MEDICARE HEALTH OUTCOMES SURVEY

REPORT ON THE MENTAL HEALTH STATUS OF MANAGED CARE BENEFICIARIES

Cohort I Baseline and Follow Up

FINAL REPORT

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EXECUTIVE SUMMARY

This research examines the differences between beneficiaries at high risk for depression and those at low risk for depression sampled in the Medicare Health Outcomes Survey (HOS). This survey has a longitudinal design with *Cohort I Baseline* data collected in 1998 and *Cohort I Follow-Up* data collected in 2000 from a national random sample of Medicare managed care beneficiaries. The demographic representativeness of this sample is also compared to a demographic profile of beneficiaries lost to follow-up due to (1) voluntary disenrollment from a health plan, (2) involuntary disenrollment from a health plan, (3) death, and (4) survey nonresponse.

Depression risk was investigated through use of the Mental Component Summary (MCS) score from the SF-36 portion of the HOS. Beneficiaries in the *Cohort I Baseline* sample were classified into two groups: those who were at high risk for depression (MCS score less than or equal to 42) and those who were at low risk for depression (MCS score greater than 42). Effect sizes for means and proportions were used to evaluate whether observed differences between groups were meaningful. In setting program priorities, the focus should be on effects that meet the threshold of at least a small effect, if not a medium or large effect.

Among high-risk beneficiaries, a higher percentage were younger, had an eighth grade education or less, had an annual household income between $5,000 and $9,999, and received Medicaid than those who were at low-risk for depression. Additionally, a higher percentage of the high-risk beneficiaries were not married and did not own their own home compared to the low-risk group (Figure 1 and Table 1).

The physical health status of the high-risk and low-risk beneficiaries declined at a similar rate over time (medium effect sizes), as shown in Figure 2. However, the high-risk group had significantly lower Physical Component Score (PCS) means at both points in time. The MCS score was higher for the low-risk group compared to the high-risk group (large effect size). However, the MCS score for the high-risk group increased from baseline to follow-up (large effect size). It is likely that this finding reflects a regression to the mean and not a less-depressed population. Proportionally, more of the high-risk beneficiaries had difficulty with all activities of daily living (ADLs), as displayed in Tables 4 and 5, and proportionally, more had four or more chronic conditions compared to the low-risk group (Table 7).

Based on these analyses, dual-eligible, disabled, and younger Medicare managed care beneficiaries with lower income and education are high-priority groups for depression screening. Depression is an often-overlooked yet highly treatable chronic condition. Managed care plans should focus on encouraging primary care physicians to screen at-risk beneficiaries on a regular basis.

Figure 1
***Cohort I* Selected Demographics at Baseline**
Beneficiaries At High-Risk for Depression
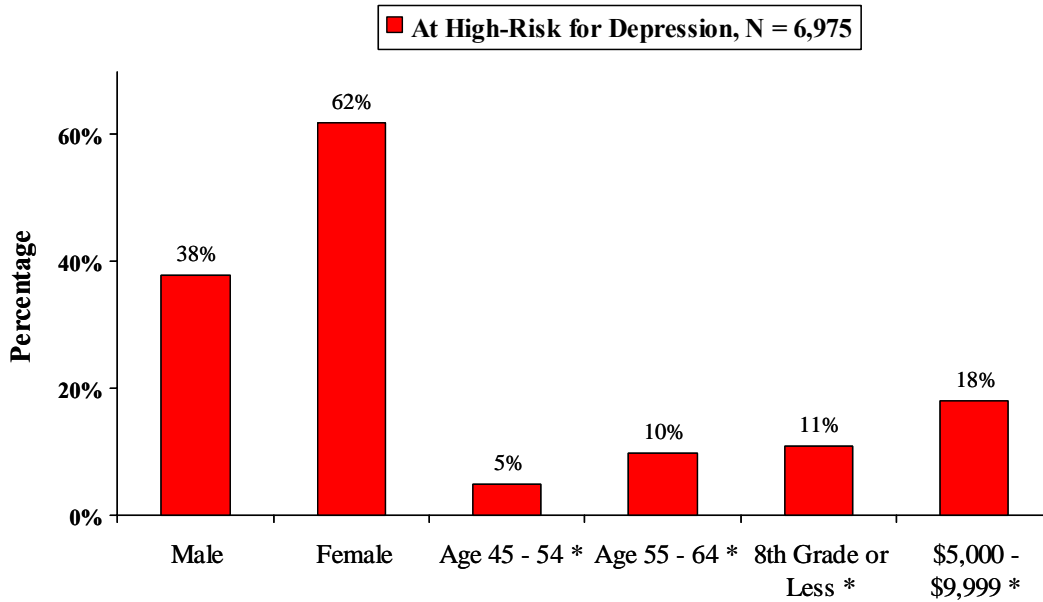
* Small effect size, between 0.20 and 0.50.

(See Methodology Section for an explanation of effect size.)

Source: *Cohort I* Medicare Health Outcomes Survey Database
Cohort I Baseline, 1998 and Follow Up, 2000

Figure 2
***Cohort I* Health Status of Beneficiaries**
By Depression Risk Status

| ◆ **High-Risk** | **N = 6,975** |
| ■ **Low-Risk** | **N = 44,725** |

*   Differences between High-Risk and Low-Risk Groups at both Baseline and Follow-Up have Medium Effect Size: $0.50 \le g < 0.80$.

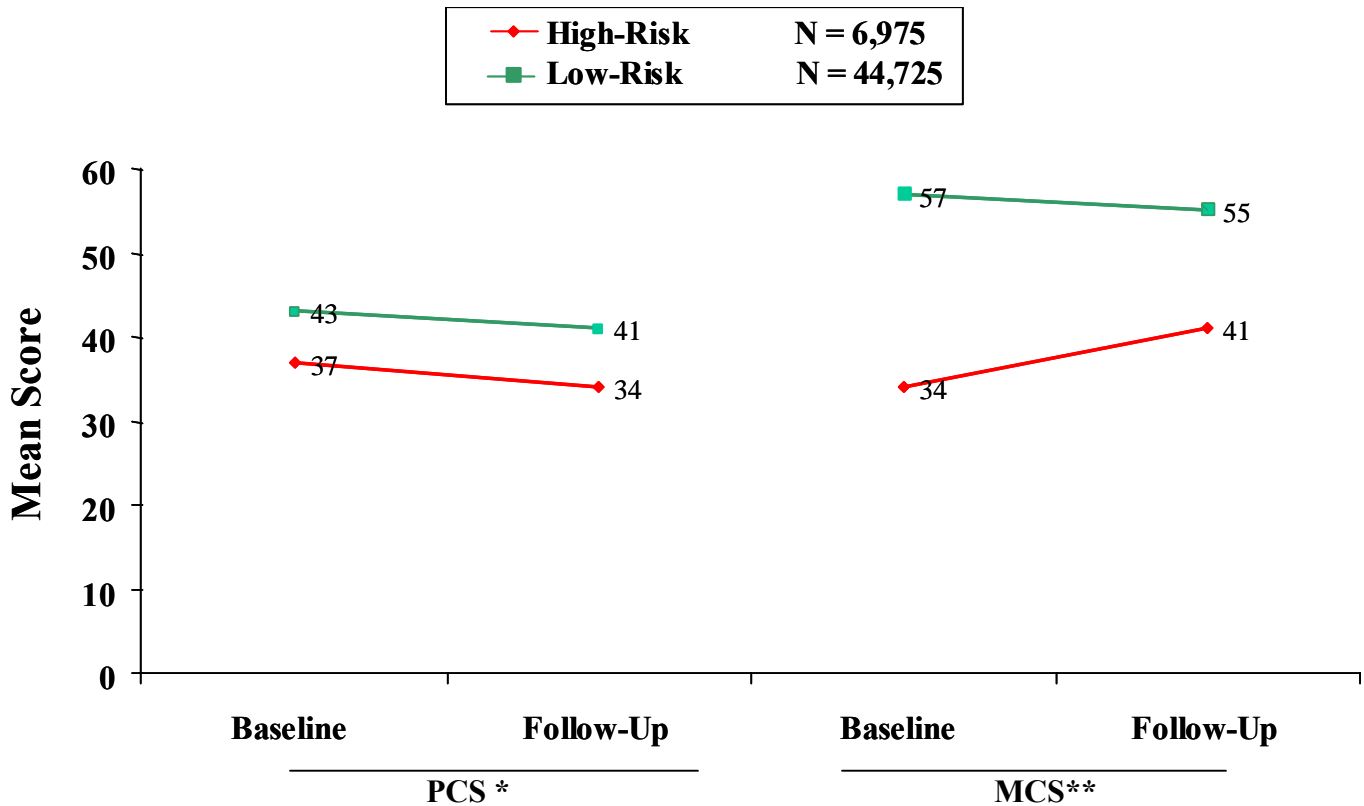**   Differences between High-Risk and Low-Risk Groups at both Baseline and Follow-Up have Large Effect Size: $g \ge 0.80$.

