Potentially Preventable Readmissions in Texas Medicaid and CHIP Programs

Measurement Period: Fiscal Year 2013

The Institute for Child Health Policy

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The External Quality Review Organization

for Texas Medicaid Managed Care and CHIP

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Introduction

This report provides information on the occurrence of potential preventable hospital readmissions for enrollees of Texas Medicaid and CHIP programs during fiscal year 2013. Preventable hospital readmissions were estimated to contribute over $25 billion to wasteful health care spending annually in the United States.[1] Texas Medicaid beneficiaries had over 780,000 inpatient hospital admissions with paid amounts totaling over 5.4 billion dollars during fiscal year 2013. Managed care enrollees accounted for 60% of these stays, with the remainder being paid directly by the State of Texas Medicaid-CHIP programs (fee-for-service). Reporting on the types and distribution of potentially preventable readmissions (PPRs) creates opportunities for targeted interventions. Reducing PPRs will have both economic and quality benefits for the State of Texas and the beneficiaries of the Texas Medicaid and CHIP programs.

Texas legislative initiatives and resources in Medicaid

For the 2012-2013 biennial budget, State of Texas Medicaid funding was almost $21 billion. This was more than 20% of state tax revenues. Including federal funds, the Texas Medicaid budget is in excess of $52 billion – or just over a quarter of the total state two-year budget.

In 2009 the Texas Legislature passed House Bill (H.B.) 1218[2], which required HHSC to provide reporting to hospitals on their performance with regard to PPRs in their Medicaid patients. In 2011 Senate Bill (S.B.) 7[3] required a "quality-based outcomes" payment program for Texas Medicaid based on "the extent to which the (provider) reduces potentially preventable events" using quality measures that "have the greatest effect on improving quality of care and the efficient use of services." This is advancement beyond the payment reforms enacted by other states such as Maryland and New York. The Texas legislation was recognized by the National Association of Medicaid Directors for incentivizing innovations and improvements in hospital-based care, patient management, and follow-up.[4]

Two other important aspects of S.B. 7 were the creation of the Texas Institute of Health Care Quality and Efficiency and authorization of the Medicaid/CHIP Quality-Based Payment Advisory Committee. The general mandate of the Institute is to advise the legislature on ways to improve the quality and efficiency of health care delivery, improve reporting and transparency regarding health care information, and implementation of collaborative payment and health care delivery systems. The Quality-Based Payment Advisory Committee focuses on reimbursement

[1] National Priorities Partnership. Preventing Hospital Readmission: A $25 Billion Opportunity. qualityforum.org. November 2010. https://www.qualityforum.org/NPP/docs/Preventing_Hospital_Readmissions_CAB.aspx.

[2] State of Texas House Bill 1218. *81st Legislature, Regular Session, 2009*.

[3] State of Texas Senate Bill 7. 82nd *Legislature, 1st Called Session, 2011*.

[4] National Association of Medicaid Directors. Policy Brief - State Medicaid directors driving innovation: Payment reform. medicaiddirectors.org. July, 2012. medicaiddirectors.org/node/472.

systems, and standards and benchmarks for quality and efficiency. Reducing potentially preventable events, including PPRs, is a focus for both entities.

The reduction of PPRs for Medicaid and CHIP enrollees is also an important component of the Healthcare Transformation and Quality Improvement Program 1115 Waiver approved by the Centers for Medicare and Medicaid Services (CMS) in 2011. Under this waiver, Delivery System Reform Incentive Payment Pool (DSRIP) funding provides incentives for hospitals and other providers to develop and implement programs to improve access, quality, and efficiency in their delivery of care in four categories. Two of these categories, quality improvements, and population focused improvements could include specific programs to reduce PPRs at the provider level.

Measuring and reporting preventable hospital readmissions

Hospital readmissions are an indicator for quality of care because they may reflect poor clinical care or poor coordination of services during hospitalization or during the post-discharge period. A major shortcoming of all-cause readmission measures is that they fail to distinguish between readmissions that could not be prevented (e.g., a car crash or acute illness unrelated to previous conditions) and those that are clinically related to the initial hospitalization (e.g., a recurrence of the initial problem, or a post-surgical infection). Readmissions which are determined likely to have resulted from deficiencies in care rather than from unrelated events are defined as PPRs. A panel of clinicians determined whether each possible admission/readmission pair represents a PPR by considering characteristics of the admission, readmission, and the patient.

Considering the conditions of the initial admissions is also important in calculating PPR rates for comparison. Readmission rates vary significantly depending on the condition of the initial admission. For example, PPR following a mental health or substance abuse related initial admission is more likely, while obstetrical admissions are rarely followed by a PPR. When PPR rates are calculated for comparing provider performance, the results must be risk adjusted to account for differences in the pool of admissions considered at risk of being followed by a PPR.

