# New York State Report on Sepsis Care Improvement Initiative: Hospital Quality Performance

# 2019

**Clinical Center**
**Office of Quality and Patient Safety**
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# Table of Contents

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# Introduction

Sepsis is a life-threatening medical emergency that requires early detection and timely, appropriate interventions to improve the chance of survival and optimize outcomes for patients of all ages. Sepsis is the body's extreme response to an infection and without treatment can progress in severity from sepsis to severe sepsis and septic shock. Patients with severe sepsis and septic shock can experience tissue damage, organ failure and even death.

Since 2014, the New York State (NYS) Sepsis Care Improvement Initiative has been a resource for quality improvement in sepsis care. An initiative of the NYS Department of Health, the NYS Sepsis Care Improvement Initiative works with hospitals and partners across the state to improve early detection of severe sepsis and septic shock, initiate timely interventions and treatment and reduce overall mortality. Severe sepsis and septic shock impact approximately 50,000 patients in NYS each year and prior to the start of the Sepsis Care Improvement Initiative in 2014, nearly 30% of adult patients died from severe sepsis or septic shock in NYS. In addition, many more experience lifelong impairments because of the broad impact sepsis can have on organ and tissue function.

# Report Overview and Purpose

The NYS Department of Health (Department) is pleased to present this fifth annual public report on the Sepsis Care Improvement Initiative. This report builds upon the Department's long history of data-driven quality improvement activities. It is consistent with the Department's mission to protect, improve and promote the health, productivity and well-being of all New Yorkers. This report contains results from 2019 on hospitals' use of sepsis protocols as well as on data collection of adult and pediatric cases of severe sepsis and septic shock, sepsis quality measures and outcomes on which hospitals are compared, statewide trends for key quality measures and outcomes, and key ongoing collaborations between the Department and external partners. The report represents considerable efforts by NYS hospitals and clinicians to measure and improve care and outcomes for individuals with this common, complex, and lethal condition.

The purpose of this public report is to provide actionable information to hospitals to support their ongoing quality improvement efforts, to inform new initiatives surrounding sepsis care, and to educate patients and caregivers as part of a statewide initiative to reduce the impact of this deadly condition. This report also aims to highlight areas for improvement to assist hospitals and clinicians in focusing their efforts.

# Special Note About this Report and Future Reports

The annual 'New York State Report on Sepsis Care Improvement Initiative: Hospital Quality Performance' has been drafted and posted publicly by the Department each year since 2015 as a PDF document upon the completion of extensive data cleaning, audit and follow-up with hospitals, and the development of a risk-adjusted mortality model for the year. Significant changes were made to data collection and reporting beginning in 2020 including the elimination of the collection of process measures. Therefore, the 2019 report will be the final report published as a PDF document and will be the last report that highlights adherence to process measures and bundle completion. Future reports will be published using a dashboard format which will contain outcome measures and risk-adjusted mortality rates.

# The New York State Sepsis Care Improvement Initiative

The NYS Sepsis Care Improvement Initiative began in 2014 with a goal to reduce sepsis-related mortality in NYS. Since then, all acute care hospitals in NYS that provide care to patients with sepsis have been required by amendment of Title 10 of the New York State Codes, Rules and Regulations (Sections 405.2 and 405.4) to develop and implement evidence-informed sepsis protocols, which describe their approach to both early recognition and treatment of patients with severe sepsis and septic shock. Hospitals must also report data on all severe sepsis and septic shock patients to the NYS Department of Health. These data are used to evaluate each hospital's performance on key process measures of early treatment and outcome measures (i.e., risk-adjusted mortality rates). The Department uses clinical information submitted by each hospital to develop a methodology to evaluate risk-adjusted mortality rates (RAMR) for each hospital. Risk adjustment takes into consideration the different characteristics and comorbid conditions, including sepsis severity of patients cared for within each hospital, and permits comparison of hospital performance.

# Data Collection

## Patient Population

For the purpose of data collection, the NYS Sepsis Care Improvement Initiative defines sepsis as a life-threatening medical emergency that requires early recognition and intervention. Sepsis is further defined as confirmed or suspected infection accompanied by two systemic inflammatory response syndrome (SIRS) criteria; severe sepsis is sepsis complicated by organ dysfunction[s]; for adults, septic shock is sepsis-induced hypotension persisting despite adequate intravenous fluid resuscitation and/or evidence of tissue hypoperfusion; and for pediatric patients (those under 18 years of age), septic shock is sepsis and cardiovascular organ dysfunction despite 20cc/kg of crystalloid fluid administration. This is based on the Sepsis-2 definition. In 2016, a task force convened by national societies including the Society of Critical Care Medicine (SCCM) and the European Society of Intensive Care Medicine (ESICM) proposed a new definition of sepsis, termed Sepsis-3. The Department consulted with the NYS Sepsis Advisory Group and decided that due to the complexity of the method, the lack of requisite data for many patients at presentation, and concerns that it may result in later identification of patients who might have sepsis, that the Sepsis-3 definition is impractical for the purpose of identification and data collection in the NYS Sepsis Care Improvement Initiative. Therefore, the Department has decided to continue use of the Sepsis-2 definition in the NYS Sepsis Care Improvement Initiative.

This report presents hospital-reported data for adult and pediatric patients with a diagnosis of severe sepsis or septic shock evaluated at NYS hospitals from the first quarter (Q1) of 2016 through the fourth quarter (Q4) of 2019. However, in this report, the terms 'sepsis' and 'severe sepsis or septic shock' are used interchangeably to refer to these patients. Patient cohorts within this broader population differ across various sections and measures in this report. These differences reflect the Department's intent to understand care for all patients with sepsis while also conducting fair comparisons of hospitals' care processes and outcomes. In the first section, aggregate data from all reporting hospitals are used to present statewide trends and includes all patients diagnosed with severe sepsis or septic shock, with limited exceptions, regardless of whether the patient presented with severe sepsis or septic shock in the emergency department

or an inpatient unit. The next section describes hospital-specific data, which includes all patients for measures that are relevant to all hospitals, while other measure populations are limited to patients who are not transferred. These differences are fully described in each section.

In 2019, high-volume hospitals with large numbers of sepsis patients had the option of reporting on a representative random sample of 400 sepsis patients for the calendar year, rather than reporting on their entire population of sepsis patients. Thirty-four (34) hospitals opted to report a sample of patients. For these hospitals, the selected sample was compared to the eligible population with regard to key patient characteristics, and results demonstrated that the sample did not differ significantly from the hospital's whole eligible population (see Appendix A for details about sampling).

In this report, adult patients are defined as those age 18 years or older and pediatric patients are those aged younger than 18 years. Data in this report are presented through 2019 to align with risk-adjusted mortality data.

The sepsis population excludes those patients with advance directives that limited implementing sepsis care interventions, patients who refused sepsis care interventions, and neonates who were not discharged from the neonatal intensive care unit (NICU).

## Data Source and Data Submission

The primary data source for this report is the Sepsis Clinical Database (SCD). The SCD is comprised of demographic and clinical data abstracted from the hospital medical record by hospital staff. These abstracted data are submitted electronically to a secure web portal hosted by Island Peer Review Organization (IPRO), the Medicaid External Quality Review Organization for New York State, for validation. IPRO conducts an independent audit of a sample of medical records for each hospital to ensure data integrity and accuracy.

## Quality Measures

Quality measures including process and outcome measures are calculated for reporting both statewide rates and trends and hospital-specific rates and trends. The Adult NYS sepsis process of care measures were developed using a National Quality Forum (NQF) measure for guidance: NQF #500 Severe Sepsis and Septic Shock: Management Bundle. The Pediatric NYS sepsis process of care measures are aligned with Surviving Sepsis Campaign International Guidelines for Management of Severe Sepsis and Septic Shock 2012. These measures, reported as statewide and hospital-specific rates, reflect several key processes of care that can increase the probability of surviving an episode of sepsis.

The start time for care process measures is the time at which patients presented with severe sepsis or septic shock. Presentation is defined as the time at which all criteria for severe sepsis or septic shock were met, or a clinician documented a diagnosis of severe sepsis or septic shock. Explicit criteria for severe sepsis presentation and septic shock presentation are defined in a publicly available data dictionary. These criteria include a combination of infection, signs of SIRS, and organ dysfunction for severe sepsis. Septic shock was defined as severe sepsis plus persistent hypotension and/or inadequate tissue perfusion as evidenced by elevated lactate level.

For the 34 hospitals that opted to sample in 2019, adult measure performance is calculated using a representative random sample of cases and serves as an estimate of actual performance. For all remaining hospitals, and all pediatric measures, the actual observed performance is reported. More information on sampling and how the adult measures are calculated for these hospitals can be found in Appendix A.

Two mortality outcome measures are presented in this 2019 report. Statewide trends over time for both the adult and pediatric populations are presented using crude in-hospital mortality, consistent with previous reports. Mortality in this measure includes all cases of severe sepsis or septic shock who expired in the hospital, regardless of length of stay. In contrast, risk-adjusted mortality utilizes 30-day post-presentation mortality. This measure includes all severe sepsis and septic shock patient deaths that occurred within 30 days of the presentation of severe sepsis and septic shock, including patients who were discharged alive from the hospital but expired within 30 days of presentation and excluding patients who died in the hospital but expired more than 30 days post presentation. More information regarding the risk adjustment methodology can be found in Appendix B.

## Limitations

There are some limitations to the data presented in this report. The data in this report reflect medical record documentation, and it is possible that elements of care were provided but not documented. It is also possible that some patient characteristics that were not collected, such as uncommon comorbid conditions, are not reflected in the measures but may have impacted outcomes. The start time in the prior reports, which was the time of initiation of the hospital's protocol, may not be aligned with the start time in this report, which is the time of severe sepsis and septic shock presentation. This difference should be considered in interpreting year over year comparisons.

# Statewide Incidence and Trends

Statewide rates and rate trends are reported using data for all patients diagnosed with severe sepsis or septic shock. The denominator for population rates uses 2016-2019 Claritas small-area NYS population data. Only NYS residents are included in calculating population rates.

Tables 1 and 2 display calendar year incidence rates of severe sepsis or septic shock for adult (age >=18) and pediatric (age <18) patients by age, sex, and race/ethnicity. In 2019, there were approximately 465 sepsis cases per 100,000 adults and about 15 sepsis cases per 100,000 children. Among adults, males had a higher incidence of sepsis compared to females (514 vs. 419 cases per 100,000). Sepsis incidence among adults generally increased with age, with adults age 80 and older having the highest incidence of sepsis (about 2,650 sepsis cases per 100,000). Sepsis incidence was highest among White, Non-Hispanic and Black, Non-Hispanic adults with just under 480 cases per 100,000 for both groups, and lowest among Asian, Non-Hispanic adults with about 190 cases per 100,000. Among children, males and females had similar incidence of sepsis, with about 15 cases per 100,000 for both groups. Sepsis incidence was highest among infants under one year (65 cases per 100,000) and lowest among children ages 3-5 (8 cases per 100,000). Sepsis incidence was highest among Black, Non-Hispanic children with about 15 cases per 100,000, and lowest among Native American/Pacific Islander/Multi-Racial, Non-Hispanic children with about 8 cases per 100,000.

**Table 1. Adult Severe Sepsis or Septic Shock Cases by Sex and Age, 2019**

| Characteristic | Level | Sepsis Cases (N) | Sepsis Cases (%) | Sepsis Cases Per 100,000 |
|---|---|---|---|---|
| Age | 18-29 | 1,944 | 2.7% | 58.7 |
| | 30-39 | 2,726 | 3.7% | 100.4 |
| | 40-49 | 4,131 | 5.7% | 166.9 |
| | 50-59 | 9,428 | 12.9% | 347.0 |
| | 60-69 | 15,606 | 21.4% | 662.1 |
| | 70-79 | 17,548 | 24.0% | 1314.4 |
| | 80+ | 21,667 | 29.7% | 2653.3 |
| Sex | Female | 34,294 | 46.9% | 418.7 |
| | Male | 38,732 | 53.0% | 513.9 |
| | Unknown | 24 | 0.0% | |
| Race/ Ethnicity | White, Non-Hispanic | 42,791 | 58.6% | 479.6 |
| | Black, Non-Hispanic | 10,528 | 14.4% | 479.4 |

| | | | | |
|---|---|---|---|---|
| | Asian, Non-Hispanic | 2,719 | 3.7% | 191.2 |
| | Native American / Pacific Islander / Multi-Racial, Non-Hispanic | 651 | 0.9% | 231.8 |
| | Other, Non-Hispanic | 3,193 | 4.4% | |
| | Hispanic | 7,911 | 10.8% | 279.8 |
| | Other/Unknown Ethnicity | 5,257 | 7.2% | |
| **Total** | **Total** | **73,050** | **100.0%** | **464.5** |

*Note: Race/Ethnicity sepsis case counts are imputed from fully abstracted case distribution for sampling hospitals.*

**Table 2. Pediatric Severe Sepsis or Septic Shock Cases by Sex and Age, 2019**

| Characteristic | Level | Sepsis Cases (N) | Sepsis Cases (%) | Sepsis Cases Per 100,000 |
|---|---|---|---|---|
| Age | < 1 year | 148 | 23.7% | 65.2 |
| | 1-2 | 89 | 14.3% | 19.3 |
| | 3-5 | 58 | 9.3% | 8.3 |
| | 6-11 | 120 | 19.2% | 8.7 |
| | 12-17 | 209 | 33.5% | 14.8 |
| Sex | Female | 298 | 47.8% | 14.6 |
| | Male | 326 | 52.2% | 15.3 |
| Race /Ethnicity | White, Non-Hispanic | 230 | 36.9% | 12.1 |
| | Black, Non-Hispanic | 98 | 15.7% | 15.1 |
| | Asian, Non-Hispanic | 42 | 6.7% | 12.1 |
| | Native American / Pacific Islander / Multi-Racial, Non-Hispanic | 13 | 2.1% | 7.7 |
| | Other, Non-Hispanic | 35 | 5.6% | |
| | Hispanic | 119 | 19.1% | 11.1 |
| | Other/Unknown Ethnicity | 87 | 13.9% | |
| **Total** | **Total** | **624** | **100.0%** | **14.9** |

*Note: Race/Ethnicity sepsis case counts are imputed from fully abstracted case distribution for sampling hospitals.*

Figures 1 and 2 show trends in overall incidence of severe sepsis and septic shock by quarter from Q1 2016 - Q4 2019 for adult and pediatric patients. The population denominator used for each quarter is the calendar year population for that year and quarterly rates presented here are not comparable to the yearly rates presented above.

Among adults, sepsis incidence has increased from about 93 cases per 100,000 at the beginning of 2016 to 122 cases per 100,000 at the end of 2019; though this increase may be due to better detection or better reporting rather than a true increase in incidence. There is also a seasonal pattern to sepsis cases, such that highest incidence of sepsis incidence occurs in the first quarter (January to March) of each year.

Among children, sepsis cases have decreased from 4.9 cases per 100,000 at the beginning of 2016 to 3.9 cases at the end of 2019. Potentially due to a lower overall number of cases, it is not clear whether a seasonal pattern in the incidence of sepsis exists among children.

**Figure 1. Adult Sepsis Cases per 100,000 by Quarter 2016-19**

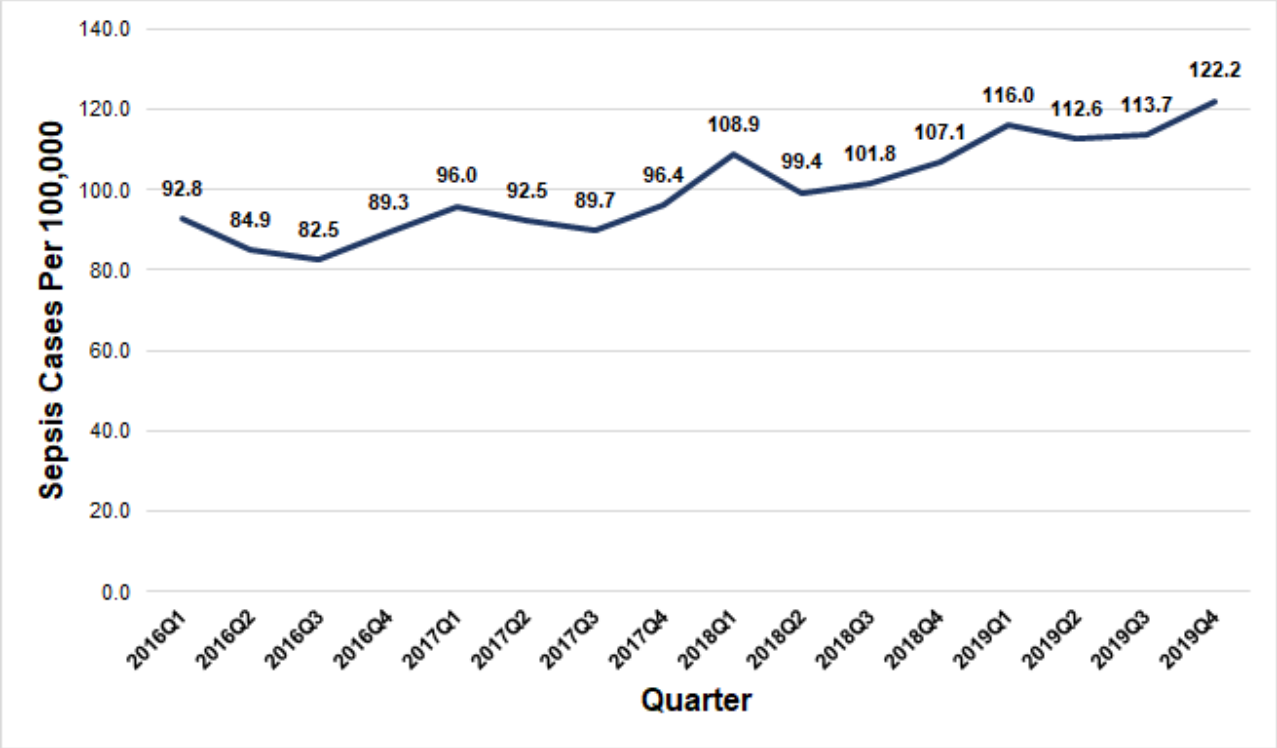
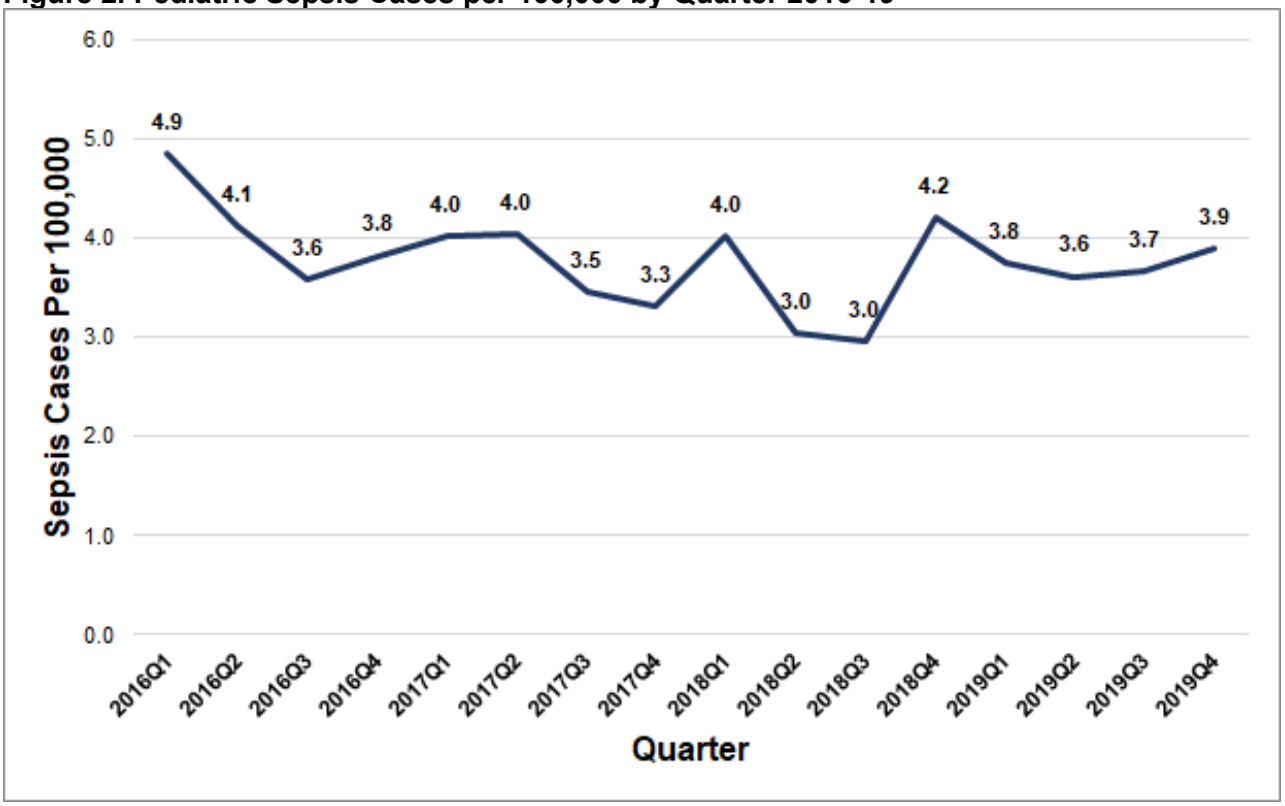


**Figure 2. Pediatric Sepsis Cases per 100,000 by Quarter 2016-19**



# Statewide Trends

Statewide rates and trends are reported using data for all patients diagnosed with severe sepsis or septic shock submitted to the Department for measure calculation, with measure-specific exclusions as noted below. The measures calculated using aggregate data from all hospitals for statewide reporting are briefly summarized below.

Adult Specific Measure Descriptions:

The start time for care process measures is the time at which patients presented with severe sepsis or septic shock. Presentation is defined as the time at which all criteria for severe sepsis or septic shock were met, or a clinician documented a diagnosis of severe sepsis or septic shock. Explicit criteria for severe sepsis presentation and septic shock presentation are defined in a publicly available data dictionary. These criteria include a combination of infection, signs of SIRS, and organ dysfunction for severe sepsis. Septic shock was defined as severe sepsis plus persistent hypotension and/or inadequate tissue perfusion as evidenced by elevated lactate level.

- 3-Hour Bundle (Adult): The percentage of adult patients with severe sepsis or septic shock who received blood cultures up to 48 hours before to three (3) hours after severe sepsis or septic shock start time; initial lactate level collection up to six (6) hours before to three (3) hours after severe sepsis or septic shock start time; and broad-spectrum antibiotics up to 24 hours before to three (3) hours after severe sepsis or septic shock start time. This measure is not calculated for patients who were excluded from the hospital's protocol or from specific care interventions within three (3) hours of start time, who were transferred from or to another acute care hospital, or who died within three (3) hours of start time.
    - Individual Bundle Component Rates: Timely Administration of Broad-Spectrum Antibiotics - The percentage of adult patients with severe sepsis or septic shock who received broad-spectrum antibiotics up to 24 hours before to three (3) hours after severe sepsis or septic shock start time.

- 6-Hour Bundle (Adult): The percentage of adult patients with severe sepsis or septic shock who received all the recommended interventions in the 6-Hour Bundle (Adult), including interventions in the 3-Hour Bundle (Adult) within measure timeframes, a repeat lactate level within six (6) hours of severe sepsis or septic shock start time if initial lactate level is elevated, resuscitation with crystalloid fluids up to six (6) hours before to within three (3) hours of septic shock start time or initial hypotension time (whichever is earlier), fluid status assessment within six (6) hours of septic shock start time after fluid resuscitation is present, and vasopressor therapy within six (6) hours of septic shock start time if persistent hypotension after fluid resuscitation is present. This measure is not calculated for patients who were excluded from the hospital's protocol or from specific care interventions within three (3) hours or six (6) hours of start time (depending on measure component timeframe), who were transferred from or to another acute care hospital, or who died within three (3) hours or six (6) hours of start time (depending on measure component timeframe).

