UPMC *My*Health

Managing the Health and Costs of U.S. Healthcare Workers

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Background: Workplace wellness programs hold promise for managing the health and costs of the U.S. workforce. These programs have not been rigorously tested in healthcare worksites.

Purpose: To evaluate the impact of *My*Health on the health and costs of UPMC healthcare workers.

Design: Five-year observational study conducted in 2013 with subgroup analyses and propensity-matched pair comparisons to more accurately interpret program effects.

Setting/participants: UPMC, an integrated health care delivery and financing system headquartered in Pittsburgh, Pennsylvania. Participants included 13,627 UPMC employees who were continuously enrolled in UPMC-sponsored health insurance during the study period and demonstrated participation in *My*Health by completing a Health Risk Assessment in both 2007 and 2011, as well as 4,448 other healthcare workers employed outside of UPMC who did not participate in the program.

Intervention: A comprehensive wellness, prevention, and chronic disease management program that ties achievement of health and wellness requirements to receipt of an annual credit on participants' health insurance deductible.

Main outcome measures: Health-risk levels, medical, pharmacy, and total healthcare costs, and Healthcare Effectiveness Data and Information Set performance rates for prevention and chronic disease management.

Results: Significant improvements in health-risk status and increases in use of preventive and chronic disease management services were observed in the intervention group. Although total healthcare costs increased significantly, reductions in costs were significant for those who moved from higher- to the lowest-risk levels. The difference in differences in costs between reduced- and maintained-risk groups was also significant. Matched pair comparisons provided further evidence of program effects on observed reductions in costs and improvements in prevention, but not improvements in chronic disease management.

Conclusions: Incorporating incentivized health management strategies in employer-sponsored health insurance benefit designs can serve as a useful, though not sufficient, tool for managing the health and costs of the U.S. healthcare workforce.

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Introduction

Population health management within workplace settings is an important focus of U.S. healthcare reform. Modifiable lifestyle risk factors, such as unhealthy diet, physical inactivity, tobacco use, and excessive alcohol assumption, are responsible for much of the high prevalence and cost of chronic diseases,[1,2] including their earlier onset among growing numbers of working-age Americans.[3] In a recent national survey,

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67% of employers identified "employees' poor health habits" as one of the top three challenges to maintaining affordable health coverage.[4] Numerous published studies have further documented associations between employee health risks and healthcare spending and productivity.[5–12]

To improve employee health, curtail rising healthcare costs, and ensure competitiveness, employers are increasingly adopting health promotion and chronic disease prevention and management strategies, often referred to as workplace wellness programs.[13] Workplace wellness recognizes that work-related conditions, opportunities, and resources can have an important influence on an employee's health trajectory.[14]

Provisions of the Affordable Care Act support these programs by allowing employers to reduce the cost of health insurance for participants and increase these incentives over time.[15] A growing body of research has demonstrated that well-designed workplace wellness programs, especially when coupled with targeted incentives in insurance benefit designs, can reduce health risks and health-related costs and lead to a positive return on investment in a variety of employer populations.[16–19]

U.S. healthcare workers are a prime target for improving population health and mitigating rising healthcare costs. Health care is the largest industry in the U.S. economy and, in most communities, hospitals are the largest employers.[20] Since 2007, as employment has fallen by 6.8% across all non-healthcare sectors, the number of healthcare workers has increased by 6.3%, reaching an all-time high of 10.7% of total employment in January 2011.[21]

At the same time, employees of hospitals and health systems have poorer health status,[22] higher rates of healthcare service utilization,[22] and higher healthcare costs[23] than those in other industries. However, to our knowledge, only three studies[24–26] of healthcare worksite wellness programs incorporated in employer-sponsored insurance benefit designs have been published to date.

This 5-year observational study addresses this evidence gap by evaluating the impact of the *My*Health program on the health and costs of UPMC healthcare workers. As a self-insured employer, UPMC assumes the financial risk for providing health insurance benefits for nearly 40,000 of its 55,000 employees and their families. UPMC Health Plan, a fully owned subsidiary of UPMC and the second largest health insurer in western Pennsylvania, administers and manages the UPMC group health plan.

