

Statistical Brief #9

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New York State All Payer Patient Safety Indicators, 2009-2013

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Introduction

This Statistical Brief provides a summary of the Agency of Healthcare Research and Quality (AHRQ) Patient Safety Indicator (PSI) metrics for all payer inpatient hospital discharges in New York State (NYS) from January 1, 2009 through December 31, 2013.

Patient Safety Indicators are a set of measures that utilize hospital discharge data to provide insight into the quality of care delivered by hospitals. PSIs help to identify complications of medical care and adverse events following surgeries, procedures and childbirth during the hospital admission. PSIs can be used to highlight potential quality of care concerns in hospitals or on a regional level; identify areas that need further study and investigation; and track changes over time.

Methods

PSI computation was performed through the use of the AHRQ Quality Indicators software version 4.5 (May 2013 release) for each of the five years. Each PSI is defined by a specific set of criteria that includes one or more types of the clinical identification of the disease, condition, procedure, or their combination. Definition could be based on International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) diagnostic and/or procedural codes, Major Diagnostic Categories (MDC), or Medicare Severity Diagnosis Related Groups (MS-DRG).

There are thirty-one PSI metrics that are divided into Provider level and Area level types, and a PSI composite. The Provider level PSI type is further divided into categories including Medical/Surgical including Volume, Surgical, Obstetric, and a Composite metric. Area level PSI type is divided into medical/surgical and surgical categories. Selected medical/surgical and surgical only PSIs were combined into one composite measure to summarize them in one patient safety metric.

A PSI indicator is assigned to a discharge when the record matches the specific inclusion and exclusion criteria for the denominator. All but three obstetric PSIs are calculated only for discharges for patients 18

Highlights

- During the five year period studied, rates for most patient safety indicators decreased, demonstrating a desirable trend for hospital complications and adverse events.
- Notably, decreasing trends were visible for both sepsis mortality and postoperative sepsis rates.
- In-hospital infection rates decreased markedly over the time period, with Central Venous Catheter-Related Bloodstream Infection decreasing nearly 50 percent.
- The greatest decrease occurred for Transfusion Reaction Count, with a decrease of -83.33%.
- Death in Low Mortality DRGs and Deaths among Surgical Inpatients with Serious Treatable Complications decreased during the study period (19.76 and 5.70% respectively).
- Over time the PSI composite decreased, showing NYS patient safety performance as measured by PSIs not only improved since 2009, but the improvement was better than expected.
- PSIs that increased between 2009 and 2013 were Postoperative Respiratory Failure and Birth Trauma-Injury to Neonate.

years or older. Another common, but not universal exclusion are discharges with an MDC14 (pregnancy, childbirth, and puerperium). All PSIs that are presented as a rate or counts have additional multiple inclusion and exclusion criteria to identify only those discharges that are at risk for a particular adverse event. Besides diagnostic and procedural information, it includes type of admission and days between admission and date of procedure. The numerator for each PSI rate, with the exception of the area PSIs, is a sum of the discharges that satisfy the denominator criteria and criteria for a specific complication measure by PSI. All PSIs presented in this report are measures of the potential in-hospital or iatrogenic complications and adverse events of care, therefore lower rates and counts are desired for all metrics. For more detailed technical specifications for the PSI metrics please refer to the AHRQ web site at:

http://www.qualityindicators.ahrq.gov/Modules/PSI_TechSpec.aspx

Provider Level Metrics

There are eighteen Provider Level PSIs that can be further defined as eight Surgical PSIs, five Medical/Surgical PSIs, three Obstetric PSIs, two Volume PSIs that are used to measure Medical/Surgical complications, and one Composite measure. Surgical PSI 04 - Death among Surgical Inpatients with Serious Treatable Complications, has five additional strata by specific complication: Pneumonia, Pulmonary Embolism or Deep Vein Thrombosis, Sepsis, Shock or Cardiac Arrest, GI Hemorrhage or Acute Ulcer, and Retained Surgical Item or Un-retrieved Device Fragment Count.

In this report the Provider level metrics are presented as both observed and expected rates as well as by their ratio. With the exception of Volume PSIs and the Composite, Provider level metrics are presented as a rate per 1,000 discharges at risk. The observed rate is the actual rate of occurrence of adverse events per 1,000 discharges at risk. The expected rate is the rate the provider would have if it performed the same as the reference population, adjusting for the provider's actual case-mix using identified risk factors such as patient demographic information, modified MS-DRG and comorbid conditions. Expected values were calculated using parameter estimates applied to the New York State (NYS) discharges. Each PSI has a unique set of covariates identified as potential risk adjusters. The parameter estimates used to calculate expected values are based on the analysis of the 2010 AHRQ's Cost and Utilization Project (HCUP) State Inpatient Databases (SID) and are a product of the logistic regression models used in the risk adjustment process that was separately developed for each PSI. These parameter estimates represent distribution of the risk factors in 2010 national sample which is a reference population for the version of the AHRQ PSI software used in this study.

Medical/Surgical Metrics: The denominator for each of these PSIs is a number of medical or surgical discharges as defined by DRG or MS-DRG codes relevant for a particular PSI. The numerator is the sum of the PSI-specific complications or adverse events identified by secondary diagnoses not present on admission and/or by a set of procedures. The numerator for the two mortality PSIs is the number of in-hospital deaths among patients meeting denominator criteria.

