

# A population study on provisions of care for patients with community-acquired sepsis

Jack Zhenhe Zhang<sup>1</sup>, Anna Lee<sup>1</sup>, Chanu Rhee<sup>2,3</sup>, Lowell Ling<sup>1</sup>

<sup>1</sup> Department of Anaesthesia and Intensive Care, The Chinese University of Hong Kong, Hong Kong SAR, China

<sup>2</sup> Department of Population Medicine, Harvard Medical School/Harvard Pilgrim Health Care Institute, Boston, MA, USA

<sup>3</sup> Division of Infectious Diseases, Department of Medicine, Brigham and Women's Hospital, Boston, MA, USA



## Introduction

- Sepsis affects 48.9 million people and leads to 11 million deaths worldwide each year<sup>1</sup>
- In Hong Kong, one in four of all adult deaths are attributable to sepsis<sup>2</sup>
- Longitudinal epidemiology, provisions of care and management of community-acquired sepsis (CAS) are poorly characterized

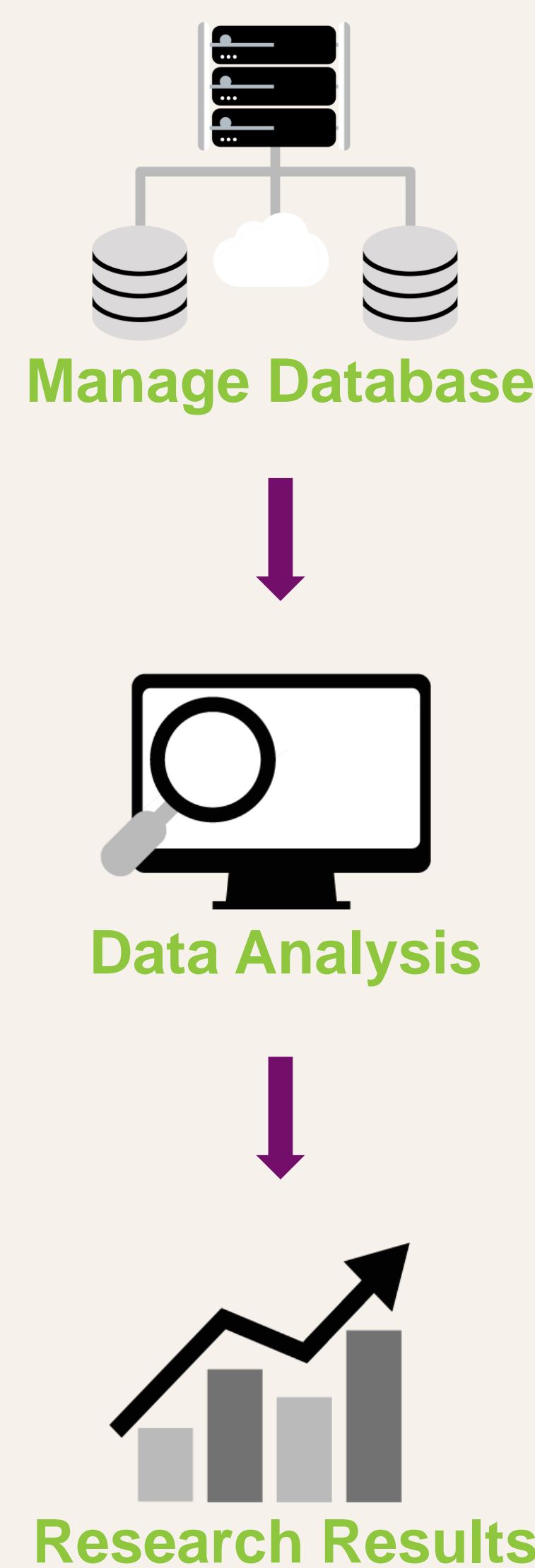
## Question

What are the overall trends in provisions of care for hospitalized adult patients with CAS in Hong Kong from 2009 to 2018?

