

ASSOCIATION OF RACE, ETHNICITY AND LANGUAGE PREFERENCE IN SEPSIS OUTCOMES & CARE

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BACKGROUND

- Improving sepsis outcomes is a top priority at Mount Sinai Health System (MSHS), located in New York, New York.
- The study includes 6 hospitals totaling 3,284 beds, ranging from a 212 bed community-based hospital to an 1,139 bed urban academic medical center.
- 133,283 inpatient admissions and 396,714 Emergency Department (ED) visits per year.

MSHS Sepsis Program Background

- MSHS Sepsis Strategy Committee was formed in 2016, comprised of sepsis experts, through which we standardized workflows and tools in the ED and inpatient settings across our hospitals.
- The MSHS Sepsis program is a comprehensive program aimed at improving sepsis recognition and patient management to improve patient outcomes.
- Tools were built into our EMR, Epic, including clinical decision support for early sepsis recognition, a Sepsis Pathway flag, and a sepsis order set for timely adherence to the MSHS Sepsis Care Bundles.

MSHS Sepsis Care Bundle



1-Hour Sepsis Bundle

- Draw 1st serum lactate (LA)
- Draw blood culture x 2 before antibiotics
- Initiate 1 liter fluid bolus (all sepsis)
- Initiate broad spectrum antibiotics for Septic Shock



3-Hour Sepsis Bundle

- Initiate broad spectrum antibiotics for all other Sepsis
- Complete 30 ml/kg fluids (if LA ≥4 mmol/L and or sustained hypotension)



4-Hour Sepsis Bundle

- Assess vital signs and for persistent or recurrent hypotension upon completion of fluids
- Draw 2nd LA upon completion of fluids for all LA > 2 mmol/L
- Complete sepsis reassessment



6-Hour Sepsis Bundle

- Initiate vasopressors for septic shock, unresponsive to fluids

- Patients with a Sepsis pathway flag and a systolic blood pressure (SBP) < 90 and/or a serum LA > 2 are clinically adjudicated retrospectively by the care teams to confirm a diagnosis of severe sepsis or septic shock.
- The adjudicated cases reside in a Clinical Sepsis Registry (CSR) used to track and monitor outcomes and leveraged for targeted improvement efforts.

METHODS

Sepsis Disparities – Study Design Objective: retrospective analysis to investigate if there are disparities in sepsis outcomes and care within MSHS between different racial/ethnic and language groups, measured by:

Outcomes Metrics

- In-hospital mortality
- 30-Day Readmissions
- Length of Stay (LOS)

Process Metrics

- 1 hour MSHS bundle
- 3 hour MSHS bundle
- 4 hour MSHS bundle
- 6 hour MSHS bundle

