Accounting for the Socio-Economic Status (SES) of Hospital Patients in the Readmission Reduction Incentive Program (RRIP)

Presentation to the Performance Measurement Work Group

Robert Murray

Representing CareFirst Blue Cross Blue Shield of Maryland

March 15, 2017

Background and Overview of Presentation

- For the RY 2018 RRIP the HSCRC attempted to identify a methodology that would take into account the impact of patient SES on hospital readmission rates
- Staff believed that including factors in the RRIP that accounted for patient SES might improve the fairness of the methodology
- There is also a growing body of literature that suggests that SES can be a powerful predictor of poorer outcomes [1]

[1] Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs. A Report Required by the Improving Medicare Post-Acute Care Transformation (IMPACT) Act of 2014 United States Department of Health and Human Services Office of the Assistant Secretary for Planning and Evaluation Washington, D.C., December 2016

Karen E. Joynt, et al. Should Medicare Value-Based Purchasing Take Social Risk into Account? The New England Journal of Medicine. Vol. 376;6 February 9, 2017.

Melinda B. Buntin, Ph.D., and John Z. Ayanian, M.D., M.P.P. Social Risk Factors and Equity in Medicare Payment. The New England Journal of Medicine. Vol. 376;6 February 9, 2017.

Background and Overview (continued)

- Previously (based on a regression analysis by Mathematica), staff determined that factors such as age, sex, principal payer and ADI did not "substantially change the predictive model" for readmissions
- Thus, the RY 2018 RRIP methodology did not include a factor that adjusted hospital readmission performance for patient SES
- Last year, CareFirst suggested a methodology that directly measured the readmission rates of patients classified as "indigents" & "non-indigents" based on principal & secondary payer
- CareFirst was unable to provide an analysis to verify its approach and Staff decided not pursue it because of the results of the Mathematica regression analysis
- This presentation sets forth an analysis and methodology for quantifying the impact of SES on hospital readmission rates based on a "direct approach" (i.e., using actual patient level data)

Background and Overview (continued)

- In our analysis, we define two classes of patients – "indigents" and "non-indigents" based on principal and secondary payer designations
- Readmission rates of each class patients are compared on a statewide basis at both the APR-SOI and MDC levels
- The analysis (which is based on 2.5 years of HSCRC case mix data) shows that as hypothesized, readmission rates for "indigent" patients is substantially higher than readmission rates for "non-indigent" patients (as we define these two classes of patients)
- The presentation also suggests a method for calculating "Expected" readmission rates (at the APR-SOI case mix adjusted level)
- A hospital's ratio of its Expected Readmission Rate (ERR) to its Actual Readmission Rate (ARR) can be used to rank relative hospital performance for the RRIP on the basis of Attainment – after adjusting for SES

Data and Analysis

- Our analysis used HSCRC inpatient discharge data for the years FY14, FY15 and the first 6 months of FY16
- The analysis accounted for unplanned, planned and "non-readmission" cases (cases not readmitted with in 30 days)
- Our proposed definition of "Indigent" cases included all cases with payer designations of: Medicaid, Self-Pay, Charity and Medicare/ Medicaid (i.e., the patient was a "Dual Eligible" patient with Medicare as principal payer and Medicaid as secondary payer)
- "Non-Indigent" patients were those who did not qualify as Indigent
- The data set included 1,593,934 cases or which 538,699 were identified as Indigent (33.8%) & 1,055,235 were Non-Indigent (66.2%)
- Indigent **readmissions** were 58,173 (10.8% of Indigent cases) and Non-indigent **readmissions** were 91,450 (8.7% of Non-Indigent cases)

Results

- Schedule 1 sets forth the readmission rates for Indigents and Non-Indigents (as defined) for the years FY14, FY15 and FH FY16

Schedule 1

Rates for Indigents (Including Dual Eligibles), Non-Indigents and Total

	Indigent Cases (1)			Non-Indigent Cases (2)			Total Cases		
Time period	Indigent Admits	Re-admissions	% Readmits	Non-Indigent Admits	Re-admissions	% Readmits	Admits	Total Re-admissions	% Readmits
FY 2016	103,372	10,500	10.16%	206,615	16,942	8.29	309,987	27,442	8.85%
FY 2015	218,238	24,054	11.02%	415,751	36,893	8.87	633,989	60,947	9.61%
FY 2014	217,089	23,619	10.87%	432,869	37,615	8.69	649,958	61,234	9.42%
Total	538,699	58,173	10.80%	1,055,235	91,450	8.66	1,593,934	149,623	9.39%