In January 2005, UPMC adopted *My*Health, a comprehensive wellness, prevention, and chronic disease management program developed by UPMC Health Plan as part of its group health benefit design.[27–29] Through participation in *My*Health, UPMC group health members who meet a minimal number of health and wellness requirements can receive a credit on their annual insurance deductible (i.e., the amount paid by employees toward health coverage each year before payments are made under the UPMC-sponsored health insurance policy). UPMC group health members are actively supported to participate in the *My*Health program, with annual rates of participation exceeding 90%.

Methods

Setting and Participants

This study was conducted at UPMC, an integrated healthcare delivery and financing system headquartered in Pittsburgh, Pennsylvania, and the state's largest non-governmental employer. The intervention group comprised 13,627 UPMC employees who were continuously enrolled in UPMC-sponsored health insurance during the 5-year study period and demonstrated participation in *My*Health by completing a Health Risk Assessment (HRA) in both 2007 and 2011 (Figure 1). In 2011, their average age was 48.9 years; 77.2% were women; most were registered or licensed practical nurses (22.1%), administrative support workers (20.1%), or other healthcare professionals (15.2%); and more than 60% worked in a hospital.

A total of 4,448 other healthcare workers employed outside of UPMC served as the comparison group for this study. These employees had employer-sponsored health insurance through UPMC Health Plan, but their group health benefits did not include the *My*Health program. Propensity scores were used to match these healthcare workers with members of the intervention group for age, gender, and 24 chronic conditions. Confounding effects were controlled such that no significant differences in these variables were observed between the matched pairs.

Intervention

The *My*Health program ties UPMC group health plan members' eligibility for a maximum allowable annual insurance deductible credit to three requirements: (1) completion of an online HRA each year; (2) a blood lipid and glucose screening within the past 5 years; and (3) participation in the Take a Healthy Step program. Spouses and dependents of UPMC group health members also have access to *My*Health programs and services, but their participation is not required for receipt of the annual deductible credit.

All UPMC group health members who complete the HRA receive feedback on their health and potential risks, prioritized modifiable lifestyle risk factors, dynamic "what if" scenario modeling, and recommendations for improving risk levels. They are also provided access to online educational materials and self-help tools, telephonic health coaching, and group support related to managing lifestyle issues, such as alcohol and tobacco use; emotional health and stress; exercise, nutrition, and weight; and chronic diseases, including depression, diabetes, heart disease, and respiratory health.

Through the Take a Healthy Step program, members can earn additional "points" by choosing from a menu of more than 140 health and wellness activities designed to help reduce health risks and prevent or better manage chronic disease. Points are assigned to activities based on their complexity, effort needed to complete, and overall health value. For example, 250 points are awarded for

