

Statistical Brief #4

Office of Quality and Patient Safety Bureau of Health Informatics

October 2014



New York State All Payer Potentially Preventable Emergency Room Visits 2011-2012

Stephen Goins, MS, Tatiana Ledneva, MS Mary Beth Conroy, MPH

Introduction

Initiatives to achieve the triple aim of improving population health, increasing consumer satisfaction and reducing health care costs has become a priority at both the state and federal level. Essential to this effort is the development of performance based programs and program metrics that can effectively monitor the progress of the federal and state initiatives enacted to achieve this triple aim. The rate of Potentially Preventable Emergency Room Visits (PPVs) are a measure that reflect both the quality of patient care and the opportunity to target potentially avoidable costs. PPVs are ER visits for ambulatory care sensitive conditions that may have been avoided with adequate patient monitoring and follow-up. PPVs represent poor quality of, or access to, primary care or care coordination. PPVs represent a substantial portion of all New York State (NYS) emergency room (ER) visits. With increasing incentives to contain healthcare costs and improve population health; monitoring and reducing non-emergent emergency room visits as a community health performance based quality metric has attracted increased attention.

Although eliminating every ER visit for ambulatory sensitive conditions may not be feasible, avoiding a fraction of these visits can aid efforts in promoting prevention and management of diseases and conditions through primary and preventive care services. A shift to primary care disease management improves health on both the individual and population levels; and indirectly results in significant saving. It is important to note that PPVs are a population based quality measure and do not reflect the care provided at a specific facility. High rates of PPVs can help to identify the regions and conditions where resources should be targeted to improve patient quality and reduce costs.

Valid comparisons between existing analyses are difficult because there is no standard definition for a PPV. The analysis presented in this brief was performed using an algorithm recently developed by 3M Health Information Systems designed specifically to identify PPVs. The 3M method uses principal diagnosis and procedures performed during an ER visit to identify visits that are ambulatory care sensitive, and

Highlights

- Approximately 75% of eligible New York State (NYS) Emergency Room (ER) visits (visits that did not result in an inpatient admission) in 2012 were potentially preventable.
- The most common conditions to result in an ER visit in NYS were 'Musculoskeletal System and Connective Tissue Diagnoses', 'Infections of the Upper Respiratory Tract and Otitis Media', and 'Contusion, Open Wound & Other Trauma to Skin and Subcutaneous Tissue'. These conditions accounted for nearly 20% of all ER visits in 2012, approximately 88% of which were potentially preventable.
- ER visits that were primarily self-paid had the highest adjusted rate of PPVs compared to all other payers with 76.89 per 100 eligible visits potentially preventable.
- The mean statewide cost of a PPV in 2012 was \$703.77 per visit, representing a 9.6% rise in mean cost per PPV visit from 2011.

therefore considered potentially preventable. The PPV definition is expanded upon within the algorithm for some institutionalized patients based on the expectation of elevated care-coordination for these individuals. PPVs defined in this manner have the advantage of being directly associated with the 3M™ Enhanced Ambulatory Patient Groupings (EAPGs) outpatient payment system which provides a link between the clinical and financial aspects of care and provides a meaningful evaluation of the potential financial impact of these visits.

The purpose of this brief is to provide a summary of the demographic and clinical characteristics, as well as crude and risk adjusted rates, of PPVs for all-payer hospital ambulatory emergency room visits in NYS. Visits were identified from New York State Statewide Planning and Research Cooperative system (SPARCS) reporting by Article 28 hospitals for 2011-2012.

Methods

The unit of analysis for this report was an emergency room (ER) visit, defined as any outpatient discharge record with a revenue or CPT/HCPCS code indicating emergency room care from an Article 28 (acute care) New York State hospital between January 1, 2011 and December 31, 2012 as reported to the Statewide Planning and Research Cooperative System (SPARCS). SPARCS is a comprehensive all payer hospital discharge data reporting system established in 1979 as a result of cooperation between the health care industry and government. SPARCS currently collects patient level detail on patient characteristics, diagnoses, treatments, services, and charges for every hospital discharge, ambulatory surgery patient, and emergency department admission in New York State. Those ER visits resulting in an inpatient admission to the same facility, or visits to facilities with known ER reporting issues, were excluded.