## Objectives

- Determine the compliance to basic sepsis investigations and resource utilization in terms of invasive organ support
- Compare the use of broad-spectrum antibiotics (Big-gun) and antimicrobial resistance (AMR) prevalence
- Assess the trends in provision of critical care and compare outcomes between patients in the ICU and general wards

## Methods



### Study design:

- Population-based, retrospective cohort study
- Study period: 2008/04/01 ~ 2019/03/31
- All 41 publicly-funded hospitals (provide 90% of acute hospital care) in Hong Kong

### Participants:

- adult ( $\geq 18$  years old) patients with CAS ( $\leq 48$  hours of hospital episode admission)

### Data extraction:

- Sepsis cases were identified by our previously validated electronic health record (EHR)-based surveillance definition<sup>2</sup>
- Cases were identified from a population EHR database named Clinical Data Analysis and Reporting System

### Definition:

- Hospital mortality: death from any cause at hospital episode discharge
- ICU: adult intensive care unit managed by ICU specialists

### Statistical analysis:

- Trends were modeled by exponential regression
- Trends in hospital mortality of the ICU and general wards were stratified by  $\Delta$ SOFA scores

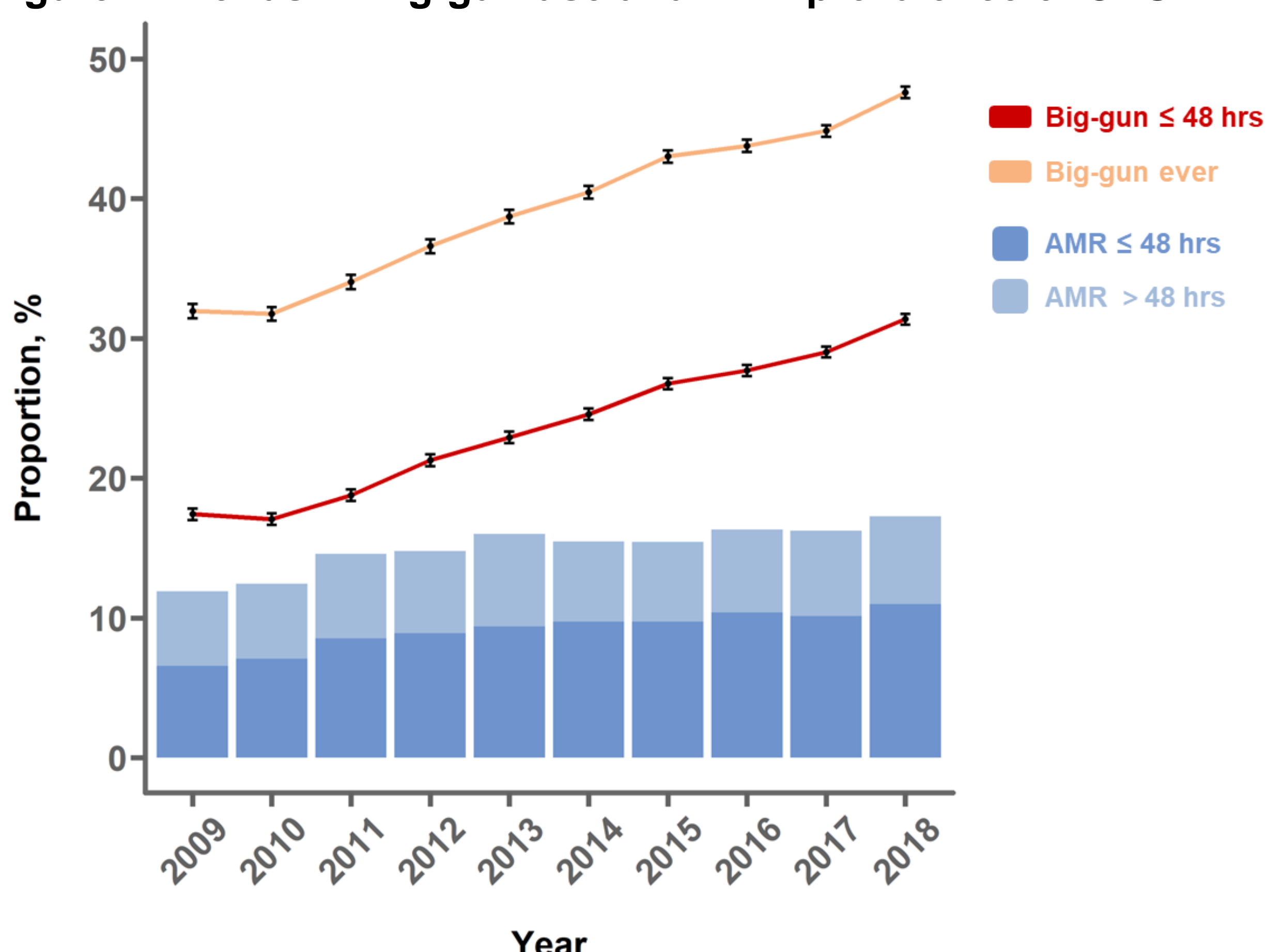
## Results

**Table 1. Trends in investigations, provision of critical care, and mortality of CAS between 2009-2018 (N = 421,096)**

	2009, %	2018, %	Relative annual change [95% CI]	P
<b>Blood culture <math>\geq 2</math></b>	11.5	12.7	+1.4% [0.3, 2.5%]	0.02
<b>Lactate test</b>	4.4	16.4	+15.3% [12.6, 17.9%]	< 0.001
<b>CT</b>	18.6	31.7	+5.6% [4.2, 7.0%]	< 0.001
<b>Vasopressor</b>	6.4	13.3	+8.8% [6.3, 11.3%]	< 0.001
<b>Mechanical Ventilation</b>	16.0	10.4	-5.4% [-6.9, -4.0%]	< 0.001
<b>Renal Replacement Therapy</b>	5.5	3.4	-3.4% [-6.4, -0.2%]	0.04
<b>ICU Admission</b>				
CAS with any invasive organ support <sup>a</sup>	41.2	34.0	-2.7% [-4.1, -1.2%]	0.003
All CAS	11.5	10.1	-1.9% [-3.2, -0.6%]	< 0.001
<b>Hospital Mortality</b>	21.7	21.0	-0.2% [-0.7, 0.4%]	0.46

