MILLIMAN WHITE PAPER

# Risk score impacts of the Medicare Advantage 2018 RxHCC risk score model update

How does this model update affect plan risk scores?

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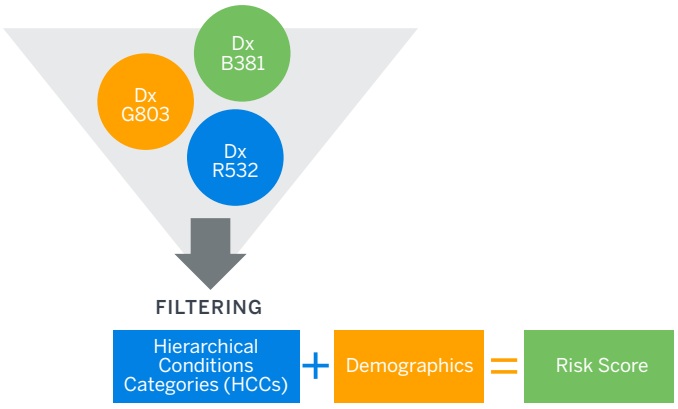
CMS has finalized a revised Part D risk score model for payment year 2018. The impact will vary based on demographics, but overall the update will lower risk scores and increase revenue.

## Background

The Final 2018 Rate Announcement, released by the Centers for Medicare and Medicaid Services (CMS) on April 3, 2017, included changes to the Medicare Part D RxHCC risk score model. This model calculates member-level risk scores, which are used to determine payment to Part D Medicare Advantage (MA) plan sponsors in payment year (PY) 2018. Although the pharmacy hierarchical condition categories (RxHCCs) used to predict future drug cost have not changed from the prior model, the amount of weight given to each RxHCC has. The changes to this model will affect each plan differently, based on the demographic and disease profile of the Medicare beneficiaries enrolled with the plan. It is essential for Part D plan sponsors to understand the impact of this update on their risk scores to accurately forecast the revenue effects.

The RxHCC risk score model is a prospective risk score model, using a base year of diagnosis information to predict the expected Part D costs for the following year for each member. Although the model predicts Part D costs, it is based on diagnoses from medical claims, not pharmacy data. Figure 1 displays the risk score calculation process. Diagnosis codes are filtered into pharmacy hierarchical condition categories, each of which represents a grouping of similar diseases. This information is paired with demographic information, then a set of weights or coefficients is applied to the applicable RxHCCs and demographic information and summed up to produce the final risk score. Under the current transition from Risk Adjustment Processing System (RAPS) to Encounter Data System (EDS) data, this process is performed separately for the diagnosis information found in the RAPS data and the EDS data, and then the two risk scores are blended together using the blending percentages specified by CMS for the payment year.

**FIGURE 1: RISK SCORE CALCULATION**




This paper summarizes the changes in member risk scores that are due to the risk score model update. The summaries are developed based on the new demographic and disease condition category coefficients published by CMS using the CMS 5% Sample database. Using this Medicare population as the basis to assess the impact provides further insight into how risk scores will change under the PY2018 model for specific plan types, population types, and geographic areas.

The Medicare 5% Sample database is composed of Medicare fee-for-service (FFS) beneficiaries. While FFS and MA beneficiaries are similar, they are not the same. The results presented in this paper are based on FFS beneficiaries enrolled in calendar year (CY) 2015 and enrolled for 12 months in CY2014. We used dual-eligibility as a proxy for low-income eligibility. Using diagnoses from CY2014 we created mock RAPS and EDS data sets from the FFS claims data under both sets of diagnosis filtering logic. Other analyses have shown that there is a difference in risk scores that is due to just this filtering logic.[1] Our comparisons in this paper between 2017 and 2018 risk scores also take into account the change in the normalization factor between the two models, as well as the increased weight given to RAPS scores as CMS changes the RAPS/EDS blending percentages from 75%/25% to 85%/15% for PY2018.

1 Zhu, B. et al. (September 15, 2016). Medicare Advantage and the Encounter Data Processing System: Be Prepared. Milliman White Paper. Retrieved April 11, 2017, from http://us.milliman.com/insight/2016/Medicare-Advantage-and-the-Encounter-Data-Processing-System-Be-prepared/.

