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Analysis of Case-Mix Strategies and Recommendations for 2000 Medicare Fee-for-Service CAHPS

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DRU-2937-CMS

February 2003

Prepared for Center for Medicare and Medicaid Services

RAND Health

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PREFACE

This report analyzes survey data collected in 2000. This report originally appeared as a report to CMS entitled Final Task 9: Report Analysis of Case-Mix Strategies and Recommendations for Medicare Fee-for-Service CAHPS in August 2001.

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1. INTRODUCTION

The Medicare Fee-for-Service (MFFS) Consumer Assessment of Health Plans (CAHPS) project surveys Medicare beneficiaries enrolled in the original Medicare health plan [1] in order to present information regarding their experiences to Medicare beneficiaries, state peer review organizations (PROs), and the Health Care Financing Administration (HCFA). The goals of the project include:

1. Empowering beneficiaries to compare the experiences of those receiving FFS Medicare and those receiving Medicare through managed care plans available in their area, as mandated by the Balanced Budget Act of 1997, and
2. Informing HCFA and state PROs about regional, state, and perhaps sub-state variation in experiences with FFS Medicare.

A key component of these comparisons is appropriate case-mix adjustment. Case-mix adjustment attempts to remove from ratings and reports of care response patterns that are systematically associated with such patient-level characteristics as demographics, socio-economic status, and general health status, which may vary considerably across reporting units. These systematic patterns of association may reflect "response bias," response patterns that do not correspond to actual differences in quality of care.[2] In any event, these are patient characteristics that are generally agreed to be beyond the control of providers or plans once they have been selected by beneficiaries. The goal of case-mix adjustment can therefore be thought of as follows: to estimate the ratings and reports that a plan or collection of FFS providers would have received if all providers and plans treated the same standardized population of patients (Medicare beneficiaries). This adjustment should make attributions of ratings and reports to FFS providers and managed care plans more appropriate, supporting better decision-making by beneficiaries and quality improvement by PROs and HCFA.

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[1] These beneficiaries, plus those unsurveyed benediciaries in the one Private Medicare FFS plan (Sterling), constitute all beneficiaries not enrolled in managed care plans.

The Harvard team (see Cioffi, Cleary, Ding, Shaul, Zaborski, and Zaslavsky, 2001) has conducted case-mix adjustment analyses on three years of MMC data, and also performed case-mix adjustment analyses on the MFFS field test data. In doing so, they built an analytic framework and some associated terminology that are well suited to the case-mix adjustment of MFFS data discussed here. Their reports provide additional background on some of the techniques used here, and the reader who is not familiar with these reports may want to consult them when reading this report. Additional work on case-mix adjustment of CAHPS® data may be found in Zaslavsky, Zaborski, Ding, Shaul, Cioffi, and Cleary (2001) and Elliott, Swartz, Adams, Spritzer, and Hays (2001). Because of the importance of coordinating MFFS and MMC case-mix adjustment when comparing MMC plans to collections of MFFS providers, this report will parallel the approach and terminology of these previous reports where appropriate. In addition, the selection of case-mix adjuster variables and models for evaluation and comparison in this report draws on the findings established in these reports.

Prior to the introduction of the MFFS survey, MMC case-mix adjustment (CMA) had a single focus: the adjustment of ratings and reports for comparison among MMC plans. MFFS case-mix adjustment now has two foci: (1) adjustment of collections of FFS providers for comparison to MMC plans and (2) adjustments of collections of FFS providers for comparison with other FFS providers. This report will develop recommendations for both contexts, and will refer to these contexts as *MFFS-vs.-MMC CMA* and *Within-MFFS CMA*, respectively.

MFFS lacks a predefined reporting unit that is analogous to the plan in MMC. The need to define such a unit and the manner in which such a unit is defined as implications for both reporting and CMA in MFFS. We will use the term *reporting entity* to refer to an aggregation of providers for which CAHPS ratings and reports are reported. This term will thus apply to either a plan in

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[2] It should be noted that case-mix methods cannot by themselves distinguish response bias from systematic differences in actual health care experiences that are associated with the case-mix variables.

the case of MMC or to a collection of FFS providers in the case of MFFS.[3] Note that the MFFS reporting entity can be a sub-state, state, or regional aggregation of FFS providers.

2. SUMMARY OF DATA AND VARIABLES

A. Data

The first (2000) national administration of the CAHPS MFFS survey involved the administration of 168,000 surveys to MFFS beneficiaries: 3000 to beneficiaries residing in Puerto Rico, and 165,000 to beneficiaries residing in the 50 states and the District of Columbia. As described in the first report of geographic unit recommendations (Elliott, Solomon, Suttorp, and Hays, 2000), the 165,000 United States surveys were administered to a stratified random sample of MFFS beneficiaries, 600 each in 275 strata. These strata will be referred to as *geo units* or *MFFS Sampling Strata*. These geo units are collections of counties which are entirely contained within states (1 to 17 GU units in each state), are generally contiguous, and were designed to avoid crossing Managed Care Contract Area boundaries, Metropolitan Statistical Area Boundaries, and Health Service Area boundaries where possible. The geo units contain approximately equal numbers of MFFS beneficiaries (with undersampling of beneficiaries in 30 highly populous counties and oversampling of non-MSA counties in 12 states being the major departures from proportionality), and were designed to potentially function as reporting units as well as sampling strata. Of the 275 geo units, 205 had some MMC penetration.

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3 In the case of FFS, the aggregations of providers are based on geographically-defined, non-overlapping sets of FFS beneficiaries. As beneficiaries may seek care outside of their unit of residence, the corresponding sets of providers will be mostly, but not entirely, non-overlapping across units.

As detailed in the RTI Team's MFFS Operations Report, 96.5% of the surveys went to eligibles[4] and the response rate among eligibles was 63.9%, resulting in 103,551 completed surveys.

B. Variables

As detailed elsewhere, CAHPS reports consumer experiences in the form of four global ratings (rated on a 0-10 scale, from *worst possible* to *best* possible) and five composites (each composed of two to four report items, which are rated on a four-point ordinal scale from never to always or on a three-point ordinal scale from not a problem to a big problem). Because CMA is applied to individual report items before they are combined into composites, this report will examine CMA of the four global ratings and the 21 report items, as summarized in Table 1 (adapted from Table III-3 in the 2000 MMC Case-Mix Report).5

Table 1. CAHPS ratings and Composites

Variables	Description
Ratings	
Health Plan	Rate your experience with your Medical health plan [Medicare]
Health Care	Rate all the health care you got in the last 6 months
Personal Doctor	Rate your personal doctor or nurse now
Specialists	Rate the specialist you saw most often in the last 6 months
Composites	*Report Items*
Get Care Needed	Easy to get a referral
	Get necessary care
	Easy to find doctor you happy with
	Delays in care when waiting for approval
Get Care Quickly	Get medical help through phone at doctor office

4 3.5% of surveys were mailed to persons who did not meet eligibility criteria. No replacements were drawn for these frame errors.

5 We also examined single dichotomous item regarding whether Medicare provides for good quality of life.

	See doctor as soon as wanted
	Get appointment as soon as wanted
	Wait in doctor office/clinic for more than 15 minutes
Doctor Communicate Well	Doctor listen carefully
	Doctor explain things in ways can be understood
	Doctor show respect
	Doctor spend enough time
Office Staff Courtesy	Office staff treat with courtesy and respect
	Office staff helpful
Paperwork, Info, & Customer service	Get info or help needed when call plan customer service
	Find and understand written information
	Have problem paperwork for health plan [Medicare]

Other survey variables and one administrative variable (dual eligibility) were considered as case-mix adjusters (independent variables), as summarized in Table 2.

Table 2: Description of Independent Variables Used in MFFS Case-Mix Adjustment

Name (Dummies)	Description	Response Options
AGE (AGE64, AGE6569, AGE7579, AGE80)	Age	<65 (disabled), 65-69, 70-74, 75-79, >79
EDUC (LESS8GRD, SOMEHIGH, SOMECOLL, COLLGRAD, COLLMORE)	Education	<8 grd, some hs, hs grad, some coll, coll grad, >coll grad
GHP (EXCEL, VERYGOOD, FAIR, POOR)	General health perception	Excellent, very good, good, fair, poor
MHP (MHEXCEL, MHGOOD, MHFAIR, MHPOOR)	Mental health perception	Excellent, very good, good, fair, poor
RPCS12	SF-12 physical composite score; includes MHP item.	Mixed response options converted to standardized score
RMCS12	SF-12 mental composite score; includes MHP item.	Mixed response options converted to standardized score
(PROXY, ANSPROXY)	Proxy respondent status	No assistance on survey, someone helped but did not answer for you,

		someone answered for you
DUALELIG[6]	Dual-eligibility indicator (eligible for Medicaid program)	Yes, no

Finally, three sets of FFS reporting entities were considered. The dummy variables used for these purposes were 274 geo unit indicators (one omitted), 51 state/district/territory indicators[7] (one omitted), and 9 HCFA region indicators (one omitted). A list of the states constituting each of the ten HCFA regions appears as Table 3. Geo unit, state, and HCFA region indicators were also used to create interaction terms for the evaluation of assumptions of the homogeneity of effects of case-mix adjusters across reporting entities.

Table 3: Distribution of Respondents by HCFA Region

HCFA Region	Region Number	Respondent Count
Northeast (MA,ME,VT,CT,RI,NH)	1	5,754
NY/ NJ/Puerto Rico	2	9,729
Mid-Atlantic (PA,DE,DC,MD,VA,WV)	3	11,782
S. Atlantic (AL,FL,GA,KY,MS,NC,SC,TN)	4	23,045
Mid-West (IL,MN,OH,WI,MI,IN)	5	19,701
Southwest (AR,OK,TX,LA,NM)	6	11,455
Central (KS,MO,IA,NE)	7	6,435
West (CO,MT,ND,SD,UT,WY)	8	2,439
Pacific (CA,AZ,HI,NV)	9	7,949
Northwest (AK,ID,OR,WA)	10	3,956

[6] HCFA data contain the indicator of state buy-in, which is a proxy for dual-eligibility status; state buy-in can exist for an individual who is not actually on Medicaid.

[7] Hereafter called *state* indicators for brevity, but also applicable to the District of Columbia and Puerto Rico

3. GENERAL ANALYTIC APPROACH

In this report, CMA involves linear regression models with global ratings and reports of care serving as dependent variables and with beneficiary-level characteristics serving as independent variables (case-mix adjusters).[8] As noted in this year's MMC CMA Report, one can describe this model as follows for a single outcome *i*:

$$y_{ipj} = \beta_i' x_{ipj} + \mu_{ip} + \varepsilon_{ipj}$$

where y_{ipj} represents the response to [outcome] i of respondent j from [reporting entity] p …, β_i is a regression coefficient vector, x_{ipj} is a covariate vector … [containing case-mix adjusters], μ_{ip} is an intercept parameter for [reporting entity] *p*, and ε_{ipj} is the error term.