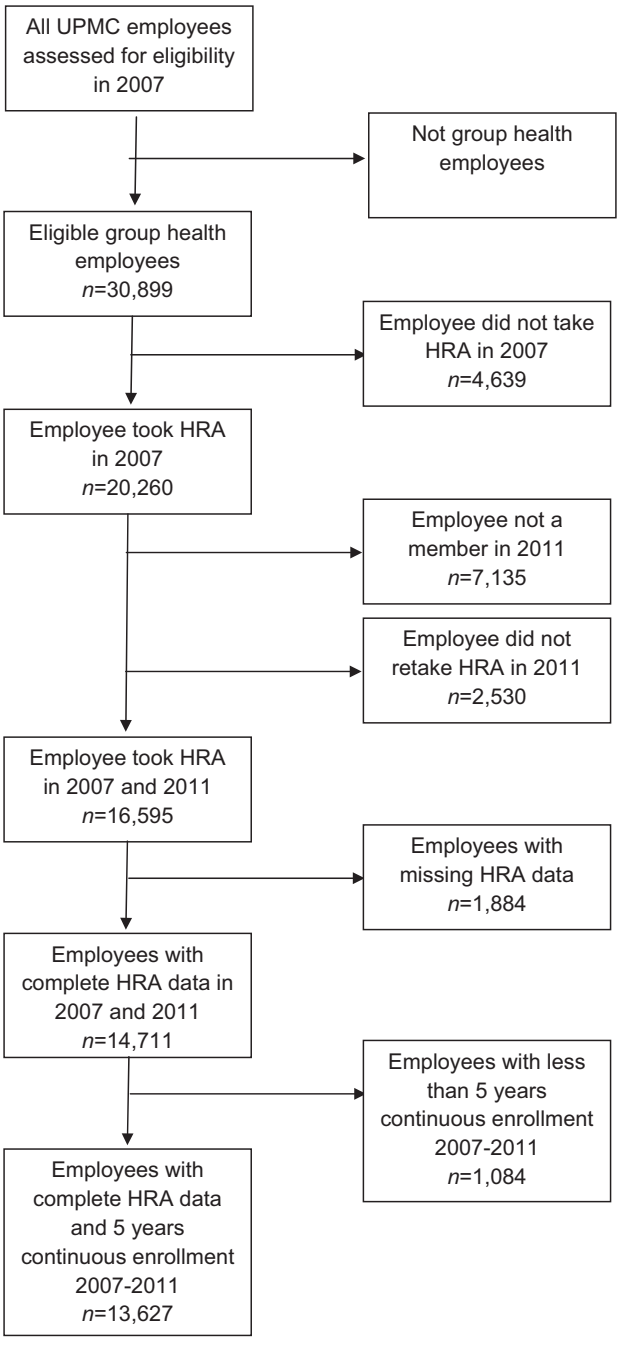

Figure 1. Intervention group CONSORT chart HRA, health risk assessment

completing a 10–12-week lifestyle behavior change program and follow-up health coaching, 100 points for an annual preventive care visit or obtaining condition-appropriate care, and 75 points for completing an online nutrition education program.

Both the requirements for *My*Health program participation and the maximum allowable deductible credit tied to participation increased over the 5-year study period (Table 1). In 2007, all intervention group members who completed the HRA and had a biometric screening in the past 5 years received a deductible credit of $200 (individual) or $400 (family). In 2008, to receive the increased deductible credit of $250 (individual)/$500 (family), they also had to complete one "healthy step" through the Take a Healthy Step program.

From 2009 on, the completion of health and wellness activities was converted to points, and, in that year, all members who earned 100 or more points received the maximum deductible credit of $500 (individual) or $1,000 (family). In 2010 and 2011, the minimum number of required points was increased to 200. Intervention group members who earned 200 points in 2010 and 2011 received the maximum deductible credit of $500 (individual)/$1,000 (family) and $1,000 (individual)/$2,000 (family), respectively.

Data Sources, Outcome Measures, and Analysis

Intervention group. Self-reported information from the HRA, available biometric screening data, and UPMC Health Plan claims data were used to examine pre–post changes in health-risk status and associated changes in healthcare costs for intervention group members between 2007 and 2011. Modeled on the work of Edington and colleagues,[30] members were assigned to an overall risk level based on their total number of self-reported risks (i.e., low risk=0–2, moderate risk=3–4, and high risk=5 or more) from among 13 health risk measures (Table 2). The three 2007 risk group levels were then reclassified into nine risk movement levels reflecting changes in the number of risks during the study period (Table 3).

McNemar and generalized McNemar tests were utilized to assess changes in risk levels over time. Because cost differences between 2007 and 2011 did not differ from the normal distribution, the paired *t* test was used to evaluate cost changes for the intervention group as a whole and changes associated with each of the nine risk movement levels, the combined reduced- and maintained-risk groups, and difference in differences in costs between the combined reduced- and maintained-risk groups over time.

Combining subgroups into risk movement type was essential for identifying potential program effects that might otherwise be masked when analyzing changes for the entire intervention group. To balance members in each group, those who started in the low-risk category and, by definition, could not reduce their risk levels during the study period were excluded from the combined risk group analyses.