Surgical Metrics: Definitions for these PSIs are very similar to the Medical/Surgical metrics with one exception that they are calculated surgical only discharges as defined by DRG or MS-DRG codes specific for a particular PSI.

Obstetric Metrics: The numerator for PSIs related to childbirth are discharges, among cases meeting the inclusion and exclusion rules for the denominator. Diagnostic criteria for identification of Obstetric PSIs is applied to any of the listed diagnoses. Obstetric PSIs are represented only as observed rates and are not risk adjusted.

Volume Metrics: Two volume PSI metrics PSI 05 - Retained Surgical Item or Un-retrieved Device Fragment Count and PSI 16 - Transfusion Reaction Count are associated with Surgical/Medical discharges and represent the sum of the number of hospital discharges with procedure codes and diagnoses corresponding

to the particular PSI definition for patients aged 18 and older or obstetric patients. Adverse events that are measured by volume PSIs are identified through secondary diagnoses that were not present on admission.

Composite Metric: There is one composite PSI 90 – Patient Safety for Selected Indicators with eleven components including PSI 03, PSI 06, PSI 07, PSI 08, PSI 09, PSI 10, PSI 11, PSI 12, PSI 13, PSI 14, and PSI 15. (Refer to [Table 1](#) for descriptions of these PSIs). The composite PSI is the weighted average of the observed to expected ratios for the component indicators. Component weights represent denominator weights and are calculated as the relative frequency within the reference population of the PSI component denominator. These weights were provided by the AHRQ and represent a 2010 national sample. Statewide observed to expected ratios for the composite indicators were calculated using national figures as the reference. Composite value of 1.0 represents an average performance, values higher than 1.0 represent worse than expected performance, and values lower than 1.0 represent better than expected performance. A lower composite rate is desirable.

Area Level Metrics

There are seven Area level PSIs. (Refer to [Table 2](#) descriptions of these PSIs). Four (PSI 21, PSI 22, PSI 23, PSI 25, PSI 26) are calculated for Medical/Surgical and two (PSI 24, PSI 27) for Surgical only hospital discharges. Area level metrics are reported as a rate per 100,000 population at risk and are calculated for patients aged 18 and older. The numerators for all area level PSIs have inclusion and exclusion criteria based on both principal and secondary diagnoses in addition to other PSI-specific criteria with the exception of the PSI 27 that is defined through secondary diagnoses only and additional criteria. The denominator for area level PSIs is population aged 18 and older in the county of patient's residence. The population denominators were provided as part of the AHRQ software and are based on public-use files of intercensal and postcensal estimates of county level population by five year age group, gender, race, and Hispanic origin acquired from the United States Census Bureau. Area level PSIs are not risk adjusted and are reported as observed population rates.

Patient Safety Indicators were calculated for each Article 28 (acute care) hospital in the NYS for years 2009-2013 and are available on Health Data NY (<https://health.data.ny.gov/>). This statistical brief presents only statewide rates and ratios that were calculated as part of the process.

Data Source

Hospital inpatient discharges analyzed in this report were submitted by an Article 28 (acute care) hospitals within NYS through the Statewide Planning and Research Cooperative System (SPARCS) for the time period January 1, 2009 through December 31, 2013.

Findings

Medical/Surgical and Surgical Metrics:

Some in-hospital adverse events related to care provided are similar in nature for Medical/Surgical and Surgical only discharges. Therefore, findings for these metrics will be discussed together. [Table 1](#) presents statewide rates, ratios (observed/expected) and counts for Medical/Surgical, Surgical, Volume, and Obstetric PSIs for inpatient hospital discharges from 2009 to 2013. All rates for the Medical/Surgical PSIs show a decreasing trend from 2009 to 2013. Moreover, the ratio of observed to expected presented in [Table 1](#) for all the Medical/Surgical PSIs decreased in the range between 6.48 and 49.26 percent. The most notable percent decrease in ratios was seen for PSI 07 - Central Venous Catheter-Related Bloodstream Infection which fell by nearly 50 percent from 1.04 to 0.49. While the ratio of observed to expected for the Medical/Surgical metric, PSI 03 - Pressure Ulcer, decreased during the study period from 1.93 to 1.79, it was still greater than one, showing one of the worst results for PSIs in 2013. Additional information for all

Medical/Surgical PSIs can be found in [Figure 1](#), where the percent change is reported for each Medical/Surgical PSI from 2009 to 2013.

a. Mortality measures: Two mortality metrics, one for medical/surgical discharges (PSI 02 - Deaths in Low-Mortality DRGs) and one for surgical only discharges (PSI 04 - Deaths among Surgical Inpatients with Serious Treatable Complications) showed a decrease in the ratio of observed to expected between 2009 and 2013. Ratios for PSI 02 were consistently lower than one across all five years and decreased by 19.76 percent from 0.87 to 0.70 ([Figure 2](#)) showing that NYS performed better than expected relative to the 2010 national rates.

The ratio of observed to expected in-hospital mortality rates for PSI 04 also decreased from 2009 to 2013 from 1.07 to 1.01. However, the ratio is slightly above one meaning that overall NYS performed as well as or worse than expected during the study period. PSI 04 is broken into five mortality strata measuring rates of death for surgical patients from the following complications: pneumonia, pulmonary embolism or deep vein thrombosis, sepsis, shock or cardiac arrest, and GI hemorrhage or acute ulcer. For each of the five categories, the ratio of observed to expected decreased from 2009 to 2013. However, the ratio for PSI 04B - Pulmonary Embolism or Deep Vein Thrombosis remained above one as it decreased from 1.14 to 1.10. Furthermore, as seen in [Figure 2](#), ratios for PSI 04B - Pulmonary Embolism or Deep Vein Thrombosis changed the least among mortality metrics, decreasing only by 0.84 percent from 2009 to 2013. The most notable reduction in mortality was a decrease of 18 percent for PSI 13 - Postoperative Sepsis.

