MEDICARE HEALTH OUTCOMES SURVEY

NATIONAL AND STATE COMPARISONS OF HEALTH STATUS FOR MEDICARE MANAGED CARE AND FEE-FOR-SERVICE BENEFICIARIES

FINAL REPORT
Deliverable for Task 5.10

PREPARED BY HEALTH SERVICES ADVISORY GROUP

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EXECUTIVE SUMMARY

The Balanced Budget Act of 1997 and the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 have contributed to a restructuring of the manner in which care is provided to Medicare beneficiaries. As a result of this restructuring, research interest has increased in possible health status differences between beneficiaries in traditional Medicare, or Fee-For-Service (FFS), and beneficiaries in Medicare managed care (Medicare Advantage [MA]). This study examines physical and mental health status for beneficiaries 65 years of age or older in these systems of care during the years 2002 and 2004, both nationally and for individual states.

Actual 2002 - 2004 longitudinal change for MA beneficiaries was compared to simulated longitudinal change within matched FFS cases from 2002 and 2004 cross-sectional surveys. Beneficiaries in 2002 and 2004 were exactly matched on year of birth and propensity-score matched on demographic and other background covariates. Propensity score matching did not include any health characteristics of beneficiaries so as to not affect plan programs that may have improved health. Propensity score reweighting was used to model the conditional probability of being in the MA sample in the 2002 baseline year and to address selection into FFS versus MA, using a variety of demographic and health characteristics. Finally, generalized estimating equations and difference-in-difference analyses were used to compare differences in health status change from 2002 and 2004 between FFS and Medicare managed care beneficiaries.

At the national level, there is not a significant difference in the amount of 2002 - 2004 change for physical or mental health status between FFS and MA beneficiaries. Although most states did not exhibit significant differences in mental health status change, an interesting pattern emerged; mental health status is somewhat higher for FFS beneficiaries compared to managed care beneficiaries.

A key strength of the current research study is the rigor employed in examining health status change for Medicare beneficiaries. However, a primary limitation is the different survey research designs used in FFS and managed care. The longitudinal study design for the Medicare Health Outcomes Survey (HOS) is a more powerful design in detecting changes in health status over time, compared to the cross-sectional design associated with the FFS survey. Another limitation involves beneficiaries who were non-respondents to the Medicare HOS follow-up survey. Non-respondents to the 2004 HOS include beneficiaries who were deceased, those who voluntarily disenrolled from their health plan, beneficiaries who were involuntarily disenrolled from their health plan, and those who had an invalid survey at follow up. Results of analyses indicate that non-respondents are systematically different from respondents. Respondents are less likely to be limited in their baseline activities of daily living, less likely to report having chronic conditions, and more likely to have significantly higher PCS and MCS scores, when compared to non-respondents. Hence, caution should be exercised when interpreting the results of the analyses in this report.

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INTRODUCTION

The Balanced Budget Act of 1997 and the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (Centers for Medicare & Medicaid Services [CMS], 2006) have contributed to a restructuring of the manner in which care is provided to beneficiaries. As a result of these statutes, there has been research interest in possible health status differences between the Medicare managed care (Medicare Advantage [MA]) and the original Medicare populations. This study is based on the Medicare Health Outcomes Survey (HOS), sponsored by CMS, and the Consumer Assessment of Healthcare Providers and Systems (CAHPS®)[1] Fee-For-Service (FFS) survey, developed by the Agency for Healthcare Research and Quality (AHRQ). The HOS survey was initiated in 1997 in response to the growing number of Medicare beneficiaries who were receiving care from managed care organizations. The Medicare HOS is the first national health outcomes measure for the Medicare population in managed care settings. CMS sponsors the Medicare FFS CAHPS survey to collect information on the experiences, as well as health status, of enrollees in the original Medicare program. This report summarizes the methodology and results for health status comparisons between beneficiaries in managed care and beneficiaries in original Medicare (Task 5.10).

HEALTH STATUS OF BENEFICIARIES IN MEDICARE MA AND FFS

There is not a clear consensus in the literature about differences in health status between FFS and MA beneficiaries. Some research examining differences in health status between MA and FFS beneficiaries indicates that managed care enrollees are healthier than FFS enrollees (Kan, 2002). However, elderly and poor enrollees with chronic conditions had worse outcomes in MA compared to FFS (Ware et al., 1996). The prevalence of chronic disease is higher for FFS enrollees, and greater proportions of FFS beneficiaries have limitations in their activities of daily living (ADLs; Pope et al., 2000). Health status comparisons using a 36-item health survey indicate statistically and clinically significant differences between the managed care and FFS populations; however, this difference is relatively small (Pope et al., 2000). The results of a comparison for managed care and FFS Florida hospital patients indicated that mean severity scores are lower for health maintenance organization (HMO) inpatients compared to FFS inpatients (Revere et al., 2004). Using a matching design, Safran et al. (2002) compared FFS and HMO beneficiaries. Results indicated that FFS enrollees had significantly more chronic conditions, impaired ADLs, and significantly lower physical component summary scores compared to the MA enrollees. However, in a longitudinal study of MA and FFS beneficiaries using the Medicare Current Beneficiary Survey (MCBS), no significant differences were found between enrollees for two-year changes in health and functional status (Riley, 2000). Additionally, in a regional and national comparison of MA plans and FFS, Landon et al. (2004)

[1] CAHPS® is a registered trademark of the Agency for Healthcare Research and Quality.

found that similar percentages of MA and FFS beneficiaries rated their health status as very good or excellent.

Other research indicates a clear enrollment bias on the part of managed care. Some authors have concluded that managed care organizations selectively enroll beneficiaries who are predicted to be less costly (Greenwald et al., 2000; Khan et al., 2002). Using 1996 Medicare data, researchers examined correlations between HMO market share and the average costs of beneficiaries in the FFS sector. The authors found significant service-level selection by HMOs (Cao & McGuire, 2003). Additionally, in a comprehensive analysis, Mello et al. (2003) found that there was evidence of some favorable HMO selection in Medicare during the years of 1993-1996. Research has also found that there is more voluntary disenrollment of less healthy beneficiaries from managed care, compared to traditional Medicare (Atherly et al., 2005; Morgan et al., 1997).

Specific aspects of MA and FFS health system performance that may impact health status have been examined. For example, the Landon et al. study (2004) indicates that MA plans outperformed FFS in delivering preventive services; however, FFS outperformed MA plans in terms of access to care and beneficiary experiences. In a study of MA and FFS beneficiaries, MA beneficiaries used more preventive and outpatient services than FFS beneficiaries (Xu & Jensen, 2005). In research using the MCBS, there was not a statistically significant difference between HMO beneficiaries and FFS beneficiaries for propensity to seek health care. However, a larger proportion of HMO enrollees rated their physical health as very good or excellent compared to the FFS population (Murgolo, 2002).

ISSUES COMPARING HEALTH STATUS BETWEEN MEDICARE MANAGED CARE AND MEDICARE FEE-FOR-SERVICE BENEFICIARIES

In sum, the literature indicates that there are not clear conclusions regarding health status comparisons between FFS and managed care beneficiaries. An assessment of health status differences between managed care and FFS systems of care may depend on how health status is operationalized, disenrollment of beneficiaries from plans, and many other complexities, which make comparisons between systems of care challenging. For example, comparisons in health status between FFS and MA should be limited to geographical areas of the country that provide a *choice* between FFS and MA health plans (Elliott, 2005). Otherwise, regional differences and MA-FFS differences may be confounded. Generally, research studies on FFS and MA comparisons have not taken into account this factor.

The opportunity for beneficiaries to choose a health plan does not necessarily imply that they will, in fact, analyze their choices. The dynamics of beneficiary choice have not been well understood, specifically, how choice may influence actual plan selection. In a recent report, Mathematica Policy Research, Inc., indicates that when beneficiaries do consider a choice between FFS and MA, approximately 36 percent rely on their physician for that choice (Mathematica, 2001, 2004). Only 12 percent of beneficiaries say that they rely on health plan information as their most important source of information in decision making. The Mathematica report also notes that the disabled lack adequate information to make informed choices.

Additionally, the oldest old, who typically have lower income and lower educational levels, depend on caregivers, family, or friends to help in decision making (Mathematica, 2001, 2004). Other research indicates that plan premiums and plan characteristics have a significant effect on managed care plan selection (Atherly et al., 2004). Possibly the assumption that all beneficiaries have information about, and actively consider health plan choices, may not be the case for all age groups, and may depend upon the health status of the beneficiary.

At baseline, nonresponse bias can pose a challenge to health status comparisons. However, a report by Research Triangle Institute ([RTI] McCall et al., 2004), which includes the 2000 HOS survey results, states that for the analysis of the *Cohort III Baseline* survey, "…a comparison of the differences between eligibles and respondents by plan response rate deciles does not suggest that there is a response rate below which respondents are an unrepresentative sample of survey eligibles" (p. 27). Additionally, these authors posit similar results for FFS CAHPS: "A comparison of the differences between eligibles and respondents by state level response rate deciles does not immediately suggest that there is a response rate below which respondents are an unrepresentative sample of survey eligibles" (p. 57). Hence, based on the detailed analysis of nonresponse bias in both FFS and HOS surveys, there is reason to believe that nonresponse bias at baseline may not be a significant issue in the current analysis.

The following section of this report summarizes the analytical methodologies employed in the current study to examine differences in baseline health status and differences in changes in health status over the two-year period from 2002 to 2004 between MA and FFS Medicare beneficiaries.

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METHODOLOGY

MEDICARE HEALTH OUTCOMES SURVEY

Beginning in 1998 and continuing annually, an HOS baseline cohort is created from a random sample of 1,000 members per plan from MA plans in the United States. In plans with fewer than 1,000 Medicare members, the sample consists of the entire enrolled Medicare population that meets the inclusion criteria. The HOS has a longitudinal design, with each cohort having a two-year follow-up remeasurement. Medicare beneficiaries who are continuously enrolled in a given health plan for at least six months are eligible for sampling. Beneficiaries who are institutionalized, nursing home residents, or disabled under age 65 are eligible for inclusion, but those with end stage renal disease are excluded. Beneficiaries are excluded from follow up two years later if they disenrolled from their plan (voluntarily disenrolled), if their plan no longer has a contract in place at the time of follow up (involuntarily disenrolled), or for reason of death. The data collection protocol includes a combination of multiple mailings and telephone follow up over a period of approximately four months. CMS contracts with the National Committee for Quality Assurance (NCQA) to oversee the data collection activities for the Health Plan Employer Data and Information Set (HEDIS®), which includes the Medicare HOS.[2]

The 2002 and 2004 HOS instruments consist of a 36-item health survey, as well as additional demographic and health-related questions. Physical and mental functioning and well being are measured with the physical component summary (PCS) score and the mental component summary (MCS) score. The PCS and MCS scores are calculated using the following scales: general health, mental health, physical functioning, role-emotional, social functioning, role-physical, bodily pain, and vitality. A higher PCS or MCS score reflects better health status. For this study, the responses from a subset of the 36-item health survey were recoded to generate the 12-item health survey, which includes PCS and MCS scores. Demographic and other background information in the HOS includes gender, age, race, marital status, education, annual household income, homeowner status, and Medicaid enrollment, smoking status, the presence or absence of selected chronic conditions, and other negative health symptoms. The complete data collection protocol can be found in the *HEDIS® Volume 6: Specifications for the Medicare Health Outcomes Survey* (NCQA, 2002, 2004).

