

Title: The Hassle of Wellness: Do Peers and Health Status Matter?

JEL Keywords: Health Insurance (I130, J320), wellness (I310), Information (L150)

Abstract Despite substantial financial incentives provided by the Affordable Care Act (ACA) and employers, employee enrollment in wellness programs is low. This paper studies enrollment in a wellness program offered along an employer-provided health insurance plan. Two factors are considered in the choice of health plan with wellness: the effect of peer choices and family health on plan choice. Using exclusively obtained data of health insurance plan choice and utilization, this paper compares the two near-identical plans and focuses on a subsample of new employees. Results show that peers affect own choice of health insurance: a 10 percentage points rise in the share of colleagues enrolled in Aetna Wellness increases the probability of own enrollment in the plan by 1.1 percentage points to 3.9 percentage points. This result suggests that lack of experience with a wellness program are key to employee reluctance to enroll. Health effect on probability of enrollment in Aetna Wellness ranges from a 3 percentage points decline to a 3 percentage points rise depending on the measure, suggesting that while wellness programs appeal to low- to medium-intensity users of medical services, they do not appeal to individuals with more severe medical conditions which might benefit most from better coordinated medical care.

1 Introduction

The Affordable Care Act (ACA) has instituted incentives to promote workplace wellness programs. A wellness program is a set of screening tools (health risk assessment questionnaire), interventions (counseling, chronic disease management), and discounts, which is offered on its own or as part of a health insurance plan. As the incidence of chronic disease due to lifestyle conditions has imposed a real productivity burden on employers (Mattke 2013), employers have turned to wellness programs to influence lifestyle choices and medical utilization of employees. According to the RAND Employer Survey of 2013 more than half US employers offer some wellness promotion initiative, with 31% of those offering it through their group health plan. The survey also found that only 46% of employees enroll in wellness programs, despite the frequent financial incentives provided by employers. The success of the ACA incentives, however, depends on employee willingness to engage in wellness programs, and undertake the lifestyle changes.

Many studies have looked at the cost efficiency of wellness programs in the context of health insurance (Oscilla et al. 2012 provide an excellent summary of current research), however no research, to our knowledge, has been conducted into the uptake of wellness program. Scarcity of health insurance data, particularly with wellness features, has limited research into the uptake and utilization of such plans. Several studies have looked at the optimality of health insurance choices in the context of employer-provided insurance (Einav, Finkelstein, Cullen 2010, Einav et al. 2013, Handel 2011) and public health insurance programs (Abaluck and Gruber 2011), establishing that employees often forego better plans due to monetary and time costs associated with switching, and an excessive focus on the plan premium.

Studies into uptake of specific features of health plans are limited in number due to the scarcity of such data. Parente et al. (2004) studies plan choice in Consumer-Driven Health Plans and find that such flexible plans do not attract the young and healthy subset of employees, but does appeal to the

wealthier employees and those who wanted greater availability of providers. Cardon and Showalter (2007) study the uptake of medical savings accounts, and find that in the presence of adverse selection, health savings accounts may, but not necessarily, make both healthy and sick consumers better off. The authors conclude that introduction of tax-preferred health savings accounts linked to high deductible accounts may select for healthier members. Bhargava et al. (2015) looks at the health insurance selections of an employer who permitted employees to “build” their own plans from standardized menu of 48 plan options. They find that the majority of employees choose dominated options, and pay on average 42% more for their health insurance. When assessing the roots of the suboptimal choice, they find that while the complexity of the choice contributed, a lack of understanding of basic health insurance concepts, such as cost-sharing features, accounts for the bulk of the choice.

This paper studies the take up of a wellness program which is offered as an optional component of health insurance by a large self-insured university. The analysis will focus on two factors which influence the choice of the health insurance with wellness features: (1) the effect of peer choices on one’s own choice of health insurance; (2) the effect of own and family health on choice of insurance. The wellness program studied here, offered alongside a health insurance plan, had substantial financial incentives but remained largely unpopular among the employees. The plan was designed to make the member a proactive party in the maintenance of their health through identification of health risks, tools to maintain chronic health conditions, and incentives to engage in preventive care. If employees resist, however, any gains from such a plan will be minimal and temporary. If the resistance was due to the genuine disutility from the features of the program, it might be overcome with greater financial incentives for the employee. If, however, the resistance is due to perception and lack of information, it can be overcome with improved employee education about the true benefits and costs of the program.

To estimate the model, health insurance data are used here, obtained through an exclusive agree-

ment with a private employer, are uniquely suited for the study. First, the time period coincides with the introduction of a health insurance with wellness plan offered in parallel and based upon an existing plan. This study takes advantage of this unique set-up for the comparison of two near-identical plans to isolate the effect of the wellness features on choice. Second, the data allow limiting the analysis to a subsample of new employees, eliminating the bias introduced by switching costs and simultaneity of peer choices. Finally, the availability of claims data for employees allow the definition of objective measures of employee and family health.

2 Background

2.1 Health Plan Characteristics

In 2008, a large self-insured university introduced Aetna Wellness health insurance plan, in collaboration with local area physicians. Aetna Wellness was offered in parallel to an existing Aetna Preferred Provider Organization (PPO) plan, which had identical medical and pharmacy benefits. The aim of Aetna Wellness was to involve the primary physician more actively in the identification, assessment, and treatment of health risks before they evolved into costly hospital treatments. The plan encouraged a healthier and more active lifestyle by offering discounts at the gym, counseling for nutrition, smoking cessation, and stress management. The enrollees were required to choose a primary care provider (PCP) and complete a health risk assessment (HRA) questionnaire. The plan encourages members to schedule an annual examination with their PCP, who, on the basis of HRA and lab results, would set a healthy living action plan. Beyond the optional initial examination, the PCP does not act as a gatekeeper for healthcare, and the benefit brochure explicitly stated that the member can use any specialist services without referrals.