PPV Methodology

PPV identification was completed through the use of the PPV algorithm component of 3M™ Population Focused Preventables (PFP) Classification System (Version 1.2) software through the assignment of EAPGs. Treatment using emergency services can occur in many health care settings. To be considered in the PPV software, outpatient visits must have one of the following revenue codes or Evaluation and Management CPT Codes to be included in the classification grouping:

Code	Value
Revenue Codes	
0450	Emergency department general
0451	EMTALA emergency medical screening
0452	ER beyond EMTALA screening
0456	Urgent Care
0459	Other emergency room
0981	Professional fees-emergency room
Evaluation and Management CPT Codes	
99281	Emergency Department visit (straight forward decision making)
99282	Emergency Department visit (low complexity)
99283	Emergency Department visit (expanded problem focus exam/moderate complexity)
99284	Emergency Department visit (detail exam/mod complexity)
99285	Emergency Department visit (high complexity) are identified as ED visits for a patient

The PPV calculations include both inpatient and outpatient data. When an ER stay occurs shortly after a hospitalization, the assignment of PPV may be the result of actions taken or omitted during the hospital stay. In addition, outpatient claims with dates that overlap an inpatient admission are excluded from PPV assignment.

Because EAPGs are classified primarily by procedural codes, visits with no procedures documented were excluded from eligibility. In addition, visits from facilities with significant disparities in procedure reporting between analysis years were also excluded. Following these exclusions 6,301,626 ER visits in 2011 and 6,475,549 visits in 2012 were considered eligible for PPV assignment.

The first step in PPV identification is the assignment of one or more EAPGs to an ER visit to explain the amount and type of resources used in a visit and determine if the reason for the visit was for a significant procedure, ancillary services, or medical. A list of principal diagnoses, within Medical and non-Medical EAPGs, indicate ambulatory care sensitive conditions and if indicated as the reason for an ER visit result in PPV assignment. Supplementary criteria for PPVs are applied if a visit originates from a Residential Nursing Facility (RNF). The list of principal diagnoses that represent PPVs is greatly expanded, particularly in regards to trauma diagnoses. The addition of these auxiliary conditions is based on the premise that nursing facilities should offer more closely coordinated care and have protocols in place to prevent trauma. After completion of the PPV logic 4,728,546 ER visits in 2011 and 4,858,262 ER visits in 2012 were identified as potentially preventable. The final step in developing PPV rates is to determine the chronic disease burden of each patient for purposes of risk adjustment. PPV rates vary by level of disease burden and these differences should be accounted for to make reasonable comparisons across strata. Chronic disease burden was assessed using 3M™ Clinical Risk Grouping Software to assign each patient to a CRG based on their prior years SPARCS inpatient and outpatient claims. It should be noted that only institutional claims were used to assign CRGs. Ideally, pharmacy and non-institutional claims would also be used in CRG grouping process. Although institutional claims have the most influence over CRG assignment, these missing components of patients' clinical history would likely alter CRG assignment for some individuals.

Age and health-status (Base CRG) adjusted PPV rates within strata were calculated through indirect standardization using all eligible NYS ER visits that not resulted in inpatient admission as the reference population. Costs were calculated by applying 2010 facility average ratio cost to charges (RCCs) to total charges. Facility specific RCCs are calculated from New York State Institutional Cost Report (ICR) data submitted annually by health care facilities operating in New York State. All data manipulation and analysis outside of CRG grouping and PPV identification were performed using SAS 9.3 statistical software. CRG grouping was performed using 3M Clinical Risk Grouping Software version 1.10 (July 2012) and PPV identification was completed using 3M Population Focused Preventables version 1.2 (April 2014).

Findings

Demographic Characteristics

Demographic characteristics of patients with eligible ER visits in 2012 are presented in [Table 1](#). Statewide, three quarters (75.02%) of all eligible ER visits in 2012 were identified as being potentially preventable; a total of 4,858,262 visits. Just over half (54.50%) of eligible visits were made by females, who had a slightly higher PPV rate (75.73 per 100 visits) than males (74.18 per 100 visits). Adults between 35 and 64 had the highest rate of PPVs at 78.05 per 100 visits, while younger adults aged 19-35 had the lowest rate (71.81 per 100 visits). Residents of New York City accounted for nearly half of all eligible ER visits (46.26%), and also had a higher rate of PPVs (75.79 per 100 visits) than by residents of the rest of NYS (74.44 per 100 visits) and out-of-state and foreign residents (73.70 per 100 visits).