(See Methodology Section for an explanation of effect size.)

Source: *Cohort I* Medicare Health Outcomes Survey Database
Cohort I Baseline, 1998 and *Cohort I Follow Up*, 2000

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INTRODUCTION

This study is based on the Medicare Health Outcomes Survey (HOS) sponsored by the Centers for Medicare & Medicaid Services (CMS). The 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. This research examines differences in demographics, health status, smoking status, activities of daily living (ADLs), and chronic conditions for beneficiaries determined to be at high risk or low risk for depression. Beneficiaries were sampled in 1998 (baseline) and 2000 (follow-up).

Combating depression among the elderly is a high priority, since the baby boom generation is rapidly approaching age 65. Approximately 2 million (6 percent) of the 35 million adults older than age 65 have a diagnosable depressive illness such as major depressive disorder, bipolar disorder, or dysthymic disorder, or depressive symptoms (National Institute of Mental Health, 2003). According to the National Institute of Mental Health, 75 percent of older adults who committed suicide have visited a primary care physician within one month of their death (National Institute of Mental Health, 2003). The World Health Organization Global Burden of Disease Survey (using the disability adjusted life year [DALY]) indicated that major depression will be the single leading cause of disease burden by 2020 (Murray & Lopez, 1996).

Given the rapid increase in the number of adults older than age 65, it is vital to better understand and improve this population's mental health. During testimony before the Senate Special Committee on Aging, Dr. Donna Cohen stated, "The lack of recognition, diagnosis, and treatment of depression in Americans of all ages, but especially older Americans, is unacceptable since depressive disorders are treatable illnesses. Depression goes undetected in half of the general population and 80 percent of the older population," (Cohen, 2003).

Though the 65-plus age group is particularly vulnerable to depression and lack of treatment, the Medicare managed care disabled population also has high depression levels. In analyses utilizing the *Cohort I Baseline* and *Cohort I Follow Up* data from the Medicare HOS, the disabled under-65 age group was more likely to offer positive responses to the depression screening questions than were the disabled or the nondisabled group aged 65 and over (Health Services Advisory Group, 2003).

Depression has been linked to poor physical health outcomes and specific diseases, and is associated with comorbidity. In a recent study of comorbid depression in adults with diabetes, the positive relationship between major and minor depression and increased medical morbidity remained significant when controlling for health status and health behaviors (Anderson, Freedland, Clouse & Lustman, 2001). The authors also found that the presence of diabetes doubles the odds of comorbid depression. The results of a study conducted in the Netherlands

indicated that after adjusting for age, gender, and socioeconomic status, a diagnosis of depression was associated with a three-fold increased risk of developing Parkinson's disease (Schuurman et al., 2002). In spite of the wealth of research on depression, much of the existing data are not based on beneficiaries in Medicare managed care.

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METHODOLOGY

Beginning in 1998, and continuing annually, a Medicare Health Outcomes Survey (HOS) baseline cohort is created from a random sample of 1,000 members from Medicare Advantage (MA) plans in the United States (prior to 2004, Medicare managed care plans were known as Medicare+Choice [M+C] plans). In plans with fewer than 1,000 Medicare members, the sample consists of the entire enrolled Medicare population that meets the inclusion criteria. Medicare beneficiaries who are continuously enrolled in health plans 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. The data collection protocol includes a combination of multiple mailings and telephone follow-up of non-respondents over a period of approximately four months.

CMS contracts with the National Committee for Quality Assurance (NCQA), which in turn monitors the data collection activities for the HEDIS® (Health Plan Employer Data and Information Set[1]). 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. Cases are also excluded if insufficient data are available for the explanatory and outcome measures.

Demographic information in the HOS includes gender, age, race, marital status, education, annual household income, homeowner status, and Medicaid enrollment. Respondents are also asked about their smoking habits. The HOS measures a beneficiary's ability to perform six Activities of Daily Living (ADLs) by asking the respondent to rate his or her ability to perform the activity. The six ADLs are bathing, dressing, eating, getting in or out of chairs, walking, and using the toilet. The three-point response scale options are: no difficulty performing the activity, difficulty performing the activity, and unable to perform the activity. The complete data collection protocol can be found in the HEDIS® *Volume 6: Specifications for the Medicare Health Outcomes Survey* (NCQA, 2000).

The SF-36 portion of the HOS consists of eight scales which assess general health, mental health, physical functioning, role-emotional, social functioning, role-physical, bodily pain, and vitality. These scales create two summary health measures: the Physical Component Summary (PCS) and Mental Component Summary (MCS) scores.

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

Respondents are also asked to indicate if a doctor had ever told them they had one or more of the following 13 chronic conditions:

- Angina or coronary artery disease
- Any cancer (other than skin cancer)
- Arthritis of the hand and/or wrist
- Arthritis of the hip and/or knee
- Emphysema/asthma/chronic obstructive pulmonary disease (COPD)
- Congestive heart failure (CHF)
- Crohn's disease/ulcerative colitis/inflammatory bowel disease (GI problems)
- Diabetes/high blood sugar/sugar in the urine (diabetes)
- Hypertension/high blood pressure
- Myocardial infarction (MI) or heart attack
- Other heart conditions such as problems with heart valves or the rhythm of the heartbeat
- Sciatica
- Stroke

ANALYTIC SAMPLE DESCRIPTION

The respondents in this study were 279,135 beneficiaries sampled from 269 managed care plans for *Cohort I Baseline*. The exclusion criterion and the number of beneficiaries eliminated at each sequential step are outlined below. Demographic characteristics of voluntarily and involuntarily disenrolled beneficiaries, as well as nonrespondents and the deceased, are compared to the *Cohort I* mental health sample (see Results).