Outcome Measure:

- Adult In-Hospital Mortality: The percentage of adult patients with severe sepsis or septic shock with in-hospital mortality.

Pediatric Specific Measures Descriptions:

- 1-Hour Bundle (Pediatric): The percentage of pediatric patients with severe sepsis or septic shock who received blood cultures up to 48 hours before to one (1) hour after severe sepsis or septic shock start time; fluid administration up to six (6) hours before to one (1) hour after severe sepsis or septic shock start time; and broad-spectrum antibiotics up to 24 hours before to one (1) hour after severe sepsis or septic shock start time. This measure is not calculated for patients who were excluded from the hospital's protocol or from specific care interventions within one (1) hour of start time, who were transferred from or to another acute care hospital, or who died within one (1) hour of start time.
    - Individual Bundle Component Rates: Timely Administration of Broad-Spectrum Antibiotics -The percentage of pediatric patients with severe sepsis or septic shock who received broad-spectrum antibiotics up to 24 hours before to one (1) hour after severe sepsis or septic shock start time.

Outcome Measure:

- Pediatric In-Hospital Mortality: The percentage of pediatric patients with severe sepsis or septic shock with in-hospital mortality.

## Bundle Results

Timely intervention for patients with severe sepsis and septic shock is critical. Current guidelines recommend timely collection of blood cultures and lactate level and early administration of antibiotics for these patients. Delays in bundle completion and antibiotic administration have been associated with a higher risk of mortality. Repeat lactate levels, fluids, and vasopressors for blood pressure support are recommended for a subset of patients with certain manifestations of severe sepsis or septic shock.

Figures 3-6 depict trend analyses based on aggregated data submitted by hospitals from First Quarter (Q1) 2016 through Fourth Quarter (Q4) 2019. For the measures with specified time parameters in the trend graphs for this section (Figures 3-7), 'start time' is defined as the presentation time of severe sepsis or septic shock for calendar year (CY) 2017 through 2019, while in previous years, start time was defined as the date and time when each hospital determined that its protocol had been initiated for each patient. This difference in start time definition is a limitation and should be considered in interpretation of measure rate trends. Beginning in 2017, statewide measures for adults are weighted by total adult case volume within sampling hospitals. Patients who died within three to six hours of start time (depending on the bundle), who were excluded from the hospital's protocol or from specific care interventions within three to six hours of start time (depending on bundle), and who were transferred from or to another acute care hospital are excluded from these figures.

Figure 3 shows the percentage of adult patients with severe sepsis or septic shock for whom all the recommended early interventions, or 3-Hour Bundle (Adult), were administered within the recommended timeframe. These interventions include measurement of lactate level, blood culture collection prior to antibiotics, and antibiotic administration. At the onset of the initiative, 48.5% of eligible patients with severe sepsis or septic shock received all three interventions within the recommended timeframe, while by Q4 2019 the percentage increased to 72.3%.

**Figure 3. 3-Hour Bundle (Adult): Quarter One, 2016 through Quarter Four, 2019***

**(*) excludes patients who were excluded from the hospital's protocol or from specific care interventions, who died within three hours, or who were transferred from or to another acute care hospital**

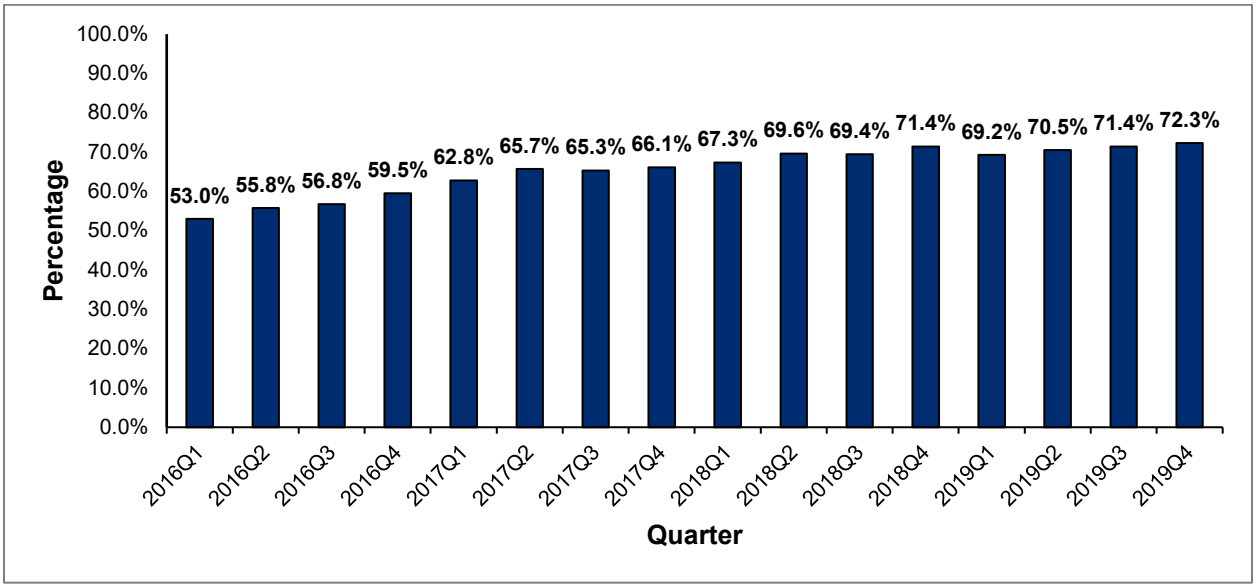



Figure 4 shows the percentage of adult patients with severe sepsis or septic shock for whom all the recommended early interventions in the 6-Hour Bundle (Adult) were administered within the recommended timeframe. It should be noted that the variable Repeat Volume Status and Tissue Perfusion Reassessment was included in the 6-Hour Bundle (Adult) for the first time in 2017. The addition of this variable appeared to suppress the 6-Hour Bundle (Adult) rates in 2017 and trends should therefore be interpreted with caution.

**Figure 4. 6-Hour Bundle (Adult): Quarter One, 2016 through Quarter Four, 2019***

**(*) excludes patients who were excluded from the hospital's protocol or from specific care interventions, who died within six hours, or who were transferred from or to another acute care hospital**

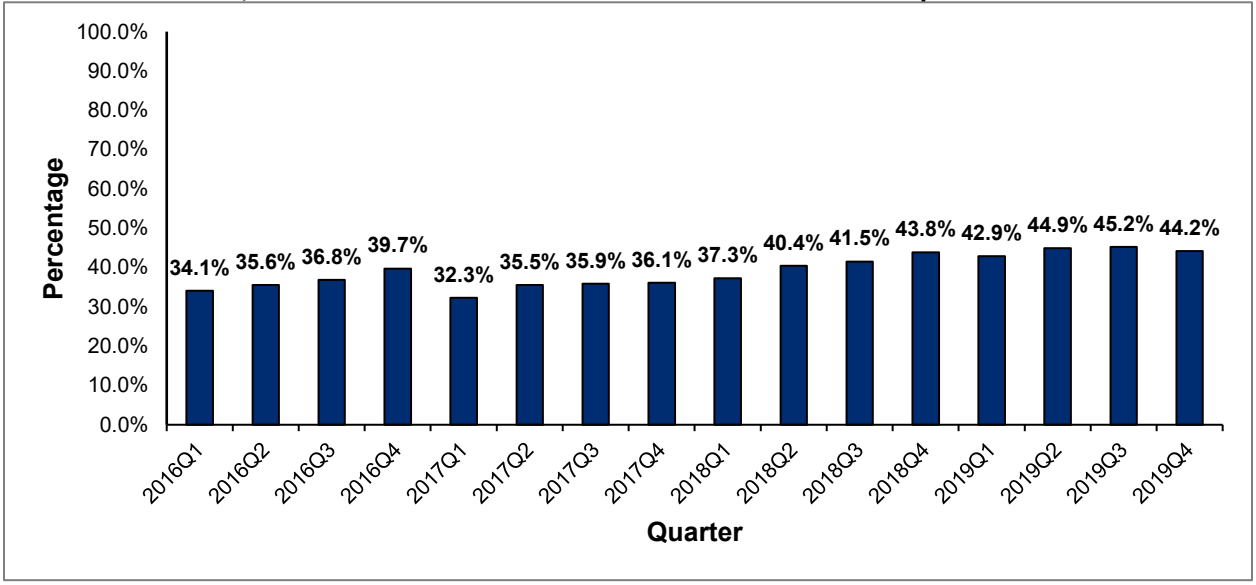
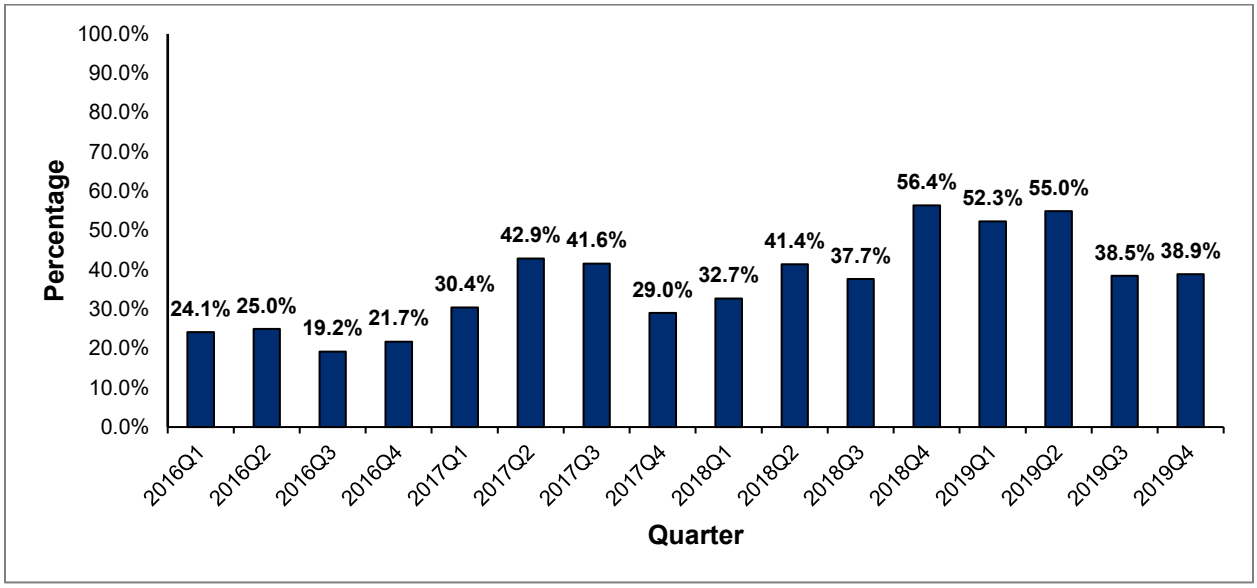


Figure 5 shows the percentage of pediatric patients with severe sepsis or septic shock who received all interventions in the 1-Hour Bundle (Pediatric).

**Figure 5. 1-Hour Bundle (Pediatric): Quarter One, 2016 through Quarter Four, 2019***

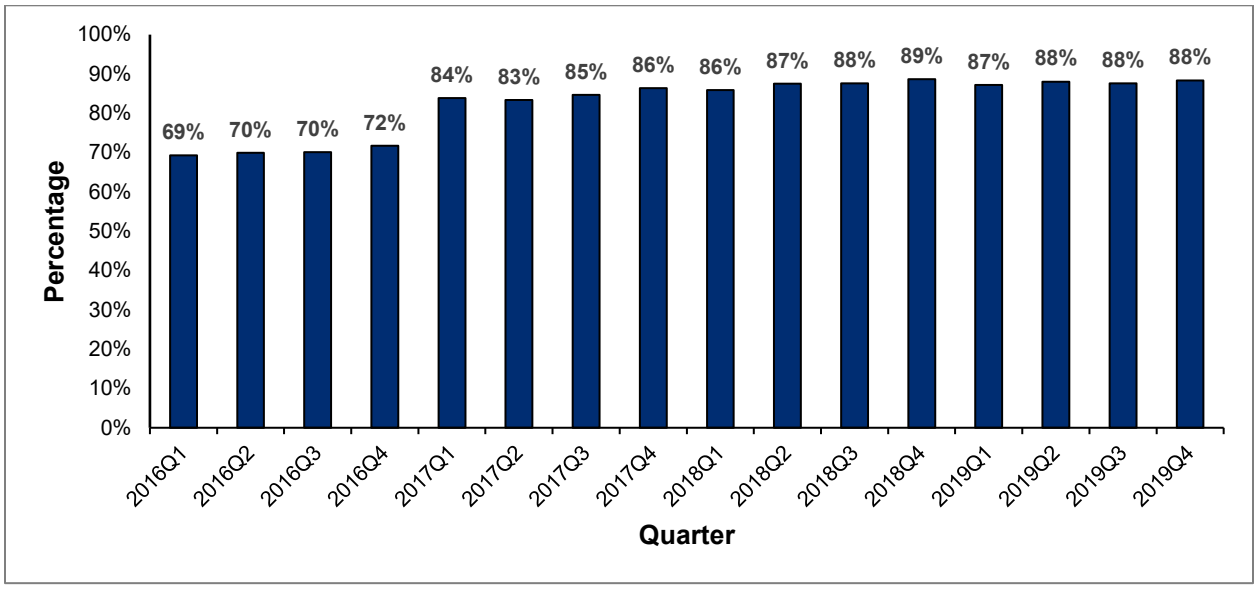
**(*) excludes patients who were excluded from the hospital's protocol or from specific care interventions, who died within one hour, or who were transferred from or to another acute care hospital**




The percentage of adult patients with severe sepsis or septic shock that received broad spectrum antibiotics is presented in Figure 6 independently from the bundle results.

**Figure 6. Adult Timely Administration of Broad-Spectrum Antibiotics: Quarter One, 2016 through Quarter Four, 2019***

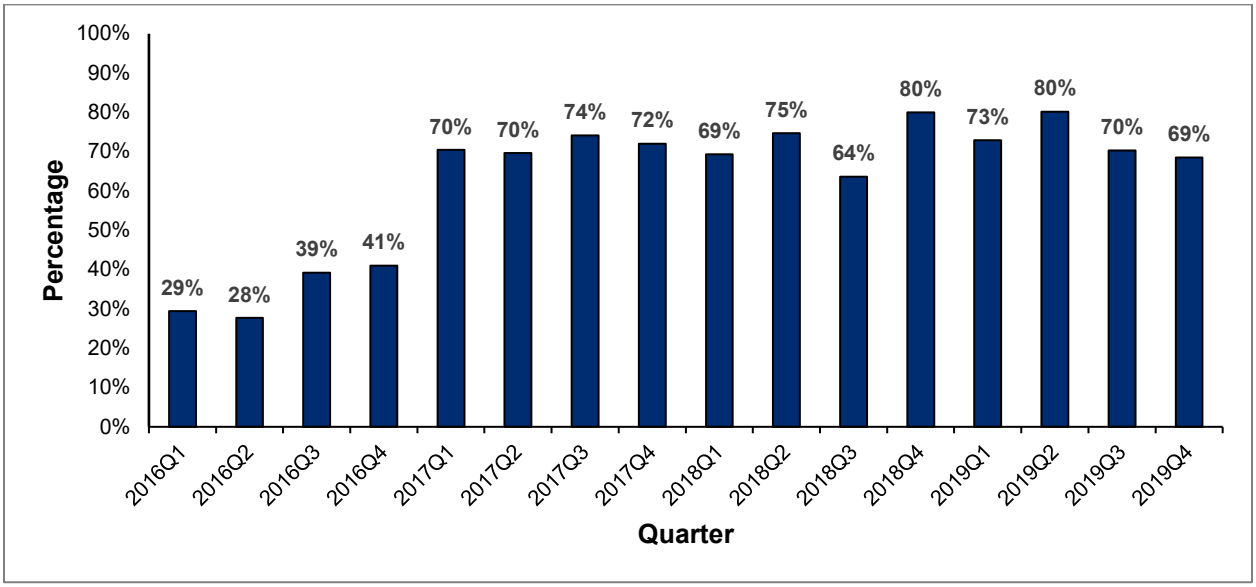
**(*) excludes patients who were excluded from the hospital's protocol or from specific care interventions, who died within three hours, or who were transferred from or to another acute care hospital**



The percentage of pediatric patients with severe sepsis or septic shock that received broad spectrum antibiotics is presented in Figure 7 independently from the bundle results.

**Figure 7. Pediatric Timely Administration of Broad-Spectrum Antibiotics: Quarter One, 2016 through Quarter Four, 2019***

**(*) excludes patients who were excluded from the hospital's protocol or from specific care interventions, who died within one hour, or who were transferred from or to another acute care hospital**




## Outcome Measures: In-Hospital Mortality

To evaluate the impact of the NYS Sepsis Care Improvement Initiative on the outcomes of patients with severe sepsis and septic shock, the percentage of sepsis patients with in-hospital mortality is calculated. Trends in overall mortality from severe sepsis or septic shock are presented in Figures 8 and 9. All patients with severe sepsis or septic shock submitted to the Department are included in the mortality calculation and, beginning in 2017, statewide in-hospital mortality for adults is weighted by total adult case volume within sampling hospitals. Figure 8 shows the percentage of adult patients with severe sepsis or septic shock who died during their hospital stay. The overall mortality continued to decrease in 2019, from 28.1% in Q1 2016 to 23.0% in Q4 2019.

**Figure 8. Adult In-Hospital Mortality: Quarter One, 2016 through Quarter Four, 2019**

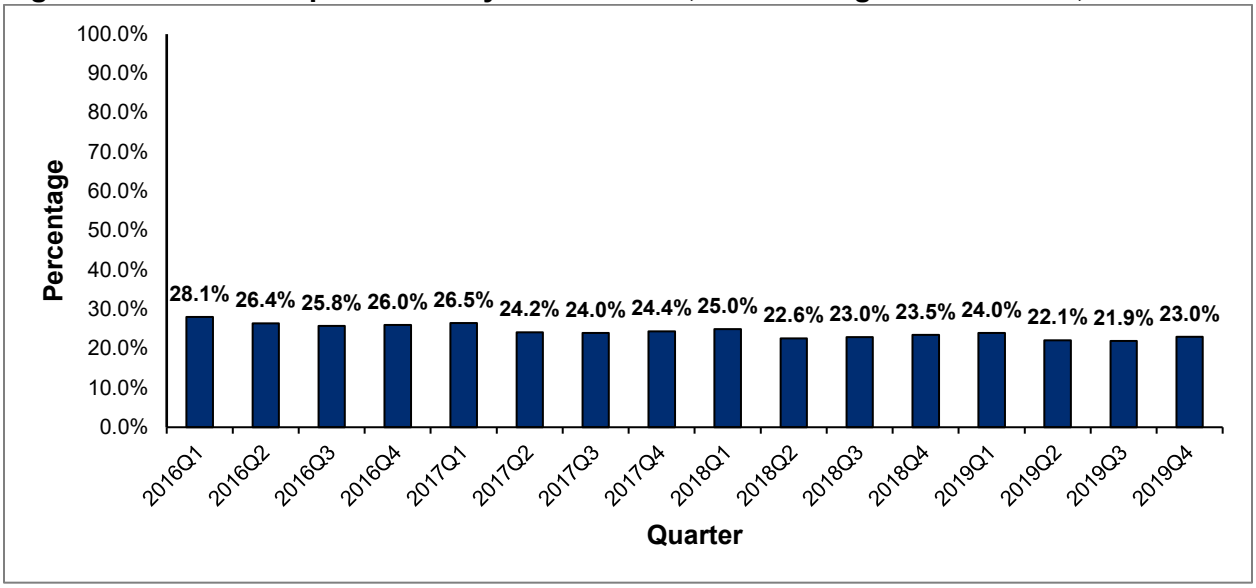
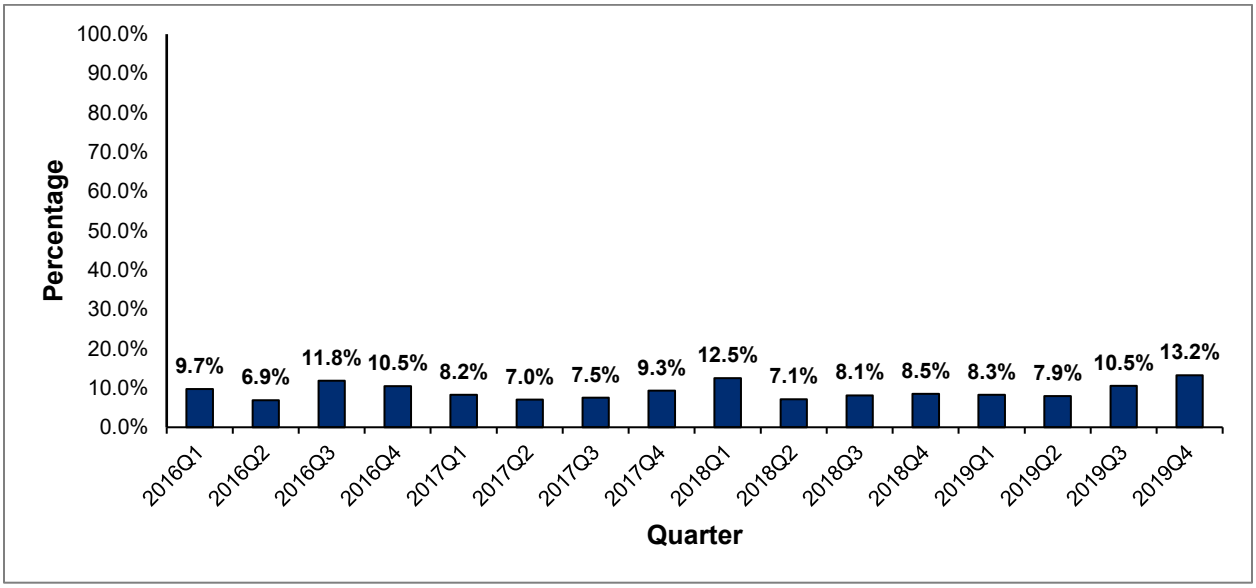



Figure 9 shows the percentage of pediatric patients with severe sepsis or septic shock who died during their hospital stay. The percentages of in-hospital mortality for pediatric patients fluctuated across quarters; ranging from a low of 6.9% reported in Q2 2016 to a high of 13.2% reported in Q4 2019. The fluctuation in percentages is likely influenced by the low volume of pediatric cases in each quarter. The number of pediatric cases per quarter in 2019 ranged from a low of 151 in Q2 2019 to a high of 159 in Q4 2019.

**Figure 9. Pediatric In-Hospital Mortality: Quarter One, 2016 through Quarter Four, 2019**



# Hospital Performance

The hospital-specific measures are described below. Process of care measures that are presented for hospital performance comparison include all patients with severe sepsis or septic shock in the measures, except for those excluded from protocols for clinical contraindications or other valid reasons. For hospital-specific process of care measures, transferred patients are additionally excluded, since they have received care at more than one hospital.

Hospital Specific Measure Descriptions:

- Adult Timely Administration of Broad-Spectrum Antibiotics: The percentage of adult patients with severe sepsis or septic shock who received broad-spectrum antibiotics up to 24 hours before to three (3) hours after severe sepsis or septic shock start time, a critical early intervention, is presented independent of 3-Hour Bundle (Adult) completion.

- 3-Hour Bundle (Adult): The percentage of adult patients with severe sepsis or septic shock who received blood cultures up to 48 hours before to three (3) hours after severe sepsis or septic shock start time; initial lactate level collection up to six (6) hours before to three (3) hours after severe sepsis or septic shock start time; and broad-spectrum antibiotics up to 24 hours before to three (3) hours after severe sepsis or septic shock start time. This measure is not calculated for patients who were excluded from the hospital's protocol or from specific care interventions within three (3) hours of start time, who were transferred from or to another acute care hospital, or who died within three (3) hours of start time.