Table 1: Plan Comparison for a Family, 2012

	Aetna Wellness	Aetna	PPO2
Premium	3515	4555	3828
Deductible			
<i>In Network</i>	0	500	300
<i>Out of Network</i>	800	900	900
Out of Pocket Maximum			
<i>In Network</i>	4000	4100	4100
<i>Out of Network</i>	7000	7100	7100
Coinsurance			
<i>In Network</i>	90	90	90
<i>Out of Network</i>	80	80	70
Network	Aetna	Aetna	PHCS
Must choose PCP	Yes	No	No
Enhanced Wellness Program	Yes	No	No
Enrollment in 2012	1647	859	2428

Notes: Plan characteristics for individual, spouse, and child(ren) enrollment in 2012. The premium is calculated as the sum of 26 bi-weekly payments.

Two additional plans were available to employees. Aetna HDHP with a family deductible of \$6,250, with an annual premium of \$3,615, had an enrollment below 20 throughout period. Aetna 80/20 plan was designed for pre-retired and retired employees with an annual premium of \$6133, and was discontinued in 2013. Both plans are excluded from present analysis. Results from estimates including Aetna 80/20 are available upon request.

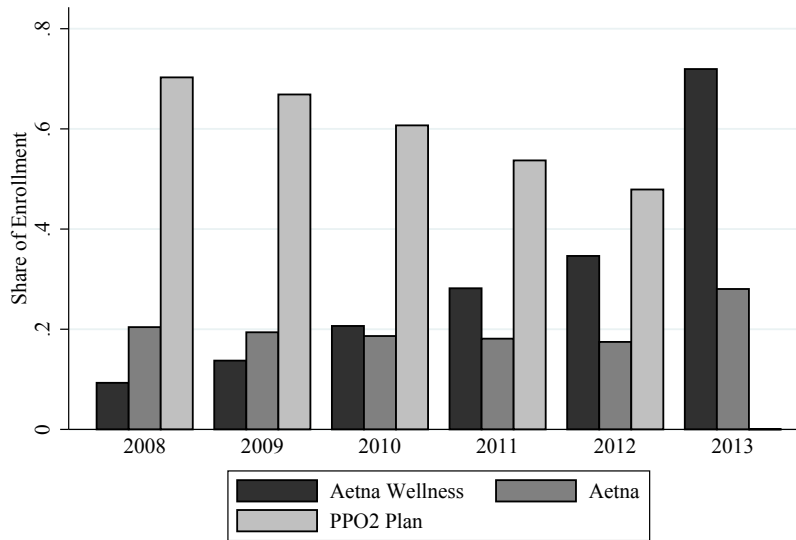


Figure 1: Enrollment in Plans, 2008-2013

Each bar represents the share of enrollment from the total enrollment among the three plans. In 2013, the PPO2 plan was discontinued.

Table 1 compared the three main health insurance options for an active employee in 2012. Compared to the Aetna plan, Aetna Wellness had the same coinsurance rate, network of physicians, hospitals, and pharmacies, and no referrals were necessary for specialist visits. Aetna Wellness was better than Aetna because it had a lower premium, deductible, and annual out of pocket maximum across the years, and it offered additional health services such as discounted gym membership. However, Aetna Wellness carried the non-monetary cost of mandatory choice of a primary care physician (PCP) and the completion of the health risk assessment questionnaire.

The PPO2 plan had the largest enrollment among the three, but it was administered by a provider with a different network of physicians and hospitals. The pharmacy network was the same across all three plans. Prior to 2011, the PPO2 plan and Aetna Wellness both had zero in-network deductible, though the PPO2 plan had a higher premium. The PPO2 plan was discontinued in 2013, and all its members were required to choose a new plan.

Figure 1 shows the share of enrollment among all the plans. The PPO2 Plan has the largest

share of enrollment, with more than 40% in 2008, but its share declines sharply as Aetna Wellness enrollment increases. The Aetna share of enrollment has remained mostly unchanged, suggesting that members with the closest comparison between Aetna and Aetna Wellness were less likely to switch. This puzzle is reinforced when comparing the cost to the employee between these two plans.

New and current employees who chose Aetna over Aetna Wellness had substantial foregone savings. Figure 2 shows the distribution of foregone savings for Aetna members. Since the coinsurance rate is the same for Aetna and Aetna Wellness, the foregone savings is the sum of the expected out-of-pocket expenditure and the difference in the premium for Aetna members. The figure shows the distribution of the foregone savings for current and new employees. While the foregone savings can be as high as \$1,500 for a family in 2012, the amount varies depending on the coverage type and the amount of medical expenditure. However, the foregone savings are positive for all Aetna members, new and current employees.

2.2 Conceptual Framework

The aim of this paper is to explore two factors in this choice puzzle. It explores the role of information and health in the choice of the plan. If health insurance is a reputation good, then the employee choice will be conditional on information about the wellness features from colleagues. As defined by Satterthwaite (1979), a reputation good is any product or service for which seller's products are differentiated and consumers' search among sellers consists of a series of inquiries to relatives, friends, and associates for recommendations.

Second, the paper looks at the role of health in the choice of plan. Employees and families with a greater number of health conditions may have direct disutility from a wellness plan. The disutility

