

July 18, 2017

**Memorandum**

**TO:** Paul Precht  
Medicare-Medicaid Coordination Office  
Centers for Medicare and Medicaid Services

**FROM:** Actuarial Research Corporation

**SUBJECT: P3C Acuity Adjustment Analysis**

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**Introduction:**

CMS is considering developing a new model, the Person Centered Community Care (P3C) model, which would adapt the current Programs for All-Inclusive Care for the Elderly (PACE) to certain dual eligible individuals with disabilities that impair their mobility. Provisionally these individuals would be age 21 or older, are assessed as requiring a nursing home level of care, but are able to live in a community setting safely, and meet other program eligibility criteria.

The Medicare Medicaid Coordination Office (MMCO) within the Centers for Medicare and Medicaid Services (CMS) requested that Actuarial Research Corporation (ARC) perform preliminary research that could support the development of the potential model. The analysis described below explores potential variation between historical Medicare Fee-for-Service (FFS) expenditures as tabulated from Medicare claims and theoretical capitation rates for certain dual eligible enrollees diagnosed with specific mobility impairments as well as potential methodologies for developing an acuity adjustment.

ARC performed a series of tabulations comparing theoretical capitation payments generated using the product of HCC risk scores and CMS FFS county rates with historical Medicare FFS claims expenditures during CYs 2013-2015. Per CMS guidance, if there was a significant difference between the theoretical and historical tabulated rates during this illustrative

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historical period, ARC would explore potential acuity adjustment methods and develop illustrative sample values for targeted subgroups of the population.

**Objectives:**

1. Tabulate and compare simulated theoretical capitated payment per member per month (PMPM) based on county rate and HCC risk score with Medicare fee-for-service (FFS) expenditures during CY2013-2015 for dual-eligible beneficiaries nationwide with specific mobility impairment diagnoses.
2. Explore potential acuity adjustment methods for potential enrollees in the P3C Model to adjust for variation between the theoretical calculation of P3C capitated payments and historical expenditures for the specialized subgroup of enrollees that would potentially be eligible for the P3C Model when using the current HCC risk score methodology.

Of note: this analysis is not intended to assess the accuracy of the methodologies used to set Medicare Advantage rates, including the HCC risk score methodology. The current payment methodology is used to pay the broader Medicare Advantage population and assumes that there is some degree of risk spreading through the enrollment of a broader proportion of the Medicare population in plans. To address differences in costs across segments of the Medicare population, the CMS-HCC risk adjustment model incorporates adjustments for a variety of differences, including different health conditions, and different statuses such as long term institution stays, ESRD, aged and disabled, and Medicaid. The models, however, are not intended to pay separately for small focused subgroups of beneficiaries, such as that which is the focus of the potential P3C model. As such, a review of capitated payments for a small focused segment of the population would necessarily be an invalid assessment of the methodology's broader accuracy.

**Data Sources:**

1. Medicare Beneficiary Summary File
  - a. ARC used the Other Chronic or Potentially Disabling Conditions data set in the Medicare Beneficiary Summary File to identify beneficiaries with mobility impairment diagnoses. Under this definition of mobility impairment, any beneficiary with at least one of the following seven conditions was included in the analysis:
    - 1) Cerebral Palsy
    - 2) Cystic Fibrosis and Other Metabolic Development Disorders
    - 3) Mobility Impairments

- 4) Multiple Sclerosis and Transverse Myelitis
- 5) Muscular Dystrophy
- 6) Spina Bifida and Other Congenital Anomalies of the Nervous System
- 7) Spinal Cord Injury
- b. Nursing Home Level of Care: For community-dwelling full benefit dual eligible beneficiaries, the Medicare Part D \$0 copay flag indicating eligibility for Medicaid Home and Community Based Waiver services was used.

## 2. Medicare Enrollment Database (EDB) and Eligibility Criteria

ARC used information from the Medicare Enrollment Database to perform certain eligibility checks during each year for the beneficiaries identified. The checks include:

- a. Group Health Organization: Months when a beneficiary was enrolled in a group health organization (Medicare Advantage, PACE, etc.) were excluded from the analysis because Medicare expenditure data for these beneficiaries is not available in the FFS claims data for those months.
- b. Death: Months following an enrollee's death (as recorded in the Medicare EDB) were excluded from the analysis.
- c. Medicare Part A and Part B: Months when a beneficiary was not eligible for both Medicare Part A and Part B were excluded from the analysis.
- d. Hospice: Beneficiaries who elected hospice care were deemed ineligible for the demonstration from the date of election forward.
- e. End Stage Renal Disease: Beneficiaries who were classified as ESRD were tabulated separately beginning with the month they were first classified as ESRD in the event that we would like to include them in subsequent analyses.
- f. Dual status: Only full-benefit dual eligible beneficiaries were included in the analysis.

## 3. Medicare National Claims History (NCH) Claims Data

ARC searched Medicare NCH Claims Data from the Chronic Condition Warehouse (CCW) for claims incurred between January 1, 2013 and December 31, 2015 (CY 2013-2015) for beneficiaries identified in Step 1. The data includes all applicable Medicare Part A and Part B claims processed through September 2016. All claims have at least 9 months of runout and, accordingly, no completion factor analysis was deemed necessary. For any beneficiary who would have been potentially eligible during CY2013-2015, all claims incurred during periods of potential eligibility were selected and tabulated.

## 4. CMS Hierarchical Condition Categories (CMS-HCC) 2017 risk model

Based on a finder file of beneficiaries included in this analysis, ARC was provided<sup>1</sup> with 2017 HCC model risk scores for every potentially eligible beneficiary using historical diagnoses for each of the three years (CY2013-2015) included in the analysis. The 2017 risk model was applied to each year for standardization.