- 6-Hour Bundle (Adult): The percentage of adult patients with severe sepsis or septic shock who received all the recommended interventions in the 6-Hour Bundle (Adult), including interventions in the 3-Hour Bundle (Adult) within measure timeframes, a repeat lactate level within six (6) hours of severe sepsis or septic shock start time if initial lactate level is elevated, resuscitation with crystalloid fluids up to six (6) hours before to within three (3) hours of septic shock start time or initial hypotension time (whichever is earlier), fluid status assessment within six (6) hours of septic shock start time after fluid resuscitation is present, and vasopressor therapy within six (6) hours of septic shock start time if persistent hypotension after fluid resuscitation is present. This measure is not calculated for patients who were excluded from the hospital's protocol or from specific care interventions within three (3) hours or six (6) hours of start time (depending on measure component timeframe), who were transferred from or to another acute care hospital, or who died within three (3) hours or six (6) hours of start time (depending on measure component timeframe).

- Pediatric Timely Administration of Broad-Spectrum Antibiotics: The percentage of pediatric patients with severe sepsis or septic shock who received broad-spectrum antibiotics up to 24 hours before to one (1) hour after severe sepsis or septic shock start time, a critical early intervention, is presented independent of 1-Hour Bundle (Pediatric) completion.

- 1-Hour Bundle (Pediatric): The percentage of pediatric patients with severe sepsis or septic shock who received blood cultures up to 48 hours before to one (1) hour after severe sepsis or septic shock start time; fluid administration up to six (6) hours before to one (1) hour after severe sepsis or septic shock start time; and broad-spectrum antibiotics up to 24 hours before to one (1) hour after severe sepsis or septic shock start time. This measure is not

calculated for patients who were excluded from the hospital's protocol or from specific care interventions within one (1) hour of start time, who were transferred from or to another acute care hospital, or who died within one (1) hour of start time.

## Performance Data – Adults

Hospital-reported data were used to calculate the hospital-specific performance measures described above. Hospitals with 10 or fewer sepsis cases are not included in hospital comparisons in this report. Table 3 shows how hospitals were categorized and ranked according to performance on the measures. After calculating the performance measures for each hospital, the data for each individual measure were ordered from the lowest percentage to the highest percentage achieved and divided into quintiles. Each hospital was assigned to a "performance level" category based on the quintile into which their percentage fell for a given measure. Those hospitals ranked in quintile 1 are the lowest performers and those hospitals ranked in quintile 5 are the highest performers. Table 3 shows the quintiles, category assignment, and the range of percentages represented in each category for adult timely administration of broad-spectrum antibiotics (Timely Antibiotics), 3-Hour Bundle (Adult) and 6-Hour Bundle (Adult).

**Table 3. Category Assignment for the Adult Sepsis Performance Measures, 2019**

| Quintile | Category (Performance Level) | Summary Table Symbol | Ranking Percentiles | Timely Antibiotics (%) | 3-Hour Bundle (Adult) (%) | 6-Hour Bundle (Adult) (%) |
|---|---|---|---|---|---|---|
| Quintile 5 | Highest | Best | 80th – 100th | 94.11 - 100.0 | 81.31 - 94.50 | 58.71 - 80.30 |
| Quintile 4 | High | | 60th – 80th | 91.41 - 94.10 | 76.31 - 81.30 | 47.81 - 58.70 |
| Quintile 3 | Middle | | 40th – 60th | 88.01 - 91.40 | 71.51 - 76.30 | 40.61 - 47.80 |
| Quintile 2 | Low | | 20th – 40th | 84.61 - 88.00 | 64.21 - 71.50 | 32.21 - 40.60 |
| Quintile 1 | Lowest | Worst | 0th – 20th | 67.10 - 84.60 | 28.80 - 64.20 | 3.10 - 32.20 |

Hospitals' performance on adult timely administration of broad-spectrum antibiotics, 3-Hour Bundle (Adult), and 6-Hour Bundle (Adult) measures are presented in Table 4. The interventions within these measures collectively have been demonstrated to help direct appropriate care. This measure is only reported for those hospitals with greater than 10 adult sepsis cases in 2019.

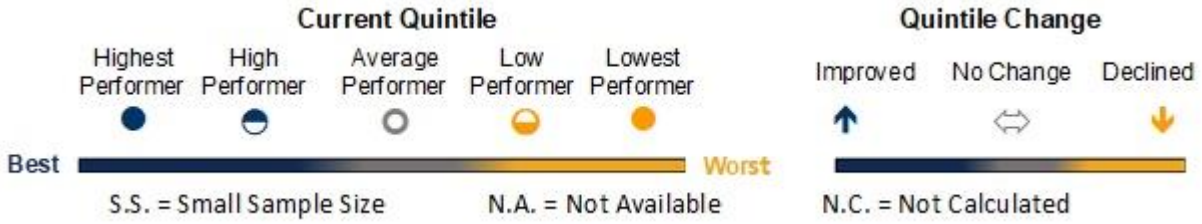
For hospitals that participated in sampling for 2019, the measure result reported here is an estimate drawn from a representative subset of their sepsis population. The 95% confidence intervals associated with these estimates appear in Appendix A. Since actual observed counts of measure numerators and denominators are unknown among sampling hospitals, statewide measure volume is not reported. Cells containing an S.H. indicate hospitals that participated in sampling for 2019.

In addition to the hospital's performance level by quintile, the change in the hospital's performance level between 2018 and 2019 is presented, reflecting whether the hospital's performance category improved, declined, or remained unchanged. The cells that contain an S.S. indicate that the data were suppressed due to low counts (fewer than 10 sepsis cases). The cells that contain an N.C. indicate that the measure was not calculated because the hospital did not have any patients that satisfied the criteria for inclusion in the measure. The cells that contain an N.A. indicate that a measure result was not available for that hospital in at least one of the years compared.

## Table 4. Adult Sepsis Measure Summary Report by Hospital, 2019

| PFI/Facility Name | Timely Administration of Broad Spectrum Antibiotics | | | | 3-Hour Bundle (Adult) | | | | 6-Hour Bundle (Adult) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of Cases (N) | Met Measure (%) | Current Quintile | Quintile Change from CY2018 | Number of Cases (N) | Met Measure (%) | Current Quintile | Quintile Change from CY2018 | Number of Cases (N) | Met Measure (%) | Current Quintile | Quintile Change from CY2018 |
| (0306) Adirondack Medical Center-Lake Placid Site | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |
| (0324) Adirondack Medical Center-Saranac Lake Site | 34 | 97.1 | ● | ↑ | 34 | 85.3 | ● | ↑ | 33 | 24.2 | ● | ⇔ |
| (0001) Albany Medical Center Hospital | S.H. | 67.1 | ● | ⇔ | S.H. | 28.8 | ● | ⇔ | S.H. | 6.3 | ● | ⇔ |
| (0004) Albany Memorial Hospital | 21 | 71.4 | ● | ↓ | 21 | 57.1 | ● | ↓ | 19 | 47.4 | ○ | ↓ |
| (0325) Alice Hyde Medical Center | 38 | 78.9 | ● | ↓ | 38 | 60.5 | ● | ⇔ | 37 | 37.8 | ◒ | ⇔ |
| (0116) Arnot Ogden Medical Center | 344 | 89.5 | ○ | ↑ | 344 | 80.2 | ◓ | ⇔ | 342 | 52.9 | ◓ | ↑ |
| (0085) Auburn Community Hospital | 151 | 85.4 | ◒ | ↓ | 151 | 62.9 | ● | ⇔ | 148 | 40.5 | ◒ | ↓ |
| (0739) Aurelia Osborn Fox Memorial Hospital | 66 | 95.5 | ● | ⇔ | 66 | 80.3 | ◓ | ↓ | 66 | 45.5 | ○ | ⇔ |
| (1438) Bellevue Hospital Center | 279 | 91.4 | ◓ | ⇔ | 279 | 66.7 | ◒ | ↓ | 276 | 43.5 | ○ | ↓ |
| (0280) Bertrand Chaffee Hospital | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. |
| (0708) Bon Secours Community Hospital | 65 | 86.2 | ◒ | ↓ | 65 | 81.5 | ● | ⇔ | 64 | 40.6 | ◒ | ↓ |
| (1178) BronxCare Hospital Center | S.H. | 89.4 | ○ | ↓ | S.H. | 75 | ○ | ↓ | S.H. | 53.7 | ◓ | ↓ |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1286) Brookdale Hospital Medical Center | 361 | 77.6 | ● | ⇔ | 361 | 57.3 | ● | ⇔ | 353 | 15.9 | ● | ⇔ |
| (0885) Long Island Community Hospital | S.H. | 99.1 | ● | ⇔ | S.H. | 84.1 | ● | ↑ | S.H. | 69.2 | ● | ⇔ |
| (1288) Brooklyn Hospital Center - Downtown Campus | 425 | 87.8 | ◒ | ⇔ | 425 | 68.5 | ◒ | ⇔ | 423 | 38.1 | ◒ | ⇔ |
| (0098) Brooks-TLC Hospital System, Inc. | 74 | 89.2 | ○ | ↓ | 74 | 68.9 | ◒ | ↓ | 73 | 49.3 | ◓ | ↓ |
| (0207) Buffalo General Medical Center | S.H. | 73.4 | ● | ⇔ | S.H. | 62.6 | ● | ⇔ | S.H. | 39.1 | ◒ | ⇔ |
| (0815) Canton-Potsdam Hospital | 93 | 92.5 | ◓ | ↓ | 93 | 74.2 | ○ | ↓ | 93 | 49.5 | ◓ | ↑ |
| (0379) Carthage Area Hospital Inc. | 65 | 73.8 | ● | ⇔ | 65 | 49.2 | ● | ⇔ | 65 | 3.1 | ● | ⇔ |
| (0971) Garnet Health Medical Center - Catskills | 153 | 91.5 | ◓ | ⇔ | 153 | 77.1 | ◓ | ↑ | 150 | 42.7 | ○ | ↑ |
| (0968) Garnet Health Medical Center - Catskills - G. Hermann Site | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. |
| (0977) Cayuga Medical Center at Ithaca | 408 | 85.3 | ◒ | ⇔ | 408 | 64.7 | ◒ | ↑ | 403 | 38.5 | ◒ | ⇔ |
| (0135) Champlain Valley Physicians Hospital Medical Center | 229 | 94.8 | ● | ↑ | 229 | 78.2 | ◓ | ⇔ | 225 | 41.3 | ○ | ↑ |
| (0128) Chenango Memorial Hospital Inc. | 35 | 88.6 | ○ | ↑ | 35 | 82.9 | ● | ↑ | 35 | 60 | ● | ⇔ |
| (0798) Claxton-Hepburn Medical Center | 84 | 91.7 | ◓ | ↑ | 84 | 82.1 | ● | ⇔ | 84 | 59.5 | ● | ↑ |
| (0676) Clifton Springs Hospital and Clinic | 45 | 71.1 | ● | ↓ | 45 | 53.3 | ● | ⇔ | 44 | 22.7 | ● | ↓ |



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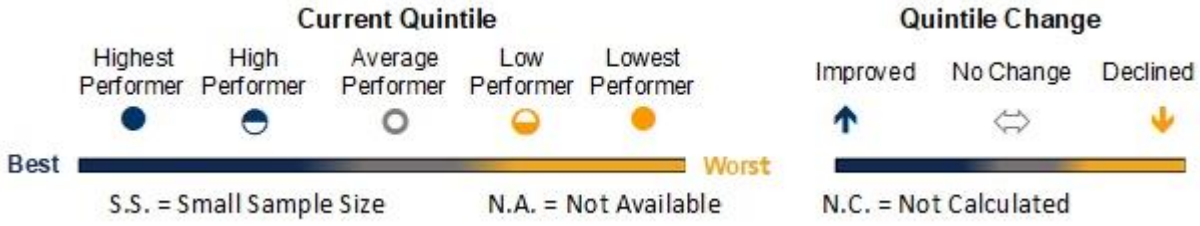
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (0851) Cobleskill Regional Hospital | 35 | 85.7 | ◒ | ⇔ | 35 | 80 | ◓ | N.A. | 35 | 65.7 | ● | N.A. |
| (0146) Columbia Memorial Hospital | 26 | 84.6 | ◒ | ↓ | 26 | 84.6 | ● | ⇔ | 26 | 30.8 | ● | ⇔ |
| (0401) Community Memorial Hospital Inc. | 24 | 91.7 | ◓ | N.A. | 24 | 75 | ○ | N.A. | 24 | 45.8 | ○ | N.A. |
| (1294) Coney Island Hospital | 424 | 86.6 | ◒ | ⇔ | 424 | 62 | ● | ⇔ | 416 | 23.3 | ● | ⇔ |
| (0866) Corning Hospital | 59 | 86.4 | ◒ | ↑ | 59 | 71.2 | ◒ | ⇔ | 59 | 45.8 | ○ | ↑ |
| (0158) Cortland Regional Medical Center Inc. | 215 | 96.3 | ● | ↑ | 215 | 87.4 | ● | ⇔ | 215 | 74 | ● | ⇔ |
| (0636) Crouse Hospital | 229 | 95.2 | ● | ↑ | 229 | 79 | ◓ | ↑ | 226 | 46.5 | ○ | ↑ |
| (0581) Degraff Memorial Hospital | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |
| (0174) Delaware Valley Hospital Inc. | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. |
| (0891) Stony Brook Eastern Long Island Hospital | 41 | 90.2 | ○ | ↓ | 41 | 63.4 | ● | ↓ | 41 | 34.1 | ◒ | ⇔ |
| (0565) Eastern Niagara Hospital - Lockport Division | 18 | 77.8 | ● | ⇔ | 18 | 38.9 | ● | ⇔ | 18 | 11.1 | ● | ⇔ |
| (0303) Elizabethtown Community Hospital | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. |
| (1002) Ellenville Regional Hospital | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |
| (0829) Ellis Hospital | 418 | 80.6 | ● | ⇔ | 418 | 62.4 | ● | ↓ | 413 | 36.1 | ◒ | ↓ |
| (1626) Elmhurst Hospital Center | S.H. | 89.8 | ○ | ↑ | S.H. | 75.6 | ○ | ↑ | S.H. | 29.6 | ● | ↓ |
| (0210) Erie County Medical Center | 194 | 77.3 | ● | ⇔ | 194 | 64.9 | ◒ | ↑ | 193 | 40.9 | ○ | ↑ |
| (0678) F Thompson Hospital | 235 | 86.4 | ◒ | ↑ | 235 | 71.1 | ◒ | ⇔ | 233 | 40.3 | ◒ | ⇔ |



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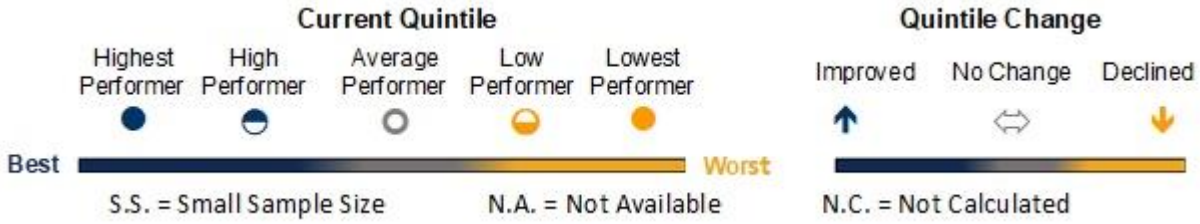
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (0599) Faxton-St. Luke's Healthcare St. Luke's Division | 230 | 91.7 | ◓ | ⇔ | 230 | 73.5 | ○ | ⇔ | 227 | 21.6 | ● | ⇔ |
| (1628) Flushing Hospital Medical Center | 403 | 92.8 | ◓ | ⇔ | 403 | 79.4 | ◓ | ↑ | 398 | 50 | ◓ | ↑ |
| (1638) Long Island Jewish Forest Hills | S.H. | 87 | ◒ | ⇔ | S.H. | 70 | ◒ | ⇔ | S.H. | 35.8 | ◒ | ⇔ |
| (0518) Long Island Jewish Valley Stream | 377 | 89.7 | ○ | ⇔ | 377 | 79.6 | ◓ | ↑ | 377 | 46.9 | ○ | ⇔ |
| (0671) Geneva General Hospital | 89 | 79.8 | ● | ⇔ | 89 | 67.4 | ◒ | ↑ | 88 | 34.1 | ◒ | ↑ |
| (0490) Glen Cove Hospital | 237 | 96.6 | ● | ⇔ | 237 | 94.5 | ● | ⇔ | 236 | 72.9 | ● | ⇔ |
| (1005) Glens Falls Hospital | 376 | 94.4 | ● | ↑ | 376 | 78.2 | ◓ | ↑ | 366 | 54.6 | ◓ | ↑ |
| (0925) Good Samaritan Hospital Medical Center | S.H. | 87.5 | ◒ | ↓ | S.H. | 74.1 | ○ | ↓ | S.H. | 60 | ● | ⇔ |
| (0779) Good Samaritan Hospital of Suffern | 341 | 91.5 | ◓ | ⇔ | 341 | 73.3 | ○ | ↓ | 330 | 27.9 | ● | ↓ |
| (0812) Gouverneur Hospital | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |
| (1445) Harlem Hospital Center | 190 | 90 | ○ | ↑ | 190 | 77.4 | ◓ | ⇔ | 188 | 38.8 | ◒ | ↓ |
| (0990) HealthAlliance Hospital Broadway Campus | 246 | 95.9 | ● | ⇔ | 246 | 82.9 | ● | ⇔ | 242 | 69.4 | ● | ↑ |
| (0989) HealthAlliance Hospital Mary's Avenue Campus | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. |
| (0775) Helen Hayes Hospital | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. |
| (0409) Highland Hospital | S.H. | 91.9 | ◓ | ⇔ | S.H. | 78.3 | ◓ | ⇔ | S.H. | 58.5 | ◓ | ↑ |
| (1447) Hospital for Special Surgery | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |



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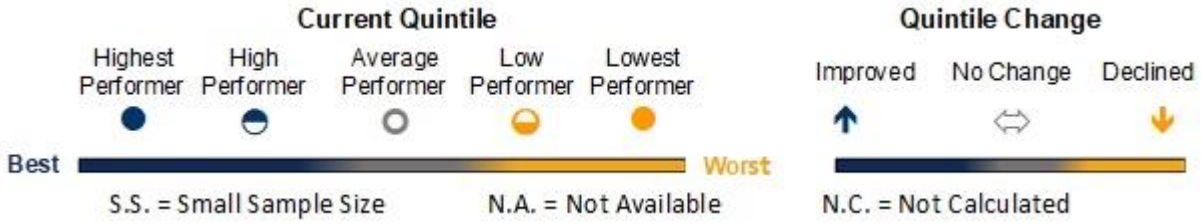
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1039) Hudson Valley Hospital Center | 451 | 95.3 | ● | ↑ | 451 | 88.2 | ● | ↑ | 445 | 74.4 | ● | ⇔ |
| (0913) Huntington Hospital | 512 | 92.4 | ◓ | ⇔ | 512 | 86.1 | ● | ⇔ | 505 | 67.9 | ● | ↑ |
| (1309) Interfaith Medical Center | 90 | 95.6 | ● | ↑ | 90 | 91.1 | ● | ↑ | 85 | 52.9 | ◓ | ⇔ |
| (0873) Ira Davenport Memorial Hospital Inc. | 14 | 92.9 | ◓ | ↑ | 14 | 92.9 | ● | N.A. | 14 | 50 | ◓ | N.A. |
| (1165) Jacobi Medical Center | 342 | 94.4 | ● | ⇔ | 342 | 67.5 | ◒ | ↓ | 337 | 43.6 | ○ | ↓ |
| (1629) Jamaica Hospital Medical Center | 487 | 89.7 | ○ | ↓ | 487 | 67.8 | ◒ | ↓ | 478 | 32.2 | ● | ↓ |
| (0895) John T Mather Memorial Hospital of Port Jefferson New York Inc. | 326 | 94.5 | ● | ↑ | 326 | 85.9 | ● | ↑ | 324 | 69.8 | ● | ↑ |
| (0267) Kenmore Mercy Hospital | 341 | 86.8 | ◒ | ↓ | 341 | 71 | ◒ | ↓ | 336 | 43.2 | ○ | ↓ |
| (1301) Kings County Hospital Center | 463 | 78.8 | ● | ⇔ | 463 | 60.3 | ● | ↓ | 461 | 24.1 | ● | ⇔ |
| (1315) Kingsbrook Jewish Medical Center | 220 | 94.5 | ● | ↑ | 220 | 90 | ● | ↑ | 218 | 80.3 | ● | ↑ |
| (1122) Lawrence Hospital Center | 342 | 87.1 | ◒ | ↓ | 342 | 73.1 | ○ | ⇔ | 338 | 46.2 | ○ | ⇔ |
| (1450) Lenox Hill Hospital | S.H. | 92.2 | ◓ | ↑ | S.H. | 73.6 | ○ | ↑ | S.H. | 45.9 | ○ | ↓ |
| (0383) Lewis County General Hospital | 65 | 80 | ● | ↓ | 65 | 67.7 | ◒ | ↓ | 63 | 58.7 | ◓ | ⇔ |
| (1172) Lincoln Medical & Mental Health Center | 434 | 88.9 | ○ | ↓ | 434 | 56.9 | ● | ↓ | 430 | 14.9 | ● | ⇔ |
| (0362) Little Falls Hospital | 20 | 90 | ○ | ↑ | 20 | 70 | ◒ | ⇔ | 20 | 45 | ○ | ↓ |



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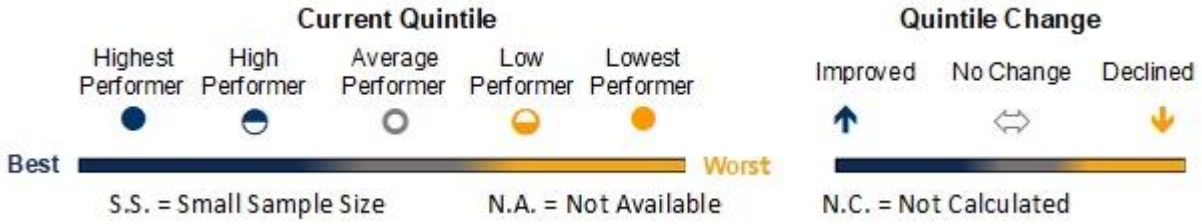
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1630) Long Island Jewish Medical Center | S.H. | 89.5 | ○ | ↑ | S.H. | 73.3 | ○ | ↑ | S.H. | 39.5 | ◒ | ↑ |
| (3376) Long Island Jewish Schneiders Children's Hospital Division | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |
| (1305) Maimonides Medical Center | S.H. | 91.5 | ◓ | ⇔ | S.H. | 74.3 | ○ | ↓ | S.H. | 33.9 | ◒ | ↓ |
| (0170) Margaretville Hospital | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. |
| (0746) Mary Imogene Bassett Hospital | 132 | 90.9 | ○ | ⇔ | 132 | 71.2 | ◒ | ⇔ | 130 | 33.8 | ◒ | ⇔ |
| (0804) Massena Memorial Hospital | 22 | 100 | ● | ⇔ | 22 | 77.3 | ◓ | ↑ | 22 | 31.8 | ● | ↓ |
| (0718) Medina Memorial Health Care System | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |
| (0039) Memorial Hosp of Wm F & Gertrude F Jones A/K/A Jones Memorial Hosp | 117 | 91.5 | ◓ | ↓ | 117 | 75.2 | ○ | ↓ | 113 | 55.8 | ◓ | ↓ |
| (1453) Memorial Hospital for Cancer and Allied Diseases | 552 | 92.6 | ◓ | ⇔ | 552 | 79.3 | ◓ | ↑ | 548 | 50.5 | ◓ | ↑ |
| (0213) Mercy Hospital of Buffalo | S.H. | 85.5 | ◒ | ⇔ | S.H. | 67.8 | ◒ | ↓ | S.H. | 34.2 | ◒ | ↓ |
| (0513) Mercy Hospital | 269 | 97.4 | ● | ⇔ | 269 | 88.1 | ● | ⇔ | 262 | 77.1 | ● | ⇔ |
| (1454) Metropolitan Hospital Center | 103 | 86.4 | ◒ | ⇔ | 103 | 68.9 | ◒ | ↓ | 102 | 47.1 | ○ | ↑ |
| (3067) Millard Fillmore Suburban Hospital | 497 | 80.5 | ● | ⇔ | 497 | 68.2 | ◒ | ↑ | 490 | 35.5 | ◒ | ↑ |
| (3058) Montefiore Med Center - Jack D Weiler Hosp of A Einstein College Div | 1,054 | 73.6 | ● | ⇔ | 1,054 | 38.4 | ● | ⇔ | 1,050 | 11.7 | ● | ⇔ |