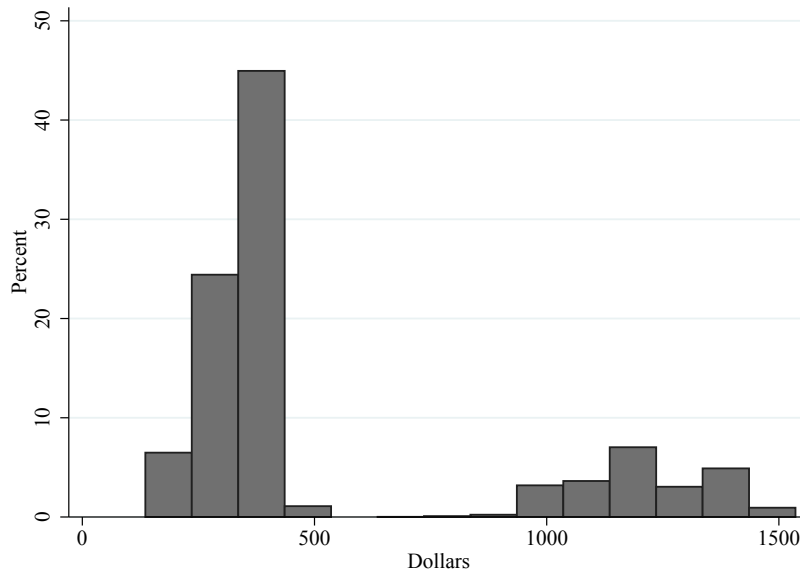


Figure 2: Foregone Savings of Aetna Members

The figure represents the distribution of foregone savings for Aetna members. Foregone savings are calculated based on expected medical out-of-pocket expenditure under Aetna Wellness and the difference in the premium for the coverage tier of the enrollee.

may stem from a lack of salience for the word "wellness". Though the plan brochure emphasizes the advisability of the plan for employees with health conditions, these employees may perceive the plan as intended for maintaining good health. Furthermore, less healthy employees and families may be averse to additional doctors' visits and testing.

The contribution of this paper is threefold. First, it compares near-identical plans to isolate the effect of wellness features on plan choice as it operates through information from colleagues and family health, thus overcoming the endogenous characteristic of choice. This allows the attribution of the difference in choice to preferences over wellness features of the plan. Second, by limiting the analysis to new employees it eliminates the impact of switching costs on plan choice.

Finally, claim data will be used to create objective measures of member health on the basis of diagnostic and pharmacy codes. To assess the health status and predict future health resource

utilization, the paper uses ACG software developed by The Johns Hopkins Bloomberg School of Public Health.

3 Research Design

3.1 Data

The university employer provided exclusive access to the health insurance plan choices and subsequent utilization of its employees between 2008 and 2013. The sample included both salaried and hourly employees in academic, administrative, and union job types. All the employees in the sample were active, which excluded retired, on-leave, and suspended employees. Since the department of the employee was an important datum, all employees with missing department were excluded from the sample. While dependents were included in the raw data, all analysis was conducted on the family level, as the employee made the decisions about plan types. Families with dual employees at the university were excluded from the sample. The resulting sample consisted of 13,219 employees tracked across an average 4.2 years. Of these employees, 8,213 enrolled in one of the three health plans at some time during the panel years.

Employees selected among the health insurance plans each November, during the open enrollment period. They could choose to default into their current plan, or actively select another plan. Because of the default option, estimates using the total sample would be subject to *status quo* bias associated with switching costs (Handel 2013). To circumvent this problem, analysis will use a subsample of new employees as preferred specification. During this period, 4,502 new employees were hired by the employer, of which 1,241 chose one of the three plans. Employees were considered new if they started employment in mid-year after the open enrollment period for the current

year, and before the following year's enrollment period. In the first month of employment, employees were required to select a health insurance plan. If they did not select a plan, they received no health coverage until the next open enrollment period. The combination of no previous plan and no default option made the new employees the ideal subsample for studying the choice of plans.

3.2 Dependent Variable

This study uses the probability of choosing Aetna Wellness as the dependent variable of the model. In a pairwise comparison, the dependent variable is the probability that the employee selected Aetna Wellness over Aetna. This pairwise probability model is estimated using a logit specification. When comparing the larger choice set, the dependent variable is the employee probability of choosing Aetna Wellness over Aetna and PPO2. The estimation of this specification is discussed in detail in the Methods of Estimation section.

3.3 Control Variables

To estimate the effect of own and family health on plan choice, two indices of health status of employee and family are derived from claims data. The first, the Charlson Comorbidity Index, is an index which predicts the ten-year mortality of a patient who may have a range of comorbid conditions.¹ The family health index is defined as the sum of the Charlson index for the employee and dependents. In this sample 85% of families have a Charlson score of 0. Since the index is heavily skewed, it measures the plan selection on the more severe range of health conditions

¹The Charlson Comorbidity Index tracks 22 comorbid conditions each assigned a score 1, 2, 3 or 6 depending on the risk of dying associated with each one (a higher score indicating a higher probability of mortality). For example, a score of 1 is assigned to myocardial infarction, congestive heart failure, peripheral vascular disease, dementia, cerebrovascular disease, chronic lung disease, chronic liver disease. A score of 2 is assigned to hemiplegia, kidney disease, diabetes, tumor, leukemia, lymphoma.

spectrum.

For a more evenly distributed index of health, an index of medical utilization intensity was derived from claims data using the Johns Hopkins ACG[®] System (Version 10.0.1).² The ACG System provides an output which categorizes the individual according to current health services utilization on a scale from 0 to 5, with 0 score indicating no diagnosis available, and 5 indicating a very high user. For the family, the individual medical utilization indices are summed. In the result, only 25% of the employees have a family score of 0, and the scores are well-distributed in the healthy to low user range.

To estimate the effect of information spillovers, employee's department colleagues are used as the group of reference. Since the employer is a university, a department may include academic and administrative employees. To investigate the effect of information, the share of enrollment in each health plan in the department is computed. The share of plan j in individual i 's department at time t is defined as:

$$Share_{ijt} = \frac{\sum_{l=1}^{D_{it}} \mathbb{1}\{Plan_{lit} = j\}}{D_{it}}$$

where D_{it} is the number of employees in i 's department at time t , and $Plan_{lit}$ a plan indicator counting the number of employees in i 's department enrolled in plan j , excluding employee i from the count. The information spillover, as defined here, is not exogenously determined. As employees are involved in the hiring decision of the department, the composition of the department is not random. As a result, the estimates here must be carefully interpreted, with the endogeneity in mind, as associations, not causation.