Note (1): Indigent cases in Schedule 1 are defined as Medicaid, Self-Pay, Charity and Medicare with Medicaid as secondary payer (otherwise referred to as Dual Eligible cases)

Note (2): Non-Indigent cases in Schedule 1 are all cases not defined as Indigent

- We believe that the above definition of the SES class of "Indigent" differs from the payer class definitions used in the prior analysis by the HSCRC and Mathematica of the effects of SES on readmission rates

- We do not believe the regression analysis performed previously explicitly accounted for the impact of Dual Eligible patients on readmission rates

- The literature cited before, indicated that **dual enrollment status** was determined to be a powerful predictor of poor outcomes. This observation appears to be substantiated by our analysis shown above.

Alternative Analysis

- To illustrate the impact that the inclusion of Dual Eligible cases has on readmission rates we also performed an "an Alternative Analysis" which removed Dual cases from the Indigent class and instead included Dual cases in the Non-Indigent Class

- Schedule 2 below shows the results of this Alternative Analysis with Dual Eligible Cases included in the Non-Indigent SES Class (just for illustration purposes)

Schedule 2
"Dual Eligibles Not Classified as Indigents
Indigents" (excluding Dual Eligibles) vs. Non-Indigents (including Dual Eligibles)

	Redefined "Indigent" Cases (3)			Non-Indigent Cases (4)			Total Cases		
Time period	"Indigent" Admits	Re-admissions	% Readmits	Non-Indigent Admits	Re-admissions	% Readmits	Admits	Total Re-Admissions	% Readmits
FY 2016	81,044	6,714	8.28%	228,943	20,728	9.05%	309,987	27,442	8.85
FY 2015	170,796	15,019	8.79%	463,193	45,928	9.91%	633,989	60,947	9.61
FY 2014	172,809	15,019	8.96%	477,369	45,746	9.58%	649,958	61,234	9.42
Total	424,649	37,222	8.76%	1,169,505	112,402	9.61%	1,593,934	149,623	9.39

Note (3): In order to illustrate the impact that Dual Eligible cases have on Readmission rates, Indigent cases in Schedule 2 are defined as Medicaid, Self-Pay and Charity cases only (not including Dual Eligible cases)
Note (4): Non-Indigent cases in Schedule 2 are defined as all remaining cases (including Dual Eligible cases)

- Previously, with Dual cases in the Indigent Class the Indigent readmission rate was 10.80%. With Duals removed, the Indigent readmission rate drops to 8.76%

- Again, consistent with findings in recent literature Dual Eligibles appear to have a substantial influence on outcomes as measured by readmission rates

Analysis at the MDC Level

- An analysis performed at the MDC level also supports the case that Indigent and Non-Indigent classes (as defined) have a differential impact on a hospital's readmission rate (see Schedule 3 below)

Schedule 3
FY 2014, FY 2015 and the first six months of FY 2016 Readmission Rates by MDC