Medical Reasons for ER Visit

The twenty-five most common reasons for an eligible ER visit in 2012, classified by 3M™ Primary Enhanced Ambulatory Patient Group (EAPG), are listed in [Table 2](#). Condition frequencies in 2011 (not shown) were similar to those in 2012. Over 90% of visits in seventeen of the twenty-five most common primary EAPG categories were classified as a PPV, and accounted for over 80% of visits in three additional EAPG categories. The most common reason for an ER visit was 'Level II Other Musculoskeletal System and Connective Tissue Diagnoses', accounting for 7.13% of eligible ER visits; 89.56% of which were identified as PPVs. 'Infection of Upper Respiratory Tract & Otitis Media' was the second most common condition overall, representing 6.79% of eligible ER visits, nearly all (99.99%) of which were PPVs. Many other primary EAPG categories are entirely comprised of PPVs including 'Abdominal Pain', 'Chest Pain', and 'Other Skin, Subcutaneous Tissue & Breast Disorders'. Primary EAPG categories with low proportions of PPVs include 'Respiratory Therapy' (0.01%), 'Level I Skin Repair' (0.55%), 'Other Antepartum Diagnoses' (0.33%), and 'Level II Other Ear, Nose, Mouth, Throat & Cranial/ Facial Diagnoses'.

Supplemental PPV criteria applied to visits from Residential Nursing Facilities (RNFs) generally result in a higher rate of PPVs. There were 25,741 eligible ER visits in 2012 determined to have originated from RNFs, with a rate of 88.41 PPVs per 100 visits. This count potentially underestimates the number of RNF visits as discharge status was used as a proxy for admission source to identify eligible visits. The ten most common reasons for an ER visit originating in a RNF in 2012 are presented in [Table 3](#). The relative frequencies of common conditions that resulted in an ER visit are similar within the RNF subset as compared to the entire population. Only four of the ten most common conditions among RNF visits are not among the ten most common EAPGs overall and only two of these, 'Physical Therapy' and 'Level I Gastrointestinal Diagnoses' are not present in the top twenty-five. 'Contusion, Open Wound and Other Trauma to Skin and Subcutaneous Tissue' (7.72% of visits) is the most common reason for ER visits among this group, with 98.34% of visits potentially preventable. The nine most common primary EAPGs all had more than 97% of visits classified as PPV. Only visits for 'Respiratory Therapy' had a low percentage of PPVs (2.97%).

The distribution of ER visits by health status (as defined by CRG) in 2011-2012 is presented in [Table 4](#). There was a reduction in the percentage of eligible ER visits with a base health status CRG assignment of 'Healthy' in 2012, that corresponded with a slightly higher PPV rate for patients in the dominant chronic disease categories in 2012 compared to 2011. However, PPV rates within CRG were nearly identical across years. Individuals with the lowest disease burden (the 'Healthy') represented the overwhelming majority of all ER visits. Visits by the 'Healthy' also had a PPV rate slightly less than the statewide rate. The highest rate of PPVs in both years was seen among individuals with multiple minor chronic diseases (approximately 84 per 100 visits).

Adjusted PPV Rates by Primary Payer

Although there was little variation across years, there was significant variation in the rate of PPVs between primary payers indicated for the visit, as shown in [Chart 1](#) adjusted for both age and health status (CRG). For visits that were primarily self-pay or Medicaid, the rate of PPVs was statistically significantly higher than the statewide average in both 2011 and 2012 ($P < .05$). Self-pay visits had the highest adjusted rate in 2011 and 2012 with a PPV of 77.16 and 76.89 per 100 visits respectively, followed closely by Medicaid paid visits with a rate of 76.37 and 76.69 PPVs per 100 visits in 2011 and 2012 respectively. Visits with primary payer being Private insurance constituted more than half of all ER visits in both 2011 and 2012 and had a PPV rate that was statistically significantly lower ($P < .05$) than the state average at 74.46 PPVs per 100 ER visits. Visits for which the primary payer was Medicare had an adjusted PPV rate that was marginally higher than the state average, but was still statistically significantly different ($P < .05$). The lowest rate of PPVs occurred among visits for which the primary payer was 'Other'. This group also represented the lowest proportion of all ER visits and includes visits paid by workers compensation, various additional federal programs, and gratis. This group may have contained a higher proportion of injuries relative to the other payers, which generally results in fewer PPVs and may have contributed to this group's lower rates.