The readmission time interval is the maximum number of days between a discharge and a subsequent admission during which the subsequent admission is considered for being a PPR. This can theoretically be any length of time, but the greatest numbers of PPRs occur on the second and third day after the initial discharge, after which the likelihood declines over time. Admissions occurring sooner after discharge could be more likely related to care received during the initial stay, while later PPRs could more often be the result of issues with follow-up care. For this reason, PPR rates for evaluating hospital performance were calculated using a 15-day readmission interval, although PPR rates calculated for evaluating program or health plan performance use a 30-day interval.

In certain situations, a readmission was very likely planned, unpreventable, or beyond provider control. Examples include HIV patients or patients with discharge status “left against medical

advice". These admissions are excluded from consideration for subsequent PPR. Certain patient types are also excluded based on the reliability of using their data for determining PPR rates. For example, undocumented aliens and dual eligible patients may have readmission data not captured in the available data.

The PPR measure is reported as a rate determined by the proportion of candidate admissions that were followed by one or more PPRs.

Methodology

The PPR methodology developed by 3M™ is distinct from other methods of measuring readmissions. Complete documentation on the logic is available in 3M documentation, which is found on the HHSC web-page for potentially preventable events at http://www.hhsc.state.tx.us/hhsc_projects/ECI/Potentially-Preventable-Events.shtml. This methodology has been used with the Florida, Maryland, and Utah all-payer populations, the New York Medicaid population, and the Medicare population.

The computer algorithm is based on the All Patient Refined Diagnosis Related Groups (APR-DRGs) classification scheme. The APR-DRG system developed by 3M™ uses diagnoses and present on admission (POA) indicators, procedures, age, sex, and discharge status to assign DRG and severity of illness (SOI) subclasses to hospital stays. The 314 base APR-DRG categories each have four possible SOI subclasses. The PPR algorithm considers each of the possible admission/readmission pair of APR-DRG/SOI and in certain cases additional criteria including age, or particular diagnoses and procedures are also considered.

Defining PPRs

A readmission is considered clinically related to the initial admission if it falls into one of the following categories:

Recurrence — A continuation or recurrence of the reason for the initial admission, or a closely related condition.

Example: Initial admission APR-DRG 141 (asthma) and readmission APR-DRG 141.

Unrelated ambulatory care sensitive condition (ACS) or chronic problem — An acute decompensation of an ACS designated by AHRQ, or other chronic problem that was not the reason for the initial admission, but may have resulted from inadequate care during the initial admission or outpatient follow-up.

Examples: Initial admission APR-DRG 141 (asthma) and readmission for a chronic problem, APR-DRG 053 (Seizure), or ACS, APR-DRG 139 (pneumonia).

Acute medical condition related to care — An acute medical condition or complication that may be related to or may have resulted from care during the initial admission or outpatient follow-up.

Example: Initial admission APR-DRG 141 (asthma) and readmission APR-DRG 134 (pulmonary embolism).

Mental health —

Mental health or substance abuse readmissions following a non-mental health admission.

> Examples: Initial admission APR-DRG 141 (asthma) and readmission APR-DRG 751 (depression) or APR-DRG 775 (alcohol abuse).

Mental health or substance abuse readmission following a mental health or substance abuse readmission admission.

> Example: Initial admission APR-DRG 775 (alcohol abuse) and readmission APR-DRG 751 (depression).

Surgical recurrence — A continuation or recurrence of the problem causing the surgery from the initial admission, or a closely related problem.

> Example: Initial admission APR-DRG 225 (appendectomy) and readmission APR-DRG 221 (major bowl procedure).

Surgical complication — A complication that may be related to or may have resulted from care during the initial admission for surgery.

> Example: Initial admission APR-DRG 225 (appendectomy) and readmission APR-DRG 791 (operating room procedure complication).

A readmission that does not fit one of these categories (e.g., readmission for trauma) is classified as a clinically unrelated readmission and therefore not potentially preventable (i.e., not a PPR).

Because a patient could have multiple related readmissions, PPR are defined as part of PPR chains. Readmissions can become part of a PPR chain when they follow the previous discharge within the readmission interval, and are clinically related to the initial admission in the chain. The occurrence of a readmission that is not clinically related to the initial readmission breaks the readmission chain (i.e., a subsequent readmission could not be linked back to the same initial admission even if it occurred within the readmission interval).

The PPR rate is calculated using the number of readmission chains as the numerator, rather than the total number of PPRs. The denominator is comprised of all candidate admissions (i.e., all the admissions that could be the initial admission of a valid PPR chain). This includes readmissions that were determined clinically unrelated (not PPRs), but excludes any PPRs. The PPR rate is thus the proportion of candidate admissions that were followed by one or more PPRs to all candidate admissions.

Data inclusion

Encounter data from Texas Medicaid, including fee-for-service (FFS), STAR, STAR+PLUS, STAR Health, and CHIP programs are included in this report. Only inpatient hospital encounters

(identified by bill type) with paid status were considered for inclusion. From this overall dataset, certain data were then excluded based on 3M exclusionary criteria and/or due to data quality. These data that were excluded are described within this report.