		A	B	C	B/C-1
			Readmission Rates		
MDC	MDC Description	Total Discharges	Indigent Readmission Rate	Non-Indigent Readmission Rate	Variance
1	Diseases and Disorders of the Nervous System	100,679	13.03%	10.94%	19.14%
2	Diseases and Disorders of the Eye	1,937	3.98%	5.23%	-23.88%
3	Diseases and Disorders of the Ear, Nose, Mouth And Throat	15,795	5.42%	5.11%	6.20%
4	Diseases and Disorders of the Respiratory System	150,283	18.20%	15.17%	19.96%
5	Diseases and Disorders of the Circulatory System	171,263	15.39%	12.27%	25.43%
6	Diseases and Disorders of the Digestive System	129,363	15.84%	12.07%	31.27%
7	Diseases and Disorders of the Hepatobiliary System And Pancreas	44,893	17.44%	13.31%	30.98%
8	Diseases and Disorders of the Musculoskeletal System And Connective Tissue	151,561	7.92%	5.51%	43.73%
9	Diseases and Disorders of the Skin, Subcutaneous Tissue And Breast	39,339	9.12%	6.84%	33.46%
10	Diseases and Disorders of the Endocrine, Nutritional And Metabolic System	45,447	13.09%	9.61%	36.14%
11	Diseases and Disorders of the Kidney And Urinary Tract	73,799	13.83%	11.97%	15.55%
12	Diseases and Disorders of the Male Reproductive System	7,420	6.58%	4.38%	50.08%
13	Diseases and Disorders of the Female Reproductive System	17,850	4.12%	3.70%	11.37%
14	Pregnancy, Childbirth And Puerperium	180,158	0.56%	0.40%	38.03%
15	Newborn And Other Neonates (Perinatal Period)	173,707	0.02%	0.01%	111.38%
16	Diseases and Disorders of the Blood and Blood Forming Organs and Immunological Disorders	23,111	19.38%	16.72%	15.88%
17	Myeloproliferative DDs (Poorly Differentiated Neoplasms)	13,099	15.18%	13.32%	13.95%
18	Infectious and Parasitic DDs (Systemic or unspecified sites)	88,200	27.56%	23.37%	17.92%
19	Mental Diseases and Disorders	84,004	17.89%	12.67%	41.23%
20	Alcohol/Drug Use or Induced Mental Disorders	22,204	10.52%	8.72%	20.68%
21	Injuries, Poison And Toxic Effect of Drugs	20,446	15.06%	12.16%	23.89%
22	Burns	1,266	4.88%	4.98%	-2.00%
23	Factors Influencing Health Status and Other Contacts with Health Services	27,742	8.41%	7.34%	14.52%
24	Multiple Significant Trauma	6,012	32.02%	32.57%	-1.67%
25	Human Immunodeficiency Virus Infection	3,910	9.94%	7.35%	35.24%

Indigent Cases include Medicaid, Self-Pay, Charity and Dual Eligible Cases.

Calculation of Readmission Rates at APR-SOI Level

- An “Expected” Readmission Rate (an ERR) can be calculated on a Case mix and Indigence Adjusted basis
- This is accomplished by determining both the Indigent and Non-Indigent Readmission rate for each APR-DRG SOI cell across the state
- For instance for the APR DRG Intracranial Hemorrhage SOI 3 in FY2014 included 107 Indigent cases of which 16 were readmissions (16/107 = 0.15)
- For Non-Indigent cases for that same APR DRG SOI there were 690 cases of which 93 were readmissions (93/690 = 0.135)
- Using the statewide data over the 2.5 year period (FY14 – FH FY16) we calculated Expected Readmission Rates for both Indigent cases and Non-Indigent cases at an APR-DRG SOI level
- Schedule 4 on the next slide presents these results

Calculation of Expected Readmission Rates

Schedule 4

Summary of Expected Statewide (Case Mix Adjusted) Readmission Rates

Indigent vs Non Indigent Readmission rate by APR DRG SOI[1]

Fiscal Year	Total Cases	Indigent (1) Readmissions	% Readmits	Non-Indigent Readmissions	% Readmits
2014	649,958	75,276	11.58%	55,349	8.52%
2015	633,989	73,333	11.57%	54,851	8.65%
FH2016	309,987	31,994	10.32%	25,165	8.12%
Total	1,593,934	180,603	11.33%	135,365	8.49%

Note (1): In this analysis, Indigent cases are defined as Medicaid, Self-Pay, Charity and Dual Eligible Cases.

- The aggregated (over 2.5 years) and case mix adjusted (by APR-SOI) data show that the Expected Readmission Rate for Indigent patients substantially exceeds the Expected Readmission Rate for Non-Indigent patients
- For example, over the full 2.5 year period the Indigent Readmission Rate would have been 11.33%, while the Non-Indigent Readmission Rate would be 8.49%
- In aggregate, the Indigent Readmission Rate was 33.5% higher than the Non-Indigent Readmission rate (11.33%/8.49%) = 1.335

Calculation of Expected Readmission Rates (continued)