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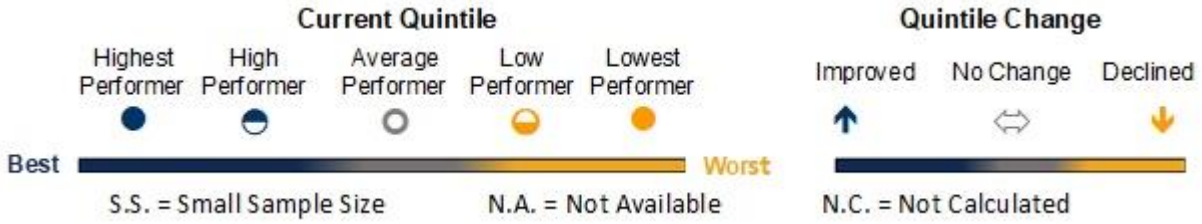
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1169) Montefiore Medical Center - Henry & Lucy Moses Div | 968 | 72.7 | ● | ⇔ | 968 | 35 | ● | ⇔ | 964 | 14.2 | ● | ⇔ |
| (1168) Montefiore Medical Center-Wakefield Hospital | 402 | 75.9 | ● | ⇔ | 402 | 39.1 | ● | ⇔ | 401 | 15 | ● | ⇔ |
| (1061) Montefiore Mount Vernon Hospital | 39 | 82.1 | ● | ⇔ | 39 | 48.7 | ● | ↓ | 38 | 26.3 | ● | ↓ |
| (1072) Montefiore New Rochelle Hospital | 231 | 87.9 | ◒ | ⇔ | 231 | 73.6 | ○ | ↓ | 230 | 51.7 | ◓ | ⇔ |
| (0309) Elizabethtown Community Hospital Moses Ludington | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. |
| (1439) Mount Sinai Beth Israel | S.H. | 92.5 | ◓ | ⇔ | S.H. | 81.6 | ● | ↑ | S.H. | 45.5 | ○ | ↓ |
| (1324) Mount Sinai Beth Israel Brooklyn | 277 | 86.6 | ◒ | ↓ | 277 | 65 | ◒ | ↓ | 260 | 41.5 | ○ | ⇔ |
| (1456) Mount Sinai Hospital | S.H. | 89.3 | ○ | ⇔ | S.H. | 61.4 | ● | ⇔ | S.H. | 28.9 | ● | ↓ |
| (1639) Mount Sinai Hospital - Mount Sinai Hospital of Queens | 367 | 91.6 | ◓ | ⇔ | 367 | 76.8 | ◓ | ↑ | 358 | 47.8 | ○ | ⇔ |
| (1466) Mount Sinai West | S.H. | 90.4 | ○ | ⇔ | S.H. | 71.6 | ○ | ⇔ | S.H. | 37.2 | ◒ | ↓ |
| (1469) Mount Sinai S Morningside | S.H. | 89.8 | ○ | ⇔ | S.H. | 73.7 | ○ | ↑ | S.H. | 44.2 | ○ | ⇔ |
| (0583) Mount St. Mary's Hospital and Health Center | 232 | 91.8 | ◓ | ↑ | 232 | 65.9 | ◒ | ↓ | 231 | 38.5 | ◒ | ↓ |
| (0528) Nassau University Medical Center | 347 | 85 | ◒ | ⇔ | 347 | 71.5 | ◒ | ↑ | 339 | 42.2 | ○ | ↑ |
| (0330) Nathan Littauer Hospital | 176 | 93.2 | ◓ | ↓ | 176 | 73.9 | ○ | ↓ | 173 | 56.1 | ◓ | ⇔ |



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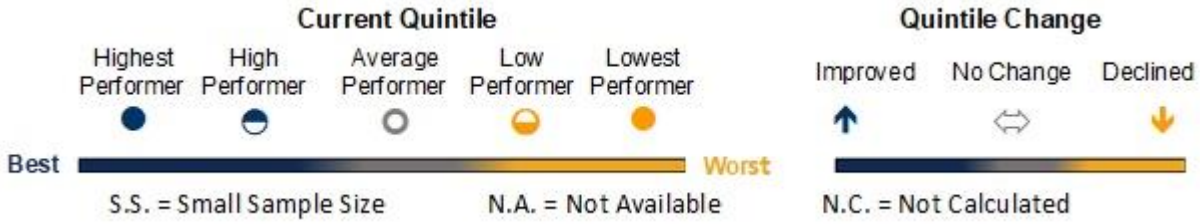
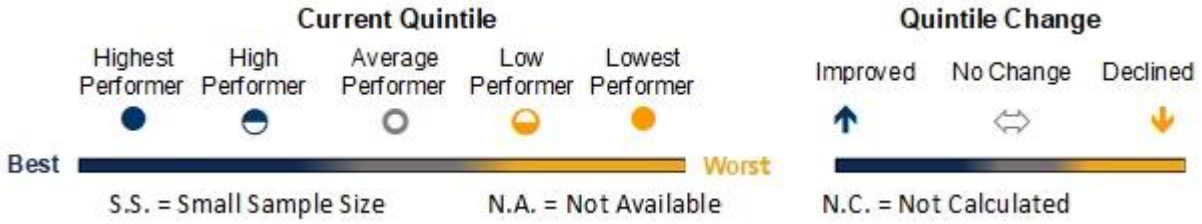
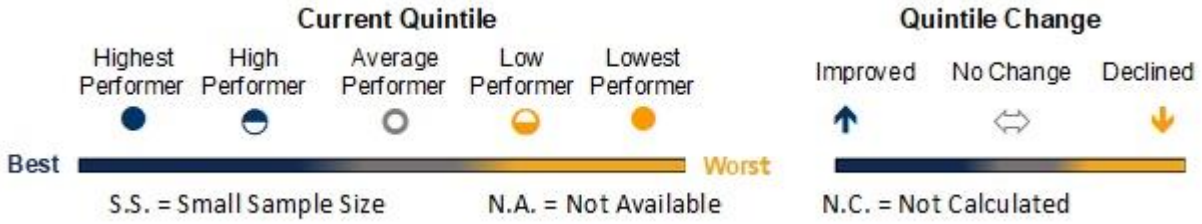
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1293) Maimonides Midwood Community Hospital | 285 | 96.5 | ● | ⇔ | 285 | 80 | ◓ | ↓ | 284 | 64.1 | ● | ⇔ |
| (1637) New York-Presbyterian/Queens | S.H. | 81.1 | ◒ | ⇔ | S.H. | 65.6 | ◒ | ⇔ | S.H. | 48.5 | ◓ | ↑ |
| (1306) New York-Presbyterian Brooklyn Methodist Hospital | 215 | 88.4 | ○ | ↑ | 215 | 74.4 | ○ | ↑ | 203 | 46.3 | ○ | ↑ |
| (3975) New York Presbyterian Hospital - Allen Hospital | 169 | 94.1 | ● | ↑ | 169 | 84 | ● | ⇔ | 154 | 40.3 | ◒ | ⇔ |
| (1464) New York Presbyterian Hospital - Columbia Presbyterian Center | S.H. | 93.4 | ◓ | ↑ | S.H. | 79.5 | ◓ | ↑ | S.H. | 37.7 | ◒ | ⇔ |
| (1458) New York Presbyterian Hospital - New York Weill Cornell Center | S.H. | 93 | ◓ | ↓ | S.H. | 75.5 | ○ | ↓ | S.H. | 46.3 | ○ | ⇔ |
| (1437) New York-Presbyterian/Lower Manhattan Hospital | 167 | 92.8 | ◓ | ↓ | 167 | 79 | ◓ | ⇔ | 161 | 41 | ○ | ↑ |
| (1028) Newark-Wayne Community Hospital | 214 | 82.7 | ● | ⇔ | 214 | 61.7 | ● | ⇔ | 212 | 30.7 | ● | ⇔ |
| (0574) Niagara Falls Memorial Medical Center | 90 | 86.7 | ◒ | ↓ | 90 | 76.7 | ◓ | ↓ | 88 | 54.5 | ◓ | ↓ |
| (0393) Nicholas H Noyes Memorial Hospital | 98 | 90.8 | ○ | ↑ | 98 | 63.3 | ● | ⇔ | 97 | 44.3 | ○ | ⇔ |
| (1186) North Central Bronx Hospital | 72 | 95.8 | ● | ⇔ | 72 | 83.3 | ● | ↑ | 71 | 52.1 | ◓ | ⇔ |
| (0541) North Shore University Hospital | S.H. | 90.4 | ○ | ↑ | S.H. | 71.7 | ○ | ↑ | S.H. | 38.6 | ◒ | ↑ |
| (0192) Northern Duchess Hospital | 51 | 82.4 | ● | ↓ | 51 | 72.5 | ○ | ⇔ | 48 | 64.6 | ● | ↑ |



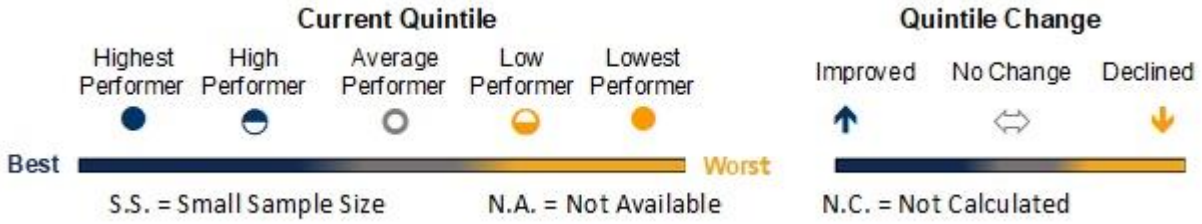
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1117) Northern Westchester Hospital | 391 | 93.6 | ◓ | ↓ | 391 | 88 | ● | ↑ | 387 | 71.6 | ● | ⇔ |
| (0776) Montefiore Nyack Hospital | 361 | 89.5 | ○ | ⇔ | 361 | 78.9 | ◓ | ⇔ | 354 | 53.7 | ◓ | ⇔ |
| (1446) NYU Langone Orthopedic Hospital | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |
| (1463) NYU Langone Hospitals | S.H. | 98.9 | ● | ⇔ | S.H. | 88.9 | ● | ⇔ | S.H. | 77.1 | ● | ⇔ |
| (1304) NYU Langone Brooklyn | 410 | 98.8 | ● | ⇔ | 410 | 92 | ● | ⇔ | 405 | 76.5 | ● | ⇔ |
| (0165) O'Connor Hospital | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |
| (0066) Olean General Hospital | 408 | 77.7 | ● | ⇔ | 408 | 58.1 | ● | ⇔ | 402 | 30.3 | ● | ⇔ |
| (0397) Oneida Health Hospital | 117 | 94 | ◓ | ↑ | 117 | 81.2 | ◓ | ↑ | 116 | 59.5 | ● | ⇔ |
| (0699) Garnet Health Medical Center | S.H. | 85.9 | ◒ | ⇔ | S.H. | 76.8 | ◓ | ↑ | S.H. | 36.9 | ◒ | ↓ |
| (0727) Oswego Hospital | 241 | 86.3 | ◒ | ⇔ | 241 | 68.5 | ◒ | ↓ | 238 | 57.1 | ◓ | ↓ |
| (0043) Our Lady of Lourdes Memorial Hospital Inc. | 139 | 94.2 | ● | ⇔ | 139 | 74.8 | ○ | ⇔ | 136 | 44.1 | ○ | ↑ |
| (0938) Peconic Bay Medical Center | 187 | 86.6 | ◒ | ↑ | 187 | 71.1 | ◒ | ↑ | 181 | 34.3 | ◒ | ↑ |
| (1129) Phelps Hospital | 239 | 94.1 | ● | ⇔ | 239 | 82 | ● | ↑ | 237 | 65 | ● | ⇔ |
| (0552) Plainview Hospital | 230 | 97.8 | ● | ↑ | 230 | 81.3 | ◓ | ↑ | 228 | 46.5 | ○ | ⇔ |
| (0752) Putnam Hospital Center | 251 | 96 | ● | ⇔ | 251 | 86.5 | ● | ⇔ | 249 | 71.1 | ● | ⇔ |
| (1633) Queens Hospital Center | S.H. | 90.5 | ○ | ⇔ | S.H. | 79 | ◓ | ⇔ | S.H. | 39.1 | ◒ | ⇔ |
| (1738) Richmond University Medical Center | 401 | 90.8 | ○ | ⇔ | 401 | 58.9 | ● | ⇔ | 398 | 22.4 | ● | ⇔ |
| (0377) River Hospital, Inc. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |



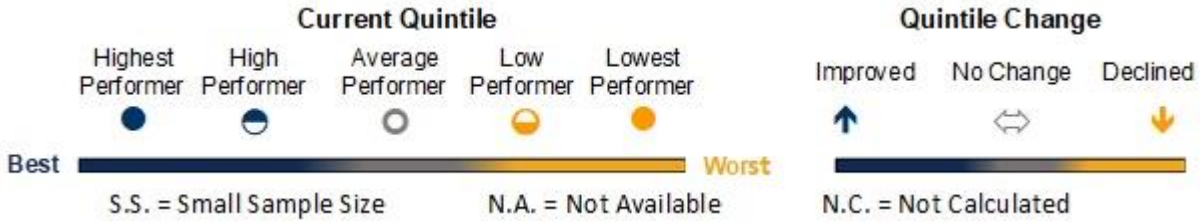
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (0411) Rochester General Hospital | S.H. | 77.4 | ● | ⇔ | S.H. | 55.7 | ● | ⇔ | S.H. | 25.1 | ● | ⇔ |
| (0589) Rome Memorial Hospital, Inc. | 183 | 89.6 | ○ | ⇔ | 183 | 82 | ● | ⇔ | 183 | 60.1 | ● | ↑ |
| (0216) Roswell Park Cancer Institute | 43 | 79.1 | ● | ⇔ | 43 | 39.5 | ● | ⇔ | 42 | 4.8 | ● | ⇔ |
| (0756) Samaritan Hospital | 275 | 92.4 | ◓ | ↓ | 275 | 73.5 | ○ | ↓ | 271 | 57.2 | ◓ | ↓ |
| (0367) Samaritan Medical Center | 185 | 89.7 | ○ | ↑ | 185 | 71.4 | ◒ | ↓ | 176 | 40.3 | ◒ | ↓ |
| (0818) Saratoga Hospital | 486 | 92.8 | ◓ | ⇔ | 486 | 84 | ● | ↑ | 477 | 67.5 | ● | ⇔ |
| (1176) SBH Health System | 284 | 80.6 | ● | ⇔ | 284 | 54.6 | ● | ⇔ | 280 | 15 | ● | ⇔ |
| (0858) Schuyler Hospital | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |
| (0218) Sisters of Charity Hospital | 124 | 88.7 | ○ | ⇔ | 124 | 60.5 | ● | ↓ | 121 | 28.9 | ● | ↓ |
| (0292) Sisters of Charity Hospital - St. Joseph Campus | 47 | 87.2 | ◒ | ↓ | 47 | 74.5 | ○ | ⇔ | 45 | 40 | ◒ | ⇔ |
| (1097) SJRH - Andrus Pavilion | 156 | 84 | ● | ↓ | 156 | 65.4 | ◒ | ⇔ | 155 | 33.5 | ◒ | ⇔ |
| (1124) SJRH - Dobbs Ferry Pavilion | 16 | 100 | ● | N.A. | 16 | 56.3 | ● | N.A. | 16 | 37.5 | ◒ | N.A. |
| (1158) Soldiers and Sailors Memorial Hospital of Yates County Inc. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |
| (0527) South Nassau Communities Hospital | S.H. | 87.6 | ◒ | ⇔ | S.H. | 74.7 | ○ | ↓ | S.H. | 47.7 | ○ | ↓ |
| (0889) Stony Brook Southampton Hospital | 123 | 90.2 | ○ | ↑ | 123 | 80.5 | ◓ | ⇔ | 123 | 42.3 | ○ | ↓ |
| (0924) South Shore University Hospital | 354 | 89.3 | ○ | ⇔ | 354 | 70.1 | ◒ | ↓ | 347 | 50.1 | ◓ | ↑ |
| (0704) St. Anthony Community Hospital | 36 | 94.4 | ● | ⇔ | 36 | 88.9 | ● | ⇔ | 36 | 44.4 | ○ | ↓ |



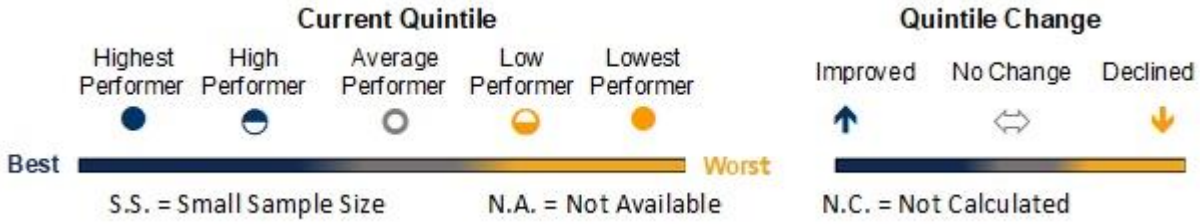
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (0943) St. Catherine of Siena Hospital | S.H. | 96.4 | ● | ⇔ | S.H. | 90.8 | ● | ⇔ | S.H. | 77.6 | ● | ⇔ |
| (0896) St. Charles Hospital | 307 | 94.8 | ● | ↑ | 307 | 79.2 | ◓ | ↓ | 303 | 62 | ● | ⇔ |
| (0598) St. Elizabeth Medical Center | 204 | 79.9 | ◒ | ↓ | 204 | 55.9 | ◒ | ↓ | 202 | 16.3 | ◒ | ⇔ |
| (0563) St. Francis Hospital & Heart Center | S.H. | 88 | ○ | ⇔ | S.H. | 73.6 | ○ | ↓ | S.H. | 50 | ◓ | ⇔ |
| (0180) Mid-Hudson Valley Division of Westchester Medical Center | 126 | 92.1 | ◓ | ↓ | 126 | 79.4 | ◓ | ↓ | 126 | 71.4 | ● | ⇔ |
| (0870) St. James Hospital | 44 | 97.7 | ● | ↑ | 44 | 77.3 | ◓ | ↓ | 43 | 53.5 | ◓ | ↑ |
| (1635) St. John's Episcopal Hospital So Shore | 322 | 86.3 | ◒ | ⇔ | 322 | 68.6 | ◒ | ↑ | 313 | 27.8 | ◒ | ⇔ |
| (0118) St. Joseph's Hospital | .N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. |
| (0630) St. Joseph's Hospital Health Center | S.H. | 84.6 | ◒ | ⇔ | S.H. | 68.5 | ◒ | ⇔ | S.H. | 43.1 | ○ | ↑ |
| (1098) St. Joseph's Medical Center | 76 | 90.8 | ○ | ↓ | 76 | 76.3 | ○ | ↓ | 72 | 59.7 | ● | ⇔ |
| (0694) St. Luke's Cornwall Hospital/Newburgh | 175 | 91.4 | ◓ | ↓ | 175 | 84.6 | ● | ⇔ | 171 | 66.1 | ● | ⇔ |
| (0005) St. Peter's Hospital | S.H. | 86.2 | ◒ | ↓ | S.H. | 65.6 | ◒ | ⇔ | S.H. | 47.5 | ○ | ⇔ |
| (0551) St. Joseph Hospital | 412 | 93.4 | ◓ | ↓ | 412 | 81.3 | ◓ | ↓ | 403 | 48.4 | ◓ | ↓ |
| (0484) St. Mary's Healthcare | 99 | 82.8 | ◒ | ↓ | 99 | 76.8 | ◓ | ↑ | 99 | 40.4 | ◒ | ⇔ |
| (0755) Samaritan Hospital - St. Mary's Campus | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. |
| (1740) Staten Island University Hosp-North | S.H. | 84 | ◒ | ⇔ | S.H. | 60.5 | ◒ | ⇔ | S.H. | 30.5 | ◒ | ⇔ |



| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1737) Staten Island University Hospital Prince's Bay | 169 | 85.2 | ◒ | ↓ | 169 | 52.7 | ● | ⇔ | 168 | 30.4 | ● | ⇔ |
| (0413) Strong Memorial Hospital | S.H. | 86.5 | ◒ | ↓ | S.H. | 71.1 | ◒ | ↓ | S.H. | 49.4 | ◓ | ↑ |
| (0550) Syosset Hospital | 116 | 99.1 | ● | ↑ | 116 | 89.7 | ● | ↑ | 113 | 54 | ◓ | ↑ |
| (0471) The Unity Hospital of Rochester | 666 | 82.6 | ● | ⇔ | 666 | 60.8 | ● | ↓ | 659 | 25.5 | ● | ⇔ |
| (8554) A.O. Fox Memorial Hospital - Tri-Town Campus | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. | N.C. | N.C. | N.C. | N.A. |
| (0042) United Health Services Hospitals Inc. - Binghamton General Hospital | 85 | 87.1 | ◒ | ↑ | 85 | 72.9 | ○ | ↑ | 82 | 58.5 | ◓ | ⇔ |
| (0058) United Health Services Hospitals Inc. - Wilson Medical Center | 722 | 87.7 | ◒ | ↓ | 722 | 78.8 | ◓ | ⇔ | 709 | 54.9 | ◓ | ⇔ |
| (0339) United Memorial Medical Center North Street Campus | 245 | 89.8 | ○ | ↓ | 245 | 71.8 | ○ | ↓ | 245 | 60.4 | ● | ↑ |
| (0245) Stony Brook University Hospital | S.H. | 88.6 | ○ | ⇔ | S.H. | 72.9 | ○ | ⇔ | S.H. | 48.5 | ◓ | ⇔ |
| (1320) University Hospital of Brooklyn | 187 | 94.1 | ● | ↑ | 187 | 75.4 | ○ | ↑ | 186 | 47.8 | ○ | ⇔ |
| (0635) University Hospital SUNY Health Science Center | 530 | 87.9 | ◒ | ⇔ | 530 | 64.2 | ● | ⇔ | 518 | 36.9 | ◒ | ⇔ |
| (0628) Upstate University Hospital at Community General | 159 | 86.2 | ◒ | ⇔ | 159 | 67.9 | ◒ | ⇔ | 158 | 38 | ◒ | ↓ |
| (0181) Vassar Brothers Medical Center | S.H. | 92.3 | ◓ | ↑ | S.H. | 76.1 | ○ | ↓ | S.H. | 58.9 | ● | ⇔ |



| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1139) Westchester Medical Center | 206 | 93.2 | ◓ | ↑ | 206 | 79.1 | ◓ | ↑ | 206 | 58.3 | ◓ | ⇔ |
| (0111) Westfield Memorial Hospital Inc. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |
| (1045) White Plains Hospital Center | 414 | 92.3 | ◓ | ↑ | 414 | 78.5 | ◓ | ↑ | 410 | 51 | ◓ | ↑ |
| (0511) NYU Langone Hospital-Long Island | S.H. | 96.1 | ● | ↑ | S.H. | 87.2 | ● | ⇔ | S.H. | 73.9 | ● | ⇔ |
| (0103) UPMC Chautauqua at WCA | 187 | 80.2 | ● | ⇔ | 187 | 64.2 | ● | ⇔ | 186 | 30.6 | ● | ⇔ |
| (0208) John R. Oishei Children's Hospital | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. | S.S. | S.S. | S.S. | N.A. |
| (1692) Woodhull Medical & Mental Health Center | 283 | 93.6 | ◓ | ⇔ | 283 | 79.9 | ◓ | ↑ | 280 | 52.5 | ◓ | ⇔ |
| (1318) Wyckoff Heights Medical Center | 212 | 92.5 | ◓ | ⇔ | 212 | 76.4 | ◓ | ↓ | 206 | 59.7 | ● | ↑ |
| (1153) Wyoming County Community Hospital | 20 | 80 | ● | ↓ | 20 | 75 | ○ | ↑ | 20 | 40 | ◒ | ↓ |
| **Statewide** | | **87.8** | | | | **70.9** | | | | **44.3** | | |



## Performance Data – Pediatrics

Table 5 shows the quintiles, category assignment, and the percentages assigned to each category for the two pediatric measures – timely administration of broad-spectrum antibiotics (Timely Antibiotics) and the 1-Hour Bundle (Pediatric).