Impact of Sequential Exclusion Criteria		
Exclusion Criteria	**Number Excluded**	**Sample Size**
Starting Sample Size		279,135
MCS score not calculable	106,821	172,314
Involuntarily disenrolled	41,805	130,509
Nonrespondents	10,746	119,763
Voluntarily disenrolled	33,728	86,035
Deceased	9,515	76,520
Beneficiaries who completed both baseline and follow-up surveys		76,520

Additional selection criteria were imposed on the sample for this analysis in the following sequential order to eliminate inconsistencies in responses: (a) beneficiaries had to have an MCS score that could be calculated at follow-up; (b) cases with proxy respondents at either baseline or follow-up were excluded (proxy respondents have been found to be less reliable sources of health care information: Ellis et al., 2003; Yip et al., 2001); (c) institutionalized beneficiaries were excluded; (d) cases with discrepant reporting of gender for baseline and follow-up were excluded; (e) cases with discrepant reporting of age for baseline and follow-up were excluded;

(f) cases with discrepant reporting of marital status for baseline and follow-up were excluded; and (g) respondents must have answered all questions. The imposition of these additional criteria reduced the mental health sample by another 24,820 beneficiaries. The resulting *Cohort I* mental health sample was 51,700 beneficiaries.

Two groups were identified for these analyses. The first group was comprised of 6,975 beneficiaries with an MCS score of less than, or equal to, 42 at baseline (high risk for depression). The MCS score of 42 was used as a cutoff score because research has found that a score of less than, or equal to, 42 is strongly associated with depression (Ware et al., 1994). The second group included 44,725 beneficiaries who had an MCS score of greater than 42 at baseline (low risk for depression). These two groups will subsequently be referred to as the "high-risk" and the "low-risk" groups.

DATA ANALYSIS AND ANALYTIC STRATEGY

Traditional statistical tests produce numerous significant *p* values when very large samples are compared, as is the case here. A primary question becomes, which of these statistically significant differences are large enough to be used in making policy decisions? Effect size, which refers to the degree of departure from a null hypothesis, offers a way to judge the importance of a result based on large sample sizes, and is independent of any specific unit of measurement. Though chi-square significance tests are reported, Cohen's (1988) effect size for comparing the two proportions p_1 and p_2 was also calculated to compare differences between the groups for categorical variables. This is calculated as:

$$h = |\varphi_1 - \varphi_2|,$$

$$\text{where: } \varphi_1 = 2\arcsin(\sqrt{p_1}) \text{ and } \varphi_2 = 2\arcsin(\sqrt{p_2})$$

For continuous variables, *t* tests and repeated measures analyses of variance (ANOVAs) are reported. A variant of Cohen's effect size for comparing the two means x_1 and x_2, Hedges' *g* (Rosenthal & Rosnow, 1991) was used to assess important differences and is calculated as:

$$g = \frac{x_1 - x_2}{s\ pooled}$$

Following Cohen (1988), a small effect size for either proportions (*h*) or means (*g*) ranges from greater than or equal to 0.20 to less than 0.50; a medium effect size ranges from greater than, or equal to, 0.50, to less than 0.80. A large effect size is greater than or equal to 0.80.

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RESULTS

DEMOGRAPHICS

Table 1 compares the high risk and low risk beneficiaries in terms of demographic characteristics (gender, race/ethnicity, age, marital status, education, household income, homeowner status, and Medicaid status) at baseline. Small effect sizes were found for the following age groups: 45 to 54 ($h = 0.27$) and 55 to 64 ($h = 0.36$), with proportionally more high-risk beneficiaries in these age categories than low-risk beneficiaries. Proportionally more low-risk beneficiaries (63 percent) were in the 65 to 74 ($h = 0.30$) age category than high-risk beneficiaries (49 percent).

A small effect size ($h = 0.23$) was found for marital status, with more married beneficiaries in the low-risk group. More high-risk beneficiaries had an eighth grade or less education than did low-risk beneficiaries ($h = 0.20$). There were also two small effect sizes found for income level. Eighteen percent of the high-risk group had a household income of $5,000 to $9,999 compared to 9 percent of the low-risk group ($h = 0.26$). A small effect size was also found for household income of $50,000 to $79,999. Nine percent of the low-risk group was in this income range, compared to 4 percent of the high-risk group ($h = 0.20$).

A small effect size was found for home ownership and Medicaid status. Eighty-one percent of the low-risk group owned their home compared to 72 percent of the high-risk group ($h = 0.21$). Additionally, a small effect size was found for Medicaid status. Five percent of the high-risk group received Medicaid compared to 1 percent of the low-risk group ($h = 0.22$).

SF-36 SCORES

Table 2 compares SF-36 scores for the high-risk and low-risk groups. The high-risk group had significantly lower mean PCS and MCS scores, as well as scale scores, than the low-risk group. A medium effect size was found between the groups for mean PCS scores at baseline ($g = 0.59$) and at follow-up ($g = 0.65$). Large effect sizes were found for mean MCS scores and all mean scale scores between high-risk and low-risk beneficiaries. These findings are consistent with the literature on depression.

The mean MCS baseline score for the high-risk group was 34.5, and the follow-up mean MCS score was 41.2. It is possible that the increase in the mean MCS score is not due to a less-depressed population, but instead due to regression to the mean. Because the baseline mean MCS score was already so low for the high-risk group, it was less likely that it would decline further at follow-up.

Another possible explanation for the increased mean MCS score is attrition. Post hoc analyses indicated that there were small effect sizes found between the deceased group (baseline mean

MCS score = 49.8) and the analytic sample (baseline mean MCS score = 53.6), as well as the nonrespondent group (baseline mean MCS score = 51.7) and the analytic sample. (Data not displayed.) Thus, it is possible that a higher mean MCS score at follow-up for the high-risk group may have been because beneficiaries with lower MCS scores were more likely to be deceased or nonrespondents at follow-up. Below is a comparison of the percentage of high-risk and low-risk beneficiaries in the excluded groups (at baseline) compared to the analytic sample. Higher percentages of nonrespondents and deceased beneficiaries were high-risk compared to the analytic sample and voluntarily and involuntarily disenrolled beneficiaries.

Percentage of Beneficiaries at Low and High Risk in the Analytic Sample Compared to the Excluded Groups at Baseline					
	Voluntarily Disenrolled	**Involuntarily Disenrolled**	**Non-Respondents**	**Deceased**	**Analytic Sample**
Low-Risk	82.87%	84.26%	80.87%	73.60%	87.06%
High-Risk	17.13%	15.74%	19.13%	26.40%	12.94%

SMOKING STATUS

Table 3 indicates the changes in smoking status between baseline and follow-up. A small effect size was found for current smokers ($h = 0.23$). Seventeen percent of the beneficiaries in the high-risk group were current smokers at both baseline and follow-up compared to only 9 percent of the beneficiaries in the low-risk group. These results are consistent with the literature; smoking and depression are strongly associated.

ACTIVITIES OF DAILY LIVING

Tables 4 and 5 present the results for ADLs at baseline and follow-up. The response categories of "unable to do this activity" and "have difficulty" were combined and defined as impairment. The category of "no difficulty" was defined as no impairment. Small and medium effect sizes were found for all ADLs at both time points.

At baseline, the high-risk group had proportionally more beneficiaries who were impaired in all ADL categories compared to the low-risk group (Table 4). Medium effect sizes were found for walking, transferring from chairs, bathing, and dressing. Small effect sizes were found for toileting and eating.