Because all between-[reporting entity] effects are absorbed into the dummy variable coefficients, the β_i coefficients represent within-[reporting entity] effects of the adjuster variables. The adjusted [reporting entity] ratings correspond to the dummy variable effects μ_{ip}. The adjusted ratings (after centering) can be interpreted as the ratings we would expect for each [reporting entity] if every [reporting entity] had the same distribution of patient-level variables, i.e. equivalent mixes of patients.

Because MFFS has no natural reporting entity corresponding to the plan in MMC, there are several choices for reporting entity: geo unit, state, or HCFA region. The choice of reporting entity in MFFS will determine how much geographic variation is "absorbed" into the intercept vector in the above model and how much is left to be attributed to case-mix adjusters. Because geo units are entirely nested within states and states are entirely nested within HCFA regions, the smaller reporting entities will absorb at least as much variation

as the larger reporting entities. To the extent that case-mix adjusters vary geographically in their values, the choice of reporting entity will affect the magnitude of the coefficients estimated in MFFS CMA.

A. Assumptions of CMA

In order for case-mixed adjusted means to have the interpretation discussed above, a number of assumptions must be met. A first assumption is that the case-mix adjusters are not endogenous. This assumption means that the values of the case-mix adjusters are not substantially influenced by actions of the providers or by beneficiaries' experiences with providers. This assumption is not easily testable in cross-sectional studies. This report will not attempt to independently establish the exogeneity of the case-mix adjusters employed, but will instead restrict consideration to the variables in Table 2, for which there is general consensus regarding an absence of serious endogeneity in the context of case-mix adjustment of health care data.

A second assumption is that the case-mix adjusters are linear in their effects on the outcomes to which they are applied. This assumption is applicable to ordinal and continuous case-mix adjusters, and is empirically verifiable.

A third assumption is that the effects of case-mix adjusters are homogenous across the reporting entities being compared. This assumption can be verified empirically through the use of interaction terms in linear models, and is specific to the set of reporting entities being compared.

B. Desirable Properties of CMA Models

There are three properties that a good MFFS CMA model would possess: (1) reliability, (2) parsimony, and (3) robustness across applications. The criterion of reliability means that there is much confidence that the case-mix adjustment variables are truly associated with ratings and reports, and that the magnitude of these associations is well estimated. The criterion of parsimony

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[8] For the one dichotomous item an analogous logistic regression is used.

means that the model is as simple as possible without sacrificing explanatory power. In other words, variables which add to model complexity without adding to model impact are excluded. The criterion of robustness across applications means that the model selected is appropriate across the variations in reporting formats to which it is applied.

The criterion of reliability requires that case-mix adjusters have statistically significant effects and that the ratio of estimated parameters to their standard errors (t-statistics) be large.

Implementing the criterion of parsimony requires a definition of explanatory power. We will use the E.P. (explanatory power) statistic, a unitless measure of the impact of a case-mix adjuster developed by the Harvard team in the context of MMC CMA (Cioffi, Cleary, Ding, Shaul, Zaborski, and Zaslavsky, 2001). Briefly, the impact of a case-mix adjuster on adjusted scores is a product of two quantities: (1) the proportion of the variance of the outcome explained by the case-mix adjuster in an individual-level regression (incremental change in R-sq) and (2) the variance in mean levels of the case-mix adjuster across reporting entities. The formula for E.P. is:

E.P. = Var(Reporting Entity)/Var(Error) * (net increment in R-sq)

The derivation of this formula may be found in the MMC Case-Mix Report. Because values for E.P. tend to be very small, we will follow the convention of presenting E.P. * 1000. Parsimony requires selecting the simplest model that accounts for most of the explanatory power possible with more elaborate models.

Adjusted ratings and composites are presented in a number of different formats, and at different levels of aggregation. It is desirable that a CMA model be applicable across this variety of contexts and that its effects be reasonably consistent across these applications. The linear models presented here treat the 11-point global ratings and the 3- and 4-level ordinal scales as continuous variables, computing means. This approach maximizes the statistical power available to compare CMA models and also corresponds to the format in which adjusted ratings and composites may be presented to HCFA, state PROs, and researchers. On the other hand, dichotomized presentations of these same

ratings and composites will be presented to consumers.9 It is desirable that CMA models behave similarly with these dichotomized outcomes. Likewise, reporting entities will be states for some applications and presentations, but may be geo units or HCFA regions for other applications and presentations. It is desirable that CMA models behave similarly across these contexts.

C. Imputation of Missing Values for CMA variables

The potential CMA variables listed in Table 2 exhibited low rates of item missingness in the 2000 MFFS data. Nonetheless, case-wise deletion (omission of all cases with any missing values on CMA variables) would likely lead to bias in estimates of CMA models. Previous MMC CMA reports have used simple mean imputation within managed care plan for missing values of CMA variables. In order to maximize comparability with this approach, we use simple mean imputation within geo units for MFFS. Given the low rates of missingness observed, we feel that the results obtained here are likely to be quite similar to those that would have been obtained with more complex imputation methods.

4. SUMMARY OF MFFS PILOT TEST CASE-MIX ADJUSTMENT REPORT

The Harvard team performed a CMA analysis for the MFFS-CAHPS Pilot Test using data from 1,931 MFFS beneficiaries from a highly diverse but limited number of geographic areas and compared results to those obtained from 1997 and 1998 MMC beneficiaries matched on residential location. They considered a base model that was the same model which has been recommended in the MMC CMA Reports, as well as several alternatives. The base model includes age, education, general health perception, and proxy status, all coded categorically (one dummy per response option, other than a single omitted level). In the Pilot Test, coefficients for the base model were generally similar for MMC and MFFS. Gender, activities of daily living (ADL), instrumental activities of daily

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[9] Global ratings will be dichotomized 10 vs. 0-9; reports will be dichotomized such that the most favorable ordinal response will constitute a single category.

living (IADL), and variables based on zip codes did not consistently add explanatory power to the base model. Among those variables present on the MFFS instrument but absent from the MMC instrument, items related to mental health stood out as adding substantially to the explanatory power of the base model. While both the single item, five-level Mental Health Perception (MHP) scale and the 12-item SF-12 Mental Health Composite of which it is a part (RMCS12) had substantial additional explanatory power, the single item was recommended over the latter for reasons of survey brevity.

5. DISTINCTIONS BETWEEN MFFS-VS.-MMC CMA AND WITHIN-MFFS CMA

The primary purpose of MFFS-vs.-MMC CMA is to facilitate unbiased comparison of beneficiary experiences with MFFS and MMC for those beneficiaries with a choice between MFFS and MMC. Dually eligible Medicare beneficiaries (those also eligible for Medicaid) present a challenge for this comparison, because there are a number of areas in which MMC is not an option for dually eligible beneficiaries, although it is an option for Medicare beneficiaries not also eligible for Medicaid. This is reflected by the fact that the proportion of dually eligible beneficiaries in MMC is far less than the 11.2% observed in the 2000 MFFS sample (11.4% in the corresponding MFFS population). Because the dually eligible are known to differ from other Medicare beneficiaries in ways that might not adequately be captured by CMA, dually eligible beneficiaries have been excluded from MFFS-vs.-MMC comparisons and CMA models.

The primary purposes of Within-MFFS CMA are (1) to facilitate assessment of geographic variation in MFFS experiences and (2) to facilitate comparison of MFFS experiences among subgroups of beneficiaries by controlling for the effects of exogenous case-mix adjusters. The latter goal may require that case-mix adjusters be used as covariates in a regression or Analysis of Covariance (ANCOVA) model, rather than being used to explicitly adjust means of reporting entities. Because the dually eligible constitute a sizable proportion of the MFFS population, dually eligible beneficiaries are included in Within-MFFS CMA

models. The importance of dual eligibility also suggests the necessity of including an indicator of this status in these CMA models.

6. TESTING MODEL ASSUMPTIONS FOR CMA

The following sections present the results of tests of model assumptions.

A. Linearity

Table A1 in Appendix A reports the coefficients for the base model from the MFFS Pilot Test recommendations, estimated on the full 2000 MFFS data set, excluding the dually eligible, and using geo units as the reporting entity/intercept vector. Case-mix adjusters are specified as dummies. Examination of these coefficients reveals general patterns similar to those that have been observed in the past in MMC: greater age, less education, better general perceived health, and no proxy assistance are associated with more favorable ratings and reports. These patterns are fairly consistent across global ratings and report items.

If these ordinal items had linear effects on the outcomes, the coefficients would be both monotonic and approximately evenly spaced (including the value *0* for the omitted category). As can be seen, while the monotonicity usually holds, the even spacing does not. In the case of age, the difference between those under 65 (disabled) and those 65 to 69 years of age is generally much greater than between any other two adjacent age categories[10]. To a lesser extent, the difference between 65-69 and 70-74 tends to be larger than the differences between older adjacent categories. In the case of education, there is a small but fairly consistent departure from monotonicity: those with some high school education, but without a high school degree, provide the most favorable ratings and reports. Their ratings and reports are more favorable than those with more or less education.

Table 4 reports the results of partial F-tests of the null hypothesis of linearity for the coefficients in Table A1 against the alternative that the dummy coded categories explain significant additional variance. As can be seen, there is very strong evidence against the assumption that the ordinal forms of

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[10] The under 65 group differs from other age categories both in its much higher level of disability and in the greater age range contained.

education, age, and general health perception have linear effects for nearly all of the global ratings. A similar proportion of report items evinces violations of the assumption of linearity. These results indicate that these variables should be parameterized categorically, which is consistent with MMC CMA and MFFS Pilot Test CMA recommendations.

Table 4: F-Statistics for the Null Hypothesis of Linearity of Ordinal Case-Mix Adjusters, Global Ratings

MFFS Question Number	Rating Description	F-Statistics, by Case-Mix Adjuster		
		EDUCATION	**AGE**	**GENERAL HEALTH**
46	Medicare	41.00*	82.12*	6.16*
30	Health care	11.68*	11.11*	6.29*
7	Personal doctor	5.78*	24.74*	20.27*
11	Specialist	4.34*	0.94	0.23

*$p<0.05$

B. Homogeneity for MFFS-vs.-MMC CMA

Traditional CMA assumes homogeneity of effects for the case-mix adjusters across the reporting entities being compared. In the context of MFFS-vs.-MMC CMA, this translates into an assumption that the coefficients of case-mix adjusters are similar within MMC and MFFS. While the MFFS Pilot Test CMA Report found no evidence of a difference in these coefficients, the full 2000 MFFS data provide much greater statistical power to detect such differences.