#### 5. Medicare FFS county published rates

CMS publishes FFS rates by county each year. ARC used these rates for CYs 2013-2015<sup>2</sup> to determine a theoretical capitated payment baseline per member, per month (PMPM) by county for each selected subgroup of identified beneficiaries.

#### **Approach:**

ARC identified beneficiaries with mobility impairment diagnoses who were full-benefit dual eligible, nationwide, for CYs 2013 -2015. ARC then tabulated the number of such beneficiaries in every county. Using a list of 2015 PACE organizations by enrollment, ARC determined that 90% of PACE organizations had 80 or more enrollees. This analysis proceeded under the assumption that this would be a reasonable estimate of the minimum number of enrollees that organizations would consider necessary to make operation of a PACE-type plan viable. In order to simulate the potential universe of participating PACE plans, it was also assumed that about 1/3 of eligible beneficiaries would enroll in the demonstration in a given county, which implies, in turn, that 240 potentially eligible beneficiaries in a county would be the minimum viability threshold. Nationwide, 653 counties were found to meet this minimum and were included in this analysis.<sup>3</sup>

After completing the fee-for-service eligibility checks noted above, ARC tabulated the number of member months for beneficiaries meeting the eligibility requirements for each of the three calendar years and then tabulated all FFS Medicare claim payments for each calendar year. Average risk scores were then calculated for every included county by selected subgroup of beneficiaries for each of the three years. Beneficiaries were categorized by the following parameters and grouped into four subgroups:

- 1) Age – Under 65 vs. 65+
- 2) Institutional status – Community vs. Institutional

The historical tabulated FFS PMPM expenditures were compared to the product of the published Medicare county rates and the average 2017 HCC model risk scores for each

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<sup>1</sup> ARC did not perform these calculations, instead relying on the results generated by another CMS contractor.

<sup>2</sup> <https://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Ratebooks-and-Supporting-Data.html>

<sup>3</sup> Note: ARC used these assumptions to structure this illustrative analysis, but they do not represent CMS policy decisions or limitations on counties eligible for a potential P3C model test. These policies will be determined by CMS.

beneficiary subgroup in each county. The county level ratios varied substantially around the national average ratios. Under the assumption that much of this variation was attributable to the small numbers of potentially eligible beneficiaries, we substituted a blend between the national ratio and the county ratios using guidance provided to actuaries for pricing Medicare Advantage bids.<sup>4</sup> The weight given each specific county data was based on the credibility override criteria. Based on this guidance, the weight for the county level factor is the square root of the county member months divided by 24,000. However, if the calculated factor is greater than 0.9, the county factor is assigned full credibility and if the calculated factor is less than 0.2, the national factor is used, disregarding the county factor entirely. The blended ratio was divided by the national average ratio to see how much variation around the national average remained. The results of the variation analysis appear in Table 3 later in this memo. We note that this focused subgroup of beneficiaries is not representative of the larger Medicare population, and the current payment methodology is not designed to pay exactly for this focused subset. For example, we do not have individual HCCs in the risk adjustment model for each of these conditions and the HCC model is not intended to pay exactly for small groups of beneficiaries. Similarly, each county may have different proportions of the beneficiaries who meet the narrow criteria for this demonstration.

## Results:

Table 1 shows a comparison between the historical FFS per capita expenditures for potentially eligible beneficiaries and a theoretical per capita payment rate for each of the subgroups over the three-year period:

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<sup>4</sup> INSTRUCTIONS FOR COMPLETING THE MEDICARE ADVANTAGE BID PRICING TOOLS FOR CONTRACT YEAR 2017, April 8, 2016, p.19. "Overriding the CMS Formulas for Partial Credibility... If the CMS formula for partial credibility is applied and the resulting credibility is—

- Less than or equal to 20 percent, then the actuary may override the computed credibility with 0 percent credibility.
- Greater than or equal to 90 percent, then the actuary may override the computed credibility with 100 percent credibility."

