

BACKGROUND

The burn patients usually required invasive procedures and prolonged hospitalization, which increased their exposure to pathogens. Infection remains the most common cause of their morbidity and mortality during hospitalization.

OBJECTIVE

1. To analyze the incidence of common infections in the hospitalized burn patients.
2. To evaluate the in-hospital outcomes, length of hospital stay and hospital charge of burn patients.
3. To assess the risk factors for infection in burn patients and the effect of infection on their in-hospital mortality.

METHODS

Data Source:

- Nationwide Inpatient Sample (NIS) 2005-2014
- Burn patients (≥ 18 years old): identified by ICD-9-CM codes

Studied Infections:

- Bacteremia, pneumonia, urinary tract infection, surgical infection, *Clostridium difficile* infection, skin and soft tissue infection, cardiovascular infection, infection of throat, nose and ear

Risk for Infection: Logistic regression

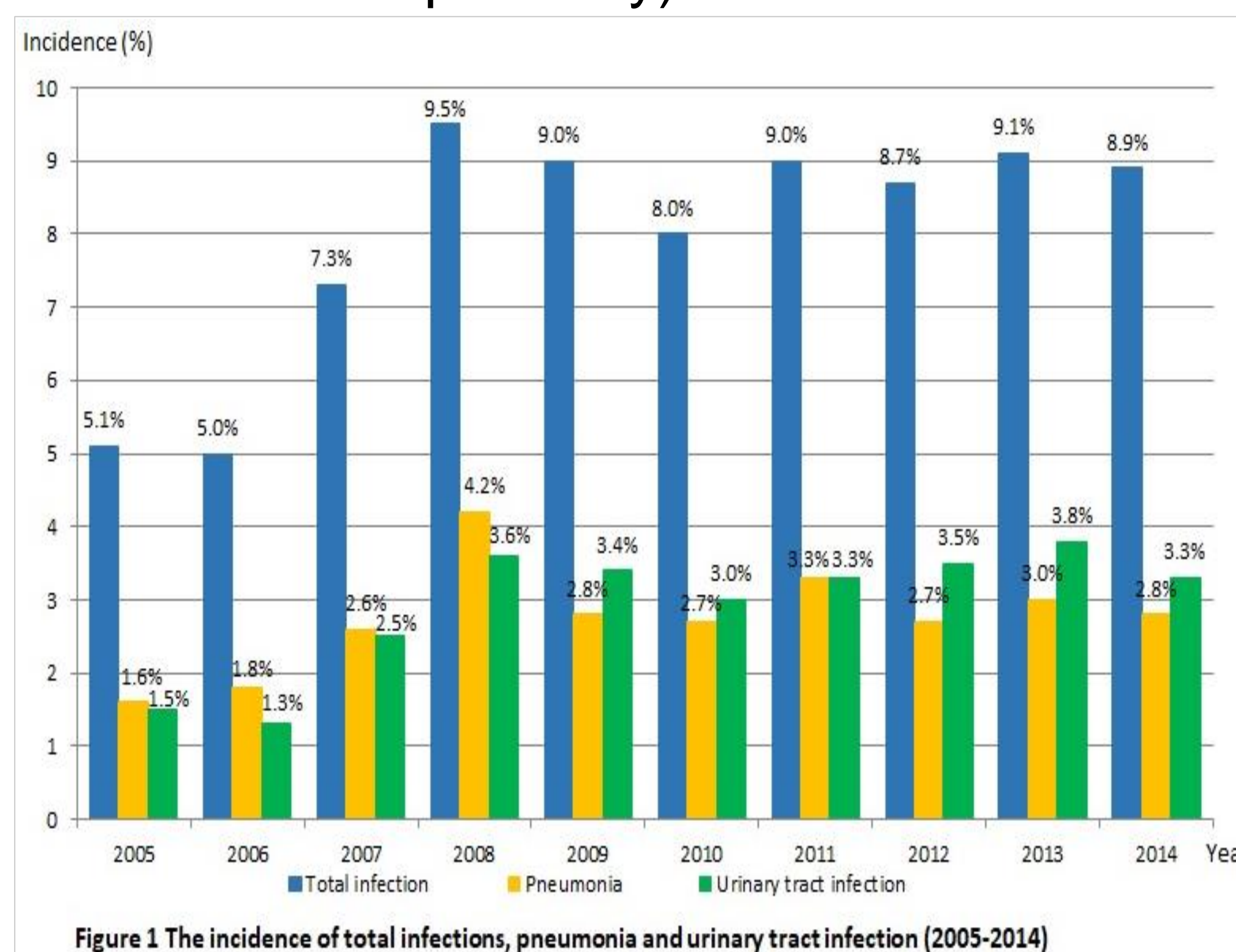
- Burn patients with infection vs. Burn patients without infection
- Definition of infection: at least one of studied infections