**Table 5. Category Assignment for the Pediatric Sepsis Performance Measures**

| Quintile | Category (Performance Level ) | Summary Table Symbol | Percentiles Included | Timely Antibiotics (%) | 1-Hour Bundle (Pediatric) (%) |
|---|---|---|---|---|---|
| Quintile 5 | Highest | ● Best | 80th – 100th | 87.51 - 95.50 | 64.91 - 95.50 |
| Quintile 4 | High | ◓ | 60th – 80th | 84.21 - 87.50 | 47.11 - 64.90 |
| Quintile 3 | Middle | ○ | 40th – 60th | 75.71 - 84.20 | 40.91 - 47.10 |
| Quintile 2 | Low | ◒ | 20th – 40th | 57.91 - 75.70 | 27.31 - 40.90 |
| Quintile 1 | Lowest | ● Worst | 0th – 20th | 0.00 - 57.90 | 0.00 - 27.30 |

Table 6 shows the percentage of pediatric patients with severe sepsis or septic shock who received all interventions in the 1-Hour Bundle (Pediatric) and who received timely administration of broad-spectrum antibiotics, regardless of other interventions received. For pediatric patients, these timely interventions include blood cultures, antibiotics, and the administration of 20 cc/kg of crystalloid fluid. Pediatric patients who died within one hour of start time, who were excluded from the hospital's protocol or from specific care interventions, or who were transferred from or to another acute care hospital are excluded from both the bundle and antibiotic administration measure. Only hospitals with greater than 10 cases reported in at least one of the measure denominators are reported here.

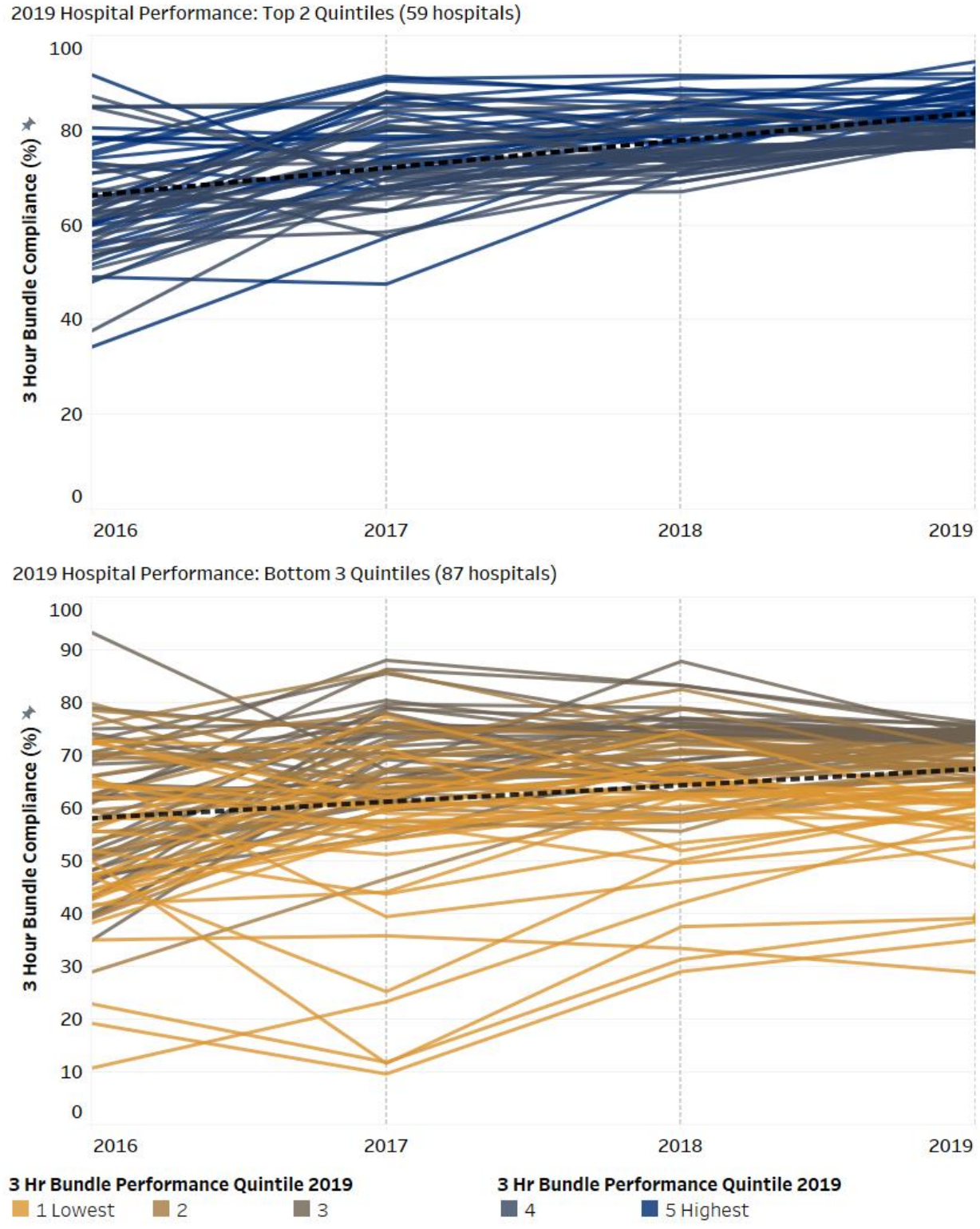
## Table 6. Pediatric Sepsis Measure Summary Report by Hospital, 2019

| PFI/Facility Name | Timely Administration of Broad Spectrum Antibiotics | | | | 1-Hour Bundle (Pediatric) | | | |
|---|---|---|---|---|---|---|---|---|
| | Number of Cases (N) | Met Measure (%) | Current Quintile | Quintile Change from CY2018 | Number of Cases (N) | Met Measure (%) | Current Quintile | Quintile Change from CY2018 |
| (0001) Albany Medical Center Hospital | 19 | 57.9 | ◒ | ↓ | 19 | 31.6 | ◒ | ↑ |
| (1288) Brooklyn Hospital Center - Downtown Campus | 11 | 90.9 | ● | N.A. | 11 | 27.3 | ● | N.A. |
| (0379) Carthage Area Hospital Inc | 12 | 0 | ● | ↓ | 12 | 0 | ● | N.A. |
| (1301) Kings County Hospital Center | 19 | 84.2 | ◓ | ↑ | 19 | 31.6 | ◒ | ⇔ |
| (3376) Long Island Jewish Schneiders Children's Hospital Division | 31 | 48.4 | ● | ⇔ | 31 | 12.9 | ● | ↓ |
| (1305) Maimonides Medical Center | 37 | 83.8 | ○ | ↑ | 37 | 56.8 | ◓ | ↑ |
| (1453) Memorial Hospital for Cancer and Allied Diseases | 22 | 72.7 | ◒ | ↓ | 22 | 40.9 | ◒ | ⇔ |
| (1169) Montefiore Medical Center - Henry & Lucy Moses Div | 20 | 20 | ● | ⇔ | 20 | 5 | ● | ⇔ |
| (1456) Mount Sinai Hospital | 12 | 75 | ◒ | ↓ | 12 | 41.7 | ○ | N.A. |
| (1464) New York Presbyterian Hospital - Columbia Presbyterian Center | 40 | 95 | ● | ⇔ | 40 | 70 | ● | ↑ |
| (1463) NYU Langone Hospitals | 22 | 95.5 | ● | N.A. | 22 | 95.5 | ● | N.A. |
| (0413) Strong Memorial Hospital | 37 | 75.7 | ○ | ⇔ | 37 | 64.9 | ◓ | ⇔ |
| (0245) Stony Brook University Hospital | 16 | 87.5 | ● | ↑ | 16 | 62.5 | ◓ | ↓ |
| (0635) University Hospital SUNY Health Science Center | 19 | 84.2 | ◓ | ↑ | 19 | 42.1 | ○ | N.A. |
| (0511) NYU Langone Hospital-Long Island | 15 | 86.7 | ◓ | ↓ | 15 | 66.7 | ● | ⇔ |
| (0208) John R. Oishei Children's Hospital | 51 | 76.5 | ○ | ↓ | 51 | 47.1 | ○ | ↑ |
| **Statewide** | | **73.1** | | | | **46.5** | | |

## Hospital Performance Over Time

Data from the years 2016 to 2019 allows us to look at hospital performance over time. Figure 10 is a depiction of hospital performance data from 2016 to 2019, charting hospitals' 3-Hour Bundle (Adult) performance, measured as the percentage of adult patients who received all the recommended interventions in the 3-Hour Bundle (Adult). Each line represents one hospital, and the color of the line represents its 3-Hour Bundle (Adult) performance quintile in 2019. Hospitals in the top two quintiles are shown in the top half of the figure while hospitals in the bottom three quintiles are shown in the bottom half of the figure. In general, hospitals have improved their three-hour bundle performance across time, and the rate of increase was greater among hospitals in the top two quintiles compared to the bottom three quintiles.

**Figure 10. Percent of Adult Patients Receiving 3-Hour Bundle (Adult) by Hospital, 2016-19[1]**




[1]Each line represents one hospital; 146 hospitals included.

Table 7 summarizes how NYS hospitals' performance changed from 2018 to 2019 among the in-hospital adult and pediatric sepsis care quality measures: 3-Hour Bundle (Adult), 6-Hour Bundle (Adult), and 1-Hour Bundle (Pediatric). Facilities in the 'Higher Measure Result' category had a higher absolute measure result in 2019 relative to 2018, while facilities in the 'Lower Measure Result' category had a lower absolute measure result in 2019. Only facilities with a calculated measure result in both 2018 and 2019 are included in this table. Table 7 demonstrates that while many facilities did not change in relative measure performance as measured by quintiles in Tables 4 and 6, virtually no facilities maintain the same absolute measure of performance from 2018 to 2019. However, these results should be interpreted with caution, as measure results are sensitive to specification changes. More information on hospital measure performance over time can be found in Appendix D.

**Table 7. Facility Changes in Sepsis Process Measures from 2018 to 2019**

| Measure Change | 3-Hour Bundle (Adult) | | 6-Hour Bundle (Adult) | | 1-Hour Bundle (Pediatric) | |
|---|---|---|---|---|---|---|
| | Hospitals (N) | Hospitals (%) | Hospitals (N) | Hospitals (%) | Hospitals (N) | Hospitals (%) |
| Higher Measure Result | 95 | 59.7% | 101 | 63.5% | 6 | 54.5% |
| Same Measure Result | 1 | 0.6% | 1 | 0.6% | 0 | 0.0% |
| Lower Measure Result | 63 | 39.6% | 57 | 35.8% | 5 | 45.5% |
| Total | 159 | 100.0% | 159 | 100.0% | 11 | 100.0% |

# Risk-Adjusted Mortality

Hospital performance on management of sepsis is a key factor that directly relates to patient outcomes. The use of sepsis protocols and measures of protocol adherence are important to patients because of their impact on improvement in the probability of survival. It is difficult, however, to compare outcomes among hospitals when assessing performance, because different hospitals treat different types of patients. Hospitals with sicker patients may have higher rates of mortality than other hospitals.

In order to more fairly compare hospitals on the critical outcome of survival, risk adjustment was used to account for differences in the characteristics of the hospitals' populations of sepsis patients, since patient characteristics can impact the risk of dying from sepsis. Risk adjustment takes into account accompanying chronic illnesses that can complicate treatment and outcomes for patients with sepsis, patient demographic factors such as age, and the severity of sepsis for each patient. It should be noted that there may be risk factors, such as some medical comorbidities and social determinants of health, that were not accounted for in this risk adjustment model but may have impacted the risk-adjusted rates. The RAMR represents the best estimate, after accounting for available factors, of what the hospital's mortality rate would have been if the hospital had a mix of patients identical to the statewide mix. Risk-adjusted mortality describes the risk-adjusted percentage of all patients with sepsis at each hospital who expired. For 2019, our mortality outcome includes all patients who died within 30 days following the presentation of severe sepsis and septic shock. More detail regarding the adult risk adjustment methodology can be found in Technical Appendix B.

Adult risk-adjusted sepsis mortality rates for each hospital are presented in Table 8. All adult patients with severe sepsis or septic shock submitted to the Department are included in the risk-adjusted mortality measure, except for those who were transfer patients, those who were admitted from hospice, those who had advance directives that restricted the use of protocol interventions, or those who refused any of the protocol interventions. Hospitals with significantly lower observed mortality rates than expected based on their patient population's characteristics are identified as high performers, while hospitals with significantly higher observed mortality rates than expected are identified as low performers. Hospitals with mortality rates that are not significantly different than expected based on their patient population's characteristics are identified as average performers.

Hospitals' change in RAMR performance status relative to the previous year is presented in Table 8 as well. This change does not necessarily indicate an increase or decrease in RAMR, but rather represents hospital movement between the high, average, and low performance statuses across years and should be interpreted with caution given the differences in RAMR methodology between the two years.

**Table 8. Adult Sepsis Risk Adjusted Mortality Rate (RAMR) Summary Report by Hospital, 2019**

| PFI/Facility Name | Number of Cases (N) | Number of Outcomes (N) | RAMR | Performance | Performance Change from CY2018 |
|---|---|---|---|---|---|
| (0306) Adirondack Medical Center-Lake Placid Site | S.S. | S.S. | S.S. | S.S. | N.A. |
| (0324) Adirondack Medical Center-Saranac Lake Site | 32 | 13 | 29.21 | ◇ | ⇔ |
| (0001) Albany Medical Center Hospital | 220 | 86 | 30.82 | ◆ | ↓ |
| (0004) Albany Memorial Hospital | 21 | 2 | 25.38 | ◇ | ⇔ |
| (0325) Alice Hyde Medical Center | 36 | 9 | 31.35 | ◇ | ⇔ |
| (0116) Arnot Ogden Medical Center | 305 | 66 | 25.78 | ◇ | ⇔ |
| (0085) Auburn Community Hospital | 122 | 30 | 23.90 | ◇ | ⇔ |
| (0739) Aurelia Osborn Fox Memorial Hospital | 53 | 5 | 20.94 | ◆ | ↑ |
| (1438) Bellevue Hospital Center | 212 | 39 | 24.75 | ◇ | ⇔ |
| (0708) Bon Secours Community Hospital | 34 | 6 | 24.66 | ◇ | ⇔ |
| (1178) BronxCare Health Systems | 282 | 69 | 27.93 | ◇ | ⇔ |
| (1286) Brookdale Hospital Medical Center | 333 | 170 | 43.93 | ◆ | ↓ |
| (0885) Long Island Community Hospital | 336 | 89 | 24.57 | ◇ | ↓ |
| (1288) Brooklyn Hospital Center - Downtown Campus | 345 | 81 | 24.50 | ◇ | ⇔ |
| (0098) Brooks-TLC Hospital System, Inc. | 63 | 6 | 20.11 | ◆ | ↑ |
| (0207) Buffalo General Medical Center | 287 | 116 | 33.82 | ◆ | ⇔ |

| PFI/Facility Name | Number of Cases (N) | Number of Outcomes (N) | RAMR | Performance | Performance Change from CY2018 |
|---|---|---|---|---|---|
| (0815) Canton-Potsdam Hospital | 86 | 12 | 22.91 | ◇ | ⇔ |
| (0379) Carthage Area Hospital Inc. | 52 | 6 | 23.09 | ◇ | ↓ |
| (0971) Catskill Regional Medical Center | 131 | 37 | 28.30 | ◇ | ⇔ |
| (0977) Cayuga Medical Center at Ithaca | 331 | 69 | 27.68 | ◇ | ↓ |
| (0135) Champlain Valley Physicians Hospital Medical Center | 178 | 51 | 23.87 | ◇ | ⇔ |
| (0128) Chenango Memorial Hospital Inc. | 34 | 4 | 23.56 | ◇ | ⇔ |
| (0798) Claxton-Hepburn Medical Center | 72 | 14 | 26.04 | ◇ | ↓ |
| (0676) Clifton Springs Hospital and Clinic | 42 | 10 | 30.07 | ◇ | ⇔ |
| (0146) Columbia Memorial Hospital | 22 | 14 | 39.10 | ◆ | ⇔ |
| (0401) Community Memorial Hospital Inc. | 23 | 0 | 21.73 | ◆ | N.A. |
| (1294) Coney Island Hospital | 268 | 102 | 25.88 | ◇ | ↓ |
| (0866) Corning Hospital | 50 | 14 | 29.33 | ◇ | ↑ |
| (0158) Cortland Regional Medical Center Inc | 177 | 18 | 19.25 | ◆ | ⇔ |
| (0636) Crouse Hospital | 222 | 57 | 24.53 | ◇ | ⇔ |
| (0581) Degraff Memorial Hospital | S.S. | S.S. | S.S. | S.S. | N.A. |
| (0891) Eastern Long Island Hospital | 33 | 14 | 31.05 | ◇ | ⇔ |
| (0565) Eastern Niagara Hospital - Lockport Division | 19 | 11 | 29.40 | ◇ | ↑ |

| PFI/Facility Name | Number of Cases (N) | Number of Outcomes (N) | RAMR | Performance | Performance Change from CY2018 |
|---|---|---|---|---|---|
| (1002) Ellenville Regional Hospital | S.S. | S.S. | S.S. | S.S. | N.A. |
| (0829) Ellis Hospital | 396 | 126 | 26.94 | ◇ | ⇔ |
| (1626) Elmhurst Hospital Center | 287 | 75 | 26.79 | ◇ | ↓ |
| (0210) Erie County Medical Center | 151 | 40 | 24.72 | ◇ | ⇔ |
| (0678) F F Thompson Hospital | 207 | 54 | 28.05 | ◇ | ↓ |
| (0599) Faxton-St. Luke's Healthcare St. Luke's Division | 211 | 78 | 26.61 | ◇ | ⇔ |
| (1628) Flushing Hospital Medical Center | 353 | 167 | 33.46 | ◆ | ↓ |
| (1638) Long Island Jewish Forest Hills | 333 | 129 | 30.52 | ◆ | ↓ |
| (0518) Long Island Jewish Valley Stream | 354 | 94 | 26.96 | ◇ | ⇔ |
| (0671) Geneva General Hospital | 81 | 29 | 32.36 | ◆ | ⇔ |
| (0490) Glen Cove Hospital | 203 | 54 | 26.61 | ◇ | ↓ |
| (1005) Glens Falls Hospital | 356 | 81 | 27.86 | ◇ | ⇔ |
| (0925) Good Samaritan Hospital Medical Center | 339 | 71 | 25.78 | ◇ | ⇔ |
| (0779) Good Samaritan Hospital of Suffern | 285 | 104 | 25.41 | ◇ | ⇔ |
| (0812) Gouverneur Hospital | S.S. | S.S. | S.S. | S.S. | N.A. |
| (1445) Harlem Hospital Center | 156 | 38 | 24.88 | ◇ | ⇔ |
| (0990) HealthAlliance Hospital Broadway Campus | 220 | 56 | 27.85 | ◇ | ⇔ |
| (0409) Highland Hospital | 301 | 60 | 23.77 | ◇ | ⇔ |

| PFI/Facility Name | Number of Cases (N) | Number of Outcomes (N) | RAMR | Performance | Performance Change from CY2018 |
|---|---|---|---|---|---|
| (1447) Hospital for Special Surgery | S.S. | S.S. | S.S. | S.S. | N.A. |
| (1039) Hudson Valley Hospital Center | 378 | 88 | 24.87 | ◇ | ↓ |
| (0913) Huntington Hospital | 446 | 93 | 23.70 | ◇ | ↓ |
| (1309) Interfaith Medical Center | 40 | 2 | 21.31 | ◆ | ⇔ |
| (0873) Ira Davenport Memorial Hospital Inc | 13 | 4 | 28.40 | ◇ | N.A. |
| (1165) Jacobi Medical Center | 281 | 79 | 24.63 | ◇ | ↓ |
| (1629) Jamaica Hospital Medical Center | 445 | 163 | 27.59 | ◇ | ⇔ |
| (0895) John T Mather Memorial Hospital of Port Jefferson New York Inc | 272 | 52 | 20.63 | ◆ | ↑ |
| (0267) Kenmore Mercy Hospital | 315 | 95 | 33.52 | ◆ | ↓ |
| (1301) Kings County Hospital Center | 399 | 116 | 30.28 | ◆ | ↓ |
| (1315) Kingsbrook Jewish Medical Center | 230 | 87 | 26.00 | ◇ | ↓ |
| (1122) Lawrence Hospital Center | 319 | 99 | 29.06 | ◇ | ⇔ |
| (1450) Lenox Hill Hospital | 294 | 76 | 25.31 | ◇ | ⇔ |
| (0383) Lewis County General Hospital | 54 | 4 | 21.47 | ◆ | ↑ |
| (1172) Lincoln Medical & Mental Health Center | 341 | 99 | 31.13 | ◆ | ↓ |
| (0362) Little Falls Hospital | 14 | 0 | 24.21 | ◆ | ↑ |
| (1630) Long Island Jewish Medical Center | 305 | 77 | 23.64 | ◇ | ⇔ |

| PFI/Facility Name | Number of Cases (N) | Number of Outcomes (N) | RAMR | Performance | Performance Change from CY2018 |
|---|---|---|---|---|---|
| (3376) Long Island Jewish Schneiders Children's Hospital Division | S.S. | S.S. | S.S. | S.S. | N.A. |
| (1305) Maimonides Medical Center | 332 | 79 | 23.25 | ♦ | ⇔ |
| (0746) Mary Imogene Bassett Hospital | 125 | 49 | 35.10 | ♦ | ↓ |
| (0804) Massena Memorial Hospital | 21 | 7 | 26.84 | ◊ | N.A. |
| (0718) Medina Memorial Health Care System | S.S. | S.S. | S.S. | S.S. | N.A. |
| (0039) Memorial Hosp of Wm F & Gertrude F Jones A/K/A Jones Memorial Hosp | 83 | 11 | 20.99 | ♦ | ↑ |
| (1453) Memorial Hospital for Cancer and Allied Diseases | 389 | 159 | 30.43 | ♦ | ↓ |
| (0213) Mercy Hospital of Buffalo | 315 | 104 | 30.92 | ♦ | ⇔ |
| (0513) Mercy Hospital | 236 | 95 | 34.24 | ♦ | ↓ |
| (1454) Metropolitan Hospital Center | 78 | 12 | 22.92 | ◊ | ⇔ |
| (3067) Millard Fillmore Suburban Hospital | 469 | 178 | 34.71 | ♦ | ⇔ |
| (3058) Montefiore Med Center - Jack D Weiler Hosp of A Einstein College Div | 887 | 293 | 29.30 | ◊ | ↑ |
| (1169) Montefiore Medical Center - Henry & Lucy Moses Div | 827 | 267 | 30.00 | ♦ | ⇔ |
| (1168) Montefiore Medical Center-Wakefield Hospital | 330 | 93 | 25.60 | ◊ | ⇔ |
| (1061) Montefiore Mount Vernon Hospital | 40 | 17 | 27.21 | ◊ | ⇔ |
| (1072) Montefiore New Rochelle Hospital | 193 | 67 | 28.46 | ◊ | ⇔ |