# Changes to the PY2018 RxHCC risk score model

### CHANGES TO THE COEFFICIENTS

The model assigns risk score coefficients to the demographic characteristics and condition categories of each previously enrolled Medicare beneficiary. The impact of each condition category on the risk score varies based on the beneficiary's income level, age, and institutionalized status. Figures 2 and 3 show the condition categories that experienced the greatest increases and decreases under the new 2018 risk score model as compared with the 2017 risk score model. Figure 2 shows the RxHCCs with the largest increase across any of the five models. Figure 3 similarly shows the largest decrease.

The largest increase in coefficient was for the Cystic Fibrosis RxHCC for beneficiaries under the age of 65. Beneficiaries aged 65 and older saw a much smaller change.

Chronic Viral Hepatitis C and Chronic Myeloid Leukemia saw large coefficient increases for the entire population.

**FIGURE 2: TOP 10 RXHCC COEFFICIENT INCREASES**

| 2017 to 2018 | | | | | | |
|---|---|---|---|---|---|---|
| | | Community | | | | Institutional |
| | | Low Income | | Non-Low Income | | |
| | | Under 65 | 65+ | Under 65 | 65+ | |
| RXHCC225 | Cystic Fibrosis | 1.58 | 0.01 | 1.91 | 0.38 | 0.38 |
| RXHCC54 | Chronic Viral Hepatitis C | 0.96 | 1.21 | 1.22 | 1.28 | 0.44 |
| RXHCC15 | Chronic Myeloid Leukemia | 0.99 | 1.14 | 0.84 | 1.11 | 0.90 |
| RXHCC40 | Specified Hereditary Metabolic/Immune Disorders | 0.72 | 0.17 | -0.53 | 0.21 | 0.33 |
| RXHCC160 | Multiple Sclerosis | 0.26 | 0.21 | 0.70 | 0.45 | 0.11 |
| RXHCC16 | Multiple Myeloma and Other Neoplastic Disorders | 0.42 | 0.44 | 0.55 | 0.54 | 0.05 |
| RXHCC1 | HIV/AIDS | 0.25 | 0.35 | 0.52 | 0.28 | 0.37 |
| RXHCC185 | Primary Pulmonary Hypertension | 0.33 | 0.06 | 0.42 | 0.12 | 0.03 |
| RXHCC17 | Secondary Cancers of Bone, Lung, Brain, and Other Specified Sites; Liver Cancer | 0.20 | 0.26 | 0.32 | 0.34 | 0.16 |
| RXHCC82 | Psoriatic Arthropathy and Systemic Sclerosis | 0.26 | 0.18 | -0.05 | 0.05 | 0.12 |

**FIGURE 3: TOP 10 RXHCC COEFFICIENT DECREASES**

| 2017 to 2018 | | | | | | |
|---|---|---|---|---|---|---|
| | | Community | | | | Institutional |
| | | Low Income | | Non-Low Income | | |
| | | Under 65 | 65+ | Under 65 | 65+ | |
| RXHCC314 | Pemphigus | -0.07 | -0.01 | -0.56 | 0.09 | -0.01 |
| RXHCC40 | Specified Hereditary Metabolic/Immune Disorders | 0.72 | 0.17 | -0.53 | 0.21 | 0.33 |
| RXHCC395 | Lung Transplant Status | -0.30 | -0.18 | -0.17 | 0.08 | 0.23 |
| RXHCC396 | Major Organ Transplant Status, Except Lung, Kidney, and Pancreas | -0.30 | -0.18 | -0.17 | -0.06 | -0.27 |
| RXHCC397 | Pancreas Transplant Status | -0.16 | -0.03 | 0.09 | 0.08 | -0.01 |
| RXHCC95 | Sickle Cell Anemia | 0.01 | -0.02 | 0.10 | 0.00 | -0.14 |
| NA_RXHCC145 | NonAged * Autism | 0.00 | 0.00 | 0.00 | 0.00 | -0.13 |
| NA_RXHCC1 | NonAged * HIV/AIDS | 0.00 | 0.00 | 0.00 | 0.00 | -0.10 |
| RXHCC355 | Narcolepsy and Cataplexy | 0.05 | 0.01 | 0.01 | 0.03 | -0.10 |
| RXHCC157 | Spinal Cord Disorders | 0.00 | 0.01 | -0.07 | -0.02 | -0.02 |