The same pattern was found at follow-up (Table 5). The high-risk group had proportionally more beneficiaries who were impaired in all ADLs than the low-risk group. Medium effect sizes were found for walking, transferring from chairs, and bathing. Small effect sizes were found for dressing, toileting, and eating.

Figure 3 summarizes the results for the repeated measures ANOVA for the prevalence of impaired ADLs at baseline and follow-up. Both the group effect and the time effect were significant (Thalheimer & Cook, 2002). The effect size for the group effect was large ($d=1.03$), and there was a small effect size for the time effect ($d = 0.36$). However, the effect size criterion for the interaction effect was not met ($d = 0.14$).

Figure 3
Mean Number of Impaired ADLs for the High-Risk and Low-Risk Groups
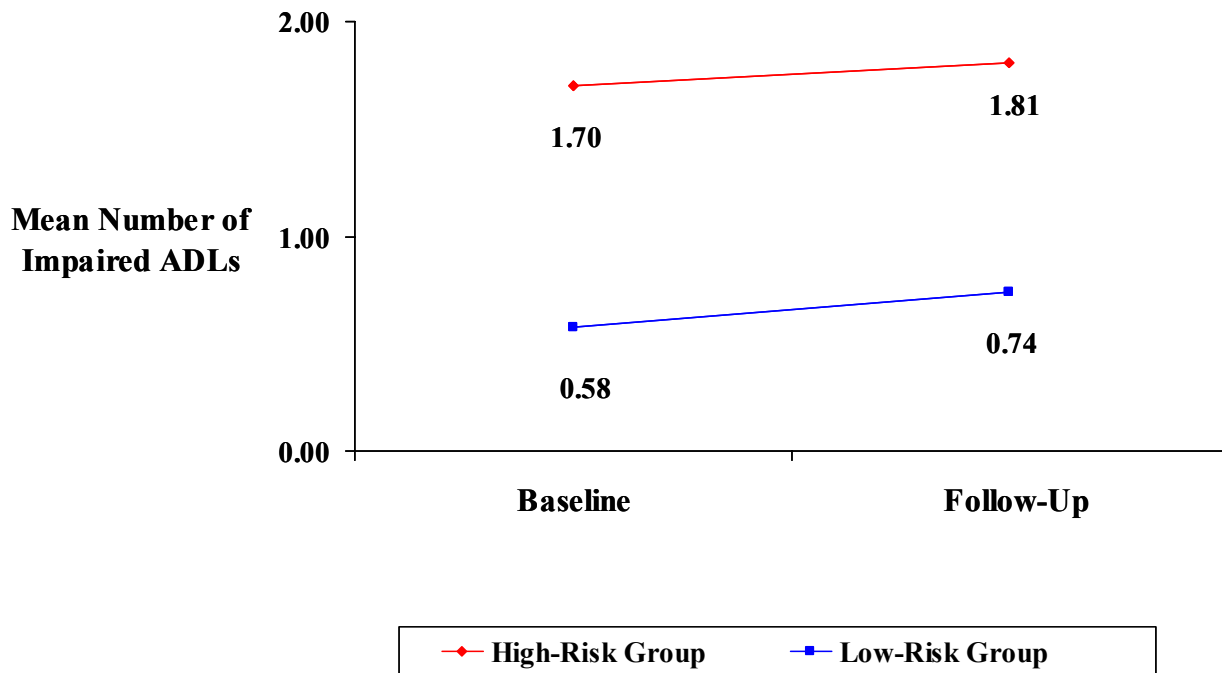
CHRONIC CONDITIONS

Table 6 indicates that the high-risk group was more likely than the low-risk group to report many of the chronic conditions. At baseline, proportionally more of the high-risk group reported angina pectoris/coronary artery disease ($h = 0.21$), arthritis of the hand and/or wrist ($h = 0.31$), arthritis of the hip and/or knee ($h = 0.28$), any cancer (other than skin cancer; $h = 0.21$), and Crohn's disease/ulcerative colitis/inflammatory bowel disease (GI problems; $h = 0.26$) than the low-risk group. A small effect size for a higher proportion in the high-risk group was also found for diabetes ($h = 0.21$), emphysema/asthma/chronic obstructive pulmonary disease (COPD; $h = 0.28$), other heart conditions ($h = 0.24$), and sciatica ($h = 0.34$).

A similar pattern was found for chronic conditions at follow-up. Proportionally more of the high-risk group had arthritis of the hand and/or wrist ($h = 0.30$), arthritis of the hip and/or knee ($h = 0.27$), any cancer (other than skin cancer) ($h = 0.21$), GI problems ($h = 0.22$), diabetes ($h = 0.20$), chronic obstructive pulmonary disease ($h = 0.25$), and sciatica ($h = 0.32$) than the low-risk group.

An interesting pattern was observed for the prevalence of chronic conditions. The high-risk group had proportionally fewer beneficiaries with lower numbers of chronic conditions (none through two conditions) than the low-risk group. However, the high-risk group had proportionally more beneficiaries with three to six conditions. Table 7 indicates that small effect sizes were found for no chronic conditions ($h = 0.30$; low-risk group = 16 percent, high-risk group = 7 percent), one condition ($h = 0.23$; low-risk group = 24 percent, high-risk group = 15 percent), four or five conditions ($h = 0.25$; low-risk group = 16 percent, high-risk group = 26 percent), and six or more conditions ($h = 0.35$; low-risk group = 5 percent, high-risk group = 15 percent). The same pattern was repeated at follow-up: no conditions ($h = 0.24$; low-risk group = 14 percent, high-risk group = 7 percent), one condition ($h = 0.23$; low-risk group = 22 percent, high-risk group = 13 percent), four or five conditions ($h = 0.20$; low-risk group = 19 percent, high-risk group = 27 percent), and six or more conditions ($h = 0.33$; low-risk group = 7 percent, high-risk = 17 percent). Medium effects were found for the mean number of chronic conditions at baseline ($g = 0.60$) and at follow up ($g = 0.54$). (Data not displayed.)

Figure 4 summarizes the results for the repeated measures ANOVA for the prevalence of chronic conditions. Both the group effect and the time effect were significant (Thalheimer & Cook, 2002). The effect size for the group effect was large ($d = 1.39$), and there was a small effect size for time ($d = 0.48$). However, the effect size criterion for the interaction effect was not met ($d = 0.17$).