²Developed at the Johns Hopkins Bloomberg School of Public Health ACG[®] System (Version 10.0.1) uses diagnostic codes from claims and case-mix methodology to describe and predict population health care utilization and costs. The Adjusted Clinical Groups (ACG) are a series of mutually exclusive health status categories defined by morbidity, age, and sex. They are based on the premise that the level of resources necessary for delivering appropriate healthcare to a population is correlated with the illness burden of that population. Thus, individual diseases or conditions are placed into diagnostic groups based on five clinical dimensions: duration of condition, severity of condition, diagnostic certainty, etiology of the condition (infectious, injury, other), and specialty care involvement.

All models also control for age, gender, number of dependents, salary, and the log of sum of health premium and deductible.

4 Descriptive Statistics

The summary statistics in table 2 show that Aetna Wellness members tend to be younger, with fewer dependents, earning a lower salary than Aetna members. However, they are more comparable to PPO2 members in age and salary, though they still have fewer dependents. Aetna Wellness members have lower medical expenditure, reflected also in the lower Charlson index and lower medical utilization intensity index. Aetna Wellness members also have more department colleagues enrolled in the same plan which suggests that information plays a role in the plan choice. The statistics were similar among new employees. Though not significantly younger, Aetna Wellness members had fewer dependents and a lower salary than Aetna members. They also had a greater share of department colleagues enrolled in Aetna Wellness.

5 Methods of Estimation

The main challenge to the identification of the peer effect and the health effect is the endogeneity of the plan choice. The endogeneity arises when individual choice of the plan is affected by unobservable characteristics. To mitigate the endogeneity of choice here, we first compare two near identical plans. Since, controlling for premium and deductible, Aetna and Aetna Wellness differ only on the wellness features, the choice of either plan will be characterized by preferences over these features.

Table 2: Summary Statistics

	All Employees		New Employees		All
	Aetna Wellness	Aetna	Aetna Wellness	Aetna	
Age	43.44 (11.78)	48.17 (11.86)	35.39 (9.63)	36.79 (10.27)	45.59 (11.96)
Female	.54 (.49)	.42 (.49)	.47 (.49)	.48 (.50)	.50 (.50)
No. of dependents	1.08 (1.29)	1.19 (1.30)	.39 (.83)	.49 (1.04)	1.17 (1.24)
Salary	62616 (48011)	82875 (58292)	57028 (40223)	75861 (65563)	65182 (44384)
Medical Expenditure	8999 (19935)	10834 (21326)	3582 (9826)	5534 (23196)	9301 (16331)
Charlson Index	.16 (.59)	.24 (.72)	.05 (.34)	.12 (.61)	.19 (.54)
Medical Utilization Intensity	2.34 (1.01)	2.47 (.94)	1.72 (1.01)	1.75 (.93)	2.39 (0.89)
Aetna Wellness Share in Dept.	.38 (.22)	.25 (.24)	.28 (.22)	.21 (.18)	.23 (.19)
Number of employees	4541	2338	767	199	8213

Source: Health insurance choice and utilization data 2008-2013.

Notes: The last column includes all new and current employees enrolled in Aetna Wellness, Aetna, or PP2 plan. Medical expenditure reported for current year for all employees. Charlson index and medical utilization intensity are the family sum of the respective indices. The medical utilization intensity index is based on the output of The Johns Hopkins University ACG System.

A challenge to the identification of the peer effect on plan choice is the reflective nature of information, as group choice may affect and inform individual choice, which, in turn may inform and affect group choice. To break the cyclical nature of information flow, we repeat all our analysis for a subsample of new employees. Since new employees choose their plans months after their colleagues, their choice cannot affect the choices of department colleagues. Another factor confounding the effect of peers is that department colleagues tend to share similar characteristics. To mitigate this effect, department fixed effects should be introduced in the estimated models, which, however, cannot be done with the small sample size used in this analysis. Thus, the results should be interpreted with this caveat in mind.

In the pairwise comparison of Aetna Wellness and Aetna, a logit model of the choice of Aetna Wellness is estimated. Limiting the analysis to two plans, however, assumes “independence of irrelevant alternatives” (IIA), in other words that the presence of PPO2 does not affect individual choice between Aetna Wellness and Aetna. Since employees in our data choose between all three plans, this assumption is not justified. Therefore, the analysis will continue with the estimation of a random coefficient model of the extended choice set. A random coefficient logit improves the specification in two respects: it relaxes the IIA assumption and estimates a distribution of the coefficient of interest, allowing for more heterogeneity in the response to peer effects; it incorporates into the estimation information about choices which were available but not selected.

As described by Cameron and Trivedi (2010), a random-parameter logit specification is a type of additive random-utility model where the errors ϵ_{ij} are type II extreme-value distributed, as in the conditional logit model, and some of the parameters are normally distributed. If the utility of alternative j is:

$$u_{ij} = x'_{ij}\beta_i + z'_i\gamma_{ji} + \epsilon_{ij} \quad (1)$$

where $\beta_i = \beta + v_i$, and $\gamma_{ji} = \gamma_i + w_{ji}$ where v_i and w_{ji} are normally distributed unobservables, then

conditional on the unobservables, the probability of choice of plan j is:

$$p_{ij}|v_i, w_{ji} = \exp(x'_{ij}\beta + z'_i\gamma_j + x'_{ij}v_i + z'_iw_{ji}) \left/ \sum_{l=1}^m \exp(x'_{il}\beta + z'_i\gamma_l + x'_{il}v_i + z'_iw_{ji}) \right. \quad (2)$$

The random-parameter logit was estimated for the choice set of Aetna Wellness, Aetna, and the PPO2 plan. The plan share in the department of the employee was the random coefficient parameter, while family health, individual characteristics, plan cost, and year were interacted with plan specific dummies, allowing us to estimate the effect of these variables on the probability of joining each plan. Since Aetna Wellness was chosen as the base choice, all the coefficients show the probability of choosing Aetna or PPO2 with respect to the base choice.