According to the Texas Health and Human Services System Consolidated Budget (http://www.hhsc.state.tx.us/about_hhsc/finance/2016-2017.pdf page 111), inpatient hospital costs for 2014-2015 are estimated to be about $8.31 billion (all funds). These amounts include inpatient services for general hospitals (including TEFRA based hospitals) and psychiatric hospitals. These amounts do not include crossover claims paid for inpatient services by Texas Medicaid for Medicaid recipients who are also enrolled in Medicare (dual eligibles).

For this analysis, hospitals, were uniquely identified using their National Provider Identifier (NPI). The FFS encounters include the Texas Provider Identifier (TPI) which was crosswalked to the appropriate NPI.

Admissions are excluded from consideration through the PPR algorithm in the following categories:

Newborns — Although newborns (all babies age 0 – 7 days old, and babies 8 – 14 days old with low birth weight) are at significant risk for a many causes of hospital admission, readmissions are rare in the newborn population. Determining that a readmission is clinically related to an initial admission and not the result of other circumstance is challenging in this population. The 3M™ software is being expanded to include certain categories of newborn admissions, but they are excluded from consideration in this report.

Undocumented Alien Status — If the patient had undocumented alien status and if the client was discharged and readmitted, the readmission may not have been captured in the Medicaid database.

Medicaid / Medicare Dual Eligibility — Patients who were dually eligible for both Medicaid and Medicare during the measurement year were excluded. The Medicaid administrative data will not include a patient's complete history because coverage is also provided by Medicare.

Global PPR exclusions — In some situations, it is very likely that a readmission was either planned, unpreventable, or beyond a hospital's influence. These include admissions with DRGs for certain malignancies, HIV patients, palliative care, and encounters with a discharge status of "left against medical advice". Initial admissions during which the patient died would have no possibility of readmission. These admissions are excluded from consideration for having PPRs. Certain types of admissions are considered 'non-events' (e.g., transfer admissions). These admissions are excluded from consideration for having PPRs, and have no impact on the creation of PPR chains including other admissions.

In rare cases, a member could exhaust their benefits before a readmission, causing the data to be incomplete. Enrollment churn could also affect data completeness if it intersected with a PPR chain. However, these cases are expected to have little impact on results and therefore are not excluded.

To allow for the 15-day readmission interval, candidate admissions must occur during the first 11.5 months of the measurement year.

Total Admissions at Risk for PPR (candidate admissions)

All acute care inpatient hospital admissions during the first 11.5 months of the measurement year, for eligible patients, minus global exclusions and non-events are considered candidates for having PPR. Admissions identified as PPRs are excluded.

PPR Calculations

The 3M^{TM} PPR software identifies PPRs, but it does not calculate reporting rates. The calculation of rates, including adjustment for case mix is done in a separate set of steps following logic recommended by 3M^{TM}.

Actual Number of PPR Chains

A readmission chain consists of an initial admission, and a series of PPRs that are all clinically related to the initial admission. Most PPR chains include only 2 admissions (the initial admission and a single PPR), but some chains include more than one PPR.

Actual PPR Rate

The PPR rate is the proportion of candidate admissions that were followed by one or more PPR. Admissions identified as PPR are not included in the denominator.

Actual PPR Rate = Actual Number of PPR Chains / Candidate admissions

Expected PPR Rate

Case mix adjustment is essential in creating PPR rates that can be used for comparison across providers. In general, a greater proportion of severely ill patients will result in a higher PPR rate. Based on 3M^{TM} recommendations, PPR rates are risk adjusted for four clinical characteristics:

- *The APR-DRG of the initial admission.* — In general, patients with certain diagnoses are more likely to be readmitted than others.
- *The SOI.* — Patients with serious complications and co-morbidities are more likely to be readmitted.
- *Age.* — Pediatric patients are less likely to be readmitted than adults with the same conditions.
- *Mental health/substance abuse (MH/SA) comorbidity*— Patients with major MH/SA conditions as secondary diagnoses are more likely to be readmitted, even for unrelated

medical or surgical admissions. The 3M^{TM} software identifies these based on a list of 218 diagnosis codes for major mental health or substance abuse.

The statewide actual PPR rate is determined for each level of APR-DRG/SOI within age groups for adults and pediatric members. Adjustment factors for MH/SA status are calculated for each age group based on the odds ratio of a candidate admission having PPRs. The expected PPR rate for each APR-DRG/SOI within age groups and MH/SA categories is the statewide actual PPR rate for the APR-DRG/SOI age category, multiplied by the appropriate MH/SA status adjustment for the age group. By averaging the expected PPR rates for all the admissions in a provider's case mix, the expected PPR rate for the provider is determined.

Actual to Expected Ratio (A/E ratio)

The ratio of the actual PPR rate for a provider to the expected rate indicates performance relative to the overall PPR rate for Texas Medicaid and CHIP.

Expenditures

Paid amounts are considered for the analysis of expenditures. Only admissions with paid status are included. Admission expenditures include institutional payments only; physician costs, additional services, and cost to the patient are not included. The expenditures for a PPR chain are the sum of paid amounts for the PPR admissions. Expenditures for the initial admission are not considered.

The calculation of expected expenditures is the same as for expected PPR rates.