Study Population: 5,510 MSHS CSR patients, discharged Jan 1,2021 – Dec 31,2022

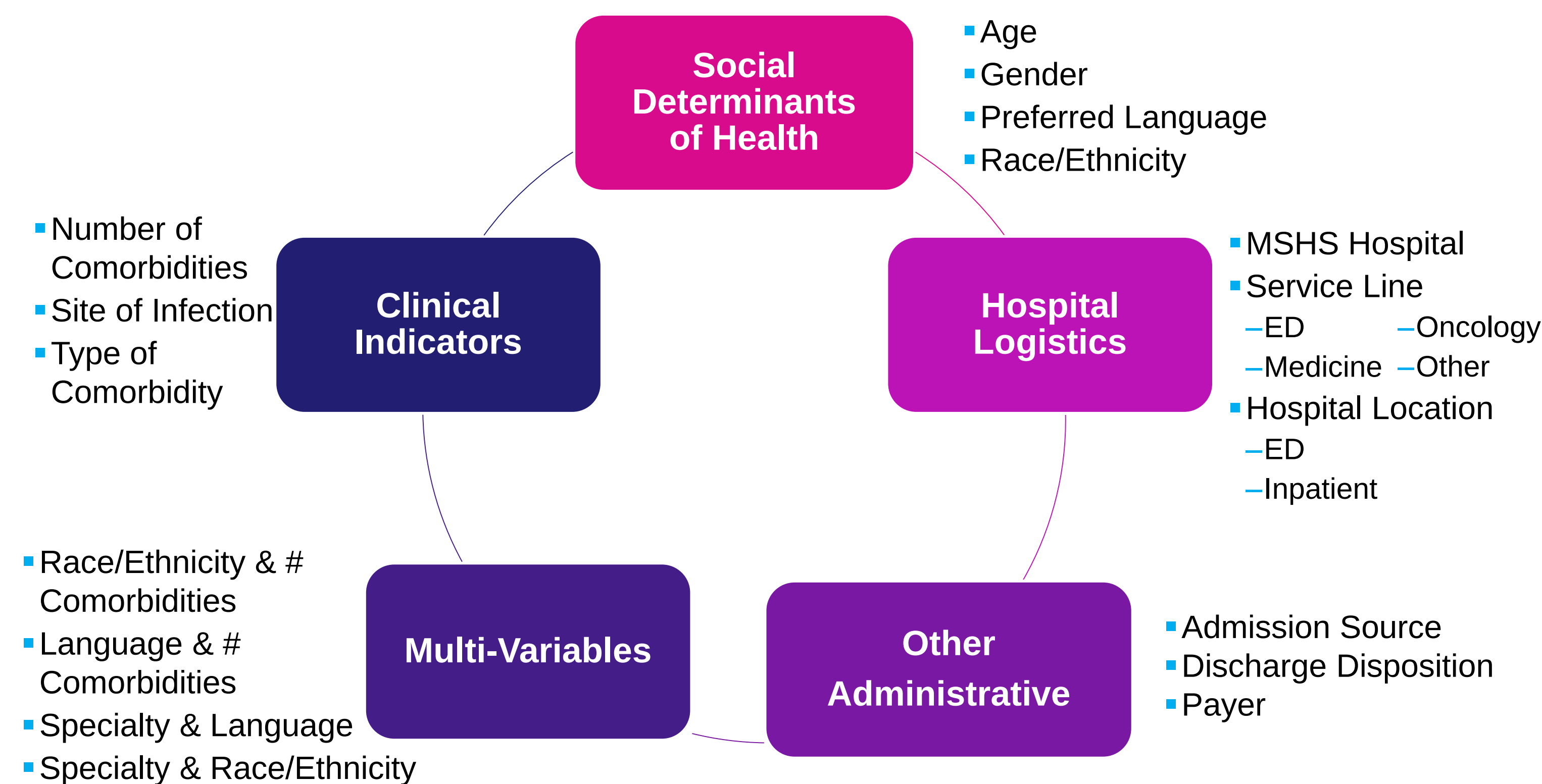
- Adult patients aged 18 years or older.
- CSR cases with a severe sepsis or septic shock diagnosis.
- A supplemental analysis was conducted to compare CSR cases to other inpatient (IP) cases for outcome metrics.

Exclusions: All COVID patients, and for each of the following analysis:

- In-hospital Mortality:** discharged to hospice or left against medical advice (AMA).
- 30-day Readmissions:** in hospital expirations, discharged to hospice or left AMA.
- LOS:** cases discharged to hospice, left AMA or LOS > 100 days.

Approach: primary independent variables, patients:

- Racial/ethnic group:** White, Black, Hispanic, Asian, Other & Unknown.
- Spoken Language preference:** English, Spanish, Chinese, Other non-English & Unknown.
- Patient-level covariates and modeling, (logistic regression and accelerated failure time models), were used to account for confounders or mediators of the relationship between the variables.