Specified Hereditary Metabolic/Immune Disorders saw a large shifting of risk score weights, where risk scores decreased significantly for under-65 non-low-income beneficiaries, and were correspondingly increased for under-65 low-income beneficiaries.

The largest risk score decreases were for the non-low-income population under age 65. In general, the population under age 65 also saw larger decreases than the 65-and-over population.

Figure 4 includes the coefficient changes for the demographic portion of the risk score. The most drastic changes occurred at the youngest ages, especially for institutionalized beneficiaries. Although not as drastic, females tend to have slightly larger decreases than males.

Note that all of the coefficient comparisons in Figures 2, 3, and 4 are prior to any changes in the risk score model normalization factor from 2017 to 2018.

**FIGURE 4: CHANGE IN DEMOGRAPHIC COEFFICIENTS**

| 2017 to 2018 | | | |
|---|---|---|---|
| | Community | | Institutional |
| Demographic Group | Low Income | Non-Low Income | |
| Female 0-34 | 0.012 | 0.016 | (0.127) |
| Female 35-44 | (0.012) | (0.027) | 0.149 |
| Female 45-54 | (0.010) | (0.010) | 0.034 |
| Female 55-59 | (0.006) | (0.019) | 0.009 |
| Female 60-64 | (0.007) | (0.019) | 0.010 |
| Female 65-69 | (0.018) | (0.025) | (0.003) |
| Female 70-74 | (0.031) | (0.025) | (0.020) |
| Female 75-79 | (0.030) | (0.026) | (0.031) |
| Female 80-84 | (0.041) | (0.032) | (0.038) |
| Female 85-89 | (0.046) | (0.039) | (0.045) |
| Female 90-94 | (0.040) | (0.048) | (0.052) |
| Female 95+ | (0.037) | (0.054) | (0.054) |
| Male 0-34 | 0.004 | 0.044 | 0.167 |
| Male 35-44 | (0.006) | 0.007 | 0.027 |
| Male 45-54 | 0.007 | (0.009) | 0.061 |
| Male 55-59 | 0.025 | 0.005 | 0.043 |
| Male 60-64 | 0.026 | 0.024 | 0.032 |
| Male 65-69 | 0.016 | (0.011) | (0.013) |
| Male 70-74 | (0.011) | (0.009) | (0.004) |
| Male 75-79 | (0.005) | (0.001) | (0.019) |
| Male 80-84 | (0.013) | (0.003) | (0.019) |
| Male 85-89 | (0.002) | (0.009) | (0.021) |
| Male 90-94 | (0.020) | (0.010) | (0.035) |
| Male 95+ | 0.008 | (0.024) | 0.003 |
| Originally Disabled Female | 0.018 | 0.001 | 0.006 |
| Originally Disabled Male | 0.008 | - | 0.006 |

### CHANGE TO NORMALIZATION FACTOR

The normalization factor changed from 0.976 in the prior model to 1.005 in the updated model. This change causes risk scores to decrease by 2.9%, all else equal.

A comparison of just the model coefficients is useful but ultimately insufficient to demonstrate the actual impact of the risk score model update. To measure the actual impact of the model update, it is necessary to score beneficiaries under both models. Doing so demonstrates the combined impact of both the RxHCC and the demographic coefficient changes based on the actual disease and demographic makeup of Medicare beneficiaries. Additionally, the change in the normalization factor and blending between RAPS and EDS data sources between the two models is included.

