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1. Introduction

- Community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) have emerged globally and are associated with more severe disease than healthcare-associated MRSA (HA-MRSA).^{1,2}
- We hypothesise that a range of CA-MRSA strains will be more virulent than a range of HA-MRSA strains.

2. Methods

- Eighteen HA-MRSA strains from 2 clones, and 26 CA-MRSA strains from 7 clones were selected.
- Fibrinogen and fibronectin binding by CA and HA strains in exponential and stationary phases was compared using t-tests.
- Phenol Soluble Modulin (PSM) production was measured using mass spectrometry and compared using ANOVA.
- A *Galleria melonella* (caterpillar) pathogenicity model was performed and differences compared using survival analysis and the log-rank test.

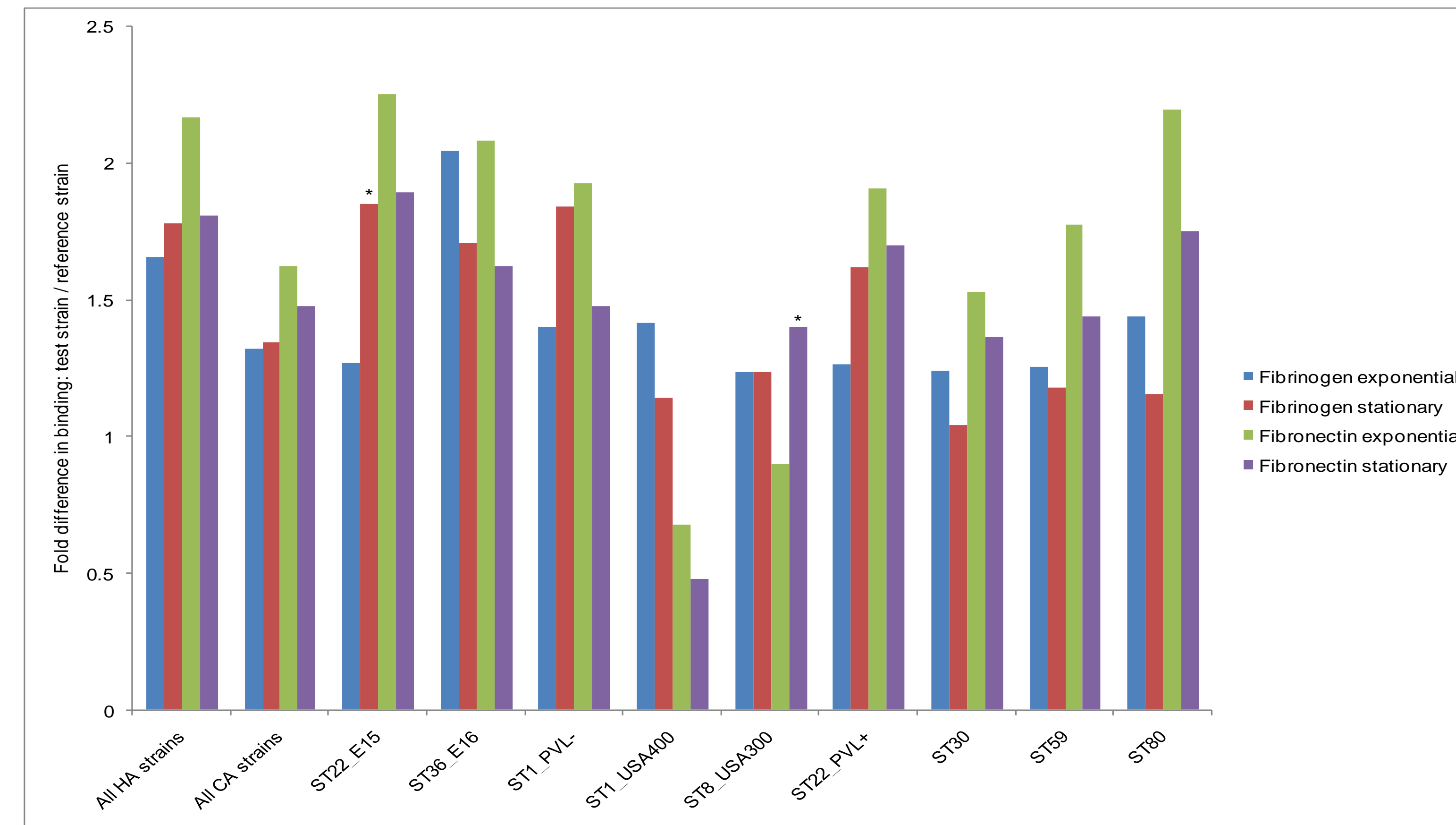


Figure 1. Change in fibrinogen and fibronectin binding from exponential to stationary phase. * = $p < 0.05$ comparing exponential with stationary phase binding.