| PFI/Facility Name | Number of Cases (N) | Number of Outcomes (N) | RAMR | Performance | Performance Change from CY2018 |
|---|---|---|---|---|---|
| (1439) Mount Sinai Beth Israel | 279 | 64 | 22.80 | ♦ | ⇔ |
| (1324) Mount Sinai Beth Israel Brooklyn | 330 | 135 | 27.31 | ◊ | ⇔ |
| (1456) Mount Sinai Hospital | 260 | 41 | 16.89 | ♦ | ⇔ |
| (1639) Mount Sinai Hospital - Mount Sinai Hospital of Queens | 324 | 82 | 27.64 | ◊ | ↑ |
| (1466) Mount Sinai West | 282 | 51 | 20.93 | ♦ | ⇔ |
| (1469) Mount Sinai Morningside | 299 | 72 | 26.14 | ◊ | ↓ |
| (0583) Mount St. Mary's Hospital and Health Center | 208 | 41 | 25.70 | ◊ | ⇔ |
| (0528) Nassau University Medical Center | 305 | 98 | 30.79 | ♦ | ↓ |
| (0330) Nathan Littauer Hospital | 159 | 27 | 22.10 | ♦ | ↑ |
| (1293) Maimonides Midwood Community Hospital | 205 | 74 | 27.03 | ◊ | ⇔ |
| (1637) New York-Presbyterian/Queens | 268 | 50 | 21.50 | ♦ | ⇔ |
| (1306) New York-Presbyterian Brooklyn Methodist Hospital | 232 | 86 | 29.75 | ◊ | ⇔ |
| (3975) New York Presbyterian Hospital - Allen Hospital | 182 | 75 | 26.84 | ◊ | ⇔ |
| (1464) New York Presbyterian Hospital - Columbia Presbyterian Center | 233 | 81 | 26.96 | ◊ | ⇔ |
| (1458) New York Presbyterian Hospital - New York Weill Cornell Center | 238 | 81 | 27.29 | ◊ | ⇔ |

| PFI/Facility Name | Number of Cases (N) | Number of Outcomes (N) | RAMR | Performance | Performance Change from CY2018 |
|---|---|---|---|---|---|
| (1437) New York-Presbyterian/Lower Manhattan Hospital | 160 | 41 | 23.63 | ◇ | ⇔ |
| (1028) Newark-Wayne Community Hospital | 207 | 30 | 22.98 | ◇ | ⇔ |
| (0574) Niagara Falls Memorial Medical Center | 83 | 20 | 25.11 | ◇ | ⇔ |
| (0393) Nicholas H Noyes Memorial Hospital | 81 | 10 | 21.56 | ◆ | ⇔ |
| (1186) North Central Bronx Hospital | 56 | 3 | 21.49 | ◆ | ↑ |
| (0541) North Shore University Hospital | 303 | 72 | 24.56 | ◇ | ↓ |
| (0192) Northern Dutchess Hospital | 41 | 18 | 33.40 | ◆ | ↓ |
| (1117) Northern Westchester Hospital | 340 | 61 | 24.14 | ◇ | ⇔ |
| (0776) Montefiore Nyack Hospital | 309 | 93 | 25.97 | ◇ | ⇔ |
| (1446) NYU Langone Orthopedic Hospital | S.S. | S.S. | S.S. | S.S. | N.A. |
| (1463) NYU Langone Hospitals | 306 | 83 | 24.47 | ◇ | ↓ |
| (1304) NYU Langone Brooklyn | 411 | 116 | 25.20 | ◇ | ↓ |
| (0165) O'Connor Hospital | S.S. | S.S. | S.S. | S.S. | N.A. |
| (0066) Olean General Hospital | 323 | 71 | 28.80 | ◇ | ⇔ |
| (0397) Oneida Health Hospital | 107 | 30 | 31.07 | ◇ | ⇔ |
| (0699) Garnet Health Medical Center | 305 | 63 | 24.47 | ◇ | ⇔ |
| (0727) Oswego Hospital | 205 | 38 | 25.25 | ◇ | ⇔ |

| PFI/Facility Name | Number of Cases (N) | Number of Outcomes (N) | RAMR | Performance | Performance Change from CY2018 |
|---|---|---|---|---|---|
| (0043) Our Lady of Lourdes Memorial Hospital Inc. | 122 | 43 | 37.87 | ♦ | ↓ |
| (0938) Peconic Bay Medical Center | 160 | 42 | 27.22 | ◊ | ↑ |
| (1129) Phelps Hospital | 200 | 41 | 22.96 | ◊ | ↓ |
| (0552) Plainview Hospital | 207 | 54 | 24.61 | ◊ | ⇔ |
| (0752) Putnam Hospital Center | 217 | 45 | 25.80 | ◊ | ↓ |
| (1633) Queens Hospital Center | 239 | 37 | 19.67 | ♦ | ⇔ |
| (1738) Richmond University Medical Center | 338 | 151 | 29.02 | ◊ | ⇔ |
| (0377) River Hospital, Inc. | S.S. | S.S. | S.S. | S.S. | N.A. |
| (0411) Rochester General Hospital | 311 | 75 | 30.19 | ◊ | ↑ |
| (0589) Rome Memorial Hospital, Inc | 162 | 28 | 22.65 | ◊ | ⇔ |
| (0216) Roswell Park Cancer Institute | 35 | 19 | 31.54 | ◊ | ⇔ |
| (0756) Samaritan Hospital | 264 | 70 | 24.99 | ◊ | ⇔ |
| (0367) Samaritan Medical Center | 164 | 29 | 20.45 | ♦ | ⇔ |
| (0818) Saratoga Hospital | 436 | 102 | 30.70 | ♦ | ↓ |
| (1176) SBH Health System | 279 | 77 | 28.15 | ◊ | ⇔ |
| (0858) Schuyler Hospital | S.S. | S.S. | S.S. | S.S. | N.A. |
| (0218) Sisters of Charity Hospital | 120 | 29 | 25.48 | ◊ | ⇔ |
| (0292) Sisters of Charity Hospital - St. Joseph Campus | 45 | 13 | 27.62 | ◊ | ↑ |

| PFI/Facility Name | Number of Cases (N) | Number of Outcomes (N) | RAMR | Performance | Performance Change from CY2018 |
|---|---|---|---|---|---|
| (1097) SJRH - Andrus Pavilion | 157 | 55 | 28.86 | ◇ | ⇔ |
| (1124) SJRH - Dobbs Ferry Pavillion | 12 | 1 | 24.56 | ◇ | N.A. |
| (1158) Soldiers and Sailors Memorial Hospital of Yates County Inc. | S.S. | S.S. | S.S. | S.S. | N.A. |
| (0527) South Nassau Communities Hospital | 331 | 107 | 25.25 | ◇ | ⇔ |
| (0889) Stony Brook Southampton Hospital | 110 | 35 | 26.30 | ◇ | ⇔ |
| (0924) Southside Hospital | 298 | 96 | 25.72 | ◇ | ⇔ |
| (0704) St. Anthony Community Hospital | 34 | 15 | 29.14 | ◇ | ⇔ |
| (0943) St. Catherine of Siena Hospital | 311 | 60 | 21.58 | ♦ | ⇔ |
| (0896) St. Charles Hospital | 275 | 39 | 23.78 | ◇ | ⇔ |
| (0598) St. Elizabeth Medical Center | 178 | 62 | 30.44 | ◇ | ⇔ |
| (0563) St. Francis Hospital & Heart Center | 313 | 70 | 22.76 | ♦ | ↑ |
| (0180) Mid-Hudson Valley Division of Westchester Medical Center | 89 | 5 | 17.17 | ♦ | ⇔ |
| (0870) St. James Mercy Hospital | 36 | 6 | 24.10 | ◇ | ⇔ |
| (1635) St. John's Episcopal Hospital So Shore | 269 | 117 | 32.47 | ♦ | ↓ |
| (0630) St. Joseph's Hospital Health Center | 300 | 75 | 27.21 | ◇ | ⇔ |
| (1098) St. Joseph's Medical Center | 64 | 30 | 35.06 | ♦ | ↓ |
| (0694) St. Luke's Cornwall Hospital/Newburgh | 178 | 55 | 26.34 | ◇ | ⇔ |

| PFI/Facility Name | Number of Cases (N) | Number of Outcomes (N) | RAMR | Performance | Performance Change from CY2018 |
|---|---|---|---|---|---|
| (0005) St. Peter's Hospital | 299 | 84 | 30.32 | ◇ | ⇔ |
| (0551) St. Joseph Hospital | 367 | 100 | 26.81 | ◇ | ⇔ |
| (0484) St. Mary's Healthcare | 78 | 15 | 22.12 | ◆ | ⇔ |
| (1740) Staten Island University Hosp-North | 324 | 90 | 26.56 | ◇ | ⇔ |
| (1737) Staten Island University Hospital Prince's Bay | 156 | 39 | 25.36 | ◇ | ⇔ |
| (0413) Strong Memorial Hospital | 269 | 66 | 23.45 | ◇ | ↓ |
| (0550) Syosset Hospital | 94 | 42 | 29.63 | ◇ | ⇔ |
| (0471) The Unity Hospital of Rochester | 638 | 157 | 32.66 | ◆ | ⇔ |
| (0042) United Health Services Hospitals Inc. - Binghamton General Hospital | 67 | 6 | 22.50 | ◇ | ⇔ |
| (0058) United Health Services Hospitals Inc. - Wilson Medical Center | 608 | 135 | 26.16 | ◇ | ⇔ |
| (0339) United Memorial Medical Center North Street Campus | 214 | 46 | 26.63 | ◇ | ⇔ |
| (0245) Stony Brook University Hospital | 300 | 85 | 28.74 | ◇ | ⇔ |
| (1320) University Hospital of Brooklyn | 158 | 43 | 26.32 | ◇ | ⇔ |
| (0635) University Hospital SUNY Health Science Center | 510 | 152 | 28.30 | ◇ | ⇔ |
| (0628) Upstate University Hospital at Community General | 131 | 28 | 25.68 | ◇ | ⇔ |
| (0181) Vassar Brothers Medical Center | 315 | 82 | 29.08 | ◇ | ⇔ |

| PFI/Facility Name | Number of Cases (N) | Number of Outcomes (N) | RAMR | Performance | Performance Change from CY2018 |
|---|---|---|---|---|---|
| (1139) Westchester Medical Center | 211 | 65 | 29.75 | ◊ | ⇔ |
| (0111) Westfield Memorial Hospital Inc | S.S. | S.S. | S.S. | S.S. | N.A. |
| (1045) White Plains Hospital Center | 385 | 116 | 27.88 | ◊ | ⇔ |
| (0511) NYU Langone Hospital-Long Island | 343 | 79 | 26.35 | ◊ | ⇔ |
| (0103) UPMC Chautauqua at WCA | 164 | 29 | 23.60 | ◊ | ⇔ |
| (0208) John R. Oishei Children's Hospital | S.S. | S.S. | S.S. | S.S. | N.A. |
| (1692) Woodhull Medical & Mental Health Center | 190 | 36 | 25.31 | ◊ | ⇔ |
| (1318) Wyckoff Heights Medical Center | 184 | 60 | 29.53 | ◊ | ⇔ |
| (1153) Wyoming County Community Hospital | 18 | 7 | 29.55 | ◊ | ⇔ |
| **Statewide** | | | **26.60** | | |

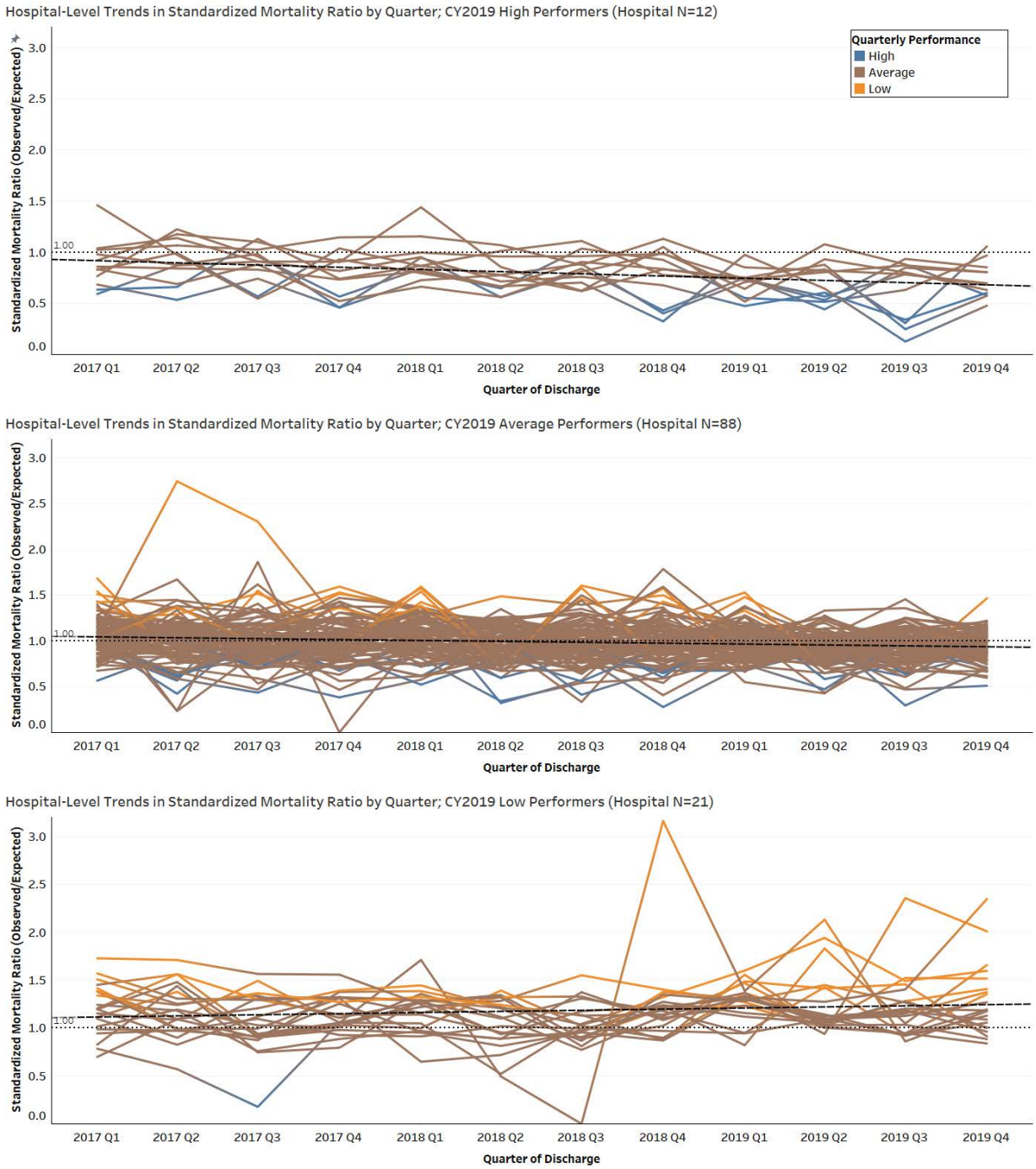
[1]Statewide numerator and denominator are not presented as the statewide rate is weighted based on sampling hospitals reported total cases.

## Adult Risk Adjusted Mortality Performance Over Time

Figure 11 charts quarterly trends in hospital RAMR performance from Q1 2017 through Q4 2019. This figure is split into three charts, each representing a set of hospitals grouped by their CY 2019 RAMR performance (High, Average, Low). Each line represents a single hospital and trends their standardized mortality ratio (SMR). SMR was determined by applying the 2019 standard logistic regression model to all adult severe sepsis cases from 2017 through 2019 and represents the ratio of the observed number of deaths in the quarter to the expected number of deaths in the quarter after accounting for patient characteristics represented in the risk adjustment model. A value of 1 for the SMR indicates that the quarterly observed number of deaths is exactly equal to the expected number of deaths after accounting for patient risk factors for sepsis mortality. A value above 1 indicates the quarter had more observed deaths than expected (lower performance) and a value below 1 indicates the quarter had fewer observed deaths than expected (higher performance). The color of the lines in each quarter represents statistically significant hospital SMR performance in that quarter. The black dotted line represents the overall trend in SMR for the group of hospitals over all quarters. To improve the validity of the quarterly SMR estimates shown here, only hospitals with at least 10 cases in each quarter are trended in Figure 11.

In general, hospitals that were high performers in CY 2019 (n=12) had either average or high performance across all quarters trended. The overall trend for these hospitals also demonstrates an improvement of SMR over time. In the second chart, hospitals that were average performers in CY 2019 (n=88) had quarterly SMRs ranging from low to high performance depending on quarter and also demonstrated a general trend of improving (lowering) SMR over time. Hospitals with low performance in CY 2019 (n=21) generally had either average or low performance across all quarters trended. Additionally, the overall trend for these facilities indicates a slightly worsening SMR over time.

## Figure 11. Hospital Level Adult Standardized Mortality Ratio (SMR) Trends by Quarter



## Pediatric Risk Adjusted Mortality Performance Over Time

This report includes a pediatric risk-adjusted mortality model that predicts the probability of mortality within 30 days of severe sepsis and septic shock presentation among children under age 18 and adjusts for differences in patient characteristics that can impact the risk of dying from sepsis. Due to the substantially smaller volume of pediatric severe sepsis and septic shock cases compared to adult cases, the pediatric risk-adjusted mortality model includes pediatric severe sepsis and septic shock cases from 2017 through 2019. Hospital-specific risk-adjusted sepsis mortality rates were not calculated for the pediatric population. Instead, the statewide pediatric standardized mortality ratio (SMR) is presented by quarter from 2017-2019. The SMR is the ratio of the observed number of deaths in the quarter to the expected number of deaths in the quarter after accounting for patient characteristics that were determined by the risk adjustment model to increase the risk of mortality. A value of 1 for the SMR indicates that the quarterly observed number of deaths is exactly equal to the expected number of deaths after accounting for patient risk factors for sepsis mortality. A value above 1 indicates the quarter had more observed deaths than expected (lower performance) and a value below 1 indicates the quarter had fewer observed deaths than expected (higher performance). Given the relatively small sample size, these results should be interpreted with caution, as a small increase in the number of deaths in any given quarter may significantly impact the SMR. More detail regarding the pediatric risk adjustment methodology can be found in Technical Appendix C.

Figure 13 displays the pediatric SMR and 95% confidence interval for each quarter from 2017 to 2019. If the confidence interval for the quarterly SMR is entirely below the value of 1, the quarter performed significantly better than expected. In other words, that quarter had fewer observed deaths than expected after adjusting for patient risk factors for sepsis related mortality. If the quarterly confidence interval was entirely above 1, the quarterly performance was significantly worse than expected. Quarters with significantly better than expected performance are displayed in blue as “High” performance and quarters with significantly worse than expected performance are shown in gold as “Low” performance. Quarters with “Average” performance, i.e., the performance is not significantly different from the expected performance, are shown in brown.

Figure 14 displays the pediatric SMR by quarter as a line alongside the volume of pediatric sepsis cases shown as bars, with survivors beyond 30 days shown in light green and deaths within 30 days shown in dark green. The quarterly mortality performance uses the same color scheme as Figure 13, with high quarterly performance shown in blue, average performance shown in brown, and low performance shown in gold.

Both figures show no clear trend in sepsis related mortality among the pediatric population. Most quarters across the three-year period have average performance, indicating that the observed number of deaths for that quarter are not significantly different from the expected number of deaths, after accounting for patient risk factors. There are two exceptions to this pattern: the 4$^{th}$ quarter in 2018 had high performance (significantly fewer deaths than expected) and the 4$^{th}$ quarter of 2019 had low performance (significantly more deaths than expected).

**Figure 13. Pediatric Standardized Mortality Ratio (SMR) with 95% Confidence Interval by Quarter**

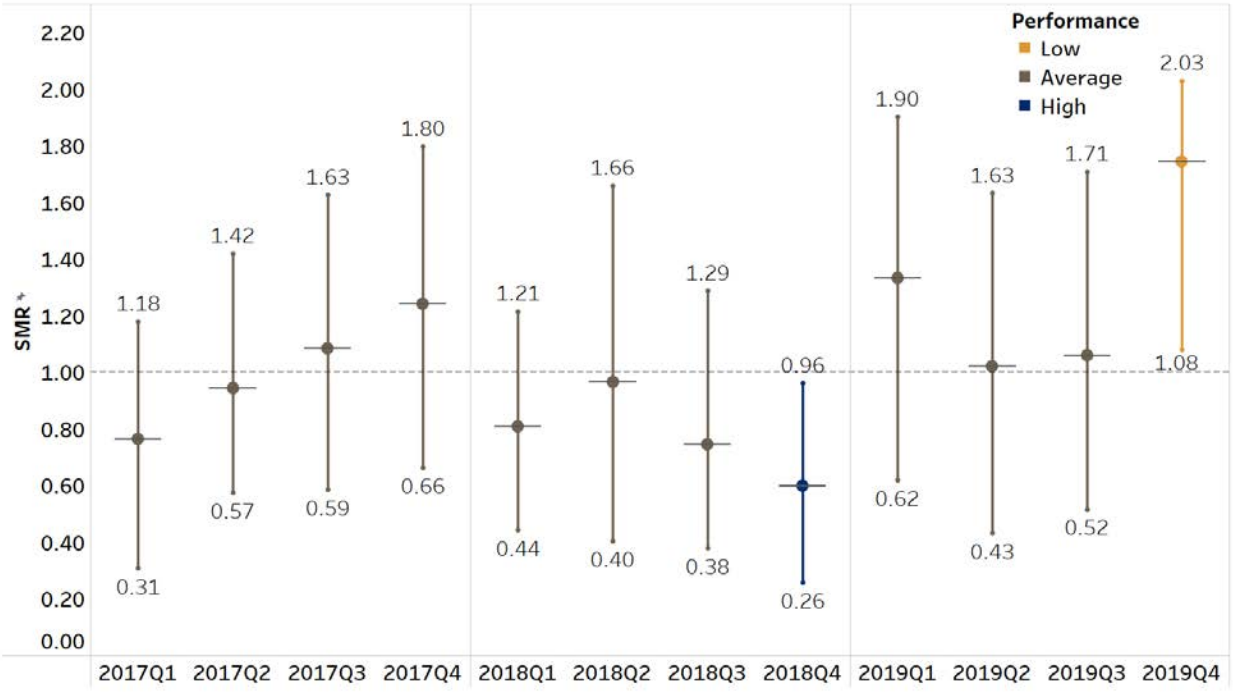
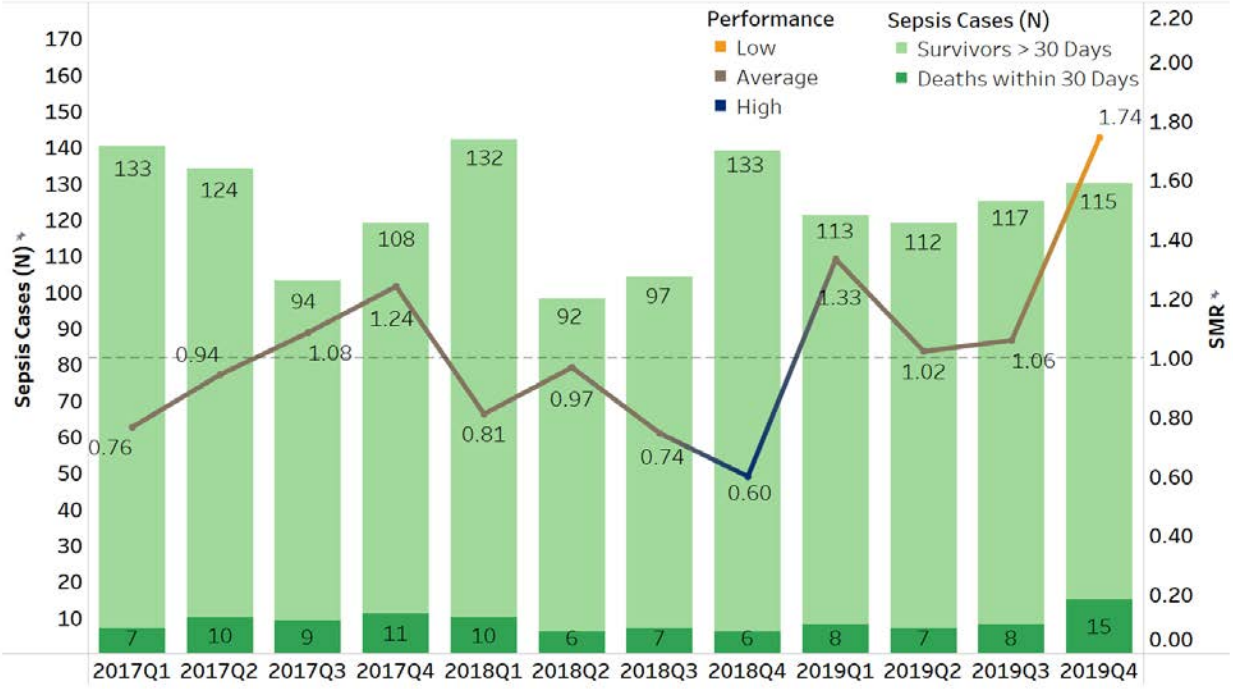



**Figure 14. Pediatric Sepsis Cases and Deaths with Standardized Mortality Ratio (SMR) by Quarter**



# New York State Quality Improvement Efforts

The development and implementation of the NYS Sepsis Care Improvement Initiative are the result of ongoing Department collaboration with Federal, State, private initiatives, and hospital partners to improve sepsis awareness, advance sepsis care, and to make maximal use of the data collected from hospitals to better understand which clinical practices are influencing survival and other important outcomes for patients. Several of these collaborations to improve sepsis care are described below.