MEDICARE FEE-FOR-SERVICE CAHPS SURVEY

The purpose of the CAHPS surveys is to provide a standardized system for the measurement and reporting of health plan enrollees' experiences with the care they receive. In 1995, AHRQ funded the development of the original CAHPS survey by a consortium of researchers at Harvard Medical School, RTI, RAND, and Westat. In 1997, CMS began collecting CAHPS survey data

[2] HEDIS® is a registered trademark of the National Committee for Quality Assurance.

from managed care enrollees. In 2000, CMS initiated the Medicare FFS CAHPS survey to collect information on the experiences of enrollees in the original Medicare program.

The Medicare CAHPS survey questions produce scores for four global rating questions (e.g., how respondents rate health care received from their health plan) and six composite measures. The composite measures are sets of questions grouped together to address a single aspect of care (e.g. getting needed care or getting care quickly). The CAHPS questionnaires are cross-sectional and are administered by mail, followed by telephone interviews of beneficiaries who do not respond to the mail questionnaires. The sampling units for CAHPS survey administration are 276 geographic areas referred to as "geounits." Within each geounit, a simple random sample of FFS beneficiaries is drawn with the goal of achieving a minimum of 300 beneficiaries in each sampling unit. [3] Currently, the FFS CAHPS survey contains a 12-item health status measure.

ANALYTIC STRATEGY

To enable the comparisons between managed care and FFS beneficiaries for PCS and MCS scores, responses from the 36-item health survey used in managed care were recoded to generate the 12-item version of PCS and MCS scores based on the same algorithms used in the FFS survey. Additionally, the analytical sample was restricted to Medicare beneficiaries 65 years or older and for whom baseline and follow-up PCS and MCS scores could be calculated. The analytic sample also was restricted to beneficiaries in health plans that had a contract in place at follow up, and who lived in counties where there was a choice between managed care plans and traditional FFS Medicare in 2002 and 2004.

The PCS and MCS scores from the HOS survey were obtained from the same enrollee at baseline (2002) and follow up (2004), whereas the PCS and MCS scores from the FFS survey were obtained from two cross-sectional surveys conducted in 2002 and 2004. For this reason, propensity score techniques were used to simulate longitudinal cases by matching FFS beneficiaries in 2002 to FFS beneficiaries in 2004. Donald Rubin (1973) pioneered the propensity score methodology, which has been used in medical research (e.g. Foster, 2003; Hollenbeak et al., 2006) and is being used in CAHPS research (de Vries et al., 2005). This method seeks to capture the desirable properties of experimental designs with observational data (including survey data), and has the potential to reduce selection bias. The propensity score is the conditional probability that an individual belongs to a naturally occurring "treatment" group, based on the individual's background characteristics. Since the propensity score summarizes the information on the background characteristics in a single summary score, it has a distinct advantage over standard matching techniques (Drake, 1993; Gu & Rosenbaum, 1993).

[3] Except for a few geounits that are stratified by county to better match managed care.

PROPENSITY SCORE FOR FFS MATCHED PAIRS

The propensity score was developed using multivariate logistic regression to model the conditional probability of FFS beneficiaries in 2004 being included in the 2002 FFS survey, given demographic and other background characteristics. These included gender, race/ethnicity, educational attainment, population density of county (metropolitan county with greater than 250,000; urban county with greater than 2,500; rural county with less than 2,500; or completely rural), smoking status, additional insurance, dual eligibility for Medicaid and Medicare, use of a proxy in responding to the survey, and state of residence. With the exception of smoking status, matching did not include any other health characteristics so as to not bias within FFS change toward zero. The mode of survey administration was not used as a covariate because most of the FFS CAHPS surveys were conducted by mail, with relatively few respondents answering by telephone. To take into account aging effects, the age of 2004 FFS beneficiaries that would have been observed if the beneficiaries were included in the 2002 survey, was calculated by subtracting two years from age reported in 2004, so as to match exactly on birth year. Thus, a 67-year old FFS beneficiary in 2004 would have an observed age of 65 years in 2002. The age variable was used to obtain an exact match based on age.

To achieve maximum predictive power for the propensity score model, all of the covariates were retained in the model regardless of their level of statistical significance. The predicted probability derived from the model was the propensity score. Age and the propensity scores were used to create matched pairs of 2002 and 2004 FFS beneficiaries based on a Greedy matching algorithm (Parsons, 2001). The distribution of the covariates between the two matched groups were compared using the McNemar test to determine whether the propensity score matching succeeded in creating two equivalent groups with balanced covariates. If significant differences were found between the two groups on any covariate, the two-way interaction terms of that covariate with all other variables were entered into a logistic regression model along with all of the previous variables, and new propensity scores were calculated. Prior to matching, 60,945 (2002) and 54,027 (2004) FFS sample beneficiaries met the criteria for being included in the study. The matching process resulted in 35,226 matched pairs of 2002 and 2004 FFS beneficiaries that were nearly equivalent in all observed covariates.

The 35,226 matched pairs of 2002 and 2004 FFS beneficiaries were integrated with 45,422 managed care beneficiaries who met the study criteria, to create an analytic file. To take into account the complex survey design, sampling weights were necessary for statistical analysis. Post-stratification weights associated with the 2002 FFS sample were available from the public use file, and served as the sampling weight. For the managed care sample, the sampling weight was calculated for each beneficiary in the 2002 baseline year by dividing his or her managed care plan's population size by the managed care sample size in the same year. Sampling weights from FFS and managed care beneficiaries were standardized by multiplying each of the respective sampling weights by the inverse ratio of share of FFS or managed care sampling weights to total FFS and managed care combined weights.

PROPENSITY SCORE REWEIGHTING FOR SELECTION AT BASELINE

To address selection bias in comparisons between managed care and FFS beneficiaries, a propensity score reweighting based on multivariate logistic regression was used to model the conditional probability of being in the managed care sample in the 2002 baseline year, given observed demographic characteristics and other background covariates. The observed covariates included age at time of the survey, gender, race, educational level, population density of county (metropolitan county with greater than 250,000; urban county with greater than 2,500; rural county with less than 2,500; or completely rural), smoking status, dual eligibility for Medicaid and Medicare, use of a proxy in responding to the survey, and state of residence. The propensity score calculated from the model was used to create an adjustment factor to apply to the survey sampling weight associated with observations from the FFS sample, so the weighted means of observed covariates in the FFS group were comparable to those observed in the managed care group (Shen and Zuckerman, 2005).

The propensity adjustment factor was developed by dividing the propensity score for the managed care group into 20 intervals with the same total number of observations, calculating the proportion of the FFS group whose propensity scores were within each of the 20 intervals, and calculating the ratio of the share of the managed care group in each interval to the share of the FFS group in that interval (Barsky et al., 2002; Shen and Zuckerman, 2005). Propensity score reweighting may be more efficient than the propensity score matching alternative in this context, since the former utilizes nearly all observations from the FFS group. One hundred twenty-one FFS observations with propensity scores outside the distribution of the propensity scores for the managed care group received a zero weight and were excluded from the analysis.

The baseline differences in PCS and MCS scores between FFS and managed care beneficiaries in 2002 were compared using SAS® (Version 9.1.3)[4] survey procedures to account for the complex survey design and survey weights. Unadjusted and adjusted comparisons between the two groups at the state level were conducted using (1) standardized survey weights and (2) standardized final weights derived as products of survey weights and propensity score weights, respectively.

Generalized estimating equations (GEEs) and difference-in-difference analyses were used to model correlated data. We compared differences in PCS or MCS scores between 2002 and 2004 matched pairs of FFS beneficiaries to changes in PCS or MCS scores between 2002 and 2004 managed care beneficiaries. Liang and Zeger (1986) and Zeger and Liang (1986) introduced GEEs to account for the correlation between observations in generalized linear regression models. GEEs are used to model the marginal expectation of a set of outcomes as a function of explanatory variables (population averages model). Specifically, individual PCS or MCS scores in 2002 or 2004 were modeled as a function of the intercept; baseline PCS or MCS score in 2002; time period (0 for 2002 and 1 for 2004); a dummy indicator representing managed care or FFS (0 for FFS and 1 for managed care); 50 dummy indicators representing state of residence; two-way interactions between managed care indicator and time period; two-way interactions between dummy indicators representing state and time period; two-way interactions between

[4] SAS® is a registered trademark of the SAS Institute.

state and time; three-way interactions between state, managed care indicator, and time period; and predicted score, representing a linear combination of the effect of demographic and other background variables on PCS or MCS scores. Demographic and other background variables included indicators representing age at the time of the survey, gender, race, Hispanic, educational level, population density of county, smoking status, dual eligibility for Medicaid and Medicare, and use of a proxy in responding to the survey. The propensity score weights were incorporated into the GEE model, and separate models were fitted for PCS and MCS scores. The parameter estimates obtained from the model were used to calculate adjusted mean PCS or MCS scores at the state level, after controlling for all other variables in the model. The correct standard errors associated with the difference-in-difference parameter were calculated using the jackknife replication method (Flores-Cervantes et al., 1999). To correct for the inflation of alpha errors due to multiple comparisons, all of the statistical analyses were conducted with the alpha error set equal to 0.001.

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RESULTS

Table 1 presents the demographic characteristics of the original FFS samples in 2002 and 2004, and the age and propensity score matched FFS samples. The comparison of the original FFS samples indicates significant differences in the distribution of sample enrollees across several demographic and background variables between 2002 and 2004.[5] Members of the FFS sample in 2002 were more likely to be African American, less likely to be Hispanic or other race, less likely to have additional insurance, more likely to be smokers, less likely to have a college education or more than four years of college, less likely to be dual eligible, and more likely to have missing information on a number of demographics and other background characteristics when compared to the FFS sample in 2004. Additionally, the two original groups were significantly different in their distribution of sample enrollees across a number of the states. As a result of the propensity matching, the two matched groups were much more balanced in their distribution of enrollees across observed demographic and other background characteristics. Furthermore, the two matched groups were not significantly different in their distribution of sample enrollees across all 50 states. The results indicate that the propensity and age adjustments were successful in producing a balanced matched set of beneficiaries between 2002 and 2004.

BASELINE COMPARISONS

Table 2 compares the demographic and background characteristics of the beneficiary samples in managed care (n = 45,422) and FFS (n = 35,226) in 2002 for the original (unweighted) and the propensity score reweighted sample. It is clear from the results of the unweighted samples of MA and FFS that there are differences in the distribution of sample enrollees across several observed demographic and background variables. The managed care sample enrollees were more likely to be female (58.8 percent versus 56.0 percent) African American (5.3 percent versus 3.9 percent), a smoker (9.5 percent versus 6.2 percent), and Hispanic (4.1 percent versus 2.6 percent) than the FFS sample enrollees. The managed care sample enrollees were less likely to be between the ages of 65 and 69 (23.7 percent versus 29.4 percent), to have some college or be a college graduate (28.1 percent versus 31.3 percent) or have more than four years of college education (7.6 percent versus 11.1 percent), to have dual eligibility (3.1 percent versus 5.1 percent), and to be proxy respondents (8.6 percent versus 12.5 percent) than the FFS sample enrollees. After the propensity score weights were applied, the reweighted samples were much more balanced and similar in their distribution of sample enrollees on the observed characteristics and their states of residence.