Figure 4
**Mean Number of Chronic Conditions for the High-Risk
and Low-Risk Groups**
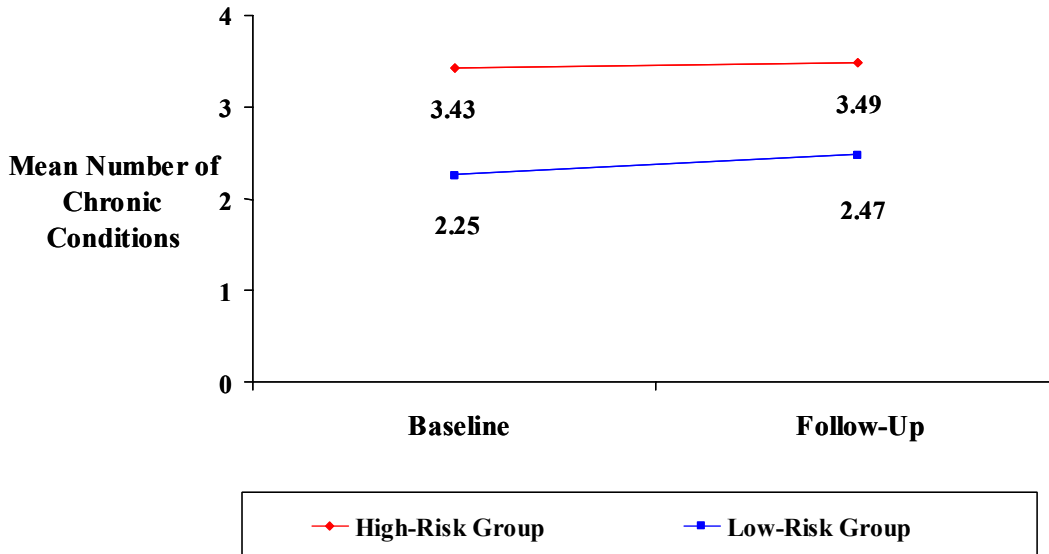
REPRESENTATIVENESS OF THE ANALYTIC SAMPLE

To address the question of representativeness of the *Cohort I* mental health sample, we used baseline information to compare voluntarily and involuntarily disenrolled beneficiaries, deceased beneficiaries, and nonrespondent beneficiaries with that mental health sample. Table 8 indicates that a large number of beneficiaries were involuntarily disenrolled between 1998 and 2000 ($n = 34,483$) and a large number were also voluntarily disenrolled ($n = 27,576$). There were 5,928 deceased beneficiaries and 8,012 nonrespondents.

Nonrespondents were more likely to be Black/African American and/or Nonhispanic White (small effect size). Ten percent of the nonrespondent group were Black/African American compared to 5 percent of the *Cohort I* mental health sample ($h = 0.20$). The *Cohort I* mental health sample consist of 89 percent Nonhispanic White beneficiaries compared to 81 percent of the nonrespondent sample ($h = 0.24$).

Deceased beneficiaries were more likely to be male. Fifty-two percent of the deceased group was male compared to 42 percent in the *Cohort I* mental health sample ($h = 0.21$). Deceased beneficiaries were also more likely to be older, with a mean age of 75.9 compared to 72.2 in the *Cohort I* mental health sample. (medium effect size, $g = 0.53$). The deceased were less likely to have owned their home than the mental health analytic sample. Seventy percent of the deceased sample owned their own home; however, 80 percent of the *Cohort I* mental health sample owned their home ($h = 0.23$).

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DISCUSSION

Several conclusions can be drawn from the current research. These results indicate that high-risk Medicare managed care beneficiaries were of lower socioeconomic status than the low-risk beneficiaries. Members of the high-risk group were more likely to not be married, have an eighth grade or less educational level, have a household income between $5,000 and $9,999, and receive Medicaid than the low-risk group members. Also, members of the high-risk group were less likely to own their own home than their low-risk peers. Consistent with the previous research on disabled beneficiaries in the managed care population, it is the younger beneficiaries, under age 45 and between 45 and 54 years old, who are at high risk for depression (small effect sizes). There were proportionally more beneficiaries in the high-risk group in these age categories compared to the low-risk groups. Additionally, there were several small effect sizes between the deceased group and the *Cohort I* analytic sample. The deceased group was comprised of more males and fewer females than the *Cohort I* analytic sample. The deceased group was also more likely to be lower income, have less than an eighth grade education, and be less likely to have owned their home. It appears that beneficiaries who have a low socioeconomic level and a low educational level have a greater risk for mortality. This finding should be investigated further in the Medicare managed care population.

Consistent with the literature, the high-risk Medicare managed care beneficiaries in these analyses were less healthy than their low-risk peers, and more likely to have multiple chronic conditions than the low-risk group. For example, the largest effect sizes between the high-risk and low-risk groups were for arthritis of the hand and/or wrist and sciatica, with proportionally more of the high-risk group reporting these conditions. High-risk beneficiaries had more comorbidities and impaired ADLs than the low-risk beneficiaries. Though the direction of cause and effect for high risk for depression and impaired ADLs, as well as for chronic conditions, is not addressed here, the implications for health care providers are important. Younger beneficiaries with multiple chronic conditions, who have a low educational level and low income, and those who receive Medicaid should be considered a high priority for depression screening. Additionally, it is also important that depression be described as an illness by the health care provider because, especially for the elderly, there is a great deal of stigma attached to this illness (Department of Health and Human Services [DHHS], 1999).

Managed care health plans interested in screening for depression should target younger, disabled, single beneficiaries with lower levels of education and income, as well as those who receive Medicaid. Since this demographic group of beneficiaries is more likely to be depressed, it is imperative that treatment options be provided to them. As was noted earlier in this report, many of the elderly have been inadequately treated for depression in primary care. One possible explanation for this may be the entanglement between physical symptoms and depression. Baron indicates that the major complaint of depressed patients is their presenting physical symptoms, not their dysphoric mood (2003). Effective diagnosis and management of depression with the aid

of short screening questions, as well as discussion of treatment options, should enhance communication between physicians and the elderly, leading to improved outcomes (Greene et al., 1996; Huag, 1996). However, treatment efficacy may vary by race/ethnicity. A recent study indicates that African Americans and Hispanics are less likely than Whites to find antidepressant medication acceptable in the treatment of depression (Cooper et al., 2003). Additionally, recent research indicates evidence of a preference for counseling/psychotherapy compared to antidepressant medications among the elderly (Unutzer et al., 2003). Thus, age is also important when considering treatment options.

With attention to improving the communication between physicians and the elderly, it is possible to reduce the levels of depression in this population. Primary care physicians will most likely be the point of contact for the rapidly increasing population of Medicare beneficiaries; however, older adults in health maintenance organizations have been found to have low treatment rates for depression in primary care (Unutzer et al., 2000). Positive outcomes result from effective treatment. For example, patients with Bipolar I disorder had a "…threefold reduction in the rate of suicide attempts" during a two-year treatment plan that combined psychotherapy and pharmacotherapy (Rucci et al., 2002). Brief psychodynamic therapy has also been found to be effective in reducing late-life major depression (DHHS, 1999).

Managed care plans could use the HOS data to examine physical health differences between their high-risk and low-risk beneficiaries. The data can provide insight into the health of these beneficiaries over a two-year interval, and also provide managed care plans the ability to specifically focus their quality improvement efforts on specific subgroups of beneficiaries.