RESULTS

Outcome Metrics

Outcomes by Race/Ethnicity and Preferred Language

	N (%)			Mortality (%)			30day – Readmissions (%)			Length of Stay (Median)		
	SS/ Shock	Other IP	p-value	SS/ Shock	Odds Ratio (95% CI)	p-value	SS/ Shock	Odds Ratio (95% CI)	p-value	SS/ Shock	Time Ratio (95% CI)	p-value
Overall	N= 5,510	N= 220,958	-	N= 5,026	N= 211,812	<.0001	N= 3,884	N= 206,997	<.0001	N= 5,006	N= 211,517	<.0001
Race/Ethnicity												
White, non-Hispanic (referent)	1702 (30.89)	79386 (35.93)	<.0001	25.13	ref		11.71	ref		9	ref	
Black, non-Hispanic	1471 (26.70)	52453 (23.74)	<.0001	21.12	0.8 (0.67, 0.95)	0.01	16.39	1.48 (1.16, 1.88)	0.002	10	1.09 (1.02, 1.17)	0.009
Asian, non-Hispanic	381 (6.91)	15362 (6.95)	1	24.44	0.96 (0.74, 1.26)	0.79	10.41	0.88 (0.57, 1.35)	0.55	8	0.96 (0.86, 1.06)	0.39
Hispanic	1307 (23.72)	52952 (23.96)	1	18.02	0.66 (0.54, 0.79)	<.0001	16.77	1.52 (1.19, 1.94)	0.0009	8	0.87 (0.82, 0.94)	0.0001
Other race, non-Hispanic	525 (9.53)	16855 (7.63)	<.0001	26.71	1.09 (0.86, 1.37)	0.49	11.58	0.99 (0.68, 1.43)	0.95	10	1.06 (0.96, 1.16)	0.25
Unknown	124 (2.25)	3950 (1.79)	0.13	36.61	1.72 (1.15, 2.57)	0.01	2.82	0.22 (0.05, 0.9)	0.04	8	1.13 (0.94, 1.36)	0.20
Spoken Language Preference												
English (referent)	4320 (78.40)	190075 (86.02)	<.0001	20.99	ref		13.82	ref		9	ref	
Spanish	575 (10.44)	18242 (8.26)	<.0001	19.74	0.93 (0.74, 1.16)	0.50	15.93	1.18 (0.89, 1.56)	0.24	8	0.92 (0.84, 0.99)	0.03
Chinese	149 (2.70)	2865 (1.30)	<.0001	35.61	2.08 (1.45, 3)	<.0001	20	1.56 (0.91, 2.68)	0.11	8.5	1.15 (0.98, 1.36)	0.09
Other	242 (4.39)	6854 (3.10)	<.0001	22.61	1.1 (0.8, 1.51)	0.56	6.18	0.41 (0.22, 0.76)	0.005	9	0.9 (0.8, 1.02)	0.09
Unable to communicate / Sign language	17 (0.31)	245 (0.11)	0.0002	37.5	2.26 (0.82, 6.23)	0.12	20	1.56 (0.33, 7.37)	0.57	8.5	1.01 (0.63, 1.64)	0.95
Unknown	207 (3.76)	2677 (1.21)	<.0001	55.9	4.77 (3.56, 6.4)	<.0001	20.93	1.65 (0.97, 2.8)	0.06	10	1.51 (1.31, 1.75)	<.0001

Other IP = general MSHS inpatient population, CI = Confidence Interval

- Compared to general IP population the SS/Shock cohort had a lower percentage of patients that are White, non-Hispanic and Preferred spoken language is English
- Statistically significant difference

Outcome Measures: Statistically Significant Key Findings

Mortality

- Hispanic patients and Black patients had a lower rate when compared to White, non-Hispanic patients.
- Asian patients had a similar rate compared to White, non-Hispanic patients.
- Patients who spoke Spanish had a rate similar to English speakers.
- Chinese, Other non-English speakers, and Unknown language preferences had higher rates when compared to English speakers.

30-Day Readmissions

- Black, non-Hispanic, Hispanic and Spanish-speaking patients had higher rates compared to White, non-Hispanic and English-speaking patients.

Length of Stay (LOS)

- Hispanic and White, non-Hispanic patients had shorter LOS compared to Black, non-Hispanic patients experienced who had longer LOS.

Process Metrics

MSHS Sepsis Bundle: Statistical Significant Differences in Compliance Rates

	1 Hour	3 Hour	4 Hour	6 Hour
Overall Compliance	61.6%	56.3%	18.2%	8.0%
Age group received the bundle at significantly lower rate	No differences	No differences	40-49 (14.4%)	70-79 (0.4%)
Race/ethnicity received the bundle at significantly higher rates	No differences	No differences	No differences	Other race, non-Hispanic (12.8%)
Language spoken received at a significantly higher rate	No differences	No differences	No differences	No differences
Patients w/ these comorbidities received bundle at significantly lower rates	- Blood Cancers - Chronic respiratory failure - Chronic liver disease - ICU at admission - Immune modifying medications - Mechanical vents	- Blood Cancers - Chronic respiratory failure - Chronic liver disease - ICU at admission - Immune modifying medications - Mechanical vents - Metastatic cancer	- Blood Cancers - Immune modifying medications - Organ transplant	No differences

CONCLUSIONS

- Race had little association with sepsis mortality.
- Black, non-Hispanic and Hispanic patients are more likely to be readmitted within 30-days for initial sepsis hospital discharge.
- Limited English proficiency is a significant risk factor for in-hospital sepsis mortality, but not for 30-day readmissions and LOS.
- Patient comorbidities are indicators of decreased compliance with the sepsis bundle.
- Age, Race/Ethnicity and preferred spoken language were not indicators of compliance with the sepsis bundle, especially 1-hour and 3-hour.
- Key outcome observations for the SS/Shock patients were very similar for the general MSHS inpatient population.

NEXT STEPS

- Continue local process improvement efforts on sepsis care for **ALL** patients.
- Complete additional disparities analysis:
 - Individual sepsis bundle metrics.
 - Multi-variant analysis of outcome metrics: LOS, Mortality and 30day Readmissions.
- Collaborate with our Patient Language Center to improve capture of patient's preferred language and use of interpreter services.
- Leverage Sepsis disparities analysis framework for other clinical quality initiatives.