limitations:
 - Single hospital system
 - Small sample size for some harm events
- Future directions:
 - Further refine the prediction model
 - Use a refined prediction model to identify patients at high risk, and intervene



QUESTIONS?

Thank you!



REFERENCES

[1]: Friedman et al., Do Patient Safety Events Increase Readmissions? *Medical Care*. 47(5), 583-590 (2009)

[2]: Hughes and Chukwuma. Admissions and Readmissions Related to Adverse Events, 2007-2014. Technical Report of Navy and Marine Corps Public Health Center Portsmouth United States (2015).

