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New York State All-Payer Potentially Preventable Readmission Rates 2009-2012

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Introduction

Hospital readmissions are increasingly viewed as a potential indicator of the quality of inpatient care, predicated on the notion that they might have been prevented with improved coordination of services between inpatient and outpatient settings. Potentially Preventable Readmissions (PPRs) are return admissions, identified by a software program developed by 3M Health Information Systems, within a specified time period that are clinically related to the initial admission. These return admissions are thought to be potentially preventable with proper care and treatment during the initial hospitalization; and through adequate discharge planning, follow-up and coordination between the inpatient and outpatient settings.

The analyses in this brief provide a summary of Potentially Preventable Readmissions in New York based on hospital inpatient discharges reported through the New York State Statewide Planning and Research Cooperative (SPARCS) system by Article 28 hospitals for the time period 2009 through 2012. In addition, costs and charges associated with admissions for each year are reported.

Methods

Analysis

The Potentially Preventable Readmission Classification System software (Version 30.0) was used to identify readmissions within a 30 day window from the initial admission that addressed a continuation, recurrence or complication of a problem that occurred during the initial hospitalization. Analyses to identify readmissions were calculated for each year (January 1st through December 31st) separately.

Within the software, logic is employed to first assign an All Patient Refined Diagnosis Related Group (APR DRG) to each admission. Next, each base APR DRG is divided into one of four severity of illness (SOI) levels to further describe an admission determined primarily by secondary diagnoses. Afterwards, globally-excluded admissions and non-event admissions are identified and removed from analysis by the software. Additionally, specific admission types and discharge status

Highlights

- The statewide PPR rate decreased from 8.11 in 2009 to 7.86 in 2012.
- The most frequent reason for readmission was heart failure.
- Over the four years, heart failure admissions and readmissions have steadily decreased while sepsis admissions and readmissions are on the rise.
- New York City had the highest PPR rates, while the Western-Buffalo region had the lowest PPR rates.
- The percentage of total hospital admissions that are readmissions is decreasing, as well as the percent of total costs associated with these readmissions.

types exclude a hospitalization as at risk to be followed by a potentially preventable readmission. Excluded types of admissions include; most types of major metastatic malignancies, trauma, burns, many types of obstetrical admissions and newborns, as well as patients whose treatment abruptly ended (the patient left against medical advice or the patient was transferred to another hospital).

Categorization for each admission is dependent on both the readmission time interval and the disposition of the patient at the time of discharge. The PPR logic determines if a readmission is clinically-related to the initial admission and classifies each admission to one of four final types of admission: initial admission, readmission, only admission, or transfer admission. A PPR chain is composed of an initial admission and all the readmissions associated with that initial admission. A unique identification number is assigned to all admissions in the chain for easy identification of related admissions. A readmission can occur at any hospital. If the admission was suitable to be followed by a readmission but was not, it is recorded as an only admission. A transfer admission is an admission with a discharge status of transferred to another hospital for care. The observed PPR rate is the number of observed PPR chains divided by the number of at risk admissions (PPR chains plus only admissions).

Converting Charges to Costs

Estimates of discharge costs were calculated using hospital discharge data from SPARCS and Institutional Cost Report (ICR) data. ICRs include data on cost for each facility as well as ratios of Cost to Charges (RCCs). RCCs are certified, calculated and reported by facilities and are subject to external audit. For example, if a hospital charge is $20,000 and the RCC is 50%, the estimated cost is $10,000. As with charges, cost data are hospital-specific. Cost data presented in this analysis was calculated using facility specific 2010 audited RCC files.

Risk Adjustment

A statewide statistical model was developed to enable fair comparison among hospitals. Variables used in the risk adjustment to predict the probability that the "at risk admission" would be followed by a PPR included; APR-DRG at initial admission, severity of illness (SOI) within that APR-DRG, patient age, and patient's mental health status at initial admission. Age groups were categorized into five groups: less than or equal to 17 years of age, 18-45 years of age, 46-59 years of age, 60-75 years of age, 76 years of age and older. Mental health status was indicated by a secondary diagnosis code of mental health on the initial admission; which is a variable that is obtained from the 3M PPR software. A statewide norm PPR rate was calculated for each combination of APR-DRG, SOI, age category, and mental health status within the dataset, and combinations where the number of admissions was 5 or less were removed from the analysis.

