Using Claims Data to Identify Medicare+Choice Enrollees At Risk for a Decline in Functional Health Status

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Abstract

Background

The purpose of the Medicare program is to maintain and enhance the health status of its beneficiaries, without excessive cost. Because late in life one faces declines in health status, much of the medical intervention on behalf of the elderly is designed to forestall declines in health status. To do so more effectively, health plans have developed two sets of methods: Identification of people at risk for decline and development of interventions that lessen that risk. This paper pertains to the first method.

Methods

This task order links survey data to Medicare+Choice (M+C) plans' administrative (enrollment and claims) data to achieve two objectives:

- To characterize utilization of health care including diagnoses and procedures by members who deteriorate, remain stable, or improve over 2 years.
- To develop an algorithm (that uses only administrative data) for identifying enrollees at risk for decline.

All M+C plans are required to participate annually in the Medicare Health Outcomes Survey (HOS), which incorporates the widely-used Medical Outcome Study 36-Item Short-Form Health Survey (SF-36). The HOS yields two scores, Physical Component Summary (PCS) and the Mental Component Summary (MCS). This task order uses a convenience sample of ten geographically disperse health plans affiliated with a large managed care organization (MCO).

The key variables involve a change in physical functional status or in mental functional status. Decline in health status was defined as either death or a statistically significant drop in health status. Given this dichotomous variable, a logistic regression was used.

Much work has been done over the last two decades using claims information to predict an enrollee's health care costs, usually motivated by actuarial needs. We used two of these risk assessment algorithms, often termed "predictive models," one proprietary and one in the public domain. These algorithms place enrollees into risk categories, each one of which has a predicted relative cost. This project, however, uses the risk categories to predict functional status, not cost. Risk factors associated with a decline in health status were also assessed. (e.g., whether the enrollee had type I diabetes).

Results

This study found a greater decline in the Physical Component Summary (PCS) compared to the Mental Component Summary (MCS). Cost per enrollee per month was highest for enrollees who died in the next 24 months, which is consistent with the often-reported finding that in the last six months of life health care cost per month is several times the average. Cost per month was essentially the same regardless of whether one's PCS remained constant or decreased. Interestingly, it was substantially higher for enrollees whose PCS increased in the next two years, perhaps because they were recovering from an acute episode.

Risk categories are predictive of a decline in PCS and MCS. Two logistic regressions (one using each predictive model) were run for PCS and MCS separately. All of the four these are highly significant, and each regression has at least a dozen conditions that are significant predictors of decline in functional status.

Conclusion

Using predictive models (some of which are widely available), a health plan can identify enrollees who are at-risk for a decline in health status.

Key Users/Stakeholders

Key users of these results include local health plans, national plans, disease management vendors, and scholars working on care management programs.

Implications

These findings have two possible uses: for quality checks for an individual health plan and for the development of better disease management and case management programs for all plans nationally. These programs are most likely to be developed by large health plan and disease management vendors. However, the methodology developed here could be applied by a local plan for quality assessment. As such, the methodology can serve as part of an HOS toolkit.

Background

A major goal of the Medicare program is to maintain and enhance the health status of its beneficiaries, without excessive cost. Because late in life one faces declines in health status, much of the medical intervention on behalf of the elderly is designed to forestall declines in health status. To do so more effectively, health plans have developed two sets of methods: Identification of people at risk for decline and development of interventions that lessen that risk. This paper pertains to the first method.

The plausibility of implementing this approach is substantially greater for beneficiaries enrolled in Medicare+Choice (M+C) plans than for beneficiaries in fee-for-service (FFS) Medicare. Health plans have the infrastructure to assess the risks for a decline in health status and target medical care according to those risks (Boult, et al, 1998; Berenson and Horvath, 2003, p. 43). Not surprisingly, more effort has been put into assessing and analyzing the health status of M+C enrollees than FFS beneficiaries. However, in 2005 CMS started implementing within FFS a chronic care improvement program, now called Medicare Health Support.[1] This task order is part of the M+C effort.

Analyses of who might benefit from a medical intervention usually involve one of two methods: randomized controlled trials and observational data. To definitively measure the effectiveness of the intervention, one would randomly assign patients with specified diagnoses to treatment and control groups, those that receive an intervention and those who do not. Alternatively, one could analyze existing observational data, in particular, by regressing a set of variables on the change in health status. From those regression results, one could identify a category of elderly whose health status is likely to decline. Although people who are unlikely to experience a decline in health status might benefit from an intervention, those elderly at risk for decline are more plausible candidates for intervention. Although this second approach yields only suggestive results, the first approach is much more difficult to implement. This paper analyzes observational data.

The remainder of this background section reviews the interventions conducted by health plans on behalf of at-risk enrollees. It also reviews how health plans identify people for intervention programs and the published literature on the predictors of decline.

Health Plan Interventions for At-Risk Enrollees

A major rationale for health plans is their management of health care. Care management can be in response to high cost utilization such as hospital admissions, expensive durable medical equipment, or pharmaceutical treatment. Care management can also be more proactive, and these usually take one of two forms: disease management and case management. In its purest form, a disease management program (DMP) is limited to people with a specific diagnosis, whereas case management pertains to an individual who may have multiple health conditions.

[1] http://www.cms.hhs.gov/CCIP (accessed on Aug. 10, 2005)

According to a survey of health plans, DMPs almost universally have these components (Welch, et al., 2002):

- Use evidence-based guidelines,
- Identify the population with the condition,
- Stratify that population by risk and match the intervention with the need, and
- Educate patients in self-management.

These components are common in case management programs (Chen, et al., 2000), although guidelines probably play less of a role because of the greater heterogeneity of patients with multiple conditions. Of the conditions prevalent among the elderly, the most common DMPs in 2000 were for diabetes, congestive heart failure (CHF), and coronary artery disease.

There is some evidence that DMPs are successful but interpretation is controversial. Performing a meta-analysis of diabetes DMPs, Knight et al. (2005) found that such programs improve glycemic control to a modest degree. In a similar analysis of depression DMPs, Nyemeyer-Gromen et al. (2004) found that such programs enhanced quality of care, with costs in the range of other widely accepted public health improvements.

In a study of DMPs for coronary artery disease, heart failure, diabetes, and asthma, Fireman et al. (2004) found that process indicators increased sharply and costs for covered patients grew more slowly than for comparison groups. However, during the study period, screening practices became more aggressive, so that at the end of the study period patients entered these DMPs less sick than similar patients at the beginning of the period. Therefore, the authors were unwilling to conclude that the programs saved money. At a more general level, Villagra (2004) called for a standard methodology that evaluates clinical and financial outcomes of DMPs.

Identifying People for Intervention

Identification of people for intervention has two components: initial identification and risk stratification (Welch, et al., 2002). There are four widely-used methods of initial identification: physician referral, self-referral, pharmacy utilization data, and other claims (or encounter) data. The prevalence of a method varies across conditions. For example, physician referral is more prevalent for CHF than diabetes, but pharmacy utilization is more prevalent for diabetes. This latter pattern reflects that fact that one of the major deficiencies in the treatment of CHF is under-use of medication. There are five widely-used methods of risk stratification: physician assessment, patient self-assessment, pharmacy data, other claims data, and lab and diagnostic testing results.

Identification and stratification sometimes involves a two-step process, in which a less expensive method is used to identify patients and a more expensive method is used to stratify them. For instance, once diabetics have been identified (often using utilization data), it becomes efficient to stratify them using laboratory test results, which health plans often do not have in electronic form. Test results are used to stratify diabetics in two-thirds of health plans, because blood sugar level is one of the best predictors of future complications.

In peer-reviewed literature, the focus has been on identifying patients at risk for a decline in health status, often regardless of the nature of their specific conditions. Health status is often measured by a person's ability to function (e.g., climb stairs, be free from pain, and not feel depressed). When so measured, it is referred to as "functional status." The most widely-used instrument is the Medical Outcome Study 36-Item Short-Form Health Survey (SF-36) (Ware, et al., 2004). For M+C enrollees, these data are collected via the Medicare Health Outcome Survey (HOS), which is described below.

Stuck, et al. (1998) reviews the literature prior to 1998. More recently, studies in the decline in the health status of the elderly have sometimes used the HOS (Haffer, et al, 2003), but not always (Dove, Duncan, and Robb, 2003). The former performed univariate analyses of the effect of certain chronic conditions and other factors on changes in health status. For instance, on average, beneficiaries with hypertension experienced a drop of 2.1 points in physical status and .7 points in mental status. Beneficiaries who were already depressed experienced a 1.9 point drop in physical status but only a .1 point drop in mental status.

Objectives of this Task Order

Preferably using administrative data, M+C plans would be able to identify enrollees who are at risk for a decline in health status. Identification of such enrollees would allow for early medical intervention. Univariate analyses have been performed, but multivariate analyses are rare in the literature.

This task order links HOS survey data to M+C plans' administrative (enrollment and claims) data to achieve two objectives:

- To characterize utilization of health care including diagnoses and procedures by members who deteriorate, remain stable or improve over 2 years as measured by the SF-36 questionnaire.
- To develop an algorithm (that uses only administrative data) for identifying enrollees at risk for decline.

To categorize conditions, this task order uses software designed to assess risk, often termed "predictive models," which are widely available. These risk categories serve as predictors of decline in health status.

Data and Methods

Setting

M+C enrollment rose slowly in the late 1980s and then rapidly throughout the 1990s, peaking in 1999, with 17 percent of Medicare beneficiaries (Gold, 2003). Enrollment has declined since then, due to a slowdown in the growth in Medicare's payment rate and a general backlash against managed care. Many plans left the program between 1999 and 2001. This study pertains to M+C plans over the period from 1998 to 2002.

Data

A key component of this project is the Medicare Health Outcomes Survey (HOS) data.

Medicare Health Outcomes Survey (HOS)

Building on the Medical Outcome Study, the HOS is a longitudinal, self-administered survey of Medicare beneficiaries (Jones, et al., 2004). Since 1998, all M+C plans have been required to participate in this quality assessment/improvement initiative. The heart of the HOS is the SF-36 measures of physical and mental health status. To facilitate adjustment of the SF-36 scores for case-mix, the HOS includes assessments of Activities of Daily Living (ADLs), information on 13 chronic medical conditions, and demographic and socioeconomic data.

One thousand Medicare beneficiaries, who were continuously enrolled for a six-month period, were randomly sampled from each plan and surveyed to obtain baseline data. Whenever a health plan had fewer than 1000 members, all eligible members were included in the sample. Two years later, respondents who were still enrolled in the MCO and provided sufficient information on the baseline survey were surveyed again for follow-up data. Cohort I was surveyed in 1998 and resurveyed in 2000. Cohort II was surveyed in 1999 and resurveyed in 2001. Collection of HOS data continues on a cohort basis.

Data were processed and scored in a standardized way to facilitate comparison of plans. Questions comprising the SF-36 were used to calculate two summary measures: the Physical Component Summary (PCS) and the Mental Component Summary (MCS). Scores were derived using norm-based algorithms and a missing data estimation utility. Very high PCS scores indicate the person has minimal physical limitations, disabilities or declines in well-being, high energy level, and a health rating of "excellent." High MCS scores indicate frequent positive affect, absence of psychological distress, and minimal limitations in usual social and role activities due to emotional problems.

The case-mix adjusted results are reported to plans. The main focus of the reports is to show health plans whether their enrollees' physical and mental functional status has improved, stayed the same, or gotten worse compared to other health plans. To facilitate development of quality improvement interventions that might prevent functional decline among the population of enrollees, health plans receive beneficiary level data and a user's guide.

Study Data

This project analyzes a convenience sample of enrollees from 10 M+C health plans operated by a large managed care organization (MCO), which had about six percent of the M+C enrollment nationally in the middle of our study period. This MCO maintains a data warehouse with administrative data—enrollment and claims data—for many of its enrollees, including those in M+C plans. Although data originates from different claims processing systems, the data in this warehouse are modified to facilitate analysis. For instance, original claims and adjustments are combined. Each enrollee is assigned a

single ID number for research purposes, which allows linkage across time and various data files and also protects the enrollee's identity. Users can readily extract records by such variables as enrollee ID and date of service.

For M+C enrollees, we extracted all claims—facility, professional, and pharmacy—with dates of service within 12 months prior to the baseline survey date. These claims contain variables that are typical across payer systems. For instance, facility claims have revenue codes representing inpatient room and board charges. Professional claims have diagnostic codes: International Classification of Diseases, 9th Clinical Modification (ICD9) codes. Pharmacy claims have National Drug Codes. Typical of M+C plans, our study plans had limited drug benefits, which varied by plan and year. Hence, pharmacy claims may be incomplete for some enrollees.

HOS data were obtained from CMS for cohorts 1 through 3 for ten health plans. The raw database has 13,020 observations. As detailed in Table 1 [there's a typo in line 9 of Table 1 (omit +C10) in front of database], this sample size was pared down when several screens were applied. In particular, almost one thousand observations were dropped because the respondent (who was not necessarily the enrollee) differed between the two surveys. About another two thousand were dropped because the period covered by the database did not include a minimum of six months immediately prior to the baseline survey. This process yielded 9,209 observations for which we had both administrative data and data on the baseline survey.

To analyze any change in functional status from baseline measures, we obtained results from the follow-up survey as well. We might lack follow-up survey results for people either because they died prior to the second survey or they were alive but did not respond to that survey. As shown in Table 2, 10.2 percent of the sample died within 24 months of the baseline survey, 23.5 percent were alive at that time but did not respond to the survey, and the remaining 66.3 percent responded. Hence, analyses of the change in functional change between baseline and follow-up surveys pertain to 6,101 observations.[2]

Methods

We wish to predict which enrollees will decline in functional health status over a two-year period, using as predictors the presence or absence of certain health conditions at the beginning of the period. This goal suggests some variant of regression analysis. The next subsection discusses the definition of the decline in health status, which has implications for the variant of regression analysis; the second subsection describes how conditions are defined.

Analytic Approach

Our dependent variables involve the change in physical functional status or in mental functional status.

[2] Three enrollees responded to the follow-up survey but died within 24 months of the baseline survey., reflecting the fact that the interval between the two surveys can be greater or less than 24 months. These three observations are combined with other observations of enrollees who died.