### CHANGES BY ENROLLEE TYPE

Applying the PY2018 risk score model to all of the beneficiaries in the Medicare 5% Sample database provides additional insight into how these coefficient changes will impact a plan's average risk score based on the plan's mix of enrollee types. Using all of the beneficiaries from the Medicare 5% Sample database, wFigures 5 and 6 show the average risk score change for continuing enrollees (enrolled with Medicare since at least the beginning of 2014) and new enrollees (enrolled with Medicare after January 2014). These risk score changes include the impact of the change in normalization and RAPS/EDS blending.

**FIGURE 5: CONTINUING ENROLLEES, MODEL CHANGE IMPACT**

| 2017 to 2018 - Continuing Enrollees | | | | |
|---|---|---|---|---|
| | Community | | Institutional | Total |
| Gender | Low Income | Non-Low Income | | |
| Female | -3.0% | -5.9% | -3.5% | -5.0% |
| Male | -0.7% | -2.6% | -1.4% | -2.1% |
| Total | -2.1% | -4.4% | -2.8% | -3.7% |

**FIGURE 6: NEW ENROLLEES, MODEL CHANGE IMPACT**

| 2017 to 2018 - New Enrollees | | | | |
|---|---|---|---|---|
| | Community | | Institutional | Total |
| Gender | Low Income | Non-Low Income | | |
| Female | -0.8% | -2.5% | -2.8% | -2.1% |
| Male | 3.6% | 2.7% | -1.9% | 2.8% |
| Total | 1.0% | -0.1% | -2.4% | 0.1% |

On average, risk scores decreased for all continuing enrollees. For new enrollees, female community members saw risk score decreases while male community members saw risk score increases. Institutional members of both genders saw risk score decreases.

### CHANGES BY STATE

The average risk score change by state is presented as Appendix A. Overall, the results by state show a very consistent 3% to 4% decrease in risk score. The state with the largest decrease was Iowa, at a 4.3% decrease, and the state (or district) with the smallest decrease was Washington, D.C., with a 0.9% decrease.

### DISTRIBUTION OF CHANGES BY MEMBER

The risk score change by member varies more than the results by plan, enrollee type, or geography. For all enrollee types, around 80% to 90% of all members experienced a decrease in risk score under the PY2018 model. The median risk score decrease for each enrollee type varied from 3% to 8%, and is highlighted in grey in Figure 7.

The community non-low-income enrollee type had the greatest number of beneficiaries that experienced a decrease in risk score of over 10%.

**FIGURE 7: DISTRIBUTION OF RISK SCORE CHANGE BY MEMBER**

| Summary of Distributions by Model for Continuing Enrollees | | | | |
|---|---|---|---|---|
| | Community | | Institutional | Total |
| Difference | Low Income | Non-Low Income | | |
| 10%+ Decrease | 8.7% | 34.4% | 0.3% | 29.3% |
| 9-10% Decrease | 3.4% | 5.8% | 1.2% | 5.2% |
| 8-9% Decrease | 5.9% | 5.1% | 2.3% | 5.2% |
| 7-8% Decrease | 8.0% | 5.2% | 5.7% | 5.7% |
| 6-7% Decrease | 8.9% | 8.9% | 8.9% | 8.9% |
| 5-6% Decrease | 7.8% | 7.1% | 11.9% | 7.3% |
| 4-5% Decrease | 9.8% | 6.3% | 14.2% | 7.1% |
| 3-4% Decrease | 9.8% | 5.5% | 15.4% | 6.5% |
| 2-3% Decrease | 8.7% | 4.1% | 14.7% | 5.1% |
| 1-2% Decrease | 6.7% | 3.8% | 10.8% | 4.4% |
| 0-1% Decrease | 4.7% | 3.1% | 6.3% | 3.5% |
| 0-1% Increase | 5.5% | 2.6% | 2.9% | 3.1% |
| 1-2% Increase | 4.2% | 1.7% | 1.4% | 2.1% |
| 2-3% Increase | 2.6% | 1.6% | 1.1% | 1.8% |
| 3-4% Increase | 1.3% | 0.8% | 0.9% | 0.9% |
| 4-5% Increase | 0.8% | 0.5% | 0.6% | 0.6% |
| 5-6% Increase | 0.6% | 0.3% | 0.4% | 0.4% |
| 6-7% Increase | 0.4% | 0.3% | 0.3% | 0.3% |
| 7-8% Increase | 0.2% | 0.3% | 0.1% | 0.3% |
| 8-9% Increase | 0.1% | 0.3% | 0.1% | 0.3% |
| 9-10% Increase | 0.1% | 0.3% | 0.0% | 0.3% |
| 10%+ Increase | 1.6% | 1.9% | 0.5% | 1.8% |

## Revenue Impact

A decrease to risk scores will yield higher bids in 2018, which means greater revenue, all else being equal. The exact amount will vary by plan.