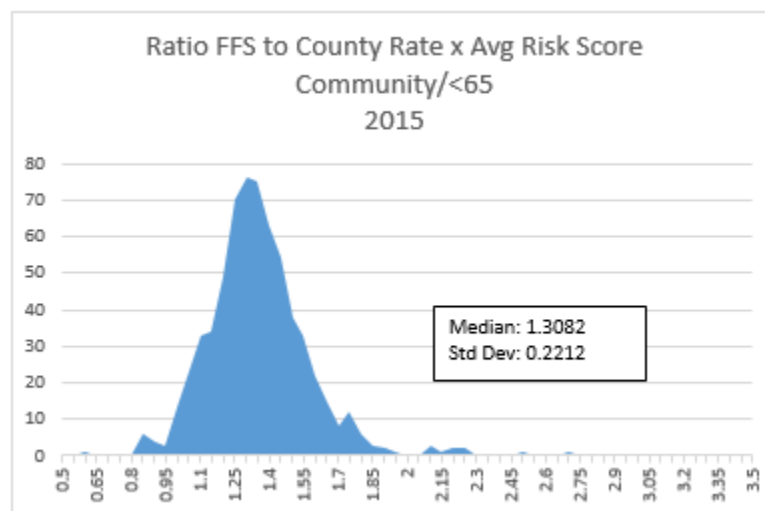
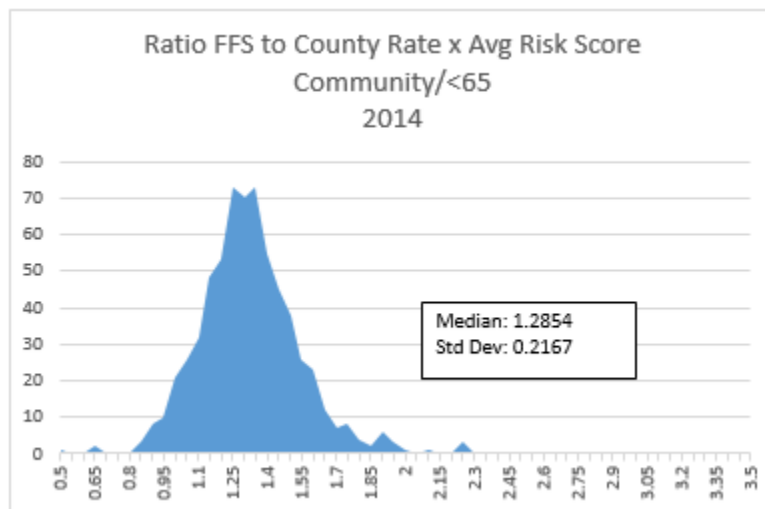
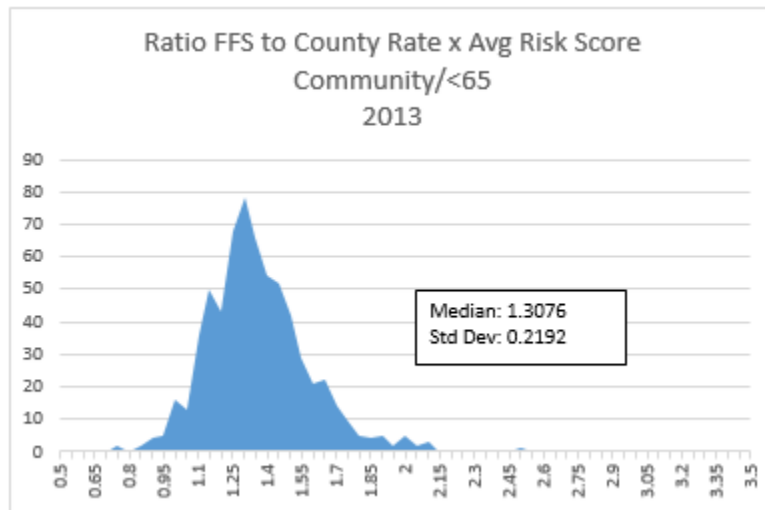
Table 1. Comparison of Historical FFS Expenditures to Theoretical Per Capita Payment

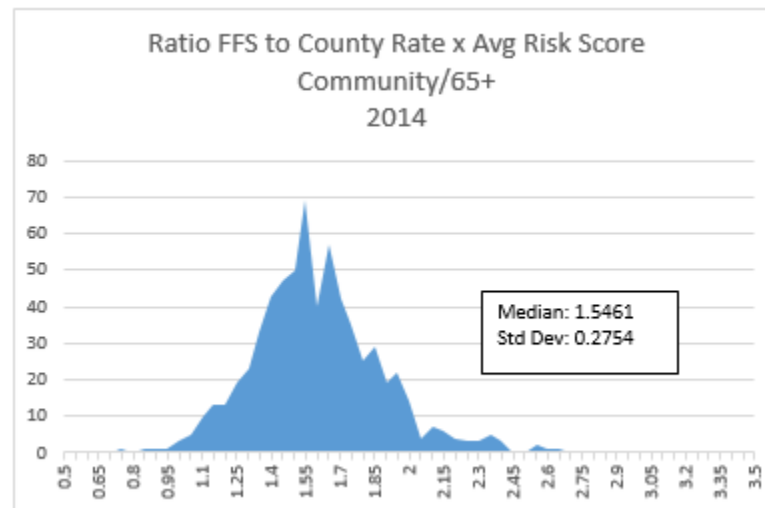
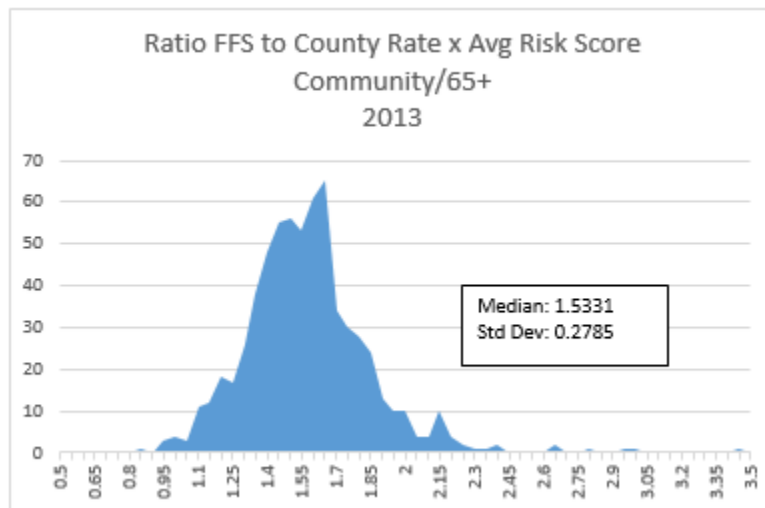
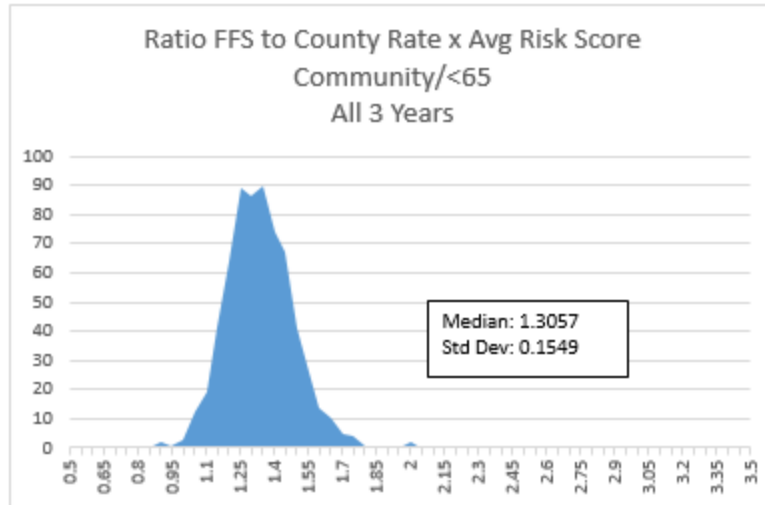
Population Subgroup	Year	Standardized County Rate	Average Risk Score	Theoretical Per Capita Rate Payment	Potential Enrollee Historical FFS Per Capita	Eligible FFS MM	Ratio FFS to Rate Payment
Community/<65	2013	774.86	1.6800	1,309.81	1,731.96	2,357,737	1.3223
	2014	799.71	1.7341	1,394.20	1,817.85	2,286,801	1.3039
	2015	771.34	1.8014	1,396.18	1,838.52	2,141,991	1.3168
	<b>Total</b>	<b>782.12</b>	<b>1.7365</b>	<b>1,365.56</b>	<b>1,794.53</b>	<b>6,786,529</b>	<b>1.3141</b>