Healthcare Effectiveness Data and Information Set (HEDIS®) measures were used to evaluate pre–post changes in preventive and chronic disease management service use for the intervention group between 2008, when UPMC Health Plan began systematically tracking these measures, and 2011. HEDIS is a tool provided by the National Committee for Quality Assurance (NCQA) and used by more than 90% of U.S. health plans to measure and benchmark performance on important dimensions of care and service.[31] Updated annually, the tool currently comprises 75 measures across eight domains.

The chi-square test was performed on changes in HEDIS rates for four preventive measures, including annual ambulatory or preventive care visit, colorectal cancer screening, breast cancer screening, and cervical cancer screening, and three chronic disease management measures, including comprehensive diabetes care, cardiovascular disease management, and asthma medication use.

Table 1. UPMC *My*Health deductible credit and point requirements, 2007–2011

	2007	2008	2009	2010	2011
UPMC *My*Health deductible credit					
Individual	$200	$250	$500	$500	$1,000
Family	$400	$500	$1,000	$1,000	$2,000
"Take a Healthy Step" points required to gain credit		1 step	100 points	200 points	200 points

These measures were among those endorsed by the NCQA during the study period.

Comparison group. Propensity-matched pair comparisons were used to determine whether significant positive outcomes observed for intervention group members over time could be reasonably associated with participation in *My*Health. Difference in differences in costs were examined using UPMC Health Plan claims data for intervention group members who reduced risk levels matched to the maximum number of available comparison group members, yielding 1,690 matched pairs.

The paired *t*-test was used for these analyses because cost differences between 2007 and 2011 were not different from the normal distribution for both groups. Difference in differences in the use of preventive and chronic disease management services were examined using HEDIS performance data for intervention group members matched to the maximum number of available comparison group members, yielding a total of 4,448 matched pairs. A general mixed model with logistic link function for repeated binary measures was used for these analyses.

Table 2. UPMC *My*Health health risk measures and criteria

Health risk measure	Health risk criteria
1. Weight	BMI > 27.8 for men; BMI > 27.3 for women
2. Stress	PHQ-2 derived based on life/job satisfaction
3. Existing medical condition	Heart problems, cancer, diabetes, stroke
4. Tobacco usage	Cigarettes, chewing tobacco, cigars, pipes
5. Safety belt usage	Seldom or never wears seatbelt
6. High cholesterol	> 239 mg/dL
7. Blood pressure	> 139/89 mmHg
8. Physical activity	Exercise < 1 day/week
9. Perception of health	Describes overall health as "poor" or "fair"
10. HDL cholesterol	< 35 mg/dL
11. Life satisfaction	Disagree with "In general, I am satisfied"
12. Alcohol usage	> 2 drinks/day
13. Illness days	> 5 days of work missed because of an illness

HDL, high-density lipoprotein; PHQ-2, Patient Health Questionnaire-2

Summary

Figure 2 summarizes the total set of analyses that were conducted in 2013 using SAS software, version 9.3 (SAS Institute Inc., Cary NC). Healthcare costs in 2007 were re-priced to the 2011 fee schedule to account for cost shifting across different benefit structures (i.e., variable copayments) and price increases over the 5-year period.

Results

Health Risk Levels

Significant improvements in health risk levels were observed for the intervention group during the 5-year period (Table 3). Overall, 13.6% of members reduced risk levels, 76.4% maintained risk levels, and 10.6% increased risk levels. The proportion of members at low risk increased significantly by 2.0%, and proportions at moderate and high risk decreased significantly by 1.12% and 0.88%, respectively.

Medical, Pharmacy, and Total Healthcare Costs

Although significant ($p \leq 0.0001$) pre–post increases were observed for medical, pharmacy, and total healthcare costs for the intervention group as a whole, changes in costs varied by risk movement level (Table 4). As expected, medical, pharmacy, and total healthcare costs increased significantly for each of the three increased-risk groups. Similar across-the-board cost increases were observed for each of three maintained-risk groups, but not all changes were significant. For each of the three reduced-risk groups, total healthcare costs decreased, but changes were significant only for those who moved from higher- to the lowest-risk levels.