- So, to clarify – the above analysis uses the Statewide distribution of total cases by APR-DRG SOI
- The analysis then says, if one hospital had the same distribution of cases in the APR DRG SOI cells as the Statewide distribution of cases by APR DRG SOI –
  - And that hospital's patient were **only Indigent patients**
  - It would be expected to have an 11.33% readmission rate
- Similarly, if a hospital had the same distribution of cases in the APR DRG SOI cells as the Statewide distribution of cases by APR DRG SOI –
  - And that hospital had **only Non-Indigent patients**
  - It would be expected to have a readmission rate of 8.49%
- We believe this analysis also substantiates the fact that the SES of a hospital's patients could be taken into account in evaluating its Readmission Rate performance through our approach

A Method for Evaluating a Hospital's Readmission Rate Level

- An Expected Readmission Rate for a hospital's Indigent patients can be determined by applying each hospital's own distribution of Indigent cases to the Statewide Indigent Readmission Rates by APR-DRG SOI cell

- Likewise, an Expected Readmission Rate for a hospital's Non-Indigent patients can be determined by applying that hospital's own distribution of Non-Indigent cases to the Statewide Non-Indigent Readmission Rates by APR-DRG SOI cell

- A hospital's Total Expected Readmission Rate, for any given period of time, would then be the ratio of is Expected Readmissions and its total number of Admissions.

- For example, if a hospital was determined to have 400 Expected Indigent Readmissions and 600 Expected Non-Indigent Readmissions and total Admissions of 10,000, its Expected overall Readmission rate would be 10% (1,000/10,000)

Evaluating a Hospital's Readmission Rate Level

- Using the methodology just described, a hospital's Actual Readmission Rate can be compared to its Expected Readmission rate for any particular time period **<u>to gauge its Performance</u>**

- The resulting ratio would provide an indication of whether that hospital was performing more or less favorably in reducing Readmissions, than Expected

  - If a hospital's Actually Readmission Rate (ARR) was 9% and its Expected Readmission Rate (ERR) was 10%, that hospital would have 10% fewer Readmissions than it would have had if, in each APR-DRG SOI, its Actual Readmission Rate had been equal to the Statewide average for a particular APR-DRG SOI and each SES class – a **"more Favorable Result**"

  - Similarly, if its ARR = 11% and its ERR = 10% it would have 10% more Readmissions than Expected **– a less Favorable Result**

Evaluating a Hospital's Readmission Rate Level (continued)

- Thus, each hospital's performance on Readmissions can be summarized using an index defined as the ratio of the hospital's ERR to its ARR – in the first example the hospitals Ratio would be 0.9 (9%/10%) and in the second example it would have been 1.1 (11%/10%)
- The indices can be used to determine an Attainment standard (i.e., 0.85)
- Any hospital with a Readmission Index below 0.85 say, might be eligible to receive rewards in the subsequent Rate Year based on its variance between its Readmission Index and 0.85
- Any hospital that was about this standard, would be subject to penalties based on the difference between its actual Readmission Index and the 0.85 standard
- The approach recognizes the differing Attainment levels of hospitals (favorable or unfavorable) and would provide rewards or penalties scaled in proportion to each hospital's performance

Summary and Conclusion

- Earlier, based on the results of Mathematica's regression analysis, the HSCRC determined that the use of a patient's payer class did not substantially change the HSCRC's predictive readmission model and hospital rankings on readmission rates

- Our methodology was intended to address the question of whether information on the payer classification of patients could be used to develop a factor that could adjust for the impact of the SES of hospital patients on its rate of readmissions

- Our analysis clearly shows that adjusting hospital readmission rates based on its mix of Indigent and Non-Indigent patients (particularly the inclusion of Dual Eligible cases in the Indigent patient class) can enhance the comparative analysis of hospital readmission rate performance and improve the overall fairness of the HSCRC's attainment-based methodology

- We believe the results indicate that the hospital ranking on Readmission Attainment will likely change when our proposed SES adjustment is included in the HSCRC model, however - we would therefore suggest, that the HSCRC staff perform such an analysis based on our observations

- Additionally, our observations may be helpful to hospital personnel in their attempts to reduce readmission rates, because they suggest that a focus of efforts to reduce the readmission rates of Dual Eligible patients may be the most effective way for hospitals to improve their overall readmission rate performance