Given HOS data, change is necessarily defined over a two-year period. Following others (e.g., HEDIS, 2002, p. 83), we consider an enrollee to have increased in functional status if his or her increase is greater than 95 percent confidence interval. Thus, an increase in PCS of 5.66 points or more is considered to be an increase in functional status, and a decrease of PCS of 5.66 points or more is considered to be a decrease. The analogous figure for MCS is 6.72 points.

Dealing with observations for enrollees who died is problematic. On the one hand, one cannot compute the change in health status, because health status is not conventionally measured for decedents. On the other hand, death is arguably the greatest decrease in functional status.

We incorporate death in our analyses in two ways. First, we define two variables: the probability of being alive two years after the baseline survey and the change in status, conditional on being alive. The two variables are logically independent. The determinants of the probability of being alive are estimated using a logistic regression, and the determinants of the change in status are estimated with a linear regression.

Second, we treat death as a serious decrease in functional status. Observations for enrollees who died and enrollees who took the follow-up survey are pooled. A logistic regression is used to estimate the determinants of whether an enrollee experienced a decrease in status (such as dying) or not.

Risk Assessment Algorithms

Perhaps the most powerful predictors of which enrollees were at risk for functional decline involve laboratory results and other information in medical charts. However, as a practical matter, health plans are limited to the use of information on claims. Much work has been done over the last two decades on using claims information to predict an enrollee's health care costs, usually motivated by actuarial needs. These risk assessment algorithms are often termed "predictive models" and are widely available, although not necessarily for free.

We selected two such models, using only their classification system, not the weights used to predict cost. The Chronic Illness and Disability Payment System (CDPS) was chosen because it is the only model in the public domain. The Episode Risk Groups (ERGs) was chosen, in part because it was readily available to the project and in part because it predicts cost as well as any risk assessment model (Cumming, et al., 2002). The exact ranking relative to alternatives depends on the choice of metric, R-square vs. mean absolute prediction error.

ERGs are a propriety software package produced by Ingenix. The package uses an enrollee's facility, professional, and pharmacy claims to construct episodes of care. An episode may have a begin and end date, although episodes of chronic care are often open-ended. Each episode is classified into one of 120 ERGs, usually defined in terms of diagnoses. An enrollee can have overlapping episodes of different groups, and can have

multiple, nonoverlapping episodes of the same ERG. The present project uses only information on whether an enrollee was in each ERG, ignoring how recently the episode occurred.[3]

CDPS was originally developed for the Medicaid program but has been modified for Medicare enrollees (Kronick, et al, 2000). It uses diagnostic codes found on facility and professional claims (but not pharmacy claims). CDPS has 20 major categories of diagnoses, which largely correspond to body systems. Most of the major categories are subdivided according the cost level of a diagnosis.

Table 6 (see below) crosswalks the "major practice categories" (MPC) of ERGs and the "major categories" of CDPS. The crosswalk is necessarily rough and is only intended to help the reader to quickly compare the results from the two classification systems. In most cases, there is a straight-forward one-to-one relationship, reflecting both systems' use of body systems as an organizing device. A counter-example is cancer: CDPS has a major category for cancers, which in ERGs are classified according to cancer site.

In our multivariate analyses of declines in functional status, we include sex and age (three variables for age ranges, one of which is excluded) as well as the above risk assessment categories.

Results

Study Population

Of the three cohorts studied, the first is underrepresented, probably because of HOS start-up issues and because the database is less extensive in its earlier years. Descriptive statistics of the study population are presented below in Table 5A. Our analytic file has regional diversity, except that the West is not represented. There are three states in the South, two in the Northeast, and three in the Central region.

The young old (65-74) are overrepresented, the under 65 (i.e., largely the disabled) and the over 75 are underrepresented. The distribution by sex and race are similar to that of the Medicare population as a whole. Enrollees with education beyond high school are unrepresented and those that did not graduate from high school are somewhat overrepresented, consistent with the notion that health plans offer beneficiaries lower cost (premiums plus out-of-pocket copayments), which is especially appealing to people of modest means. Beneficiaries who are dually eligible for Medicare and Medicaid are substantially underrepresented. Medicaid pays for their Medicare copayments, so the duals save less than the nonduals by enrolling in health plans.

[3] Although pharmacy coverage in these health plans is complete and hence the data on pharmacy claims are incomplete, we run the ERG using the available pharmacy claims as well as facility and professional claims. Were we creating an algorithm, the use of pharmacy claims would be inappropriate. However, in applying an algorithm, the more information, the greater the ability to identify enrollees with certain conditions.

Correlates of Changes in Health Status

Table 3 presents summary statistics for physical and mental health scores and for their changes. PCS scores are lower than for MCS and over the two-year period PCS fell further than MCS, which is consistent with previous work (Haffer, et al., 2003). More enrollees experienced an increase in MCS than PCS and fewer experienced a decrease. These results suggest that aging has more impact on physical than mental health.

Cost and utilization patterns are disaggregated by change in PCS, as shown in Table 4. Cost per enrollee per month was highest for enrollees who died in the next 24 months, which is consistent with the often-reported finding that in the last six months of life health care cost per month is several times the average. Cost per month was essentially the same regardless of whether one's PCS remained constant or decreased. Interestingly, it was substantially higher for enrollees whose PCS increased in the next two years. This probably reflects regression toward the mean, discussed below. The patterns found in cost are largely replicated in hospitalization rate and the physician visit rate.

Tables 5 A-E present univariate analyses of PCS level at baseline and PCS over the two-year period. Both level and change are measured relative to a reference category, which is typically the most prevalent category. For ordinal variables, the reference category was the more prevalent of the two extreme values, which maximizes the likelihood of finding a significant difference.

Table 5A reports a number of significant differences in levels but no significant differences in change. Enrollees in southern State A have significantly lower PCS scores than New England State B (the reference category), and enrollees in Midwest State C have significantly higher scores PCS scores decrease with age but are higher for males, despite their higher mortality rate. PCS scores increase with both education level and income, and are lower for enrollees who are eligible for Medicaid. Relative to married enrollees, widowed enrollees have lower scores, as do the few enrollees who are separated.

Enrollees in fair or poor health have much lower PCS scores than enrollees in excellent or very good health, which is reassuring given the two measures are conceptually very similar. Enrollees in fair or poor health tend to improve in the next two years. This probably represents a regression toward the mean, in which ones health measured at any given time includes a transient component that typically dissipates (Welch, 1985). Clinically, this takes the form of an acute condition (or acute manifestation of a chronic condition) when the baseline survey was taken. When the follow-up survey was conducted, recovery may have occurred, at least in part. This pattern appears in Tables 5 B through E.

Most of the surveyed conditions have a significantly negative effect on PCS scores (Table 5C), as one would expect. The only exceptions to this pattern are a current diagnosis for either breast or prostate cancer. Stroke and two heart conditions have a significant improvement, presumably reflecting recovery from an acute event. A current diagnosis of lung cancer is also associated with a significant improvement. However,

because of the low survival rate for lung cancer, this pattern may be indicative that the sicker enrollees die.

Virtually all of the reported symptoms have significantly negative effects on PCS score (Table 5D). In general, the effect on PCS score increases with the severity of the symptom. All of the ADLs in the survey have significantly negative effects on PCS scores (Table 5E). An anomaly is that the most severe ADL deficit level is associated with less of an effect than the next most severe deficit level.[4] For instance, enrollees who have difficulty bathing have a PCS score 15.2 below enrollees without any difficulty, but those unable to bath (a more severe deficit) have a score only 12.7 below the reference category. Similarly, when finding that stroke patients decreased in physical status but increased in mental health status between 6 and 16 months after their stroke, Jonsson, et al. (2005) postulated an internal adaptation to their life situations. Singer et al. (1999) found that mental health status remained stable in the face of declining physical health for patients with one of four chronic conditions. They also suggested adaptation. Regardless, the enrollees in these most severe categories never exceed 3 percent.

Predictors of Declines in Health Status

Tables 7A-D report the prevalence rates of risk categories. Tables 7A and 7B pertain to ERGs, with the first table ordering ERGs by major practice category and the second table, by prevalence rate. ERGs with high prevalence rates include benign hypertension, hyperlipidemia, rhinitis/sinusitis, and assorted ERGs defined in terms of a combination of the affected organ and low cost. The second most prevalent ERG is preventative and administrative, which may indicate that the enrollee had a check-up. Enrollees often have multiple ERGs, and thirteen percent of them had no ERG, suggesting that they might not have seen a physician during the period.

CDPS categories with high prevalence rates includes cataracts, type II diabetes, chronic obstructive pulmonary disease (COPD), and CDPS defined in terms of a combination of organ and low cost (Table 7D). Although cross-walking ERGs and CDPS at the major category level is straight-forward, doing so at the specific category level is difficult, indicating different classification algorithms.

Tables 8A and 8B report the results of logistic regressions analyses assessing whether the enrollees were alive (within 24 months of responding to the baseline survey) on a vector of risk categories. Both regressions are highly significant, with a large number of significant predictors. In most cases, these have the expected sign; that is, a serious condition is expected to have a negative impact on the probability of still being alive. (By design, the dependent variables in Tables 8 through 10 were coded to ensure that the expected sign for a severe condition is negative in all the tables.) In both tables, there are a number of positive signs, such as benign hypertension ERG and very low cardiovascular CDPS. Plausibly, physicians are more likely to use the codes that result in these risk categories if an enrollee has no more serious conditions. Thus, such codes may

[4] An HOS contractor has replicated this anomaly. SC Haffer, personal communication, Aug. 8, 2005.

be more indicative of the severe conditions that are not present than of minor conditions that are.

Risk categories are not very predictive of the change in PCS and MCS, conditional on the enrollee still being alive, as shown in Tables 9A and 9B. Very few risk categories are significant relative to the previous pair of tables, and several that are significant have few observations, suggesting that the significance calculation is inexact.

Risk categories are more predictive of the change in PCS and MCS when death is treated as a decline in health status, as shown in Tables 10A and 10B. All of the four logistic regressions are highly significant. Each regression has at least a dozen significantly negative coefficients (excluding age and sex coefficients), that is, conditions that predict a decline in health status. More specifically, taking ERGs as predictors of a decline in PCS, we find congestive heart failure, type I diabetes with comorbidity, and several malignant neoplasm. Predictive CDPSs include ischemic heart disease, type I diabetes without complications, and COPD.

Discussion

Analytic Technique

Of the three variants of regression analyses, the most useful is the last, in which logistic regression is used to analyze whether an enrollee declined in health status and death is treated as a decline. A number of conditions were found to be significant predictors. By way of contrast, analysis of the change in health status (ignoring death) yielded too few conditions as predictors to be useful.

The choice of risk assessment algorithm does not appear to be critical. Both algorithms performed well, and plausible alternatives are available commercially.

Development of Care Management Programs

By measuring the impact of a condition on the decline in one's health status, these findings have two possible uses: for quality checks for an individual health plan and for the development of better management programs for all plans nationally.

A local plan could implement the methodology developed here, running a predictive model on administrative data and HOS data. If a category of enrollees declined more sharply in the plan than nationally, this would be diagnostic that the plan's treatment protocols were below average. The plan could institute quality improvement.

These results could also be used to develop DM and case management programs designed to lower enrollees' risk of functional decline. More so than local plans, it is the large health plan chains and DM vendors who are likely to develop new programs, in part, because they can spread the development costs over many lives. Our results are relevant to these groups and to scholars, who can help to develop prototype programs.

To facilitate a concrete discussion, we list the ERGs that predict a decline in health status (see Table 10A). The prevalence rate is included because a DMP entails a fixed cost; the lower the prevalence rate, the less likely a program is to be economical.

MPC	ETG Description	Coefficient Estimate		Prevalence Rate
Neoplasm				
Blood	Leukemia wo bone marrow transplant	-1.529	+	0.2%
ENT	Malignant neoplasm ENT	-1.432	++	0.4%
GI	Malignant neoplasm	-0.882	+++	1.2%
Lung	Malignant pulmonary neoplasm	-0.828	++	0.7%
Neuro	Neoplasm of central nervous system	-2.818	++	0.1%
Other Conditions				
Cardio	Congestive heart failure	-0.592	+++	4.7%
Cardio	Other lower cost cardiology, I	-0.429	+	1.6%
Cardio	Other moderate cost cardiology, I	-0.217	+	6.1%
Endocr	Type I diabetes, w cb	-0.474	++	2.0%
Lung	Other moderate cost pulmonology	-0.679	+++	2.4%
Neuro	Other higher cost neurology	-0.310	++	5.9%
Psych	Dementia and mental retardation	-1.095	+	0.5%

Of the twelve conditions, five pertain to neoplasms. Of these, the most plausible candidate for case management is GI neoplasm because of its relatively high prevalence rate.

Of non-neoplasm conditions, at least two are the focus of common DMPs—CHF and diabetes, which are two out of the three conditions in Medicare's FFS version of disease management. Given these results, cardiology DMPs might be expanded, perhaps taking the form of increased the prevalence of DMPs for coronary artery disease. Dementia and mental retardation are not promising as DMPs because of the relative low prevalence rate.

Also promising are programs for pulmonology and neurology conditions. For such programs to be viable, the definition of a set of diagnoses involves a tradeoff. The set needs to be homogenous enough for guidelines to be articulated but prevalent enough to spread the fixed costs of implementing and administering a program. The fewer the diagnoses, the more homogeneity but the lower the prevalence of the set of diagnoses.

Needless to say, the precise findings would differ depending on whether one uses the impact on physical or mental functional status and on the risk categories included.

Study Limitations

The primary limitation of our approach is its inability to estimate the effect of alternative medical interventions. Our approach measures the probability that an enrollee with a given set of characteristics will decline in health status—given conventional interventions. Just knowing which types of enrollees will experience a decline is of little interest if that decline is inevitable. In principle, we would like to know the effect that

different types of interventions have on health status. However, such information can be convincingly only generated through randomized controlled trials.

Data from ten M+C plans were analyzed. Although these plans were geographically dispersed, they are all affiliated with the same managed care organization. However, it is unlikely that the rate at which a certain category of enrollees declines in health status varies substantially by organizational type.

