Introduction
Large observational studies have shown reductions in hospital mortality related to severe sepsis and septic shock. However, there is a paucity of data regarding trend in long-term outcomes. Sepsis survivors suffer many of the sequelae of critical illness; including high risk of 1-year mortality. We sought to determine whether there is a similar reduction in hospital mortality from sepsis over time at BIDMC, and if present, whether the gains translate to 1-year mortality. We also explored potential mechanisms behind the improved outcomes.

Methods
We performed a retrospective analysis using the Medical Information Mart for Intensive Care (MIMIC) database which links data from various information systems. We identified patients with sepsis as defined by Angus and van der Poll criteria. Variables obtained included year of admission, patient age, gender, Elixhauser comorbidity index, Sequential Organ Failure Assessment (SOFA), initial and 24-hour lactate concentration, use of vasopressors and mechanical ventilation, 28-day and 1-year mortality, and intensive care unit (ICU) and hospital length-of-stay. Cochran-Armitage and Mann-Kendall tests were employed to determine whether the trend increased, decreased, or was unchanged. A 0.01 level of significance was used as the p value cutoff.

Results

Discussion and Conclusions
Similar to prior studies, we have shown decreased short-term mortality over time. In particular, these results mirror the findings reported in the ANZIC study. Our study extends current knowledge regarding mortality gains in sepsis by demonstrating decreased sepsis mortality at one year.

The analysis suggests potential mechanisms underlying the observed improvement in sepsis mortality. We found decreased mechanical ventilation and vasopressor use over time, despite no significant change in severity of illness on presentation and during the first day in the ICU. Perhaps decreased iatrogenic injury associated with these interventions, or their more selective use, contributed to the mortality gains. Surprisingly, we did not observe improved lactate clearance during the study period.

Learning is the hallmark of quality improvement. This requires integration of data coming from disparate sources and bringing together of expertise from various disciplines including data science to leverage the value of digital health data.

References