The expected number of PPR chains is the sum of these probabilities across all at risk admissions in a facility. This number represents the number of PPR chains we would expect to see at each facility based on the characteristics of their patients during the at risk admission. The expected PPR rate is the number of expected PPR chains divided by the number of at risk admissions.

A risk adjusted PPR rate (per 100 hospitalizations) for each facility was calculated by dividing the observed PPR rate by the expected PPR rate, multiplying by the statewide observed PPR rate. The statewide PPR rate (per 100 hospitalizations) is calculated by dividing the total number of observed PPR chains at all facilities by the total number of at risk admissions at all facilities for each discharge year separately.

Data Source

These analyses were based on hospital inpatient discharge data from the New York State Statewide Planning and Research Cooperative System (SPARCS). SPARCS is a comprehensive data system that collects patient level detail on patient characteristics, diagnoses, treatments, services, and charges for every hospital discharge, ambulatory surgery visit and emergency department visit in New York State. From all New York State inpatient Article 28 (acute care) hospitals, 10.4 million admissions were included in this analysis from January 1, 2009 and December 31, 2012.

A total of 61,374 (0.59%) admissions were excluded because they were considered "non-events", such as same day transfers to acute care hospitals for non-acute care (e.g. hospice care), malignances with a chemotherapy or radiotherapy procedure, discharges considered a "categorical exclusion", which includes patients who discharged themselves against medical advice, patients with certain conditions such as trauma, burns, obstetrical or newborns, or other global exclusions. A total of 7,354,835 at risk admissions remained in the final dataset used for this analysis.

The SPARCS PPR rates by hospital for years 2009-2012 can be found on Health Data NY (https://health.data.ny.gov/). Health Data NY is a 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.

Findings

APR-DRG at Initial admission and readmission

Chart 1 contains the top 12 medical and surgical APR-DRGs for the initial admission in the PPR chain, ranked according to their frequency for each discharge year. These are admissions that were followed by a potentially preventable readmission. Heart failure and COPD, both medical APR-DRGs, were the two most frequent APR-DRGs from 2009 to 2011. In 2012, Heart failure remained the most frequent APR-DRG, with Sepsis replacing COPD as the second most frequent APR-DRG. The top 12 APR DRGs represented 26% of the initial admissions for each year. Consistently, over the four years, nearly 75% of initial admissions were for medical APR-DRGs while only 25% were surgical APR DRGs.

Chart 2 presents the 10 most frequent medical and surgical APR-DRGs for potentially preventable readmissions, ranked according to their frequency for each discharge year. Heart failure, Sepsis, and COPD, all medical APR-DRGs, were the three most frequently reported APR-DRGs from 2009-2012. The top 10 APR-DRGs contain 35% of readmissions for each year. Nearly 95% of all readmissions were for medical APR-DRGs.

PPR Rates by Hospital

The PPR Rates by Hospital data can be accessed at: https://health.data.ny.gov/Health/Hospital-Inpatient-Potentially-PrevenChart-Readmis/amqp-cz9w. Within this dataset, for each hospital, the total number of at risk admissions, the total number of observed PPR chains, observed PPR rate, expected PPR rate, and risk adjusted PPR rate are presented by year beginning in 2009. Whether a hospital performed better or worse than expected varied between years. For example, a facility in 2009 could perform better than expected, based on their case mix, but in 2010 perform no differently than expected based on their case mix. Statewide observed rates for each year are also presented. Chart 3 illustrates statewide observed PPR rates by discharge year. The statewide observed PPR rate decreased from 2009 (8.11) to 2012 (7.86). Hospital observed PPR rates ranged from 0.00 to 33.33 with their risk adjusted rates ranging from 0.00 to 22.57.