Adjusted PPV Rates by Region

Regional rates of PPVs, presented in [Chart 2](#), are adjusted for both age and health status. Five regions experienced a decrease in their adjusted PPV rates from 2011 to 2012 with the largest reduction in the Utica-Adirondack region (~ 1%), although this region still had a PPV rate well above the statewide average. Five regions also experienced a rise in PPV rates from 2011 to 2012. One of these regions with an increase in PPV rate was NYC, whose slight increase may have had an impact on maintaining the state average across years as NYC represented 47 percent of all eligible ER visits. Although the Long-Island PPV rate also increased, this region had the lowest rate in both 2011 and 2012 (72.22 and 72.55 per 100 visits, respectively). Inter-regional variations in PPV Rates are larger than intra-regional variations. In 2012 the highest PPV rate, in Utica-Adirondack, was 76.35 per 100 visits; almost 4% higher than the Long Island PPV rate.

Distribution of PPV Costs by Region

The mean approximate cost per PPV by region is presented in [Chart 3](#). Overall, non-PPV ER visits were found to be more expensive, with a mean estimated cost 25% higher than that of PPVs. Mean estimated cost per PPV rose in every region between 2011 and 2012 by an average of 13%. New York City experienced the smallest estimated cost increase (8.01%) while the Northeast region experienced the largest increase (17.45%). Long Island had the highest estimated mean cost of any region with an estimated mean cost of \$816.97 per PPV in 2012, surpassing the 2011 statewide Non-PPV estimated cost. New York City had the second highest estimated mean cost at \$733.01 per PPV in 2012. The Finger Lakes had the lowest estimated mean cost in 2012 (\$595.79 per PPV), but estimated costs were relatively similar across regions outside of the Northern Metro, Long Island, and New York City regions.

Conclusions

Approximately 75% of all eligible ER visits for 2011 and 2012 were potentially preventable. Seventeen of the twenty-five most common reasons for an eligible ER visit had 90% or greater PPVs. Targeting these EAPGs represents a substantial opportunity for improving population health, quality of care and cost savings.

Tables and Charts

Table 1: Emergency Room Demographics, 2012

Category		Eligible Visits	Observed PPVS	% All Eligible Visits	PPV Rate per 100 Visits
Sex	Female	3,531,474	2,674,409	54.54	75.73
	Male	2,943,991	2,183,799	45.46	74.18
	Unknown	84	54	<0.01	64.29
Age	<5	569,741	427,291	8.80	75.00
	5-18	945,014	690,846	14.59	73.10
	19-35	1,988,727	1,428,054	30.71	71.81
	36-64	2,243,302	1,750,892	34.64	78.05
	65+	728,765	561,179	11.25	77.00
Residence	New York City	2,995,845	2,270,687	46.26	75.79
	Rest of State	3,107,949	2,313,594	48.00	74.44
	Other/Out of State	371,755	273,981	5.74	73.70
Total		6,475,549	4,858,262	100.00	75.02

Table 2: Top 25 Primary EAPG Frequencies for All Eligible Visits, 2012 (n=6,475,549)

Primary EAPG	Primary EAPG Description	Eligible Visit Count	% of All Eligible Visits	% of Visits PPV
00661	Level II Other Musculoskeletal System & Connective Tissue Diagnoses	462,001	7.13	89.56
00562	Infections Of Upper Respiratory Tract & Otitis Media	439,958	6.79	99.99
00674	Contusion, Open Wound & Other Trauma To Skin & Subcutaneous Tissue	348,953	5.39	70.58
00871	Signs, Symptoms & Other Factors Influencing Health Status	275,644	4.26	94.77
00628	Abdominal Pain	273,229	4.22	100.00
00065	Respiratory Therapy	243,737	3.76	0.01
00604	Chest Pain	234,880	3.63	100.00
00675	Other Skin, Subcutaneous Tissue & Breast Disorders	219,362	3.39	100.00
00012	Level I Skin Repair	206,974	3.20	0.55
00627	Non-Bacterial Gastroenteritis, Nausea & Vomiting	186,528	2.88	100.00
00657	Lumbar Disc Disease	171,857	2.65	100.00
00040	Splint, Strapping And Cast Removal	137,591	2.12	100.00
00656	Back & Neck Disorders Except Lumbar Disc Disease	130,242	2.01	91.92
00563	Dental & Oral Diseases & Injuries	124,165	1.92	83.86
00727	Acute Lower Urinary Tract Infections	113,850	1.76	99.99
00564	Level I Other Ear, Nose, Mouth, Throat & Cranial/Facial Diagnoses	109,791	1.70	99.95
00530	Headaches Other Than Migraine	107,684	1.66	100.00
00765	Other Antepartum Diagnoses	105,929	1.64	0.33
00842	Alcohol Abuse & Dependence	104,699	1.62	99.85
00808	Viral Illness	103,520	1.60	99.96
00673	Cellulitis & Other Bacterial Skin Infections	99,572	1.54	100.00
00565	Level II Other Ear, Nose, Mouth, Throat & Cranial/Facial Diagnoses	93,111	1.44	1.20
00576	Level I Other Respiratory Diagnoses	87,566	1.35	88.50
00752	Level I Menstrual And Other Female Diagnoses	82,000	1.27	99.94
00553	Level I Other Ophthalmic Diagnoses	79,688	1.23	93.80