In 2013, the observed rate for PSI 02 - Deaths in Low-Mortality DRGs was 0.26 per 1,000 discharges at risk. Observed rates within PSI 04 strata varied by complication. The lowest observed mortality rate in 2013 was for PSI 04A - Pneumonia (79.87 per 1,000 surgical discharges at risk), while the highest was for PSI 04D - Shock or Cardiac Arrest (352.31 per 1,000 surgical discharges at risk).

b. Infection Measures: PSIs measuring adverse events related to in-hospital infections include PSI 04C - Sepsis Mortality, PSI 07 - Central Venous Catheter-Related Bloodstream Infection, and PSI 13 - Postoperative Sepsis among elective surgical discharges. The infection-related PSI metrics showed some of the greatest decreases in rates and percent change in ratios from 2009 to 2013. Observed rates for PSI 04-C, PSI 07 and PSI 13 were 23.6, 42.2 and 23.7 percent smaller (respectively) in 2013 than in 2009. Additionally, while in 2009, the ratio of observed to expected for all three infection PSIs showed that NYS performed worse than expected (1.14, 1.04 and 1.16 respectively), in 2013 all three PSIs had ratios below one (0.94, 0.53 and 0.87 respectively), demonstrating that NYS hospitals dramatically changed safety practices related to control of the in-hospital infections. The most notable percent decrease in ratios was seen for PSI 07 - Central Venous Catheter-Related Bloodstream Infection which fell by nearly 50 percent from 1.04 to 0.49.

c. Postoperative Measures: Five surgical PSI metrics that were designed to measure in-hospital adverse events during the postoperative period include: PSI 08 - Postoperative Hip Fracture, PSI 10 - Postoperative Physiologic and Metabolic Derangements, PSI 11 - Postoperative Respiratory Failure, PSI 13 - Postoperative Sepsis, and PSI 14 - Postoperative Wound Dehiscence. The ratio of observed to expected for all but one (PSI 08) postoperative measures showed that in 2013 NYS performed better than expected and was in the range between 0.72 and 0.87. PSI 08 - Postoperative Hip Fracture is measuring a relatively rare event as evidenced by the observed rate in 2013 of 0.04 per 1,000 surgical discharges at risk. While this rate was worse than expected with a ratio of 1.42, overall, the ratio for PSI 08 decreased the most among the Surgical metrics (44.26 percent). The only postoperative adverse event that had an increased ratio during the study period was PSI 11 (4.7 percent), though it still performed well overall in 2013 (Ratio = 0.85).

d. Perioperative Measures: Two perioperative PSIs are employed to examine the occurrence of iatrogenic events among surgical patients at any time during their hospital admission. In 2013 NYS performed as well as expected or worse, respectively, for PSI 09 - Perioperative Hemorrhage or Hematoma (Ratio=1.01) and PSI 12 - Perioperative Pulmonary Embolism or Deep Vein Thrombosis (Ratio=1.18). Between 2009 and 2013 both statewide perioperative measures showed a marked improvement in the ratio of observed to expected. For PSI09 the change was from 1.15 to 1.01 and for PSI 12 from 1.60 to 1.18 as seen in [Table 1](#). In

2003 the observed rates for these metrics were 6.29 per 1,000 discharges for PSI 09 and 5.91 per 1,000 discharges for PSI 12.

Obstetric Measures:

Three obstetric measures were developed by AHRQ to flag adverse events during birth and delivery. Both delivery related complications measured by PSI 18 - Obstetric Trauma-Vaginal Delivery with Instrument and PSI 19 - Obstetric Trauma-Vaginal Delivery without Instrument had their rates reduced between 2009 and 2013 from 2.13 to 2.42 per 1,000 deliveries and 143.05 to 138.63 per 1,000 deliveries respectively. However, from 2009 to 2013 the rates for PSI 17 - Birth Trauma-Injury to Neonate increased from 2.13 to 2.42 per 1,000 newborns. [Figure 3](#) further elaborates on the percent change in obstetric PSI rates across the years. PSI 17 increased by 13.8 percent, while PSI 18 decreased by 3.1 percent and PSI 19 decreased by 8.4 percent.

Volume Measures:

Two measures for Medical/Surgical complications of care are presented as counts per year. PSI 05 - Retained Surgical Item or Un-retrieved Device Fragment (83 cases in 2013) and PSI 16 - Transfusion Reaction Count (one case in 2013) both decreased in magnitude from 2009 to 2013, with PSI 05 decreasing by 18 cases (17.82%) and PSI 16 by 5 cases (83.33%, [Figure 4](#)). Both metrics fluctuated over time, but neither went above the 2009 baseline year counts at any point in the five year period.