## Conclusion

Overall, the PY2018 risk score model update leads to lower risk scores for many Medicare beneficiaries. It appears that the greatest risk score decreases are experienced by the non-low-income beneficiaries. Females also appear to have greater risk score decreases than males, all else being equal.

Plans should analyze their historical risk adjustment data under the current PY2017 and updated PY2018 risk score models to understand exactly how the PY2018 risk score model update will impact their risk scores and revenue.

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# Appendix A

| Model Change by State | | | |
|---|---|---|---|
| State | | Member Months | 2017 to 2018 Impact |
| AK | Alaska | 33,217 | -3.6% |
| AL | Alabama | 362,303 | -3.8% |
| AR | Arkansas | 237,479 | -3.7% |
| AZ | Arizona | 333,249 | -3.7% |
| CA | California | 1,471,194 | -2.9% |
| CO | Colorado | 230,777 | -3.3% |
| CT | Connecticut | 225,727 | -3.2% |
| DC | District of Columbia | 31,752 | -0.9% |
| DE | Delaware | 85,561 | -3.7% |
| FL | Florida | 1,203,702 | -3.4% |
| GA | Georgia | 506,462 | -3.6% |
| HI | Hawaii | 55,844 | -4.1% |
| IA | Iowa | 250,002 | -4.3% |
| ID | Idaho | 94,924 | -3.5% |
| IL | Illinois | 777,238 | -3.7% |
| IN | Indiana | 438,302 | -3.8% |
| KS | Kansas | 212,961 | -4.0% |
| KY | Kentucky | 324,169 | -3.6% |
| LA | Louisiana | 268,226 | -3.2% |
| MA | Massachusetts | 462,227 | -3.1% |
| MD | Maryland | 404,066 | -3.4% |
| ME | Maine | 118,587 | -3.5% |
| MI | Michigan | 639,773 | -3.3% |
| MN | Minnesota | 199,264 | -3.6% |
| MO | Missouri | 403,960 | -3.5% |
| MS | Mississippi | 243,115 | -3.6% |
| MT | Montana | 83,450 | -3.6% |
| NC | North Carolina | 629,436 | -3.6% |
| ND | North Dakota | 50,818 | -4.1% |
| NE | Nebraska | 139,514 | -3.9% |
| NH | New Hampshire | 118,195 | -3.8% |
| NJ | New Jersey | 608,424 | -3.4% |
| NM | New Mexico | 117,612 | -3.2% |
| NV | Nevada | 140,634 | -3.0% |
| NY | New York | 973,316 | -3.1% |
| OH | Ohio | 609,854 | -3.5% |
| OK | Oklahoma | 280,040 | -3.7% |
| OR | Oregon | 200,721 | -3.1% |
| PA | Pennsylvania | 722,270 | -3.5% |
| RI | Rhode Island | 58,675 | -3.1% |
| SC | South Carolina | 366,140 | -4.1% |
| SD | South Dakota | 62,806 | -4.0% |
| TN | Tennessee | 402,066 | -3.7% |
| TX | Texas | 1,184,876 | -3.5% |
| UT | Utah | 105,860 | -3.5% |
| VA | Virginia | 525,960 | -4.1% |
| VT | Vermont | 61,639 | -3.6% |
| WA | Washington | 399,141 | -3.2% |
| WI | Wisconsin | 323,913 | -3.7% |
| WV | West Virginia | 155,022 | -3.9% |
| WY | Wyoming | 48,350 | -3.7% |
| | Totals | 17,982,813 | -3.5% |