Community/65+	2013	804.81	2.0573	1,668.05	2,494.67	1,872,509	1.4956
	2014	830.41	2.1627	1,808.40	2,745.39	1,668,118	1.5181
	2015	798.74	2.2616	1,817.39	2,974.96	1,399,053	1.6369
	<b>Total</b>	<b>811.73</b>	<b>2.1508</b>	<b>1,757.71</b>	<b>2,715.37</b>	<b>4,939,680</b>	<b>1.5448</b>
Institutional/<65	2013	781.72	2.9103	2,289.72	2,488.82	181,735	1.0870
	2014	806.15	2.9526	2,396.94	2,631.36	188,466	1.0978
	2015	776.24	2.9603	2,311.82	2,710.91	179,876	1.1726
	<b>Total</b>	<b>788.30</b>	<b>2.9412</b>	<b>2,333.76</b>	<b>2,610.28</b>	<b>550,077</b>	<b>1.1185</b>
Institutional/65+	2013	794.78	2.2732	1,819.99	2,291.05	520,963	1.2588
	2014	819.49	2.2708	1,874.55	2,340.11	544,565	1.2484
	2015	788.31	2.2587	1,790.91	2,422.30	516,546	1.3526
	<b>Total</b>	<b>801.17</b>	<b>2.2676</b>	<b>1,829.27</b>	<b>2,350.79</b>	<b>1,582,074</b>	<b>1.2851</b>