Concluding Comments

This study identified several conditions that are plausible candidates for care management programs. In addition to the three DMPs mentioned above—CHF, diabetes, and coronary artery disease—our findings indicate that health plans may also benefit from developing programs for GI neoplasm and pulmonology and neurology conditions. However, going from these initial findings to a fully functional program involves substantial amount of work. In particular, the intervention component of the program has to be developed and tested.

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Table 1. Derivation of Sample Size		
Number of Observations		Characteristic
3,635		Cohort I
4,973		Cohort 2
4,412		Cohort 3
	13,020	Total
967		Different respondent in baseline and follow-up surveys
233		HIC numbers in multiple cohorts
310		HIC numbers not in database
248		Data of questionable quality
	1,758	Sum
	11,262	Number remaining
		HIC numbers without at least six months of data
		in the database
1,460		Cohort 1
511		One health plan (cohort 2 and 3 only)
82		Others
	2,053	Sum
	9,209	Number used in analysis

Table 2. Sample Size and Percentage Distribution by Whether the Enrollee was Alive 24 Months After the Baseline Survey and by Whether the Enrollee had a Follow-Up Survey

Follow-Up	Alive 24 Months after the Baseline Survey		
Survey	Alive	Dead	Total
Count			
Yes	6,101	3	6,104
No	2,163	942	3,105
Total	8,264	945	9,209
Percentage			
Yes	66.3%	0.0%	66.3%
No	23.5%	10.2%	33.7%
Total	89.7%	10.3%	100.0%

In principle, follow-up surveys are taken 24 months after the baseline survey. However, the interval can be greater or less than 24 months.

Table 3. Physical and Mental Component Scores, Change between Baseline and Follow-up Surveys and SF-36 Components

	PCS	MCS
N	6,101	6,101
Baseline		
Mean	43.9	52.2
Standard deviation	11.0	10.0
Change from baseline		
Mean	-1.6	-0.5
Standard deviation	8.4	9.4
Percentile		
0th (minimum)	-40.4	-49.9
25th	-6.0	-4.8
50th (median)	-1.1	-0.1
75th	3.1	4.2
100th (maximum)	34.9	44.2
Percentage distribution		
Increase	16%	20%
Stable	57%	58%
Decrease	27%	22%

Health status change of less than 2 times the standard error--that is, by 5.66 for PCS and 6.72 for MCS--was considered to be the result of random variation

	Mean	
SF-36 Component	Baseline	Follow-up
Physical health components		
Physical functioning	42.6	40.8
Role-physical	45.0	43.5
Bodily pain	47.5	46.7
General health	47.7	46.6
Mental health components		
Vitality	50.7	49.5
Social functioning	49.0	48.0
Role-emotional	47.9	46.9
Mental health	52.2	51.7

Table 4. Cost and Utilization Rates by Change in PCS

Cost or Utilization Measure	Total	Change in PCS: Increase	Change in PCS: Stable	Change in PCS: Decrease	Dead	Alive but no followup
N	9,209	980	3,493	1,628	945	2,163
Cost per enrollee per month	$ 253	$ 297	$ 192	$ 191	$ 586	$ 231
Hospital admissions per 1000 enrollees	213	223	147	151	564	209
Visits per enrollee	15.0	16.3	12.8	13.2	27.6	14.0

Table 5A. Correlates of Change in Physical Component Scores, Demographic Factors

	Prevalence		Effect on PCS	
Demographic Factor	Baseline	Follow-up	at Baseline	Change
N	9,209	6,101	9,209	6,101
Cohort				
I	17%	17%	**2.0**	-0.2
II	43%	43%	ref	ref
III	40%	39%	-0.1	0.2
State				
Alabama	15%	14%	**-3.6**	0.0
Florida	10%	8%	0.2	0.1
Missouri	15%	15%	0.7	0.0
North Carolina	5%	5%	-0.2	-0.3
Nebraska	16%	17%	0.2	-0.4
New York	5%	4%	-0.7	0.7
Ohio	23%	24%	ref	ref
Rhode Island	12%	12%	**2.0**	-0.1
Age				
55-64	2%	3%	**5.0**	-1.3
65-74	61%	66%	**4.7**	-0.7
>74	36%	32%	ref	ref
Sex				
Male	42%	40%	**1.4**	0.4
Female	58%	60%	ref	ref
Race				
Non-white	17%	14%	**-2.6**	-0.2
White	83%	86%	ref	ref
Education				
< high school	37%	33%	ref	ref
high school graduate	34%	36%	**3.2**	-0.3
beyond high school	26%	28%	**5.4**	0.1
Household income (annual)				
<10K	20%	18%	**-5.4**	-0.4
10K to < 20K	27%	26%	**-3.4**	-0.2
20K to < 30K	17%	18%	**-1.1**	-0.4
=>30K	27%	29%	ref	ref
Marital Status				
Divorced	8%	8%	-0.3	0.0
Separated	1%	1%	**-3.3**	-0.5
Widowed	31%	29%	**-2.4**	0.0
Never Married	3%	3%	0.7	-0.3
Married	53%	56%	ref	ref
Medicaid eligibility				
Yes	3%	3%	**-6.8**	0.1
No	96%	97%	ref	ref
Retirement community				

Yes	10%	9%	**-2.6**	0.0
No	86%	88%	ref	ref

ref = reference category, which typically is the most prevalence category. For an ordinal variable, the reference category is the most prevalent of the two extreme values.
Significant coefficients are bolded.

Table 5B. Correlates of Change in Physical Component Scores, SF-36 Measures and Components

	Prevalence		Effect on PCS	
SF-36 Measure	Baseline	Follow-up	at Baseline	Change
General health rating (now)				
Excellent or very good	29%	28%	ref	ref
Good	41%	43%	**-8.0**	**1.5**
Fair or poor	30%	29%	**-19.1**	**3.6**
Health excellent (now)				
Definitely or mostly true	55%	56%	ref	ref
Do not know	13%	12%	**-7.6**	**1.2**
Definitely or mostly false	32%	31%	**-15.8**	**3.2**
Health transition (past year)				
Much or somewhat better	15%	13%	ref	ref
Same	66%	67%	**1.0**	1.0
Much or somewhat worse	19%	20%	**-12.0**	**4.8**
Expect health to get worse				
Definitely or mostly true	16%	15%	**-12.9**	**1.9**
Do not know	45%	46%	**-6.8**	**0.9**
Definitely or mostly false	38%	38%	ref	ref

See notes at the bottom of Table 5A.

Table 5C. Correlates of Change in Physical Component Scores, Conditions						
		Prevalence			Effect on PCS	
Measure		Baseline	Follow-up		at Baseline	Change
Ever had						
	Paralysis	11%	10%		**-9.0**	0.8
	Lost ability to talk	6%	6%		**-7.8**	0.7
	Hypertension	55%	59%		**-4.2**	0.1
	Angina/coronary disease	16%	16%		**-6.8**	0.8
	Congestive heart failure	7%	8%		**-10.1**	1.1
	Myocardial infarction	11%	11%		**-6.4**	**1.5**
	Other heart condition	20%	21%		**-6.4**	**1.5**
	Stroke	8%	8%		**-8.1**	**1.9**
	Chronic lung disease	13%	13%		**-7.3**	0.7
	Gastrointestinal inflammation	5%	4%		**-7.5**	0.2
	Arthritis of hand or hip	34%	35%		**-6.8**	0.1
	Sciatica	21%	21%		**-7.8**	**1.1**
	Diabetes	18%	18%		**-5.2**	0.6
	Any cancer	14%	14%		**-3.3**	**1.7**
Current diagnosis						
	Colon	3%	3%		**-3.2**	1.5
	Lung	2%	2%		**-7.9**	**3.9**
	Breast	4%	5%		-1.5	-0.5
	Prostate	7%	8%		-1.0	1.8
None of the above		17%	15%		**8.6**	**-0.5**
See notes at the bottom of Table 5A.						

Table 5D. Correlates of Change in Physical Component Scores, Symptoms

	Prevalence		Effect on PCS	
Symptom	Baseline	Follow-up	at Baseline	Change
<u>In the past 4 weeks</u>				
Chest pain at rest				
None	83%	84%	ref	ref
Little time	11%	10%	**-7.6**	**1.2**
Some time	6%	5%	**-11.1**	0.1
Most time	1%	1%	**-13.9**	1.1
All time	0%	0%	**-11.7**	1.5
Dyspnea lying flat				
None	79%	81%	ref	ref
Little time	10%	10%	**-9.1**	**1.3**
Some time	8%	6%	**-11.8**	**1.5**
Most time	2%	2%	**-14.0**	0.3
All time	1%	1%	**-15.9**	-0.2
Dyspnea sitting				
None	81%	83%	ref	ref
Little time	10%	9%	**-9.9**	**1.3**
Some time	7%	6%	**-13.5**	**2.1**
Most time	1%	1%	**-14.5**	-1.5
All time	1%	0%	**-15.8**	2.7
Dyspnea walking one block				
None	64%	64%	ref	ref
Little time	15%	16%	**-9.2**	**1.8**
Some time	10%	9%	**-12.4**	**1.7**
Most time	5%	6%	**-16.2**	**2.0**
All time	5%	5%	**-19.2**	**2.0**
Dyspnea climbing stairs				
None	51%	51%	ref	ref
Little time	22%	24%	**-6.4**	0.5
Some time	11%	12%	**-11.2**	**1.4**
Most time	7%	7%	**-15.7**	**2.4**
All time	8%	7%	**-19.2**	**1.8**
Numbness in feet				
None	70%	71%	ref	ref
Little time	12%	12%	**-6.2**	0.6
Some time	10%	10%	**-9.8**	**1.7**
Most time	4%	4%	**-12.7**	**1.9**
All time	3%	3%	**-13.1**	0.6
Ankle/leg edema				
None	61%	58%	ref	ref
Little time	16%	18%	**-5.3**	0.7
Some time	13%	13%	**-9.4**	**1.9**

Most time	6%	6%	**-11.9**	1.3
All time	5%	5%	**-15.4**	**2.0**
Tingling/burning feet				
None	71%	71%	ref	ref
Little time	12%	13%	**-5.8**	**1.1**
Some time	11%	9%	**-8.8**	0.7
Most time	4%	4%	**-11.7**	1.6
All time	3%	3%	**-13.6**	1.1
Decrease hot/cold feelings				
None	83%	85%	ref	ref
Little time	7%	7%	**-7.8**	1.3
Some time	6%	5%	**-9.9**	1.1
Most time	2%	2%	**-11.4**	0.5
All time	2%	2%	**-12.8**	0.1
Unhealed sores				
None	95%	96%	ref	ref
Little time	2%	2%	**-7.4**	1.8
Some time	2%	1%	**-8.2**	1.1
Most time	1%	0%	**-7.6**	-4.3
All time	1%	0%	**-8.5**	-3.0
Arthritic pain				
None	17%	16%	ref	ref
Very mild	14%	15%	**-1.3**	0.2
Mild	22%	24%	**-6.1**	0.9
Moderate	34%	34%	**-11.1**	**1.4**
Severe	13%	12%	**-16.6**	1.4
Back pain				
None	50%	49%	ref	ref
Little time	21%	23%	**-5.0**	**1.0**
Some time	17%	16%	**-10.1**	**1.4**
Most time	7%	7%	**-15.7**	**1.8**
All time	5%	4%	**-18.4**	**1.7**
Numbness in leg				
None	69%	70%	ref	ref
Little time	13%	13%	**-6.4**	**1.4**
Some time	11%	11%	**-10.0**	0.7
Most time	5%	5%	**-14.3**	**1.9**
All time	2%	2%	**-14.3**	1.3
<u>Now</u>				
Able to read newspaper	93%	94%	**6.1**	-0.1
Able to hear most things	87%	88%	**4.0**	0.7
Acid indigestion	34%	32%	**-4.0**	-0.4
Difficult urinary control	26%	28%	**-6.6**	0.8
<u>In the past year</u>				
Sad/depressed for 2 weeks or more	22%	20%	**-6.7**	0.7

Sad/depressed much of the time	8%	7%	-5.6	-0.7

See notes at the bottom of Table 5A.

Table 5E. Correlates of Change in Physical Component Scores, Activities of Daily Living (ADLs)

	Prevalence		Effect on PCS	
Activity of Daily Living	Baseline	Follow-up	at Baseline	Change
Difficulty bathing				
Not difficult	85%	87%	ref	ref
Difficult	12%	11%	**-15.2**	**2.4**
Unable	3%	2%	**-12.7**	**2.9**
Difficulty dressing				
Not difficult	87%	90%	**ref**	**ref**
Difficult	11%	9%	**-15.0**	**2.4**
Unable	2%	2%	**-11.6**	2.8
Difficulty eating				
Not difficult	94%	95%	ref	ref
Difficult	5%	4%	**-11.6**	**2.4**
Unable	1%	1%	**-8.3**	3.2
Difficulty getting out of chair				
Not difficult	73%	74%	ref	ref
Difficult	25%	25%	**-14.1**	**2.6**
Unable	1%	1%	**-12.7**	3.3
Difficulty walking				
Not difficult	65%	66%	ref	ref
Difficult	32%	32%	**-15.4**	**2.8**
Unable	3%	2%	**-17.6**	**4.0**
Difficulty toileting				
Not difficult	91%	92%	ref	ref
Difficult	8%	6%	**-14.3**	**2.6**
Unable	1%	1%	**-8.5**	1.6

See notes at the bottom of Table 5A.