Table 3 presents the results of unadjusted and adjusted PCS comparisons for MA and FFS for the baseline year of 2002, nationally, and for the states. The results at the state level for both PCS and MCS scores should be interpreted with caution among states with small sample sizes (n < 30). These states include Alaska, Arkansas, Delaware, Maine, Mississippi, Puerto Rico, South Carolina, South Dakota, Utah, and Vermont. The unadjusted comparison in PCS scores indicates

[5] Statistical significance is set for all analyses at the $p < 0.001$ level to account for multiple comparisons.

that a significant difference does not exist nationally between FFS and managed care enrollees at alpha equal to 0.001. The unadjusted FFS mean PCS score is 42.17 and the MA mean PCS score is 42.89 (difference = 0.72, $p < 0.01$). All states with significant differences are those with small sample sizes ($n < 30$) with the exception of two states. Indiana's FFS mean PCS score is 42.09 and the MA mean PCS score is 39.01, and Minnesota's FFS mean PCS score is 44.00 and the MA mean PCS score is 41.96.

Nationally, the reweighted adjusted FFS mean PCS score is 42.11, and the MA mean PCS score is 42.89 (difference = 0.78, $p < 0.01$), which is not statistically significant at alpha equal to 0.001. Significant differences existed for states with small sample sizes ($n < 30$), with the exception of Indiana. Indiana's reweighted FFS mean PCS score is 41.62 and the reweighted MA mean PCS score is 39.01.

Table 4 presents the results of the mean MCS scores for the unadjusted and propensity score reweighted adjusted comparisons between FFS and MA. Nationally, there is not a significant difference for unadjusted mean MCS scores between FFS and MA systems of care (FFS mean MCS score = 53.94, MA mean MCS score = 53.51, $p > 0.05$). A number of states with considerable sample size had significantly different unadjusted mean MCS scores, with FFS means significantly higher than MA means.

The reweighted adjusted comparisons between FFS and MA enrollees are not statistically significant at the national level (FFS mean MCS score = 53.85; the MA mean MCS score = 53.51; Table 4). However, several states exhibited statistically significant differences. For states with sufficient sample size, significant differences for the reweighted adjusted comparisons produced the same pattern that was found for the unadjusted comparisons: higher reweighted FFS mean MCS scores, compared to MA.

CHANGE SCORE COMPARISONS

As stated in the Methodology section, we used GEEs and difference-in-difference analyses to compare FFS and MA systems of care between 2002 and 2004 at the national and state level. The comparison was made after adjusting for the differential probability of being in managed care through the propensity score reweighting, the initial baseline PCS or MCS scores, and the differential effects that demographic and other background characteristics may have had on the study outcomes through the incorporation of the observed covariates directly in the GEEs model. Separate models were fitted for PCS and MCS scores. The parameter estimates derived from the model were used to calculate adjusted mean PCS and MCS scores for each state, holding other variables in the model constant at their means. The correct standard errors for the adjusted mean comparisons were obtained through jackknife repeated replication procedures to take into account the complex survey sampling design.

Table 5 presents adjusted mean PCS scores and difference-in-differences estimates of the changes in PCS scores between FFS and managed care enrollees from 2002 and 2004. Nationally, there is no significant difference in the amount of physical health status change

between FFS and managed care. The magnitudes of change in the FFS mean PCS score (2002 mean = 41.56; 2004 mean = 41.14) are similar to those observed in the MA mean PCS score (2002 mean = 41.68; 2004 mean = 40.49; difference-in-difference estimate = 0.76). However, there are a few states that did have significant differences in physical health status change. As stated earlier, the results at the state level for both PCS and MCS scores should be interpreted with caution for states with small sample sizes (n < 30). These states include Alaska, Arkansas, Delaware, Maine, Mississippi, Puerto Rico, South Carolina, South Dakota, Utah, and Vermont. Florida had significantly greater decline in MA (difference = - 1.69) than FFS (difference = - 0.20). However, West Virginia had a more significant decline in FFS (difference = - 4.76) than MA (difference = - 1.86).

Table 6 presents the results of the difference-in-difference analysis for change in MCS scores from 2002 to 2004, using the same methodology as described for the PCS model. Nationally, there are no statistically significant differences between FFS and MA systems of care. Though the decline in mean MCS scores from 2002 to 2004 is greater for MA, this difference is not statistically significant (FFS 2002 mean MCS score = 53.78, 2004 mean = 53.25; MA 2002 mean MCS score = 53.65, 2004 mean MCS score = 52.19; difference-in-difference estimate = 0.92). Only two states with sufficient sample size have significant differences in change. The results for Rhode Island indicate a significantly increased FFS mean MCS score (difference = 1.14), and a decrease in the MA mean MCS score (difference = - 0.55). West Virginia has a greater decline in the FFS mean MCS score (difference = - 3.22), compared to MA (difference = - 1.43).

POWER ANALYSIS

A power analysis was performed to determine the probability of not committing a type II error, that is, correctly rejecting the null hypothesis when the null hypothesis is false. The power can be determined by knowing the significance level, the sample size, and the "effect size" (Cohen, 1988). Given the sample size employed in the study, the significance level of 0.05, and the standard error of the difference-in-difference estimates of 0.54 and 1.05 for PCS and MCS measures, the study has 80 percent power to detect an effect size of at least 0.02, nationally. The observed difference-in-difference estimates between FFS and managed care enrollees would have to be at least 1.52 and 2.95 points nationally for PCS and MCS scores, respectively, for the results to be statistically significant at 0.05 level with 80 percent power. Therefore, the sample size employed in this study is sufficient to detect practical differences between FFS and managed care enrollees, if they exist.

ANALYSIS OF MEDICARE HOS ATTRITION BIAS

As indicated earlier, the PCS and MCS scores from the HOS survey were obtained from the same member over the two-year period, whereas the PCS and MCS scores from the FFS survey were obtained from two cross-sectional surveys conducted in 2002 and 2004. The longitudinal study design for HOS is a more powerful design in detecting changes in health status over time

when compared to the cross-sectional design associated with the FFS survey. However, estimates from the longitudinal study design may be biased in measuring changes in health status if enrollees who dropped out of the remeasurement survey were systematically different from enrollees who responded to the follow-up survey.

The 2002 baseline HOS survey included a random sample of 173,504 beneficiaries, both aged and disabled, from 178 managed care plans. Of the 173,504 enrollees sampled, 97,051 (55.94 percent) completed the baseline survey with sufficient information to calculate both PCS-12 and MCS-12 scores. Of the 97,051 respondents, 90,942 were seniors aged 65 and older. For the 2004 follow-up survey, 45,450 of 90,942 seniors (49.98 percent) completed the follow-up survey with sufficient information to allow for the calculation of PCS-12 and MCS-12 remeasurement scores. Of the 45,492 who did not provide the follow-up responses, 16,662 (36.63 percent) individuals voluntary disenrolled from the managed care plans, 14,545 (31.97 percent) did not respond to the follow-up survey, 7,390 (16.24 percent) individuals involuntary disenrolled because their managed care plans discontinued the services, 6,236 (13.49 percent) individuals deceased during the two-year period, and 759 (1.67 percent) individuals were considered invalid because members were not enrolled in managed care plans, had an incorrect address and phone number, or had a language barrier.

Table 7 presents the results of the analysis examining selective attrition associated with the HOS survey. Respondents were compared to non-respondents at follow-up on a number of baseline demographic characteristics, socioeconomic status (SES), limitations in ADLs, the presence of 13 chronic conditions, and baseline PCS-12 and MCS-12 scores. The results indicate that respondents are not significantly different from non-respondents in their gender distribution. However, respondents are more likely to be younger, more likely to be white, less likely to be African American, more likely to be a college graduate or have more than a 4 year college degree, more likely to be married, less likely to be divorced, separated, or widowed, more likely to have a higher level of household income, less likely to be Medicaid eligible, more likely to be a self-respondent, more likely to be a non-smoker, and less likely to be institutionalized than those who are non-respondents to the follow-up survey.

Additionally, respondents are less likely to be limited in their baseline ADLs and are less likely to report having chronic conditions, when compared to those who dropped out of the follow-up survey. A significantly higher percentage of non-respondents at follow-up report having difficulty or unable to perform ADLs, i.e. bathing, dressing, eating, getting in or out of chairs, walking, or using the toilet, than do the respondents. A higher percentage of non-respondents also report having one of the 13 chronic conditions; hypertension, angina or coronary artery disease, congestive heart failure, myocardial infarction, other heart conditions, stroke, chronic obstructive pulmonary disease (COPD), inflammatory bowel disease, arthritis of hip or knee, arthritis of hand or wrist, sciatica, diabetes, and any type of cancer. Finally, baseline respondents have significantly higher baseline PCS-12 and MCS-12 scores when compared to follow-up non-respondents. The results indicated that baseline respondents to the longitudinal follow-up survey are healthier than those who dropped out of the survey. These findings may bias the comparison in health status measures between managed care and FFS beneficiaries, due to non-response at follow up.

4

DISCUSSION

The current study examined physical and mental health status differences over time for beneficiaries in FFS and managed care, nationally, and for individual states. These results indicate that at the national level, no significant differences for *change* in physical health status were found for beneficiaries in FFS and managed care from 2002 to 2004. Our results are consistent with those reported by Riley (2000) who did not find significant differences for two-year change in physical health status between FFS and health maintenance organization beneficiaries. Riley's study examined health status using the MCBS, and indicates that a more refined estimate of health status may reveal differences between FFS and managed care. However health status as measured by a 12-item health survey, did not reveal significant differences in the amount of physical health status change at the aggregate level.

A strength of the current study is the analysis of differences in amounts of change for mental health status between FFS and MA beneficiaries. The research literature has primarily focused on physical health status in comparing differences between FFS and managed care, and generally has not considered mental health status (for an exception, see Ware et al., 1996). There was not a significant *change* in mental health status at the national level between beneficiaries in FFS and managed care from 2002 to 2004. Though significant change was not found for most states in mental health status over time, an interesting pattern emerged in which mean MCS scores were higher for FFS than for managed care. This pattern is clear in the unadjusted comparisons for mean MCS scores and in the propensity score reweighted adjusted comparison. Although the modeling process eliminated most of the differences in mental health status change, the pattern is interesting and was not expected.

Another strength of the analyses reported here is the rigor employed in the assessment of health status change between systems of care. Matching was used to create equivalence for the FFS sample by comparing different beneficiaries from two different baseline years. Because the FFS sample had a sampling weight associated with it, sampling weights for the MA sample had to be created. This ensured comparability in making population comparisons. The propensity score reweighting and the use of GEEs and the difference-in-difference analyses to address the effect of time, as well as testing numerous possible interactions, and using jackknife replications to estimate correct standard errors, all contribute to the rigor of these analyses.