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APPENDIX

Variable	Category	High-Risk Group N = 6,975		Low-Risk Group N = 44,725		χ^2 Value	*p* Value	Effect Size
Table 1 **Selected Demographics at Baseline**								
Total								
Gender	Male	2,658	38.10%	19,257	43.10%	60.6	<0.001	0.10
	Female	4,317	61.90%	25,466	56.90%			0.10
	Missing/Total	0	/ 6,975	2	/ 44,723			
Race/Ethnicity	African American	429	6.20%	1,908	4.30%	207.6	<0.001	0.09
	Asian/Pacific Islander	78	1.10%	774	1.70%			0.05
	American Indian/Alaskan Native	72	1.00%	233	0.50%			0.06
	Nonhispanic White	5,915	85.30%	39,762	89.40%			0.12
	Hispanic White	225	3.20%	996	2.20%			0.06
	Nonhispanic Other/Multiracial	61	0.90%	367	0.80%			0.01
	Hispanic Other/Multiracial	153	2.20%	427	1.00%			0.10
	Missing/Total	42	/ 6,933	258	/ 44,467			
Age Group	Under 45	133	1.90%	100	0.20%	2,668.2		0.19
	45 - 54	331	4.70%	303	0.70%			0.27 *
	55 - 64	708	10.20%	928	2.10%			0.36 *
	65 - 74	3,386	48.50%	28,372	63.40%			0.30 *
	75 - 84	2,099	30.10%	13,389	29.90%			0.00
	85 or Over	318	4.60%	1,633	3.70%			0.05
	Missing/Total	0	/ 6,975	0	/ 44,725			
	Mean Age (SD)	70.6	(9.50)	72.4	(6.30)	*t* Value	<0.001	0.26 *
Marital Status	Married	3,534	50.90%	27,743	62.20%	373.4	<0.001	0.23 *
	Divorced	925	13.30%	3,999	9.00%			0.14
	Separated	92	1.30%	271	0.60%			0.07
	Widowed	2,115	30.50%	11,259	25.20%			0.12
	Never Married	279	4.00%	1,330	3.00%			0.05
	Missing/Total	30	/ 6,945	123	/ 44,602			

* Small effect size, between 0.20 and 0.50.

		Table 1, Selected Demographics at Baseline Continued						
Variable	**Category**	**High-Risk Group**		**Low-Risk Group**		**χ² Value**	**p Value**	**Effect Size**
Educational Level	8th Grade or Less	775	11.30%	2,555	5.80%	720.2	<0.001	0.20 *
	Some High School	1,452	21.10%	6,310	14.30%			0.18
	High School/GED	2,570	37.40%	16,655	37.70%			0.01
	Some College	1,389	20.20%	10,792	24.40%			0.10
	College Graduate	333	4.80%	3,702	8.40%			0.15
	More than 4 Year Degree	358	5.20%	4,202	9.50%			0.17
	Missing/Total	98	/ 6,877	509	/ 44,216			
Income Level	Less than $5,000	253	4.30%	741	2.00%	1,045.4	<0.001	0.13
	$5,000 - $9,999	1,073	18.20%	3,473	9.40%			0.26 *
	$10,000 - $19,999	2,124	36.10%	10,338	28.00%			0.17
	$20,000 - $29,999	1,249	21.20%	8,647	23.40%			0.06
	$30,000 - $39,999	574	9.70%	5,706	15.50%			0.18
	$40,000 - $49,999	280	4.80%	3,303	8.90%			0.16
	$50,000 - $79,999	233	4.00%	3,267	8.80%			0.20 *
	$80,000 - $99,999	50	0.80%	673	1.80%			0.09
	$100,000 or more	52	0.90%	770	2.10%			0.10
	Missing/Total	1,087	/ 5,888	7,807	/ 36,918			
Homeowner Status	Owned	4,918	72.30%	35,652	81.20%	297.6	<0.001	0.21 *
	Owned or being bought by someone in your family other than you	436	6.40%	2,062	4.70%			0.07
	Rented for money	1,314	19.30%	5,559	12.70%			0.18
	Not owned and one in which you live without payment or rent	134	2.00%	625	1.40%			0.05
	Missing/Total	173	/ 6,802	827	/ 43,898			
Medicaid Status	Out of Medicaid	6,615	94.80%	44,107	98.60%	464.4	<0.001	0.22 *
	In Medicaid	360	5.20%	618	1.40%			0.22 *
	Missing/Total	0	/ 6,975	0	/ 44,725			

* Small effect size, between 0.20 and 0.50.

| | | | High-Risk Group | | | | Low-Risk Group | | | | |
| | | | N = 6,975 | | | | N = 44,725 | | | | |
SF-36 Measure			Mean (SD)	Two-Year Difference	*t* Value	*p* Value	Mean (SD)	Two-Year Difference	*t* Value	*p* Value	Effect Size
Physical Component Summary (PCS) Score		Baseline	36.7 (11.2)	-2.7	-27.2	<0.001	43.4 (11.4)	-1.9	-47.6	<0.001	0.59 **
		Follow Up	34.0 (10.9)				41.5 (11.7)				0.65 **
Mental Component Summary (MCS) Score		Baseline	34.5 (6.2)	6.7	52.0	<0.001	56.6 (5.5)	-1.9	-52.9	<0.001	3.95 ***
		Follow Up	41.2 (11.2)				54.7 (8.3)				1.54 ***
Physical Functioning Scale		Baseline	34.5 (12.3)	-1.4	-12.7	<0.001	44.1 (11.1)	-2.1	-52.5	<0.001	0.85 ***
		Follow Up	33.1 (12.4)				42.0 (11.8)				0.75 **
Role-Physical Scale		Baseline	33.1 (10.5)	0.5	3.3	0.001	46.3 (11.8)	-2.6	-45.5	<0.001	1.13 ***
		Follow Up	33.6 (10.9)				43.7 (12.5)				0.82 ***
Bodily Pain Scale		Baseline	37.0 (10.2)	-0.1	-0.4	0.690	47.2 (10.2)	-1.6	-35.8	<0.001	1.00 ***
		Follow Up	36.9 (10.4)				45.6 (10.5)				0.83 ***
General Health Scale		Baseline	37.0 (10.3)	0.1	1.2	0.222	48.9 (9.5)	-1.7	-50.0	<0.001	1.24 ***
		Follow Up	37.1 (10.7)				47.2 (10.1)				0.99 ***
Vitality Scale		Baseline	37.0 (8.6)	1.7	16.7	<0.001	51.0 (9.4)	-1.8	-48.1	<0.001	1.51 ***
		Follow Up	38.7 (9.8)				49.2 (10.0)				1.05 ***
Social Functioning Scale		Baseline	34.1 (10.1)	3.1	22.4	<0.001	52.1 (8.3)	-2.2	-49.3	<0.001	2.10 ***
		Follow Up	37.2 (12.3)				49.9 (10.1)				1.21 ***
Role-Emotional Scale		Baseline	29.8 (7.7)	7.5	46.0	<0.001	53.0 (6.7)	-2.9	-57.6	<0.001	3.39 ***
		Follow Up	37.3 (12.9)				50.1 (10.2)				1.21 ***
Mental Health Scale		Baseline	36.5 (8.8)	4.0	32.1	<0.001	55.0 (6.7)	-1.4	-39.9	<0.001	2.64 ***
		Follow Up	40.5 (11.1)				53.6 (8.1)				1.53 ***

Table 2
SF-36 Mean Normed Scores

Note: Normed to the 1990 general population. Ware, Snow, Kosinski and Gandek (1993).

 **Medium effect size, between 0.50 and 0.80; ***Large effect size, greater than 0.80 between the high-risk and low-risk groups.

Table 3 Change in Smoking Status from Baseline to Follow-Up					χ^2 Value	p Value	Effect Size
	High-Risk Group N=6,975		Low-Risk Group N=44,725				
Current Smoker at Baseline and Follow-Up	1,040	17.00%	3,786	9.30%	385.2	<0.001	0.23 *
Non-Smoker at Baseline and Follow-Up	2,316	37.80%	17,091	42.00%			0.09
Ex-Smoker at Baseline and Follow-Up	2,431	39.70%	18,148	44.60%			0.10
Current Smoker at Baseline to Ex-Smoker at Follow-Up	205	3.30%	1,071	2.60%			0.04
Non-Smoker at Baseline to Current Smoker at Follow-Up	16	0.30%	56	0.10%			0.05
Ex-Smoker at Baseline to Current Smoker at Follow-Up	118	1.90%	537	1.30%			0.05
Missing/Total	849	/ 6,126	4,036	/ 40,689			

* Small effect size, between 0.20 and 0.50.