Table 6. Crosswalk between Major Practice Categories (MPCs) in Two Predictive Models: Episode Risk Groups (ERGs) and Chronic Illness and Disability Payment System (CDPS)

Present in		Major Practice Category	
ERG	CDPS	Label	Description
x	x	Blood	Hematological
x	x	Cardio	Cardiovascular
x	x	Chem	Chemical Dependency/Substance Abuse
x	x	Endocr	Endocrinology/Diabetes/Metabolic
x	x	ENT	Otolaryngology/Ear
x	x	Eye	Ophthalmology
x	x	Genital	Genital
x	x	GI	Gastroenterology
x	x	Infect	Infectious Diseases
x	x	Lung	Pulmonology
x	x	Neuro	Neurology
x	x	Ortho	Orthopedics & Rheumatology
x	x	Psych	Psychiatric
x	x	Renal	Nephrology
x	x	Skin	Dermatology
x		Isolated	Isolated Signs & Symptoms
x		Liver	Hepatology
x		Misc	Late Effects, Envta'l Trauma & Poisoning
x		Prev	Preventive & Administrative
x		Uro	Urology
	x	Cancer	Cancer
	x	CerebVas	Cerebrovascular

The purpose of this crosswalk is to facilitate comparing results in subsequent tables. Because of differences between the two models, the crosswalk should not be considered precise.

Table 7A. Prevalence Rates for Episode Risk Groups (ERGs), Ordered by Major Practice Category (MPC)			
N=9,209			
MPC	ERG Description	Rate	Count
Blood	Leukemia w bone marrow transplant	0.0%	-
Blood	Leukemia wo bone marrow transplant	0.2%	15
Blood	Major non-neoplastic blood disease	1.2%	115
Blood	Other neoplastic blood disease	0.5%	48
Blood	Lower cost hematology	3.6%	329
Cardio	Malignant hypertension	1.4%	127
Cardio	Benign hypertension	29.0%	2,670
Cardio	Congestive heart failure	4.7%	429
Cardio	Coronary heart disease, w AMI	1.2%	114
Cardio	Coronary heart disease, incl ischemia, wo AMI	13.0%	1,200
Cardio	Atherosclerosis	1.3%	123
Cardio	Major arterial trauma, inflammation, aneurysm	0.2%	23
Cardio	Heart transplant	0.0%	-
Cardio	Other lower cost cardiology, I	1.6%	143
Cardio	Other lower cost cardiology, II	4.9%	447
Cardio	Other moderate cost cardiology, I	5.9%	544
Cardio	Other moderate cost cardiology, II	0.7%	69
Chem	Moderate and higher cost substance abuse	0.2%	18
Chem	Other drug dependence	0.3%	29
Endocr	Type I diabetes, w cb	2.0%	188
Endocr	Type I diabetes, wo cb	0.9%	79
Endocr	Type II diabetes, w cb	6.8%	622
Endocr	Type II diabetes, wo cb	3.3%	304
Endocr	Malignant neoplasm of pancreas/pituitary	0.1%	9
Endocr	Hyperlipidemia	14.0%	1,292
Endocr	Other lower cost endocrinology I	6.1%	564
Endocr	Other lower cost endocrinology II	1.5%	141
Endocr	Other moderate cost endocrinology	1.5%	137
Endocr	Other higher cost endocrinology	2.2%	207
ENT	Rhinitis/sinusitis	6.6%	607
ENT	Malignant neoplasm ENT	0.4%	34
ENT	Other lower cost ENT, I	6.0%	557
ENT	Other lower cost ENT, II	6.9%	637
ENT	Moderate cost ENT	1.5%	135
Eye	Glaucoma	6.7%	614
Eye	Other lower cost ophthalmology	12.0%	1,103
Eye	Moderate cost ophthalmology	21.8%	2,009
Eye	Higher cost ophthalmology	2.2%	202
Genital	Malignant neoplasm, breast, w BMT	0.0%	-
Genital	Malignant neoplasm, breast, wo BMT	1.7%	157
Genital	Malignant neoplasm, female genital tract	0.4%	34
Genital	Other lower cost gynecology, I	2.7%	251
Genital	Other lower cost gynecology, II	3.2%	293

Genital	Other moderate cost gynecology, I	0.0%	3
Genital	Other moderate cost gynecology, II	1.7%	155
Genital	Other moderate cost gynecology, III	0.0%	2
GI	Ulcer	1.2%	111
GI	Hernias	1.6%	151
GI	Appendicitis	0.1%	5
GI	Malignant neoplasm, gastroenterology	1.2%	106
GI	Other lower cost gastroenterology	6.8%	628
GI	Other moderate cost gastroenterology, I	5.4%	498
GI	Other moderate cost gastroenterology, II	5.9%	539
GI	Other higher cost gastroenterology	1.2%	114
Infect	AIDS/HIV	0.0%	1
Infect	Non-HIV major infectious disease w cb	0.5%	49
Infect	Non-HIV major infectious disease, wo cb	0.3%	27
Infect	Lower cost infectious disease	1.1%	104
Isolated	Isolated signs and symptoms	4.7%	431
Liver	Cholelithiasis	0.7%	67
Liver	Infectious hepatitis	0.1%	9
Liver	Liver transplant	0.0%	-
Liver	Other lower cost hepatology	0.3%	30
Liver	Other moderate cost hepatology	0.4%	37
Liver	Other higher cost hepatology	0.2%	17
Lung	Acute bronchitis	5.6%	520
Lung	Asthma	2.3%	213
Lung	Chronic Bronchitis	2.2%	204
Lung	Emphysema	1.1%	102
Lung	Malignant pulmonary neoplasm	0.7%	63
Lung	Other lower cost pulmonology, I	0.0%	-
Lung	Other lower cost pulmonology, II	3.4%	310
Lung	Other lower cost pulmonology, III	1.6%	149
Lung	Other moderate cost pulmonology	2.4%	225
Misc	Late effects and complications	0.5%	46
Misc	Environmental trauma	0.5%	44
Misc	Poisonings and toxic effects of drugs	0.3%	27
Neuro	Migraine headache	0.3%	27
Neuro	Major brain and spinal trauma	0.2%	18
Neuro	Neoplasm of central nervous system	0.1%	12
Neuro	Non-cranial nerve inflammation, incl carpal tunnel	1.9%	174
Neuro	Other lower cost neurology	1.3%	116
Neuro	Other moderate cost neurology	1.1%	102
Neuro	Other higher cost neurology	5.9%	543
Ortho	Arthritis	1.1%	98
Ortho	Lower cost orthopedics, I	11.9%	1,100
Ortho	Lower cost orthopedics, II	7.0%	641
Ortho	Other moderate cost orthopedics, I	17.1%	1,572
Ortho	Other moderate cost orthopedics, II	1.1%	103
Ortho	Other moderate cost orthopedics, III	0.5%	43
Ortho	Higher cost orthopedics	0.8%	72
Prev	Preventative and administrative	22.8%	2,099
Psych	Major and minor depression	2.2%	203

Psych	Personality and eating disorders	0.1%	5
Psych	Dementia and mental retardation	0.5%	49
Psych	Child psychiatric disorders	0.0%	-
Psych	Schizoaffective disorders	0.5%	42
Psych	Lower cost psychiatry	0.2%	21
Psych	Other moderate cost psychiatry	1.6%	148
Renal	Acute renal failure	0.1%	10
Renal	Chronic renal failure	0.8%	77
Renal	Kidney Transplant	0.0%	-
Renal	Lower cost nephrology	0.4%	35
Renal	Moderate cost nephrology	0.1%	8
Skin	Lower cost dermatology, I	21.8%	2,010
Skin	Lower cost dermatology, II	2.0%	183
Skin	Moderate cost dermatology	3.2%	293
Skin	Higher cost dermatology	1.2%	112
Uro	Lower cost urology, I	12.4%	1,140
Uro	Lower cost urology, II	1.3%	122
Uro	Moderate cost urology	2.3%	209
Uro	Higher cost urology	3.7%	337
	Enrollees with no ERG	13.0%	1,198
See Table 3 for descriptions of MPCs.			

Table 7B. Prevalence Rates for Episode Risk Groups (ERGs), Ordered by Prevalence Rate			
N=9,209			
MPC	ERG Description	Rate	Count
Cardio	Benign hypertension	29.0%	2,670
Prev	Preventative and administrative	22.8%	2,099
Skin	Lower cost dermatology, I	21.8%	2,010
Eye	Moderate cost ophthalmology	21.8%	2,009
Ortho	Other moderate cost orthopedics, I	17.1%	1,572
Endocr	Hyperlipidemia	14.0%	1,292
Cardio	Coronary heart disease, incl ischemia, wo AMI	13.0%	1,200
Uro	Lower cost urology, I	12.4%	1,140
Eye	Other lower cost ophthalmology	12.0%	1,103
Ortho	Lower cost orthopedics, I	11.9%	1,100
Ortho	Lower cost orthopedics, II	7.0%	641
ENT	Other lower cost ENT, II	6.9%	637
GI	Other lower cost gastroenterology	6.8%	628
Endocr	Type II diabetes, w cb	6.8%	622
Eye	Glaucoma	6.7%	614
ENT	Rhinitis/sinusitis	6.6%	607
Endocr	Other lower cost endocrinology I	6.1%	564
ENT	Other lower cost ENT, I	6.0%	557
Cardio	Other moderate cost cardiology, I	5.9%	544
Neuro	Other higher cost neurology	5.9%	543
GI	Other moderate cost gastroenterology, II	5.9%	539
Lung	Acute bronchitis	5.6%	520
GI	Other moderate cost gastroenterology, I	5.4%	498
Cardio	Other lower cost cardiology, II	4.9%	447
Isolated	Isolated signs and symptoms	4.7%	431
Cardio	Congestive heart failure	4.7%	429
Uro	Higher cost urology	3.7%	337
Blood	Lower cost hematology	3.6%	329
Lung	Other lower cost pulmonology, II	3.4%	310
Endocr	Type II diabetes, wo cb	3.3%	304
Genital	Other lower cost gynecology, II	3.2%	293
Skin	Moderate cost dermatology	3.2%	293
Genital	Other lower cost gynecology, I	2.7%	251
Lung	Other moderate cost pulmonology	2.4%	225
Lung	Asthma	2.3%	213
Uro	Moderate cost urology	2.3%	209
Endocr	Other higher cost endocrinology	2.2%	207
Lung	Chronic Bronchitis	2.2%	204
Psych	Major and minor depression	2.2%	203
Eye	Higher cost ophthalmology	2.2%	202
Endocr	Type I diabetes, w cb	2.0%	188
Skin	Lower cost dermatology, II	2.0%	183
Neuro	Non-cranial nerve inflammation, incl carpal tunnel	1.9%	174

Genital	Malignant neoplasm, breast, wo BMT	1.7%	157
Genital	Other moderate cost gynecology, II	1.7%	155
GI	Hernias	1.6%	151
Lung	Other lower cost pulmonology, III	1.6%	149
Psych	Other moderate cost psychiatry	1.6%	148
Cardio	Other lower cost cardiology, I	1.6%	143
Endocr	Other lower cost endocrinology II	1.5%	141
Endocr	Other moderate cost endocrinology	1.5%	137
ENT	Moderate cost ENT	1.5%	135
Cardio	Malignant hypertension	1.4%	127
Cardio	Atherosclerosis	1.3%	123
Uro	Lower cost urology, II	1.3%	122
Neuro	Other lower cost neurology	1.3%	116
Blood	Major non-neoplastic blood disease	1.2%	115
Cardio	Coronary heart disease, w AMI	1.2%	114
GI	Other higher cost gastroenterology	1.2%	114
Skin	Higher cost dermatology	1.2%	112
GI	Ulcer	1.2%	111
GI	Malignant neoplasm, gastroenterology	1.2%	106
Infect	Lower cost infectious disease	1.1%	104
Ortho	Other moderate cost orthopedics, II	1.1%	103
Lung	Emphysema	1.1%	102
Neuro	Other moderate cost neurology	1.1%	102
Ortho	Arthritis	1.1%	98
Endocr	Type I diabetes, wo cb	0.9%	79
Renal	Chronic renal failure	0.8%	77
Ortho	Higher cost orthopedics	0.8%	72
Cardio	Other moderate cost cardiology, II	0.7%	69
Liver	Cholelithiasis	0.7%	67
Lung	Malignant pulmonary neoplasm	0.7%	63
Infect	Non-HIV major infectious disease w cb	0.5%	49
Psych	Dementia and mental retardation	0.5%	49
Blood	Other neoplastic blood disease	0.5%	48
Misc	Late effects and complications	0.5%	46
Misc	Environmental trauma	0.5%	44
Ortho	Other moderate cost orthopedics, III	0.5%	43
Psych	Schizoaffective disorders	0.5%	42
Liver	Other moderate cost hepatology	0.4%	37
Renal	Lower cost nephrology	0.4%	35
ENT	Malignant neoplasm ENT	0.4%	34
Genital	Malignant neoplasm, female genital tract	0.4%	34
Liver	Other lower cost hepatology	0.3%	30
Chem	Other drug dependence	0.3%	29
Infect	Non-HIV major infectious disease, wo cb	0.3%	27
Misc	Poisonings and toxic effects of drugs	0.3%	27
Neuro	Migraine headache	0.3%	27
Cardio	Major arterial trauma, inflammation, aneurysm	0.2%	23
Psych	Lower cost psychiatry	0.2%	21
Chem	Moderate and higher cost substance abuse	0.2%	18
Neuro	Major brain and spinal trauma	0.2%	18

Liver	Other higher cost hepatology	0.2%	17
Blood	Leukemia wo bone marrow transplant	0.2%	15
Neuro	Neoplasm of central nervous system	0.1%	12
Renal	Acute renal failure	0.1%	10
Endocr	Malignant neoplasm of pancreas/pituitary	0.1%	9
Liver	Infectious hepatitis	0.1%	9
Renal	Moderate cost nephrology	0.1%	8
GI	Appendicitis	0.1%	5
Psych	Personality and eating disorders	0.1%	5
Genital	Other moderate cost gynecology, I	0.0%	3
Genital	Other moderate cost gynecology, III	0.0%	2
Infect	AIDS/HIV	0.0%	1
Blood	Leukemia w bone marrow transplant	0.0%	-
Cardio	Heart transplant	0.0%	-
Genital	Malignant neoplasm, breast, w BMT	0.0%	-
Liver	Liver transplant	0.0%	-
Lung	Other lower cost pulmonology, I	0.0%	-
Psych	Child psychiatric disorders	0.0%	-
Renal	Kidney Transplant	0.0%	-
See Table 3 for descriptions of MPCs.			