Results

Admissions considered at risk for PPR

A total of 334,860 candidate admissions were identified from Medicaid and CHIP encounters for the first 11.5 months of fiscal year 2013. Table 1 provides a summary of these admissions at risk for PPR.

Table 1. Summary of admissions at risk for PPRs during SFY 2013

Patient care category[1]		Program						
		STAR	STAR+PLUS	STAR Health	FFS	All Medicaid	CHIP	Medicaid + CHIP
Pediatric	Respiratory	14,733	120	328	5,607	20,788	1,011	21,799
	Other Medical	20,990	352	566	10,678	32,586	2,380	34,966
	Other Surgical	6,928	130	210	3,807	11,075	1,262	12,337
	MH/SA[2]	6,266	557	2,162	5,343	14,328	1,739	16,067
	Subtotal	48,917	1,159	3,266	25,435	78,777	6,392	85,169
Adult	Circulatory	1,989	5,323	2	2,930	10,244	20	10,264
	Other Medical	10,928	22,176	68	14,177	47,349	307	47,656
	Other Surgical	5,368	6,314	17	5,385	17,084	152	17,236
	MH/SA[2]	3,613	8,558	223	3,167	15,561	185	15,746
	Subtotal	21,898	42,371	310	25,659	90,238	664	90,902
Obstetrics		144,895	1,765	227	11,777	158,664	125	158,789
Total		**215,710**	**45,295**	**3,803**	**62,871**	**327,679**	**7,181**	**334,860**

[1]Based on major diagnostic categories (MDC), procedure codes, and age.
[2]Mental health or substance abuse.

Overall, 47% of candidate admissions were for obstetrics, although in programs other than STAR obstetrics admissions were less than 20% of the total. Among non-obstetric admissions, the proportion of adult to pediatric admissions is nearly equal for STAR and FFS, but is skewed by program enrollment criteria for other programs (e.g., STAR Health and CHIP serve children).

PPR categorization

A total of 15,595 admissions were identified as PPRs. The clinical relationship categories for these admissions are summarized in Table 2.

Table 2. PPR admissions by clinical relationship to the initial admission.

PPR Clinical Relationship Reasons[1]	Number of PPR Admissions	% of Total PPR Events	Expenditures for PPR Admissions[3]	% of Total PPR Expenditure
Recurrence	3,687	23.64%	$36,327,123.04	26.90%
Unrelated ambulatory care sensitive condition (ACS)	500	3.21%	$3,567,770.24	2.64%
Unrelated chronic problem	1,171	7.51%	$12,325,269.11	9.13%
Acute medical condition related to care for the condition of the initial admission	4,816	30.88%	$45,359,366.68	33.59%
Surgical recurrence	239	1.53%	$6,068,303.43	4.49%
Surgical complication	290	1.86%	$5,779,610.89	4.28%
Mental health readmission following a non-MH/SA[2] admission	515	3.30%	$2,412,434.10	1.79%
Substance abuse readmission following a non-MH/SA[2] admission	87	0.56%	$507,068.15	0.38%
MH/SA[2] readmission following a MH/SA[2] admission	4,290	27.51%	$22,706,541.13	16.81%

[1]The 3M™ category for the clinical relationship between the initial admission and the PPR admission. See the Methodology section for Defining PPRs for complete descriptions.

[2]Mental health or substance abuse.

[3]Expenditure data includes the detail paid amount from FFS claims, which is an estimated cost.

Statewide results

The overall PPR rate was 3.74%. Most of the 12,517 PPR chains included only two admissions, although the average chain length was 1.25. The total PPR expenditures were $135 million, which is about 2% of total inpatient expenditures. Table 3 shows overall results for Texas Medicaid and CHIP programs, categorized by patient care categories.

As noted previously, obstetric admissions make up a large part of the total admissions at risk for PPR, but these admissions have a very low rate of PPR (<1%). Pediatric admissions have a lower rate of PPR than adult admissions. The highest PPR rate is for MH/SA admissions in both age groups. For adults these admissions have a higher than average number of PPRs per chain (1.38) indicating that patients with MH/SA admissions are more likely to have a string of related admissions.

Table 3. Statewide PPR for Texas Medicaid and CHIP, SFY 2013

Patient care category[1]		Candidate Admissions	Number of PPR Chains	PPR Rate	Total PPR Admissions	Members with PPR	Total PPR Expenditures[3]
Pediatric	Respiratory	21,799	470	2.16%	500	454	$8,275,925.68
	Other Medical	34,966	1066	3.05%	1,232	978	$23,508,608.20
	Other Surgical	12,337	456	3.70%	514	438	$9,596,436.52
	MH/SA[2]	16,067	1456	9.06%	1,828	1,317	$12,431,636.37
	Subtotal	85,169	3,448	4.05%	4,074	3,187	$53,812,606.77
Adult	Circulatory	10,264	977	9.52%	1,271	820	$10,871,058.97
	Other Medical	47,656	4,009	8.41%	5,240	3,341	$42,416,046.93
	Other Surgical	17,236	1,073	6.23%	1,249	1,001	$12,776,225.79
	MH/SA[2]	15,746	1,859	11.81%	2,567	1,542	$10,704,703.60
	Subtotal	90,902	7,918	8.71%	10,327	6,704	$76,768,035.29
Obstetrics		158,789	1,151	0.72%	1,194	1,146	$4,472,844.71
Total		**334,860**	**12,517**	**3.74%**	**15,595**	**11,037**	**$135,053,486.77**

[1]Based on major diagnostic categories (MDC), procedure codes, and age.