## Sepsis Advisory Group

The Department convenes a group of clinicians from across NYS who have assisted with the development and implementation of the initiative since 2013. This diverse expert group includes both adult and pediatric specialists who treat patients with sepsis. The advisory group has provided key input into the structure of on-going quarterly performance reports presented to each hospital on their protocol use, protocol adherence, and mortality results compared to statewide averages as well as trended over time. These interim feedback performance reports have provided information for hospitals to target implementation of the improvements seen over time.

In addition to providing input in the refinement of the data collection and measurement process, the Sepsis Advisory Group advises the Department on new developments and interventions for patients with sepsis, including treatments and processes of care delivery, that show promise for improving outcomes for patients with sepsis throughout NYS. The advisory group will focus increasingly on data evaluation for identifying and disseminating promising clinical interventions and system improvements from those hospitals with exceptional results.

## Pediatric Sepsis Advisory Group

The Pediatric Sepsis Advisory Group, comprised of pediatric critical care experts, developed revised definitions for pediatric severe sepsis and septic shock, which provided clarity to ensure reliable data abstraction and comparable eligible populations reported by each hospital. The Pediatric Sepsis Advisory Group was instrumental in contributing to the development of a dedicated Pediatric Data Dictionary as the Department determined the need to devote a data dictionary each to the adult and pediatric population.

## Data Subcommittee

The data subcommittee, which includes clinicians, statisticians, and experts in clinical measurement, provided feedback and comments on questions related to data collection and offered expert opinions on the risk adjustment model for this report.

## IPRO, Implementation Business Partner

IPRO assisted the Department throughout the initiative, including the review of hospital sepsis protocols, development of the data dictionary, feedback reports, validation, and analyses. Key activities included the streamlining of electronic data collection, ensuring data integrity, customizing reports, providing webinars, and helpdesk support to hospitals.

## New York State Hospitals

In 2018, the Department surveyed participating hospitals and convened meetings of staff involved in sepsis reporting to identify challenges and best practices, quality improvement initiatives, and hospitals' data needs. The Department obtained information from a statewide hospital survey, and from continuous in-person meetings where data abstraction, burden of reporting, and other issues were discussed. These efforts continued throughout 2019 and gave the Department valuable insight into the continued improvements to data definitions and specifications and planning for data sharing with hospitals to facilitate future quality improvement initiatives.

## END SEPSIS

Several private foundations, including END SEPSIS, formerly the Rory Staunton Foundation, have provided support and assistance in raising public awareness regarding sepsis, which has amplified the work of the initiative in NYS. The mission of END SEPSIS is to reduce the catastrophic impact of sepsis through education, awareness, and improved sepsis policies in hospitals and other medical environments. It has been instrumental in advocating for the existing regulations ('Rory's Regulations') in New York and now, in other states as well, which provide for the rapid diagnosis and treatment of sepsis. It is estimated that between 2015 and 2019, the efforts of NYS hospitals and the Department to implement Rory's Regulations and reduce deaths from sepsis have saved more than 16,000 lives.

In 2019, END SEPSIS was awarded a federal contract intended to better understand and combat maternal sepsis, a leading cause of pregnancy-related and postpartum deaths in the United States. The maternal sepsis initiative was funded in part by the Biomedical Advanced Research and Development Authority (BARDA) Division of Research, Innovation, and Ventures (DRIVe), part of the United States Department of Health and Human Services (HHS) Office of the Assistant Secretary for Preparedness and Response.

Through the initiative, all cases of maternal sepsis in New York State between 2016 and 2018 were identified. These data were then analyzed to identify the factors that place some women at higher risk of developing sepsis, including demographic characteristics, comorbidities and associated obstetric procedures.

The New York State Department of Health partnered with END SEPSIS to develop a dataset of maternal sepsis cases in New York State between the years 2016 and 2018. Linking the Statewide Planning and Research Cooperative System (SPARCS) and Vital Statistics datasets, the Department identified associations between hospitalizations for maternal sepsis and hospital and patient characteristics to identify potentially at-risk target populations.

## Support for Research

The Department has continued to support research related to the early detection and treatment of sepsis. The Department recognizes the value of the data collected through the Sepsis Care Improvement Initiative and has developed a process for researchers interested in requesting data for research purposes. To facilitate the process, a Sepsis Clinical Data, Data Use Agreement is now available on the Department's website at the following link: https://www.health.ny.gov/diseases/conditions/sepsis/docs/external_dua.pdf.

# Next Steps

The Department plans to continue working with partners to improve identification and care of sepsis patients to optimize outcomes.

Data Collection Improvement and Alignment

The Department will:

- continue to work with hospitals to refine the sepsis data dictionary to ensure complete and accurate data collection; and
- continue work with the Pediatric Sepsis Advisory Group to refine pediatric data collection and analyses.

Facilitation of Quality Improvement

The Department will:

- investigate ways to share data with hospitals that can be used to identify opportunities for improvement and to identify high-risk populations that can benefit from targeted interventions;
- continue to provide a mechanism for sharing of best practices among hospitals for early identification of sepsis patients and ensuring timely, appropriate treatment;
- continue to explore the potential for new outcomes-focused measures that can drive quality improvement; and
- continue to conduct research and collaborate with leading organizations to better understand and inform the public about the early detection and management of sepsis for all populations, including those impacted by maternal sepsis.

Alignment with Current Guidelines

The Department will continue to work with the Sepsis Advisory Group and Pediatric Sepsis Advisory Group to monitor the evolving evidence and guidelines for identification and management of sepsis and to ensure that data collection and reports align with the latest evidence.

# Definitions of Key Terms

- Sepsis - a confirmed or suspected infection accompanied by two system inflammatory response syndrome (SIRS) criteria.
- Severe sepsis (adult) – confirmed or suspected infection, two or more manifestations of systemic inflammatory response to infection, and organ dysfunction.
- Severe sepsis (pediatric) – confirmed or suspected infection, abnormal temperature or white blood cell count and one other manifestation of systemic inflammatory response to infection, and organ dysfunction.
- Septic shock (adult) - severe sepsis and hypotension persisting despite adequate intravenous fluid resuscitation or severe sepsis and evidence of tissue hypoperfusion.
- Septic shock (pediatric) - sepsis and cardiovascular organ dysfunction despite 20cc/kg of crystalloid fluid administration.

- Protocol initiation - patients in each hospital who received care consistent with the initiation of their formal protocol, excluding those cases with identified (and justified) clinical or advanced directive exceptions.
- 3-Hour Bundle (Adult) - this is a composite measure that represents the percentage of adult patients with severe sepsis or septic shock who received blood cultures up to 48 hours before to three (3) hours after severe sepsis or septic shock start time; initial lactate level collection up to six (6) hours before to three (3) hours after severe sepsis or septic shock start time; and broad-spectrum antibiotics up to 24 hours before to three (3) hours after severe sepsis or septic shock start time. This measure is not calculated for patients who were excluded from the hospital's protocol or from specific care interventions within three (3) hours of start time, who were transferred from or to another acute care hospital, or who died within three (3) hours of start time.
- 6-Hour Bundle (Adult) - this is a composite measure that represents the percentage of adult patients with severe sepsis or septic shock who received all the recommended interventions in the 6-Hour Bundle (Adult), including interventions in the 3-Hour Bundle (Adult) within measure timeframes, a repeat lactate level within six (6) hours of severe sepsis or septic shock start time if initial lactate level is elevated, resuscitation with crystalloid fluids up to six (6) hours before to within three (3) hours of septic shock start time or initial hypotension time (whichever is earlier), fluid status assessment within six (6) hours of septic shock start time after fluid resuscitation is present, and vasopressor therapy within six (6) hours of septic shock start time if persistent hypotension after fluid resuscitation is present. This measure is not calculated for patients who were excluded from the hospital's protocol or from specific care interventions within three (3) hours or six (6) hours of start time (depending on measure component timeframe), who were transferred from or to another acute care hospital, or who died within three (3) hours or six (6) hours of start time (depending on measure component timeframe).
- 1-Hour Bundle (Pediatric) - this is a composite measure that represents the percentage of pediatric patients with severe sepsis or septic shock who received blood cultures up to 48 hours before to one (1) hour after severe sepsis or septic shock start time; fluid administration up to six (6) hours before to one (1) hour after severe sepsis or septic shock start time; and broad-spectrum antibiotics up to 24 hours before to one (1) hour after severe sepsis or septic shock start time. This measure is not calculated for patients who were excluded from the hospital's protocol or from specific care interventions within one (1) hour of start time, who were transferred from or to another acute care hospital, or who died within one (1) hour of start time.

# Technical Appendix A: Adult Sepsis Sampling Hospitals

Beginning in 2017, the Department began to accept submission of a random sample of adult sepsis cases from high volume hospitals to fulfill reporting requirements regarding sepsis data collection. Pediatric sepsis cases are not eligible for sampling. A high-volume hospital is defined as one which submitted more than 400 cases to the sepsis clinical database for calendar year of data submission two years prior to the current year. Hospitals that meet this case volume requirement have the option to opt-in to a sampling approach to send a complete list of adult sepsis cases for sample selection on a monthly or quarterly basis. A random sample of these cases within each hospital are then selected by the Department and returned to the hospital for full data abstraction and submission, for a total of 400 adult cases submitted to the sepsis clinical database by each sampling hospital.

For sampling hospitals, measure performance is calculated based on each hospital's performance in their representative sample of cases. This result is then weighted by calculating the estimated numerator and denominator on a quarterly basis from the sample performance and the number of cases in each quarter the hospital would have reported had it not sampled, based on the full adult case list submitted for sampling. Measure performance for sampling hospitals then is presented as an estimate based on a representative sample of cases rather than observed performance, and therefore carries a level of uncertainly in the accuracy of this estimate. This uncertainty is represented in this appendix by 95% Confidence Intervals; representing the highest and lowest bounds between which we would expect the point estimate to lie in 95% of random samples of the adult sepsis cases for each sampling hospital.

Measure estimates and 95% confidence intervals for all 34 hospitals that participated in sampling for CY 2019 data submission are presented in Table A1. The denominator of the measure represents the number of cases estimated to be in the denominator of the measure based on the full adult case list submitted for sampling, and thus will be larger than the total number of cases submitted to the clinical data portal.

## Table A1. Adult Sepsis Measure Summary Report for Sampling Hospitals

| | Timely Administration of Broad-Spectrum Antibiotics | | | | 3-Hour Bundle (Adult) | | | | 6-Hour Bundle (Adult) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PFI/Facility Name | Number of Cases (N) | Met Measure (%) | 95% CI Lower Bound (%) | 95% CI Upper Bound (%) | Number of Cases (N) | Met Measure (%) | 95% CI Lower Bound (%) | 95% CI Upper Bound (%) | Number of Cases (N) | Met Measure (%) | 95% CI Lower Bound (%) | 95% CI Upper Bound (%) |
| (0001) Albany Medical Center Hospital | 517 | 67.1 | 66.57 | 67.67 | 517 | 28.8 | 28.29 | 29.35 | 493 | 6.3 | 5.99 | 6.59 |
| (1178) Bronx-Lebanon Hospital Center - Concourse Division | 559 | 89.4 | 89.07 | 89.82 | 559 | 75 | 74.42 | 75.49 | 549 | 53.7 | 53.11 | 54.36 |
| (0885) Brookhaven Memorial Hospital Medical Center Inc | 553 | 99.1 | 99.03 | 99.16 | 553 | 84.1 | 83.84 | 84.34 | 545 | 69.2 | 68.86 | 69.49 |
| (0207) Buffalo General Medical Center | 813 | 73.4 | 72.99 | 73.88 | 813 | 62.6 | 62.12 | 63.10 | 805 | 39.1 | 38.63 | 39.63 |
| (1626) Elmhurst Hospital Center | 472 | 89.8 | 89.63 | 90.03 | 472 | 75.6 | 75.35 | 75.92 | 460 | 29.6 | 29.26 | 29.87 |
| (1638) Forest Hills Hospital | 430 | 87 | 86.82 | 87.13 | 430 | 70 | 69.80 | 70.20 | 427 | 35.8 | 35.61 | 36.05 |
| (0925) Good Samaritan Hospital Medical Center | 1,234 | 87.5 | 87.20 | 87.84 | 1,234 | 74.1 | 73.72 | 74.58 | 1,234 | 60 | 59.49 | 60.45 |
| (0409) Highland Hospital | 663 | 91.9 | 91.61 | 92.10 | 663 | 78.3 | 77.91 | 78.65 | 655 | 58.5 | 58.03 | 58.92 |
| (1450) Lenox Hill Hospital | 645 | 92.2 | 92.01 | 92.49 | 645 | 73.6 | 73.24 | 74.04 | 634 | 45.9 | 45.45 | 46.35 |
| (1630) Long Island Jewish Medical Center | 763 | 89.5 | 89.24 | 89.79 | 763 | 73.3 | 72.86 | 73.67 | 751 | 39.5 | 39.09 | 40.00 |
| (1305) Maimonides Medical Center | 988 | 91.5 | 91.26 | 91.74 | 988 | 74.3 | 73.91 | 74.68 | 973 | 33.9 | 33.49 | 34.34 |
| (0213) Mercy Hospital | 649 | 85.5 | 85.22 | 85.81 | 649 | 67.8 | 67.41 | 68.18 | 635 | 34.2 | 33.77 | 34.57 |
| (1439) Mount Sinai Beth Israel | 598 | 92.5 | 92.25 | 92.70 | 598 | 81.6 | 81.28 | 81.93 | 593 | 45.5 | 45.12 | 45.95 |
| (1456) Mount Sinai Hospital | 1,042 | 89.3 | 88.81 | 89.88 | 1,042 | 61.4 | 60.58 | 62.27 | 1,042 | 28.9 | 28.08 | 29.69 |
| (1466) Mount Sinai Roosevelt | 747 | 90.4 | 90.13 | 90.60 | 747 | 71.6 | 71.26 | 71.98 | 737 | 37.2 | 36.79 | 37.57 |
| (1469) Mount Sinai St. Luke's | 943 | 89.8 | 89.55 | 90.09 | 943 | 73.7 | 73.31 | 74.09 | 936 | 44.2 | 43.79 | 44.68 |
| (1637) New York Hospital Medical Center of Queens | 2,025 | 81.1 | 80.68 | 81.50 | 2,025 | 65.6 | 65.14 | 66.12 | 1,890 | 48.5 | 47.90 | 49.03 |
| (1464) New York Presbyterian Hospital - Columbia Presbyterian Center | 624 | 93.4 | 93.09 | 93.76 | 624 | 79.5 | 78.94 | 80.03 | 605 | 37.7 | 37.01 | 38.36 |
| (1458) New York Presbyterian Hospital - New York Weill Cornell Center | 441 | 93 | 92.63 | 93.31 | 441 | 75.5 | 74.94 | 76.08 | 417 | 46.3 | 45.59 | 46.98 |
| (0541) North Shore University Hospital | 1,065 | 90.4 | 90.10 | 90.75 | 1,065 | 71.7 | 71.25 | 72.23 | 1,054 | 38.6 | 38.08 | 39.15 |
| (1463) NYU Hospitals Center | 550 | 98.9 | 98.81 | 99.01 | 550 | 88.9 | 88.61 | 89.21 | 537 | 77.1 | 76.69 | 77.50 |

| | Timely Administration of Broad-Spectrum Antibiotics | | | | 3-Hour Bundle (Adult) | | | | 6-Hour Bundle (Adult) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PFI/Facility Name** | **Number of Cases (N)** | **Met Measure (%)** | **95% CI Lower Bound (%)** | **95% CI Upper Bound (%)** | **Number of Cases (N)** | **Met Measure (%)** | **95% CI Lower Bound (%)** | **95% CI Upper Bound (%)** | **Number of Cases (N)** | **Met Measure (%)** | **95% CI Lower Bound (%)** | **95% CI Upper Bound (%)** |
| (0699) Orange Regional Medical Ctr-Goshen Campus | 896 | 85.9 | 85.64 | 86.24 | 896 | 76.8 | 76.42 | 77.15 | 887 | 36.9 | 36.44 | 37.29 |
| (1633) Queens Hospital Center | 537 | 90.5 | 90.30 | 90.71 | 537 | 79 | 78.66 | 79.25 | 527 | 39.1 | 38.73 | 39.45 |
| (0411) Rochester General Hospital | 1,341 | 77.4 | 76.95 | 77.86 | 1,341 | 55.7 | 55.17 | 56.24 | 1,337 | 25.1 | 24.66 | 25.60 |
| (0527) South Nassau Communities Hospital | 1,047 | 87.6 | 87.28 | 87.89 | 1,047 | 74.7 | 74.29 | 75.09 | 1,035 | 47.7 | 47.26 | 48.20 |
| (0943) St Catherine of Siena Hospital | 824 | 96.4 | 96.19 | 96.52 | 824 | 90.8 | 90.52 | 91.03 | 814 | 77.6 | 77.26 | 78.02 |
| (0563) St Francis Hospital | 683 | 88 | 87.65 | 88.34 | 683 | 73.6 | 73.19 | 74.10 | 678 | 50 | 49.48 | 50.52 |
| (0630) St Joseph's Hospital Health Center | 803 | 84.6 | 84.20 | 84.92 | 803 | 68.5 | 68.03 | 68.96 | 794 | 43.1 | 42.57 | 43.58 |
| (0005) St Peters Hospital | 897 | 86.2 | 85.83 | 86.52 | 897 | 65.6 | 65.06 | 66.04 | 868 | 47.5 | 46.94 | 47.99 |
| (1740) Staten Island University Hosp-North | 744 | 84 | 83.73 | 84.28 | 744 | 60.5 | 60.12 | 60.85 | 737 | 30.5 | 30.17 | 30.88 |
| (0413) Strong Memorial Hospital | 1,568 | 86.5 | 86.02 | 86.94 | 1,568 | 71.1 | 70.51 | 71.71 | 1,556 | 49.4 | 48.68 | 50.03 |
| (0245) University Hospital | 765 | 88.6 | 88.31 | 88.95 | 765 | 72.9 | 72.49 | 73.39 | 754 | 48.5 | 48.03 | 49.05 |
| (0181) Vassar Brothers Medical Center | 716 | 92.3 | 92.08 | 92.55 | 716 | 76.1 | 75.71 | 76.52 | 701 | 58.9 | 58.44 | 59.39 |
| (0511) Winthrop-University Hospital | 1,038 | 96.1 | 95.99 | 96.31 | 1,038 | 87.2 | 86.90 | 87.47 | 1,030 | 73.9 | 73.51 | 74.26 |
| **Statewide** | | **87.8** | **87.57** | **88.10** | | **70.9** | **70.54** | **71.28** | | **44.3** | **43.85** | **44.66** |

# Technical Appendix B: Adult Risk Adjustment Methodology

The objective of the risk adjustment process is to assess hospital performance in preventing severe sepsis related mortality after accounting for differences in patient case mix among hospitals. The 2019 risk-adjusted mortality outcome includes all severe sepsis and septic shock patient deaths that occurred within 30 days of the presentation of severe sepsis and septic shock, including patients who were discharged alive from the hospital but expired within 30 days of presentation. Measurement of this outcome is facilitated by a match of sepsis clinical data to NYS vital statistics. For the purposes of this section, 'mortality' will be used to describe this outcome. In the first part of the risk adjustment process, a mortality model estimates the probability of mortality for each patient with severe sepsis and septic shock. This estimate is based on patient demographic, comorbidity, and severity of illness characteristics. Multivariable logistic regression was used to determine which variables are important and accurate in estimating the probability of mortality for each patient. Table B1 contains the patient demographic, comorbidity, and severity of illness variables included in this analysis. These variables were then used in hierarchical logistic regression model with a random intercept for each hospital to control for clustering of patients within a hospital.

The risk-adjusted model in this report makes use of the most recent complete and audited data from four quarters of patient data submission in 2019. All patients who were discharged and transferred from one hospital to another or who were admitted from hospice care were excluded from model development and the application of the model to each hospital's result. Patients with advance care directives in place prior to the episode of sepsis, who declined sepsis protocol interventions, or who refused sepsis protocol interventions at the time of presentation, were removed from the data set. Patients who live outside of New York or who could not be matched to SPARCS were also removed from the data set, because NYS vital statistics do not include deaths that occurred out of state and a match to SPARCS is necessary to identify patients in the NYS vital statistics data. Patients admitted more than once in 2019 for sepsis are represented only once (using a randomly selected admission) for purposes of development of the risk-adjusted model and evaluating each hospital's performance.

To assess hospital performance, hospital-specific RAMRs were calculated as the ratio of predicted number of deaths to expected number of deaths at a hospital multiplied by the statewide crude mortality rate. The expected number of deaths for each hospital is estimated by summing the probability of mortality calculated for every patient from that hospital using the estimated regression coefficients and the average hospital specific intercept. The predicted number of deaths for each hospital is estimated by summing the probability of mortality for each patient from that hospital through the hierarchical model using the estimated regression coefficients with the addition of the hospital specific intercept. The standardized mortality ratio (SMR) is calculated by dividing the predicted by the expected number of deaths among patients treated in each hospital. The SMR was then multiplied by the statewide crude mortality rate to obtain a risk-adjusted mortality rate (RAMR). Confidence intervals for the RAMR were calculated using a percentile bootstrapping approach. Approximately 2,000 bootstrap samples were used to generate a distribution of RAMR for each hospital and the $2.5^{th}$ percentile and the $97.5^{th}$ percentile of the distribution of each quarter were used as the 95% lower and upper confidence bounds, respectively. If the confidence interval for a hospital's RAMR is entirely below the statewide rate, the hospital performed significantly better than the state average. If the hospital's confidence interval was entirely above the statewide rate, the hospital performed

significantly worse than the statewide rate. Figure B1 contains a plot showing the RAMR and confidence interval for each hospital. The highest performing hospitals are displayed in blue and the lowest performing hospitals are displayed in gold.

There are limitations associated with the risk-adjusted mortality model. These are largely related to factors associated with sepsis mortality that are not currently collected in the sepsis clinical database, and therefore not included in the risk adjustment model. These include significant comorbidities associated with sepsis mortality, including cardiac arrest and burns, as well as social determinates of health, including socio-economic status and access to health care. While these data are not currently collected in the sepsis clinical database, an effort to identify and capture more of the relevant covariates is underway and should improve the performance of the risk adjustment model. Variability in the measured outcome may also be considered a limitation of this model. In the 2019 methodology, patients discharged alive from the hospital who expire within 30 days of presentation are included in the outcome, which may include patients who expired for reasons unrelated to sepsis. However, the 30-day post-presentation mortality approach is expected to be a more realistic representation of sepsis mortality compared to using discharge status and this benefit outweighs potential error associated with this outcome methodology.