Historical FFS per capita expenditures are calculated by dividing the sum of FFS Medicare claim payments by the number of eligible member months. Theoretical per capita payment rates are calculated for each beneficiary by multiplying the standardized FFS county rate by their HCC risk score and eligible months, summing for all beneficiaries, and dividing by the total number of eligible months. Note that historical standardized FFS county rates are published on a county basis, so in the above tables the standardized FFS county rate for each cohort is the weighted average of the standardized county rates by eligible member months in each county. Additionally, the pattern that can be seen in the weighted average standardized county rates in Table 1 can be explained by a change in how those rates were developed and what they represent. 2014 was the first year that the CMS Office of the Actuary was directed by the Secretary of Health and Human Services to reflect the anticipated physician payment cuts into the rates before the override was passed by Congress. Previously, an override was not incorporated into the rates until it was passed, which was typically after the rates were announced, resulting in a one-year delay in affecting the benchmarks. Therefore, the apparent rate spike in 2014 relative to 2013 and 2015 occurs because the 2014 rate includes both the catchup of the override for 2013 and the anticipated override for 2014.

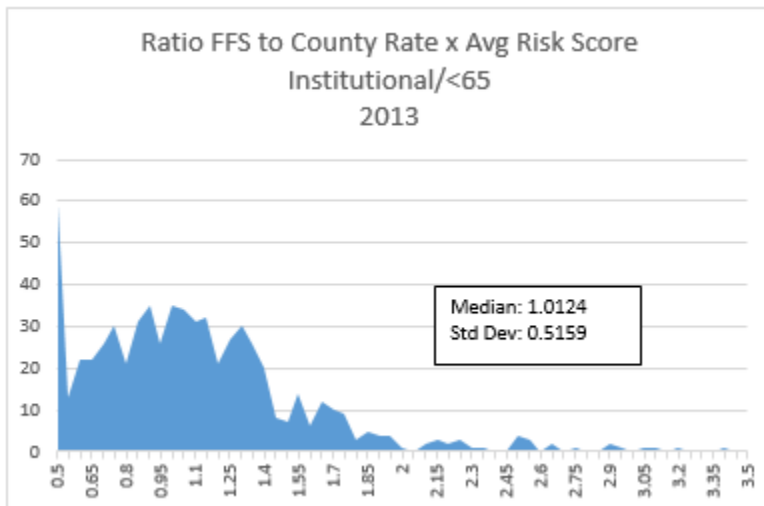
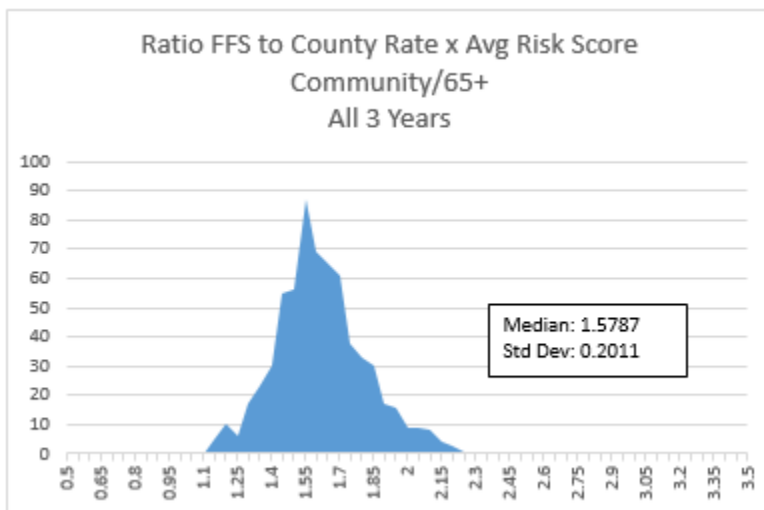
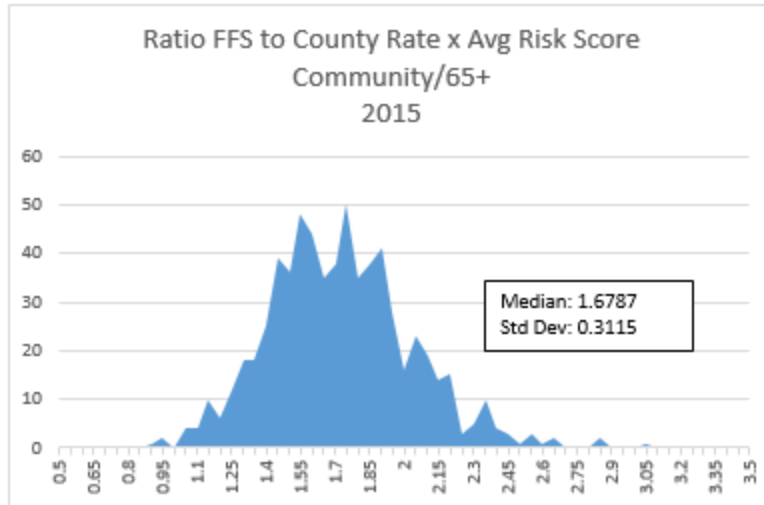
The following graphs display the frequency distribution of the ratio of tabulated historical FFS expenditures to the standardized FFS county rates times average risk score for each of the

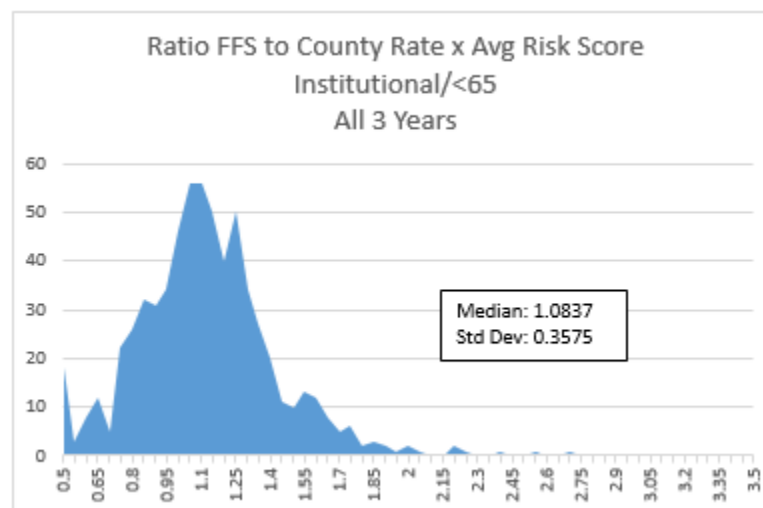
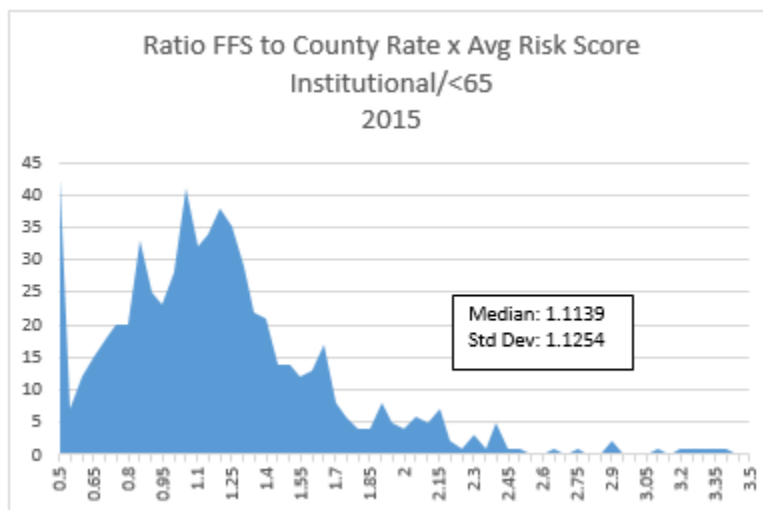
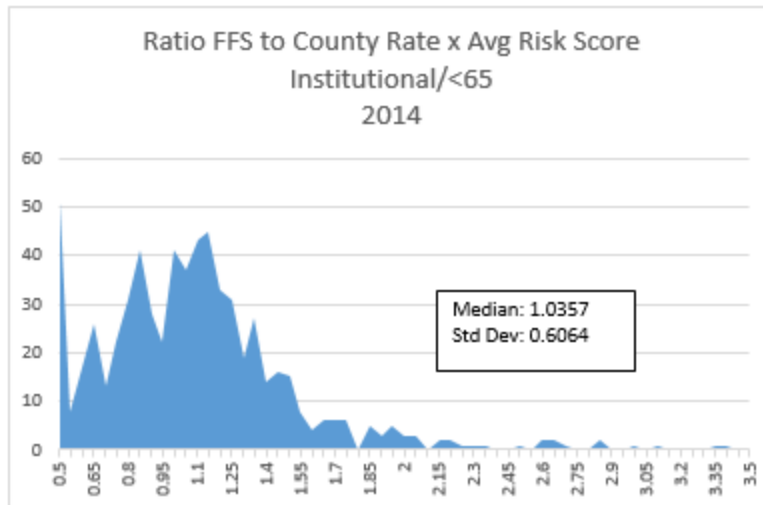
653 counties in the analysis. There is one graph for each of the four subgroups for each year and all three years combined.