Table 4 Impaired Activities of Daily Living at Baseline †						
	Number and Percentage Impaired					
Activity of Daily Living	High-Risk Group N = 6,975		Low-Risk Group N = 44,725		χ2 Value	p Value	Effect Size
Walking	3,760	54.5%	10,675	24.0%	2744.9	<0.0001	0.64**
Getting In or Out of Chairs	3,094	44.9%	8,020	18.1%	2533.1	<0.0001	0.59**
Bathing	1,750	25.3%	2,576	5.8%	2957.3	<0.0001	0.57**
Dressing	1,434	20.8%	2,051	4.6%	2465.4	<0.0001	0.51**
Toileting	1,041	15.1%	1,456	3.3%	1799.8	<0.0001	0.43*
Eating	738	10.7%	863	1.9%	1521.6	<0.0001	0.39*

† The categories of "unable to do" and "have difficulty" were combined to establish impairment.

* Small effect size, between 0.20 and 0.50; **Medium effect size, between 0.50 and 0.80.

Table 5 Impaired Activities of Daily Living at Follow-Up †						
Number and Percentage Impaired						
	High-Risk Group **N = 6,975**		**Low-Risk Group** **N=44,725**		**χ^2 Value**	**p Value**	**Effect Size**
Walking	3,966	57.4%	13,041	29.4%	2120.2	<0.0001	0.57**
Getting In or Out of Chairs	3,307	47.9%	9,956	22.4%	2031.0	<0.0001	0.54**
Bathing	1,909	27.6%	3,723	8.4%	2269.9	<0.0001	0.52**
Dressing	1,572	22.7%	2,986	6.7%	1894.9	<0.0001	0.47*
Toileting	1,105	15.9%	2,050	4.6%	1341.7	<0.0001	0.39*
Eating	762	11.1%	1,263	2.8%	1062.7	<0.0001	0.34*

† The categories of "unable to do" and "have difficulty" were combined to establish impairment.

* Small effect size, between 0.20 and 0.50; **Medium effect size, between 0.50 and 0.80.

Table 6
Chronic Conditions at Baseline and Follow-Up

Condition	High-Risk Group N=6,975		Low-Risk Group N=44,725		χ^2 Value	p Value	Effect Size
Baseline							
Angina Pectoris/CAD‡	1,465	21.60%	5,994	13.60%	297.8	<0.001	0.21 *
Arthritis Hand/Wrist	3,169	46.30%	13,840	31.40%	586.3	<0.001	0.31 *
Arthritis Hip/Knee	3,310	48.30%	15,264	34.60%	478.9	<0.001	0.28 *
Any Cancer	636	9.40%	1,876	4.30%	327.2	<0.001	0.21 *
Congestive Heart Failure	988	14.40%	5,456	12.30%	22.5	<0.001	0.06
GI Problems§	744	11.00%	1,855	4.20%	556.4	<0.001	0.26 *
Diabetes	1,450	21.10%	5,859	13.30%	299.2	<0.001	0.21 *
Emphysema/Asthma/COPD ††	1,408	20.60%	4,687	10.60%	563.1	<0.001	0.28 *
Hypertension/HBP‡‡	4,059	59.00%	22,008	49.80%	202.4	<0.001	0.18
Myocardial Infarction	924	13.70%	3,748	8.50%	185.2	<0.001	0.17
Other Heart Conditions	1,952	28.80%	8,151	18.50%	387.0	<0.001	0.24 *
Sciatica	2,419	35.50%	8,875	20.20%	800.1	<0.001	0.34 *
Stroke	627	9.25	2,133	4.80%	220.2	<0.001	0.17
Follow-Up							
Angina Pectoris/CAD	1,511	22.30%	6,660	15.10%	226.5	<0.001	0.19
Arthritis Hand/Wrist	3,250	47.50%	14,460	32.70%	568.7	<0.001	0.30 *
Arthritis Hip/Knee	3,511	51.20%	16,715	37.80%	449.3	<0.001	0.27 *
Any Cancer	812	11.90%	2,688	6.10%	313.7	<0.001	0.21 *
Congestive Heart Failure	1,082	15.70%	6,435	14.50%	7.2	0.007	0.03
GI Problems	663	9.80%	1,887	4.30%	372.2	<0.001	0.22 *
Diabetes	1,588	23.00%	6,742	15.20%	267.9	<0.001	0.20 *
Emphysema/Asthma/COPD	1,473	21.50%	5,401	12.20%	438.0	<0.001	0.25 *
Hypertension/HBP	4,209	61.10%	23,896	53.90%	124.5	<0.001	0.15
Myocardial Infarction	1,032	15.20%	4,266	9.70%	191.8	<0.001	0.17
Other Heart Conditions	1,966	28.90%	9,131	20.70%	234.0	<0.001	0.19
Sciatica	2,405	35.40%	9,320	21.20%	671.7	<0.001	0.32 *
Stroke	740	10.90%	2,725	6.20%	204.3	<0.001	0.17

* Small effect size, between 0.20 and 0.50.

‡Coronary artery disease

§Crohn's disease/ulcerative colitis/inflammatory bowel disease

††Chronic Obstructive Pulmonary Disease

‡‡High blood pressure

		High-Risk Group N = 6,975		Low-Risk Group N = 44,725		χ^2 Value	p Value	Effect Size
Table 7 **Number of Chronic Conditions**								
Time Point	Number of Conditions							
Baseline	No Conditions	427	7.00%	6,744	16.30%	1,761.40	0.001	0.30 *
	One Condition	904	14.80%	9,815	23.80%			0.23 *
	Two Conditions	1,102	18.00%	9,193	22.30%			0.11
	Three Conditions	1,170	19.10%	6,931	16.80%			0.06
	Four or Five Conditions	1,597	26.10%	6,553	15.90%			0.25 *
	Six or More Conditions	922	15.10%	2,036	4.90%			0.35 *
	Missing/Total	853	/ 6,122	3,453	/ 41,272			
Follow-Up	No Conditions	389	6.50%	5,563	13.60%	1,356.10	0.001	0.24 *
	One Condition	765	12.80%	8,835	21.60%			0.23 *
	Two Conditions	1,104	18.50%	8,944	21.90%			0.08
	Three Conditions	1,098	18.40%	7,299	17.90%			0.01
	Four or Five Conditions	1,617	27.00%	7,564	18.50%			0.20 *
	Six or More Conditions	1,009	16.90%	2,636	6.50%			0.33 *
	Missing/Total	993	/ 5,982	3,884	/ 40,841			

* Small effect size, between 0.20 and 0.50.