Comparison of the MFFS coefficients in Table A1 of this report to the coefficients for the base model reported in Table III-8 of the MMC CMA report for the years 1997-1999 reveals striking differences in a number of coefficients, particularly the coefficients for general health perception for global ratings.[11] For example, for the rating of one's health plan/Medicare, MFFS respondents in poor health gave ratings 0.19 points lower than those in good health, but MMC respondents in poor health gave ratings 0.52-0.67 points lower than those in good health. Similarly, MFFS respondents in poor health rated

[11] These differences in coefficients are not sensitive to the inclusion or exclusion of the dually eligible.

their personal doctor 0.10 points lower than MFFS respondents in good health, whereas MMC respondents in poor health rated their personal doctor 0.30 to 0.39 points lower than those in good health. As a can be seen, these differences are quite large when compared to the standard errors of estimate. As a rough rule of thumb, all differences of 0.10 points or more between MMC and MFFS global rating coefficients would be significant at the .05 level of significance, and some differences as small as 0.05 points would also be statistically significant. These comparisons provide clear evidence that at least some case-mix adjusters have reliably different magnitudes of effect within MMC and MFFS. This invites the question of whether the magnitude of this heterogeneity is large enough to be important, and if so, for which case-mix adjusters.

Table 5 below illustrates the magnitude of the effects of case-mix adjusters in 1997-1999 MMC data and 2000 FFS data for the four global ratings, using data from Table A1 of this report and Table III-8 of the MMC 1997-1999 CMA Report. The entries in Table 5 represent the *range* in coefficients among the ordinal levels of the case-mix adjusters, subtracting the coefficient for the level with the most favorable rating from the level with the least favorable rating. The consistency of MMC coefficients from 1997-1999 suggests that yearly differences are unlikely to account for differences between MMC and MFFS coefficients.

The most consistent pattern is that the effect of health status is considerably stronger in MMC than in MFFS. In other words, the tendency for the healthy to give more positive ratings than the unhealthy is much stronger in MMC than in MFFS. To a lesser extent the effect of education is also stronger in MMC than in MFFS. The tendency of the older to be more positive in their ratings than the younger is considerably stronger in MFFS than in MMC for the rating of Medicare/one's health plan, and a little stronger in MFFS than in MMC for the other three global ratings. Proxy effects are fairly consistent between MMC and MFFS.

Table 5: Comparison of MMC and MFFS Case-Mix Coefficients (Range of Ordinal Coefficients)

	MMC	**MMC**	**MMC**	MFFS
	1997	1998	1999	2000
Medicare/ Plan				
Health status	0.99	1.19	1.24	**0.50**
Age	0.54	0.45	0.50	**1.19**
Education	0.74	0.79	0.81	**0.67**
Proxy	0.32	0.32	0.35	**0.34**
Health Care				
Health status	1.13	1.11	1.07	**0.79**
Age	0.29	0.24	0.25	**0.35**
Education	0.47	0.54	0.52	**0.33**
Proxy	0.20	0.26	0.22	**0.19**
Personal Dr				
Health status	0.76	0.76	0.74	**0.45**
Age	0.18	0.21	0.14	**0.25**
Education	0.42	0.52	0.45	**0.30**
Proxy	0.23	0.23	0.21	**0.16**
Specialist				
Health status	0.84	0.76	0.70	**0.49**
Age	0.16	0.18	0.17	**0.19**
Education	0.38	0.37	0.41	**0.30**
Proxy	0.12	0.16	0.16	**0.15**

A major implication of this heterogeneity is that the difference between the case-mix adjusted mean of a managed care plan and a FFS reporting entity depends upon the reference population. For example, because the effect of health status is stronger for MMC than for MFFS (the "slope" is "steeper" in a linear approximation), and because better health status is associated with better ratings and reports, case-mix adjustment to a *healthy* reference population would be relatively more favorable to MMC, and case-mix adjustment to an *unhealthy* reference population would be relatively more favorable to MFFS.

There are at least three approaches to dealing with the heterogeneity of case-mix effects for MFFS-vs.-MMC CMA: (1) stratification, (2) estimation of pooled CMA coefficients, and (3) independent estimation of CMA coefficients for MFFS and MMC, with adjustment to the midpoint of MFFS and MMC population means. See Elliott, Swartz, Adams, Spritzer, and Hays (2001) for additional discussion of this topic.

Stratification would attempt to divide beneficiaries into subgroups (on the basis of health status or other variables), such that remaining case-mix variables had essentially homogenous effects within subgroups. While this approach potentially offers very targeted and informative comparisons, additional research regarding (1) the best way to stratify from a statistical perspective and (2) the implications of reporting stratified ratings and reports on consumer comprehension would need to be completed before this approach could be recommended. Stratified reporting would require "drill-down" capability, so that targeted information could be shown to beneficiaries for their stratum only, or would require multiple displays of information. Case-mix adjustment would occur within these strata, using variables not involved in the stratification.

The estimation of pooled CMA coefficients essentially ignores the heterogeneity by forcing common coefficients across MMC and MFFS. This approach has at least two difficulties: (1) the relative weighting of MFFS and MMC in determining the coefficients is somewhat arbitrary and (2) comparisons among MMC plans are adjusted not on the basis of how case-mix adjusters function within MMC, but partially on the basis of how these variables function within MFFS[12].

Independent estimation of CMA coefficients for MFFS and MMC has the advantage of allowing more appropriate adjustment of comparisons within payment type (MMC or MFFS). Furthermore, if the reference population to which both payment types are adjusted is the midpoint of the mean vectors of the two payment types on case-mix adjuster variables, the amount of adjustment is the same as would have been produced by pooled estimation of CMA coefficients. For these reasons, this third approach to case-mix heterogeneity (independent estimation) is recommended.

C. Homogeneity for Within-MFFS CMA

Homogeneity of the effects of case-mix adjusters across reporting entities is an assumption behind the comparison of MFFS experiences across reporting

entities. To the extent this assumption does not apply, caution must be exercised when interpreting differences in case-mix adjusted means in reports and ratings across MFFS reporting entities. The MMC CMA Report found evidence of statistically significant heterogeneity in case-mix coefficient across the ten HCFA regions. A similar finding in MFFS would pose some difficulties when HCFA regions were used as reporting entities.

The MMC CMA Report tested for regional interactions among case-mix adjusters by starting with the standard base model (with the standard dummy specifications of ordinal case-mix adjusters) plus HCFA region dummies, and then testing the additional variance contributed by the interactions of HCFA region dummies with *linear* specifications of the ordinal case-mix adjusters in the base model (using a partial F-test). A similar approach was followed here for MFFS.[13]

Table 6 presents the p-values for these partial-F tests for MFFS for the four global ratings. As can be seen, there is no evidence of heterogeneity for education and proxy status within MFFS across HCFA region. The model was then re-estimated after dropping these two sets of interactions. A summary of these new models appears as Table 7.

Table 6: P-values for partial F-tests of heterogeneity of Within-FFS Case-Mix Effects by HCFA Region

	Medicare	Health Care	Specialist	Personal Doctor
health	0.0240	0.0754	0.0192	0.0071
age	0.0000	0.0004	0.0249	0.0070
education	0.4473	0.2649	0.6934	0.4917
proxy	0.1366	0.3200	0.3339	0.5594

As can be seen, there is a moderate amount of regional variation in the magnitude of coefficients. The effects of general health perception are greatest in region nine (Pacific) and smallest in region four (South Atlantic). Interestingly, this means that the MFFS coefficients are most like the MMC coefficients in a region with high managed care penetration and least like MMC

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[12] The second difficulty could be eliminated only if one were willing for the case-mix adjusted MMC overall mean to be different when comparing within-MMC and when comparing to MFFS.
[13] Categorical, rather than linear interactions were used for proxy status.

coefficients in a region with low managed care penetration.[14] The effects of age within MFFS are greatest in regions eight, nine, and ten (West, Pacific, and Northwest), and smallest in region two (NY/NJ/Puerto Rico).

Table 7: Coefficients of Linear Interactions of Case-Mix Adjusters with HCFA Regions

		Medicare	Health Care Personal Dr	Specialist
Partial F-test for GHP	p-value	0.001	0.019	0.000	0.004
GHP INTERACTIONS					
GHP-01		-0.15	-0.22	-0.14	-0.11
GHP-02		-0.17	-0.20	-0.11	-0.10
GHP-03		-0.16	-0.19	-0.12	-0.17
GHP-04		-0.12	-0.17	-0.06	-0.08
GHP-05		-0.15	-0.22	-0.09	-0.13
GHP-06		-0.11	-0.21	-0.11	-0.17
GHP-07		-0.13	-0.21	-0.12	-0.17
GHP-08		-0.19	-0.26	-0.12	-0.18
GHP-09		-0.21	-0.25	-0.16	-0.18
GHP-10		-0.08	-0.17	-0.12	-0.20
	Average	-0.15	-0.21	-0.12	-0.15
Partial F-test for AGE	p-value	0.000	0.000	0.005	0.037
AGE INTERACTIONS					
AGE-01		0.24	0.09	0.09	0.05
AGE-02		0.21	0.03	0.02	0.01
AGE-03		0.24	0.07	0.04	0.04
AGE-04		0.22	0.07	0.06	0.05
AGE-05		0.24	0.07	0.04	0.01
AGE-06		0.23	0.08	0.07	0.10
AGE-07		0.24	0.07	0.08	0.05
AGE-08		0.33	0.12	0.06	0.08
AGE-09		0.32	0.14	0.10	0.08
AGE-10		0.37	0.09	0.06	0.05
	Average	0.26	0.08	0.06	0.05

Additional analyses found evidence of statistically significant heterogeneity across geo units within states in the effects of general health

[14] This may be evidence of a managed care "spillover effect," such as those demonstrated by Baker (1999).

perception on MFFS global ratings, especially for the ratings of Medicare and of Health Care.

The existence of substantial linear interactions of case-mix adjusters with HCFA Regions suggests that MFFS-vs.-MMC CMA should employ these interaction terms in order to ensure comparability. For Within-MFFS CMA, the existence of these interactions suggests caution in comparing geo units from different HCFA Regions.

7. SELECTING VARIABLES FOR THE CASE-MIX MODEL

Building on the findings and recommendations of the MMC CMA Report and the MFFS Pilot Test CMA Report, four case-mix models (differing in their sets of case-mix adjusters/independent variables) are evaluated.

A. Models to be Compared

The first model to be evaluated is the base model for MMC: age, general health perception, education, and proxy status, all coded categorically. The second model to be evaluated is the model recommended by the MFFS Pilot Test CMA Report: the base model plus the single-item mental health perception. The third model to be evaluated is the base model plus the SF-12 mental composite score. The fourth model to be evaluated is the base model plus the SF-12 physical composite score.[15]

B. Explanatory Power of Case-Mix Adjusters

Table 8 summarizes the explanatory power of the case-mix adjusters involved in the four models being compared. The variables constituting the base model are labeled Group 1; the variables added to the base model to create the other models are labeled Group 2. Explanatory power was calculated in a different manner for Group 1 and Group 2 variables. The third column in Table 8 reports the increase in R-square for the individual-level regression when adding the case-mix adjuster in question to the base model (for Group 2 CMAs) *or* the base model without the case-mix adjuster in question (for Group 1 CMAs). In other words, this column reports the marginal contribution of each Group 1 CMA to the base model, controlling for other Group 1 CMAs, but reports the additional contribution of each Group 2 CMA to the base model. The fourth column of Table 8 reports the ratio of geo unit variance to error variance. The last column reports the (rescaled) explanatory power statistic. It should be noted that the fourth column and hence explanatory power will vary with the choice of reporting entity.