The results in this report should be interpreted with caution, however. The analysis of attrition in the Medicare HOS indicates that non-respondents to the 2004 HOS are systematically different than respondents. The exclusion of the voluntarily disenrolled may bias the findings in the current report. For example, several research studies have found that compared to healthy beneficiaries, less healthy beneficiaries are more likely to disenroll from managed care. A recent study concludes that high-risk and high-cost Medicare managed care patients with diabetic complications disenroll from their plans more quickly than low-risk low-cost beneficiaries. However, the authors note that this effect is mitigated by health plans that offer better

prescription drug benefits (Atherly et al., 2005). Other research has found that beneficiaries who disenroll from managed care typically do so in order to obtain needed health services (Morgan et al., 1997). Approximately 37 percent of the beneficiaries who did not provide follow-up responses to the Medicare 2004 HOS were individuals who voluntary disenrolled from managed care plans. This percentage represents over one third of the non-respondents. Research that examines the health status and demographics of all voluntarily disenrolled beneficiaries by plan during the course of the Medicare HOS may provide insightful results. We address limitations in the final section of this report.

5

LIMITATIONS

There are several limitations to the findings presented in this report. As stated previously, the exclusion of non-respondents to the HOS presents a limitation to the results of the analyses. Additionally, because we did not examine differences in health status change for population sub-groups such as those in poor health, beneficiaries with disabilities, and those who are socioeconomically disadvantaged, it is possible that differences may exist. Since the results in the current report are aggregated at the national and state level, it is possible that individual plans may vary in performance.

Another limitation involves the assumption of beneficiary choice. An important ideal of the managed care program is that beneficiaries will, in fact, analyze their choices for health coverage. However, 86 percent of beneficiaries indicated that they did not give serious thought to choice of health coverage (Mathematica, 2001).

A third limitation involves the measurement of health status. Health status operationalized here does not include the deceased. Trisolini et al. indicate that, "There is no standard convention for scoring death for either the MCS or PCS…Diehr et al. (1995) have shown that this approach underestimates changes in health status and can significantly bias comparisons of the performance of different health care plans or providers" (2002, p. 1-3,4). In the current analysis, the deceased were not included in the modeling, nor were any data imputed for death. The pattern of results seen in this report should be validated against health status models that include the deceased in the modeling and comparison process.

A final limitation of the analyses reported here involves differences in the survey research design between FFS and HOS. The HOS research design, in which the same beneficiaries are assessed at two different time points (longitudinal design) is not equivalent to comparing different beneficiaries at two different time points (FFS research design). To more adequately compare health status change in the FFS and HOS populations, one possible avenue for further exploration is to model or posit a pattern of attrition in the FFS population. For example, one could assume that attrition within FFS would mirror that within HOS to create retention weights for the FFS cases that were proportionate to the probability of retention predicted from a logistic regression of HOS retention. These weights would be a function of baseline FFS characteristics and would be multiplied by other weights already employed. To accomplish this without such an assumption, it would be necessary to analyze the FFS population over time, so as to measure patterns of attrition. Once these analyses were completed, it would then be possible to apply a model to a FFS baseline year and simulate the attrition of beneficiaries using baseline years.

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APPENDIX

Table 1
Characteristics of Medicare Fee-For-Service Samples in 2002 and 2004

	Original Samples of FFS Medicare Samples[1]						Age and Propensity Score Matched FFS Medicare Samples [2,3]					
Characteristics[4]	Number of Enrollees, 2002	Percentage	Number of Enrollees, 2004	Percentage	*p* Value[5]		Number of Enrollees, 2002	Percentage	Number of Enrollees, 2004	Percentage	*p* Value	
Gender												
Female	34,519	56.64%	30,647	56.73%	0.7696	NS	19,733	56.02%	19,784	56.16%	0.3547	NS
Race												
Black	4,503	7.39%	3,259	6.03%	0.0000	***	1,379	3.91%	1,350	3.83%	0.3995	NS
Other	1,971	3.23%	1,901	3.52%	0.0076	NS	803	2.28%	846	2.40%	0.1377	NS
Additional Insurance												
Yes	46,709	76.64%	45,037	83.36%	0.0000	***	31,291	88.83%	31,214	88.61%	0.1491	NS
Missing	4,986	8.18%	54	0.10%	0.0000	***	39	0.11%	39	0.11%	1	NS
County Characteristics												
Metro	51,508	84.52%	45,468	84.16%	0.0958	NS	30,743	87.27%	30,736	87.25%	0.891	NS
Urban	8,432	13.84%	7,546	13.97%	0.5195	NS	4,139	11.75%	4,154	11.79%	0.7604	NS
Missing	22	0.04%	121	0.22%	0.0000	***	2	0.01%	2	0.01%	1	NS
Smoking Status												
Smoker	5,398	8.86%	4,278	7.92%	0.0000	***	2,170	6.16%	2,184	6.20%	0.6982	NS
Missing	1,415	2.32%	801	1.48%	0.0000	***	176	0.50%	170	0.48%	0.6617	NS
Education												
Some College/College	17,836	29.27%	16,453	30.45%	0.0000	***	11,014	31.27%	11,054	31.38%	0.4395	NS
> 4-Year College	6,646	10.90%	6,195	11.47%	0.0026	NS	3,893	11.05%	3,778	10.73%	0.0035	NS
Missing	1,308	2.15%	1,017	1.88%	0.0015	NS	379	1.08%	356	1.01%	0.283	NS
Medicaid Dual Eligible												
Yes	4,327	7.10%	4,067	7.53%	0.0054	NS	1,792	5.09%	1,843	5.23%	0.2097	NS
Hispanic												
Yes	2,222	3.65%	2,203	4.08%	0.0001	***	923	2.62%	937	2.66%	0.6266	NS
Proxy-Respondents												
Yes	9,384	15.40%	8,417	15.58%	0.3952	NS	4,404	12.50%	4,532	12.87%	0.0214	NS
Missing	2,144	3.52%	1,240	2.30%	0.0000	***	223	0.63%	215	0.61%	0.5809	NS
State of Residence												
Alabama	800	1.31%	674	1.25%	0.3272	NS	431	1.22%	419	1.19%	0.4619	NS
Alaska	3	0.00%	3	0.01%	0.8826	NS	2	0.01%	1	0.00%	0.5637	NS
Arizona	1,076	1.77%	912	1.69%	0.3145	NS	590	1.67%	568	1.61%	0.2259	NS
Arkansas	199	0.33%	183	0.34%	0.7199	NS	88	0.25%	82	0.23%	0.4669	NS
California	4,340	7.12%	3,460	6.40%	0.0000	***	2,535	7.20%	2,501	7.10%	0.1864	NS
Colorado	958	1.57%	811	1.50%	0.3303	NS	492	1.40%	497	1.41%	0.7639	NS
Connecticut	971	1.59%	896	1.66%	0.3827	NS	548	1.56%	558	1.58%	0.5115	NS
Delaware	1,000	1.64%	880	1.63%	0.8727	NS	571	1.62%	574	1.63%	0.858	NS
District of Columbia	558	0.92%	484	0.90%	0.7246	NS	267	0.76%	245	0.70%	0.1029	NS
Florida	5,049	8.28%	4,080	7.55%	0.0000	***	3,163	8.98%	3,134	8.90%	0.2004	NS

Table 1, continued
Characteristics of Medicare Fee-For-Service Samples in 2002 and 2004

	Original Samples of FFS Medicare Samples[1]						Age and Propensity Score Matched FFS Medicare Samples [2,3]					
State of Residence	Number of Enrollees, 2002	Percentage	Number of Enrollees, 2004	Percentage	*p* Value[5]		Number of Enrollees, 2002	Percentage	Number of Enrollees, 2004	Percentage	*p* Value	
Georgia	1,100	1.80%	965	1.79%	0.8110	NS	617	1.75%	630	1.79%	0.4364	NS
Hawaii	705	1.16%	600	1.11%	0.4602	NS	303	0.86%	313	0.89%	0.5398	NS
Idaho	452	0.74%	685	1.27%	0.0000	***	183	0.52%	185	0.53%	0.6698	NS
Illinois	2,176	3.57%	1,925	3.56%	0.9462	NS	1,309	3.72%	1,305	3.70%	0.847	NS
Indiana	1,362	2.23%	1,167	2.16%	0.3883	NS	764	2.17%	786	2.23%	0.2188	NS
Iowa	894	1.47%	906	1.68%	0.0042	NS	431	1.22%	419	1.19%	0.2526	NS
Kansas	352	0.58%	586	1.08%	0.0000	***	178	0.51%	175	0.50%	0.3173	NS
Kentucky	485	0.80%	651	1.20%	0.0000	***	251	0.71%	254	0.72%	0.6473	NS
Louisiana	886	1.45%	777	1.44%	0.8250	NS	467	1.33%	479	1.36%	0.5037	NS
Maine	240	0.39%	203	0.38%	0.6218	NS	112	0.32%	105	0.30%	0.4986	NS
Maryland	1,295	2.12%	1,177	2.18%	0.5312	NS	757	2.15%	775	2.20%	0.393	NS
Massachusetts	1,908	3.13%	1,734	3.21%	0.4463	NS	1,187	3.37%	1,202	3.41%	0.4083	NS
Michigan	1,834	3.01%	1,655	3.06%	0.5941	NS	1,178	3.34%	1,165	3.31%	0.4902	NS
Minnesota	1,348	2.21%	1,235	2.29%	0.3977	NS	751	2.13%	774	2.20%	0.1639	NS
Mississippi	127	0.21%	136	0.25%	0.1247	NS	48	0.14%	45	0.13%	0.6547	NS
Missouri	1,299	2.13%	1,136	2.10%	0.7352	NS	827	2.35%	827	2.35%	1.0000	NS
Nebrasksa	539	0.88%	487	0.90%	0.7597	NS	281	0.80%	291	0.83%	0.3912	NS
Nevada	629	1.03%	514	0.95%	0.1686	NS	321	0.91%	315	0.89%	0.665	NS
New Hampshire	667	1.09%	568	1.05%	0.4792	NS	376	1.07%	388	1.10%	0.4461	NS
New Jersey	2,668	4.38%	2,385	4.41%	0.7616	NS	1,688	4.79%	1,697	4.82%	0.6507	NS
New Mexico	569	0.93%	622	1.15%	0.0003	***	268	0.76%	272	0.77%	0.7257	NS
New York	3,845	6.31%	3,226	5.97%	0.0173	NS	2,354	6.68%	2,370	6.73%	0.5129	NS
North Carolina	1,479	2.43%	1,258	2.33%	0.2751	NS	841	2.39%	851	2.42%	0.6135	NS
North Dakota	590	0.97%	699	1.29%	0.0000	***	209	0.59%	211	0.60%	0.6949	NS
Ohio	3,068	5.03%	2,520	4.66%	0.0036	NS	1,890	5.37%	1,882	5.34%	0.6884	NS
Oklahoma	711	1.17%	617	1.14%	0.6968	NS	378	1.07%	386	1.10%	0.6251	NS
Oregon	885	1.45%	785	1.45%	0.9904	NS	509	1.44%	505	1.43%	0.8252	NS
Pennsylvania	3,575	5.87%	2,950	5.46%	0.0030	NS	2,222	6.31%	2,251	6.39%	0.2039	NS
Puerto Rico	22	0.04%	13	0.02%	0.2430	NS	2	0.01%	2	0.01%	1.0000	NS
Rhode Island	327	0.54%	418	0.77%	0.0000	***	143	0.41%	137	0.39%	0.2207	NS
South Carolina	287	0.47%	252	0.47%	0.9116	NS	179	0.51%	172	0.49%	0.5498	NS
South Dakota	401	0.66%	354	0.66%	0.9542	NS	205	0.58%	194	0.55%	0.3008	NS
Tennessee	1,545	2.54%	1,351	2.50%	0.7097	NS	898	2.55%	888	2.52%	0.6188	NS
Texas	3,082	5.06%	2,670	4.94%	0.3718	NS	1,874	5.32%	1,868	5.30%	0.8111	NS
Utah	281	0.46%	265	0.49%	0.4689	NS	141	0.40%	131	0.37%	0.2513	NS
Vermont	20	0.03%	19	0.04%	0.8289	NS	5	0.01%	4	0.01%	0.7055	NS
Virgin Islands		0.00%	108	0.20%	0.0000	***		0.00%		0.00%	0.7055	NS
Virginia	569	0.93%	601	1.11%	0.0026	NS	292	0.83%	291	0.83%	0.9372	NS
Washington	1,511	2.48%	1,272	2.35%	0.1690	NS	817	2.32%	829	2.35%	0.536	NS
West Virginia	380	0.62%	494	0.91%	0.0000	***	176	0.50%	179	0.51%	0.5775	NS
Wisconsin	1,878	3.08%	1,658	3.07%	0.9015	NS	1,107	3.14%	1,094	3.11%	0.4865	NS