[2]Mental health or substance abuse.

[3]Expenditure data includes the detail paid amount from FFS claims, which is an estimated cost.

Initial Admission APR-DRG

Tables 4, 5, and 6 summarize PPRs grouped by the APR-DRG of the initial admission. Table 4 includes the top 25 admission categories by PPR rate. Tables 5 and 6 are the top 25 admission categories by number of PPRs and total PPR expenditures, respectively.

Considering categories with the highest PPR rates provides an opportunity to identify these cases for readmission risk during care. Although some of the categories with the highest rates have relatively few total admissions, they represent specific areas (e.g. kidney transplant, hepatic and pancreatic conditions) where targeted interventions could make substantial difference – especially where related APR-DRG categories (e.g., similar procedures or related conditions) show similarly high rates.

Table 4. The top 25 APR-DRG categories for initial admissions by PPR rate.

APR-DRG of candidate admissions		Number of Candidate Admissions	PPR rate[1]	Total number of PPRs	PPR Expenditures[2]
440	Kidney transplant	20	25.00%	7	$78,97.59
260	Major pancreas, liver & shunt procedures	126	23.81%	42	$756,494.38
264	Other hepatobiliary, pancreas & abdominal proc.	41	21.95%	14	$170,431.82
279	Hepatic coma & other major acute liver disorders	938	19.40%	267	$2,711,277.53
776	Other drug abuse & dependence	308	17.86%	69	$283,780.28

APR-DRG of candidate admissions		Number of Candidate Admissions	PPR rate[1]	Total number of PPRs	PPR Expenditures[2]
261	Major biliary tract proc.	41	17.07%	8	$138,358.37
774	Cocaine abuse & dependence	134	16.42%	22	$65,916.37
772	Alcohol & drug dependence w rehab or rehab/detox therapy	56	16.07%	13	$70,806.75
162	Cardiac valve procedures w cardiac catheterization	57	15.79%	10	$106,628.80
312	Skin graft, except hand, for musculoskeletal & connective tissue diagnoses	45	15.56%	9	$89,784.28
280	Alcoholic liver disease	753	14.87%	145	$1,591,569.95
750	Schizophrenia	6,143	14.31%	1,258	$5,437,553.45
740	Mental illness diag. w OR proc.	14	14.29%	2	$15,737.17
662	Sickle cell anemia crisis	1,954	14.07%	457	$3,024,399.99
177	Cardiac pacemaker & defibrillator revision except device replacement	50	14.00%	8	$108,803.74
242	Major esophageal disorders	153	13.73%	26	$389,300.99
405	Other proc. for endocrine, nutritional & metabolic disorders	69	13.04%	9	$81,381.65
190	Acute myocardial infarction	429	12.82%	81	$740,424.46
775	Alcohol abuse & dependence	544	12.68%	77	$337,764.05
005	Tracheostomy w/ MV 96+ hours w/o extensive procedure	301	12.62%	46	$941,532.70
194	Heart failure	2,543	12.58%	452	$4,298,361.25
444	Renal dialysis access device procedure only	137	12.41%	21	$192,862.49
760	Other mental health disorders	74	12.16%	11	$101,850.01
283	Other disorders of the liver	652	12.12%	105	$1,389,237.84
441	Major bladder procedures	58	12.07%	9	$29,775.18

[1]PPR rate = PPR chains / Candidate Admissions. Chains may include multiple PPRs.

[2]Expenditure data includes the detail paid amount from FFS claims, which is an estimated cost.

Strategies to reduce the total number of PPRs should include consideration of the admission types that result in the highest numbers of PPR. The importance of mental health admissions is evident in the top three APR-DRG categories for total PPRs, all of which also have greater than average PPR rates. The obstetric categories should not be ignored because of their low PPR rates because the large numbers of admissions in these categories still result in large total numbers of PPR.

Table 5. The top 25 APR-DRG categories for initial admissions by total number of PPR.