Risk for In-hospital Mortality: Logistic regression

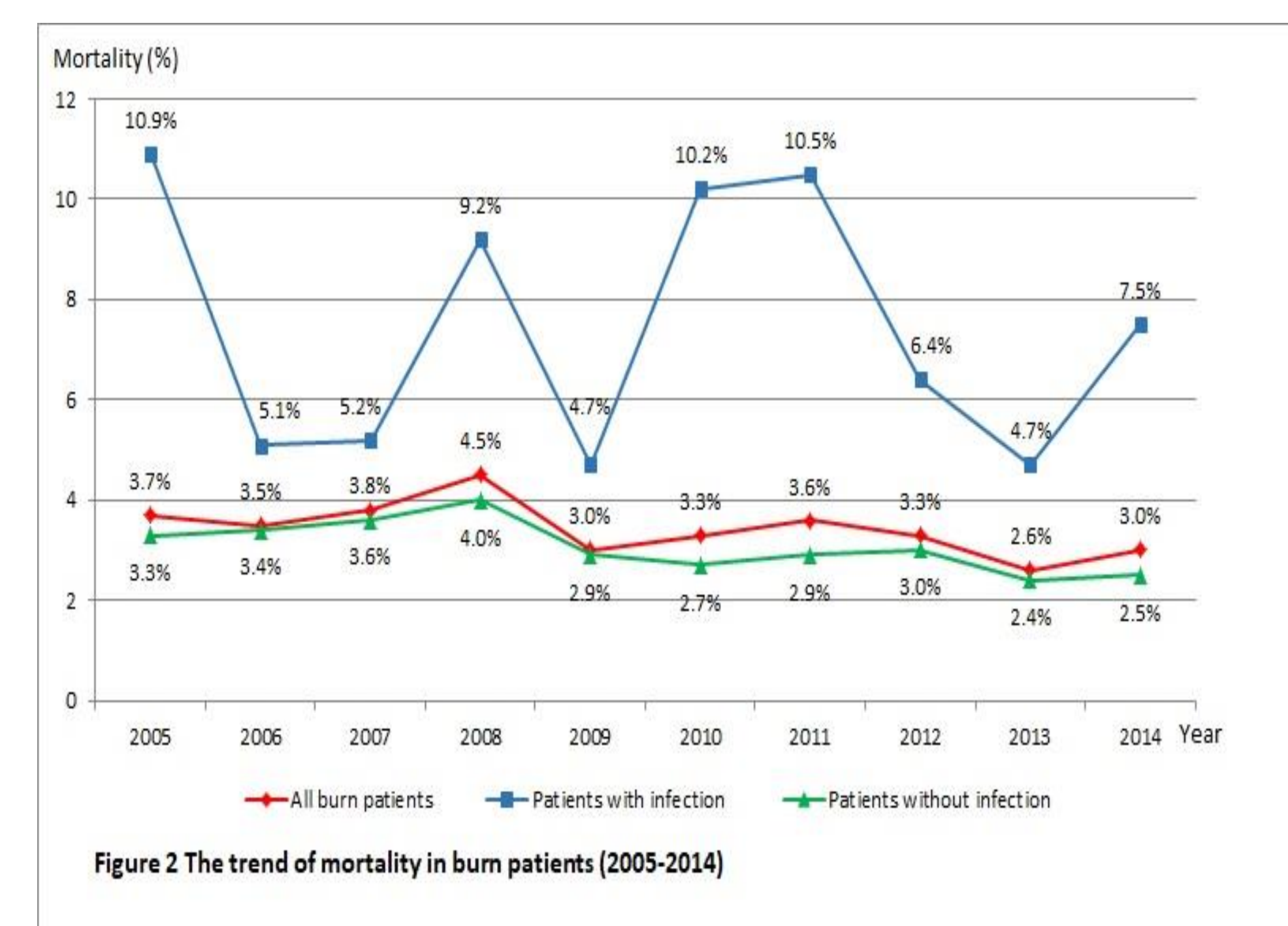
- Case group: all burn patients
- Control group: patients without burn, 1:1 matched with the cases in age, gender, race and admission year

RESULT 1: Incidence of Infections

- In 125,957 hospitalized burn patients, 8.2% (n=10,301) had at least one infection.
- The infection rate increased from 5.1% in 2005 to 9.5% in 2008, then stayed around 9.0% until 2014. (Figure 1)
- Urinary tract infection and pneumonia were the most common infections of the hospitalized burn patients (incidence: 3.0% and 2.8% respectively).