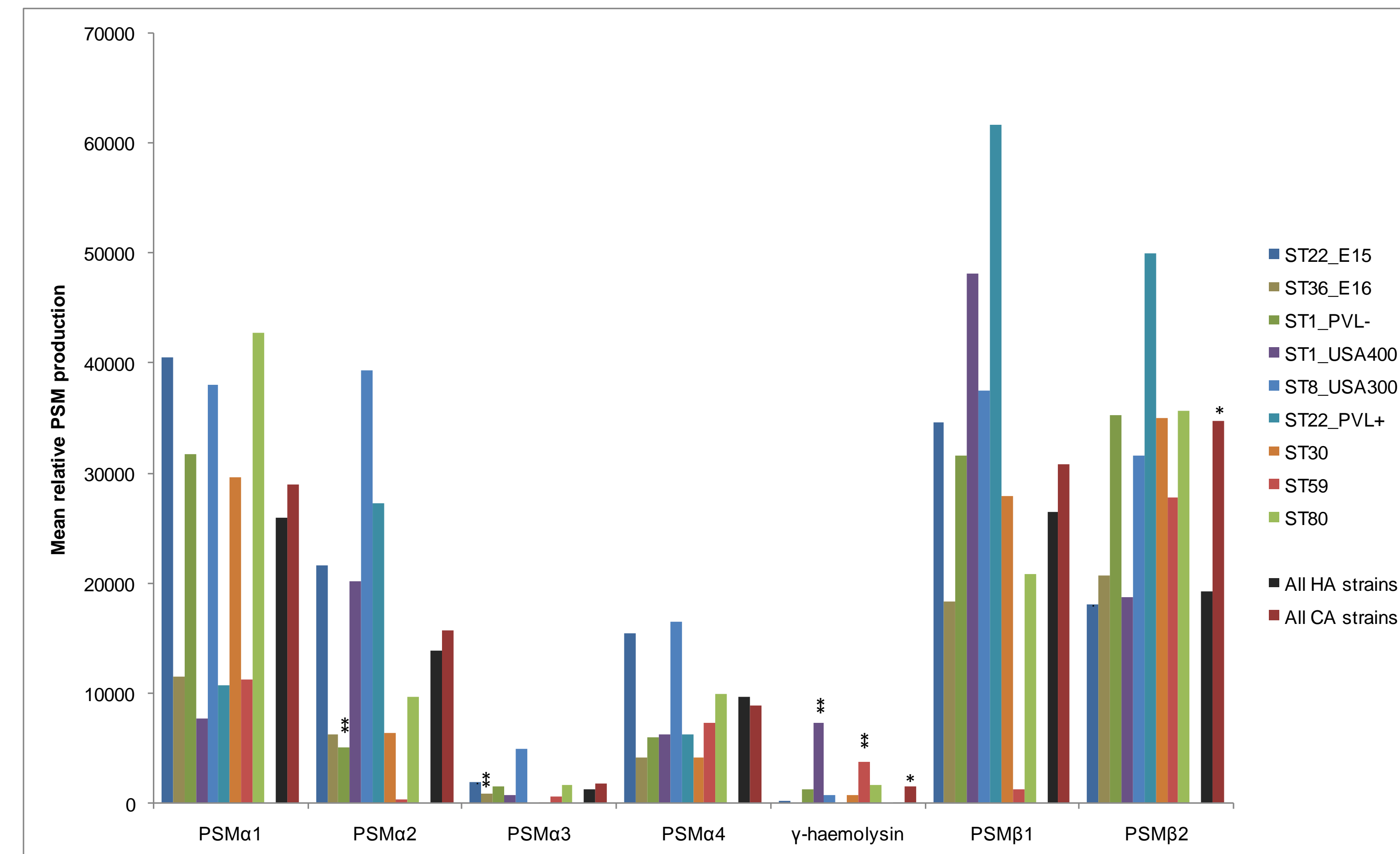


Figure 2. PSM production. * = $p < 0.01$ when comparing HA with CA strains; ‡ = $p < 0.05$ in ANOVA post-hoc testing when comparing individual groups using ST8 (USA300) isolates as a reference.

3. Results

- Overall binding to fibrinogen and fibronectin was significantly lower for CA vs HA strains in exponential and stationary phases ($p < 0.05$), but there was no difference in fibrinogen or fibronectin binding when moving from exponential to stationary phase ($p > 0.05$) (Fig 1).
- There was no significant difference in overall PSM production between HA and CA strains ($p = 0.231$) but there was significant variation between clones ($p = 0.003$) (Fig 2).
- Surprisingly, *G. melonella* caterpillar mortality was significantly more rapid in HA v CA strains ($p = 0.007$), and there was a significant difference between clones ($p < 0.001$).

4. Discussion

- There are significant differences in activity of MRSA strains in laboratory assays that model distinct steps in the pathogenesis of *S. aureus* disease; however we did not identify a consistent and distinct virulence phenotype for the CA vs HA groups.
- The mechanism of increased disease severity attributed to CA-MRSA remains unclear.

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References: 1. Otto M. *Int J Med Microbiol* 2013;303:324-330; 2. Chambers HF. *N Engl J Med* 2005;352:1485-1487.