Table 8
Comparison of Cohort I Beneficiaries:
Voluntarily Disenrolled, Involuntarily Disenrolled, Deceased, Non-Respondent, and Mental Health Analytic Samples

Variable	Category	Voluntarily Disenrolled		Involuntarily Disenrolled		Deceased		Non-Respondents		Cohort I Mental Health Sample		χ^2 Value	*p* Value
Total		N = 27,576		N = 34,483		N = 5,928		N = 8,012		N = 51,700			
Gender	Male	11,401	41.70%	14,764	43.20%	3,077	52.4%*	3,426	43.20%	21,915	42.40%	238.6	<0.001
	Female	15,966	58.30%	19,390	56.80%	2,800	47.6%*	4,510	56.80%	29,783	57.60%		
	Missing/Total	209	/ 27,367	329	/ 34,154	51	/ 5,877	76	/ 7,936	2	/ 51,698		
Race/Ethnicity	African American	1,657	6.10%	2,084	6.10%	339	5.80%	753	9.6%*	2,337	4.50%	891.5	<0.001
	Asian/Pacific Islander	368	1.40%	337	1.00%	60	1.00%	138	1.80%	852	1.70%		
	American Indian/Alaskan Native	224	0.80%	214	0.60%	54	0.90%	90	1.10%	305	0.60%		
	Non-Hispanic White	23,356	85.90%	30,130	88.70%	5,111	87.60%	6,334	80.5%*	45,677	88.90%		
	Hispanic White	840	3.10%	585	1.70%	117	2.00%	260	3.30%	1,221	2.40%		
	Non-Hispanic Other/Multiracial	331	1.20%	370	1.10%	88	1.50%	124	1.60%	428	0.80%		
	Hispanic Other/Multiracial	422	1.60%	258	0.80%	68	1.20%	167	2.10%	580	1.10%		
	Missing/Total	378	/ 27,198	505	/ 33,978	91	/ 5,837	146	/ 7,866	300	/ 51,400		
Age Group	Under 45	224	0.80%	228	0.70%	19	0.30%	120	1.50%	233	0.50%	2,383.00	<0.001
	45-54	480	1.70%	512	1.50%	56	0.90%	151	1.90%	634	1.20%		
	55-64	1,101	4.00%	1,185	3.40%	203	3.40%	331	4.10%	1,636	3.20%		
	65-74	16,421	59.50%	20,225	58.70%	2,341	39.5%*	4,505	56.20%	31,758	61.40%		
	75-84	8,043	29.20%	10,557	30.60%	2,387	40.3%*	2,419	30.20%	15,488	30.00%		
	85 or Over	1,307	4.70%	1,776	5.20%	922	15.6%*	486	6.10%	1,951	3.80%		
	Missing/Total	0	/ 27,576	0	/ 34,483	0	/ 5,928	0	/ 8,012	0	/ 51,700	*F* Value	
	Mean (SD)	72.0	(7.60)	72.4	(7.40)	75.9**	(8.30)	72.2	(8.40)	72.2	(6.80)	376.5	<0.001
Marital Status	Married	16,168	59.20%	20,438	59.90%	3,080	52.50%	4,268	53.90%	31,277	60.70%	367.7	<0.001
	Divorced	2,796	10.20%	3,247	9.50%	568	9.70%	874	11.00%	4,924	9.60%		
	Separated	281	1.00%	333	1.00%	65	1.10%	129	1.60%	363	0.70%		
	Widowed	7,320	26.80%	9,067	26.60%	1,974	33.60%	2,349	29.70%	13,374	25.90%		
	Never Married	747	2.70%	1,017	3.00%	181	3.10%	299	3.80%	1,609	3.10%		
	Missing/Total	264	/ 27,312	381	/ 34,102	60	/ 5,868	93	/ 7,919	153	/ 51,547		

* Small effect size, between 0.20 and 0.50 between group and Cohort I Mental Health Sample.

** Medium effect size, between 0.50 and 0.80 between group and Cohort I Mental Health Sample.

		Voluntarily Disenrolled		Involuntarily Disenrolled		Deceased		Non-Respondents		Cohort I Mental Health Sample		χ^2	p
Table 8, continued													
Comparison of Cohort I Beneficiaries: Voluntarily Disenrolled,													
Involuntarily Disenrolled, Deceased, Non-Respondent, and Mental Health Analytic Samples													
Variable	Category												
Total		N = 27,576		N = 34,483		N = 5,928		N = 8,012		N = 51,700		Value	Value
Education Level	8th Grade or Less	2,524	9.30%	2,763	8.10%	670	11.50%	821	10.40%	3,330	6.50%	745.2	<0.001
	Some High School	4,786	17.70%	5,691	16.80%	1,212	20.90%	1,527	19.40%	7,762	15.20%		
	High School/GED	9,528	35.20%	12,099	35.60%	1,992	34.30%	2,730	34.70%	19,225	37.60%		
	Some College	6,219	23.00%	7,899	23.30%	1,247	21.50%	1,737	22.10%	12,181	23.80%		
	College Graduate	1,948	7.20%	2,664	7.80%	347	6.00%	487	6.20%	4,035	7.90%		
	More than 4 Year Degree	2,081	7.70%	2,841	8.40%	341	5.90%	561	7.10%	4,560	8.90%		
	Missing/Total	490	/ 27,086	526	/ 33,957	119	/ 5,809	149	/ 7,863	607	/ 51,093		
Income Level	Less than $5,000	775	3.50%	848	3.00%	250	5.40%	307	5.10%	994	2.30%	894.6	<0.001
	$5,000 - $9,999	2,961	13.30%	3,222	11.40%	778	16.70%	940	15.60%	4,546	10.60%		
	$10,000 - $19,999	6,792	30.60%	8,392	29.60%	1,567	33.50%	1,908	31.60%	12,462	29.10%		
	$20,000 - $29,999	4,885	22.00%	6,393	22.60%	974	20.90%	1,213	20.10%	9,896	23.10%		
	$30,000 - $39,999	3,010	13.60%	4,060	14.30%	556	11.90%	713	11.80%	6,280	14.70%		
	$40,000 - $49,999	1,584	7.10%	2,236	7.90%	238	5.10%	372	6.20%	3,583	8.40%		
	$50,000 - $79,999	1,494	6.70%	2,115	7.50%	222	4.80%	402	6.70%	3,500	8.20%		
	$80,000 - $99,999	285	1.30%	459	1.60%	39	0.80%	84	1.40%	723	1.70%		
	$100,000 or more	398	1.80%	603	2.10%	47	1.00%	92	1.50%	822	1.90%		
	Missing/Total	5,392	/ 22,184	6,155	/ 28,328	1,257	/ 4,671	1,981	/ 6,031	8,894	/ 42,806		
Homeowner Status	Owned	20,289	75.50%	26,030	77.40%	4,025	70.2%*	5,665	73.10%	40,570	80.00%	518.1	<0.001
	Owned or being bought by someone in your family other than you	1,653	6.20%	1,988	5.90%	396	6.90%	532	6.90%	2,498	4.90%		
	Rented for money	4,436	16.50%	5,045	15.00%	1,188	20.70%	1,415	18.30%	6,873	13.60%		
	Not owned and one in which you live without payment or rent	482	1.80%	588	1.70%	124	2.20%	134	1.70%	759	1.50%		
	Missing/Total	716	/ 26,860	832	/ 33,651	195	/ 5,733	266	/ 7,746	1,000	/ 50,700		
Medicaid Status	Out of Medicaid	26,691	96.80%	33,735	97.80%	5,692	96.00%	7,750	96.70%	50,722	98.10%	227.3	<0.001
	In Medicaid	885	3.20%	748	2.20%	236	4.00%	262	3.30%	978	1.90%		
	Missing/Total	0	/ 27,576	0	/ 34,483	0	/ 5,928	0	/ 8,012	0	/ 51,700		

* Small effect size, between 0.20 and 0.50 between group and Cohort I Mental Health Sample.