Stroke order set utilization improves core measure performance and decreases length of stay

SPECTRUM HEALTH

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We hypothesize that utilizing stroke specific order sets increases compliance to core measures and subsequently decrease length of stay (LOS) and readmissions.
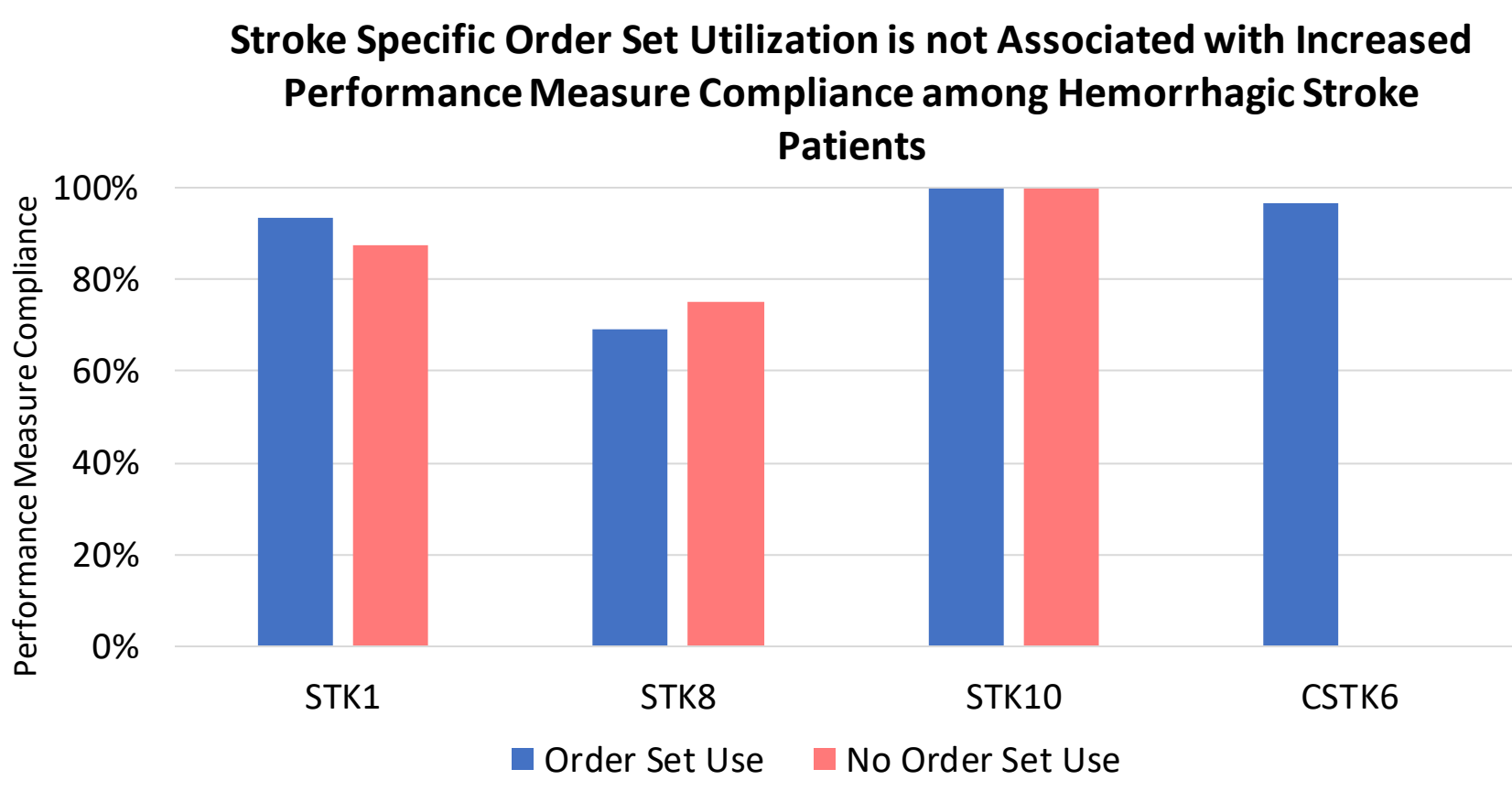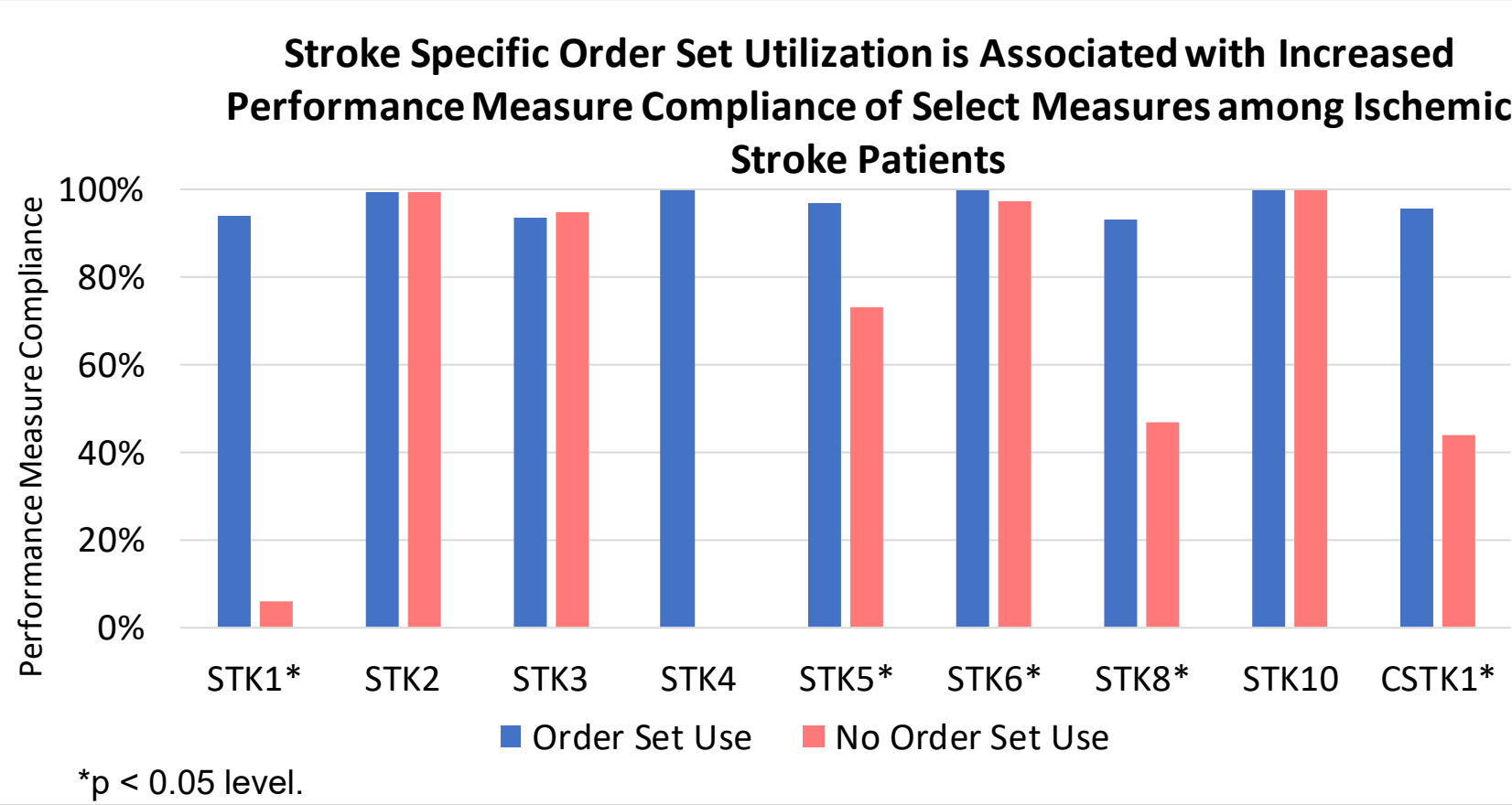
Introduction