6 Results

The results will be presented first for the pairwise comparison between Aetna Wellness and Aetna for all employees and new employees. The larger set of choices will be considered in a multinomial analysis, comparing Aetna Wellness to Aetna and the PPO2 plan.

6.1 Pairwise Comparison

The pairwise comparison estimates the probability of choosing Aetna Wellness, compared to Aetna, as a function of the peer effect of Aetna Wellness, peer effect of Aetna, health index, plan costs, and demographic variables. Table 3 presents the estimates of the logit specification.

Table 3 presents the estimates of the conditional logit specification of the pairwise comparison of

Table 3: Logit Results: Aetna Wellness vs. Aetna

	All Employees				New Employees			
	(1) Coeff.	Marg.	(2) Coeff.	Marg.	(3) Coeff.	Marg.	(4) Coeff.	Marg.
Aetna Share	-.99*** (.23)	-.19*** (.04)	-1.08*** (.25)	-.20*** (.05)	-1.31* (.65)	-.17* (.09)	-1.29 (.72)	-.16 (.09)
Aetna Wellness Share	1.21*** (.18)	.23*** (.03)	1.18*** (.19)	.22*** (.04)	.85 (.61)	.11 (.08)	1.08 (.67)	.14 (.08)
Medical Utilization Intensity	-.02 (.02)	-.00 (.00)			.09 (.10)	.01 (.01)		
Charlson Index			-.14** (.05)	-.03** (.01)			-.39 (.21)	-.05 (.03)
Medical Exp.			.10*** (.02)	.02*** (.00)			.25*** (.07)	.03*** (.01)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dep. Var. Mean		.57		.55		.80		.80
N	13511	13511	11994	11994	895	895	801	801

Notes: The table shows conditional logit results from estimating the model given in equation (4) by maximum likelihood. The dependent variable is an indicator of choice of Aetna Wellness when choosing between Aetna Wellness and Aetna. Each pair of columns shows coefficients and marginal effects from a single regression. Marginal effects are calculated from predictions of the model fit at fixed values of some covariates, using the *margins* command of Stata. Standard errors, clustered at the individual level, are in parentheses. The first and second specifications are for all employees, specifications (3) and (4) include only new employees. The first and third specifications use medical utilization intensity as the measure of health, while the second and fourth specifications include the Charlson index of comorbidities. Demographic variables include age, gender, number of dependents, salary. All specifications also control for log of sum of health premium and deductible.

*** $p \leq 0.001$; ** $p \leq 0.01$; * $p \leq 0.05$.

Aetna Wellness and Aetna for all employees and for new employees. The model is estimated using two measures of health: medical utilization intensity in specifications (1) and (3), and the Charlson index of comorbidities in specifications (2) and (4). In each specification, the estimated coefficients and the marginal effects are reported. The coefficients on interest are the Aetna Wellness share, medical utilization intensity, and Charlson index. Since the peer effect is defined by the share of department employees enrolled in a plan, the variable ranges from 0 to 1, which would constitute a 100 percentage points change in enrollment share. For a more practical interpretation, however, we interpret the peer effect through a 10 percentage points increase in the Aetna Wellness Share.

In the first column, looking at all employees, we divide the marginal effect .23 by 10, to conclude that a 10 percentage point increase in Aetna Wellness Share among colleagues increases own probability of enrollment by 2.3 percentage points. For new employees that number is smaller at 1.1 to 1.4 percentage points. The sample of new employees is substantially smaller than for all employees, making inference unreliable. The effect of health is similar across both current and existing employees. The intensity of medical utilization has no discernable effect on probability of enrollment in this specification. The Charlson index, however, decreases the probability of enrollment by 3 to 5 percentage points. Table 2 reports the standard deviation of the Charlson index for all employees in the sample at 0.54, which allows us to translate the marginal effect into a 1.62 to 2.7 increase in probability of enrollment at one standard deviation. However, since the index is heavily skewed to the right (only 25% of families have a nonzero index), the standard deviation for families with nonzero Charlson index is 0.99, suggesting that for families with some chronic medical condition, the probability of enrolling in Aetna Wellness is lower by 3 to 5 percentage points at one standard deviation.

The coefficient on Aetna Share is also of interest. Using the same interpretation as for Aetna Wellness, for new employees, a 10 percentage points rise in the share of Aetna enrollees among colleagues decreases own probability of enrolling in Aetna Wellness by 1.6 to 1.7 percentage

points. We interpret this as a “cross-price” effect of Aetna, as its share increases, the employee finds out more about the plan and less about Aetna Wellness, making it less likely that they will enroll in the wellness plan.

6.2 Extended Choice Set

The pairwise comparison of the health plans assumes independence of irrelevant alternatives (IIA), that is, the choice between Aetna Wellness and Aetna is not affected by the availability of other plans. Since this assumption is not likely to hold in the current setting, then the relevant choice set are all health plan options faced by the employee. This section re-estimates the model with a larger set of plan choices, comparing Aetna Wellness to Aetna and the PPO2 plan. The estimation will first use a multinomial logit specification, and then random coefficient logit specification to account for heterogeneity in preference for wellness.

In the multinomial logit specification, Aetna Wellness is compared to Aetna and the PPO2 plan using the choices that employees made. Table 4 shows the estimates for the specification. In this table, only the marginal effects are reported.

A 10 percentage point increase in Aetna Wellness share can be computed by dividing the marginal coefficient .16 by 10, for a 1.6 percentage point rise in probability, comparable to the pairwise comparison result. For new employees, a 10 percentage point rise in share is associated with a 3.9 percentage point increase in own probability of enrollment. The effect of medical utilization is also comparable to the pairwise comparison. No effect is seen from the intensity of medical utilization for all employees or new employees. The Charlson index has a slight negative impact, with a 1 to 3 percentage point decrease for each standard deviation among those with non-zero values of the index.

