DHSC Statsheet
Delaware Health Statistics Center
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Division of Public Health
Department of Health
and Social Services

Methicillin-Resistant Staphylococcus Aureus (MRSA) Associated Hospitalizations in Delaware

Hospitalizations of patients with an MRSA infection are associated with:

1) longer stays;

2) higher charges; and

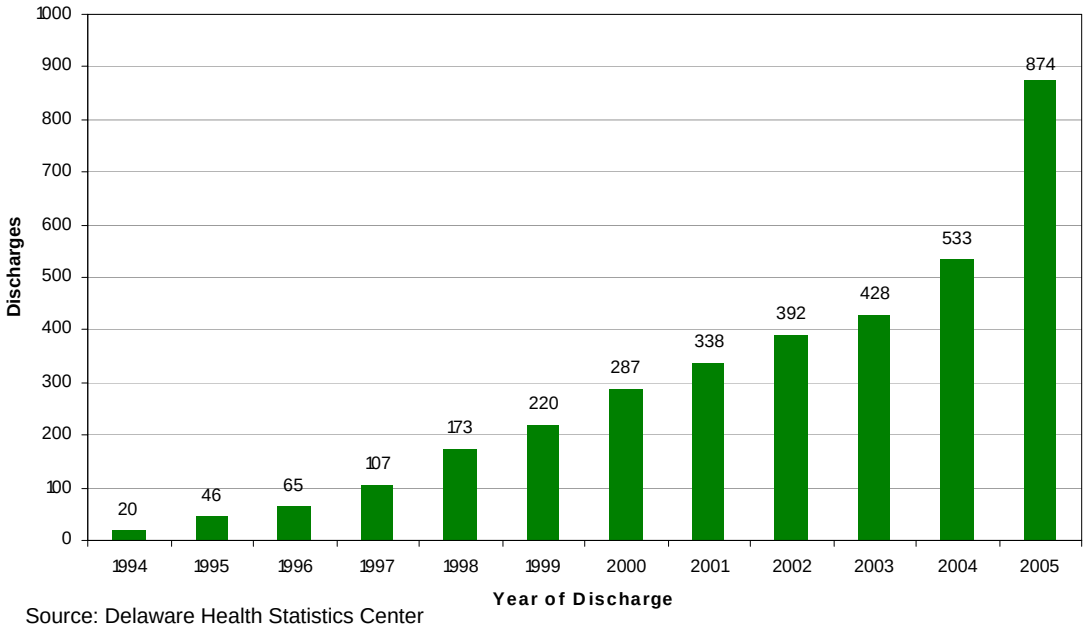
3) greater risk of mortality.

MRSA infections have received increasing attention as the number of people diagnosed with both healthcare- and community-acquired infections has risen. An October JAMA report estimated that community-acquired MRSA accounted for 14 percent of all MRSA infections in 2005[4]. Though distinguishing between healthcare- and community-acquired types of MRSA cannot be determined by hospital discharge data alone, the most serious cases of MRSA that require hospitalization are captured by the data, providing a valid insight to the trend in MRSA hospitalizations.

Each hospital discharge record has one primary and up to eight secondary diagnoses. Because MRSA infections can only be listed as a secondary diagnosis, MRSA associated hospitalizations were identified by the presence of ICD-9-CM (International Classification of Diseases, Ninth Revision, Clinical Modification) discharge diagnosis code V09.0 in any one of the secondary diagnoses.

The number of hospital discharges with a secondary diagnosis of MRSA has risen from 20 in 1994 to 874 in 2005.

Figure 1
Number of Hospital Discharges with a Secondary Diagnosis of MRSA
Delaware Hospitals, 1994-2005



Source: Delaware Health Statistics Center

As shown in Figure 1, the number of MRSA discharges in Delaware hospitals more than tripled from 2000 to 2005, with a 64 percent increase from 2004 to 2005. In 2005, the 874 hospitalizations associated with MRSA infections represented .8 percent of all hospital discharges, a proportion similar to national estimates[3].

Patient Characteristics

Males accounted for 51 percent of MRSA associated discharges in 2005, though females comprised the majority of all non-MRSA discharges (see Table 1).

The age distribution for MRSA discharges differed from non-MRSA discharges; proportionately there were fewer patients under 1, and more patients ages of 18-44 and 45-64.

The majority (68.4 percent) of MRSA associated hospitalizations were admitted from the emergency department; admissions from physicians accounted for 26.8 percent of MRSA discharges.

Similar to the results found in national studies[1], MRSA associated hospitalizations in Delaware had longer average stays and higher total charges than non-MRSA hospitalizations. The average length of stay was almost 3 days longer for MRSA hospitalizations. The average charge for MRSA hospitalizations was $21,471 compared to an average of $16,531 for non-MRSA hospitalizations.

The proportion of in-hospital deaths was not significantly higher for MRSA associated discharges, though differences existed in patients discharged to their home, other health care facilities, and home health care. Patients with an MRSA infection were less likely to be discharged home, and more likely to be discharged to either another health care facility or home health care, than patients without an MRSA infection.

