

Cost-of-illness Analysis of *Staphylococcus aureus* Bacteremia

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Background

- Staphylococcus aureus* is a leading cause of bacteremia and leads to ICU admission in 30% of cases.
- S.aureus* bacteremia (SAB) has been associated with high morbidity, heavy consumption of health care resources, and mortality rates ranging from 20-40%
- Nosocomial methicillin-resistant *S.aureus* (MRSA) infection has been associated with higher rates of hospitalization and mortality than methicillin-susceptible *S.aureus* (MSSA) infection in the US.
- We reviewed clinical and economic data for hospitalized cases of MRSA and MSSA bacteremia in the context of a publicly funded health care system.

Methods

- The study period was from April 2007 to March 2010 involving 5 hospitals (4 academic, 1 community) in the Greater Toronto Area
- Demographic and clinical data gathered on adult patients with SAB diagnosed ≤ 3 days of hospitalization
- The primary outcome was direct cost of inpatient care per patient, determined at hospital discharge using the Ontario Case Costing Initiative methodology
- Costs per case were broken down into functional cost centers to determine the most significant cost components
- Statistical analysis was performed using Wilcoxon rank-sum test for continuous variables and Fisher's exact test for categorical variables

Results

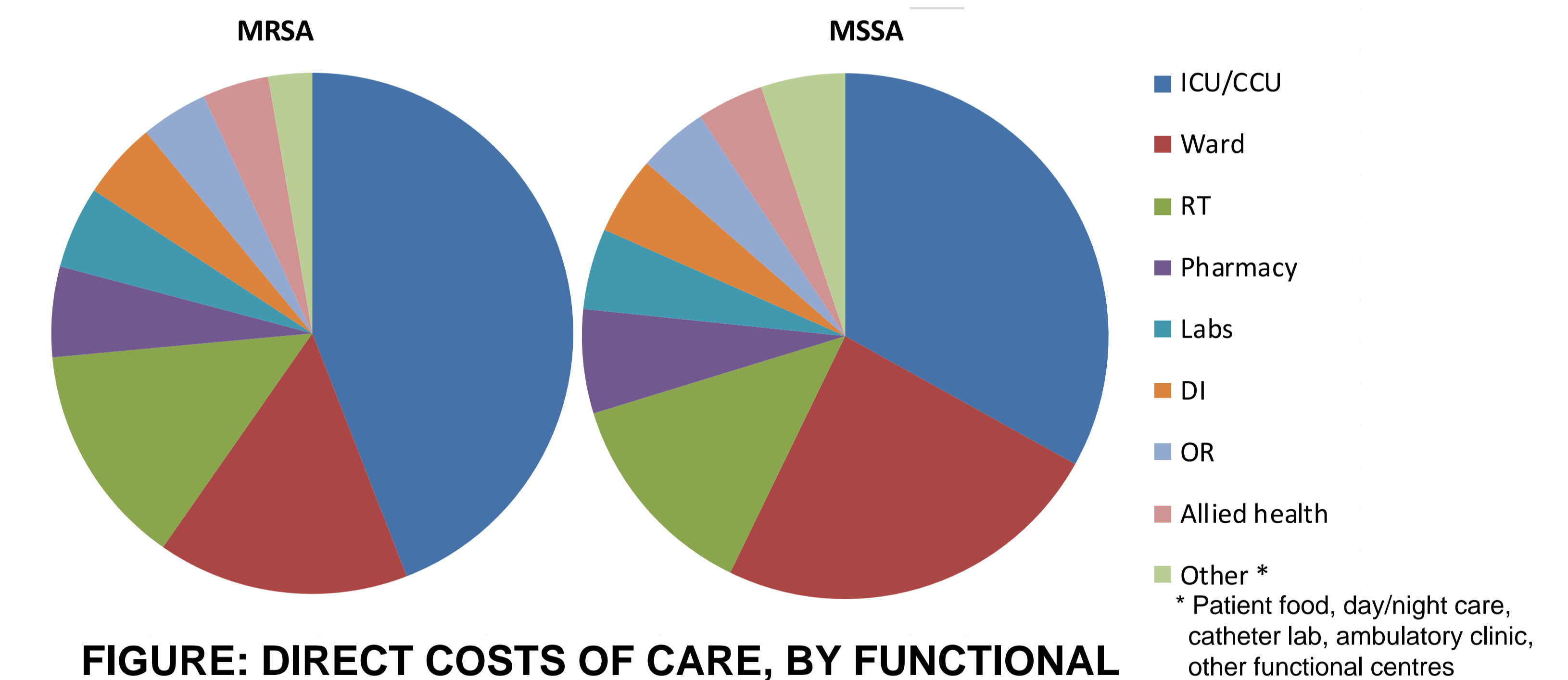
TABLE 1: CHARACTERISTICS OF S. AUREUS BACTEREMIA COHORT

Characteristic	MRSA (N = 71)		MSSA (N = 461)		p-value
Hospital site					
1	19	21%	73	79%	0.119
2	11	8%	120	92%	
3	9	11%	72	89%	
4	11	14%	70	86%	
5	21	14%	126	86%	
Age (median, IQR)	61	(51-79)	63	(50-77)	0.812
Sex, male	51	72%	294	64%	0.229
Comorbidities					
Cancer	11	15%	125	27%	0.040
Cardiovascular disease	25	35%	143	31%	0.495
Chronic pulmonary disease	8	11%	28	6%	0.124
Diabetes	25	35%	151	33%	0.686
Dialysis	14	20%	59	13%	0.137
Intravenous drug use	8	11%	27	6%	0.117
Liver disease	2	3%	36	8%	0.211
Prosthetic heart valve	1	1%	20	4%	0.338
Transplant	0	0%	15	3%	0.240
Health-care associated	23	32%	91	20%	0.020
Sites of infection					
Abscess	9	13%	61	13%	>0.999
Endovascular	15	21%	116	25%	0.554
Osteomyelitis	13	18%	64	14%	0.364
Prosthetic device	4	6%	8	2%	0.063
ICU admission required *	23	38%	107	27%	0.092
Mortality					
During treatment	12	17%	79	17%	>0.999
Median LOS (IQR)	18	(7-31)	13	(8-25)	0.222
ICU LOS (IQR) *	12	(6-23)	6	(3-13)	0.028

* data available for Sites 1, 2, 3, 5 (60 MRSA patients; 391 MSSA patients)

TABLE 2: DIRECT COSTS OF MRSA AND MSSA BACTEREMIA, BY SITE

Hospital site	MRSA	IQR	MSSA	IQR	p-value
1	18,723	11,676-27,965	10,124	6,216-17,822	0.040
2	10,508	5,328-27,255	10,967	6,797-31,489	0.480
3	21,797	6,384-85,023	14,020	6,249-32,629	0.303
4	9,393	5,520-19,667	6,655	3,135-15,306	0.555
5	18,609	8,940-49,498	11,878	6,933-27,267	0.157
Overall	18,402	6,784-36,350	11,060	6,091-26,098	0.050



Summary

- There were no differences in overall lengths of stay, mortality and site of care between patients with MRSA and MSSA bacteremia
- MRSA bacteremia was associated with acquisition in health care settings and cancer care, and subsequent need for intensive care
- Median direct cost per case of MRSA bacteremia was higher than for MSSA bacteremia.
- The cost of SAB, and the differences in the costs of MRSA and MSSA bacteremia, varied across sites.
- As hospitals move towards case-based funding, understanding the dynamics of resource utilization and costs will become critical to improving the quality of care that patients receive.