Table 4: Multinomial Conditional Logit Results: Aetna Wellness, Aetna, PPO2 Plan

	All Employees		New Employees	
	(1)	(2)	(3)	(4)
	Marg.	Marg.	Marg.	Marg.
Aetna Share	-.11*** (.03)	-.11*** (.03)	-.12 (.09)	-.08 (.10)
Aetna Wellness Share	.16*** (.02)	.16*** (.02)	.39*** (.10)	.39*** (.10)
PPO2 Plan Share	-.17*** (.02)	-.17*** (.02)	.03 (.07)	.03 (.07)
Medical Utilization Intensity	-.00 (.00)		.01 (.01)	
Charlson Index		-.01* (.01)		-.03 (.04)
Demographics	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
N	27999	25173	1158	1021

The table shows multinomial conditional logit results from estimating the model given in equation (4) by maximum likelihood. The dependent variable is the probability of choice of Aetna Wellness compared to Aetna and the PPO2 plan. Aetna Wellness is the base category. Only marginal effects are reported. Marginal effects are calculated from predictions of the model fit at fixed values of some covariates, using the *margins* command of Stata. Standard errors, clustered at the individual level, are in parentheses. The first and second specifications are for all employees, while specifications (3) and (4) include only new employees. The first and third specifications use medical utilization intensity as the measure of health, while the second and fourth specifications include the Charlson index of comorbidities.

Demographic variables include age, gender, number of dependents, salary. All specifications also control for log of sum of health premium and deductible.

*** $p \leq 0.001$; ** $p \leq 0.01$; * $p \leq 0.05$.

The random-parameter logit was estimated for the choice set of Aetna Wellness, Aetna, and the PPO2 plan, with covariates of individual characteristics, plan cost, year dummies, and plan share in the department of employee.

For current employees, the estimation results in table 5 show that a 10 percentage point rise in colleague enrollment in Aetna Wellness increases own probability of enrollment by 1.7 percentage points. For new employees, the increase is 1.5 percentage points. The estimate of the standard deviation suggests that the small sample of new employees is impacting the precision of the results, but the coefficient estimate is the same as for current employees. Thus, though the results are more noisy than for current employees, the effect is the same.

The estimate of health effect is stronger in this specification. The intensity of medical utilization has a 3 percentage point increase in probability of enrollment. With a standard deviation of 0.89 for its mean, one standard deviation from the mean in the intensity of utilization increases the probability of enrollment by 2.67 percentage points.

6.3 Robustness of Results

To test the robustness of the results, a falsification test is conducted by randomly assigning the department to employees. If the peer effect is spurious, non-zero Aetna Wellness share effects should be estimated even with randomly assigned colleague groups. To generate the coefficient distribution from the random assignment, the estimates and standard errors are bootstrapped with 500 iterations, and the mean of the coefficient distribution is tested against a null of equality with the coefficient estimates in table 3.

Table 6 reports the coefficient estimates for peer effects of Aetna Wellness. The coefficients are close to zero in magnitude and are significantly different from the coefficients found in table 3.

Table 5: Random coefficient conditional logit: Aetna Wellness, Aetna, PPO2 Plan

	All Employees		New Employees	
	Coeff.	Marg.	Coeff.	Marg.
Insurance Share	2.63***	.34***	2.22***	.37***
	(.09)	(.17)	(.27)	(.14)
Std. Dev.	1.53		1.09	
	(.17)		(.62)	
Health Index	MUI	MUI	MUI	MUI
Demographics	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Notes: This table shows the estimates of the random parameter logit model for choice of plan. The dependent variable is the probability of choice of plan among Aetna Wellness, Aetna, and PPO2 plan. Aetna Wellness is the base category. Coefficients and marginal effects are reported, standard errors, clustered at the individual level, are in parentheses. Marginal effects are calculated from the normalized difference in fitted probabilities for an incremental change in variable of interest. The standard deviations of the random coefficients are reported, with standard errors in parentheses. Estimates are done with 500 repetitions, discarding the first 50. Observations are grouped by person-year.

Demographic variables include age, gender, number of dependents, salary, and the medical utilization intensity index (MUI). All specifications also control for the sum of health premium and deductible.

*** $p \leq 0.001$; ** $p \leq 0.01$; * $p \leq 0.05$.

Table 6: Logit with Random Colleague Assignments: Aetna Wellness vs. Aetna

	All Employees		New Employees	
	Coeff.	Marg.	Coeff.	Marg.
Aetna Wellness Share	-.00028 (.0700)	-.00005 (.0134)	.01750 (.3457)	.00234 (.0455)
Health Index	MUI	MUI	MUI	MUI
Demographics	Yes	Yes	Yes	Yes
Fixed Year Effects	Yes	Yes	Yes	Yes

Notes: The table reports robustness check for spurious correlation using the specification of table 3. The specification is estimated with randomly assigned employee departments using a bootstrapping algorithm with 500 iterations. Coefficients and marginal effects are reported, with standard errors clustered at the individual level reported in parentheses. Marginal effects are calculated from predictions of the model fit at fixed values of some covariates, using the *margins* command of Stata.

Demographic variables include age, gender, number of dependents, salary, and the medical utilization intensity index (MUI). All specifications also control for log of sum of premium and deductible. Each model also controls for Aetna share and medical utilization intensity.

*** $p \leq 0.001$; ** $p \leq 0.01$; * $p \leq 0.05$.

This test allows us to conclude that the effect of the information spillovers is not spurious and is driven by an actual transfer of information between department colleagues and new employees.

If information is a significant factor in the enrollment decision, the effect of Aetna Wellness share should decline in the years after its introduction. The Appendix presents estimation results for each year between 2008 and 2013. As expected, the magnitude of the effect is large in the initial year and wanes in the following years. The effect is particularly notable when looking at the sample of all employees, while sample constraints make the estimates too noisy for reliable conclusions among new employees.

7 Discussion

The estimation results suggest that lack of experience and information about wellness programs plays an important role in employee willingness to enroll and participate in it. While a well-concerted introduction by human resources and the increasing popularity of such programs may counter some of the employee reluctance, experiences by colleagues appear to have a more important impact on enrollment.