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[15] The addition of a dual eligibility flag for Within-MFFS CMA will be considered, at least implicitly, within each of these four models.

Among Group 1 CMAs, education and age have substantial explanatory power for ratings of Medicare and general health perception and education has substantial explanatory power for ratings of health care. Education's explanatory power is partially a function of its substantial variation by geo unit.

Among Group 2 CMAs, the SF-12 physical composite adds virtually nothing to the R-square of the base model and therefore adds very little explanatory power. Both the mental health perception item and the SF-12 mental composite add substantial explanatory power to the base model for ratings of health care and specialists. The contributions of the SF-12 mental composite are somewhat larger than for the single-item mental health perception.

Table 8. Explanatory Power of Case-Mix Adjusters, Geo Unit Reporting Entities, Dual Eligibles Included

	CMA	Change in R-square	Var(Geo Unit) /Var(Error)	E.P.*1000
Q46: Medicare				
Group 1	**AGE**	0.0274	0.0177	0.4862
	GHP	0.0061	0.0289	0.1762
	EDUC	0.0100	0.0627	0.6256
	PROXY	0.0041	0.0325	0.1331
	ANSPROXY	0.0008	0.0057	0.0045
Group 2	**MHP**	0.0051	0.0212	0.1087
	RPCS12	0.0008	0.0173	0.0135
	RMCS12	0.0087	0.0228	0.1983
Q30: Health Care				
Group 1	**AGE**	0.0040	0.0177	0.0706
	GHP	0.0178	0.0289	0.5158
	EDUC	0.0046	0.0627	0.2887
	PROXY	0.0021	0.0325	0.0677
	ANSPROXY	0.0011	0.0057	0.0065
Group 2	**MHP**	0.0150	0.0212	0.3173
	RPCS12	0.0018	0.0173	0.0303
	RMCS12	0.0207	0.0228	0.4714
Q11: Specialist				
Group 1	**AGE**	0.0012	0.0177	0.0206
	GHP	0.0062	0.0289	0.1785
	EDUC	0.0027	0.0627	0.1692
	PROXY	0.0010	0.0325	0.0340
	ANSPROXY	0.0013	0.0057	0.0074

	MHP	0.0101	0.0212	0.2146
	RPCS12	0.0010	0.0173	0.0176
Group 2	**RMCS12**	0.0111	0.0228	0.2532
Q7: Personal Doctor				
	AGE	0.0019	0.0177	0.0342
	GHP	0.0043	0.0289	0.1240
Group 1	**EDUC**	0.0028	0.0627	0.1785
	PROXY	0.0007	0.0325	0.0237
	ANSPROXY	0.0013	0.0057	0.0073
	MHP	0.0059	0.0212	0.1250
	RPCS12	0.0001	0.0173	0.0022
Group 2	**RMCS12**	0.0062	0.0228	0.1417

C. Reliability of Case-Mix Adjuster Estimates

Appendix A Table A1 contains coefficients and standard errors for the base model (Model 1). As can be seen, virtually all dummies are statistically significant for the four global ratings, with t-statistics (coefficients divided by standard errors) often exceeding ten, indicating that these variables are well estimated. The same is true to a lesser extent for the report items.

Appendix A Table A2 contains coefficients and standard errors for Model 2, including the dual eligibility flag applicable to Within-MFFS CMA. The base model coefficients remain well estimated in this model, and coefficients for the mental health perception item are also well estimated. As with general perceived health, higher mental perceived health is associated with more positive ratings and reports of care. The addition of the mental health perception item to the base model has little effect on base model coefficients, with the exception that the magnitude of the coefficients of the general health perception item are diminished (because of correlation between the two items).[16]

The dual eligibility flag is only intermittently statistically significant and is inconsistent in its direction. In some instances the dually eligible respond more favorably than would be expected on the basis of other case-mix adjusters; in other cases, they respond less favorably.

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[16] Although Tables A1 and A2 differ in the inclusion of dual eligibles, the conclusions in this paragraph regarding the effects of adding the mental health perception item also hold when two parallel models that both exclude dual eligibles are compared.

D. Robustness to Dichotomization of Outcomes in Reporting

Appendix A Table A3 is a parallel version of Appendix A Table A1 for the four global ratings, with the exception that the global ratings have been dichotomized in the manner in which they are sometimes presented to consumers: *10* vs. *0-9*. Both tables compare the base model (Model 1). Ideally, the effects of Model 1 would be similar for the two presentations. An examination of Table A3 reveals that a large majority of the coefficients for the dichotomized ratings are statistically significant and well estimated. The direction of age effects is similar to that observed in the standard model, although the distinction between those under 65 and 65 to 69 may not be as pronounced. The direction of education effects is similar to the standard model for three of four ratings, although specialists appear to be more often rated *10* by the better educated. The direction of health effects is similar to the standard model for three of four ratings. The distinction between *good*, *fair*, and *poor* health status appears to be weaker for the dichotomized ratings, suggesting that the impact of these health statuses on ratings is generally within the 0-9 range. Once again, dichotomized specialists ratings behaved somewhat differently than in the standard model, with those in worse health more likely to rate their specialists *10*.

E. Recommendations for Case-Mix Adjustments

Model 1, the base model[17], is reliable, parsimonious, and reasonably robust with respect to dichotomization of the global ratings. Because of the unavailability of mental health items on this year's MMC instrument, this model is probably the most appropriate model for MFFS-vs.-MMC CMA. We recommend independent estimation of CMA coefficients for MFFS and MMC, with adjustment to the midpoint of MFFS and MMC population means.

Models 2 and 3 each add substantial explanatory power to the base model. Model 2 is especially appealing in that it requires that only a single item be added to the instrument, whereas Model 3 requires 12 additional items. For this reason, we recommend Model 2, including the dual eligible flag, for Within-MFFS

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[17] With age, GHP, education, and proxy status as case-mix adjustors.

CMA this year (within an ANCOVA context). We also recommend that the mental health perception item be added to the MMC instrument in order to permit Model 2 to be used for MFFS-vs.-MMC CMA in the future. Because of recent rapid changes in local demography, we recommend that the contributions of zip code level variables be reexamined when the corresponding 2000 Census data become available.

8. IMPACT OF CASE-MIX ADJUSTMENTS

A. Within-MFFS CMA

Table 9 summarizes the impact of case-mix adjustment of MFFS geo units, as compared to one another on the four global ratings. The mean adjustments of geo units may appear to be very small, ranging from 0.018 to 0.041 points on a 11-point scale. This is a little deceptive, however, because small differences are important on these highly skewed scales, with means near nine. Variation in unadjusted geo unit means are also small, so that the standard deviations of these case-mix adjustments are 16 to 37 percent of the standard deviations of the unadjusted geo unit means. The largest case-mix adjustments range from 0.112 to 0.280 points, 82 to 158 percent of the standard deviations of the unadjusted geo unit means, and 12 to 27 percent of the *range* of the unadjusted geo unit means. The impact of Within-MFFS CMA is therefore moderate, but not negligible. The MMC CMA Report reached similar conclusions for Within-MMC CMA.

Table 9: Impact of Within-MFFS CMA, Geo Unit Reporting Entities

	Medicare	Health Care	Doctor	Specialist
Mean absolute adjustment	0.041	0.038	0.018	0.025
Largest adjustment	0.280	0.197	0.112	0.141
STD (adj)	0.052	0.046	0.022	0.031
STD (adj)/STD (unadjusted geo unit means)	0.293	0.374	0.161	0.180

B. MFFS-vs.-MMC CMA

1. Geographic equivalence weights

In comparing MFFS and MMC, there was concern that underlying geographic factors not captured in a case-mix model might inappropriately influence MFFS-vs.-MMC comparisons. In order to ensure geographic equivalence of state-level comparisons, a team led by Alan Zaslavsky at Harvard and Marc Elliott at RAND created county-based "geographic equivalence weights" (GEW) in the 43 "states" (including the District of Columbia) where MMC exists. The creation of these weights, which geographically match MFFS and MMC within states, is detailed in Appendix B.

2. Impact of CMA and weights on MFFS-vs.-MMC comparisons

The impact of CMA on MFFS-vs.-MMC comparisons is best understood in conjunction with the impact of comparison weights. Within each of the 43 states (including the District of Columbia) where MMC exists, MFFS and MMC were compared in four ways: using CMA alone, weighting alone, both, and neither (unadjusted comparison). For each of these four methods we estimated state MFFS minus MMC differences.

CMA was performed according to the recommendations of this task report for MFFS-vs.-MMC CMA, using the base model of adjusters, excluding the dually eligible, with coefficients estimated independently by MFFS/MMC status and by HCFA region. Adjustments were projected to the state midpoint of MFFS and MMC. Weighting involved the application of the geographic equivalence weights and the MFFS nonresponse weights (described briefly in Appendix B).

The four difference estimates were computed for each of the four CAHPS® 0-10 global ratings. In order to assess the robustness of MFFS-vs.-MMC CMA to variations in scoring, both means of the 0-10 ratings and the proportion of *10*'s were used as scoring methods. Table 10 below contains the standard deviation of raw state-level MFFS minus MMC difference estimates. The corresponding means of these differences are near zero across states, and as can be seen, the unadjusted estimates of these differences vary only moderately from state to state.

Table 10. Standard deviations of raw state-level estimates of MFFS minus MMC differences

	Rating of health care	Rating of plan/Medicare	Rating of personal doctor	Rating of specialist
0-10 mean scoring	0.17 points	0.37 points	0.15 points	0.21 points
% 10's	4.2%	6.8%	3.9%	5.0%

In examining these estimates of the MFFS minus MMC difference, the emphasis was on comparisons of the case-mix only estimate, the weighting only estimate, and the estimate involving both with the raw (unadjusted) estimate of the MFFS minus MMC difference. The mean of these differences of differences (DoD) across states reflects whether a given adjustment method tends to consistently favor MFFS or MMC as compared to the raw estimate of the state-

level difference. The standard deviation of these DoDs reflects the average magnitude of the adjustments.

The means of these DoDs reveal two patterns. Whether considered alone or in combination with weights, CMA almost always adjusts in favor of MFFS. On the other hand, the weights, whether alone or in combination with CMA, tend to adjust in favor of MMC, although not with as much consistency as CMA adjusts towards MFFS. The net effect of these often opposite components sometimes favors MFFS and sometimes favors MMC.