Table 3: Top 10 Primary EAPG Frequencies for Eligible Visits from Residential Nursing Facility Residents, 2012 (n=25,741*)

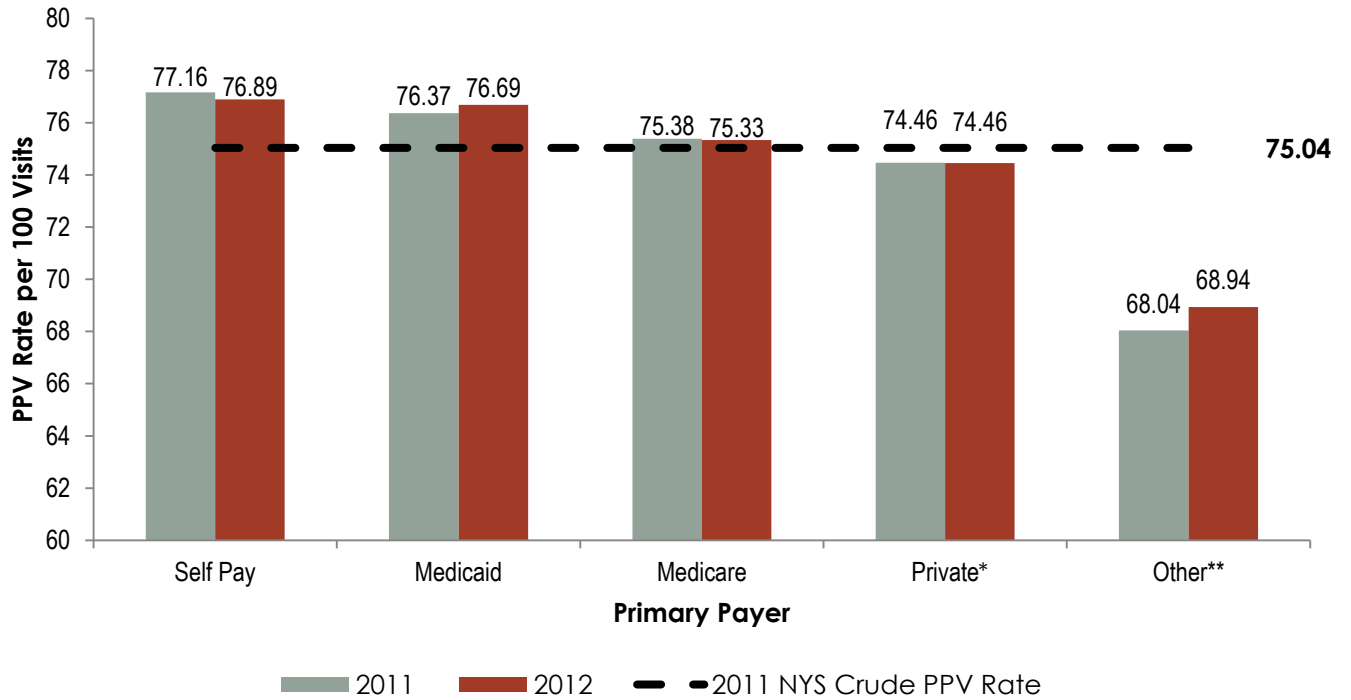
Primary EAPG	EAPG Description	Eligible Visit Count	% of All Eligible Visits	% of Visits PPV
00674	Contusion, Open Wound & Other Trauma To Skin & Subcutaneous Tissue	1,987	7.72	98.34
00871	Signs, Symptoms & Other Factors Influencing Health Status	1,460	5.67	98.97
00012	Level I Skin Repair	1,177	4.57	97.20
00661	Level II Other Musculoskeletal System & Connective Tissue Diagnoses	1,074	4.17	99.81
00271	Physical Therapy	1,065	4.14	100.00
00565	Level II Other Ear, Nose, Mouth, Throat & Cranial/Facial Diagnoses	1,031	4.01	99.81
00624	Level I Gastrointestinal Diagnoses	995	3.87	100.00
00727	Acute Lower Urinary Tract Infections	961	3.73	100.00
00604	Chest Pain	818	3.18	100.00
00065	Respiratory Therapy	707	2.75	2.97