Table 7C. Prevalence Rates for Chronic Illness and Disability Payment System (CDPS), Ordered by Major Practice Category (MPC)			
N=9,209			
MPC	CDPS Description	Rate	Count
Blood	Very high	0.01%	1
Blood	High	0.21%	19
Blood	Medium	0.43%	40
Blood	Low	0.86%	79
Blood	Very low	0.93%	86
Blood	Super low	0.31%	29
Blood	Anemia	7.20%	663
Blood	Hematological, not well def	0.01%	1
Cancer	Very high	1.18%	109
Cancer	High	1.05%	97
Cancer	Medium	2.15%	198
Cancer	Low	4.01%	369
Cancer	Very low	4.51%	415
Cancer	Benign	6.20%	571
Cancer	Cancer, not well def	2.71%	250
Cardio	Very high	0.30%	28
Cardio	Ischemic heart disease, high	7.48%	689
Cardio	Ischemic heart disease, low	6.41%	590
Cardio	Ischemic heart disease, extra low	17.79%	1638
Cardio	Valvular, conductive and others, medium	0.26%	24
Cardio	Valvular, conductive and others, low	7.31%	673
Cardio	Valvular, conductive and others, very low	4.52%	416
Cardio	Peripheral vascular, medium	6.75%	622
Cardio	Super low	2.42%	223
Cardio	Cardiovascular, not well def	10.14%	934
CerebVas	High	0.35%	32
CerebVas	Medium	2.61%	240
CerebVas	Low	3.41%	314
CerebVas	Very low	0.18%	17
CerebVas	Extra low	1.02%	94
CerebVas	Super low	0.00%	0
CerebVas	Cerebrovascular, not well def	0.74%	68
Chem	Low	0.14%	13
Chem	Very low	0.27%	25
Chem	Substance abuse, not well def	0.55%	51
Endocr	High	1.29%	119
Endocr	Low	2.24%	206
Endocr	Super low	35.39%	3259
Endocr	Type 1 or 2 with rare complications	0.72%	66
Endocr	Type 1 with common complications	0.37%	34
Endocr	Type1	2.91%	268
Endocr	Type 2 with common complications	1.03%	95
Endocr	Type 2	10.96%	1009

Endocr	Metabolic, not well def	3.45%	318
ENT	Super low	8.99%	828
ENT	Ear, not well def	0.29%	27
Eye	Cataract	18.60%	1713
Eye	Retinal Disorder	5.29%	487
Eye	Low	6.24%	575
Eye	Super low	17.43%	1605
Eye	Eye, not well def	1.34%	123
Genital	Extra low	10.32%	950
Genital	Super low	14.34%	1321
GI	High	0.39%	36
GI	Ostomy	0.45%	41
GI	Medium	1.67%	154
GI	Low	5.43%	500
GI	Super low	10.16%	936
GI	Gastro, not well def	9.89%	911
Infect	High	0.10%	9
Infect	HIV, Medium	0.01%	1
Infect	Medium	0.65%	60
Infect	Low	0.97%	89
Infect	Super low	3.77%	347
Lung	High	1.01%	93
Lung	Medium	3.75%	345
Lung	Pneumonia high	0.33%	30
Lung	Pneunomia low	4.12%	379
Lung	COPD	10.44%	961
Lung	Asthma	1.54%	142
Lung	Super low	15.85%	1460
Lung	Pulmonary, excluded	0.07%	6
Lung	Pulmonary, not well def	8.78%	809
Neuro	High	0.12%	11
Neuro	Peripheral, high	1.21%	111
Neuro	Peripheral, low	0.93%	86
Neuro	Multiple sclerosis, muscular dystrophy and others	0.43%	40
Neuro	Parkinson's disease	0.61%	56
Neuro	Convulsions and epilepsy	0.97%	89
Neuro	Low	7.58%	698
Neuro	CNS, not well def	10.16%	936
Neuro	CNS, other	1.55%	143
Ortho	Medium	3.94%	363
Ortho	Very low	7.73%	712
Ortho	Extra low	7.39%	681
Ortho	Super low	8.77%	808
Ortho	Skeletal, not well def	16.07%	1480
Psych	High	0.09%	8
Psych	Medium	0.99%	91
Psych	Low	2.99%	275
Psych	Delirium	0.33%	30
Psych	Dementia	1.75%	161
Psych	Psychiatric, not well def	2.89%	266

Renal	Extra high	0.05%	5
Renal	Very high	0.92%	85
Renal	Medium	0.64%	59
Renal	Low	0.22%	20
Renal	Very low	4.85%	447
Renal	Super low	7.93%	730
Renal	Renal, not well def	3.46%	319
Skin	High	0.37%	34
Skin	Low	1.28%	118
Skin	Super low	27.59%	2541
Skin	Skin, not well def	0.51%	47
See Table 3 for descriptions of MPCs.			

Table 7D. Prevalence Rates for Chronic Illness and Disability Payment System (CDPS), Ordered by Prevalence Rate			
N=9,209			
MPC	CDPS Description	Rate	Count
Endocr	Super low	35.39%	3,259
Skin	Super low	27.59%	2,541
Eye	Cataract	18.60%	1,713
Cardio	Ischemic heart disease, extra low	17.79%	1,638
Eye	Super low	17.43%	1,605
Ortho	Skeletal, not well def	16.07%	1,480
Lung	Super low	15.85%	1,460
Genital	Super low	14.34%	1,321
Endocr	Type 2	10.96%	1,009
Lung	COPD	10.44%	961
Genital	Extra low	10.32%	950
GI	Super low	10.16%	936
Neuro	CNS, not well def	10.16%	936
Cardio	Cardiovascular, not well def	10.14%	934
GI	Gastro, not well def	9.89%	911
ENT	Super low	8.99%	828
Lung	Pulmonary, not well def	8.78%	809
Ortho	Super low	8.77%	808
Renal	Super low	7.93%	730
Ortho	Very low	7.73%	712
Neuro	Low	7.58%	698
Cardio	Ischemic heart disease, high	7.48%	689
Ortho	Extra low	7.39%	681
Cardio	Valvular, conductive and others, low	7.31%	673
Blood	Anemia	7.20%	663
Cardio	Peripheral vascular, medium	6.75%	622
Cardio	Ischemic heart disease, low	6.41%	590
Eye	Low	6.24%	575
Cancer	Benign	6.20%	571
GI	Low	5.43%	500
Eye	Retinal Disorder	5.29%	487
Renal	Very low	4.85%	447
Cardio	Valvular, conductive and others, very low	4.52%	416
Cancer	Very low	4.51%	415
Lung	Pneunomia low	4.12%	379
Cancer	Low	4.01%	369
Ortho	Medium	3.94%	363
Infect	Super low	3.77%	347
Lung	Medium	3.75%	345
Renal	Renal, not well def	3.46%	319
Endocr	Metabolic, not well def	3.45%	318
CerebVas	Low	3.41%	314
Psych	Low	2.99%	275

Endocr	Type1	2.91%	268
Psych	Psychiatric, not well def	2.89%	266
Cancer	Cancer, not well def	2.71%	250
CerebVas	Medium	2.61%	240
Cardio	Super low	2.42%	223
Endocr	Low	2.24%	206
Cancer	Medium	2.15%	198
Psych	Dementia	1.75%	161
GI	Medium	1.67%	154
Neuro	CNS, other	1.55%	143
Lung	Asthma	1.54%	142
Eye	Eye, not well def	1.34%	123
Endocr	High	1.29%	119
Skin	Low	1.28%	118
Neuro	Peripheral, high	1.21%	111
Cancer	Very high	1.18%	109
Cancer	High	1.05%	97
Endocr	Type 2 with common complications	1.03%	95
CerebVas	Extra low	1.02%	94
Lung	High	1.01%	93
Psych	Medium	0.99%	91
Infect	Low	0.97%	89
Neuro	Convulsions and epilepsy	0.97%	89
Blood	Very low	0.93%	86
Neuro	Peripheral, low	0.93%	86
Renal	Very high	0.92%	85
Blood	Low	0.86%	79
CerebVas	Cerebrovascular, not well def	0.74%	68
Endocr	Type 1 or 2 with rare complications	0.72%	66
Infect	Medium	0.65%	60
Renal	Medium	0.64%	59
Neuro	Parkinson's disease	0.61%	56
Chem	Substance abuse, not well def	0.55%	51
Skin	Skin, not well def	0.51%	47
GI	Ostomy	0.45%	41
Blood	Medium	0.43%	40
Neuro	Multiple sclerosis, muscular dystrophy and others	0.43%	40
GI	High	0.39%	36
Endocr	Type 1 with common complications	0.37%	34
Skin	High	0.37%	34
CerebVas	High	0.35%	32
Lung	Pneumonia high	0.33%	30
Psych	Delirium	0.33%	30
Blood	Super low	0.31%	29
Cardio	Very high	0.30%	28
ENT	Ear, not well def	0.29%	27
Chem	Very low	0.27%	25
Cardio	Valvular, conductive and others, medium	0.26%	24
Renal	Low	0.22%	20
Blood	High	0.21%	19

CerebVas	Very low	0.18%	17
Chem	Low	0.14%	13
Neuro	High	0.12%	11
Infect	High	0.10%	9
Psych	High	0.09%	8
Lung	Pulmonary, excluded	0.07%	6
Renal	Extra high	0.05%	5
Blood	Hematological, not well def	0.01%	1
Blood	Very high	0.01%	1
Infect	HIV, Medium	0.01%	1
CerebVas	Super low	0.00%	0
See Table 3 for descriptions of MPCs.			

Table 8A. ERGs as Predictors of Whether an Enrollee was Alive Within 24 Months of Taking the Baseline Survey, Logistic Regression						
Likelihood ratio chi squared			819.10			
p			<.001			
Pseudo R-square			0.085			
N			9,209			
			Coefficient			
MPC	ERG Description		Estimate	p		N
Blood	Leukemia wo bone marrow transplant		-1.72	0.006	++	15
Blood	Lower cost hematology		-0.59	0.000	+++	329
Blood	Major non-neoplastic blood disease		-0.70	0.006	++	115
Blood	Other neoplastic blood disease		-0.65	0.095		48
Cardio	Atherosclerosis		0.17	0.555		123
Cardio	Benign hypertension		0.25	0.010	**	2,670
Cardio	Congestive heart failure		-1.13	0.000	+++	429
Cardio	Coronary heart disease, wo AMI		-0.24	0.028	+	1,200
Cardio	Coronary heart disease, w AMI		-0.53	0.050	+	114
Cardio	Major arterial trauma, inflam, aneurysm		0.03	0.965		23
Cardio	Malignant hypertension		0.05	0.874		127
Cardio	Other lower cost cardiology, I		0.15	0.651		143
Cardio	Other lower cost cardiology, II		-0.19	0.221		447
Cardio	Other moderate cost cardiology, I		-0.33	0.017	+	544
Cardio	Other moderate cost cardiology, II		-0.39	0.277		69
Chem	Moderate and higher cost		-1.08	0.049	+	18
Chem	Other drug dependence		-0.29	0.626		29
Demo	Age less than 65		0.62	0.058		211
Demo	Sex (1=male, 0=female)		-0.31	0.000	+++	3,852
ENT	Malignant neoplasm ENT		-1.43	0.001	+++	34
ENT	Moderate cost ENT		-0.47	0.076		135
ENT	Other lower cost ENT, I		0.13	0.429		557
ENT	Other lower cost ENT, II		-0.14	0.342		637
ENT	Rhinitis/sinusitis		0.38	0.029	*	607
Endocr	Hyperlipidemia		0.78	0.000	***	1,292
Endocr	Malignant neoplasm of pancreas		-3.04	0.008	++	9
Endocr	Other higher cost endocrinology		0.19	0.439		207
Endocr	Other lower cost endocrinology I		0.03	0.869		564
Endocr	Other lower cost endocrinology II		0.12	0.688		141
Endocr	Other moderate cost endocrinology		1.64	0.003	**	137
Endocr	Type I diabetes, w cb		-0.71	0.001	+++	188
Endocr	Type I diabetes, wo cb		-0.29	0.376		79
Endocr	Type II diabetes, w cb		-0.27	0.053		622
Endocr	Type II diabetes, wo cb		0.00	0.991		304
Eye	Glaucoma		0.29	0.078		614
Eye	Higher cost ophthalmology		-0.30	0.175		202
Eye	Moderate cost ophthalmology		0.11	0.229		2,009
Eye	Other lower cost ophthalmology		0.17	0.160		1,103

GI	Appendicitis		13.35	0.984		5
GI	Hernias		-0.20	0.453		151
GI	Malignant neoplasm		-0.97	0.000	+++	106
GI	Other higher cost		-0.67	0.013	+	114
GI	Other lower cost		-0.29	0.034	+	628
GI	Other moderate cost, I		0.28	0.116		498
GI	Other moderate cost, II		0.08	0.629		539
GI	Ulcer		-0.27	0.359		111
Genital	Malignant neoplasm, breast, wo BMT		-0.74	0.003	++	157
Genital	Malignant neoplasm, female gen tract		-1.40	0.001	++	34
Genital	Other lower cost gynecology, I		0.81	0.018	*	251
Genital	Other lower cost gynecology, II		0.79	0.024	*	293
Genital	Other moderate cost gynecology, I		12.56	0.993		3
Genital	Other moderate cost gynecology, II		0.53	0.178		155
Genital	Other moderate cost gynecology, III		13.22	0.992		2
Infect	AIDS/HIV		13.58	0.996		1
Infect	Lower cost infectious disease		0.08	0.818		104
Infect	Non-HIV major w cb		0.04	0.911		49
Infect	Non-HIV major, wo cb		1.25	0.150		27
Isolated	Isolated signs and symptoms		0.39	0.078		431
Liver	Cholelithiasis		0.63	0.158		67
Liver	Infectious hepatitis		0.71	0.624		9
Liver	Other higher cost hepatology		-1.77	0.009	++	17
Liver	Other lower cost hepatology		0.05	0.936		30
Liver	Other moderate cost hepatology		-1.01	0.015	+	37
Lung	Acute bronchitis		0.00	0.997		520
Lung	Asthma		-0.45	0.035	+	213
Lung	Chronic Bronchitis		-0.60	0.002	++	204
Lung	Emphysema		-1.02	0.000	+++	102
Lung	Malignant pulmonary neoplasm		-1.84	0.000	+++	63
Lung	Other lower cost pulmonology, II		-0.22	0.246		310
Lung	Other lower cost pulmonology, III		-0.25	0.321		149
Lung	Other moderate cost pulmonology		-0.80	0.000	+++	225
Misc	Environmental trauma		-0.56	0.207		44
Misc	Late effects and complications		-0.12	0.770		46
Misc	Poisonings and toxic effects of drugs		0.76	0.336		27
Neuro	Major brain and spinal trauma		-0.99	0.103		18
Neuro	Migraine headache		12.99	0.974		27
Neuro	Neoplasm of central nervous system		-1.63	0.016	+	12
Neuro	Non-cranial nerve inflammation		0.66	0.048	*	174
Neuro	Other higher cost neurology		-0.82	0.000	+++	543
Neuro	Other lower cost neurology		-0.72	0.007	++	116
Neuro	Other moderate cost neurology		0.34	0.356		102
Ortho	Arthritis		0.41	0.355		98
Ortho	Higher cost orthopedics		-0.02	0.961		72
Ortho	Lower cost orthopedics, I		0.03	0.818		1,100
Ortho	Lower cost orthopedics, II		0.18	0.266		641
Ortho	Other moderate cost orthopedics, I		0.19	0.078		1,572
Ortho	Other moderate cost orthopedics, II		-0.11	0.747		103
Ortho	Other moderate cost orthopedics, III		1.49	0.152		43