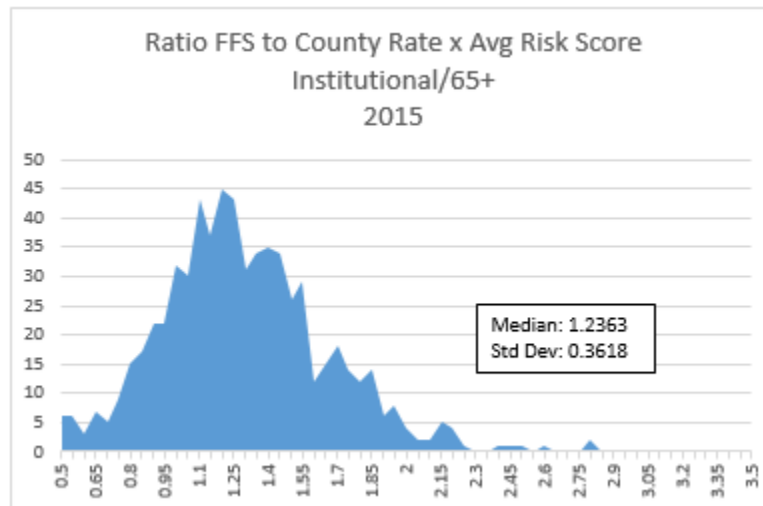
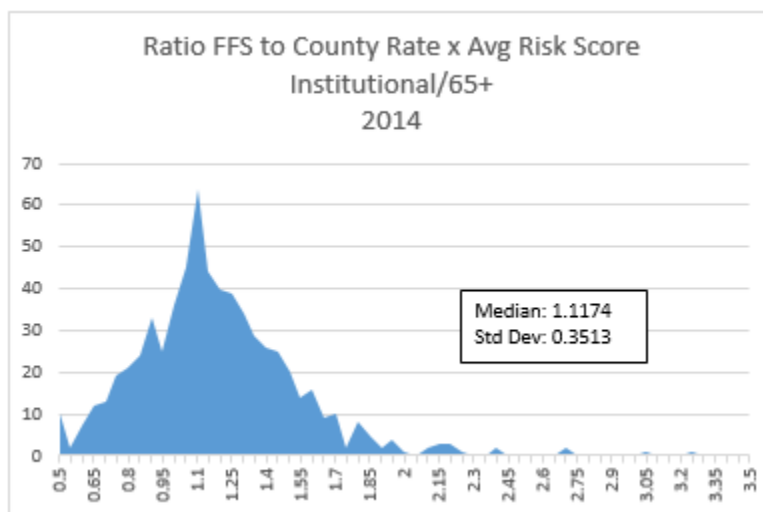
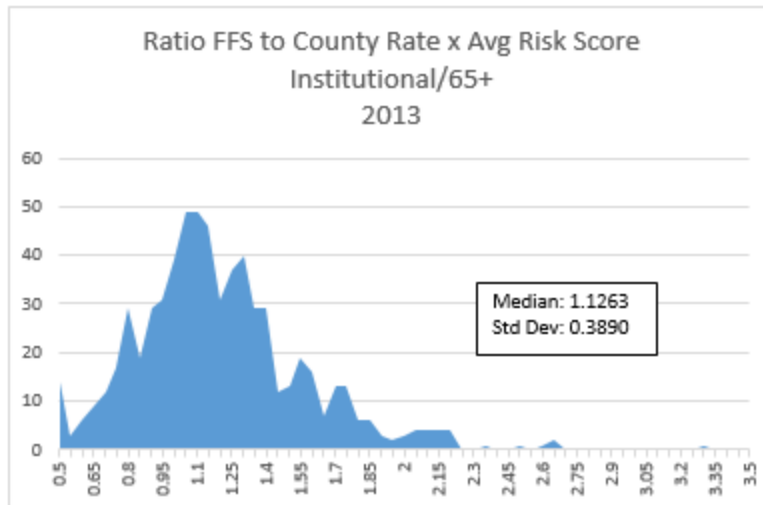