When members who maintained risk levels were combined into one group, significantly higher medical (p=0.0415); pharmacy (p=0.0009); and total healthcare costs (p=0.0058) were observed. Conversely, when members who reduced risk levels were combined into one group, significantly lower medical (p=0.0016) and total healthcare costs (p=0.0054) were observed even though pharmacy costs increased significantly (p=0.0470). The difference in differences between groups demonstrated significant savings in medical (p=0.0008); pharmacy (p=0.0170); and total healthcare costs (p=0.0002) for the reduced-risk group relative to the maintained-risk group.

Table 3. Health risk transition for the intervention group from 2007 to 2011, n=13,627

	2011 Low	2011 Moderate	2011 High	2007 %	*p*-value	Comparison
2007 Low	9261[a]	**1,141**[b]	**98**[b]	77.05	**<0.0001**	Low
2007 Moderate	**1,340**[c]	980[a]	**209**[b]	18.56	**0.0051**	Moderate
2007 High	**171**[c]	**256**[c]	171[a]	4.39	**<0.0001**	High
2011 %	79.05[a]	17.44[a]	3.51[a]		**<0.0001**	Overall movement

Note: Boldface indicates statistical significance.
[a]Maintained health risks
[b]Increased health risks
[c]Decreased health risks

Results of the 1,690 propensity-matched pair comparisons demonstrated significant difference in differences in medical ($p<0.0001$) and total healthcare costs ($p<0.0001$) for members who reduced risks relative to comparison group members. Pharmacy costs increased for both groups, but the difference in differences between matched pairs was not significant (p=0.8409).

Use of Preventive and Chronic Disease Management Services

Changes in HEDIS rates for the intervention group between 2008 and 2011 were mainly positive and statistically significant (Table 5). Significant increases in preventive service use were observed for annual ambulatory or preventive care visits, colorectal cancer screening, and breast cancer screening. Although the cervical cancer screening rate decreased by 0.94%, this was not significant. Significant increases were also observed for use of diabetes and cardiovascular disease management services. The use of asthma management services, which already exceeded 90% in 2008, increased by 2.91% but was not significant.

Results of the 4,448 propensity-matched pair comparisons demonstrated significant difference in differences for intervention group members relative to comparison group members on the same three preventive service use measures that were observed to increase significantly for the intervention group over time: annual ambulatory or preventive care visits (p=0.0143); colorectal cancer screening (p=0.0106); and breast cancer screening (p=0.0143). However, no statistically significant differences between the intervention and comparison groups were observed for cervical cancer screening (p=0.6488) or use of chronic disease management services for diabetes (p=0.2642); cardiovascular disease (p=0.1234); or asthma (p=0.6052).

Discussion

This study represents the largest and longest continuous observation of a financially incentivized wellness, prevention, and chronic disease management program implemented in a healthcare worksite to date. In addition, the use of subgroup analyses and propensity-matched pair comparisons permits more accurate interpretation of program effects than has previously been possible.