Diagnoses

In 2005, the most common primary diagnosis associated with an MRSA infection was skin and subcutaneous tissue infections, which accounted for almost one third of all MRSA associated discharges (see Table 2). Complications of surgical procedures or medical care was the second most frequently occurring primary diagnosis, comprising 8 percent of all MRSA discharges, followed by pneumonia and complications of device, implant, or graft, both of which accounted for just over 6 percent of the total MRSA hospitalizations.

In 1995, septicemia was the most common primary diagnosis and skin and subcutaneous tissue infections accounted for only 4.3 percent of all MRSA associated discharges. In 2000, that proportion was stable at 4.9; by 2005 it had increased to 32.8 percent and was the principal diagnosis most frequently associated with a secondary diagnosis of MRSA.

Procedures

Each hospital discharge record can have anywhere from zero to six listed procedures. In 2005, 31 percent of MRSA associated discharges had no procedures; out of the remaining 69 percent, there were 1330 total procedures performed. The most commonly performed procedures were incision and drainage of the skin and subcutaneous tissue, other vascular catheterization, and debridement of wound (see Table 3). Both incision and drainage and debridement of wound are related to the surgical treatment of skin infections and account for almost one-quarter of all procedures performed during an MRSA associated hospitalization.

Table 1. 2005 Discharges by MRSA Presence and Inpatient Characteristic

Characteristic	Type of Discharge				Significant Difference
	MRSA		*Non-MRSA*		
	Frequency	*Percent*	*Frequency*	*Percent*	
Gender					
Male	447	51.1	47496	41.4	*
Female	427	48.9	67247	58.6	*
Age					
Under 1	21	2.4	14,829	12.9	*
1-17	88	10.1	10,469	9.1	
18-44	256	29.3	28,622	24.9	*
45-64	227	26.0	24,365	21.2	*
65+	282	32.3	36,458	31.8	
Admission Source					
Routine physician admissions	252	28.8	53,404	46.5	*
Other hospital	16	1.8	2,386	2.1	
Long-term care facility	7	0.8	348	0.3	*
Emergency department	598	68.4	58,339	50.8	*
Other	1	0.1	267	0.2	
Status					
Routine - Home	383	43.8	77586	67.6	*
Other short-term hospital	15	1.7	2816	2.5	
Other health care facility	177	20.3	10013	8.7	*
Home health care	252	28.8	19794	17.3	*
Left against advice	13	1.5	687	0.6	*
Expired	26	3.0	2631	2.3	
	Mean		*Mean*		
Total Charges	$ 21,471		$ 16,531		*
LOS	7.6		4.7		*

Source: Delaware Health Statistics Center

Table 2. Most Common Primary Diagnoses for Discharges with a Secondary Diagnosis of MRSA

	CCS Primary Diagnoses	*Frequency*	*Percent*
1	Skin and subcutaneous tissue infections	287	32.8
2	Complications of surgical procedures or medical care	70	8.0
3	Pneumonia (except that caused by tuberculosis or STD)	55	6.3
4	Complication of device; implant or graft	55	6.3
5	Septicemia (except in labor)	43	4.9
6	Infective arthritis and osteomyelitis (except that caused by tuberculosis or STD)	30	3.4
7	Chronic obstructive pulmonary disease and bronchiectasis	26	3.0
8	Other connective tissue disease	20	2.3
9	Respiratory failure; insufficiency; arrest (adult)	19	2.2
10	Urinary tract infections	19	2.2

Source: Delaware Health Statistics Center

Table 3. Most Common All-listed Procedures for Discharges with a Secondary Diagnosis of MRSA

	CCS All-listed Procedures	*Frequency*	*Percent*
1	Incision and drainage; skin and subcutaneous tissue	185	13.9
2	Other vascular catheterization; not heart	161	12.1
3	Debridement of wound; infection or burn	125	9.4
4	Other diagnostic procedures (interview; evaluation; consultation)	98	7.4
5	Respiratory intubation and mechanical ventilation	68	5.1
6	Other non-OR therapeutic procedures on skin and breast	54	4.1
7	Other therapeutic procedures on muscles and tendons	47	3.5
8	Hemodialysis	38	2.9
9	Partial excision bone	30	2.3
10	Diagnostic ultrasound of heart (echocardiogram)	28	2.1

Source: Delaware Health Statistics Center

References:

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3. Noskin GA, Rubin RJ, Schentag J, Kluytmans J, Hedblom E, Smulders M, Lapetina E, Gemmen E. **The Burden of Staphylococcus aureus Infections on Hospitals in the United States: An Analysis of the 2000 and 2001 Nationwide Inpatient Sample Database.** Arch Intern Med, Aug 8/22, 2005; 165: 1756 - 1761.

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DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health

If you have comments, suggestions, and/or questions, please contact the Delaware Health Statistics Center at (302) 744-4541.

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