Prev	Preventive and administrative		0.26	0.007	**	2,099
Psych	Dementia and mental retardation		-1.33	0.000	+++	49
Psych	Lower cost psychiatry		0.09	0.903		21
Psych	Major and minor depression		-0.08	0.752		203
Psych	Other moderate cost psychiatry		-0.55	0.022	+	148
Psych	Personality and eating disorders		-1.55	0.181		5
Psych	Schizoaffective disorders		0.68	0.164		42
Renal	Acute renal failure		-0.74	0.373		10
Renal	Chronic renal failure		-0.68	0.023	+	77
Renal	Lower cost nephrology		-0.66	0.210		35
Renal	Moderate cost nephrology		-1.00	0.258		8
Skin	Higher cost dermatology		-0.36	0.193		112
Skin	Lower cost dermatology, I		0.06	0.522		2,010
Skin	Lower cost dermatology, II		0.00	0.990		183
Skin	Moderate cost dermatology		0.58	0.018	*	293
Uro	Higher cost urology		-0.18	0.302		337
Uro	Lower cost urology, I		0.02	0.830		1,140
Uro	Lower cost urology, II		-0.31	0.341		122
Uro	Moderate cost urology		-0.10	0.637		209
Positive coefficient						
*	p<.05					
**	p<.01					
***	p<.001					
Negative coefficient						
+	p<.05					
++	p<.01					
+++	p<.001					
See Table 3 for descriptions of MPCs.						

Table 8B. CDPS as Predictors of Whether an Enrollee was Alive Within 24 Months of Taking the Baseline Survey, Logistic Regression					
Likelihood ratio chi squared		997.62			
p		<.0001			
Pseudo R-square		0.103			
N		9,209			
		Coefficient			
MPC	CDPS Description	Estimate	p		N
Blood	Very high	8.04	0.978		1
Blood	High	-1.71	0.003	++	19
Blood	Medium	-0.48	0.296		40
Blood	Low	-0.24	0.484		79
Blood	Very low	0.06	0.851		86
Blood	Super low	-0.80	0.126		29
Blood	Anemia	-0.21	0.105		663
Cancer	Very high	-2.24	0.000	+++	109
Cancer	High	-1.33	0.000	+++	97
Cancer	Medium	-0.24	0.283		198
Cancer	Low	-0.07	0.695		369
Cancer	Very low	-0.04	0.850		415
Cancer	Benign	0.22	0.218		571
Cardio	Very high	-0.19	0.724		28
Cardio	Ischemic heart disease, high	-0.76	0.000	+++	689
Cardio	Ischemic heart disease, low	-0.01	0.963		590
Cardio	Ischemic heart disease, extra low	0.17	0.141		1,638
Cardio	Valvular, conductive, others, medium	-0.06	0.930		24
Cardio	Valvular, conductive, others, low	-0.23	0.065		673
Cardio	Valvular, conductive, others, very low	-0.36	0.019	+	416
Cardio	Peripheral vascular, medium	-0.35	0.007	++	622
Cardio	Super low	0.74	0.048	*	223
CerebVas	High	-0.15	0.781		32
CerebVas	Medium	-0.79	0.000	+++	240
CerebVas	Low	-0.10	0.587		314
CerebVas	Very low	-0.47	0.459		17
CerebVas	Extra low	-0.12	0.710		94
Chem	Low	0.02	0.985		13
Chem	Very low	-1.25	0.008	++	25
Demo	Age less than 65	0.38	0.273		211
Demo	Age 75 and higher	-0.77	0.000	+++	3,345
Demo	Sex (1=male, 0=female)	-0.35	0.000	+++	3,852
ENT	Super low	0.01	0.920		828
Endocr	High	-0.70	0.004	++	119
Endocr	Low	-0.17	0.460		206
Endocr	Super low	0.25	0.003	**	3,259
Endocr	Type 1 or 2 with rare complications	-0.65	0.093		66
Endocr	Type 1 with common complications	-0.76	0.122		34

Endocr	Type1	-0.73	0.000	+++	268
Endocr	Type 2 with common complications	-0.28	0.410		95
Endocr	Type 2	-0.45	0.000	+++	1,009
Eye	Cataract	0.16	0.126		1,713
Eye	Retinal Disorder	0.11	0.500		487
Eye	Low	0.38	0.028	*	575
Eye	Super low	0.07	0.537		1,605
GI	High	-0.76	0.089		36
GI	Ostomy	-0.93	0.021	+	41
GI	Medium	-0.24	0.338		154
GI	Low	-0.22	0.157		500
GI	Super low	-0.01	0.965		936
Genital	Extra low	0.57	0.000	***	950
Genital	Super low	0.58	0.000	***	1,321
Infect	High	-0.99	0.280		9
Infect	HIV, Medium	9.49	0.974		1
Infect	Medium	0.45	0.270		60
Infect	Low	-0.32	0.339		89
Infect	Super low	0.19	0.336		347
Lung	High	-1.30	0.000	+++	93
Lung	Medium	-0.33	0.041	+	345
Lung	Pneumonia high	-0.43	0.356		30
Lung	Pneunomia low	-0.13	0.404		379
Lung	COPD	-0.87	0.000	+++	961
Lung	Asthma	0.14	0.690		142
Lung	Super low	0.01	0.905		1,460
Neuro	High	1.82	0.134		11
Neuro	Peripheral, high	0.00	0.994		111
Neuro	Peripheral, low	0.74	0.140		86
Neuro	Multiple sclerosis	0.26	0.638		40
Neuro	Parkinson's disease	-0.98	0.004	++	56
Neuro	Convulsions and epilepsy	-0.10	0.768		89
Neuro	Low	0.16	0.269		698
Ortho	Medium	-0.10	0.570		363
Ortho	Very low	-0.06	0.664		712
Ortho	Extra low	0.08	0.576		681
Ortho	Super low	0.27	0.073		808
Psych	High	-0.73	0.453		8
Psych	Medium	-0.15	0.658		91
Psych	Low	-0.13	0.513		275
Psych	Delirium	-0.93	0.038	+	30
Psych	Dementia	-1.09	0.000	+++	161
Renal	Extra high	-0.51	0.698		5
Renal	Very high	-0.03	0.928		85
Renal	Medium	-0.40	0.236		59
Renal	Low	-0.21	0.750		20
Renal	Very low	-0.26	0.118		447
Renal	Super low	-0.04	0.803		730
Skin	High	-0.32	0.490		34
Skin	Low	0.04	0.876		118

Skin	Super low	0.15	0.093		2,541
Positive coefficient					
*	p<.05				
**	p<.01				
***	p<.001				
Negative coefficient					
+	p<.05				
++	p<.01				
+++	p<.001				
See Table 3 for descriptions of CDPS Categories.					

Table 9A. ERGs as Predictors of the Change in Physical and Mental Health Statuses, Regression Analysis									
		Physical Health				Mental Health			
R-squared		0.024				0.016			
p		0.005				0.820			
N		6,101				6,101			
		Coeff.				Coeff.			
MPC	ETG Description	Est.	p			Est.	p		N
Blood	Leukemia wo bone marrow transplant	-2.49	0.470			1.64	0.675		7
Blood	Lower cost hematology	-0.73	0.266			0.19	0.802		178
Blood	Major non-neoplastic blood disease	2.04	0.080			0.35	0.788		54
Blood	Other neoplastic blood disease	0.68	0.651			-3.37	0.045	+	33
Cardio	Atherosclerosis	-1.66	0.101			-0.52	0.650		74
Cardio	Benign hypertension	0.00	0.990			-0.16	0.574		1,807
Cardio	Congestive heart failure	0.93	0.149			-0.04	0.952		188
Cardio	Coronary heart disease, wo AMI	0.40	0.259			-0.25	0.542		759
Cardio	Coronary heart disease, w AMI	3.54	0.001	**		-1.33	0.278		63
Cardio	Major arterial trauma, inflam, aneurysm	3.84	0.067			1.82	0.441		17
Cardio	Malignant hypertension	-0.07	0.943			0.07	0.947		86
Cardio	Other lower cost cardiology, I	-1.49	0.098			1.44	0.156		91
Cardio	Other lower cost cardiology, II	0.42	0.428			0.05	0.938		270
Cardio	Other moderate cost cardiology, I	-0.40	0.411			0.04	0.948		331
Cardio	Other moderate cost cardiology, II	0.75	0.557			0.09	0.948		46
Chem	Moderate and higher cost	4.78	0.093			-2.03	0.527		9
Chem	Other drug dependence	-1.52	0.502			-0.63	0.806		14
Demo	Age less than 65	0.17	0.803			0.88	0.251		161
Demo	Age 75 and higher	-0.30	0.210			-0.34	0.210		1,927
Demo	Sex (1=male, 0=female)	-0.13	0.610			0.07	0.813		2,463
ENT	Malignant neoplasm ENT	-4.52	0.030	+		-0.71	0.764		17
ENT	Moderate cost ENT	1.36	0.143			0.08	0.943		85
ENT	Other lower cost ENT, I	-0.08	0.867			-0.44	0.393		372
ENT	Other lower cost ENT, II	0.60	0.170			-0.05	0.915		422
ENT	Rhinitis/sinusitis	-0.16	0.714			-0.52	0.291		424
Endocr	Hyperlipidemia	0.16	0.605			0.23	0.506		976
Endocr	Malignant neoplasm of pancreas	-2.20	0.809			6.98	0.497		1
Endocr	Other higher cost endocrinology	-0.58	0.457			0.52	0.559		123
Endocr	Other lower cost endocrinology I	-0.20	0.656			0.41	0.422		388
Endocr	Other lower cost endocrinology II	0.95	0.277			0.16	0.871		96
Endocr	Other moderate cost endocrinology	0.24	0.786			0.62	0.535		95
Endocr	Type I diabetes, w cb	-0.68	0.438			-0.35	0.724		98
Endocr	Type I diabetes, wo cb	1.36	0.313			-0.88	0.559		40
Endocr	Type II diabetes, w cb	0.12	0.789			-0.67	0.195		381
Endocr	Type II diabetes, wo cb	0.91	0.149			-1.67	0.019	+	190
Eye	Glaucoma	0.00	0.997			-0.37	0.445		432
Eye	Higher cost ophthalmology	-1.69	0.034	+		-0.07	0.934		119
Eye	Moderate cost ophthalmology	-0.40	0.126			-0.03	0.919		1,390

Eye	Other lower cost ophthalmology	-0.28	0.400			-0.07	0.853		776
GI	Appendicitis	-0.84	0.826			2.09	0.629		5
GI	Hernias	0.64	0.453			0.64	0.506		101
GI	Malignant neoplasm	-2.20	0.051			1.11	0.387		57
GI	Other higher cost	0.92	0.394			2.20	0.070		66
GI	Other lower cost	0.53	0.225			0.04	0.929		408
GI	Other moderate cost, I	1.04	0.034	*		-0.09	0.866		327
GI	Other moderate cost, II	0.59	0.211			0.31	0.555		357
GI	Ulcer	0.65	0.575			-1.58	0.229		57
Genital	Malignant neoplasm, breast, wo BMT	1.02	0.211			1.02	0.271		111
Genital	Malignant neoplasm, female gen tract	2.46	0.264			0.41	0.870		15
Genital	Other lower cost gynecology, I	0.23	0.719			-0.32	0.657		185
Genital	Other lower cost gynecology, II	-0.74	0.203			0.64	0.326		231
Genital	Other moderate cost gynecology, I	10.08	0.039	*		-0.55	0.920		3
Genital	Other moderate cost gynecology, II	0.00	0.996			-0.27	0.775		111
Genital	Other moderate cost gynecology, III	-6.99	0.265			5.78	0.414		2
Infect	AIDS/HIV	2.07	0.806			14.72	0.121		1
Infect	Lower cost infectious disease	-0.11	0.916			0.59	0.618		66
Infect	Non-HIV major w cb	1.44	0.449			-4.53	0.034	+	23
Infect	Non-HIV major, wo cb	0.39	0.838			-1.93	0.372		20
Isolated	Isolated signs and symptoms	0.07	0.881			-0.41	0.462		316
Liver	Cholelithiasis	-0.35	0.805			0.24	0.881		42
Liver	Infectious hepatitis	15.56	0.009	**		2.47	0.713		2
Liver	Other higher cost hepatology	-1.20	0.816			-8.45	0.147		3
Liver	Other lower cost hepatology	1.01	0.613			0.86	0.702		18
Liver	Other moderate cost hepatology	1.69	0.417			-0.51	0.828		18
Lung	Acute bronchitis	0.10	0.824			-0.97	0.069		350
Lung	Asthma	0.00	0.995			1.04	0.211		138
Lung	Chronic Bronchitis	-0.45	0.579			-0.04	0.963		114
Lung	Emphysema	-0.03	0.982			0.14	0.915		52
Lung	Malignant pulmonary neoplasm	1.35	0.483			0.80	0.712		20
Lung	Other lower cost pulmonology, II	1.03	0.093			-0.66	0.342		198
Lung	Other lower cost pulmonology, III	1.91	0.036	*		1.33	0.197		90
Lung	Other moderate cost pulmonology	-0.67	0.466			0.24	0.812		95
Misc	Environmental trauma	1.83	0.271			2.19	0.242		26
Misc	Late effects and complications	3.24	0.117			2.65	0.257		18
Misc	Poisonings and toxic effects of drugs	-1.48	0.487			-0.20	0.934		16
Neuro	Major brain and spinal trauma	-0.56	0.853			5.03	0.138		8
Neuro	Migraine headache	0.26	0.887			1.28	0.540		21
Neuro	Neoplasm of central nervous system	-7.53	0.046	+		-9.34	0.029	+	5
Neuro	Non-cranial nerve inflammation	-0.79	0.319			0.82	0.359		121
Neuro	Other higher cost neurology	1.11	0.034	*		0.09	0.873		284
Neuro	Other lower cost neurology	0.70	0.494			-1.85	0.110		70
Neuro	Other moderate cost neurology	-1.23	0.244			0.84	0.482		67
Ortho	Arthritis	-1.40	0.161			1.35	0.232		73
Ortho	Higher cost orthopedics	-0.62	0.655			1.45	0.350		40
Ortho	Lower cost orthopedics, I	0.34	0.319			0.17	0.664		752
Ortho	Lower cost orthopedics, II	0.69	0.105			0.04	0.925		446
Ortho	Other moderate cost orthopedics, I	1.01	0.001	***		0.11	0.750		1,055
Ortho	Other moderate cost orthopedics, II	-1.59	0.138			0.35	0.772		64