[1] 2002, n=60,945; 2004, n=54,027

[2] 2002, n=35,226; 2004, n=35,226

[3] Matched samples were created based on an exact match of age of 2004 enrollees that would have been observed in 2002 and propensity score predicting probability of being in the 2002 cohort.

[4] Reference levels are male, White, without additional insurance, rural county, non-smoker, high school or less, non-Medicaid dual eligible, non-Hispanic, and self-respondent.

[5] *** p <0.001, NS=Not statistically significant at 0.001 level accounting for multiple comparisons

Table 2
Characteristics of Medicare Managed Care and Medicare Fee-For-Service Samples in 2002

	Unweighted Samples of Managed Care and FFS Medicare				Propensity Score Weighted FFS Sample	
	Managed Care (n=45,422)		FFS (n=35,226)		FFS (n=35,105)	
Characteristics[1]	Mean[2]	Standard Error[2]	Mean[2]	Standard Error[2]	Mean[2]	Standard Error[2]
Age Group						
65-69	0.237	0.002	0.294	0.002	0.246	0.002
70-74	0.314	0.002	0.288	0.002	0.321	0.002
75-79	0.239	0.002	0.234	0.002	0.237	0.002
80-84	0.141	0.002	0.129	0.002	0.138	0.002
85-89	0.054	0.001	0.046	0.001	0.046	0.001
90-94	0.013	0.001	0.008	0.000	0.010	0.001
Gender						
Female	0.588	0.002	0.560	0.003	0.590	0.003
Race						
Black	0.053	0.001	0.039	0.001	0.056	0.001
Other	0.076	0.001	0.023	0.001	0.060	0.001
County Characteristics						
Metro	0.893	0.001	0.873	0.002	0.885	0.002
Urban	0.093	0.001	0.117	0.002	0.101	0.002
Missing	0.000	0.000	0.000	0.000	0.000	0.000
Smoking Status						
Smoker	0.095	0.001	0.062	0.001	0.100	0.002
Missing	0.045	0.001	0.005	0.000	0.048	0.001
Education						
Some College/College	0.281	0.002	0.313	0.002	0.289	0.002
> 4-Year College	0.076	0.001	0.111	0.002	0.075	0.001
Missing	0.013	0.001	0.011	0.001	0.007	0.000
Medicaid Dual Eligible						
Yes	0.031	0.001	0.051	0.001	0.031	0.001
Hispanic						
Yes	0.041	0.001	0.026	0.001	0.034	0.001
Proxy-Respondents						
Yes	0.086	0.001	0.125	0.002	0.080	0.001
Missing	0.060	0.001	0.006	0.000	0.066	0.001
State of Residence						
Alabama	0.015	0.001	0.012	0.001	0.013	0.001
Alaska	0.000	0.000	0.000	0.000	0.000	0.000
Arizona	0.033	0.001	0.017	0.001	0.031	0.001
Arkansas	0.000	0.000	0.002	0.000	0.001	0.000
California	0.085	0.001	0.072	0.001	0.070	0.001
Colorado	0.029	0.001	0.014	0.001	0.028	0.001
Connecticut	0.011	0.000	0.016	0.001	0.012	0.001
Delaware	0.000	0.000	0.016	0.001	0.004	0.000
District of Columbia	0.001	0.000	0.008	0.000	0.002	0.000
Florida	0.062	0.001	0.090	0.002	0.063	0.001
Georgia	0.007	0.000	0.018	0.001	0.008	0.000

Table 2, continued
Characteristics of Medicare Managed Care and Medicare Fee-For-Service Samples in 2002

	Unweighted Samples of Managed Care and FFS Medicare				Propensity Score Weighted FFS Sample	
	Managed Care (n=45,422)		FFS (n=35,226)		FFS (n=35,105)	
	Mean[2]	Standard Error[2]	Mean[2]	Standard Error[2]	Mean[2]	Standard Error[2]
State of Residence						
Hawaii	0.018	0.001	0.009	0.000	0.020	0.001
Idaho	0.015	0.001	0.005	0.000	0.016	0.001
Illinois	0.027	0.001	0.037	0.001	0.028	0.001
Indiana	0.023	0.001	0.022	0.001	0.024	0.001
Iowa	0.013	0.001	0.012	0.001	0.015	0.001
Kansas	0.003	0.000	0.005	0.000	0.003	0.000
Kentucky	0.007	0.000	0.007	0.000	0.008	0.000
Louisiana	0.013	0.001	0.013	0.001	0.013	0.001
Maine	0.000	0.000	0.003	0.000	0.000	0.000
Maryland	0.007	0.000	0.021	0.001	0.007	0.000
Massachusetts	0.026	0.001	0.034	0.001	0.026	0.001
Michigan	0.017	0.001	0.033	0.001	0.019	0.001
Minnesota	0.044	0.001	0.021	0.001	0.042	0.001
Mississippi	0.000	0.000	0.001	0.000	0.000	0.000
Missouri	0.026	0.001	0.023	0.001	0.025	0.001
Nebraska	0.007	0.000	0.008	0.000	0.006	0.000
Nevada	0.021	0.001	0.009	0.001	0.020	0.001
New Hampshire	0.008	0.000	0.011	0.001	0.008	0.000
New Jersey	0.017	0.001	0.048	0.001	0.016	0.001
New Mexico	0.015	0.001	0.008	0.000	0.013	0.001
New York	0.077	0.001	0.067	0.001	0.077	0.001
North Carolina	0.016	0.001	0.024	0.001	0.017	0.001
North Dakota	0.006	0.000	0.006	0.000	0.006	0.000
Ohio	0.081	0.001	0.054	0.001	0.082	0.001
Oklahoma	0.013	0.001	0.011	0.001	0.014	0.001
Oregon	0.052	0.001	0.014	0.001	0.052	0.001
Pennsylvania	0.062	0.001	0.063	0.001	0.064	0.001
Puerto Rico	0.000	0.000	0.000	0.000	0.000	0.000
Rhode Island	0.014	0.001	0.004	0.000	0.017	0.001
South Carolina	0.000	0.000	0.005	0.000	0.001	0.000
South Dakota	0.000	0.000	0.006	0.000	0.001	0.000
Tennessee	0.025	0.001	0.025	0.001	0.026	0.001
Texas	0.022	0.001	0.053	0.001	0.021	0.001
Utah	0.000	0.000	0.004	0.000	0.001	0.000
Vermont	0.000	0.000	0.000	0.000	0.000	0.000
Virgin Islands	0.000	0.000	0.000	0.000	0.000	0.000
Virginia	0.004	0.000	0.008	0.000	0.004	0.000
Washington	0.025	0.001	0.023	0.001	0.025	0.001
West Virginia	0.008	0.000	0.005	0.000	0.008	0.000
Wisconsin	0.042	0.001	0.031	0.001	0.042	0.001

[1] Reference levels are: over 95 years of age, male, White, rural county, non-smoker, high school or less, non-Medicaid dual eligible, non-Hispanic, and self-respondent.

[2] Numbers reported as 0.000 are less than 0.0005.

Table 3
Comparison of Baseline Mean PCS Scores between Medicare Fee-For-Service and Medicare Managed Care Beneficiaries in 2002

