DEPARTMENT OF HEALTH & HUMAN SERVICES

Centers for Medicare & Medicaid Services

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OFFICE OF THE ACTUARY

RISK SCORE CREDIBILITY GUIDELINES

The Office of the Actuary (OACT) at the Centers for Medicare & Medicaid Services (CMS) has developed guidelines for full credibility, as used in the Medicare Advantage (MA) and Part D bid pricing tools (BPTs). This guidance is provided as a resource to certifying actuaries, not as a requirement.

The guidelines below apply to the pricing of risk scores based on the CMS preferred methodology, as described in the MA and Part D bid instructions. CMS has not developed credibility guidelines for risk scores based on alternate approaches or for CMS-HCC ESRD risk scores. This guidance is effective April 10, 2015, as summarized in the following table:

Table 1—Guidelines for Full Credibility

Subject Experience	Exposure Required for Full Credibility
Estimated Part C risk scores for development of bids as posted on CMS Health Plan Management System (HPMS)	300 beneficiaries
Beneficiary-level file to support Part C bids as distributed by CMS	3,600 member months
Estimated Part D risk scores for development of bids as posted on HPMS	125 beneficiaries
Beneficiary-level file to support Part D bids as distributed by CMS	1,500 member months

Background

Although OACT has provided claims credibility guidance since Contract Year 2006 for MA and Part D BPTs, this is the first time we have developed guidance specifically for risk scores. We have received previous requests for such guidance and believe that it is warranted, not only because of the unique characteristics of risk score experience but also because of the potential erroneous use of claims credibility guidelines to develop these scores in the absence of more appropriate analysis.

We expect to repeat this process every five years.

Synopsis of the Methodology

Based on an application of classical credibility theory, the determination of full credibility depends on the assumed variation in risk score experience. Our goal is to determine the number of individuals in a group that are needed to have a probability, P, of being within a percentage, k, relative to the expected risk score amount. OACT has chosen values of P = 95% and k = 10%, consistent with the assumptions used to set the existing MA and Part D claims credibility guidelines.

We model the distribution of risk scores using the following statistical formula from the *Central Limit Theorem*:

$$\text{Aggregate risk score for a group of n individuals} = \sum_{i=1}^{n} X_i \xrightarrow{d} N(n \times \mu, n \times \sigma^2), \text{ where}$$

X_i is the risk score amount with mean (μ) and variance (σ^2) for an individual. X_i is calculated on a per capita basis, where the risk score amount equals the sum of an individual's monthly risk scores within the underlying data set. X_i is assumed to be independently and identically distributed for each individual.

We calculated the mean and variance from historical experience from MA and Part D, separately for each data set used in the CMS preferred methodology for projecting risk scores. The data sources include—

- Plan-level data for the July enrollee cohort with retroactive enrollment and status adjustments. This data is used in the estimated risk scores for development of bids as posted on HPMS, and

- Beneficiary-level files containing twelve months of membership with retroactive enrollment and status adjustments. This data is provided in the beneficiary-level files to support bids as distributed by CMS.

We excluded MA experience for both end-stage renal disease status and hospice status. For Part D experience, we excluded data for employer or union-only group waiver plans. The risk scores were calculated for five separate calendar years, 2009 through 2013, using the risk adjustment models listed in the following table:

Table 2—Risk Adjustment Models

Year	MA Risk Score	Part D Risk Score
2013	0.33×2014 HCC $+ 0.67 \times 2013$ HCC	2014 RxHCC
2012	0.75×2014 HCC $+ 0.25 \times 2013$ HCC	2014 RxHCC
2011	2013 HCC	2013 RxHCC
2010	2011 HCC	2012 RxHCC
2009	2011 HCC	2011 RxHCC

Calculating X_i, as described above, means that our analysis and results reflect both: (i) statistical fluctuation and (ii) variation caused by periodic updates to the risk adjustment model. We are simultaneously incorporating both types of variation to be consistent with the conditions typically encountered when projecting the MA and Part D risk scores;

n   is the number of individuals in the group; and

$N(n \times \mu, n \times \sigma^2)$ denotes the *Normal* distribution with mean, $n \times \mu$, and variance, $n \times \sigma^2$.

Given our definitions and assumptions above, we solve for the following probability:

$$\text{Probability}\left[(1-k) \times n \times \mu \leq \sum_{i=1}^{n} X_i \leq (1+k) \times n \times \mu\right] = 95\%$$

By symmetry of both the *Normal* distribution and our probability statement, we can write the following relationship:

$$n \times \mu \times k = \sqrt{n} \times \sigma \times z_{0.975}, \text{ where}$$

$z_{0.975}$ is the z-score for the 97.5th percentile of the standard Normal distribution ($z_{0.975} \approx 1.960$).

Substituting for the known variables and solving for n produces the following equation:

$$n = \left(\frac{1.96 \times \sigma}{0.1 \times \mu}\right)^2.$$

Since n is defined on a per capita basis, we convert the final result to an applicable exposure by multiplying n by the average exposure per member, as shown in the following formula:

$$\text{Full Credibility} = \text{Average Exposure} \times \left(\frac{1.96 \times \sigma}{0.1 \times \mu}\right)^2.$$

Results of the Analysis

The results based on actual calendar year experience are summarized in the following tables:

Table 3—Results using Plan-level Data

Year	MA			Part D		
	σ/μ	Average Exposure*	Full Credibility*	σ/μ	Average Exposure*	Full Credibility*
2013	0.858	1.0	283	0.539	1.0	112
2012	0.862	1.0	285	0.536	1.0	110
2011	0.867	1.0	289	0.465	1.0	83
2010	0.843	1.0	273	0.454	1.0	79
2009	0.844	1.0	274	0.455	1.0	80

* The average exposure and full credibility in Table 3 are expressed as 'number of beneficiaries' because the data includes only a single month (July) of exposure, which is equivalent to the number of beneficiaries.

Table 4—Results using Beneficiary-level Data

Year	MA			Part D		
	σ/μ	Average Exposure*	Full Credibility*	σ/μ	Average Exposure*	Full Credibility*
2013	0.894	11.2	3,439	0.584	11.3	1,481
2012	0.896	11.2	3,454	0.582	11.3	1,470
2011	0.902	11.2	3,501	0.517	11.3	1,160
2010	0.878	11.2	3,317	0.504	11.3	1,103
2009	0.881	11.2	3,340	0.504	11.3	1,103

* The average exposure and full credibility in Table 4 are expressed as 'member months' because the data includes a full calendar year of exposure.

For simplicity, we are using a twelve to one relationship between the guidelines based on beneficiary-level experience and plan-level experience, respectively.

The results for MA are consistent and stable during the experience period. For MA BPTs, OACT is setting full credibility guidelines at 300 beneficiaries for plan-level experience and 3,600 member months for beneficiary-level experience. If the risk scores for base years 2012 and 2013 had not been blended, the results in Table 3 and Table 4 above would be 0.9% to 2.2% higher and would not affect the guidelines.

The results for Part D increase significantly from 2011 to 2012 but appear stable in the periods before and after 2011. To minimize the risk of underestimating a new guideline, OACT is setting full credibility guidelines for Part D BPTs at 125 beneficiaries for plan-level experience and 1,500 member months for beneficiary-level experience.