APR-DRG of candidate admissions		Number of Candidate Admissions	PPR rate[1]	Total number of PPRs	PPR Expenditures[2]
753	Bipolar disorders	14,172	9.74%	1,801	$10,839,063.43
750	Schizophrenia	6,143	14.31%	1,258	$5,437,553.45
751	Major depressive disorders & other/unspecified	7,006	9.12%	824	$4,321,369.13

APR-DRG of candidate admissions		Number of Candidate Admissions	PPR rate[1]	Total number of PPRs	PPR Expenditures[2]
	psychoses				
540	Cesarean delivery	49,960	1.26%	655	$2,512,485.97
560	Vaginal delivery	91,298	0.52%	492	$1,713,744.55
662	Sickle cell anemia crisis	1,954	14.07%	457	$3,024,399.99
194	Heart failure	2,543	12.58%	452	$4,298,361.25
420	Diabetes	3,160	8.13%	382	$2,284,967.21
720	Septicemia & disseminated infections	3,661	8.22%	363	$4,092,748.51
140	Chronic obstructive pulmonary disease	2,831	9.33%	337	$2,569,857.90
139	Other pneumonia	7,416	3.37%	297	$3,761,416.83
279	Hepatic coma & other major acute liver disorders	938	19.40%	267	$2,711,277.53
460	Renal failure	1,718	10.83%	252	$2,101,332.44
812	Poisoning of medicinal agents	1,930	9.22%	203	$729,471.86
053	Seizure	4,425	3.89%	201	$1,864,584.84
383	Cellulitis & other bacterial skin infections	5,633	2.91%	201	$1,309,451.90
138	Bronchiolitis & RSV pneumonia	7,876	2.50%	201	$2,032,583.91
282	Disorders of pancreas except malignancy	1,586	9.39%	185	$1,538,449.01
133	Pulmonary edema & respiratory failure	1,595	8.34%	169	$2,139,773.27
254	Other digestive system diagnoses	1,909	6.76%	159	$1,473,335.22
249	Non-bacterial gastroenteritis, nausea & vomiting	3,596	3.50%	148	$1,745,840.48
280	Alcoholic liver disease	753	14.87%	145	$1,591,569.95
225	Appendectomy	3,609	3.77%	139	$1,372,954.62
463	Kidney & urinary tract infections	4,176	2.73%	138	$1,129,081.26
754	Depression except major depressive disorder	1,333	7.20%	123	$653,720.55

[1]PPR rate = PPR chains / Candidate Admissions. Chains may include multiple PPRs.

[2]Expenditure data includes the detail paid amount from FFS claims, which is an estimated cost.

Reducing PPRs improves health quality, and PPRs also represent significant avoidable expenditures. Considering admission categories based on the PPR associated expenditures provides another way to efficiently target areas where substantial savings are possible. Mental health categories are again at the top of the list. They not only have high numbers of admissions and relatively high PPR rates, but expenditures for readmissions in these categories are substantial. In contrast, obstetrical admissions, although numerous, have relatively low PPR rates and lower costs per readmission. Readmissions after heart failure are much more costly than other APR-DRG categories with higher numbers of candidate admissions and PPR rates, causing them to rank fourth by total expenditures.

Table 6. The top 25 APR-DRG categories for initial admissions by total PPR Expenditures.

APR-DRG of candidate of candidate admissions		Number of Candidate Admissions	PPR rate[1]	Total number of PPRs	PPR Expenditures[2]
753	Bipolar disorders	14,172	9.74%	1,801	$10,839,063.43
750	Schizophrenia	6,143	14.31%	1,258	$5,437,553.45
751	Major depressive disorders & other psychoses	7,006	9.12%	824	$4,321,369.13
194	Heart failure	2,543	12.58%	452	$4,298,361.25
720	Septicemia & disseminated infections	3,661	8.22%	363	$4,092,748.51
139	Other pneumonia	7,416	3.37%	297	$3,761,416.83
660	Major hematologic/immunologic diag. exc. sickle cell crisis & coagul	333	9.61%	40	$3,386,965.83
662	Sickle cell anemia crisis	1,954	14.07%	457	$3,024,399.99
279	Hepatic coma & other major acute liver disorders	938	19.40%	267	$2,711,277.53
140	Chronic obstructive pulmonary disease	2,831	9.33%	337	$2,569,857.90
540	Cesarean delivery	49,960	1.26%	655	$2,512,485.97
661	Coagulation & platelet disorders	364	8.52%	49	$2,461,205.12
420	Diabetes	3,160	8.13%	382	$2,284,967.21
133	Pulmonary edema & respiratory failure	1,595	8.34%	169	$2,139,773.27
460	Renal failure	1,718	10.83%	252	$2,101,332.44
138	Bronchiolitis & RSV pneumonia	7,876	2.50%	201	$2,032,583.91
221	Major small & large bowel procedures	891	9.88%	115	$2,005,366.19
053	Seizure	4,425	3.89%	201	$1,864,584.84
249	Non-bacterial gastroenteritis, nausea & vomiting	3,596	3.50%	148	$1,745,840.48
560	Vaginal delivery	91,298	0.52%	492	$1,713,744.55
143	Other respiratory diagnoses except signs, symptoms & minor diagnoses	901	6.22%	61	$1,683,287.53
021	Craniotomy except for trauma	552	8.70%	54	$1,671,184.09
280	Alcoholic liver disease	753	14.87%	145	$1,591,569.95
130	Resp. system diag. w/ ventilator support 96+ hrs.	750	7.20%	67	$1,565,410.24
282	Disorders of pancreas except malignancy	1,586	9.39%	185	$1,538,449.01

[1]PPR rate = PPR chains / Candidate Admissions. Chains may include multiple PPRs.