The tendency of CMA to adjust towards MFFS is probably attributable to the lesser health of the MFFS population (even without dual-eligibles) and to the strong, positive, association of better health status with more favorable ratings in the MMC population. Because the GEWs have much larger coefficients of variation than the MFFS nonresponse weights, most of the effects of the combined weights on estimates of the MFFS minus MMC difference are probably attributable to the GEWs. Since the GEWs tend to emphasize FFS beneficiaries in counties with high MMC penetration, their tendency to favor MMC might reflect lower FFS ratings in high MMC penetration counties.

Comparing standard deviations of DoDs across four global ratings and two scoring methods, the magnitude of CMA effects are 33 to 60 percent as large as the magnitude of weighting effects. Average CMA effects are small but not trivial - CMA DoD standard deviations are 13 to 22 percent as large as the standard deviations of the raw state-level estimates of the MFFS minus MMC difference. The largest CMA adjustments are moderately large in magnitude - 0.07 to 0.20 points on the 0 to 10 scale and 3.7 to 5.7 percentage points for the percentage of *10*'s.

The net effects of CMA and weighting are moderate in magnitude, with standard deviations typically 33 to 67 percent as large as the raw state-level estimates of the MFFS minus MMC difference. The largest net adjustments are substantial - 0.24 to 0.44 points on the 0 to 10 scale and 5.3 to 8.3 percentage points for the percentage of *10*'s. Table 11 lists five states with large net adjustments (the effects of CMA and weight combined as compared to raw estimates) in favor of MFFS for at least one measure. In the cases of Kentucky, West Virginia, and the District of Columbia, health selection into MMC may be

especially strong. It should also be noted that West Virginia lacks county-level weighting (see Appendix B). Florida and Missouri may be states in which FFS ratings are higher in high MMC penetration counties. Table 12 lists 11 states with large net adjustments in favor of MCC on at least one measure.

Table 11. States with the largest net adjustments in favor of MFFS

	Rating of care		Rating of plan/ Medicare		Rating of personal doctor		Rating of specialist	
State	Mean	Prop.	Mean	Prop.	Mean	Prop.	Mean	Prop.
Kentucky	**X**	**X**			**X**	**X**		x
West Virginia	**X**	**X**			**X**		**X**	
D. C.		**X**		**X**		**X**		
Florida					x	x		
Missouri		x				x		

A bold X indicates that the adjustment had a large CMA component.

Table 12. States with the largest net adjustments in favor of MMC

	Rating of care		Rating of plan/ Medicare		Rating of personal doctor		Rating of specialist	
State	Mean	Prop.	Mean	Prop.	Mean	Prop.	Mean	Prop.
Georgia	x	x	x	x				
Iowa			x	x			x	
Kansas			x	x				
Arizona	x							
Hawaii							x	
Virginia								x
Texas			x					
Washington			x					
Wisconsin			x					
Oklahoma			x					
Nevada			x					

In summary, the GEWs have moderate effects that tend to favor MMC, whereas CMA has small to moderate effects that consistently favor MFFS. The net adjustments are moderate on average, but are large for some states. We recommend the use of both GEWs and CMA in 2000 and 2001 MFFS-vs.-MMC comparisons. Proposed changes in 2001 MFFS sample design would increase MFFS sample size in some of the counties that currently require especially large GEWs. This would allow geographical matching without some of the losses of precision necessary for a few states in the 2000 comparisons.

APPENDIX A: CASE-MIX ADJUSTMENT COEFFICIENTS

Notes: All R-squares for Appendix Tables include variance attributable to the reporting entity intercept vector. Coefficients in Appendix Tables are followed by their standard errors in parentheses. The coefficients for proxy status should be interpreted as follows: the coefficient for those beneficiaries receiving no assistance is 0, the coefficient for those beneficiaries receiving some help (but answering for themselves) is represented by "PROXY", and the coefficient for those beneficiaries for whom proxy answered is represented by the sum of the "PROXY" coefficient and the "ANSPROXY" coefficient. In other words, the ANSPROXY coefficient estimates the difference between two types of proxy assistance.

Table A1: Case-Mix Coefficients, Base Model, No Dual Eligibles, No Regional Interactions, Geo Unit Reporting Entities

	GLOBAL RATINGS			
	Q46 Medicare	Q30 Health Care	Q7 Personal Dr	Q11 Specialist
R-SQUARE	0.06	0.04	0.02	0.03
AGE				
AGE64	-0.86 (0.03)	-0.26 (0.02)	-0.01 (0.02)	-0.13 (0.03)
AGE6569	-0.29 (0.02)	-0.12 (0.02)	-0.14 (0.02)	-0.07 (0.02)
AGE7579	0.19 (0.02)	0.06 (0.02)	0.07 (0.02)	0.05 (0.02)
AGE80	0.32 (0.02)	0.08 (0.02)	0.11 (0.02)	0.05 (0.02)
EDUCATION				
LESS8GRD	0.05 (0.02)	0.05 (0.02)	0.06 (0.02)	0.06 (0.03)
SOMEHIGH	0.14 (0.02)	0.08 (0.02)	0.10 (0.02)	0.11 (0.03)
SOMECOLL	-0.25 (0.02)	-0.14 (0.02)	-0.07 (0.02)	-0.10 (0.02)
COLLGRAD	-0.39 (0.02)	-0.24 (0.02)	-0.20 (0.02)	-0.17 (0.03)
COLLMORE	-0.53 (0.02)	-0.27 (0.02)	-0.20 (0.02)	-0.20 (0.03)
GHP				
EXCEL	0.34 (0.03)	0.49 (0.03)	0.38 (0.02)	0.27 (0.04)
VERYGOOD	0.14 (0.02)	0.22 (0.02)	0.16 (0.01)	0.14 (0.02)
FAIR	-0.08 (0.02)	-0.17 (0.01)	-0.08 (0.01)	-0.13 (0.02)
POOR	-0.19 (0.02)	-0.33 (0.02)	-0.10 (0.02)	-0.25 (0.03)

PROXIES				
PROXY	-0.32 (0.02)	-0.20 (0.02)	-0.15 (0.02)	-0.16 (0.03)
ANSPROXY	-0.28 (0.03)	-0.28 (0.03)	-0.31 (0.03)	-0.31 (0.04)

COMPOSITE REPORT OUTCOMES

GETTING NEEDED CARE

	Q9 Problem seeing a specialist	Q21 Problem getting necessary care	Q4 Problem finding a doctor/nurse	Q22 Problem with delays in health care
R-SQUARE	0.03	0.03	0.04	0.02
AGE				
AGE64	-0.11 (0.01)	-0.06 (0.01)	-0.12 (0.01)	-0.08 (0.00)
AGE6569	-0.01 (0.01)	-0.00 (0.00)	-0.05 (0.01)	-0.01 (0.00)
AGE7579	0.01 (0.01)	0.00 (0.00)	0.03 (0.01)	0.00 (0.00)
AGE80	0.02 (0.01)	-0.00 (0.00)	0.07 (0.01)	0.00 (0.00)
EDUCATION				
LESS8GRD	-0.05 (0.01)	-0.03 (0.01)	0.03 (0.01)	-0.02 (0.00)
SOMEHIGH	-0.02 (0.01)	-0.01 (0.00)	0.02 (0.01)	-0.01 (0.00)
SOMECOLL	-0.00 (0.01)	-0.01 (0.00)	-0.06 (0.01)	-0.00 (0.00)
COLLGRAD	-0.01 (0.01)	-0.01 (0.01)	-0.06 (0.01)	-0.00 (0.00)
COLLMORE	-0.04 (0.01)	-0.03 (0.01)	-0.08 (0.01)	-0.01 (0.00)
GHP				
EXCEL	0.06 (0.01)	0.03 (0.01)	0.06 (0.01)	0.01 (0.00)
VERYGOOD	0.03 (0.01)	0.02 (0.00)	0.03 (0.01)	0.00 (0.00)
FAIR	-0.05 (0.01)	-0.04 (0.00)	-0.05 (0.01)	-0.01 (0.00)
POOR	-0.12 (0.01)	-0.12 (0.01)	-0.11 (0.01)	-0.04 (0.00)
PROXIES				
PROXY	-0.03 (0.01)	-0.01 (0.00)	-0.01 (0.01)	-0.01 (0.00)
ANSPROXY	0.02 (0.01)	0.00 (0.01)	-0.02 (0.01)	0.01 (0.01)

GETTING CARE QUICKLY

	Q14 Getting help during regular hrs.	Q18 Getting immediate care	Q16 Getting regular health care appt.	Q23 Waiting 15 minutes past appt.
R-SQUARE	0.03	0.03	0.02	0.06
AGE				
AGE64	-0.06 (0.01)	-0.08 (0.01)	-0.06 (0.01)	-0.07 (0.01)
AGE6569	0.00 (0.01)	-0.00 (0.01)	-0.02 (0.01)	-0.01 (0.01)
AGE7579	0.02 (0.01)	0.03 (0.01)	0.01 (0.01)	0.01 (0.01)
AGE80	0.02 (0.01)	0.04 (0.01)	0.03 (0.01)	0.02 (0.01)

EDUCATION				
LESS8GRD	0.00 (0.01)	-0.02 (0.01)	-0.02 (0.01)	-0.01 (0.01)
SOMEHIGH	0.02 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
SOMECOLL	-0.04 (0.01)	-0.03 (0.01)	-0.04 (0.01)	-0.04 (0.01)
COLLGRAD	-0.07 (0.01)	-0.02 (0.02)	-0.08 (0.01)	-0.08 (0.01)
COLLMORE	-0.10 (0.01)	-0.04 (0.01)	-0.11 (0.01)	-0.08 (0.01)
GHP				
EXCEL	0.16 (0.01)	0.11 (0.02)	0.13 (0.01)	0.29 (0.02)
VERYGOOD	0.08 (0.01)	0.05 (0.01)	0.07 (0.01)	0.14 (0.01)
FAIR	-0.07 (0.01)	-0.07 (0.01)	-0.05 (0.01)	-0.11 (0.01)
POOR	-0.09 (0.01)	-0.10 (0.01)	-0.07 (0.01)	-0.19 (0.01)
PROXIES				
PROXY	-0.05 (0.01)	-0.02 (0.01)	-0.05 (0.01)	-0.04 (0.01)
ANSPROXY	-0.04 (0.02)	-0.01 (0.02)	-0.03 (0.01)	-0.04 (0.02)