Ortho	Other moderate cost orthopedics, III	-1.49	0.313			2.69	0.108		33
Prev	Preventive and administrative	0.18	0.487			0.12	0.680		1,492
Psych	Dementia and mental retardation	0.61	0.823			-3.06	0.322		11
Psych	Lower cost psychiatry	1.94	0.346			2.59	0.263		17
Psych	Major and minor depression	-0.55	0.460			1.71	0.041	*	135
Psych	Other moderate cost psychiatry	0.09	0.929			0.81	0.464		77
Psych	Personality and eating disorders	-0.84	0.863			11.10	0.045	*	3
Psych	Schizoaffective disorders	-5.07	0.029	+		-2.85	0.276		15
Renal	Acute renal failure	-1.31	0.744			-0.88	0.847		5
Renal	Chronic renal failure	-1.05	0.469			0.23	0.890		36
Renal	Lower cost nephrology	-0.11	0.955			-1.71	0.427		20
Renal	Moderate cost nephrology	-1.31	0.732			6.66	0.123		5
Skin	Higher cost dermatology	-0.91	0.405			1.76	0.155		62
Skin	Lower cost dermatology, I	-0.33	0.222			0.01	0.968		1,348
Skin	Lower cost dermatology, II	-0.36	0.654			-0.34	0.712		114
Skin	Moderate cost dermatology	-0.51	0.397			0.14	0.842		209
Uro	Higher cost urology	-0.79	0.203			-0.02	0.979		207
Uro	Lower cost urology, I	0.02	0.951			-0.13	0.737		763
Uro	Lower cost urology, II	-0.36	0.700			-1.14	0.277		87
Uro	Moderate cost urology	-0.90	0.236			1.22	0.153		131
	Intercept	-1.76	0.000	+++		-0.42	0.111		
See Table 6 for descriptions of MPCs.									
See Table 8A or 8B for the symbols indicating the level of significance.									

Table 9B. CDPS as Predictors of the Change in Physical and Mental Health Statuses, Regression Analysis									
		Physical Health				Mental Health			
R-squared		0.026				0.019			
p		<.0001				0.029			
N		6,101				6,101			
		Coeff.				Coeff.			
MPC	CDPS Description	Est.	p			Est.	p		N
Blood	Very high	9.94	0.236			-16.98	0.073		1
Blood	High	6.34	0.047	*		-1.03	0.775		7
Blood	Medium	3.17	0.064			1.31	0.498		25
Blood	Low	-2.16	0.114			-0.12	0.937		39
Blood	Very low	1.59	0.206			1.73	0.224		47
Blood	Super low	2.75	0.223			1.47	0.564		14
Blood	Anemia	-0.69	0.135			-1.07	0.041	+	379
Cancer	Very high	1.12	0.408			-1.30	0.393		40
Cancer	High	-0.29	0.836			2.49	0.111		38
Cancer	Medium	-1.74	0.022	+		0.87	0.309		130
Cancer	Low	0.07	0.909			-0.25	0.702		238
Cancer	Very low	-0.02	0.975			0.01	0.983		292
Cancer	Benign	0.55	0.225			0.49	0.333		395
Cardio	Very high	5.47	0.045	*		-1.27	0.679		10
Cardio	Ischemic heart disease, high	0.52	0.317			-0.61	0.300		337
Cardio	Ischemic heart disease, low	1.13	0.022	*		-0.14	0.796		384
Cardio	Ischemic heart disease, extra low	-0.39	0.356			0.48	0.307		998
Cardio	Valvular, conductive, others, medium	0.19	0.940			0.77	0.784		12
Cardio	Valvular, conductive, others, low	0.22	0.647			-0.50	0.343		388
Cardio	Valvular, conductive, others, very low	-0.22	0.693			0.61	0.321		258
Cardio	Peripheral vascular, medium	-0.36	0.444			0.10	0.850		372
Cardio	Super low	-0.18	0.792			1.01	0.188		162
CerebVas	High	1.98	0.319			0.79	0.724		19
CerebVas	Medium	2.72	0.001	**		-0.26	0.781		115
CerebVas	Low	0.49	0.444			0.36	0.616		198
CerebVas	Very low	3.48	0.275			0.05	0.990		7
CerebVas	Extra low	1.37	0.246			-0.42	0.754		53
Chem	Low	0.57	0.851			1.61	0.638		8
Chem	Very low	3.86	0.132			-2.92	0.312		11
Demo	Age less than 65	0.19	0.782			0.93	0.222		161
Demo	Age 75 and higher	-0.23	0.329			-0.31	0.255		1927
Demo	Sex (1=male, 0=female)	0.03	0.887			-0.03	0.906		2463
ENT	Super low	-0.03	0.928			0.15	0.727		555
Endocr	High	1.07	0.356			2.43	0.064		58
Endocr	Low	-0.84	0.269			-1.18	0.170		129
Endocr	Super low	-0.07	0.778			0.25	0.337		2300
Endocr	Type 1 or 2 with rare complications	-1.97	0.184			0.61	0.715		34
Endocr	Type 1 with common complications	-0.61	0.784			0.01	0.997		15

Endocr	Type1	0.43	0.565			-2.14	0.010	+	147
Endocr	Type 2 with common complications	0.41	0.722			-2.62	0.041	+	58
Endocr	Type 2	0.72	0.087			-1.18	0.013	+	617
Eye	Cataract	-0.12	0.676			-0.08	0.809		1191
Eye	Retinal Disorder	-0.81	0.103			-0.25	0.648		328
Eye	Low	-0.16	0.719			-0.02	0.966		394
Eye	Super low	-0.16	0.572			-0.02	0.956		1115
GI	High	-2.08	0.330			0.70	0.772		16
GI	Ostomy	6.53	0.001	***		1.85	0.404		19
GI	Medium	1.29	0.152			-0.89	0.381		92
GI	Low	0.06	0.914			0.24	0.685		299
GI	Super low	0.92	0.011	*		-0.37	0.363		644
Genital	Extra low	-0.25	0.505			-0.03	0.938		668
Genital	Super low	0.13	0.665			-0.25	0.466		974
Infect	High	-3.59	0.560			5.20	0.455		2
Infect	Medium	1.36	0.368			-3.64	0.033	+	33
Infect	Low	-0.22	0.842			1.00	0.428		57
Infect	Super low	0.47	0.421			-0.49	0.455		224
Lung	High	2.08	0.170			-0.80	0.639		33
Lung	Medium	-0.60	0.376			1.30	0.091		175
Lung	Pneumonia high	7.08	0.015	*		0.12	0.971		9
Lung	Pneunomia low	0.59	0.353			-0.02	0.972		207
Lung	COPD	0.57	0.155			-0.52	0.249		530
Lung	Asthma	0.78	0.343			0.38	0.687		107
Lung	Super low	0.15	0.624			-0.52	0.119		1028
Neuro	High	-1.75	0.587			4.88	0.179		7
Neuro	Peripheral, high	-1.65	0.117			0.78	0.510		67
Neuro	Peripheral, low	-0.12	0.912			1.52	0.230		58
Neuro	Multiple sclerosis	2.75	0.154			1.47	0.501		20
Neuro	Parkinson's disease	-4.02	0.026	+		0.68	0.740		23
Neuro	Convulsions and epilepsy	0.82	0.497			-0.85	0.530		51
Neuro	Low	0.40	0.335			-0.94	0.048	+	465
Ortho	Medium	0.66	0.268			1.37	0.041	*	219
Ortho	Very low	1.15	0.006	**		0.01	0.987		474
Ortho	Extra low	1.52	0.000	***		0.09	0.855		453
Ortho	Super low	0.90	0.019	*		0.13	0.771		564
Psych	High	-2.71	0.471			1.67	0.695		5
Psych	Medium	-1.47	0.208			3.68	0.005	**	54
Psych	Low	-0.77	0.270			2.91	0.000	***	155
Psych	Delirium	-2.01	0.420			-6.47	0.022	+	12
Psych	Dementia	-1.28	0.287			-1.90	0.161		53
Renal	Extra high	-7.71	0.200			-5.67	0.403		2
Renal	Very high	-1.33	0.302			-3.23	0.027	+	46
Renal	Medium	0.40	0.823			0.07	0.973		24
Renal	Low	-0.85	0.729			-1.31	0.634		12
Renal	Very low	0.35	0.507			0.96	0.108		284
Renal	Super low	0.66	0.106			0.10	0.834		474
Skin	High	-3.28	0.154			5.01	0.053		14
Skin	Low	-1.98	0.074			1.08	0.386		61
Skin	Super low	-0.46	0.076			0.24	0.412		1707

	Intercept	-1.98	0.000	+++		-0.34	0.183		
See Table 6 for descriptions of MPCs.									
See Table 8A or 8B for the symbols indicating the level of significance.									

Table 10A. ERGs as Predictors of Decline in Physical and Mental Health Statuses, Logistic Regression								
The dependent variable was coded such that a negative sign indicates that an independent variable increases the probability of a decline. Thus, each variable has the same expected sign across Tables 5-7.								
		Physical Health				Mental Health		
Likelihood ratio chi squared		436.44				615.86		
p		<.0001				<.0001		
Pseudo R-square		0.060				0.084		
N		7,046				7,046		
% decline		37%				30%		
		Coeff.				Coeff.		
MPC	ETG Description	Est.	p			Est.	p	N
Blood	Leukemia wo bone marrow transplant	-1.529	0.026	+		-0.281	0.639	13
Blood	Lower cost hematology	-0.248	0.081			-0.192	0.194	244
Blood	Major non-neoplastic blood disease	-0.113	0.641			-0.490	0.047	+ 85
Blood	Other neoplastic blood disease	-0.199	0.536			-0.413	0.209	44
Cardio	Atherosclerosis	-0.161	0.480			-0.218	0.352	93
Cardio	Benign hypertension	0.011	0.856			0.038	0.565	2,029
Cardio	Congestive heart failure	-0.592	0.000	+++		-0.724	0.000	+++ 331
Cardio	Coronary heart disease, wo AMI	-0.065	0.430			-0.162	0.059	949
Cardio	Coronary heart disease, w AMI	0.013	0.956			-0.559	0.018	+ 90
Cardio	Major arterial trauma, inflam, aneurysm	0.716	0.155			0.421	0.402	21
Cardio	Malignant hypertension	-0.160	0.458			-0.140	0.538	99
Cardio	Other lower cost cardiology, I	-0.429	0.041	+		0.436	0.091	103
Cardio	Other lower cost cardiology, II	-0.062	0.607			-0.091	0.467	341
Cardio	Other moderate cost cardiology, I	-0.217	0.045	+		-0.169	0.134	429
Cardio	Other moderate cost cardiology, II	-0.151	0.596			-0.210	0.476	59
Chem	Moderate and higher cost	-0.064	0.909			-0.645	0.243	15
Chem	Other drug dependence	-0.275	0.580			-0.781	0.120	19
Demo	Age less than 65	-0.006	0.974			0.140	0.468	172
Demo	Age 75 and higher	-0.439	0.000	+++		-0.544	0.000	+++ 2,454
Demo	Sex (1=male, 0=female)	-0.116	0.048	+		-0.135	0.030	+ 2,949
ENT	Malignant neoplasm ENT	-1.432	0.001	++		-0.764	0.057	29
ENT	Moderate cost ENT	-0.034	0.873			-0.307	0.159	107
ENT	Other lower cost ENT, I	0.108	0.327			0.107	0.358	431
ENT	Other lower cost ENT, II	0.114	0.272			-0.014	0.894	500
ENT	Rhinitis/sinusitis	0.122	0.255			0.083	0.470	470
Endocr	Hyperlipidemia	0.271	0.000	***		0.456	0.000	*** 1,040
Endocr	Malignant neoplasm of pancreas	-12.682	0.959			-1.619	0.155	9
Endocr	Other higher cost endocrinology	-0.071	0.689			0.124	0.518	157
Endocr	Other lower cost endocrinology I	0.043	0.692			0.122	0.298	444
Endocr	Other lower cost endocrinology II	0.109	0.604			0.101	0.651	111
Endocr	Other moderate cost endocrinology	0.108	0.629			0.487	0.068	99
Endocr	Type I diabetes, w cb	-0.474	0.010	++		-0.451	0.018	+ 141
Endocr	Type I diabetes, wo cb	-0.267	0.349			-0.358	0.223	55
Endocr	Type II diabetes, w cb	-0.188	0.073			-0.214	0.052	465