Area Measures:

To help better understand the patterns of patient safety complications on a geographical level, seven Provider level PSIs (PSI 05, PSI 06, PSI 07, PSI 14, PSI 15, PSI 16 and PSI 09) were calculated as a rate per population at risk in the county of patient residence. [Table 2](#) presents statewide observed rates for the Area level PSIs (PSI 21-PSI 27) from 2009 to 2013. All Area level PSIs rates decreased from 2009 to 2013 following the same trends as rate measured corresponding Provider level PSIs. [Figure 5](#) presents the percent change in observed rates for Area level PSIs from 2009 to 2013. Only two measures: PSI 21 - Retained Surgical Item or Un-Retrieved Device Item Fragment and PSI 27 - Postoperative Hemorrhage or Hematoma had higher rates in 2010 than the reference 2010 national population (1.29 vs 0.95 and 41.95 vs 38.05 per 100,000). All other metrics were below national rates and further decreased through the years. The greatest percent change was seen for PSI 26 - Transfusion Reactions, which dropped 89 percent during the analysis time period.

Composite Measure:

While individual PSIs target very specific complications of care, they do not always reflect on the overall state of patient safety issues in a particular hospital or geographical area. A composite measure that can meaningfully summarize outcomes from multiple PSIs could be more reflective of the institutional practices overall. The names of the PSIs that are grouped into one composite measure are identified in [Table 1](#). [Figure 6](#) shows the dynamic of change of the statewide Composite PSI90 from 2009 to 2013. During the study period the value of the composite was reduced dramatically from 1.09 to 0.84 with NYS performing better than expected beginning in 2010.

Conclusions

From 2009 to 2013 decreases in rates and counts were observed in all of the Medical/Surgical PSI measures, twelve of the thirteen Surgical PSIs, two of the three Obstetric PSIs, and all of the Volume PSIs. All area level PSIs had values in 2013 lower than in 2009. Overall, most PSI metrics have decreased during the examined period demonstrating a very desirable trend for hospital complications and adverse events. Only two PSIs increased over the five years, those are PSI 11 - Postoperative Respiratory Failure (observed rate change: 6.21 to 7.39 per 100) and PSI 17 - Birth Trauma-Injury to Neonate (observed rate change: 2.13 to 2.42 per 1,000 birth). The increase for PSI 17 (ratio of observed to expected increased 13.7 percent) is very undesirable and could be influenced by multiple factors such as the type of delivery and equipment used, increased maternal weight and having a baby large for gestational age.

The rate of occurrence of the stage III or IV pressure ulcer that is measured by PSI 03 - Pressure Ulcer decreased from 2009 to 2013, but the ratio of observed to expected rate was much greater than one (1.93 and 1.79 in respective years). This suggests that more attention should be given to this undesirable outcome in NYS hospitals. Pressure ulcers are more common among critically ill, older patients and those being treated for urinary tract infections, anemia, and electrolyte disorders[1] . Many internal and external factors could influence a patient's susceptibility to pressure ulcers. Targeting care towards patient groups and conditions known to be associated with pressure ulcers may aid in decreasing the rate further in New York State.

Decreasing trends were visible for both sepsis mortality (PSI 04C), and postoperative sepsis rates (PSI 13). Nationally, hospitalization rates for sepsis have increased in the past years, as reported by the CDC [2], however, the decline in sepsis mortality has been reported across both clinical and administrative data sources [3],[4]. In NYS, the decline in sepsis occurrence and sepsis mortality implies better prevention, case recognition and improved care management for hospital acquired severe infection. Supporting this is the fact that one of the most significant improvements was noted for PSI 07 - Central Venous Catheter-Related Bloodstream Infection that had its ratio decreasing from 1.04 to 0.53 during the five year study period.

Both PSIs measuring in-hospital mortality, PSI 02 - Death in Low-Mortality DRGs and PSI 04 - Deaths among Surgical Inpatients with Serious Treatable Complications and its strata all declined from 2009 to 2013. The most rapid decline in ratio, as was discussed above, was noted for PSI 04C - Sepsis mortality (18.09 percent), distantly followed by PSI 04D - Shock or Cardiac Arrest (3.97 percent) and PSI 04B - Pulmonary Embolism and Deep Vein Thrombosis (3.46 percent). The observed decline in mortality for PSI 04C, PSI 04B could also be due to the decline in the rates of these complications as measured by PSI 13 and PSI 12.

The statewide value for the Composite PSI 90 decreased over the analysis period from significantly higher than expected to significantly lower than expected as evident from 95 percent confidence intervals around Composite measure shown on [Figure 6](#) for each study year. Initially, the observed rate for the composite was greater than one (1.09) meaning that NYS performed worse than expected in 2009. Over time the composite decreased to 0.84, showing that NYS performance in terms of overall patient safety not only improved from 2009, but the improvement was better than expected.

Tables and Figures

Table 1. New York State Patient Safety Indicators Provider Level Measures, 2009 – 2013