	Unadjusted Comparison								Propensity Score Reweighted Adjusted Comparison							
	FFS			Managed Care					FFS			Managed Care				
State of Residence	N	Mean	SE[1]	N	Mean	SE	Diff[2]	*p* Value[3]	N	Mean	SE	N	Mean	SE	Diff	*p* Value
Alabama	431	39.89	0.62	663	38.42	0.55	1.47	NS	431	39.94	1.13	663	38.42	0.55	1.52	NS
Alaska~	2	50.16	0.71	1	47.38		2.79	***	2	50.16	0.71	1	47.38		2.79	***
Arizona	590	42.35	0.52	1,505	42.52	0.35	-0.17	NS	590	42.15	0.63	1,505	42.52	0.35	-0.37	NS
Arkansas~	88	38.51	1.43	3	48.91	0.41	-10.40	***	88	38.72	1.40	3	48.91	0.41	-10.19	***
California	2,535	41.36	0.31	3,858	42.10	0.31	-0.74	NS	2,535	41.30	0.45	3,858	42.10	0.31	-0.79	NS
Colorado	492	42.82	0.56	1,335	42.31	0.35	0.51	NS	492	42.77	0.59	1,335	42.31	0.35	0.47	NS
Connecticut	548	44.47	0.52	520	45.67	0.56	-1.19	NS	548	44.51	1.22	520	45.67	0.56	-1.16	NS
Delaware~	571	43.09	0.51	6	40.85	5.35	2.23	NS	543	43.24	0.53	6	40.85	5.35	2.39	NS
District of Columbia	267	44.11	0.73	44	41.92	1.65	2.19	NS	267	44.61	0.77	44	41.92	1.65	2.69	NS
Florida	3,163	42.08	0.23	2,831	42.61	0.35	-0.52	NS	3,163	41.38	0.39	2,831	42.61	0.35	-1.23	NS
Georgia	617	41.02	0.51	337	43.23	0.63	-2.21	NS	617	41.69	1.60	337	43.23	0.63	-1.54	NS
Hawaii	303	44.28	0.79	822	42.69	0.37	1.59	NS	302	44.84	0.93	822	42.69	0.37	2.14	NS
Idaho	183	41.63	0.93	680	40.13	0.49	1.50	NS	183	42.38	1.00	680	40.13	0.49	2.25	NS
Illinois	1,309	42.69	0.43	1,215	41.38	0.52	1.32	NS	1,308	41.56	0.99	1,215	41.38	0.52	0.19	NS
Indiana	764	42.09	0.45	1,055	39.01	0.36	3.09	***	764	41.62	0.68	1,055	39.01	0.36	2.61	***
Iowa	431	41.91	0.59	609	40.96	0.47	0.95	NS	431	41.95	0.75	609	40.96	0.47	0.99	NS
Kansas	178	41.89	0.95	146	42.04	0.90	-0.15	NS	178	42.14	1.21	146	42.04	0.90	0.10	NS
Kentucky	251	41.14	0.81	329	41.69	0.64	-0.55	NS	251	39.75	1.34	329	41.69	0.64	-1.93	NS
Louisiana	467	40.19	0.62	583	40.38	0.49	-0.19	NS	466	41.12	1.17	583	40.38	0.49	0.74	NS
Maine~	112	40.08	1.18	1	43.62		-3.54	NS	69	38.09	1.49	1	43.62	0.00	-5.53	***
Maryland	757	43.43	0.44	315	41.27	0.79	2.16	NS	757	44.35	0.91	315	41.27	0.79	3.08	NS
Massachusetts	1,187	43.44	0.41	1,179	43.73	0.35	-0.29	NS	1,187	43.66	0.50	1,179	43.73	0.35	-0.08	NS
Michigan	1,178	41.02	0.40	754	41.77	0.52	-0.75	NS	1,178	39.44	1.07	754	41.77	0.52	-2.33	NS
Minnesota	751	44.00	0.45	2,012	41.96	0.27	2.04	***	751	43.63	0.59	2,012	41.96	0.27	1.68	NS
Mississippi~	48	40.33	1.86	1	32.28		8.05	***	48	40.33	1.86	1	32.28		8.05	***
Missouri	827	41.75	0.45	1,197	42.58	0.38	-0.83	NS	827	41.69	0.58	1,197	42.58	0.38	-0.89	NS
Nebraska	281	41.43	0.79	297	42.67	0.65	-1.24	NS	281	41.02	0.87	297	42.67	0.65	-1.65	NS
Nevada	321	41.77	0.76	954	42.68	0.44	-0.91	NS	321	41.76	1.05	954	42.68	0.44	-0.92	NS
New Hampshire	376	44.17	0.63	346	44.24	0.60	-0.07	NS	376	43.82	1.23	346	44.24	0.60	-0.42	NS

Table 3, continued
Comparison of Baseline Mean PCS Scores between Medicare Fee-For-Service and Medicare Managed Care Beneficiaries in 2002

	Unadjusted Comparison								Propensity Score Reweighted Adjusted Comparison							
	FFS			Managed Care					FFS			Managed Care				
State of Residence	N	Mean	SE[1]	N	Mean	SE	Diff[2]	*p* Value[3]	N	Mean	SE	N	Mean	SE	Diff	*p* Value
New Jersey	1,688	43.08	0.32	771	44.65	0.59	-1.57	NS	1,688	43.22	0.68	771	44.65	0.59	-1.43	NS
New Mexico	268	43.47	0.72	669	41.61	0.44	1.86	NS	268	42.53	1.33	669	41.61	0.44	0.92	NS
New York	2,354	42.14	0.28	3,509	42.62	0.23	-0.48	NS	2,353	41.94	0.45	3,509	42.62	0.23	-0.68	NS
North Carolina	841	40.58	0.47	722	42.08	0.48	-1.50	NS	841	41.01	0.82	722	42.08	0.48	-1.07	NS
North Dakota	209	42.34	1.47	264	44.01	1.08	-1.67	NS	209	43.37	1.41	264	44.01	1.08	-0.64	NS
Ohio	1,890	41.36	0.29	3,664	41.84	0.25	-0.48	NS	1,890	41.43	0.38	3,664	41.84	0.25	-0.41	NS
Oklahoma	378	40.33	0.65	582	40.80	0.48	-0.46	NS	378	40.78	0.86	582	40.80	0.48	-0.02	NS
Oregon	509	41.17	0.57	2,370	41.33	0.26	-0.16	NS	509	41.41	0.70	2,370	41.33	0.26	0.08	NS
Pennsylvania	2,222	42.54	0.26	2,834	43.64	0.29	-1.10	NS	2,222	42.91	0.39	2,834	43.64	0.29	-0.73	NS
Puerto Rico~	2	49.71	5.30	1	56.58		-6.87	NS	2	49.71	5.30	1	56.58		-6.87	NS
Rhode Island	143	43.71	1.01	648	42.55	0.47	1.16	NS	143	44.08	1.12	648	42.55	0.47	1.53	NS
South Carolina~	179	40.44	0.93	2	51.72	1.97	-11.29	***	175	40.58	0.94	2	51.72	1.97	-11.14	***
South Dakota~	205	42.37	0.98	2	54.41	0.82	-12.03	***	201	42.31	0.98	2	54.41	0.82	-12.10	***
Tennessee	898	40.04	0.44	1,151	41.28	0.34	-1.25	NS	898	40.55	0.56	1,151	41.28	0.34	-0.74	NS
Texas	1,874	40.93	0.33	1,003	41.00	0.45	-0.08	NS	1,874	41.27	0.67	1,003	41.00	0.45	0.27	NS
Utah~	141	42.71	0.99	1	49.97		-7.26	***	104	42.29	1.17	1	49.97	0.00	-7.69	***
Vermont~	5	33.19	5.26	1	34.56	0.00	-1.37	NS	5	33.19	5.26	1	34.56		-1.37	NS
Virginia	292	43.80	0.72	183	42.97	0.86	0.83	NS	292	41.72	1.73	183	42.97	0.86	-1.25	NS
Washington	817	41.56	0.47	1,157	42.37	0.38	-0.80	NS	816	41.60	0.59	1,157	42.37	0.38	-0.77	NS
West Virginia	176	43.48	0.89	376	40.99	0.58	2.49	NS	176	43.45	0.95	376	40.99	0.58	2.46	NS
Wisconsin	1,107	42.30	0.36	1,914	42.34	0.27	-0.05	NS	1,107	42.50	0.42	1,914	42.34	0.27	0.16	NS
National	35,226	42.17	0.18	45,422	42.89	0.14	-0.72	NS	35,105	42.11	0.20	45,422	42.89	0.14	-0.78	NS

[1] S tandard error

[2] Difference between Fee-For-Service and managed care

~ n < 30

[3] *** p <0.001, NS=Not statistically significant at 0.001 level accounting for multiple comparisons

Table 4
Comparison of Baseline Mean MCS Scores between Medicare Fee-For-Service and Medicare Managed Care Beneficiaries in 2002

	Unadjusted Comparison								Propensity Score Reweighted Adjusted Comparison							
	FFS			Managed Care					FFS			Managed Care				
State of Residence	N	Mean	SE[1]	N	Mean	SE	Diff[2]	*p* Value[3]	N	Mean	SE	N	Mean	SE	Diff	*p* Value[3]
Alabama	431	53.80	0.46	663	50.96	0.46	2.84	***	431	53.73	0.61	663	50.96	0.46	2.77	***
Alaska~	2	49.45	2.81	1	44.45		4.99	NS	2	49.45	2.81	1	44.45	0.00	4.99	NS
Arizona	590	54.78	0.32	1,505	53.36	0.27	1.43	***	590	54.70	0.50	1,505	53.36	0.27	1.34	NS
Arkansas~	88	54.99	0.84	3	57.62	1.37	-2.63	NS	88	55.16	0.83	3	57.62	1.37	-2.46	NS
California	2,535	54.08	0.22	3,858	52.92	0.25	1.16	***	2,535	54.72	0.26	3,858	52.92	0.25	1.80	***
Colorado	492	54.63	0.36	1,335	53.10	0.28	1.53	***	492	54.72	0.41	1,335	53.10	0.28	1.61	NS
Connecticut	548	54.12	0.34	520	53.49	0.46	0.63	NS	548	54.25	0.47	520	53.49	0.46	0.76	NS
Delaware~	571	54.60	0.35	6	50.67	4.32	3.93	NS	543	54.55	0.36	6	50.67	4.32	3.88	NS
District of Columbia	267	53.27	0.53	44	54.40	1.27	-1.13	NS	267	53.48	0.52	44	54.40	1.27	-0.91	NS
Florida	3,163	54.29	0.15	2,831	52.70	0.30	1.59	***	3,163	54.25	0.26	2,831	52.70	0.30	1.55	***
Georgia	617	53.28	0.36	337	53.63	0.44	-0.35	NS	617	53.68	0.86	337	53.63	0.44	0.05	NS
Hawaii	303	52.63	0.64	822	52.88	0.31	-0.26	NS	302	52.64	0.88	822	52.88	0.31	-0.24	NS
Idaho	183	55.77	0.52	680	52.95	0.33	2.82	***	183	56.04	0.54	680	52.95	0.33	3.09	***
Illinois	1,309	54.42	0.32	1,215	52.61	0.44	1.80	***	1,308	54.87	0.37	1,215	52.61	0.44	2.26	***
Indiana	764	54.22	0.31	1,055	51.53	0.30	2.69	***	764	54.29	0.49	1,055	51.53	0.30	2.76	***
Iowa	431	55.61	0.35	609	53.45	0.35	2.16	***	431	55.16	0.88	609	53.45	0.35	1.71	NS
Kansas	178	55.12	0.61	146	52.40	0.97	2.72	NS	178	55.30	0.65	146	52.40	0.97	2.90	NS
Kentucky	251	54.64	0.51	329	51.79	0.49	2.85	***	251	52.60	1.73	329	51.79	0.49	0.81	NS
Louisiana	467	53.31	0.42	583	51.95	0.41	1.35	NS	466	52.48	0.59	583	51.95	0.41	0.53	NS
Maine~	112	54.77	0.69	1	56.49	0.00	-1.73	NS	69	54.06	0.92	1	56.49		-2.43	NS
Maryland	757	54.29	0.29	315	51.63	0.62	2.66	***	757	54.50	0.39	315	51.63	0.62	2.88	***
Massachusetts	1,187	53.66	0.32	1,179	53.46	0.27	0.20	NS	1,187	53.33	0.52	1,179	53.46	0.27	-0.14	NS
Michigan	1,178	53.70	0.27	754	52.32	0.43	1.39	NS	1,178	52.94	0.68	754	52.32	0.43	0.62	NS
Minnesota	751	55.45	0.28	2,012	53.74	0.20	1.72	***	751	55.62	0.29	2,012	53.74	0.20	1.88	***
Mississippi~	48	52.30	1.32	1	66.45		-14.16	***	48	52.30	1.32	1	66.45		-14.16	***
Missouri	827	54.69	0.30	1,197	53.45	0.29	1.24	NS	827	54.34	0.48	1,197	53.45	0.29	0.89	NS
Nebraska	281	55.79	0.48	297	53.06	0.51	2.73	***	281	55.28	0.79	297	53.06	0.51	2.22	NS
Nevada	321	54.54	0.50	954	52.53	0.36	2.01	NS	321	54.53	0.89	954	52.53	0.36	2.00	NS
New Hampshire	376	55.14	0.41	346	53.14	0.46	1.99	NS	376	54.02	0.82	346	53.14	0.46	0.88	NS