The mixed findings on the impact of own and family health on choice of a wellness plan suggest that employees with more severe chronic medical conditions are less likely to enroll. While the wellness program has many features designed for individuals in fair to good health, this particular program also includes counseling for maintenance of chronic conditions. These features, though, do not appear to entice those who might benefit from it most.

The limitations of the study are numerous and are driven primarily by the nature of the data. The data used in the estimation was obtained from a large university employer which is neither nation-

ally representative nor easily generalizable beyond the industry. Another limitation of the study is the selection of peer groups. Colleagues are never randomly assigned, and academic department groups may be more alike without constituting peer groups. The data do not allow a random assignment of peer groups, nor does the sample size allow for inclusion of department fixed effects to absorb variation due to common characteristics. This limitation weakens the causal relationship between peer group choices and own choices, however using new employees alleviates some of the confounding effect of this selection. These limitations should not preclude the usefulness of the analysis, however, since there is a particular scarcity of data on health insurance choices by working age adults.

8 Conclusion

The Affordable Care Act (ACA) provides incentives for employers to provide wellness programs to employees through health insurance plans. Much of the effort is aimed at providing punitive and rewarding measures to push health insurance members towards healthier lifestyles. If wellness programs are not well-received by employees, however, incentives are not likely to generate the outcomes commensurate with the cost of administering the program.

This paper studies the two factors contributing to employee decision to enroll in a wellness program. The results presented here suggest that information spillovers are an important component in employee decision to enroll in a wellness plan. For both current and new employees, as the share of colleagues enrolled in Aetna Wellness increases by 10 percentage points, own probability of enrollment increases between 1.1 and 3.9 percentage points.

At the same time, however, the wellness plan has a mixed appeal to employees with high medical expenditures and chronic conditions. When looking at the intensity of medical utilization, an

individual one standard deviation above the mean is 3 percentage point more likely to enroll in Aetna Wellness. On the other hand, looking at chronic conditions, an individual one standard deviation above the mean of the family Charlson index is 3 to 5 percentage points less likely to enroll in the program.

The results presented here, obtained from data provided by a university employer, are not nationally representative and cannot be generalized beyond this industry. However, while research on Medicare and Medicaid enrollment and utilization is more frequent, the scarcity of employer provided health insurance data makes this study an important analysis for the population affected by the ACA.

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Appendix

Insurance Take-Up

Since employer provided insurance enrollment is not mandatory, about 2,000 employees during the panel years do not select to enroll in insurance. The data does not contain any information about the alternative sources of insurance available to employees, however these could include spousal insurance, state or federal insurance, or no insurance. To identify the potential source of bias, a simple binary choice model of decision to insure is estimated:

$$Pr(Insurance) = \alpha_0 + x_{it}\alpha_1 + Info_{it}\alpha_2 + \alpha_3h_{it} + year + \epsilon_{it} \quad (3)$$

where x_{it} is a vector of individual characteristics, $Info_{it}$ is a vector of shares of colleagues in insurance plans, h_{it} is the health status of employee/family.

The regression results are presented in Table A1. The first column of the table lists the coefficient estimates for the entire sample. The second column are the estimates for the new employees. In both samples there appears to be some significant selection into insurance, as families with more dependents, expectations of more medical utilization, and higher salaries are more likely to be insured.

Aetna Wellness vs. PPO2 Plan

While the PPO2 Plan is not an ideal comparison to Aetna Wellness, the differences are sufficiently minor to provide a useful robustness check for the estimates of information and health effects for wellness plans. Thus, the pairwise conditional logit model is estimated for Aetna Wellness and

Table A1: Linear probability model of insurance take up.

	All Employees Coeff.	New Employees Coeff.
Age	-.00 (.00)	-.00*** (.00)
Female	.02*** (.01)	-.02 (.01)
No. of Dependents	.07*** (.00)	.06*** (.01)
Salary	.04*** (.00)	.03** (.01)
Aetna Wellness Share	.01 (.02)	-.06 (.04)
Aetna Share	-.01 (.02)	.02 (.04)
PPO2 Plan Share	.01 (.01)	-.00 (.03)
Medical Utilization Intensity	.12*** (.00)	.36*** (.00)
Year Fixed Effects	Yes	Yes
Dep. Var. Mean	.80	.50
N	42652	3032
r^2	.28	.69

The dependent variable is indicator of insurance enrollment. In the first column the standard errors clustered at individual level.

*** Significant at 0.1 percent level.

** Significant at 1 percent level.

* Significant at 5 percent level.

Table A2: Conditional Logit Results

	All Employees				New Employees			
	Coeff.	Marg.	Coeff.	Marg.	Coeff.	Marg.	Coeff.	Marg.
PPO2 Plan Share	-1.46*** (.16)	-.23*** (.02)	-1.43*** (.18)	-.21*** (.03)	-.60 (.40)	-.09 (.06)	-.74 (.43)	-.11 (.06)
Aetna Wellness Share	1.36*** (.18)	.21*** (.03)	1.33*** (.20)	.20*** (.03)	3.17*** (.78)	.47*** (.11)	3.10*** (.85)	.44*** (.12)
Med. Util. Int.	-.08*** (.02)	-.01*** (.00)			-.04 (.10)	-.01 (.01)		
Charlson Index			-.10 (.05)	-.02 (.01)			-.16 (.28)	-.02 (.04)
Past Medical Exp.			.07** (.02)	.01** (.00)			.03 (.07)	.00 (.01)
Demographic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	21382	21382	18125	18125	926	926	801	801

The dependent variable is indicator of enrollment in Aetna Wellness when choosing between Aetna Wellness and the PPO2 plan. In the first column the standard errors clustered at individual level.

Demographic variables include age, gender, number of dependents, salary. All specifications also control for log of sum of premium and deductible.

*** Significant at 0.1 percent level.

** Significant at 1 percent level.

* Significant at 5 percent level.

PPO2 Plan, and the results are presented in Table A2.