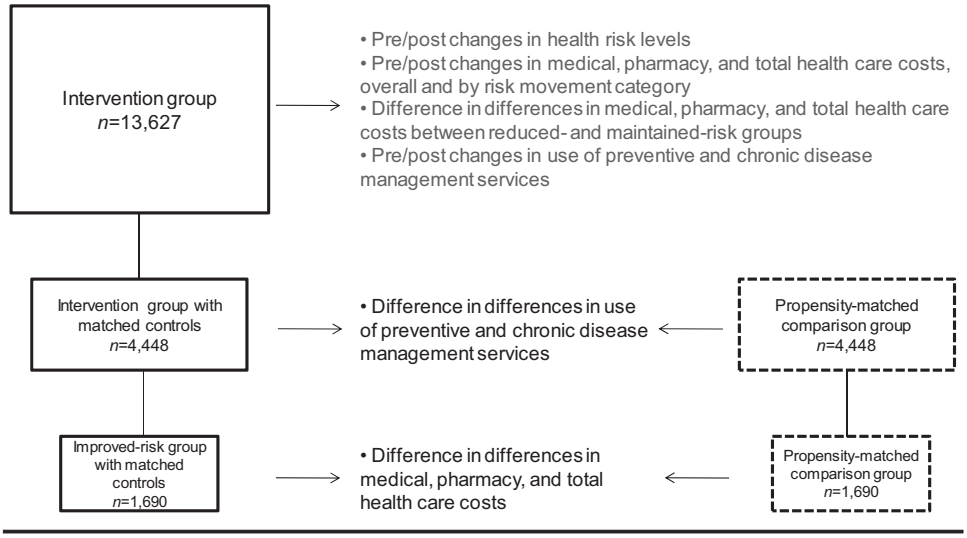

Figure 2. Summary of intervention subgroup and comparison group analyses

Lessons Learned

The results of this study are consistent with the published literature showing that total healthcare costs follow health risks[5–12] and can be mitigated over time through financially incentivized workplace wellness programs.[16–19] Specifically, savings will accrue for the combined group of

Table 4. Cost changes across risk movement categories for the intervention group between 2007 and 2011

2007 risk	2011 risk	*n*	Measure	2007 per member per month cost	2011 per member per month cost	Difference	*p*-value
Members who reduced health risks							
Moderate	Low	1,340	Total	525.29	452.64	−72.66	**0.0335**
			Medical	407.90	325.68	−82.22	**0.0147**
			Pharmacy	117.39	126.96	9.57	0.0645
High	Moderate	256	Total	581.48	562.33	−19.15	0.7784
			Medical	444.39	406.97	−37.43	0.5594
			Pharmacy	137.09	155.37	18.28	0.2109
High	Low	171	Total	709.48	463.77	−245.71	**0.0137**
			Medical	550.94	311.98	−238.96	**0.0147**
			Pharmacy	158.54	151.79	−6.75	0.6292
Members who maintained health risks							
Low	Low	9,261	Total	285.88	333.74	47.86	**<0.0001**
			Medical	211.71	254.02	42.31	**<0.0001**
			Pharmacy	74.17	79.71	5.55	**0.0061**
Moderate	Moderate	980	Total	595.83	714.65	118.82	**0.0148**
			Medical	436.39	508.41	72.02	0.1244
			Pharmacy	159.44	206.24	46.80	**0.0004**
High	High	171	Total	957.19	1,209.89	252.69	0.1861
			Medical	710.54	961.84	251.30	0.1739
			Pharmacy	246.65	248.05	1.39	0.9605
Members who increased health risks							
Low	Moderate	1,141	Total	349.50	662.36	312.86	**<0.0001**
			Medical	253.04	521.28	268.24	**<0.0001**
			Pharmacy	96.46	141.09	44.62	**<0.0001**
Low	High	98	Total	594.79	1,700.73	1,105.93	**0.0022**
			Medical	491.98	1,479.54	987.56	**0.0052**
			Pharmacy	102.82	221.19	118.38	**0.0029**
Moderate	High	209	Total	623.92	1,108.54	484.62	**0.0001**
			Medical	459.03	899.96	440.93	**0.0001**
			Pharmacy	164.89	208.58	43.69	**0.0495**

Note: Boldface indicates statistical significance.

healthcare workers who reduce risks, primarily because of significant reductions in medical costs for those who achieve the lowest health risk levels and therefore require fewer or less expensive services than those who maintain or increase health risks.

Although pharmacy costs will trend downward for workers who move from high to low risk, and the combined reduced-risk group will have significantly lower pharmacy costs than the maintained-risk group, reductions in pharmacy costs cannot be directly attributed to participation in workplace wellness, at least within current study parameters. Moreover, even when overall population health risk levels are significantly improved, savings for the combined-risk group will not be sufficient to offset rising healthcare costs for the entire workforce over a 5-year period.