[2]Expenditures data includes the detail paid amount from FFS claims, which is an estimated cost.

Provider results

A comparative assessment of providers' actual PPR rates were risk adjusted based on their case mix, accounting for APR-DRG/SOI, age, and mental health status. The expected PPR rate for the provider is determined and the A/E ratio provides a measure of whether the provider is performing better (A/E ratio less than 1) or worse than would be expected based on their case mix.

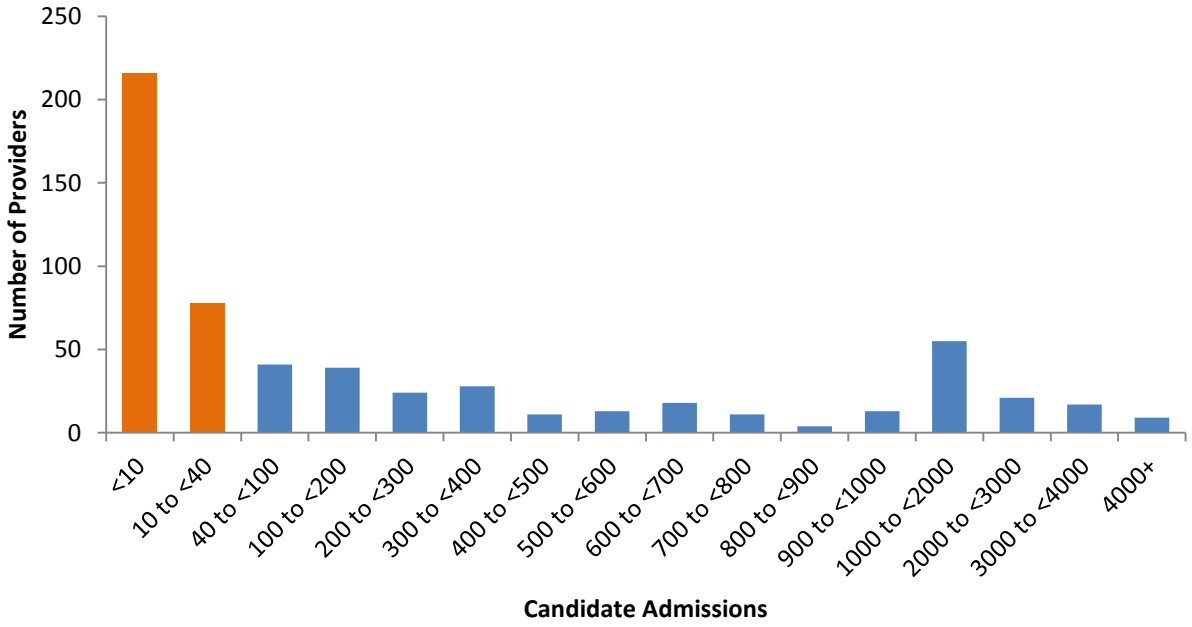
Low-volume providers can affect the reliability and interpretability of provider-based summary statistics such as statewide percentile rankings. Individual results for these providers should also be interpreted with care. Consider as an example a provider with only 30 candidate admissions and 3

PPR chains. Their PPR rate would be 10% (assuming neutral risk adjustment), but a difference of only one PPR chain could move their PPR rate to 7 or 13%. This would be substantially different given the overall distribution of rates. Providers meeting any of the following criteria were considered low volume and were excluded from percentile calculations:

- Less than 40 candidate admissions
- Less than 5 actual PPR chains
- Less than 5 expected PPR chains

A total of 611 providers had admissions at risk for PPRs. Figure 1 shows the distribution of candidate admissions. 294 providers were designated low volume based on having fewer than 40 candidate admissions.

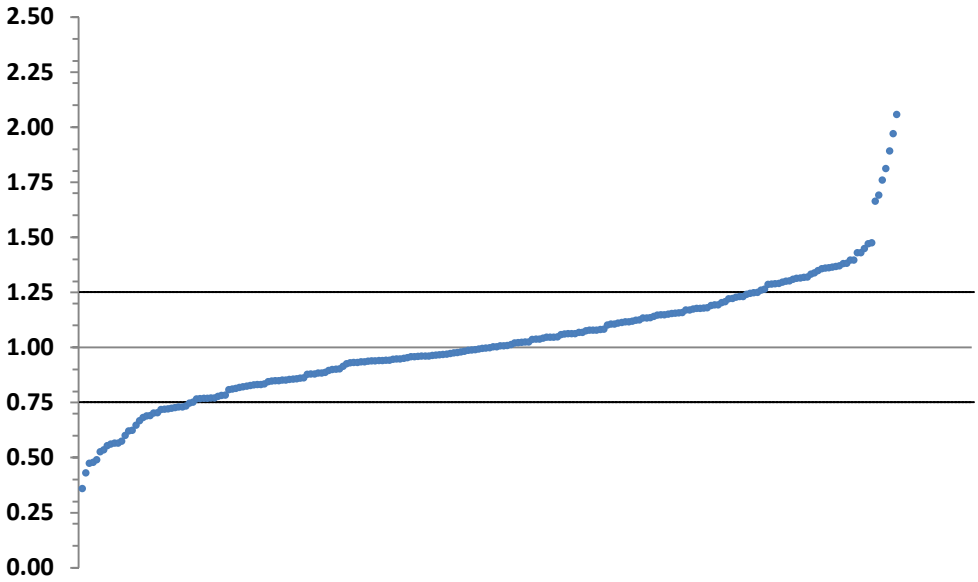
Figure 1. Distribution of candidate admissions.