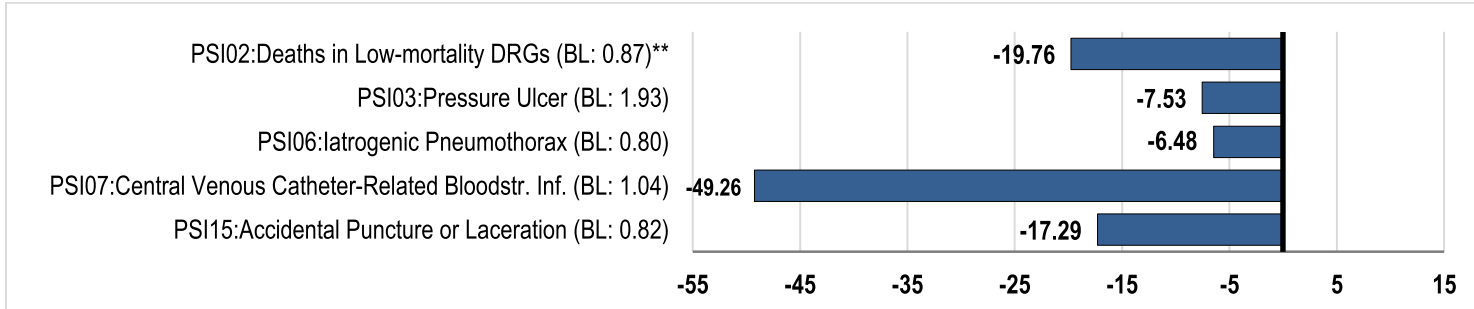
Category	Patient Safety Indicator	Measure*	2009	2010	2011	2012	2013	National Observed Rate, 2010
Medical/Surgical	PSI02:Deaths in Low-Mortality DRGs	Observed Rate	0.31	0.25	0.25	0.24	0.26	0.28
		Expected Rate	0.36	0.37	0.38	0.38	0.37	
		Ratio	0.87	0.68	0.67	0.63	0.70	
Medical/Surgical	PSI03:Pressure Ulcer**	Observed Rate	0.74	0.60	0.67	0.65	0.72	0.41
		Expected Rate	0.38	0.39	0.39	0.40	0.40	
		Ratio	1.93	1.52	1.70	1.63	1.79	
Surgical	PSI04:Deaths Among Surgical Inpatients With Serious Treatable Complications	Observed Rate	132.81	129.04	126.11	132.43	130.23	117.37
		Expected Rate	124.60	123.76	124.70	125.42	129.57	
		Ratio	1.07	1.04	1.01	1.06	1.01	
Surgical	PSI04-A: Pneumonia	Observed Rate	76.25	82.35	73.26	83.10	79.87	79.51
		Expected Rate	80.32	79.80	80.26	79.99	84.85	
		Ratio	0.95	1.03	0.91	1.04	0.94	
Surgical	PSI04-B: Pulmonary Embolism or Deep Vein Thrombosis	Observed Rate	127.83	121.17	119.38	130.26	126.85	102.50
		Expected Rate	112.14	113.01	112.71	112.91	115.28	
		Ratio	1.14	1.07	1.06	1.15	1.10	
Surgical	PSI04-C: Sepsis	Observed Rate	292.26	261.78	241.17	233.93	223.15	236.41
		Expected Rate	255.27	254.38	248.54	235.67	237.95	
		Ratio	1.14	1.03	0.97	0.99	0.94	
Surgical	PSI04-D: Shock or Cardiac Arrest	Observed Rate	369.98	382.90	370.16	360.38	352.31	357.88
		Expected Rate	369.57	358.15	366.70	361.46	366.46	
		Ratio	1.00	1.07	1.01	1.00	0.96	
Surgical	PSI04-E: GI hemorrhage or Acute Ulcer	Observed Rate	83.60	69.12	78.38	85.60	86.28	67.72
		Expected Rate	71.31	71.13	75.48	76.19	85.13	
		Ratio	1.17	0.97	1.04	1.12	1.01	
Medical/Surgical	PSI05:Retained Surgical Item or Unretrieved Device Fragment Count	Volume, Count	101	84	93	88	83	
Medical/Surgical	PSI06:Iatrogenic Pneumothorax**	Observed Rate	0.35	0.35	0.35	0.30	0.32	0.44
		Expected Rate	0.44	0.44	0.44	0.43	0.43	
		Ratio	0.80	0.80	0.80	0.69	0.75	
Medical/Surgical	PSI07:Central Venous Catheter-Related Bloodstream Infection**	Observed Rate	0.45	0.37	0.36	0.30	0.26	0.41
		Expected Rate	0.43	0.44	0.46	0.47	0.49	
		Ratio	1.04	0.83	0.79	0.63	0.53	
Surgical	PSI08:Postoperative Hip Fracture**	Observed Rate	0.07	0.05	0.04	0.05	0.04	0.03
		Expected Rate	0.03	0.03	0.03	0.03	0.03	
		Ratio	2.55	1.82	1.56	2.00	1.42	
Surgical	PSI09:Perioperative Hemorrhage or Hematoma**	Observed Rate	7.18	6.56	6.35	6.24	6.29	5.74
		Expected Rate	6.23	6.17	6.17	6.23	6.23	
		Ratio	1.15	1.06	1.03	1.00	1.01	