Recognizing that appropriate use of preventive and chronic disease management services is an important predictor of an employee's ability to reduce health risks over time, promoting these behaviors is a primary goal of workplace wellness programs. The results of this study demonstrate that financially incentivized programs such as *My*Health can have a significant impact on increasing the use of some preventive services among healthcare workers, but they are less likely to move the needle on the use of chronic disease management services, a key driver of healthcare cost reductions.[19] This variability may be due to the relatively greater effort required by an employee to engage in chronic disease management services, the nature of the services offered, and the type and level of incentives that are currently employed to promote use of these services.

Table 5. HEDIS performance rates for the intervention group in 2008 and 2011, *n*=13,627

	2008			2011			
Measure	***n* Compliant**	***n* Eligible**	**Rate %**	***n* Compliant**	***n* Eligible**	**Rate %**	***p*-value**
Preventive service use							
Annual ambulatory or preventive care visit	13,263	13,593	97.57	13,405	13,623	98.40	**<0.0001**
Colorectal cancer screening	3,087	5,311	58.12	5,171	6,984	74.04	**<0.0001**
Breast cancer screening	5,608	7,239	77.47	6,420	7,930	80.96	**<0.0001**
Cervical cancer screening	8,407	10,263	81.92	8,048	9,938	80.98	0.0879
Chronic disease management service use							
Diabetes management, all	288	854	33.72	613	1,060	57.83	**<0.0001**
HbA1c test	691	854	80.91	940	1,060	88.68	**<0.0001**
LDL test	682	854	79.86	928	1,060	87.55	**<0.0001**
Nephropathy exam/test	613	854	71.78	893	1,060	84.25	**<0.0001**
Eye exam	420	854	49.18	731	1,060	68.96	**<0.0001**
Cardiovascular lipid profile	136	160	85.00	220	240	91.67	**0.0368**
Asthma management	214	228	93.86	120	124	96.77	0.2357

Note: Boldface indicates statistical significance.
HbA1c, glycated hemoglobin; HEDIS, Healthcare Effectiveness Data and Information Set; LDL, low-density lipoprotein

Limitations

Several limitations may impact the validity, generalizability, and interpretation of the results. First, because random assignment of UPMC group health members to the intervention was not possible and those with incomplete HRA data had to be excluded from the analyses, selection bias could not be eliminated. However, given that no statistically significant differences in total healthcare costs were observed between UPMC group health members who did and did not complete the HRA in 2007 (p=0.28) or 2011 (p=0.27), the latter selection threat is unlikely to have substantially altered observed correlations between risk movement and costs. Second, although levels of intensity of program participation and incentives varied over time, measuring these differences and assessing their impact on health and cost outcomes were beyond the scope of this study.

Finally, to ensure access to comparable data that would be as complete and accurate as possible, comparison group members were selected from the available pool of non-UPMC health workers who received group health benefits through UPMC Health Plan. As self-reported HRA data were not available for these employees, program effects on observed changes in health risk status for the intervention group could not be tested. In addition, although some of these employees were insured through group health plans with workplace wellness programs similar in design to *My*Health, the level and duration of their participation in these programs was unknown. The inability to control for these variables and still maintain a relevant, adequately sized comparison group may have minimized or masked true program effects on other key outcomes.

Future Directions

Although incorporating incentivized health management strategies in employer-sponsored health insurance benefit designs can serve as a useful tool for enhancing the health and wellness of healthcare workers, new approaches are needed not only to encourage more workers to reduce health risks but also to increase the magnitude of the risk shift over time.

Recently published guidance for implementing outcomes-based incentives in connection with employer-sponsored wellness programs[32] offers one approach for achieving these goals. Supported by Affordable Care Act regulations, these incentives reward or penalize workers based on clinically relevant health standards, such as not smoking and maintaining a healthy weight, normal blood pressure, and cholesterol levels, rather than simply engaging in wellness program components.

Ultimately, however, achieving widespread and significant improvements in health risk levels, particularly among

healthcare workers with or at risk for chronic diseases, may require more than financially incentivized workplace wellness programs. Future research on managing the health and costs of the U.S. healthcare workforce should examine the extent to which other workplace modifications, such as onsite health clinics and lifestyle and disease management health coaches placed in employee workspaces, can enhance the impact of these programs.

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