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Differences in Adult Hospital and Community-Acquired Sepsis at OHSU

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Keywords

Sepsis, Hospital-acquired, Biostatistics, Database

Abstract

Sepsis is a life-threatening condition that arises from systemic infection and the body's dysregulated response. It affects 1.7 million patients annually in the US and causes an estimated 350,000 adult deaths. Sepsis is divided into two categories: Present On Admission (POA) and Non-Present on Admission (non-POA). POA sepsis is identified when the onset of sepsis is before 48 hours of admission to a medical facility, while non-POA sepsis is identified when sepsis onset is 48 hours after medical facility admission. Non-POA sepsis is associated with higher costs and poorer outcomes compared to sepsis POA. Previous studies have identified several factors associated with worse outcomes. However, variation between studies exists partly due to variations between institutions and datasets employed. To better understand the factors driving sepsis and adverse clinical outcomes locally and how OHSU fits into a broader understanding of POA and non-POA sepsis, it is first necessary to understand the current state of sepsis at OHSU.

This retrospective cohort study aims to identify factors associated with adverse outcomes in POA and non-POA sepsis. First, we generated a database using data collated from two databases: a national quality control reporting database (Vizient) and the

Table 1. Characteristics of patients POA non-POA sepsis. Abbreviations: LOS: Length of stay, ICU: intensive care unit

		POA N = 1615		non-POA N = 985	
Median Age		60	(46-70)	61	(49-70)
Sex					
	Male	952	(58.95%)	625	(63.45%)
	Female	663	(41.05%)	360	(36.55%)
Race					
	White	1301	(80.56%)	770	(78.17%)
	Black	43	(2.66%)	26	(2.64%)
	Asian	43	(2.66%)	37	(3.76%)
	Other	109	(6.75%)	67	(6.8%)
	Declined	89	(5.51%)	73	(7.41%)
	Unavailable	30	(1.86%)	12	(1.22%)
Elixhauser Score		6	(5-8)	7	(5-9)
Hospital LOS		11	(5-21)	24	(13-40)
ICU LOS		2	(1-6)	7	(2-16)
Death					
	White	345	(26.5%)	288	(37.4%)
	Black	5	(11.6%)	9	(34.6%)
	Asian	12	(27.9%)	16	(43.2%)
	Other	43	(39.4%)	35	(52.2%)
	Declined	37	(41.6%)	24	(32.9%)
	Unavailable	16	(53.3%)	4	(33.3%)
	Overall	458	(28.4%)	376	(38.2%)

OHSU Adult Sepsis Events (ASE) sepsis tracking database. The combined database enables the identification of factors associated with more severe sepsis and adverse clinical outcomes in patients with sepsis according to the CDC's Adult Sepsis Event criteria. This dataset includes patient demographic, clinical, and outcomes data (Table 1) as well as variables derived post-extraction and enables hypothesis-generating exploration of relationships between potential predictors and outcomes (Figure 1).

Table 2. Comparison of clinical characteristics of patients with POA and non-POA sepsis.

	POA N = 1615		non-POA N = 985	
Vasopressors	1267	(78.45%)	834	(84.67%)
Mechanical Ventilation	904	(55.98%)	588	(59.70%)

We plan to use the data generated from the study to develop a machine learning algorithm to identify predictive risk and protective factors. Our goal is to use the results of the model to improve outcomes for patients at OHSU.

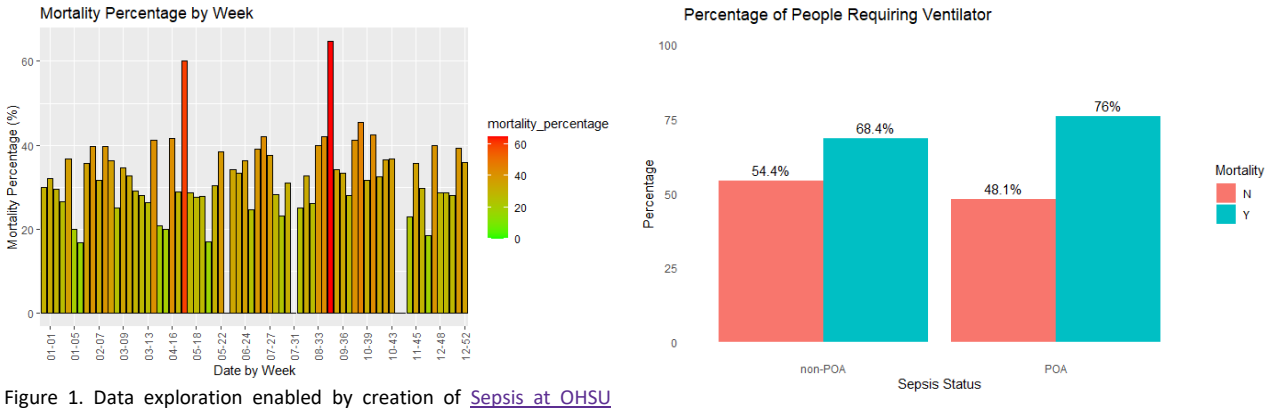

Figure 1. Data exploration enabled by creation of Sepsis at OHSU dataset. Left: Sepsis mortality rate by week. Right: Among patients with sepsis, patients who died were more likely to have required the use of a mechanical ventilator during their sepsis admission.