Category	Patient Safety Indicator	Measure*	2009	2010	2011	2012	2013	National Observed Rate, 2010
Surgical	PSI10:Postoperative Physiologic and Metabolic Derangements**	Observed Rate	0.61	0.54	0.54	0.46	0.36	0.47
		Expected Rate	0.50	0.49	0.50	0.50	0.51	
		Ratio	1.23	1.09	1.09	0.91	0.72	
Surgical	PSI11:Postoperative Respiratory Failure**	Observed Rate	6.21	6.89	7.13	8.33	7.39	8.32
		Expected Rate	7.63	7.84	8.22	8.54	8.67	
		Ratio	0.81	0.88	0.87	0.98	0.85	
Surgical	PSI12:Perioperative Pulmonary Embolism or Deep Vein Thrombosis**	Observed Rate	6.89	5.55	5.99	5.91	5.65	4.37
		Expected Rate	4.30	4.39	4.55	4.69	4.80	
		Ratio	1.60	1.26	1.32	1.26	1.18	
Surgical	PSI13:Postoperative Sepsis**	Observed Rate	12.25	11.94	12.54	8.86	9.34	11.80
		Expected Rate	10.52	10.33	10.61	10.51	10.79	
		Ratio	1.16	1.16	1.18	0.84	0.87	
Surgical	PSI14:Postoperative Wound Dehiscence*	Observed Rate	2.12	1.62	1.74	1.76	1.47	1.87
		Expected Rate	1.71	1.76	1.82	1.85	1.89	
		Ratio	1.24	0.92	0.95	0.95	0.78	
Medical/Surgical	PSI15:Accidental Puncture or Laceration**	Observed Rate	1.92	1.73	1.68	1.51	1.59	2.43
		Expected Rate	2.34	2.34	2.30	2.29	2.34	
		Ratio	0.82	0.74	0.73	0.66	0.68	
Medical/Surgical	PSI16:Transfusion Reaction Count	Volume, Count	6	4	6	4	1	
Obstetric	PSI17:Birth Trauma-Injury to Neonate	Observed Rate	2.13	2.11	2.40	2.28	2.42	2.10
Obstetric	PSI18:Obstetric Trauma-Vaginal Delivery with Instrument	Observed Rate	143.05	141.79	145.13	147.43	138.63	139.92
Obstetric	PSI19:Obstetric Trauma-Vaginal Deliveries without Instrument	Observed Rate	22.91	22.06	22.98	21.82	20.99	22.54

* Measures: Rates are per 1,000 discharges at risk; Ratios are ratios of Observed/Expected rates;

** Components of the PSI90 Composite: Patient Safety for Selected Indicators;

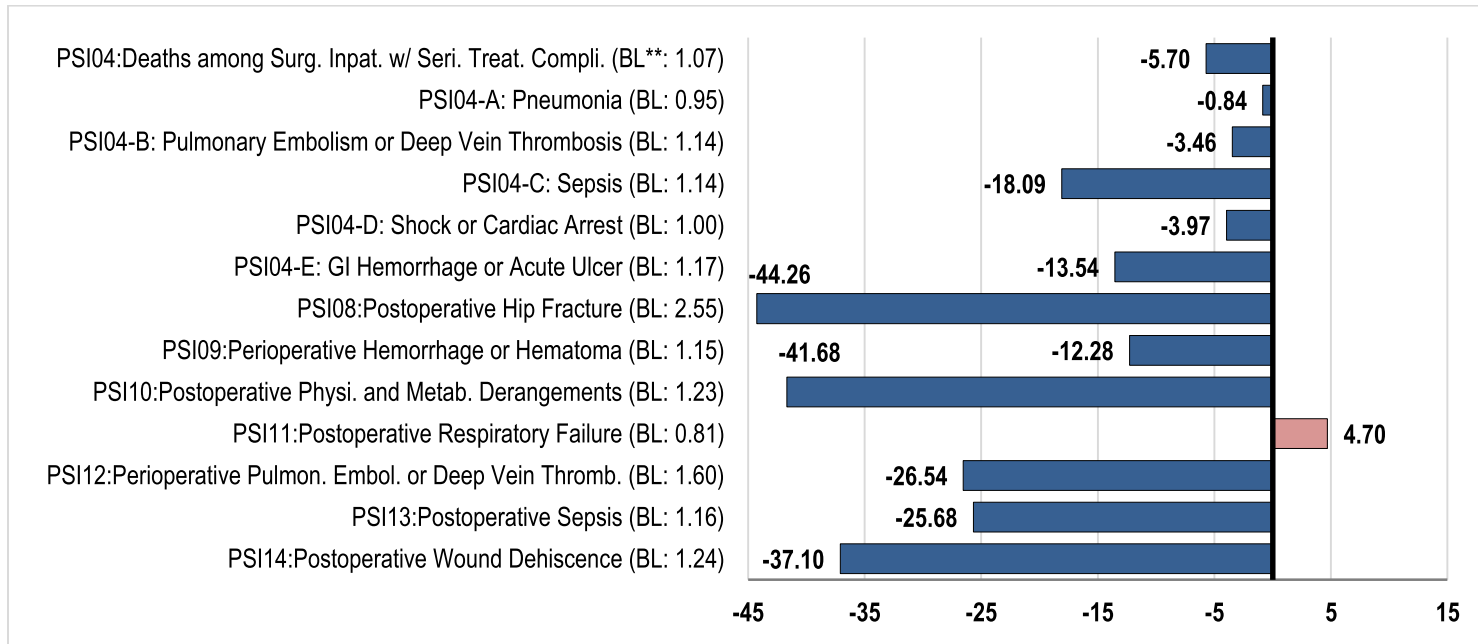
Figure 1. Percent Change in the Ratio of Observed to Expected Rates for Medical/Surgical Patient Safety Indicators in New York State, 2009 – 2013*



* Source: Statewide Planning and Research Cooperative System (SPARCS);