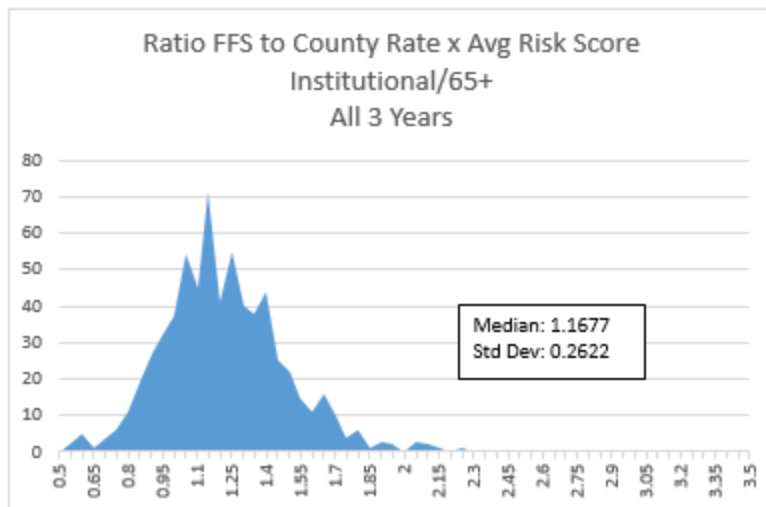












The accompanying file, “P3C County Ratios and Blended Acuity Factors 06092017.pdf”, includes the ratio of historical FFS PMPM expenditures to the theoretical capitated payment for the three-year period for each of the 653 counties included in the analysis. ARC also developed state level factors as described below.

### Acuity Adjustments

The potential acuity adjustments by county for the four subgroups of beneficiaries were determined as follows:

1. For each of the 653 counties, each of the three years 2013 through 2015, and each of the four subgroups, we tabulated the historical FFS expenditures, the average risk score, and member months (MM) for the eligible beneficiaries.
2. The weighted average (weighted by MMs) of the risk scores and the weighted average of the county rates over the three years were calculated.
3. The historical FFS per capita expenditures is the sum of the total FFS expenditures divided by the sum of the MMs over the three years.
4. The ratio of the historical FFS per capita expenditures over the three years is then divided by the average risk score over the three years times the average county rate over the three years to produce the initial acuity adjustment factor for each county.
5. A weighted average acuity adjustment factor was determined for each of the four subgroups for all of the counties included in this analysis.
6. As mentioned earlier in this memo, under the assumption that much of the variation in the initial acuity adjustment could be attributable to the small numbers of beneficiaries meeting the relevant criteria in many of the counties, we substituted a blend between the national average ratio and the county level initial acuity adjustments with the weight given each specific county data based on the credibility

criteria approved for use in the preparation of Medicare Advantage bids. That methodology takes the square root of the county member months divided by 24,000 as the weight for the county level factor. However, if that calculated weight is greater than 0.9, the county factor is assigned full credibility and if the calculated weight is less than 0.2, the national factor is used, disregarding the county factor entirely.

7. The final acuity adjustment was then calculated by multiplying the initial acuity factor by the credibility weight and adding the total average acuity factor multiplied by (1 – the credibility weight). Table 2 below illustrates how this step is calculated given different credibility adjustments for select counties.

Table 2. Blended Ratio for Select Counties for Community 65+ Category

County	Credibility	Weight	Initial Acuity Factor	Total Ratio	Blended Ratio Final Acuity Factor
Los Angeles, CA	Full	1.000	1.606	1.545	1.606
San Francisco, CA	Partial	0.661	2.056	1.545	1.883
Hawaii, HI	None	0.000	2.185	1.545	1.545

In order to see how much variation there was in the blended ratios around the country, we divided the blended ratios by the national average ratio. Table 3A below displays the distribution of counties by interval for the four beneficiary categories of the ratio of average monthly FFS costs to the capitated rates derived by using the blended acuity adjustment factors.

Table 3A. Counties Grouped by the Ratio of Average Monthly Per Capita FFS Expenditures to Capitated Rates Derived by Using the Blended Acuity Adjustment Factors

Community < 65			Community 65+		
Interval	Number of Counties	Percentage of Total	Interval	Number of Counties	Percentage of Total
<.80	0	0%	<.80	2	0%
.80 to .85	3	0%	.80 to .85	2	0%
.85 to .90	19	3%	.85 to .90	6	1%
.90 to .95	109	17%	.90 to .95	58	9%
.95 to 1.00	219	34%	.95 to 1.00	211	32%
1.00 to 1.05	181	28%	1.00 to 1.05	225	34%
1.05 to 1.10	82	13%	1.05 to 1.10	106	16%
1.10 to 1.15	26	4%	1.10 to 1.15	32	5%
1.15 to 1.20	9	1%	1.15 to 1.20	8	1%
>1.20	5	1%	>1.20	3	0%

Institutional<65			Institutional 65+		
Interval	Number of Counties	Percentage of Total	Interval	Number of Counties	Percentage of Total
<.80	0	0%	<.80	0	0%
.80 to .85	0	0%	.80 to .85	1	0%
.85 to .90	2	0%	.85 to .90	21	3%
.90 to .95	18	3%	.90 to .95	101	15%
.95 to 1.00	558	85%	.95 to 1.00	379	58%
1.00 to 1.05	61	9%	1.00 to 1.05	95	15%
1.05 to 1.10	8	1%	1.05 to 1.10	27	4%
1.10 to 1.15	5	1%	1.10 to 1.15	19	3%
1.15 to 1.20	0	0%	1.15 to 1.20	4	1%
>1.20	1	0%	>1.20	6	1%

The above table shows that, following credibility adjustment, the vast majority of the county ratios are within +/- 10% of the national average. While Table 3A above shows the variation around the national average, the potential acuity adjustment for a given county would be the numerator of the ratio, i.e., prior to dividing by the ratio of the national average historical FFS payments to theoretical payments. For example, the ratio for the Community 65+ cohort in Los Angeles County, CA compared to the national average ratio is 1.039 (1.606 divided by 1.545 – from Table 2 above) making it one of the 225 counties in the 1.00 to 1.05 interval. Because LA County has full credibility, the potential acuity adjustment for LA County is 1.606.