Additional Robustness Checks

The effect of information should decline in the years after the introduction of the plan. Table A4 presents the coefficient estimates for specifications by year between 2008 and 2013 for all employees and new employees.

Administrative employees are unevenly dispersed among the university departments. Academic departments tend to have a handful of administrative employees, while administrative departments

are made up of all administrative employees. Therefore, the relevant reference group for administrative employees may not be their department. Instead, an administrative employee's reference group may be defined by the residence of the employee – their neighbors. As a result, the administrative employee's information group can be defined as the share of administrative employees in the zip code of residence of the employee. Since more than 40% of employees reside in a single zip code, however, the analysis in Table A4 excludes that zip code to avoid selection. The results for all employees show a similar 1.6 percentage point rise in probability in enrollment for all employees, and 1.5 percentage point rise for new employees, though the small sample does not allow reliable inference.

Table A3: Conditional Logit Results

	2008		2009		2010		2011		2012		2013	
	Coeff.	Marg.	Coeff.	Marg.	Coeff.	Marg.	Coeff.	Marg.	Coeff.	Marg.	Coeff.	Marg.
All Employees												
Aetna Wellness Share	3.02***	.51***	2.16***	.44***	1.53***	.31***	1.37***	.26***	1.45***	.26***	.66**	.11**
	(.64)	(.10)	(.51)	(.10)	(.39)	(.08)	(.33)	(.06)	(.30)	(.05)	(.23)	(.04)
Medical Util. Int.	-.08	-.01	-.01	-.002	-.01	-.002	.04	.008	-.04	-.008	-.01	-.002
	(.06)	(.01)	(.05)	(.01)	(.05)	(.01)	(.05)	(.009)	(.04)	(.008)	(.03)	(.005)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dep. Var. Mean		.26		.38		.47		.57		.63		.71
N	1353	1353	1563	1563	1653	1653	1967	1967	2175	2175	4801	4801
New Employees												
Aetna Wellness Share	2.43	.46	-2.45	-.35	1.98	.23	.44	.04	.24	.02	.84	.10
	(2.21)	(.42)	(3.95)	(.57)	(1.81)	(.21)	(1.20)	(.12)	(1.15)	(.11)	(1.41)	(.17)
Medical Util. Int.	.26	.05	-.67	-.10	-.52	-.06	.11	.01	.49	.05	.36	.04
	(.23)	(.04)	(.44)	(.06)	(.33)	(.04)	(.26)	(.03)	(.26)	(.02)	(.32)	(.04)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dep. Var. Mean		.63		.75		.79		.86		.85		.82
N	145	145	84	84	136	136	201	201	233	233	97	97

The dependent variable is indicator of enrollment in Aetna Wellness when choosing between Aetna Wellness and Aetna. In the first column the standard errors clustered at individual level.

Demographic variables include age, gender, number of dependents, salary. All specifications also control for log of sum of premium and deductible.

*** Significant at 0.1 percent level.

** Significant at 1 percent level.

* Significant at 5 percent level.

Elimination of the PPO2 Plan

To investigate the discontinuation of the PPO2 Plan, we estimate the random effects model in Table 5 excluding observations in 2013 from the sample. The estimation results are reported in Table A5. While excluding the 2013 observations from the sample have a substantial effect on the estimates, the coefficients are within the range of those seen in the multinomial and pairwise conditional logit specifications. A 10 percentage point increase in the Aetna Wellness share among colleagues, increases own probability of enrollment between 1.8 and 2.0 percentage points.

Table A4: Conditional Logit Result for Administrative Employees

	All Employees		New Employees	
	Coeff.	Marg.	Coeff.	Marg.
Aetna Share	-1.62***	-.28***	-.44	-.04
	(.45)	(.08)	(.98)	(.09)
Aetna Wellness Share	1.01*	.18*	1.67	.15
	(.44)	(.08)	(1.73)	(.16)
Medical Utilization Intensity	.03	.00	.42	.04
	(.05)	(.01)	(.31)	(.03)
Demographics	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Dep. Var. Mean		.65		.78
N	3555	3555	156	156

The dependent variable is indicator of enrollment in Aetna Wellness when choosing between Aetna Wellness and Aetna. In the first column the standard errors clustered at individual level.

Demographic variables include age, gender, number of dependents, salary. All specifications also control for log of sum of premium and deductible.

An employee information reference group is defined as other administrative employees living in the same zip code. The largest zip code is excluded from analysis.

*** Significant at 0.1 percent level.

** Significant at 1 percent level.

* Significant at 5 percent level.

Table A5: Random coefficient conditional logit

	All Years				Excluding 2013			
	All Employees		New Employees		All Employees		New Employees	
	Coeff.	Marg.	Coeff.	Marg.	Coeff.	Marg.	Coeff.	Marg.
Insurance Share	2.63***	.34***	2.22***	.37***	1.30***	.18***	1.17***	.20***
	(.09)	(.17)	(.27)	(.14)	(.09)	(.08)	(.28)	(.07)
Std. Dev.	1.53		1.09		.38		.47	
	(.17)		(.62)		(.37)		(1.30)	
Health Index	MUI	MUI	MUI	MUI	MUI	MUI	MUI	MUI
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table shows the estimates of the random parameter logit model for choice of plan. The dependent variable is the probability of choice of plan among Aetna Wellness, Aetna, and PPO2 plan. Aetna Wellness is the base category. Coefficients and marginal effects are reported, standard errors, clustered at the individual level, are in parentheses. Marginal effects are calculated from the normalized difference in fitted probabilities for an incremental change in variable of interest. The standard deviations of the random coefficients are reported, with standard errors in parentheses. Estimates are done with 500 repetitions, discarding the first 50. Observations are grouped by person-year.

Demographic variables include age, gender, number of dependents, salary, and the medical utilization intensity index (MUI). All specifications also control for the sum of health premium and deductible.

*** Significant at 0.1 percent level.

** Significant at 1 percent level.

* Significant at 5 percent level.