DOCTOR COMMUNICATION

	Q26 Provider listen to you	Q27 Provider explain things	Q28 Provider show respect	Q29 Provider spend enough time
R-SQUARE	0.03	0.03	0.03	0.03
AGE				
AGE64	-0.05 (0.01)	0.00 (0.01)	-0.06 (0.01)	-0.04 (0.01)
AGE6569	-0.02 (0.01)	-0.00 (0.01)	-0.03 (0.01)	-0.02 (0.01)
AGE7579	0.01 (0.01)	-0.00 (0.01)	0.01 (0.01)	0.00 (0.01)
AGE80	0.02 (0.01)	-0.02 (0.01)	0.02 (0.01)	0.01 (0.01)
EDUCATION				
LESS8GRD	0.02 (0.01)	0.01 (0.01)	0.02 (0.01)	0.05 (0.01)
SOMEHIGH	0.03 (0.01)	0.03 (0.01)	0.03 (0.01)	0.04 (0.01)
SOMECOLL	-0.06 (0.01)	-0.02 (0.01)	-0.04 (0.01)	-0.05 (0.01)
COLLGRAD	-0.09 (0.01)	-0.04 (0.01)	-0.05 (0.01)	-0.07 (0.01)
COLLMORE	-0.09 (0.01)	-0.03 (0.01)	-0.05 (0.01)	-0.07 (0.01)
GHP				
EXCEL	0.16 (0.01)	0.20 (0.01)	0.18 (0.01)	0.23 (0.01)
VERYGOOD	0.08 (0.01)	0.10 (0.01)	0.09 (0.01)	0.11 (0.01)
FAIR	-0.07 (0.01)	-0.09 (0.01)	-0.07 (0.01)	-0.10 (0.01)
POOR	-0.11 (0.01)	-0.13 (0.01)	-0.12 (0.01)	-0.13 (0.01)
PROXIES				
PROXY	-0.02 (0.01)	-0.05 (0.01)	-0.01 (0.01)	-0.01 (0.01)
ANSPROXY	-0.11 (0.01)	-0.12 (0.01)	-0.11 (0.01)	-0.11 (0.01)

OFFICE STAFF

	Q24	Q25

	Office staff courteous	Office staff helpful
R-SQUARE	0.02	0.03
AGE		
AGE64	-0.07 (0.01)	-0.09 (0.01)
AGE6569	-0.01 (0.00)	-0.02 (0.01)
AGE7579	0.01 (0.00)	0.02 (0.01)
AGE80	0.03 (0.00)	0.04 (0.01)
EDUCATION		
LESS8GRD	-0.01 (0.01)	0.00 (0.01)
SOMEHIGH	0.00 (0.01)	0.02 (0.01)
SOMECOLL	-0.02 (0.00)	-0.05 (0.01)
COLLGRAD	-0.04 (0.01)	-0.08 (0.01)
COLLMORE	-0.05 (0.01)	-0.10 (0.01)
GHP		
EXCEL	0.06 (0.01)	0.13 (0.01)
VERYGOOD	0.03 (0.00)	0.06 (0.01)
FAIR	-0.03 (0.00)	-0.05 (0.01)
POOR	-0.05 (0.01)	-0.08 (0.01)
PROXIES		
PROXY	-0.02 (0.01)	-0.04 (0.01)
ANSPROXY	-0.04 (0.01)	-0.08 (0.01)

CUSTOMER SERVICE, INFORMATION, AND PAPERWORK

	Q45 Getting help from customer service	Q43 Finding/ understanding written info	Q41 Problem with Medicare paperwork
R-SQUARE	0.06	0.04	0.04
AGE			
AGE64	-0.16 (0.03)	-0.15 (0.02)	-0.13 (0.02)
AGE6569	-0.06 (0.02)	-0.03 (0.01)	-0.04 (0.02)
AGE7579	-0.00 (0.02)	0.03 (0.01)	0.01 (0.02)
AGE80	0.04 (0.02)	0.03 (0.01)	0.02 (0.02)
EDUCATION			
LESS8GRD	0.02 (0.03)	-0.07 (0.02)	-0.02 (0.02)
SOMEHIGH	0.06 (0.03)	-0.01 (0.02)	0.02 (0.02)
SOMECOLL	-0.04 (0.02)	-0.03 (0.01)	-0.04 (0.02)
COLLGRAD	-0.09 (0.03)	-0.02 (0.02)	-0.06 (0.02)
COLLMORE	-0.14 (0.03)	-0.10 (0.02)	-0.12 (0.02)
GHP			
EXCEL	0.02 (0.04)	0.07 (0.02)	0.08 (0.02)
VERYGOOD	0.02 (0.02)	0.03 (0.01)	0.04 (0.01)

FAIR	-0.01 (0.02)	-0.05 (0.01)	-0.08 (0.01)
POOR	-0.12 (0.03)	-0.09 (0.02)	-0.13 (0.02)
PROXIES			
PROXY	-0.10 (0.02)	-0.13 (0.02)	-0.09 (0.02)
ANSPROXY	-0.02 (0.04)	0.01 (0.03)	0.06 (0.03)

SINGLE REPORT OUTCOMES

	Q33 Getting special equipment	Q34 Getting home health care	Q36 Getting special therapy	Q38 Getting prescription medicines
R-SQUARE	0.05	0.09	0.07	0.06
AGE				
AGE64	-0.18 (0.02)	-0.16 (0.04)	-0.17 (0.02)	-0.21 (0.01)
AGE6569	-0.04 (0.02)	0.01 (0.04)	-0.04 (0.02)	-0.03 (0.00)
AGE7579	0.02 (0.01)	-0.00 (0.03)	0.02 (0.02)	0.02 (0.00)
AGE80	0.02 (0.01)	0.01 (0.03)	0.04 (0.02)	0.04 (0.00)
EDUCATION				
LESS8GRD	-0.01 (0.02)	-0.04 (0.03)	0.01 (0.02)	-0.04 (0.01)
SOMEHIGH	0.01 (0.01)	-0.02 (0.03)	-0.00 (0.02)	-0.02 (0.01)
SOMECOLL	-0.04 (0.01)	-0.08 (0.03)	-0.06 (0.02)	-0.02 (0.00)
COLLGRAD	-0.03 (0.02)	0.01 (0.04)	-0.05 (0.02)	-0.02 (0.01)
COLLMORE	-0.06 (0.02)	-0.11 (0.03)	-0.11 (0.02)	-0.06 (0.01)
GHP				
EXCEL	-0.01 (0.04)	0.01 (0.08)	0.06 (0.04)	0.05 (0.01)
VERYGOOD	0.02 (0.02)	0.02 (0.04)	0.04 (0.02)	0.04 (0.00)
FAIR	-0.03 (0.01)	-0.09 (0.02)	-0.05 (0.01)	-0.06 (0.00)
POOR	-0.09 (0.01)	-0.21 (0.03)	-0.17 (0.02)	-0.16 (0.01)
PROXIES				
PROXY	-0.04 (0.01)	-0.08 (0.02)	-0.06 (0.02)	-0.02 (0.01)
ANSPROXY	0.01 (0.02)	-0.04 (0.03)	-0.02 (0.02)	0.02 (0.01)

SINGLE REPORT OUTCOMES

	Q39 How often get prescription medicine	Q47 Getting good quality medical care	Q48 Getting the very best care	Q67 Providing good quality of life
R-SQUARE	0.03	0.03	0.04	0.04
AGE				
AGE64	-0.16 (0.01)	-0.22 (0.01)	-0.23 (0.01)	-0.86 (0.06)
AGE6569	-0.01 (0.00)	-0.05 (0.01)	-0.07 (0.01)	-0.36 (0.06)
AGE7579	0.00 (0.00)	0.03 (0.01)	0.03 (0.01)	0.06 (0.06)

AGE80	0.02 (0.00)	0.05 (0.01)	0.07 (0.01)	0.07 (0.06)
EDUCATION				
LESS8GRD	-0.05 (0.01)	-0.04 (0.01)	-0.00 (0.01)	-0.05 (0.06)
SOMEHIGH	-0.03 (0.01)	0.00 (0.01)	0.03 (0.01)	0.12 (0.05)
SOMECOLL	-0.01 (0.00)	-0.05 (0.01)	-0.09 (0.01)	-0.15 (0.05)
COLLGRAD	0.02 (0.01)	-0.07 (0.01)	-0.14 (0.01)	-0.09 (0.07)
COLLMORE	-0.00 (0.01)	-0.08 (0.01)	-0.20 (0.01)	-0.29 (0.07)
GHP				
EXCEL	0.01 (0.01)	0.14 (0.01)	0.21 (0.01)	-0.41 (0.20)
VERYGOOD	0.02 (0.00)	0.07 (0.01)	0.09 (0.01)	-0.10 (0.09)
FAIR	-0.03 (0.00)	-0.07 (0.01)	-0.07 (0.01)	-0.11 (0.05)
POOR	-0.07 (0.01)	-0.11 (0.01)	-0.11 (0.01)	-0.39 (0.05)
PROXIES				
PROXY	0.00 (0.01)	-0.07 (0.01)	-0.10 (0.01)	-0.12 (0.04)
ANSPROXY	0.01 (0.01)	-0.07 (0.01)	-0.11 (0.01)	-0.20 (0.06)

Table A2: Case-Mix Coefficients, Base Model Plus MHP, With Dual Eligibles, No Regional Interactions, Geo Unit Reporting Entities

GLOBAL RATINGS

	Q46 Medicare	Q30 Health Care	Q7 Personal Dr	Q11 Specialist
R-SQUARE	0.06	0.06	0.03	0.04
AGE				
AGE64	-0.69 (0.02)	-0.22 (0.02)	0.01 (0.02)	-0.08 (0.03)
AGE6569	-0.28 (0.02)	-0.12 (0.02)	-0.13 (0.02)	-0.07 (0.02)
AGE7579	0.19 (0.02)	0.06 (0.02)	0.07 (0.02)	0.07 (0.02)
AGE80	0.32 (0.02)	0.10 (0.02)	0.11 (0.02)	0.08 (0.02)
EDUCATION				
LESS8GRD	0.08 (0.02)	0.10 (0.02)	0.11 (0.02)	0.09 (0.03)
SOMEHIGH	0.16 (0.02)	0.11 (0.02)	0.12 (0.02)	0.11 (0.03)
SOMECOLL	-0.27 (0.02)	-0.17 (0.02)	-0.08 (0.02)	-0.13 (0.02)
COLLGRAD	-0.41 (0.02)	-0.28 (0.02)	-0.23 (0.02)	-0.21 (0.03)
COLLMORE	-0.56 (0.02)	-0.32 (0.02)	-0.24 (0.02)	-0.25 (0.03)
GHP				
EXCEL	0.20 (0.03)	0.30 (0.03)	0.22 (0.02)	0.12 (0.04)
VERYGOOD	0.07 (0.02)	0.13 (0.02)	0.08 (0.02)	0.05 (0.02)
FAIR	-0.02 (0.02)	-0.08 (0.01)	-0.01 (0.01)	-0.05 (0.02)
POOR	-0.06 (0.02)	-0.12 (0.02)	0.02 (0.02)	-0.07 (0.03)
MHP				
MHEXCEL	0.15 (0.02)	0.23 (0.02)	0.21 (0.02)	0.21 (0.02)
MHGOOD	-0.17 (0.02)	-0.21 (0.01)	-0.13 (0.01)	-0.18 (0.02)
MHFAIR	-0.24 (0.02)	-0.36 (0.02)	-0.21 (0.02)	-0.34 (0.03)
MHPOOR	-0.40 (0.03)	-0.56 (0.03)	-0.32 (0.03)	-0.49 (0.04)
PROXIES				
PROXY	-0.30 (0.02)	-0.17 (0.02)	-0.14 (0.02)	-0.12 (0.02)
ANSPROXY	-0.25 (0.03)	-0.24 (0.03)	-0.29 (0.03)	-0.27 (0.04)
DUAL ELIG	0.31 (0.02)	0.01 (0.02)	0.09 (0.02)	0.05 (0.03)