Stroke is one of the leading causes of death in the world. Over the past several decades, the stoke mortality rate has decreased by 38% which is partially attributable to the growth in treatment capabilities[2]. With the survivability of stroke increasing, there is increased importance in improving patient outcomes and hospital related complications. The growth and development of EHRs and regulatory quality programs has improved hospital management of stroke patients and compliance with best practice/evidence based care.

Stroke quality programs aim to ensure patients receive evidence-based care by measuring patient outcomes and adherence to core measures. Site specific stroke order sets embedded in EHRs augment core measure performance. The true benefit of stroke order sets on core measure performance is still an open question.

Methodology

A retrospective cohort study was conducted and included 1095 stroke patients discharged between May 1, 2017 and April 30, 2018. Hospital data was extracted from The Joint Commission stroke registry and supplemented with administrative data. The primary outcome was core measure compliance and was analyzed using Chi-square and Cochran-Mantel-Haenszel tests.

Table 1. Order Sets Compliance by Performance Measure

Performance Measures		Applicable Stroke Type	Applicable Order Set Category
	Description		
STK1	VTE Prophylaxis	IS, HS	Admission
STK2	Discharged on Antithrombotic Therapy	IS	Discharge
STK3	Anticoagulation Therapy for Atrial Fib/flutter	IS	Discharge
STK4	Thrombolytic Therapy	IS	tPA
STK5	Antithrombotic Therapy by End of Hospital Day Two	IS	Admission
STK6	Discharged on Statin Medication	IS	Discharge
STK8	Stroke Education	IS, HS	Admission
STK10	Assessed for Rehabilitation	IS, HS	Admission
CSTK1	NIHSS	IS	Pre-Admission or Admission
CSTK6	Nimodipine Administration	SAH	Admission

Note. VTE=venous thromboembolism; IS=ischemic stroke; HS=hemorrhagic stroke; SAH=subarachnoid hemorrhage; NIHSS=national institute of health stroke scale; tPA=tissue plasminogen activator.

Use of stroke specific order sets increased compliance to STK1, STK5, STK6, STK8, and CSTK1 core measures in ischemic stroke patients and decreased overall LOS.

Stroke Specific Order Set Utilization is Associated with Increased Performance Measure Compliance of Select Measures among Ischemic Stroke Patients

*p < 0.05 level.

Stroke Specific Order Set Utilization is not Associated with Increased Performance Measure Compliance among Hemorrhagic Stroke Patients

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Results

Table 2. Stroke Population Demographics based on Order Set Compliance

	Order Set Compliance (n=1009)	Order Set Non-Compliance (n=86)	p-value
Age (years)	70.9 (15.1)	74.2 (13.4)	0.03
Female, n (%)	482 (47.8)	39 (45.4)	0.66
Race, n (%)			0.55
White	867 (85.9)	76 (88.4)	
African American	79 (7.8)	4 (4.7)	
Other	63 (6.2)	6 (7.0)	
Stroke Type, n (%)			<0.0001
Ischemic	872 (86.4)	57 (66.3)	
Intracerebral Hemorrhage	106 (10.5)	26 (30.2)	
Subarachnoid Hemorrhage	31 (3.1)	3 (3.5)	
Electronic Health Record			0.0022
EHR1	549 (54.4)	32 (37.2)	
EHR2	460 (45.6)	54 (62.8)	
Admission Service			<0.0001
Hospitalist/Internal/Family Medicine	273 (27.1)	47 (54.7)	
Neurology	692 (68.6)	26 (30.2)	
Non-Neuro	27 (2.7)	13 (15.1)	
Unknown	17 (1.7)	0 (0.0)	
Discharge Service			<0.0001
Hospitalist/Internal/Family Medicine	79 (15.1)	290 (50.8)	
Neurology	432 (82.4)	190 (33.3)	
Non-Neuro	3 (0.6)	30 (5.3)	
Unknown	10 (1.9)	61 (10.7)	

Note. Median with IQR displayed for data with violation of normality.

Table 3. Stroke Population Demographics based on Order Set Compliance

	Order Set Compliance (n=1009)	Order Set Non-Compliance (n=86)	p-value
Length of Stay (days)	3.0 [1.9-5.6]	3.8 [2.4-6.8]	0.06
ICU Utilization, n (%)	460 (45.6)	27 (31.4)	0.0110
ICU Length of Stay (days)	1.9 [1.2-4.0]	2.0 [1.5-3.9]	0.8776
Mortality, n (%)	77 (7.6)	9 (10.5)	0.3484
Readmissions[a], n (%)	39 (7.4)	56 (9.8)	0.1649

Note. Median with IQR displayed for data with violation of normality; ICU= Intensive care unit; [a]Based on discharge order set, order Set Compliance (n=524), Order Set Non-Compliance (n=571).

Discussion

The findings of this study contradict previous studies that have found no association between EHR utilization and performance on quality measures[1]. Implementation of EHRs does not intrinsically improve quality of care received and subsequently, patient outcomes. It requires appropriate utilization of EHR functions (e.g., order sets, BPA's, etc.), which varies by organization.

References

[1]Joynt, K.E. et al. (2015). Lack of impact of electronic health records on quality of care and outcomes for ischemic stroke. *Journal of the American College of Cardiology*, 65(18), 1964-1972. doi: http://dx.doi.org/10.1016/j.jacc.2015.02.059
[2]Yang, Q. et al. (2017). Vital signs: recent trends in stroke death rates—United States, 2000-2015. *MMWR Morb Mortal Wkly Rep*, 66(35) 933-939. Doi: http://dx.doi.org/10.15585/mmwr.mm6635elExternal