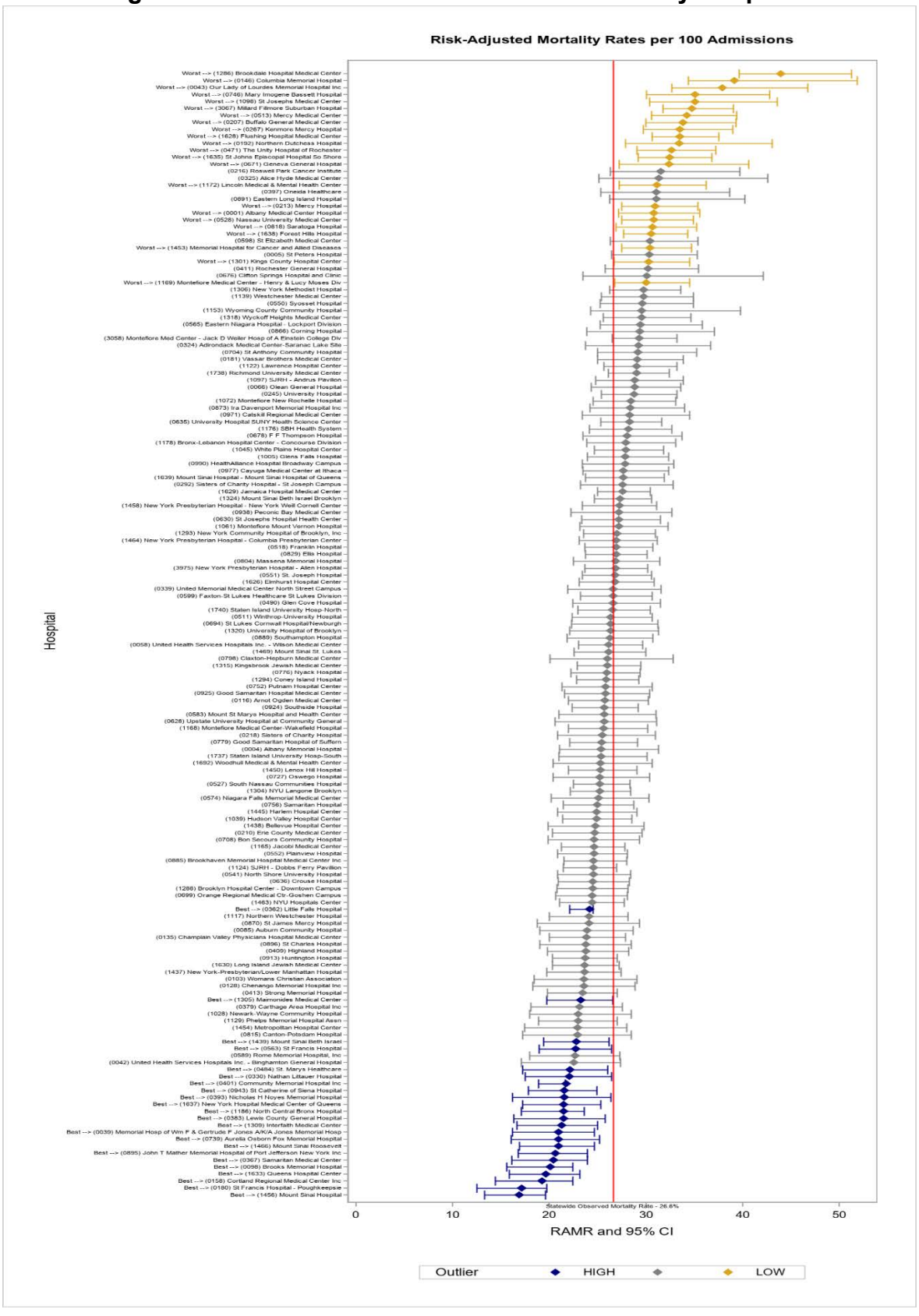
**Table B1. Variables in the Risk-Adjusted Mortality Rate (RAMR) model**

| Main Effects or Interactions | Level of effects | (%) | Coef | Odds Ratio(95%CI) | P-Value |
|---|---|---|---|---|---|
| Age-Main Effect | | | 0.03 | 1.03(1.03-1.04) | 0.000 |
| Source of Admission-Main effect | Non-Health Facility | 78.8 | **Reference Level** | | |
| | Another Health Care Facility | 0.9 | 0.37 | 1.45(1.11-1.90) | 0.006 |
| | Clinic | 3.1 | 0.17 | 1.19(1.01-1.40) | 0.038 |
| | Other | 0.3 | 0.07 | 1.07(0.66-1.75) | 0.776 |
| | SNF/ICF | 17.0 | 0.50 | 1.66(1.54-1.77) | 0.000 |
| Payer-Main effect | Private/HMO | 19.3 | **Reference Level** | | |
| | Medicaid | 15.6 | -0.08 | 0.93(0.84-1.03) | 0.143 |
| | Medicare | 61.5 | -0.05 | 0.95(0.88-1.03) | 0.186 |
| | Other | 2.6 | 0.21 | 1.24(1.03-1.48) | 0.020 |
| | Self-Pay | 1.0 | 0.36 | 1.44(1.07-1.92) | 0.014 |
| Altered Mental Status-Main effect | No | 57.6 | **Reference Level** | | |
| | Unknown | 3.4 | 0.69 | 1.99(1.73-2.29) | 0.000 |
| | Yes | 39.0 | 0.68 | 1.97(1.86-2.09) | 0.000 |
| Bandemia-Main effect | No | 37.9 | **Reference Level** | | |
| | Unknown | 41.3 | 0.00 | 1.00(0.94-1.07) | 0.933 |
| | Yes | 20.9 | 0.12 | 1.13(1.05-1.22) | 0.001 |
| Lower Respiratory Infection-Main effect | No | 55.7 | **Reference Level** | | |
| | Yes | 44.3 | -0.01 | | 0.931 |
| Platelet Count-Main effect | No | 75.4 | **Reference Level** | | |
| | Unknown | 2.1 | 0.15 | 1.16(0.96-1.40) | 0.121 |
| | Yes | 22.5 | 0.33 | 1.39(1.31-1.49) | 0.0001 |
| Septic Shock Present-Main effect | Severe Sepsis | 58.5 | **Reference Level** | | |
| | Septic Shock | 41.5 | 0.14 | | 0.012 |
| Initial Lactate Level Categories-Main effect | <2.4 mmol/L | 34.5 | **Reference Level** | | |
| | >=2.4 to <4 mmol/L | 31.3 | 0.07 | | 0.084 |
| | >=4 to >8 mmol/L | 18.3 | 0.56 | | 0.016 |
| | >=8 mmol/L | 6.5 | 1.05 | | 0.001 |
| | Missing | 9.4 | 0.38 | | 0.0001 |
| Chronic Liver Disease-Main effect | No | 94.7 | **Reference Level** | | |
| | Yes | 5.3 | 0.55 | 1.74(1.55-1.95) | 0.000 |
| Chronic Renal Failure-Main effect | No | 91.1 | **Reference Level** | | |
| | Yes | 8.9 | 0.30 | 1.36(1.24-1.49) | 0.000 |
| Chronic Respiratory Failure-Main effect | No | 93.0 | **Reference Level** | | |
| | Yes | 7.0 | 0.19 | 1.21(1.10-1.34) | 0.000 |

| Main Effects or Interactions | Level of effects | (%) | Coef | Odds Ratio (95% CI) | P-Value |
|---|---|---|---|---|---|
| Congestive Heart Failure-Main effect | No | 77.9 | | **Reference Level** | |
| | Yes | 22.1 | 0.29 | 1.33(1.25-1.42) | 0.000 |
| Diabetes-Main effect | No | 63.5 | | **Reference Level** | |
| | Yes | 36.5 | -0.15 | 0.86(0.81-0.91) | 0.000 |
| Lymphoma Leukemia Multiple Myeloma-Main effect | No | 95.8 | | **Reference Level** | |
| | Yes | 4.2 | 0.34 | 1.41(1.24-1.60) | 0.000 |
| Metastatic Cancer-Main effect | No | 91.2 | | **Reference Level** | |
| | Yes | 8.8 | 1.20 | 3.31(3.04-3.62) | 0.000 |
| ICU Admission Prior to Sepsis-Main effect | No | 89.7 | | **Reference Level** | |
| | Yes | 10.3 | 0.35 | 1.42(1.30-1.56) | 0.000 |
| Infection Etiology-Main effect | No | 88.0 | | **Reference Level** | |
| | Unknown | 7.7 | 0.39 | 1.48(1.31-1.66) | 0.000 |
| | Yes | 4.3 | 0.33 | 1.39(1.23-1.58) | 0.000 |
| MV Prior to Presentation-Main effect | No | 87.3 | | **Reference Level** | |
| | Yes | 12.7 | 0.33 | | 0.000 |
| Site of Infection-Main effect | Respiratory | 38.2 | | **Reference Level** | |
| | Central Nervous System | 0.4 | -0.43 | | 0.174 |
| | Gastrointestinal | 10.2 | -0.22 | | 0.005 |
| | Other | 19.9 | -0.11 | | 0.141 |
| | Skin | 7.9 | -0.41 | | 0.000 |
| | Urinary | 23.4 | -0.87 | | 0.000 |
| Initial Lactate Level Categories*Septic Shock Present | >=2.4 to <4 mmol/L,Yes | | 0.38 | | 0.000 |
| | >=4 to >8 mmol/L, yes | | 0.06 | | 0.806 |
| | >=8 mmol/L, yes | | 0.51 | | 0.118 |
| | , Yes | | 0.28 | | 0.010 |
| Site of infection*Lower Respiratory Infection | Central Nervous System, yes | | 1.87 | | 0.001 |
| | Gastrointestinal,Yes | | 0.36 | | 0.013 |
| | Other,Yes | | 0.15 | | 0.113 |
| | Skin,Yes | | 0.26 | | 0.140 |
| | Urinary,Yes | | 0.49 | | 0.000 |
| Site of Infection* MV Prior to Presentation | Central Nervous System,Yes | | -0.68 | | 0.244 |
| | Gastrointestinal, yes | | 0.10 | | 0.516 |
| | Other, yes | | 0.34 | | 0.003 |
| | Skin, yes | | 0.13 | | 0.528 |
| | Urinary, yes | | 0.40 | | 0.001 |

**C-Statistic= 0.778**

## Figure B1. RAMR and 95% Confidence Interval by Hospital



# Technical Appendix C: Pediatric Risk Adjustment Methodology

This report includes a pediatric risk adjustment model predicting severe sepsis and septic shock mortality among patients less than 18 years old. Given the relatively small number of pediatric sepsis cases, this analysis does not assess hospital performance in preventing severe sepsis and septic shock related mortality, but instead seeks to identify risk factors associated with mortality in the pediatric population and to describe trends in pediatric severe sepsis and septic shock mortality across time.

Following the same process as the adult mortality model, the pediatric risk-adjusted mortality outcome includes all severe sepsis and septic shock patient deaths that occurred within 30 days of the presentation of severe sepsis and septic shock, including patients who were discharged alive from the hospital but expired within 30 days of presentation. Measurement of this outcome is facilitated by a match of sepsis clinical data to NYS vital statistics. In the first part of the risk adjustment process, a mortality model estimates the probability of mortality for each patient with severe sepsis and septic shock. This estimate is based on patient demographic, comorbidity, and severity of illness characteristics. Multivariable logistic regression was used to determine which variables are important and accurate in estimating the probability of mortality for pediatric patients. Table C1 contains the patient demographic, comorbidity, and severity of illness variables included in this analysis. These variables were then used in hierarchical logistic regression model with a random intercept for each hospital to control for clustering of patients within a hospital.

To have a sufficiently large sample size, the mortality model includes data on pediatric severe sepsis and septic shock cases from 2017 to 2019. Patients with advance care directives in place prior to the episode of sepsis, who declined or refused sepsis protocol interventions, or who were admitted from hospice were removed from the data set. Patients who live outside of New York or who could not be matched to SPARCS were also removed from the data set, because NYS vital statistics do not include deaths that occurred out of state and a match to SPARCS is necessary to identify patients in the NYS vital statistics data. Newborn patients, defined as those age 0 days at admission, less than 3 days old at admission and transferred in, or those having a ‘Liveborn’ diagnosis, are also excluded from the data set due to reporting guidelines that exclude newborn patients who died in hospital from the sepsis clinical data collection. Patients admitted more than once for sepsis during the 2017-19 study period are represented only once by a randomly selected admission.

To assess overall performance in preventing severe sepsis and septic shock related mortality in the pediatric population, the probability of mortality is calculated for every patient using the mixed effects regression model. These probabilities are summed over all the patients treated during each quarter to calculate the expected number of deaths for that quarter after accounting for patient risk factors for sepsis related mortality. The actual number of deaths is determined for all patients in that quarter as well. The standardized mortality ratio (SMR) is calculated by dividing the observed number of deaths by the expected number of deaths among patients treated during each quarter. A value of 1 for the SMR indicates that the observed number of deaths is exactly equal to the expected number of deaths for that quarter, while a value above 1 indicates more observed deaths than expected and a value below 1 indicates fewer observed deaths than expected. Confidence intervals for the SMR were calculated using a percentile bootstrapping approach. Approximately 1,000 bootstrap samples were used to generate a distribution of SMR for each quarter and the $2.5^{th}$ percentile SMR and the $97.5^{th}$ percentile SMR

of the distribution of each quarter were used as the 95% lower and upper confidence bounds, respectively. If the confidence interval for the quarterly SMR is entirely below the value of 1, the quarter performed significantly better than expected. If the quarterly confidence interval was entirely above 1, the quarterly performance was significantly worse than expected. Figure C1 displays the pediatric sepsis quarterly crude death rate (the percentage of deaths for the quarter's pediatric sepsis cases) with the quarterly SMR. Quarters that performed significantly better than expected ("High" performance) are shown in blue, quarters that performed significantly worse than expected ("Low" performance) are shown in gold, and quarters with average performance are shown in brown.

There are limitations associated with the risk-adjusted mortality model. Like the adult model, the pediatric model is limited to risk factors collected in the sepsis clinical database, which does not include some significant comorbidities associated with sepsis mortality or social determinants of health. The pediatric mortality model may be further limited in the ability to capture risk factors specific to the pediatric population, given that the sepsis clinical data elements were chosen based on research on sepsis mortality among adults and there may be other risk factors for sepsis related mortality among children. As with the adult mortality outcome, the 30-day post-presentation mortality outcome may include patients who expired for reasons unrelated to sepsis. Since children tend to be more resilient that adults, there is the additional concern that some sepsis-related mortality cases may not be captured here if patients expired more than 30 days after sepsis presentation. Although a pediatric 90-day risk adjusted mortality model was explored, using 30-day mortality was determined to minimize the misclassification of sepsis mortality outcomes following a review of hospital administrative claims for pediatric patients who expired between 31 and 90 days following sepsis presentation. Given these limitations and the variability in trends shown over time, results in Figure C1 should be interpreted with caution.

Figure C1 shows no clear trend in sepsis related mortality among the pediatric population. Most quarters across the three-year period have average performance, indicating that the observed number of deaths for that quarter are not significantly different from the expected number of deaths, after accounting for patient risk factors. There are two exceptions to this pattern: the 4$^{th}$ quarter in 2018 had high performance (significantly fewer deaths than expected) and the 4$^{th}$ quarter of 2019 had low performance (significantly more deaths than expected).

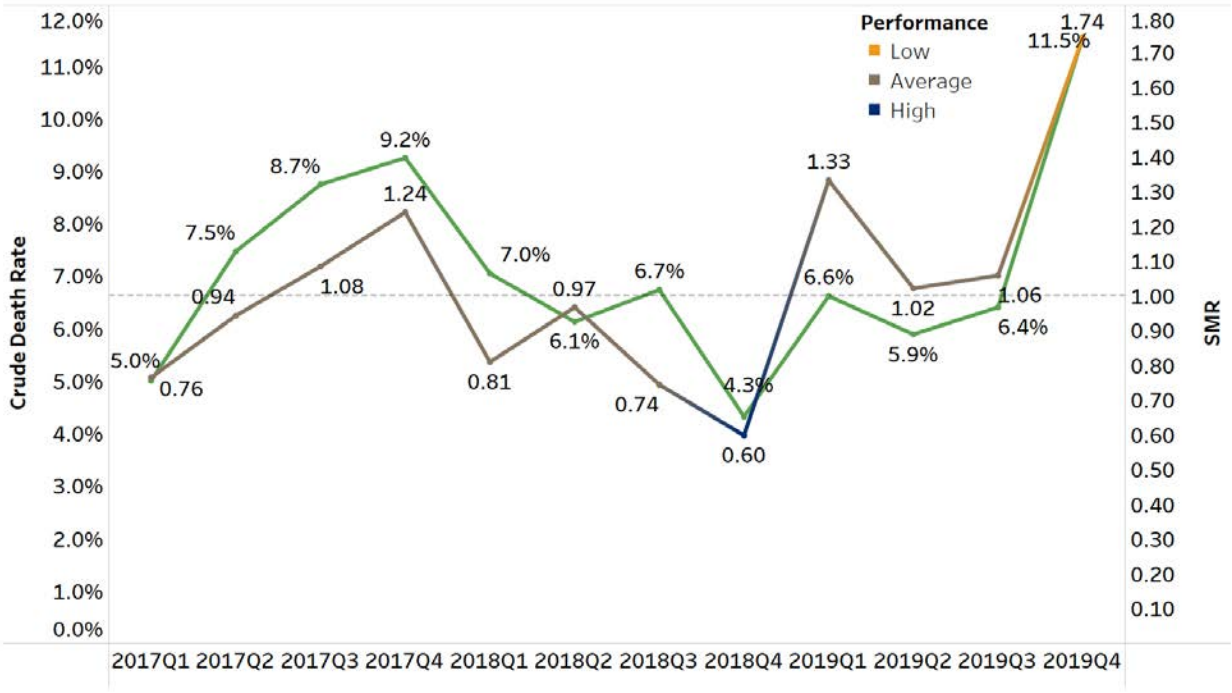
**Table C1. Variables in the Pediatric Risk-Adjusted Mortality Rate (RAMR) model**

| Main Effects or Interactions | Level of Effects | (%) | Coef. | Adjusted OR | P-Value |
|---|---|---|---|---|---|
| Intercept | | | -4.892 | | <.0001 |
| Age Groups - Main effect | <=28 days | 5.1% | -1.674 | | 0.1281 |
| | 29-364 days | 19.8% | -0.664 | | 0.1495 |
| | 1-4 | 20.8% | 0.234 | | 0.5694 |
| | 5-17 | 54.3% | **Reference Level** | | |
| Source of Admission - Main effect | Non-Health Facility, POA | 64.6% | **Reference Level** | | |
| | Different Hospital | 21.3% | 0.815 | 2.26 (1.32-3.88) | 0.0031 |
| | SNF/ICF | 2.7% | 1.742 | 5.71 (2.20-14.8) | 0.0003 |
| | Other | 11.4% | 0.221 | 1.25 (0.59-2.66) | 0.5661 |
| | No | 63.4% | **Reference Level** | | |

| | | | | | |
|---|---|---|---|---|---|
| Altered Mental Status - Main effect | Yes | 22.2% | 0.918 | 2.50 (1.46-4.28) | 0.0008 |
| | Unknown | 14.4% | 0.645 | 1.91 (0.98-3.69) | 0.0558 |
| Initial Lactate Level Categories - Main effect | <2.4 mmol/L | 33.4% | **Reference Level** | | |
| | >=2.4 to <4 mmol/L | 17.3% | -0.017 | 0.98 (0.42-2.29) | 0.9688 |
| | >=4 to >8 mmol/L | 14.0% | 1.153 | 3.17 (1.59-6.29) | 0.0010 |
| | >=8 to >10 mmol/L | 1.8% | 0.859 | 2.36 (0.54-10.2) | 0.2511 |
| | >=10 mmol/L | 2.8% | 3.271 | 26.3 (10.7-64.7) | <.0001 |
| | Unknown | 30.7% | 0.384 | 1.47 (0.77-2.79) | 0.2405 |
| Platelet Count - Main effect | No | 64.8% | **Reference Level** | | |
| | Yes | 27.1% | 0.211 | | 0.5715 |
| | Unknown | 8.1% | -0.992 | | 0.2483 |
| Diabetes - Main effect | No | 97.9% | **Reference Level** | | |
| | Yes | 2.1% | 1.912 | 6.77 (2.32-19.8) | 0.0005 |
| Lymphoma Leukemia Multiple Myeloma - Main effect | No | 93.6% | **Reference Level** | | |
| | Yes | 6.4% | 1.143 | 3.14 (1.41-6.97) | 0.0050 |
| ICU Admission Prior to Sepsis - Main effect | No | 66.8% | **Reference Level** | | |
| | Yes | 33.2% | 0.583 | 1.79 (1.08-2.98) | 0.0246 |
| Infection Etiology - Hospital Acquired Infection - Main effect | No | 84.3% | **Reference Level** | | |
| | Yes | 6.5% | 0.284 | 1.33 (0.63-2.80) | 0.4564 |
| | Unknown | 9.2% | 0.891 | 2.44 (1.21-4.91) | 0.0126 |
| MV Prior to Presentation - Main effect | No | 87.5% | **Reference Level** | | |
| | Yes | 12.5% | 0.803 | 2.23 (1.22-4.09) | 0.0095 |
| Age Groups * Platelet Count | <=28 days, Yes | | 4.351 | | 0.0007 |
| | <=28 days, Unknown | | 5.274 | | 0.0063 |
| | 29-364 days, Yes | | 2.033 | | 0.0020 |
| | 29-364 days, Unknown | | 1.763 | | 0.1529 |
| | 1-4, Yes | | 0.922 | | 0.1260 |
| | 1-4, Yes | | 1.926 | | 0.0814 |

**c statistic: 0.8467**

**Figure C1. Pediatric Standardized Mortality Ratio (SMR) with Crude Death Rate by Quarter**



# Technical Appendix D: Comparisons Over Time

The following table show statewide comparisons of performance and outcome measures for in-hospital sepsis care for NYS between 2016 and 2019.

Table D1 contains statewide sepsis care compliance and outcome measure results for adults (age ≥ 18) and compliance measure results for pediatric (age < 18) sepsis patients in NYS from 2016 to 2019. This table includes the statewide crude in-hospital death rates per 100 sepsis patients along with the 3-Hour Bundle (Adult) and 6-Hour Bundle (Adult) quality measures for adults and presents the 1-Hour Bundle (Pediatric) sepsis care measure for pediatric patients. Patient eligibility and completion criteria for each measure follows the guidelines in place for each individual calendar year. All eligible cases are included in the calculation of the statewide measure results, regardless of the number of cases at the individual hospital where the patient was seen.

**Table D1. Adult Sepsis Compliance and Outcome Measures and Pediatric Sepsis Compliance Measures Calendar Year (CY) Comparison**

| Year | Crude Death Rate (Adult) | 3-Hour Bundle Completion (Adult) | 6-Hour Bundle Completion (Adult) | 1-Hour Bundle Completion (Pediatric) |
|---|---|---|---|---|
| 2019 | 22.11 | 70.91 | 44.25 | 46.52 |
| 2018 | 22.53 | 69.48 | 40.81 | 42.67 |
| 2017 | 23.70 | 64.98 | 34.96 | 35.94 |
| 2016 | 25.45 | 56.88 | 36.38 | 8.16 |
| **Difference (CY17-CY16)** | **-1.75** | **8.09** | **-1.43** | **27.78** |
| **Difference (CY18-CY17)** | **-1.17** | **4.50** | **5.85** | **6.73** |
| **Difference (CY19-CY18)** | **-0.41** | **1.43** | **3.44** | **3.86** |

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