An additional 88 providers were designated low volume based on having <5 actual or expected PPR chains.

Among the 229 providers surpassing the low volume thresholds actual PPR rates ranged from 0.7% to 25.2%, while expected rates ranged from 0.8% to 14.3%. The distribution of A/E ratios for these providers is shown in Figure 2. Providers with A/E ratios <1 had fewer than expected PPR while providers with A/E ratios >1 had more PPRs than expected based on their case mix.

Figure 2. A/E ratios for providers passing low volume thresholds.



Excluding low volume providers, 78 providers (34%) had PPR rates about as expected with A/E ratios between 0.90 and 1.10. Only 13 providers (13%) had PPR rate much lower than expected (A/E ratio <0.75) and 39 (17%) had PPR rates much higher than expected (A/E ratio >1.25). These thresholds are indicated in Figure 2. Performance varied considerably across providers, with significant room for improvement for a substantial number of individual providers.

The statewide PPR rate percentiles provide a benchmark for comparing individual providers. Providers with lower PPR rates are considered to have better performance and thus higher percentile ranking. Thresholds for these rankings are presented in Table 7 with percentile distributions for numbers of candidate admissions and PPRs. The absolute numbers are largely determined by provider volume, but provide additional context for interpreting individual provider results.

Table 7. PPR rate percentile rankings and distributions of candidate admissions and PPRs

	State Norm	25th percentile	50th percentile	90th percentile
PPR Rate	3.74%	4.91%	3.33%	1.75%
	Distributions			
	Range	**25th percentile**	**50th percentile**	**90th percentile**
Number of Candidate Admissions	55 – 10,500	403	903	3,092
Actual Number of PPR Chains	5 – 441	12	31	128
Number of PPR Admissions	5 – 526	15	39	162
Number of Patients with PPRs	3 – 392	11	26	113

Interpretation

Overall PPR

The overall statewide PPR rate was 3.74%, however a large percentage of admissions were for obstetrics which have a very low PPR rate (0.72%). Excluding obstetrics, the overall statewide rate is 6.5%. Rates also differ when considering adult vs. pediatric within these admissions (8.71% vs 4.05%, respectively). Admissions for MH/SA have higher PPR rates in both age groups. These differences demonstrate several key points important to interpreting PPR results.

Strategies to reduce readmissions based on simple all-cause readmission measurements overlook two important considerations that impact the likelihood of being successful:

1. Many readmissions are not preventable through interventions under the control of the provider or healthcare system.
2. The risk of readmission is dependent on patient characteristics and conditions of the initial admission.

The 3M^{TM} algorithm considers the clinical relationship between the initial admission and a readmission, so PPR rates are generally lower than all-cause readmission rates. However, this tighter measure may provide more useable information on specific areas within a provider's control that can be targeted for improvement.

The differences shown above in the overall statewide rates based on cause of initial admission, age, and mental health status highlight the need for considering differences in risk of readmission both to interpret readmission rates for cause and to fairly compare performance across providers. It has also been clearly shown that the risk for readmission increases with the SOI category of the patient at the initial admission[5].

Because the results and rates presented in this report are based on all Medicaid and CHIP data for fiscal year 2013, there is no question of statistical significance as long as the inferences made are related to that population. However, when comparing providers it is useful to consider the current data population as a sample representing a point in time, which would differ had it been taken at a different time. This is a primary reason that exclusions for low volume providers are made when calculating statewide statistics based on individual provider results.

Provider PPR

The distribution of rates among the providers passing the low volume threshold shows that opportunities for improving PPR rates exist. The purpose of the provider analysis is to inform providers about areas where quality can be improved, both through inpatient care and throughout

[5] *Identifying Potentially Preventable Readmissions.* Goldfield, Norbert I., et al., et al. 1, 2008, Health Care Financing Review, Vol. 30, pp. 75-91.

the continuum of care upon discharge. Providers should consider their PPRs within different admission categories based on the number of candidate admissions, the number of PPRs, the PPR rate, and the associated expenditures. This will lead to the most efficient interventions with the best possibilities to improve quality and reduce excess costs.

Many organizations are working on developing strategies to reduce PPR rates. Two valuable resources are:

- The TMF Health Quality Institute is leading one effort in Texas. Information is available at http://texasqio.tmf.org/Networks/Readmissions.aspx.
- The Institute for Healthcare Improvement has summarized the research on reducing readmissions in several reports. Information is available at www.ihi.org.