* This count potentially underestimates the number of RNF visits as discharge status was used as a proxy for admission source to identify eligible visits

Table 4: Distribution of ER Visits and Crude PPV Rates by Clinical Risk Group Base Health Status, 2011-2012

Beneficiary Health Status	Calendar Year 2011				Calendar Year 2012			
	Eligible Visits	Observed PPVS	% Eligible Visits	% Visits PPV	Eligible Visits	Observed PPVS	% Eligible Visits	% Visits PPV
Healthy	4,824,878	3,592,437	76.57	74.46	4,623,344	3,423,921	71.40	74.06
Significant Acute	322,115	245,454	5.11	76.20	353,790	269,265	5.46	76.11
Single Minor Chronic	101,926	82,820	1.62	81.26	160,208	128,950	2.47	80.49
Multiple Minor Chronic	21,312	17,928	0.34	84.12	31,231	26,240	0.48	84.02
Single Chronic	388,506	289,052	6.17	74.40	508,816	384,426	7.86	75.55
Pairs Chronic	479,955	374,811	7.62	78.09	589,675	463,805	9.11	78.65
Triples Chronic	87,745	68,004	1.39	77.50	103,985	80,832	1.61	77.73
Malignancies	21,316	16,565	0.34	77.71	29,774	23,187	0.46	77.88
Catastrophic Condition	29,633	22,297	0.47	75.24	34,784	25,953	0.54	74.61
HIV/AIDS	24,240	19,178	0.38	79.12	39,942	31,683	0.62	79.32
Total	6,301,626	4,728,546	100.00	75.04	6,475,549	4,858,262	100.00	75.02

Chart 1: Adjusted PPV Visit Rate per 100 Eligible ER Visits by Primary Payer, 2011-2012