PPR Rates by Region

Chart 4 displays Risk Adjusted PPR rates by region. Each hospital was grouped into one of seven regions based on the facility's geographic location in New York State. Regionally, the PPR rate was highest in NYC for all four years, compared to the other regions. Western-Buffalo region had the lowest PPR rate each year. PPR rates in NYC, Northeastern, and Northern Metropolitan regions gradually decreased from 2009 to 2012. However in 2011, in the Western-Buffalo region, the PPR rate increased from 7.18 in 2010 to 7.52 per 100 at risk admissions. In the Central Region, the PPR rate slightly increased from 2009 (7.71) to 2010 (7.88) before decreasing in 2011 and 2012. The PPR rate in the Western-Rochester region increased from 2009 (7.49) to 2011 (7.64) but decreased in 2012 (7.38).

Charges and Costs of Readmissions

Aggregate charges and costs for all admissions and readmissions for each year of analysis are displayed in Chart 5. From 2009 to 2012 the cumulative number of admissions decreased steadily from 2,665,414 to

2,529,422, but both the total charges and total costs steadily increased from 2009 to 2012. The trend for PPR rates and charges from 2009 to 2012 mirrors the decreasing trend seen for cumulative admissions. In 2009, 7.7% of the total admissions were readmissions, accounting for 8.3% of the total charges. These percentages fell each year, ending with 7.4% of hospital admissions being potentially preventable readmissions accounting for 7.8% of the total charges in 2012.

Conclusions

These findings suggest that potentially preventable hospital readmissions are prevalent and costly. Although the statewide rate decreased slightly, there are still individual facilities with high PPR rates, which implies that there are opportunities for individual facilities to reduce potentially preventable readmissions and associated costs through improved care coordination.