Table 4, continued
Comparison of Baseline Mean MCS Scores between Medicare Fee-For-Service and Medicare Managed Care Beneficiaries in 2002

	Unadjusted Comparison								Propensity Score Reweighted Adjusted Comparison							
	FFS			Managed Care					FFS			Managed Care				
State of Residence	N	Mean	SE[1]	N	Mean	SE	Diff[2]	*p* Value[3]	N	Mean	SE	N	Mean	SE	Diff	*p* Value[3]
New Jersey	1,688	53.31	0.23	771	52.97	0.50	0.34	NS	1,688	52.61	0.67	771	52.97	0.50	-0.36	NS
New Mexico	268	53.48	0.60	669	52.09	0.36	1.39	NS	268	53.44	0.75	669	52.09	0.36	1.35	NS
New York	2,354	53.33	0.22	3,509	52.91	0.19	0.42	NS	2,353	53.17	0.36	3,509	52.91	0.19	0.26	NS
North Carolina	841	53.88	0.31	722	52.91	0.37	0.97	NS	841	53.87	0.34	722	52.91	0.37	0.96	NS
North Dakota	209	55.68	0.73	264	52.43	0.57	3.25	***	209	55.53	0.79	264	52.43	0.57	3.10	NS
Ohio	1,890	53.93	0.20	3,664	52.27	0.19	1.66	***	1,890	53.47	0.36	3,664	52.27	0.19	1.20	NS
Oklahoma	378	54.81	0.42	582	52.82	0.37	1.99	***	378	54.88	0.54	582	52.82	0.37	2.06	NS
Oregon	509	55.36	0.34	2,370	53.60	0.19	1.76	***	509	55.49	0.41	2,370	53.60	0.19	1.89	***
Pennsylvania	2,222	54.07	0.17	2,834	53.05	0.23	1.02	***	2,222	54.30	0.23	2,834	53.05	0.23	1.25	***
Puerto Rico~	2	47.93	1.20	1	60.76	0.00	-12.83	***	2	47.93	1.20	1	60.76		-12.83	***
Rhode Island	143	54.13	0.66	648	52.90	0.35	1.24	NS	143	53.76	0.80	648	52.90	0.35	0.86	NS
South Carolina~	179	54.23	0.65	2	57.59	0.16	-3.36	***	175	54.71	0.59	2	57.59	0.16	-2.88	***
South Dakota~	205	54.34	0.61	2	57.58	0.19	-3.24	***	201	54.27	0.62	2	57.58	0.19	-3.31	***
Tennessee	898	53.46	0.28	1,151	52.70	0.28	0.76	NS	898	53.48	0.38	1,151	52.70	0.28	0.79	NS
Texas	1,874	54.34	0.23	1,003	53.18	0.34	1.15	NS	1,874	54.01	0.48	1,003	53.18	0.34	0.83	NS
Utah~	141	54.21	0.64	1	55.95	0.00	-1.73	NS	104	54.32	0.75	1	55.95		-1.62	NS
Vermont~	5	46.72	4.35	1	55.69	0.00	-8.97	NS	5	46.72	4.35	1	55.69		-8.97	NS
Virginia	292	54.81	0.50	183	52.99	0.62	1.82	NS	292	54.70	0.49	183	52.99	0.62	1.71	NS
Washington	817	54.38	0.31	1,157	53.05	0.29	1.33	NS	816	54.51	0.40	1,157	53.05	0.29	1.46	NS
West Virginia	176	54.54	0.62	376	51.44	0.47	3.10	***	176	55.16	0.71	376	51.44	0.47	3.72	***
Wisconsin	1,107	54.80	0.24	1,914	53.34	0.21	1.45	***	1,107	55.05	0.26	1,914	53.34	0.21	1.71	***
National	35,226	53.94	0.13	45,422	53.51	0.11	0.43	NS	35,105	53.85	0.14	45,422	53.51	0.11	0.34	NS

[1] Standard error

[2] Difference between Fee-For-Service and managed care

~ n < 30

[3] *** p<0.001, NS=Not statistically significant at 0.001 level accounting for multiple comparisons

Table 5
Propensity Score Reweighted Estimates and Difference-in-Difference Analysis of Change in Mean PCS Scores between Medicare Fee-For-Service and Medicare Managed Care Beneficiaries from 2002 to 2004

	FFS			Managed Care					
State of Residence	2002 Mean[1]	2004 Mean[1]	Difference	2002 Mean[1]	2004 Mean[1]	Difference	Difference-in-Difference	Standard Error[2]	*p* Value[3]
Alabama	41.38	40.27	-1.10	40.98	39.88	-1.09	-0.01	1.29	NS
Alaska~	45.51	45.97	0.46	44.85	41.27	-3.58	4.05	0.46	***
Arizona	41.42	41.46	0.04	41.82	40.72	-1.10	1.14	0.45	NS
Arkansas~	41.30	39.20	-2.09	43.16	41.62	-1.54	-0.55	3.76	NS
California	41.84	42.13	0.29	41.74	40.71	-1.03	1.32	0.67	NS
Colorado	41.86	40.68	-1.18	41.82	40.81	-1.01	-0.16	0.93	NS
Connecticut	42.34	42.34	0.00	43.19	41.12	-2.07	2.07	3.84	NS
Delaware~	42.37	38.62	-3.75	42.74	43.36	0.62	-4.37	1.92	NS
District of Columbia	43.24	36.65	-6.59	42.40	44.35	1.95	-8.54	3.17	NS
Florida	41.64	41.44	-0.20	42.10	40.40	-1.69	1.50	0.37	***
Georgia	41.76	42.91	1.15	42.11	40.99	-1.12	2.27	9.90	NS
Hawaii	42.04	44.88	2.84	42.15	41.69	-0.45	3.29	1.53	NS
Idaho	41.71	40.19	-1.52	41.22	40.49	-0.73	-0.79	0.26	NS
Illinois	42.07	40.73	-1.34	41.85	40.81	-1.04	-0.30	0.48	NS
Indiana	41.74	39.99	-1.75	41.09	39.51	-1.58	-0.17	1.05	NS
Iowa	42.03	41.80	-0.23	41.55	40.82	-0.73	0.50	0.94	NS
Kansas	41.70	40.79	-0.91	41.63	40.87	-0.76	-0.15	1.10	NS
Kentucky	41.47	40.71	-0.76	41.78	40.61	-1.17	0.40	1.43	NS
Louisiana	41.49	42.23	0.74	41.38	40.51	-0.87	1.61	1.30	NS
Maine~	40.70	43.62	2.92	39.36					
Maryland	42.25	43.01	0.76	41.76	41.27	-0.49	1.26	1.10	NS
Massachusetts	42.41	41.33	-1.07	42.43	41.16	-1.28	0.20	0.60	NS
Michigan	41.32	42.39	1.07	41.54	41.67	0.13	0.95	0.91	NS
Minnesota	42.22	41.49	-0.73	42.19	40.34	-1.85	1.12	0.62	NS
Mississippi~	41.58	41.08	-0.50	36.92	30.57	-6.35	5.85	2.45	NS
Missouri	41.78	40.83	-0.95	41.97	41.03	-0.94	-0.01	0.58	NS

Table 5, continued
Propensity Score Reweighted Estimates and Difference-in-Difference Analysis of Change in Mean PCS Scores between Medicare Fee-For-Service and Medicare Managed Care Beneficiaries from 2002 to 2004

	FFS			Managed Care					
State of Residence	2002 Mean[1]	2004 Mean[1]	Difference	2002 Mean[1]	2004 Mean[1]	Difference	Difference-in-Difference	Standard Error[2]	*p* Value[3]
Nebraska	41.06	44.71	3.65	42.02	40.39	-1.64	5.28	3.94	NS
Nevada	41.55	41.55	0.00	41.87	41.00	-0.87	0.87	1.22	NS
New Hampshire	41.83	43.70	1.87	42.17	42.34	0.18	1.70	0.84	NS
New Jersey	42.49	41.38	-1.12	42.84	41.17	-1.67	0.55	0.95	NS
New Mexico	41.60	42.00	0.40	41.47	40.26	-1.21	1.61	2.02	NS
New York	42.04	41.64	-0.40	42.12	40.85	-1.26	0.86	0.50	NS
North Carolina	42.00	39.58	-2.42	41.77	40.12	-1.64	-0.77	1.73	NS
North Dakota	42.41	40.51	-1.90	42.61	40.55	-2.05	0.15	8.83	NS
Ohio	41.86	41.38	-0.48	41.83	40.19	-1.64	1.15	0.91	NS
Oklahoma	41.51	39.73	-1.78	41.21	39.75	-1.46	-0.32	1.84	NS
Oregon	41.65	41.48	-0.17	41.59	40.14	-1.45	1.27	0.47	NS
Pennsylvania	42.27	42.85	0.58	42.36	41.17	-1.19	1.78	0.57	NS
Puerto Rico~	43.53	38.38	-5.15	45.25					
Rhode Island	42.59	41.65	-0.94	42.37	41.80	-0.57	-0.37	1.18	NS
South Carolina~	41.54	40.28	-1.26	45.11	47.59	2.48	-3.73	2.67	NS
South Dakota~	41.37	45.31	3.94	44.24	45.24	1.00	2.94	5.15	NS
Tennessee	41.61	39.06	-2.55	41.52	39.58	-1.95	-0.61	0.80	NS
Texas	41.70	40.42	-1.27	41.46	40.92	-0.54	-0.73	0.85	NS
Utah~	41.81	39.24	-2.57	44.36	38.11	-6.25	3.68	4.14	NS
Vermont~	39.90	53.28	13.38	39.78	41.04	1.26	12.12	5.47	NS
Virginia	41.60	39.38	-2.22	41.80	40.48	-1.32	-0.90	2.30	NS
Washington	41.94	40.80	-1.14	41.96	40.99	-0.97	-0.16	1.03	NS
West Virginia	42.49	37.73	-4.76	41.88	40.02	-1.86	-2.90	0.48	***
Wisconsin	42.16	41.79	-0.37	42.15	41.03	-1.12	0.74	0.58	NS
National	41.56	41.14	-0.42	41.68	40.49	-1.19	0.76	0.54	NS

[1] The mean summary score was adjusted to account for differential effects of beneficiary characteristics on the outcome and on the probability of being in the managed care population.

[2] Standard errors were estimated using the jackknife repeated replications method to account for the complex survey design.