COMPOSITE REPORT OUTCOMES

GETTING NEEDED CARE

	Q9 Problem seeing a specialist	Q21 Problem getting necessary care	Q4 Problem finding a doctor/nurse	Q22 Problem with delays in health care
R-SQUARE	0.04	0.04	0.05	0.03

AGE				
AGE64	-0.07 (0.01)	-0.04 (0.01)	-0.11 (0.01)	-0.07 (0.00)
AGE6569	-0.01 (0.01)	-0.00 (0.00)	-0.05 (0.01)	-0.01 (0.00)
AGE7579	0.01 (0.01)	0.00 (0.00)	0.03 (0.01)	0.00 (0.00)
AGE80	0.04 (0.01)	0.01 (0.00)	0.07 (0.01)	0.01 (0.00)
EDUCATION				
LESS8GRD	-0.04 (0.01)	-0.01 (0.00)	0.05 (0.01)	-0.01 (0.00)
SOMEHIGH	-0.01 (0.01)	-0.01 (0.00)	0.03 (0.01)	-0.00 (0.00)
SOMECOLL	-0.01 (0.01)	-0.01 (0.00)	-0.07 (0.01)	-0.01 (0.00)
COLLGRAD	-0.02 (0.01)	-0.02 (0.01)	-0.07 (0.01)	-0.00 (0.00)
COLLMORE	-0.05 (0.01)	-0.04 (0.01)	-0.09 (0.01)	-0.01 (0.00)
GHP				
EXCEL	0.04 (0.01)	0.01 (0.01)	0.04 (0.01)	-0.00 (0.01)
VERYGOOD	0.02 (0.01)	0.01 (0.00)	0.02 (0.01)	-0.00 (0.00)
FAIR	-0.02 (0.01)	-0.03 (0.00)	-0.03 (0.01)	-0.01 (0.00)
POOR	-0.08 (0.01)	-0.09 (0.01)	-0.09 (0.01)	-0.02 (0.00)
MHP				
MHEXCEL	0.02 (0.01)	0.02 (0.00)	0.03 (0.01)	0.01 (0.00)
MHGOOD	-0.04 (0.01)	-0.03 (0.00)	-0.03 (0.01)	-0.01 (0.00)
MHFAIR	-0.10 (0.01)	-0.07 (0.00)	-0.07 (0.01)	-0.02 (0.00)
MHPOOR	-0.16 (0.01)	-0.14 (0.01)	-0.11 (0.02)	-0.07 (0.01)
PROXIES				
PROXY	-0.02 (0.01)	-0.01 (0.00)	0.00 (0.01)	-0.01 (0.00)
ANSPROXY	0.05 (0.01)	0.03 (0.01)	0.00 (0.01)	0.02 (0.00)
DUAL ELIG	-0.10 (0.01)	-0.07 (0.00)	-0.02 (0.01)	-0.04 (0.00)

GETTING CARE QUICKLY

	Q14 Getting help during regular hrs.	Q18 Getting immediate care	Q16 Getting regular health care appt.	Q23 Waiting 15 minutes past appt.
R-SQUARE	0.04	0.04	0.03	0.06
AGE				
AGE64	-0.05 (0.01)	-0.06 (0.01)	-0.05 (0.01)	-0.05 (0.01)
AGE6569	0.00 (0.01)	-0.00 (0.01)	-0.02 (0.01)	-0.01 (0.01)
AGE7579	0.02 (0.01)	0.03 (0.01)	0.02 (0.01)	0.01 (0.01)
AGE80	0.03 (0.01)	0.06 (0.01)	0.04 (0.01)	0.03 (0.01)
EDUCATION				
LESS8GRD	0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
SOMEHIGH	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)
SOMECOLL	-0.05 (0.01)	-0.03 (0.01)	-0.05 (0.01)	-0.04 (0.01)
COLLGRAD	-0.08 (0.01)	-0.03 (0.02)	-0.08 (0.01)	-0.09 (0.01)
COLLMORE	-0.11 (0.01)	-0.06 (0.01)	-0.12 (0.01)	-0.08 (0.01)

GHP				
EXCEL	0.10 (0.01)	0.07 (0.02)	0.07 (0.01)	0.23 (0.02)
VERYGOOD	0.05 (0.01)	0.03 (0.01)	0.04 (0.01)	0.11 (0.01)
FAIR	-0.04 (0.01)	-0.03 (0.01)	-0.02 (0.01)	-0.08 (0.01)
POOR	-0.05 (0.01)	-0.03 (0.01)	-0.02 (0.01)	-0.13 (0.01)
MHP				
MHEXCEL	0.06 (0.01)	0.07 (0.01)	0.07 (0.01)	0.06 (0.01)
MHGOOD	-0.06 (0.01)	-0.05 (0.01)	-0.06 (0.01)	-0.05 (0.01)
MHFAIR	-0.11 (0.01)	-0.13 (0.01)	-0.10 (0.01)	-0.11 (0.01)
MHPOOR	-0.13 (0.01)	-0.13 (0.02)	-0.10 (0.01)	-0.14 (0.02)
PROXIES				
PROXY	-0.04 (0.01)	-0.00 (0.01)	-0.05 (0.01)	-0.04 (0.01)
ANSPROXY	-0.03 (0.01)	-0.02 (0.02)	-0.01 (0.01)	-0.02 (0.02)
DUAL ELIG	-0.03 (0.01)	-0.06 (0.01)	-0.03 (0.01)	0.01 (0.01)

DOCTOR COMMUNICATION

	Q26 Provider listen to you	Q27 Provider explain things	Q28 Provider show respect	Q29 Provider spend enough time
R-SQUARE	0.04	0.04	0.04	0.04
AGE				
AGE64	-0.04 (0.01)	0.01 (0.01)	-0.06 (0.01)	-0.02 (0.01)
AGE6569	-0.02 (0.01)	-0.00 (0.01)	-0.03 (0.01)	-0.02 (0.01)
AGE7579	0.01 (0.01)	0.00 (0.01)	0.01 (0.01)	0.01 (0.01)
AGE80	0.03 (0.01)	-0.01 (0.01)	0.03 (0.01)	0.02 (0.01)
EDUCATION				
LESS8GRD	0.04 (0.01)	0.02 (0.01)	0.04 (0.01)	0.07 (0.01)
SOMEHIGH	0.04 (0.01)	0.03 (0.01)	0.04 (0.01)	0.05 (0.01)
SOMECOLL	-0.07 (0.01)	-0.03 (0.01)	-0.04 (0.01)	-0.06 (0.01)
COLLGRAD	-0.09 (0.01)	-0.05 (0.01)	-0.06 (0.01)	-0.08 (0.01)
COLLMORE	-0.11 (0.01)	-0.05 (0.01)	-0.07 (0.01)	-0.09 (0.01)
GHP				
EXCEL	0.10 (0.01)	0.12 (0.01)	0.11 (0.01)	0.14 (0.01)
VERYGOOD	0.05 (0.01)	0.06 (0.01)	0.06 (0.01)	0.07 (0.01)
FAIR	-0.04 (0.01)	-0.05 (0.01)	-0.03 (0.01)	-0.06 (0.01)
POOR	-0.05 (0.01)	-0.07 (0.01)	-0.06 (0.01)	-0.07 (0.01)
MHP				
MHEXCEL	0.08 (0.01)	0.10 (0.01)	0.09 (0.01)	0.11 (0.01)
MHGOOD	-0.06 (0.01)	-0.07 (0.01)	-0.06 (0.01)	-0.07 (0.01)
MHFAIR	-0.10 (0.01)	-0.13 (0.01)	-0.10 (0.01)	-0.13 (0.01)
MHPOOR	-0.14 (0.01)	-0.17 (0.01)	-0.14 (0.01)	-0.18 (0.01)
PROXIES				

PROXY	-0.01	(0.01)	-0.03 (0.01)	0.01 (0.01)	0.01 (0.01)
ANSPROXY	-0.09	(0.01)	-0.10 (0.01)	-0.09 (0.01)	-0.09 (0.01)
DUAL ELIG	-0.01	(0.01)	0.02 (0.01)	0.01 (0.01)	0.01 (0.01)

OFFICE STAFF

	Q24 Office staff courteous		Q25 Office staff helpful	
R-SQUARE	0.03		0.04	
AGE				
AGE64	-0.05	(0.01)	-0.07	(0.01)
AGE6569	-0.01	(0.00)	-0.02	(0.01)
AGE7579	0.02	(0.00)	0.02	(0.01)
AGE80	0.04	(0.00)	0.04	(0.01)
EDUCATION				
LESS8GRD	-0.01	(0.01)	0.01	(0.01)
SOMEHIGH	0.01	(0.01)	0.03	(0.01)
SOMECOLL	-0.02	(0.00)	-0.06	(0.01)
COLLGRAD	-0.04	(0.01)	-0.09	(0.01)
COLLMORE	-0.06	(0.01)	-0.11	(0.01)
GHP				
EXCEL	0.03	(0.01)	0.06	(0.01)
VERYGOOD	0.02	(0.00)	0.03	(0.01)
FAIR	-0.01	(0.00)	-0.02	(0.01)
POOR	-0.01	(0.01)	-0.02	(0.01)
MHP				
MHEXCEL	0.04	(0.00)	0.08	(0.01)
MHGOOD	-0.03	(0.00)	-0.05	(0.01)
MHFAIR	-0.07	(0.01)	-0.11	(0.01)
MHPOOR	-0.10	(0.01)	-0.14	(0.01)
PROXIES				
PROXY	-0.02	(0.01)	-0.03	(0.01)
ANSPROXY	-0.02	(0.01)	-0.07	(0.01)
DUAL ELIG	-0.04	(0.01)	-0.02	(0.01)

CUSTOMER SERVICE, INFORMATION, AND PAPERWORK

	Q45 Getting help from customer service	Q43 Finding/ understanding written info	Q41 Problem with Medicare paperwork
R-SQUARE	0.05	0.05	0.04