Charts and Charts

Chart 1: Initial Admissions by APR-DRG: Top 12 APR-DRGs

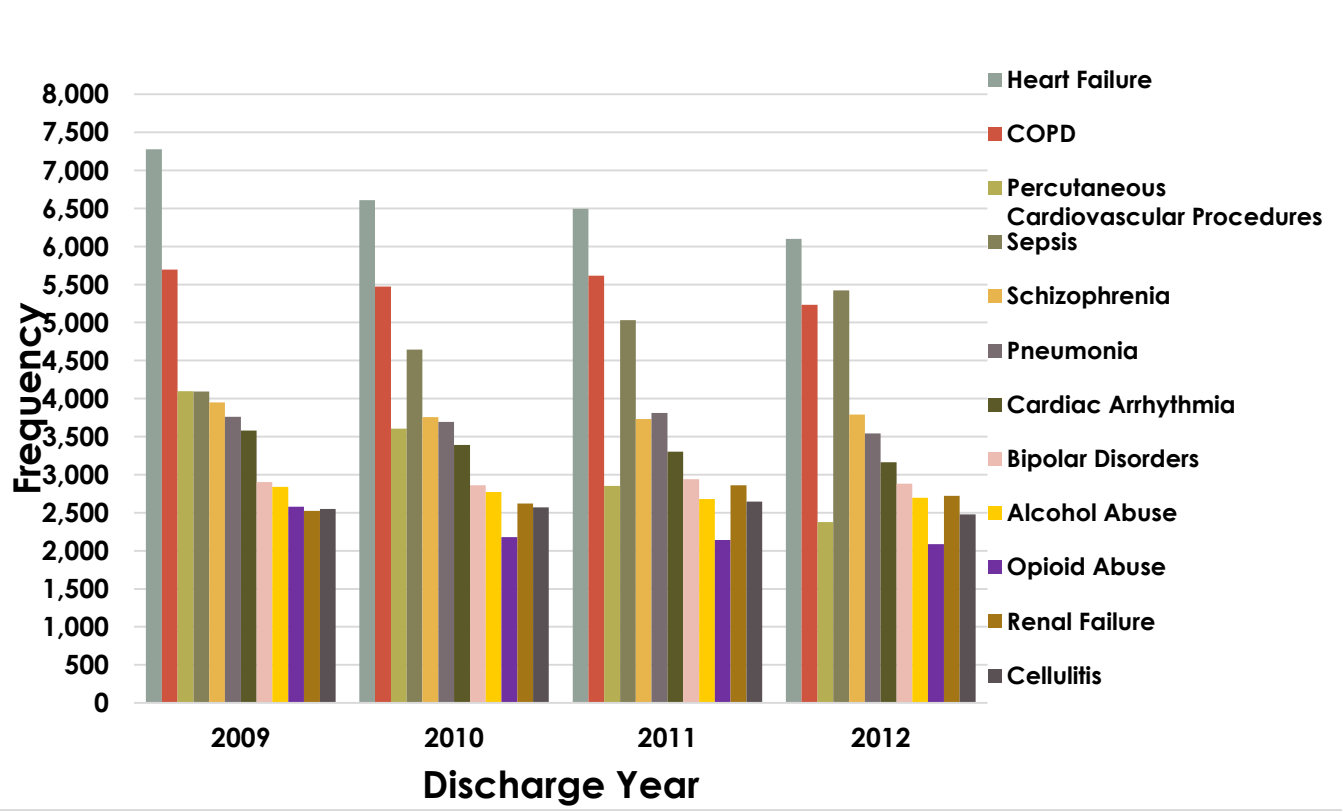

Chart 2: Readmissions by APR-DRG: Top 10 APR-DRGs

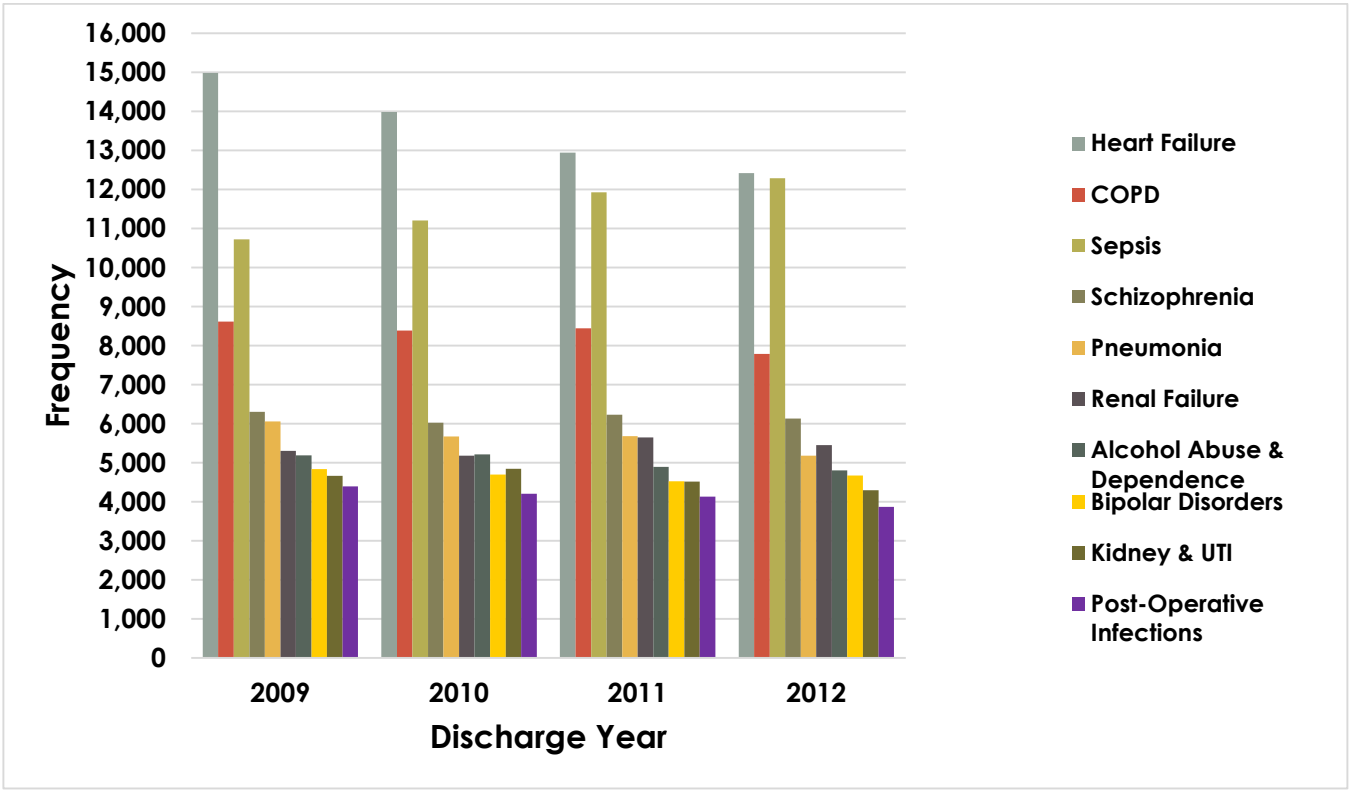

Chart 3: Statewide Observed PPR Rates by Discharge Year

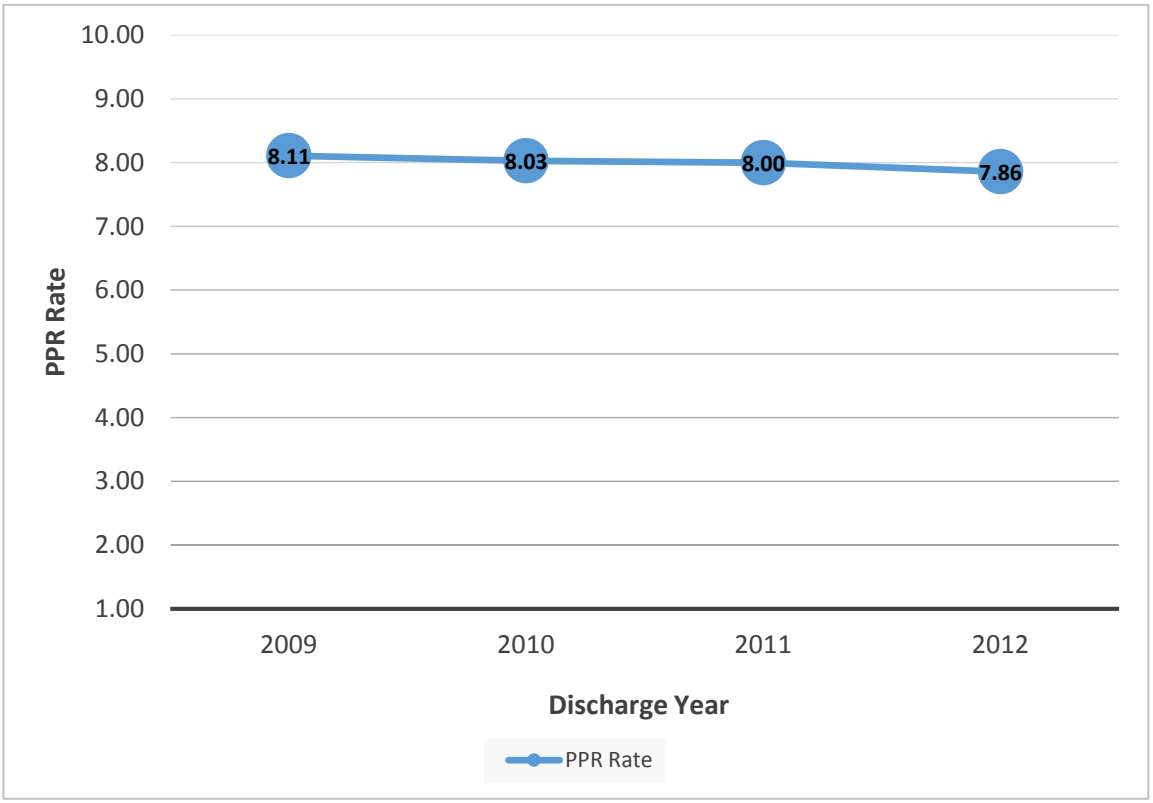

Chart 4: Risk Adjusted PPR Rates by Region

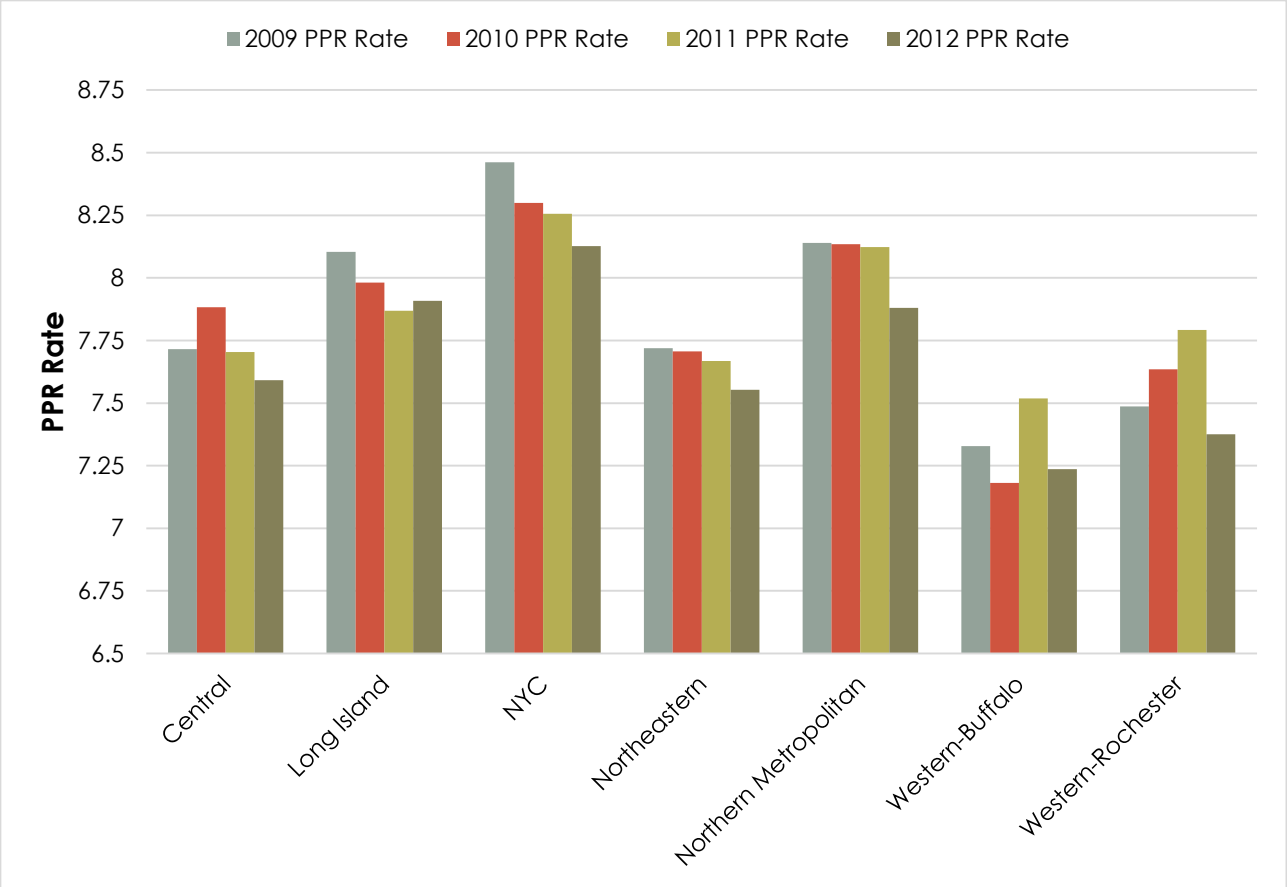

Chart 5: Charges and Costs for Admissions and Readmissions

Year	2009	2010	2011	2012
Total Inpatient Admissions	2,665,414	2,622,133	2,584,770	2,529,422
Total Inpatient Charges ($)	74,470,204,086	77,245,943,405	80,947,280,496	84,374,462,640
Total Inpatient Costs ($)	30,434,699,714	31,112,212,474	32,810,001,277	--
Number of PPRs	205,004	199,154	195,097	187,401
PPR Charges ($)	6,180,706,457	6,252,378,898	6,412,733,624	6,557,909,701
PPR Costs ($)	2,442,775,862	2,459,039,917	2,565,702,388	--
% of PPR to Total Admissions	7.69	7.60	7.55	7.41
% of PPR Charges to Total Charges	8.30	8.09	7.92	7.77
% of PPR Costs to Total Costs	8.03	7.90	7.82	--

Contact Information

We welcome questions, comments and feedback on this Statistical Brief.

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