~ n < 30

[3] *** p <0.001, NS=Not statistically significant at 0.001 level accounting for multiple comparisons

Table 6
Propensity Score Reweighted Estimates and Difference-in-Difference Analysis of Change in Mean MCS Scores between Medicare Fee-For-Service and Medicare Managed Care Beneficiaries from 2002 to 2004

	FFS			Managed Care					
State of Residence	2002 Mean[1]	2004 Mean[1]	Difference	2002 Mean[1]	2004 Mean[1]	Difference	Difference-in-Difference	Standard Error[2]	*p* Value[3]
Alabama	53.41	52.21	-1.20	52.79	52.01	-0.78	-0.42	1.32	NS
Alaska~	52.95	49.20	-3.76	51.11	49.74	-1.37	-2.39	0.31	***
Arizona	53.42	53.74	0.32	53.28	53.12	-0.16	0.48	0.86	NS
Arkansas~	53.79	54.45	0.67	54.59	51.86	-2.73	3.40	0.95	***
California	54.06	53.09	-0.96	53.21	52.30	-0.90	-0.06	0.77	NS
Colorado	53.66	53.71	0.05	53.22	52.62	-0.60	0.65	0.60	NS
Connecticut	54.03	53.74	-0.29	53.44	53.02	-0.42	0.13	0.84	NS
Delaware~	54.00	50.85	-3.15	53.59	52.21	-1.38	-1.77	1.61	NS
District of Columbia	53.62	54.41	0.79	54.33	53.19	-1.13	1.93	1.41	NS
Florida	53.77	53.38	-0.39	53.16	52.34	-0.82	0.43	0.52	NS
Georgia	53.92	53.80	-0.12	53.54	52.94	-0.60	0.47	7.80	NS
Hawaii	53.56	54.44	0.87	53.48	53.18	-0.30	1.17	0.69	NS
Idaho	54.08	53.30	-0.79	53.05	52.88	-0.18	-0.61	0.77	NS
Illinois	53.89	53.75	-0.15	53.21	53.60	0.39	-0.53	0.77	NS
Indiana	53.74	52.98	-0.75	52.70	51.80	-0.89	0.14	1.58	NS
Iowa	54.01	52.86	-1.15	53.34	52.51	-0.82	-0.33	0.81	NS
Kansas	53.58	53.59	0.02	52.88	53.13	0.25	-0.23	1.86	NS
Kentucky	53.47	53.51	0.04	52.83	53.13	0.31	-0.27	4.06	NS
Louisiana	53.36	52.76	-0.60	52.98	52.72	-0.26	-0.34	0.68	NS
Maine~	53.66	53.25	-0.41	57.05					
Maryland	53.87	54.10	0.23	52.96	52.56	-0.40	0.63	1.08	NS
Massachusetts	53.65	52.51	-1.13	53.35	52.72	-0.63	-0.51	0.93	NS
Michigan	53.78	53.22	-0.56	53.04	52.21	-0.82	0.26	0.54	NS
Minnesota	53.98	54.22	0.24	53.49	53.25	-0.24	0.48	0.75	NS
Mississippi~	53.75	50.45	-3.30	56.33	67.01	10.68	-13.98	2.13	***
Missouri	53.76	53.97	0.21	53.38	52.52	-0.85	1.06	0.43	NS

Table 6, continued
Propensity Score Reweighted Estimates and Difference-in-Difference Analysis of Change in Mean MCS Scores between Medicare Fee-For-Service and Medicare Managed Care Beneficiaries from 2002 to 2004

	FFS			Managed Care					
State of Residence	2002 Mean[1]	2004 Mean[1]	Difference	2002 Mean[1]	2004 Mean[1]	Difference	Difference-in-Difference	Standard Error[2]	*p* Value[3]
Nebraska	53.40	57.15	3.76	53.24	52.96	-0.28	4.04	3.53	NS
Nevada	53.77	53.30	-0.48	53.00	52.92	-0.08	-0.39	0.65	NS
New Hampshire	53.64	53.47	-0.17	53.12	53.39	0.27	-0.44	1.09	NS
New Jersey	53.59	53.69	0.10	53.35	52.90	-0.45	0.55	0.58	NS
New Mexico	53.84	50.50	-3.35	52.94	52.94	0.01	-3.35	2.40	NS
New York	53.62	53.12	-0.50	53.29	52.25	-1.05	0.55	0.44	NS
North Carolina	53.75	53.70	-0.05	53.13	52.17	-0.96	0.91	1.10	NS
North Dakota	53.58	56.25	2.67	52.98	53.57	0.59	2.08	4.01	NS
Ohio	53.58	53.36	-0.23	52.98	52.40	-0.59	0.36	0.46	NS
Oklahoma	53.91	53.75	-0.15	53.04	52.57	-0.48	0.32	1.65	NS
Oregon	53.91	53.07	-0.84	53.28	53.01	-0.27	-0.57	0.56	NS
Pennsylvania	53.74	53.57	-0.17	53.22	53.02	-0.21	0.04	0.38	NS
Puerto Rico~	51.30	43.00	-8.30	53.86					NS
Rhode Island	53.73	54.87	1.14	53.29	52.74	-0.55	1.68	0.11	***
South Carolina~	53.71	53.44	-0.27	54.39	50.89	-3.51	3.23	0.53	***
South Dakota~	52.56	60.48	7.92	54.89	46.93	-7.96	15.88	5.04	NS
Tennessee	53.64	54.13	0.49	53.09	52.89	-0.20	0.68	0.59	NS
Texas	53.92	52.86	-1.06	53.42	52.63	-0.79	-0.27	0.81	NS
Utah~	53.75	53.33	-0.41	54.44	48.37	-6.07	5.66	2.91	NS
Vermont~	53.47	45.47	-8.00	58.63	25.10	-33.52	25.53	3.36	***
Virginia	53.71	52.85	-0.86	53.16	53.02	-0.15	-0.72	1.36	NS
Washington	53.83	54.19	0.35	53.14	52.37	-0.77	1.13	0.61	NS
West Virginia	54.46	51.25	-3.22	52.91	51.47	-1.43	-1.78	0.42	***
Wisconsin	53.88	53.96	0.07	53.34	52.99	-0.35	0.43	0.55	NS
National	53.78	53.25	-0.54	53.65	52.19	-1.46	0.92	1.05	NS

[1] The mean summary score was adjusted to account for differential effects of beneficiary characteristics on the outcome and on the probability of being in the managed care population.

[2] Standard errors were estimated using the jackknife repeated replications method to account for the complex survey design.

~ n < 30

[3] *** p <0.001, NS=Not statistically significant at 0.001 level accounting for multiple comparisons

Table 7

Comparison of Baseline Background Characteristics and Health Status of Managed Care Respondents and Non-Respondents[a] to the Medicare Health Outcomes 2004 Follow-Up Survey

	Respondents (n=45,450)		Non-Respondents (n=45,492)		
Characteristics	**Frequency**	**Percentage**	**Frequency**	**Percentage**	***p* Value**
Gender					NS
Male	18,735	41.22%	19,024	41.82%	
Female	26,715	58.78%	26,468	58.18%	
Age Group					***
65-69	10,798	23.76%	9,546	20.98%	
70-74	14,251	31.36%	12,625	27.75%	
75-79	10,848	23.87%	10,433	22.93%	
80-84	6,403	14.09%	7,347	16.15%	
85-89	2,437	5.36%	3,776	8.30%	
90-94	607	1.34%	1,447	3.18%	
95+	106	0.23%	318	0.70%	
Race/Ethnicity					***
White	40,484	89.07%	39,117	85.99%	
African American	2,612	5.75%	4,084	8.98%	
Hispanic	516	1.14%	794	1.75%	
Other	1,838	4.04%	1,497	3.29%	
Education					***
8th grade or less	4,584	10.09%	6,310	13.87%	
Some High School	7,106	15.63%	8,148	17.91%	
High School Graduate/GED	16,957	37.31%	16,078	35.34%	
Some College	9,529	20.97%	8,631	18.97%	
4-Year College Graduate	3,250	7.15%	2,766	6.08%	
More than 4-year College	3,440	7.57%	2,692	5.92%	
Missing	584	1.28%	867	1.91%	
Marital Status					***
Married	26,614	58.56%	24,137	53.06%	
Never married	1,256	2.76%	1,318	2.90%	
Other	16,540	36.39%	19,040	41.85%	
Missing	1,040	2.29%	997	2.19%	
Annual Household Income					***
< $20,000	14,841	32.65%	17,008	37.39%	
$20,000 - $49,999	16,885	37.15%	14,537	31.96%	
$50,000 - $99,999	3,920	8.62%	3,106	6.83%	
>= $100,000	910	2.00%	692	1.52%	
Missing	8,894	19.57%	10,149	22.31%	

Table 7, continued

Comparison of Baseline Background Characteristics and Health Status of Managed Care Respondents and Non-Respondents[a] to the Medicare Health Outcomes 2004 Follow-Up Survey

	Respondents (n=45,450)		Non-Respondents (n=45,492)		
Characteristics	**Frequency**	**Percentage**	**Frequency**	**Percentage**	***p* Value**
Medicaid Dual Eligible					***
Not Medicaid Eligible	44,021	96.86%	43,085	94.71%	
Medicaid Eligible	1,429	3.14%	2,407	5.29%	
Proxy-Respondents					***
Self-respondent	38,811	85.39%	35,490	78.01%	
Proxy	3,902	8.59%	6,425	14.12%	
Missing	2,737	6.02%	3,577	7.86%	
Smoking Status					***
Smoker	4,269	9.39%	4,893	10.76%	
Non-smoker	39,128	86.09%	38,341	84.28%	
Missing	2,053	4.52%	2,258	4.96%	
Institutionalized					
Not Institutionalized	45,318	99.71%	45,091	99.12%	***
Institutionalized or Eligible	132	0.29%	401	0.88%	
Activity of Daily Living (ADL)[b]					
Bathing	4,602	10.33%	8,199	18.36%	***
Dressing	3,769	8.45%	6,819	15.26%	***
Eating	1,690	3.79%	3,378	7.57%	***
Getting in or out of chairs	10,608	23.85%	13,622	30.58%	***
Walking	13,780	30.96%	17,831	39.98%	***
Using the toilet	2,650	5.94%	4,741	10.62%	***
Chronic Conditions[c]					
Hypertension	25,953	57.60%	26,459	58.88%	***
Disease	6,684	14.95%	7,412	16.70%	***
Congestive Heart Failure	2,872	6.42%	4,305	9.67%	***
Myocardial Infarction	4,381	9.80%	5,296	11.93%	***
Other Heart Conditions	9,348	20.87%	10,267	23.09%	***
Stroke	3,174	7.09%	4,526	10.17%	***
COPD	5,377	11.98%	6,420	14.38%	***
Inflammatory Bowel Disease	2,010	4.49%	2,352	5.30%	***
Arthritis of Hip or Knee	17,714	39.38%	18,281	40.77%	***
Arthritis of Hand or Wrist	14,957	33.30%	15,431	34.51%	***
Sciatica	9,594	21.43%	10,006	22.48%	***
Diabetes	7,675	17.05%	9,127	20.35%	***
Any Cancer	6,373	14.14%	6,938	15.44%	***
Health Status	**Mean**	**SD**	**Mean**	**SD**	
PCS	41.99	11.13	39.62	11.61	***
MCS	52.74	8.84	51.07	9.73	***

[a] Non-respondents included enrollees who were deceased between 2002 and 2004, who were voluntarily or involuntarily disenrolled in 2004, who had an invalid survey in 2004, or who did not respond to the 2004 survey

[b] Number and percent of enrollees reported having difficulty or unable to do the activities (excluded missing observations)

[c] Number and percent of enrollees reported having the condition (excluded missing observations)

*** p <0.001 NS=Not statistically significant at 0.001 level accounting for multiple comparisons