RESULT 2: In-hospital Outcomes



- The in-hospital mortality of burn patients with infection varied by year. (Figure 2)
- Infections of burn patients were associated with 2.5 times increase in mortality (7.7% vs. 3.0%, $p < 0.001$), nearly 5 times prolonged length of hospital stay (median 19 days vs. 4 days, $p < 0.001$) and almost 6.5 times higher hospital charge (median \$145,389 vs. \$22,477)

RESULT 3: Risk Factors

	OR (95% CI)	
	Infections	In-hospital death
Age (years) (Reference: 18-34)		
35-44	1.02 (0.94-1.10)	1.64 (1.17-2.29)
45-54	1.33 (1.24-1.43)	2.63 (1.93-3.58)
55-64	1.39 (1.28-1.51)	4.95 (3.60-6.81)
65-74	1.79 (1.63-1.97)	8.61 (6.12-12.11)
≥ 75	2.03 (1.84-2.24)	19.58 (14.01-27.35)
Gender (Reference: Male)		
Female	1.60 (1.52-1.69)	1.12 (0.93-1.34)
Race (Reference: White)		
Black	1.05 (0.98-1.13)	0.96 (0.76-1.22)
Hispanic	0.99 (0.92-1.07)	0.95 (0.72-1.26)
Asia/Pacific Island	0.79 (0.65-0.95)	1.09 (0.61-1.94)
Native American	1.37 (1.08-1.74)	0.55 (0.15-2.05)
Other	1.12 (0.99-1.26)	1.20 (0.80-1.80)
Charlson index (Reference: 0)		
1-2	1.17 (1.06-1.31)	1.79 (1.36-2.37)
3-4	1.35 (1.10-1.67)	3.22 (1.98-5.25)
≥ 5	1.06 (0.77-1.45)	7.33 (3.43-15.64)
TBSA*		
Reference: 10%		Reference: no burn
< 10%	-	0.10 (0.06-1.17)
10-19%	2.37 (2.22-2.53)	0.70 (0.48-1.03)
20-29%	7.79 (7.24-8.38)	3.41 (2.46-4.73)
30-39%	12.12 (11.06-13.28)	10.64 (7.64-14.82)
40-49%	19.76 (17.66-22.11)	12.63 (8.48-18.81)
50-59%	14.70 (12.81-16.86)	35.74 (24.10-53.02)
60-69%	12.25 (10.33-14.52)	56.10 (35.25-89.29)
70-79%	11.16 (9.16-13.59)	47.28 (27.93-80.02)
80-89%	6.72 (5.40-8.42)	96.41 (57.36-162.05)
≥ 90	2.89 (2.23-3.76)	271.97 (167.84-440.73)

* TBSA: Total body surface area of burn

RESULT 3: Risk Factors

	OR (95% CI)
	In-hospital death
Infection (Reference: No infection)	
Cardiovascular infection	4.95 (2.12-11.55)
Pneumonia	2.11 (1.69-2.63)
Bacteremia	0.46 (0.26-0.81)
Urinary tract infection	0.51 (0.37-0.69)
MRSA infection	0.44 (0.16-1.20)
Surgery infection	0.65 (0.29-1.46)
<i>Clostridium difficile</i> infection	0.91 (0.47-1.76)
Upper respiratory infection	0.67 (0.30-1.53)
Complication / Procedure (Reference: None)	
Smoke inhalation	1.95 (1.26-3.01)
Escharotomy	4.52 (3.27-6.26)

- Age and total body surface area of burn were the major risk factors for infection and in-hospital death of burn patients.
- Pneumonia and cardiovascular infection significantly increased the risk for death of the hospitalized burn patients.
- The complication of smoke inhalation and requirement of escharotomy were associated with higher risk for mortality.

CONCLUSION

- The incidence of infection in burn patients increased during 2005-2014.
- Infection of burn patients are associated with increased in-hospital death, higher charge and prolonged hospital stay.
- The age of patients and total body surface area of burn are the major risk factors for infection and in-hospital mortality.
- Pneumonia is one of the most common infections of hospitalized burn patients, and it is associated with increased risk for their mortality during hospitalization.