Endocr	Type II diabetes, wo cb	-0.082	0.577			-0.305	0.043	+	229
Eye	Glaucoma	0.223	0.033	*		0.082	0.449		483
Eye	Higher cost ophthalmology	-0.245	0.163			-0.169	0.355		154
Eye	Moderate cost ophthalmology	0.027	0.673			0.051	0.446		1,589
Eye	Other lower cost ophthalmology	-0.008	0.924			0.250	0.004	**	880
GI	Appendicitis	-0.267	0.781			12.786	0.971		5
GI	Hernias	-0.151	0.446			-0.081	0.697		123
GI	Malignant neoplasm	-0.882	0.000	+++		-0.622	0.008	++	85
GI	Other higher cost	-0.239	0.300			-0.067	0.783		94
GI	Other lower cost	-0.051	0.620			-0.190	0.075		497
GI	Other moderate cost, I	0.265	0.029	*		0.137	0.283		375
GI	Other moderate cost, II	0.078	0.495			0.025	0.838		420
GI	Ulcer	-0.102	0.684			-0.298	0.247		80
Genital	Malignant neoplasm, breast, wo BMT	-0.007	0.971			0.151	0.471		134
Genital	Malignant neoplasm, female gen tract	-0.148	0.728			-0.775	0.073		25
Genital	Other lower cost gynecology, I	0.193	0.246			-0.029	0.870		195
Genital	Other lower cost gynecology, II	0.052	0.730			0.281	0.102		240
Genital	Other moderate cost gynecology, I	12.437	0.978			12.228	0.979		3
Genital	Other moderate cost gynecology, II	0.159	0.456			-0.056	0.798		119
Genital	Other moderate cost gynecology, III	-0.763	0.602			12.650	0.982		2
Infect	AIDS/HIV	12.771	0.987			12.585	0.988		1
Infect	Lower cost infectious disease	0.236	0.360			-0.028	0.913		78
Infect	Non-HIV major w cb	0.494	0.190			-0.433	0.280		41
Infect	Non-HIV major, wo cb	0.433	0.380			-0.016	0.974		22
Isolated	Isolated signs and symptoms	0.120	0.335			0.139	0.308		342
Liver	Cholelithiasis	0.099	0.760			-0.069	0.835		51
Liver	Infectious hepatitis	-0.249	0.840			-0.762	0.534		4
Liver	Other higher cost hepatology	-1.597	0.054			-2.368	0.028	+	15
Liver	Other lower cost hepatology	-0.864	0.064			-0.153	0.757		21
Liver	Other moderate cost hepatology	-0.316	0.435			-0.553	0.174		32
Lung	Acute bronchitis	-0.064	0.566			0.011	0.923		408
Lung	Asthma	-0.129	0.439			-0.261	0.134		174
Lung	Chronic Bronchitis	-0.296	0.088			-0.474	0.007	++	161
Lung	Emphysema	-0.412	0.078			-0.630	0.008	++	86
Lung	Malignant pulmonary neoplasm	-0.828	0.008	++		-1.046	0.001	++	53
Lung	Other lower cost pulmonology, II	-0.007	0.959			-0.325	0.025	+	238
Lung	Other lower cost pulmonology, III	0.140	0.500			-0.011	0.958		117
Lung	Other moderate cost pulmonology	-0.679	0.000	+++		-0.557	0.002	++	178
Misc	Environmental trauma	-0.053	0.888			0.120	0.770		33
Misc	Late effects and complications	-0.162	0.696			-0.322	0.454		29
Misc	Poisonings and toxic effects of drugs	-0.074	0.884			0.224	0.692		18
Neuro	Major brain and spinal trauma	-1.035	0.099			0.384	0.542		13
Neuro	Migraine headache	1.151	0.072			0.952	0.143		21
Neuro	Neoplasm of central nervous system	-2.818	0.009	++		-1.624	0.029	+	10
Neuro	Non-cranial nerve inflammation	0.058	0.762			0.191	0.363		135
Neuro	Other higher cost neurology	-0.310	0.005	++		-0.606	0.000	+++	405
Neuro	Other lower cost neurology	-0.430	0.053			-0.499	0.029	+	91
Neuro	Other moderate cost neurology	0.301	0.247			0.577	0.045	*	78
Ortho	Arthritis	-0.051	0.833			0.196	0.472		79
Ortho	Higher cost orthopedics	0.112	0.719			0.160	0.619		53

Ortho	Lower cost orthopedics, I	0.059	0.468			0.035	0.686		869
Ortho	Lower cost orthopedics, II	0.034	0.739			0.166	0.144		501
Ortho	Other moderate cost orthopedics, I	0.158	0.030	*		0.040	0.603		1,199
Ortho	Other moderate cost orthopedics, II	-0.204	0.405			-0.068	0.797		79
Ortho	Other moderate cost orthopedics, III	-0.230	0.528			1.102	0.045	*	34
Prev	Preventive and administrative	0.161	0.011	*		0.183	0.007	**	1,669
Psych	Dementia and mental retardation	-1.095	0.013	+		-1.553	0.001	++	31
Psych	Lower cost psychiatry	0.793	0.171			0.885	0.176		19
Psych	Major and minor depression	-0.034	0.847			-0.065	0.724		159
Psych	Other moderate cost psychiatry	-0.376	0.071			-0.550	0.010	++	105
Psych	Personality and eating disorders	-0.821	0.418			-0.049	0.967		4
Psych	Schizoaffective disorders	-0.263	0.600			-0.056	0.914		22
Renal	Acute renal failure	-0.027	0.971			-0.387	0.616		9
Renal	Chronic renal failure	-0.540	0.058			-0.481	0.105		63
Renal	Lower cost nephrology	0.146	0.742			-0.535	0.211		26
Renal	Moderate cost nephrology	-0.539	0.509			-1.150	0.171		7
Skin	Higher cost dermatology	-0.410	0.079			-0.124	0.613		85
Skin	Lower cost dermatology, I	-0.018	0.784			0.063	0.364		1,559
Skin	Lower cost dermatology, II	0.044	0.819			0.017	0.935		135
Skin	Moderate cost dermatology	0.135	0.361			0.204	0.201		231
Uro	Higher cost urology	-0.105	0.445			-0.091	0.530		261
Uro	Lower cost urology, I	0.002	0.985			0.020	0.817		890
Uro	Lower cost urology, II	-0.220	0.317			-0.290	0.207		100
Uro	Moderate cost urology	-0.057	0.741			0.177	0.345		163

Health status had to decrease by at least 2 times the standard error--5.66 for physical health status and 6.72 for mental health status--to be considered to have declined. Death was treated as a decline in health status.

See Table 6 for descriptions of MPCs.

See Table 8A or 8B for the symbols indicating the level of significance.

Table 10B. CDPS as Predictors of Decline in Physical and Mental Health Statuses, Logistic Regression								
The dependent variable was coded such that a negative sign indicates that an independent variable increases the probability of a decline. Thus, each variable has the same expected sign across Tables 5-7.								
		Physical Health				Mental Health		
Likelihood ratio chi squared		438.13				663.13		
p		<.0001				<.0001		
Pseudo R-square		0.060				0.090		
N		7,046				7,046		
% decline		37%				30%		
		Coeff.				Coeff.		
MPC	CDPS Description	Est.	p			Est.	p		N
Blood	Very high	9.32	0.957			-12.01	0.952		1
Blood	High	-0.46	0.390			-1.42	0.014	+	18
Blood	Medium	0.20	0.596			-0.30	0.427		34
Blood	Low	-0.59	0.041	+		-0.32	0.281		58
Blood	Very low	0.37	0.195			0.03	0.924		62
Blood	Super low	-0.08	0.862			-0.15	0.765		20
Blood	Anemia	-0.14	0.160			-0.20	0.065		500
Cancer	Very high	-1.04	0.000	+++		-1.15	0.000	+++	99
Cancer	High	-0.86	0.001	+++		-0.51	0.046	+	75
Cancer	Medium	-0.20	0.252			0.16	0.402		160
Cancer	Low	0.01	0.941			-0.16	0.233		286
Cancer	Very low	0.06	0.640			0.04	0.769		329
Cancer	Benign	0.21	0.064			0.24	0.052		440
Cardio	Very high	-0.28	0.612			-0.92	0.101		18
Cardio	Ischemic heart disease, high	-0.38	0.000	+++		-0.58	0.000	+++	537
Cardio	Ischemic heart disease, low	0.21	0.060			0.06	0.623		485
Cardio	Ischemic heart disease, extra low	-0.01	0.932			0.12	0.218		1,254
Cardio	Valvular, conductive, others, medium	0.01	0.983			-0.14	0.818		19
Cardio	Valvular, conductive, others, low	-0.11	0.299			-0.22	0.043	+	525
Cardio	Valvular, conductive, others, very low	-0.21	0.085			-0.16	0.206		332
Cardio	Peripheral vascular, medium	-0.25	0.014	+		-0.26	0.014	+	494
Cardio	Super low	0.08	0.663			0.15	0.428		170
CerebVas	High	0.19	0.673			0.20	0.667		25
CerebVas	Medium	-0.17	0.323			-0.58	0.001	+++	181
CerebVas	Low	0.30	0.046	*		-0.04	0.819		246
CerebVas	Very low	-0.08	0.900			-0.74	0.249		12
CerebVas	Extra low	0.18	0.506			-0.13	0.644		66
Chem	Low	1.34	0.092			0.68	0.370		11
Chem	Very low	-0.31	0.513			-0.98	0.042	+	20
Demo	Age less than 65	0.00	0.977			0.16	0.410		172
Demo	Age 75 and higher	-0.42	0.000	+++		-0.53	0.000	+++	2,454
Demo	Sex (1=male, 0=female)	-0.11	0.058			-0.12	0.048	+	2,949
ENT	Super low	0.05	0.595			0.06	0.504		650
Endocr	High	-0.12	0.597			-0.10	0.654		103

Endocr	Low	-0.31	0.073			-0.17	0.346		157
Endocr	Super low	0.07	0.218			0.18	0.003	**	2,567
Endocr	Type 1 or 2 with rare complications	-0.65	0.042	+		-0.45	0.190		46
Endocr	Type 1 with common complications	-0.65	0.155			-0.78	0.096		22
Endocr	Type1	-0.37	0.020	+		-0.55	0.001	+++	199
Endocr	Type 2 with common complications	-0.40	0.126			-0.73	0.006	++	72
Endocr	Type 2	-0.20	0.034	+		-0.38	0.000	+++	759
Eye	Cataract	0.04	0.523			0.06	0.422		1,362
Eye	Retinal Disorder	0.07	0.535			-0.03	0.823		384
Eye	Low	0.19	0.090			0.15	0.203		448
Eye	Super low	-0.04	0.596			0.16	0.038	*	1,275
GI	High	-1.03	0.019	+		-0.35	0.414		31
GI	Ostomy	-0.13	0.725			-0.04	0.917		36
GI	Medium	0.13	0.520			-0.28	0.178		126
GI	Low	-0.18	0.133			-0.08	0.506		380
GI	Super low	0.05	0.598			-0.05	0.607		740
Genital	Extra low	0.16	0.070			0.16	0.099		750
Genital	Super low	0.21	0.007	**		0.21	0.015	*	1,048
Infect	High	-1.16	0.317			-0.35	0.742		7
Infect	Medium	0.51	0.133			-0.16	0.645		48
Infect	Low	0.03	0.921			-0.09	0.749		73
Infect	Super low	0.16	0.261			0.08	0.578		268
Lung	High	-0.92	0.001	+++		-1.03	0.000	+++	77
Lung	Medium	-0.29	0.045	+		-0.10	0.493		271
Lung	Pneumonia high	-0.03	0.945			-0.49	0.348		22
Lung	Pneunomia low	-0.02	0.903			0.02	0.862		295
Lung	COPD	-0.31	0.000	+++		-0.67	0.000	+++	756
Lung	Asthma	0.21	0.317			0.29	0.204		118
Lung	Super low	0.04	0.593			-0.02	0.825		1,137
Neuro	High	-0.11	0.884			0.20	0.815		8
Neuro	Peripheral, high	-0.03	0.912			0.11	0.662		85
Neuro	Peripheral, low	0.46	0.125			0.47	0.155		63
Neuro	Multiple sclerosis	0.10	0.811			-0.27	0.550		26
Neuro	Parkinson's disease	-1.14	0.002	++		-0.61	0.092		42
Neuro	Convulsions and epilepsy	-0.50	0.053			-0.45	0.101		68
Neuro	Low	0.00	0.987			-0.25	0.014	+	547
Ortho	Medium	0.05	0.726			0.08	0.593		275
Ortho	Very low	0.13	0.214			-0.06	0.577		557
Ortho	Extra low	0.27	0.009	**		0.11	0.317		524
Ortho	Super low	0.14	0.129			0.15	0.139		636
Psych	High	-0.58	0.488			-0.17	0.847		7
Psych	Medium	-0.34	0.184			-0.09	0.730		69
Psych	Low	-0.07	0.654			0.04	0.797		206
Psych	Delirium	-1.01	0.038	+		-1.74	0.001	++	24
Psych	Dementia	-1.00	0.000	+++		-1.15	0.000	+++	114
Renal	Extra high	-1.00	0.461			-1.01	0.451		3
Renal	Very high	0.06	0.819			-0.24	0.397		69
Renal	Medium	-0.48	0.153			-0.65	0.061		46
Renal	Low	-0.57	0.295			-0.39	0.469		16
Renal	Very low	0.01	0.952			0.11	0.393		351

Renal	Super low	-0.01	0.909			-0.01	0.906		559
Skin	High	-0.78	0.097			-0.32	0.493		25
Skin	Low	-0.22	0.369			0.01	0.979		82
Skin	Super low	-0.03	0.657			0.13	0.047	*	1,977
Health status had to decrease by at least 2 times the standard error--5.66 for physical health status and 6.72 for mental health status--to be considered to have declined. Death was treated as a decline in health status.									
See Table 6 for descriptions of MPCs.									
See Table 8A or 8B for the symbols indicating the level of significance.									