AGE			
AGE64	-0.12 (0.03)	-0.14 (0.02)	-0.10 (0.02)
AGE6569	-0.05 (0.02)	-0.03 (0.01)	-0.04 (0.02)
AGE7579	0.00 (0.02)	0.03 (0.01)	0.01 (0.02)
AGE80	0.03 (0.02)	0.04 (0.01)	0.03 (0.02)
EDUCATION			
LESS8GRD	-0.00 (0.03)	-0.07 (0.02)	-0.02 (0.02)
SOMEHIGH	0.07 (0.03)	-0.01 (0.01)	0.03 (0.02)
SOMECOLL	-0.05 (0.02)	-0.03 (0.01)	-0.04 (0.01)
COLLGRAD	-0.10 (0.03)	-0.02 (0.02)	-0.06 (0.02)
COLLMORE	-0.15 (0.03)	-0.12 (0.02)	-0.13 (0.02)
GHP			
EXCEL	-0.00 (0.04)	0.04 (0.02)	0.06 (0.03)
VERYGOOD	-0.00 (0.02)	0.01 (0.01)	0.02 (0.02)
FAIR	0.00 (0.02)	-0.02 (0.01)	-0.04 (0.01)
POOR	-0.07 (0.03)	-0.05 (0.02)	-0.09 (0.02)
MHP			
MHEXCEL	0.02 (0.02)	0.04 (0.01)	0.03 (0.02)
MHGOOD	-0.04 (0.02)	-0.05 (0.01)	-0.03 (0.01)
MHFAIR	-0.05 (0.02)	-0.11 (0.02)	-0.12 (0.02)
MHPOOR	-0.14 (0.04)	-0.15 (0.02)	-0.14 (0.03)
PROXIES			
PROXY	-0.09 (0.02)	-0.12 (0.01)	-0.09 (0.02)
ANSPROXY	0.00 (0.04)	0.02 (0.02)	0.09 (0.02)
DUAL ELIG	-0.03 (0.03)	0.03 (0.02)	0.03 (0.02)

SINGLE REPORT OUTCOMES

	Q33 Getting special equipment	Q34 Getting home health care	Q36 Getting special therapy	Q38 Getting prescription medicines
R-SQUARE	0.06	0.08	0.08	0.06
AGE				
AGE64	-0.16 (0.02)	-0.11 (0.03)	-0.15 (0.02)	-0.19 (0.01)
AGE6569	-0.04 (0.02)	0.04 (0.03)	-0.03 (0.02)	-0.03 (0.00)
AGE7579	0.02 (0.01)	0.02 (0.03)	0.02 (0.02)	0.02 (0.00)
AGE80	0.03 (0.01)	0.03 (0.02)	0.04 (0.02)	0.05 (0.00)
EDUCATION				
LESS8GRD	-0.00 (0.01)	-0.03 (0.02)	0.02 (0.02)	-0.03 (0.01)
SOMEHIGH	0.00 (0.01)	0.00 (0.02)	0.01 (0.02)	-0.01 (0.01)
SOMECOLL	-0.05 (0.01)	-0.09 (0.02)	-0.06 (0.02)	-0.03 (0.00)
COLLGRAD	-0.04 (0.02)	0.00 (0.03)	-0.07 (0.02)	-0.03 (0.01)
COLLMORE	-0.08 (0.02)	-0.12 (0.03)	-0.12 (0.02)	-0.07 (0.01)

GHP				
EXCEL	0.00 (0.04)	0.02 (0.07)	0.06 (0.04)	0.04 (0.01)
VERYGOOD	0.02 (0.02)	0.02 (0.03)	0.02 (0.02)	0.03 (0.00)
FAIR	-0.01 (0.01)	-0.07 (0.02)	-0.03 (0.01)	-0.05 (0.00)
POOR	-0.06 (0.01)	-0.14 (0.02)	-0.13 (0.02)	-0.13 (0.01)
MHP				
MHEXCEL	0.03 (0.02)	0.02 (0.03)	-0.01 (0.02)	0.02 (0.00)
MHGOOD	-0.02 (0.01)	-0.04 (0.02)	-0.04 (0.02)	-0.03 (0.00)
MHFAIR	-0.03 (0.01)	-0.08 (0.02)	-0.08 (0.02)	-0.06 (0.01)
MHPOOR	-0.10 (0.02)	-0.17 (0.03)	-0.16 (0.02)	-0.09 (0.01)
PROXIES				
PROXY	-0.03 (0.01)	-0.04 (0.02)	-0.05 (0.02)	-0.01 (0.01)
ANSPROXY	0.03 (0.02)	-0.03 (0.02)	-0.00 (0.02)	0.04 (0.01)
DUAL ELIG	-0.05 (0.01)	-0.01 (0.02)	-0.06 (0.02)	-0.02 (0.01)

SINGLE REPORT OUTCOMES

	Q39 How often get prescription medicine	Q47 Getting good quality medical care	Q48 Getting the very best care	Q67 Providing good quality of life
R-SQUARE	0.04	0.04	0.05	0.04
AGE				
AGE64	-0.14 (0.01)	-0.17 (0.01)	-0.18 (0.01)	-0.73 (0.05)
AGE6569	-0.02 (0.00)	-0.05 (0.01)	-0.06 (0.01)	-0.31 (0.06)
AGE7579	0.01 (0.01)	0.03 (0.01)	0.04 (0.01)	0.07 (0.06)
AGE80	0.03 (0.01)	0.05 (0.01)	0.08 (0.01)	0.08 (0.05)
EDUCATION				
LESS8GRD	-0.04 (0.01)	-0.01 (0.01)	0.02 (0.01)	-0.00 (0.05)
SOMEHIGH	-0.02 (0.01)	0.01 (0.01)	0.04 (0.01)	0.11 (0.05)
SOMECOLL	-0.01 (0.00)	-0.06 (0.01)	-0.10 (0.01)	-0.19 (0.04)
COLLGRAD	0.02 (0.01)	-0.08 (0.01)	-0.16 (0.01)	-0.12 (0.07)
COLLMORE	-0.01 (0.01)	-0.10 (0.01)	-0.21 (0.01)	-0.34 (0.07)
GHP				
EXCEL	-0.02 (0.01)	0.05 (0.01)	0.11 (0.01)	-0.15 (0.19)
VERYGOOD	0.00 (0.00)	0.03 (0.01)	0.05 (0.01)	-0.07 (0.09)
FAIR	-0.02 (0.00)	-0.02 (0.01)	-0.02 (0.01)	-0.04 (0.04)
POOR	-0.03 (0.01)	-0.03 (0.01)	-0.04 (0.01)	-0.26 (0.05)
MHP				
MHEXCEL	0.03 (0.00)	0.10 (0.01)	0.11 (0.01)	0.05 (0.07)
MHGOOD	-0.04 (0.00)	-0.09 (0.01)	-0.09 (0.01)	-0.01 (0.05)
MHFAIR	-0.08 (0.01)	-0.14 (0.01)	-0.14 (0.01)	-0.16 (0.05)
MHPOOR	-0.10 (0.01)	-0.20 (0.01)	-0.19 (0.01)	-0.40 (0.06)

PROXIES				
PROXY	0.01 (0.01)	-0.06 (0.01)	-0.09 (0.01)	-0.08 (0.04)
ANSPROXY	0.03 (0.01)	-0.05 (0.01)	-0.09 (0.01)	-0.15 (0.05)
DUAL ELIG	-0.07 (0.01)	0.04 (0.01)	0.04 (0.01)	0.36 (0.04)

Table A3: Case-Mix Coefficients for Global Ratings (Dichotomized 10 vs. 0-9), Base Model, No Dual Eligibles, No Regional Interactions, Geo Unit Reporting Entities

	Q46 Medicare	Q30 Health Care	Q7 Personal Dr	Q11 Specialist
R-SQUARE	0.06	0.01	0.02	0.02
AGE				
AGE64	-0.13 (0.01)	-0.02 (0.01)	0.01 (0.01)	-0.02 (0.01)
AGE6569	-0.08 (0.00)	-0.03 (0.00)	-0.04 (0.00)	-0.03 (0.00)
AGE7579	0.05 (0.00)	0.02 (0.00)	0.03 (0.00)	0.00 (0.00)
AGE80	0.09 (0.00)	0.01 (0.00)	0.04 (0.00)	-0.02 (0.00)
EDUCATION				
LESS8GRD	0.06 (0.01)	0.01 (0.01)	0.02 (0.01)	-0.04 (0.00)
SOMEHIGH	0.07 (0.01)	0.02 (0.01)	0.03 (0.01)	-0.02 (0.00)
SOMECOLL	-0.08 (0.00)	-0.03 (0.00)	-0.03 (0.00)	0.01 (0.00)
COLLGRAD	-0.15 (0.01)	-0.07 (0.01)	-0.10 (0.01)	0.01 (0.01)
COLLMORE	-0.19 (0.01)	-0.08 (0.01)	-0.11 (0.01)	0.03 (0.01)
GHP				
EXCEL	0.13 (0.01)	0.03 (0.01)	0.09 (0.01)	-0.05 (0.01)
VERYGOOD	0.03 (0.00)	0.02 (0.00)	0.03 (0.00)	-0.02 (0.00)
FAIR	-0.00 (0.00)	-0.01 (0.00)	-0.01 (0.00)	0.03 (0.00)
POOR	-0.01 (0.01)	-0.01 (0.01)	0.01 (0.01)	0.07 (0.01)
PROXIES				
PROXY	-0.08 (0.01)	-0.02 (0.01)	-0.03 (0.01)	0.00 (0.00)
ANSPROXY	-0.11 (0.01)	-0.10 (0.01)	-0.09 (0.01)	-0.05 (0.01)

APPENDIX B: CONSTRUCTION OF GEOGRAPHIC EQUIVALENCE WEIGHTS (GEWS)

The creation of GEW began with the creation of within-MFFS and within-MMC weights. Within MFFS, nonresponse weights were created by RTI to account for differential nonresponse within the MFFS sample, as described in the corresponding MFFS Task Report. These weights were not particularly variable, with an average within-state design effect of approximately 5%. Within MMC, MMC plans were weighted proportionately to their enrollments within each state. The application of these weights within MFFS and MMC resulted in somewhat reduced precision but less biased representation of the experiences of the underlying populations. An effective sample size (ESS), which downwardly adjusts from the nominal sample size to account for this loss of precision, was calculated for MFFS and MMC within each state.

County-level weights were then devised in order to be directly proportionate to the harmonic mean of the MFFS and MMC ESS's, $1/(1/f + 1/m)$, where f and m are the MFFS ESS and MMC ESS, respectively. Thus, each county would have representation proportional to the statistical "power" it could contribute to the state MFFS-vs.-MMC comparison. This is a compromise between matching to the MFFS distribution and matching to the MMC distribution that downweights counties that are sparse in either type of beneficiary.

In four states (Maine, New Mexico, North Dakota, and West Virginia) application of these county-level weights resulted in insufficient statistical power[18] for comparison of MFFS and MMC, but similarly applied MFFS geo unit-level weights did provide sufficient statistical power. Geo unit-level GEWs were used in those cases. In a further four states (Delaware, Idaho, Nebraska, and New Hampshire), neither county-level nor geo unit-level GEWs allowed sufficient statistical power, so no such equivalence weights were constructed.[19]

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[18] According to a criterion of ESS of comparison ≥ 225 that was selected to provide precision that is equivalent to the typical precision of between-MMC plan comparison.

[19] Proposed 2001 MFFS sampling changes should permit county-level GEWs for all 43 states.

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