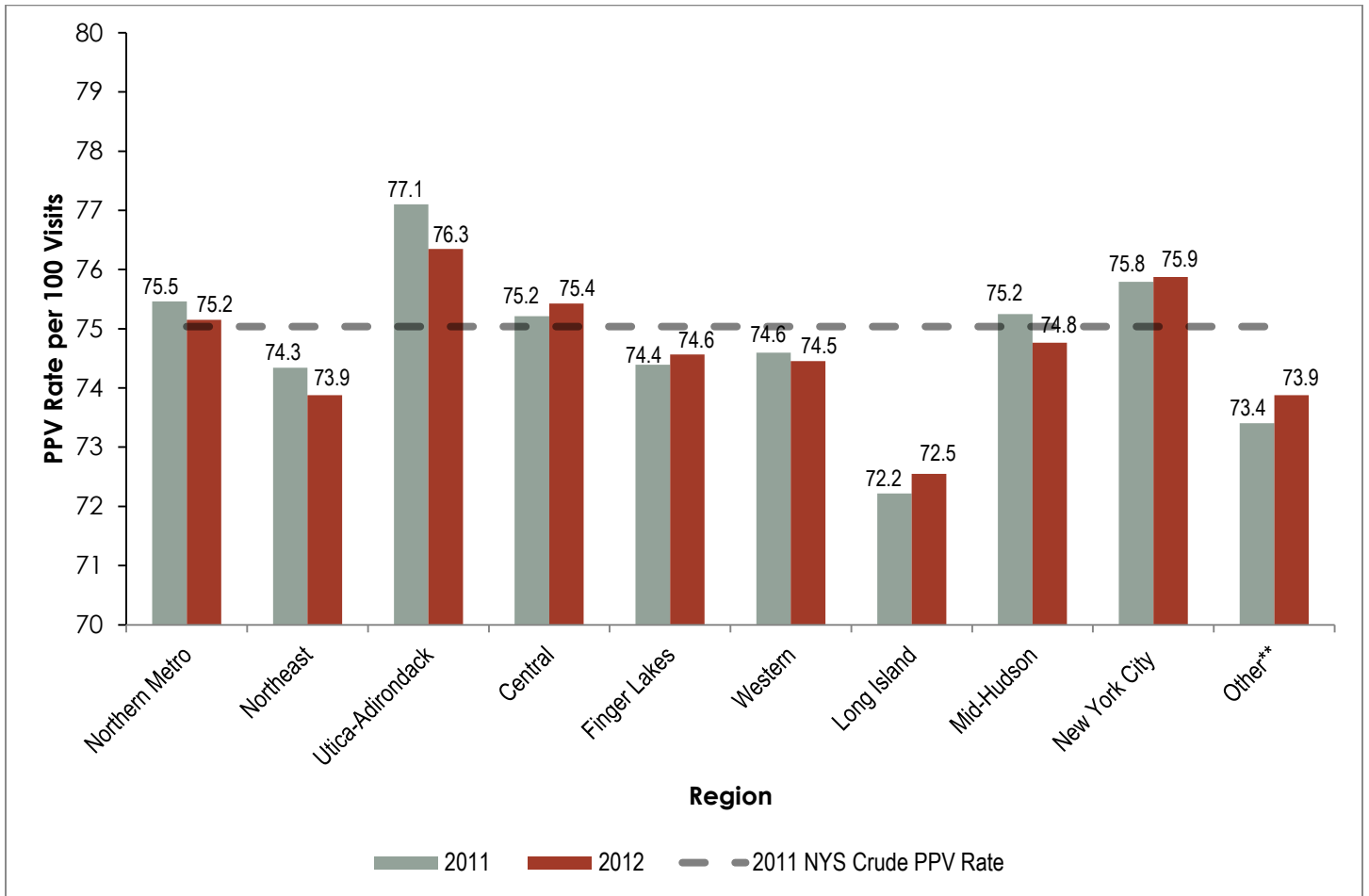


Note: Risk Adjustment is by age group and health status as defined by 3M Clinical Risk Group base health status classification.

* Insurance company, HMO, BHSP, and Blue Cross

**Other Includes Workers Compensation, TRICARE, Other Federal Programs and Grants

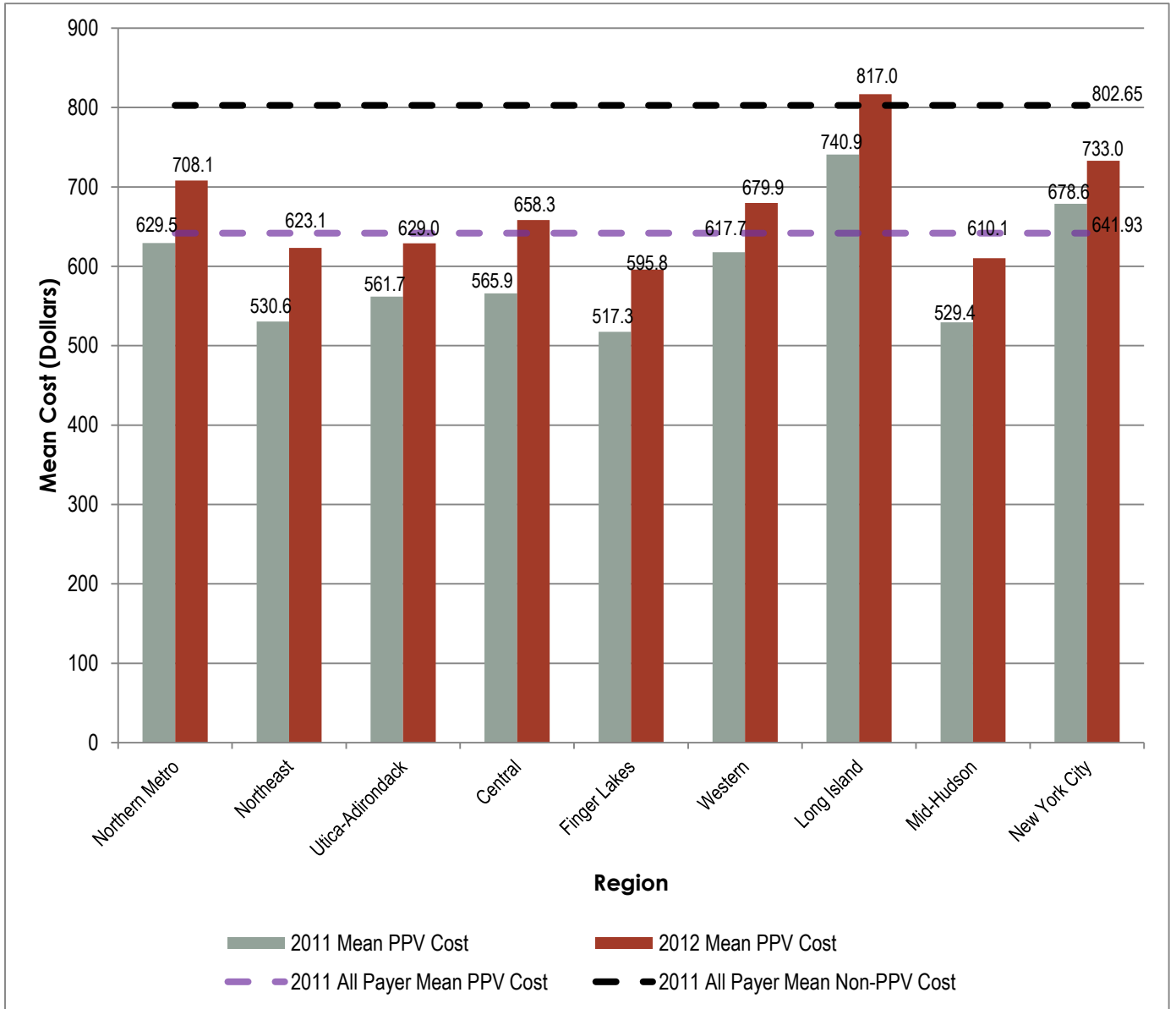
Chart 2: Adjusted PPV Visit Rate per 100 Eligible ER Visits by Region, 2011-2012