** BL: 2009 base line of ratio of Observed to Expected;

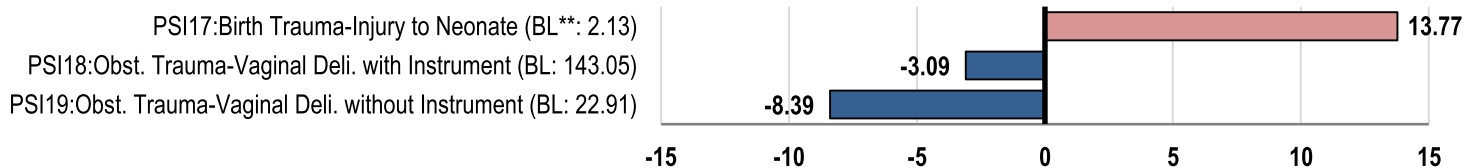
Figure 2. Percent Change in the Ratio of Observed to Expected Rates for Surgical Patient Safety Indicators in New York State, 2009 – 2013*



* Source: Statewide Planning and Research Cooperative System (SPARCS);

** BL: 2009 base line of ratio of Observed to Expected;

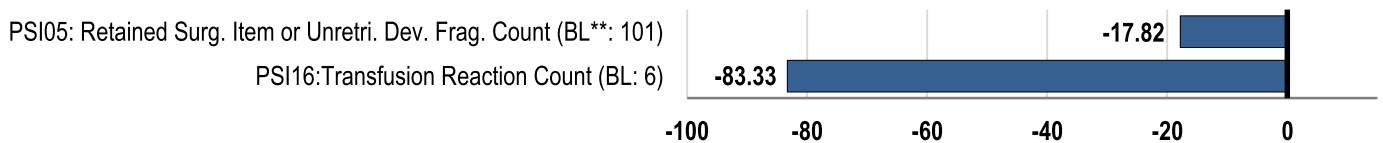
Figure 3. Percent Change in Observed Rate of Obstetric Patient Safety Indicators in New York State, 2009 – 2013*



* Source: Statewide Planning and Research Cooperative System (SPARCS);

** BL: 2009 base line of ratio of Observed to Expected;

Figure 4. Percent Change in Counts of Volume Patient Safety Indicators, 2009 – 2013*



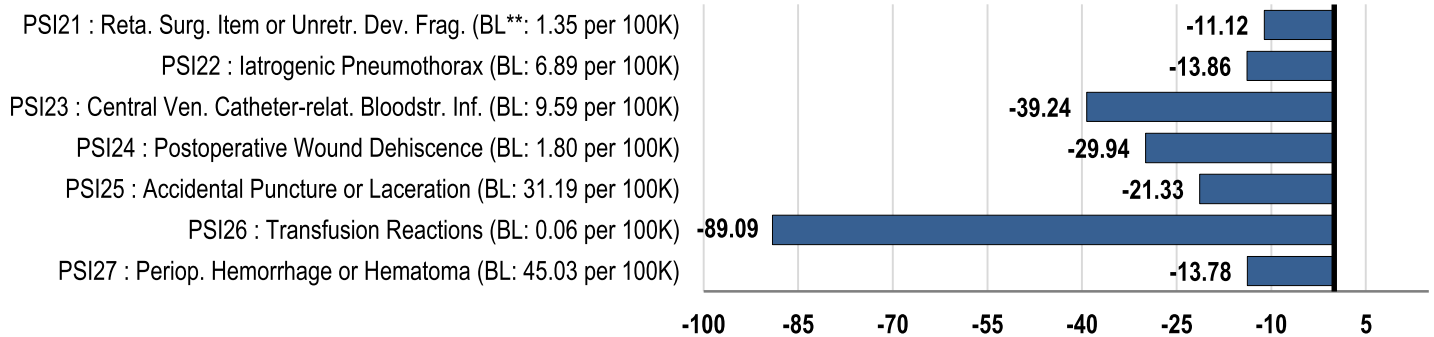
* Source: Statewide Planning and Research Cooperative System (SPARCS);

** BL: 2009 base line of ratio of Observed to Expected;

Table 2. Area Level Patient Safety Indicators, Observed Rate Per 100,000 Population in New York State, 2009 – 2013

Category	Patient Safety Indicators	2009	2010	2011	2012	2013	National Observed Rate, 2010
Medical/Surgical	PSI21: Retained Surgical Item or Unretrieved Device Fragment	1.35	1.29	1.27	1.19	1.20	0.95
Medical/Surgical	PSI22: Iatrogenic Pneumothorax	6.89	6.43	6.51	5.73	5.93	6.85
Medical/Surgical	PSI23: Central Venous Catheter-related Bloodstream Infections	9.59	8.49	8.49	6.85	5.83	10.59
Surgical	PSI24: Postoperative Wound Dehiscence	1.80	1.56	1.43	1.43	1.26	1.68
Medical/Surgical	PSI25: Accidental Puncture or Laceration	31.19	28.70	27.00	24.45	24.54	33.72
Medical/Surgical	PSI26: Transfusion Reactions	0.06	0.05	0.09	0.06	0.01	0.05
Surgical	PSI27: Perioperative Hemorrhage or Hematoma	45.03	41.95	41.12	39.40	38.83	38.05