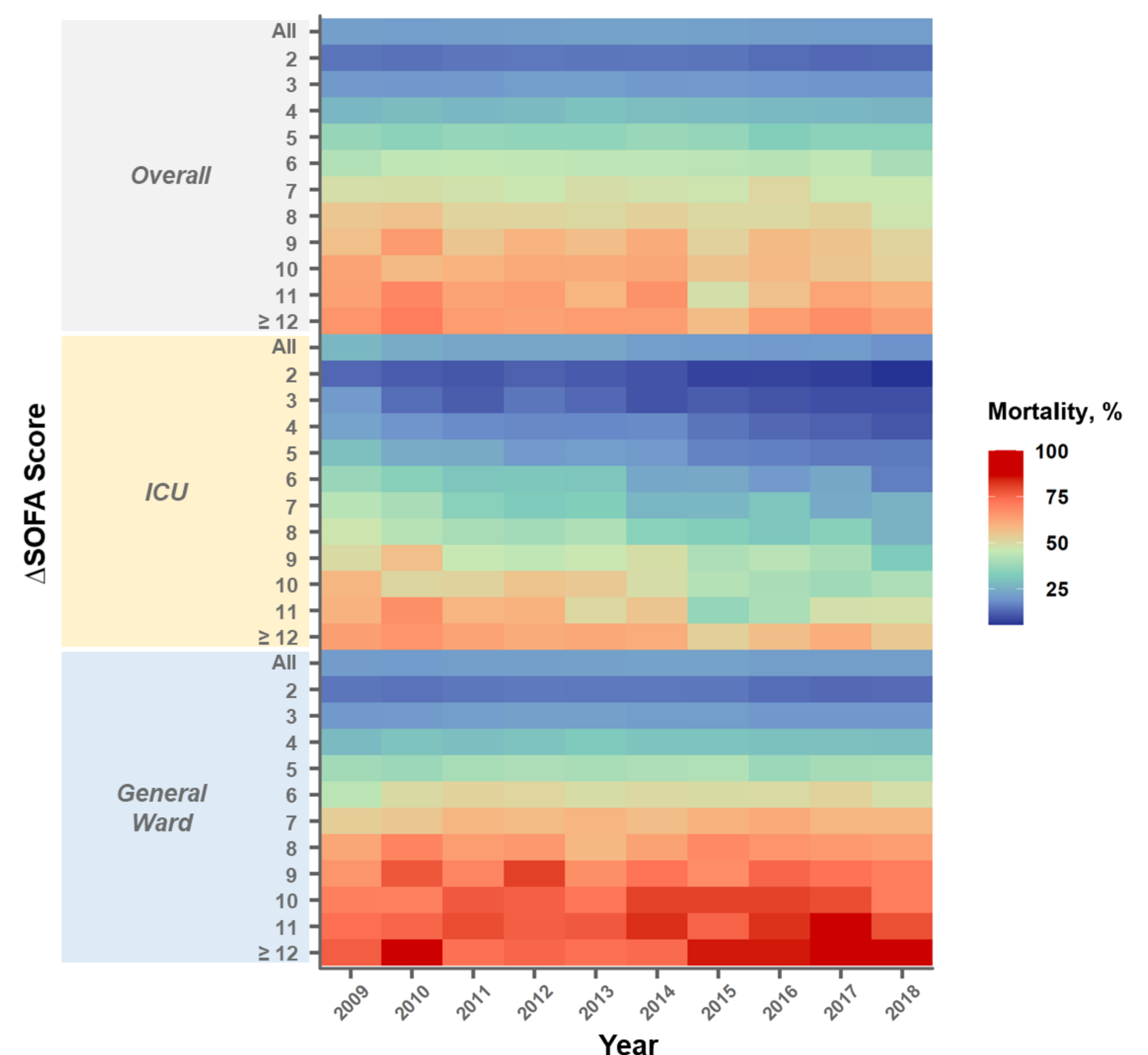
<sup>a</sup> Defined as patients who ever received mechanical ventilation or vasopressor (n = 81,724). During study decade, a total of 421,096 CAS were identified. CT, computerized tomography

**Figure 1. Trends in Big-gun use and AMR prevalence of CAS**



- Big-gun used within 48 hours of admission increased from 17.4% in 2009 to 31.4% in 2018 (relative +7.4%/year [95%CI 6.4, 8.3%],  $p < 0.001$ );
- While, AMR proportion within 48 hours of admission increased from 6.6% to 11.0% (relative +5.2%/year [95%CI 3.5, 7.0%],  $p < 0.001$ ) during the decade.

**Figure 2. Trends in hospital mortality of patients with CAS managed in the ICU and general wards stratified by  $\Delta$ SOFA scores**



$\Delta$ SOFA = Delta Sequential Organ Failure Assessment

- Hospital mortality of patients managed in the ICU significantly decreased from 27.4% in 2009 to 18.7% in 2018 (relative -3.3%/year [95%CI -4.2, -2.4%],  $p < 0.001$ ).
- In contrast, hospital mortality in general wards had no significant change from 20.9% in 2009 to 21.3% in 2018 ( $p = 0.43$ ).
- Improvement in hospital mortality of ICU patients over time was observed across whole range of  $\Delta$ SOFA scores.

## Conclusions

- Compliance to blood culture and lactate bundle were low, but overall hospital mortality was comparable to other high-income regions
- Significant proportion of invasive organ support for CAS was provided in general wards rather than ICU
- Rates of both use of Big-gun and AMR were increasing over the last decade
- Hospital mortality of CAS had only improved for patients managed in the ICU during the study decade

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## Contact

- E-mail: zhenhezhang@link.cuhk.edu.hk
- X (Twitter): @ZhenheZ
- ORCID: 0000-0001-7114-7761



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