In addition to the county level adjusted acuity factors calculated and discussed above, we developed a second option based on statewide acuity adjustments. The statewide adjustments were calculated from the same data as the county level adjustments. For the statewide factors, we calculated the average of the actual FFS per capita expenditures

divided by county rates multiplied by average risk scores, each weighted by the number of member months in the county. Both the numerator and the denominator of the ratio and the number of member months were based on the combined county data over the three years. The factors were developed for each of the subgroups (community <65, community 65+, etc.). The same credibility factors and methodology that were used for the county level acuity adjustment factors were applied to the statewide factors. Hence, some of the statewide acuity factors were based on a blending of the statewide average and the national average.

**Table 3B. States Grouped by the Ratio of Average Monthly Per Capita FFS Expenditures to Capitated Rates Derived by Using the Blended Acuity Adjustment Factors**

Community <65			Community 65+		
Interval	Number of Counties	Percentage of Total	Interval	Number of Counties	Percentage of Total
<.80	0	0%	<.80	0	0%
.80 to .85	0	0%	.80 to .85	1	2%
.85 to .90	1	2%	.85 to .90	0	0%
.90 to .95	6	12%	.90 to .95	7	14%
.95 to 1.00	15	29%	.95 to 1.00	6	12%
1.00 to 1.05	18	35%	1.00 to 1.05	18	35%
1.05 to 1.10	3	6%	1.05 to 1.10	13	25%
1.10 to 1.15	8	16%	1.10 to 1.15	5	10%
1.15 to 1.20	0	0%	1.15 to 1.20	1	2%
>1.20	0	0%	>1.20	0	0%

Institutional <65			Institutional 65+		
Interval	Number of Counties	Percentage of Total	Interval	Number of Counties	Percentage of Total
<.80	0	0%	<.80	1	2%
.80 to .85	0	0%	.80 to .85	6	12%
.85 to .90	3	6%	.85 to .90	8	16%
.90 to .95	10	20%	.90 to .95	11	22%
.95 to 1.00	11	22%	.95 to 1.00	11	22%
1.00 to 1.05	20	39%	1.00 to 1.05	8	16%
1.05 to 1.10	5	10%	1.05 to 1.10	2	4%
1.10 to 1.15	1	2%	1.10 to 1.15	1	2%
1.15 to 1.20	0	0%	1.15 to 1.20	1	2%
>1.20	1	2%	>1.20	2	4%

The above table shows that, like the county factors, the vast majority of the statewide level ratios are within +/- 10% of the national average. Table 4, in attachment "P3C Statewide Level Detail 06092017.pdf", shows all the statewide acuity factors and presents more

detailed information on the development of the state level acuity factors including: unique beneficiary counts, historical expenditures, eligible member months, and the average HCC risk scores and the county rates.

**Conclusions:**

Overall, across all three observation years and all four subgroups, the tabulated historical FFS expenditures are substantially larger than the theoretical capitated payments. For the Community under 65 population, the ratios are steady by year; the tabulated historical fee-for-service expenditures are consistently just over 30% higher than the theoretical per capita rate payments. For the other subgroups, the ratios are close to level in 2013 and 2014 and then jump up in 2015. In each case, the average risk scores and historical FFS expenditures trend similarly from 2013 to 2014 and 2014 to 2015 and much of the increase in the ratio can be attributed to the drop in the standardized FFS county rates from 2014 to 2015.

Based on this analysis, historical FFS expenditures for the specified population are higher than the theoretical capitated payments. This assessment suggests that the application of an acuity adjustment based on historical relationships might be appropriate. We have explored two options for a potential acuity adjustment. One option is based on blending county and national average ratios of tabulated historical FFS payments to theoretical per capita payments that would reduce the variation among counties. The second option would be based on blending statewide and national average ratios. In each case, a portion of that variation can be attributed to random fluctuation resulting from small sample size rather than underlying geographic differences in population. The second option would minimize the instances of small sample sizes and give more credence to the statewide averages as opposed to increased reliance on the national average.



## *Authorship and Use*

*Michael Sandler, Sol Mussey and John Wilkin prepared this document and are actuaries for ARC. Michael Sandler, Sol Mussey and John Wilkin are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial communication contained herein.*

*In developing these calculations, ARC has relied upon data provided by CMS that includes, but is not limited to, Medicare claims, county rates, and beneficiary eligibility and diagnostic information. ARC has made a review of this data, including such checks as it considered appropriate. ARC believes that this information is appropriate and suitable for this analysis, but does not take responsibility for the validity and completeness of this data. ARC has also relied on other information relevant to the use of this data, including, but not limited to, the general design for the proposed model and the beneficiary characteristics considered as indicators of eligibility for the proposed Demonstration, which were provided by CMS.*

*Actuarial Research Corporation ("ARC") created this document and the accompanying file (P3C County Ratios and Blended Acuity Factorsv1.pdf) for use by The Centers for Medicare and Medicaid Services ("CMS") pursuant to ARC's Contract under vehicle No. HHSM-500-2011-00011I with CMS. The document was prepared solely to assist CMS in understanding potential variation between Medicare Fee-for-Service (FFS) expenditures and theoretical capitation rates for certain dual eligible enrollees diagnosed with specific mobility impairments, as well as in consideration of a potential methodology for developing an acuity adjustment.*

*The methodology to be used to determine potential payment rates for any model for similar beneficiaries will be developed by CMS; these calculations do not represent projections or predictions of the experience of any organization's experience under such a program. Any party assessing whether or not to participate in a potential P3C or other CMS model should make its own assumptions.*

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