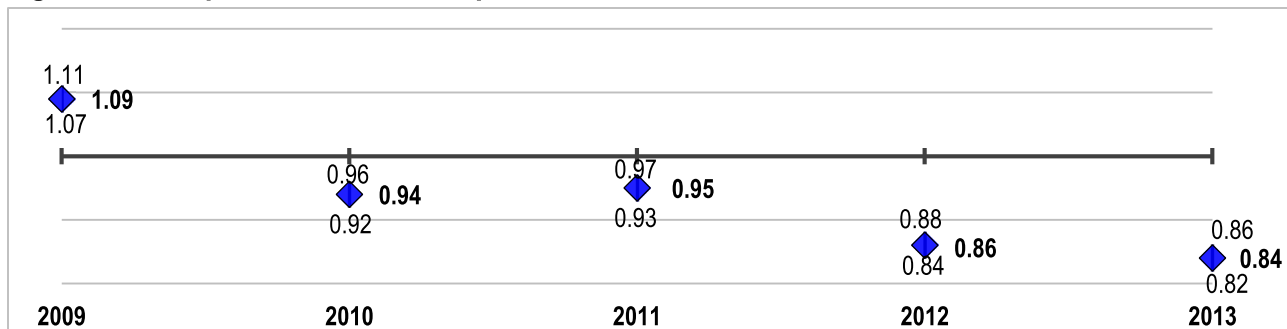
Figure 5. Percent Change in the Observed Rate for Area Level Patient Safety Indicators in New York State, 2009 - 2013*



* Source: Statewide Planning and Research Cooperative System (SPARCS);

** BL: 2009 base line for Observed rate per 100,000 population at risk;

Figure 6. Composite Patient Safety for Selected Indicators* in New York State, 2009 – 2013.**



* Composite PSI90 Components: PSI03, PSI06, PSI07, PSI08, PSI09, PSI10, PSI11, PSI12, PSI13, PSI14, PSI15;

** Source: Statewide Planning and Research Cooperative System (SPARCS);

Definitions

- **SPARCS:** The Statewide Planning and Research Cooperative System (SPARCS) is a comprehensive data reporting system established in 1979 as a result of cooperation between the health care industry and government. Initially created to collect information on discharges from hospitals, SPARCS currently collects patient level detail on patient characteristics, diagnoses and treatments, services, and charges for every Article 28 (acute care) hospital discharge, ambulatory surgery, emergency room visits, and visits to hospital-based outpatient clinics in New York State. More information on SPARCS may be found at the following direct link: <http://www.health.ny.gov/statistics/sparcs/>.
- **AHRQ:** The Agency for Healthcare Research and Quality's (AHRQ) was originally created as the Agency for Health Care Policy and Research (AHCPR) on December 19, 1989, under the Omnibus Budget Reconciliation Act of 1989, as a Public Health Service Agency in the U.S. Department of Health and Human Services (HHS). The Agency was reauthorized with a name change as the Agency for Healthcare Research and Quality on December 6, 1999, under the Healthcare Research and Quality Act of 1999. The AHRQ mission is to produce evidence to make health care safer, higher quality, more accessible, equitable, and affordable, and to work within the U.S. Department of Health and Human Services and with other partners to make sure that the evidence is understood and used. For more information follow direct link: http://www.qualityindicators.ahrq.gov/modules/psi_resources.aspx
- **HCUP:** The Healthcare Cost and Utilization Project (HCUP) includes the largest collection of longitudinal hospital care data in the United States. Sponsored by AHRQ, HCUP includes largest all payer encounter level health care data (inpatient, emergency department and ambulatory surgery records) in the U.S., beginning in 1988. HCUP is a Federal-State-Industry partnership that brings together data collection efforts of many organizations to create a national health care information resource. For more information follow direct link: <http://www.hcup-us.ahrq.gov/>
- **The United States Census Bureau** is the agency of the Federal Statistical System responsible for producing data about the US population and economy. More about US Census could be found at: <http://www.census.gov/>
- **Unit of Analysis:** The unit of analysis for this report is the hospital inpatient discharge, not the patient. Therefore, if a single person was admitted to the hospital multiple times in a single year they would be counted as distinct hospital inpatient discharges. One hospital discharge could be at risk for more than one PSI. Data in this report is presented on the statewide level.
- **Health Data NY** is a New York State Department of Health sponsored data site that provides health care providers, researchers, academics, and the general public with access to valuable health data. The data site allows users to download and analyze data in a variety of formats, create visualizations of the data and review metadata and can be accessed <https://health.data.ny.gov>.
- **Diagnosis Related Group (DRG)** is a system developed by the former Healthcare Financing Administration (HCFA), now known as the Centers for Medicare and Medicaid Services (CMS) for classification of hospital inpatient stays into groups for the purposes of payment, primarily for the Medicare reimbursement. Hospital discharge is assigned a DRG based on primary and secondary diagnoses (ICD-9-CM), all procedures (ICD-9-CM), patient's age, gender and discharge status information.
- **Medicare Severity-Diagnosis Related Groups (MS-DRG)** is a modified DRG system used for grouping of the hospital inpatient stays that takes into account patient's severity of illness. The MS-DRGs are assigned using primary and secondary diagnoses (ICD-9-CM), all procedures (ICD-9-CM), patient's age, gender and discharge status. For the list of the MS-DRGs please refer to CMS document: www.cms.gov/mmrr/Downloads/MMRR2013_003_03_a03.pdf
For the MS-DRG version used for a specific calendar year in this report, please refer to the website: <http://www.health.ny.gov/statistics/sparcs/sysdoc/appy.htm>

- **Present on Admission (POA)** is an indicator associated with each diagnosis. It indicates whether the onset of the diagnosis preceded or followed admission to the hospital. As part of the SPARCS reporting, all NYS hospitals must submit POA information on the principal and all secondary diagnoses for all inpatient discharges. For additional details please use link: <http://www.health.ny.gov/statistics/sparcs/sysdoc/inpatientoutputdd.pdf>

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