Note: Risk Adjustment is by age group and health status as defined by 3M Clinical Risk Group base health status classification.

** Other includes unknown, homeless, out-of-state and foreign residents.

Chart 3: Approximate Mean PPV Cost by Region, 2011-2012



Note: Visits by out-of-state residents excluded 5.74% of eligible ER visits.

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 hospital discharge, ambulatory surgery patient, and emergency room admission in New York State.
- **Unit of analysis-** The unit of analysis for this report is the emergency room visit, not the patient. Therefore, if a single person visited the emergency room on three separate occasions during the time frame of analysis they would be counted as three distinct emergency room visits.
- **Emergency Room Visit-** Emergency room visits were identified as institutional outpatient discharges with at least one of the following codes: Revenue Code 0450, 0451, 0452, 0456, 0459, 0981; CPT/HCPCS Code 99281, 99282, 99283, 99284, 99285
- **RNF Visits-** Visits originating from a residential nursing facility were identified based upon the discharge status of a patient following a visit due to a lack of data regarding admission source. Visits for which the patient was discharged to a skilled nursing facility, long term care hospital, or Medicaid certified nursing facility were considered to have originated from a RNF. This count potentially underestimates the number of RNF visits as discharge status was used as a proxy for admission source to identify eligible visits.
- **Primary Payer-** Primary Payer is based upon the first Source of Payment Code indicated on the SPARCS emergency room admission record. A visit may also have been paid in part by another payer, but Primary Payer indicates that payer which is principally responsible for the cost of the visit.
- **Region-** Region is defined by the patient's county of residence as indicated on the SPARCS record. Regions were defined based upon Medicaid rating regions which break down as follows:

Region	Counties
Northern Metro	Putnam, Rockland, Westchester
Northeast	Albany, Fulton, Montgomery, Rensselaer, Saratoga, Schenectady, Warren, Washington
Utica-Adirondack	Clinton, Essex, Franklin, Hamilton, Herkimer, Jefferson, Lewis, Oneida, Oswego, St. Lawrence
Central	Cayuga, Chenango, Columbia, Cortland, Delaware, Greene, Madison, Onondaga, Otsego, Schoharie, Tomkins
Finger Lakes	Allegany, Broome, Cattaraugus, Chautauqua, Chemung, Livingston, Ontario, Schuyler, Seneca, Steuben, Tioga, Wayne, Yates
Western	Erie, Genesee, Monroe, Niagara, Orleans, Wyoming
Long Island	Nassau, Suffolk
Mid-Hudson	Dutchess, Orange, Sullivan, Ulster
New York City	Bronx, Kings, New York, Queens, Richmond
Other	All others, including out of state

Acknowledgements

The Bureau of Health Informatics acknowledges Thomas O'Grady, PhD for his review of this Statistical Brief prior to publication.

Contact Information

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

Please contact us at:

Bureau of Health Informatics
Office of Quality and Patient Safety
New York State Department of Health
Corning Tower, Room 878
Albany, New York 12237

Phone: (518) 474-3189

Fax: (518) 486-3518

Email: BHI@health.ny.gov